Final Design Concept Report
(Volume 1 of 3)

PIMA FREEWAY (SR 101L), INTERSTATE 17 (I-17) TO PRINCESS DRIVE GENERAL-PURPOSE LANES

ADOT CONTRACT NO. 2005-026
PROJECT NO. 101L MA 23.4 H8297 01L
FEDERAL AID NO. NH-101-B(BEM)

Prepared For:

Arizona Department of Transportation

Prepared By:

AECOM

7720 N. 16th Street, Suite 100
Phoenix, Arizona 85020

ON THE MOVE
PARTNERS IN PROGRESS

APRIL 2016

ADOT
Intermodal Transportation

PROJECT DETERMINATION FORM

Project Number	County and ADOT District	Project Name and Highway
101L MA 23.4 H8297 01L	Maricopa	1-17 – Princess Drive
NH-101-B(BEM)	Phoenix	SR 101L, PIMA FREEWAY

Project Description:	General-Purpose Lanes

Existing Program	
Yes	No
X	

Program Year	Programmed Budget
2021-2024	$139,700,000
	DCR Cost Estimate
	$155,225,300

Operating Partnership Category					
S	F	T	D	Z	N/A
		X			

Public Hearing: In the Highway Development Process, at least one public hearing or the opportunity for a hearing will be offered for any project that:

x	Requires a significant amount of new right-of-way;
	Substantially changes the layout or function of connecting roadway or the facility being improved;
	Has a significant adverse impact on abutting real property;

	Otherwise has a significant social, economic, environmental or other effect
	Is controversial on environmental grounds;
	Or has significant floodplain encroachment
	None of the above conditions apply

Recommends:

Yes:	No:		Environmental Category		
x		Public Forum			
	x	Offer a combined Location / Design Hearing	Class 1	Class II	Class III
	x	Offer Separate Location/Design Hearing		x	
	x	Hold a Design Public Hearing			

Ron McCally — Project Manager EM01, Project Management Group — 5/5/2016 Date

Paul O'Brien — Manager, Environmental Planning Group EM02 — 6/10/16 Date

Concur:

Reed Henry — Manager, Roadway Predesign Section 605E — 5/16/2016 Date

Madhu Reddy — District Engineer — 06/20/16 Date

Approved:

Greg Byres — Roadway Group Manager 615E — 5/16/16 Date

David X. Eberhart — 7/25/16

Comments:

Public involvement requirements under NEPA (Public-Information Meeting) have been completed.

Final Design Concept Report
(Volume 1 of 3)

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EXECUTIVE SUMMARY

This Final Design Concept Report describes the development, evaluation and recommendation to provide additional general-purpose lanes on the State Route 101 Loop (SR 101L) Pima Freeway from Interstate 17 (I-17) (Milepost 23.4) to Princess Drive (Milepost 36.6). This project is located in the Arizona Department of Transportation's (ADOT's) Phoenix Construction District within Maricopa County in south-central Arizona.

Traffic demand is causing the SR 101L corridor to become increasingly congested during the morning and evening peak travel periods, and future traffic projections indicate the congestion will worsen. Additional general-purpose lanes would increase the freeway capacity and help alleviate increased levels of traffic congestion in the future.

The purpose of this report is to evaluate the safety and operational characteristics of the existing SR 101L freeway, and to evaluate alternatives to provide additional general-purpose lanes as identified in the Regional Transportation Plan Freeway Program (RTPFP). The alternatives analysis includes the evaluation of the No-Build and Build Alternatives for the additional general-purpose lanes. The Preferred Alternative includes the following improvements:

- Add two general-purpose lanes in the eastbound direction between the I-17/SR101L Traffic Interchange (TI) and 7th Avenue
- Add one general-purpose lane in the eastbound direction between 7th Avenue and the SR51/SR101L TI
- Add one general-purpose lane in the eastbound direction between Tatum Boulevard and Princess Drive
- Add two general-purpose lanes in the westbound direction between the I-17/SR101L TI and 7th Avenue
- Add one general-purpose lane in the westbound direction between 7th Avenue and the SR51/SR101L TI
- Add one general-purpose lane in the westbound direction between the SR51/SR101L TI and Princess Drive
- Add auxiliary lanes in each direction between 7th Street and Cave Creek Road

The Maricopa Association of Governments (MAG), Regional Public Transportation Authority (Valley Metro/RPTA) and ADOT have worked together for many years to develop a comprehensive plan for the Regional Freeway System that is included in the Regional Transportation Plan (RTP) that was adopted by the MAG Regional Council in November 2003.

The voters of Maricopa County passed Proposition 400 in November 2004, which authorized the continuation of the existing half-cent sales tax for the next 20 years to be used for implementing the MAG RTP. A portion of the revenues collected from the half-cent sales tax extension will be deposited into the Regional Area Road Fund (RARF) to fund the RTPFP projects.

ADOT's Tentative *Five-Year Transportation Facilities Construction Program (2017 - 2021)* includes the final design and construction for the segment of SR 101L between SR 51 and Princess Drive in the amount of $5,100,000 for final design and $61,100,000 for construction. The final design and construction of the remaining items of the overall project is included within the RTPFP as follows:

Current Projects in the RTPFP

Route	Freeway Segment	Type of Work	RTPFP Budget ($000)	RTPFP Phase	RTPFP Fiscal Year
SR 101L	I-17 to SR 51	General-Purpose Lanes (Design)	4,800	4	2023
SR 101L	I-17 to SR 51	General-Purpose Lanes (Construction)	68,700	4	2024

One additional project is currently planned adjacent to this segment of the SR 101L corridor within the RTPFP as shown in the following table.

Adjacent Freeway Projects in the RTPFP

Route	Freeway Segment	Type of Work	RTPFP Budget ($000)	RTPFP Phase	RTPFP Fiscal Year
SR 101L	Princess Drive to Shea Boulevard	General-Purpose Lanes (Design)	3,700	3	2020
SR 101L	Princess Drive to Shea Boulevard	General-Purpose Lanes (Construction)	52,700	4	2021

Additional projects are currently included in the RTP Arterial Streets Program that would contribute to the overall transportation plan within the study area as shown below.

RTP Arterial Streets Program Projects in the Study Area

Jurisdiction	Street Segment	Type of Work	RTP Budget ($000)	RTP Fiscal Year
Scottsdale	Raintree-Loop 101 TI	Pre-Design/Design	1,006	2016
Scottsdale	Raintree-Loop 101 TI	Construction	3,018	2017
Scottsdale	Miller Rd at Loop 101 Underpass	Design	2,001	2018
Scottsdale	Miller Rd at Loop 101 Underpass	Right-of-Way	4,908	2019
Scottsdale	Miller Rd at Loop 101 Underpass	Construction	13,099	2020
Scottsdale	Loop 101 Frontage Road-Pima/Princess to Hayden Rd.	Total Project Budget	41,449	2026-2035

The No-Build and numerous Build Alternatives were developed and evaluated by the project team as presented in Chapter 3.0. A screening process was conducted by the Project Team that led to the initial identification of the Preferred Alternative. The Preferred Alternative was selected based on an evaluation of the geometric design criteria, benefits to traffic operations, environmental considerations, right-of-way acquisition requirements and utility impacts, construction costs, conformance with adopted regional transportation plans, public agency input and public participation.

The total estimated cost of the segment of the Preferred Alternative between I-17 and the SR51/SR101L TI is $103,821,200 which includes $6,584,600 for final design, $2,274,300 for right-of-way and $94,962,300 for construction. The total estimated cost of the segment of the Preferred Alternative between the SR51/SR101L TI and Princess Drive is $51,404,100 which

includes $3,309,000 for final design and $48,095,100 for construction. The detailed cost estimates are included in Section 5.0 of this report.

The acquisition of new right-of-way will be required for the Preferred Alternative in the vicinity of 15th Avenue. Temporary Construction Easements (TCE's) will be required and the locations will be finalized during final design.

Continuing coordination for this project has been conducted and will be required with the following public agencies: ADOT, MAG, Federal Highway Administration (FHWA), Maricopa County Department of Transportation (MCDOT), Bureau of Reclamation (BOR), Central Arizona Water Conservation District (CAWCD), Arizona State Land Department (ASLD), and the cities of Phoenix and Scottsdale.

Coordination with concurrent construction projects may be required for this project. Coordination will also be required with several utility companies, Salt River Project (SRP), Arizona Public Service (APS), and Central Arizona Project (CAP).

The freeway widening will interface with the Reach 11 dam and flood storage reservoir. Reach 11 serves as a flood detention basin to protect the Central Arizona Project (CAP) Canal and adjacent communities from flood flows originating from the watershed to the north. The final design of the general-purpose lanes must be coordinated with representatives of the BOR and CAWCD to ensure the portion of the project that interfaces with the Reach 11 dam, Reach 11 flood reservoir, and CAP Canal are designed and constructed in accordance with their design and permitting requirements.

Mitigation measures for this project are identified in Section 8.0. The Environmental Document will include all mitigation and coordination requirements.

Additional reports prepared as part of the study include an AASHTO Controlling Design Criteria Report, Final Traffic Report, Final Drainage Concept Report, Air Quality Analysis Technical Report, Noise Analysis Technical Report, Hazardous Materials Inventory, Biology Evaluation and Categorical Exclusion.

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1.0 INTRODUCTION

1.1 FOREWORD

This Final Design Concept Report (FDCR) describes the development, evaluation and recommendation to provide additional general-purpose lanes on the Pima Freeway (SR 101L) from Interstate 17 (I-17) (Milepost 23.4) to Princess Drive (Milepost 36.6). This project is located in the Arizona Department of Transportation's (ADOT's) Phoenix Construction District within Maricopa County in south-central Arizona. Project location and vicinity maps are provided with Figures 1 and 2.

The purpose of this report is to evaluate the safety and operational characteristics of the existing SR 101L freeway, and to evaluate alternatives to provide additional general-purpose lanes as identified in the Regional Transportation Plan Freeway Program (RTPFP).

A Categorical Exclusion document and related technical reports have been prepared in concert with this Design Concept Report.

1.2 NEED FOR THE PROJECT

The State Route 101 Loop (SR 101L) Pima Freeway is a major element of the Maricopa Association of Governments (MAG) adopted RTPFP. This segment of SR 101L accommodates traffic from the Aqua Fria Freeway (SR 101L), I-17, Piestawa Freeway (SR 51), Red Mountain Freeway (SR 202L) and Price Freeway (SR 101L). It also provides an alternative route around the central Phoenix area for regional commercial and commuter traffic. The project is located within the cities of Phoenix and Scottsdale and is adjacent to the Scottsdale Municipal Airport.

Maricopa County has been one of the fastest growing regions in the United States. Population projections indicate the population of Maricopa County will double between 2000 to 2035. Growing traffic demand has caused the SR 101L corridor to become increasingly congested during the morning and evening peak travel periods, and traffic volume projections indicate the congestion will worsen in the future. Additional general-purpose lanes would increase the freeway capacity and help alleviate increased traffic congestion.

ADOT, MAG and the Regional Public Transportation Authority (Valley Metro/RPTA) have worked together for many years to develop a comprehensive plan for the Regional Freeway System which is included in the Regional Transportation Plan (RTP) that was adopted by the MAG Regional Council in November 2003.

The voters of Maricopa County passed Proposition 400 in November 2004, which authorized the continuation of the existing half-cent sales tax for the next 20 years to be used for implementing the MAG RTP. A portion of the revenues collected from the half-cent sales tax extension will be deposited into the Regional Area Road Fund (RARF) to fund the RTPFP. The SR 101L widening project is included in the RTPFP.

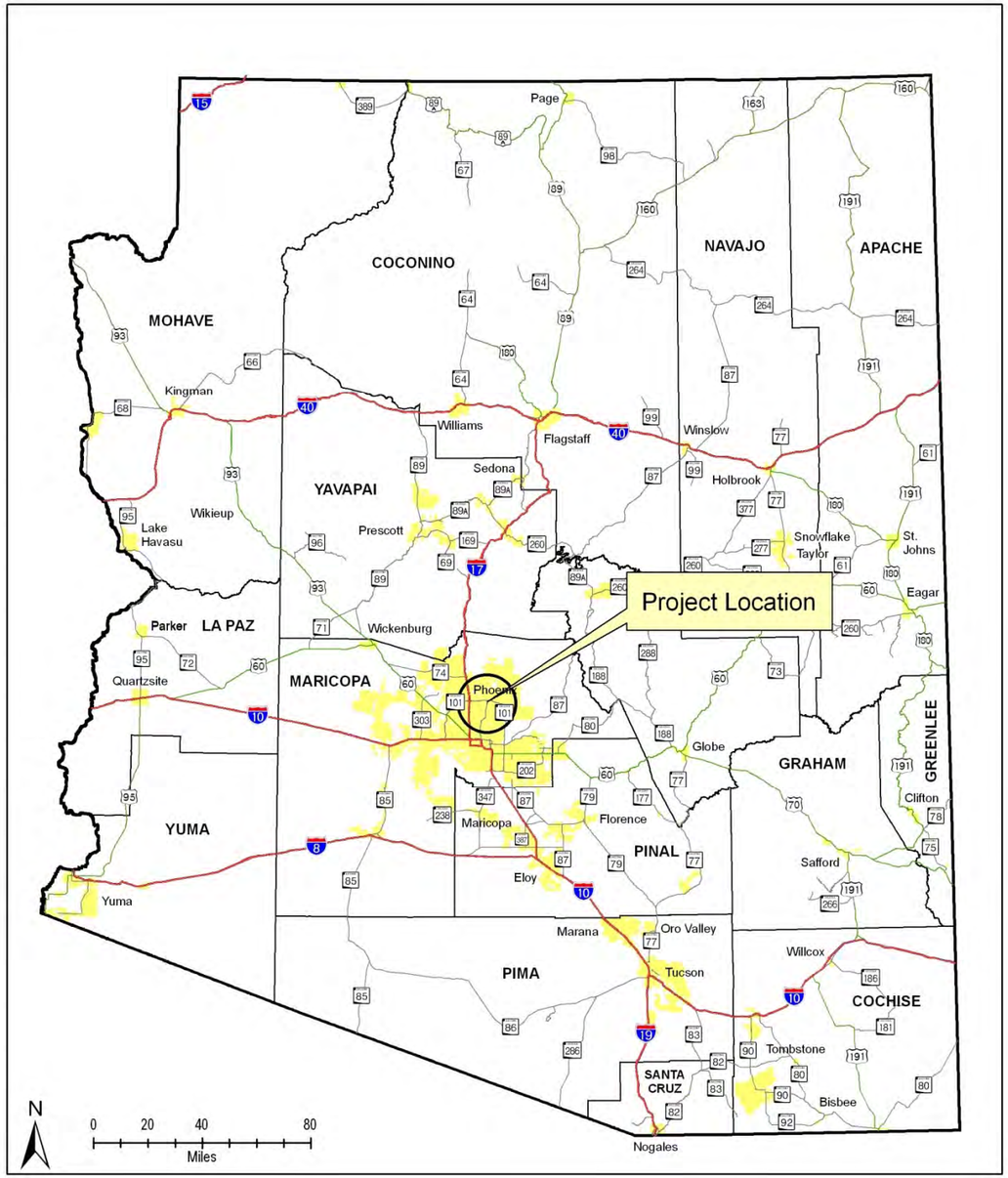

Figure 1 – Project Location Map

Figure 2 – Vicinity Map

1.3 CHARACTERISTICS OF THE CORRIDOR

1.3.1 Roadway Characteristics

SR 101L is classified as a limited-access Urban Principal Freeway/Expressway with a posted speed limit of 65 mph.

The typical eastbound and westbound roadway sections include three 12' wide general-purpose lanes plus one 12' wide high-occupancy vehicle (HOV) lane. The median shoulder width is generally 10' wide except at freeway overpasses (9.5' wide) and underpasses (8' wide). A 42" median concrete barrier separates the eastbound and westbound roadways. The outside shoulder is typically 10' wide throughout the study area (12' adjacent to concrete half barrier).

SR 101L intersects with I-17 and SR 51 with fully directional freeway-to-freeway system interchanges. Additional freeway lanes are provided on SR 101L to improve maneuverability for traffic approaching and departing these interchange.

SR 101L is a depressed freeway at I-17, transitions to an elevated freeway at 19th Avenue, and then transitions back to a depressed freeway between 15th Avenue and 7th Avenue. The freeway mainline then becomes an at-grade/elevated freeway between Cave Creek Wash and Princess Drive. The freeway is generally bordered with noise walls, retaining walls, earthen berms, or a combination of berms and walls along residential developments.

The original design of the SR 101L improvements between 19th Avenue and Scottsdale Road was conducted with metric units of measurement. The original design of the I-17/SR101L TI, the SR51/SR101L TI, the 64th Street TI, and the SR 101L mainline between Scottsdale Road and Princess Drive was conducted with the English units of measurement.

Eastbound SR 101L Mainline

Three general-purpose lanes and one HOV lane are provided on the eastbound SR 101L mainline approaching I-17. The outside general-purpose lane then merges with the adjacent lane to develop two general-purpose lanes and one HOV lane approaching the 27th Avenue entrance ramp gore. The 27th Avenue entrance ramp is designed with a tapered entrance configuration that merges into the outside freeway lane.

Two general-purpose lanes and one HOV lane are provided on the SR 101L mainline approaching the I-17/SR101L TI Ramp 'S-E/N-E' gore. This system interchange ramp (2 lanes) is configured as a parallel entrance that transition into additional freeway lanes to provide four general-purpose lanes and one HOV lane between 19th Avenue and 7th Avenue.

The 19th Avenue entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 7th Avenue exit. The 7th Avenue exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

In order to provide six lanes (1 HOV lane, 4 general-purpose lanes, and 1 auxiliary lane) beneath the south span of the 15th Avenue underpass, the travel lane widths have been reduced to 11' and the median and outside shoulder widths were reduced to 1.3' and 10', respectively.

An American Association of State Highway Transportation Officials (AASHTO) lane drop is located east of 7th Avenue thereby reducing the number of general-purpose lanes from four lanes to three lanes prior to the 7th Avenue entrance ramp gore. The median shoulder (10'), travel lane (12') and outside shoulder (10') widths are restored in the vicinity of 7th Avenue. Three general-purpose lanes and one HOV lane continue to the east on SR 101L between 7th Avenue and the SR51/SR101L TI.

The 7th Avenue entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 7th Street exit. The 7th Street exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 7th Street entrance ramp (1 lane) is configured as a parallel entrance that merges with the outside general-purpose lane. The Cave Creek Road exit ramp (1 lane) is configured as a tapered exit from the outside general-purpose lane.

The Cave Creek Road entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the SR51/SR101L TI Ramp 'E-S' exit. The median shoulder and travel lane widths are currently 3' and 11', respectively, between the Cave Creek Road entrance ramp and the SR51/SR101L TI Ramp 'E-S' exit. The SR51/SR101L TI Ramp 'E-S' exit (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane. Three general-purpose lanes and one HOV lanes continue to the east through the system interchange.

The SR51/SR101L TI Ramp 'N-E' (2 lanes) enters the SR 101L mainline and continues to the east to Tatum Boulevard to provide five general-purpose lanes and one HOV lane within this area. The Tatum Boulevard exit ramp (2 lanes) is a parallel exit configuration with a mandatory exit from the outside general-purpose lane, and the second lane designed as an optional lane with the SR 101L through movement. Four general-purpose lanes and one HOV lane continue to the east.

An AASHTO lane drop is located east of the Tatum Boulevard exit ramp thereby reducing the number of general-purpose lanes from four lanes to three lanes prior to the Tatum Boulevard entrance ramp gore. Three general-purpose lanes and one HOV lane continue to the east between Tatum Boulevard and Princess Drive.

The Tatum Boulevard entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 56th Street exit. The 56th Street exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 56th Street entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 64th Street exit. The 64th Street exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 64th Street entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Scottsdale Road exit. The Scottsdale Road exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

However, the 64th Street TI is not open to traffic so the exit ramp, entrance ramp and auxiliary lanes are not currently operational.

The Scottsdale Road entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Hayden Road exit. The Hayden Road exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Hayden Road entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Princess Drive exit. The Princess Drive exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

Westbound SR 101L Mainline

Three general-purpose lanes and one HOV lane are currently provided on westbound SR 101L between Princess Drive and the SR51/SR101L TI. The Princess Drive entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Hayden Road exit. The Hayden Road exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Hayden Road entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Scottsdale Road exit. The Scottsdale Road exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Scottsdale Road entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 64th Street exit. The 64th Street exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 64th Street entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to 56th Street exit. The 56th Street exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

However, the 64th Street TI is not open to traffic so the exit ramp, entrance ramp and auxiliary lanes are not currently operational.

The 56th Street entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Tatum Boulevard exit. The Tatum Boulevard exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Tatum Boulevard entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the SR51/SR101L TI Ramp 'W-S' exit. The SR51/SR101L TI Ramp 'W-S' exit ramp (2 lanes) is a parallel exit configuration with a mandatory exit from the auxiliary lane, and the second lane designed as an optional lane with the SR 101L through movement. Three general-purpose lanes and one HOV lane continue to the west through the system interchange.

The SR51/SR101L TI Ramp 'N-W' (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the Cave Creek Road exit. The median shoulder and travel lane widths are currently 3' and 11', respectively, between the SR51/SR101L TI Ramp 'N-W' entrance and the Cave Creek Road exit ramp. The Cave Creek Road exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Cave Creek Road entrance ramp (1 lane) is configured as a parallel entrance that merges with the outside general-purpose lane. The 7th Street exit ramp (1 lane) is configured as a tapered exit from the outside general-purpose lane.

The 7th Street entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 7th Avenue exit. The 7th Avenue exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 7th Avenue entrance ramp (1 lane) is configured as a parallel entrance that transitions into an auxiliary lane that continues to the 19th Avenue exit. The 19th Avenue exit ramp (1 lane) is a parallel exit configuration with a mandatory exit from the auxiliary lane.

Three general-purpose lanes and one HOV lane are provided on the westbound SR 101L mainline approaching the I-17/SR101L TI. An additional lane is added to the mainline just west of the 19th Avenue exit ramp gore (1 HOV lane and 4 travel lanes total) that continues to the I-17/SR101L Ramp 'W-S/W-N' exit. The I-17/SR101L TI Ramp 'W-S/W-N' exit (2 lanes) is a parallel exit configuration with a mandatory exit from the outside lane, and the second lane designed as an optional lane with the SR 101L through movement. Three general-purpose lanes and one HOV lane continue to the west.

Frontage Roads

Eastbound and westbound frontage roads (2 lanes) are provided along each side of the SR 101L mainline from west of I-17 to Cave Creek Road. A westbound one-way frontage road (2 lanes) is also provided between Scottsdale Road and Hayden Road.

Service Interchanges and Grade Separations

Full service interchanges (with a Tight-Diamond TI configuration) are provide at 7th Avenue, 7th Street, 56th Street, 64th Street (currently closed), Scottsdale Road, Hayden Road and Princess Drive. Full service interchanges with a Single-Point Urban Interchange (SPUI) configuration are provided at Cave Creek Road and Tatum Boulevard.

A Half-Diamond TI with partial freeway access is provided at 19th Avenue (ramps to/from the east). New freeway access to Black Mountain Boulevard is planned at the SR51/SR101L TI (with ramp connections to SR 51 to/from the north).

Grade separations and freeway overpasses provide local street connectivity and frontage road connections at 23rd Avenue, 15th Avenue, 16th Street and 32nd Street. Grade separations are also provided over Cave Creek Wash, the CAP Canal and the Reach 11 low flow channel.

Cross Streets

23rd Avenue is a four lane arterial street. At the SR 101L crossing (frontage road intersections only), the 23rd Avenue street section includes two lanes in the northbound direction of travel, two lanes in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and one left-turn lane for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

19th Avenue is a five lane arterial street south of SR 101L consisting of three lanes in the northbound direction of travel and two lanes in the southbound direction of travel. The roadway transitions to a four lane arterial street north of SR 101L. At the 19th Avenue TI, the street section includes two lanes in the northbound direction of travel, two lanes in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and one left-turn lane for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

15th Avenue is a two lane collector street. At the SR 101L crossing (frontage road intersections only), the 15th Avenue street section includes one lane in the northbound direction of travel, one lane in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and one left-turn lane for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

7th Avenue is a four lane arterial street. At the 7th Avenue TI, the street section includes two lanes in the northbound direction of travel, two lanes in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and one left-turn lane for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

7th Street is a four lane arterial street south of SR 101L and a six lane arterial street north of SR 101L. At the 7th Street TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

16th Street is a two lane collector street. At the SR 101L crossing (frontage road intersections only), the 16th Street section includes two lanes in the northbound direction of travel, one lane in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and one left-turn lane for the southbound to eastbound traffic movement. Sufficient pavement width is available on the southbound roadway to provide one additional travel lane in the future. One right-turn lane is provided for the southbound to westbound traffic movement.

Cave Creek Road is a six lane arterial street. At the Cave Creek Road TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

32nd Street is a four lane arterial street. At the 32nd Street overpass, the street section includes two lanes in the northbound direction of travel and two lanes in the southbound direction of travel.

Tatum Boulevard is a six lane arterial street north of SR 101L and a four lane arterial street south of SR 101L. At the Tatum Boulevard TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. However, the outside through-lanes are not currently in service. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

56th Street is a six lane arterial street north of SR 101L and a four lane arterial street south of SR 101L. At the 56th Street TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. One right-turn lane is provided for the southbound to westbound traffic movement.

64th Street is classified as a six lane arterial street, but the interchange is not operational pending future street connections. At the 64th Street TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. Two right-turn lanes are provided for the northbound to eastbound traffic movement and two right-turn lanes are provided for the southbound to westbound traffic movement.

Scottsdale Road is a six lane arterial street. At the Scottsdale Road TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, two left-turn lanes for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

Hayden Road is a four lane arterial street but is classified as an ultimate six lane arterial. At the Hayden Road TI, the street section includes three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, one left-turn lane for the northbound to westbound

traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. However, the outside through-lanes are not currently in service. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement.

Princess Drive is a six lane arterial street. At the Princess Drive TI, the street section was originally constructed to provide for three lanes in the northbound direction of travel, three lanes in the southbound direction of travel, one left-turn lane for the northbound to westbound traffic movement, and two left-turn lanes for the southbound to eastbound traffic movement. One right-turn lane is provided for the northbound to eastbound traffic movement and one right-turn lane is provided for the southbound to westbound traffic movement. However, extensive pavement marking modifications have been implemented in support of capacity improvements at this interchange.

1.3.2 Transit Facilities and Routes

A City of Scottsdale Regional Park and Ride is planned at SR 101L and Scottsdale Road. Valley Metro currently operates SR 51 Bus Rapid Transit (BRT) route that originates northeast of SR 101L and Tatum (at 52nd Street and Deer Valley Drive) that provides service to the downtown Phoenix central business district. No other BRT or Express Bus routes are currently planned within the study area.

1.3.3 Land Use and Ownership

1.3.3.1 General Land Use and Ownership

Land ownership within the project area includes State Trust land administered by the Arizona State Land Department (ASLD) and land owned by the Bureau of Reclamation (BOR), the cities of Phoenix and Scottsdale, and private parties.

Adjacent land uses along SR 101L includes residential, commercial, industrial and vacant uses along with public parks and a sanitary landfill.

West of the CAP Canal, the dominant land uses are commercial and residential development along both sides of SR 101L. Phoenix Memorial Park and Mortuary (a private cemetery) is located north of SR 101L between 3rd Avenue and Central Avenue. A solid waste landfill operated by Waste Management, Inc. is located north of SR 101L between Central Avenue and 7th Street. The landfill was recently capped and is no longer is open to the public. East of Central Avenue and south of SR 101L is a vacant parcel owned by the City of Phoenix. The City owns several additional parcels that adjoin SR 101L to the north between 12 Street and 20th Street, as well as parcels on the south side of SR 101L, east of 16th Street.

East of the CAP Canal, the land uses are typically commercial and multi-family residential near the freeway interchanges. The remaining property is typically undeveloped and owned by ASLD. The BOR owns the property in the vicinity of the CAP Canal and the Reach 11 dam and flood reservoir.

1.3.3.2 Schools

Two schools are located near SR 101L within the study area within the City of Phoenix. The Desert Winds Elementary School is located south of SR 101L on 15th Avenue (MP 24.7). Eagle Ridge Elementary School is located approximately 0.15 mile south of SR 101L (MP 26.7) on 12th Street. The Deer Valley Unified School District's administrative offices are located north of SR 101L and west of 15th Avenue (MP 24.7). There are no schools within the project vicinity within the Scottsdale city limits.

1.3.3.3 Parks

There are several parks and recreational areas that are adjacent to SR 101L within the City of Phoenix. Buffalo Ridge Park is located east of 16th Street (MP 27.2) between SR 101L and Wescott Drive. Coyote Basin Park is located approximately one-quarter mile east of Cave Creek Road (MP 28.4) between SR 101L and Beardsley Road.

Reach 11 is a flood control impoundment located along the north side of the CAP canal. Reach 11 crosses SR 101 between the CAP Canal (MP 29.4) and SR 51 (MP 29.2). Reach 11 is owned by BOR and operated by the City of Phoenix Parks Department as a recreational area. A hiking trail crosses under SR 101L at MP 29.5.

No public parks are located within the project vicinity within the City of Scottsdale.

1.3.4 Right-Of-Way

The existing ADOT right-of-way width varies along the SR 101L corridor from approximately 286' to several hundred feet at traffic interchanges.

