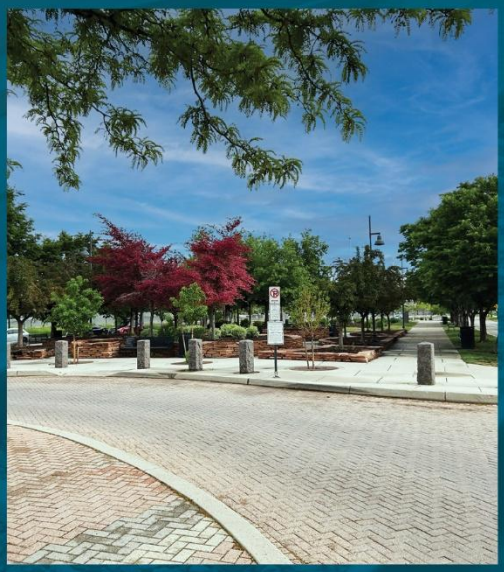
RIO GRANDE CONCEPT PLAN

Screening Analysis



FINDINGS MEMORANDUM

Technical Evaluations

August 2023

Kimley»Horn

Expect More. Experience Better.

Findings Memorandum

Technical Evaluations

Prepared for:

Salt Lake City
Transportation Division
349 South 200 East
Suite 150
Salt Lake City, Utah 84111
801-535-6630

Prepared by:

Kimley-Horn and Associates, Inc.
111 East Broadway
Suite 600
Salk Lake City, Utah 84111

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List of Acronyms

Abbreviation	Definitions
CL	Centerline
FG	Finished Grade
FHWA	Federal Highway Administration
UDOT	Utah Department of Transportation
UPRR	Union Pacific Railroad
UTA	Utah Transit Authority
SLCDPU	Salt Lake City Department of Public Utilities
SLGW	Salt Lake Garfield & Western Railway
SLC	Salt Lake City
SLC RDA	Salt Lake City Redevelopment Agency
ROW	Right-of-Way
I-15	Interstate 15
FEMA	Federal Emergency Management Agency
ROM	Rough Order of Magnitude
STD DWG	Standard Drawing
ADA	The Americans with Disabilities Act
GIS	Geographic Information System
RCP	Reinforced Concrete Pipe
RMP	Rocky Mountain Power

RIO GRANDE CONCEPT PLAN Screening Analysis | *Executive Summary*

Project Overview

The Rio Grande Plan (RGP), a citizen-generated concept, proposes to realign heavy freight rail (Union Pacific), regional commuter rail (FrontRunner), and Amtrak rail under 500 West, by way of a "train box." The RGP states that the relocation of rail infrastructure would open 75 acres of industrial land for re-development.

The centerpiece of The RGP is the historic Rio Grande Depot, which would be restored and repurposed to become the hub of transit in the city and region. This new depot would accommodate Union Pacific, UTA FrontRunner, Amtrak, as well regional rail services such as TRAX light rail.

$3-5B (2023)

$6-8B (2033)

Train Box Dimensions

4.2 *miles long*

38.25' DEEP

SPACE FOR **6** TRACKS

178' *maximum width*

Redevelopment Potential

76 ACRES OF RE-DEVELOPABLE LAND

$20-$100M (2040) generated to fund public infrastructure projects that could include the train box

Impacts

Right-of-Way Impacts

- 65 full property acquisitions
- 66 partial property acquisitions
- 11 impacted buildings

Mobility Impacts

- 13 new intersection caps
- Four new bridges
- 16 residential access impacts
- 35 commercial access impacts

Known Utility Impacts

- Five impacts to sanitary sewer trunk lines
- Seven impacts to storm water trunk lines
- Two impacts to gas trunk lines
- Three impacted electrical transmission lines

Key Goals of The RGP:

- Improve east-west mobility
- Eliminate current at-grade rail crossings
- Improve pedestrian safety of at-grade rail crossings
- Provide opportunities for redevelopment

Screening Analysis Results

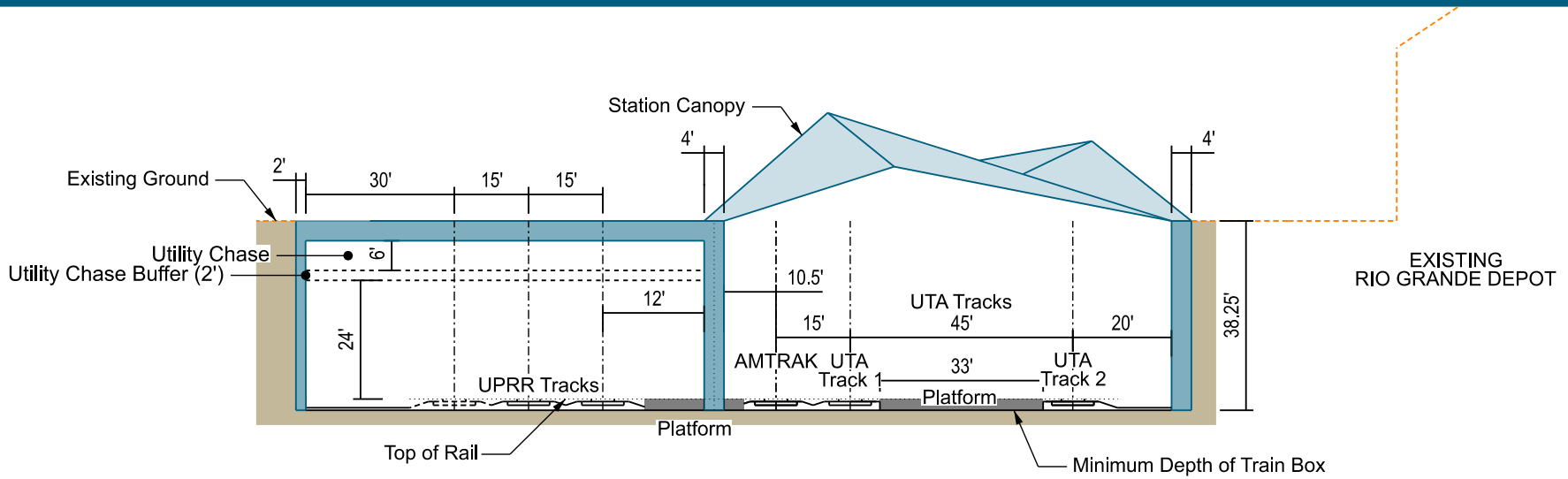
The purpose of The Rio Grande Concept Plan Screening Analysis was to review The RGP by applying existing design standards, performing preliminary engineering analysis, and engaging in stakeholder discussions to determine the potential size of the train box (depth, width, horizontal limits), its potential impacts on intersections up- and downstream of the train box, potential impacts to the existing floodplain, underground utilities and other physical factors, and the potential of freeing up land for development.

The analysis does not make a recommendation but identifies key issues and provides decision-makers preliminary information about the costs and benefits of such an undertaking so that they can decide whether the concept merits further detailed study.

See Figure 1 and Figure 2 on next page for visual representations of the findings.

Figure 1: Existing Rail and Future Train Box Extents

Figure 2: Train Box Cross Section at Rio Grande Station



1. Introduction

Salt Lake City Transportation Division initiated a task order with Kimley-Horn and Associates, Inc. to prepare a screening analysis of the Rio Grande Plan (RGP). The purpose of this analysis is to evaluate – in very general terms – what it would take to underground the heavy rail track utilized by FrontRunner and Union Pacific, between approximately 1300 S and 300 N.

This screening analysis will not make a recommendation but will identify key issues and provide decision-makers preliminary information about the costs and benefits of such an undertaking so that they may decide whether the concept merits further detailed study.

This analysis evaluates the potential size of the train box (depth, width, horizontal limits), its potential impacts on intersections up- and downstream of the train box, potential impacts to the existing floodplain and underground utilities and other physical factors, and the potential of freeing up land for development. The analysis will prepare a rough order of magnitude cost estimate for the train box concept.

This Findings Memorandum presents background information, design criteria, a conceptual alignment, and summarizes stakeholder input on the major issues that will require further detailed analysis and evaluation should Salt Lake City decide to advance The RGP to additional planning and feasibility analysis.

2. Background Information

2.1. The Rio Grande Plan

The RGP[1] is a concept proposal prepared by Salt Lake area residents to realign heavy rail freight (UPRR), regional commuter rail (FrontRunner), and Amtrak track under a reconstructed 500 W, by way of a “train box.” Because 500 W is a historical rail corridor, The RGP states that “no major relocations or acquisitions of property would be necessary” to restore rail service to the corridor. Additionally, The RGP states that relocation of UPRR rail and yard would open 75 acres of industrial land for re-development. The RGP vision is illustrated in **Figure 2**.

The centerpiece of the RGP is the historic Rio Grande Depot, which would be restored and repurposed to become the hub of transit in the city and region. This new depot would accommodate UPRR, UTA, Amtrak, and as well regional rail services such as TRAX light rail.

The Rio Grande Depot would replace the Salt Lake Central station and UTA TRAX would be re-aligned to access the depot directly.

The basis for RGP is rooted in improving transportation safety and efficiency between the east and west sides of Salt Lake City, opening the land to re-development, and creating a high-capacity transportation hub.

[1] The Rio Grande Plan, introduced in 2020, is authored by Christian Lenhart, a Transportation Engineer and Cameron Blakely, an Urban Designer. For more information about *The Rio Grande Plan* please see: https://riograndeplansaltlakecity.org/

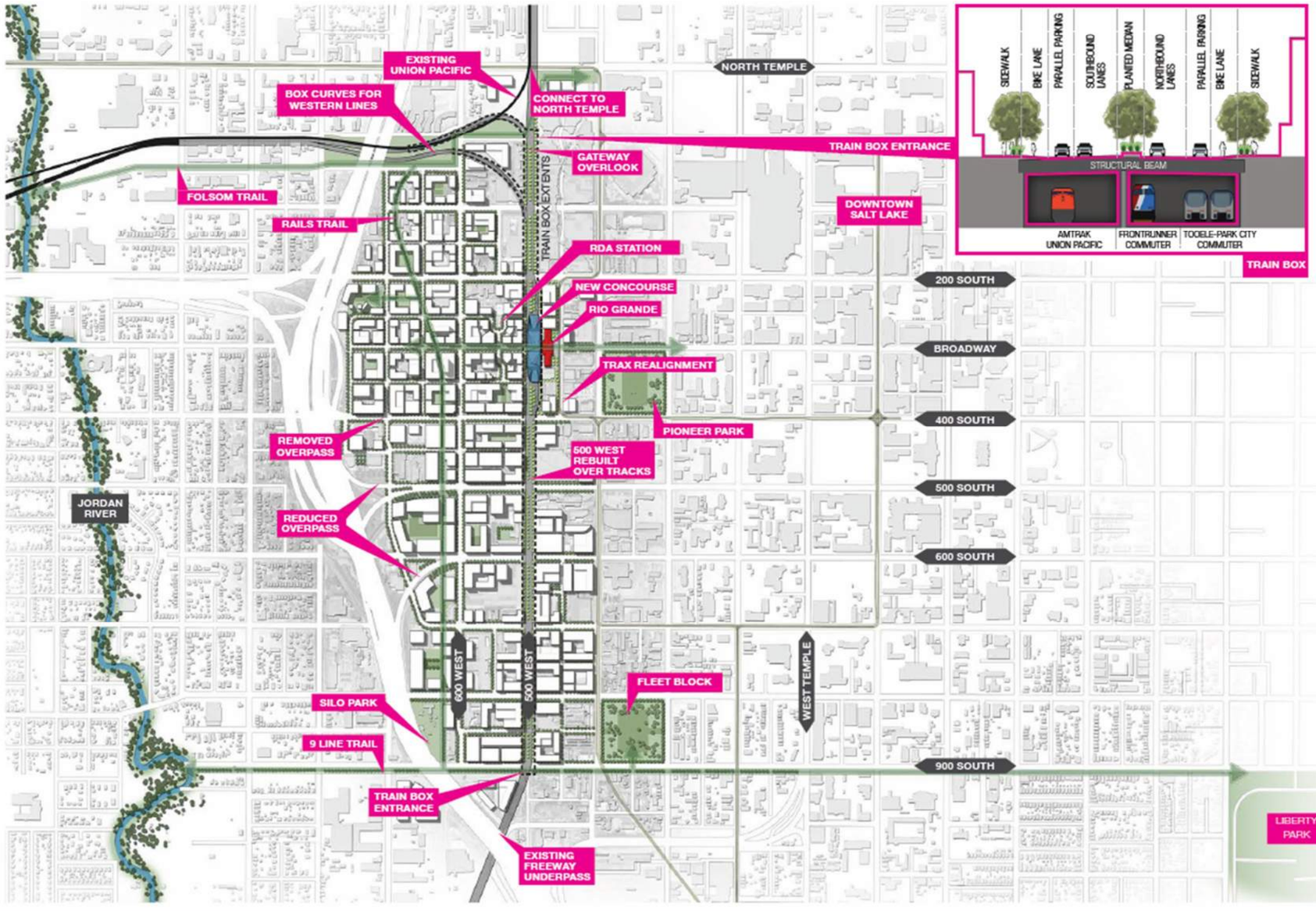
Figure 1, extracted from The RGP document, shows key issues that form the basis and justification for the project:

- Improve east-west mobility
- Eliminate current at-grade rail crossings
- Improve pedestrian safety at Salt Lake Central as well as at at-grade railroad crossings
- Provide opportunities for redevelopment

According to the RGP, the project area is a “maze of dead-ends and one-way streets that is confusing, uninviting, and which has stifled new developments in a city that is otherwise bursting with growth,” which the train box and associated development seeks to repair.

Figure 1: RGP Vision

THE VISION



MASTER PLAN

The Rio Grande Plan proposes relocating all railroad tracks to a new underground structure called a **'train box.'** With the necessary tracks moved underground, 75 acres of industrial land will be opened for development. The railroad crossings, bridges, and freight yards that prevented growth will be replaced by **seven new city blocks** where thousands of new residents can live and work, all centered around the **restored Rio Grande Depot**.

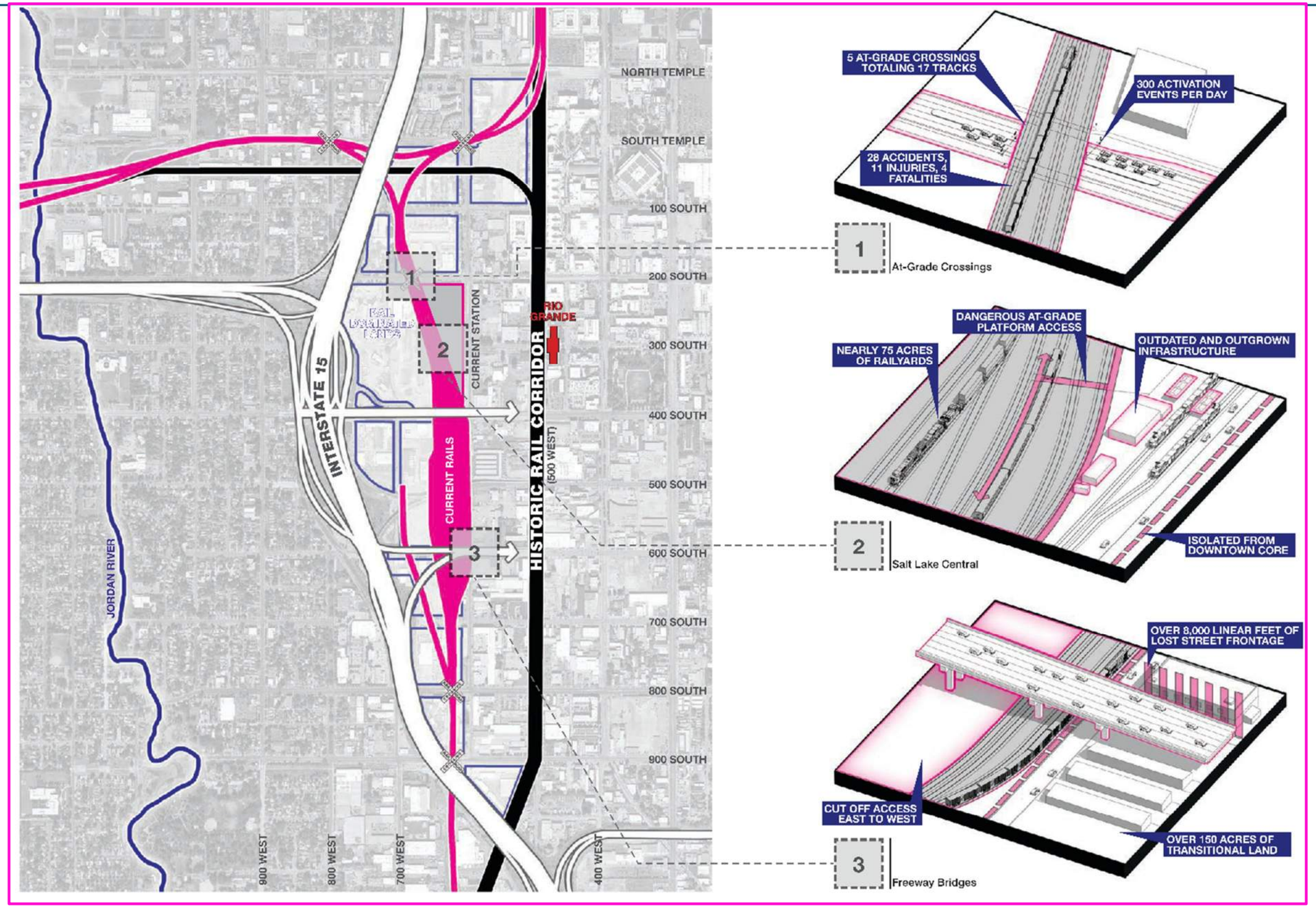
For nearly a century, the Rio Grande Depot was a center of activity on Salt Lake City's west side. From 1986 to 1999, the depot served as the city's main train station, hosting 3 Amtrak routes to Denver, San Francisco, Los Angeles, and Seattle. Tracks to the station ran in the median of 500 West from 900 South to South Temple, but were removed in 1999 to make way for shorter freeway ramps, in preparation for the 2002 Winter Olympics. Because the rail infrastructure was removed only 20 years ago, the right-of-way is still intact, and **no major relocations or acquisitions of property will be necessary** to restore rail service to the depot.

The 'train box,' which will be built below 500 West, will be similar to rail projects in Reno, NV, and Los Angeles, CA. Structurally, it will be comparable to an underground parking garage with a road surface on top, making it **substantially cheaper than conventional tunnels**. City residents on the street above will be unware of the trains traveling below their feet.

When the tracks are removed, the bridge at 400 South can be replaced with a surface street, and the freeway overpasses at 500 and 600 South can be cut back. These reductions will **open up 11 blocks of new street frontage**, restoring vibrancy to the community and creating a welcoming entrance to Salt Lake City.

*Source: **Rio Grande Plan Redevelopment Proposal**, Lenhart and Blakely, 2020, https://drive.google.com/file/d/1jwAW8DEc0WZXguTWE1qA6tZJWQkXoRY-/view*

Figure 2: RGP Justification



*Source: **Rio Grande Plan Redevelopment Proposal**, Lenhart and Blakely, 2020, https://drive.google.com/file/d/1jwAW8DEc0WZXguTWE1qA6tZJWQkXoRY-/view*

2.2. Project Analogs

The RGP identifies the Reno ReTRAC and the Denver Union Station re-development as precedent projects for the Rio Grande train box (**Figure 3**). These two projects, along with the Mid-Corridor Trench portion of the Los Angeles Alameda Corridor project, were used as comparable projects when analyzing design elements and potential costs for the train box.

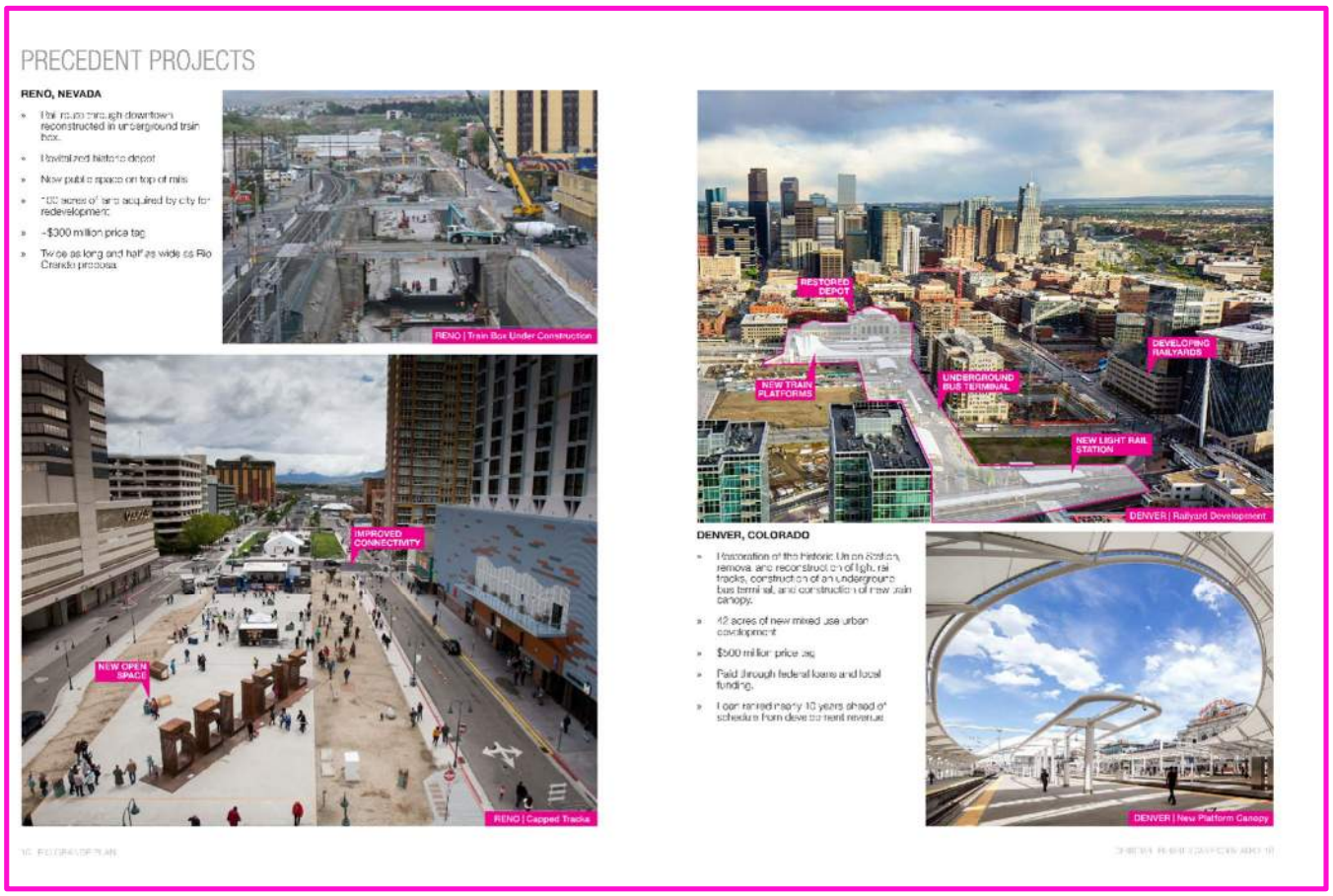


Figure 3: RGP Precedent Projects

*Source: **Rio Grande Plan Redevelopment Proposal**, https://drive.google.com/file/d/1jwAW8DEc0WZXguTWE1qA6tZJWQkXoRY-/view*

2.2.1. Denver Union Station

The Denver Union Station redevelopment involved restoring the historic Denver Union Station, creating a robust regional transit hub, and dedicating dozens of acres of land for redevelopment. Key elements include:

- Restored Union Station
- Underground bus depot
- Reconstructed light rail station
- 42 acres of new mixed-use urban development
- $500 million cost (2014) ($~645M in 2023 dollars)

2.2.2. Reno ReTRAC

The Reno ReTRAC project involved trenching freight rail tracks through downtown Reno, Nevada. **Figure 4** is an aerial image of the project. Key elements include:

- 2 mainline tracks
- 1.75-mile-long, 54-foot-wide by 33-foot-deep trench
- Revitalized historic depot
- New public space on capped sections of the trench
- 100 acres of land acquired by the city for redevelopment
- 4-year construction
- $300 million cost (2006) ($~450M in 2023 dollars)

The purpose of the project was to allow trains to move faster by removing conflicts with surface streets in downtown Reno, NV.

Figure 4: Example image, Reno ReTRAC

2.2.3. Alameda Corridor Mid-Corridor Trench

The Alameda Corridor Mid-Corridor Trench involved trenching freight rail tracks between the Port of Long Beach and downtown Los Angeles. Key elements include:

- 3 mainline tracks
- 10-mile-long, 51-foot-wide by 33-foot-deep trench
- Eliminated 30 at-grade crossings
- Included 20 miles of adjacent roadway reconstruction
- 3-year construction
- $800 million cost (2001) ($~1.4B in 2023 dollars)
- Annual operations and maintenance budget of $160,000/mile of track

Figure 5: Example images, Alameda Corridor Mid-Corridor Trench

2.3. Existing Conditions

Current conditions on 500 W, where the train box would be relocated, are illustrated in **Figure 6** and **Figure 7.** The corridor is illustrated in two segments:

- South Segment: 400 S to 600 N
- North Segment: 1500 S to 400 S

Note that information obtained from the stakeholder meetings and from the development of design criteria resulted in a design concept that increases the lengths of transition from the train box to existing alignments to the south, west, and north, as compared to the RGP.

This section of the report considers the existing conditions within that area of potential impacts of the Rio Grande train box. **Table 1** summarizes impacts to public infrastructure. **Table 2** includes images from existing 500 W.

Table 1: 500 W Conditions

Impacted Infrastructure Element	North Segment	South Segment
Unsignalized intersections	4	5
Signalized Intersections	1	3
Residential Access	13	3
Commercial Access	14	21
At-Grade Railroad Crossing	9	2
Overpass/Bridge	3	5

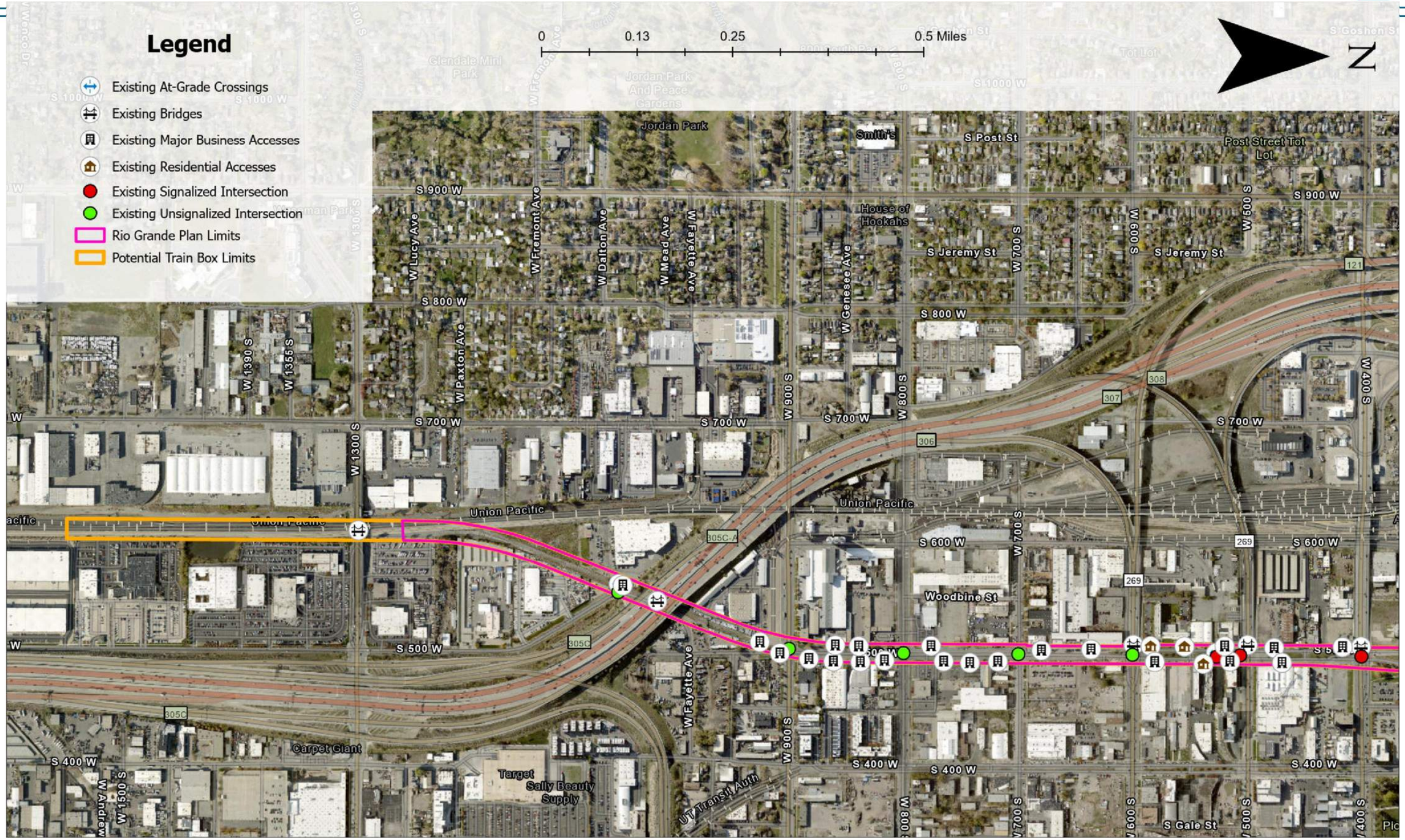


Figure 6: South Segment Existing Features – 1500 S to 400 S

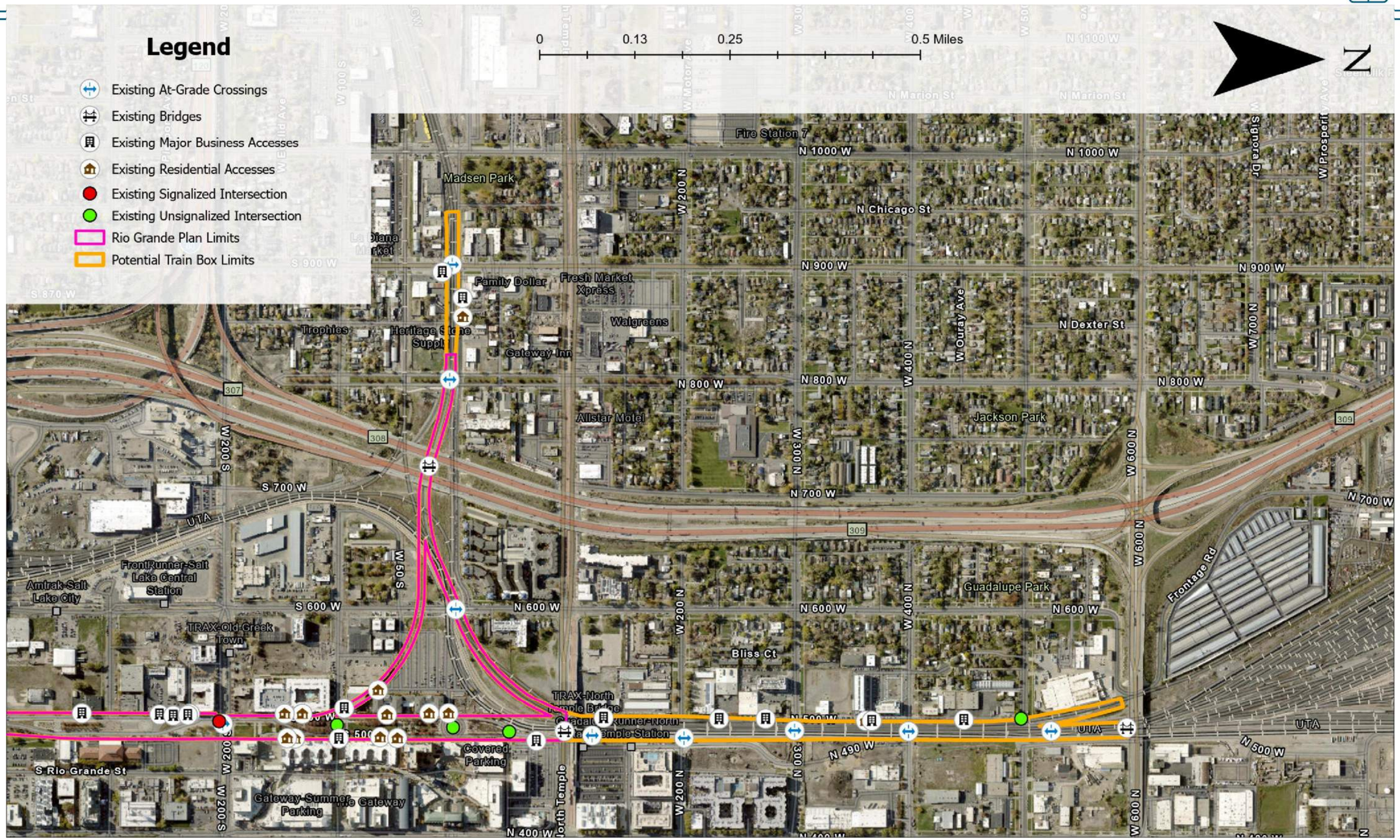


Figure 7: North Segment Existing Features – 400 S to 600 N

Table 2: Current Conditions (500 W)

	**I-15 Overpass over 500 W (950 S / 500 W).** The train box concept cross-section would impact the existing piers. The bridge will have to be replaced to allow for the larger track section. Due to heavy traffic on I-15, the bridge would require phased construction to maintain traffic during the reconstruction. Additional design may optimize the cross-section to mitigate the impact.
	**Existing businesses at approximately 950 S / 500 W.** Train box would require access to businesses to be relocated, or businesses themselves to be relocated.
	**Existing crossing of the 9-Line Trail at 900 S / 500 W.** Existing streets that cross 500 W would be reconstructed on a bridge structure over the train box.

	**Several existing power lines along 700 S / 500 W.** These would be impacted by the train box.
	**Access to new development, including Industry, along 500 W between 600 S and 700 S**. Area may be impacted by the train box.
	**600 S off-ramp as it intersects with 500 W**. Area may be impacted; additional design required. RGP states that the ramp would be shortened to allow for increased development opportunities.

	**Existing Rio Grande Depot.** The Depot would be restored as a transit hub, providing access to UTA FrontRunner commuter rail, TRAX light rail, and Amtrak.
	**Gateway 500 W linear park.** The train box would require removal and reconstruction of the linear park, which could be replaced on the structure above the train box.
	**Gateway 500 W linear park viewing south towards Rio Grande Depot.** The train box would require removal and reconstruction of the linear park, which could be replaced on the structure above the train box.

	**North Temple viaduct and existing rail lines as seen from Folsom Trail as it intersects with 500 W.** Folsom Trail would require realignment to cross the train box and connect to a relocated North Temple FrontRunner Station. City Creek is in a box culvert under the North Temple viaduct and carries a significant amount of storm water. The train box would require an inverted siphon or other means of accommodating the water.
	**North Temple FrontRunner station looking north towards new development.** The North Temple Station would require relocation to the south and be placed in the full-depth train box, as if left in its current location, the train box would be emerging from below grade.
	**A new pedestrian overpass is under construction at 300 N over the existing Union Pacific and FrontRunner**. The train box would eliminate the need for the new overpass.

	**Rail cross-section at 400 N looking south.** The train box would be emerging from below grade through this area.
	**At-grade crossing at 600 W.** 600 W crossing would be capped over the train box.
	**At-grade crossing at 900 W.** Train box would require grade separation of the 900 W crossing, as the train box would be emerging from its full depth.

3. Stakeholder Meetings

Interviews were conducted with stakeholders with input to the design and layout of the train box. Table 3 lists stakeholders whom discussions were conducted with the project team. The purpose of the meetings was to:

1. Solicit input on RGP
2. Present proposed design criteria for review and comment
3. Review the initial concept layout
4. Solicit input on issues associated with the train box that require additional investigation
5. Other items as summarized in Table 3.

Stakeholder summaries are included in Appendix E.

Table 3: Stakeholder Meetings

Stakeholder	Meeting Date	Key Discussion Items
SLC Department of Public Utilities	3/15/2023	Utility Concerns Groundwater Concerns
Union Pacific Railroad	4/6/2023	UPRR Design Criteria Rail Customer Access Train Box Ownership and Maintenance Operational Impacts
SLC Redevelopment Agency	4/17/2023	Parcels Eligible for Redevelopment Funding Mechanisms Zoning
Salt Lake City Transportation Division	4/19/2023	SLC Utility Impacts Groundwater Concerns Train Box Ownership and Maintenance
Utah Transit Authority	4/27/2023	UTA Design Criteria Environmental Cleanup Property Impacts Impacts on UTA Headquarters Redevelopment
Patriot Rail	6/14/2023	Patriot Rail plans to abandon the switching yard located near N. Temple Street.

4. Design Criteria

The first step to understanding the potential impacts of the cut-and-cover trench, or train box, is to define the required size of the train box, as well as design parameters that will control the horizontal and vertical profile of the train box. As such, the study team prepared design criteria that specify the depth, vertical and horizontal profiles, as well as parameters such as the number of tracks and the spacing between tracks. Design criteria were also prepared for utility relocations.

