

CITY OF SANTA FE

# ARROYO DE LOS CHAMISOS CROSSING

## Initial Evaluation of Alternatives Phase “A” Report



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**ARROYO DE LOS  
CHAMISOS CROSSING**  
**Initial Evaluation of  
Alternatives Phase “A” Report**

CITY OF SANTA FE

FINAL REPORT

PROJECT NO.: 2043355

DATE: DECEMBER 2019

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Our ref.: 2043355

December 04, 2019

John J Romero, PE  
City of Santa Fe Public Works Department  
Engineering Division  
500 Market Station  
Santa Fe, New Mexico 87501

Dear Mr. Romero,

Submitted for review is the Initial Evaluation of Alternatives Phase "A" Report for the Arroyo de Los Chamisos Crossing in accordance with Contract No. 19-0127. We look forward to discussing the report with you.

Kind regards,

A handwritten signature in blue ink that reads "Richard Rotto".

Richard Rotto, PE  
Associate Vice President

RKR/rkr  
Encl. Phase A Report  
cc

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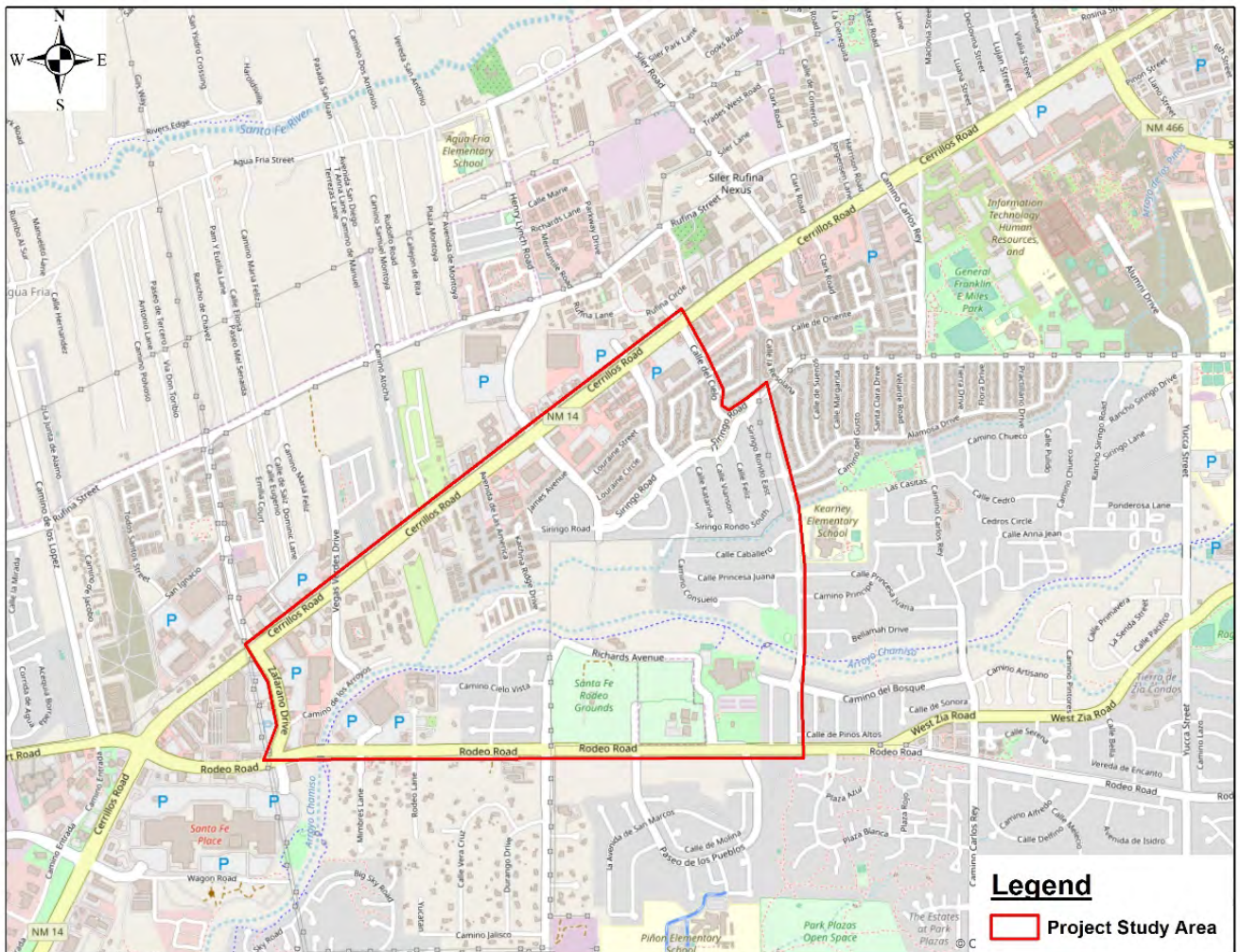
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# 1 INTRODUCTION

The City of Santa Fe is conducting an Initial Evaluation of Alternatives study for a new crossing of the Arroyo de Los Chamisos in Santa Fe, New Mexico. The study area is approximately one mile long and located between Rodeo Road (NM 300) to the south and Cerrillos Road (NM 14) to the north, and bounded between Zafarano Road and Avenida de Las Campanas to the east and west respectively. A project location map is shown in **Figure 1.1**.



**Figure 1.1 Project Study Area Map**

A new crossing will provide a connection between Rodeo Road and Cerrillos Road to improve regional mobility and relieve congestion on existing streets located in the area. The 2000 Santa Fe Community College District Plan envisioned a network of primary and secondary road connections throughout the College District but at the same time acknowledged that Richards Avenue is the “principal gateway” to the district. Currently, Richards Avenue extends from the southern tip of Rancho Viejo to Rodeo Road but just north of Rodeo Road, it dead ends and does not cross the Arroyo de Los Chamisos. As a result, northbound-southbound traffic needing to cross the Arroyo de Los Chamisos must pass through adjacent neighborhood roads including Zafarano Road, Avenida de Las Companas, Camino Carlos Rey, and Governor Miles Road.

Most of the land within the study area consists of residential neighborhoods and vacant land. Connectivity and the ability to cross over the Arroyo de Los Chamisos would be important for increasing access for those living in and traveling through the study area.

Past efforts to study a potential crossing have encountered public opposition. In 2010, the state legislature requested the New Mexico Department of Transportation (NMDOT) to evaluate the effect of extending a connection across the Arroyo de Los Chamisos. The study confirmed that it would draw local traffic from the surrounding road connections reducing traffic on Avenida de Las Companas, Governor Miles Road, Camino Carlos Rey and Zia Road.

Subsequently, the Santa Fe Metropolitan Planning Organization (MPO) Transportation Policy Board, comprised of City, County, MPO and NMDOT staff, concluded the extension was advantageous to pursue; however, subsequent public review revealed that members of the neighborhood opposed the project. Past efforts focused on a single alignment extending the Richards Avenue Corridor directly across the arroyo and vacant lands to conjoin the northern and southern segments at the west end of Siringo Road. This study will look at multiple alternatives.

The Arroyo de Los Chamisos Crossing is currently included in the Santa Fe MPO’s 2015-2040 Master Transportation Plan as a connection to “review possible alignments for an arroyo crossing between Zafarano and Avenida de las Campanas”. On September 26, 2018, the City Council approved Resolution 2018-60 to study additional alternatives. The City of Santa Fe seeks to evaluate other possible options to cross the arroyo, in addition to the previously identified alignment. A minimum of three alignments are to be evaluated with a goal of providing the City with a preferred alternative to create a new connection across the arroyo.

This alignment/corridor study is being conducted in accordance with New Mexico Department of Transportation (NMDOT) Location Study Procedures Update 2015. The Location Study Procedures describe a comprehensive process that evaluates transportation problems and identifies and evaluates potential solutions. Following this process provides for compliance with the environmental regulations of the FHWA as mandated by the National Environmental Policy Act (NEPA) if the City of Santa Fe applies for federal funds to design or construct the project in the future. In addition, the study process also serves to inform and involve stakeholders and to document the decision-making process.

The project development process under the Location Studies Procedures begins with an alignment or corridor study. The process is a four-step procedure to help identify an action that best satisfies the project purpose and need. This process is typically conducted in four distinct phases:

- Phase A – Initial Evaluation of Alternatives
- Phase B – Detailed Evaluation of Alternatives
- Phase C – Environmental Documentation
- Phase D – Preliminary Design

This report summarizes the *Phase A - Initial Evaluation of Alternatives* of the project development process. The primary objectives of Phase A are:

- 1 Establishment of the need for an action,
- 2 Development of a range of potential alternatives to achieve the need, and
- 3 Elimination of alternatives that are not feasible or are clearly inferior to the other options.

Phase A identifies the alternative(s) to study in greater detail in Phase B.

# 2 EXISTING CONDITIONS

## 2.1 ROADWAY AND ROADSIDE FEATURES

### 2.1.1 TRANSPORTATION CONDITIONS

The proposed crossing does not currently exist; therefore, vehicular and/or multi-modal connectivity across the Arroyo de Los Chamisos is not provided. The proposed crossing would provide this connectivity linking two major arterials in the area, Cerrillos Road and Rodeo Road. As residential development continues in this area and existing land becomes developed, transportation needs will continue to increase for all modes of travel and will be better served with this crossing connection. It is expected that a crossing at this location will improve the functionality of the transportation system and decrease traffic delays.

### 2.1.2 POSTED SPEED AND ROADWAY WIDTHS

Posted speeds and roadway widths within the study area are shown in **Table 2.1**. Posted speeds of 25 mph are consistent with the predominantly residential nature of the study area.

**Table 2.1** Posted Speed and Roadway Widths

STREET NAME	POSTED SPEED	LEFT GUTTER	BIKE LANE	ROAD WIDTH	BIKE LANE	RIGHT GUTTER	TOTAL WIDTH
Vegas Verde Drive	25 mph	1'-6"	-	30'-0"	-	1'-6"	33'-0"
Camino de los Arroyos (east)	25 mph	1'-6"	-	30'-0"	-	1'-6"	33'-0"
Camino de los Arroyos (west)	25 mph	1'-6"	4'-0"	20'-0"	4'-0"	1'-6"	31'-0"
Kachina Ridge Drive	25 mph	1'-6"	-	25'-8"	-	1'-6"	28'-8"
Avenida de Las Americas	25 mph	1'-6"	-	29'-4"	-	1'-6"	32'-4"
Richards Avenue (south)	25 mph	1'-6"	4'-0"	40'-0"	4'-0"	1'-6"	51'-0"
Richards Avenue (north)	25 mph	1'-6"	-	36'-0"	-	1'-6"	39'-0"
Camino Consuelo	25 mph	1'-6"	-	30'-0"	-	1'-6"	33'-0"

---

### 2.1.3 TRAFFIC CALMING AND CROSSWALKS

Traffic calming measures and marked crosswalks have been implemented in the study area on several streets as shown in **Table 2.2**.

**Table 2.2 Speed Humps and Cross Walks in the Study Area**

STREET NAME	POSTED SPEED	SPEED HUMPS	CROSSWALKS
Avenida de Las Americas	25 mph	2	0
Richards Avenue (north)	25 mph	4	2
Camino Consuelo	25 mph	8	1

---

### 2.1.4 MULTI MODAL CONSIDERATIONS

The Arroyo de Los Chamisos Trail crosses through the project area along the southern bank of the Arroyo de Los Chamisos. The Arroyo de Los Chamisos Trail does not cross the arroyo in the project area. There are currently no pedestrian or bicycle facilities available for crossing the Arroyo de Los Chamisos in the study area between Rodeo Road and Avenida de Las Campanas. The addition of a new crossing would enhance non-vehicular travel across the arroyo and improve connectivity to the College District. The pedestrian and bicycle facilities included with the proposed crossing would be connected to existing facilities on local and regional roadways within the study area to expand non-vehicular travel options for residents.

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## 2.2 HYDROLOGY

Arroyo de Los Chamisos is the 2<sup>nd</sup> largest drainage in the City of Santa Fe next to the Santa Fe River. The arroyo begins at the foot of Atalaya Mountain behind St. John's College and runs west for 20 miles, through the south end of town, joining up with the Arroyo Hondo near NM 599 and I-25, and eventually empties into the Santa Fe River near La Cienega. The arroyo crosses many streets along its path before reaching the crossing at Rodeo Road. A small tributary area named Arroyo de Los Chamisos (North Fork) joins the main branch just west of Richards Avenue. Both the main branch of the Arroyo de Los Chamisos and the North Fork of the Arroyo de Los Chamisos cross the Study Area. The total upstream drainage area at the confluence point is approximately 14 square miles. The estimated magnitude of 100-year design flows using the USGS Regression Equation are 969 cubic feet per second (cfs) for main branch and 389 cfs for North Fork.

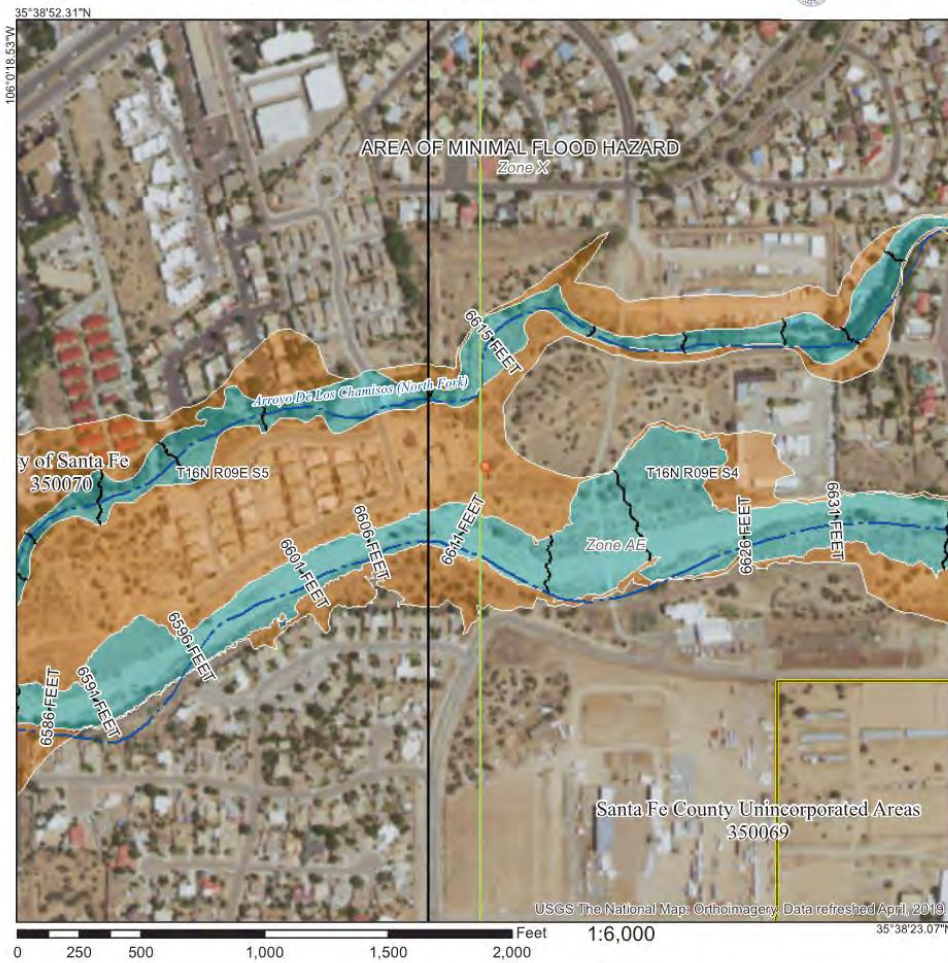
The 2012 Flood Insurance Study (FIS) for Santa Fe County provides peak discharges at various cross-sections along the Arroyo. As reported in "Table 7- Summary of Discharges" in the FIS report, the 1% annual chance of a flood at Section "AU" is estimated to be 1,900 cfs. Cross section "AU" is located 1.4 miles downstream from confluence point. The bottom width of the existing arroyo at the vicinity of



proposed Richards Avenue crossing is 100-120 feet, and the channel slope is approximately 1.6 percent.

The Digital Flood Insurance Rate Map (FIRM) prepared by FEMA is shown in Figure 2.1. The project area is designated as Special Flood Hazard Area (SFHA) Zone AE on Flood Insurance Rate Map (FIRM) Panels 35049C0394D and 35049C0413E for Santa Fe County, New Mexico and Incorporated Areas (FIS Study, 2012). Zone AE includes lands that are subject to flooding during the 100-year flood event and base flood elevations are determined. The flood hazard area does not include a regulatory floodway for this reach of Arroyo de Los Chamisos.

### National Flood Hazard Layer FIRMette



**Legend**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

<b>SPECIAL FLOOD HAZARD AREAS</b>	Without Base Flood Elevation (BFE) Zone A, V, A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
	Regulatory Floodway
<b>OTHER AREAS OF FLOOD HAZARD</b>	0.2% Annual Chance Flood Hazard. Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee. See Notes, Zone X
	Area with Flood Risk due to Levee Zone D
<b>OTHER AREAS</b>	Area of Minimal Flood Hazard Zone X
	Effective LOMRs
	Area of Undetermined Flood Hazard Zone D
<b>GENERAL STRUCTURES</b>	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
<b>OTHER FEATURES</b>	Cross Sections with 1% Annual Chance Water Surface Elevation
	Coastal Transect
	Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
<b>MAP PANELS</b>	Digital Data Available
	No Digital Data Available
	Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/4/2019 at 5:08:41 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

**Figure 2.1 FEMA Flood Insurance Rate Map for the Arroyo de Los Chamisos**



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## 2.3 TRAFFIC

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### 2.3.1 EXISTING TRAFFIC ANALYSIS

The 2019 Santa Fe Regional Travel Demand Model (VISUM), developed and maintained by the Santa Fe MPO, was utilized in the development of the alignment study traffic analysis. A total of 13 new traffic counts were performed to provide additional detail to the travel demand model and refine the results in the study area.

To cross the Arroyo, drivers currently utilize north-south connections including Zafarano Drive, Avenida de Las Campanas and Camino Carlos Rey, and north of the arroyo Richards Avenue, Camino Consuelo, Calle del Cielo, and Calle la Resolana.

The existing AM and PM traffic volumes and volume-to-capacity (v/c) ratios in the study area are provided in **Appendix D**. Currently no roadways in the study area exceed a v/c ratio of 0.85 (or 85%).

The initial evaluation of alternatives (Phase A) focused on evaluation of travel patterns for existing traffic and compared differences in travel patterns for each of the alternatives. The detailed evaluation of alternatives (Phase B) will include a detailed analysis of intersections for both existing and design/horizon year traffic volumes.

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## 2.4 RIGHT-OF-WAY AND PROPERTY OWNERSHIP

The Arroyo de Los Chamisos within the project area traverses three different property owners on five parcels as shown in **Table 2.3**. One vacant parcel north of the Arroyo is owned by the New Mexico Game & Fish Department. The existing roads occupy right-of-way owned by the City of Santa Fe.

**Table 2.3 Arroyo de Los Chamisos and Vacant Land Property Ownership**

PARCEL OWNER	FEATURE	PARCEL NO.	PARCEL AREA
City of Santa Fe	Arroyo de Los Chamisos	99306767	40.65 acres
Rodeo de Santa Fe, Inc.	Arroyo de Los Chamisos	970002591	2.12 acres
Rodeo de Santa Fe, Inc.	Arroyo de Los Chamisos	970002592	0.65 acres
Vista Del Prado Subdivision	Arroyo de Los Chamisos	99306764	11.26 acres
Vista Del Prado Subdivision	Arroyo de Los Chamisos	99306766	1.43 acres
New Mexico Game & Fish Dept.	Vacant Land	970002442	26.20 acres

Source: City of Santa Fe GIS available at <https://www.santafenm.gov/gis>

## 2.5 ENVIRONMENTAL, CULTURAL AND COMMUNITY FACTORS

The following information was collected from available resources, which includes a biological reconnaissance memorandum of the Richards Avenue Fire Station No. 7 Crossing.

### 2.5.1 LAND USE

The land uses within the study area are primarily residential neighborhoods with some vacant land. On the north side of the project area, there is access to a variety of services including a shopping center and restaurants, and access to Cerrillos Road. On the eastern end, there is access to Rodeo de Santa Fe and Rodeo Rd. There are six neighborhood associations within or adjacent to the study area, as shown in **Figure 2.2**, namely Southwest Bellamah, Las Americas, The Lofts on Cerrillos Road, Vista del Prado, Town & Country, and Pueblos de Rodeo Road.



**Figure 2.2 Neighborhood Associations Within or Adjacent to the Study Area**

The Arroyo de Los Chamisos is a physical barrier for the proposed crossing. The Arroyo de Los Chamisos Trail, a paved multi-use path, travels adjacent to the Arroyo de Los Chamisos within the study area.

## 2.5.2 DEMOGRAPHICS

Table 2.4 provides state and local demographic information, including the Study Area which lies within Census Tract 11.06. According to Census Data, the median age of residents of the Study Area is higher than that of the City, County, and State of New Mexico. Race status, as a percentage, within the Study Area reflects similar proportions to that represented within the City, County and State of New Mexico.

**Table 2.4 2010 Population Demographics**

CHARACTERISITCS	NEW MEXICO	SANTA FE COUNTY	CITY OF SANTA FE	STUDY AREA <sup>1</sup>
Total Population	2,059,179	144,170	67,947	2,674
Median Age	36.7 years	43.0 years	44.4 years	55.1 years
Percent Under 20	28.2%	23.1%	20.8%	16%
Percent Over 64	13.2%	15.1%	17.6%	34.8%
<u>Race Status (Percent)</u>				
White	68.4%	76.2 %	78.9%	74.4%
Black / African American	2.1%	0.9%	1.0%	0.8%
Native American	9.4%	3.1% <sup>0</sup>	2.1%	2.5%
Asian	1.4%	1.2%	1.4%	0.7%
Hawaiian / Pacific Islander	0.1%	0.1%	0.1%	0%
Some Other Race	15.0%	15.1%	12.8%	18.1%
Two or More races	3.7%	3.6%	3.7%	3.4%

<sup>1</sup> The Study Area lies within Census Tract 11.06

## 2.5.3 VISUAL

The visual landscape of the study area is primarily residential and vacant land. There are street lights along roadways in the area, with residential-type landscaping. There is a median, raised crosswalk, and pedestrian crossing at the north end of the study area near the connection of Richards Avenue and Cerrillos Road. On the south end, there is a bike lane at the connection of Richards Avenue and Rodeo Road.

Given the proposed connection will require a bridge or drainage structure to span the Arroyo de Los Chamisos at two locations, there are expected to be opportunities for structural aesthetics along the corridor. Aesthetics may be considered during design, including public landscaping.

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## 2.5.4 ECONOMICS

Improvements that increase north-south connections for vehicles traveling along Richards Avenue would allow Richards Avenue to serve as the primary gateway to the College District and could be an economic benefit for the community.

Table 2.5 provides comparative economic data for the State, County, City and Study Area.

**Table 2.5 Economic Profile**

CHARACTERISITCS	NEW MEXICO	SANTA FE COUNTY	CITY OF SANTA FE	STUDY AREA
<u>Housing</u>				
Owner-Occupied	69%	69%	61%	64.7%
Renter-Occupied	32%	31%	40%	35.3%
<u>2013-2017 Income and Poverty</u>				
Median Family Income	\$46,718	\$57,945	\$53,922	\$46,700
Family Poverty Rate	20.6%	14.4%	15.1%	21.9%
Per Capita Income	\$25,257	\$35,801	\$34,371	\$22,293
Per Capita Poverty Rate	20%	14.4%	15.1%	9%

<sup>1</sup> The Study Area lies within Census Tract 11.06

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## 2.5.5 NOISE

There are several residential neighborhoods within the study area which will experience increased and decreased levels of traffic. The potential for increased noise with the recommended alternative(s) may be a consideration, but will be typical for urban conditions.

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## 2.5.6 AIR

Santa Fe County is considered an attainment area under the United States Environmental Protection Agency. The proposed crossing of Arroyo de Los Chamisos is identified in the Santa Fe Metropolitan Planning Organization Transportation Improvement Program. Air quality concerns, as a result of the proposed improvement, are not expected.

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## 2.5.7 BIOLOGICAL CONSIDERATIONS

The overview of the existing biological conditions is based on a 2007 biological survey (Kennemore 2007). It is not expected that the project area has changed significantly, although a new biological field survey will be performed during a later phase of project development.

Siberian elms (*Ulmus pumila*) are expected to be present in the area, along with juniper trees (*Juniperus monosperma*), gray rabbitbrush (*Chrysothamnus nauseosus*), and cholla (*Cylindropuntia* sp.). The 2007 biological survey counted a total of 56 plant species, mostly grasses and forbs. The dominant herbaceous species observed at the time were blue grama (*Bouteloua gracilis*), black grama (*B. eriopoda*), and six-weeks grama (*B. barbata*). The 2007 survey also noted several cottontail rabbits (*Sylvilagus* sp.) in the project area. No protected or sensitive plant species and no reptiles or other mammals were observed within the project limits during the 2007 survey, and are not expected under current conditions. The cholla observed in the project area is located just east of the fire station access road at the top of the hill in the middle of the project area. This cholla needs to be more closely examined to determine its species. The state endangered Santa Fe cholla (*Cylindropuntia viridiflora*) could potentially occur in the area. Gopher burrows and other rodent burrows were observed in the vicinity during the 2007 survey. No other physical signs of ground-dwelling wildlife were noted at that time. A new biological survey and report are recommended for the project area during Phase C of this project.

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### **2.5.8 SOIL TYPES**

The soil types found within the project boundary are: Pojoaque-Rough broken land complex, Fivemile loam, Cerrillos fine sandy loam with 5-10 percent slopes, and Riverwash. Riverwash soil type is present in the channels of the two arroyos that pass through the project area. Fivemile loam is present as a small strip bordering both sides of Arroyo Chamisos. Cerrillos fine sandy loam is found at the very southern end of the project area. Runoff is medium for these latter two soil types. The Pojoaque-Rough broken land complex is found in the northern two-thirds of the project area. Runoff is rapid for this soil type and the hazard of erosion is severe. The permeability of these soil types is moderate. The average annual precipitation for these soil types is 12 to 15 inches, the average annual air temperature is 48 to 52°F, and the average frost-free period is about 160 to 170 days.

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### **2.5.9 NOXIOUS WEEDS**

The Class C weed, Siberian elm, was observed in abundance during the 2007 biological survey. No other state-listed noxious weeds were observed in the area during that survey.

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### **2.5.10 MIGRATORY BIRDS**

Three species of birds were observed within the project area during the 2007 reconnaissance, juncos (*Junco hyemalis*), robins (*Turdus migratorius*), and western bluebirds (*Sialia mexicana*). No bird nests and no protected or sensitive species were observed within the project limits during the reconnaissance. Suitable nesting habitat for raptors does not exist in the area. Suitable nesting habitat for some species of songbirds is present.