1.3.5 Utilities

Existing utilities within the study limits include cities of Phoenix and Scottsdale water and sewer pipelines; Arizona Public Service (APS) overhead power lines and underground electric conduit duct banks; Southwest Gas natural gas pipelines and miscellaneous dry utilities including Cox Cable TV, CenturyLink and Electric Lightwave/Integra Telecom cables and fiber network conduits. In addition, SR 101L also crosses over the CAP Canal and Reach 11 dam.

Existing utilities within this project corridor were identified based on ADOT as-built drawings and utility companies' record drawings. These utilities are summarized in Table 1.

No existing railroad facilities cross the SR 101L right-of-way within the study area.

Table 1 – Existing Utilities

Location / Cross Street	Utility Description
23rd Avenue	Underground power line; Underground telephone line and fiber optic line
23rd Avenue to 21st Avenue	Sleeved 30" sanitary sewer

Table 1 – Existing Utilities (Continued)

Location / Cross Street	Utility Description
21st Avenue	Underground power line; Underground telephone line
19th Avenue	Underground power lines; Underground telephone lines; Telecommunication utility joint trenches; 2" gas line; 12" and 66" water lines; 12" and 18" sanitary sewer lines
19th Avenue to 15th Avenue	Underground power line; Underground telephone line; Underground CATV; 2" gas line; 8" water line; 8" sanitary sewer line
15th Avenue	Underground telephone lines and utility joint trench; 4-5" PVC electric conduits in underpass bridge structure
13th Avenue	Underground power, CATV and telephone lines; FMS lines
7th Avenue	Underground telephone fiber optic lines; 12" and 24" RCP-sleeved DIP water lines; Electric and CATV conduits inside bridge structure
7th Avenue to Central Avenue	Underground power lines; Underground CATV lines; FMS lines; Underground telephone lines
7th Street	Underground utility joint trench; Underground telephone lines (2 lines); 12" water line; 12" sanitary sewer line
7th Street to 16th Street	Underground power/fiber optic joint trench; Underground CATV; 8" water line; Overhead 230kV power lines with 69kV and cell phone antenna on pole at SE corner of 12th Street
16th Street	Utility joint trench
16th Street to Cave Creek Road	Utility joint trench; Underground power line; 12" water line in 30" RCP sleeve
Cave Creek Road	Underground power line; 2-underground telephone lines; 4" gas line; Irrigation line (size unavailable); 12", 24" and 60" water lines; 10" sanitary sewer line; Overhead power line
Cave Creek Road to 32nd Street	36" VCP sanitary sewer line
32nd Street to CAP Canal	Underground power line; Underground telephone lines (2 lines); Gas line (size unavailable); 10" sanitary sewer line
CAP Canal to Tatum Boulevard	Underground power line and telephone joint trench; Fiber optic line along CAP Canal O&M road; 230kV overhead power line at SR51/SR101L TI
Tatum Boulevard	Underground telephone line; Underground CATV line; Gas line (size unavailable; 24" sewer force main in 36" sleeve; 36" reclaimed water line; 36" RCP and 54" water line sleeves
56th Street	69kV overhead power line; Underground gas line
56th Street to 64th Street	3-36" HDPE irrigation pipes; 11-duct APS/Cox/ADOT utility joint trench
64th Street to Scottsdale Road	Reclaimed water line in 36" steel sleeve; 3-36" HDPE irrigation pipes
Scottsdale Road	6" and 8" gas lines; City of Scottsdale 16" potable water line and a 16" well water line; Abandoned 4" gas line, CATV and telephone lines; City of Scottsdale 15" sanitary sewer; City of Scottsdale 12" sanitary sewer; Underground telephone line; APS underground 69kV power lines; APS 12kV/CenturyLink telephone/Cox CATV/ELW fiber optics utility joint trench

Table 1 – Existing Utilities (Continued)

Location / Cross Street	Utility Description
Scottsdale Road to Hayden Road	Underground power line conduits in 30" steel sleeve and 12" unsleeved sanitary sewer in a 20-foot easement; Underground CATV lines
Hayden Road	12" unsleeved sanitary sewer; 2-16" water lines; 12-duct CATV/Tel/power utility joint trench
Hayden Road to Princess Drive	66" raw water line sleeve; CATV/Tel/Power utility joint trench; Underground power conduits in 30" and 42" steel sleeves

1.3.6 Drainage

1.3.6.1 Offsite Drainage Systems

Existing Offsite Drainage System Overview

Offsite flow patterns in the vicinity of the project are generally from the northeast to the southwest. Land use within the contributing watershed is composed of a mix of undeveloped and developed areas within the cities of Scottsdale and Phoenix. Offsite runoff is generally intercepted by drainage channels located along the northern side of SR 101L that convey flows to cross culverts. The offsite system is divided into five sections:

- I-17 to Cave Creek Wash: The Beardsley Road Storm Drain Improvements project, constructed by the FCDMC prior to the construction of the SR 101L, provides offsite drainage protection for the SR 101L. The system is composed of open channels, basins, storm drains and box culverts that carry runoff from the east to the west along the north side of SR 101L for discharge into the SR 101L offsite channel west of I-17. The channel then ultimately discharges into Scatter Wash.
- Cave Creek Wash to 16th Street: Runoff approaching SR 101L from the north is collected in an underground storm drain from 16th Street to 7th Street. The storm drain discharges into the 7th Street detention basin located at the northeast corner of Beardsley Road and 7th Street. From there, flows discharge into Cave Creek Wash south of the eastbound frontage road.
- 16th Street to the CAP Canal: Offsite collector channels convey runoff to a low point located approximately 1,400' east of Cave Creek Road. The runoff then crosses the freeway and enters a debris basin on the south side of SR 101L, passes over a weir structure, and ultimately discharges into Coyote Basin Park.
- CAP Canal to Tatum Boulevard: Offsite runoff is collected in a channel along the north side of the SR 101L and is conveyed to the west to the Reach 11 dam reservoir area. Irrigator pipes are provided over the channel (and under the freeway) to irrigate vegetation within the existing washes south of SR 101L.
- Tatum Boulevard to Princess Drive: Runoff approaching SR 101L from the north is designed to "pass through" the freeway via numerous cross culverts. Short collector channel systems along the north side of the freeway direct the sheet flow runoff to the cross culverts. On the downstream (south) side of the freeway runoff is discharged as concentrated flow into existing washes, or is redistributed into sheet flow using spreader channels.

Hydrologic modeling for the five segments of the offsite drainage system was completed during the final design of the original freeway improvements by several consultants for ADOT. Runoff volumes that were developed for the original design were used for the hydraulic analysis and design of open channels, trunk lines and culverts for this study.

Drainage Channels

Offsite drainage channels exist along the north side of SR 101L for most of the length of the project. Runoff is generally collected at area inlets and spillways and conveyed through the channel system to the nearest outfall facilities.

The channels are typically concrete-lined with side slopes that vary from 4:1 to 1.5:1. Steeper slopes and U-shaped sections exist in areas with adjacent utility corridors or restricted right-of-way. Table 2 provides a summary of the existing offsite drainage channels.

Table 2 - Offsite Drainage Channel Summary

Channel Configuration / Channel Limits	Offset (Lt/Rt)	Lining Material	Length (ft)	Depth (ft)	Side Slopes (H:1)		Top Width (ft)	Bottom Width (ft)	Design Flow (cfs)
					Lt	Rt			
Trapezoidal Channel; I-17 to 23rd Drive	Lt	Shotcrete	723	3	3	3	28	8	110*
Trapezoidal Channel; Basin at 21st Avenue/ WB Frontage Road to 455' east of 19th Avenue	Lt	Concrete	1,150	10	2	2	60	20	1,342*
Trapezoidal Channel; 13th Avenue to 330' East of 13th Avenue	Lt	Concrete	301	12.5	2	2	60	10	659*
Trapezoidal Channel; 1,490' West of 7th Street to 1,215' West of 7th Street	Rt	Concrete	276	8	2	2	42	10	869
Trapezoidal Channel; 17th Place to 714' East of 17th Place	Lt	Concrete	675	3.5	2	2	20	4	46
Trapezoidal Channel; 20th Way to Cave Creek Road	Lt	Concrete	2,039	3.5	2	2	22	10	304
Trapezoidal Channel; 20th Way to Cave Creek Road	Rt	Concrete	3215	2.1	2	2	19	10	110
Trapezoidal Channel; Cave Creek Road to 525' East of Cave Creek Road	Lt	Concrete	450	5	2	2	37	16.5	802
Trapezoidal Channel; 1560' East of Cave Creek Road to 350' West of CAP Canal	Lt	Concrete	4,361	3.6	2	2	21	6.6	177
Trapezoidal Channel; Reach 11 Low Flow Channel to 1145' East of Reach 11 Low Flow Channel	Lt	Earthen	1,090	8	3	3	75	27	1,714
Trapezoidal Channel; 1145' East of Reach 11 Low Flow Channel to 40th Street	Lt	Concrete	2,665	9	2	2	42	6	377

***** Flows not found in previous drainage reports, used channel capacity calculations

Table 2 – Offsite Drainage Channel Summary (Continued)

Channel Configuration / Channel Limits	Offset (Lt/Rt)	Lining Material	Length (ft)	Depth (ft)	Side Slopes (H:1)		Top Width (ft)	Bottom Width (ft)	Design Flow (cfs)
					Lt	Rt			
Trapezoidal Channel; 355' East of 40th Street to 1060' East of Tatum Blvd	Lt	Concrete	6,102	14	1.5	1.5	58	16	3,788
Trapezoidal Channel; 56th Street to 1,755' West of 64th Street	Lt	Concrete	3,992	3	4	3	29	8	1,665
Trapezoidal Channel; 1,755' West of 64th Street to 745' West of 64th Street	Lt	Concrete	1,072	3	4	3	29	8	487*
Trapezoidal Channel; 715' West of 64th Street to 64th Street	Lt	Concrete	5,175	4	4	3	36	8	608*
Trapezoidal Channel; 64th Street to 460' East of 64th Street	Lt	Concrete	630	4	4	3	38	10	1,025*
Trapezoidal Channel; 460' East of 64th Street to 565' West of Scottsdale Road	Lt	Concrete	4,450	3	4	3	29	8	1,102*
Trapezoidal Channel; 565' West of Scottsdale Road to Scottsdale Road	Lt	Concrete	455	3	4	3	29	8	1,102*
Trapezoidal Channel; Scottsdale Road to 1,185' East of Scottsdale Road	Lt	Earthen	1,082	4	6	6	58	10	300
Trapezoidal Channel; 1,375' East of Scottsdale Road to 1,610' East of Scottsdale Road	Lt	Concrete	235	3	5	5	38	8	300
Trapezoidal Channel; 1,865' East of Scottsdale Road to 2,410' East of Scottsdale Road	Lt	Concrete	545	3	4	4	33	9	300
Trapezoidal Channel; 2,890' West of Hayden Road to 2,193' West of Hayden Road	Lt	Concrete	697	3	4	4	34	10	300
Trapezoidal Channel; 2,068' West of Hayden Road to 1,483' West of Hayden Road	Lt	Concrete	585	3	4	4	34	10	1,125
Trapezoidal Channel; 1,338' West of Hayden Road to 728' West of Hayden Road	Lt	Concrete	610	2	6	4	28	8	150
Trapezoidal Channel; Hayden Road to 770' East of Hayden Road	Lt	Concrete	1,103	3	2	2	20	8	150
Trapezoidal Channel; 790' East of Hayden Road to 970' East of Hayden Road	Lt	Concrete	180	3	2	2	20	8	150

***** Flows not found in previous drainage reports, used channel capacity calculations

Table 2 – Offsite Drainage Channel Summary (Continued)

Channel Configuration / Channel Limits	Offset (Lt/Rt)	Lining Material	Length (ft)	Depth (ft)	Side Slopes (H:1)		Top Width (ft)	Bottom Width (ft)	Design Flow (cfs)
					Lt	Rt			
Trapezoidal Channel; 1,125' East of Hayden Road to 1,588' East of Hayden Road	Lt	Concrete	463	3	2	2	20	8	314
Trapezoidal Channel; 1,985' East of Hayden Road to 2,605' East of Hayden Road	Lt	Concrete	620	3	2	2	20	8	245
Trapezoidal Channel; 2,082' West of Princess Drive to 1,556' West of Princess Drive	Lt	Concrete	526	5	2	2	30	10	1,263
Trapezoidal Channel; 1,563' West of Princess Drive to 920' West of Princess Drive	Lt	Concrete	643	4	2	2	26	10	1,263

***** Flows not found in previous drainage reports, used channel capacity calculations

Box Culverts

Box culverts are located along the offsite channel system at crossroad intersections, at locations where an open channel is not feasible due to existing utility features and existing right-of-way constraints, and at locations where runoff passes through the freeway right-of-way. Table 3 provides a summary of existing culverts.

Table 3 - Existing Box Culvert Summary

SR 101L Station	Location Description	Cells (No.)	Size (ft)	Length (ft)	Design Flow (cfs)
Station 1310+57 to Station 1312+63	North of westbound frontage road at 19th Avenue	6	10’ x 4’	210’	916
Station 1342+19 to Station 1349+98	North of westbound frontage road between 15th Avenue and 10th Avenue	1	12’ x 8’	804’	950
Station1352+97 to Station 1363+78	North of westbound frontage road between 10th Avenue and 7th Avenue	1	12’ x 8’	136’	657
Station 1364+40.75 to Station 1376+79.75	Between 7th Avenue and 7th Steet	2	7.87’ x 3.94’	1238.85’	427
Station 1409+77.42	Between 7th Avenue and 7th Street	2	7.87’ x 5.90’	1436.35’	869
Cave Creek Road Station 30+04.82	Cave Creek Road	2	7.87’ x 5.91’	177’	869
Station 1518+64	Westbound frontage road at Cave Creek Road	1	20’-6” x 7’-3”	42’	869
Station 1532+76.57	Between Cave Creek Road and 32nd Street	2	7.87’ x 5.91’	662.73’	802
Station 1532+91.17	Between Cave Creek Road and 32nd Street	1	7.87’ x 5.91’	452.76’	283
Station 1629+76	Between 32nd Street and Tatum Boulevard	4	7.87’ x 7.87’	853.02’	3788

Table 3 - Existing Box Culvert Summary (Continued)

SR 101L Station	Location Description	Cells (No.)	Size (ft)	Length (ft)	Design Flow (cfs)
Station 1680+77 to Station 1687+34	At Tatum Boulevard	2	9.84’ x 5.91’	636.48’	1293
Station 1699+12.73	Between Tatum Boulevard and 56th Street	2	5.91’ x 5.91’	306.76’	350
Station 1706+39.76	Between Tatum Boulevard and 56th Street	2	7.87’ x 5.91’	200.79’	350
Station 1710+68	Between Tatum Boulevard and 56th Street	1	10’ x 6’/10’ x 10’	Unknown	39
Station 1713+48.75	Between Tatum Boulevard and 56th Street	1	7.87’ x 5.91’	204.72’	212
Station 1717+10.3	Between Tatum Boulevard and 56th Street	1	5.91’ x 5.91’	210.30’	117
Station 1729+28.13	Between Tatum Boulevard and 56th Street	2	5.91’ x 5.91’	240.16’	117
Station 1736+21.06	Between Tatum Boulevard and 56th Street	2	7.87’ x 5.91’	429.13’	684
Station 1746+85.04	Between 56th Street and 64th Street	3	5.91’ x 5.91’	429.79’	428
Station 1751+64.04	Between 56th Street and 64th Street	2	5.91’ x 5.91’	413.39’	428
Station 1758+66.14	Between 56th Street and 64th Street	3	5.91’ x 5.91’	308.4’	701
Station 1766+10.89	Between 56th Street and 64th Street	1	5.91’ x 5.91’	229.66’	137
Station 1770+17.72	Between 56th Street and 64th Street	2	5.91’ x 5.91’	232.94’	393
Station 1776+34.51	Between 56th Street and 64th Street	6	7.87’ x 6.89’	219.82’	1886
Station 1783+13.65	Between 56th Street and 64th Street	3	5.91’ x 5.91’	200.13’	580
Station 1785+56.82	Between 56th Street and 64th Street	5	5.91’ x 5.91’ / 6’ x 6’	214.31’	1016
Station 1788+42.03	Between 56th Street and 64th Street	3	7.87’ x 7.87’ / 8’ x 8’	243.07’	1451
Station 1797+66.98	Between 56th Street and 64th Street	3	7.87’ x 7.87’ / 8’ x 8’	481.69’	1451
Station 1801+50.54	Between 56th Street and 64th Street	4	7.87’ x 7.87’ / 8’ x 8’	576.32’	1741
Station 1812+00.44	Between 64th Street and Scottsdale Road	6	7.87’ x 5.91’ / 8’ x 6’	254.33	1886
Station 1825+45.93	Between 64th Street and Scottsdale Road	8	9.84’ x 5.91’	190.29’	6094
Station 1827+42.78	Between 64th Street and Scottsdale Road	6	9.84’ x 5.91’	193.57’	1161
Station 1832+54.59	Between 64th Street and Scottsdale Road	6	9.84’ x 5.91’	246.06’	1161
Station 1838+74.67	Between 64th Street and Scottsdale Road	1	5.91’ x 5.91’	298.56’	151
Station 1842+58.53	Between 64th Street and Scottsdale Road	5	5.91’ x 5.91’	370.73’	931
Station 1847+01.44	Between 64th Street and Scottsdale Road	1	5.91’ x 5.91’	406.82’	411
Station 1850+88.58	Between 64th Street and Scottsdale Road	1	5.91’ x 5.91’	416.67’	184
Station 1863+77.00	Between Scottsdale Road and Hayden Road	2	8’ x 6’	374’	300
Station 1868+50.00	Between Scottsdale Road and Hayden Road	2	8’ x 6’	297’	300
Station 1875+43.00	Between Scottsdale Road and Hayden Road	2	6’ x 6’	233’	300
Station 1883+40.00	Between Scottsdale Road and Hayden Road	2	6’ x 6’	250’	300
Station 1892+93.00	Between Scottsdale Road and Hayden Road	5	10’ x 6’	234’	1125
Station 1923+81.00	Between Hayden Road and Princess Drive	4	10’ x 6’	314’	1263
Station 1934+33.00	Between Hayden Road and Princess Drive	5	10’ x 6’	245’	1263
Station 1937+00.00	Between Hayden Road and Princess Drive	5	10’ x 6’	241’	1263
Station 1940+85.00	Between Hayden Road and Princess Drive	4	10’ x 6’	248’	1263
Station 1948+40.00	Between Hayden Road and Princess Drive	5	10’ x 6’	318’	1263
Station 1949+86.00	Between Hayden Road and Princess Drive	5	10’ x 6’	328’	1263
Station 1951+66.00	Between Hayden Road and Princess Drive	4	10’ x 6’	306’	1263

Waterway Bridges

Freeway and ramp bridge structures are provided over Cave Creek Wash, the CAP Canal and the Reach 11 dam low-flow channel. Table 4 provides a summary of these existing bridge crossings.

Table 4 – Existing Waterway Bridge Summary

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
1490	25.90	Cave Creek Wash Bridge (EB)	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.39’
281	25.87	Cave Creek Wash Bridge EB Frontage Road	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.43’
2466	25.87	Cave Creek Wash Bridge WB Frontage Road	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.80’
1466	25.90	Cave Creek On-Ramp 7SA	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 149.03’
1486	25.90	Cave Creek Wash Off-Ramp 7SB	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.85’
1491	25.90	Cave Creek Wash Bridge (WB)	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft Foundations; Pier on drilled shafts	N/A / 148.39’
2473	29.39	CAP Canal Bridge (WB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI concrete girders; Stub abutments on drilled shaft foundations; Piers on drilled shaft foundations	N/A[(1)] / 371.80’
2541	29.42	CAP Canal Bridge (EB)	Three span, precast prestressed AASHTO Type VI concrete girders; Stub abutments on drilled shaft foundations; Piers on drilled shaft foundations	N/A[(1)] / 372.64’
2474	29.51	Low Flow Channel Bridge (WB)	Two span, precast prestressed AASHTO Type V modified concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shaft foundations	N/A[(2)] / 209.97’
2542	29.54	CAP Basin No. 1 Bridge (EB)	Two span, precast prestressed AASHTO Type V modified concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shaft foundations	N/A[(2)]/ 210.89’

(1) Supplemental survey is recommended during the Stage II design phase to determine clearances for pathways located outside of CAP Canal R/W (westernmost path is referred to as a “future equestrian trail” on the as-built documents)
(2) Supplemental survey is recommended during the Stage II design phase to determine clearances for a “bypass road” noted on as-builts

1.3.6.2 Onsite Drainage

Overview

Onsite drainage systems are a combination of closed conduit storm drain networks and open roadside ditches. Closed conduit systems are used throughout the project. East of the SR51/SR101L TI, closed conduit systems consist of short lateral storm drains that connect pavement inlets to the adjacent offsite channel or to a nearby cross culvert. West of the SR51/SR101L TI, the storm drain systems generally consist of a combination of lateral systems as well as trunk lines that carry runoff longer distances parallel to the SR 101L, discharging in to detention basins or channels.

The discharge of onsite flows into the offsite system does not affect the capacity of the channels because of the differences in design storm frequency (10 or 50-year for onsite, 100-year for offsite) and times of concentration (minutes for onsite, hours for offsite). Onsite and offsite peak flows and hydrographs are non-coincident.

Catch Basins

Standard C-15.91 and C-15.92 catch basins are used along the outside shoulders with curb and gutter or barrier. Special-detail grated inlets are used along the median barrier in superelevated roadway sections. Standard C-15.80 inlets are used to collect runoff at roadside and infield areas.

Pavement runoff along sections of the roadway without curb and gutter sheet flows on roadside slopes and is collected in channels or ditches.

Storm Drain Trunk Lines

Several storm drain trunk lines exist within the project limits west of the SR51/SR101L TI. The first extends from SR 101L Station 1390+00 and drains towards the west ultimately discharging into Scatter Wash approximately 1.6 miles west of I-17. This trunk line is located south of the eastbound lanes between I-17 and Station 1300+00, north of the westbound lanes between Station 1300+00 and Station 1325+00, and south of the eastbound lanes between Station 1325+00 and Station 1390+00.

A second trunk line begins at a detention basin at 15th Avenue and extends towards the west north of the westbound lanes. This trunk line continues through the I-17/SR101L TI and discharges into the SR 101L offsite channel west of I-17.

A third trunk line system consists of two storm drain trunk lines that discharge into Cave Creek Wash just east of Central Avenue. The northern trunk line extends from Station 1478+00 and drains towards the west, discharging into a regional basin at 7th Street. A box culvert outfall from the basin discharges into Cave Creek Wash. A southern trunk line begins near Station 1445+00 and connects into the box culvert west of 7th Street.

A fourth storm drain trunk line system begins near Station 1497+00 and drain towards the east. The trunk line discharges into an offsite channel on the north side of the SR 101L at Station 1505+00. The channel flow enters a box culvert that discharges into a basin on the south side of the SR 101L just east of Cave Creek Road.

A fifth trunk line begins near Station 1556+00 and drains towards the west into the same basin east of Cave Creek Road. This trunk line is located south of the eastbound lanes.

Detention Basins

Several detention basins form part of the existing off-site drainage system west of the SR51/SR101L TI. Detention basins at 21st Avenue and 15th Avenue are located along the north side of SR 101L that are part of the Beardsley Road drainage system. Another basin located north of SR 101L and east of 7th Street was originally constructed to store offsite and onsite flows for the SR 101L mainline and frontage roads before discharging into Cave Creek Wash. A basin on the south side of SR 101L and east of Cave Creek Road serves as an outlet for two storm drain trunk line systems. This basin overflows into the adjacent Coyote Basin Park.

1.3.6.3 Floodplains

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the project vicinity place much of the SR 101L east of the CAP Canal within Zones AO and A. The segment of SR 101L between I-17 and the CAP Canal lies within Zone X, with the exception of the crossing of Cave Creek, which is in Zone AE.

Zone AO is defined as an area subject to inundation by a 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1' and 3'. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone A is defined as an approximate study area with no base flood elevations determined. Zone AE is defined as a detailed study area with base flood elevations determined. Zone X is defined as an area of minimal flood hazard outside of a Special Flood Hazard Area with higher elevations than that of the 0.2% annual chance flood.

1.3.7 Structures

1.3.7.1 Bridges

The existing bridge structures within this segment of the SR 101L were built between the years of 1991 and 2008. The ADOT Bridge Inspection Reports indicate that all existing structures over freeway through-traffic have at least 16'-6" vertical clearance with the exception of the overpasses at 19th Avenue, Cave Creek Road, Scottsdale Road, and Hayden Road. Only one vertical clearance discrepancy was noted between the bridge maintenance database and the bridge inspection records for the SR51/SR101L TI Ramp 'W-S' structure, but the discrepancy is not anticipated to have an impact on the general purpose lane widening alternatives under consideration. It is recommended that field verification of the vertical clearances be provided through survey during final design.

A summary of the existing bridges within the study area is provided in Table 5. Metric dimensioning shown in the as-built plans is shown in English units utilizing hard conversions.

Table 5 - Existing Bridge Summary

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
2132	23.70	23rd Avenue UP	Two span, cast-in-place post-tensioned concrete box girders; Full-height abutments on spread footing; Pier on spread footing	16.82'(3) / 272.00'
2176	23.71	I-17 N/S - 101 E Gore Bridge	Six span, cast-in-place post tensioned concrete box girders; West end of bridge frames into Structure Nos. 2171 and 2168 at a hinge; Full-height abutment on a dual row of drilled shaft foundations; Piers on drilled shaft foundations	16.13'(1) / 1022.75'
2130	24.21	19th Avenue TI OP EB	Single span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations	15.42'(2)(4) / 172.23'
2131	24.21	19th Avenue TI OP WB	Single span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations	15.15'(4) / 172.23'
2464	24.66	15th Avenue UP	Two span, cast-in-place post-tensioned concrete box girders; Full-height abutments on spread footing; Pier on spread footing	17.67'(3) / 177.87'
2465	25.19	7th Avenue TI UP	Two span, cast-in-place post-tensioned concrete box girders; Partial height abutments on spread footing; Pier on spread footing	20.08'(3) / 219.82'
2281	25.87	Cave Creek Wash Bridge EB Frontage Road	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.43'
2466	25.87	Cave Creek Wash Bridge WB Frontage Road	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.80'

(1) ADOT Bridge Evaluation for the I-17 Gore Bridge states: "Change the vertical clearance sign to read: 15'-0"." This structure's minimum clearance is over the 23rd Avenue UP.
(2) ADOT Bridge Evaluation for the 19th Avenue TI OP EB bridge states: "replace the existing vertical clearance sign to read 14'-11" for NB traffic."
(3) Vertical clearances shown do not reflect changes due to AC-ARFC overlay on SR 101L.
(4) It should be noted that the vertical clearance shown for these structures are actually measured to under deck lighting. Actual clearance to bridge superstructure is therefore higher. Supplemental survey may be required pending widening recommendations for these structures

Table 5 – Existing Bridge Summary (Continued)

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
1466	25.90	Cave Creek On-Ramp 7SA	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 149.03’
1486	25.90	Cave Creek Wash Off-Ramp 7SB	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.85’
1490	25.90	Cave Creek Wash Bridge (EB)	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.39’
1491	25.90	Cave Creek Wash Bridge (WB)	Two span, precast prestressed AASHTO Type III concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shafts	N/A / 148.39’
1826	26.19	7th Street TI OP (WB)	Two span, cast-in-place post-tensioned concrete box girders; Partial height abutments on drilled shafts foundations; Pier on individual shaft caps with four drilled shaft foundations per cap	19.54’ / 206.04’
2469	26.19	7th Street TI OP (EB)	Two span, cast-in-place post-tensioned concrete box girders; Partial height abutments on drilled shaft foundations; Pier on individual shaft caps with four drilled shaft foundations per cap	19.58’ / 206.04’
1690	27.17	16th Street TI OP (WB)	Single span, cast-in-place post-tensioned concrete box girders; Full height abutments on spread footing	17.28’ / 112.86’
2470	27.17	16th Street TI OP (EB)	Single span, cast-in-place post-tensioned concrete box girders; Full height abutments on spread footing	17.74’ / 112.86’
1479	28.22	Cave Creek Road TI OP (WB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI modified concrete girders; Partial height abutments on drilled shaft foundations; Piers on spread footings	16.74’(4) / 336.56’

(4) It should be noted that the vertical clearance shown for these structures are actually measured to under deck lighting. Actual clearance to bridge superstructure is therefore higher. Supplemental survey may be required pending widening recommendations for these structures

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Table 5 – Existing Bridge Summary (Continued)

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
2471	28.22	Cave Creek Road TI OP (EB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI modified concrete girders; Partial height abutments on drilled shaft foundations; Piers on spread footings	15.95’(4)(5) / 336.72’
2472	29.19	32nd Street OP (WB)	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations; Pier on spread footing	20.72’ / 181.76’
2540	29.22	32nd Street OP (EB)	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations; Pier on spread footing	21.60’ / 181.76’
2473	29.39	CAP Canal Bridge (WB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI concrete girders; Stub abutments on drilled shaft foundations; Piers on drilled shafts	N/A(6) / 371.80’
2541	29.42	CAP Canal Bridge (EB)	Three span, precast prestressed AASHTO Type VI concrete girders; Stub abutments on drilled shaft foundations; Piers on drilled shafts	N/A(6) / 372.64’
2882	SR 51 MP 15.59	HOV SR 51 Ramp N-E	16-span, precast prestressed AASHTO Type VI modified concrete girders (spans 1 - 10) and precast prestressed AASHTO Type IV concrete girders (spans 11 - 16); Full-height abutments on dual rows of drilled shaft foundations; Piers on drilled shafts (piers 10 and 11 are straddle bents over SR 101L EB)	16.58’(4) / 1876.67’
2883	SR 51 MP 15.59	HOV SR 51 Ramp W-S	17-span, precast prestressed AASHTO Type VI modified concrete girders (spans 1 - 11) and precast prestressed AASHTO Type IV concrete girders (spans 12 - 17); Full-height abutments on dual rows of drilled shaft foundations; Piers on drilled shafts (Pier 10 is a straddle bent over SR 101L EB)	16.58’(4) / 2002.67’

(4) Supplemental survey is recommended during the Stage II design phase.
(5) ADOT Bridge Evaluation Request form for the Cave Creek Road TI OP EB bridge states: “Install a vertical clearance sign reading 15’-8” for NB traffic.” It should be noted that the vertical clearance shown for these structures are actually measured to under deck lighting. Actual clearance to bridge superstructure is therefore higher. Supplemental survey may be required pending widening recommendations for these structures.
(6) Supplemental survey is recommended during the Stage II design phase to determine clearances for pathways located outside of CAP Canal R/W (westernmost path is referred to as a “future equestrian trail” on the as-built documents)

Table 5 – Existing Bridge Summary (Continued)

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
1468	SR 51 MP 15.77	SR 51 Ramp N-W	Four-span, cast-in-place post-tensioned concrete box girders; Partial height abutments on drilled shaft foundations; Piers on large diameter drilled shafts	19.16’ / 647.00’
1469	SR 51 MP 15.77	SR 51 Ramp W-S	Four-span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations; Piers on large diameter drilled shaft foundations	19.50’ / 708.00’
2474	29.51	Low Flow Channel Bridge (WB)	Two span, precast prestressed AASHTO Type V modified concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shaft foundations	N/A[(7)] / 209.97’
2542	29.54	CAP Basin No. 1 Bridge (EB)	Two span, precast prestressed AASHTO Type V modified concrete girders; Stub abutments on drilled shaft foundations; Pier on drilled shaft foundations	N/A[(7)]/ 210.89’
. 2475	31.31	Tatum Blvd TI OP (WB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI modified concrete girders; Stub abutments on drilled shaft foundations; Piers on spread footings	17.23’ / 320.05’
2476	31.31	Tatum Blvd TI OP (EB)	Three span, combination cast-in-place post-tensioned concrete box girders with drop-in precast prestressed AASHTO Type VI modified concrete girders; Stub abutments on drilled shaft foundations; Piers on spread footings	19.36’ / 320.05’
2543	32.39	56th Street OP (WB)	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shafts located immediately behind full-height MSE walls; Pier on drilled shaft foundations	17.06’[(8)] / 215.54’
2544	32.39	56th Street OP (EB)	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations located immediately behind full-height MSE walls; Pier on drilled shaft foundations	17.49’[(8)] / 215.54’

(7) Supplemental survey is recommended during the State II design phase to determine clearances for a “bypass road” noted on as-builts
(8) It should be noted that the vertical clearance shown for these structures are actually measured to under deck lighting. Actual clearance to bridge superstructure is therefore higher. Supplemental survey may be required pending widening recommendations for these structures.