Project design criteria, summarized in Table 4, Table 5, and Table 6, were developed based on the following references:

- UPRR Technical Specifications for Design and Construction of Track and Other Rail Related Infrastructure
- UTA Commuter Rail Design Criteria
- As-builts records of existing utility lines and facilities

Table 4: Utah Transit Authority (UTA) Design Criteria

Criterion	Functional Requirement	Source
Number of Mainline Tracks	2 UTA, 1 Amtrak	Stakeholder Discussions
Minimum Horizontal Track Clearance (UTA to UTA)	15’	UTA Commuter Rail Design Criteria
Minimum Horizontal Track Clearance (UTA to UPRR)	25’	UTA Commuter Rail Design Criteria
Minimum Horizontal Clearance (Meas. from CL)	10’	UTA Commuter Rail Design Criteria
Clearance Adjustment on Curves	N/A	N/A
Minimum Vertical Clearance (Meas. from Top of Rail)	23’-6”	UTA Commuter Rail Design Criteria
Minimum Depth of Train Box (Measured from FG to Bottom of Ballast)	38.25’	FHWA Reno ReTRAC; UPRR STD DWG 0038; UPRR STD DWG 0002; UPRR STD DWG 0202; Existing Utilities
Maximum Grade	1.50% (Max. Desirable) 2.50% (Absolute Max.)	UTA Commuter Rail Design Criteria
Design Speed (Mainline)	60 mph	UTA Commuter Rail Design Criteria
Platform Dimensions	33’ wide by 850’ long	UTA Commuter Rail Design Criteria Discussion with UTA
Utility Chase	6’ tall; 2’ buffer	Discussion with SLCDPU; Existing Utilities
Horizontal Alignment	-	Chapter 3.2 UTA Commuter Rail; Design Criteria
Vertical Alignment	-	Chapter 3.2 UTA Commuter Rail Design Criteria

Table 5: Union Pacific Railroad (UPRR) Design Criteria

Criterion	Functional Requirement	Source
Number of Mainline Tracks	2-3	Stakeholder Discussions
Min. Horizontal Track Clearance (UPRR to UPRR)	15’	UPRR STD DWG 0038
Minimum Horizontal Track Clearance (UPRR to UTA)	25’	UTA Commuter Rail Design Criteria
Minimum Horizontal Clearance (Meas. from CL)	9’	UPRR STD DWG 0038
Clearance Adjustment on Curves	+1 ½” per each degree of curve	UPRR STD DWG 0038
Min. Ver. Clearance (Meas. from Top of Rail)	23’-4”	UPRR STD DWG 0038
Min. Depth of Train Box (Meas. from FG to Bottom of Ballast)	38.25’	FHWA Reno ReTRAC; UPRR STD DWG 0038; UPRR STD DWG 0002; UPRR STD DWG 0202; Existing Utilities
Maximum Grade	1.00%	Discussion with UPRR
Design Speed	45 mph	*Need UPPR Track Charts to Confirm
Utility Chase	6’ tall; 2’ buffer	Discussion with SLCDPU; Existing Utilities
Horizontal Alignment	-	UPRR STD DWGs 0015, 0018, 0019
Vertical Alignment	-	UPRR STD DWG 0016

Table 6: Utility Design Criteria

Criterion	Functional Requirement
Water	• Vertical: 5’ min. cover; 18” separation over sewer, 12” separation from other utility • Horizontal: 10’ separation from sewer, 5’ separation from other utility, 5’ from structures (e.g., walls, bldgs.)
Sewer:	• Vertical: 4’ min. cover; 18” separation under water, 12” separation from other utility • Horizontal: 10’ separation from water 5’ separation from other utility, 5’ from structures (e.g., walls, bldgs.)
Storm Drain	• Vertical: 2’ min. cover; 12” separation from other utility • Horizontal: 5’ separation from other utility, 5’ from structures (e.g., walls, bldgs.)
Gas	• Vertical: 30” min. cover; 12” separation from other utility • Horizontal: 5’ separation from other utility, 10’ from structures (e.g., walls, bldgs.)
Power & Telecom	• Vertical: 30” min. cover; 12” separation from other utility • Horizontal: 5’ separation from other utility • Consideration: electrical equipment operational clearance requirements vary by equipment type • Consideration: electrical equipment access requirements must contemplate access via boom truck

Illustrative cross-sections, which apply the design criteria, are presented in **Figure 8**, **Figure 9**, and **Figure 10**:

- **Figure 8** shows the train box at its full depth, with a cover. The train box is 38.25’ to provide for necessary vertical clearance (24’ from the top of rail) for UPRR and UTA trains. In addition, the depth includes a 6’ utility chase, a 2’ utility chase buffer, and a 4’ cover/structure depth.
- **Figure 9** shows the train box with a partial cover and an open-air section**.** Roadways are placed on the structure on the outside edges of the cover.
- **Figure 10** shows the train box section adjacent to the Rio Grande Depot. A Station Canopy covers UTA and Amtrak while UPRR is placed under cover.

Each of the cross-sections illustrates the number of tracks. Based on stakeholder discussions, UTA desires two mainline commuter rail tracks and a separate track for Amtrak passenger service. Union Pacific requires two mainline tracks to replace existing tracks, plus room for an additional third mainline track. The cross-section also provides room for a maintenance access road to access the UPRR track. The overall width of the train box varies from 125’ to 200’, with the narrowest section being at the north end and the widest section being at the Rio Grande Station.

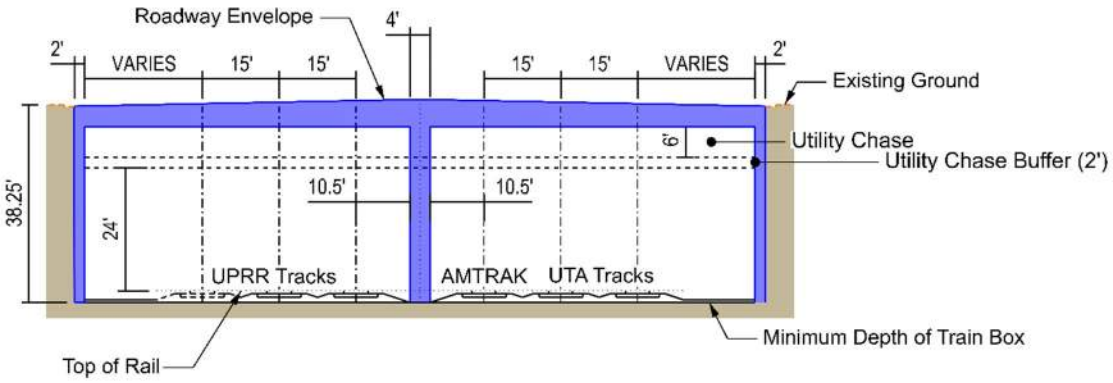


Figure 8: Typical Section 1 – Fully Covered Train Box

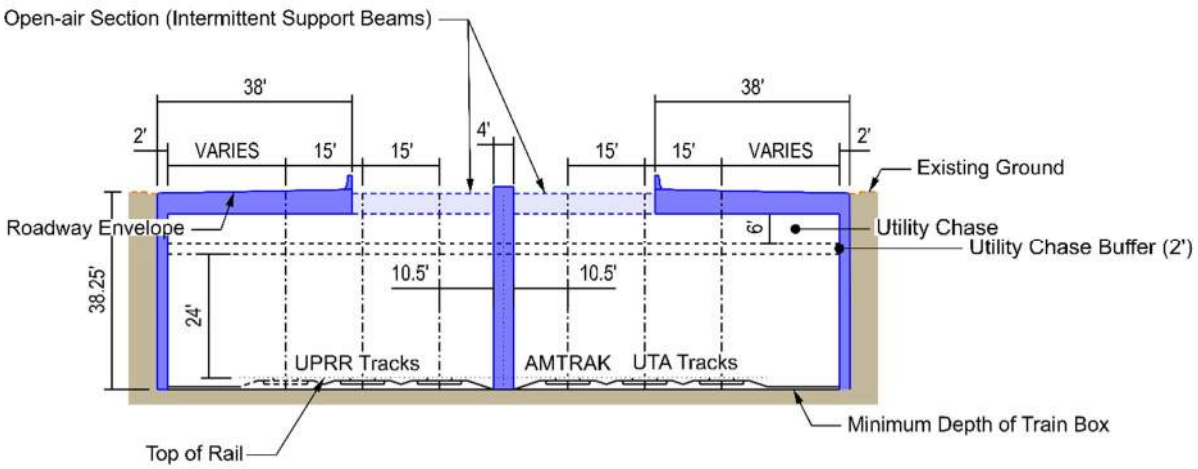


Figure 9: Typical Section 2 – Partially Covered Train Box

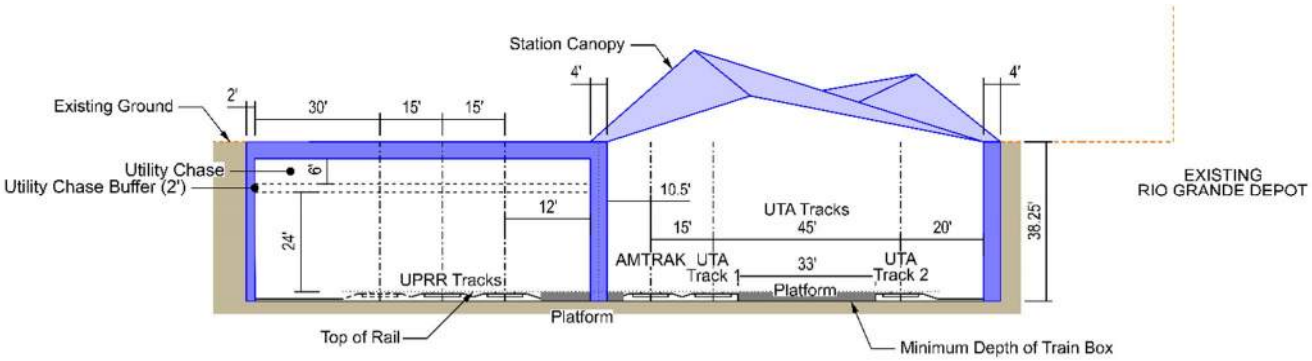


Figure 10: Typical Section 3 – Rio Grande Station

5. Conceptual Alignment

A conceptual train box horizontal alignment was prepared and is included in Appendix A. The conceptual alignment is based on that presented in the RGP, design criteria as previously presented in Table 4, Table 5, and Table 6, stakeholder discussions, and engineering analysis.

To evaluate the impacts of the 500 W alignment envelope on adjacent properties and the roadway network, two supplemental exhibits were prepared: Cover Analysis (Appendix B) and the Right-of-Way Analysis (Appendix C).

5.1. Train Box Cover Analysis

The Cover Analysis evaluates the existing roadway network, business accesses, and landscaping to illustrate how the train box could be covered (capped) to provide bridge crossings, access roads, and landscaping/plazas on top of the train box.

This practice helped to identify potential impacts on surrounding roads and accesses, prepare a basic roadway design along the train box, and inform structural and ventilation considerations.

The Reno ReTRAC Project and the Los Angeles Alameda Corridor Mid-Corridor Trench were used as examples of what intersections, plazas, and structural elements might look like on the Rio Grande train box.

The Cover Analysis is included in Appendix B.

5.2. Train Box Right-of-Way Analysis

The Right-of-Way Analysis evaluates potential temporary and permanent impacts to property adjacent to the train box. The analysis identifies potential full property acquisitions, partial property acquisitions, construction impacts, and building demolitions that may be required for construction and operation of the train box. These impacts are summarized in Table 7.

Table 7: Summary of Right-of-Way Analysis

Impact Type	**Number of Independent Impacts**	**Total Number of Impacts***
Full Property Acquisition	65 parcels	65 parcels
Partial Property Acquisition	66 parcels	66 parcels
Construction Impacts	10 parcels	76 parcels
Building Demolition	11 buildings	11 buildings

*In most cases, Partial Property Acquisitions also incur Construction Impacts beyond the area of acquisition

The Right of Way analysis is included in Appendix C and a detailed summary of all impacts is included in Appendix D. Cost of impacts are reflected in the cost estimate (Appendix F).

6. Issues Identification

The purpose of this chapter is to summarize key issues that would need to be analyzed and addressed during train box project development. This chapter outlines major issues identified through technical analysis of the conceptual alignment and discussions with stakeholders and industry experts.

Issues identification assumes that the train box would be built consistent with the conceptual alignment developed in this study.

Several issues have specific cross-references to Appendices A and B, so that they can be understood with more context. The naming convention of the cross-references is as follows:

(*Appendix Identifier-Subsection Identifier*. *Order of Cross Reference*)

Table 8: Appendix Cross-Reference Naming Convention

Appendix Identifier	Subsection Identifier	Order of Cross Reference
A B	R (Rail) M (Mobility and Circulation) U (Utilities) G (Geotechnical) E (Environmental) S (Structural)	# Varies

Example: (A-R.1)

A = Cross-reference to Appendix A
R = Rail subsection
1 = Order of rail cross-references

6.1. Rail

The construction of a train box that consolidates rail owners/operators into a single confined corridor introduces unique challenges to each organization. Amtrak, UPRR, and UTA each have different purposes, priorities and standards that define their needs if consolidated into the train box.

Additionally, the train box would interface with Salt Lake City and UDOT roadway intersections where impacts must be analyzed.

This section introduces the primary concerns of each major rail and roadway stakeholder that must be considered if the RGP continues to advance.

6.1.1. Amtrak

The National Railroad Passenger Corporation, doing business as Amtrak, is the national passenger railroad company of the United States. Amtrak operates inter-city rail service in 46 states.

Amtrak's California Zephyr route currently stops in Salt Lake City once per day (in each direction). The California Zephyr runs from Chicago, IL to the San Francisco Bay area. The eastbound train departs Salt Lake City at 3:30 am, and the westbound train departs Salt Lake City at 11:30 pm. The Salt Lake City station is located adjacent to the UTA Salt Lake Central Station. Amtrak uses Union Pacific track.

UDOT, in partnership with UTA and Nevada Department of Transportation, recently applied to Federal Railroad Administration for grant funding, through the Corridor Identification and Development Program, to study passenger rail service between Salt Lake City, and Las Vegas, NV. Idaho Transportation Department, in coordination with UDOT, UTA, and City of Boise, submitted a similar grant application to study expansion of service between Boise, ID and Salt Lake City.

Recognizing the interest in future Amtrak rail service expansion, the train box concept includes a dedicated Amtrak track through the corridor, and a dedicated platform at the Rio Grande Station.

Amtrak currently has their own platform with track on both sides to accommodate simultaneous arrival of eastbound and westbound tracks, unpredictable timetables, and duration of stopovers (20 to 30 minutes). Typical Section 3 shows only one dedicated Amtrak track at the station platform; if a second Amtrak platform track is required, sharing the FrontRunner track and platform could be considered if the following issues can be resolved:

- **Platform height**
  - To accommodate level boarding, FrontRunner platforms are 24” above the top of rail, whereas Amtrak platforms are 12” above top of the rail
  - Level boarding is required by the Federal Transit Administration to meet ADA requirements
- **Platform length (A-R.1)**
  - Minimum FrontRunner platform length is 875 ft
  - Minimum Amtrak platform length is 1000 ft
- **Platform services**
  - Amtrak platforms require space for storing and transporting luggage on and off the train and to and from the platform – a freight elevator may be required
  - Platforms require water and gas source
- **Train signaling**
  - FrontRunner uses Enhanced Automatic Train Control (E-ATC)
  - Amtrak uses Interoperable Electronic Train Management System (I-ETMS) for Positive Train Control (PTC)
  - The two systems are incompatible
- **Operating schedule**
  - Amtrak will need a means of moving baggage and accommodating passengers with mobility issues to and from the station from both the Amtrak and FrontRunner platforms
  - Amtrak will need a means of fueling and servicing their trains from both platforms or at another location
  - FrontRunner and Amtrak would need to coordinate schedules
  - Amtrak could be held off FrontRunner tracks until a time slot is available for Amtrak to enter the train box

6.1.2. Union Pacific Railroad (UPRR)

Union Pacific Railroad owns and operate various heavy rail lines in the region that service major industries. UPRR has been operating in Utah since 1869, upon completion of the trans-continental railroad. UPRR lines radiate in all directions from Salt Lake City. According to data available from Union Pacific, there are 1,267 miles of track in Utah. UPRR employs over 966 individuals in Utah. The top-five commodities shipped from Utah are intermodal/wholesale, coal, hazardous waste, non-metallic minerals, and metallic minerals.

Due to the frequent activity along this corridor, UPRR trains often block grade crossings and create barriers to east-west travel within the city. This study identified eight at-grade crossings that could be converted to below-grade crossings as part of the RGP.

A key component of the RGP is to repurpose and relocate the existing Union Pacific Railroad 4th South Rail Yard to another location. The purpose of a rail yard is to receive trains and blocks of cars, sort the cars based on their destination, and make new trains/blocks of cars. Union Pacific Railroad indicated that while the 4th South Yard sees fewer switching assignments than in the past, and is currently not critical to today's operations, but represents future available capacity providing flexibility for Union Pacific operations.

Railroad yards make it possible for trains to remain efficient in directing freight where it needs to go. The majority of rail car classification in the Salt Lake City area takes place at the Roper Yard, located about five miles south of the 4th South Yard.

The reduced reliance on the 4th South Yard is consistent with industry trends that have moved away from smaller terminals to improve efficiency by routing trains to centralized large yards.

The train box concept provides for three UPRR tracks. This provides for direct replacement of the two existing UPRR tracks, plus one additional future track. Additionally, UPRR's existing 4th South Rail Yard would be relocated, and the acquired land repurposed into new development.

The following issues associated with UPRR must be addressed:

- **Track spacing (A-R.2)**
  - Design criteria developed during this study identifies the minimum spacing between UPRR track and other track as 25 ft; UPRR's preference is 50 ft
- **Track grade (A-R.3)**
  - Design criteria developed during this study identify the maximum preferred longitudinal slope as 1.0%, which extends the limits of the train box beyond that shown in the RGP
- **Future expansion**
  - Train box must fulfill future expansion needs for UPRR
  - Elimination of 4th South Yard could impact UPRR's ability to expand and potentially affect other future projects in the region
- **Relocation of 4th South Yard (Salt Lake City North Yard)**
  - Relocating the 4th South Yard / Salt Lake City North Yard would have to satisfy UPRR's existing storage and connectivity needs and allow for future expansion
- **Connectivity between Roper Yard and Warm Springs Yard**
  - According to UPRR, 30-40 trains travel north/south between Roper Yard and Warm Springs Yard every day - a vital part of their regional system
  - This connectivity would have to be preserved and not significantly impacted
- **Groundwater**
  - UPRR has stated that groundwater poses the greatest risk to potential travel along their routes within the train box
  - Depth of the water table is not known throughout the train box project area, but according to SLCDPU, parts of the project area have a high-water table (known to range from 5' deep to 30' or more depending up on the location, as well as the season and precipitation).
  - Dewatering would be an integral part of the engineering of the train box to ensure that there is no disruption to service to any rail lines through the train box
  - If active hydrological paths are moving east-west through the area, these would need to be mitigated to avoid issues throughout the city
- **Structure and Ventilation (B-R.1)**
  - UPRR stated concern over how train exhaust would be ventilated out of the train box structure and how this concentrated amount would impact the surrounding area

  - Despite the train box structure adhering to UPRR clearance requirements, there is a concern about how heat would impact the structure if a train was staged beneath it for a prolonged period
- **Operation within train box**
  - UPRR has stated concern about how emergency situations or derailments would be managed in the train box
  - Any increased operational cost would have to be analyzed
  - Existing operations would have to be maintained throughout the duration of the construction of the train box
- **Rail customers (A-R.4)**
  - There are an estimated five to six potential UPRR customers located between 900 South and North Temple, whose business would be impacted by the relocation of tracks to the train box
  - Information on the number of active was not available
  - The train box would not accommodate UP customers
  - Relocating the train box away from existing customers would potentially require customers to relocate
- **Other rail companies**
  - Impacts to any other rail companies that use the 4th South Yard currently as an interchange with UPRR must be evaluated
  - Patriot Rail has a spur that would be potentially impacted by the western extent of the train box and any impacts to this service would need to be evaluated
  - Even if UPRR owns the track, different rail companies may operate on tracks at any point
- **Alternate route**
  - The RGP identifies the existing South Temple spur as the connection between westbound track and the north/southbound track
  - The historic Glendale Cutoff, which diverges west from mainline UPRR at 900 South, was suggested as a potential alternate connection between westbound and north/southbound track
  - Cost (including new bridges or grade separation), disruption to the newly built 9-line trail, right-of-way, efficiency, and equity impacts results in the Glendale Cutoff as an infeasible alternate western connection

During the stakeholder discussion, UPRR stated that they do not foresee significant benefit to UPRR from the RGP concept. They consider their current right-of-way and alignments to be in the ideal location and do not have plans to incur costs associated with relocating track and yard areas. Straightening the tracks would not improve travel time since trains are already traveling slowly due to proximity to various rail yards.

Stakeholders recognize that undergrounding rail would provide UPRR a lengthened area to stage trains without blocking at-grade crossings – a current issue plaguing east-west connections in the city.

6.1.3. Utah Transit Authority (UTA)

Utah Transit Authority operates two TRAX light rail lines (Blue and Green), FrontRunner commuter rail, and several bus routes that connect to Salt Lake Central Station. The train box would dramatically alter the existing operations of all these systems and has the potential to impact future system expansion plans.

The train box would impact the TRAX Blue line at 200 South, the TRAX Green line at North Temple, require re-alignment and reconstruction of FrontRunner through the Salt Lake Central (relocation to the Rio Grande Depot) and North Temple stations, and require new bus connections at both stations. This

section outlines the specific impacts relating to FrontRunner, TRAX, Bus, and the UTA Headquarters Redevelopment.

6.1.3.1. FrontRunner

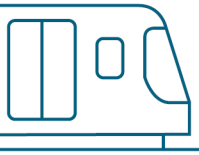
The following issues associated with FrontRunner would require to be addressed:

- **Access to platforms at Rio Grande Station (A-R.5)**
  - The train box concept at Rio Grande Station needs to accommodate multiple users (Amtrak, FrontRunner, Union Pacific) within the limited cross-section width; additional planning and design will need to consider and optimize the space requirements of each user
  - The RGP suggests that riders will access the platforms by way of escalator/elevator; the most adequate method in which riders will access the FrontRunner platform from the street level must be evaluated
- **North Temple Station (A-R.6)**
  - Per UTA design criteria, the maximum grade at a FrontRunner station is 0.5%; with desirable at 0.35%
  - To maintain the North Temple station in its current location, the platform would have to be built to maximum grade and would extend the train box extents 500 feet north. To stay below maximum grade along the platform, the North Temple station would have to be shifted south so that it could be placed completely within the full depth train box at a 0% grade.
  - This shift to the south, along with relocation of FrontRunner east to 500 W, shortens the distance between the proposed Rio Grande Depot and North Temple station from the current ¾ mile (North Temple station to Salt Lake Central station) to ½ mile (relocated North Temple Station to Rio Grande Station)
  - With the complexity associated with relocating the North Temple station underground (substantial impacts to the Gateway) and the decreased distance between stations, a consolidation of North Temple station and Rio Grande station could be considered; platform width at this single station would have to be increased to accommodate two stations' worth of boardings and alightings; this capacity concern was the original justification for two downtown FrontRunner stations
  - Were consolidation to occur, connections from Rio Grande Depot Station and TRAX Green Line to Salt Lake City International Airport must be evaluated and an effective alternative developed
- **Future Electrification**
  - The concept design does not account for future electrification of FrontRunner; additional evaluation is required as to right of way needs to accommodate electrification infrastructure
- **Future Express Service**
  - UTA has considered implementing future FrontRunner express service (wherein certain FrontRunner stations are skipped); while it is not anticipated that express service would bypass/skip a Rio Grande Depot station, future evaluation is required

6.1.3.2. TRAX

The following issues associated with TRAX light rail must be addressed:

- **Location of Salt Lake Central TRAX Station (A-R.7)**
  - The RGP proposes relocating light rail facilities from Salt Lake Central to the east of the Rio Grande Depot



- This re-alignment would require back-to-back curves at 400 W / 200 S and 500 W / 200 S which does not meet UTA's design criteria

- **Connectivity to North Temple FrontRunner Station (A-R.8)**
  - To accommodate the required grades descending into train box from the north, the North Temple FrontRunner station would shift south and be placed completely in the full-depth train box
  - This relocation would create a disconnect between the FrontRunner and TRAX Green line
- **Future expansion**
  - UTA's Future of Light Rail (FOLR) Study identifies scenarios for future expansion of the TRAX network
  - FOLR Scenario 4 (**Figure 11**) reconfigures the Blue Line, Green Line, and Red Line, and introduces a new Orange Line
  - Under Scenario 4, the new Rio Grande Depot would serve the new Orange Line and a revised Green Route
  - With the Orange Line connecting to the Airport, the North Temple Front Runner Station could potentially be removed from service

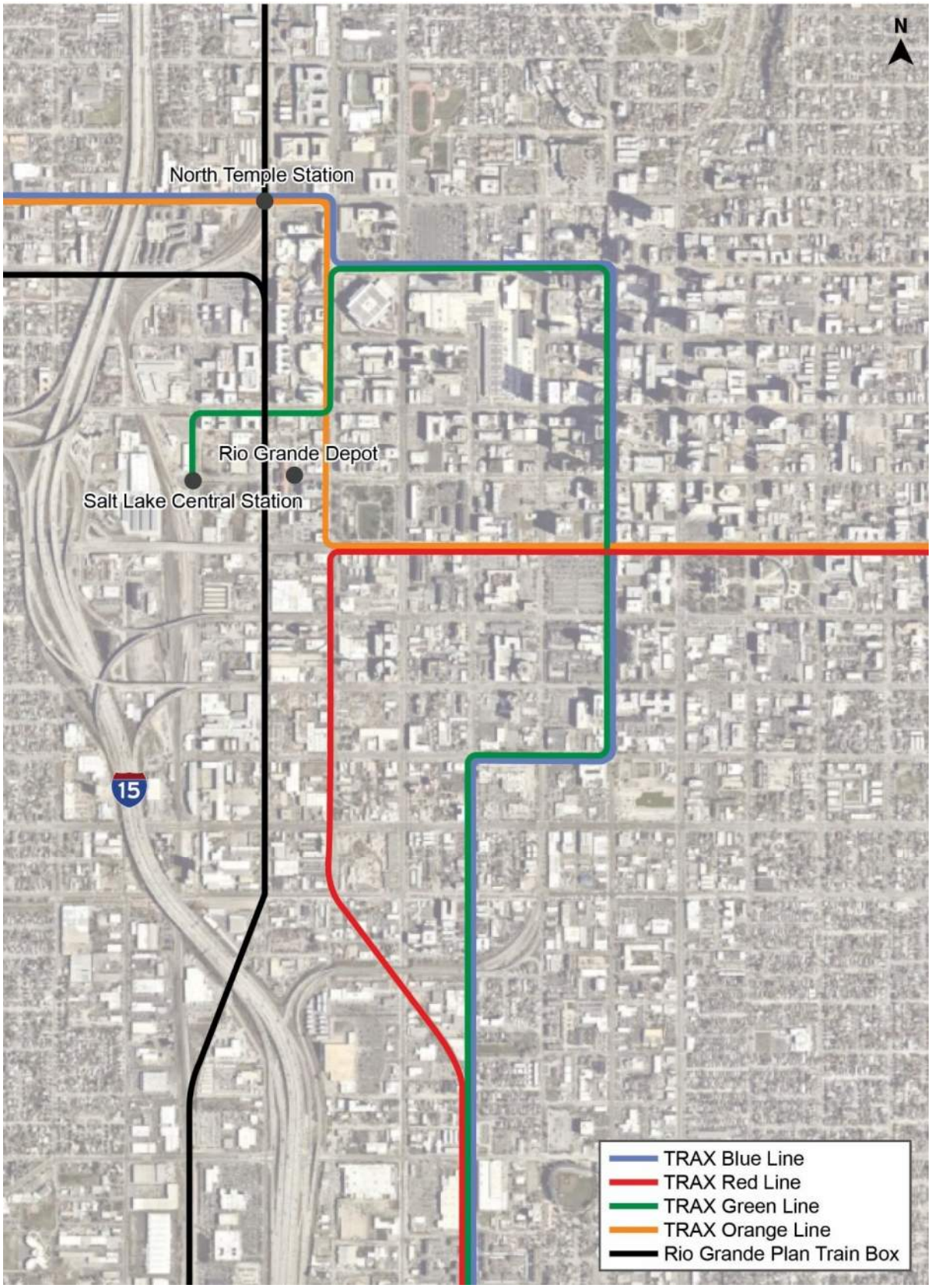


Figure 11: TRAX Future Build Scenario 4, As Proposed in UTA Future of Light Rail Study)

6.1.3.3. Bus

The following issue associated with UTA bus service must be addressed:

- **Connectivity (A-R-9)**
  - Salt Lake Central currently serves bus routes: 2, 209, 220, 509, and 513. North Temple Station serves bus routes 200, 223, F453. Any service disruption as part of adjustments to the North Temple Station and Salt Lake Central (relocated to Rio Grande Depot) stations must be evaluated and resolved

6.1.4. Patriot Rail

Patriot Rail is an operator of short-line and regional freight railroads and rail services. Patriot Rail owns and operates the Salt Lake Garfield & Western Railway (SLGW). Patriot Rail owns a railyard located at 1000 W South Temple Street **(A-R.10)**.

In 2018, Patriot Rail received a federal grant to relocate the 1000 W South Temple Street classification yard from the Poplar Grove neighborhood to a location further west, in the northwest quadrant of Salt Lake City. The new facility includes 3,500 feet of track installation and the construction of a classification yard with up to 30,000 feet of new track.

Upon relocation, Patriot Rail will vacate the 1000 W South Temple Street facility, outside of direct impacts of the train box.

6.2. Mobility and Circulation

The train box concept would include up to 20 grade-separated crossings (train box under roadways) with local streets.

In addition, access to numerous existing businesses would have to be reconstructed and, in some cases, consolidated - as was previously shown in **Figure 6** and **Figure 7.**

To minimize impacts to existing businesses and provide mobility and circulation benefits to the area and neighborhoods, existing street connectivity should be maintained to the extent possible. However, construction phasing, train box geometry, and new and planned development along the corridor present challenges to mobility both during and after the train box's construction.

This section outlines mobility and circulation-related considerations associated with the train box concept.

6.2.1. Crossings

Table 9 outlines existing intersections/crossings that would intersection with the train box concept and if their reconstruction would be required with train box construction. Additionally, Table 9 lists the type of crossing structure that could be expected if reconstructed.

A bridge over the train box is assumed at locations with existing bridges or where rail clearance requirements necessitate a new bridge **(B-M.1)**.

A cap over the train box is assumed at locations with existing at-grade intersections across 500 West. The cap is level with the rest of the roadway network, whereas the bridge is above the roadway network **(B-M.2)**.

Table 9: Crossing Reconstruction Summary

Intersection/Crossing	Reconstruction	Structure Type
1300 South	To be determined, dependent upon impact on existing structure	Bridge (Existing)
Interstate 15 (500 W)	To be determined, dependent upon impact to an existing structure	Bridge (Existing)
900 South	Yes	Cap
800 South	Yes	Cap
700 South	Yes	Cap
600 South	Yes	Cap
500 South	Yes	Cap
400 South	Yes (Viaduct removal and new cap construction)	Cap
300 South	Yes	Cap
200 South	Yes	Cap
100 South	Yes	Cap
50 North	Yes	Cap
North Temple	Yes (Viaduct removal and new cap construction)	Cap
200 North	Yes	Cap
300 North	Yes	Bridge (New)
400 North	Yes	Bridge (New)
600 North	No	-
600 West (2 crossings)	Yes	Cap
Interstate 15	No	-
800 West	Yes	Bridge (New)
900 West	Yes	Bridge (New)

6.2.2. Access Impacts

Numerous businesses along 500 W would be subject to prolonged access impacts during train box construction. Several would be subject to reconfigured access post-construction.

The train box concept envelope encompasses existing ROW inclusive of existing sidewalks, driveways, and travel lanes. Maintaining access to existing businesses during train box concept construction will require evaluation.

Approximately 16 residential properties and 35 commercial properties be subject to access impacts. Table 10 lists the major commercial and residential (multi-family) along the corridor that would be impacted.

Table 10: Major Access Impact Summary

Business Name	Address	Business Type
Nammo Composite Solutions	1000 S 500 W	Commercial
Roofers Supply	920 S 500 W	Commercial
WNDR Alpine	860 S 500 W	Commercial
Energy Management Corporation	700 S 501 W	Commercial
Slackwater Pizza SLC	684 S 500 W	Commercial
INDUSTRY SLC	650 S 500 W	Commercial
City Pet Club	601 S 500 W	Commercial
Sunrise Metro Apartments	580 S 500 W	Residential
Pamela's Place Apartments	525 S 500 W	Residential
Security Pro Self Storage	471 W 500 S	Commercial
Artspace Apartments	200 S 500 W	Residential
Rocky Mountain Power Substation	155 S 500 W	Commercial
Gateway 505	505 W 100 S	Residential
Towne Storage - Gateway	510 W 100 S	Commercial
Altitude on Fifth Apartments	135 S 500 W	Residential
Parc at Gateway Condominiums	5 S 500 W	Residential
The Gateway	400 W 200 S	Commercial
Liberty Gateway Apartments	50 S 500 W	Residential
The Union Event Center	235 N 500 W	Commercial
Salt Lake Crossing Apartments	250 N 500 W	Residential
Project Open Apartments	355 N 500 W	Residential
Signature Books	508 W 400 N	Commercial

6.2.3. Utah Department of Transportation (UDOT)

The Utah Department of Transportation owns and maintains two major roads that intersect with 500 West within the train box project area: 500 South and 600 South. These arterial roadways are the primary routes for vehicles entering (600 South) and exiting (500 South) downtown Salt Lake City by way of Interstate 15. In addition to UDOT-owned roads, there are seven Federal Aid Routes that intersect the train box concept area: 1300 South, 900 South, 800 South, 400 South, 200 South, North Temple, and 300 North. There is an on/off ramp at 400 South (south ramps at High-Occupancy Vehicle (HOV) only).

Constructing a train box introduces the following issues associated with UDOT facilities:

- **500 South and 600 South modified ramps (A-M.1)**
  - The RGP proposes that these two ramps would be modified to be shortened, to allow for more developable land along their frontages
  - This concept would need to be evaluated in coordination with UDOT to determine whether it is feasible

- **Intersection train box caps (B-M.2)**
  - Large structural caps are required at each of the major road crossings
- **Maintenance of traffic**
  - Traffic on these major roads would have to be maintained during construction
  - This would be particularly complicated where entire intersection caps would have to be constructed over the train box

This study did not include a discussion with representatives of UDOT; therefore, the issues listed are based on comments from other stakeholders and transportation professionals. All issues associated with UDOT roadway facilities would need to be confirmed in a future phase of this study.

6.3. Utilities

The train box concept along 500 West is approximately 2.4 miles long with properties receiving utility service from the right-of-way. The train box concept intersections with 16 street cross streets with 500 West that also include utility intersections and crossings. Utilities in the corridor include but are not limited to water, sanitary sewer, storm drain, electric, gas, fiber optics, and telecommunications. Utility running with or crossing a corridor that will be underground raises several utility-specific issues:

6.3.1. Main Line Relocation

A majority of the train box will run longitudinally with 500 West and, depending on the design of the box, the main line utilities in the 500 West right-of-way will need to be evaluated for relocation. For utilities at the outer edges of the right-of-way, for example, it may be possible to maintain horizontal and vertical alignments while also accommodating the train box centrally in the ROW. Considerations for this evaluation include:

- **Available ROW width and proposed trench box width (A-U.1)**
  - Depending on the extent of right-of-way needed for the trench box, the utility may be able to run parallel behind trench box walls or they may need to be relocated
- **Structural design of trench box walls**
  - Structural systems that include tie-backs or nails may impact existing utility and utility maintenance
- **Trench box construction (A-U.2)**
  - Construction approach may impact existing utilities and may warrant relocations to avoid the costs associated with extraordinary protection measures

Mainline relocations for all systems, especially gravity systems, will have greater system impacts as it relates to mainline improvements beyond the train box corridor. The extent of these impacts would need to be studied on a system-by-system basis to determine the scope of the trench box impact on mainline utilities.

6.3.2. Property Servicing

Several developed parcels along the train box concept have existing utility service connections in 500 West. Mainline relocations will impact business servicing; however, the degree of impact is uncertain. Impacts may include:

- **Basic exterior service rerouting**
  - Service reroutes exterior to the structure in right-of-way
- **Interior service rerouting**
  - Service rerouting that cannot be maintained in the 500 West right-of-way and must be connected to the structure from another direction may require interior rerouting of service to facilitate connections

- **Cross-property servicing**
  - Utility service options may be feasible from 'back of house' areas or across multiple parcels. This scenario may require a utility easement from multiple parcels and may impact future redevelopment opportunities

It is common in Salt Lake City to run parallel mains in the right-of-way where there is a utility main on both sides of the right-of-way. This provides direct servicing to property without crossing the right-of-way, providing a redundant system, mitigating maintenance impacts to the ROW, etc. A review of Salt Lake City Public Utilities GIS record of City utilities identifies segments of the corridor where the water system does not have a parallel main, thus property water services are extended across the right-of-way for connection to the main line. Depending on the space required for the train box and the ability to configure main lines on either side of the train box, strategies such as providing a parallel mainline system with mains on either side of the ROW should be explored to mitigate train box impacts to property services.

6.3.3. Utility Crossing Depths

Each of the crossing intersections with the train box corridor includes junction points and/or crossings for utility. The depth of utility considers the following factors: minimum bury depth, utility size (e.g., pipe, duct bank, conduit, etc.), vertical separation between utilities, gravity utility pipe slope, and outfall depth (for gravity systems). The influence of crossing utility size and separation can be compounding, i.e., if there is more than one utility in the crossing they can 'stack' and drive the depth of the primary utility deeper.

All utilities have minimum bury and crossing separation requirements:

- **Storm drain**: 2 feet (24 inches)
- **Gas, telecommunications, and power**: 2.5 feet (30 inches)
- **Sanitary sewer**: 4 feet (48 inches)
- **Water**: 5 feet (60 inches)

Utility depth is also influenced by vertical separation requirements between utilities:

- **Water to sewer**: 1.5 feet (18 inches) minimum vertical separation, water over the sewer
- **All other utilities**: 1 foot (12 inches) minimum vertical separation

In addition to pipe size, another factor regarding utility depths is whether the utility system relies on gravity for utility conveyance. Non-gravity utility such as water, gas, power, or telecommunications, has more flexibility in vertical disposition than gravity systems. Gravity utilities such as storm drains or sanitary sewers rely on the slope of the pipe to convey flow; therefore, these utility networks can vary in depth, with the high end of the network typically being the shallowest location for a utility. Sanitary sewer systems crossing the train box concept appear to be five to 15 feet deep, due to a combination of vertical constraints such as crossings with other utilities and the depth accrued in the gravity network.