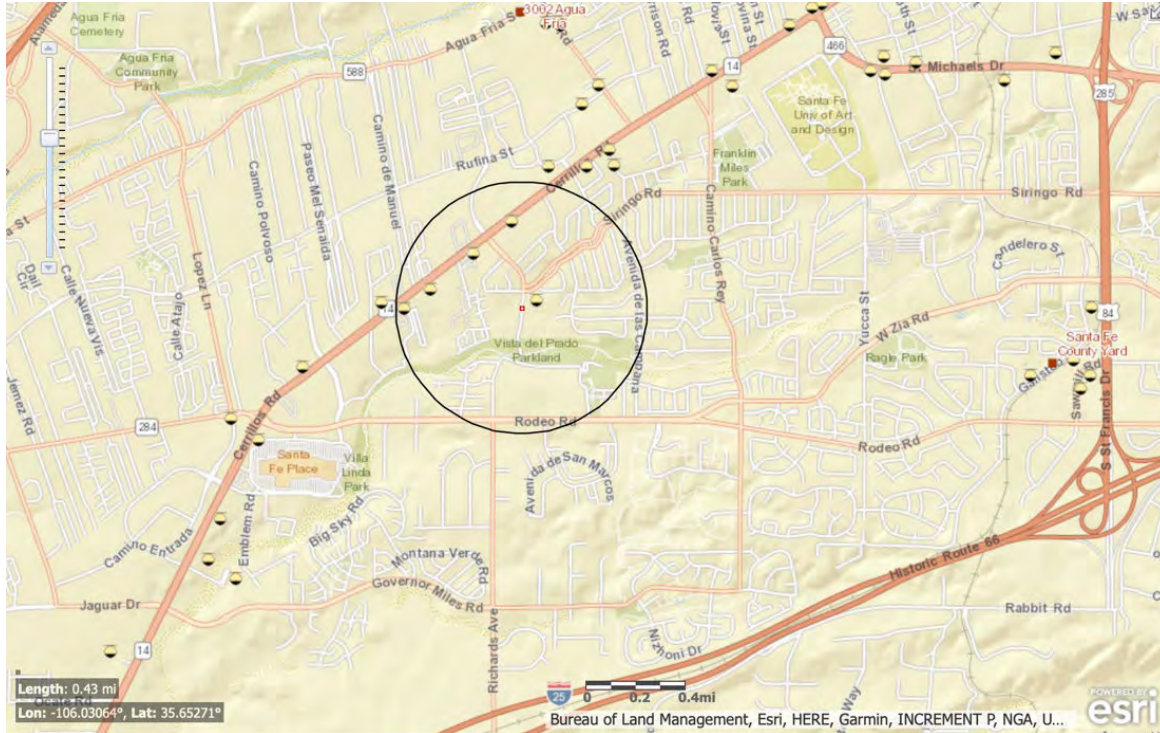
### 2.5.11 JURISDICTIONAL WETLANDS AND WATERS OF THE UNITED STATES

The proposed project crosses the Arroyo de Los Chamisos. The channel width is approximately 50 to 70 feet. The channel is considered jurisdictional waters of the United States. As such a Clean Water Act Section 404/401 application will need to be completed for, and submitted to, the U.S. Army Corps of Engineers for the placement of permanent fill material. Depending on the acreage of impact, this work could fall under Nationwide Permit #14. No obligate or wetland species were observed within or along the banks of Arroyo de Los Chamisos during the 2007 biological survey.

No jurisdictional wetlands are expected to be present in the arroyos in the proposed project area. This is based on the lack of hydric soils, obligate wetland species of plants, and wetland hydrology in the area, during the 2007, that would be affected by the project. All three of these factors must be present for a jurisdictional wetland to exist.

### 2.5.12 HAZARDOUS MATERIALS

A review of the New Mexico Environment Department's EGIS Mapper indicates that there are five known leaking underground storage tanks (USTs) within a 0.5 mile radius of the project area. Four of these have been released and one is still active. **Figure 2.3**, below, shows the 0.5 mile radius around the project area on the EGIS Mapper. Additional research will need to be completed to determine if the project area contains any hazardous contamination during Phase C of the project.



**Figure 2.3** EGIS Mapper - 0.5 Mile Radius Around Project Area

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### ***2.5.13 CULTURAL RESOURCES***

There are no recorded existing cultural resources sites within the project area; however, much of the area has never been surveyed or was surveyed over 10 years ago. A full cultural resource pedestrian survey will be completed during Phase C to fully document existing conditions. The project area does exist within the City of Santa Fe Suburban Architectural Review District; however, since federal funds may be involved, the cultural resource clearance process would fall under Section 106 and require clearance through the State Historic Preservation Officer with courtesy coordination through the City of Santa Fe Historic Preservation Division.

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## **2.6 SURVEYING AND MAPPING**

Due to the size of the project area, survey data for the Initial Evaluation of Alternatives utilized City of Santa Fe GIS data sets based on 2-foot contour interval. Project specific surveying based on a 1-foot contour interval will be performed for the Detailed Evaluation of Alternatives in Phase B.

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## **2.7 PLANNING DOCUMENTS**

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### ***2.7.1 SANTA FE COUNTY COMMUNITY COLLEGE DISTRICT PLAN***

Richards Avenue is the primary north-south connection between the City of Santa Fe and the Santa Fe Community College District. The 2000 Santa Fe Community College District Plan envisioned a network of primary and secondary road connections throughout the College District but at the same time acknowledged Richards Avenue as the “principle gateway” to the district.

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### ***2.7.2 WHITE PAPER ON POSSIBLE RICHARDS AVENUE EXTENSION***

In 2010, the state legislature requested the New Mexico Department of Transportation (NMDOT) evaluate the effect of extending Richards Avenue across the Arroyo de Los Chamisos. The study confirmed that adding the Richards Avenue Extension would impact local travel patterns the most, reducing local traffic from the surrounding road connections and reducing traffic on Avenida de Las Companas, Governor Miles Road, Camino Carlos Rey and Zia Road. Subsequently, the Santa Fe Metropolitan Planning Organization (MPO) Transportation Policy Board, comprised up of City, County, MPO and NMDOT staff, concluded the extension was advantageous to pursue; however, subsequent public review revealed that members of the neighborhood opposed the project. These past efforts focused on a single alignment extending the Richards Avenue Corridor directly across the arroyo and vacant lands to conjoin the northern and southern segments at the west end of Siringo Road.

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### ***2.7.3 SANTA FE MPO 2015-2040 MASTER TRANSPORTATION PLAN***

The Arroyo de Los Chamisos Crossing in the vicinity of Richards Avenue is currently included in the Santa Fe MPO's 2015-2040 Master Transportation Plan as a connection to "review possible alignments for an arroyo crossing between Zafarano and Avenida del las Campanas." On September 26, 2018, the City Council approved Resolution 2018-60 to study additional alternatives. The City of Santa Fe seeks to evaluate other possible options to extend Richards Avenue, in addition to the previously identified alignment. A minimum of three alignments are to be evaluated with a goal of providing the City with a preferred alternative to extend Richards Avenue to Cerrillos Road.



# 3 PUBLIC INVOLVEMENT

## 3.1 PROJECT SPECIFIC COMMUNICATION STRATEGY

A public involvement plan (PIP) was developed at the initiation of the project, inclusive of a Context Sensitive Solutions (CSS) Plan, to guide the project team through the initial activities for the Arroyo de Los Chamisos Crossing Project. Table 3.1 depicts a summary of the public involvement events.

**Table 3.1 Summary of Public Involvement Events**

PHASE	PUBLIC INVOLVEMENT GOAL	PLANNED PUBLIC INVOLVEMENT EVENTS
Phase A – Initial Evaluation of Alternatives	<ul style="list-style-type: none"> <li>• Present findings of existing conditions</li> <li>• Consider alternatives</li> <li>• Solicit public comments</li> </ul>	<ul style="list-style-type: none"> <li>• Kick-off meeting with public (1)</li> <li>• Stakeholder/Agency meeting (1)</li> <li>• Public information meeting (1)</li> </ul>
Phase B – Detailed Evaluation of Alternatives	<ul style="list-style-type: none"> <li>• Present findings of detailed analysis</li> <li>• Share preferred alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder/Agency meeting (1)</li> <li>• Public information meeting (1)</li> </ul>

Project communication will include a variety of media to engage and educate people about the project. All public meetings will be fully advertised through stakeholder websites, social media, local newspaper and email. The City of Santa Fe’s Early Neighborhood Notification (ENN) process will be applied, as directed by the City. Advertisement, facilitation, and documentation will comply with the National Environmental Policy Act (NEPA). All key stakeholders will be involved early in the process with coordination throughout.

A comment form and project-contact email will always be available so public comments can be collected for decision-making and the administrative record. Contact information will be collected when appropriate so that the project contact list remains current and accurate.

Agency and stakeholder coordination will be completed and input will be collected during meetings. All input received will be documented throughout project development.

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## 3.2 AGENCY AND STAKEHOLDER COORDINATION

To ensure there is a context sensitive approach used for the proposed crossing, additional coordination will occur with environmental regulatory agencies, representatives from Fire Station 7, neighborhood associations, and more. Key agencies and stakeholders may include representatives from the following agencies:

- Santa Fe County
- Santa Fe Community College
- Santa Fe Metropolitan Planning Organization
- New Mexico Department of Transportation
- City of Santa Fe Fire and Police Departments
- New Mexico Game and Fish
- New Mexico State Forestry
- New Mexico Energy Minerals and Natural Resources Department
- Federal Highway Administration
- United States Corp of Engineers

Coordination with key agencies and stakeholders will occur via email, phone calls, and in-person meetings, if needed. Additional stakeholders will be identified throughout the planning process and will be invited to the public meetings.

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## 3.3 PUBLIC

As outreach to the general public, three user groups will be considered throughout this project and are highlighted below. Efforts will be made to engage as many members for the groups identified, as possible through the various outreach methods.

- 1) Directly Impacted
  - a) Neighborhood associations
  - b) Public and private employers within the study area
- 2) Those who frequently travel through the project area
  - a) Residents in Santa Fe
  - b) Commuters (local or regional)
  - c) Area bicyclists
- 3) Those who rely on the corridor as part of their operation
  - a) School bus operators
  - b) Goods transporters, service providers and freight delivery companies
  - c) Police, fire, and emergency service providers

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## 3.4 PUBLIC INFORMATION MEETINGS

There will be two public information meetings as listed above. To provide consistency, the Phase A public meeting will be located in the same place as the Phase B public meeting, and they will both

have an open-house type format. There may be a short presentation to explain the proposed crossing alternative(s) with an opportunity for members of the community to provide input.

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### 3.5 PUBLIC MEETING NOTIFICATIONS

All meeting notifications will be distributed through the following actions:

- Paper flyers placed in public places in the City of Santa Fe
  - City of Santa Fe offices, local coffee shops, libraries, community centers
- Posted on stakeholder websites
  - City of Santa Fe, Santa Fe MPO
- Posted on relevant social media platforms associated with stakeholders
  - City of Santa Fe, Santa Fe MPO
- Email notification for all contacts on the project list
- Placed in Santa Fe New Mexican starting two weeks before the meeting ( 1-2 placements per public meeting)
- Mailings to be completed in compliance with the City of Santa Fe ENN process

For consistency, compliance, and clarity the format for all meeting notifications will include the following:

- Identification of the sponsoring agencies to include City of Santa Fe, NMDOT, and FHWA;
- Purpose of the meeting in relation to the overall project;
- Meeting date, location, and time;
- Map showing the study area and meeting location;
- Contact number for further information and Americans with Disabilities Act (ADA) or bilingual accommodations

A project email list is being developed and used to inform stakeholders of public involvement events. All event invitations will be emailed to everyone on the list.

## 4 PURPOSE AND NEED

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### 4.1 PHYSICAL DEFICIENCIES

A proper crossing of the Arroyo de Los Chamisos has always been a deterrent to north-south traffic moving through the corridor. As a result, north-south bound traffic needing to cross the Arroyo de Los Chamisos must pass through adjacent neighborhood roads including Zafarano Drive, Avenida de Las Campanas, Camino Carlos Rey, and Governor Miles Road.

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### 4.2 PROJECT CONTEXT AND CONSIDERATIONS

The proposed crossing of the Arroyo de Los Chamisos would provide additional north-south connectivity between the City of Santa Fe and the Santa Fe Community College District. The study area is approximately 1 mile long and located between Rodeo Road (NM 300) to the south and Cerrillos Road (NM 14) to the north and bounded between Zafarano Road and Avenida de Las Campanas to the east and west respectively.

The proposed corridor would eliminate the existing physical barrier caused by the Arroyo de Los Chamisos. Most of the land within the study area consists of residential neighborhoods and vacant land. Connectivity and the ability to cross over the Arroyo de Los Chamisos would be important for increasing access for those living and traveling through the study area.

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### 4.3 PURPOSE

The purpose of the proposed crossing is to enhance the transportation system within Santa Fe.

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### 4.4 NEED

The need is based on improving regional connectivity and reducing congestion and overall impacts on local roads.

# 5 DESCRIPTION OF ALTERNATIVES

Four alternatives were developed for the initial evaluation of alternatives, including the no-build alternative and three build alternatives for crossing the Arroyo de Los Chamisos.

The southern terminus of all alternatives is the signalized intersection of Rodeo Road and Richards Avenue.

The northern terminus of each alternative is one of the four signalized intersections along Cerrillos Road in the study area namely, Vegas Verdes Drive, Avenida de Las Americas, Richards Avenue, or Camino Consuelo.

**Figure 5.1** shows the three proposed build alternatives providing north-south connectivity by crossing the Arroyo de Los Chamisos. The alternatives are described below.

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## 5.1 NO-BUILD ALTERNATIVE

The No-Build Alternative assumes that the Arroyo de Los Chamisos would remain a physical barrier in the study area. Under the No-Build, no new construction or major improvements would be made. Pedestrian and vehicular traffic would continue to use the existing crossing locations of Rodeo Road to the west and Avenida de Las Campanas to the east. Emergency access for Santa Fe Fire Station 7 across the Arroyo de Los Chamisos, when dry, would remain in place. In addition to being a viable alternative, the No-Build scenario also serves as the benchmark from which the other alternatives will be compared.

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## 5.2 ALTERNATIVE “A”

Alternative “A”, as shown in **Figure 5.2**, proposes a crossing of the Arroyo de Los Chamisos to connect to the existing Camino de los Arroyos / Kachina Ridge Drive intersection. In addition, Alternative “A” includes extending Camino de Los Arroyos west for access to Vegas Verdes Drive and Cerrillos Road. Alternative “A” would provide additional access to Cerrillos Road through Kachina Ridge Drive to the Camino de Las Americas / Cerrillos Road signalized intersection and would connect to Rodeo Road via the existing Richards Avenue intersection. Emergency access for Santa Fe Fire Station 7 across the Arroyo de Los Chamisos, when dry, would remain in place.

New road typical sections assumed for Alternative “A” are shown in **Figure 5.5**. Existing road typical sections along the alignment are assumed to remain unchanged.

A conceptual “Plan and Profile” layout of Alternative “A” from Rodeo Road to Cerrillos Road is shown **Appendix A**.



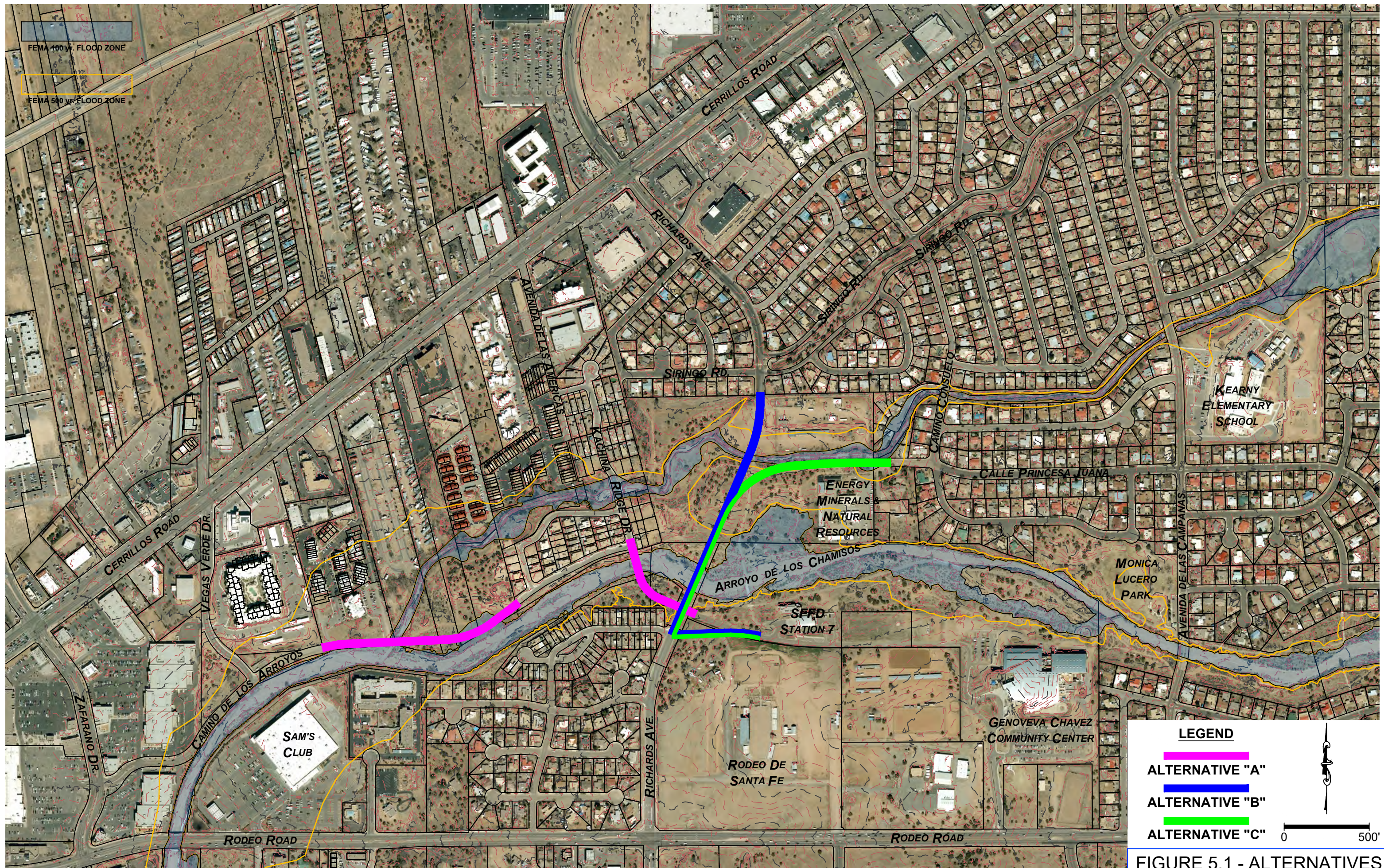


FIGURE 5.1 - ALTERNATIVES





FIGURE 5.2 - ALTERNATIVE "A"





FIGURE 5.3 - ALTERNATIVE "B"



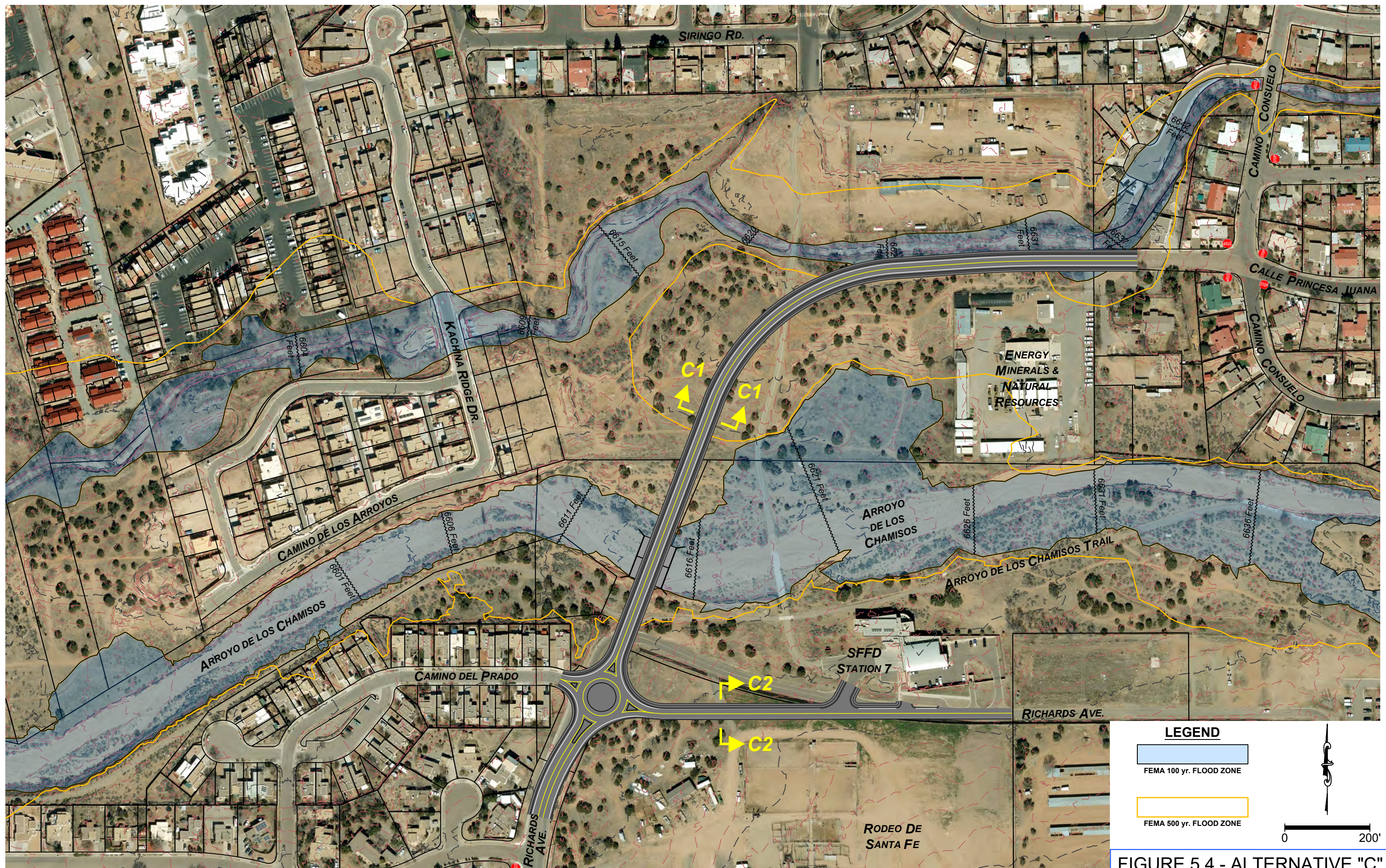
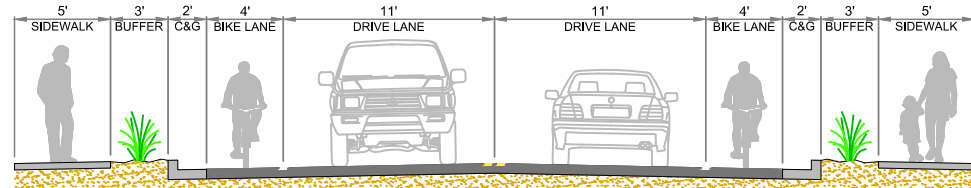
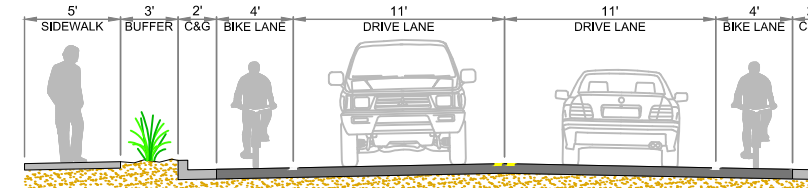


FIGURE 5.4 - ALTERNATIVE "C"

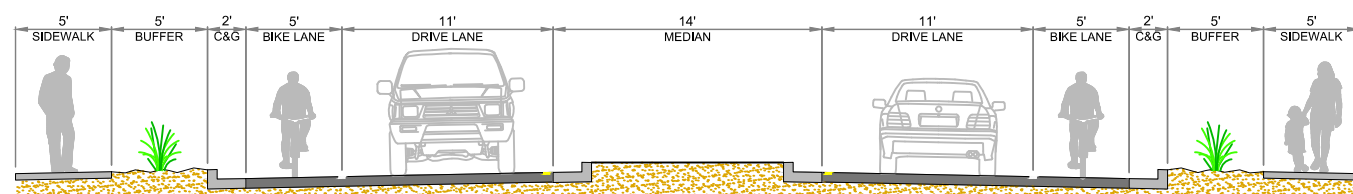




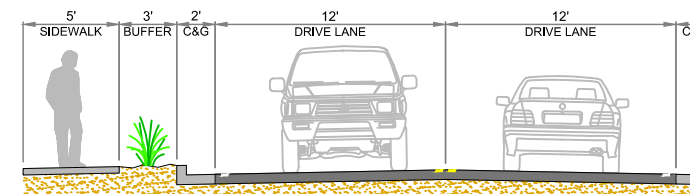
**TYPICAL SECTION A1**  
Arroyo de los Chamisos Crossing



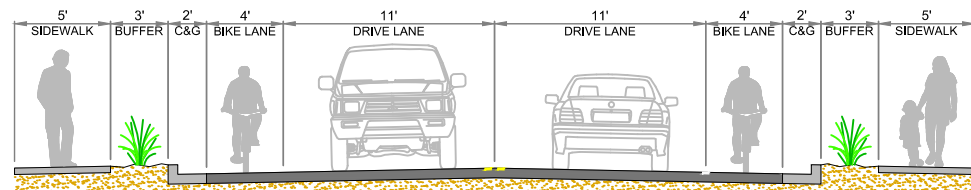
**TYPICAL SECTION A2**  
Camino de los Arroyos



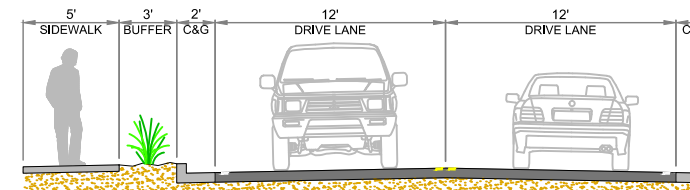
**TYPICAL SECTION B1**  
Arroyo de los Chamisos Crossing



**TYPICAL SECTION B2**  
Richard's Ave. to SFFD & GCCC



**TYPICAL SECTION C1**  
Arroyo de los Chamisos Crossing



**TYPICAL SECTION C2**  
Richard's Ave. to SFFD & GCCC

TYPICAL SECTIONS SHOWN IN THIS PHASE "A" REPORT REFLECT EXISTING TRAFFIC VOLUMES. THE PHASE "B" REPORT WILL INCLUDE A MORE DETAILED ANALYSIS OF TYPICAL SECTIONS FOR BOTH EXISTING AND HORIZON YEAR TRAFFIC VOLUMES.