Table 5 – Existing Bridge Summary (Continued)

Structure Number	SR 101L Milepost	Structure Name	Superstructure and Foundation Type(s)	Minimum Vertical Clearance / Total Bridge Length
2774	33.50	64th Street TI UP	Two span, precast prestressed AASHTO Type VI concrete girders; Stub abutments on drilled shaft foundations; Piers on large diameter drilled shaft foundations	17.22’ / 276.70’
1457	34.52	Scottsdale Road TI OP	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations; Pier on spread footing	15.32’[(3)(8)(9)] / 236.19’
1458	35.55	Hayden Road TI OP	Two span, cast-in-place post-tensioned concrete box girders; Stub abutments on drilled shaft foundations; Pier on spread footing	15.73’[(3)(8)(10)] / 226.19’

(3) Supplemental survey is recommended during the Stage II design phase.
(8) It should be noted that the vertical clearance shown for these structures are actually measured to under deck lighting. Actual clearance to bridge superstructure is therefore higher. Supplemental survey may be required pending widening recommendations for these structures.
(9) ADOT Bridge Evaluation for the Scottsdale Road TI OP bridge states: “Replace the existing vertical clearance sign to read 15’-2” for NB traffic and 15’-3” for SB traffic.”
(10) ADOT Bridge Evaluation for the Hayden Road TI OP bridge states: “Repair: Replace the posted vertical clearance sign to read 15’-6” for SB and 15’-8” for NB traffic.”

1.3.7.2 Retaining Walls

A review of the as-built plans indicate that the majority of the existing retaining walls were built as cast-in-place concrete walls with spread footings. There were also a few soil nail walls and Mechanically Stabilized Earth (MSE) walls built along the corridor. Existing wall types and locations are listed in Table 6. As-built stationing data is shown in the tables unless noted otherwise. Metric stationing callouts were hard converted to English units; these are denoted with an “(m)”, where applicable.

Table 6 – Existing Retaining Walls

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
I-17/SR101L System TI	WB wall along south side of Ramp W-S from Ramp W-S Station 1718+02.00 to Ramp W-S Station 1723+92.96	MSE Wall
	WB wall along north side of Ramp W-S from Ramp W-S Station 1716+64.95 to Ramp W-S Station 1723+92.96	
	EB wall on outside of freeway adjacent to north side of Ramp S-E from Ramp S-E Station 2249+48.12 to Ramp S-E Station 2253+70.00	
	EB wall on outside of freeway adjacent to north side of Ramp S-E from Ramp S-E Station 2253+70.00 to Ramp S-E Station 2254+30.00	
	EB wall on outside of freeway adjacent to south side of Ramp S-E from Ramp S-E Station 2249+48.12 to Ramp S-E Station 2252+29.91	

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, 23rd Avenue Underpass	Wall at southeast corner of 23rd Avenue Underpass from 23rd Avenue Station 118+50.49 to 23rd Avenue Station 118+71.80	Non-standard, cast-in-place concrete cantilever wall with integral pedestrian parapet
	Wall at southwest corner of 23rd Avenue Underpass from 23rd Avenue Station 118+46.17 to 23rd Avenue Station 118+67.70	
	Wall at northeast corner of 23rd Avenue Underpass at approximate 23rd Avenue Station 121+44; 10' long with an approximate of skew of 1 degree to 23rd Avenue	
	Wall at northeast corner of 23rd Avenue Underpass from previously noted 10' long wall at 23rd Avenue approximate Station 121+44 10' to Ramp W-S Abutment	As-built plans do not indicate the final wall selection and originally showed geometry that was placed at 45 degrees (contrary to the independently field verified wall which was built parallel to the mainline); Possibly an ADOT B-standard wall, Indeterminate Case
	Wall at northwest corner of 23rd Avenue Underpass at approximate 23rd Avenue Station 121+55; 19.6' long and perpendicular to 23rd Avenue with an angle point to Ramp 27C Station 2613+01.15	ADOT B-18.10 Standard, Case I for portion perpendicular to 23rd Avenue; Case III for remainder of wall
SR 101L, between 23rd Avenue Underpass and 19th Avenue TI Overpass	EB wall along south side of SR 101L from SR 101L Station 1307+62.41 to SR 101L Station 1310+04.61	MSE Wall
SR 101L, 19th Avenue TI Overpass	MSE walls between Abutments 1 and 2 of 19th Avenue TI Overpass at SR 101L centerline	MSE Wall
SR 101L. between 19th Avenue TI Overpass and 15th Avenue Underpass	EB wall along south side of SR 101L from SR 101L Station 1312+11.62 to Station 1318+60.02	MSE Wall; Adjacent wall is noted in next row with apparent station discrepancy
	EB wall along south side of SR 101L from SR 101L Station 1318+60.02(m) to Station 1320+58.86(m)	ADOT B-18.10 Standard, Case II
	WB wall located on north side of SR 101L from SR 101L Station 1312+37.63 to Station 1318+67.93	MSE Wall
	WB wall located between SR 101L and WB Frontage Road (Beardsley Road) from SR 101L Station 1328+37.50(m) to Station 1336+20.41(m) (at west side of 15th Avenue Underpass abutment)	Soil nail wall
	EB wall located between SR 101L and EB Frontage Road (Beardsley Road) from SR 101L Station 1332+30.94(m) to Station 1336+42.39(m) (at west side of 15th Avenue Underpass abutment)	

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, between 15th Avenue Underpass and 7th Avenue TI Underpass	WB wall located between SR 101L and WB Frontage Road (Beardsley Road) from SR 101L Station 1336+83.07(m) (at east side of 15th Avenue Underpass abutment) to Station 1351+70.60(m)	Soil nail wall
	EB wall located between SR 101L and EB Frontage Road (Beardsley Road) from SR101L Station 1337+06.04(m) (at east side of 15th Avenue Underpass abutment) to Station 1349+80.15(m)	
	WB wall located along south side of Ramp 7AA from SR 101L Station 1351+70.67(m) to Station 1355+64.44(m)	ADOT B-18.10 Standard, Case II
SR 101L, 7th Avenue TI Underpass	Northwest wall parallel to 7th Avenue, adjacent to Abutment 1 from 7th Avenue Station31+38.35(m) to 7th Avenue Station 31+62.46(m)	ADOT B-18.10 Standard, Case II
	Northeast wall parallel to 7th Avenue, adjacent to Abutment 1 from 7th Avenue Station 31+38.88(m) to 7th Avenue Station 31+64.64(m)	
	Southwest wall parallel to 7th Avenue, adjacent to Abutment 2 from 7th Avenue Station 33+97.04(m) to 7th Avenue Station 34+16.23(m)	
	Southeast wall parallel to 7th Avenue, adjacent to Abutment 2 from 7th Avenue Station 33+99.22(m) to 7th Avenue Station 34+20.58(m)	
SR 101L, Cave Creek Wash Overpasses	Walls along north side of Ramp 7SA adjacent to bridge abutments from Ramp 7SA Station 5+74.59(m) to Ramp 7SA Station 6+04.12(m), and from Ramp 7SA Station 7+54.05(m) to Ramp 7SA Station 7+86.86(m)(1)	ADOT B-18.10 Standard, Case II
	Walls located between front face of abutment backwalls at SR 101L mainline Cave Creek Wash Bridges and Ramp 7SA/7SB bridge structures	
	Walls along south side of Ramp 7SB adjacent to bridge abutments from Ramp 7SB Station 6+40.71(m) to Ramp 7SB Station 6+66.96(m), and from Ramp 7SB Station 8+16.72(m) to Ramp 7SB Station 8+46.24(m) (1)	
SR 101L, 7th Street TI Overpass	Northwest wall adjacent to bridge abutment from SR 101L Station 1414+51.86(m) to Station 1414+61.86(m)	ADOT B-18.10 Standard, Case II
	Southwest wall adjacent to bridge abutment from SR 101L Station 1414+49.09(m) to Station 1414+59.09(m)	
	Southeast wall adjacent to bridge abutment from SR 101L Station 1416+98.93(m) to Station 1417+08.93(m)	
	Northeast wall adjacent to bridge abutment from SR 101L Station 1417+01.70(m) to Station 1417+11.70(m)	
SR 101L, between 7th Street TI Overpass and 16th Street TI Overpass	EB wall along south side of SR 101L from SR 101L Station 1423+45.80(m) to Station 1430+24.93(m)	ADOT B-18.10 Standard, Case II
	WB wall located between SR101L and 7th Street Ramp C from SR 101L Station 1426+00.00 to Station 1428+99.83	Non-standard cast-in-place concrete combination noise/retaining wall (MAG wall)

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, 16th Street TI Overpass	Northwest wall adjacent to bridge abutment from SR 101L Station 1466+61.33(m) to Station 1467+07.26(m)	Combination noise/retaining wall (ADOT B-18.10 Standard, Case II with doweled cast-in-place concrete noise wall)
	Northeast wall adjacent to bridge abutment from SR 101L Station 1468+35.21(m) to Station 1468+90.33(m)	
	Southwest wall adjacent to bridge abutment from SR 101L Station 1466+62.31(m) to Station 1467+09.56(m)	ADOT B-18.10 Standard, Case II
	Southeast wall adjacent to bridge abutment from SR 101L Station 1468+37.51 (m) to Station 1468+93.94(m)	Originally built as an ADOT B-18.10 Standard, Case II wall; A non-standard cast-in-place concrete noise wall was doweled to this wall under the TRACS No. H6236-01C noise mitigation project
SR 101L, between 16th Street TI Overpass and Cave Creek Road TI Overpass	WB wall along north side of SR 101L from SR 101L Station 1510+63.91(m) to Station 1521+74.25(m) (adjacent to Cave Creek Road TI Overpass abutment)	MSE Wall
	EB wall along south side of SR 101L from SR 101L Station 1514+29.59(m) to Station 1521+39.86(m) (adjacent to Cave Creek Road TI Overpass abutment)	
SR 101L, Cave Creek Road TI Overpass	Wall parallel to Cave Creek Road Ramp C at northeast corner of bridge structure from Cave Creek Road Ramp C Station 0+98.43(m) to Cave Creek Road Ramp C Station 2+05.54(m)	ADOT B-18.10 Standard, Case III
SR 101L, between Cave Creek Road TI Overpass and 32nd Street Overpass	WB wall along north side of SR 101L from SR 101L Station 1525+09.91(m) (adjacent to Cave Creek Road TI Overpass abutment) to Station 1529+47.54(m)	Non-standard combination cast-in-place concrete retaining/noise wall
	EB wall along south side of SR 101L from SR 101L Station 1524+82.91(m) (adjacent to Cave Creek Road TI Overpass abutment) to Station 1530+19.26(m)	
SR 101L, 32nd Street Overpass	WB wall on outside of freeway, west of 32nd Street Overpass from SR 101L Station 1574+81.41(m) to Station 1574+94.20(m) (adjacent to 32nd Street Overpass Abutment 1)	Non-standard, cast-in-place concrete cantilever wall with integral roadway barrier (WB median walls abandoned in place with EB bridge structure construction)
	WB wall on outside of freeway, east of 32nd Street Overpass from SR 101L Station 1576+86.55(m) (adjacent to 32nd Street Overpass Abutment 2) to Station 1576+99.34(m)	
	WB wall at freeway median , west of 32nd Street Overpass from SR 101L Station 1574+78.01(m) to Station 1574+90.80(m) (adjacent to 32nd Street Overpass Abutment 1)	
	WB wall at freeway median , east of 32nd Street Overpass from SR 101L Station 1576+91.35(m) (adjacent to 32nd Street Overpass Abutment 2) to Station 1577+04.14(m)	
	EB wall on outside of freeway, west of 32nd Street Overpass from SR 101L Station 1574+78.47(m) to Station 1574+94.06(m) (adjacent to 32nd Street Overpass Abutment 1)	ADOT B-18.40 Standard retaining wall with integral roadway barrier
	EB wall on outside of freeway, east of 32nd Street Overpass from SR 101L Station 1576+86.31(m) (adjacent to 32nd Street Overpass Abutment 2) to Station 1577+01.90(m)	

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, CAP Canal Overpass	WB wall on outside of freeway, west of CAP Canal Overpass from SR 101L Station 1584+79.57(m) to 1584+92.37(m) (adjacent to CAP Canal Overpass Abutment 1)	Non-standard, cast-in-place concrete cantilever wall with integral roadway barrier (WB median wall abandoned in place with EB bridge construction)
	WB wall on outside of freeway, east of CAP Canal Overpass SR 101L Station 1588+96.85(m) (adjacent to CAP Canal Overpass Abutment 2) to 1589+09.65(m)	
	WB wall at freeway median, west of CAP Canal Overpass from SR 101L Station 1585+24.79(m) to Station 1585+37.59(m) (adjacent to CAP Canal Overpass Abutment 1)	
	EB wall on outside of freeway, west of CAP Canal Overpass from SR 101L Station 1585+63.49(m) to Station 1585+76.29(m) (adjacent to CAP Canal Overpass Abutment 1)	ADOT B-18.40 Standard retaining wall with integral roadway barrier
	EB wall on outside of freeway, east of CAP Canal Overpass from SR 101L Station 1589+81.51(m) (adjacent to CAP Canal Overpass Abutment 2) to Station 1589+94.31(m)	
SR 101L, CAP Basin No.1 (a.k.a. Low Flow Channel) Overpass	WB wall on outside of freeway, west of Low Flow Channel Overpass from SR 101L Station 1590+92.44(m) to Station 1591+05.05(m) (adjacent to Low Flow Channel Overpass Abutment 1)	Non-standard, cast-in-place concrete cantilever wall with integral roadway barrier (WB median wall abandoned in place with EB bridge construction)
	WB wall on outside of freeway, east of Low Flow Channel Overpass from SR 101L Station 1593+34.93(m) (adjacent to Low Flow Channel Overpass Abutment 2) to 1593+47.52(m)	
	WB wall at freeway median , west of Low Flow Channel Overpass from SR 101L Station 1591+39.65(m) to Station 1591+52.44(m) (adjacent to Low Flow Channel Overpass Abutment 1)	
	WB wall at freeway median , east of Low Flow Channel Overpass from SR 101L Station 1593+89.59(m) (adjacent to Low Flow Channel Overpass Abutment 2) to Station 1594+02.39(m)	
	EB wall on outside of freeway, west of CAP Basin No.1 Overpass from SR 101L Station 1591+92.82(m) to Station 1592+09.22(m) (adjacent to CAP Basin No.1 Overpass Abutment 1)	ADOT B-18.40 Standard retaining wall with integral roadway barrier
	EB wall on outside of freeway, east of CAP Basin No. 1 Overpass from SR 101L Station 1594+31.51(m) (adjacent to CAP Basin No. 1 Overpass Abutment 2) to Station 1594+47.92(m)	
SR51/SR101L System TI	WB wall located along SR51/SR101L TI HOV Ramp from HOV Ramp Station 43+96.29 to HOV Ramp Station 48+36.05	MSE Wall
	EB wall located along SR51/SR101L TI HOV Ramp from HOV Ramp Station 43+58.29 to HOV Ramp Station 47+93.27	
	Wall between WB and EB SR 101L at SR51/SR101L TI HOV Ramp from HOV Ramp Station 43+58.29 to HOV Ramp Station 43+83.71	

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, between CAP Canal Overpass and Tatum Boulevard TI Overpass	WB wall along outside of freeway from SR 101L Station 1674+73.21(m) to Station 1684+81.87(m) at Tatum Boulevard TI Overpass	MSE Wall
	EB wall along outside of freeway from SR 101L Station 1678+09.43(m) to Station 1684+81.87(m) at Tatum Boulevard TI Overpass	
SR 101L, between Tatum Boulevard TI Overpass and 56th Street TI Overpass	WB wall along outside of freeway from SR 101L Station 1688+04.87(m) at Tatum Boulevard TI Overpass to Station 1691+60.10(m)	MSE Wall
	EB wall along outside of freeway from SR 101L Station 1688+71.39(m) Tatum Boulevard TI Overpass to Station 1697+57.22(m)	
SR 101L, 56th Street TI Overpass	WB wall along outside of freeway and returning parallel to 56th Street TI Overpass (in front of bridge abutment) from SR 101L Station 1741+14.17(m) to Station 1742+01.53(m) at 56th Street TI Overpass	MSE Wall
	EB wall along outside of freeway and returning parallel to 56th Street TI Overpass (in front of bridge abutment) from SR 101L Station 1742+12.60(m) to Station 1742+82.62(m) at 56th Street TI Overpass	
	WB wall along outside of freeway and returning parallel to 56th Street TI Overpass (in front of bridge abutment) from SR 101L Station 1743+93.02(m) at 56th Street TI Overpass to Station 1744+75.07(m)	
	EB wall along outside of freeway and returning parallel to 56th Street TI Overpass (in front of bridge abutment) from SR 101L Station 1744+77.78(m) at 56th Street TI Overpass to Station 1745+73.49(m)	
SR 101L, 64th Street TI Underpass	Wall located on north side of 64th Street Ramp A and west side of 64th Street from Ramp A Station 25+09.24 to 64th Street Station 25+38.12	ADOT Standard B-18.10, Case II
	Wall located on east side of 64th Street and north side of 64th Street Ramp C from 64th Street Station 26+00.84 to Ramp C Station 15+00.00	
	Wall located on south side of 64th Street Ramp B and parallel to 64th Street on west side from Ramp B Station 20+88.25 to 64th Street Station 32+81.22	Combination of non-standard cast-in-place concrete retaining wall and ADOT Standard B-18.10, Case II, except for two cast-in-place concrete headwall segments located above RCBCs
	Wall at NW corner of 64th Street TI Underpass from 64th Street Station 26+88.46 to 64th Street Station 27+03.46	ADOT Standard B-18.10, Case II
	Wall at NE corner of 64th Street TI Underpass from 64th Street Station 27+23.19 to 64th Street Station 27+41.70	
	Wall at SW corner of 64th Street TI Underpass from 64th Street Station 30+06.92 to 64th Street Station 30+17.75	
	Wall at SE corner of 64th Street TI Underpass from 64th Street Station 30+48.58 to 64th Street Station 30+60.58	

(1) Stations calculated from bridge as-built stationing and retaining wall length table

Table 6 – Existing Retaining Walls (Continued)

General Location	Retaining Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Retaining Wall Type
SR 101L, between Hayden Road TI Overpass and Pima Road TI Overpass	Wall at RCBC weir structure, nearly perpendicular and south of Pima Road Ramp B from Pima Road Ramp B Station 4+24.63 to Pima Road Ramp B Station 4+24.37	Non-standard, cast-in-place concrete cantilever wall
	Wall at between RCBC's at weir structure, south of Pima Road Ramp B from Pima Road Ramp B Station 7+07.71 to Pima Road Ramp B Station 7+85.38	
	Wall at between RCBC's at weir structure, south of Pima Road Ramp B from Pima Road Ramp B Station 8+53.08 to Pima Road Ramp B Station 9+08.24	
	Wall at RCBC weir structure, south of Pima Road Ramp B from Pima Road Ramp B Station 9+54.36 to Pima Road Ramp B Station 11+02.16	
	Wall at RCBC weir structure, nearly perpendicular and south of Pima Road Ramp B from Pima Road Ramp B Station 11+07.61 to Pima Road Ramp B Station 11+05.90	
	Weir wall (and divider walls) located south of RCBC outlets and retaining walls (south of Pima Road Ramp B) from Pima Road Ramp B Station 4+24.69 to Pima Road Ramp B Station 11+07.98	Non-standard cast-in-place concrete wall

(1) Stations calculated from bridge as-built stationing and retaining wall length table

1.3.7.3 Noise Walls

Existing noise wall locations are presented in Table 7. The noise walls consist predominantly of concrete noise walls (non-standard and ADOT standard) although some masonry walls exist along the corridor as well as non-standard concrete extensions of roadway barriers. There are also a few combination retaining/noise walls noted in the table below. Metric stationing callouts were hard converted to English units; these are denoted with an "(m)", where applicable.

Table 7 – Existing Noise Walls

General Location	Noise Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Sound Wall Type (Spread Footing Foundation Unless Noted Otherwise)
SR 101L, Between 23rd Avenue TI Underpass and 19th Avenue TI Overpass	Wall parallel to 23rd Avenue at southeast corner of 23rd Avenue/South Frontage Road (Beardsley Road) and along south side of Beardsley Road from Beardsley Road Station 2785+40.68 to Beardsley Road Station 2797+75.30	ADOT B-30.20 Standard (Masonry Wall)
	Wall between WB Frontage Road (Beardsley Road) and Ramp W-S from Ramp W-S Station 1711+00.00 to Ramp W-S Station 1723+92.96	Non-standard, cast-in-place concrete wall barrier extension
SR 101L, between 19th Avenue TI Overpass and 15th Avenue Underpass	Wall parallel to and along south side of EB Frontage Road (Beardsley Road) from Station 2816+99.45 to Beardsley Road Station 2828+37.51 (west of 17th Lane)	ADOT B-30.20 Standard (Masonry Wall)

Table 7 – Existing Noise Walls (Continued)

General Location	Noise Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Sound Wall Type (Spread Footing Foundation Unless Noted Otherwise)
SR 101L, between 19th Avenue TI Overpass and 15th Avenue Underpass	Wall parallel to and along south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1328+49.57(m) (east of 17th Lane) to EB Frontage Road Station 1336+28.74(m)	Non-standard, cast-in-place concrete wall
	Wall on north side of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1324+80.12(m) to WB Frontage Road Station 1326+71.62(m)	Non-standard, cast-in-place concrete wall
	Wall along north side of 19th Avenue Ramp 19AC from SR 101L Station 1321+35.83(m) to Station 1327+10.18(m)	Non-standard, cast-in-place wall founded on a single row of 36" diameter drilled shafts (Note: noise wall is noted as "designed for future 4' height extension")
SR 101L, between 15th Avenue Underpass and 7th Avenue TI Underpass	Wall on north side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1337+20.21(m) to EB Frontage Road Station 1342+49.98(m)	Non-standard, cast-in-place concrete wall roadway barrier extension
	Wall on north side of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1342+75.39(m) to WB Frontage Road Station 1349+22.05(m)	ADOT B-30.10 Standard (Concrete Wall)
	Wall on north side of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1350+23.72(m) to WB Frontage Road Station 1354+03.28(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4 feet); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters
	Wall on south side of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1347+92.45(m) to WB Frontage Road Station 1352+05.84(m)	Non-standard, cast-in-place concrete wall roadway barrier extension
SR 101L, between 7th Avenue TI Underpass and 7th Street TI Overpass	WB wall located on south side of Ramp 7AC from Ramp 7AC Station 1+31.27(m) to Ramp 7AC Station 10+82.87(m)	Non-standard, cast-in-place concrete wall
	WB wall located between Ramp 7AC/SR 101L and WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1375+49.21(m) to WB Frontage Road Station 1389+60.01(m)	ADOT B-30.10 Standard (Concrete Wall)
	Wall on south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1363+91.08(m) to EB Frontage Road Station 1364+75.30(m)	
	Wall on south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1367+09.15(m) to EB Frontage Road Station 1372+61.58(m)	
	Wall on south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1376+02.85(m) to EB Frontage Road Station 1376+55.09(m)	
	Wall between Ramp 7AD/SR101L and EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1375+44.69(m) to EB Frontage Road Station 1390+17.80(m)	
SR 101L, between 7th Street TI Overpass and 16th Street TI Overpass	Wall located along south side of Ramp 7SD from Ramp 7SD Station 8+20.21(m) to Station 12+04.00(m)	Non-standard, cast-in-place concrete wall roadway barrier extension
	Wall located along south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1428+89.44(m) to EB Frontage Road Station 1441+32.87(m)	Non-standard, cast-in-place concrete wall

Table 7 – Existing Noise Walls (Continued)

General Location	Noise Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Sound Wall Type (Spread Footing Foundation Unless Noted Otherwise)
SR 101L, between 7th Street TI Overpass and 16th Street TI Overpass	Wall located along south side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1442+34.81(m) to EB Frontage Road Station 1455+46.56(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters
	Wall located along north side of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1458+03.35(m) to EB Frontage Road Station 1464+66.17(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters; The wall stem was subsequently removed under the noise mitigation project TRACS No. H623601C and the footing was abandoned in place.
	WB wall along north side of SR 101L from SR 101L Station 1460+70.77(m) to Station 1466+61.33(m)	Non-standard, cast-in-place concrete wall
	WB wall along north side of SR 101L from SR 101L Station 1466+61.33(m) to Station 1468+90.33(m) (passes over 16th Street)	Combination noise/retaining wall (ADOT B-18.10 Standard, Case II with doweled cast-in-place concrete noise wall) on either side of bridge and non-standard post-and-panel on bridge deck
	WB wall located between SR101L and 7th Street Ramp C from SR 101L Station 1462+02.86 to Station 1428+98.58	Non-standard cast-in-place concrete combination noise/retaining wall (MAG wall)
	WB wall located along south side of WB Frontage Road from SR 101L Station 1427+36.09 to Station 1443+30.56	Non-standard cast-in-place concrete noise wall on drilled shaft foundations (MAG wall)
SR 101L, between 16th Street TI Overpass and Cave Creek Road TI Overpass	WB wall along north side of SR 101L from SR 101L from SR 101L Station 1468+90.33(m) to Station 1476+28.52(m)	Non-standard, cast-in-place concrete wall
	EB wall between SR 101L and EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1475+53.90(m) to EB Frontage Road Station 1488+06.36(m)	Non-standard, cast-in-place concrete wall
	WB wall between SR 101L and WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1479+57.38(m) to WB Frontage Road Station 1488+40.29(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters
	Wall located north of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1487+51.41(m) to WB Frontage Road Station 1494+55.91(m)	ADOT B-30.10 Standard (Concrete Wall)
	Wall located north of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1494+55.91(m) to WB Frontage Road Station 1503+19.29(m)	First 18.0 meters (59.06') and last 25.0 meters (82.02') consist of ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters

Table 7 – Existing Noise Walls (Continued)

General Location	Noise Wall Description (Approximate Freeway Centerline Stationing Unless Noted Otherwise)	Sound Wall Type (Spread Footing Foundation Unless Noted Otherwise)
SR 101L, between 16th Street TI Overpass and Cave Creek Road TI Overpass	Wall located north of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1494+55.91(m) to WB Frontage Road Station 1503+19.29(m)	Remainder of wall consists of non-standard, cast-in-place concrete wall founded on 450 mm (approx.. 18") diameter drilled shafts and rock sockets
	Wall located south of EB Frontage Road (Beardsley Road) from EB Frontage Road Station 1494+75.07(m) to EB Frontage Road Station 1500+32.97(m)	ADOT B-30.10 Standard (Concrete Wall)
	Wall located north of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1503+42.29(m) to WB Frontage Road Station 1506+83.96(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters
	Wall located north of WB Frontage Road (Beardsley Road) from WB Frontage Road Station 1508+04.63(m) to WB Frontage Road Station 1510+27.60(m)	ADOT B-30.10 Standard (Concrete Wall) for heights up to 4.4 meters (14.4'); Non-standard, cast-in-place concrete wall for wall heights exceeding 4.4 meters
	Wall located along south side of SR 101L from SR 101L Station 1468+37.51(m) to Station 1481+35.50(m)	Non-standard, cast-in-place concrete wall doweled into retaining/wing wall at 16th Street Overpass from Station 1468+37.51 (m) to Station 1468+93.94(m); Non-standard cast-in-place concrete wall on spread footings for the remaining length
SR 101L, between Cave Creek Road TI Overpass and 32nd Street Overpass	WB wall along north side of SR 101L from SR 101L Station 1525+09.91(m) to Station 1529+47.54(m)	Non-standard combination cast-in-place concrete retaining/noise wall
	EB wall along south side of SR 101L from SR 101L Station 1524+82.91(m) to Station 1530+19.26(m)	
	Wall on outside of Cave Creek Road Ramp CCC, Cave Creek Road Ramp CCC Station 5+67.59(m) to Cave Creek Road Ramp C Station 15+09.19(m)	Non-standard, cast-in-place concrete wall roadway barrier extension (split-face aesthetic to emulate block)
	WB wall along the north edge of the mainline freeway from SR 101L Station 1555+11.81(m) to Station 1574+31.93(m)	
	Wall located on south side of Cave Creek Road Ramp CCD along right-of-way from SR 101L Station 1527+72.64(m) to Station 1545+45.64(m)	Non-standard, cast-in-place concrete wall
	WB wall along Mohawk Lane from SR 101L Station 1536+95.55(m) to Station 1574+81.56(m)	Non-standard masonry wall
	EB wall along R/W from SR 101L Station 1545+45.64(m) to Station 1562+75.28(m)	
	EB wall along south side of SR 101L from SR 101L Station 1561+70.01(m) to Station 1574+31.76(m) at end of anchor slab for 32nd Street Overpass	Non-standard, cast-in-place concrete wall roadway barrier extension (split-face aesthetic to emulate block)
SR 101L, between 32nd Street Overpass and CAP Canal Overpass	EB wall along south side of SR 101L from SR 101L Station 1577+45.34(m) at end of anchor slab for 32nd Street Overpass to Station 1584+91.41(m) at end of anchor slab for CAP Canal Bridge	Non-standard, cast-in-place concrete wall roadway barrier extension (split-face aesthetic to emulate block)

1.3.7.4 Culverts

Existing culvert (reinforced concrete box and aluminum box) locations are presented in Table 8. As-built stationing data is shown in Table 8 unless noted otherwise. Metric stationing callouts were hard converted to English units; these are denoted with an "(m)", where applicable.