The final factor that affects gravity utility, specifically, is the depth of the storm drain or sanitary sewer outfall. Most of Salt Lake City's storm drain system outfalls the Jordan River, for example. Because the Jordan River is at a shallow elevation relative to much of Salt Lake City's storm drain, there are existing scenarios where the City's storm drain crossing 500 West is large in diameter to provide capacity at very flat slopes. The combination of a shallow outfall elevation and large diameter pipe has forced a condition where the pipe is a part of the pavement section, which is less than the minimum bury depth typically required. This means that several of the shallow large-diameter storm drainpipes are specialty conveyance structures designed to sustain direct traffic loads, whereas standard storm drainpipes are designed to withstand traffic loads distributed by the soil and pavement section above.

Crossing the train box with utility will need to be considered with the development of the train box section. Non-gravity utilities may be routed through a 'chase'-like space designated for utility in the upper areas of the train box as shown in **Figure 8**, and should consider the following:

- Utility crossing the train box would need to be supported through the train box section via hangers, support beams, or columns
- Water utility may require insulation if the train box space is not enclosed or climate controlled.
- Gravity utilities, depending on where in the utility network the crossing occurs (I.e., depth), may be able to fit in the designated chase section of the train box
- Gravity utility crossing in the chase section may also be limited by pipe size
- The vertical depth of space dedicated to the chase area of the train box will influence the total depth of the train box and, therefore, the total length of the train box alignment, i.e., the larger the chase, the deeper the train box, and the longer the approaches into the box

In the event utility cannot be passed through the box in a manner such as the chase described above or in **Figure 8**, alternative routing will need to be considered to take utility under or around the box and/or approaches. Constraints associated with rerouting gravity utility is the additional length of pipe added to the network, which results in additional system depth; when the outfall depth is fixed (e.g., Jordan River), finding additional depth in the network may not be feasible or practical. It is unknown the extent to which any of the existing utility networks would need to be improved to accommodate rerouting around the train box.

6.3.4. Maintenance of Utility

When reviewing the train box impacts on utilities, consideration must be given to the long-term maintenance and operations of the utility. Factors to contemplate include:

- **Access management**
  - Access for maintenance personnel to safely inspect and perform maintenance on the utilities.
  - Access for equipment to safely maneuver for maintenance operations.
  - Protocols should be established to maintain utilities within the train box where active train operations will occur.
- **Ancillary repair**
  - Repair associated with utility maintenance, such as pavement replacement, is often required.
  - Repair may be complicated by the train box structure, e.g., if the utility is located behind the train box walls and the walls have been designed to utilize soil reinforcement elements such as soil nails, then the structural elements and utility should be designed in a manner that mitigates maintenance access to the utility without compromising the structure.
  - Maintenance operations personnel should be trained to manage the utility around the structural components of the train box and there should be protocols established regarding the repair of structural elements if damage occurs during utility maintenance operations.

6.3.5. Notable Utility Considerations

There are notable or sizeable utilities along or crossing the proposed train box corridor and will need to be evaluated for incorporation in the train box section or rerouting. These utilities include but are not limited to:

- **Water (pressurized)**
  - Watermain sizes 8" - 16" in various locations
- **Sanitary Sewer (gravity)**

  - 48-inch brick sanitary sewer transmission main exists in the 500 West corridor between 100 South and 200 North. It is understood this main conveys approximately one third of the City's sewer discharge.
  - 36" RCP sanitary sewer at 500 South
  - 18" sanitary sewer at 700 South
  - 18" sanitary sewer at 800 South
  - 15" and 25" sanitary sewer at 900 South
- **Storm Drain (gravity)**
  - A 60-inch culvert conveys City Creek under the railroad tracks at North Temple.
  - 54" RCP storm drain at 200 South
  - 48" RCP storm drain at 400 South
  - 55" x 69" concrete storm drain at 600 South
  - (3) 48" x 72" concrete storm drain at 800 South
  - 48" x 60" concrete storm drain at 900 South
  - 166" x 60" concrete storm drain at 900 South
- **Natural Gas (pressurized)**
  - 16" and 10" gas mains in 500 West from 300 North through 200 South.
- **Power**
  - RMP duct banks (various sizes) in 500 West
  - RMP overhead transmission lines in 600 South
  - RMP overhead transmission lines in 500 West
  - RMP overhead transmission lines in 700 South

6.4. Geotechnical

Performing a geotechnical study is important to understand the risks, costs, and structural constraints of the train box structure. Geologic factors can significantly influence the stability, strength, and behavior of a structure. The following geotechnical issues should be considered:

- **Groundwater**
  - Groundwater depths will vary along the entirety of the corridor and may be as shallow as five feet in depth.
  - Groundwater depths typically vary with seasonal precipitation and may vary annually based on exceptional rain or snow seasons.
  - Excavations extending below groundwater depths will require dewatering.
  - The train box may create conditions that serve as an effective cutoff wall for groundwater flows, causing surcharging and pressure on existing structures if not properly addressed.
  - Dewatering measures should be evaluated to manage groundwater effects on the train box and existing structures.
    - Dewatering measures are common throughout the city on privately held commercial projects with subsurface structures like City Creek Center; similar systems would be considered for the train box, which may include a combination of gravel beds to allow the flow of groundwater to a series of perforated pipes that convey the water to a pump system.
    - Redundancy should be considered in the design of the dewatering system, especially if it will rely on mechanical measures like pumps.
    - Downstream outfall location(s) will need to be identified for the dewatering system discharge and evaluated for capacity to receive dewatering flows.
  - The ownership and maintenance of the dewatering systems will need to be determined. Dewatering systems are commonly considered as an auxiliary facility to a structure; it may

be logical to attribute the ownership and maintenance of the dewatering system to that of the train box structure.
    - Operation and maintenance protocols and training will need to be developed for dewatering systems.
- **Flooding**
    - Flooding caused by major rain events and snowmelt, though exceptional events, present a significant risk to a deep trench of this size.
    - Strategies should be developed to safeguard train movement and operations through the train box from major rain events.
    - Strategies may include secondary dewatering systems, identifying a more conservative design storm and duration for drainage systems, etc.
    - Sections of the train box corridor are in varying designations of flood plain, much of which is designated as X or AH. Areas shown in the FEMA firmette with the most risk of flood hazard extend from approximately 500 South and beyond the city limits with South Salt Lake. Areas north of 500 South are also designated as X or are considered areas of undetermined flood hazard. The engineering of the corridor may manage or resolve the flood plain designation through the improvement of storm drain systems as impacts from the train box alignment are evaluated.
- **Soil conditions**
    - Conducting a comprehensive geotechnical assessment of the entire corridor is recommended to understand subsurface conditions in the corridor.
    - Soil conditions will vary along the corridor and are likely to comprise varying degrees of sand, clay, silts, etc.
    - Native soils in Salt Lake City are typically low-strength, compressible, and unable to support heavy foundation loads without settlement. Ground improvements such as piles or rammed aggregate piers for the train box may be recommended to manage soil conditions and liquefaction potential.
    - The train box structure, like all structures in the region, should be designed with considerations for seismic resilience.

6.5. Environmental

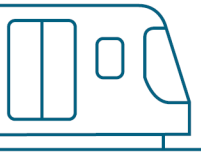
Environmental considerations are important at both the redevelopment site and the new train box. The following environmental issues are anticipated:

6.5.1. Biohazard

Because construction of the train box and adjacent redevelopment would take place on former heavy industry and rail land, steps must be taken to ensure that the land and area are suitable for habitation and travel.

Implementing effective control measures and adhering to relevant regulations are essential to keeping the train box clean from toxic spills. The following environmental concerns will require consideration:

- **Exposure during construction**
    - Because construction of the train box and adjacent redevelopment would take place on former heavy industry and rail land, exposure to biohazards during construction is a major concern
- **Contamination remediation**
    - The process of remediation of potentially contaminated land in both the train box and the adjacent redevelopment area could be time consuming and extremely expensive



  - The unknowns associated with potential contamination increase risk for the developer, City, and UTA
- **Transport of hazardous materials**
  - A plan for how to regulate the transport of hazardous materials through the train box must be developed
- **Spill management**
  - Freight lines running through the train box are at risk of derailment and consequently spilling hazardous materials
  - A plan for how to manage spill risk and cleanup process within the train box would be imperative to successful operation

6.5.2. Air Quality

Air quality is an important consideration, both within the train box and in the areas immediately surrounding it. Although future developments may result in cleaner trains, the current locomotives that would operate in the train box are diesel and generate a significant amount of exhaust. Managing the risk associated with this exhaust to users within the train box and those traveling and living alongside it must be analyzed further.

The train box concept includes a semi-covered box structure. Depending on the needs at street level, the box should be open to the air as much as possible. The following air quality concerns should be considered:

- **Ventilation**
  - Extent to which the train box ventilates naturally must be analyzed
  - Vacuum effect in the train box must be analyzed to ensure that air can be effectively cycled and ventilated
- **Flushing exhaust**
  - In areas of insufficient natural ventilation, a system must be evaluated for effectively flushing exhaust out of the train box
- **Direction of ventilated exhaust**
  - The direction and concentration of ventilated exhaust as it leaves the train box must be analyzed
  - This is particularly important in areas directly adjacent to existing buildings and should be considered for any areas where pedestrians will gather or that will be redeveloped along the corridor

6.5.3. Cultural Resources

New construction may affect cultural resources (resources that are over 50 years old that retain characteristics representing the time they were constructed), both historic architecture (above-ground) and archaeology (underground) sites. The State Historic Resource Office (SHPO) maintains a database of historic architecture resources that have been previously studied, determined to be eligible for listing on the National Register of Historic Places (NRHP), or are listed on the NRHP. Based on the SHPO website, there are five residential and commercial buildings in the study area that have been previously determined to be individually eligible for listing on the NRHP or contribute toward the listing of a larger historic district. SHPO also maintains a confidential database of known archaeological sites.

Future projects should consider potential impacts on cultural resources. This likely will include additional studies for potential additional historic resources and coordination with the SHPO. Use of federal funds will require following Section 106 of the National Historic Preservation Act and Section

4(f) of the US Department of Transportation Act, which also include additional consultation with stakeholders and public notification.

6.5.4. Community Impacts

The change in transportation routes — vehicles, active transportation, and trains — may change how people travel through this area of the City and may affect whether people choose this area as a destination. While these changes will be most noticeable on the transportation infrastructure itself, it may also affect the community in the following ways:

- **Environmental Justice**
  - The potential change in emissions (as described in Section 6.5.2) would be considered as part of the equity/Environmental Justice evaluation as it relates to nearby residences
  - A change in travel patterns for vehicles may alter traffic volumes and resulting noise and congestion near residences and businesses
- **Residential and commercial transportation**
  - A change in infrastructure for bicyclists and pedestrians may alter opportunities for active transportation for residents
  - A change in transit routes may alter commuting opportunities for residents and employees

6.5.5. Regulatory Requirements

Use of federal or state funding will trigger requirements for environmental compliance:

- **Federal funds**
  - Federal funds require the project to follow the National Environmental Policy Act (NEPA)
  - Use of federal funds on a part of the project may trigger NEPA for the entire project, depending on how the purpose and need of each element is described
  - This also results in other applicable federal regulations such as Section 4(f) which protects historic resources and public recreation sites
  - The lead federal agency will depend on the funds, the final project elements, and the scope of the project
- **State funds**
  - State funds may require completion of a State Study, which has a similar process to a NEPA document but is led by the state instead of a federal agency

6.6. Structural

As the track alignment begins to transition to a subterranean track, it will require a variety of structural elements to support the roadways, parks, and other features along the alignment.

The following section discusses structure types by geographic locations, and the loading parameters and challenges anticipated with each section.

6.6.1. South Limit (Approx. 1600 South) to 900 South

The train box concept through this section is uncovered, simplifying the structures. If the decision is made to cover the track alignment through this section to create vegetated areas or development areas, this would resemble the structures described in other sections. As currently proposed, this section could be constructed with retaining walls along the outside to support the properties it passes through until it reaches 900 South. The preferred wall type would be a cut or top-down wall construction. Some examples of this wall type are soil nail walls, soldier pile walls, and sheet piling walls.

- **Soil nail**
  - This is historically the least expensive and most common cut wall type. It does not require large equipment like the crane or large excavators needed for other listed types, only a horizontal driller for the soil nails and a concrete mixer for the shotcrete. However, the shotcrete surfacing of the wall can appear rough and unfinished, unless additional budget is allocated to include an architecturally finished façade. Evaluation of underground structures and basements is required to determine if there is room for penetration of the nails. This method requires obtaining underground easements as right-of-way since the soil nails will penetrate the surrounding ground and potentially cross into adjacent properties below the ground.
- **Soldier pile**
  - Soldier pile walls are more expensive to construct and usually require a crane and pile-driving equipment to install the soldier piles. Steel H-piles are driven at specified intervals along the wall alignment and lagging (usually wood but can be steel or concrete) is placed between the piles to retain the soil. Concrete panels, either precast or cast-in-place, can be put over the lagging to provide a more finished look. Ground anchors may be required to further support the wall elements at a certain height of the wall depending on soil parameters.
- **Sheet piling**
  - The cost for sheet piling falls in between the two other wall-type alternatives. This is typically constructed with a large excavator using a hydraulic attachment to drive steel sheets into the ground. This is the type of wall that has been used in areas with high groundwater. Sheet piling provides effective systems to prevent water intrusion and can be lined with concrete to create a more pleasing appearance for a permanent installation.

The other significant element within the south limit is the under crossing of I-15 at approximately 1000 South. The existing structure carries I-15 over a two-lane road (500 West) and two sets of railroad tracks. The existing three-span bridge has a perpendicular span length of approximately 100 feet between the two bent supports. The proposed track section requires a total section width of 137 feet. Therefore, the bridge will have to be replaced to allow for the larger track section. Due to heavy traffic on I-15, the bridge would require phased construction to maintain traffic during the reconstruction.

6.6.2. 900 South to 400 South

This section of the train box concept includes roadways constructed above the track alignment. Some areas will be covered supporting the roadway sections of 500 West and the intersecting roadways and others will be uncovered areas. The combination of loadings requires customized structural frames at each intersecting roadway, the frame will function as a bridge to support the roadway sections above. The structural system would also be designed to support a 6-ft utility chase. The train box concept includes cross beams located above the tracks to support the utility lines and provide lateral support to the main structural framing system. The exterior framing would be connected by a continuous concrete wall to resist soil loading. The framing system could consist of steel or concrete material for the beams and columns, depending on the aesthetic and structural requirements.

6.6.3. 400 South to 200 South (Rio Grande Depot Station)

This segment is similar to the 900 S to 400 South segment but will need to incorporate the proposed station canopy and platform elements including elevators, and stair systems or escalators to bring passengers to street level. One section will be designed as a covered section to support roadway traffic above and the other will be the canopy for the Rio Grande Depot Station. The design challenges in this section include the increased section width (approx. 183 feet in contrast to the 137 feet in previous

sections) and the unbalanced loading in the adjacent bays. The longer spans require deeper beams; as such, the profiles of the track and/or the roadway above will need to be adjusted to provide adequate clearance. The differences in loading in the two bays require a custom design in this area with each portion of the train box acting as an individual structure.

6.6.4. 200 South to North Temple

The train box concept show section covered throughout the entire length creating a long tunnel. The loading will vary from traffic and pedestrians on 500 West and crossing roadways to significant areas of parks consisting of sod, bushes, and trees. The weight of the soil will need to be analyzed to determine a maximum depth, which will limit the types of vegetation that can be planted in these areas. Another unique aspect of this section is a significantly larger span on the northern side (92-foot clear span versus a previous max span of 72 feet in the Rio Grande Depot Station section) requiring a different design section. This section could potentially become a three-bay design to accommodate the track layout and loading.

6.6.5. North Temple to 600 North

This section is similar to the southernmost region (1600 S to 900 S) since it is an uncovered single bay section with no need for overhead support. Therefore, the only structural elements here will be the exterior retaining walls and potentially the bottom slab with the wall type chosen based on the geotechnical, groundwater, and adjacent ROW issues. This section has proposed bridges at 200 N, 300 N, and 400 N. The span lengths of these bridges are such that the bridges should be single span bridges across the entire track box.

6.6.6. Other Structural Considerations

The track alignment traverses existing public and private developments containing building structures and site structural components. The proximity of existing structures indicate that temporary shoring will be required at several locations along the route to prevent underpinning of existing buildings. The new alignment should consider existing structure surcharge loads, conflicts between existing buildings foundation types and basement construction, and vibration analysis and photo documentation of existing structures prior to construction. Extensive communication, coordination and exploration is required to understand existing conditions prior to design phase. Construction costs should consider temporary and permanent shoring, and dewatering procedures.

6.7. Redevelopment Economic Assessment

Salt Lake City Redevelopment Agency (SLC RDA) conducted an analysis of the potential revenue that may be generated through redevelopment of the land that would be vacated by FrontRunner and Union Pacific as they relocate their facilities to the train box.

According to the analysis, if the train box moves forward, approximately 75.5 acres will require at least partial demolition. SLC RDA estimates the FY2022 taxable value of the impacted parcels at $17.5 million. If all impacted parcels were demolished and redevelopment occurred according to future zoning and anticipated development densities for the area, it is anticipated that by 2040, the taxable value of these parcels would increase to approximately $1.9 billion. The parcel redevelopment may potentially include over 1 million SF of office space, 430,000 SF of commercial, and 2,600 residential units.

If the impacted parcels were included in an RDA Project Area, property tax increment to support both public and private development within the area would be generated. It is estimated that between $20 million and $100 million would be available to support public projects for the area, as approved by the

RDA Board. These projects may include infrastructure improvements, the Green Loop, public structured parking, and the train box.

6.8. Other Redevelopment Projects

6.8.1. Salt Lake City RDA Station Center Development Plan

Redevelopment Agency of Salt Lake City is currently leading a vision plan for the RDA-owned block between 500 W and 600 W, and 200 S and 400 S. This effort, initiated in spring 2023, will prepare a land use plan to include residential, commercial, and retail uses. Early concepts being explored include vehicular access from 500 W. While the train box concept would influence this plan, particularly for vehicle access, many of the envisioned land uses could be implemented with or without the train box concept. The largest influence is orientation of the "front door" of the development. If the train box is implemented, 500 W becomes a primary transit-focused "front door" to the development. Without the train box, the development must integrate with and enhance Salt Lake Central station.

6.8.2. UTA Headquarters Redevelopment

Utah Transit Authority is currently in the process to design and develop a new UTA Headquarters at the site of the exiting Salt Lake Central Station. The headquarters development would be mixed-use with commercial on lower levels, and office space above. The development is planned to anchor a renewed transit hub at 600 West, providing an improved experience for FrontRunner, TRAX, and bus passengers than they currently experience at the existing Salt Lake Central station.

As the planning and design of the UTA Headquarters progresses, additional discussion is required as to how the train box concept could integrate with and support the UTA Headquarters development.

6.8.3. Salt Lake City Green Loop

Salt Lake City Downtown Master Plan, adopted in 2016, proposes a Green Loop linear park network integrated with city streets, providing shade, landscaped areas, and green corridors for people to walk and ride a bicycle. The concept was also included in the Salt Lake City Reimagine Nature Plan (2022). The project may include up to 60 acres of urban parks and open space, integrated into 5.5 miles of city streets.

Figure 12: Salt Lake City Green Loop

The full Green Loop is likely to require 10 years or more to implement. The first segment of the Green Loop is the 9-Line Trail along 900 South. Salt Lake City has initiated design of 200 East, as well as an in-depth analysis of the remainder of the loop.

Figure 12 shows that the current concept for the

Green Loop utilizes 500 W between 900 South and North Temple Street. This potential alignment directly conflicts with the train box concept. **Figure 12** shows an alternative alignment west of 600 West. Relocation of the FrontRunner and Union Pacific may enable integration of the Green Loop into the repurposed UTA/UP corridor.

6.9. Constructability, Phasing, and Maintenance

Considerations related to the construction, ownership, and lifespan maintenance of the train box will require exploration. These issues must be analyzed in appropriate detail as project development continues:

- **Constructability**
  - Infrastructure of this complexity must be closely analyzed to ensure it can be built without major unforeseen issues and cost overruns
- **Phasing of construction (A-O.1)**
  - Most of the train box could be constructed without disrupting existing train travel along UPRR, UTA, Amtrak, and Patriot Rail
  - The area of exception is the area north of The Gateway and west of 500 W, where the new train box overlaps with existing operations
  - Evaluation and development of a construction phasing plan must be performed to confirm feasibility, and must consider maintenance of rail operations and associated infrastructure
  - Maintenance of traffic as road crossings are reconstructed must be analyzed
- **Ownership and Maintenance**
  - Long-term ownership and maintenance of the train box must be determined; UTA and UPRR each have a critical interest to ensure proper maintenance of the train box, as potential disruptions of service due to failed de-watering or structural systems would have significant impacts
  - Based on stakeholder discussions, UPRR does not have expressed interest in owning or being responsible for the maintenance of the train box
  - Maintenance responsibility of the train box structure needs to be determined – options include Salt Lake City, the State of Utah, Utah Transit Authority, UPRR, or establishment of a new transportation authority charged with ownership and maintenance responsibilities
  - Cost-sharing agreements would need to be prepared including each of the above-named parties.

7. Cost Estimate

7.1. RGP Cost Estimate

The RGP estimated that the cost of this project ranged from **$**300 to $500 million. It states that costs would stay low due to the nature of the project area. **Figure 13** lists assumptions as documented in the RGP that informed the initial cost estimate.

The RGP assumptions excluded costs such as disruptions to current rail operations, private property acquisitions, and reconstruction of roadway crossings.

The RGP assumed that creating a special tax district for the newly re-developable land would offset the cost of design, engineering, and construction of the train box.

KEEPING COSTS LOW

The Rio Grande Plan has been designed to have the greatest positive impact with the least amount of disruption, displacement, and cost:

- By building new rail infrastructure in a new right-of-way, current rail operations will not be disrupted during construction, **minimizing delays to transit riders and reducing remediations**.
- The Rio Grande Plan takes advantage of the full width of 500 West. **No private properties will need to be acquired** for this stretch of the corridor.
- Because so much of the historic rail corridor still exists – including freeway bridges and a clear right-of-way – disruptions to adjacent property owners and residents **will be minimal**.
- No ramps, bridges, or major roads will need to be altered. Although the Rio Grande Plan enables the existing overpasses to be reduced or eliminated in the future, such changes are not necessary for rail service to be restored to the Rio Grande Depot.
- By opening new land for development, the Rio Grande Plan will turn otherwise vacant land into a **source of income for the city**

*Source: **Rio Grande Plan Redevelopment Proposal**, Lenhart and Blakely, 2020, https://drive.google.com/file/d/1jwAW8DEc0WZXguTWE1qA6tZJWQkXoRY-/view*

Figure 13: RGP Cost Analysis

7.2. Train Box Screening Analysis Cost Estimate

Implementing the train box concept would incur substantial impacts to current rail operations, area utilities, private property, and existing transportation infrastructure. The detailed cost of such impacts cannot be determined at this early stage; however, a rough order of magnitude (ROM) cost estimate range was prepared based on this train box concept alignment (Appendix F). The ROM cost estimate

includes as many items as could be determined at this stage of analysis. The potential cost of the train box and associated impacts ranges from **$3 to $5 billion**. The estimate includes a contingency of 30% for additional unknown items.

In addition to items that are reflected in the cost estimate, there are several items that are not directly reflected due to the inability to provide accurate estimates at this screening level. These additional elements are listed below.

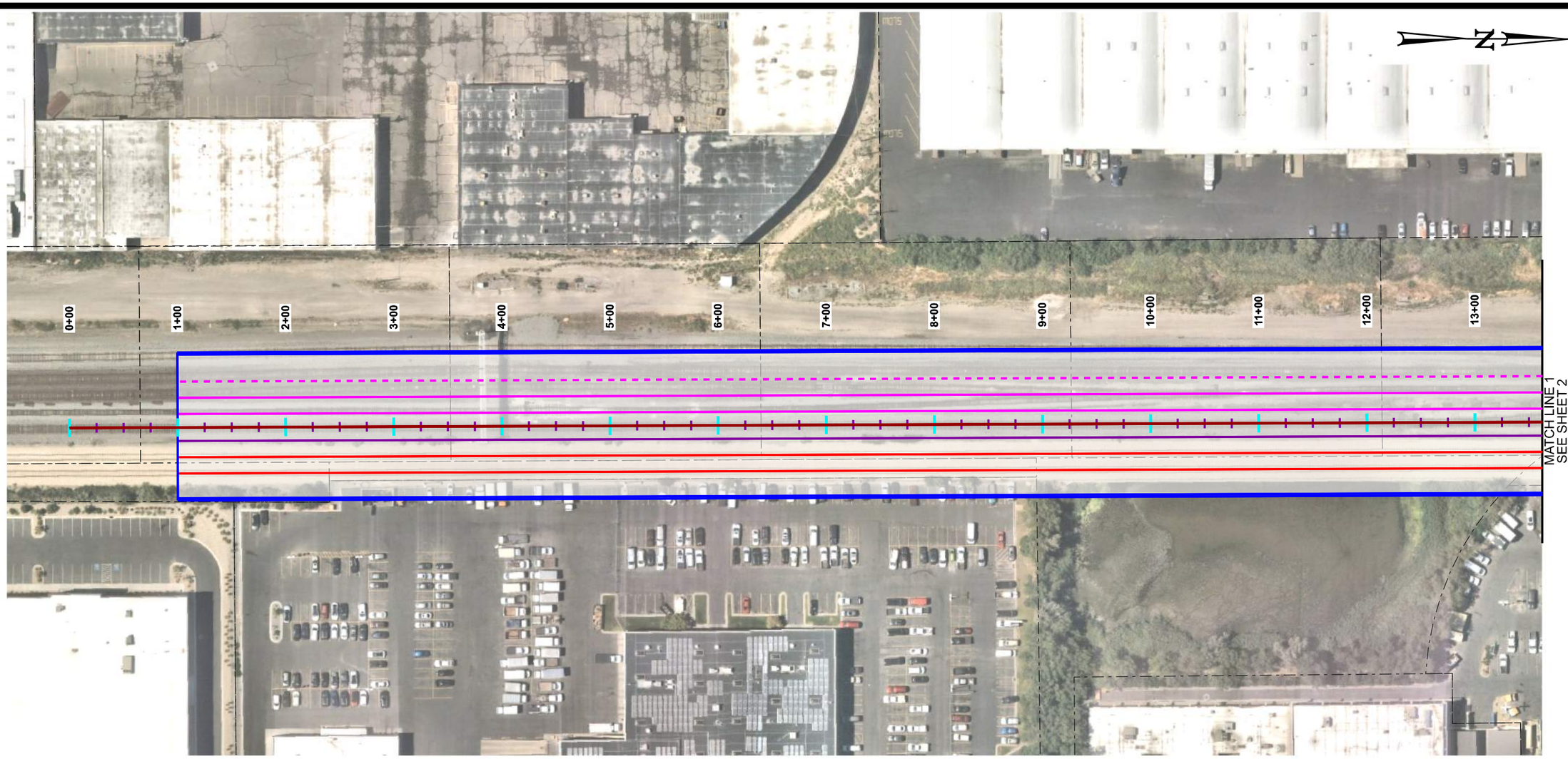
A contingency of 30% is reflected in the cost estimate to account for these items. Additional analysis and engineering design is required to prepare cost estimates.

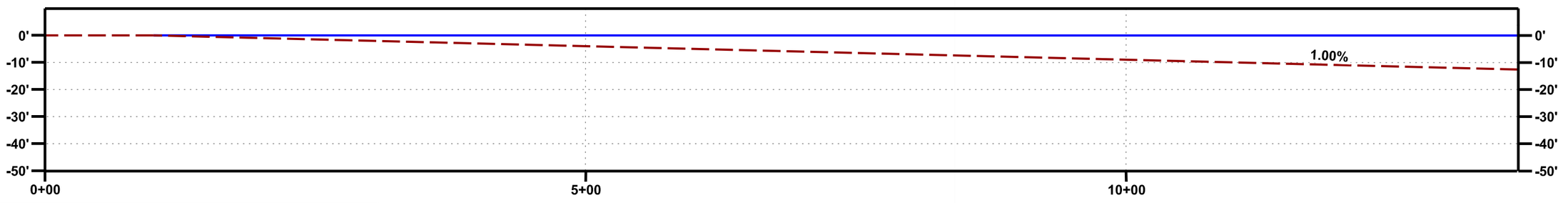
ITEMS NOT INCLDUED IN COST ESTIMATE

ITEM	NOTES	POTENTIAL RELATIVE COST
Rio Grande Station Canopy	Architectural elements	$$ (millions)
De-watering system	• Piping and lift stations • Downstream outfall or system improvements	$$ (millions)
Detailed systemic utility adjustments	• Reconstruction of existing 500 West public utility lines • Upstream or downstream system improvements to facilitate crossings	$$$ (potentially tens of millions)
500 South and 600 South viaducts and ramps	Ramps reconfiguration	$$$ (tens of millions)
Property acquisition of the 400 South UP Yard to include the purchase of the replacement yard	Requires negotiation with Union Pacific Railroad	$$$ (tens of millions)
Subsurface ground improvements such as piles, rammed aggregate piers, or significant over-excavation	Requires geotechnical analysis to determine extent and scale	$$ (millions)
Structural support of existing buildings along the corridor	Required structural analysis, large multistory buildings (multifamily) are of primary concern	$$$ (tens of millions)
Business assistance or relocation services, including cost of acquiring properties that currently have rail access	Requires appraisal	$$ (millions)
Maintenance of freight and transit operations during construction	Requires negotiation with Union Pacific Railroad and Utah Transit Authority	$$ (millions) to $$$ (tens of millions)

ITEM	NOTES	POTENTIAL RELATIVE COST
Operational cost impacts to Union Pacific Railroad, Amtrak, Utah Transit Authority	• Relocating and remediating UPRR's 400 South Yard • Removal of existing rail, stations, and platforms • Remediating removed or abandoned rail • Construction delays to train operations • Spur connections and railroad customer servicing (estimated 5-6 currently railroad customers within the project limit)	$$ (millions)
On-going maintenance and operating costs	• Maintenance of trench and box infrastructure, ventilation equipment and dewatering, • Increased utility costs for lift stations and inverted siphons	$ (hundreds of thousands) to $$ (millions) (annually)

APPENDIX A – CONCEPTUAL ALIGNMENT





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PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED BY:

SALT LAKE CITY CORPORATION
COMMUNITY AND ECONOMIC DEVELOPMENT
TRANSPORTATION DIVISION
349 SOUTH 200 EAST, SUITE 100 SALT LAKE CITY, UTAH 84111-2836
TELEPHONE: 801-535-7961
FAX: 801-535-6093
E-MAIL: WWW.SLCGOV.COM

Kimley»Horn

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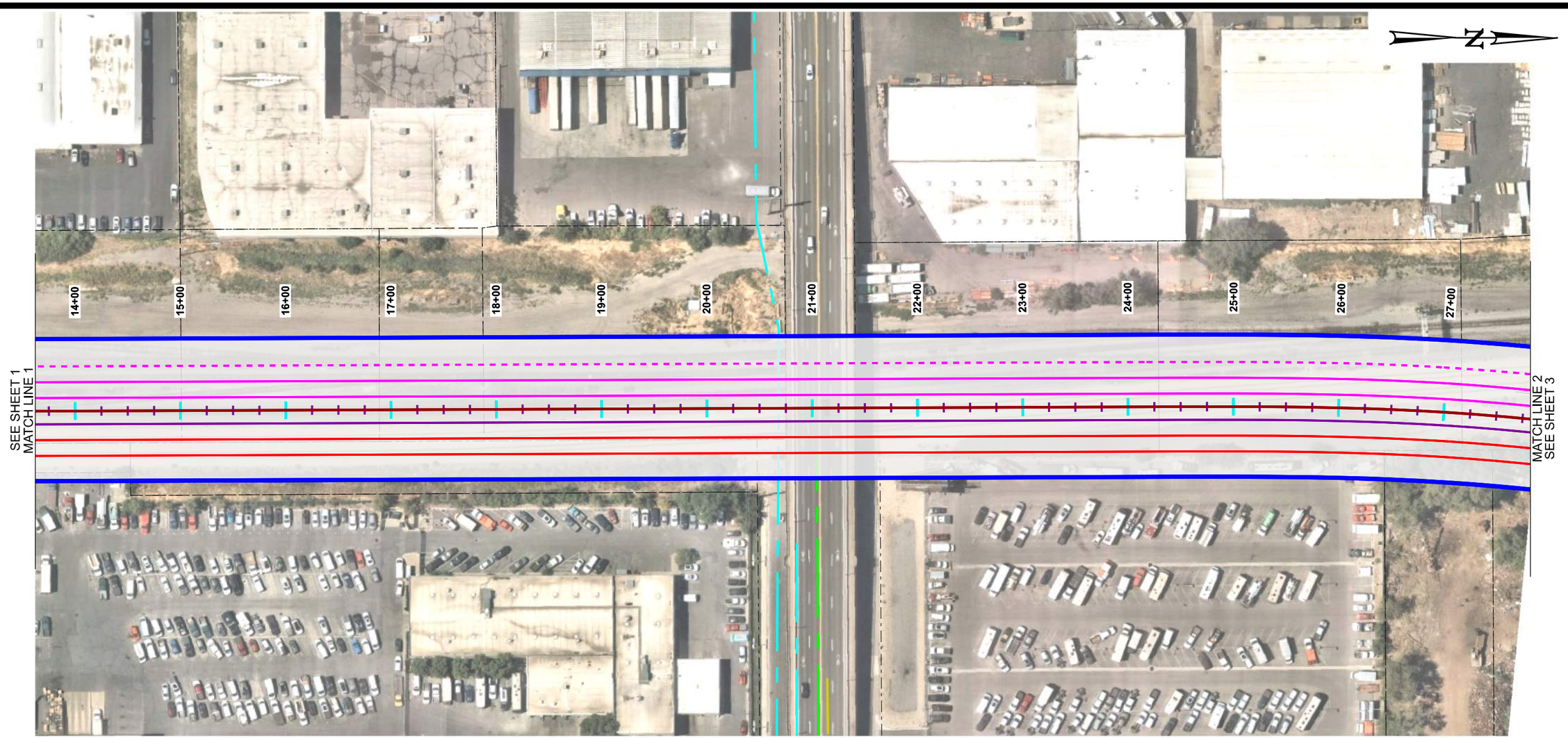

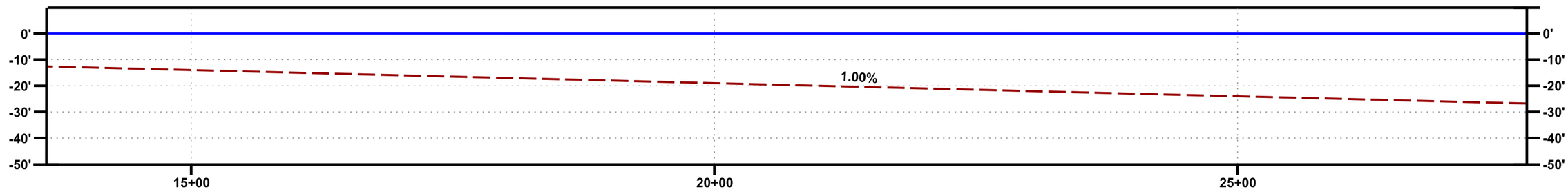

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TELEPHONE: 801-535-7961
FAX: 801-535-6093
E-MAIL: WWW.SLCGOV.COM

Kimley»Horn

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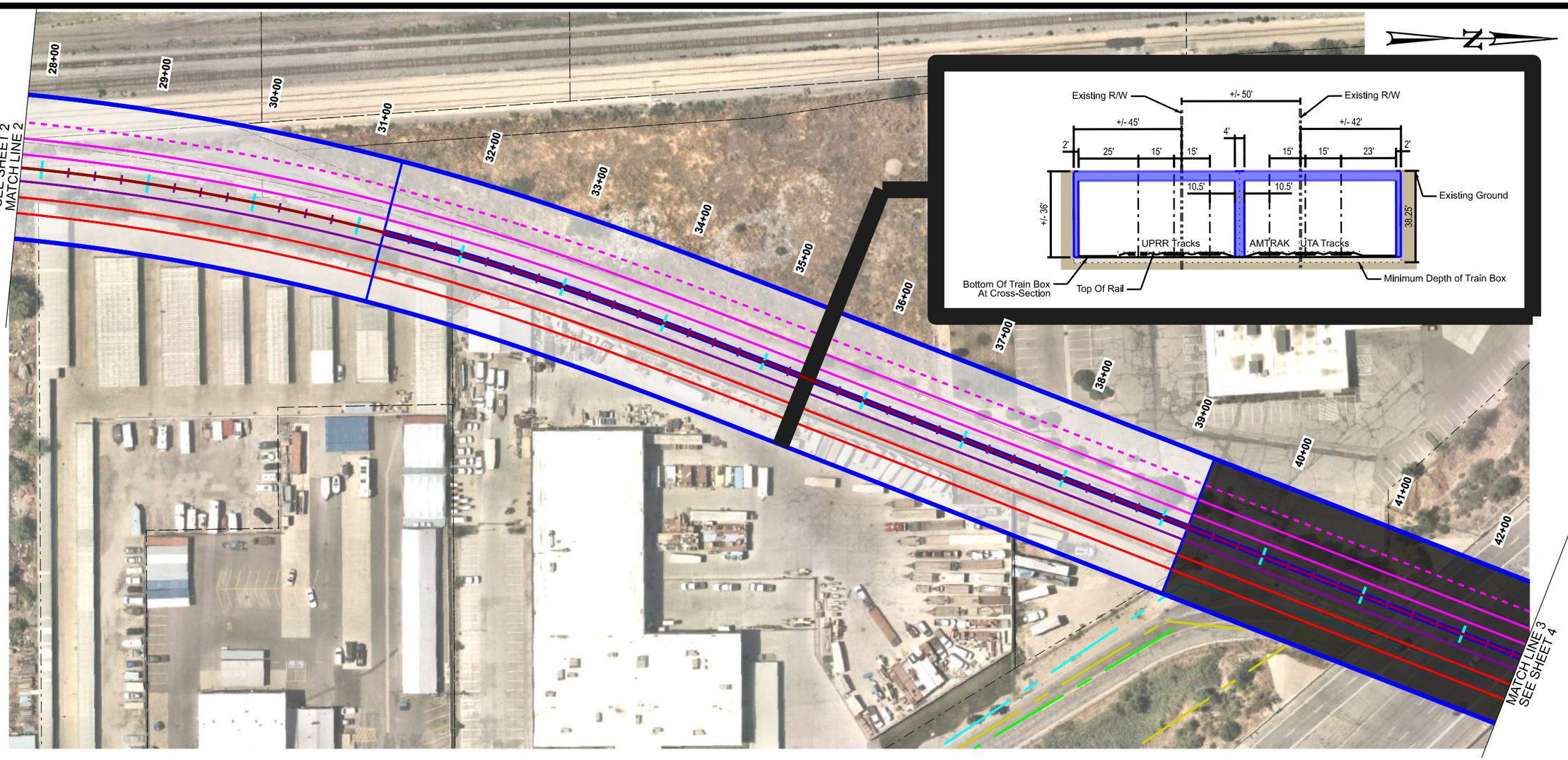