**FIGURE 5.5 - SECTIONS**

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## 5.3 ALTERNATIVE “B”

Alternative “B”, as shown in Figure 5.3, proposes an extension of Richards Avenue north across the Arroyo de Los Chamisos to connect to the existing Richards Avenue / Siringo Road intersection for access to the Richards Avenue / Cerrillos Road signalized intersection. The emergency access road across the Arroyo de Los Chamisos for Santa Fe Fire Station 7 would be replaced by the new all-weather crossing.

New road typical sections assumed for typical sections for Alternative “B” are shown in **Figure 5.5**. Existing road typical sections along the alignment are assumed to remain unchanged. It should be noted that Richards Avenue north of the arroyo was constructed to accommodate the future extension across the arroyo.

A conceptual “Plan and Profile” layout of Alternative “B” from Rodeo Road to Cerrillos Road is shown **Appendix B**.

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## 5.4 ALTERNATIVE “C”

Alternative “C”, as shown in Figure 5.4, proposes a crossing of the Arroyo de Los Chamisos to connect from Richards Avenue on the south side of the arroyo to the existing Calle Princesa Juana / Camino Consuelo intersection. This alternative would allow access to Cerrillos Road via the existing Camino Consuelo signalized intersection. The emergency access road across the Arroyo de Los Chamisos for Santa Fe Fire Station 7 would be replaced by the new all-weather crossing.

New road typical sections assumed for typical sections for Alternative “C” are shown in **Figure 5.5**. Existing road typical sections along the alignment are assumed to remain unchanged.

A conceptual “Plan and Profile” layout of Alternative “C” from Rodeo Road to Cerrillos Road is shown **Appendix C**.

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## 5.5 ENGINEERING FACTORS AND ANALYSIS

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### 5.5.1 GEOMETRIC DESIGN

The American Association of State Highway and Transportation Officials (AASHTO) Green Book entitled *A Policy on Geometric Design of Highways and Streets*, 7<sup>th</sup> Edition (2018) specifies design criteria for the geometric design of roads. Roads are classified by functional type, such as arterials, collectors and local streets. The alternatives evaluated in the project area may be classified as either an urban “local” or “collector” road, where a collector provides more throughway traffic than a local

road. Collectors that have a volume not more than 2,000 vehicles per day (vpd) are referred to as low-volume collectors.

Design criteria for local roads and low-volume collector roads are provided in **Table 5.1**.

An initial evaluation of each of the alternatives ability to satisfy the urban local and collector road geometric design criteria are provided in **Table 5.2**.

**Table 5.1 Design Criteria for Urban Local and Collector Roads**

DESIGN CRITERIA	LOCAL ROAD / STREET	LOW-VOLUME COLLECTOR
Lane Widths	10 to 11 ft	10 to 12 ft
Design Speed	20 to 30 mph	30 to 40 mph
Traffic Volume	Not significant factor	Less than 2,000 vpd
Minimum Radius at 25 mph	167 ft	167 ft
Maximum Grade	Up to 15 percent	9 percent
Stopping Site Distance at 25 mph	155 ft	155 ft

**Table 5.2 Evaluation of Alternatives to Satisfy Geometric Design Criteria**

DESIGN CRITERIA	ALTERNATIVE "A"	ALTERNATIVE "B"	ALTERNATIVE "C"
Lane Widths of 10 ft	Pass	Pass	Pass
Design Speed of 25 mph	Fail	Pass	Fail
Traffic Volume of 2,000 vpd	Pass	Pass	Pass
Minimum Radius at 25 mph	Fail	Pass	Fail
Maximum Grade of 9 percent	Pass	Pass	Fail
Stopping Site Distance at 25 mph	Fail	Pass	Fail

For Alternative "A" seven (7) horizontal curves on Kachina Ridge Drive have a radius less than 167 ft limiting the design speed to less than 25 mph, four (4) of which meet 20 mph and 3 meet a 10 mph design speed.

For Alternative "B" the horizontal and vertical geometry satisfy a 25 mph design speed.

For Alternative "C" two (2) vertical curves on Camino Consuelo have an insufficient stopping site distance limiting the design speed to less than 25 mph.

**5.5.2 TRAFFIC OPERATIONS**

A traffic analysis of each of the alternatives is provided in **Appendix D**. The 2019 Santa Fe Regional Travel Demand Model (VISUM), developed and maintained by the Santa Fe MPO, was utilized in the development of the alignment study traffic analysis. Only present day (not future) traffic volumes were evaluated in Phase A.

**Table 5.3** summarizes the estimated AM and PM peak traffic volumes for the no-build and build alternatives.

**Table 5.3 Maximum Directional AM/PM Peak Hour Traffic Volumes (VPH) for Roadways in the Study Area**

ROADWAY	NO-BUILD	ALT "A"	ALT "B"	ALT "C"
Cerrillos Road	2,330 AM 2,420 PM	2,300 AM 2,490 PM	2,170 AM 2,360 PM	2,300 AM 2,410 PM
Rodeo Road	1,280 AM 1,420 PM	1,120 AM 1,340 PM	1,140 AM 1,350 PM	1,160 AM 1,270 PM
Zafarano Drive	530 AM 790 PM	450 AM 700 PM	450 AM 710 PM	510 AM 750 PM
Camino Carlos Rey	520 AM 420 PM	510 AM 390 PM	500 AM 380 PM	510 AM 410 PM
Richards Avenue	350 AM 590 PM	320 AM 540 PM	530 AM 780 PM	330 AM 580 PM
Avenida de Las Campanas	310 AM 340 PM	210 AM 230 PM	160 AM 150 PM	250 AM 220 PM
Siringo Road	220 AM 320 PM	210 AM 320 PM	230 AM 330 PM	290 AM 400 PM
Camino Consuelo	220 AM 250 PM	170 AM 210 PM	150 AM 190 PM	370 AM 450 PM
Avenida de Las Americas / Kachina Ridge Drive	80 AM 120 PM	330 AM 430 PM	80 AM 130 PM	80 AM 120 PM
Vegas Verdes Drive / Camino de los Arroyos	70 AM 90 PM	40 AM 100 PM	30 AM 90 PM	30 AM 90 PM

Alternative "A" would attract an estimated new 570 trips in the AM peak hour, the majority of which would use Kachina Ridge Drive / Avenida de Las Americas. Only 120 AM peak hour vehicles would utilize the Camino de Los Arroyos and Vegas Verdes Drive. Alternative "A" would attract an estimated 670 trips in the PM peak hour, with only 185 PM peak hour trips utilizing Camino de Los Arroyos and Vegas Verdes Drive. These results suggest that Camino de Los Arroyos and Vegas Verdes Drive are out of direction for most destinations resulting in increased travel time and lower utilization. With Alternative "A", Avenida de Las Americas would be expected to experience a 258-313% increase.

However, Alternative “A” would reduce traffic on Camino Consuelo by 16-20%, Avenida de Las Campanas by 32% and Camino Carlos Rey by 2-7%.

Alternative “B” would attract more than an estimated 800 trips in the AM peak hour and more than an estimated 900 trips in the PM peak hour. Alternative “B” would reduce traffic on Camino Consuelo by 24-32%, Avenida de Las Campanas by 48-56%, and Camino Carlos Rey by 4-10%. Alternative “B” increases traffic on Richards Avenue by 32-51% and provides the most direct route for through north/south travel

Alternative “C” would attract nearly an estimated 400 trips in the AM peak hour and nearly an estimated 450 trips in the PM peak hour. Alternative “C” would reduce traffic on Avenida de Las Campanas by 19-35%, and Camino Carlos Rey by 2%. However, Alternative “C” would increase traffic on Camino Consuelo by 68-80%.

The north-south collector roads of Zafarano Drive, Vegas Verdes Drive, and Avenida de Las Campanas are expected to be relieved of considerable traffic volumes in the peak hours as a result of any of the three Build Alternatives.

**Table 5.4** shows the estimated reduction in travel time through the Study Area with the build alternatives compared against the existing travel time with the no-build alternative. The modeling shows that Alternatives “A” and “B” would significantly reduce travel time while Alternative “C” would only modestly reduce travel time.

**Table 5.4 Evaluation of Alternatives for Decrease in Travel Time**

TRAVEL DIRECTION	NO-BUILD	ALT “A”	ALT “B”	ALT “C”
Traveling Northbound	Base Line	33% decrease	28% decrease	16% decrease
Traveling Southbound	Base Line	27% decrease	20% decrease	6% decrease

### 5.5.3 DRIVEWAY ACCESS

Alternative “A” has seven (7) shared driveways serving thirty (30) single family residences with direct access to Kachina Ridge Drive that would be affected by the increased traffic attracted by a crossing of the Arroyo de Los Chamisos.

Alternative “B” has eleven (11) driveways serving eleven (11) single family residences with direct access to Richards Avenue that would be affected by the increased traffic attracted by a crossing of the Arroyo de Los Chamisos.

Alternative “C” has forty-two (42) driveways serving forty-two (42) single family residences with direct access to Richards Avenue that would be affected by the increased traffic attracted by a crossing of the Arroyo de Los Chamisos.

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#### **5.5.4 CONSTRUCTABILITY**

Since the proposed construction of all three build alternatives to cross the arroyo is primarily on undeveloped lands, constructability is not considered a differentiating factor. All alternatives would require intersection improvements on Rodeo Road and Cerrillos Road; however, improvements at the Avenida de Las Americas / Cerrillos Road Intersection with Alternative “A” would be much more extensive than at any other location due to the lack of median space on Cerrillos Road and narrow roadway on Avenida de Las Americas.

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#### **5.5.5 DRAINAGE**

All three build alternatives cross the main branch of the Arroyo de Los Chamisos and cross or impact the north fork at various locations. Therefore, drainage is not considered to be a differentiating factor for the comparison of alternatives.

The estimated discharges as reported in FEMA 2012 Flood Insurance Study (FIS) for Santa Fe County will be the basis for hydraulic analysis to size the proposed structures. A detailed drainage study will be prepared during Phase B; however, for the purposes of the Phase A Report, the size of the drainage structures was assumed based on the information provided in the FIS. For the main branch an 8 cell Concrete Box Culvert (CBC) with 12’ wide x 10’ tall openings would provide enough hydraulic opening for the 100-year flood. The proposed structure for the north fork is assumed to be a two cell CBC with 12’ wide x 8’ tall openings for the 100-year flood.

The proposed channel geometry and erosion protection measures will be developed to achieve channel stability. Recommendations for channel improvements, erosion protection and bank stabilization will be provided in the drainage report.

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#### **5.5.6 RIGHT-OF-WAY**

Right-of-Way acquisitions would be required for all three build alternatives. The properties potentially affected by each alternative are summarised in **Table 5.5**.

**Table 5.5 Right-of-Way Needs for Each Alternatives**

PARCEL OWNERS	NO-BUILD	ALT "A"	ALT "B"	ALT "C"
City of Santa Fe	Base Line	No	No	No
Rodeo de Santa Fe, Inc.	Base Line	Yes	Yes	Yes
Rodeo de Santa Fe, Inc.	Base Line	Yes	Yes	Yes
Vista Del Prado Subdivision	Base Line	Yes	No	No
Vista Del Prado Subdivision	Base Line	Yes	No	No
New Mexico Game & Fish Dept.	Base Line	No	Yes	Yes

**5.5.7 CONSTRUCTION COSTS**

All three alternatives require similar lengths of new road construction; therefore, roadway construction costs are not considered to be significantly different for the build alternatives.

Alternatives "C" is anticipated to be somewhat less costly than the other two build alternatives since the roadway width is narrower and the extent of drainage structures somewhat less. Alternative "B" is anticipated to have the greatest cost due to the wider roadway section. The cost of Alternative "A" is anticipated to be between that of Alternatives "B" and "C".

**5.6 ENVIRONMENTAL FACTORS AND ANALYSIS**

During Phase A the only delineating factor for the three alternatives is the quantity of residential units and associated driveways which are impacted by the proposed routes. Alternative "C" has the most impact on the residential areas but should not be determined in isolation as a factor to remove it from consideration. In Phase B and C, further analysis may provide details on additional environmental factors that will assist with the decision-making process. It is expected that all recommended alternatives will require biological and cultural investigations, traffic noise analysis, hazardous materials investigations, and continued evaluation of community impacts.



# 6 INITIAL SCREENING ANALYSIS

**Table 5.6** summarizes the results of the initial evaluation of alternatives based on a number of initial evaluation factors.

**Table 5.1 Initial Screening Matrix**

PARCEL OWNERS	NO-BUILD	ALT "A"	ALT "B"	ALT "C"
Meets Purpose and Need	--	+	++	+
Geometric Design	-	--	++	--
Traffic Operations	--	+	++	+
Reduced Travel Time	0	+	++	+
Driveway Access	0	--	-	--
Constructability	0	-	0	0
Drainage	0	0	0	0
Right-of-Way	0	--	-	-
Construction Cost	0	0	0	0
Total	-5	-4	6	-2

- ++ = very positive (2 points)
- + = positive (1 point)
- 0 = comparable (0 points)
- = negative (-1 points)
- = very negative (-2 points)

# 7 RECOMMENDATIONS

All of the alternatives satisfy the purpose and need for the project since all provide improved regional connectivity and reduce traffic on local roads.

The No-Build Alternative does not meet the purpose and need; however, it is recommended to be carried forward into Phase B - Detailed Evaluation of Alternatives to serve as the benchmark from which the other alternatives will be compared.

Alternative "A" has several significant horizontal alignment geometric design deficiencies on Kachina Ridge Drive with a low, 10 mph design speed at several locations, abrupt direction changes and physical limitations at the Cerrillos Road / Avenida de Las Americas Intersection. Due to out of direction travel the traffic modeling suggests that traffic would prefer to utilize Kachina Ridge Drive in lieu of Vegas Verdes Drive. This alternative has the most right-of-way impacts of all the alternatives in addition to significant driveway access impacts to more than 30 residences along Kachina Ridge Drive. With an overall negative evaluation score, Alternative "A" is recommended to be eliminated from further consideration in Phase B - Detailed Evaluation of Alternatives.

Alternative "B" provides the most direct connection between Rodeo Road and Cerrillos Road. The alternative has driveway access impacts for 11 residences along Richards Avenue with moderate right-of-way impacts; however, all other factors fare well or are comparable to the other alternatives including the geometric design which has no anticipated deficiencies. With the highest overall evaluation score, Alternative "B" is recommended to be studied in more detail in Phase B - Detailed Evaluation of Alternatives.

Alternative "C" has a couple of significant vertical alignment geometric design deficiencies with a low, 10 mph design speed at some locations and a high number of existing speed humps along Camino Consuelo. The alternative has the most driveway access impacts with 42 residences along Camino Consuelo. With an overall negative evaluation score, Alternative "C" is recommended to be eliminated from further consideration in Phase B - Detailed Evaluation of Alternatives.

# BIBLIOGRAPHY

- Kennemore, Devin. 2007. Biological Reconnaissance Memorandum, Richards Avenue Fire Station No. 7 Crossing, Santa Fe, New Mexico. City of Santa Fe Project No. 884-A. Prepared by C<sup>2</sup> Environmental Consulting, LLC, January 17, 2007.
- Flood Insurance Study Number 35049CV001B, Santa Fe County, New Mexico and Incorporated Areas, Federal Emergency Management Agency (FEMA), 2012. FEMA Flood Map Service Center website [msc.fema.gov](http://msc.fema.gov).



# APPENDIX

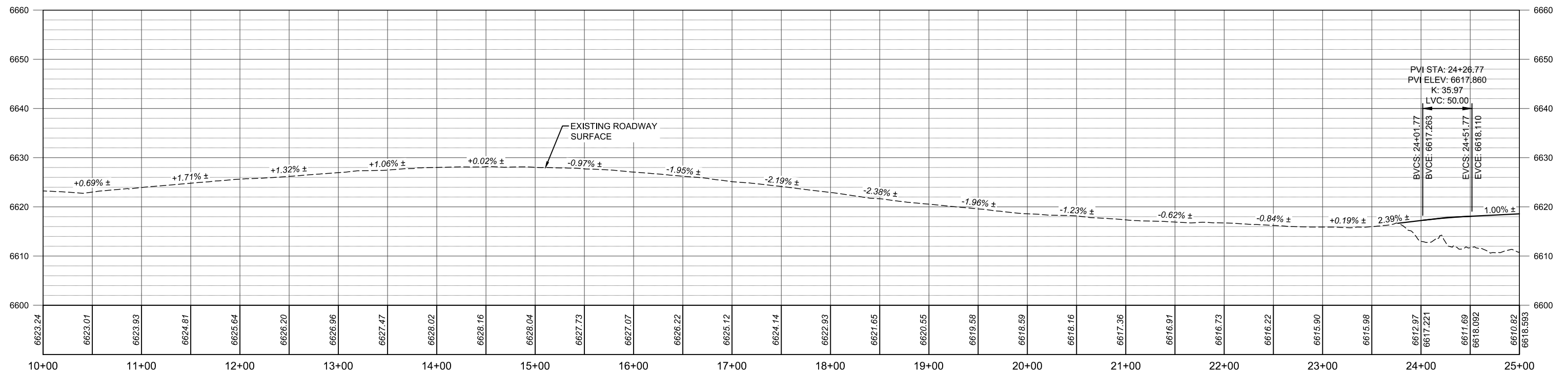
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ALTERNATIVE

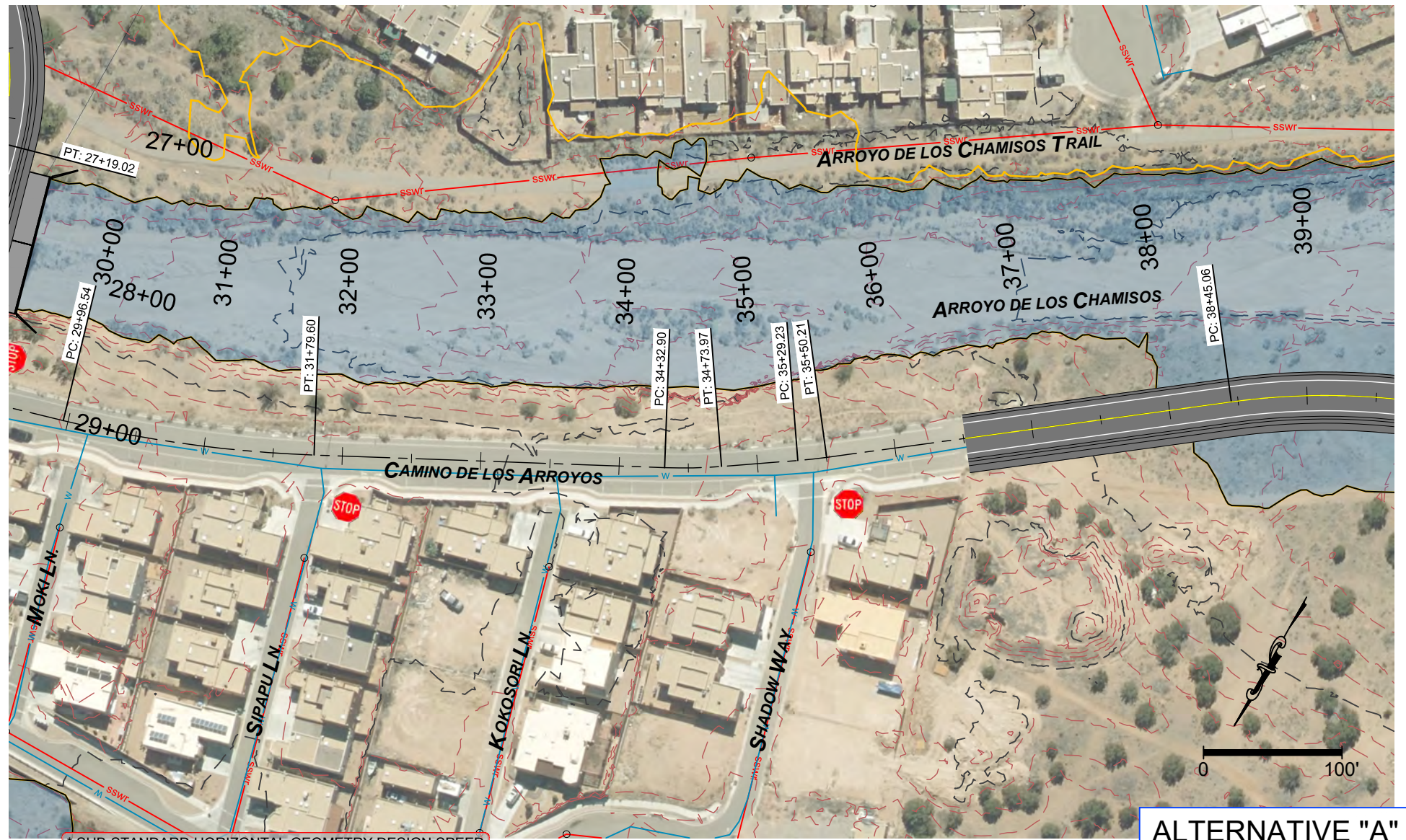
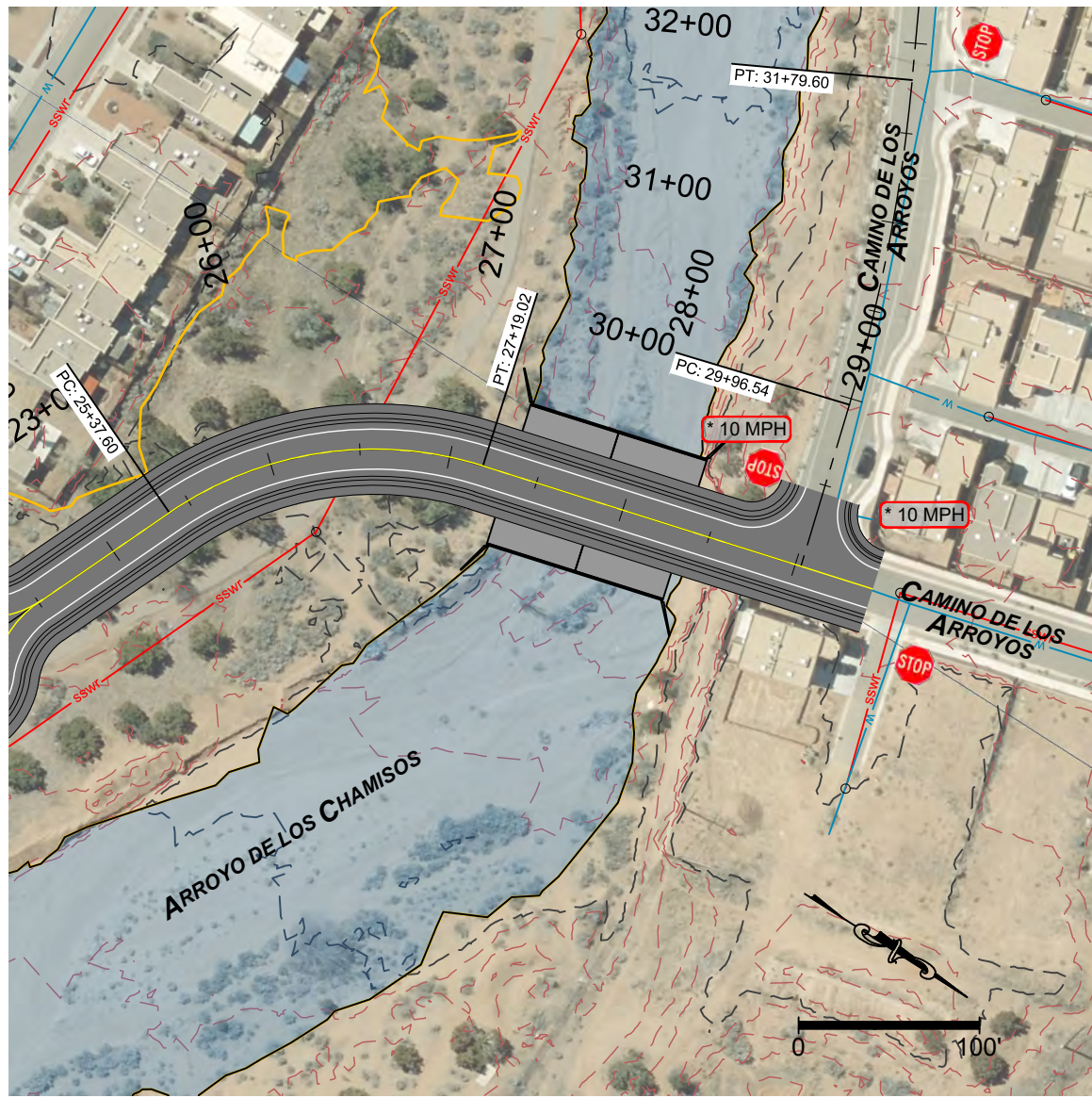
“A” PLAN &