Table 8 – Existing Culverts

Route/General Location	Approximate Freeway Centerline Stationing (Unless Noted Otherwise)	Structure Description	Structure Type (Reinforced Concrete Box Culvert Unless Noted Otherwise)
SR 101L, north of WB Frontage Road (Beardsley Road) at 19th Avenue	Approximate SR 101L Station 1310+57 to approximate Station 1312+63(1)	6-cell, 10' x 4', 210' long	ADOT B-Standard 02.60, built as part of FCDMC Interceptor Channel Project (Table I assumed based on as-built profile); Inlet and outlet transitions from ADOT Standard B-18.10 retaining walls and cast-in-place concrete channel
SR 101L, north of WB Frontage Road (Beardsley Road) between 15th Avenue and 10th Avenue	Approximate SR 101L Station 1342+19 to approximate Station 1349+98(1)	1-cell, 12' x 8', 804'long	Precast ADOT B-Standard 02.10, built as part of FCDMC Interceptor Channel Project (Table I assumed based on as-built profile); Inlet and outlet transitions from ADOT Standard B-18.10 retaining walls and cast-in-place concrete channel
SR 101L, north of WB Frontage Road (Beardsley Road) between 10th Avenue and 7th Avenue	Approximate SR 101L Station 1352+97 to approximate Station 1363+78(1)	From west to east: 1-cell, 12' x 8' x 928' long with a 7' transition to a 1-cell, 12' x 6' culvert; 136' long at Station 1362+25	Precast ADOT B-Standard 02.10, built as part of FCDMC Interceptor Channel Project (Table I assumed based on as-built profile); Non-standard inlet wingwalls transitioning to channelized intake (immediately east of 7th Avenue) and outlet transitions to ADOT Standard B-18.10 retaining walls and cast-in-place concrete channel
SR 101L, between 7th Avenue and 7th Street	SR 101L Station 1364+40.75(m) to Station 1376+79.75(m)	2 cell, 7.87' x 3.94' x 1,238.85' long; Mostly parallel to north side of WB Frontage Road (Beardsley Road)	ADOT B-Standard 02.20 (metric), Table I with B-04.10 outlet wings and B-06.10 apron; inlet transitions to 1.68 m (approximate 5.5') diameter pipe
	Intersecting EB Frontage Road (Beardsley Road) Station 1404+46.19(m), skewed 65.5 degrees Rt. (428.15' long) Intersecting SR 101L Station 1409+77.42(m), skewed 72 degrees Rt. (586.94' long) Intersecting WB Frontage Road (Beardsley Road) Station1414+92.13, skewed 71 degrees Rt. (421.26' long)	2-cell, 7.87' x 5.91' x 1,436.35' long	ADOT B-Standard 02.20 (metric), Tables I - V with non-standard inlet apron/wings and non-standard outlet wings with B-06.10 apron

(1) Total length and/or stationing of box culverts measured in aerial view; as-built plans either have no data, do not clearly state total length of box culvert, or were not ADOT projects.

Table 8 – Existing Culverts (Continued)

General Location	Approximate Freeway Centerline Stationing (Unless Noted Otherwise)	Structure Description	Structure Type (Reinforced Concrete Box Culvert Unless Noted Otherwise)
SR 101L, Cave Creek Road	Cave Creek Road Station 30+05.21(m)	2-cell, 7.87' x 5.91' extension with vertical wall transitions to existing 8' x 6' culvert under Cave Creek Road (total length is approximately 177' long[(1)])	Non-standard extension (metric) of existing RCB 8' x 6' with ADOT B-04.10 outlet wings and B-06.10 apron
	WB Frontage Road (Beardsley Road) Approximate Station 1518+64	1-cell, 20'-6" x 7'-3" x 42' long	Non-standard aluminum box culvert with non-standard wings located north of WB Frontage Road, west of Cave Creek Road (serves as access road crossing for U-Haul facility)
SR 101L, between Cave Creek Road and 32nd Street	SR 101L Station 1532+76.57(m), skewed 33 degrees Lt.	2-cell, 7.87' x 5.91' x 662.73' long; Crosses SR 101L and ties into open channel on north side	ADOT B-Standard 02.20 (metric), Tables I - IV with B-04.30 outlet wings, B-06.10 apron, and non-standard apron
	SR 101L Station 1532+91.17(m), skewed 33 degrees Lt.	1-cell, 7.87' x 5.91' x 452.76' long; Crosses SR 101L and ties into Fork Wash on north side	ADOT B-Standard 02.20 (metric), Tables I - IV with B-04.50 inlet and outlet wings, B-06.10 apron, and non-standard apron
SR 101L, between 32nd Street and Tatum Boulevard TI Overpass	Approximate SR 101L Station 1629+76 (m), variable skew (curved box)	4-cell, 7.87' x 7.87' x 853.02' long; Crosses SR 101L on a curve	ADOT B-standard 02.10 (metric), Table II with unknown aprons/wings
SR 101L, Tatum Boulevard TI Overpass	Approximate SR 101L Station 1680+77 (m) to Station 1687+34(m) (nearly parallel to north side of Tatum Boulevard Ramps A and C)	2- cell, 9.84' x 5.91' x 636.48' long; Crosses Tatum Boulevard	ADOT B-standard 02.10 (metric), Table II with unknown aprons/wings
SR 101L,between Tatum Boulevard TI Overpass and 56th Street TI Overpass	SR 101L Station 1699+12.73 (m), skewed 22 degrees right	2-cell, 5.91' x 5.91' x 306.76' long	ADOT B-standard 02.10 (metric), Table I with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons
	SR 101L Station 1706+39.76 (m), No skew	2-cell, 7.87' x 5.91' x 200.79' long	ADOT B-standard 02.10 (metric), Table I with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons
	SR 101L approximate Station 1710+68, No skew	1-cell , 10' x 6' transitioning to 10' x 10', unknown length	As-built plans for this culvert could not be located. This culvert was originally noted as a double cell "future culvert" in Project No. 600-1(6)P Phase A (Volume 2 of 3). Subsequent field investigation reveals that this culvert does not have an inlet (confirmed by aerial) and has a single storm drain penetration into the east wall originating from a catch-basin at the median barrier.
	SR 101L Station 1713+48.75(m), skewed 7 degrees Rt.	1-cell, 7.87' x 5.91' x 204,72' long	ADOT B-standard 02.10 (metric), Table I with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons
	SR 101L Station 1717+10.3(m), skewed 17 degrees Lt.	1-cell, 5.91' x 5.91' x 210.30' long	ADOT B-standard 02.10 (metric), Table I with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons
	SR 101L Station 1729+28.13(m), skewed 6 degrees Rt.	2-cell, 5.91' x 5.91' x 240.16' long	ADOT B-standard 02.10 (metric), Table I with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons

(1) Total length and/or stationing of box culverts measured in aerial view; as-built plans either have no data, do not clearly state total length of box culvert, or were not ADOT projects.

Table 8 – Existing Culverts (Continued)

General Location	Approximate Freeway Centerline Stationing (Unless Noted Otherwise)	Structure Description	Structure Type (Reinforced Concrete Box Culvert Unless Noted Otherwise)
SR 101L, between Tatum Boulevard TI Overpass and 56th Street TI Overpass	SR 101L Station 1736+21.06(m), skewed 15 degrees Lt.	2-cell; 7.87' x 5.91' x 429.13' long	ADOT B-standard 02.10 (metric), Tables I-IV with B-04.30 inlet wings, B-04.10 outlet wings, and B-06.10 aprons
SR 101L, between 56th Street TI Overpass and 64th Street TI Underpass	SR 101L Station 1746+85.04(m), skewed 9 degrees Lt.	3-cell, 6' x 6' x 429.79' long	ADOT B-Standard 02.30 (English) used on metric project; Tables I-II, IV-V with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1751+64.04(m), skewed 6 degrees Lt.	2-cell, 6' x 6' x 413.39' long	ADOT B-Standard 02.20 (English) used on metric project; Tables I-IV with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1758+66.14(m), skewed 11 degrees Rt.	3-cell, 6' x 6' x 308.4' long	ADOT B-Standard 02.30 (English) used on metric project; Tables I-II with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1766+10.89 (m), skewed 20 degrees Rt.	1-cell, 6' x 6' x 229.66' long	ADOT B-Standard 02.10 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1770+17.72(m), skewed 19 degrees Lt.	2-cell, 6' x 6' x 232.94' long	ADOT B-Standard 02.20 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1776+34.51(m), skewed 9 degrees Lt.	6-cell, 8' x 7' x 219.82' long	ADOT B-Standard 02.60 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1783+13.65(m), no skew	3-cell, 6' x 6' x 200.13' long	ADOT B-Standard 02.30 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1785+56.82[(1)], skewed 10 degrees Rt.	5-cell, 6' x 6' x 203.41' long; Later extended with a 6' x 6' x 10.9' culvert at the inlet with the 64th Street TI Underpass project	ADOT B-Standard 02.50 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings; Extension at the inlet used Table I and B-04.30 wings
	SR 101L Station 1788+42.03[(1)], skewed 6 degrees Rt.	3-cell, 8' x 8' x 193.57' long; Later extended with an 8' x 8' x 34.5' culvert at the inlet and 15' at the outlet with the 64th Street TI Underpass project	ADOT B-Standard 02.30 (English) used on metric project; Table I with B-04.40 inlet wings and B-04.20 outlet wings; Extensions used Table I at the inlet and outlet and used B-04.40 inlet wings and B-04.20 outlet wings
	SR 101L Station 1797+66.98[(1)], skewed 22 degrees Rt.	3-cell, 8' x 8' x 206.69' long; Later extended with an 8' x 8' x 171' culvert at the inlet and 104' at the outlet	ADOT B-Standard 02.30 (English) used on metric project; Table I with B-04.40 inlet wings and B-04.20 outlet wings; Extensions used Tables I-V at the inlet and Tables I-IV at the outlet with B-04.40 inlet wings and non-standard outlet wings

(1) Total length and/or stationing of box culverts measured in aerial view; as-built plans either have no data, do not clearly state total length of box culvert, or were not ADOT projects.

Table 8 – Existing Culverts (Continued)

General Location	Approximate Freeway Centerline Stationing (Unless Noted Otherwise)	Structure Description	Structure Type (Reinforced Concrete Box Culvert Unless Noted Otherwise)
SR 101L, between 56th Street TI Overpass and 64th Street TI Underpass	SR 101L Station 1801+50.54(1), skewed 35 degrees Rt.	4-cell, 8' x 8' x 252.62' long; Later extended with a 8' x 8' x 187' culvert at the inlet and 136.7' at the outlet	ADOT B-Standard 02.40 (English) used on metric project; Table I with B-04.80 inlet wings and B-04.60 outlet wings; Extensions used Tables I-V at the inlet and non-standard details at the outlet to avoid a drilled shaft conflict with the 64th Street TI Underpass and utilize B-04.80 inlet wings and non-standard outlet wings
SR 101L, between 64th Street TI Underpass and Scottsdale Road TI Overpass	SR 101L Station 1812+00.44(1), no skew	6-cell, 8' x 6' x 191.93' long; Later extended with an 8' x 6' x 31.6' culvert at the inlet and 30.8' at the outlet	ADOT B-Standard 02.60 (English) used on metric project; Table I with B-04.30 inlet wings and B-04.10 outlet wings; Extensions used Table I at the inlet and outlet and used B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1825+45.93(m), skewed 16 degrees Lt.	8-cell, 10' x 6' x 190.29' long	Non-standard reinforced concrete box culvert (metric) with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1827+42.78(m), no skew	6-cell, 10' x 6' x 193.57' long	ADOT B-Standard 02.60 (English) used on metric project, Table I with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1832+54.59(m), skewed 2 degrees Rt.	6- cell, 10' x 6' x 246.06' long	ADOT B-Standard 02.60 (English) used on metric project; Tables I-II with B-04.30 inlet wings with non-standard curved outlet with individual channelized/parallel walls transitioning out of culvert walls(2)
	SR 101L Station 1838+74.67(m), skewed 3 degrees Lt.	1-cell, 6' x 6' x 298.56' long	ADOT B-Standard 02.10 (English) used on metric project; Tables I & III with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1842+58.53(m), skewed 18 degrees Lt.	5-cell, 6' x 6' x 370.73' long	ADOT B-Standard 02.50 (English) used on metric project; Tables I & III with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1847+01.44(m), skewed 15 degrees Rt.	1-cell, 6' x 6' x 406.82' long	ADOT B-Standard 02.10 (English) used on metric project; Tables I-II & IV with B-04.30 inlet wings and B-04.10 outlet wings
	SR 101L Station 1850+88.58(m), skewed 8 degrees Rt.	1-cell, 6' x 6' x 416.67' long	ADOT B-Standard 02.10 (English) used on metric project; Tables I & III-V with B-04.30 inlet wings and B-04.10 outlet wings
SR 101L Between Scottsdale Road TI Overpass and Hayden Road TI Overpass	SR 101L Station 1863+77.00, no skew	2-cell, 8' x 6' x 374' long	ADOT B-Standard B-02.20, Tables I-II with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1868+50.00, skewed 1 degree Rt.	2-cell, 8' x 6' x 297' long	ADOT B-Standard B-02.20, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron

(1) Total length and/or stationing of box culverts measured in aerial view; as-built plans either have no data, do not clearly state total length of box culvert, or were not ADOT projects.
(2) Subsequent box culvert extension utilized English unit stationing and is reflected here

Table 8 – Existing Culverts (Continued)

General Location	Approximate Freeway Centerline Stationing (Unless Noted Otherwise)	Structure Description	Structure Type (Reinforced Concrete Box Culvert Unless Noted Otherwise)
SR 101L Between Scottsdale Road TI Overpass and Hayden Road TI Overpass	SR 101L Station 1875+43.00, skewed 18 degrees Rt.	2-cell, 6' x 6' x 233' long	ADOT B-Standard B-02.20, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1883+40.00, skewed 15 degrees Lt.	2-cell, 6' x 6' x 250' long	ADOT B-Standard B-02.20, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1892+93.00, skewed 1 degree Lt.	5-cell, 10' x 6' x 234' long	ADOT B-Standard B-02.50, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
SR 101L, between Hayden Road TI Overpass and Princess Drive TI Overpass	SR 101L Station 1923+81.00, skewed 12 degrees Lt.	4-cell, 10' x 6' x 314' long	ADOT B-Standard B-02.40, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1934+33.00, skewed 9 degrees Lt.	5-cell, 10' x 6' x 245' long	ADOT B-Standard B-02.50, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1937+00.00, skewed 14 degrees Lt.	5-cell, 10' x 6' x 241' long	ADOT B-Standard B-02.50, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1940+85.00, no skew	4-cell, 10' x 6' x 248' long	ADOT B-Standard B-02.40, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and B-06.10 outlet apron
	SR 101L Station 1948+40.00, skewed 37 degrees Lt.	5-cell, 10' x 6' x 318' long	ADOT B-Standard B-02.50, Table I with non-standard inlet wings/aprons, B-04.50 outlet wings, and non-standard outlet consisting of a spreader channel/weir(1)
	SR 101L Station 1949+86.00, skewed 36 degrees Lt.	5-cell, 10' x 6' x 328' long	ADOT B-Standard B-02.50, Table I with non-standard inlet wings/aprons, B-04.50 outlet wings, and non-standard outlet consisting of a spreader channel/weir(1)
	SR 101L Station 1951+66.00, skewed 12 degrees Lt.	4-cell, 10' x 6' x 306' long	ADOT B-Standard B-02.40, Table I with non-standard inlet wings/aprons, B-04.10 outlet wings, and non-standard outlet consisting of a spreader channel/weir(1)

(1) Total length and/or stationing of box culverts measured in aerial view; as-built plans either have no data, do not clearly state total length of box culvert, or were not ADOT projects.
(2) Subsequent box culvert extension utilized English unit stationing and is reflected here

1.3.8 Signing and Lighting

Guide Signs

The existing overhead freeway guide signs are mounted on bridge fascias or are supported with cantilever sign supports or tubular sign bridges. The majority of the existing overhead sign supports were not designed to accommodate future pavement widening based on a review of the as-built plans. Table 9 identifies the existing overhead sign structures that would be required to be modified to support the additional general-purpose and auxiliary lanes associated with this project.

In addition to the existing guide signs, the Grand Canyon State Logo Signs program will be installing new logo signs throughout the Regional Freeway System. The preliminary design plans for the new logo signs planned within the study limits have been reviewed and incorporated into the existing guide sign inventory.

Table 9 – Existing Sign Structures Requiring Modifications

Direction of Travel	Milepost	SR 101L Station	Sign Support Type
Eastbound	E24.25	1314+16	Cantilever
Eastbound	E24.42	1323+77	Cantilever
Eastbound	E24.77	1342+44	Cantilever
Eastbound	E25.10	1354+69	DMS
Eastbound	E25.58	1384+50	Cantilever
Eastbound	E25.75	1393+03	Cantilever
Eastbound	E27.11	1464+88	Cantilever
Eastbound	E27.62	1492+00	Sign Bridge
Eastbound	E27.81	1501+95	Cantilever
Eastbound	E28.84	1556+44	Sign Bridge
Eastbound	E29.35	1583+49	Sign Bridge
Eastbound	E29.59	1596+17	Cantilever
Eastbound	E29.91	1612+89	Cantilever
Eastbound	E30.56	1646+79	Cantilever
Eastbound	E30.97	1668+62	Sign Bridge
Eastbound	E31.73	1708+32	Cantilever
Eastbound	E31.82	1713+42	Cantilever
Eastbound	E32.07	1726+40	Cantilever
Eastbound	E32.54	1751+00	Cantilever
Eastbound	E32.86	1767+71	Cantilever
Eastbound	E33.18	1784+69	Cantilever
Eastbound	E33.86	1820+58	Cantilever
Eastbound	E33.97	1826+50	DMS
Eastbound	E34.12	1834+62	Cantilever
Eastbound	E34.68	1864+60	Cantilever

Table 9 – Existing Sign Structures Requiring Modifications (Continued)

Direction of Travel	Milepost	SR 101L Station	Sign Support Type
Eastbound	E34.89	1877+30	Cantilever
Eastbound	E35.18	1891+00	Cantilever
Eastbound	E35.45	1905+15	Cantilever
Eastbound	E35.71	1918+00	Cantilever
Eastbound	E35.92	1930+40	Cantilever
Eastbound	E36.18	1943+05	Cantilever
Westbound	W23.99	1300+46	Cantilever
Westbound	W24.12	1306+99	Sign Bridge
Westbound	W24.36	1320+00	Sign Bridge
Westbound	W24.62	1333+31	Sign Bridge
Westbound	W25.55	1382+04	Cantilever
Westbound	W25.78	1394+44	Cantilever
Westbound	W26.29	1421+58	Sign Bridge
Westbound	W26.57	1435+52	Cantilever
Westbound	W26.84	1450+12	Cantilever
Westbound	W26.90	1458+19	DMS
Westbound	W27.20	1469+79	Cantilever
Westbound	W28.57	1541+41	Cantilever
Westbound	W28.84	1556+57	Sign Bridge
Westbound	W29.36	1583+82	Cantilever
Westbound	W30.51	1644+84	Cantilever
Westbound	W30.75	1657+35	Sign Bridge
Westbound	W30.94	1667+19	Sign Bridge
Westbound	W31.70	1706+75	Cantilever
Westbound	W31.88	1716+00	Cantilever
Westbound	W32.03	1724+94	Sign Bridge
Westbound	W32.80	1764+53	Cantilever
Westbound	W33.07	1778+83	Cantilever
Westbound	W33.80	1817+63	Cantilever
Westbound	W34.11	1834+00	Cantilever
Westbound	W34.38	1848+00	Cantilever
Westbound	W34.88	1875+00	Cantilever
Westbound	W35.13	1888+70	Cantilever
Westbound	W35.38	1901+00	Cantilever
Westbound	W35.66	1916+00	Cantilever
Westbound	W35.92	1930+65	Cantilever
Westbound	W36.28	1944+50	Cantilever
Westbound	W36.46	1957+75	Cantilever

Freeway Lighting

The existing SR 101L freeway mainline lighting consists of a mixture of high mast poles (100' to 120' high) with 400-Watt high pressure sodium (HPS) high mast fixtures at the SR51/SR101L TI, high mast poles (100' high) with 400-Watt HPS high mast fixtures at the service traffic interchanges, and high mast median mounted high mast poles (69' mounting height) with two 400-Watt HPS high mast fixtures along the freeway. Underdeck bridge lighting is provided on the freeway overpasses and underpasses.

The SR 101L mainline and ramp lighting systems are energized with 240/480 volt Type IV load centers. Table 10 lists the locations of the existing load centers and the limits of the lighting fixtures associated with each load center.

Table 10 – Existing SR 101L Load Center Locations

Load Center Locations	Load Center Address	Western Limit (SR 101L Station)	Eastern Limit (SR 101L Station)
27th Avenue, NW corner, SR 101L Station 1257+30	20212 N. 27th Avenue	1258+50	1273+00
23rd Avenue, NW corner, SR 101L Station 1283+70	20172 N. 23rd Avenue	1278+50	1292+00
19th Avenue, NW corner, SR 101L Station 1310+60	1146 N. 19th Avenue	1295+00	1335+00
7th Avenue, NW corner, SR 101L Station 1361+60	20202 N. 7th Avenue	1338+00	1385+00
7th Street, NE corner, SR 101L Station 1417+30	20203 N. 7th Street	1388+00	1441+70
16th Street, SE corner, SR 101L Station 1467+20	20196 N. 16th Street	1445+00	1495+40
Cave Creek Road, SW corner, SR 101L Station 1521+60	20398 N. Cave Creek Road	1448+50	1549+00
32nd Street, SE corner, SR 101L Station 1576+50	20443 N. 32nd Street	1552+00	1621+00
SR 51, North side, SR 101L Station 1611+30	3837 E. Beardsley Road	1623+00	1637+00
Tatum Boulevard, SW corner, SR 101L Station 1686+10	20498 N. Tatum Boulevard	1641+00	1712+00
56th Street, SW corner, SR 101L Station 1743+00	18896 N. 56th Street	1716+00	1799+00
Scottsdale Road, SE corner, SR 101L Station 1857+50	18853 N. Scottsdale Road	1800+00	1882+00
Hayden Road, SE corner, SR 101L Station 1911+50	18587 N. Hayden Road	1885+00	1938+00
Princess Drive, NE corner, SR 101L Station 1963+60	17823 N. Pima Road	1941+00	1973+00

Table 11 provides a summary of the existing SR 101L mainline conduit crossing locations located within the study area.

Table 11 – Existing Mainline Lighting Conduit Crossings

Direction of Travel	SR 101L Station	Conduit Crossing Description
Eastbound	1258+60	2 inch
Eastbound	1267+50	2 inch
Eastbound	1283+50	2 inch
Eastbound	1309+60	2 inch
Eastbound	1361+80	2 inch
Eastbound	1416+50	2 inch
Eastbound	1466+20	2 inch
Eastbound	1469+50	2 inch
Eastbound	1507+60	2 inch
Eastbound	1521+30	2 inch
Eastbound	1525+00	2 inch
Eastbound	1537+00	2 inch
Eastbound	1573+70	2 inch
Eastbound	1577+70	2 inch
Eastbound	1589+40	2 inch
Eastbound	1597+00	2 inch
Eastbound	1645+10	2 inch
Eastbound	1670+40	2 inch
Eastbound	1685+20	2 inch
Eastbound	1688+00	2 inch
Eastbound	1702+30	2 inch
Eastbound	1731+30	2 inch
Eastbound	1741+80	2 inch
Eastbound	1752+40	2 inch
Eastbound	1788+00	2 inch
Eastbound	1814+90	2 inch
Eastbound	1845+50	3 inch
Eastbound	1856+40	2 inch
Eastbound	1858+00	2 inch
Eastbound	1869+50	3 inch
Eastbound	1896+40	2 inch
Eastbound	1910+90	2 inch
Eastbound	1925+90	2 inch
Eastbound	1964+10	2 inch
Westbound	1258+60	2-1/2 inch
Westbound	1267+50	2 inch
Westbound	1283+50	2 inch

Table 11 – Existing Mainline Lighting Conduit Crossings (Continued)

Direction of Travel	SR 101L Station	Conduit Crossing Description
Westbound	1309+60	2 inch
Westbound	1361+80	2 inch
Westbound	1379+60	2 inch
Westbound	1396+30	2 inch
Westbound	1416+50	2 inch
Westbound	1428+00	2 inch
Westbound	1521+30	2 inch
Westbound	1525+00	2 inch
Westbound	1589+40	2 inch
Westbound	1618+30	2 inch
Westbound	1685+20	2 inch
Westbound	1688+00	2 inch
Westbound	1741+80	2 inch
Westbound	1788+00	2 inch
Westbound	1814+90	2 inch
Westbound	1856+40	2 inch
Westbound	1858+00	2 inch
Westbound	1910+90	2 inch
Westbound	1964+10	2 inch

1.3.9 Freeway Management System

The existing Freeway Management System (FMS) consists of ramp meters at various entrance ramps, Dynamic Message Signs (DMS), closed-circuit television (CCTV) cameras, and vehicle detectors at the locations shown in Table 12.

The FMS communication system includes three 3” conduits with fiber optic cables located along the shoulders of the northbound and southbound roadways. The conduit system is concrete encased where located along the existing roadways, and is typically within the bridge structure at the overpasses. The City of Scottsdale has placed fiber optic cables that support their 911 communication system at various locations within the ADOT FMS conduit.