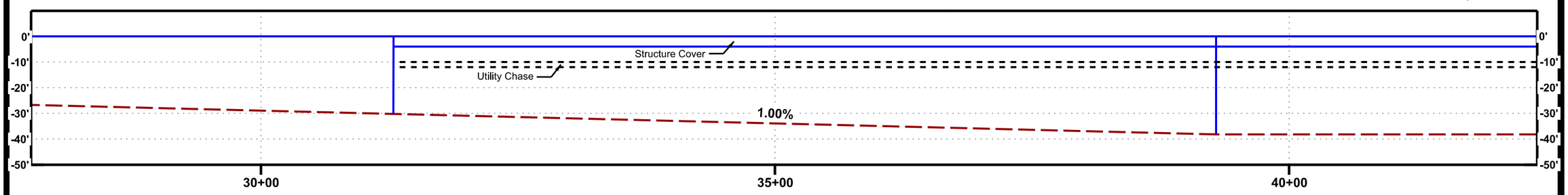

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E-MAIL: WWW.SLCGOV.COM

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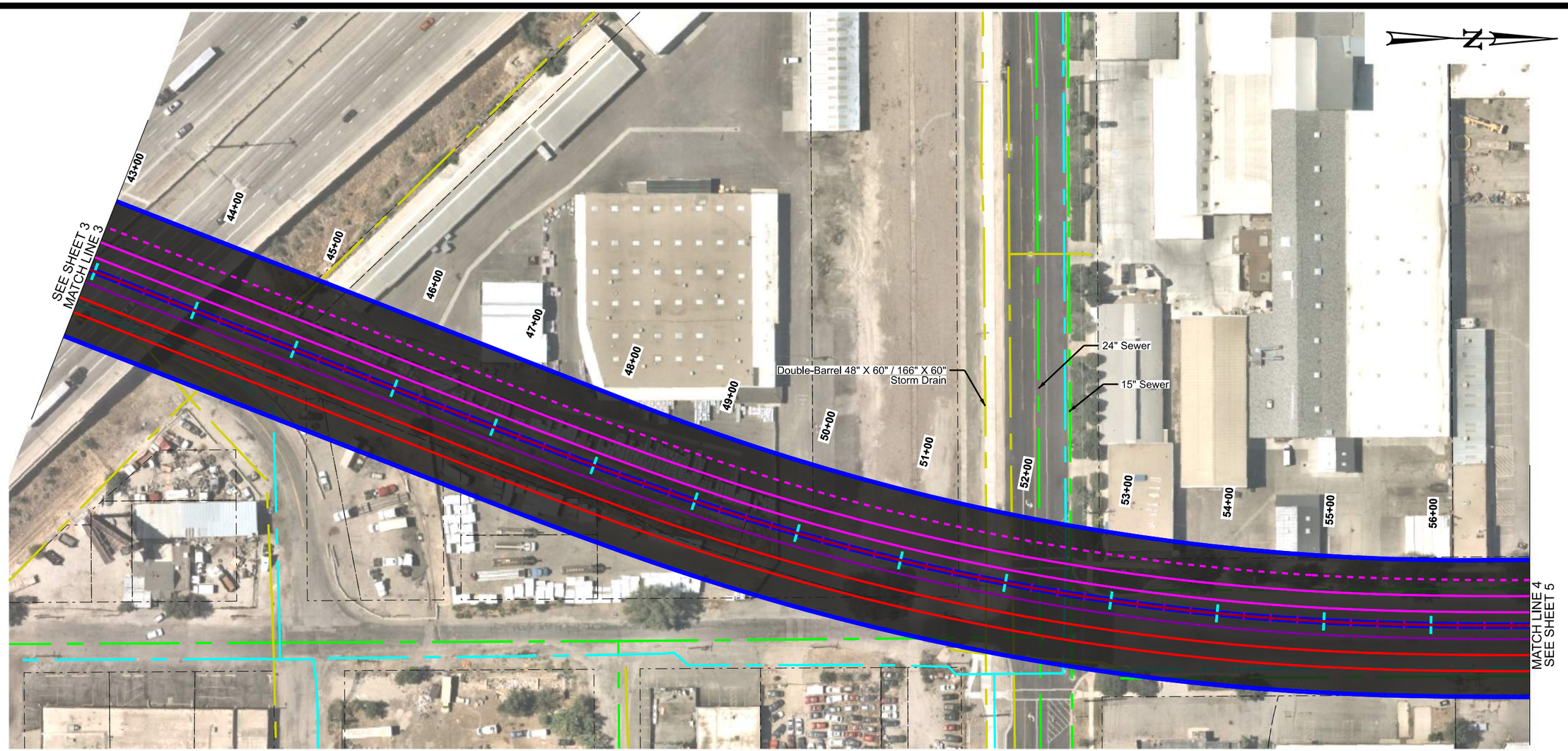

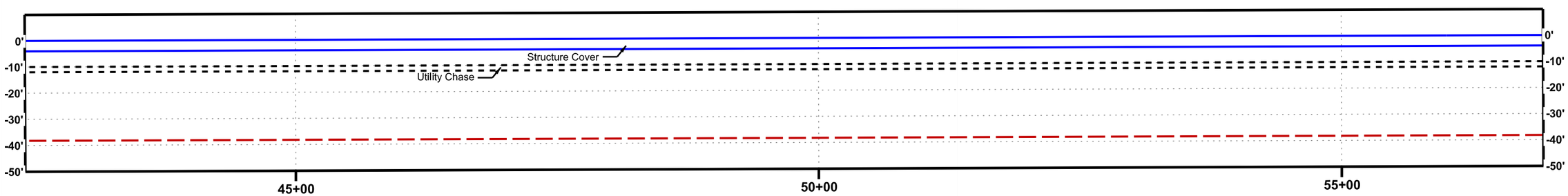

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FAX: 801-535-6093
E-MAIL: WWW.SLCGOV.COM

Kimley»Horn

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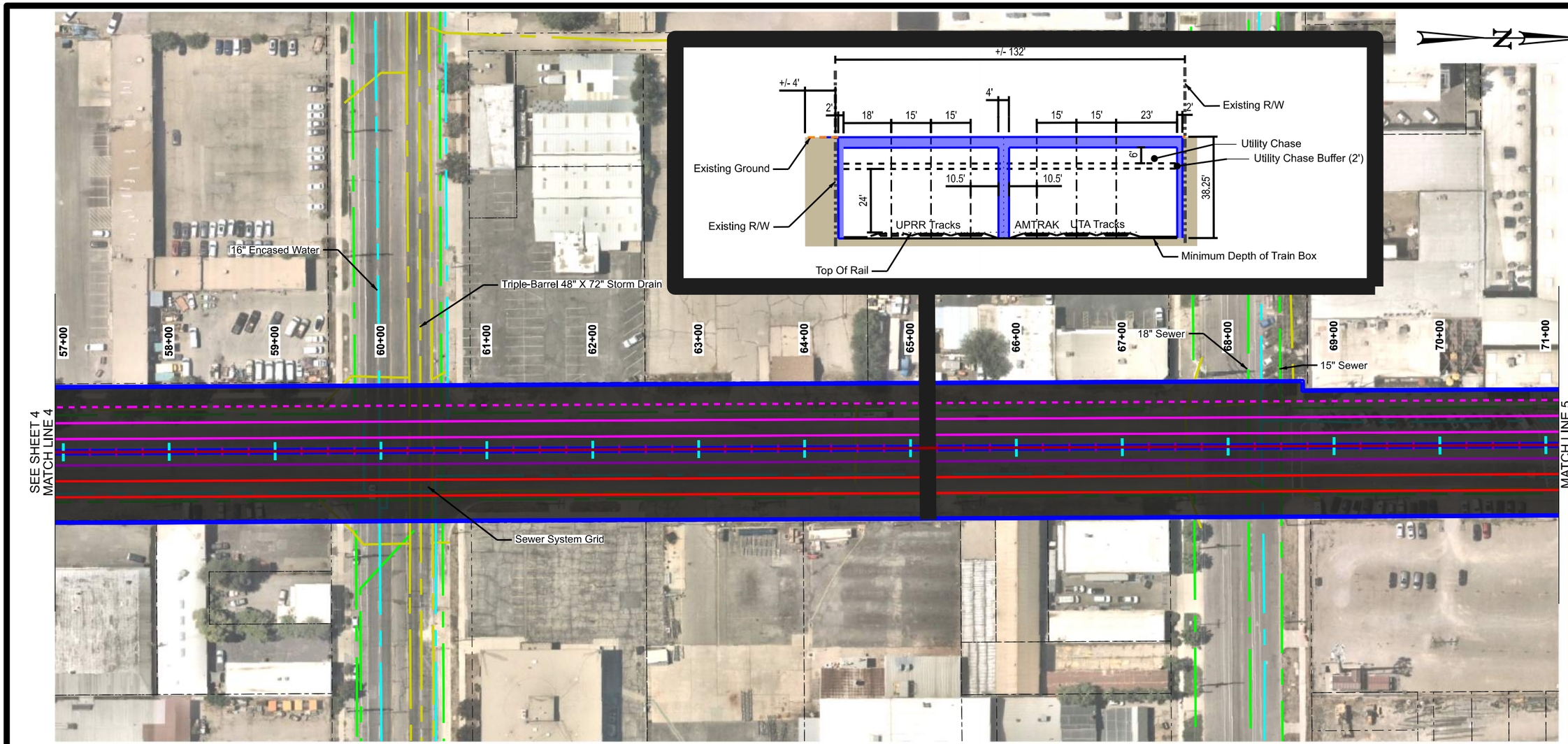

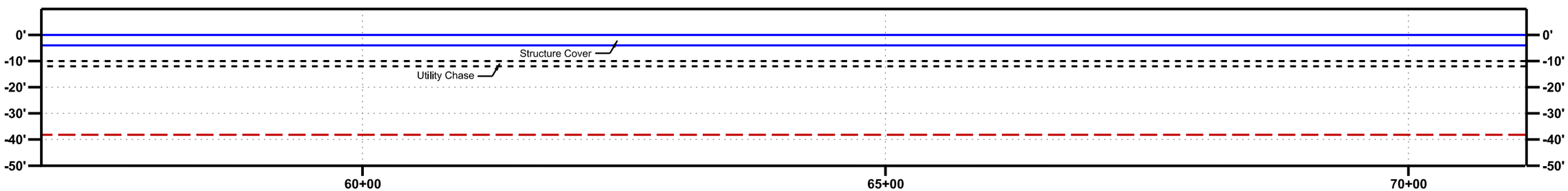

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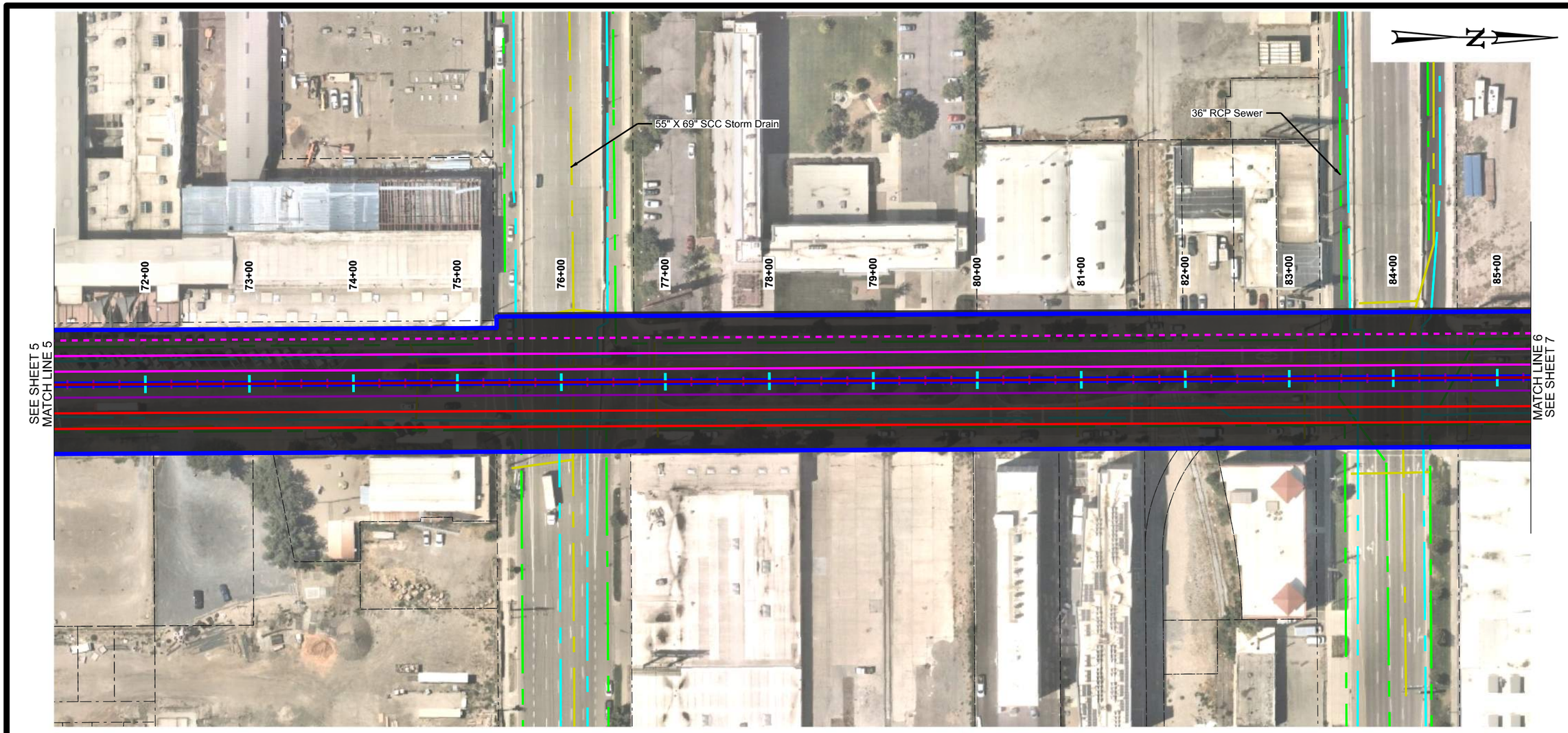
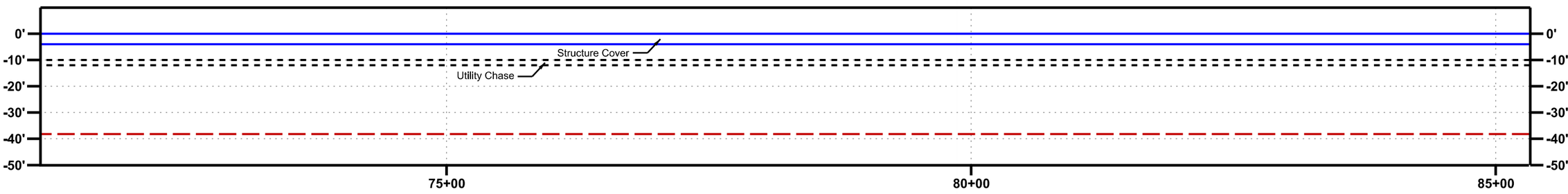
ALG 5

BINDING ORDER 5/15





- SLOPED TRAIN BOX
- FLAT TRAIN BOX
- FUTURE UTA TRACK
- FUTURE AMTRAK TRACK
- FUTURE UPRR TRACK
- POTENTIAL UPRR TRACK
- TRAIN BOX STRUCTURE
- EXISTING RIGHT-OF-WAY
- SLCDPU STORM DRAIN LINE
- SLCDPU WATER LINE
- SLCDPU SEWER LINE
- TRAIN BOX CENTERLINE
- TRAIN BOX FLOOR ELEVATION

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED BY:

SALT LAKE CITY CORPORATION
COMMUNITY AND ECONOMIC DEVELOPMENT
TRANSPORTATION DIVISION
349 SOUTH 200 EAST, SUITE 100 SALT LAKE CITY, UTAH 84111-2836
TELEPHONE: 801-535-7961
FAX: 801-535-6093
E-MAIL: WWW.SLCGOV.COM

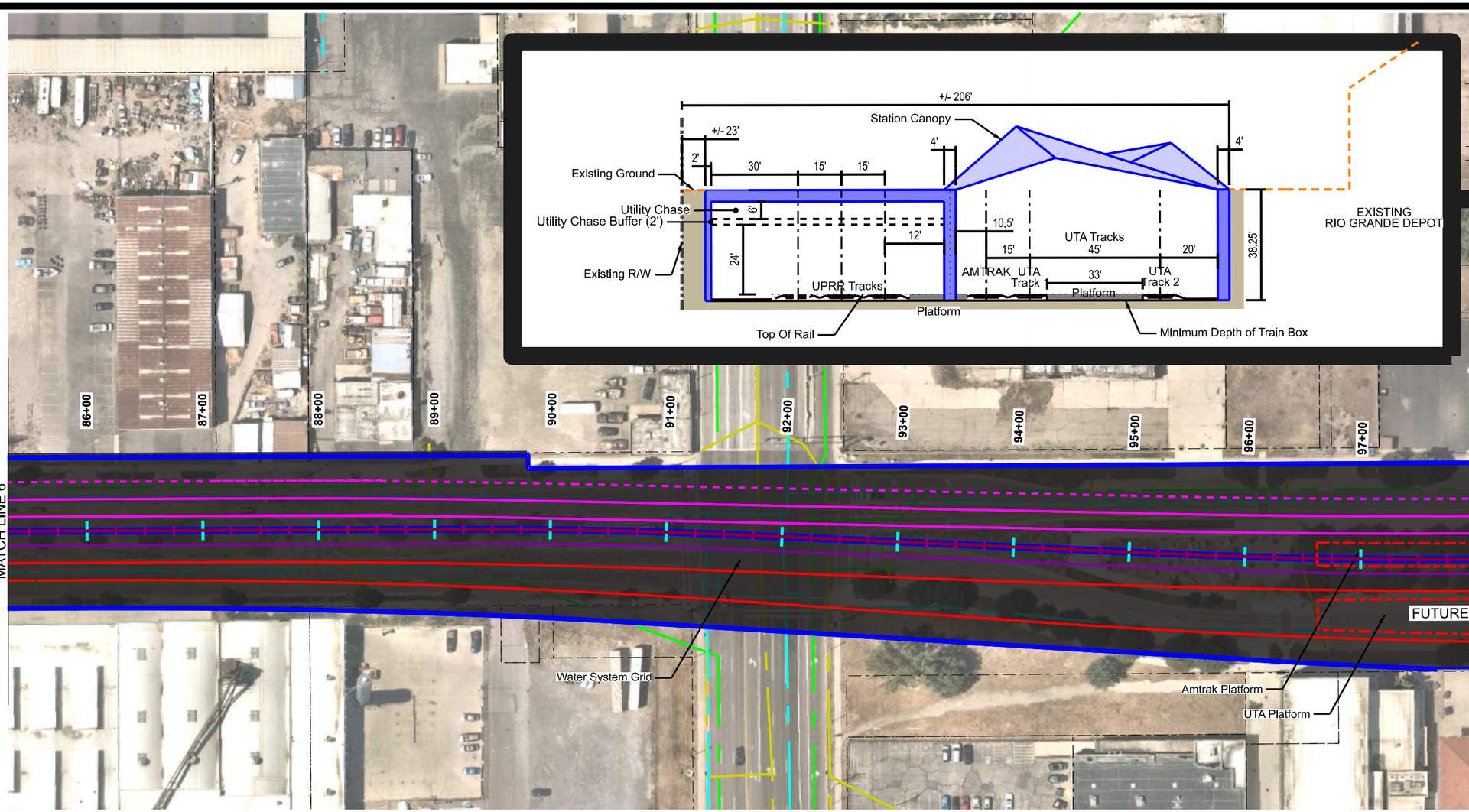
Kimley»Horn

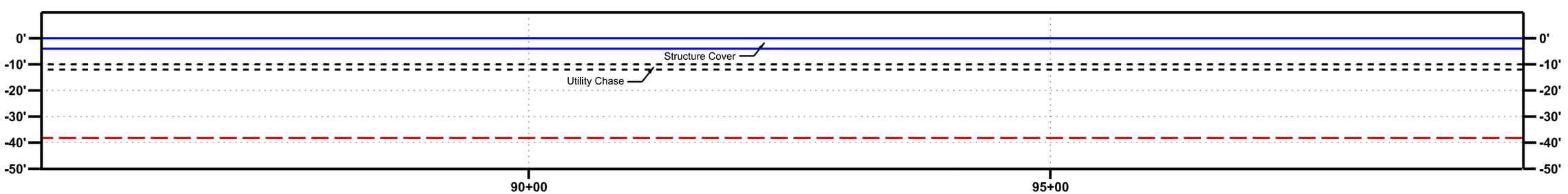
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 6

BINDING ORDER 6/15





- SLOPED TRAIN BOX
- FLAT TRAIN BOX
- FUTURE UTA TRACK
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- FUTURE UPRR TRACK
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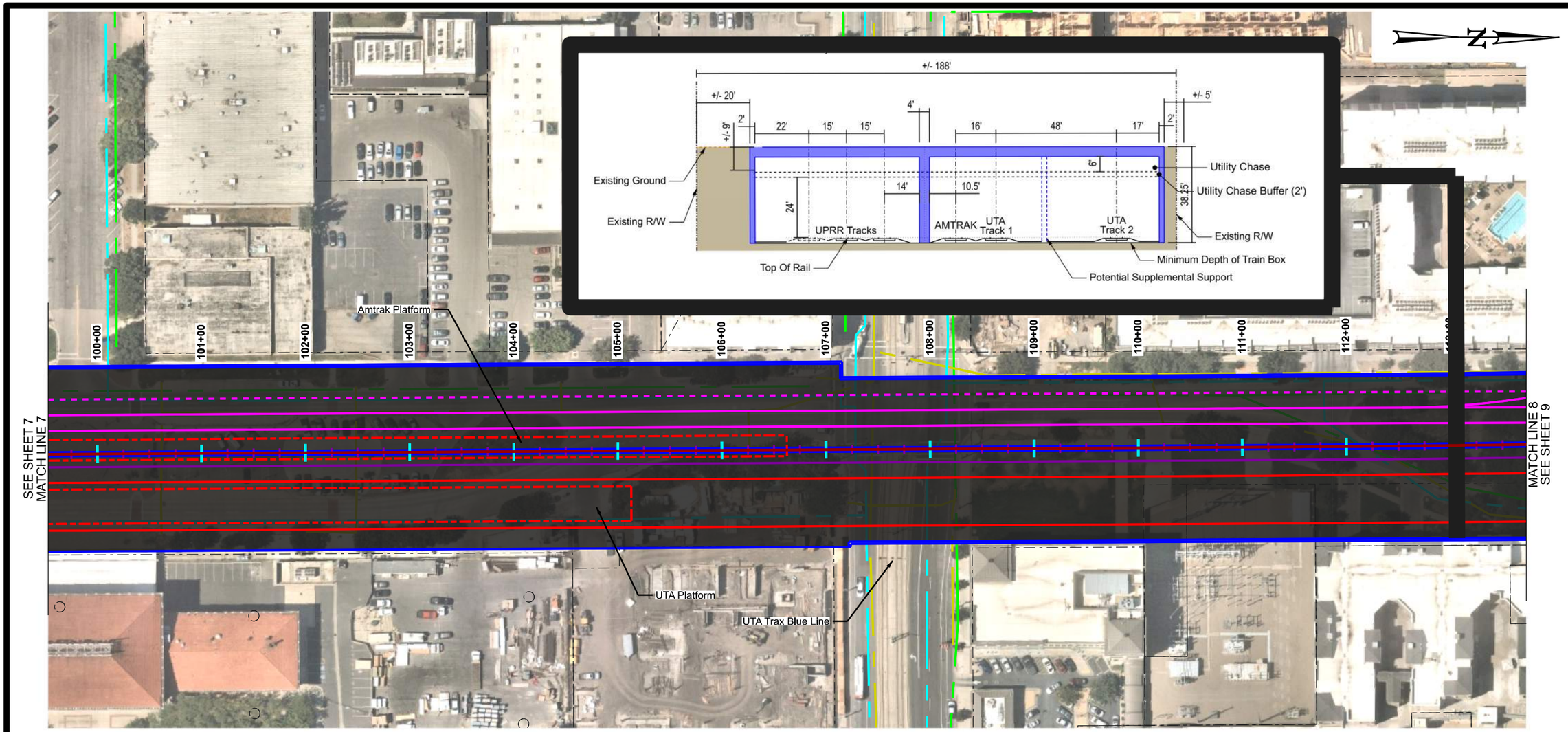
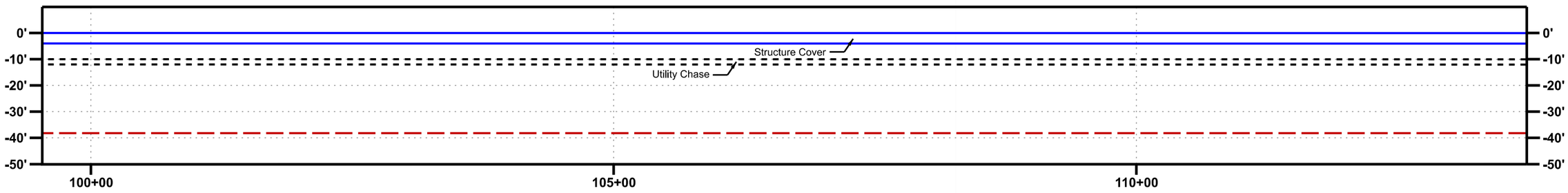
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 7

BINDING ORDER 7/15





- SLOPED TRAIN BOX
- FLAT TRAIN BOX
- FUTURE UTA TRACK
- FUTURE AMTRAK TRACK
- FUTURE UPRR TRACK
- POTENTIAL UPRR TRACK
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PRELIMINARY

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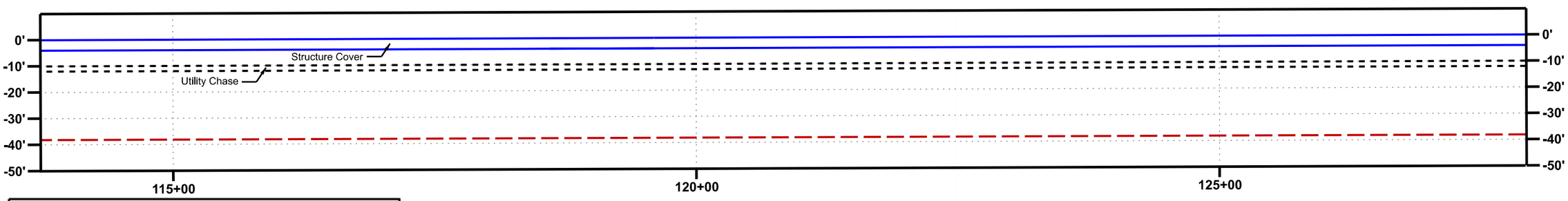
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 8

BINDING ORDER 8/15



- SLOPED TRAIN BOX
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PRELIMINARY
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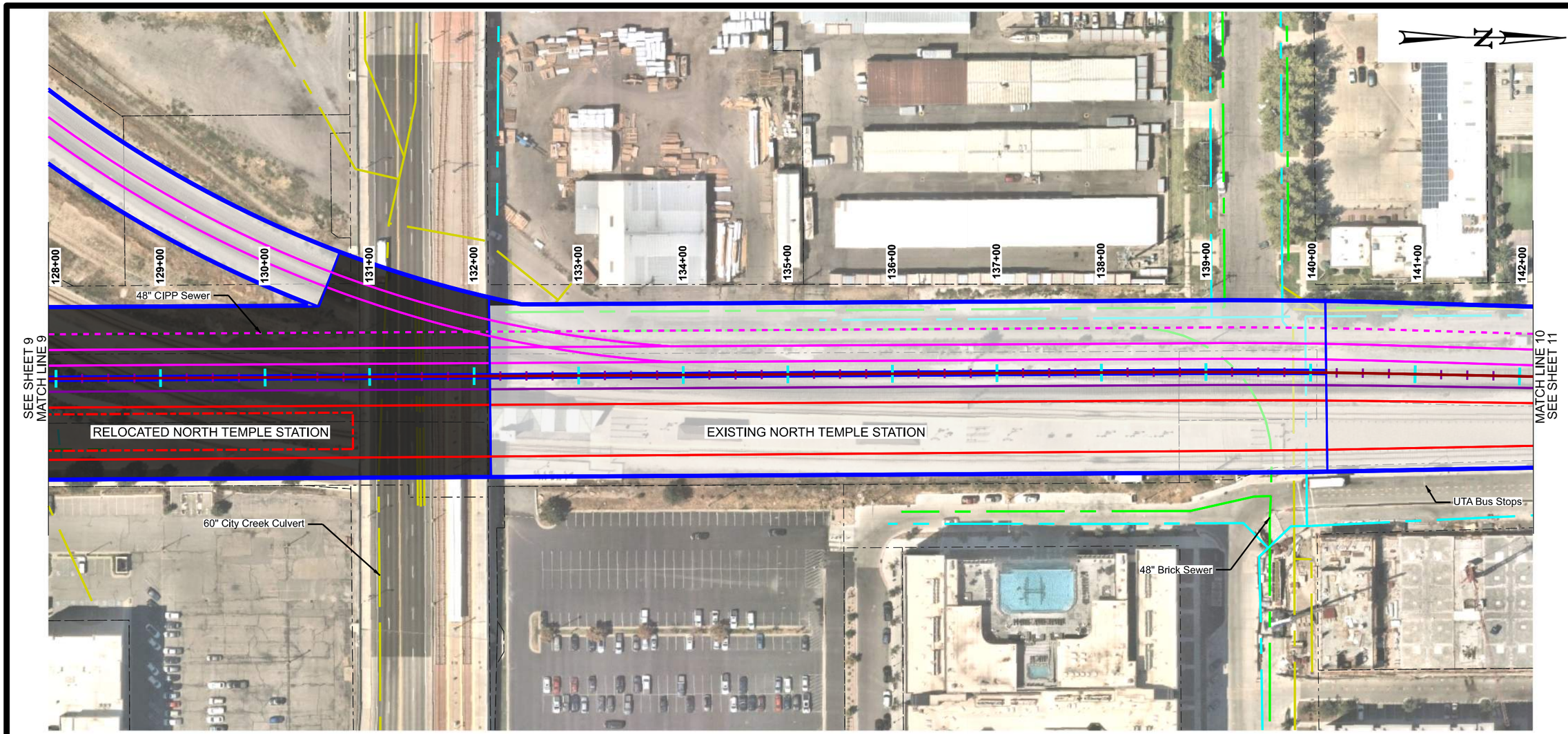
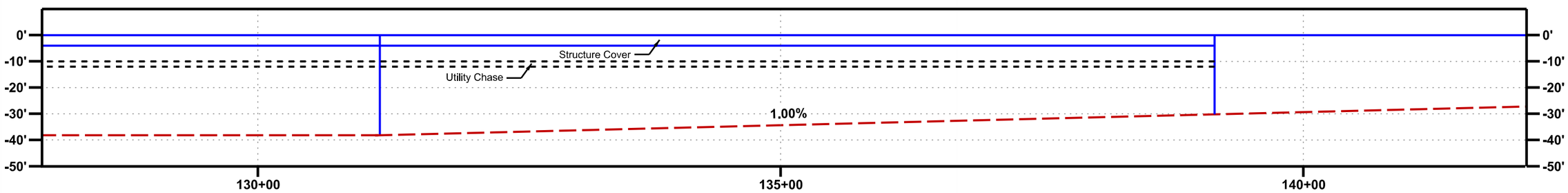
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 9

BINDING ORDER 9/15





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- TRAIN BOX FLOOR ELEVATION

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TELEPHONE: 801-535-7961
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E-MAIL: WWW.SLCGOV.COM

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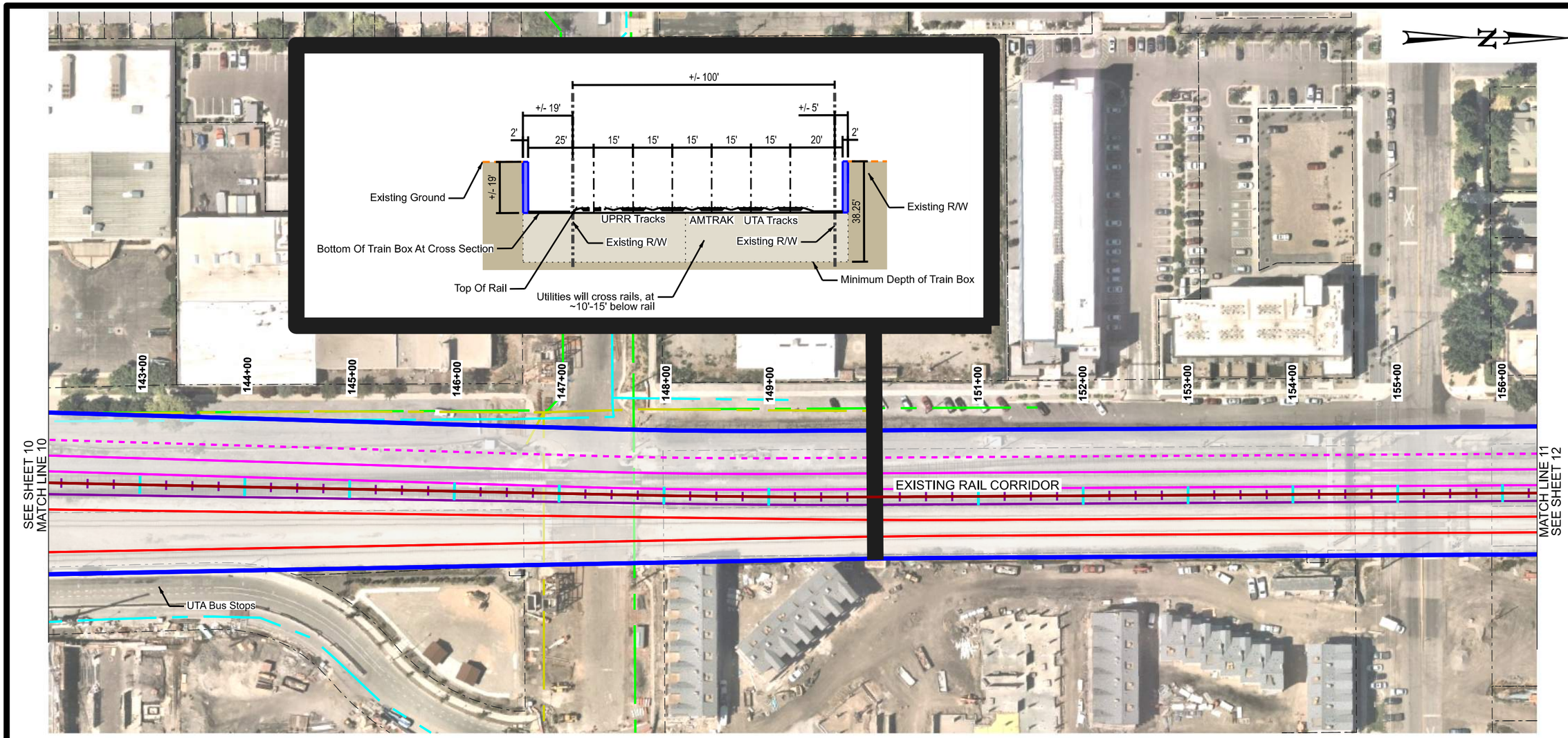
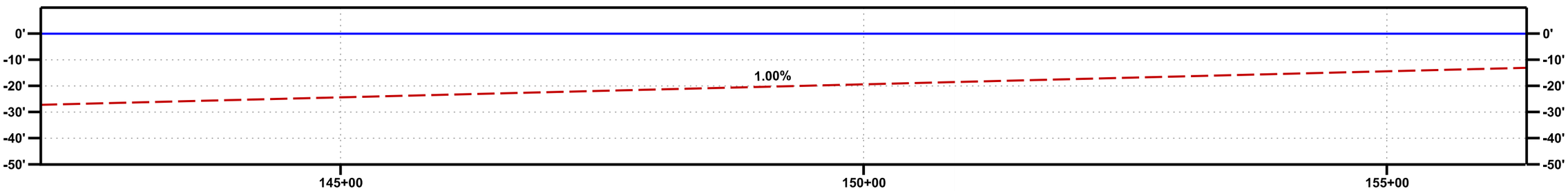
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 10

BINDING ORDER 10/15





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- FUTURE UPRR TRACK
- POTENTIAL UPRR TRACK
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- SLCDPU WATER LINE
- SLCDPU SEWER LINE
- TRAIN BOX CENTERLINE
- TRAIN BOX FLOOR ELEVATION