PROFILE



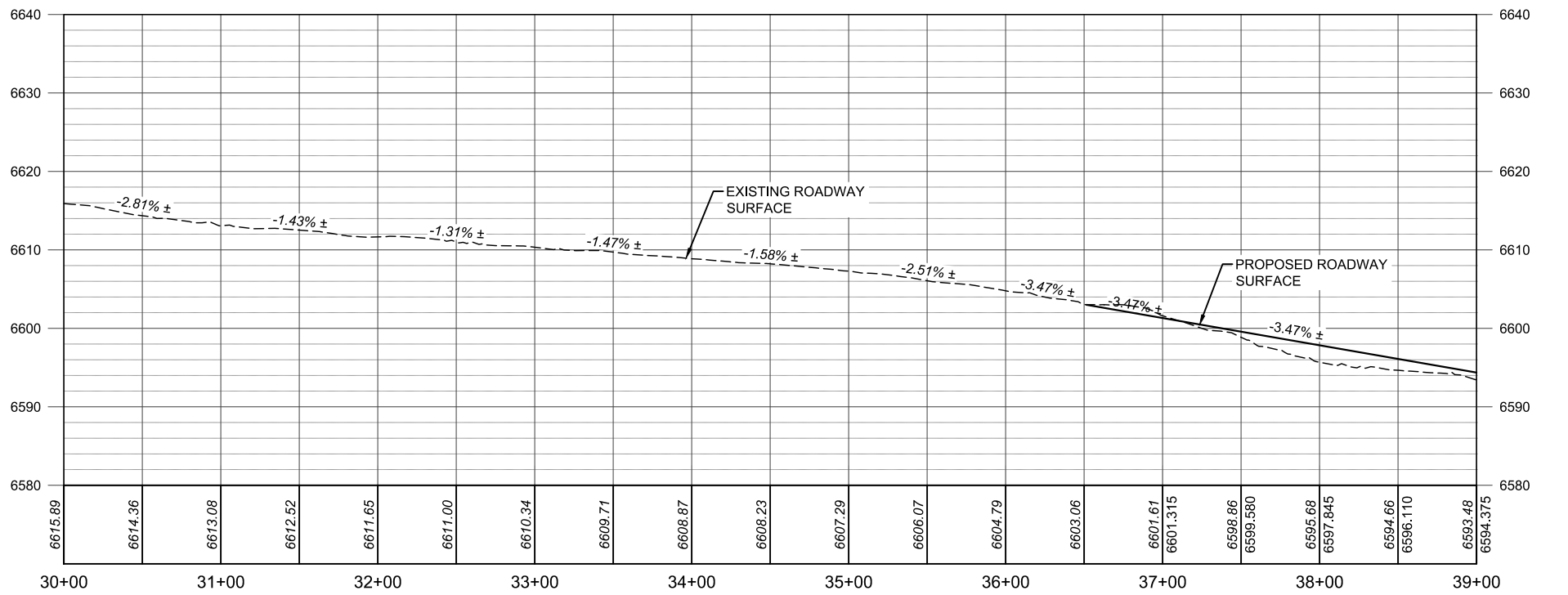
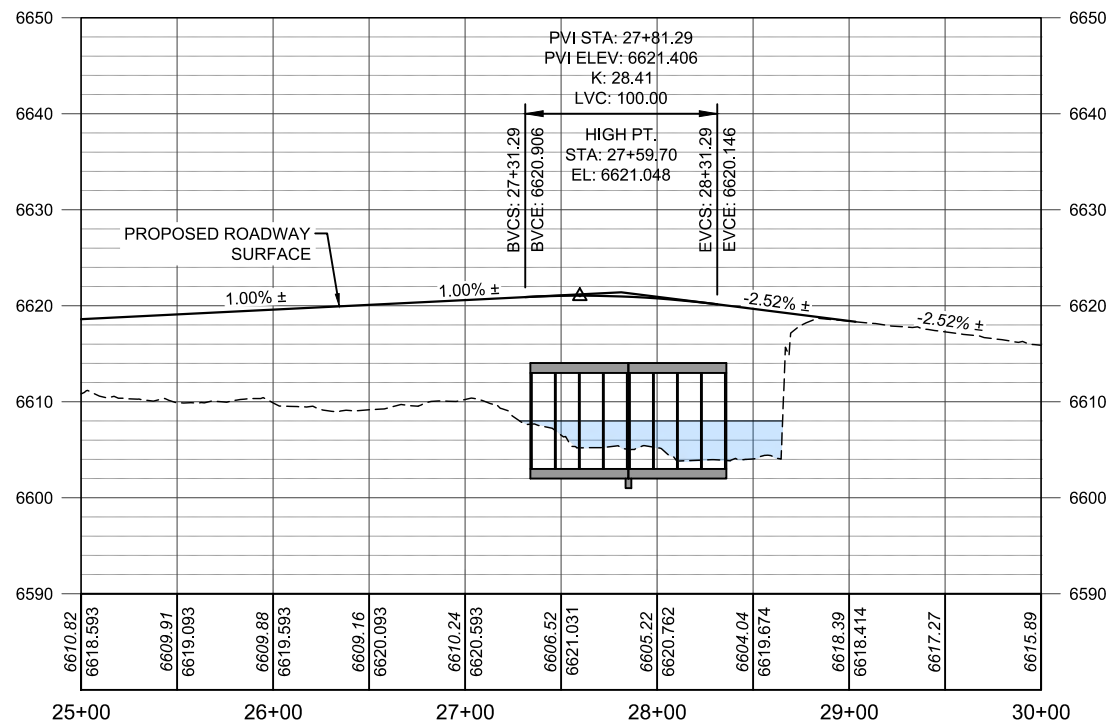




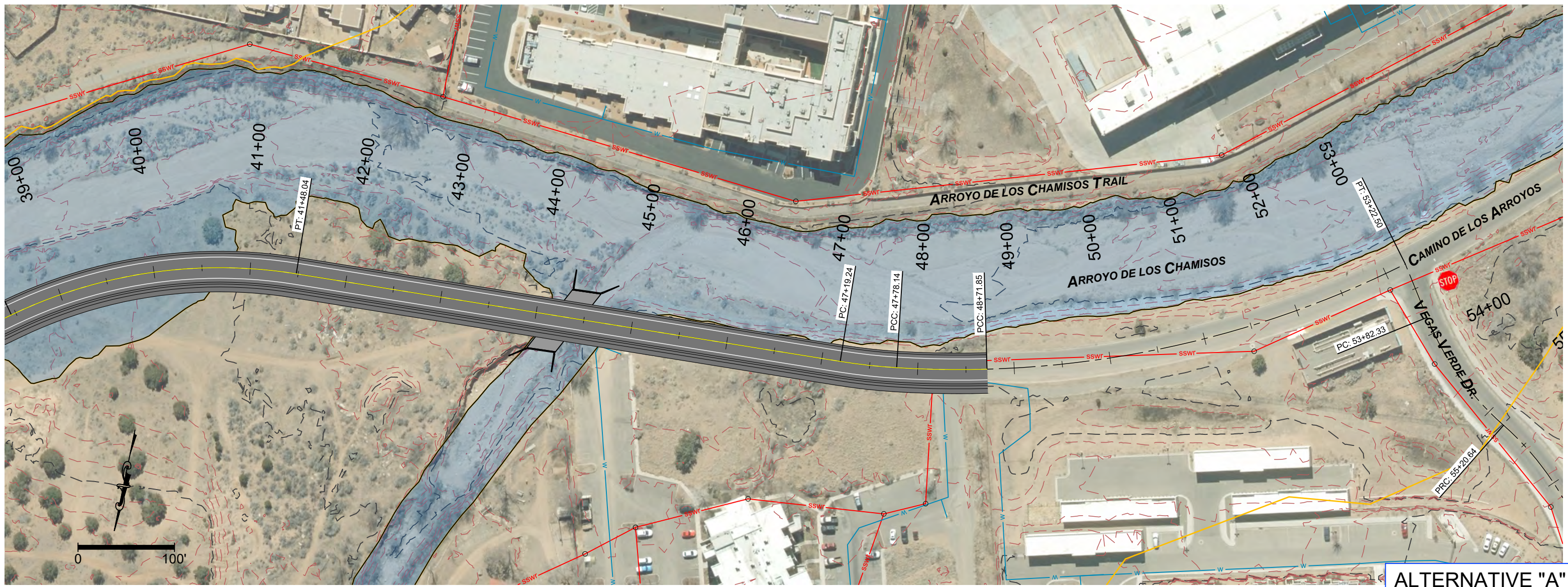


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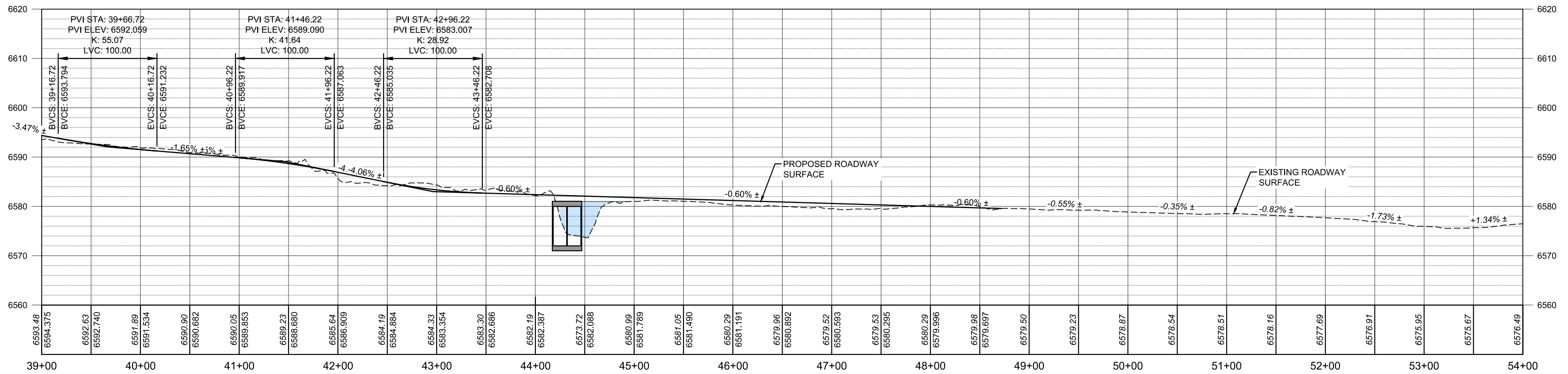
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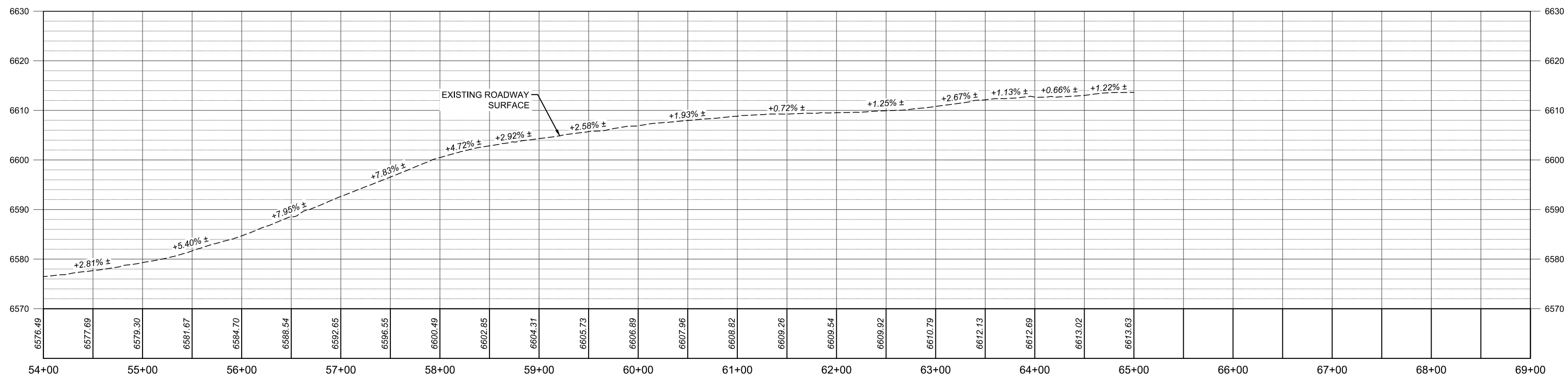
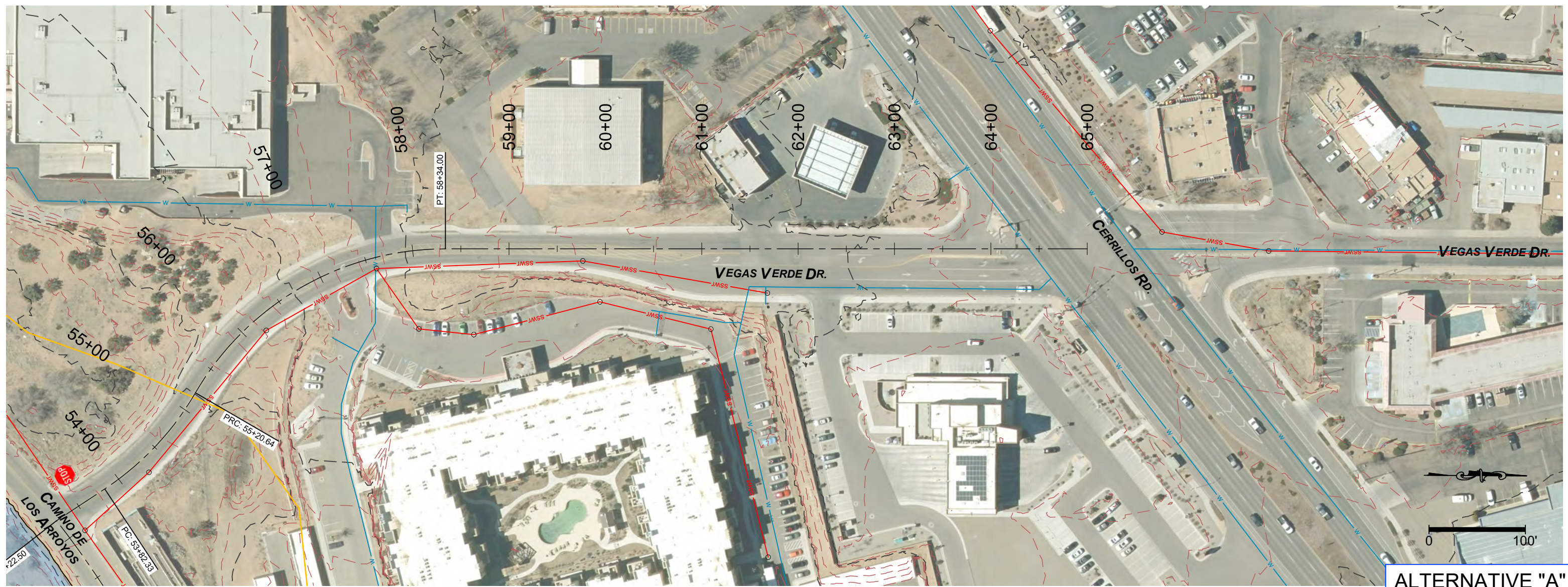




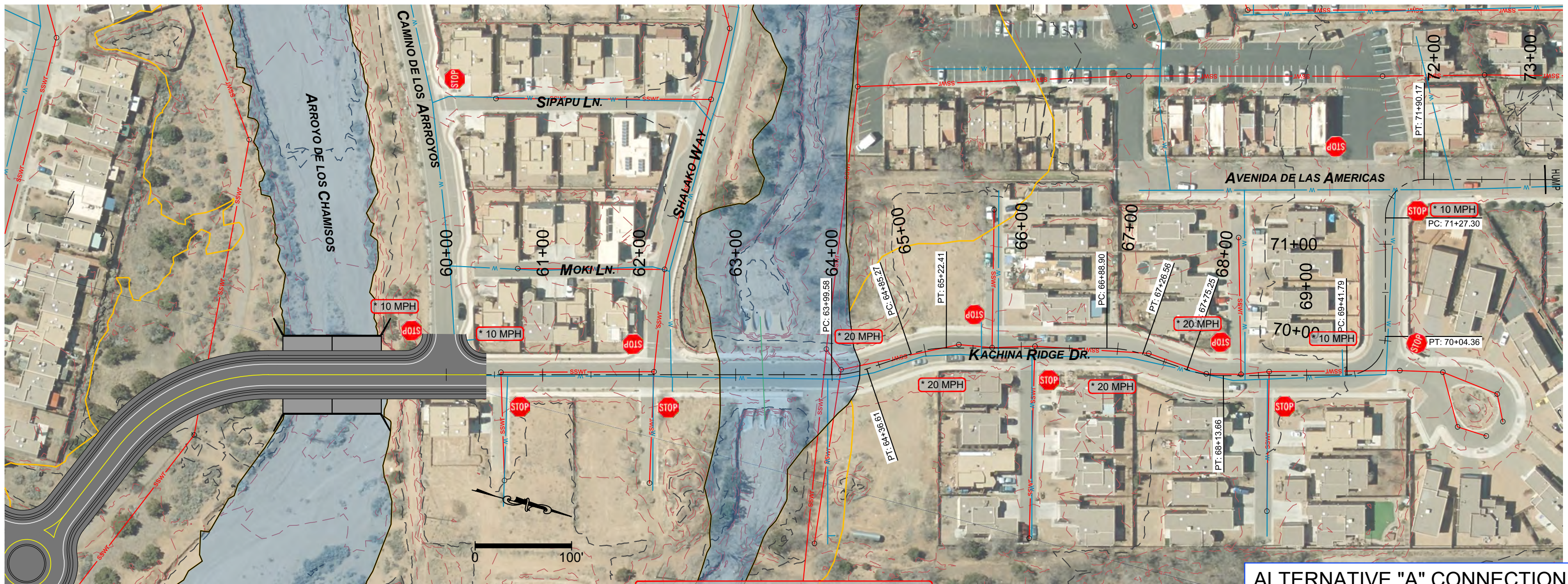
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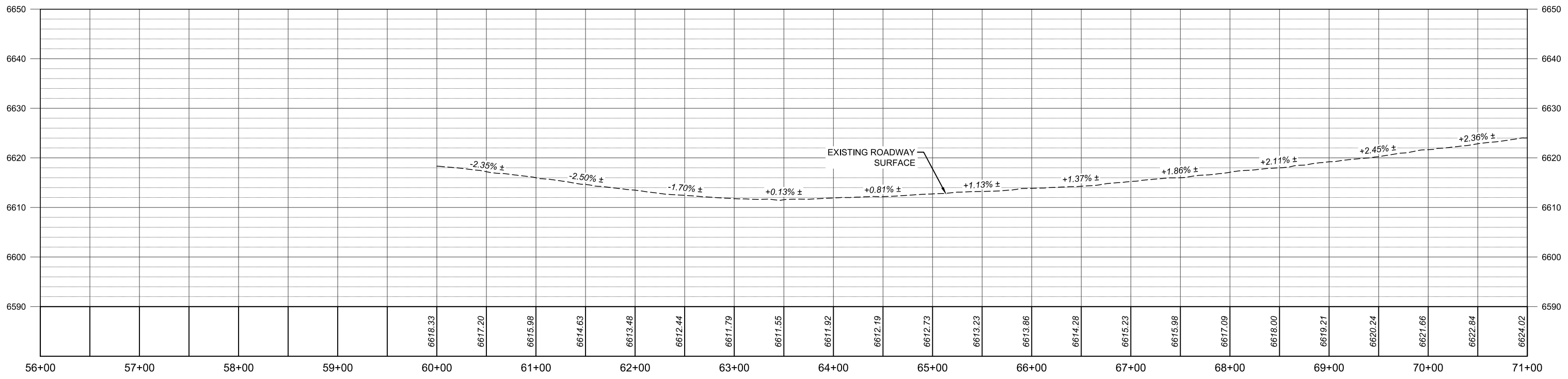






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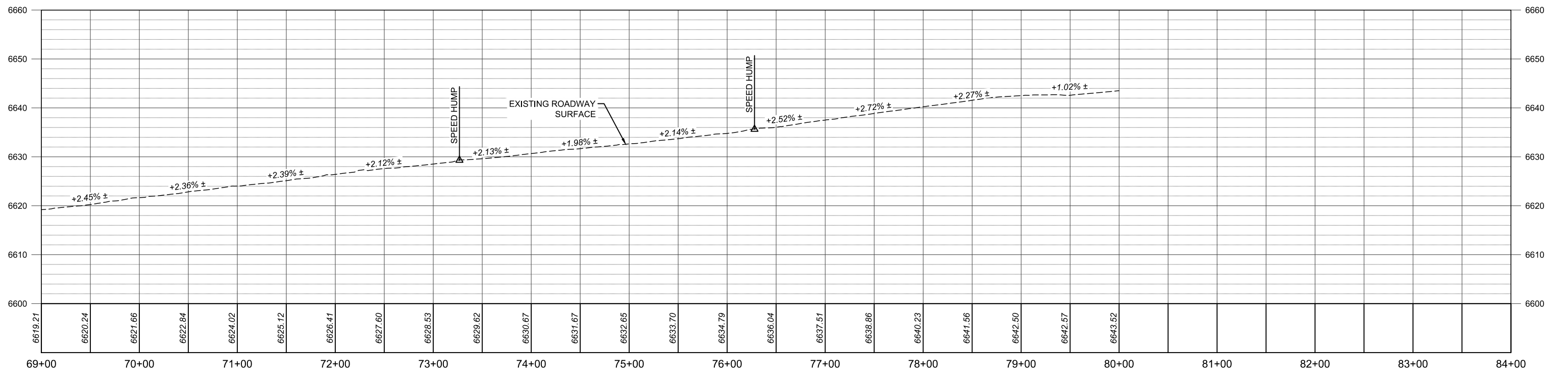






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ALTERNATIVE "A" CONNECTION





# APPENDIX

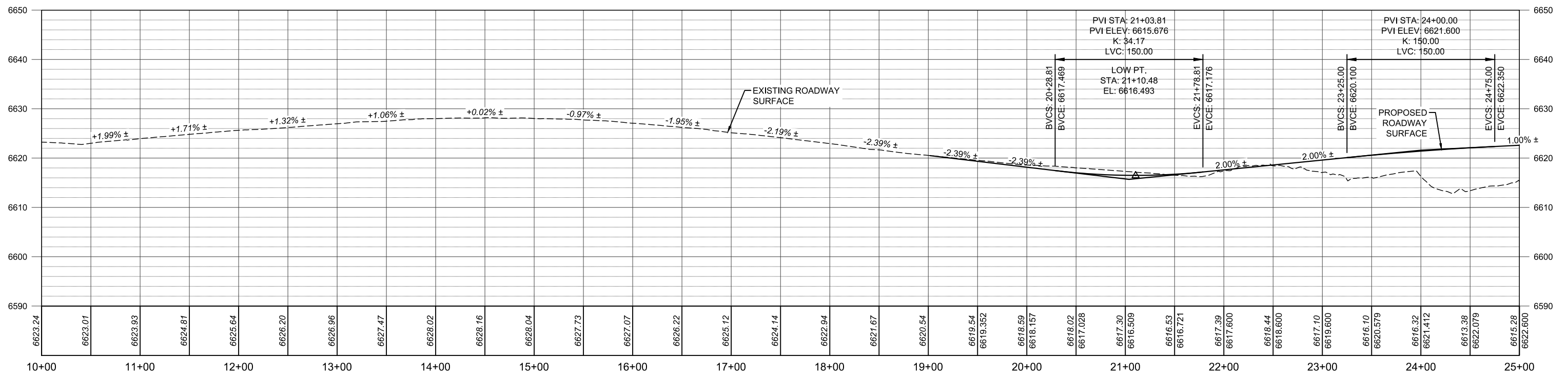
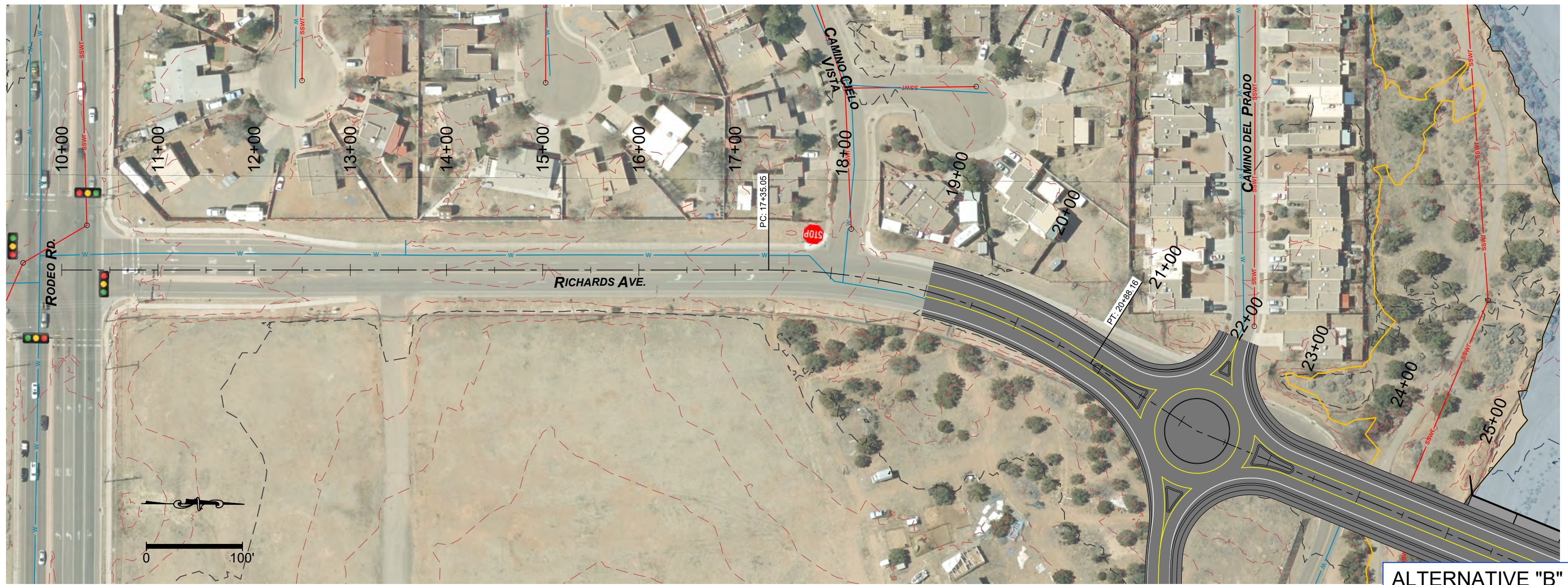
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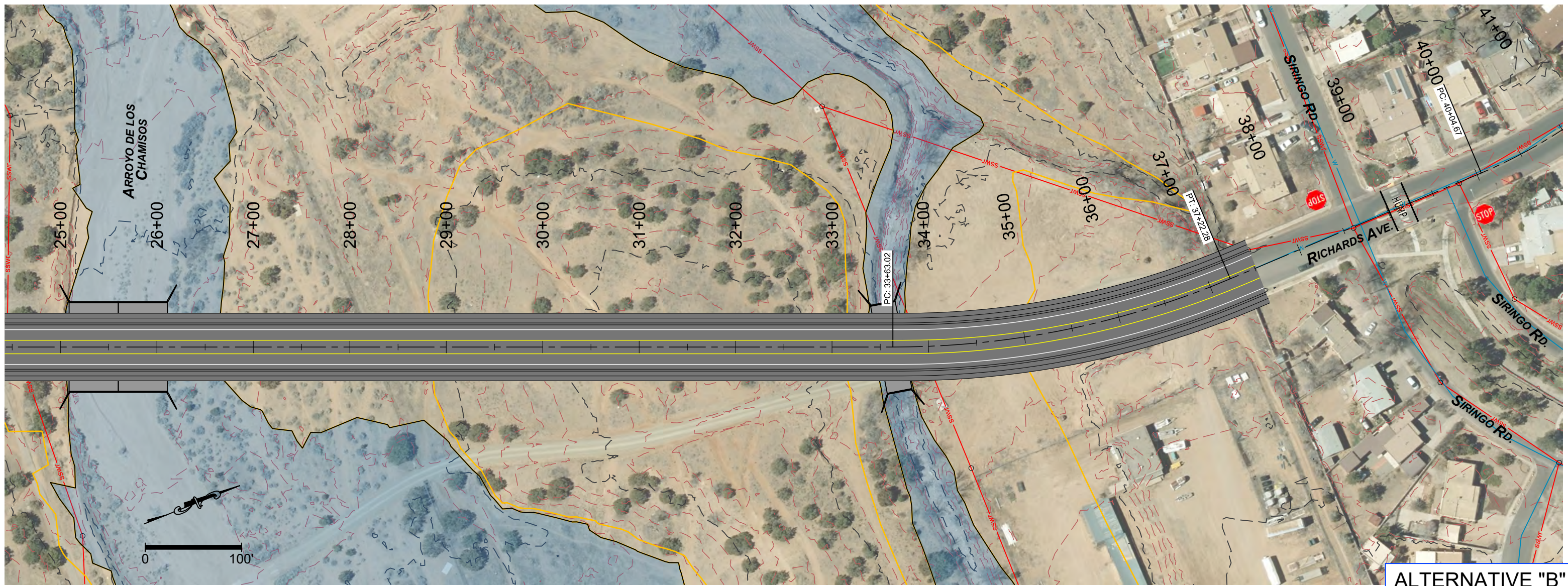
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PROFILE