Table 12 – Existing FMS System Components

Direction of Travel	SR 101L Station	FMS Element
Eastbound	1325+85	System Loops
Eastbound	1328+00	Ramp Meter
Eastbound	1354+80	DMS
Eastbound	1372+10	System Loops

Table 12 – Existing FMS System Components (Continued)

Direction of Travel	SR 101L Station	FMS Element
Eastbound	1376+80	Ramp Meter
Eastbound	1416+80	Conduit Crossing
Eastbound	1429+80	System Loops
Eastbound	1431+20	Ramp Meter
Eastbound	1473+10	System Loops
Eastbound	1478+20	CCTV
Eastbound	1478+20	DMS
Eastbound	1522+00	Conduit Crossing
Eastbound	1535+90	System Loops
Eastbound	1568+20	System Loops
Eastbound	1569+15	Conduit Crossing
Eastbound	1606+35	CCTV
Eastbound	1606+80	Conduit Crossing
Eastbound	1611+60	System Loops
Eastbound	1635+30	System Loops
Eastbound	1639+55	Conduit Crossing
Eastbound	1699+80	Ramp Meter
Eastbound	1699+90	System Loops
Eastbound	1741+80	DMS
Eastbound	1743+10	Conduit Crossing
Eastbound	1753+20	System Loops
Eastbound	1757+50	Ramp Meter
Eastbound	1798+30	Conduit Crossing
Eastbound	1800+40	CCTV
Eastbound	1809+40	System Loops
Eastbound	1827+20	DMS
Eastbound	1866+60	System Loops
Eastbound	1870+20	Ramp Meter
Eastbound	1885+00	DMS
Eastbound	1908+60	CCTV
Eastbound	1920+70	System Loops
Eastbound	1923+50	Ramp Meter
Westbound	1323+60	Conduit Crossing
Westbound	1345+50	DMS
Westbound	1350+10	Ramp Meter
Westbound	1353+80	System Loops

Table 12 – Existing FMS System Components (Continued)

Direction of Travel	SR 101L Station	FMS Element
Westbound	1362+00	CCTV
Westbound	1362+50	Conduit Crossing
Westbound	1400+00	Ramp Meter
Westbound	1404+00	System Loops
Westbound	1416+70	Conduit Crossing
Westbound	1417+00	CCTV
Westbound	1453+00	System Loops
Westbound	1453+30	Conduit Crossing
Westbound	1462+00	DMS
Westbound	1467+00	Conduit Crossing
Westbound	1506+00	Ramp Meter
Westbound	1510+00	System Loops
Westbound	1522+00	CCTV
Westbound	1522+00	Conduit Crossing
Westbound	1564+19	DMS
Westbound	1569+00	System Loops
Westbound	1569+20	Conduit Crossing
Westbound	1606+00	System Loops
Westbound	1606+80	Conduit Crossing
Westbound	1634+00	System Loops
Westbound	1639+50	Conduit Crossing
Westbound	1674+00	System Loops
Westbound	1676+00	Ramp Meter
Westbound	1689+00	CCTV
Westbound	1733+00	Ramp Meter
Westbound	1735+00	System Loops
Westbound	1742+00	CCTV
Westbound	1743+10	Conduit Crossing
Westbound	1746+33	DMS
Westbound	1791+00	System Loops
Westbound	1798+30	Conduit Crossing
Westbound	1843+00	Ramp Meter
Westbound	1847+00	System Loops
Westbound	1854+00	CCTV
Westbound	1857+00	Conduit Crossing
Westbound	1882+80	Conduit Crossing

Table 12 – Existing FMS System Components (Continued)

Direction of Travel	SR 101L Station	FMS Element
Westbound	1896+00	Ramp Meter
Westbound	1899+00	System Loops
Westbound	1911+20	Conduit Crossing
Westbound	1938+34	DMS
Westbound	1945+00	CCTV
Westbound	1954+00	System Loops
Westbound	1957+00	Ramp Meter

1.3.10 Geotechnical Conditions

1.3.10.1 Existing Subsurface Conditions

The subsurface conditions for this segment of SR 101L were determined based on review of as-built plans and available geotechnical investigation reports of the various projects completed along SR 101L within the study limits.

The project site is located in the Basin and Range Geologic Province of the southwestern United States. The Basin and Range Province is characterized by a modern landscape consisting of broad alluvial valleys interspersed with and bounded by uplifted and fault-block mountain ranges, often with well-developed pediments and alluvial fans. Generally, the mountain ranges and valleys trend in a north-south to northwest-southeast direction. The modern landscape was formed by late Tertiary (Miocene-Pliocene) extensional tectonism and high-angle normal faulting followed by subsequent erosion of the uplifted mountains and depositions of the sediments in the newly-formed basins.

From an engineering standpoint, the general subgrade conditions can be grouped into the soils present to the east and west of Cave Creek Road. The soils encountered west of Cave Creek Road are predominantly granular comprised of poorly graded, sands and gravels with lesser amounts of clay and silt. At the 16th Street OP, very dense, gravel and sand was present at the surface to depths of 10 feet to 15 feet and underlain by granodiorite and/or greenstone rock.

From Cave Creek Road to the east, the soils are predominantly fine grained comprised of silty and clayey sands with occasional layers of sandy clay, sandy silt, clayey gravel and sandy gravel. In general, the soils encountered are weakly to moderately cemented and low to medium plasticity. Also, the soils are generally firm to hard with an increase in firmness with an increase in depth.

Groundwater was not encountered within any of the test borings drilled within the project limits.

1.3.11 Existing Pavement Structural Sections

As-built plans were reviewed to inventory the existing mainline pavement sections. The typical mainline pavement section consists of asphalt rubber-asphalt concrete friction course (AR-ACFC) over portland cement concrete pavement (PCCP) over aggregate base (AB) (Class 2), asphalt concrete ((25mm) (AC (1.0)), or asphalt concrete base (ACB). AC (1.0) is typically used in place of AB to increase the pavement structural number. ACB is typically substituted for AB in areas of depressed roadways. The portion of the mainline between the CAP Bridge and the Low Flow Channel consists of Continuously Reinforced Concrete Pavement (CRCP) over AC (1.0).

The existing pavement sections are inventoried in the following table. Metric stationing callouts were hard converted to English units; these are denoted with an "(m)", where applicable.

Table 13 – Existing Pavement Structural Sections

Project Segment & Project Number	Item	AR-ACFC (in)	PCCP (in)	AC 25 mm (AC 1.0") (in)	AB (Class 2) (in)	ACB Mix (in)	Total Thickness (in)
Northeast Outer Loop Pima-Price (101L) Pima, Jct. I-17 – 19th Ave (East Half TI) STP-600-1(12) 101L MA 023 H4733 01C	Mainline & outside shoulder (elevated) WB Station1295+00 to 1323+00 EB Station1295+00 to 1323+00	-	12.0	-	4.0	-	16.0
	Mainline & outside shoulder (depressed) Station 1245+00 to 1295+00	-	12.0	-	-	4.0	16.0
	Ramps and gores	-	10.0	-	4.0	-	14.0
Pima Freeway (SR-101), 19th Avenue – Cave Creek Road (Phase B) AC-STP-600-1-(13)B 101L MA 024 H4830 01C	Mainline (depressed) 19th Avenue to Cave Creek Wash	-	11.4(1)	3.9(1)	-	-	15.4(1)
	Mainline (elevated) Cave Creek Wash to Cave Creek Road	-	11.4(1)	-	3.9(1)	-	15.4(1)
	Ramps	-	9.8(1)	-	3.9(1)	-	13.8(1)
	Gores	-	9.8(1)	-	-	-	9.8(1)
Pima Freeway (101L), Cave Creek Road – Scottsdale Road, Phase B ACSTP-600-1(16)B 101L MA 029 H4845 01C	Mainline Cave Creek Road to Scottsdale Road	-	11.4(1)	-	3.9(1)	-	15.4(1)
	Ramps	-	9.8(1)	-	3.9(1)	-	13.8(1)
Pima Freeway (101L), Jct. I-17 (23rd Ave.)-56th Street ACSTP-600-1(6)P 101L MA 022 H3565 01C	Mainline (elevated)	-	11.4(1)	-	3.9(1)	-	15.4(1)
Pima Freeway (101L), Jct. I-17 (23rd Ave.)-56th Street ACSTP-600-1(6)P 101L MA 022 H3565 01C	Mainline (depressed) Cave Creek Road Ramp C WB Station1540+00.75(m) to Station 1542+63.22(m) Cave Creek Road Ramp D EB Station1540+00.75(m) to Station 1552+43.84	-	11.4(1)	3.9(1)	-	-	15.4(1)
	Mainline 32nd Street to CAP Bridge	-	13.8(1)	-	3.9(1)	-	17.7(1)
	Mainline CAP Bridge to Low Flow Channel	-	9.8(1) CRCP	3.9(1)	-	-	13.8(1)

(1) Converted from metric units of measurement to English units of measurement

Table 13 - Existing Pavement Structural Sections (Continued)

Project Segment & Project Number	Item	AR-ACFC (in)	PCCP (in)	AC 25 mm (AC 1.0") (in)	AB (Class 2) (in)	ACB Mix (in)	Total Thickness (in)
Pima Freeway (101L), Jct. I-17 (23rd Ave.)-56th Street ACSTP-600-1(6)P 101L MA 022 H3565 01C	Ramps: Tatum Boulevard Ramp A WB Station1666+70.90(m) to WB Station1671+46.05(m); Tatum Boulevard Ramp B; EB Station1667+30.26 (m) to EB Station 1671+88.18(m); Tatum Boulevard Ramp C; WB Station1702+69.65 (m) to WB Station 1706+67.22(m); Tatum Boulevard Ramp D; EB Station1700+75.73(m) to EB Station 1706+06.27(m); Cave Creek Road Ramp C; WB Station1538+04.82(m) to WB Station 1540+00.75(m); Cave Creek Road Ramp D; EB Station1539+34.91(m) to EB Station1540+00.75(m); 56th Street Ramp A; WB Station1725+03.80(m) to WB Station 1729+28.55(m); 56th Street Ramp B; EB Station1726+35.03(m) to EB Station 1730+50.12(m)	-	11.4(1)	-	3.9(1)	-	15.4(1)
	Ramps: Cave Creek Road Ramp C; WB Station1536+65.22(m) to WB Station 1538+04.82(m); Cave Creek Road Ramp D; EB Station1525+11.53 (m) to EB Station 1539+34.91(m); Tatum Boulevard Ramp A; WB Station1671+45.46(m) to WB Station 1673+19.92(m); Tatum Boulevard Ramp B; EB Station1671+87.69(m) to EB Station 1673+50.03(m); Tatum Boulevard Ramp C; WB Station1700+96.67(m) to WB Station 1702+69.65(m); Tatum Boulevard Ramp D; EB Station1689+61.66(m) to EB Station 1700+75.73(m); 56th Street Ramp A; WB Station1729+28.55(m) to WB Station 1730+31.51(m); 56th Street Ramp B; EB Station1730+50.12(m) to EB Station 1731+53.25(m); Gores: 56th Street Ramp B gore	-	9.8(1)	-	3.9(1)	-	13.8(1)
	All gore areas except 56th Street Ramp B gore	-	9.8(1)	-	-	-	9.8(1

(1) Converted from metric units of measurement to English units of measurement

Table 13 - Existing Pavement Structural Sections (Continued)

Project Segment & Project Number	Item	AR-ACFC (in)	PCCP (in)	AC 25 mm (AC 1.0") (in)	AB (Class 2) (in)	ACB Mix (in)	Total Thickness (in)
Pima Freeway (101L), Scottsdale Road to Pima Road RAM-600-1-564 101 MA 034 H3230 02C & RAM-101-B-501 101 MA 034 H5543 01C	Mainline and Outside Shoulders Scottsdale Road to Pima Road	-	11.5	-	4.0	-	15.5
Pima Freeway (101L), Scottsdale Road to Pima Road RAM-600-1-564 101 MA 034 H3230 02C & RAM-101-B-501 101 MA 034 H5543 01C	Ramps & Gores	-	10.0	-	4.0	-	14.0
	Outside Shoulders Ramps: 64th Street Ramp A; Station 1780+83.58 to Station 1787+54.28 Lt; 64th Street Ramp B; Station 1785+18.74 to Station 1789+61.42 Rt	1.0	11.5	-	4.0	-	16.5
	Gores: 64th Street Ramp B; Station 17+90.00 to Station 25+37.04; 64th Street Ramp C; Station 11+01.59 to Station 18+50.00	-	10.0	-	4.0	-	14.0
Pima Freeway (SR 101), Loop 101/64th Street TI NH-101-B(003)B 101 MA 032 H6240 01 C	64th Street Ramp A; Station1787+54.28 to Station 1788+88.48 Lt; Station 17+82.61 to Station 28+22.92; 64th Street Ramp B; Station 1789+61.42 to Station 1791+09.32 Rt; Station 15+88.72 to Station 17+90.00; 64th Street Ramp C; Station1811+23.56 to Station 1812+35.93 Lt; Station 18+50.00 to Station 20+81.62; 64th Street Ramp D; Station 1812+07.11 to Station 1813+15.42 Rt; Station 11+21.43 to Station 20+62.27	1.0	10.0	-	4.0	-	15.0
Pima Freeway (SR 101L), 21st Avenue to Tatum Blvd NH-900-A(068)A	Mainline	1.0	-	-	-	-	1.0
Pima Freeway (SR 101L), Tatum Blvd to Scottsdale Road NH-999-A(040)A	Mainline	1.0	-	-	-	-	1.0

(1) Converted from metric units of measurement to English units of measurement

Table 13 - Existing Pavement Structural Sections (Continued)

Project Segment & Project Number	Item	AR-ACFC (in)	PCCP (in)	AC 25 mm (AC 1.0") (in)	AB (Class 2) (in)	ACB Mix (in)	Total Thickness (in)
Pima Freeway (SR 101L), Scottsdale Road to Frank Lloyd Wright Blvd NH-900-A-(072)A 999 MA 000 H6371 03C	Mainline	1.0	-	-	-	-	1.0
SR 101L, I-10 to Tatum Blvd 101A(208)N 101L MA 001 H4756 01C	HOV Lanes and Inside Shoulder	1.0	12.0	-	4.0	-	17.0
Pima Freeway (SR 101L), Tatum Blvd to Princess Drive 101-B-NFA 101 MA 031 H7208 01C	HOV Lanes and Inside Shoulder	1.0	12.0	-	4.0	-	17.0

(1) Converted from metric units of measurement to English units of measurement

1.3.12 Previous Projects

The Milepost Strip Map shows the following projects that were previously constructed within the study area:

Table 14 – Previous Projects

Project Number and/or TRACS Number	Begin Milepost	As-Built Date	Description
ACSTP-600-1(6)P 101L MA 022 H3565 01C	22	2002	Construct Frontage Roads and Mainline Jct. I-17(23rd Ave.) - 56th Street
AC-STP-600-1(13)B 101L MA 024 H4830 01C	24.5	2001	Construct Mainline Roadway and Structures 19th Avenue - Cave Creek Road
RAM-600-0-506 101L MA 23 H2445 04C	23	1992	Grade, Pavement, Drainage and Structures I-17 Interchange
RAM-600-1-557 101L MA 023 H5094 01C	23	2000	Landscape Design, I-17 Interchange
RAM-600-0-518 101L MA 23 H2445 02C	23	2001	Grade, Pavement, Drainage and Structures I-17 Interchange, West Half
STP-600-1(12) 101L MA 023 H4733 01C	23	2003	Construct Roadway I-17 Interchange, East Half
NH-EB-STP-CMAQ-101-A(208)N 101 MA 001 H7456 01C	1	2011	Construct HOV Lanes I-10 to Tatum Boulevard
RAM-600-1-562 101 MA 024 H4830 03C	24.2	2003	Landscape Plans 19th Ave to CAP Canal
RAM-600-1-563 101 MA 029, H4845 03C	29.5	2003	Landscape Plans CAP Canal to Scottsdale Road
ACSTP-600-1(16)B 101L MA 029 H4845 01C	29	2001	Construct Roadway Cave Creek Road to Scottsdale Road
CM-101-B(202)AC 101 MA 023 H6662 01C	23.4	2010	Construct FMS I-17 to Tatum Boulevard

Table 14 – Previous Projects (Continued)

Project Number and/or TRACS Number	Begin Milepost	As-Built Date	Description
RAM-1011-B-505 101 MA 024 H6236 01C	24.4	2002	Noise Mitigation Pima Corridor
888-A-NFA MA 000 H7525 01C	26	2012	Construct Maricopa Regional Supplemental Noise Walls Various Locations
101-A(208)N H7456 01C	24	2012	Striping Plans I-17 to 7th Avenue
RAM-600-1-564 101 MA 034 H3230 02C	34.54	2003	Construct Roadway Scottsdale Road to Pima Road
RAM-101-B-501 101L MA 034 H5543 01C	34.52	2001	Construct Scottsdale Road T.I.O.P Bridge and Crossroad
RAM-600-1-544 101L MA 036 H4083 01 C	36.62	2002	Construct Roadway Pima Road to Shea Boulevard
NH-101-B(003)B 101 MA 032 H6240 01C	32.71	2009	Construct 64th Street T.I. and Aux Lanes 64th Street
101-B-NFA 101 MA 031 H7208 01C	31.1	2009	Construct HOV Lanes, Tatum Boulevard to Princess Drive
101-B-NFA H7699 01 C	29.8	2010	Construct FMS SR 51 to Princess Drive
RAM-101-B-500 101 MA 034 H5518 01C	34	2002	Landscape and Irrigation Scottsdale Road to Pima Road
RAM-051-A-502 051 MA 014 H5385 01C	13.38	2003	Construct Roadway and Directional Ramps SR 51, Bell Road to Pima Freeway (SR 101L)
NON-FA 051 MA 009 H6479 01C	30.15	2006	Construct HOV Ramp, HOV Lanes Widening SR 51 / SR 101L
NH-900-A(072) A 999 MA 000 H6371	34.24	2005	AR-ACFC Overlay Scottsdale Road to Frank Lloyd Wright Boulevard
PROJECT #S0405 CITY OF SCOTTSDALE BID CALL #07PB038	34	2008	Construct North Freeway Frontage Road Scottsdale Road to Hayden Road

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2.0 TRAFFIC AND CRASH DATA

2.1 CRASH ANALYSIS

The ADOT Traffic Studies Section provided crash data for the segment of the SR 101L corridor between the I-17/SR101L TI and Princess Drive. There were a total of 3,192 reported crashes within the study area between March 31, 2006 and March 31, 2011. Figure 3 (pages 31-36) and Table 15 illustrates the crash summary by freeway segment during this time period. The following is a summary of some key characteristics of the crash data:

- Of the 3,192 crashes reported, 2,284 resulted in property damage only (72%), 895 resulted in injuries (28%), and 13 resulted in a fatality (<1%).
- 79% of the crashes involved another motor vehicle while 14% involved a fixed object. These two types of crashes accounted for 93% of the crashes.
- Of the 2,517 crashes with another motor vehicle, 82% (2,064 crashes) were rear-end crashes, and 16% (396 crashes) were sideswipe crashes.
- 74% of the crashes occurred during daylight hours, 6% occurred at dusk or dawn, and the remaining 20% occurred during hours of darkness.

Table 15 – Mainline Crash Summary

Freeway Segment	No. of Crashes (March 2006 – March 2011)	Crash Rate (2006 – 2011) (Crash/Million Vehicle Miles)
Eastbound SR 101L		
I-17 to 19th Avenue	64	0.68
19th Avenue to 7th Avenue	204	1.71
7th Avenue to 7th Street	145	1.24
7th Street to 16th Street	154	1.30
16th Street to Cave Creek Road	245	1.80
Cave Creek Road to 32nd Street	145	1.00
32nd Street to SR 51	101	0.77
SR 51 to Tatum Boulevard	93	0.57
Tatum Boulevard to 56th Street	87	0.51
56th Street to Scottsdale Road	151	0.57
Scottsdale Road to Hayden Road	42	0.29
Hayden Road to Princess Drive	41	0.29
Westbound SR 101L		
Princess Drive to Hayden Road	49	0.34
Hayden Road to Scottsdale Road	123	0.86
Scottsdale Road to 56th Street	235	0.89
56th Street to Tatum Boulevard	126	0.74
Tatum Boulevard to SR 51	156	0.96
SR 51 to 32nd Street	187	1.43
32nd Street to Cave Creek Road	75	0.52
Cave Creek Road to 16th Street	148	1.09
16th Street to 7th Street	143	1.21
7th Street to 7th Avenue	205	1.75
7th Avenue to 19th Avenue	195	1.63
19th Avenue to I-17	78	0.82

According to the *Regional Freeway Bottleneck Study* (MAG, 2006), the average crash rate on the Regional Freeway System was 0.78 accidents per million vehicle miles in 2000. This study also documented the 75th percentile as 1.41 crashes per million vehicle miles. In the eastbound direction, 5 of the 12 segment rates are more than the average crash rate, with 2 segments above the 75th percentile. In the westbound direction of travel, 9 of the 12 segment rates exceed the average, with 3 segments above the 75th percentile.

This evaluation indicates that 82% of the crashes with another motor vehicle on this segment of the SR 101L corridor are rear-end crashes. This type of crash is commonly associated with congested traffic conditions. Providing additional freeway capacity may reduce the level of congestion and provide a more balanced level-of-service throughout the corridor, which may reduce these crash rates.

2.2 EXISTING TRAFFIC CONDITIONS

Historical traffic count data was obtained from ADOT's Multimodal Planning Division (MPD) for years 2009 and 2010. In addition, SR 101L mainline traffic counts were conducted at several locations within the study area in February 2012. The existing average daily traffic (ADT) and peak hour volumes are shown on Figure 4 (pages 39-44).

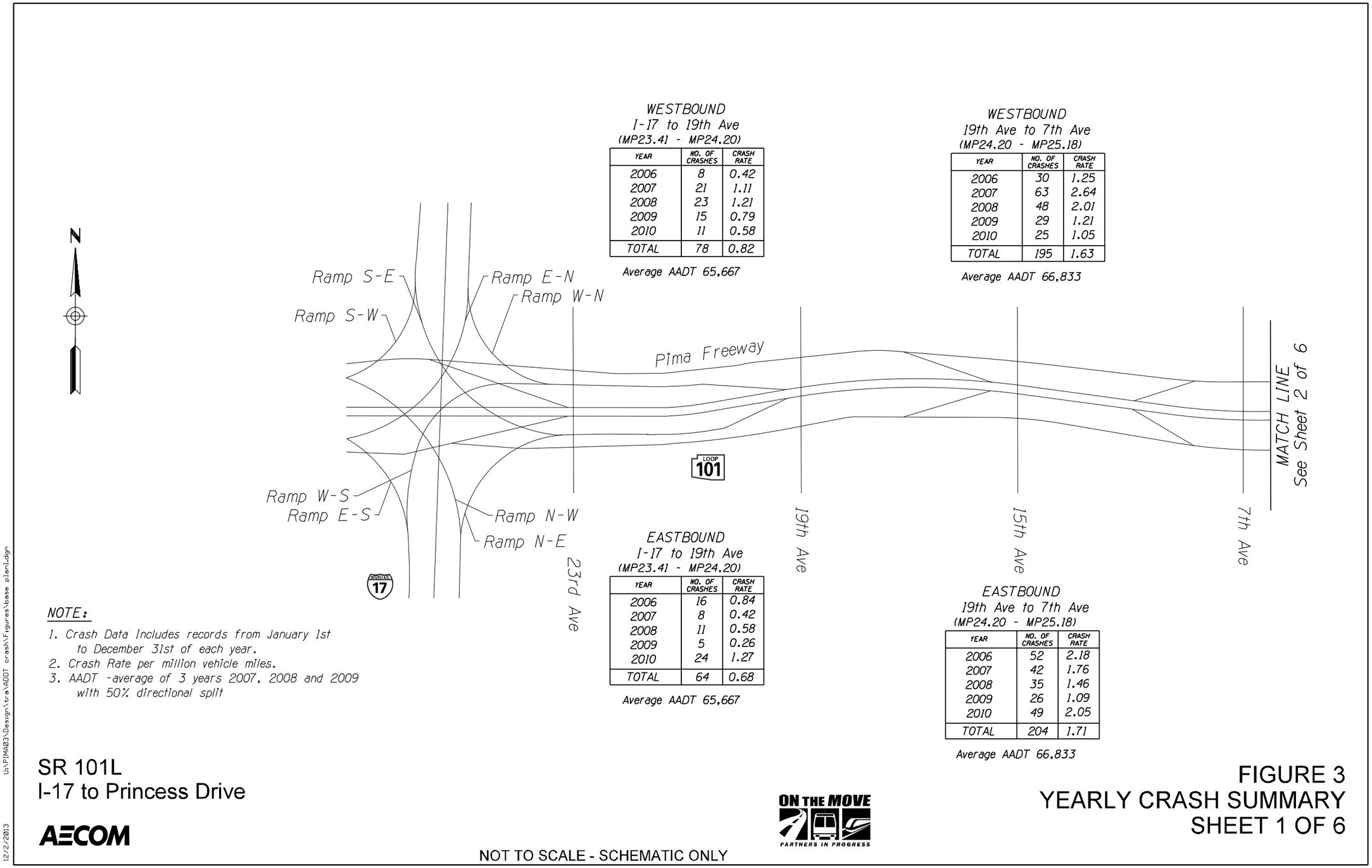
Since vehicles can enter/exit the HOV lanes at any given point throughout the corridor, the mainline volumes include an estimate of the ingress and egress of vehicles from the HOV lanes. Therefore, the volumes shown in Figure 4 do not balance between the entrance and exit ramps. Detailed data on traffic volumes can be found in Appendix A of the Initial Traffic Report.

The existing SR 101L mainline daily traffic volumes vary within the study area from approximately 154,100 vehicles per day (vpd) at the west end (between 19th Avenue and 7th Avenue) to approximately 121,700 vpd at the east end (between Hayden Road and Princess Drive). Aside from the I-17/SR101L TI and SR51/SR101L TI directional ramps, the Tatum Boulevard and Scottsdale Road ramps have the highest traffic volumes (9,600 - 17,900 vpd).

The traffic factors shown in Table 16 are based on traffic counts that were obtained in February 2012. The portion of the ADT occurring within the peak hour is approximately 7 to 9% and the directional distribution is approximately 50 to 60% in the peak direction of travel.

The traffic factors were also compiled from the ADOT MPD Roadway Inventory Management System from 2012 and generally agree with these percentages. The portion of ADT occurring within the peak hour is listed at approximately 9 to 10% and the directional distribution is approximately 50 to 65% in the peak direction of travel. Based on the ADOT MPD Roadway Inventory Management System from 2010, the portion of traffic classified as commercial vehicles (trucks) is approximately 6% west of Tatum Boulevard and approximately 3% east of Tatum Boulevard.