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TRANSPORTATION DIVISION
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TELEPHONE: 801-535-7961
FAX: 801-535-6093
E-MAIL: WWW.SLCGOV.COM
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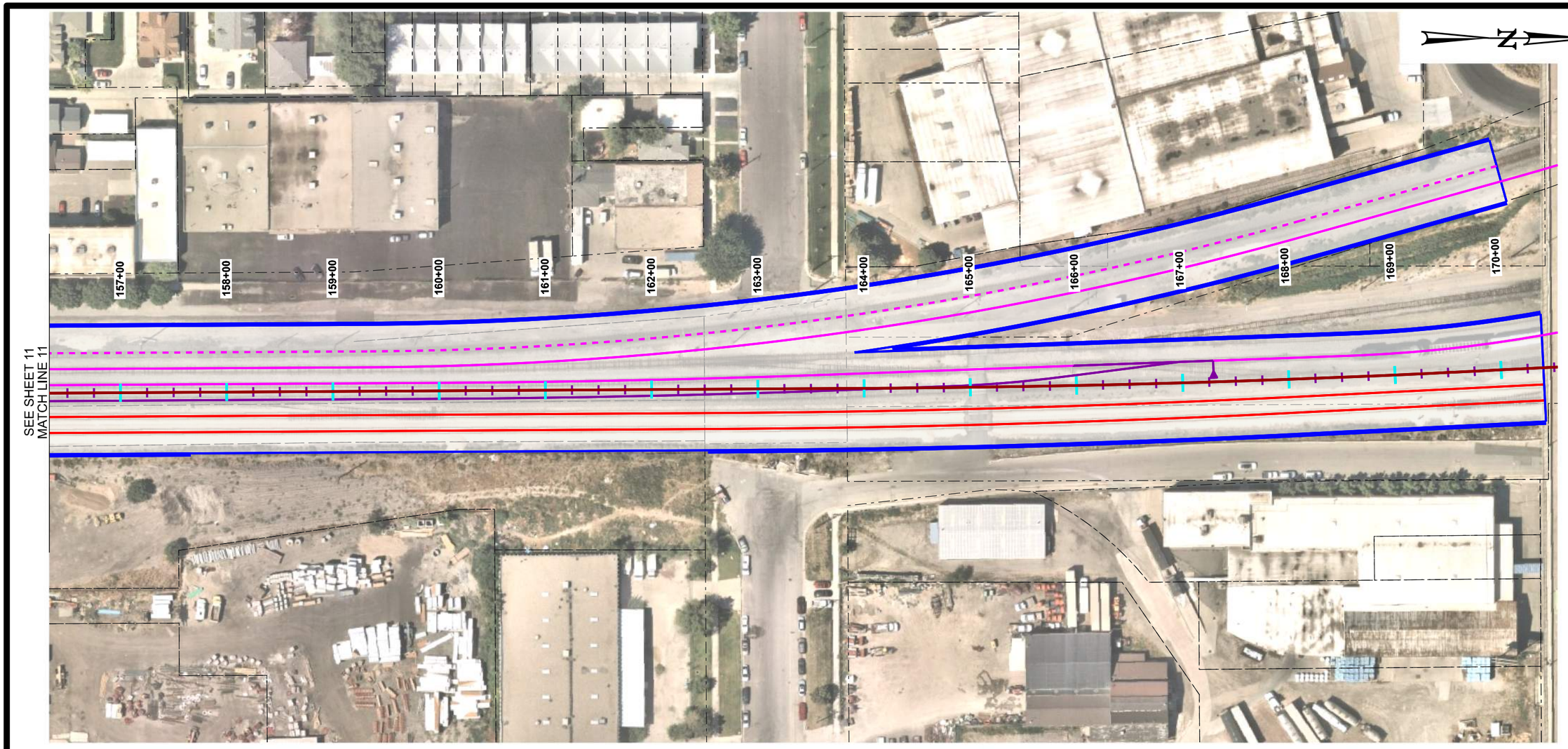
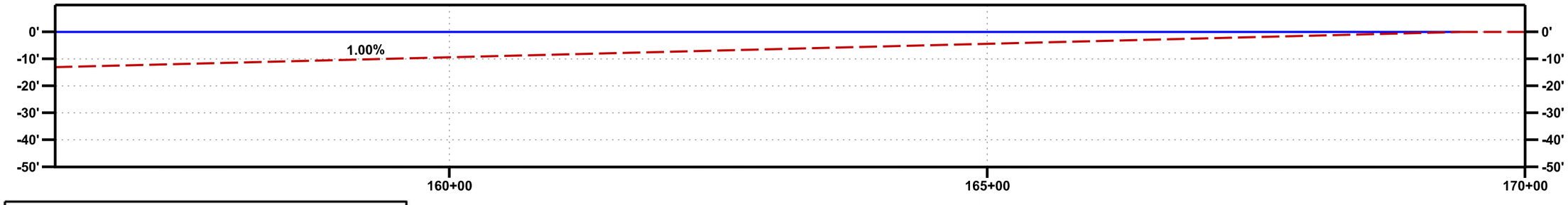
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 11

BINDING ORDER 11/15





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- FUTURE AMTRAK TRACK
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- TRAIN BOX FLOOR ELEVATION

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TELEPHONE: 801-535-7961
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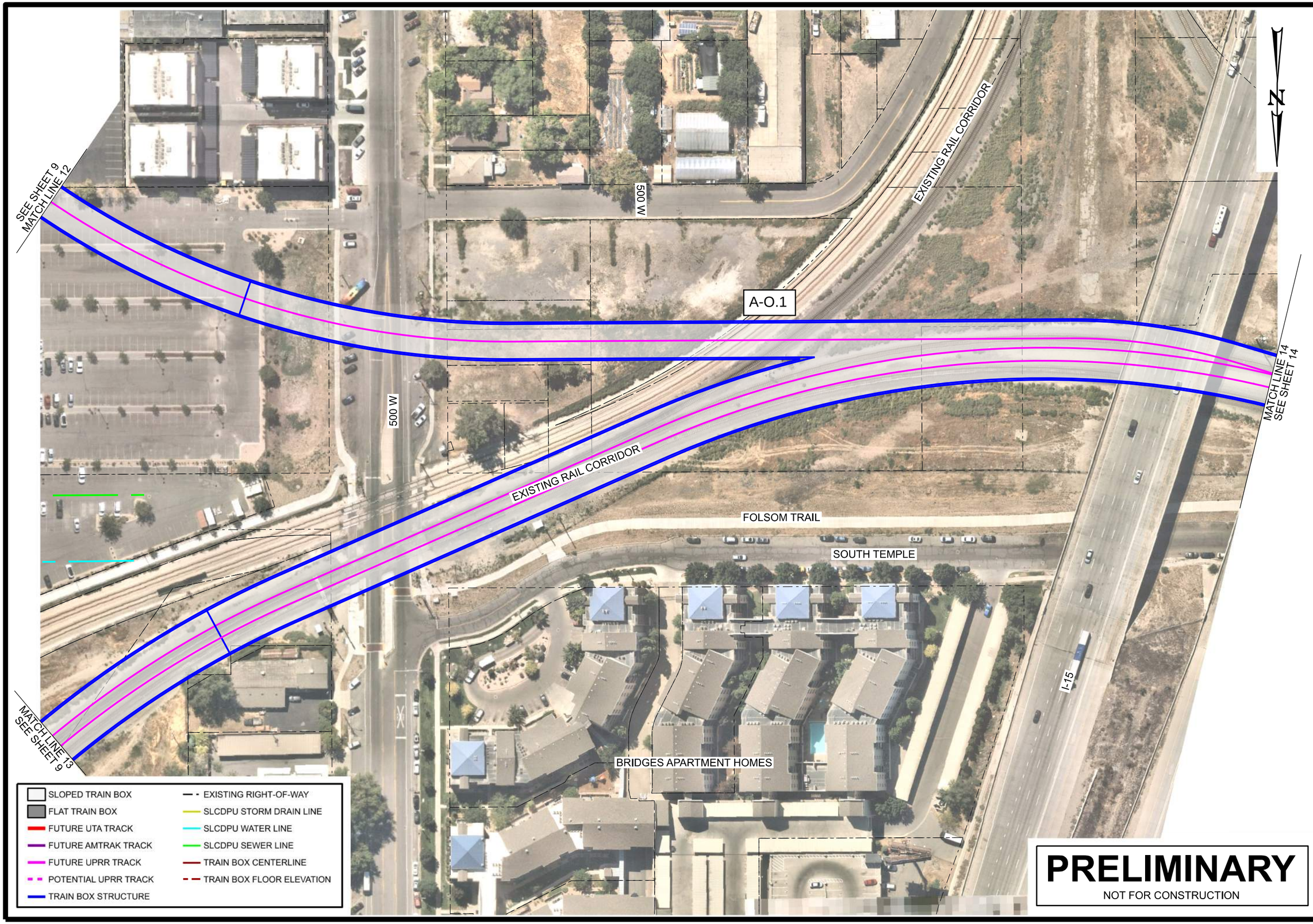
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 12

BINDING ORDER 12/15



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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:

ALIGNMENT

SHEET IDENTIFIER:

ALG 13

BINDING ORDER 13/15

SEE SHEET 13
MATCH LINE 14

FOLSOM TRAIL

800 W

JEREMY ST

900 W

A-O.1

FOLSOM TRAIL

MATCH LINE 15
SEE SHEET 15

SOUTH TEMPLE

800 W

900 W

EMERIL AVE

- SLOPED TRAIN BOX
- FLAT TRAIN BOX
- FUTURE UTA TRACK
- FUTURE AMTRAK TRACK
- FUTURE UPRR TRACK
- POTENTIAL UPRR TRACK
- TRAIN BOX STRUCTURE
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PRELIMINARY

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Kimley»Horn

RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 14

BINDING ORDER 14/15

FOLSOM AVE

1000 W

PATRIOT RAIL YARD

A-R.10

SEE SHEET 14
MATCH LINE 15

SOUTH TEMPLE

CHICAGO ST

AMERICAN BEAUTY DR

LEARNED AVE

- SLOPED TRAIN BOX
- FLAT TRAIN BOX
- FUTURE UTA TRACK
- FUTURE AMTRAK TRACK
- FUTURE UPRR TRACK
- POTENTIAL UPRR TRACK
- TRAIN BOX STRUCTURE
- EXISTING RIGHT-OF-WAY
- SLCDPU STORM DRAIN LINE
- SLCDPU WATER LINE
- SLCDPU SEWER LINE
- TRAIN BOX CENTERLINE
- TRAIN BOX FLOOR ELEVATION

PRELIMINARY

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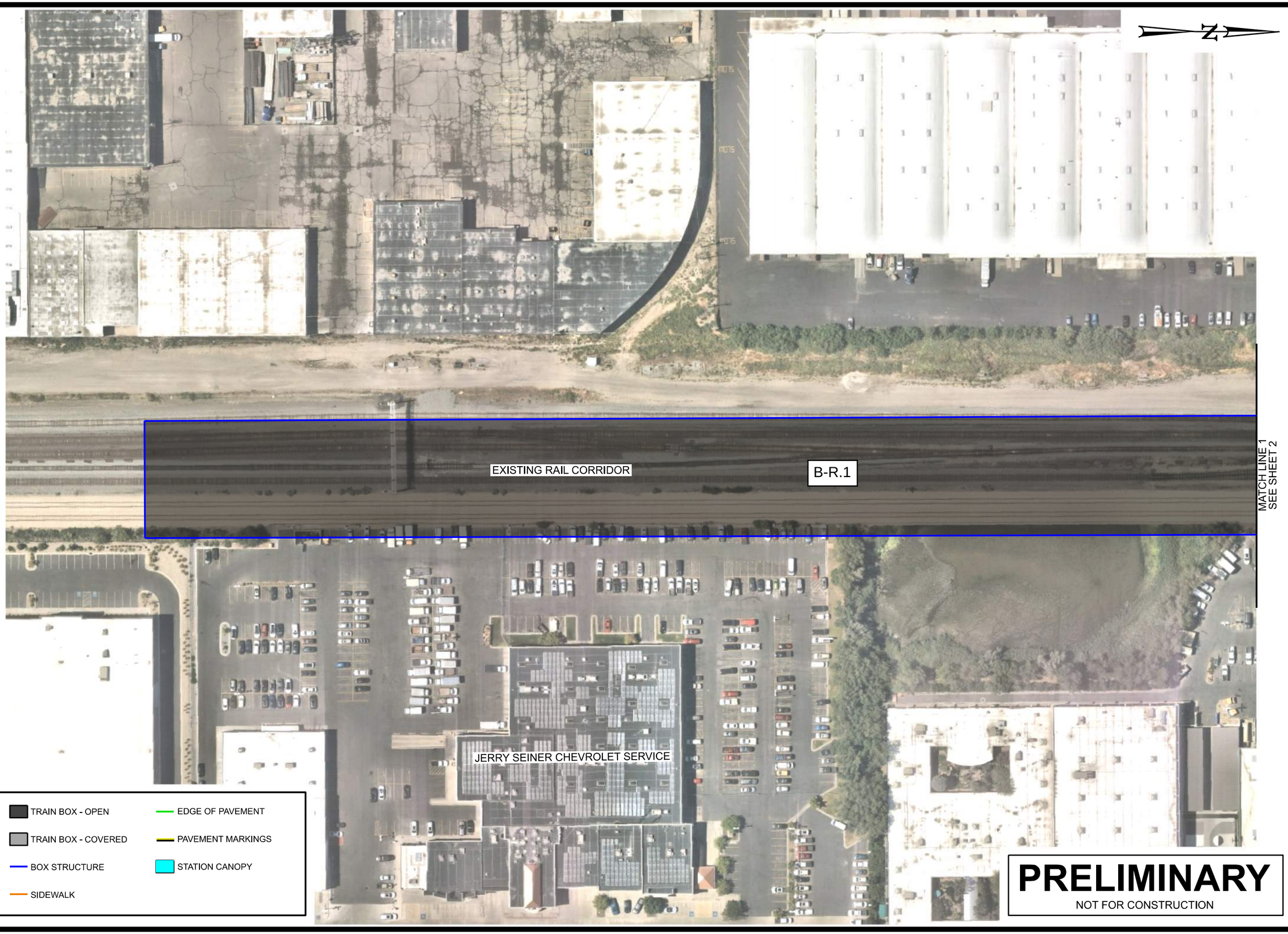
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
ALIGNMENTS

SHEET IDENTIFIER:
ALG 15

BINDING ORDER 15/15

APPENDIX B – COVER ANALYSIS



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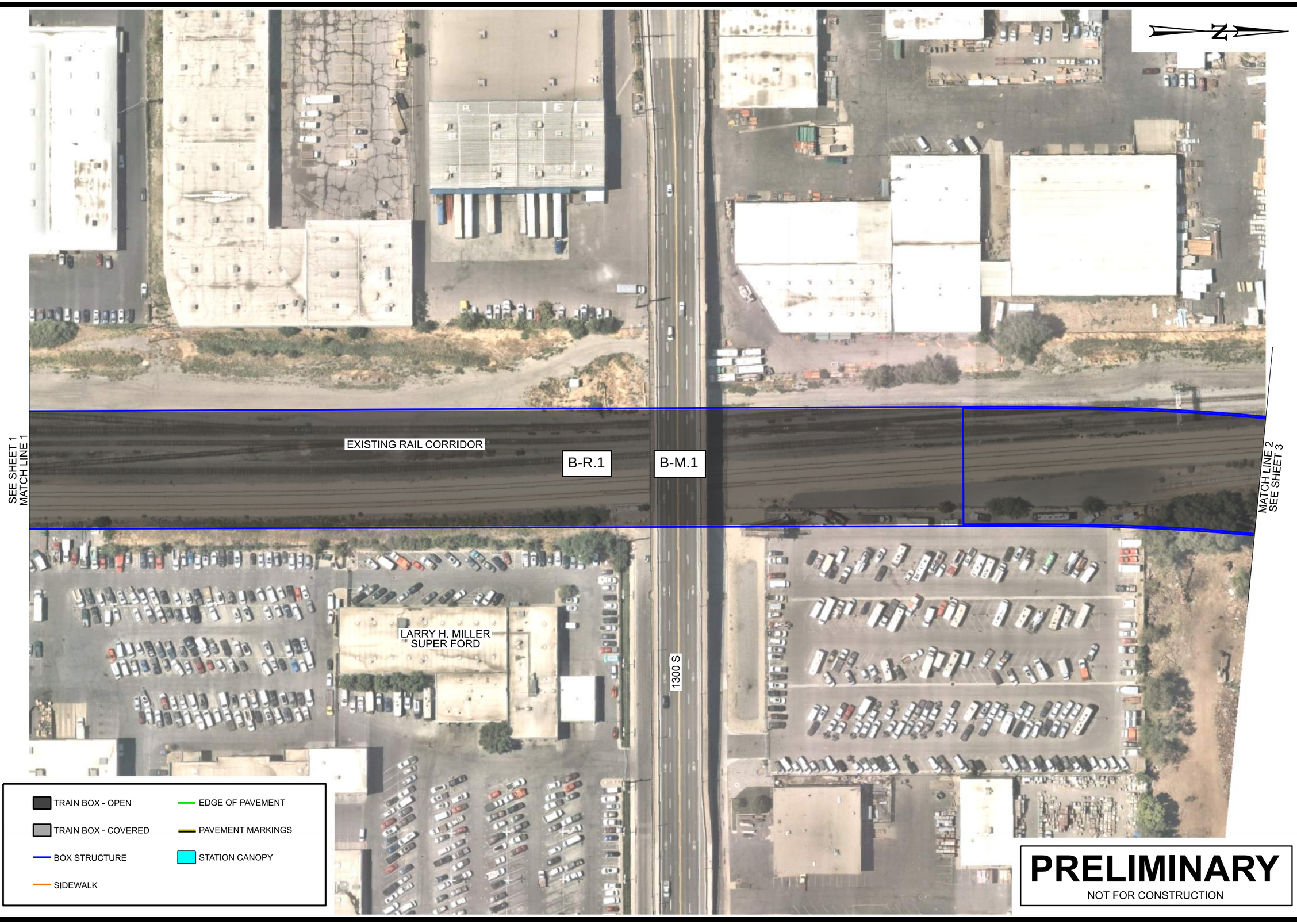
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 1

BINDING ORDER 1/15

PRELIMINARY
NOT FOR CONSTRUCTION



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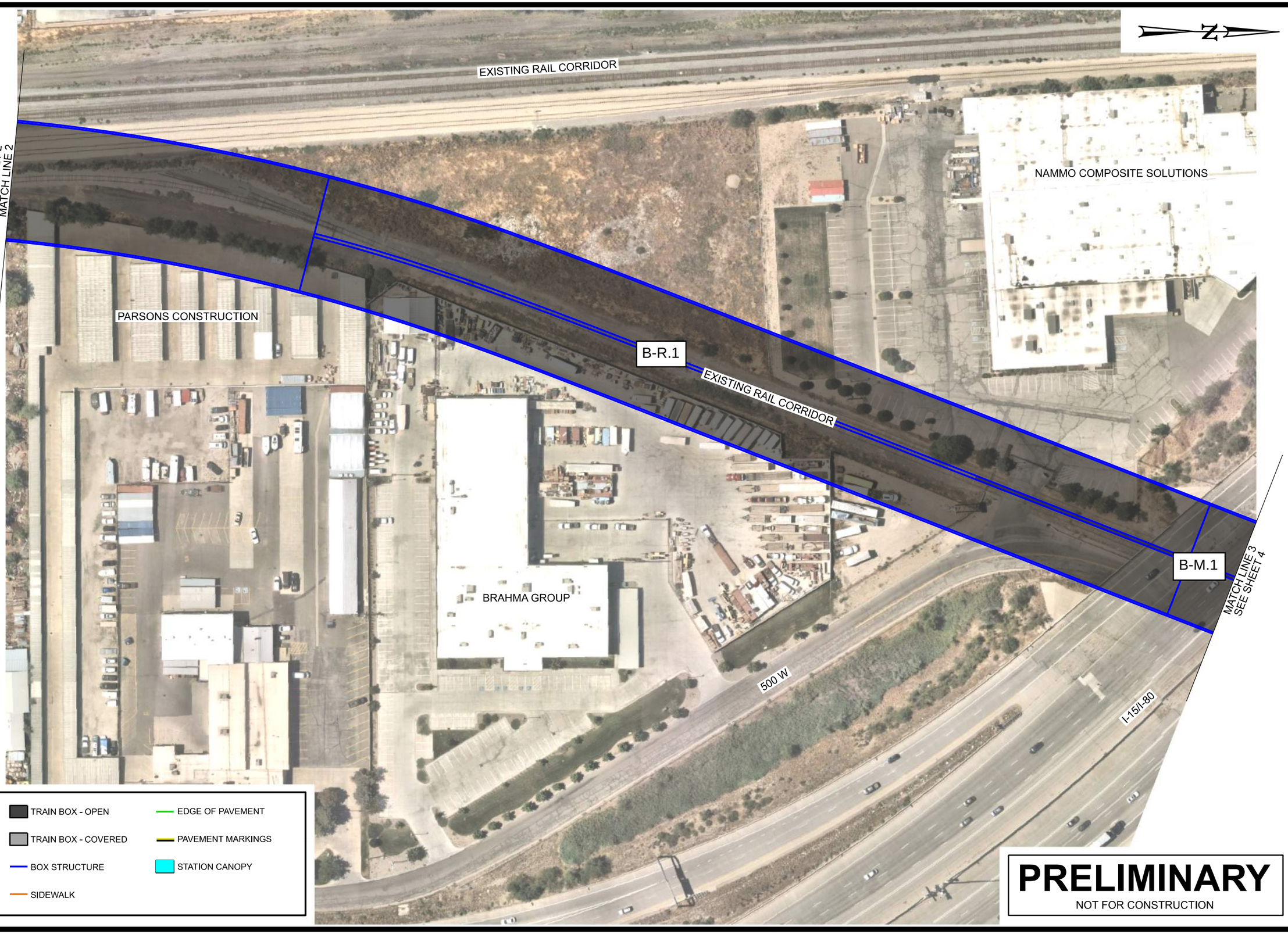
Kimley»Horn

RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 2

BINDING ORDER 2/15



PRELIMINARY

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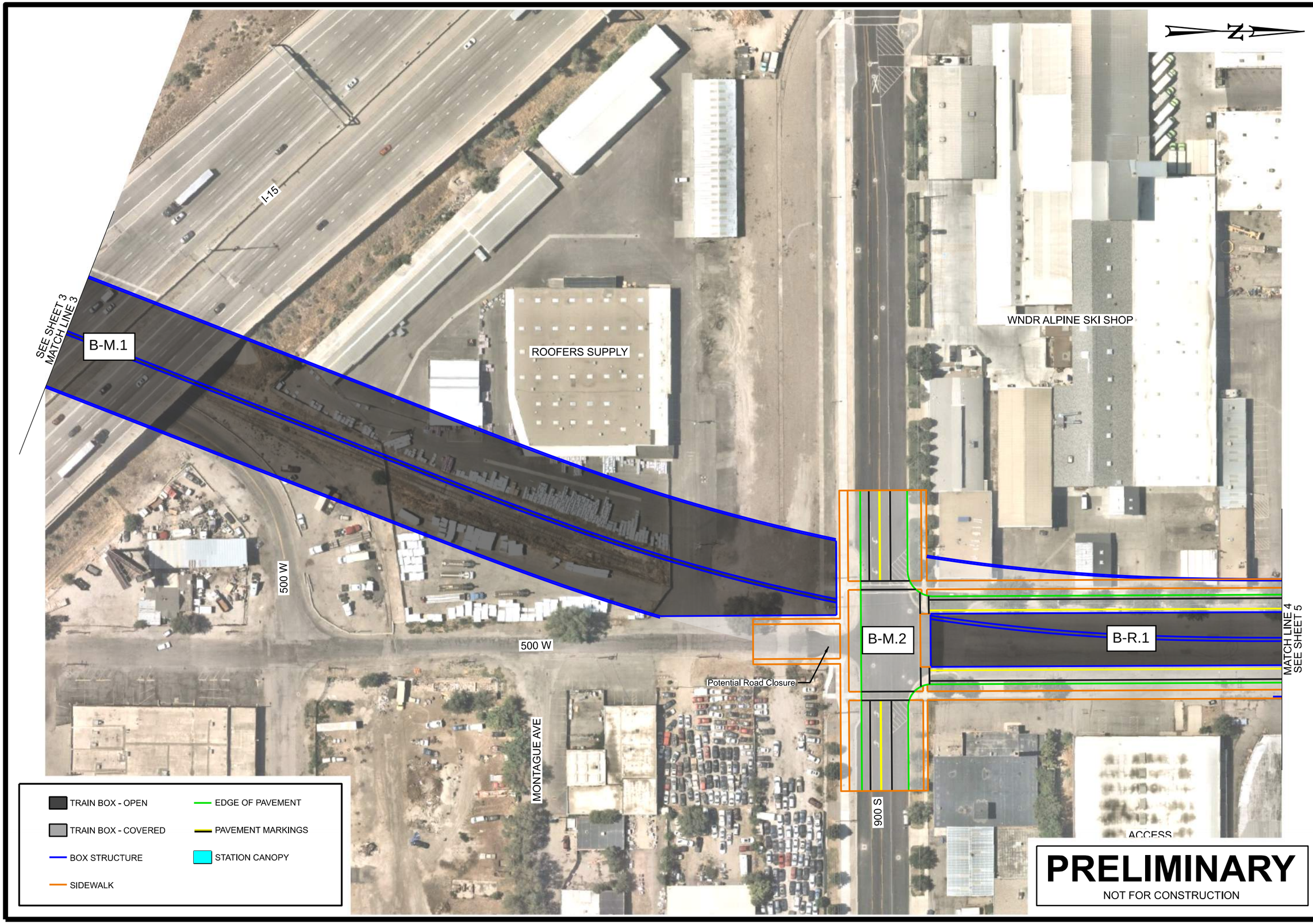
RIO GRANDE SCREENING AND

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 3

BINDING ORDER 3/15



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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 4

BINDING ORDER 4/15

PRELIMINARY
NOT FOR CONSTRUCTION

WOODBINE ST

INDUSTRY SLC

SEE SHEET 4
MATCH LINE 4

B-R.1

B-M.2

500 W

B-M.2

MATCH LINE 5
SEE SHEET 6

800 S

700 S

S ELDER CT

TRAIN BOX - OPEN

TRAIN BOX - COVERED

BOX STRUCTURE

SIDEWALK

EDGE OF PAVEMENT

PAVEMENT MARKINGS

STATION CANOPY

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED BY:

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RIO GRANDE SCREENING ANALYSIS

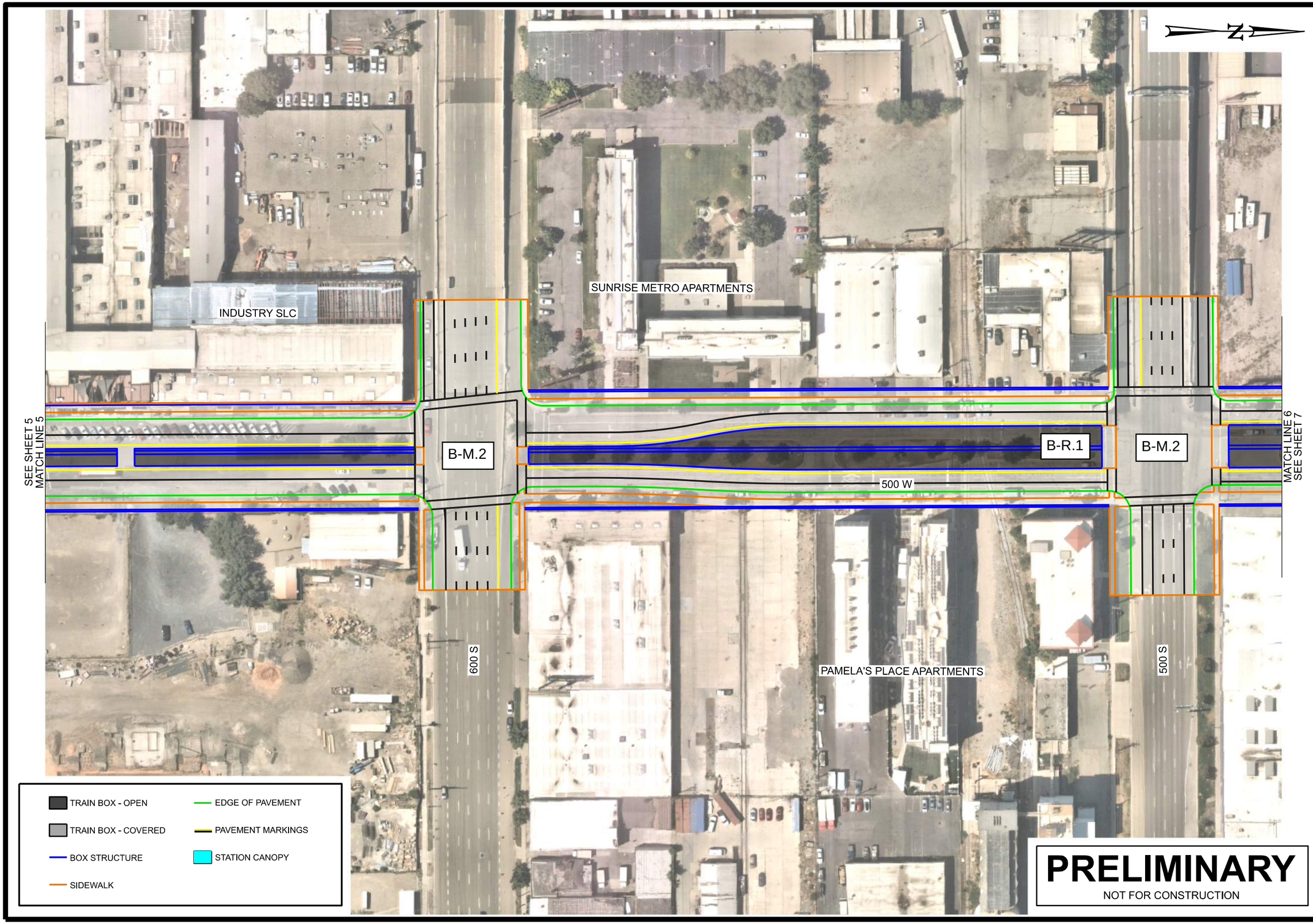
SHEET TITLE:

COVER ANALYSIS

SHEET IDENTIFIER:

CV 5

BINDING ORDER 5/15



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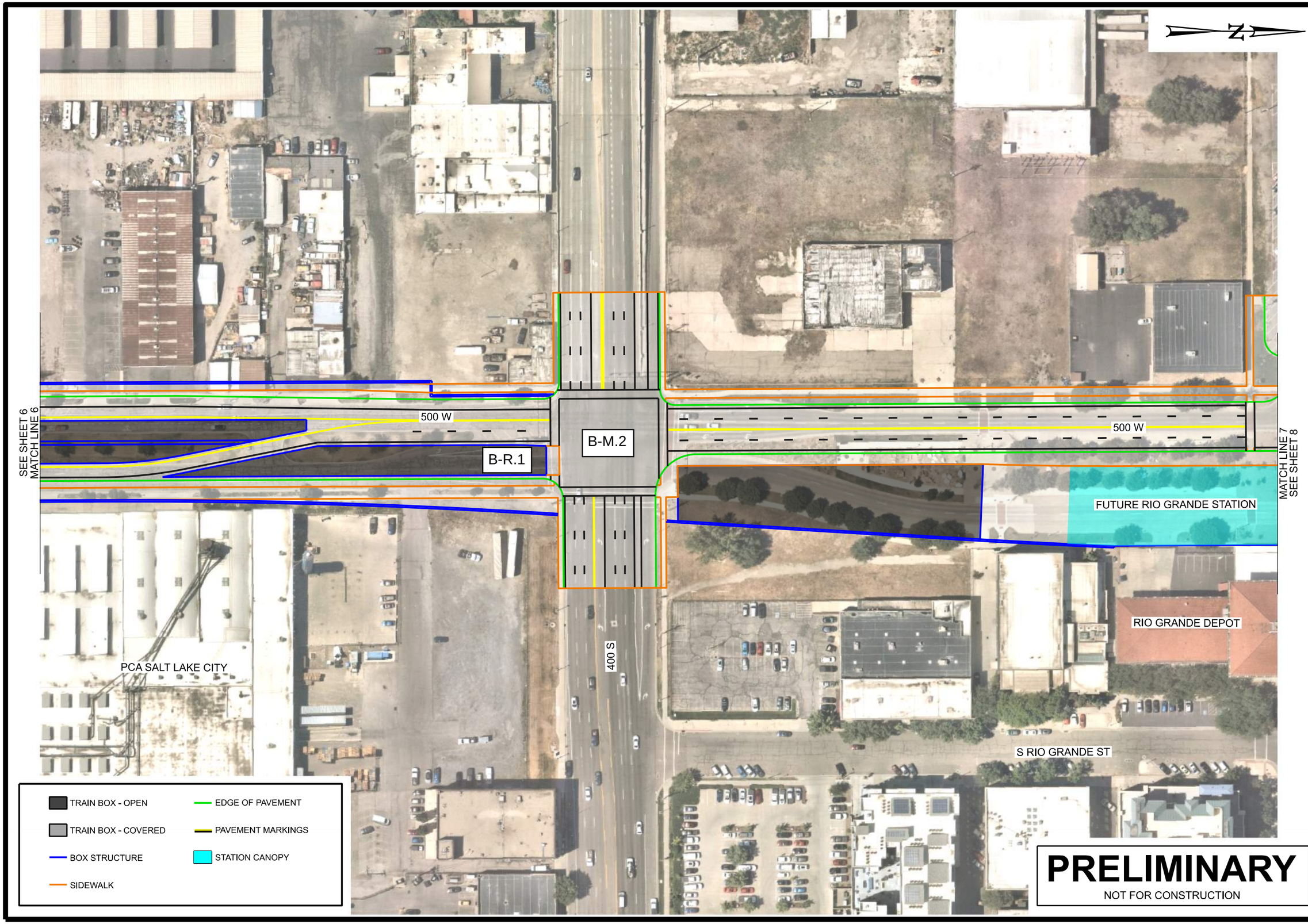
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 6

BINDING ORDER 6/15



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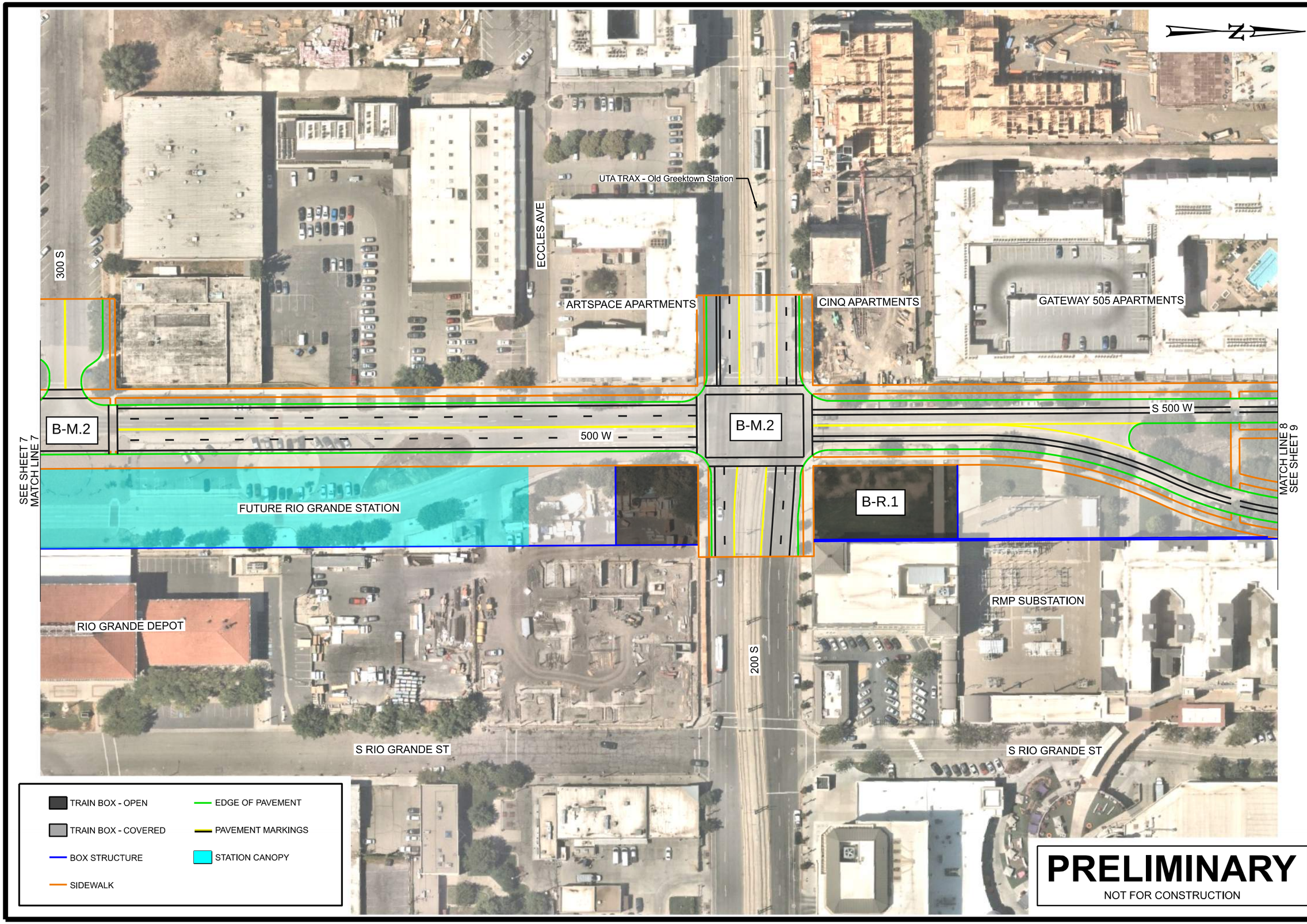
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 7

BINDING ORDER 7/15



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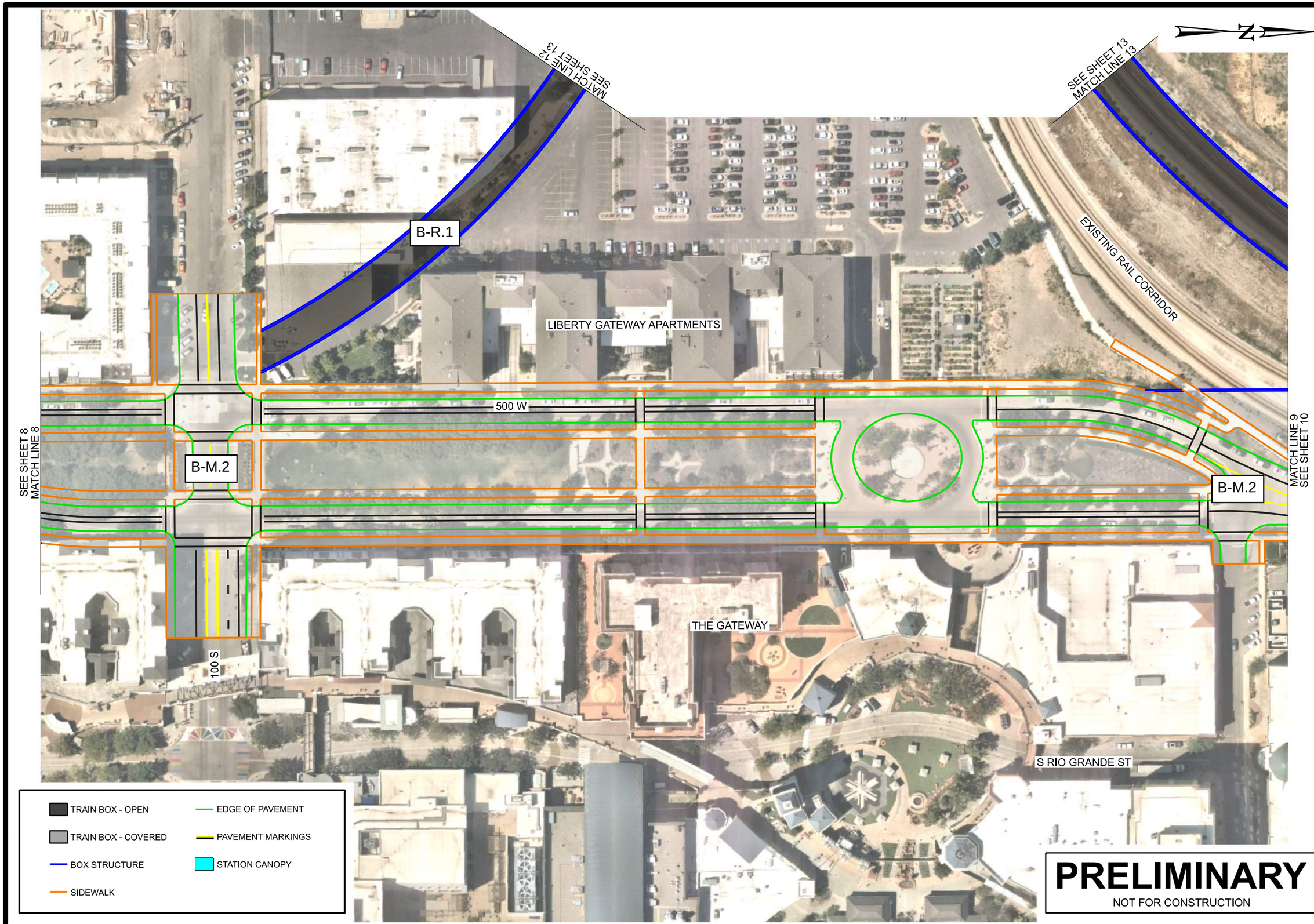
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 8

BINDING ORDER 8/15



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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 9

BINDING ORDER 9/15

EXISTING RAIL CORRIDOR

EXISTING RAIL CORRIDOR

SEE SHEET 9
MATCH LINE 9

B-M.1

ROUND WINDOW
MOULDINGS INC.