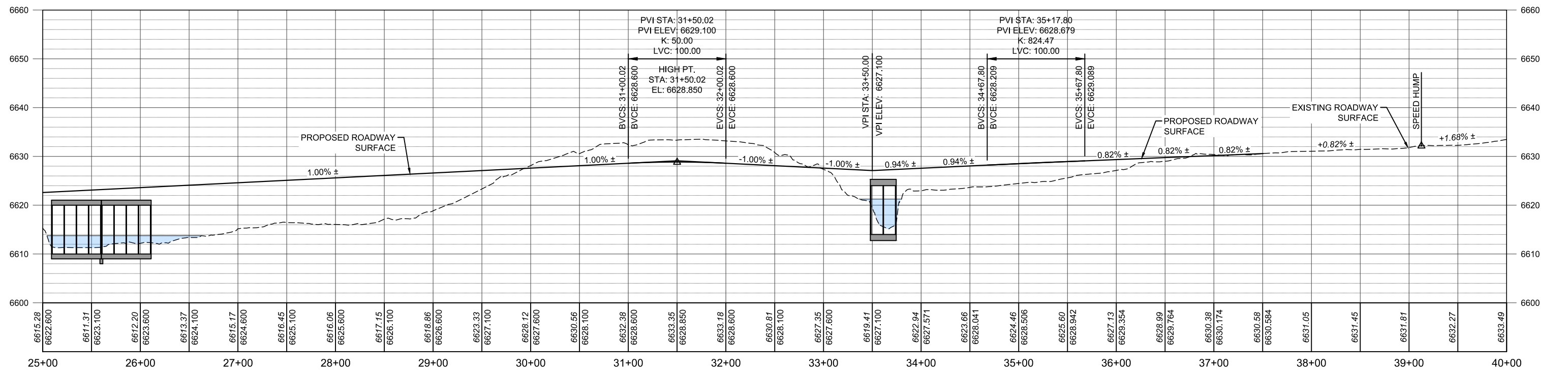








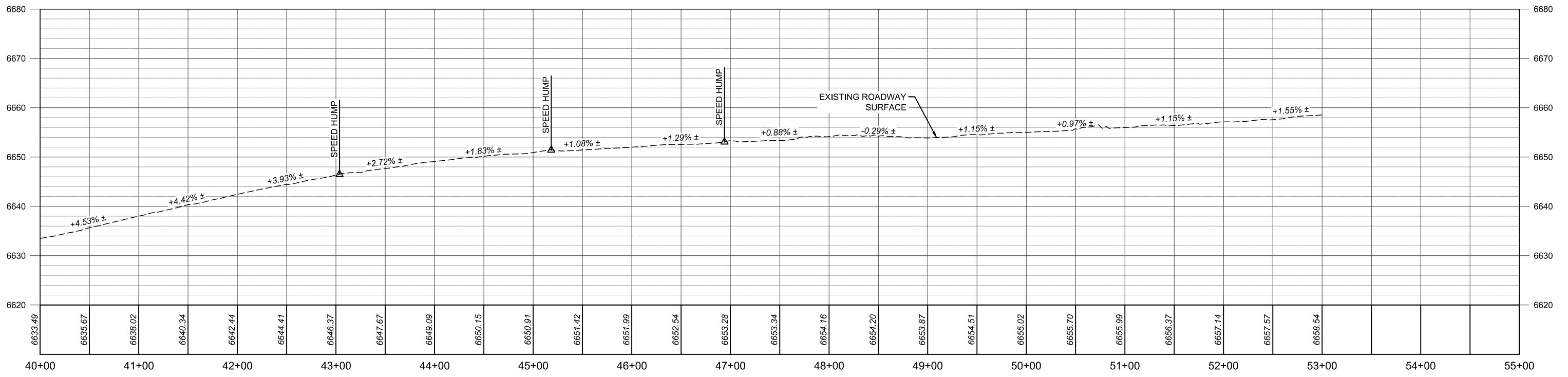
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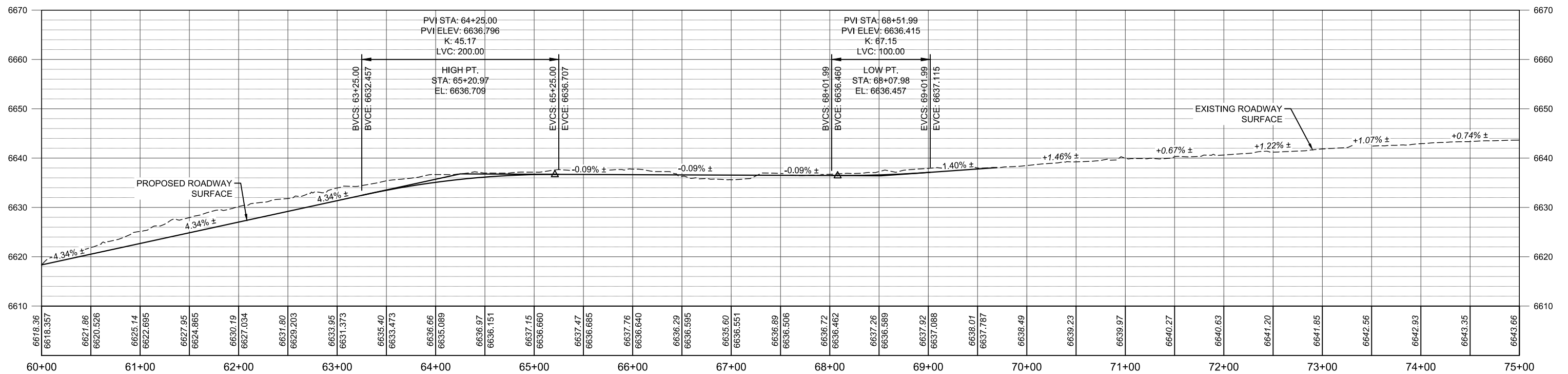
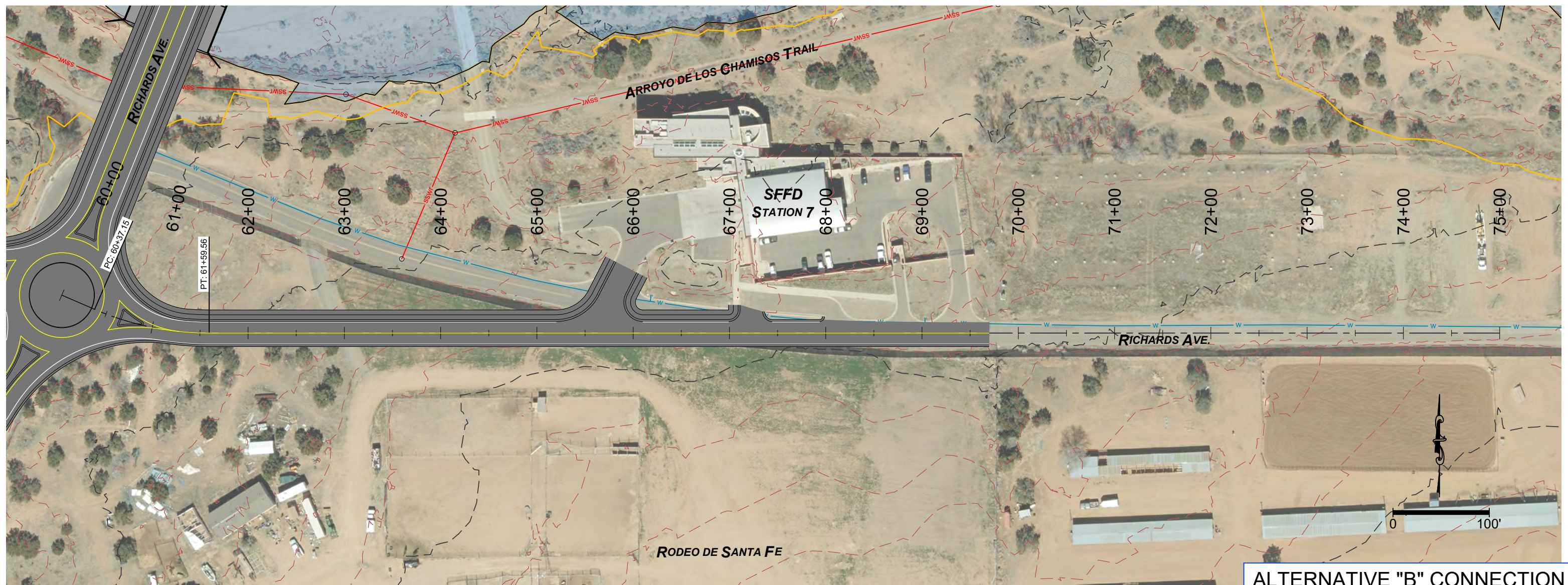




ALTERNATIVE "B"









# APPENDIX

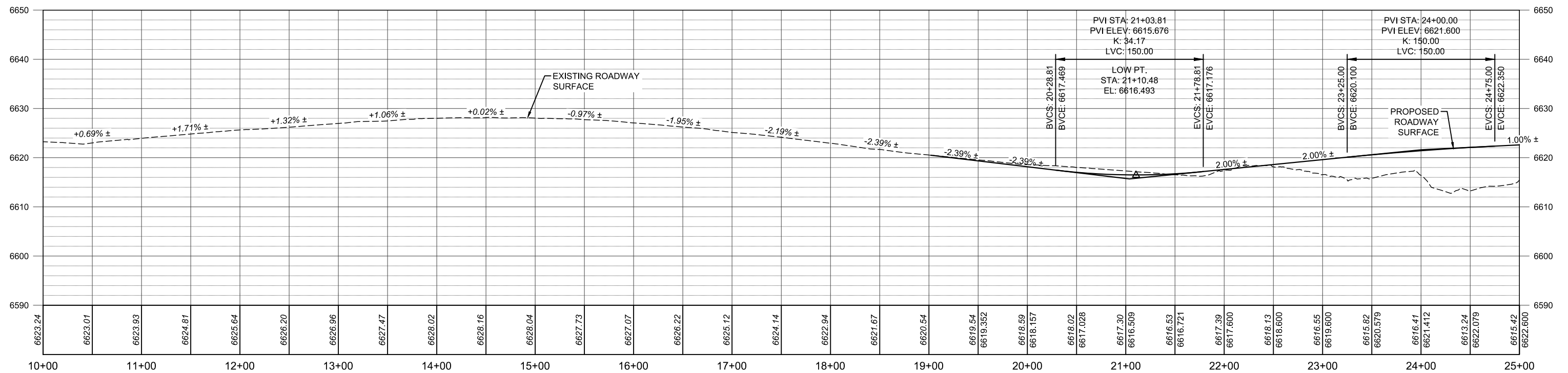
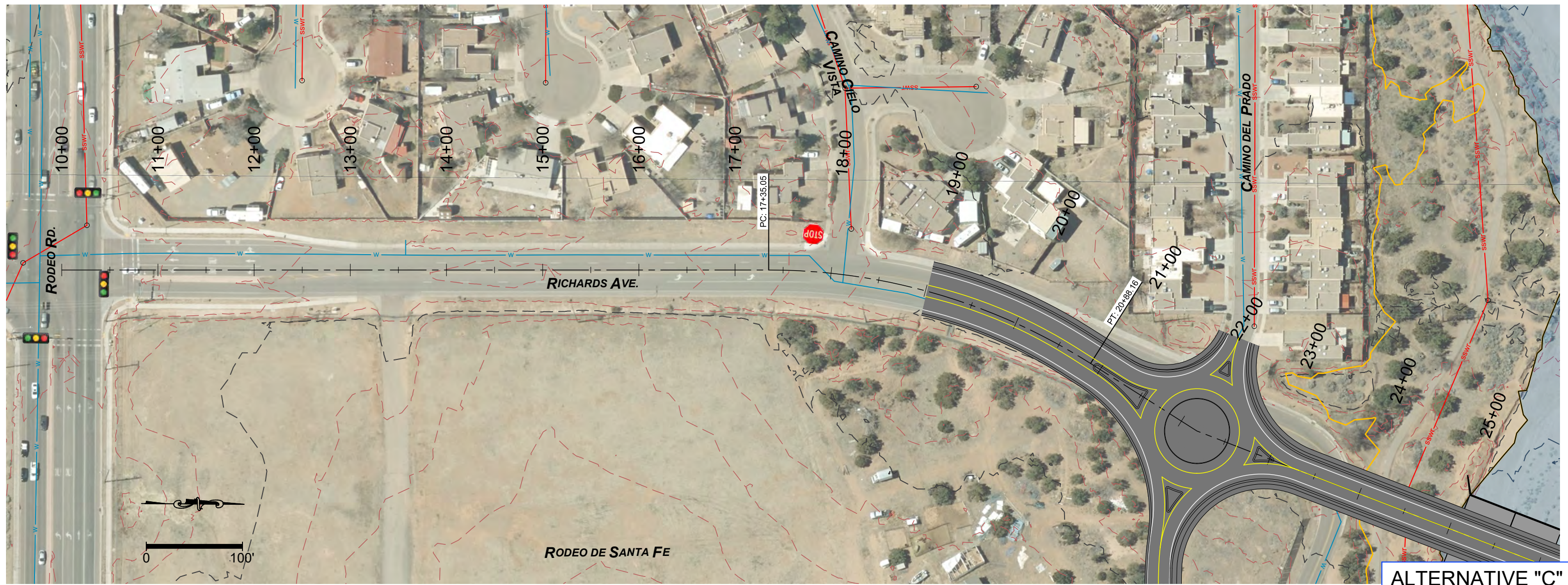
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ALTERNATIVE

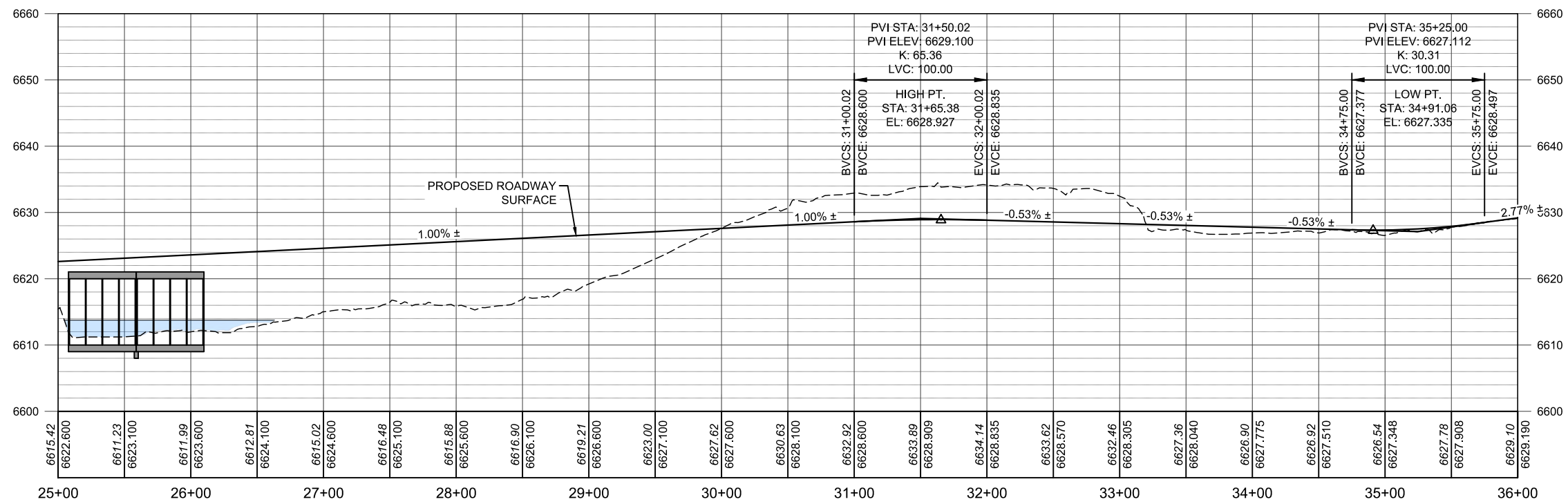
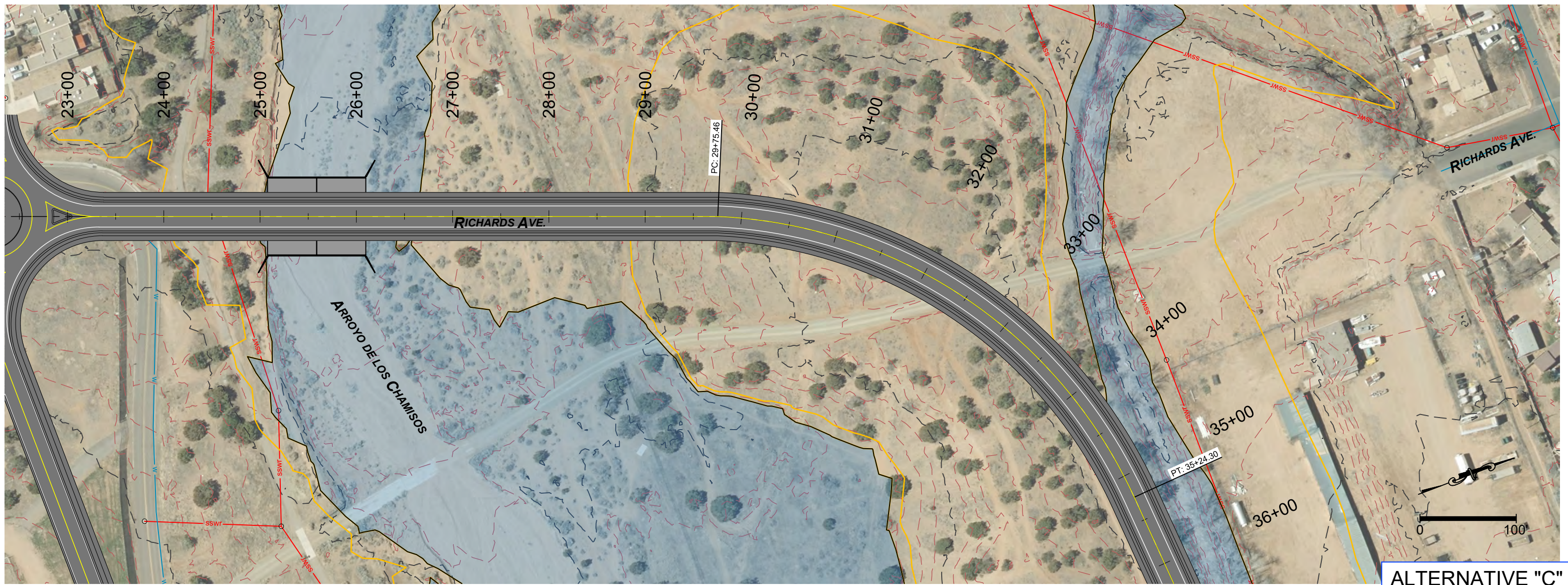
“C” PLAN &

PROFILE

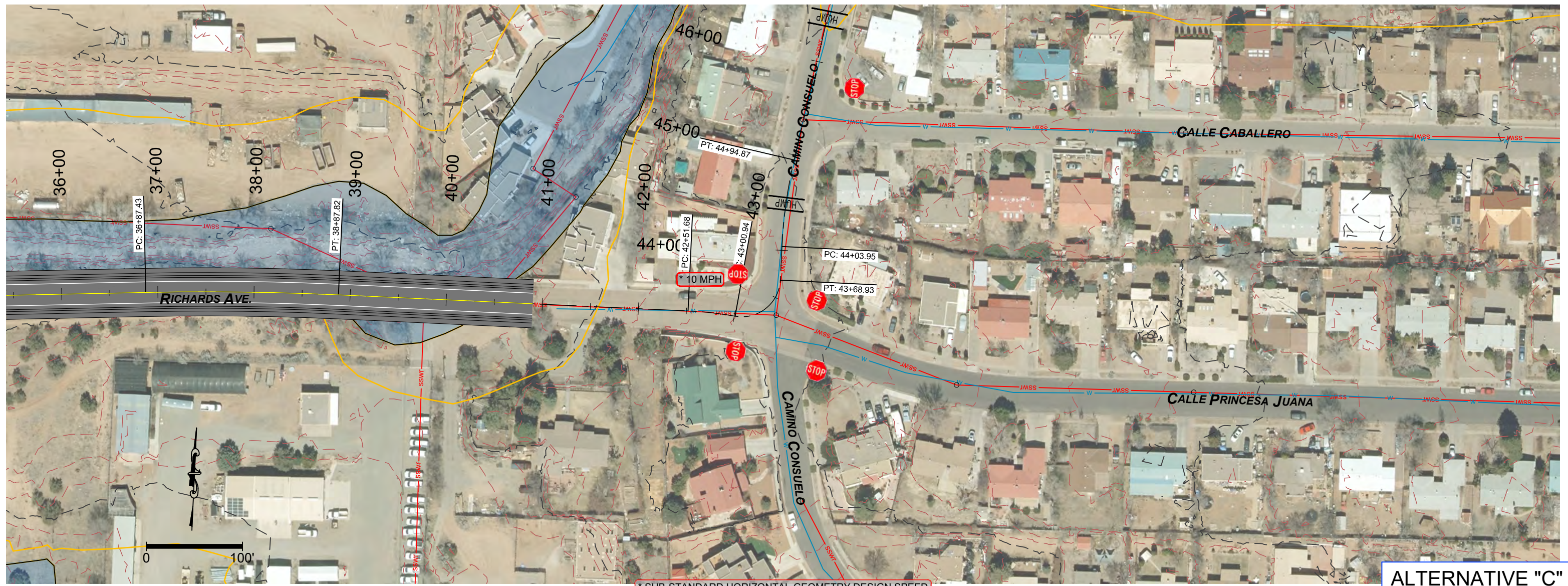






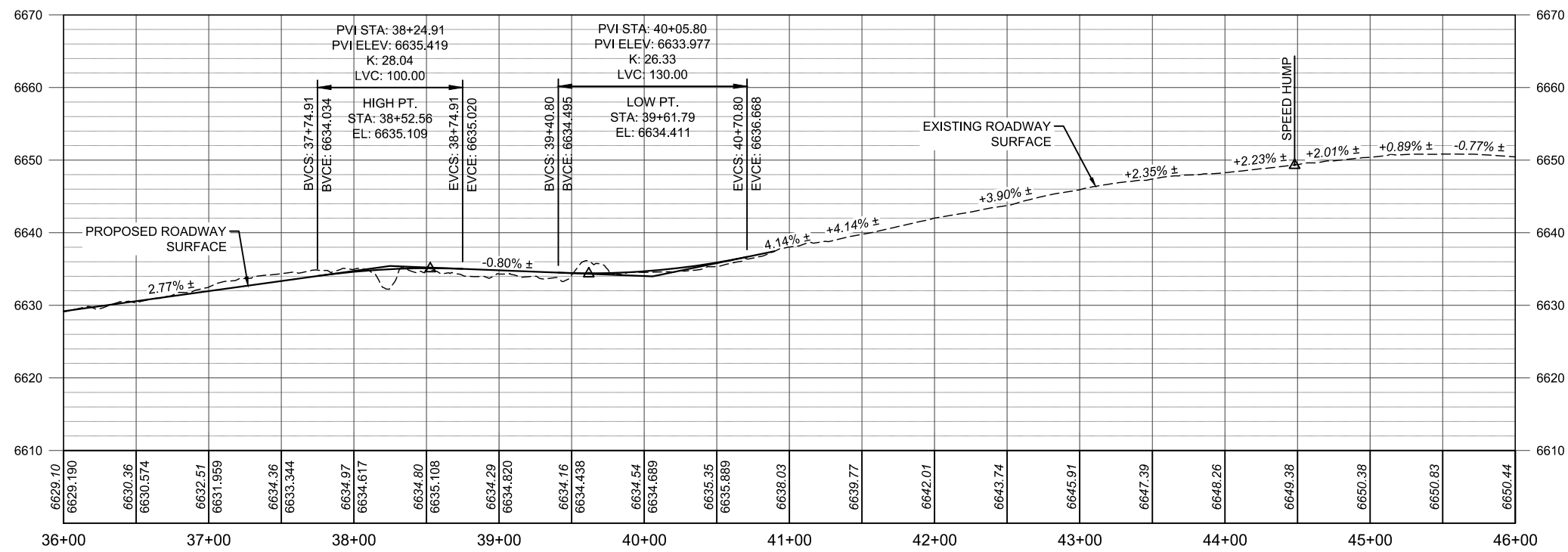




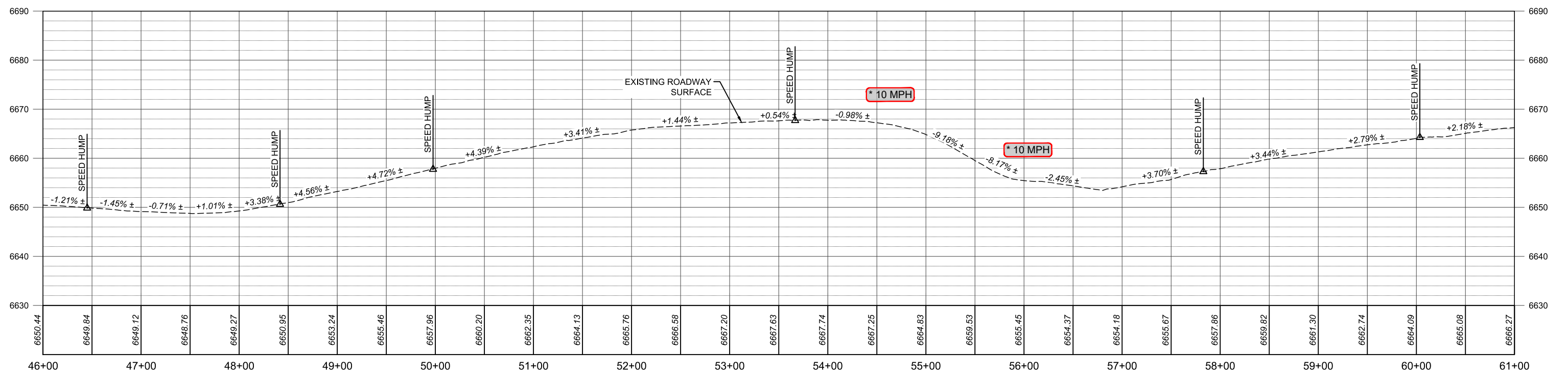


\* SUB-STANDARD HORIZONTAL GEOMETRY DESIGN SPEED

ALTERNATIVE "C"