(Text continued on Page 37)



WESTBOUND
I-17 to 19th Ave
(MP23.41 - MP24.20)

YEAR	NO. OF CRASHES	CRASH RATE
2006	8	0.42
2007	21	1.11
2008	23	1.21
2009	15	0.79
2010	11	0.58
TOTAL	78	0.82

Average AADT 65,667

WESTBOUND
19th Ave to 7th Ave
(MP24.20 - MP25.18)

YEAR	NO. OF CRASHES	CRASH RATE
2006	30	1.25
2007	63	2.64
2008	48	2.01
2009	29	1.21
2010	25	1.05
TOTAL	195	1.63

Average AADT 66,833

EASTBOUND
I-17 to 19th Ave
(MP23.41 - MP24.20)

YEAR	NO. OF CRASHES	CRASH RATE
2006	16	0.84
2007	8	0.42
2008	11	0.58
2009	5	0.26
2010	24	1.27
TOTAL	64	0.68

Average AADT 65,667

EASTBOUND
19th Ave to 7th Ave
(MP24.20 - MP25.18)

YEAR	NO. OF CRASHES	CRASH RATE
2006	52	2.18
2007	42	1.76
2008	35	1.46
2009	26	1.09
2010	49	2.05
TOTAL	204	1.71

Average AADT 66,833

NOTE:

1. Crash Data Includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split

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SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 3
YEARLY CRASH SUMMARY
SHEET 1 OF 6

N

WESTBOUND
7th Ave to 7th St
(MP25.18 - MP26.16)

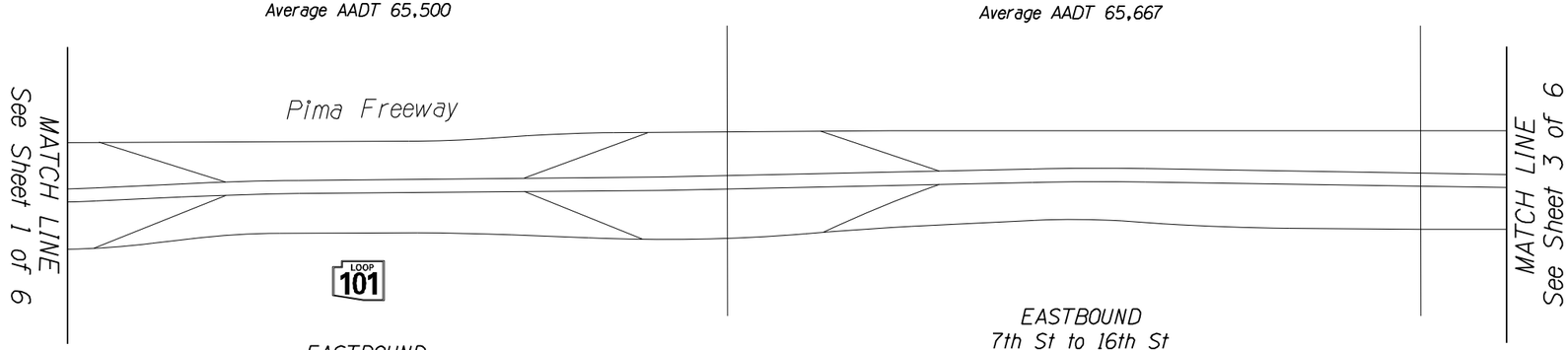
YEAR	NO. OF CRASHES	CRASH RATE
2006	29	1.24
2007	57	2.43
2008	39	1.66
2009	42	1.79
2010	38	1.62
TOTAL	205	1.75

Average AADT 65,500

WESTBOUND
7th St to 16th St
(MP26.16 - MP27.15)

YEAR	NO. OF CRASHES	CRASH RATE
2006	29	1.22
2007	28	1.18
2008	30	1.26
2009	29	1.22
2010	27	1.14
TOTAL	143	1.21

Average AADT 65,667



EASTBOUND
7th Ave to 7th St
(MP25.18 - MP26.16)

YEAR	NO. OF CRASHES	CRASH RATE
2006	20	0.85
2007	38	1.62
2008	22	0.94
2009	21	0.90
2010	44	1.88
TOTAL	145	1.24

Average AADT 65,500

EASTBOUND
7th St to 16th St
(MP26.16 - MP27.15)

YEAR	NO. OF CRASHES	CRASH RATE
2006	26	1.10
2007	30	1.26
2008	34	1.43
2009	24	1.01
2010	40	1.69
TOTAL	154	1.30

Average AADT 65,667

NOTE:

1. Crash Data Includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split

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SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 3
YEARLY CRASH SUMMARY
SHEET 2 OF 6

N

WESTBOUND
16th St to Cave Creek Rd
(MP27.15 - MP28.21)

YEAR	NO. OF CRASHES	CRASH RATE
2006	25	0.92
2007	30	1.10
2008	34	1.25
2009	30	1.10
2010	29	1.07
TOTAL	148	1.09

Average AADT 70,333

WESTBOUND
Cave Creek Rd to 32nd St
(MP28.21 - MP29.21)

YEAR	NO. OF CRASHES	CRASH RATE
2006	16	0.55
2007	7	0.24
2008	18	0.62
2009	13	0.45
2010	27	0.72
TOTAL	75	0.52

Average AADT 79,500

Pima Freeway

MATCH LINE
See Sheet 4 of 6

MATCH LINE
See Sheet 2 of 6

LOOP 101

Cave Creek Rd

32nd St

EASTBOUND
16th St to Cave Creek Rd
(MP27.15 - MP28.21)

YEAR	NO. OF CRASHES	CRASH RATE
2006	59	2.17
2007	50	1.84
2008	45	1.65
2009	46	1.69
2010	45	1.65
TOTAL	245	1.80

Average AADT 70,333

EASTBOUND
Cave Creek Rd to 32nd St
(MP28.21 - MP29.21)

YEAR	NO. OF CRASHES	CRASH RATE
2006	28	0.96
2007	28	0.96
2008	37	1.28
2009	25	0.86
2010	27	0.93
TOTAL	145	1.00

Average AADT 79,500

NOTE:

1. *Crash Data Includes records from January 1st to December 31st of each year.*
2. *Crash Rate per million vehicle miles.*
3. *AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split*

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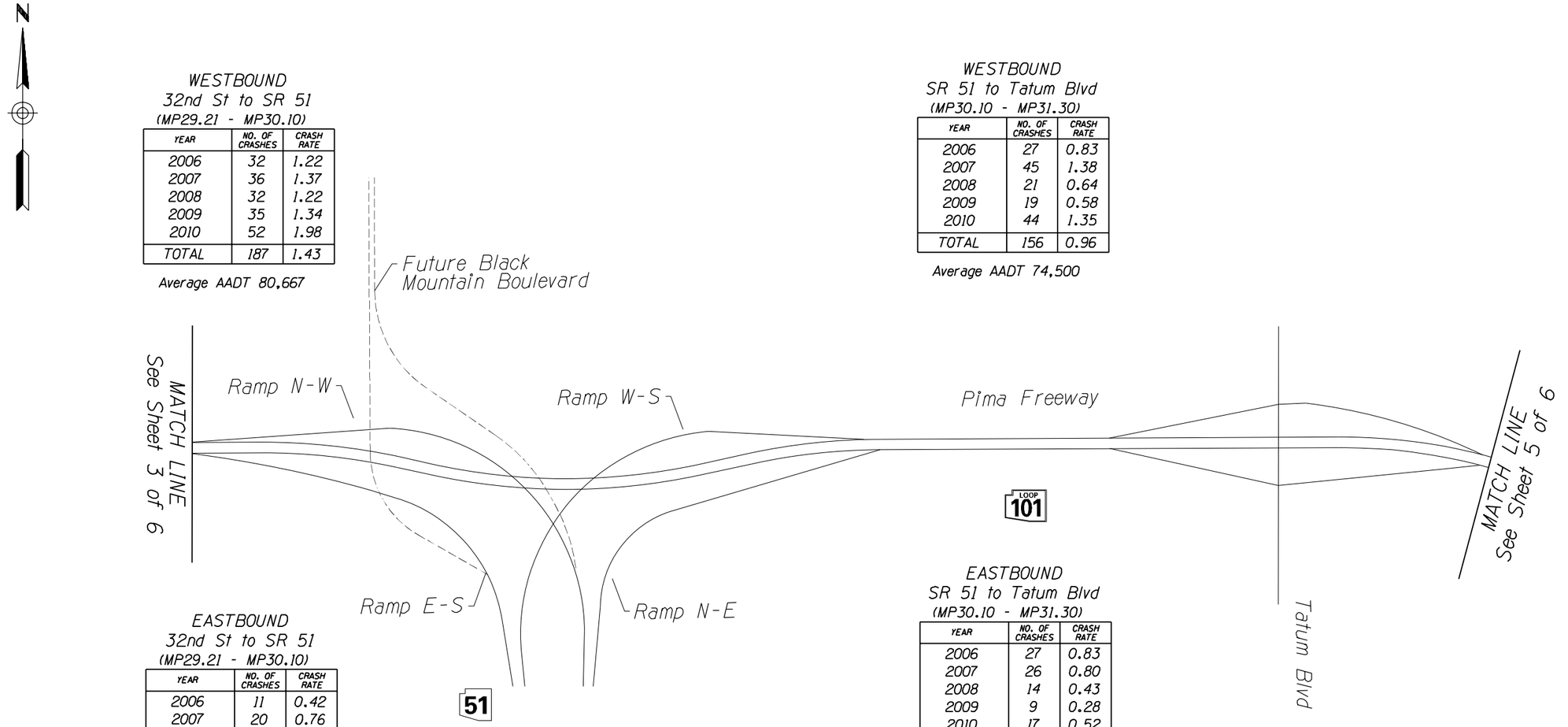
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 3
YEARLY CRASH SUMMARY
SHEET 3 OF 6

NOT TO SCALE - SCHEMATIC ONLY


N
WESTBOUND
32nd St to SR 51
(MP29.21 - MP30.10)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 32 | 1.22
2007 | 36 | 1.37
2008 | 32 | 1.22
2009 | 35 | 1.34
2010 | 52 | 1.98
TOTAL | 187 | 1.43
Average AADT 80,667
WESTBOUND
SR 51 to Tatum Blvd
(MP30.10 - MP31.30)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 27 | 0.83
2007 | 45 | 1.38
2008 | 21 | 0.64
2009 | 19 | 0.58
2010 | 44 | 1.35
TOTAL | 156 | 0.96
Average AADT 74,500
Future Black Mountain Boulevard
MATCH LINE See Sheet 3 of 6
Ramp N-W
Ramp W-S
Pima Freeway
LOOP 101
MATCH LINE See Sheet 5 of 6
Tatum Blvd
Ramp E-S
Ramp N-E
51
EASTBOUND
32nd St to SR 51
(MP29.21 - MP30.10)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 11 | 0.42
2007 | 20 | 0.76
2008 | 29 | 1.11
2009 | 20 | 0.76
2010 | 21 | 0.80
TOTAL | 101 | 0.77
Average AADT 80,667
EASTBOUND
SR 51 to Tatum Blvd
(MP30.10 - MP31.30)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 27 | 0.83
2007 | 26 | 0.80
2008 | 14 | 0.43
2009 | 9 | 0.28
2010 | 17 | 0.52
TOTAL | 93 | 0.57
Average AADT 74,500
NOTE:
1. Crash Data Includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split
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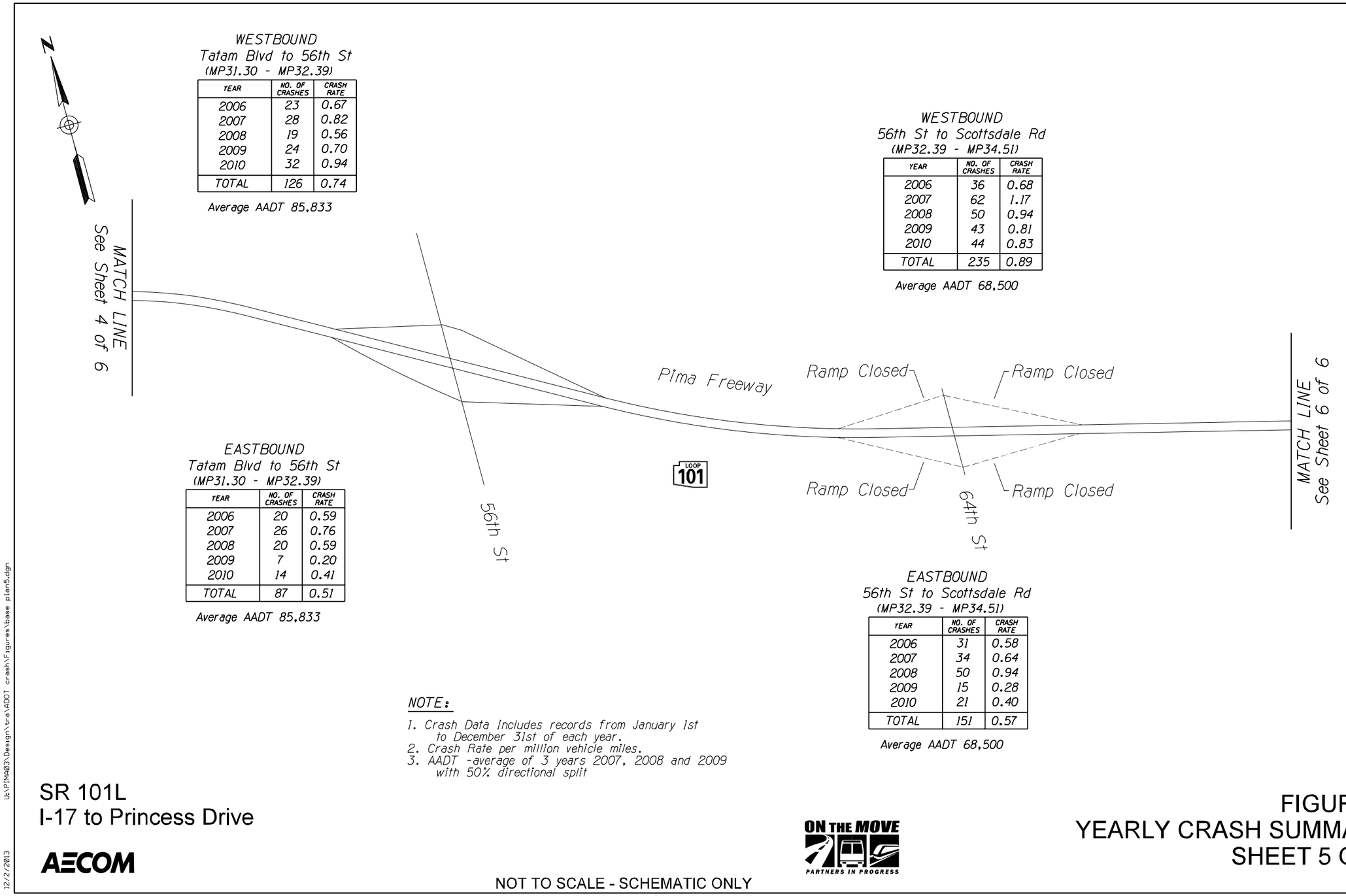
12/2/2013
SR 101L
I-17 to Princess Drive
AECOM
NOT TO SCALE - SCHEMATIC ONLY
ON THE MOVE
PARTNERS IN PROGRESS
FIGURE 3
YEARLY CRASH SUMMARY
SHEET 4 OF 6


N
WESTBOUND
Tatam Blvd to 56th St
(MP31.30 - MP32.39)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 23 | 0.67
2007 | 28 | 0.82
2008 | 19 | 0.56
2009 | 24 | 0.70
2010 | 32 | 0.94
TOTAL | 126 | 0.74
Average AADT 85,833
WESTBOUND
56th St to Scottsdale Rd
(MP32.39 - MP34.51)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 36 | 0.68
2007 | 62 | 1.17
2008 | 50 | 0.94
2009 | 43 | 0.81
2010 | 44 | 0.83
TOTAL | 235 | 0.89
Average AADT 68,500
MATCH LINE
See Sheet 4 of 6
Pima Freeway
Ramp Closed
Ramp Closed
Ramp Closed
Ramp Closed
LOOP 101
56th St
64th St
MATCH LINE
See Sheet 6 of 6
EASTBOUND
Tatam Blvd to 56th St
(MP31.30 - MP32.39)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 20 | 0.59
2007 | 26 | 0.76
2008 | 20 | 0.59
2009 | 7 | 0.20
2010 | 14 | 0.41
TOTAL | 87 | 0.51
Average AADT 85,833
EASTBOUND
56th St to Scottsdale Rd
(MP32.39 - MP34.51)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 31 | 0.58
2007 | 34 | 0.64
2008 | 50 | 0.94
2009 | 15 | 0.28
2010 | 21 | 0.40
TOTAL | 151 | 0.57
Average AADT 68,500
NOTE:
1. Crash Data Includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split
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12/2/2013
SR 101L
I-17 to Princess Drive
AECOM
ON THE MOVE
PARTNERS IN PROGRESS
NOT TO SCALE - SCHEMATIC ONLY
FIGURE 3
YEARLY CRASH SUMMARY
SHEET 5 OF 6

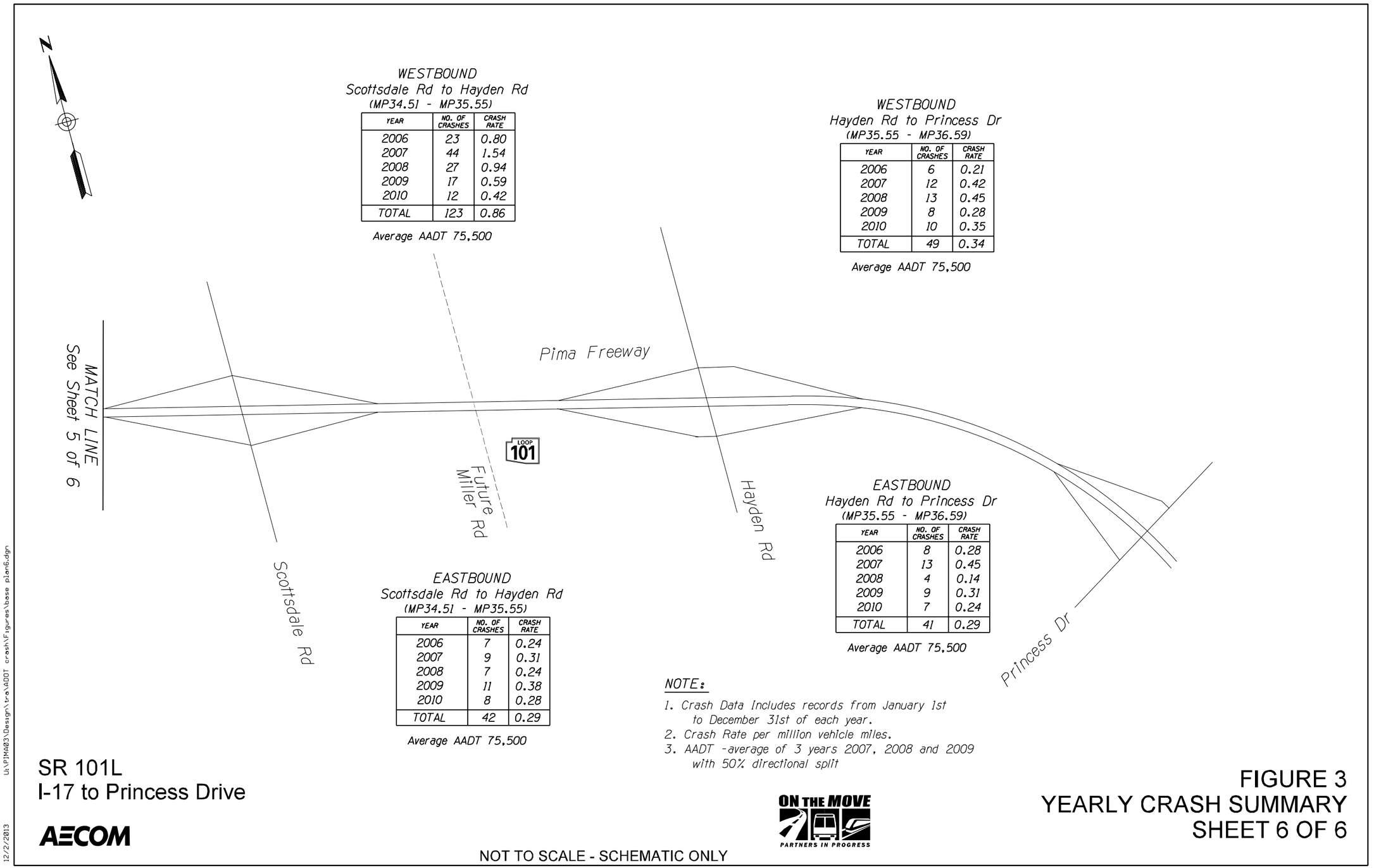
N
WESTBOUND
Scottsdale Rd to Hayden Rd
(MP34.51 - MP35.55)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 23 | 0.80
2007 | 44 | 1.54
2008 | 27 | 0.94
2009 | 17 | 0.59
2010 | 12 | 0.42
TOTAL | 123 | 0.86
Average AADT 75,500
WESTBOUND
Hayden Rd to Princess Dr
(MP35.55 - MP36.59)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 6 | 0.21
2007 | 12 | 0.42
2008 | 13 | 0.45
2009 | 8 | 0.28
2010 | 10 | 0.35
TOTAL | 49 | 0.34
Average AADT 75,500
Pima Freeway
LOOP 101
Future Miller Rd
Hayden Rd
Princess Dr
Scottsdale Rd
MATCH LINE
See Sheet 5 of 6
EASTBOUND
Scottsdale Rd to Hayden Rd
(MP34.51 - MP35.55)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 7 | 0.24
2007 | 9 | 0.31
2008 | 7 | 0.24
2009 | 11 | 0.38
2010 | 8 | 0.28
TOTAL | 42 | 0.29
Average AADT 75,500
EASTBOUND
Hayden Rd to Princess Dr
(MP35.55 - MP36.59)
YEAR | NO. OF CRASHES | CRASH RATE
2006 | 8 | 0.28
2007 | 13 | 0.45
2008 | 4 | 0.14
2009 | 9 | 0.31
2010 | 7 | 0.24
TOTAL | 41 | 0.29
Average AADT 75,500
NOTE:
1. Crash Data Includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT -average of 3 years 2007, 2008 and 2009 with 50% directional split
SR 101L
I-17 to Princess Drive
AECOM
ON THE MOVE
PARTNERS IN PROGRESS
FIGURE 3
YEARLY CRASH SUMMARY
SHEET 6 OF 6
NOT TO SCALE - SCHEMATIC ONLY
12/2/2013
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Table 16 – Mainline Traffic Factors

	A.M. Peak Hour			P.M. Peak Hour		
	K value	Directional Split		K value	Directional Split	
		WB	EB		WB	EB
Within the Sr51/SR101L TI	7%	42%	58%	9%	57%	43%
27th Avenue to I-17/SR101L TI Ramps	7%	44%	56%	8%	54%	46%
I-17/SR101L TI Ramps to 19th Avenue	7%	46%	54%	8%	54%	46%
19th Avenue to 7th Avenue	7%	48%	52%	8%	53%	47%
7th Avenue to 7th Street	7%	49%	51%	7%	54%	46%
7th Street to Cave Creek Road	7%	46%	54%	7%	54%	46%
Cave Creek Road to SR51/SR101L TI Ramps	7%	38%	62%	8%	52%	48%
Within the SR51/SR101L TI	7%	35%	65%	8%	59%	41%
SR51/Sr101L TI Ramps to Tatum Boulevard	8%	41%	59%	8%	57%	43%
Tatum Boulevard to 56th Street	8%	36%	64%	8%	57%	43%
56th Street to Scottsdale Road	8%	39%	61%	8%	62%	38%
Scottsdale Road to Hayden Road	8%	39%	61%	8%	58%	42%
Hayden Road to Princess Drive	8%	39%	61%	8%	59%	41%
Between the Princess Drive Ramps	8%	37%	63%	8%	56%	44%

Source: February 2012 Traffic Counts

2.3 OPERATIONAL ANALYSIS METHODOLOGY

2.3.1 SR 101L Widening Alternatives

An operational analysis was performed for all segments of the mainline including the general-purpose lanes, ramp junctions, and weave sections for the existing conditions, the No-Build Alternative, and each of the Build Alternatives. The CORSIM computer program was used to provide a simulation of the entire freeway system within the study area. CORSIM is a microscopic traffic simulation program that uses roadway geometry and traffic volume inputs to simulate operations of an entire freeway network. CORSIM has the ability to provide various measures of effectiveness for each link within the system. The vehicle density and speed outputs from CORSIM were used as the measure of effectiveness to relate to a level-of-service as established by the Highway Capacity Manual (HCM).

The concept of level-of-service (LOS) uses qualitative measures that characterize operational conditions within a stream of traffic. The descriptions of individual levels-of-service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. Six levels of service are defined for each type of facility for which the analytical procedures are available. They are given letter designations from ‘A’ to ‘F’, with LOS ‘A’ representing the best operational conditions and LOS ‘F’ representing an over-capacity condition with a high degree of congestion. Each level of service represents a range of operating conditions.

Table 17 depicts the vehicle densities (vehicles per mile per lane) and corresponding levels-of-service established in the HCM.

Table 17 – Vehicle Densities and Corresponding Levels-of-Service

Level-of-Service	Density Range (pc/mi/ln)
A	0-11
B	>11-18
C	>18-26
D	>26-35
E	>35-45
F	>45

Source: *Highway Capacity Manual* (2010), pg. 23-3

In order to verify the CORSIM output, additional analyses were performed using the Highway Capacity Software (HCS), which uses the procedures from the *Highway Capacity Manual* (2010)(HCM) to provide the traffic operational characteristics in terms of level-of-service. One of the major disadvantages of using HCS for analyzing a major freeway network is that it does not address the cumulative effects of delay on an entire system. HCS only allows for the evaluation of a single location within an overall system and does not take into account the effects of conditions upstream and downstream. For example, a severe upstream bottleneck may limit the amount of traffic reaching a downstream location. Similarly, a severe downstream bottleneck may cause queuing to such an extent that it effects an upstream location. Therefore, CORSIM was used to evaluate the entire system and HCS was used to verify the CORSIM results.

The following CORSIM model input assumptions were used for the operational analysis:

- Free flow speed of 65 mph for the mainline general-purpose lanes
- Free flow speed of 55 mph for the system interchange ramps
- Free flow speed of 50 mph for the service interchange ramps
- Commercial vehicle percentage was assumed to be 5% westbound and 6% eastbound during peak hours

The commercial vehicle percentage is based on recent experience in observing the existing traffic conditions and performing operational analysis for projects on the Regional Freeway System, and not on the existing ADOT count data. The ADOT MPD Roadway Inventory Management Section indicates that 3% of the daily traffic east of Tatum Boulevard and 6% of the traffic west of Tatum Boulevard is classified as commercial vehicles. However, the recent traffic counts indicate that roughly 5% of the vehicles in the westbound direction of travel and 6% of the vehicles in the eastbound direction of travel in the peak hour would be classified as commercial vehicles. Therefore the truck percentages indicated by the recent traffic counts were used for the operational analysis.

In order to replicate the existing peak hour travel conditions, the A.M. and P.M. peak hour CORSIM models were calibrated based on measured field data. The calibration process followed FHWA guidelines for developing an existing conditions model and included multiple simulation runs (10) using random seeds to account for variability in the output. Existing field measured traffic volumes, speeds, travel times, and queue lengths were utilized as calibration data.

Travel time measurements were performed during both A.M. and P.M. peak hours in April 2012. The field travel time measurements were conducted along the eastbound and westbound directions of travel from the I-17/SR101L TI to the Princess Drive TI.

The travel time measurements were recorded and averaged over two days in both directions of travel for each route. These travel times were one of the data sets used to calibrate the existing conditions CORSIM model. The CORSIM output link volume data was compared to the input volumes for each roadway segment. At selected locations the driver behavior parameters were modified to calibrate the volume comparison.

Following the calibration process, the CORSIM model output closely replicated the existing congestion conditions observed in the study area. The lane changing and driver behavior parameters from the calibration process were then used in the future condition CORSIM models (Design Year 2035). Each future conditions model was run at least ten times and the model output was averaged to determine the density.

Since the objective of this study is to evaluate capacity improvements for the SR 101L mainline, the operational analysis was constrained to the SR 101L mainline general-purpose lanes, entrance/exit ramp junctions and weaving areas.

2.3.2 Service Interchanges

Alternative D and Alternative E (see Section 2.4) would remove the existing 19th Avenue TI ramps (to/from the east). The removal of the 19th Avenue ramps would require the traffic that currently use the ramps to re-route their trips to the adjacent arterial streets, or utilize the eastbound and westbound frontage roads to access SR 101L at the 7th Avenue TI. Therefore, operational analyses was conducted to evaluate the impact of redistributed traffic on the 19th Avenue TI, the 15th Avenue intersections, and the 7th Avenue TI.

Intersection LOS analyses were conducted using Synchro 8.0 in accordance with procedures outlined in the HCM. Table 18 below shows the control delays and corresponding levels-of-service established in the HCM for signalized intersections.

Table 18 – Intersection Delay and Corresponding Levels-of-Service

Level-of-Service	Control Delay (sec/veh)
A	< 10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	> 80

Source: *Highway Capacity Manual* (2010), pg. 23-3

The following assumptions/input parameters were used in the intersection analysis:

- Peak hour factor: 0.92
- Vehicle travel speed: 45 mph
- Intersection spacing: based on proposed roadway geometrics
- Percentage of heavy vehicles: 5%
- Lane widths: 12 feet
- Base saturation flow rate: 1,900 vphpl for all movements
- Right-turn on red movements: these traffic movements were included in the analysis and modeled in the software
- Cycle length: between 90 and 160 seconds

The 2035 traffic volume projections were adjusted by utilizing a 0.92 peak hour factor to provide an appropriate “safety factor” for the analysis. The resulting control delays obtained from the Synchro software for each approach movement were used to develop a cumulative average control delay for the total interchange.

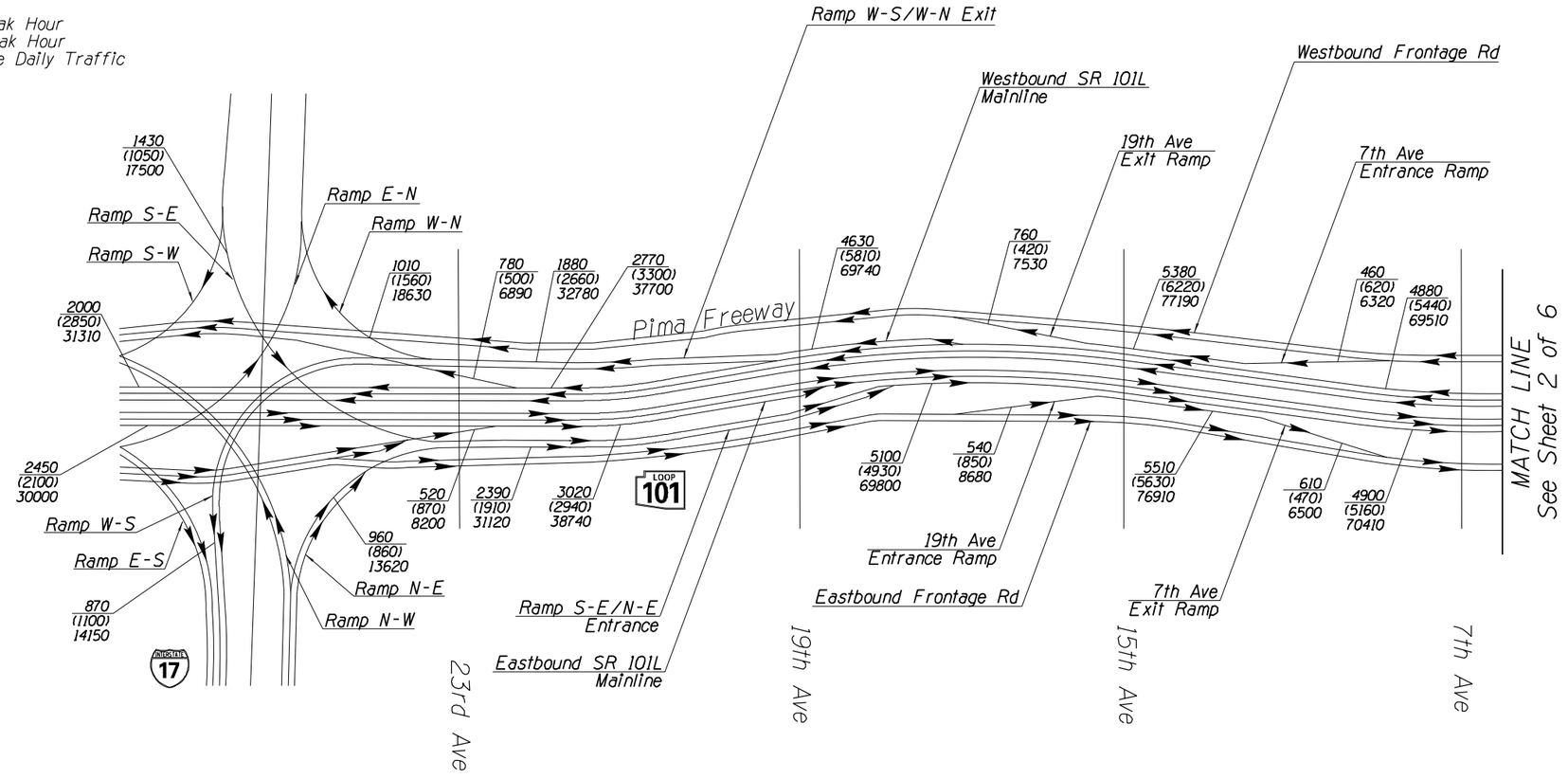
In accordance with the goals established for the regional freeway system, each service interchange should provide LOS ‘D’ or better operations for the overall interchange and each intersection approach. Individual movements within an intersection approach roadway may operate with a lower level-of-service.