U-HAUL NEIGHBORHOOD
DEALER

New Crossing Due to North Temple Station Relocation

Road Closure

B-R.1

EXISTING RAIL CORRIDOR

200 N

Road Converted To One-Way

500 W

B-M.1

MATCH LINE 10
SEE SHEET 11

UTA FrontRunner -
Existing North Temple Station

New Connector Road

NORTH TEMPLE

HARDWARE APARTMENTS

SALT LAKE CROSSING APARTMENTS

200 N

TRAIN BOX - OPEN

TRAIN BOX - COVERED

BOX STRUCTURE

SIDEWALK

EDGE OF PAVEMENT

PAVEMENT MARKINGS

STATION CANOPY

PRELIMINARY

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E-MAIL: WWW.SLCGOV.COM

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RIO GRANDE SCREENING ANALYSIS

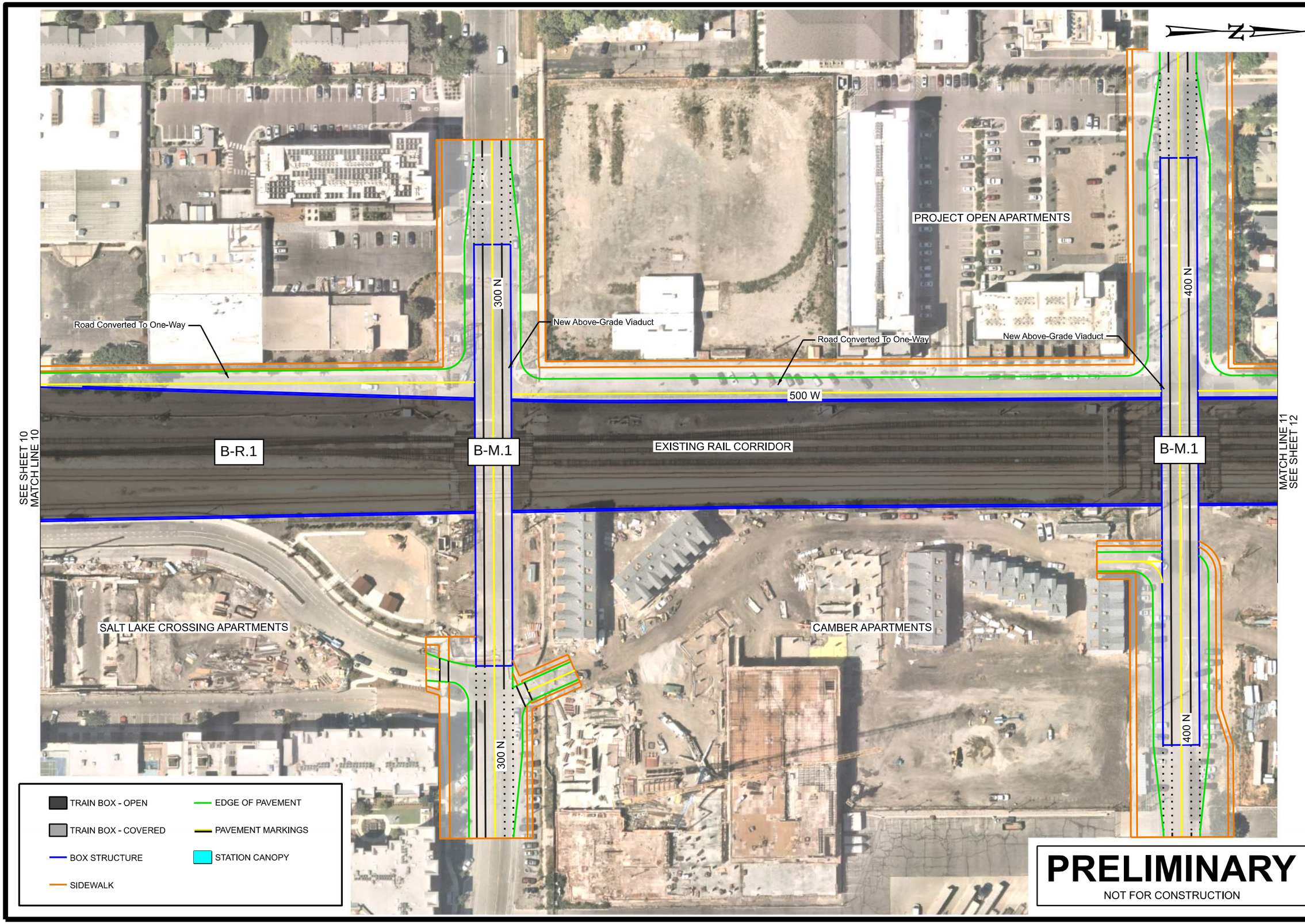
SHEET TITLE:

COVER ANALYSIS

SHEET IDENTIFIER:

CV 10

BINDING ORDER 10/15



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TRANSPORTATION DIVISION
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TELEPHONE: 801-535-7961
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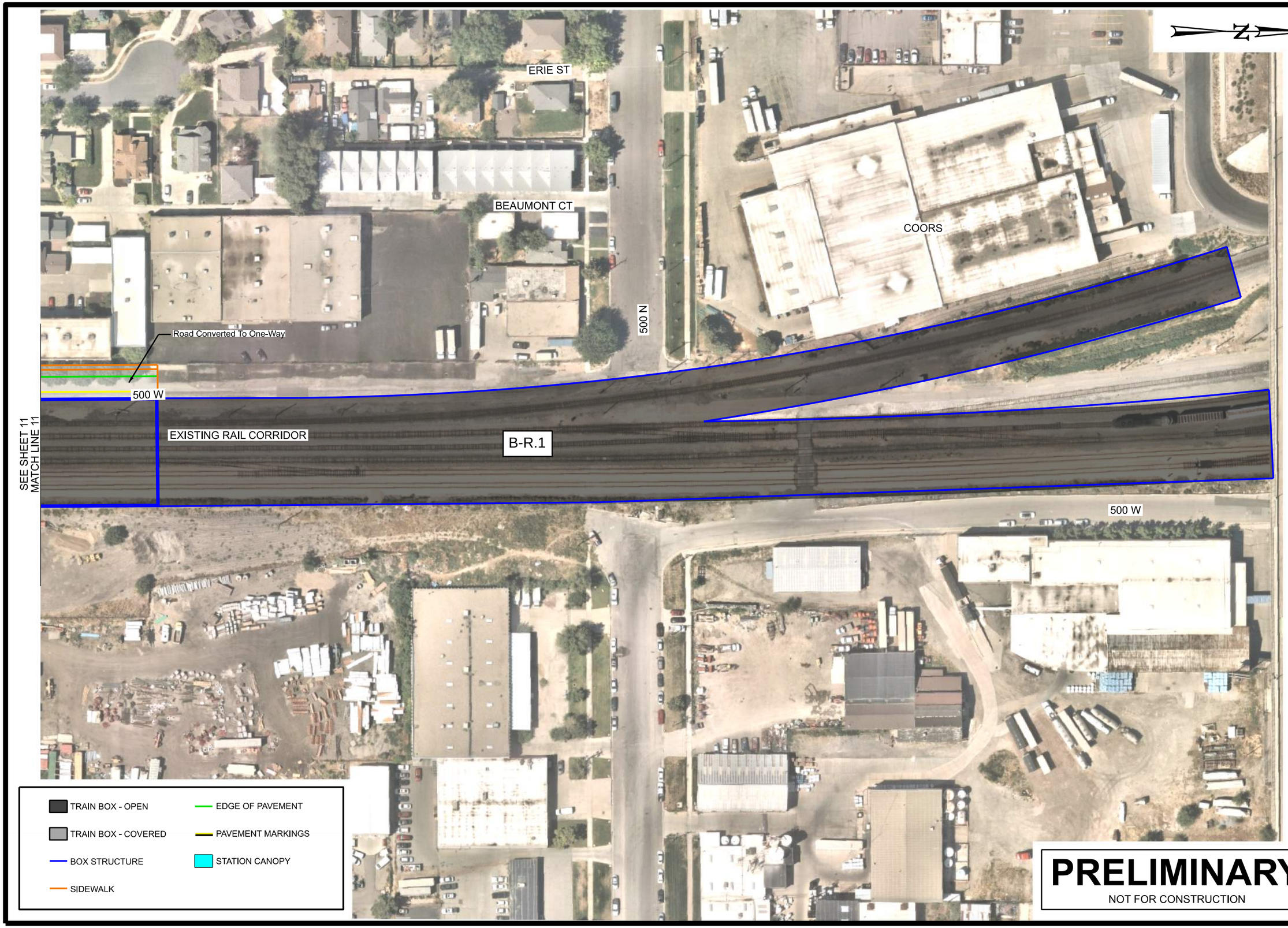
RIO GRANDE SCREENING ANALYSIS

PRELIMINARY
NOT FOR CONSTRUCTION

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 11

BINDING ORDER 11/15



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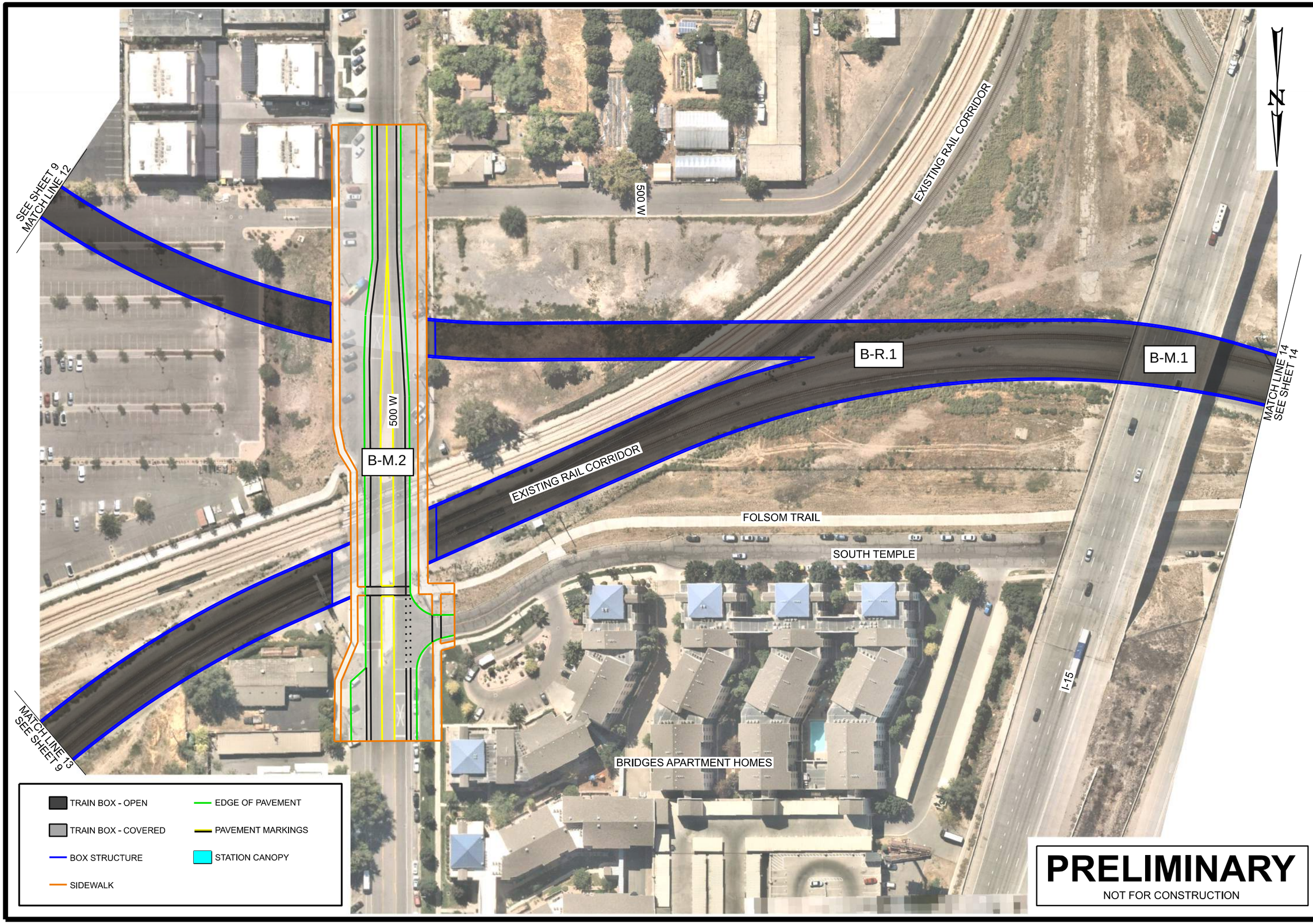
RIO GRANDE SCREENING ANALYSIS

PRELIMINARY
NOT FOR CONSTRUCTION

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 12

BINDING ORDER 12/15



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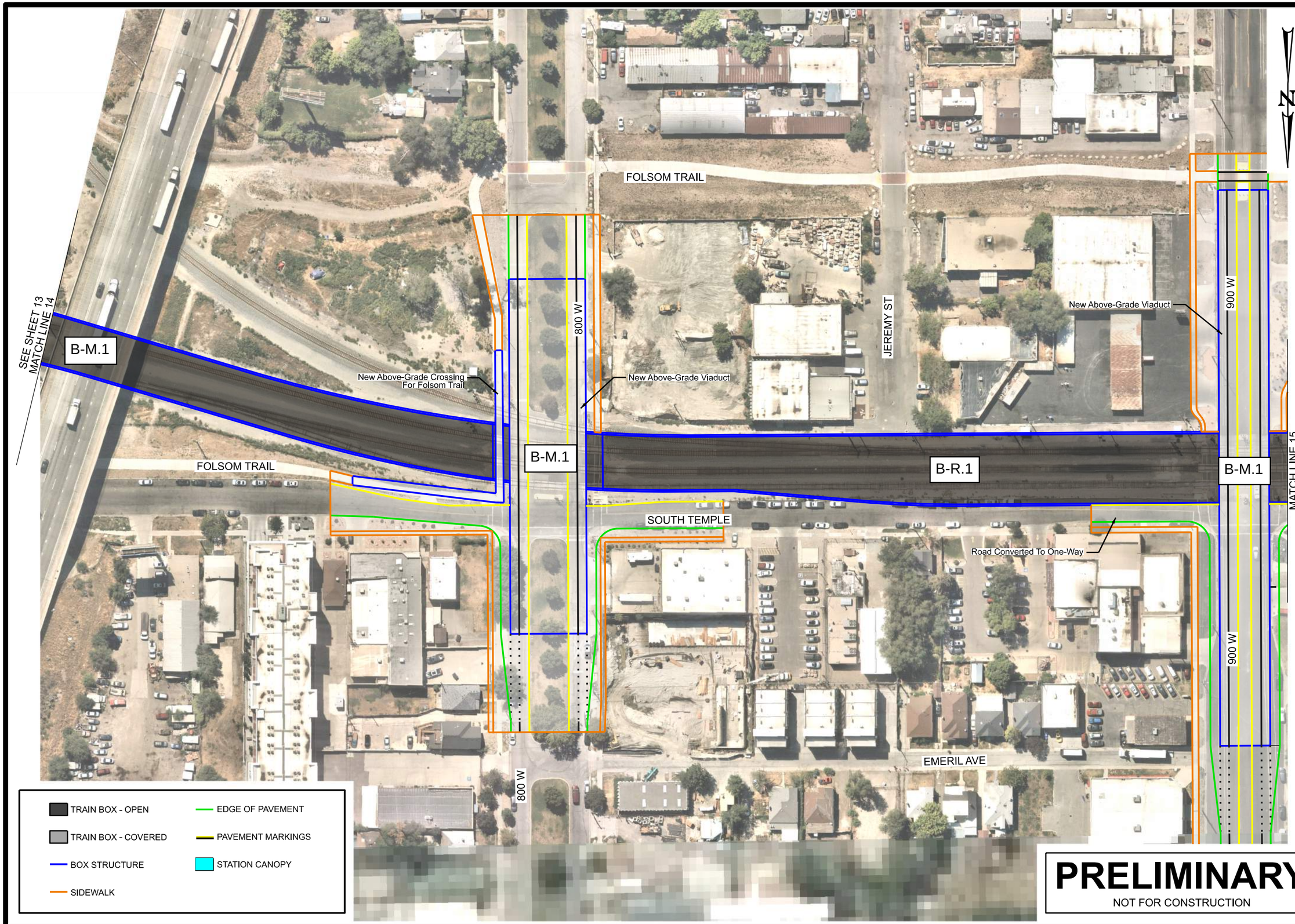
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
COVER ANALYSIS

SHEET IDENTIFIER:
CV 13

BINDING ORDER 13/15

PRELIMINARY
NOT FOR CONSTRUCTION



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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:

COVER ANALYSIS

SHEET IDENTIFIER:

CV 14

BINDING ORDER 14/15

FOLSOM AVE

1000 W

SEE SHEET 14
MATCH LINE 15

B-R.1

SOUTH TEMPLE

Road Converted To One-Way

PATRIOT RAIL YARD

CHICAGO ST

AMERICAN BEAUTY DR

LEARNED AVE

TRAIN BOX - OPEN

TRAIN BOX - COVERED

BOX STRUCTURE

SIDEWALK

EDGE OF PAVEMENT

PAVEMENT MARKINGS

STATION CANOPY

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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:

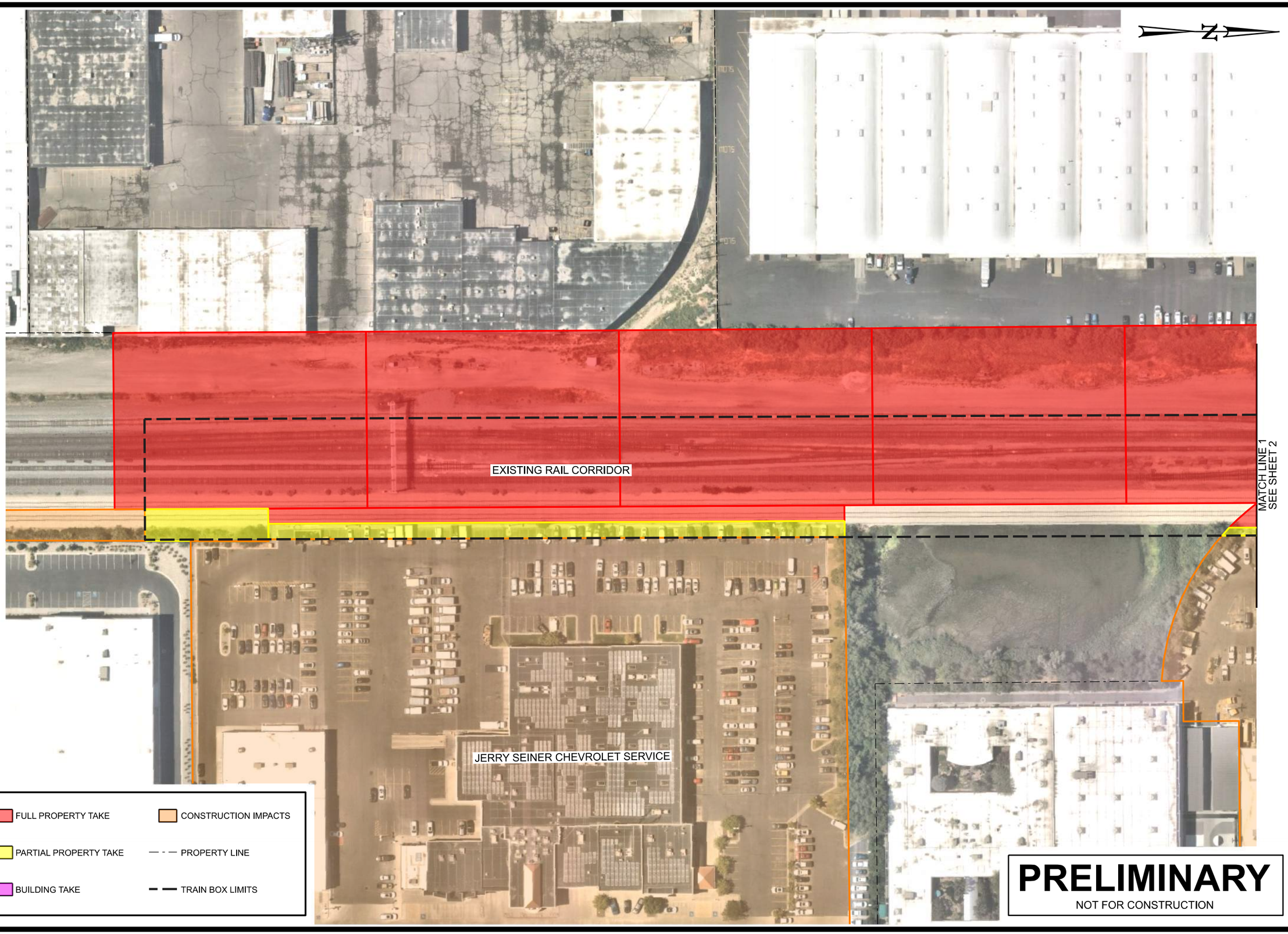
COVER ANALYSIS

SHEET IDENTIFIER:

CV 15

BINDING ORDER 15/15

APPENDIX C – RIGHT OF WAY ANALYSIS



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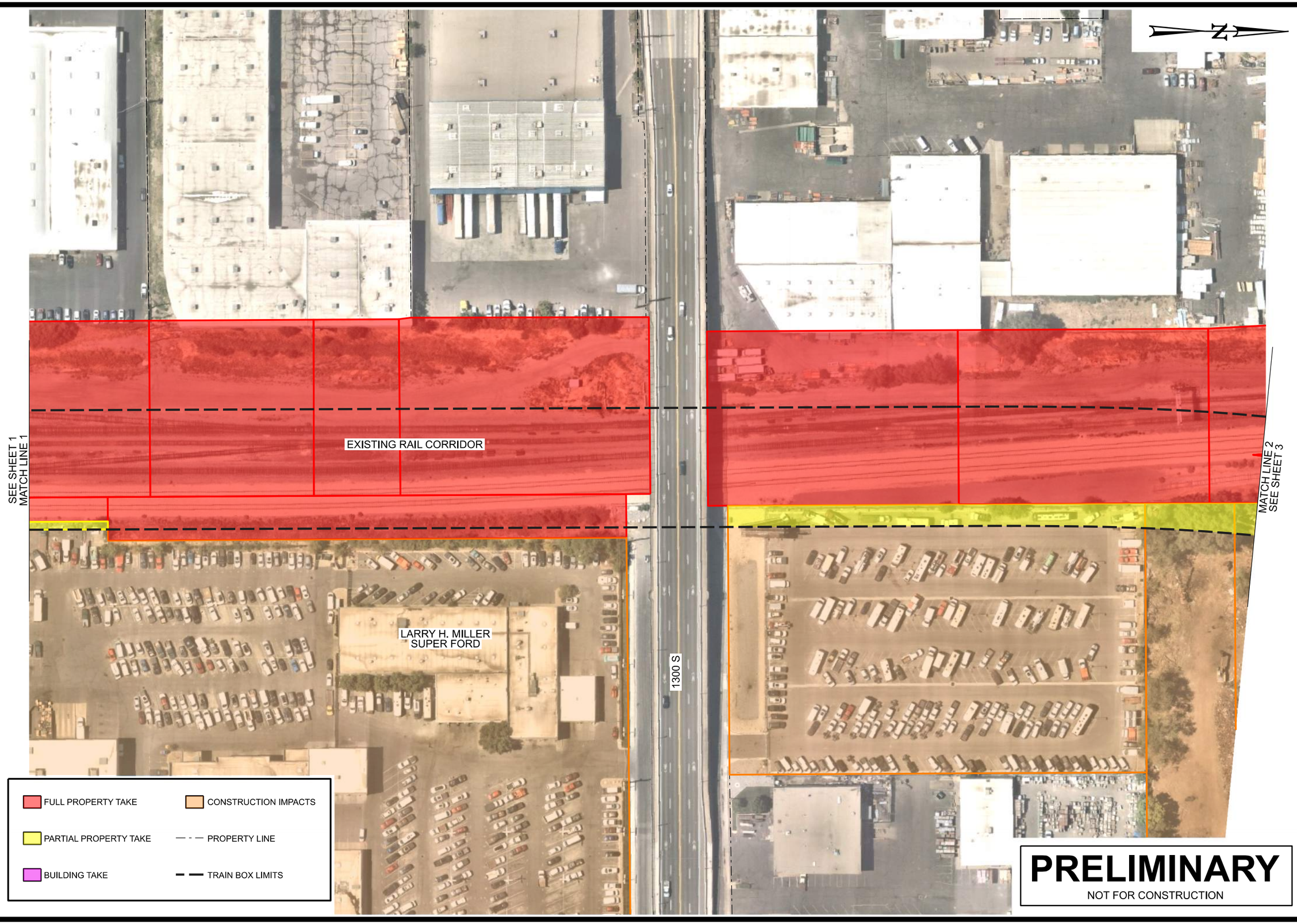
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 1

BINDING ORDER 1/15



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RIO GRANDE SCREENING ANALYSIS

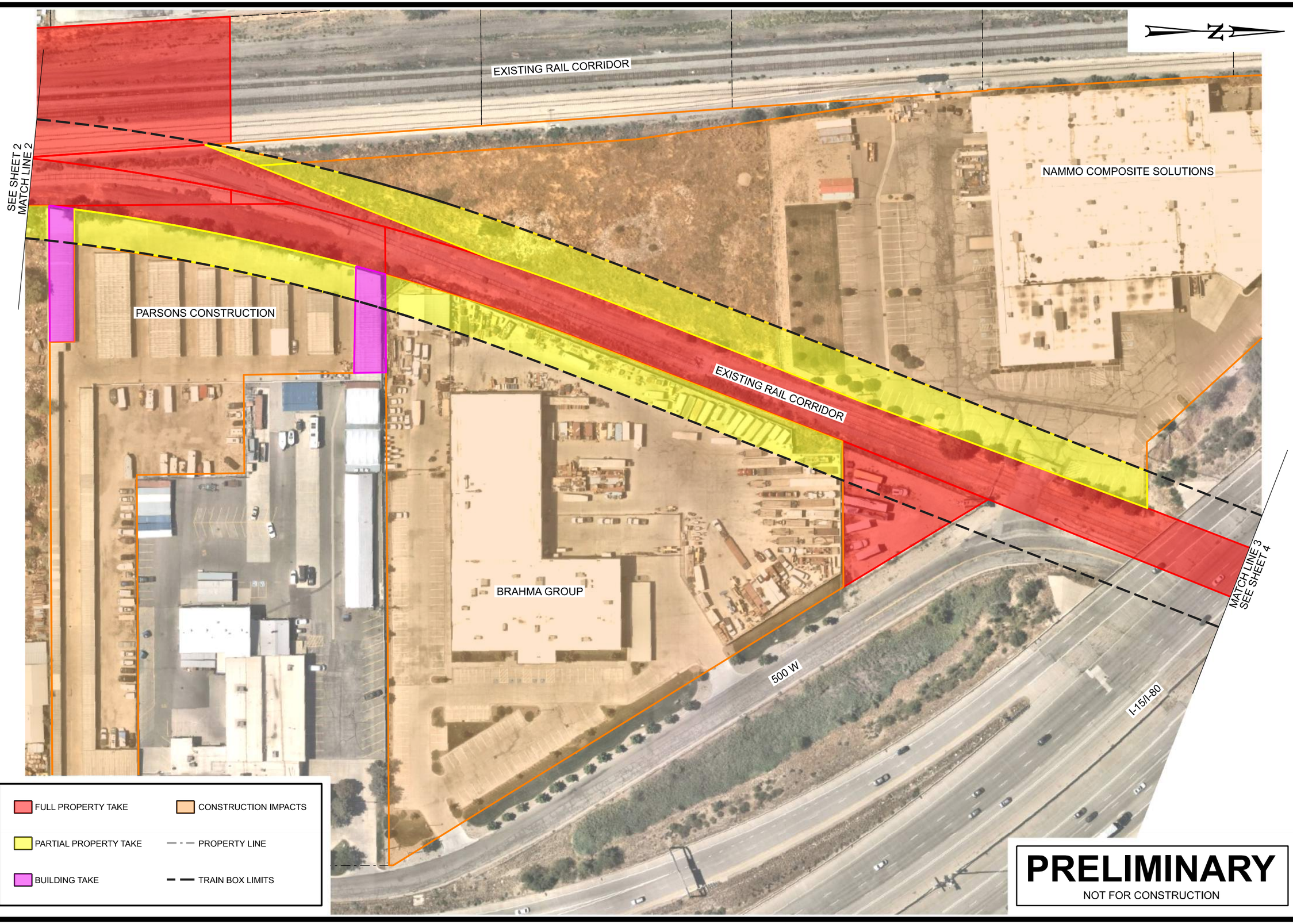
SHEET TITLE:

RIGHT OF WAY

SHEET IDENTIFIER:

ROW 2

BINDING ORDER 2/15



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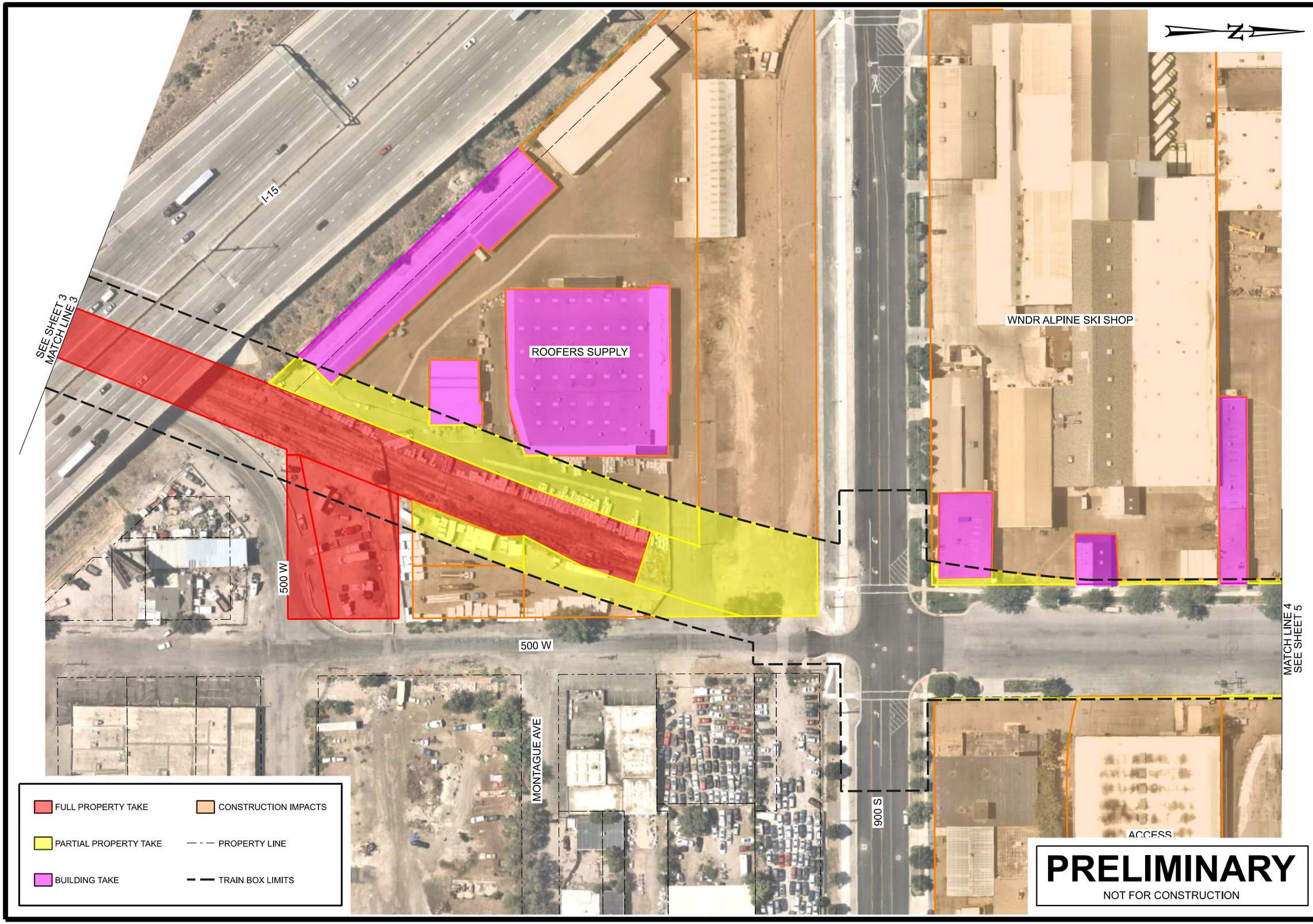
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 3

BINDING ORDER 3/15



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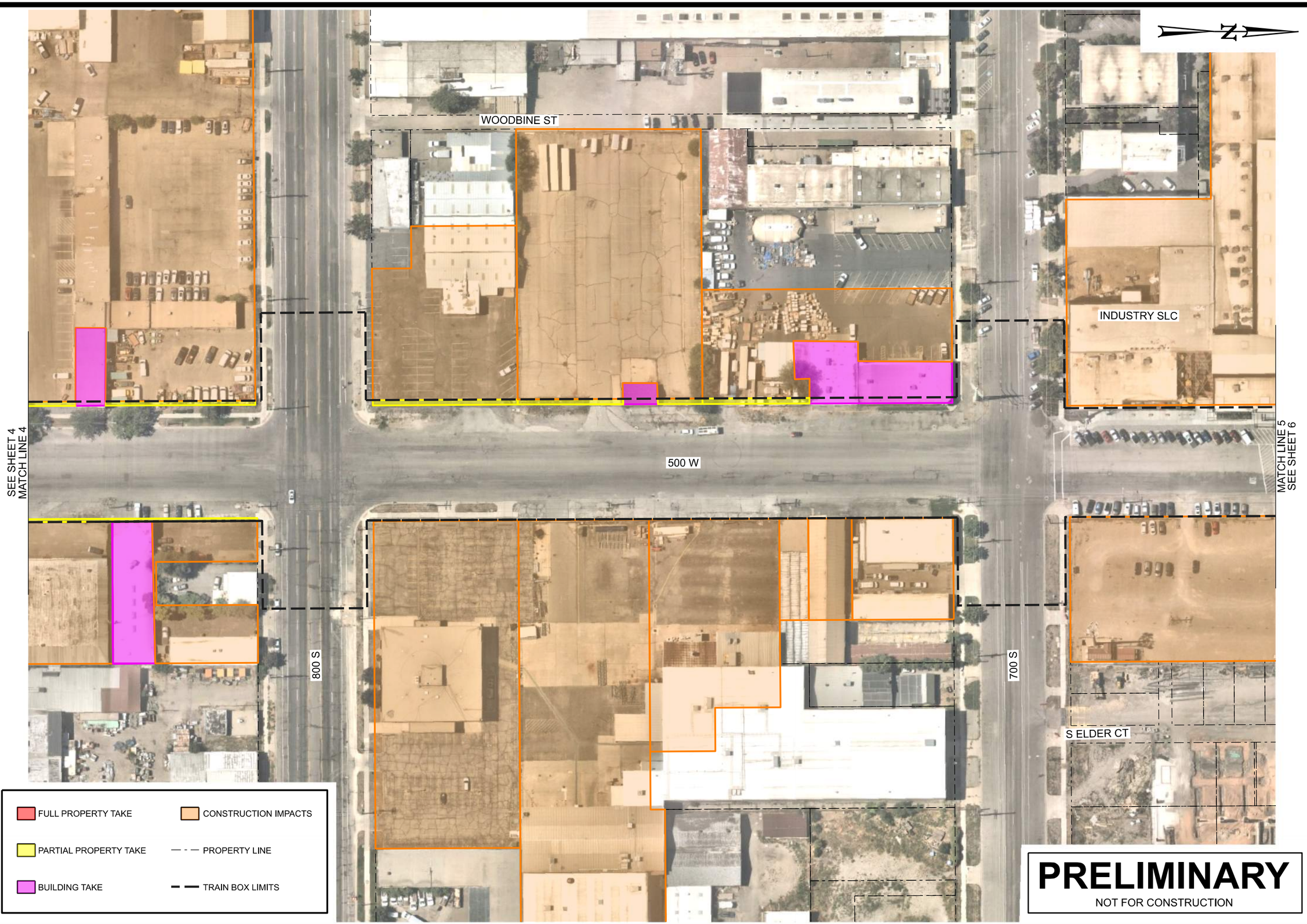
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 4