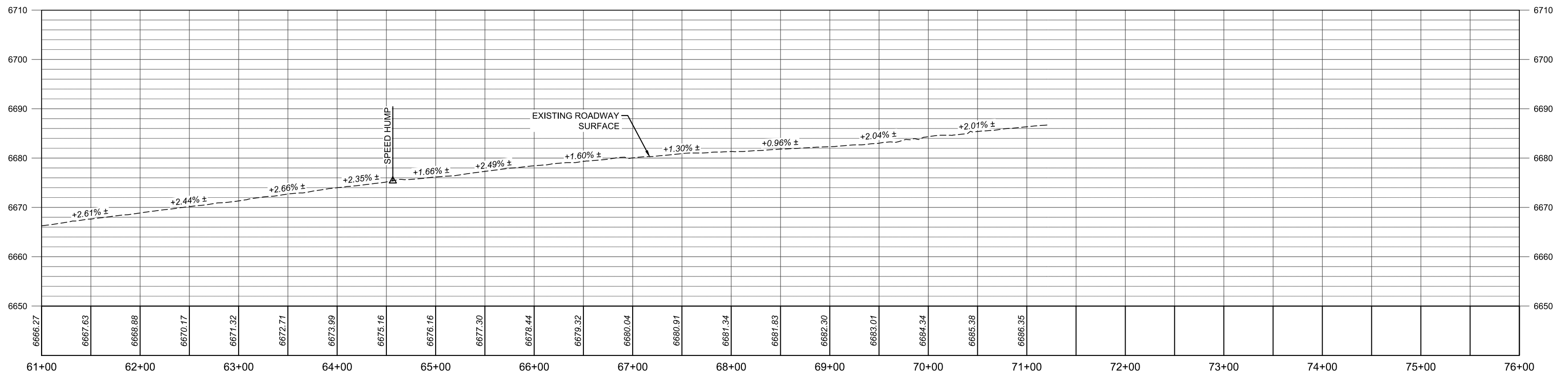


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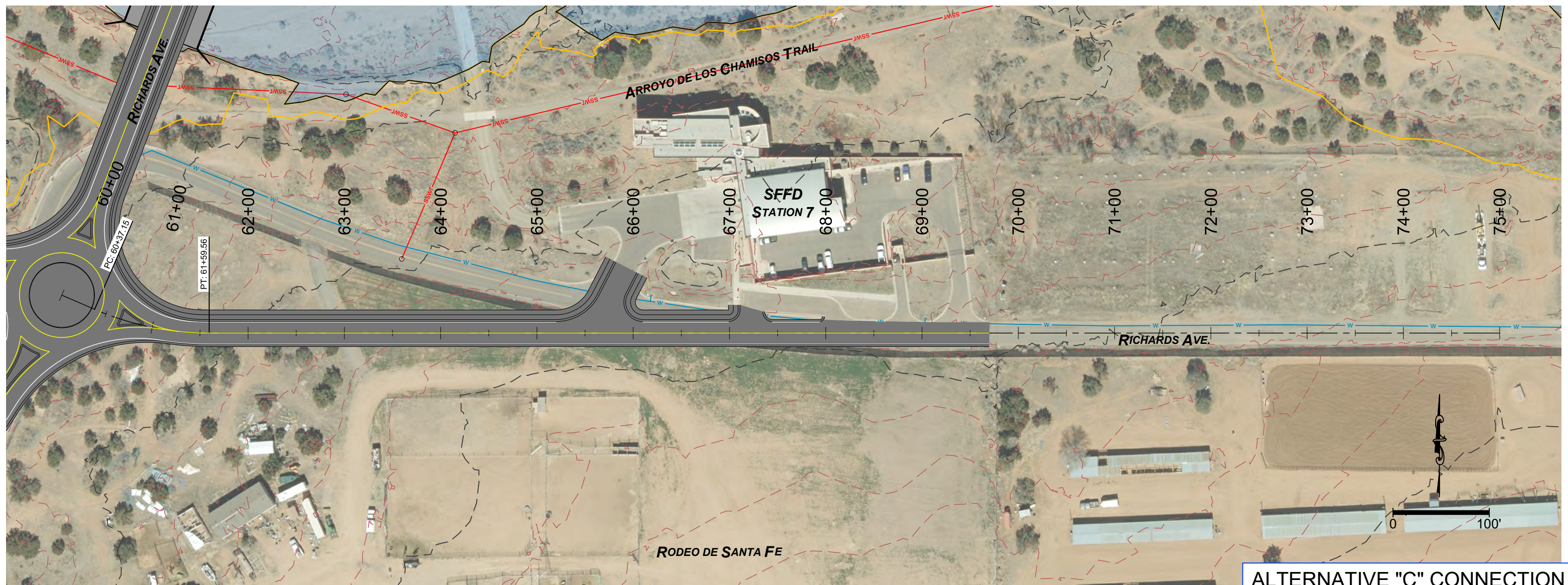




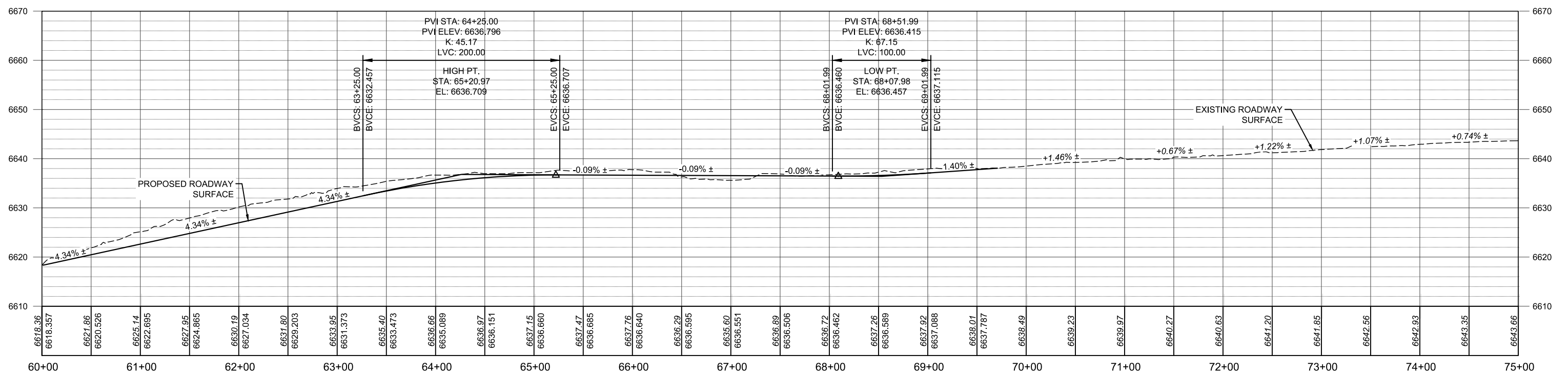
ALTERNATIVE "C"







ALTERNATIVE "C" CONNECTION





# APPENDIX

# D

# TRAFFIC ANALYSIS





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7500 Jefferson St. NE  
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## MEMORANDUM

**DATE:** November 6, 2019  
**TO:** Richard Rotto, Louis Berger  
**FROM:** Melanie Bishop, Bohannon Huston, Inc.  
**SUBJECT:** **Arroyo de los Chamisos Crossing: Phase A Traffic Analysis**

### I. STUDY PURPOSE

The Arroyo de los Chamisos Crossing: Phase A alignment study evaluates alternatives for a new crossing over Arroyo de los Chamisos that connects to existing Richards Avenue. The purpose of this memo is to summarize the traffic analysis of these alternatives and discuss the local impacts these extension alternatives would have on traffic patterns.

The current alignment of Richards Avenue ends north of Rodeo Road at the Arroyo de los Chamisos and begins again just south of Siringo Road opposite the arroyo. Because it does not connect across the arroyo, north-south traffic in the vicinity currently use other routes to get to their destinations. This traffic analysis will investigate whether or not an additional route can be added to the system to improve mobility in the area and what the potential impacts (positive or negative) might be on the existing street network.

This study evaluates three proposed alignment alternatives as follows:

1. *Alternative Alignment A –*

This alignment extends Richards Avenue northwest across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Vegas Verdes Drive and Zafarano Drive via Camino de los Arroyos by extending Camino de los Arroyos west. This alternative also provides access to Cerrillos Road via the existing roadways Kachina Ridge Drive and Avenida de las Americas.

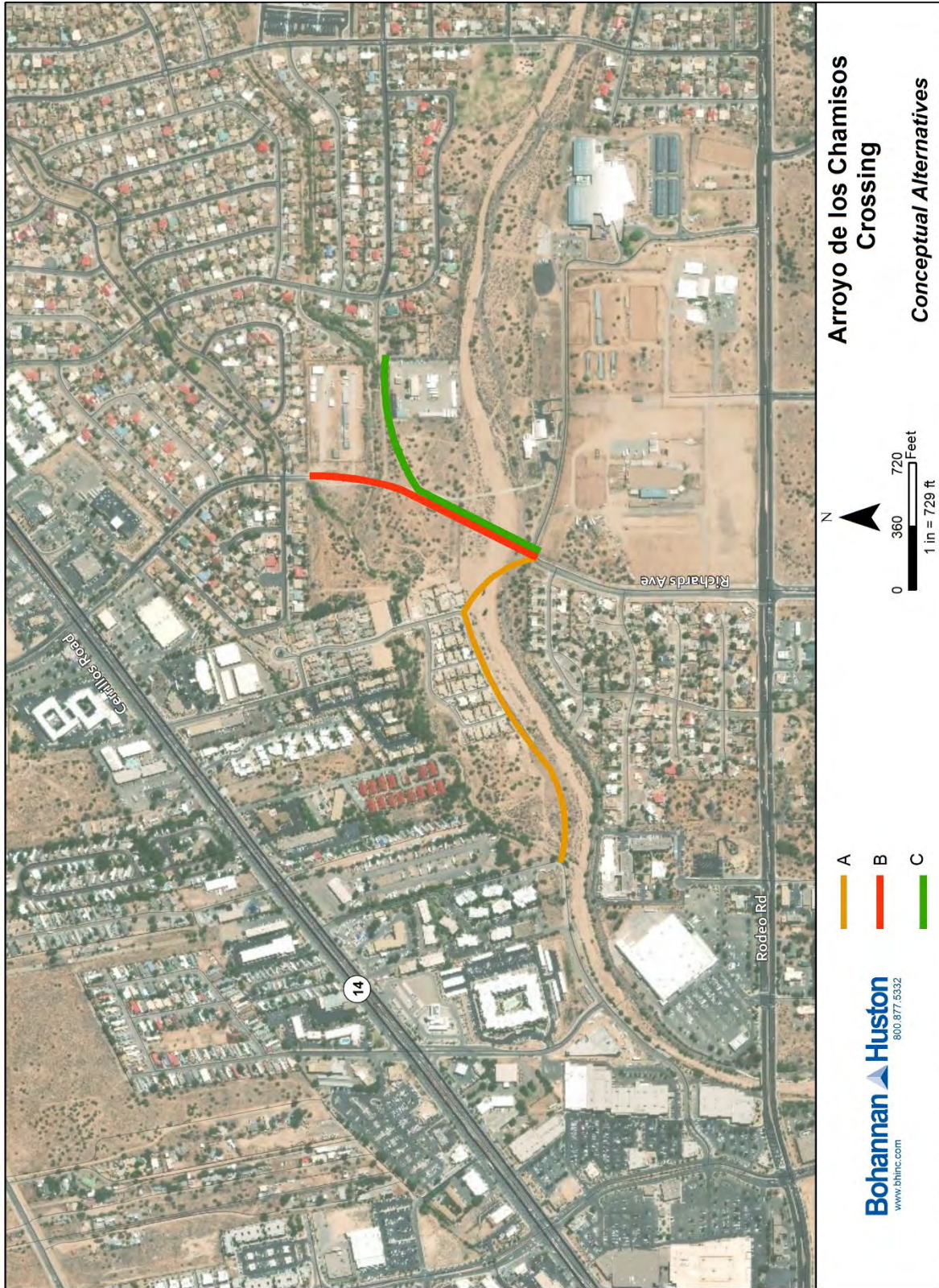
2. *Alternative Alignment B –*

This alignment extends Richards Avenue north across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Cerrillos Road via Richards Avenue.

3. *Alternative Alignment C –*

This alignment extends Richards Avenue northeast across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Cerrillos Road via Camino Consuelo.

The map below demonstrates locations of the conceptual alternatives.



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Author: mbsnop  
November 2019



## II. STUDY METHODOLOGY

The 2019 Santa Fe Regional travel demand model was utilized in the development of the alignment study traffic analysis. A total of 13 new traffic counts were performed to provide additional detail to the travel demand model to refine the results in the study area.

The modeling effort consisted of modeling the three alternative alignments and assessing the changes in travel behavior based on the model results.

The following assumptions were applied during model development:

### 1. *Alternative Alignment A –*

This alignment is assumed to be a 2-lane local road with a speed limit of 25 miles per hour (MPH). The intersection of Camino de los Arroyos and Kachina Ridge Drive is coded in the model as a two-way stop, with the eastbound leg of Camino de los Arroyos expected to stop.

The full length of Avenida de las Americas/Kachina Ridge Drive was not coded as a link in the model, so link 3095 was added to provide network connectivity between Richards Avenue and Cerrillos Road.

### 2. *Alternative Alignment B –*

This alignment is assumed to be a 2-lane local road with a speed limit of 25 MPH. Richards Avenue and Siringo Road is a two-way stop-controlled intersection, with the westbound leg of Siringo Road expected to stop.

### 3. *Alternative Alignment C –*

This alignment is assumed to be a 2-lane local road with a speed limit of 25 MPH. The speed on Camino Consuelo was reduced to 20 MPH due to newly constructed speed humps. The intersection of Camino Consuelo and Calle Princesa Juana is coded as an all-way stop, matching current conditions.

## III. EXISTING CONDITIONS

To cross the Arroyo, drivers currently utilize north-south connections including Zafarano Drive, Avenida de las Campanas and Camino Carlos Rey, and north of the arroyo Richards Avenue, Camino Consuelo, Calle del Cielo, and Calle la Resolana.

The existing AM and PM peak hour traffic volumes of the roadways in the study area is shown in the attached figure.

Volume to capacity (v/c) indicates the level of delay a vehicle is expected to experience, with 0.85 (or 85%) or below generally an acceptable value. Currently no roadways in the study area exceed 85% v/c. The volume to capacity percentage per roadway link is represented in the attached figure.

## **IV. ALTERNATIVES ANALYSIS**

The regional travel demand model evaluates the effects on travel patterns in Santa Fe from changes in the roadway network. The three alternative alignments were evaluated independently in the model to determine the expected change in traffic volumes for each. Traffic volumes associated with each roadway alignment can be compared against the existing traffic volumes displayed in the attached figures.

This evaluation determines the anticipated traffic volumes for each new alignment and the traffic volume changes on parallel routes. Parallel routes are north-south connections between Rodeo Road and Cerrillos Road including Vegas Verdes and Avenida de las Americas to the west of Richards Avenue and Camino Consuelo and Avenida de las Campanas to the east.

Results from the model output demonstrate a higher increase in the AM traffic volumes for all three alternative alignments. Detailed results below focus on AM peak hour traffic.

### ***A. Alternative Alignment A***

This alignment extends Richards Avenue northwest across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Zafarano Drive via Camino de los Arroyos. Camino de los Arroyos is an existing roadway that does not currently have a connection between the east and west segments. This alternative also provides the option to access Cerrillos Road via the existing roadways Kachina Ridge Drive and Avenida de las Americas.

#### ***1. Volumes***

Alternative Alignment A (link number 3093) attracts approximately 570 trips in the AM peak hour, the majority of which utilize Kachina Ridge Drive/ Avenida de las Americas when traveling to or from Cerrillos Road. Of those trips, 120 are expected to utilize the connection via Camino de los Arroyos in the AM peak hour. This alignment attracts approximately 670 trips in the PM peak hour, of which 185 are expected to utilize the connection via Camino de los Arroyos.

Some nearby roadways will carry additional traffic as a result of this alignment. Traffic is expected to increase substantially on Avenida de las Americas and on Richards Avenue south of the arroyo.

As can be expected, the existing arroyo crossings will have reductions in traffic. Existing arroyo crossings that were evaluated include Camino Consuelo, Avenida de las Campanas, and Camino Carlos Rey. The percent decreases were determined by averaging each link along the entire roadway within the study area. This alignment is expected to decrease average traffic volumes on Camino Consuelo by 20-25%, Avenida de las Campanas by 35-42%, and Camino Carlos Rey by 7-8%.

The expected volumes for AM and PM peak hours per roadway link and the expected increase and decrease in volumes per roadway link are shown in the attached figures.

#### ***2. Volume to Capacity***

The construction of Alternative Alignment A will not result in any roadways exceeding 85% v/c. The highest v/c percentage occurs on southbound Avenida de las Americas with a segment



reaching 71% in the PM peak hour. The volume to capacity percentage per roadway link is represented in the attached figures

### *3. Travel Time*

The expected travel time for Alignment A was compared against the existing travel time between the same set of nodes, in this case from Richards Avenue and Rodeo Road to Cerrillos Road and Avenida de las Americas. This alignment is expected to decrease travel time by 33% for vehicles traveling northbound and 27% for vehicles traveling southbound.

## **B. Alternative Alignment B**

This alignment extends Richards Avenue north across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Cerrillos Road via Richards Avenue.

### *1. Volumes*

Alternative Alignment B (link number 3096) attracts just over 800 trips in the AM peak hour and just over 900 trips in the PM peak hour. As expected, Richards Avenue attracts substantial traffic volumes when it becomes a continuous north-south connection between the Community College District and its terminus at Agua Fria Road. Northbound Camino Consuelo approaching Cerrillos Road is also expected to see a small increase in traffic. This alignment is expected to decrease average traffic volumes on Camino Consuelo by 21-29%, Avenida de las Campanas by 47-53%, and Camino Carlos Rey by 13%.

The expected volumes for AM and PM peak hours per roadway link and the expected increase and decrease in volumes per roadway link are shown in the attached figures.

### *2. Volume to Capacity*

Alternative Alignment B will not result in any roadway exceeding 85% v/c. The highest v/c percentage occurs on southbound Richards Avenue with the northbound arroyo crossing segment reaching 84% in the AM peak hour. The volume to capacity percentage per roadway link is represented in the attached figure.

### *3. Travel Time*

The expected travel time for Alignment B was compared against the existing travel time between the same set of nodes (Richards Avenue and Rodeo Road to Richards Avenue and Cerrillos Road). This alignment is expected to decrease travel time by 28% for vehicles traveling northbound and 20% for vehicles traveling southbound.

## **C. Alternative Alignment C**

This alignment extends Richards Avenue northeast across the Arroyo de los Chamisos to provide a connection from Rodeo Road to Cerrillos Road via Camino Consuelo.

### *1. Volumes*

Alternative Alignment C (link number 3097) attracts almost 400 trips in the AM peak hour and 450 trips in the PM peak hour. Traffic is expected to increase on Camino Consuelo and on Richards Avenue south of the arroyo. This alignment is expected to decrease average traffic volumes on Avenida de las Campanas by 34-43% and Camino Carlos Rey by 7%.

The expected volumes for AM and PM peak hours per roadway link and the expected increase and decrease in volumes per roadway link are shown in the attached figures.

### *2. Volume to Capacity*

Alternative Alignment C will not result in any roads exceeding 85% v/c. The highest v/c percentage occurs on southbound Camino Consuelo with a segment reaching 76% in the PM peak hour. The volume to capacity percentage per roadway link is represented in the attached figure.

### *3. Travel Time*

The expected travel time for Alignment C was compared against the existing travel time between the same set of nodes (Richards Avenue and Rodeo Road to Camino Consuelo and Cerrillos Road). This alignment is expected to decrease travel time by 16% for vehicles traveling northbound and 6% for vehicles traveling southbound.

## **V. CONCLUSIONS**

This evaluation determines the anticipated traffic volumes for each new alignment and the traffic volume changes on parallel routes. Parallel routes are north-south connections between Rodeo Road and Cerrillos Road including Zafarano, Vegas Verdes, and Avenida de las Americas to the west of Richards Avenue and Camino Consuelo, Avenida de las Campanas, and Camino Carlos Rey to the east. Results from the traffic modeling suggest the majority of changes in traffic patterns occur in the immediate vicinity of the study area.

North-south connectors including Avenida de las Campanas, Camino Carlos Rey, Zafarano, and Vegas Verdes are expected to be relieved of considerable traffic volumes as a result of any of the three alignments. Adjacent roadways will absorb the diverted traffic from Avenida de las Campanas and Camino Consuelo as drivers who utilize this north-south connection have other options.







Overall, the most prominent increase in study area traffic volumes is seen with Alignment B with a 44% increase on the new roadway link in the AM peak hour. Alignment A will result in a 24% increase in traffic volumes in the AM peak hour and Alignment C results in a 22% increase in traffic volumes in the AM peak hour.

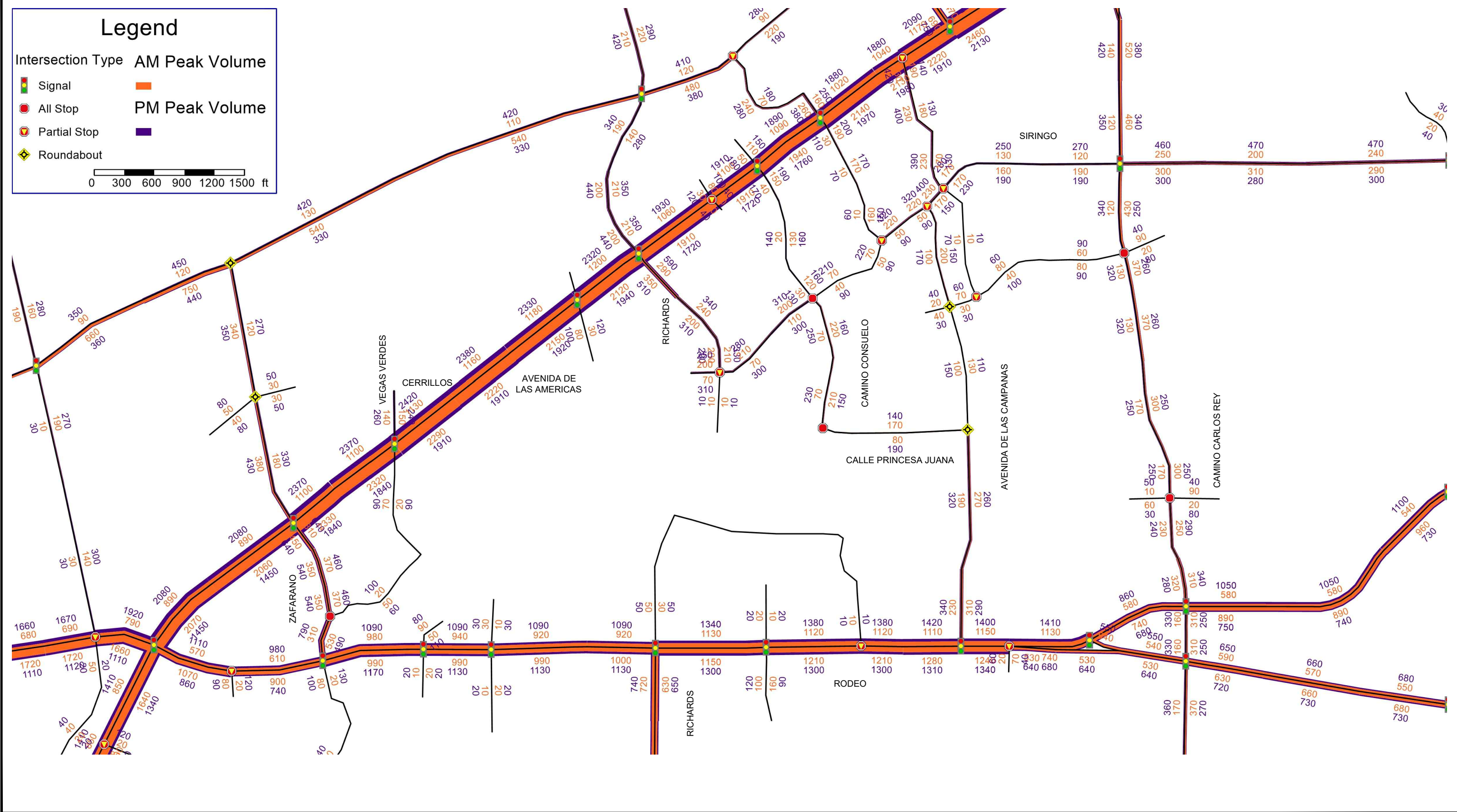
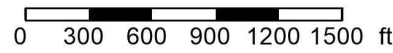
A summary of the existing traffic volumes and volumes associated with each alignment is located in the attachment. Roadway link numbering is displayed on the attached figure for reference.