(Text continued on page 45)

N

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2012 AM Peak Hour
(xxx) - 2012 PM Peak Hour
xxxx - 2012 Average Daily Traffic



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 4
2012 EXISTING VOLUMES & LANE CONFIGURATION
SHEET 1 OF 6

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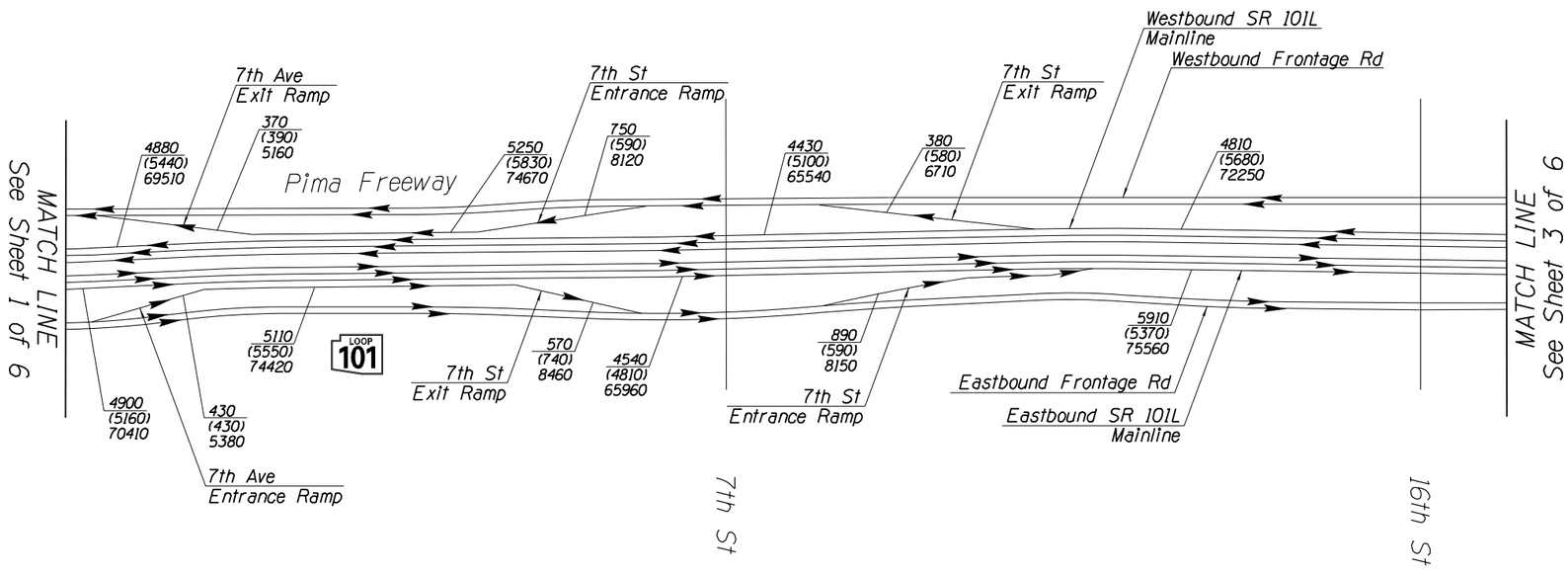

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2012 AM Peak Hour
(xxx) - 2012 PM Peak Hour
xxxx - 2012 Average Daily Traffic

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 4
2012 EXISTING VOLUMES &
LANE CONFIGURATION
SHEET 2 OF 6

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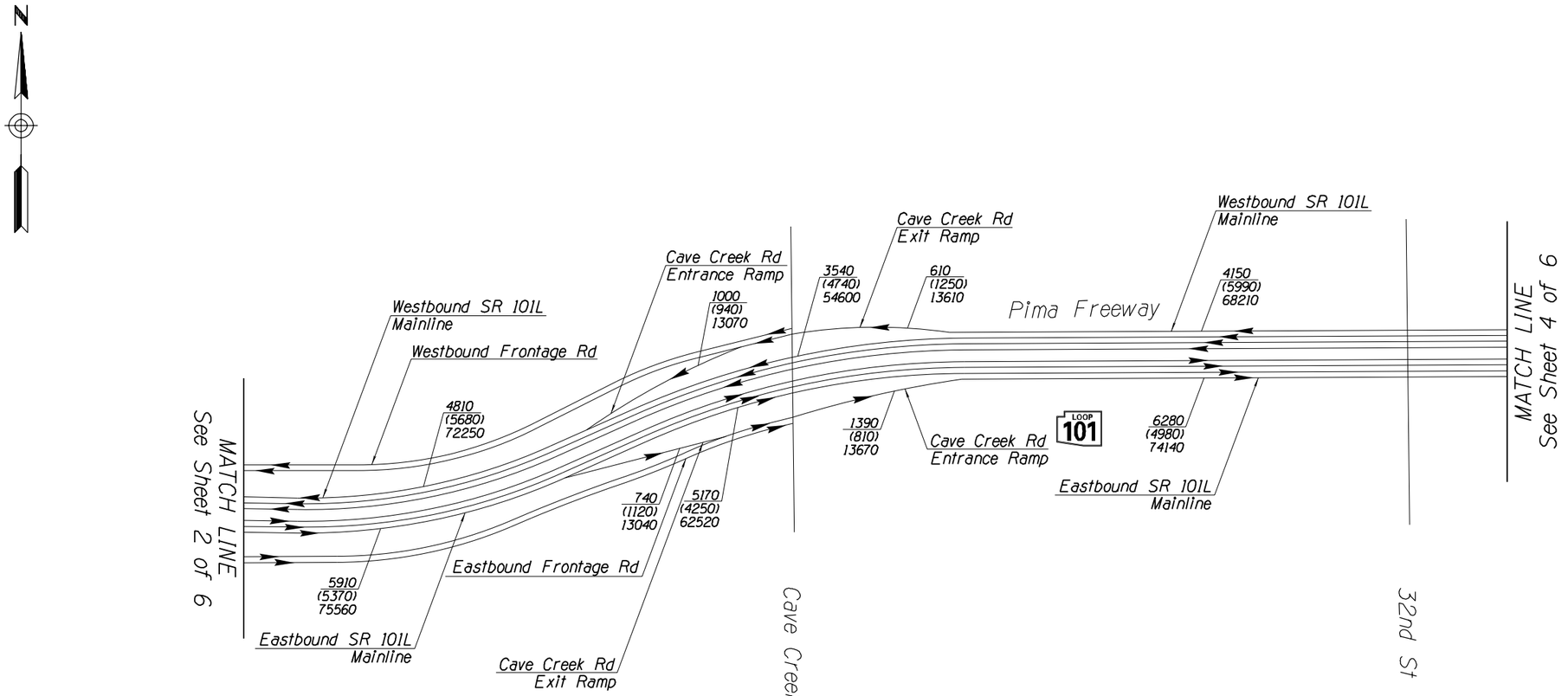

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2012 AM Peak Hour
(xxx) - 2012 PM Peak Hour
xxxx - 2012 Average Daily Traffic

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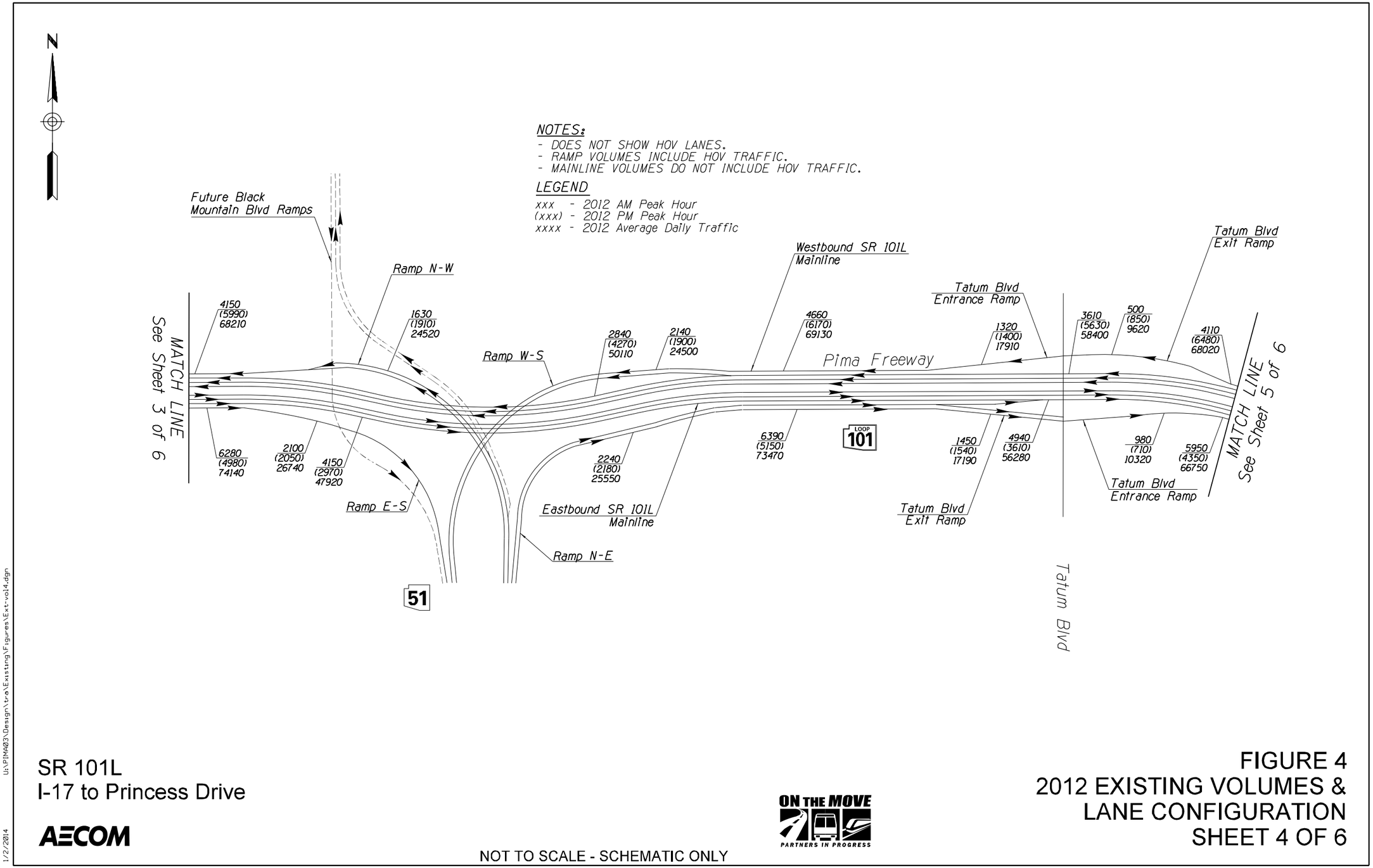
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 4
2012 EXISTING VOLUMES &
LANE CONFIGURATION
SHEET 3 OF 6



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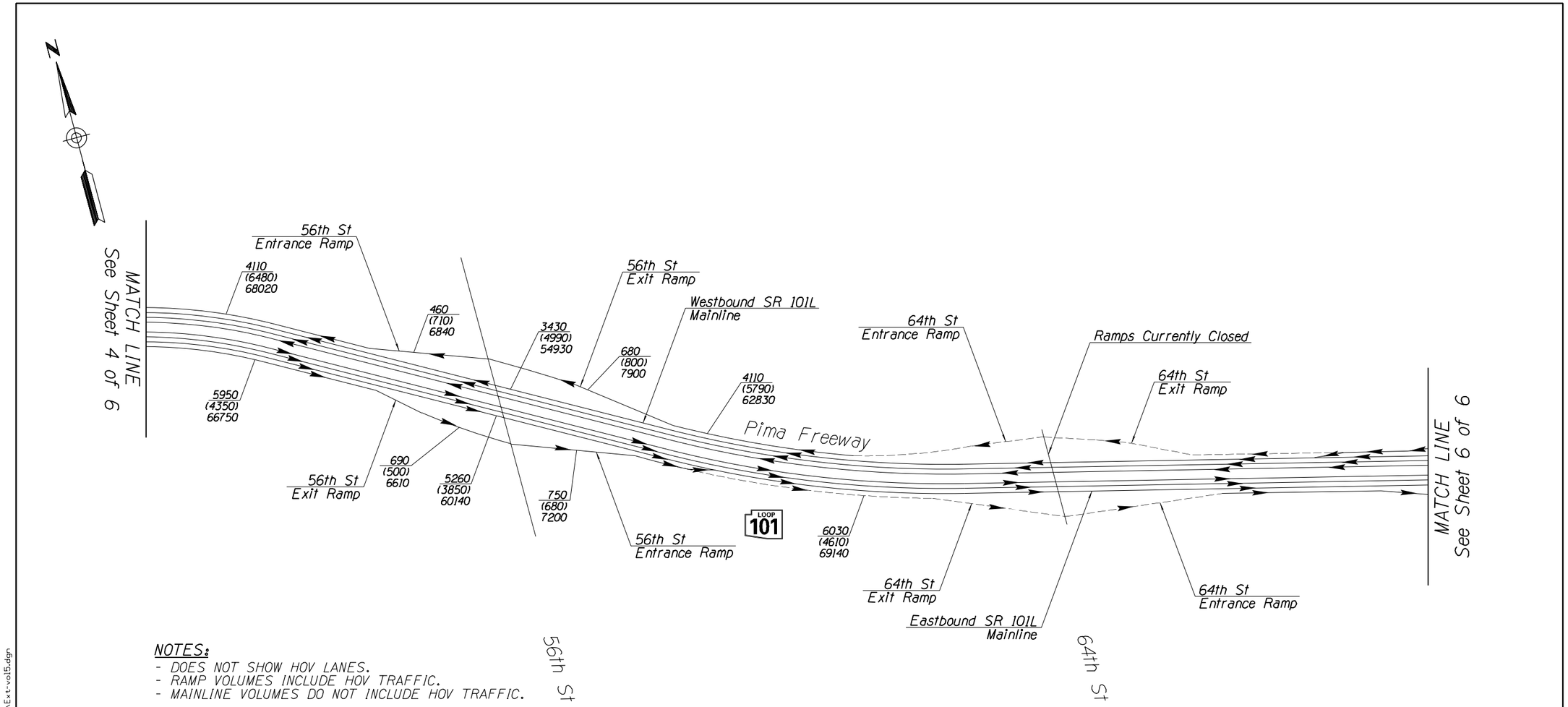
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 4
2012 EXISTING VOLUMES &
LANE CONFIGURATION
SHEET 4 OF 6



NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

xxx - 2012 AM Peak Hour
(xxx) - 2012 PM Peak Hour
xxxx - 2012 Average Daily Traffic

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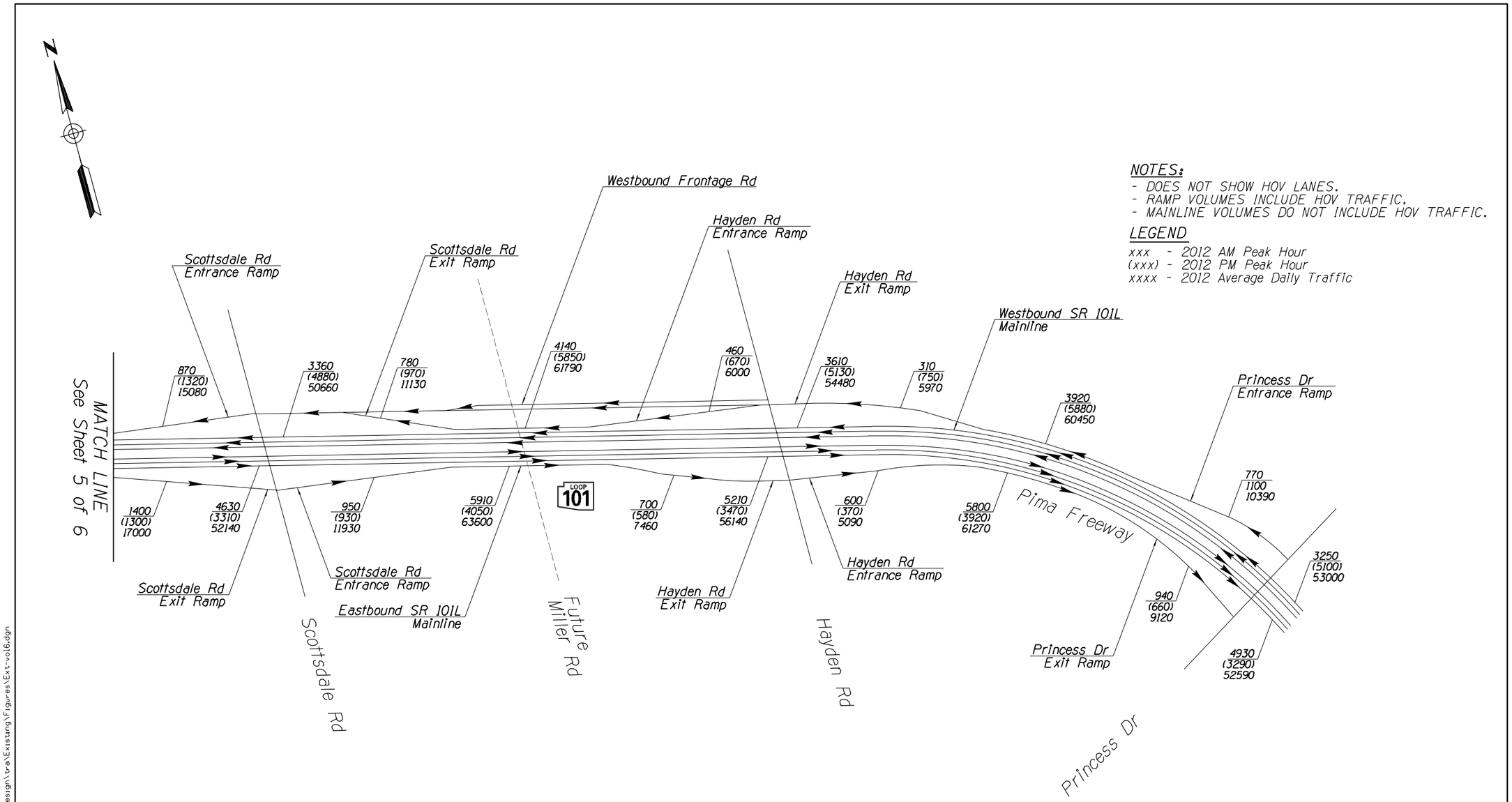
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 4
2012 EXISTING VOLUMES &
LANE CONFIGURATION
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 4
2012 EXISTING VOLUMES &
LANE CONFIGURATION
SHEET 6 OF 6

2.4 SR 101L WIDENING ALTERNATIVES

2.4.1 Introduction

Section 3.3 of this report provides a detailed description of the SR 101L Widening Alternatives that were evaluated for this study. The alternatives include the following:

- No-Build Alternative
- Alternative A: SR 101L Widening Alternative
  - Provides one additional general-purpose lane in each direction between 7th Avenue and Princess Drive
  - Would prioritize the SR 101L mainline lanes (3 lanes) over the Ramp 'S-E/N-E' directional ramps (1 lane) departing the I-17/SR101L TI
- Alternative B: SR 101L Widening Alternative
  - Provides one additional general-purpose lane in each direction between 7th Avenue and Princess Drive
  - Would prioritize the I-17/SR101L TI eastbound directional ramp lanes (2 lanes) over the SR 101L mainline (2 lanes) departing the I-17/SR101L TI
- Alternative C: SR 101L Widening Alternative
  - Provides one additional general-purpose lane in each direction between 7th Avenue and Princess Drive
  - Would provide all of the needed general-purpose (3 lanes) and eastbound directional ramp lanes (2 lanes) departing the I-17/SR101L TI
- Alternative D: SR 101L Widening Alternative
  - Provides one additional general-purpose lane in each direction between 7th Avenue and Princess Drive
  - Would provide all of the needed general-purpose (3 lanes) and eastbound directional ramp lanes (2 lanes) departing the I-17/SR101L TI
  - Would remove the 19th Avenue TI ramps (to/from the east) from service
- Alternative E: SR 101L Widening Alternative
  - Provides one additional general-purpose lane in each direction between 7th Avenue and Princess Drive
  - Would provide all of the needed general-purpose (3 lanes) and eastbound directional ramp lanes (2 lanes) departing the I-17/SR101L TI
  - Would remove the 19th Avenue TI ramps (to/from the east) from service
  - Would revise 7th Avenue eastbound exit to a tapered exit

MAG provided traffic volume projections for Design Year 2035. MAG maintains a regional traffic forecasting model to develop future traffic volume projections based on projected socio-economic, population, employment, origin-destination, and other regionally based data. The output from the model includes daily, peak period, and peak hour traffic volumes for general-purpose and HOV lanes for the regional freeway system.

Network simulation output was provided by MAG for the No-Build and Build Alternatives. The 2035 model includes all transportation system improvements identified in the RTP through year 2035. The 2035 traffic volume projections that were received from MAG were post-processed in accordance with the procedures recommended by MAG.

Traffic operational analysis was conducted for each SR 101L Widening Alternative based upon the methodology presented in Section 2.3. The following sections describe the alternatives and the level-of-service analysis results. The lane diagrams, Year 2035 traffic volume projections and level-of-service analysis results for each of the SR 101L Widening Alternatives are included in Appendix F.

In accordance with the traffic operational goals established for this study, the SR 101L mainline should operate with level-of-service (LOS) 'D' or better operational characteristics within the limits of this study.

2.4.2 Existing Conditions

Description of Existing Conditions

The existing roadway configuration, existing average daily traffic (ADT) and peak hour volumes were shown previously on Figure 4 (pages 39-44). The roadway configuration and traffic count data represents the existing roadway conditions in 2012, which preceded the roadway restriping project that occurred in early 2013 for the segment of eastbound SR 101L between I-17 and 7th Avenue.

Operational Analysis Results

Figure 5 (pages 47-52) and Figure 6 (pages 53-58) summarize the level-of-service analysis results for the existing conditions A.M. and P.M. peak hours. The results of the level-of-service analysis and field observation indicate SR 101L currently operates with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - I-17/SR101L TI Ramp 'S-E'
  - I-17/SR101L TI Ramp 'S-E/N-E' Entrance
  - Eastbound SR 101L mainline from west of I-17 to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Eastbound SR 101L mainline between Tatum Boulevard and 64th Street

- P.M. Peak Hour
  - Eastbound SR 101L mainline between the 7th Street exit ramp and the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Westbound SR 101L mainline between 19th Avenue exit ramp and the Cave Creek Road exit ramp
  - Westbound SR 101L mainline between 64th Street and the Hayden Road entrance ramp

Significant congestion is currently occurring throughout the SR 101L corridor during the A.M. and P.M. peak travel periods.

2.4.3 No-Build Alternative

Description of Alternative

The No-Build Alternative includes the existing roadways and planned improvements that are currently programmed for construction. The Year 2035 traffic volume projections and lane diagrams are shown on Figure 7 (pages 59-64).

Additional improvements that have been or will be implemented on SR 101L within the study period includes the following:

- Provide an eastbound general-purpose lane-drop (from 3 lanes to 2 lanes) between I-17 and the 27th Avenue entrance ramp gore (completed in 2013)
- Reconfigure the I-17/SR101L TI Ramp 'S-E/N-E' entrance to provide a two lane entrance with a "lane-add" configuration (completed in 2013)
- Provide four eastbound general-purpose lanes, one HOV lane and one auxiliary lane between the 19th Avenue entrance ramp and the 7th Avenue exit (completed in 2013)
- Transition the eastbound general-purpose lanes from four lanes to three lanes with an AASHTO lane drop that would occur prior to the 7th Avenue entrance ramp gore (completed in 2013)
- Open the 64th Street TI to traffic (currently planned prior to 2035).

Each of these existing and planned improvements has been included in the No-Build Alternative for evaluation.

Operational Analysis Results

Figure 8 (pages 65-70) and Figure 9 (pages 71-76) summarize the level-of-service analysis results for the No-Build Alternative during A.M. and P.M. peak hours. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - I-17/SR101L TI Ramp 'S-E'
  - I-17/SR101L TI Ramp 'N-E'
  - I-17/SR101L TI Ramp 'S-E/N-E' Entrance
  - Eastbound SR 101L mainline from west of I-17 to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp
  - Westbound SR 101L mainline between the 7th Avenue entrance ramp and the 7th Avenue exit ramp
  - Westbound SR 101L mainline between the 7th Street exit ramp and the Cave Creek Road entrance ramp
- P.M. Peak Hour
  - I-17/SR101L TI Ramp 'S-E'
  - I-17/SR101L TI Ramp 'N-E'
  - I-17/SR101L TI Ramp 'S-E/N-E' Entrance
  - Eastbound SR 101L mainline from west of I-17 to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' Exit
  - Westbound SR 101L mainline between the 19th Avenue exit ramp and Princess Drive
  - SR51/SR101L TI Ramp 'N-W'

The projected growth in travel demand within the SR 101L corridor will result in increased congestion that would result in significantly longer traffic queues during the A.M. and P.M. peak travel periods. Therefore, the No-Build Alternative would not achieve the primary project goal to provide LOS 'D' or better operational characteristics on SR 101L between I-17 and Princess Drive. However, the No-Build Alternative will be carried forward for further evaluation in the environmental document.

2.4.4 Alternative A

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. The following provides a detailed description of Alternative A.

<u>Eastbound SR 101L Mainline</u>

The existing configuration of the SR 101L mainline (three general-purpose lanes and one HOV lane) approaching I-17 would be extended to be continuous between I-17 and Princess Drive. The 27th Avenue entrance ramp would be designed with a tapered entrance configuration that merges into the outside freeway lane to retain the mainline lane configuration approaching the I-17/SR101L TI Ramp 'S-E/N-E' entrance ramp gore.

This alternative would reconfigure the Ramp 'S-E/N-E' entrance to merge Ramp 'N-E' with Ramp 'S-E' prior to entering the eastbound SR 101L mainline. One entrance ramp lane would enter eastbound SR 101L with a "lane-add" design. Four lanes (one HOV lane and 3 general-purpose lanes) would continue to the east to the 19th Avenue entrance ramp.

The 19th Avenue entrance ramp would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the 7th Avenue exit. The 7th Avenue exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane. Four general-purpose lanes and one HOV lane would continue to the east to the SR51/SR101L TI.