BINDING ORDER 4/15

PRELIMINARY
NOT FOR CONSTRUCTION



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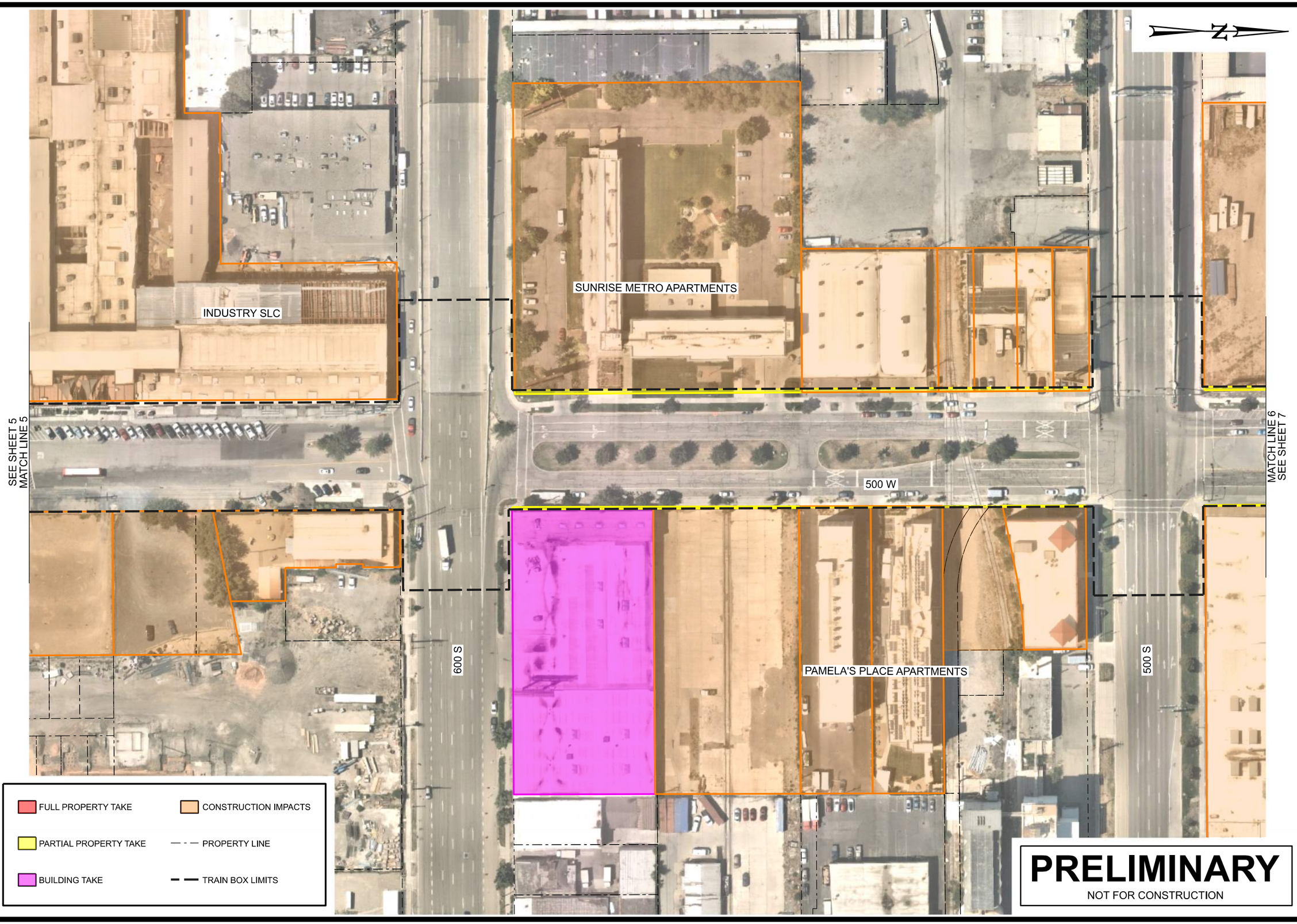
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 5

BINDING ORDER 5/15



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RIO GRANDE SCREENING ANALYSIS

PRELIMINARY
NOT FOR CONSTRUCTION

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 6

BINDING ORDER 6/15

SEE SHEET 6
MATCH LINE 6

500 W

500 W

MATCH LINE 7
SEE SHEET 8

FUTURE RIO GRANDE STATION

RIO GRANDE DEPOT

PCA SALT LAKE CITY

400 S

S RIO GRANDE ST

- FULL PROPERTY TAKE
- PARTIAL PROPERTY TAKE
- BUILDING TAKE
- CONSTRUCTION IMPACTS
- PROPERTY LINE
- TRAIN BOX LIMITS

PRELIMINARY

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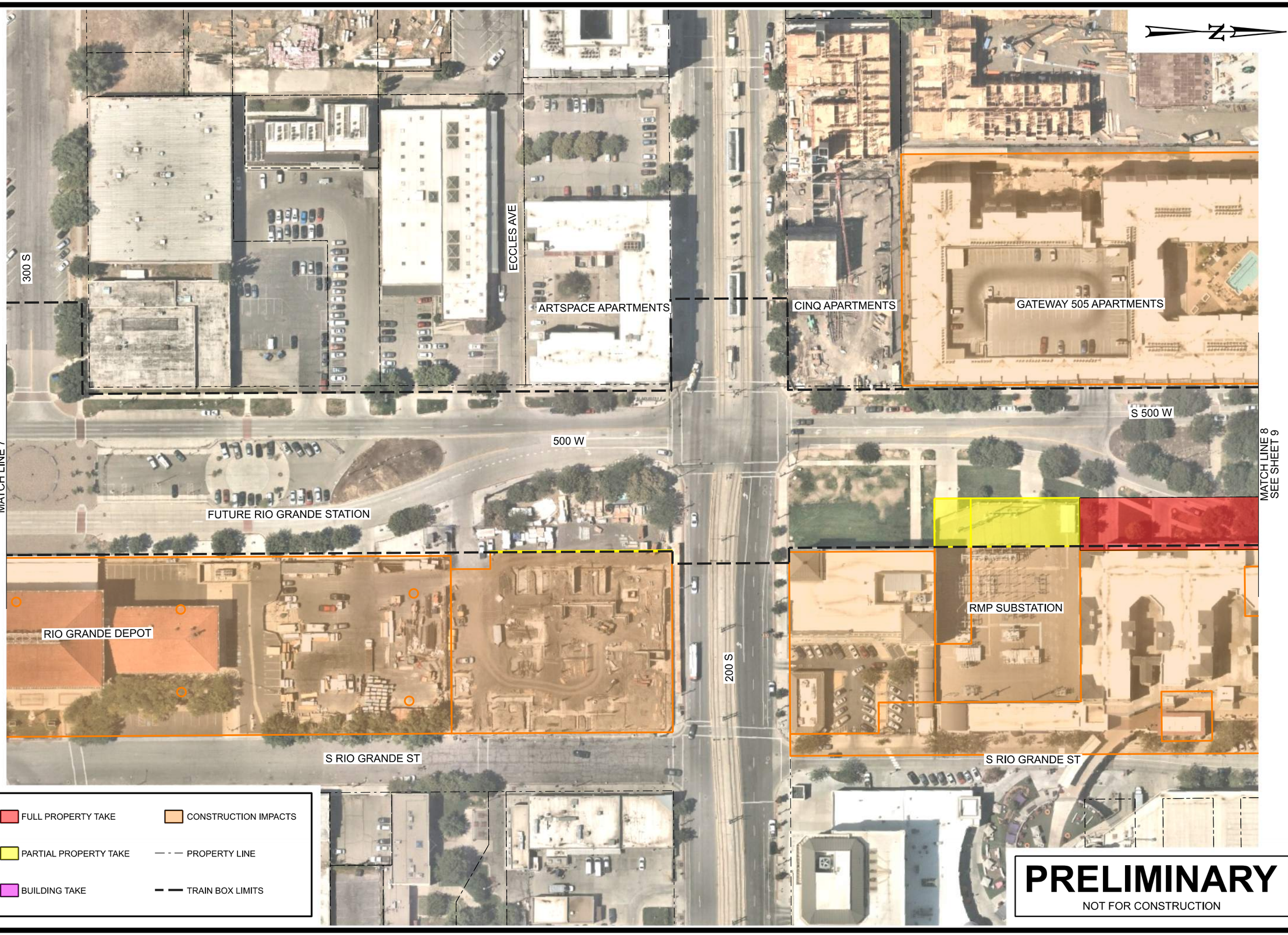
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 7

BINDING ORDER 7/15



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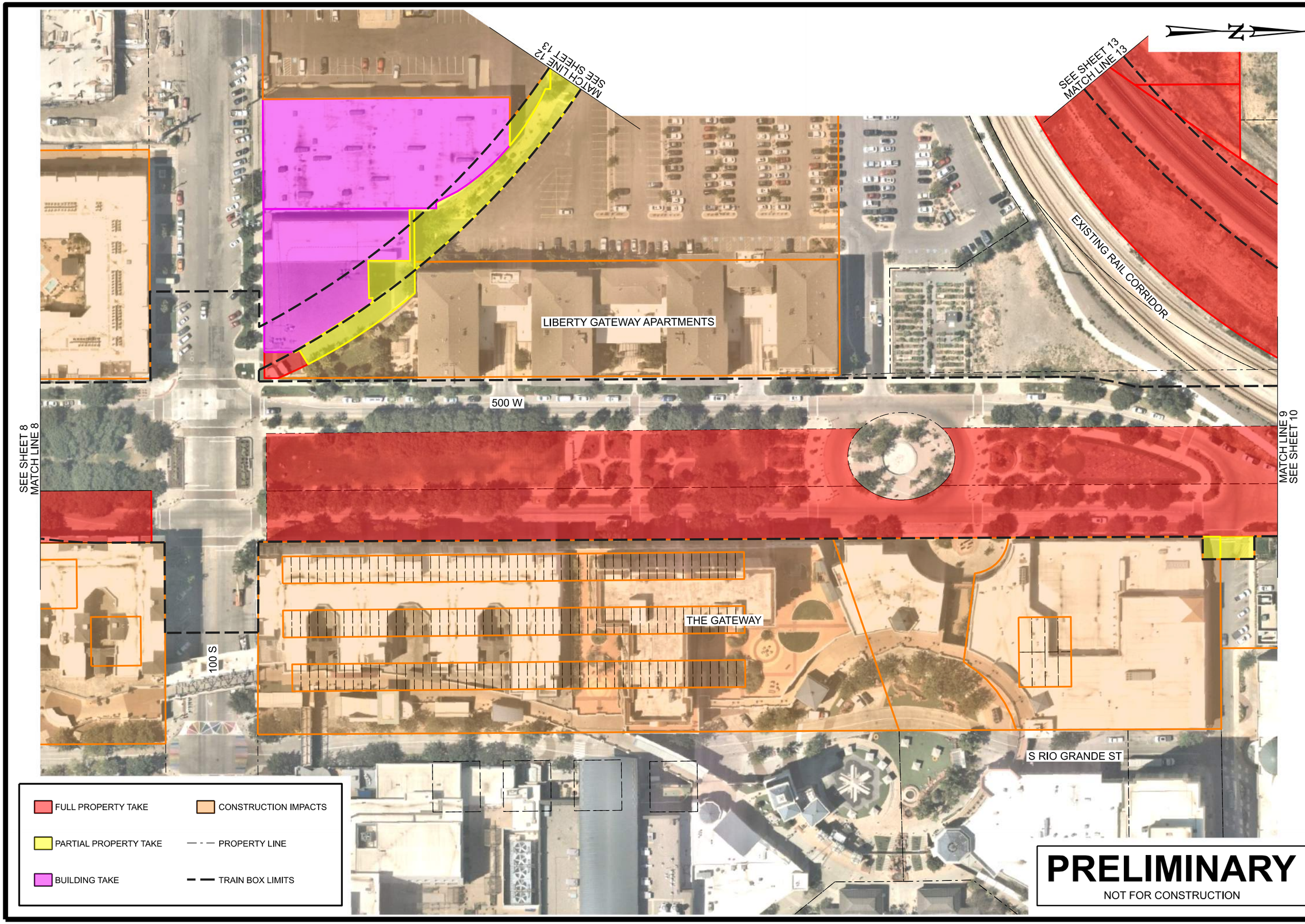
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 8

BINDING ORDER 8/15



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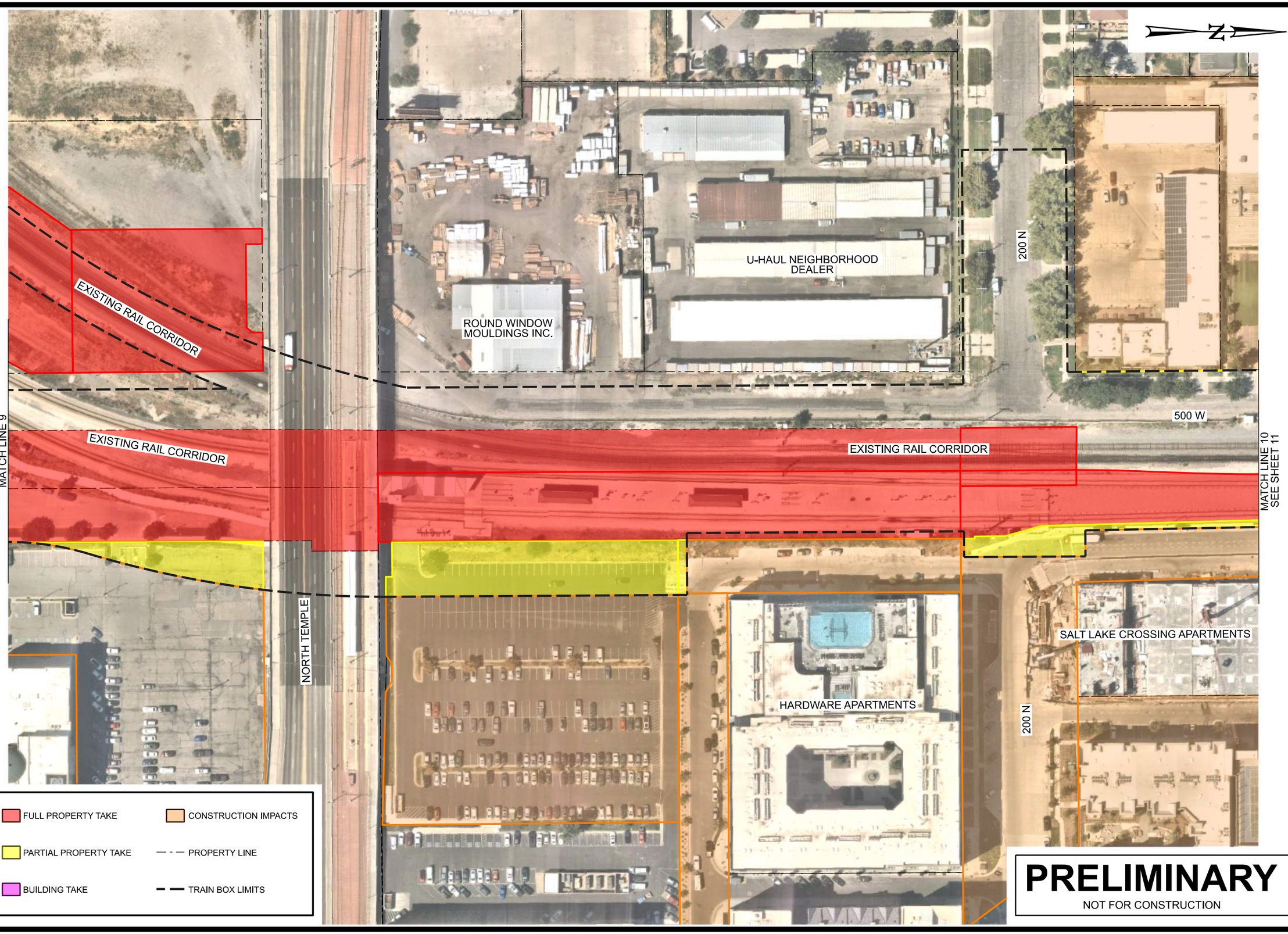
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 9

BINDING ORDER 9/15



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RIO GRANDE SCREENING ANALYSIS

PRELIMINARY
NOT FOR CONSTRUCTION

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 10

BINDING ORDER 10/15

PROJECT OPEN APARTMENTS

EXISTING RAIL CORRIDOR

SALT LAKE CROSSING APARTMENTS

CAMBER APARTMENTS

500 W

300 N

400 N

SEE SHEET 10
MATCH LINE 10

MATCH LINE 11
SEE SHEET 12

FULL PROPERTY TAKE

CONSTRUCTION IMPACTS

PARTIAL PROPERTY TAKE

PROPERTY LINE

BUILDING TAKE

TRAIN BOX LIMITS

PRELIMINARY

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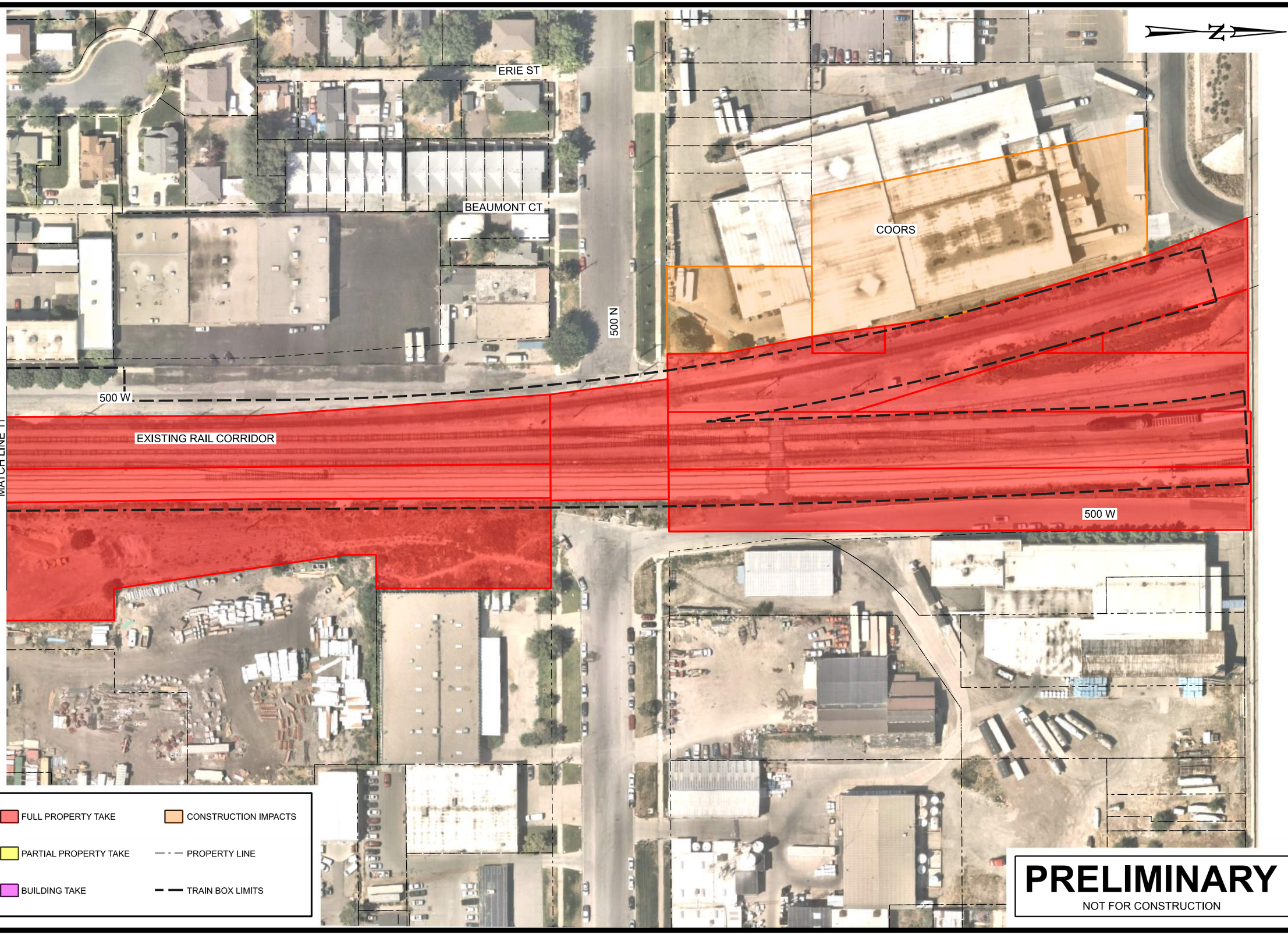
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 11

BINDING ORDER 11/15



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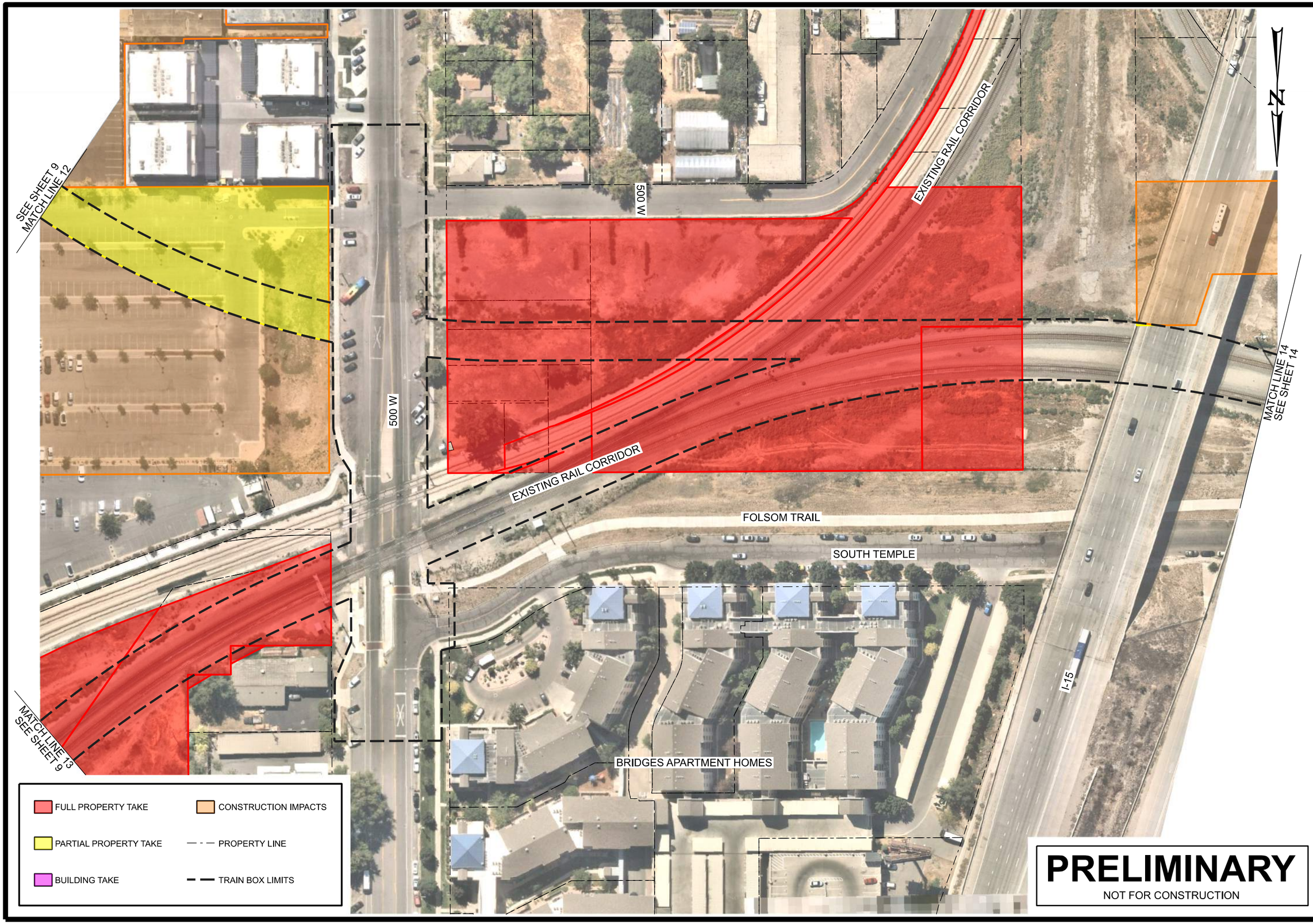
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 12

BINDING ORDER 12/15



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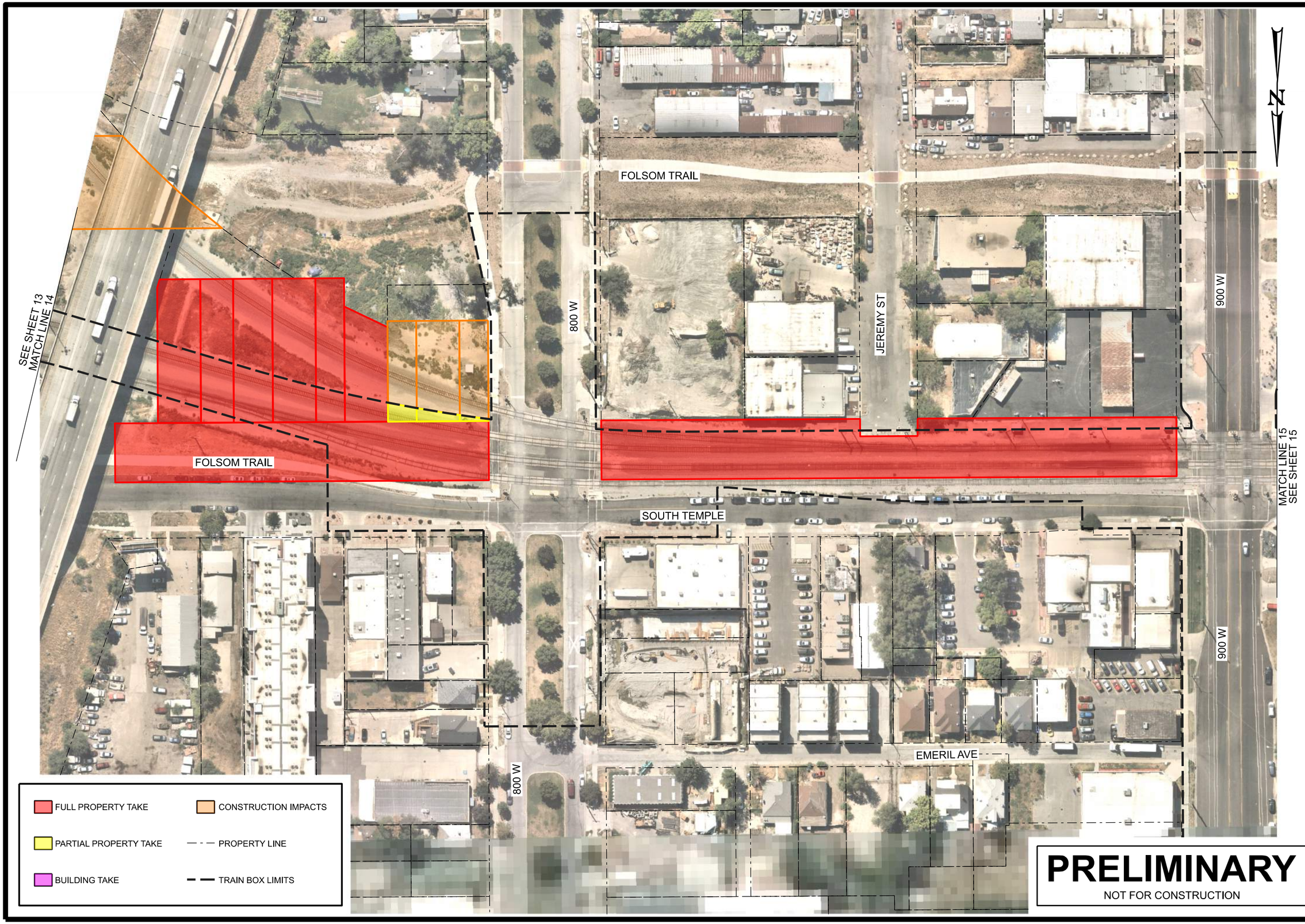
RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 13

BINDING ORDER 13/15



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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:

RIGHT OF WAY

SHEET IDENTIFIER:

ROW 14

BINDING ORDER 14/15

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RIO GRANDE SCREENING ANALYSIS

SHEET TITLE:
RIGHT OF WAY

SHEET IDENTIFIER:
ROW 15

BINDING ORDER 15/15

APPENDIX D – RIGHT OF WAY ANALYSIS SUMMARY OF IMPACTS

Impact Type	Name	Address	Parcel ID	Property Type	Total Parcel Square Footage	Impacted Square Footage
Full Property Acquisition	Union Pacific Railroad (UPRR)	Null	15135010060000	Railroad	57,526	57,526
	Union Pacific Railroad (UPRR)	Null	15135010050000	Railroad	57,478	57,478
	Utah Transit Authority	1532 S 500 W	15131520040000	Railroad	11,401	11,401
	Union Pacific Railroad (UPRR)	Null	15135010050000	Railroad	57,523	57,523
	Union Pacific Railroad (UPRR)	Null	15135010030000	Railroad	57,807	57,807
	Union Pacific Railroad (UPRR)	Null	15135010020000	Railroad	58,030	58,030
	Utah Transit Authority	595 W 1300 S	15131020030000	Railroad	2,967	2,967
	Utah Transit Authority	596 W 1300 S	15123540020000	Railroad	29,749	29,749
	Union Pacific Railroad (UPRR)	Null	15135010010000	Railroad	38,107	38,107
	Union Pacific Railroad (UPRR)	Null	15125010180000	Railroad	19,942	19,942
	Union Pacific Railroad (UPRR)	Null	15125010170000	Railroad	58,430	58,430
	Union Pacific Railroad (UPRR)	Null	15125010160000	Railroad	57,629	57,629
	Union Pacific Railroad (UPRR)	Null	15125010150000	Railroad	57,610	57,610
	Union Pacific Railroad (UPRR)	Null	15125010140000	Railroad	53,964	53,964
	Union Pacific Railroad (UPRR)	602 W 1300 S	15123020050000	Railroad	10,781	10,781
	Union Pacific Railroad (UPRR)	Null	15125010570000	Railroad	603	603
	Null	Null	Null	Railroad	12,437	12,437
	Union Pacific Railroad (UPRR)	1018 S 500 W	15125010630000	Railroad	100,704	100,704
	Fledgling Real Estate, LLC	1050 S 500 W	15123040010000	Industrial	14,012	14,012
	State Road Commission of Utah	960 S 500 W	15121570040000	Industrial	6,124	6,124
	American Crane Inc	950 S 500 W	15121570030000	Industrial	15,308	15,308
	Packaging Corporation of America	411 S 500 W	15013290020000	Industrial	1,632	1,632
	Packaging Corporation of America	473 W 400 S	15013290010000	Industrial	5,460	5,460
	Salt Lake City Corporation	485 W 100 S	15011760140000	Commercial	19,674	19,674
	Towne Storage Gateway, LLC	502 W 100 S	15011060030000	Commercial	1,185	1,185
	Salt Lake City Corporation	484 W 100 S	15011260130000	Residential	96,764	96,764
	Salt Lake City Corporation	484 W 100 S	15011260140000	Industrial	94,631	94,631
	Salt Lake City Corporation	899 W South Temple	15022040100000	Railroad	43,560	43,560
	Salt Lake City Corporation	719 W South Temple	15022270050000	Railroad	29,185	29,185
	Western Pacific Railroad Co	31 S 800 W	15025040960000	Railroad	5,962	5,962
	Salt Lake City Corporation	761 W South Temple	15022280010000	Railroad	5,663	5,663
	Salt Lake City Corporation	753 W South Temple	15022280020000	Railroad	8,276	8,276
	Salt Lake City Corporation	741 W South Temple	15022280030000	Railroad	7,405	7,405
	Salt Lake City Corporation	741 W South Temple	15022280040000	Railroad	6,098	6,098
	Salt Lake City Corporation	721 W South Temple	15022280050000	Railroad	8,276	8,276
	Rio Grande Western Railroad Co	693 W South Temple St	15025040940000	Railroad	19,061	19,061
	Union Pacific Railroad (UPRR)	633 E South Temple St	15011030240000	Railroad	89,948	89,948
	Pacificorp	20 S 600 W	15011030290000	Vacant	80,435	80,435
	Union Pacific Railroad (UPRR)	4 S 600 W	15011010120000	Railroad	3,049	3,049
	Utah Transit Authority	6 S 600 W	15011010070000	Railroad	436	436
	Union Pacific Railroad (UPRR)	4 S 600 W	15011010130000	Railroad	1,911	1,911
	Utah Transit Authority	678 W 100 S	15011030110000	Railroad	9,148	9,148
	Union Pacific Railroad (UPRR)	Null	8365010080000	Railroad	54,456	54,456
	Salt Lake City Corporation	12 N 600 W	8363540270000	Industrial	413	413
	Salt Lake City Corporation	12 N 600 W	8363540260000	Industrial	223	223
	Union Pacific Railroad (UPRR)	Null	8365010090000	Railroad	5,159	5,159
	Salt Lake City Corporation	49 N 500 W	8363550020000	Railroad	68,843	68,843
	Union Pacific Railroad (UPRR)	Null	8365010070000	Railroad	33,194	33,194
	Salt Lake City Corporation	152 N 500 W	8365030540000	Railroad	31,939	31,939
	Utah Transit Authority	154 N 500 W	8363760230000	Railroad	51,400	51,400
	SLHNET Investments LC	202 N 500 W	8363280260000	Railroad	6,433	6,433
	Utah Transit Authority	204 N 500 W	8363280270000	Railroad	2,292	2,292
	Utah Transit Authority	249 N 490 W	8363300010000	Railroad	43,297	43,297
	SLC Rail Holdings, LLC	356 N 500 W	8363260020000	Railroad	35,684	35,684
	Utah Transit Authority	354 N 500 W	8365030530000	Railroad	30,785	30,785
	SLC 300 North LLC	480 W 400 N	8365030500000	Railroad/Vacan	108,190	108,190
	Utah Transit Authority	452 N 500 W	8365030510000	Railroad	24,625	24,625
	Salt Lake City Corporation	499 W 500 N	8361760240000	Railroad	17,174	17,174
	The D & R G W Railroad Company	502 W 500 N	8365010020000	Railroad	48,151	48,151
	The D & R G W Railroad Company	529 W 600 N	8365010030000	Railroad	2,051	2,051
	Union Pacific Railroad (UPRR)	Null	8365010080000	Vacant	733	733
	Union Pacific Railroad (UPRR)	Null	8365010070000	Vacant	7,712	7,712
	Null	Null	Null	Null	22,722	22,722
	Null	Null	Null	Null	42,350	42,350
	Oregon Short Lines RR CO	550 N 500 W	8365030430000	Railroad	46,174	46,174