# Legend

Intersection Type AM Peak Volume







-  Signal
-  All Stop
-  Partial Stop
-  Roundabout
-  AM Peak Volume
-  PM Peak Volume

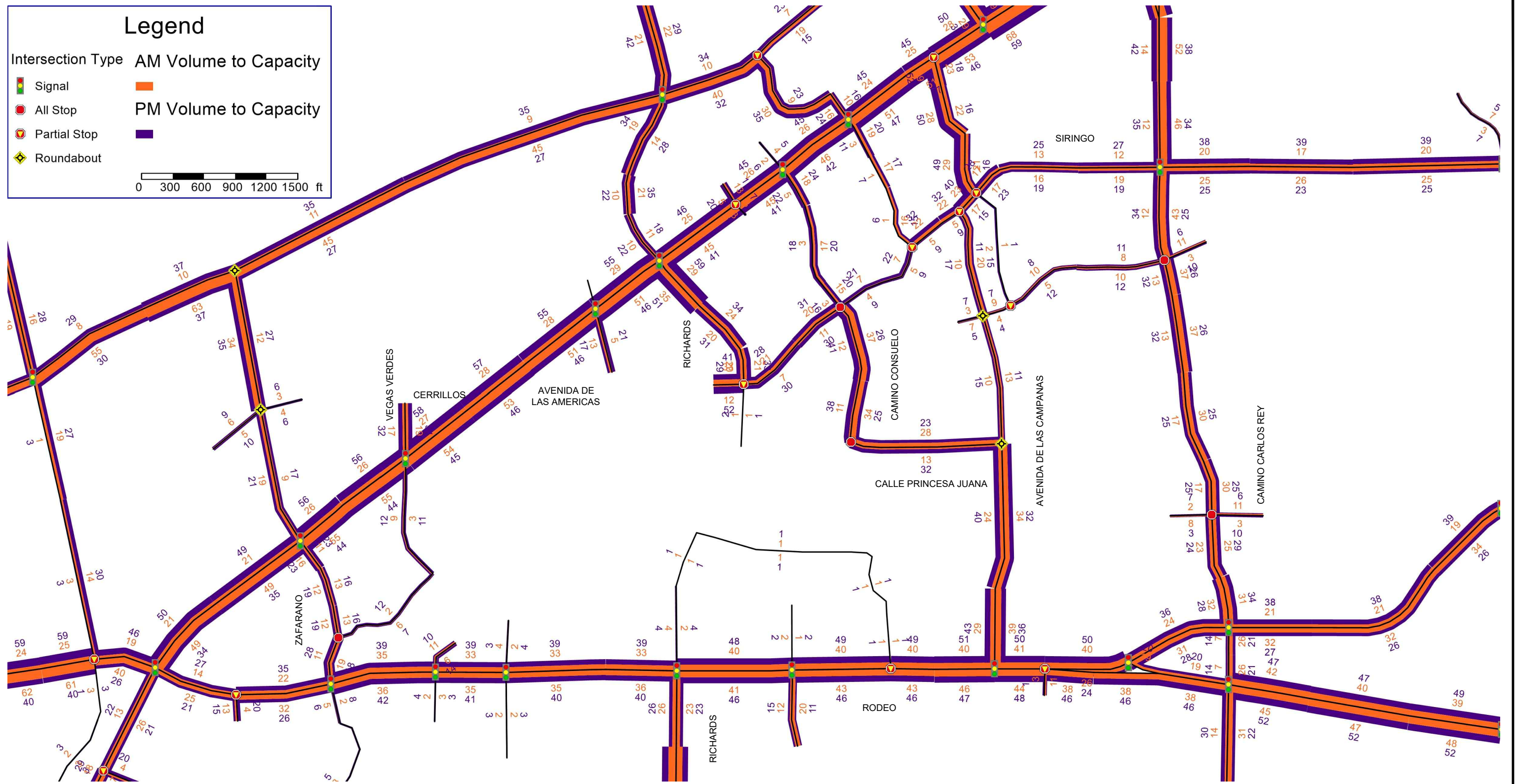
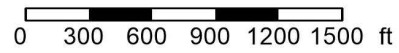


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# Legend





- Intersection Type
-  Signal
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  -  Roundabout
- AM Volume to Capacity
- 
  - 

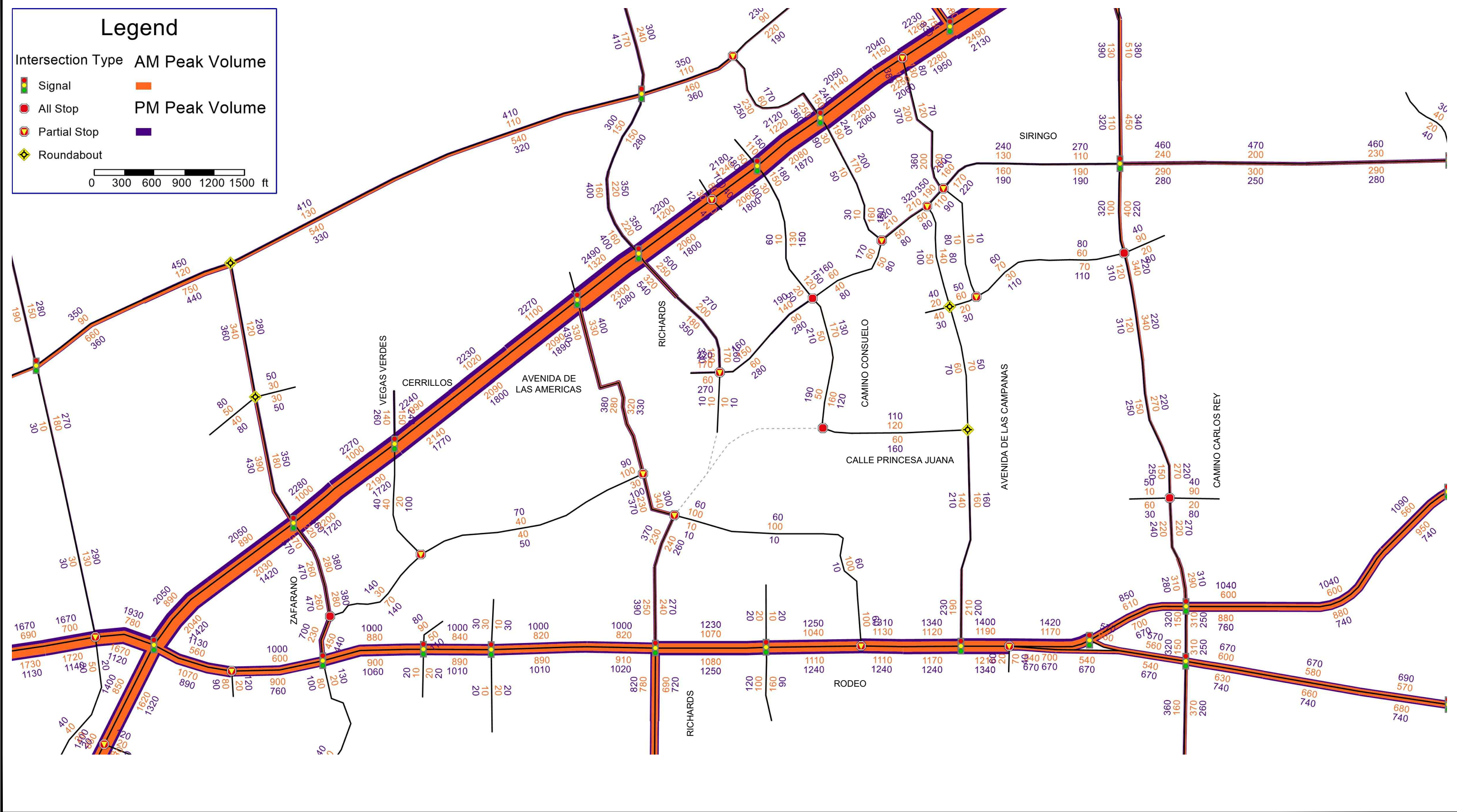
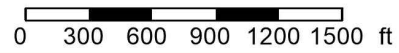


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# Legend

- Intersection Type
-  Signal
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  -  Roundabout
- AM Peak Volume
- PM Peak Volume



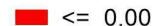
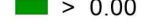
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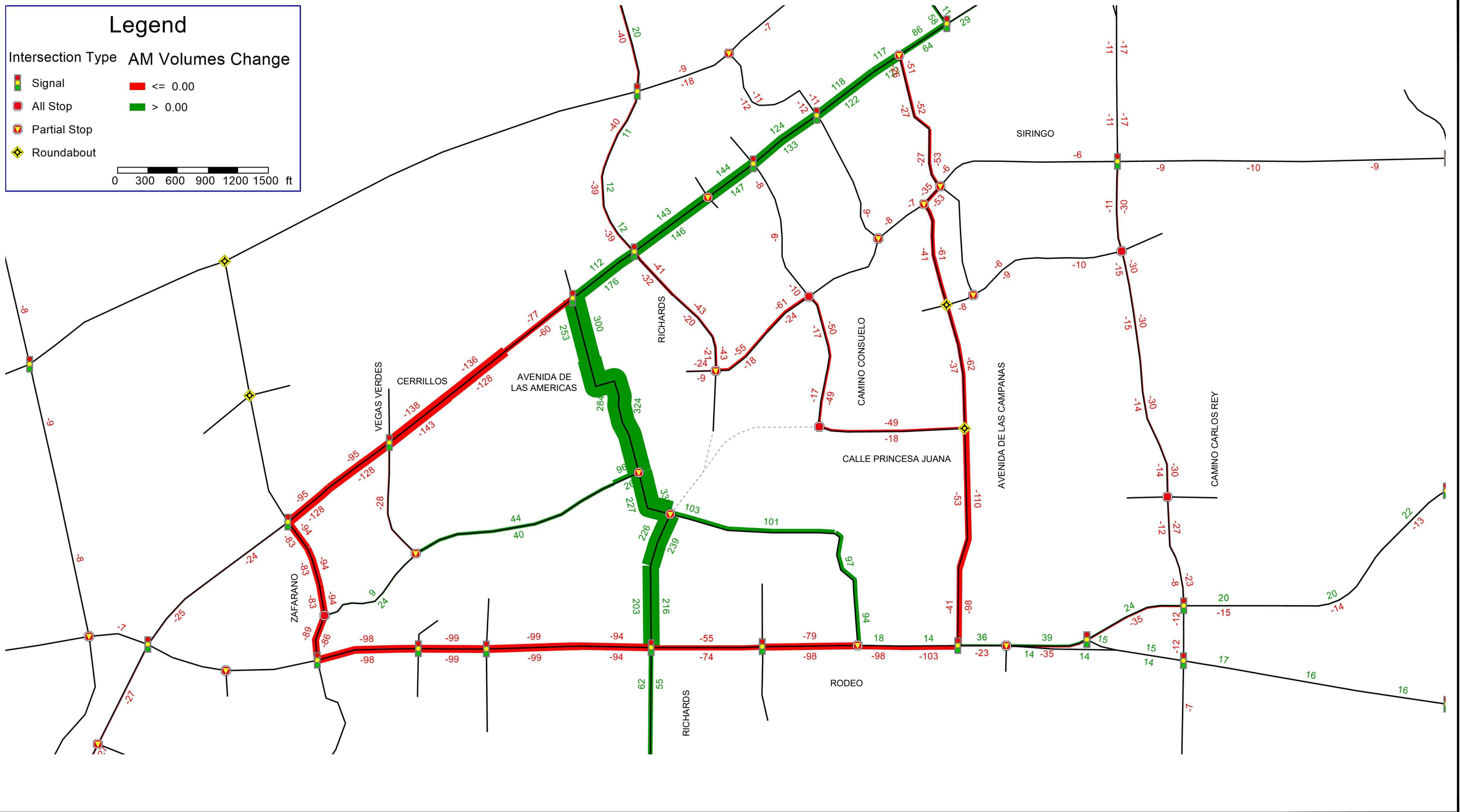
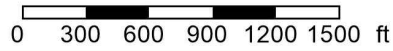
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Intersection Type AM Volumes Change

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

AM Volumes Change

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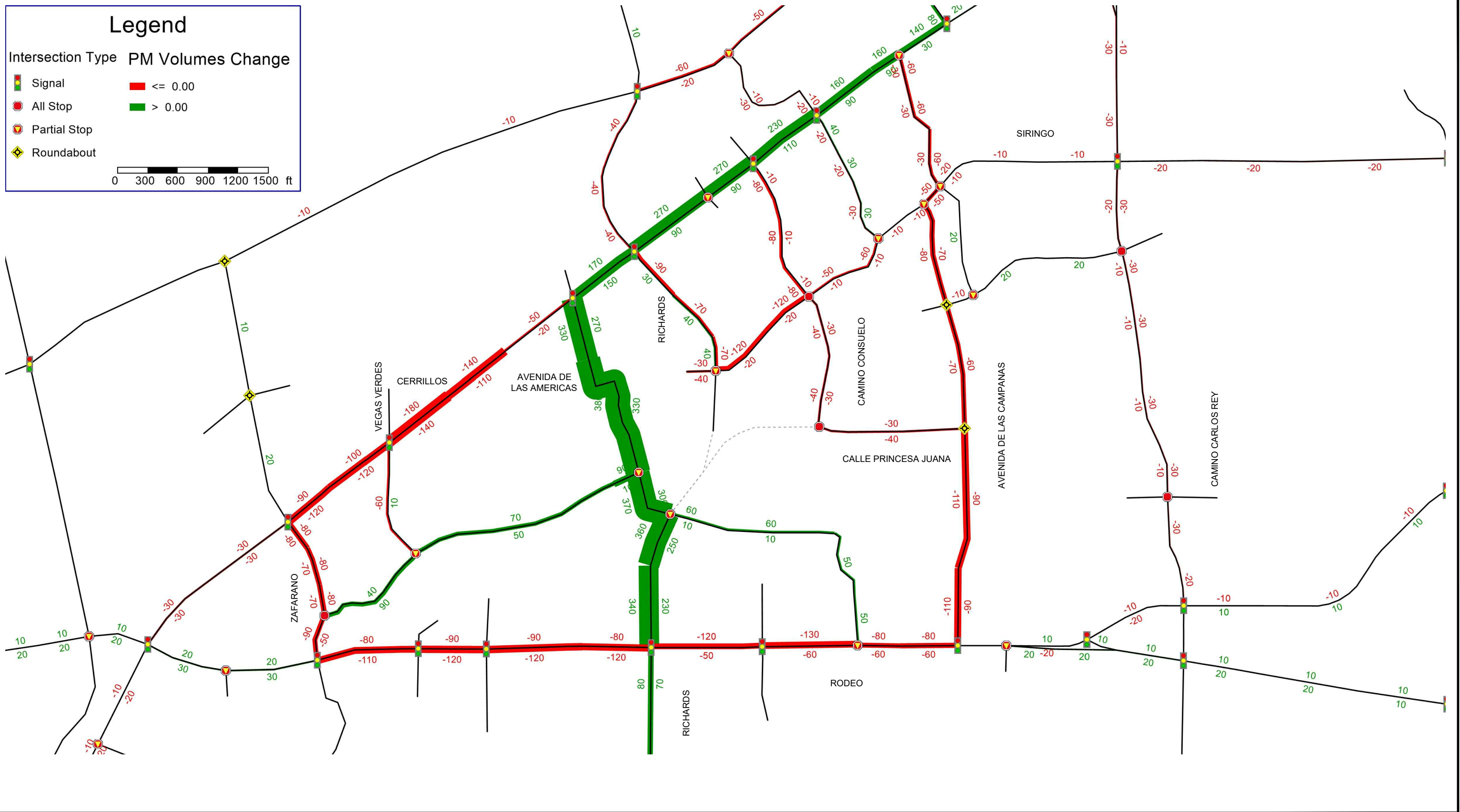
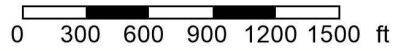


# Legend

## Intersection Type PM Volumes Change







-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

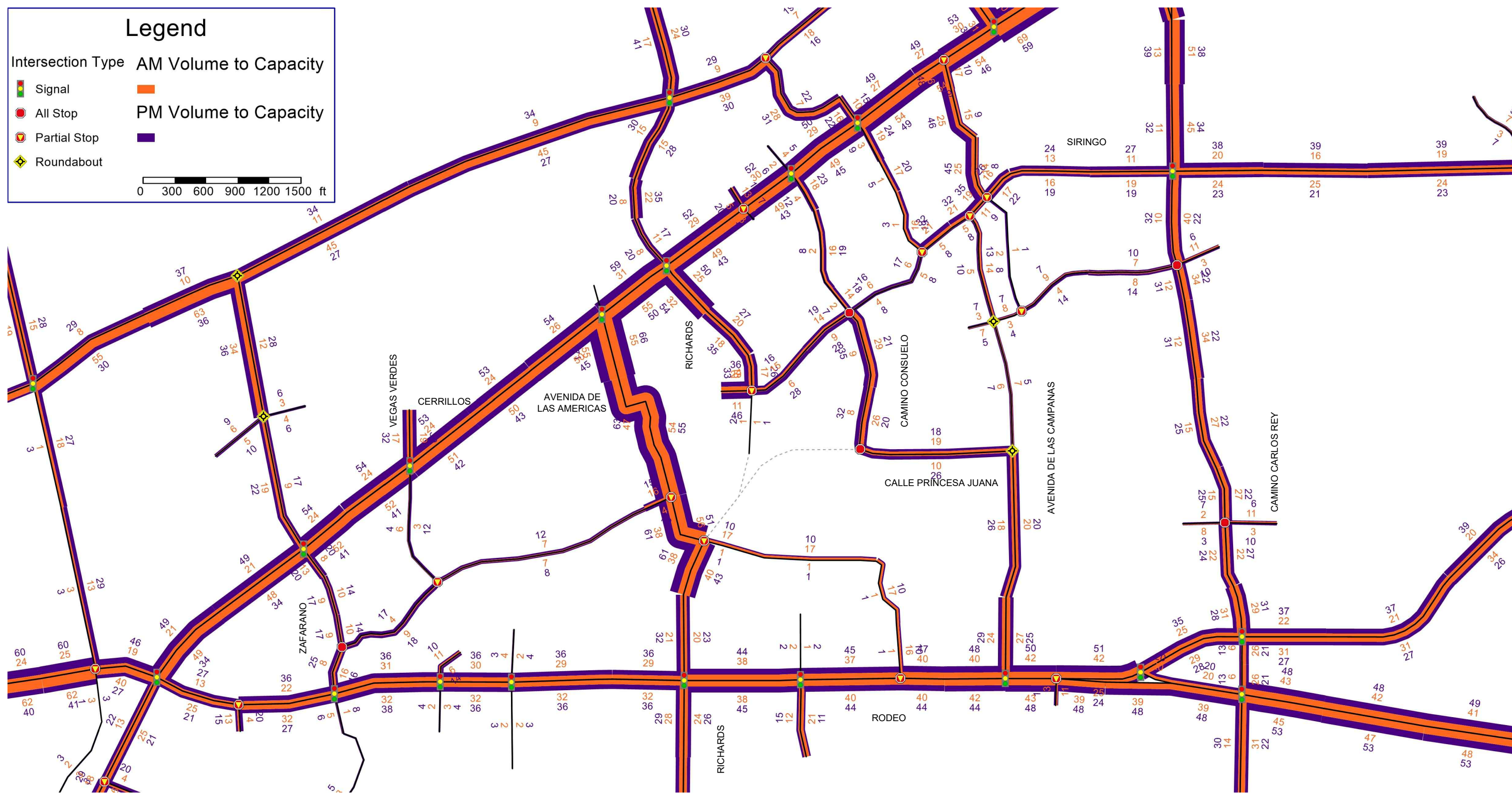
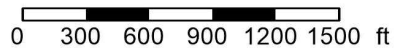
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█ > 0.00



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# Legend

- Intersection Type
-  Signal
  -  All Stop
  -  Partial Stop
  -  Roundabout
- AM Volume to Capacity
- 
  - 



## ARROYO DE LOS CHAMISOS CROSSING SANTA FE, NEW MEXICO

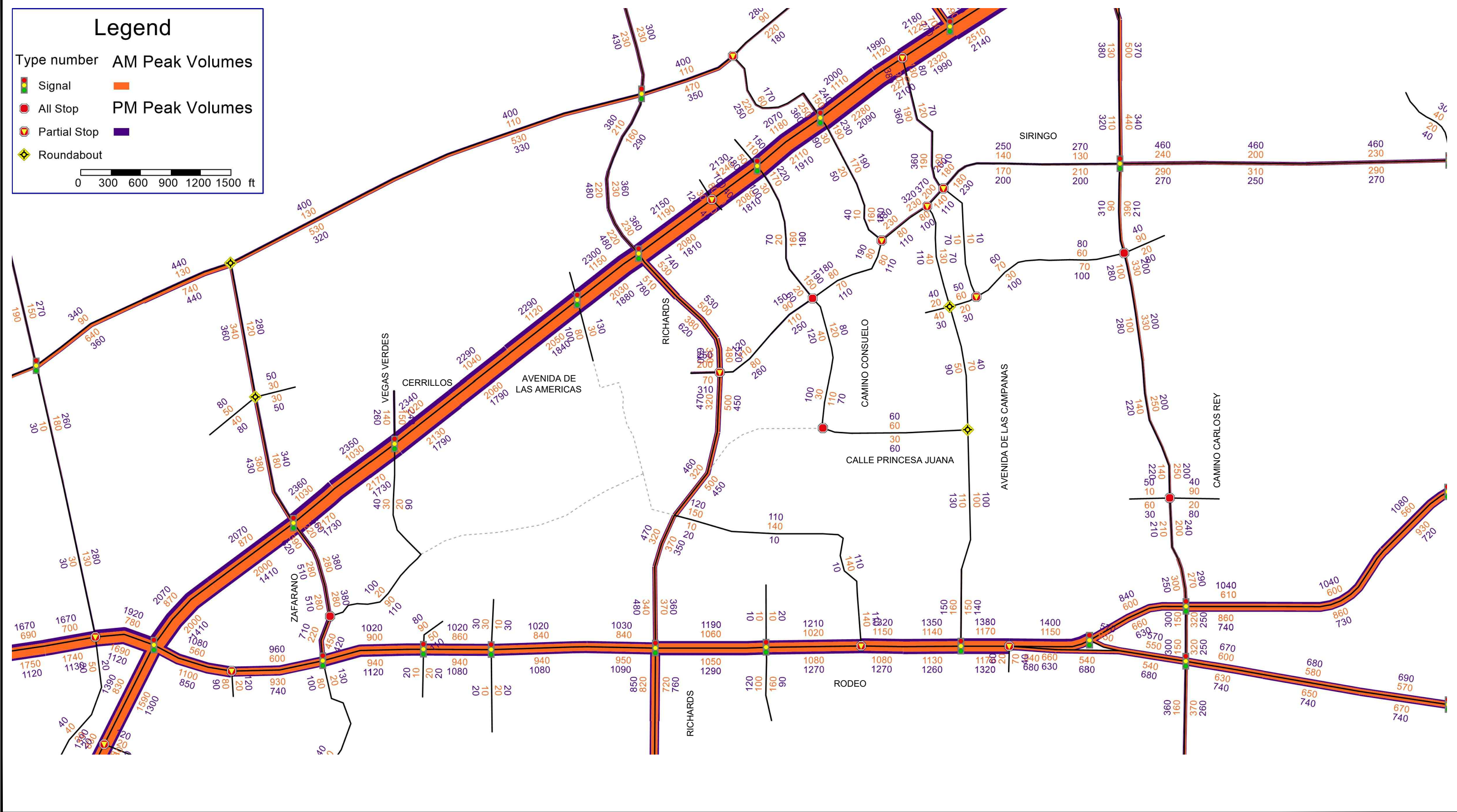
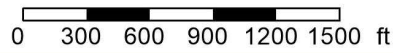
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# Legend

- Type number
- Signal
  - All Stop
  - Partial Stop
  - Roundabout

- AM Peak Volumes
- PM Peak Volumes

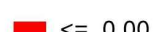


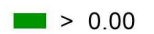
P:\20190530\TRANS\Study\Report-Production\Report\_Figures\20190530\_Figures.dwg, Nov. 08, 2019 - 8:46am

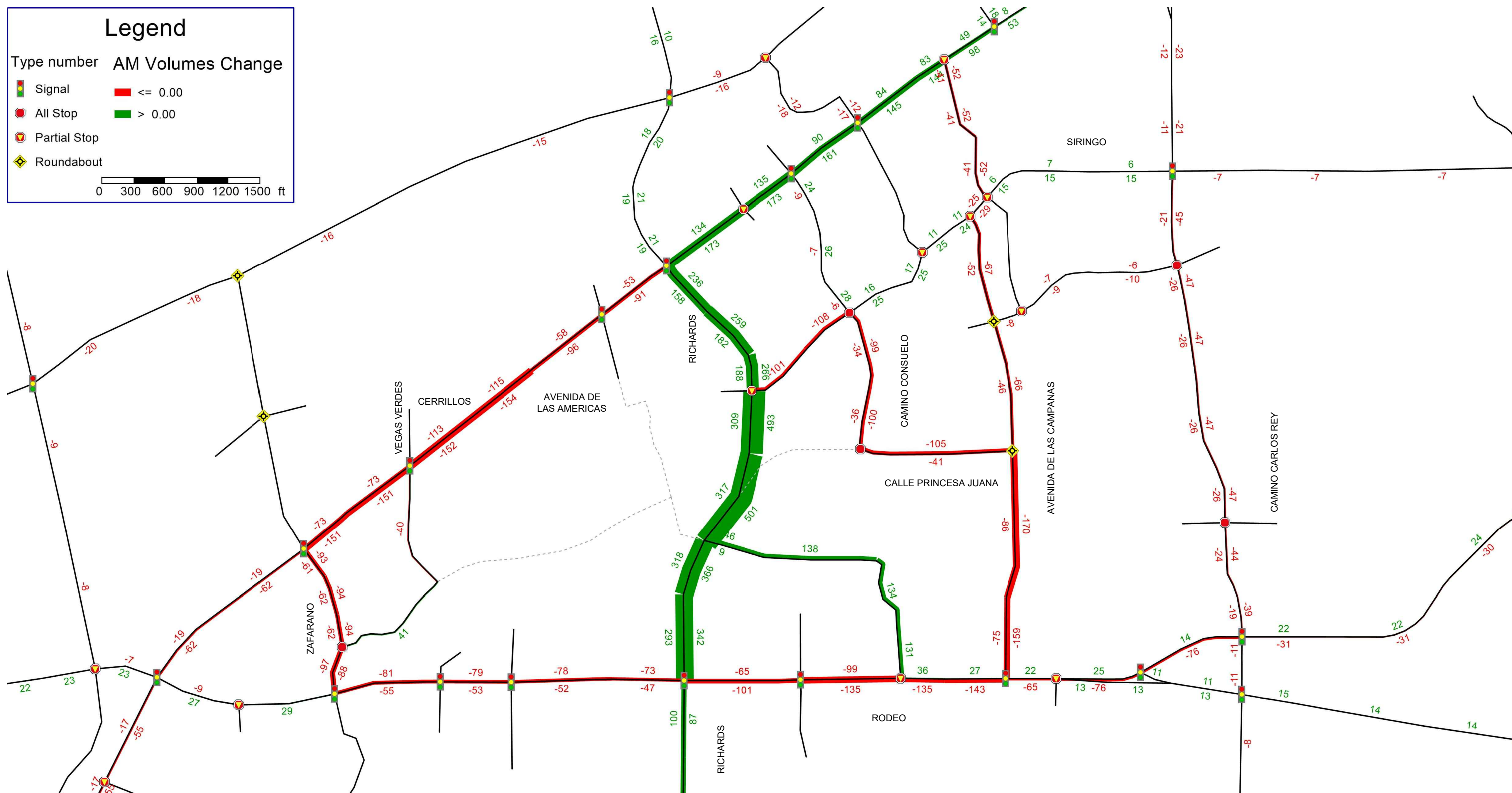
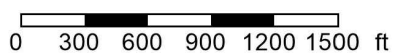
# Legend

Type number AM Volumes Change

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

  $\leq 0.00$

  $> 0.00$



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## ARROYO DE LOS CHAMISOS CROSSING SANTA FE, NEW MEXICO


## ALIGNMENT B AM CHANGE IN TRAFFIC VOLUMES



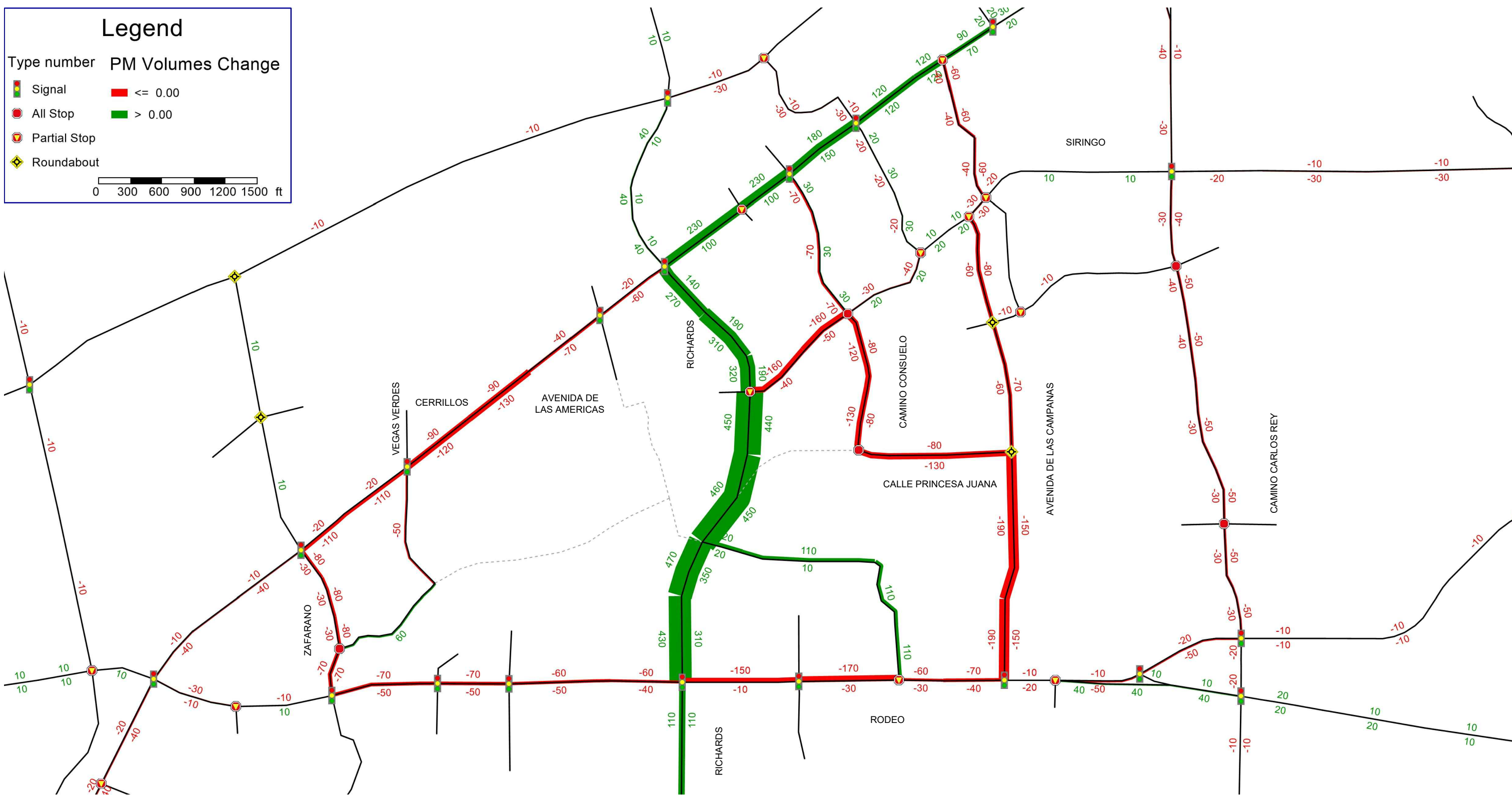
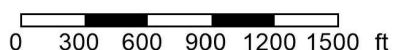
# Legend

Type number PM Volumes Change

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

  $\leq 0.00$







  $> 0.00$

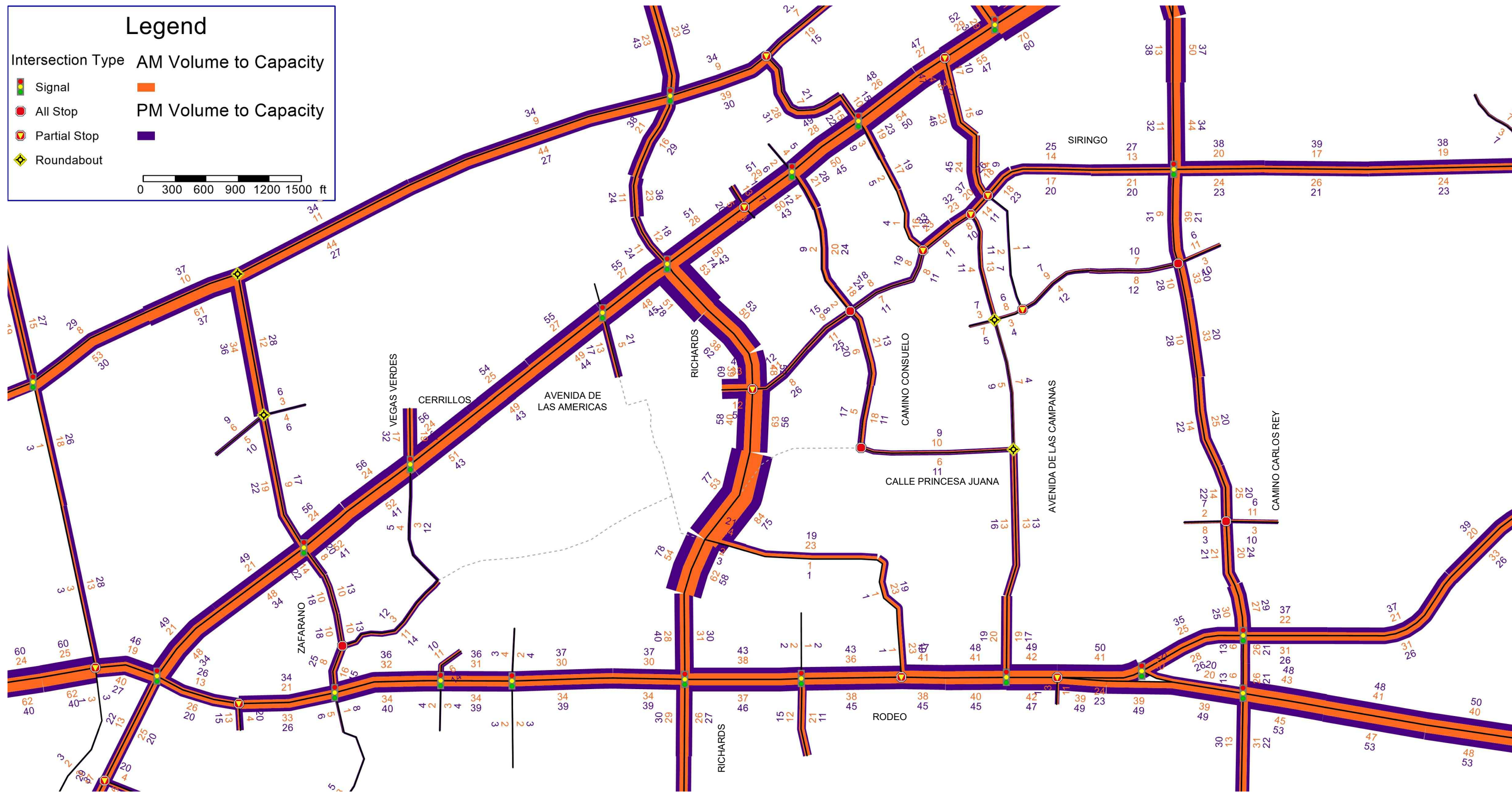
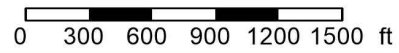


## ARROYO DE LOS CHAMISOS CROSSING SANTA FE, NEW MEXICO

## ALIGNMENT B PM CHANGE IN TRAFFIC VOLUMES

# Legend

- Intersection Type
-  Signal
  -  All Stop
  -  Partial Stop
  -  Roundabout
- AM Volume to Capacity
- 
  - 









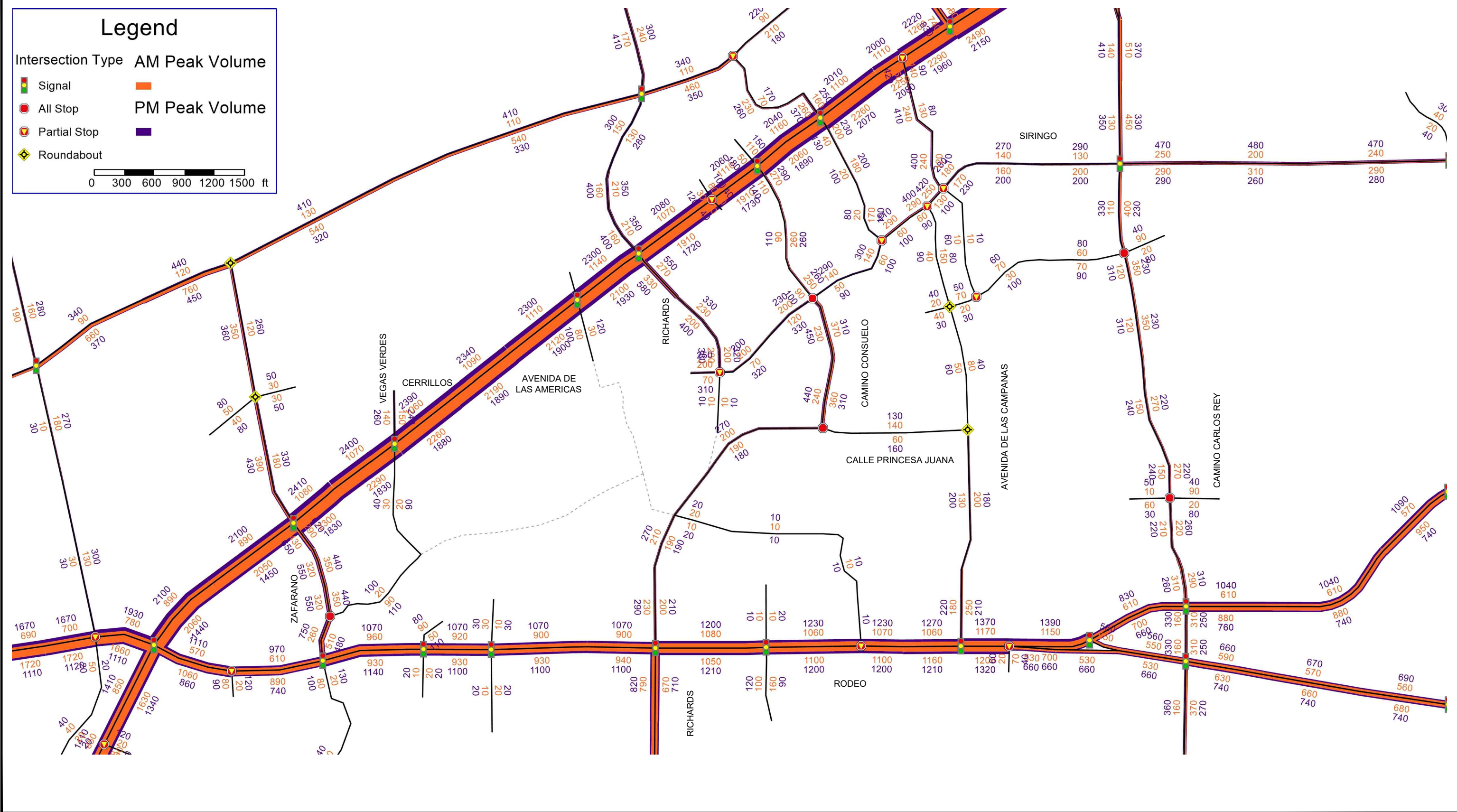
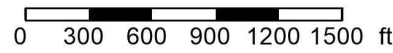
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# Legend

Intersection Type AM Peak Volume

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout
-  AM Peak Volume
-  PM Peak Volume



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## ARROYO DE LOS CHAMISOS CROSSING SANTA FE, NEW MEXICO

## ALIGNMENT C AM AND PM TRAFFIC VOLUMES

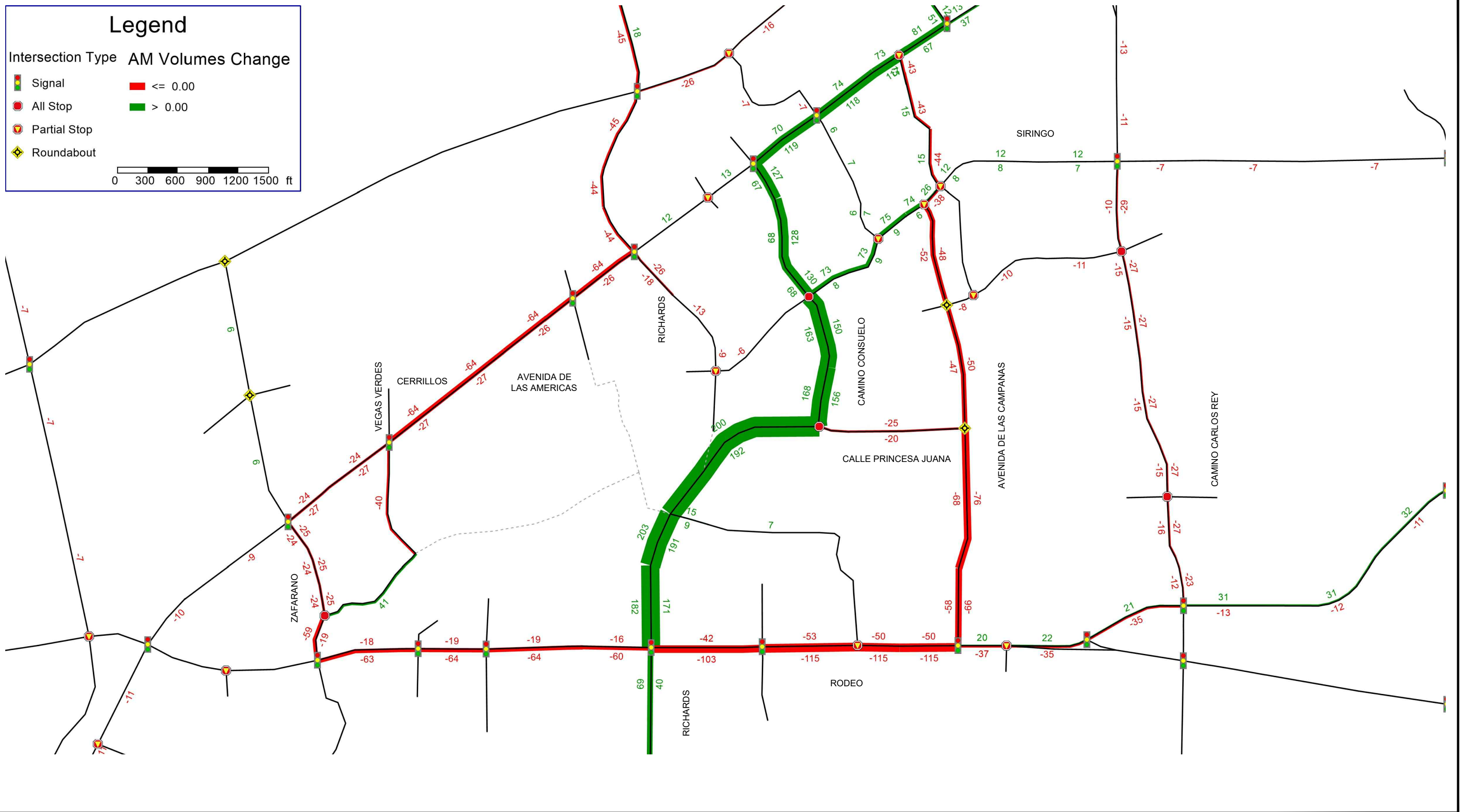
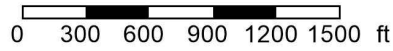
# Legend

Intersection Type AM Volumes Change

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

AM Volumes Change

- █ ≤ 0.00
- █ > 0.00



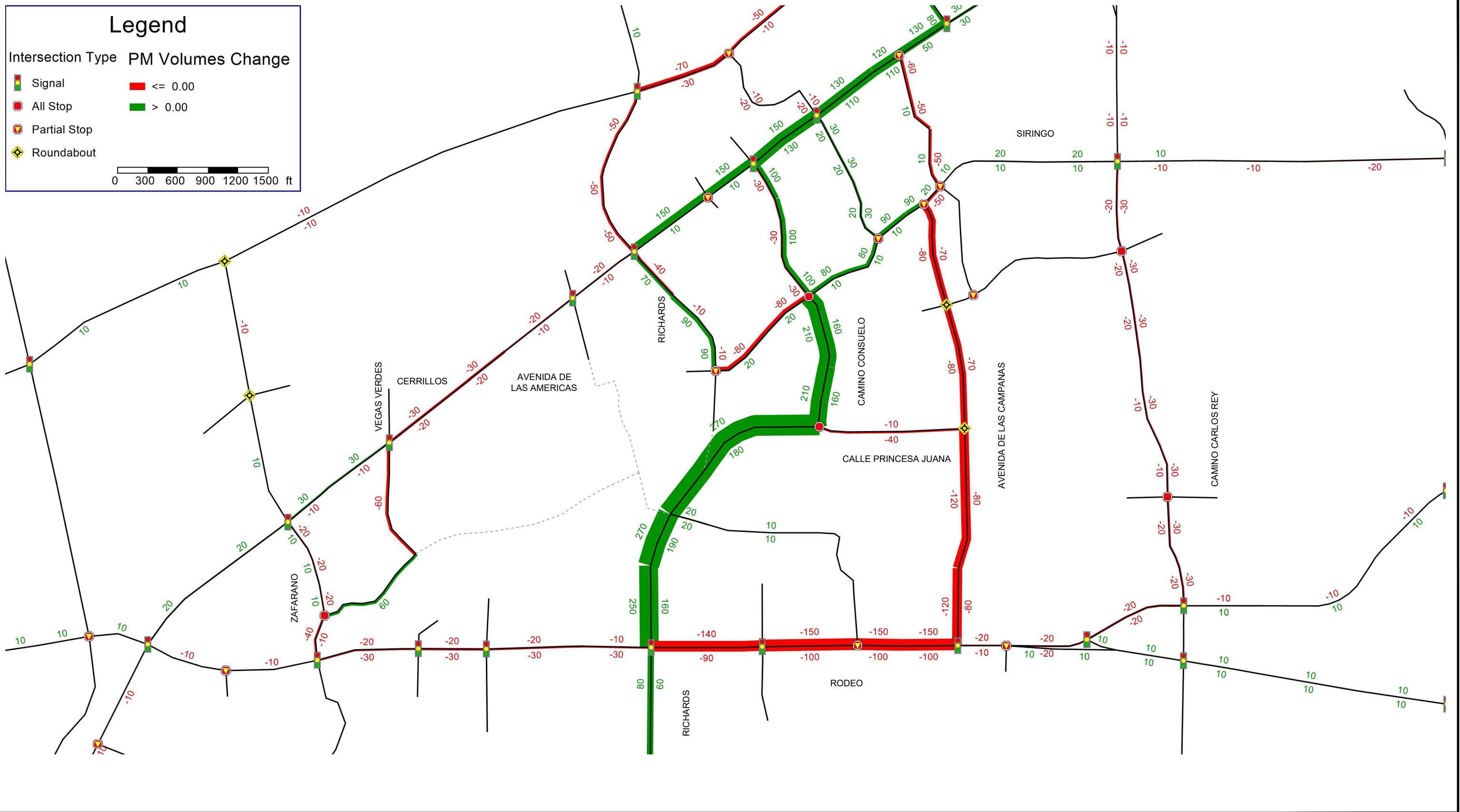
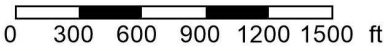
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# Legend







Intersection Type PM Volumes Change

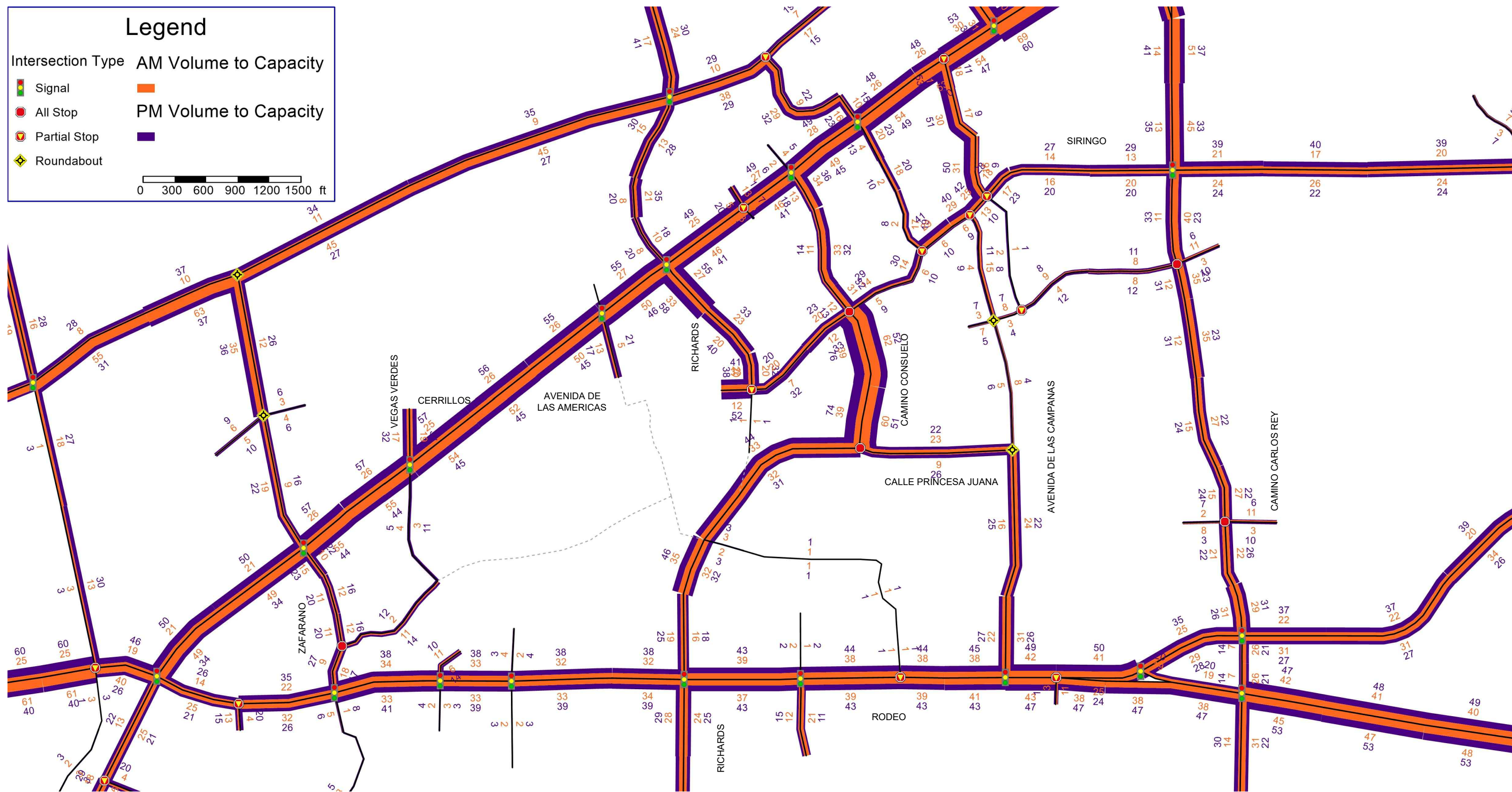
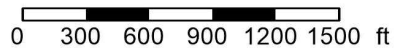
-  Signal
-  All Stop
-  Partial Stop
-  Roundabout



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# Legend

- Intersection Type
-  Signal
  -  All Stop
  -  Partial Stop
  -  Roundabout
- AM Volume to Capacity
- 
  - 



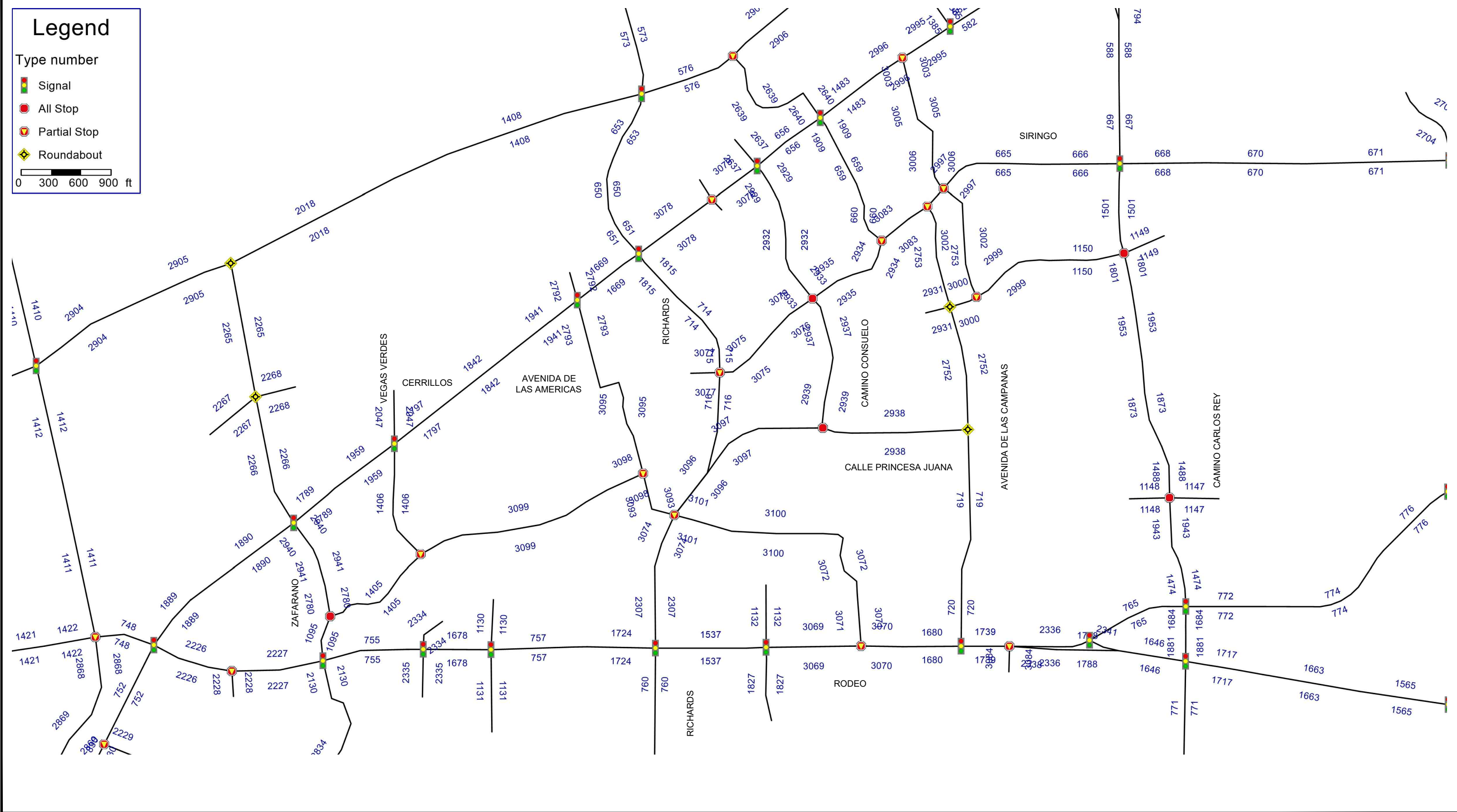
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### Legend

Type number

-  Signal
-  All Stop
-  Partial Stop
-  Roundabout

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