Partial Property Acquisition	Utah Transit Authority	590 W 1700 S	15131550060000	Railroad	34,161	5,116
	LC G.O.K. Properties	1530 S 500 W	15131520100000	Commercial	553,212	11,844
	LHM SFO, LLC	525 W 1300 S	15131020040000	Commercial	523,591	1,129
	LHM SFO, LLC	580 W 1300 S	15123530030000	Commercial	148,104	12,090
	Standard Iron & Metals Co., Inc.	1178 S 500 W	15123530020000	Industrial	82,764	3,228
	Standard Iron & Metals Co., Inc.	1178 S 500 W	15123530010000	Industrial	38,333	1,896
	Union Storage, Inc	1150 S 500 W	15123040090000	Industrial	133,294	12,500
	Utah Transit Authority	1052 S 500 W	15123020070000	Vacant	17,860	854
	Micelli 10th South LLC	1020 S 500 W	15123020060000	Industrial	349,787	43,494
	L.L.C Canyonlands Apartments; L.L.C Canyonlands Apartments	1132 S 500 W	15123040020000	Industrial	215,186	23,158
	Salt Lake City Metro	920 S 500 W	15121570010000	Industrial	6,098	4,374
	Salt Lake City Metro	920 S 500 W	15121570020000	Industrial	7,841	101
	Salt Lake City Metro	920 S 500 W	15121560010000	Industrial	5,227	6,492
	Salt Lake City Metro	920 S 500 W	15121550020000, 15121550010000	Industrial	145,490	19,734
	Salt Lake City Metro, LLC	505 W 900 S	15121550030000	Industrial	115,870	18,267
	Salt Lake City Metro LLC	510 W 900 S	15121530040000	Industrial	217,800	2,306
	Salt Lake City Metro LLC	513 W 800 S	15121530050000	Industrial	217,800	1,263
	Utah Investments LC	863 S 500 W	15121760070000	Industrial	48,787	523
	Broadbent Land and Resources, LLC	855 S 500 W	15121760050000	Industrial	56,628	542
	Feulner Enterprises, LLC	827 S 500 W	15121760020000	Industrial	27,443	546
	465 W. 800 South, LLC	825 S 500 W	15121760100000	Industrial	21,780	562
	WH3 Properties LLC	774 S 500 W	15121080070000	Industrial	31,799	989
	BCG Granary Partners	742 S 500 W	15121080030000	Commercial	65,776	1,038
	L & S Ventures, LLC	501 W 700 S	15121080020000	Commercial	37,026	770
	Industry SLC LLC	675 S 500 W	15121270130000	Industrial	59,677	8
	LTD, AAM Investments	635 S 500 W	15013790240000	Industrial	38,768	18
	CPC Real Holdings LLC	601 S 500 W	15013790180000	Industrial	16,117	61
	Silos South Apartments, LLC	470 W 600 S	15013770170000	Industrial	108,900	791
	Sunrise Metro, LLC	580 S 500 W	15013520330000	Commercial	117,612	1,482
	Associated Investments, LLC	534 S 500 W	15013520230000	Industrial	25,700	668
	BCG QP LLC	505 W 500 S	15013520220000	Industrial	6,970	174
	BCG QP LLC	505 W 500 S	15013520210000,	Industrial	22,216	551
	Box 500 Apartments LLC	543 S 500 W	15013770120000	Residential	27,443	160
	Ribbon Properties, LLC	525 S 500 W	15013770010000	Residential	27,443	145
	Olympus QOZB, LLC	515 S 500 W	15013760050000	Industrial	13,939	110
	471W, LLC	471 W 500 S	15013760040000	Industrial	13,504	135
	Martin Yard LLC	454 S 500 W	15013040070000	Industrial	82,328	989
	Douglas W Jones	440 S 500 W	15013040040000	Industrial	26,572	60
	Douglas W Jones	430-434 S 500 W	15013040030000	Industrial	23,958	343
	WIFCO LC	503 W 400 S	15013030170000	Industrial	70,567	186
	Packaging Corporation of America	460 W 500 S	15013290060000	Industrial	135,907	564
	Packaging Corporation of America	475 W 400 S	15013290030000	Industrial	101,495	1,079
	210 RIO LLC	205 S 500 W	15011780020000	Vacant	50,965	223
	Utah Power & Light Company	165 S 500 W	15011760030000	Industrial	6,970	2,266
	Utah Power & Light Company	155 S 500 W	15011760020000	Industrial	31,363	6,786
	Towne Storage Gateway, LLC	510 W 100 S	15011060060000	Industrial	25,700	5,384
	Dumbles Holdings, LLC	536 W 100 S	15011050060000	Commercial	88,862	1,183
	Boyer 500 West LC	35 S 600 W	15011020070000	Commercial	192,100	47,617
	LTD Gateway Associates	440 W 50 N	8363760400000	Commercial	116,741	8,881
	LTD Gateway Associates	19 N Rio Grande St	8363760440000	Commercial	59,677	524
	Salt Lake City Corporation	779 W South Temple	15022270010000	Railroad	3,920	152
	Salt Lake City Corporation	777 W South Temple	15022270020000	Railroad	5,663	550
	Salt Lake City Corporation	767 W South Temple	15022270030000	Railroad	3,920	612
	Western Pacific Railroad Co	45 S IFIFTEEN FWY	15025040970000	Railroad	35,719	39.793
	KBSIII 155 North 400 West, LLC	155 N 400 W	8363760560000	Commercial	106,722	20,416
	Null	Null	Null	Null	98,764	7,176
	MISSIO DEI COMMUNITYMISSIO DEI COMMUNITY	510 W 200 N	8363050410000	Commercial	49,223	9
	Rec Development LLC	235 N 500 W	8363050770000	Commercial	60,984	0
	Oakmont Properties - Hardware Village, LLC	155 N 400 W	8363760550000	Commercial	30,056	16
	Null	Null	Null	Vacant	19,486	623
	OAKMONT PROPERTIES-4TH WEST-I, LLC; OAKMONT PROPERTIES-4TH WEST-II, LLC	495 W 300 N	8363300020000	Vacant	16,553	17
	OAKMONT PROPERTIES-4TH WEST-I, LLC; OAKMONT PROPERTIES-4TH WEST-II, LLC	255 N 400 W	8363310020000	Commercial	256,568	72
	Missouri Pacific Railroad Co	510 W 300 N	8363030080000	Commercial	108,900	50
	NORTH 4TH APARTMENTS LLC	355 N 500 W	8361550320000	Commercial	67,082	9
	SLC Camber, LLC	494 W 300 N	8363800010000	Vacant	159,378	3,413
	Admiral Beverage Corporation	531 W 600 N	8361040120000	Industrial	60,548	20

Construction Impacts	Utah Transit Authority	590 W 1700 S	15131550060000	Railroad	34,161	N/A
	LC G.O.K. Properties	1530 S 500 W	15131520100000	Commercial	553,212	N/A
	LHM SFO, LLC	525 W 1300 S	15131020040000	Commercial	523,591	N/A
	LHM SFO, LLC	580 W 1300 S	15123530030000	Commercial	148,104	N/A
	Standard Iron & Metals Co., Inc.	1178 S 500 W	15123530020000	Industrial	82,764	N/A
	Standard Iron & Metals Co., Inc.	1178 S 500 W	15123530010000	Industrial	38,333	N/A
	Union Storage, Inc	1150 S 500 W	15123040090000	Industrial	133,294	N/A
	Utah Transit Authority	1052 S 500 W	15123020070000	Vacant	17,860	N/A
	L.L.C CANYONLANDS APARTMENTS; L.L.C. CANYONLANDS APARTMENTS	1132 S 500 W	15123040020000	Commercial	215,186	N/A
	Micelli 10th South LLC	1020 S 500 W	15123020060000	Industrial	349,787	N/A
	Salt Lake City Metro	920 S 500 W	15121570010000	Industrial	6,098	N/A
	Salt Lake City Metro	920 S 500 W	15121570020000	Industrial	7,841	N/A
	Salt Lake City Metro	920 S 500 W	15121560010000	Industrial	5,227	N/A
	Salt Lake City Metro	920 S 500 W	15121550020000, 15121550010000	Industrial	145,490	N/A
	Salt Lake City Metro LLC	505 W 900 S	15121550030000	Industrial	115,870	N/A
	Salt Lake City Metro LLC	510 W 900 S	15121530040000	Industrial	217,800	N/A
	Salt Lake City Metro, LLC	513 W 800 S	15121530050000	Industrial	217,800	N/A
	Utah Investments LC	863 S 500 W	15121760070000	Industrial	48,787	N/A
	Broadbent Land and Resources, LLC	855 S 500 W	15121760050000	Industrial	56,628	N/A
	Feulner Enterprises, LLC	827 S 500 W	15121760020000	Industrial	27,443	N/A
	465 W. 800 South, LLC	825 S 500 W	15121760100000	Industrial	21,780	N/A
	WH3 Properties LLC	774 S 500 W	15121080070000	Industrial	31,799	N/A
	BCG Granary Partners	440 W 800 S	15121290120000	Commercial	61,420	N/A
	BCG Granary Partners	750 S 400 W	15121290110000	Commercial	103,673	N/A
	BCG Granary Partners	742 S 500 W	15121080030000	Commercial	65,776	N/A
	BCG Granary Partners	745 S 500 W	15121290090000	Industrial	35,719	N/A
	BCG Granary Partners, LLC	735 S 500 W	15121290030000	Industrial	3,920	N/A
	BCG Granary Partners, LLC	717 S 500 W	15121290020000	Industrial	5,663	N/A
	BCG Granary Partners, LLC	467 W 700 S	15121290010000	Industrial	13,504	N/A
	L & S Ventures, LLC	501 W 700 S	15121080020000	Commercial	37,026	N/A
	Industry Office SLC, LLC	513 W 600 S	15013540060000	Industrial	255,697	N/A
	Industry SLC LLC	675 S 500 W	15121270130000	Commercial	59,677	N/A
	LTD, AAM Investments	635 S 500 W	15013790240000	Commercial	38,768	N/A
	CPC Real Holdings LLC	601 S 500 W	15013790180000	Industrial	16,117	N/A
	Silos South Apartments, LLC	470 W 600 S	15013770170000	Industrial	108,900	N/A
	Sunrise Metro, LLC	580 S 500 W	15013520330000	Residential	117,612	N/A
	Associated Investments, LLC	534 S 500 W	15013520230000	Industrial	25,700	N/A
	BCG QP LLC	505 W 500 S	15013520220000	Industrial	6,970	N/A
	BCG QP LLC	505 W 500 S	15013520210000	Industrial	8,276	N/A
	BCG QP LLC	505 W 500 S	15013520200000	Industrial	6,970	N/A
	BCG QP LLC	505 W 500 S	15013520190000	Industrial	6,970	N/A
	Box 500 Apartments LLC	543 S 500 W	15013770120000	Residential	27,443	N/A
	Ribbon Properties, LLC	525 S 500 W	15013770010000	Residential	27,443	N/A
	Olympus QOZB, LLC	515 S 500 W	15013760050000	Industrial	13,939	N/A
	471W, LLC	471 W 500 S	15013760040000	Industrial	13,504	N/A
	Martin Yard LLC	454 S 500 W	15013040070000	Industrial	82,328	N/A
	Douglas W Jones	440 S 500 W	15013040040000	Industrial	26,572	N/A
	Douglas W Jones	430-434 S 500 W	15013040030000	Industrial	23,958	N/A
	WIFCO LC	503 W 400 S	15013030170000	Commercial	70,567	N/A
	Packaging Corporation of America	460 W 500 S	15013290060000	Industrial	135,907	N/A
	Packaging Corporation of America	475 W 400 S	15013290030000	Industrial	101,495	N/A
	State of Utah	300 S Rio Grande St	15013260070000	Commercial	4,792	N/A
	State of Utah, The	300 S Rio Grande St	15011780032000	Commercial	168,142	N/A
	210 RIO LLC	205 S 500 W	15011780020000	Vacant	50,965	N/A
	LP Gateway Residences	505 W 100 S	15011080330000	Residential	139,392	N/A
	BCAL Gateway Property LLC	468 W 200 S	15011760190000	Commercial	31,799	N/A
	Utah Power & Light Company	165 S 500 W	15011760030000	Industrial	6,970	N/A
	Utah Power & Light Company	155 S 500 W	15011760020000	Industrial	31,363	N/A
	Gateway Block C-1 Condominium Assoc Inc	135 S 500 W	15011850090000	Commercial	96,268	N/A
	Dumbles Holdings, LLC	536 W 100 S	15011050060000	Commercial	88,862	N/A
	Gateway Block C-2 Condominium Owners Association	49 S 500 W # COM	15011300110000	Residential	155,074	N/A
	Liberty Gateway Properties LC	50 S 500 W	15011020080000	Residential	71,003	N/A
	Boyer 500 West LC	35 S 600 W	15011020070000	Commercial	192,100	N/A
	Western Pacific Railroad Co	45 S IFIFTEEN FWY	15025040970000	Railroad	35,719	N/A
	Gateway Associates LTD	2 S Rio Grande St	8363760430000	Commercial	30,056	N/A
	LTD Gateway Associates	19 N Rio Grande St	8363760440000	Commercial	59,677	N/A
	LTD Gateway Associates	440 W 50 N	8363760400000	Commercial	116,741	N/A
	KBSIII 155 North 400 West, LLC	155 N 400 W	8363760560000	Commercial	106,722	N/A

	Null	Null	Null	Null	98,764	N/A
	OAKMONT PROPERTIES-4TH WEST-I, LLC; OAKMONT PROPERTIES-4TH WEST-II, LLC	495 W 300 N	8363300020000	Vacant	16,553	N/A
	OAKMONT PROPERTIES-4TH WEST-I, LLC; OAKMONT PROPERTIES-4TH WEST-II, LLC	255 N 400 W	8363310020000	Commerical	256,568	N/A
	Missouri Pacific Railroad Co	510 W 300 N	8363030080000	Commercial	108,900	N/A
	NORTH 4TH APARTMENTS LLC	355 N 500 W	8361550320000	Commercial	67,082	N/A
	SLC Camber, LLC	494 W 300 N	8363800010000	Vacant	159,380	N/A
	Admiral Beverage Corporation	506 W 500 N	8361040310000	Industrial	15,246	N/A
	Admiral Beverage Corporation	531 W 600 N	8361040120000	Industrial	60,548	N/A

Building Demolition	Union Storage, Inc	1150 S 500 W	15123040090000	Industrial	133,294	8,560
	Salt Lake City Metro	920 S 500 W	15121550020000, 15121550010000	Industrial	145,490	58,721
	Salt Lake City Metro LLC	510 W 900 S	15121530040000	Industrial	217,800	8,794
	Salt Lake City Metro LLC	513 W 800 S	15121530050000	Industrial	217,800	10,021
	465 W. 800 South, LLC	825 S 500 W	15121760100000	Industrial	21,780	7,530
	BCG Granary Partners	742 S 500 W	15121080030000	Commercial	65,776	944
	L & S Ventures, LLC	501 W 700 S	15121080020000	Commercial	37,026	9,760
	Silos South Apartments, LLC	470 W 600 S	15013770170000	Industrial	108,900	53,112
	Douglas W Jones	440 S 500 W	15013040040000	Industrial	26,572	1,818
	Towne Storage Gateway, LLC	510 W 100 S	15011060060000	Industrial	25,700	20,313
	Dumbles Holdings, LLC	536 W 100 S	15011050060000	Commercial	88,862	32,939

APPENDIX E – STAKEHOLDER SUMMARIES

Project Management Team Meeting
Meeting Notes
Wednesday, March 15
9:00 am – 10:00 am

Attendees

☒ Joe Taylor, Salt Lake City Transportation Division
☒ Julianne Sabula, Salt Lake City Transportation Division
☒ Ashley Ogden, Salt Lake City RDA
☒ Eric Daems, Salt Lake City Planning
☒ Michael Guymon, Salt Lake City, Public Utilities
☒ Ramin Narabadi, Salt Lake City, Public Utilities
☒ Theo Gochnour, Kimley-Horn
☒ Amanda Risano, Kimley-Horn
☒ Brent Crowther, Kimley-Horn

Notes

1. Introductions
    a) Michael Guymon introduced Ramin Narabadi as the new liaison with Salt Lake City Transportation Division

2. Design Criteria Overview
    b) Brent Crowther and Theo Gochnour provided an overview of the Design Criteria Memo.
    c) Memo was reviewed with Salt Lake City Transportation Division and Salt Lake City Public Utilities. It is attached for reference.
    d) Much of the storm drain in this area has to tie into Jordan River at shallow depths.
    e) Michael Guymon notes that sanitary sewer minimum cover is 2'. However, facilities are often 12-15' deep.
    f) Of primary concern is sanitary sewer which could be very deep and outside of the utility chase. Would some of these need to be reconfigured outside of the corridor?
    g) Most utilities are 5’ below grade. As such, the utility chase as shown in the cross-section can work for water. However, for storm drain and gravity utilities, depths will vary.
    h) Action: Kimley-Horn (Amanda Risano) to work with Ramin to obtain additional information, as available, about utility depth, particularly for sanitary sewer.
    i) Michael Guymon stated that ownership of the groundwater management system will be a critical issue. Who will own, operate, and maintain it? The system is not something that public utilities would accept responsibility for.
    j) Perhaps not within this scope of work, but the quantification of the amount of water would be of interest - volume, where it would go, etc. It is almost a certainty

that the groundwater table is less than 38' (less than the depth of the train box cross section).

k) Can we see if we can determine how the Alameda Corridor/Reno ReTRAC addressed groundwater?
l) There are multiple storm drain conveyances, all of which would need to enter the Jordan River at an appropriate elevation.
m) UDOT may have had to design a dewatering concept on I-15. The train box will require a design such that it will not float.
n) City Creek pumps a sizeable amount of water from the City Creek garage to the storm drain system. Dewatering represents a permanent degradation of storm drain capacity. It's a quantity issues, as well as a quality issue in more industrialized issues. By law, Salt Lake city is required to reject water that has not been treated. There is not a good Salt Lake City policy in place that addresses every situation.
o) There is a major 48" brick sewer along 100 South that carries approximately 1/3 of the city's sewer capacity (most of Downtown SLC). How do brick sewers do with train vibrations?

3. Roll Plot Overview

a) Theo Gochnour reviewed the horizontal layout of the train box concept, consistent with the design criteria document. Max grade assumed is 1.5%, based on best available information from Union Pacific.
b) Need to confirm/investigate if train box would conflict with I-15 abutments.
c) Brent Crowther described that the width of the train box was expanded based on discussions with UTA to accommodate Amtrak, as well as an additional UP track. This has made it so that frontage roads to either side of the train box are not possible. Generally, roadway connections would need to be placed on top of the train box.
d) Julianne Sabula suggested that perhaps roadway networks would be discontinuous and only segments of 500 W would be placed on top of the train box.
e) Eric Daems asked how landscaping would be accommodated on top of box structure.
f) Action: Kimley-Horn to layout an alternative cross section with roadway segment on a portion (outside edges) of the train box. An idea is that the travel lanes (one in each direction) would only be on the outer 12 feet of the train box. The inside of the train box could then be open for ventilation, with periodic crossings. Kimley-Horn will evaluate where roadway connectivity is needed, and where it could be eliminated.
g) Question was asked about hazardous materials containment. That will need to be addressed. It is assumed that the train box will be closed bottom due to ground water issues. Contamination of ground water will require consideration.
h) There was discussion about location of the North Temple Station. Transfers to the Green line are important at North Temple Station. Barring any future realignment of the Green Line, transfers to the Airport need to be maintained.

i) Group suggested that the North Temple FrontRunner Station be reconfigured such that it is below grade, to minimize impacts to Gateway and to maintain the North Temple Station transfers with the Green line.
j) Group suggested that we quantify the speed enhancements that would be attractive to Union Pacific.

4. Next Steps

a) Revise horizontal layout:
   i) Further investigate and obtain information on utilities depths.
   ii) Prepare an alternative cross section with frontage roads on top of the train box.
   iii) Move North Temple Station to the north to maintain train box through North Temple Station.
   iv) Review access/frontage road connection needs and opportunities
   v) Prepare for stakeholder discussions. Per project schedule, stakeholder meetings will be held April 3-13. Note, due to spring break, etc. interviews will be focused on week of April 10-14. Stakeholder groups to include:
   vi) Utah Transit Authority
   vii) Utah Department of Transportation
   viii) Union Pacific Railroad
   ix) Other Salt Lake City Divisions/Departments.

UPRR Coordination Meeting #1
Meeting Notes
Thursday, April 6
9:00 am – 10:00 am

Attendees

☒ Joe Taylor, Salt Lake City Transportation Division
☒ Jon Larsen, Salt Lake City Transportation Division
☒ Becka Roolf, Salt Lake City
☒ Nathan Anderson, UPRR
☒ Tyson Moeller, UPRR
☒ Theo Gochnour, Kimley-Horn
☒ Amanda Risano, Kimley-Horn

Agenda

1. Review design criteria memo
    a. Grade
        i. UP would like us to design with no greater than 1% slope; UP views additional grade as additional operational costs for their trains
    b. Clearance (horizontal, vertical)
        i. Standard clearance from UP to adjacent rail is 50'
        ii. Nothing less than 20' track centers between UP tracks
        iii. They reminded us that with all new builds, we must meet today's standards, even if they don't necessarily match what is currently out there
2. Review cross-sections that show the UP lines
    a. Does this provide sufficient for future expansion needs (three UP lines)?
        i. There are more considerations beyond just enough UP lines through trench. With projects this complex there are a lot of snowball impacts to projects that may be currently inactive but at some point, UP would want to invest in.
        ii. What is the 100-year plan for this project? And how much would it cost?
    b. Any other comments on the cross-sections?
        i. UP is the host track for AMTRAK service
        ii. Clearance from electrical is important as well due to potential interference with signal operations
        iii. If train is staged under structure for prolonged amount of time, heat on structure, utility, and people becomes a concern
        iv. Obtaining a higher level of survey could help understand extent of ROW impacts – UP has a lot of ROW that appears to be unused, but they hold it in case they want to use it in the future.

v. Several concerns with Air Quality in trench:
    1. Where is ventilated air directed outside of trench? Towards buildings? What are the impacts to stakeholders at the street level?
    2. How do we flush exhaust out of trench after a train has passed through?
    3. There is a vacuum effect that impacts train thru-put to cycle air/ventilation in a tunnel condition – e.g., there is a time limitation on how long the tunnel can be occupied and it affects train operations.
vi. What happens if there is a derailment? Do we need to have a road on both sides of UP's tracks for emergency maintenance access?
vii. Make sure that we bring in freight experts to give feedback on freight-specific design considerations

3. Review horizontal layout
    a. Remember that fiber and billboards are a revenue source for UP – want to protect these as much as possible
    b. Discussion re: at-grade crossings at the downgrade and upgrade locations on the train box alignment.
        i. How does traffic cross?
        ii. Do at grade crossings need to be closed or relocated?
        iii. How does this impact neighborhood connectivity (e.g., Guadalupe neighborhood emergency access)
    c. If UP tracks or yards, environmental remediation will be required in those areas – factor in the cost of this relative to the developable land that is made available via the train box.
4. Discussion of "issues" that need to be identified in our memorandum.
    a. Rail customers access? How many active customers do you have, and where are they?
        i. They are going to check on their end
    b. Train box ownership?
        i. When we brought up dewatering at City Creek, they mentioned that that is included in operating budget of a commercial mall, so if the same were to be done here it may be more expensive than we are expecting. And what would the operating budget be for the trench for its lifespan?
        ii. UP specifically indicated they would not take ownership of the box or associated maintenance programs or costs.
    c. Train box maintenance?
        i. UP made clear that they would not be responsible for maintaining the trench – they are not looking to add more cost to their current operations

   ii. UP expressed concern about network resiliency – impacts of failed groundwater systems, record snowfall/rain, etc. on an undergrounded rail condition.

d. What benefits do you feel that the train box would provide to UP?
   i. Put simply, they said there would be no benefits to UP
   ii. Travel time
      1. UP did not find the ability to increase speed an advantage at the rail box location b/c their trains are already running relatively slowly b/c of curvature in the rail alignment and the proximity of existing rail yards.
   iii. Fuel economy
   iv. Reduced street conflicts
   v. Longer trains?
   vi. Do we have leverage we are not applying regarding longer trains?
   vii. Double stack?
e. What negative impacts would the train box have on UP?
   i. Are we putting the UP (and UTA) network at risk by placing it in trench with a high water table?
   ii. The 4th South yard is currently the interchange for UP and Salt Lake Garfield Western – how would it be impacted? Yard may not be critical to UP today, but it is a holding that offers flexibility for future capacity.
   iii. The Roper yard to North Yard connectivity is vital to much of what UP does in SLC
      1. There are 30-40 trains that go North-South along UP tracks every day
      2. North Yard provides connectivity to all legs (N/S/E/W) of UP track
   iv. Patriot rail has a spur at South Temple – impacts?
   v. What would be the cumulative out-of-route miles caused by this relocation?
f. Perspective on alternative routes (e.g. Glendale Cut-off, Inland Port)
   i. No plans – UP considers their current rail ROW and alignments to be in their ideal location and has no plans to incur the costs to relocate to alternative route configurations.
   ii. Relocation of UP ROW would require consideration of:
      1. Location – where would the ROW go?
      2. Who is impacted? Lots of homes and businesses
      3. How much is the investment ("Lots of B's $$$")
      4. What is the long-term (100-yr) plan?
      5. How many 'out of route' miles are added to their operational costs?

RDA Coordination Meeting
Meeting Notes
Friday, May 19, 2023
10:30 am – 11:30 am.

Attendees

☒ Joe Taylor, Salt Lake City Transportation Division
☒ Ashley Ogden, Salt Lake City RDA
☒ Kate Warrett, Salt Lake City RDA
☒ Theo Gochnour, Kimley-Horn
☒ Brent Crowther, Kimley-Horn

Agenda

1. General Notes:

a) Funding options include:
   i) Housing Transit Reinvestment Zone
   ii) CRA (Community Reinvestment Area).
b) RDA will conduct an analysis focused on parcels that would be available from UP/UTA for redevelopment.
c) Action: Kimley-Horn to send an updated list of parcels to RDA (focused on UP/UTA).
d) New UTA HQ will not be included in the analysis.
e) Analysis will provide a “best case” scenario.
f) Analysis will assume:
   i) Include UP property
   ii) Assume that overpasses will be removed
g) A follow-up analysis would later that would reflect the larger “Rio Grande Plan” study area.
h) Current cost escalation is approximately 4%.
i) Analysis land use assumptions:
   i) RDA will work with Planning Department to determine what zoning is going to be. Go with the highest and best estimates.
   ii) Land is zoned with the land use proposed in the application.
   iii) HHRTZ requires 51% residential, and zoning is in place.
j) Horizon years
   i) Year of construction: 2035 was suggested
   ii) Opening year: 2040 was suggested
   iii) Will assume an aggressive build-out, so can project more TIF.
   iv) Assumed that TIF collected after the project is completed.

   v) Tax increment can start before construction is completed, but more will be collected if assume that construction is completed. We'll collect the most once is completed.

k) Kate Werrett Questions:
   i) Not planning on redeveloping all the parcels shown in the KMZ?
      (1) Good question, it wouldn't be all – but this is one of the
      (2) What are the assumptions we should make for redevelopment?
   ii) Does this include just the areas freed up by moving the rail, or a larger areas of parcels in the adjacent areas?
l) There is already an HTRZ (Housing Transit Re-Investment Zone) application submitted for the granary which encompasses some of the parcels shown as part of the Rio Grande Project
   i) They are pursuing one for the UTA station area as well
   ii) 51% of the use would have to be residential through an HTRZ – this is difficult due to increased remediation requirements
   iii) HTRZ requires that re-developed land be zoned according to zoning of that time – CRA does not
m) There is a certain level of assuming the interests of property owners to be able to estimate revenue
n) The main thing Joe wants answered is specifically regarding the UP property that is annexed and how much of the project this property will pay for
o) Action Item: Isolate UP Parcels that would be abandoned and send them an updated list
p) We're not trying to necessarily make it work, we just want to talk about it realistically
q) Assume that overpasses would be decommissioned as shown in RGP in order for properties to be developed
r) Other funding mechanism is CRA (Community Re-Investment Area) – does not have zoning requirements
s) RDA to work with Planning Department to make good assumptions of how area would be zoned and what could be built there
t) This project is probably 10-15 years out – Construction starting in 2035, build-out by 2040, so that we are consistent
u) Start collecting tax-increment in 2040 so that it is most valuable
v) Assume 4.04% inflation rate

Stakeholder Discussion
Utah Transit Authority
Meeting Agenda
Thursday, April 27, 2023
1:00 pm – 2:00 pm

Attendees

- ☒ Janelle Robertson
- ☒ Matt Carter
- ☒ Hal Johnson
- ☒ Grey Turner
- ☒ Paul Drake
- ☒ Sean Murphy
- ☐ Brian Allen
- ☐ Lara McLellan
- ☒ Theo Gochnour
- ☒ Brent Crowther, Kimley-Horn

Agenda

1. Review design criteria memo
    a. Grade
        i. Refer to AREMA Commuter Rail and Intercity Rail Systems for allowable longitudinal slopes (1.00%-2.00% for freight typically)
    b. Clearance (horizontal, vertical)
        i. Add buffer to design criteria for maintenance roads (25’ roughly)

2. Review cross-sections
    a. Who would own the track that Amtrak runs on?
        i. What offset from UP/UTA can it have
    b. The connection going West is a major constraint
        i. The route shown in the Rio Grande Plan is a historic yard track with a design speed of about 10 MPH – not exactly fitting for a mainline turnoff
    c. Amtrak has 8” tall platform and UTA has 24” tall platform
        i. Amtrak would probably need two tracks at the station due to unpredictable timetables
        ii. There are sometimes two trains there at the same time
        iii. Amtrak has like 20–30-minute stops
        iv. Require water source, gas source, way of getting luggage out of the box
        v. Freight elevator?
        vi. 1000-foot-long platform

vii. Need to find the agreement with Amtrak and it goes through all requirements to see if there is any wiggle room
viii. In station locations we need some sort of continuous maintenance easement/road
ix. We may need to reduce # of UP tracks through station area to maximize available space
x. We could narrow down to one large center platform – 33' platform, not track centers, is probably the minimum width of the platform
xi. Revisit the minimum length of platforms
1. Standard UTA is over 800' (see SLCentral)
2. Amtrak standard is 1000'
xii. UP's PTC is different from UTA's PTC (Positive Train Control)
xiii. The 600/700 South Crossover ROW is maxxed out and it doesn't have space for existing road that goes through underpass

3. Map review
   a. Horizontal layout map
      i. Environmental cleanup required for land sold by UP to the City
         1. There is a chance that even if UP sold the land to SLC /UTA it would not be developable due to environmental concern
         2. The yard areas are extremely contaminated
         3. This is a major constraint that would need to be identified and cost would need to be estimated to see if the project can even pencil in the way that the Rio Grande Plan suggests
      ii. If SLCentral and North Temple are consolidated at Rio Grande, this could be a problem
      iii. We want to avoid "Planning Blight" and "Planning Paralysis" by exploring this project's feasibility
   b. Property impacts map
      i. Show impacts related to re-aligning trax to Rio Grande Street

4. Discussion of "issues" that should be identified and documented in future Summary Report/Memorandum

Patriot Rail Coordination Meeting
Meeting Notes
Tuesday, June 13
4:00 pm – 5:00 pm

Attendees:

☒ Don Itzkoff, Patriot Rail (Washington DC)
☒ Michael Heleher – Operations (Jacksonville)
☒ Mike Candella – Operations (Salt Lake)
☒ Rob Thrall (Business Development)
☒ Erich Smith (Real Estate)
☒ Becka Roolf
☒ Joe Taylor
☒ Brent Crowther
☒ Theo Gochnour

Agenda:

1. Connecting Communities Overview
    a. Becka Roolf – provided a high-level overview. How much would it cost? What are the technical challenges involved? If elected officials want to move forward, what does that mean? If they decide it's too much, we have that information in-hand.
    b. We know what the other options might look like – viaducts across rail lines, dealing with interchanges or underpasses at freeways.
    c. Recon. Communities -> community-driven approach

2. Patriot Rail
    a. Operates Salt Lake Garfield and Western Rail
    b. Patriot Rail runs all lines on UPRR track
    c. They want to get out of the downtown yard due to the delays associated with interchanging with UPRR downtown – blocking crossings hurts communities and they are working on plan to eliminate this
        i. All work for relocation must be done by end of December 2025
        ii. Infragrant to move interchange from downtown to outside the city a bit closer to the airport -> increased capacity, less congestion
    d. Still need eastern connection post-relocation - key for flexibility and enhanced capacity

    i. Once relocation has occurred, plan is to lease operation of South Temple Railyard
    ii. Potential opportunities as Big League Utah and RMP eye the former RMP site for MLB stadium
e. Patriot Rail likes the separated uses between AmTrak and UP rail
f. Is center of gravity of industry moving to NW quadrant and might this move interest UP? -> combine with Rio into re-alignment
    i. Rio Tinto is studying re-aligning freight tracks in NW quadrant to accommodate expansion of tailings pond
g. Patriot Rail can be a resource moving forward
h. SL&G does not have any interaction at 4th south yard
i. Alameda Corridor was most difficult from a funding standpoint -> they used tolls and had a robust repayment timeline
j. What are public benefits?

APPENDIX F – ROUGH ORDER OF MAGNITUDE COST ESTIMATE

Rio Grande Plan
ROM Cost Estimate

Item	Quantity	Unit of Measure	Unit Cost	Total Cost	Notes
Track					
UTA Track (New)	33,882	TF	$ 650	$ 22,022,981	
UPRR Track (New)	65,290	TF	$ 650	$ 42,438,674	
Amtrak Track (New)	16,498	TF	$ 650	$ 10,723,835	
Platform	72,100	SF	$ 200	$ 14,420,042	Includes Rio Grande and North Temple station platforms and Amtrak platform
Switch (New)	4	EA	$ 550,000	$ 2,200,000	
Signals	115,670	TF	$ 150	$ 17,350,498	Length of total new track
			SUBTOTAL	$ 109,156,030	
Structural					
Retaining Walls	1,012,550	SF	$ 300	$ 303,765,000	
Main Viaduct (900 S to N Temple)	1,303,340	SF	$ 400	$ 521,336,000	Includes intersection caps
Roadway Bridges	198,712	SF	$ 350	$ 69,549,055	I-15, 200 N, 300 N, 400 N, 800 W, 900 W
Rio Grande Depot Station Appurtances	1	LS	$ 25,000,000	$ 25,000,000	
			SUBTOTAL	$ 919,650,055	
Right-of-Way					
Full Property Aquisition	1,728,821	SF	$ 30	$ 51,864,628	
Partial Property Aquisition	235,856	SF	$ 30	$ 7,075,689	
Building Demolition	302,252	SF	$ 100	$ 30,225,178	
			SUBTOTAL	$ 89,165,495	
Roadway and Excavation					
Remove Asphalt	645,583	SF	$ 10	$ 6,455,825	
Remove Concrete	207,996	SF	$ 25	$ 5,199,901	
Remove Curb and Gutter	12,555	FT	$ 10	$ 125,549	
Sidewalk	304,264	SF	$ 10	$ 3,042,636	
Roadway Pavement	1,123,432	SF	$ 14	$ 15,728,041	
Landscaping	10	ACRE	$ 225,000	$ 2,145,288	
Excavation	79,101,295	CF	$ 15	$ 1,186,519,421	
Curb and Gutter	44,940	FT	$ 30	$ 1,348,207	
400 South Viaduct Reconstruction	1	LS	$ 100,000,000	$ 100,000,000	
North Temple Viaduct Reconstruction	1	LS	$ 100,000,000	$ 100,000,000	
Maintenance of Traffic	1	LS	$ 120,000,000	$ 120,000,000	
			SUBTOTAL	$ 1,540,564,869	
Utilities					
Waterline Improvements	2,900	LF	$ 300	$ 870,000	Assumes parallel 12" main for 2 blocks where parallel lines do not already occur, includes service line reconnections.
Sewer Improvements	1,500	LF	$ 400	$ 600,000	Assumes parallel 8" main for 2 blocks where parallel lines do not already occur, includes service line reconnection. Assumes existing mains can remain in place. Does not include 48" transmission line relocation - magnitude of upstream/downstream scope is not understood at this time. Does not include crossing sewer utility relocation - magnitude of upstream/downstream scope is not understood at this time.
Storm Drain Improvements	5,700	LF	$ 400	$ 2,280,000	Assumes parallel 15" trunk line storm drain where parallel lines do not already occur. Assumes existing mains can remain in place. Does not account for the ~6 major multi-pipe or large-diameter culvert relocations that may need to occur - downstream/upstream impacts are not fully understood at this time.
Power & Telecom Improvements	1	LS	$ 20,000,000	$ 20,000,000	Will require input from franchise utility.
Fiber Optic Improvements	1	LS	$ 5,000,000	$ 5,000,000	Will require input from franchise utility.
Gas Improvements	1	LS	$ 10,000,000	$ 10,000,000	Will require input from franchise utility.
			SUBTOTAL	$ 38,750,000	

	2023		2033	
Direct Subtotal	**$ 2,697,286,449**		**Direct Subtotal**	**$ 2,697,286,449**
Additional Calculated Construction Cost:			**Additional Calculated Construction Cost:**	
Flagging- RR (.05%)	$ 545,780		Flagging- RR (.05%)	$ 545,780
Total Direct Cost	**$ 2,697,832,229**		**Total Direct Cost**	**$ 2,697,832,229**
Indirect Construction Cost:			**Indirect Construction Cost:**	
Contractor OH/Markup (10%)	$ 269,783,223		Contractor OH/Markup (10%)	$ 269,783,223
General Yearly Escalation (0%)	-		General Yearly Escalation (6%/year)	$ 2,562,940,617
Total Indirect Construction Cost:	**$ 269,783,223**		**Total Indirect Construction Cost:**	**$ 2,832,723,840**
Other Indirect Costs:			**Other Indirect Costs:**	
Environmental (1%)	$ 26,978,322		Environmental (1%)	$ 26,978,322
Design (2%)	$ 53,956,645		Design (2%)	$ 53,956,645
Construction Engineering (3%)	$ 80,934,967		Construction Engineering (3%)	$ 80,934,967
Yearly Escalation for Engineering Services (0%)	$ -		Yearly Escalation for Engineering Services (3.75%/year)	$ 80,934,967
Total Other Indirect Cost:	**$ 161,869,934**		**Total Other Indirect Cost:**	**$ 242,804,901**
Contingency (30%)	$ 809,349,669		Contingency (30%)	$ 809,349,669
Total Cost	$ 3,938,835,054		**Total Cost**	$ 6,582,710,638

Items Not Estimated:

- **Architectural elements of the Rio Grande Station canopy**
- **Operational cost impacts to Union Pacific Railroad, Amtrak, Utah Transit Authority**
  - Relocating and remediating UPRR's 400 South Yard
  - Removal of existing rail, stations, and platforms
  - Remediating removed or abandoned rail
  - Construction delays to train operations
  - Spur connections and railroad customer servicing (estimated 5-6 currently railroad customers within the project limit)
- **De-watering system**
  - Piping and lift stations
  - Downstream outfall or system improvements
- **Detailed systemic utility adjustments**
  - Reconstruction of existing 500 West public utility lines
  - Upstream or downstream system improvements to facilitate crossings
- **Reconfiguration of the 500 South and 600 South viaducts and ramps**
- **Ground improvements such as piles, rammed aggregate piers, or significant over-excavation**
- **Structural support of existing buildings along the corridor**
- **Business assistance or relocation services, including cost of acquiring properties that currently have rail access**
- **Maintenance of freight and transit operations during construction**
- **Property acquisition of the 400 South UP Yard to include the purchase of the replacement yard**
- **On-going maintenance and operating costs:**
  - Maintenance of the trench and box infrastructure, ventilation equipment and dewatering,
  - Increased utility costs for lift stations and inverted siphons