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(Text continues on page 77)

N

NOTES:

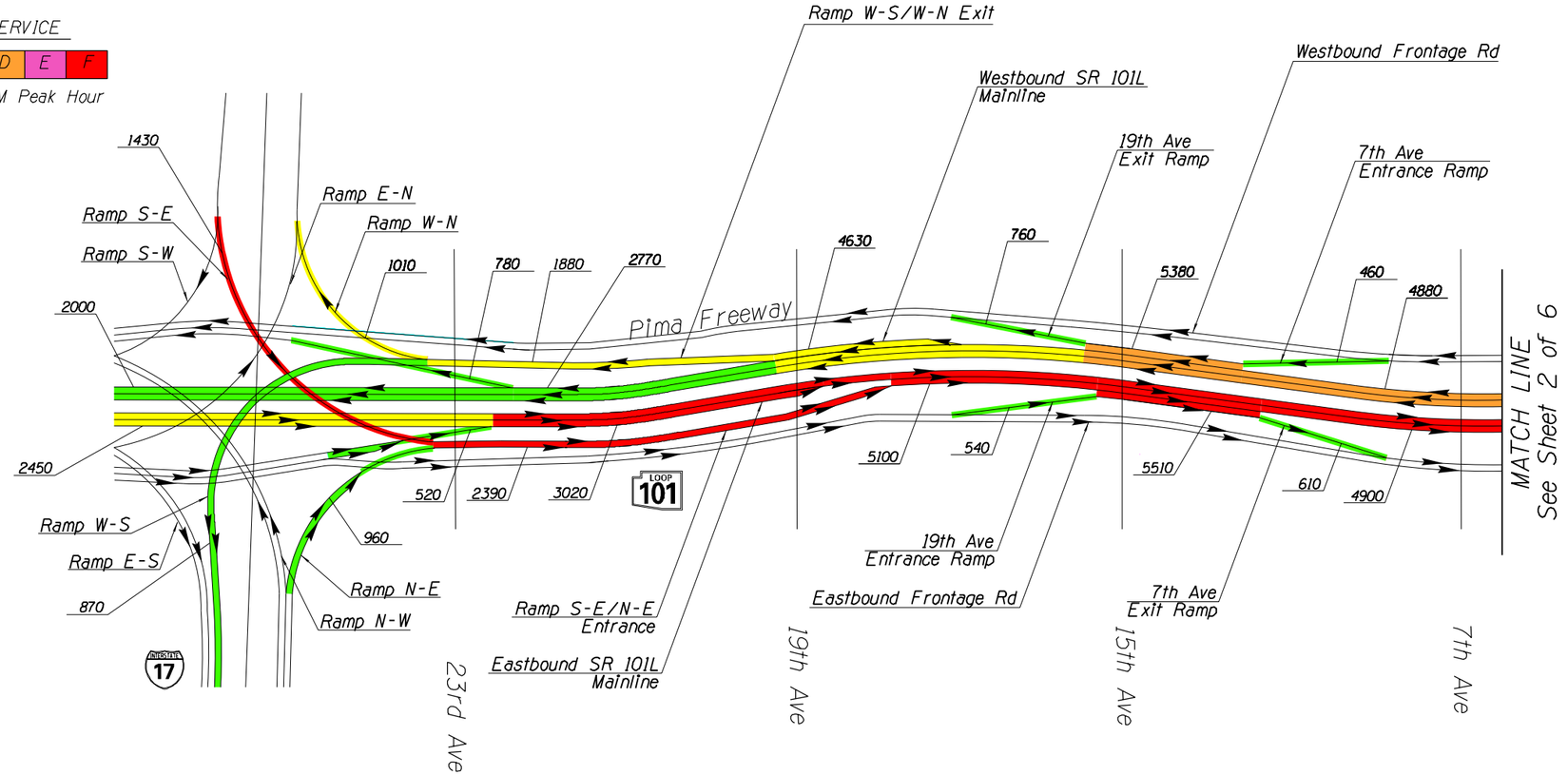
1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 AM Peak Hour



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1/2/2014

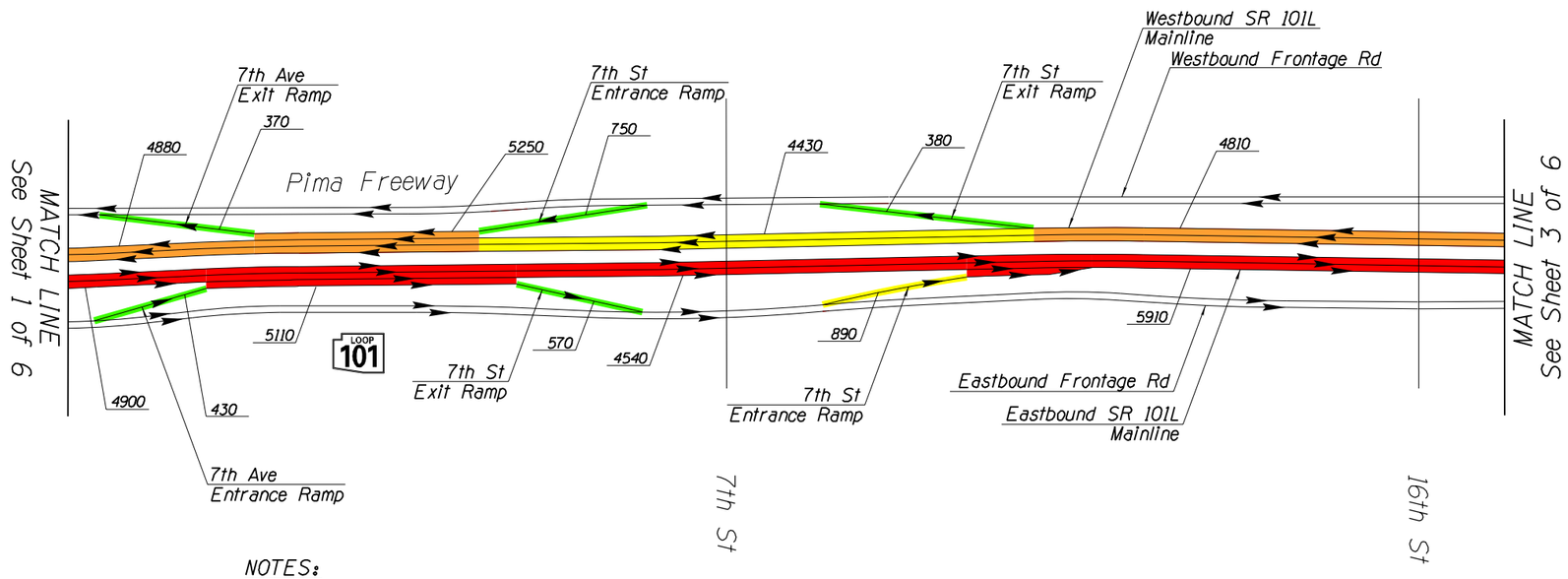
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 1 OF 6



NOTES:

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3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 AM Peak Hour

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1/2/2014

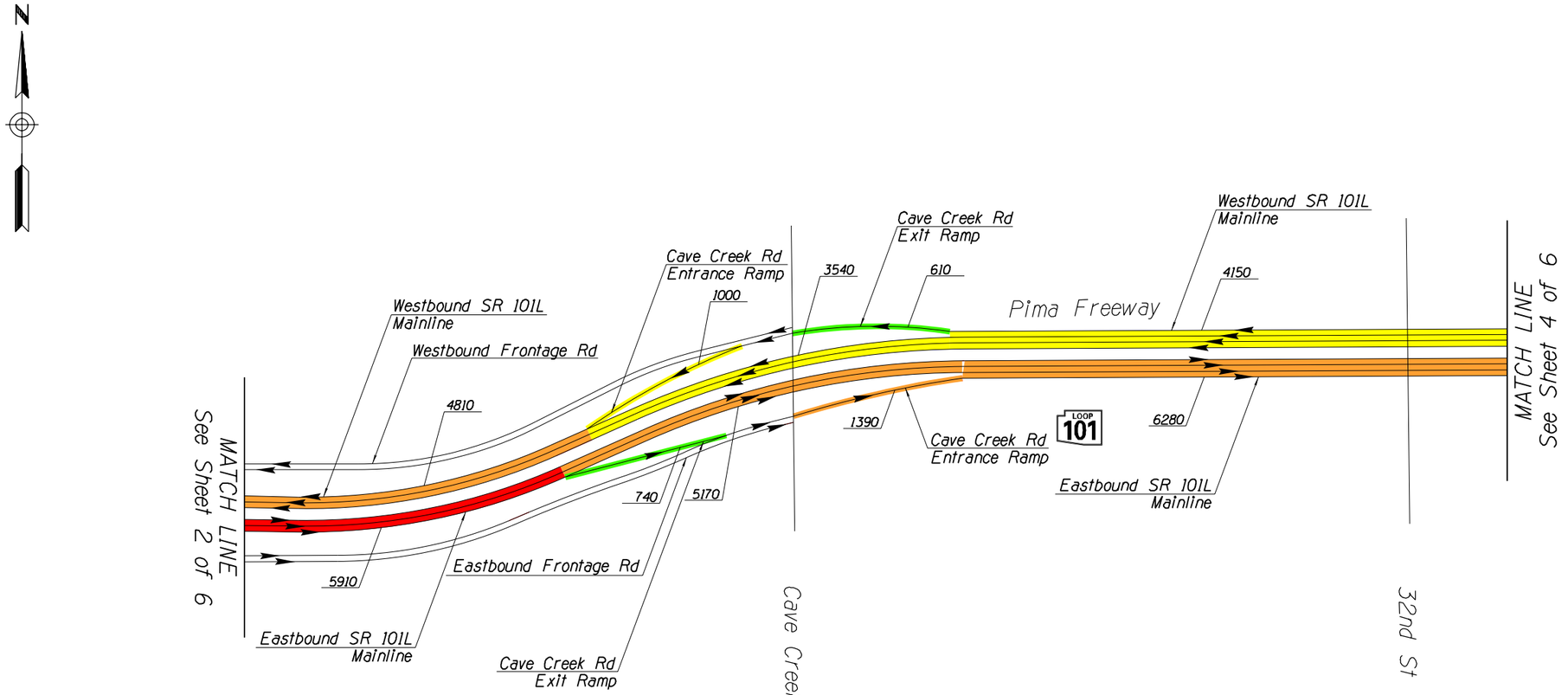
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 2 OF 6



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4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 AM Peak Hour

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1/8/2014

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 3 OF 6

N

NOTES:
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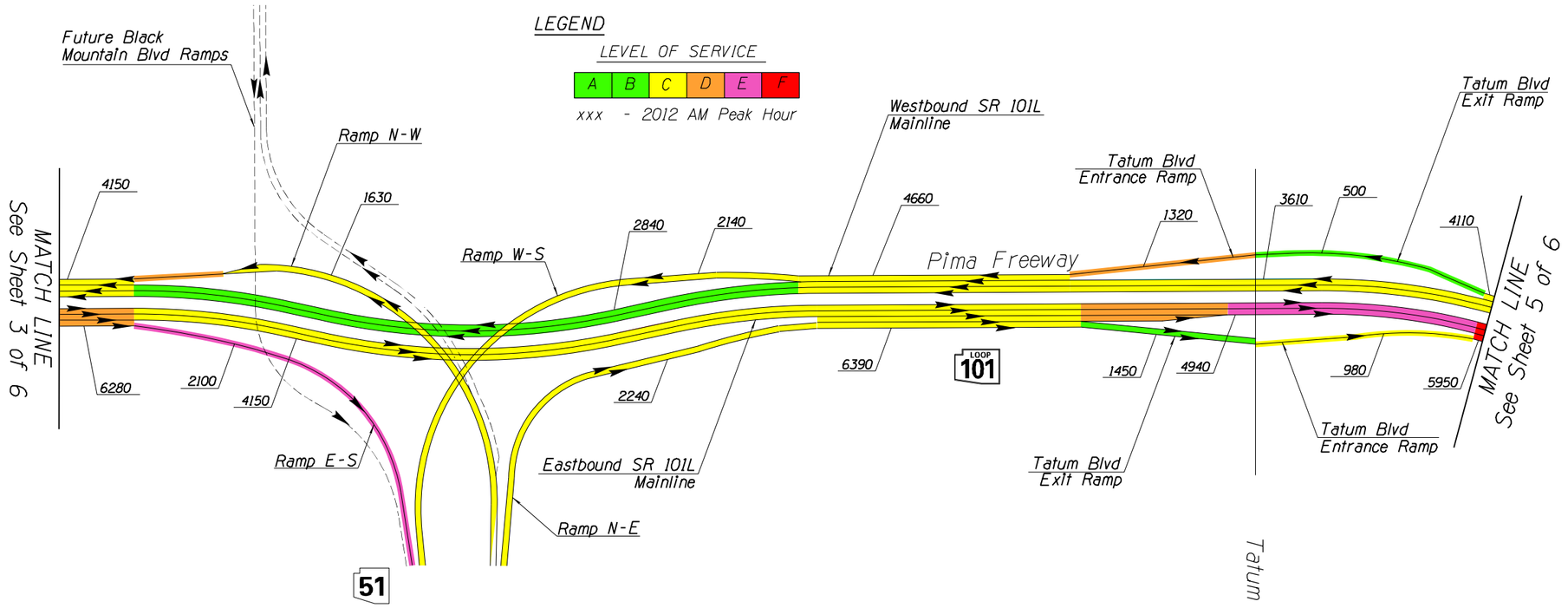
LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 AM Peak Hour



SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 4 OF 6

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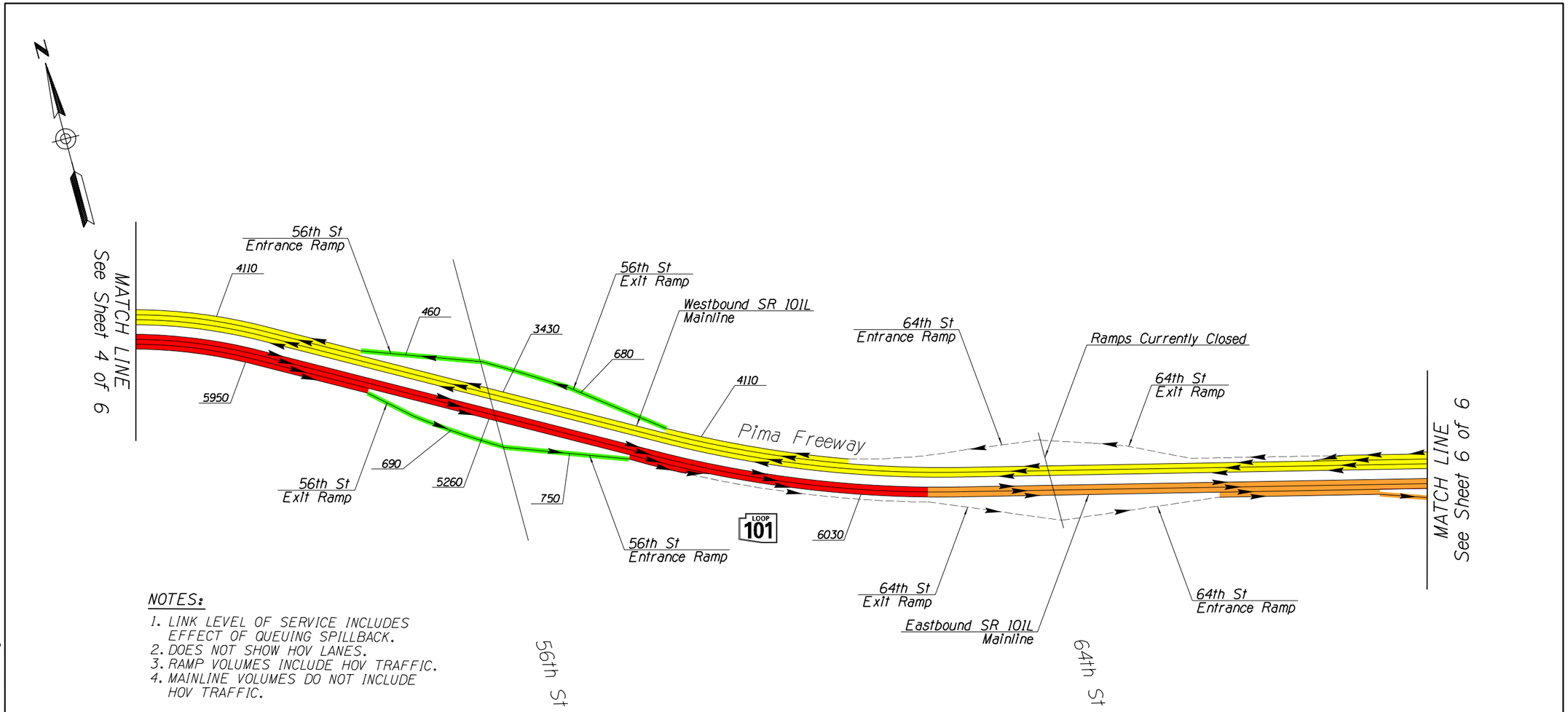
1/2/2014



NOTES:

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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 AM Peak Hour

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1/2/2014

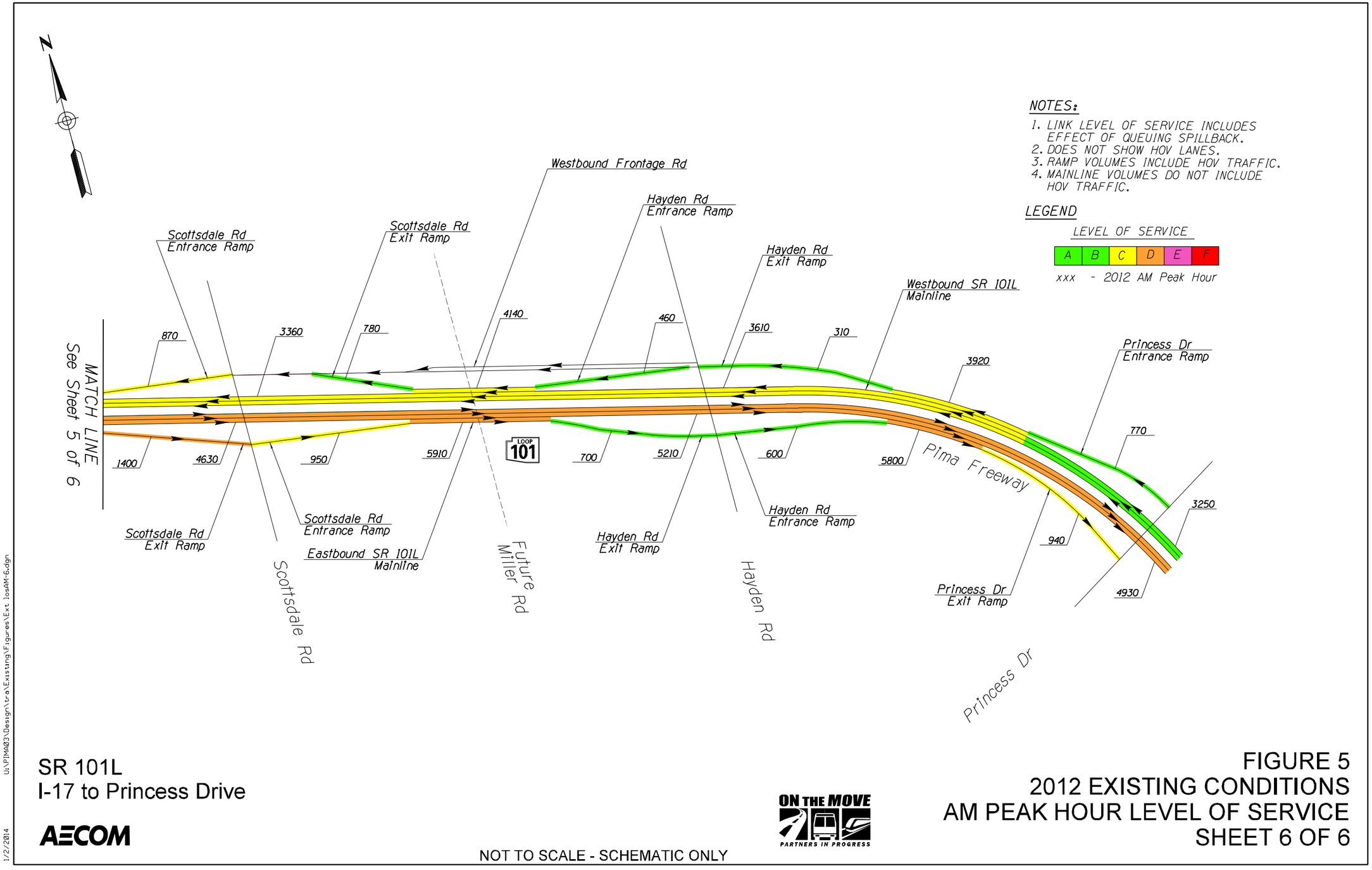
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 5
2012 EXISTING CONDITIONS
AM PEAK HOUR LEVEL OF SERVICE
SHEET 6 OF 6

N

NOTES:

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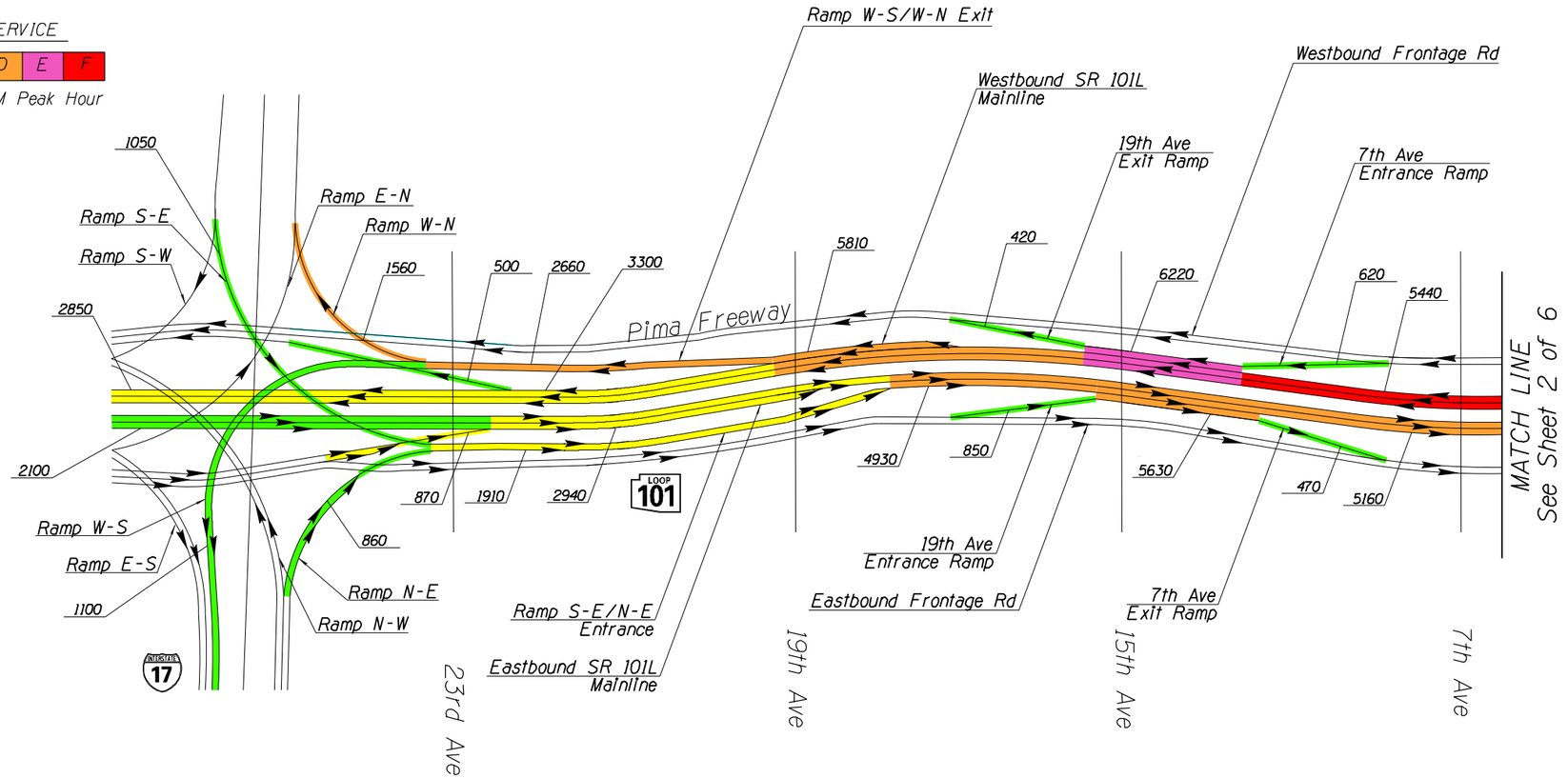
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 PM Peak Hour



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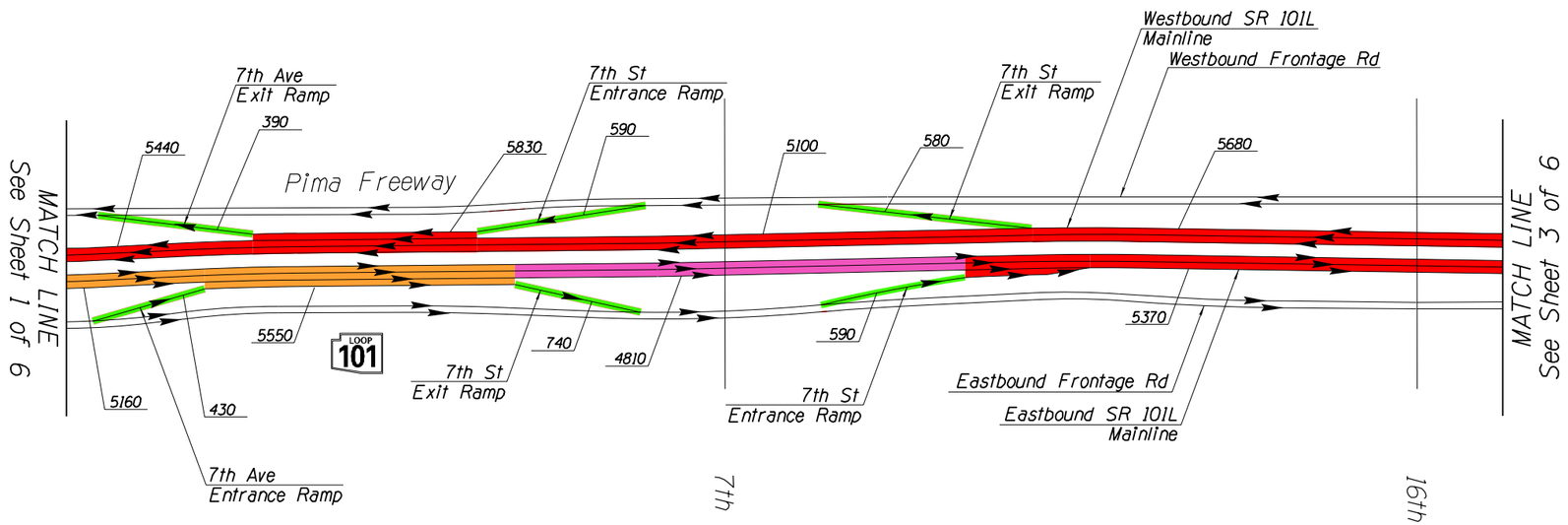
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 1 OF 6



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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 PM Peak Hour

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 2 OF 6

NOT TO SCALE - SCHEMATIC ONLY

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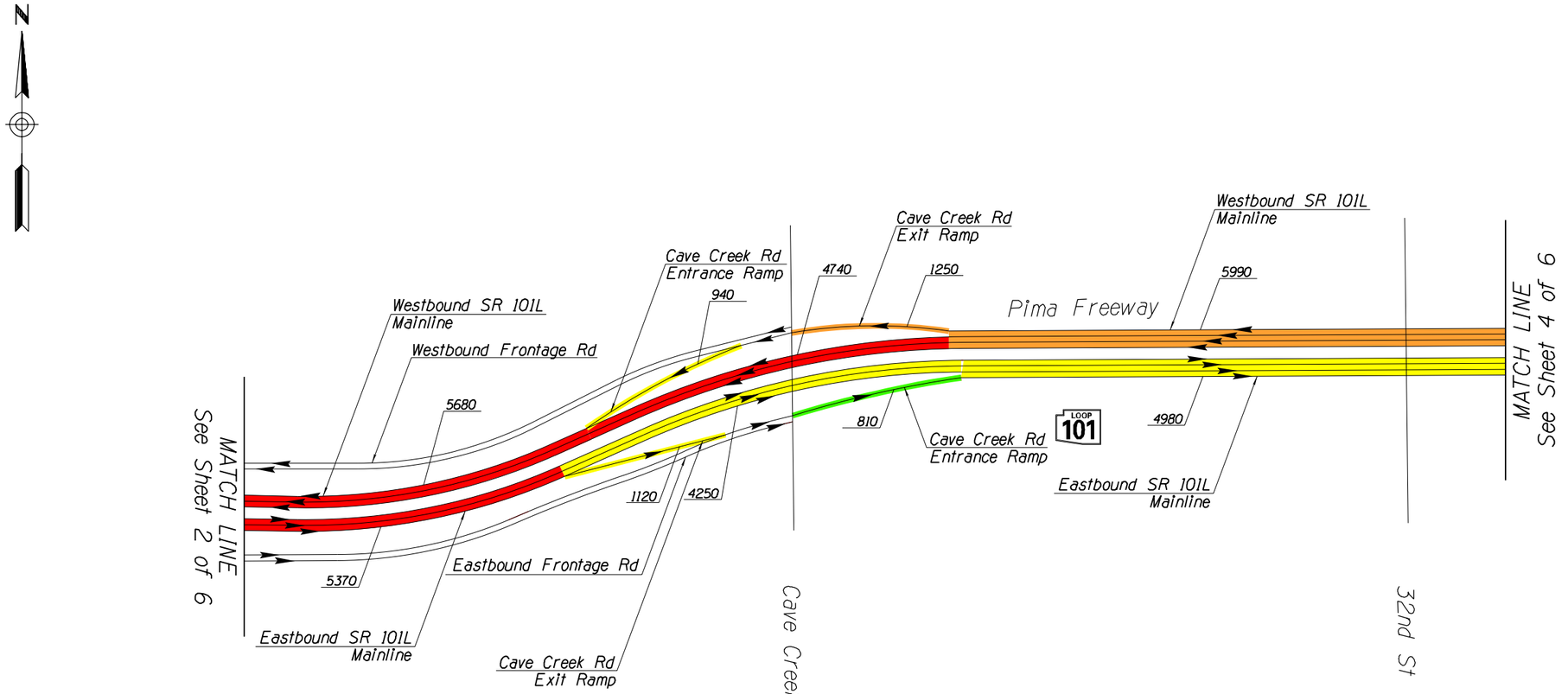
1/2/2014



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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 PM Peak Hour

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1/8/2014

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 3 OF 6

N

NOTES:
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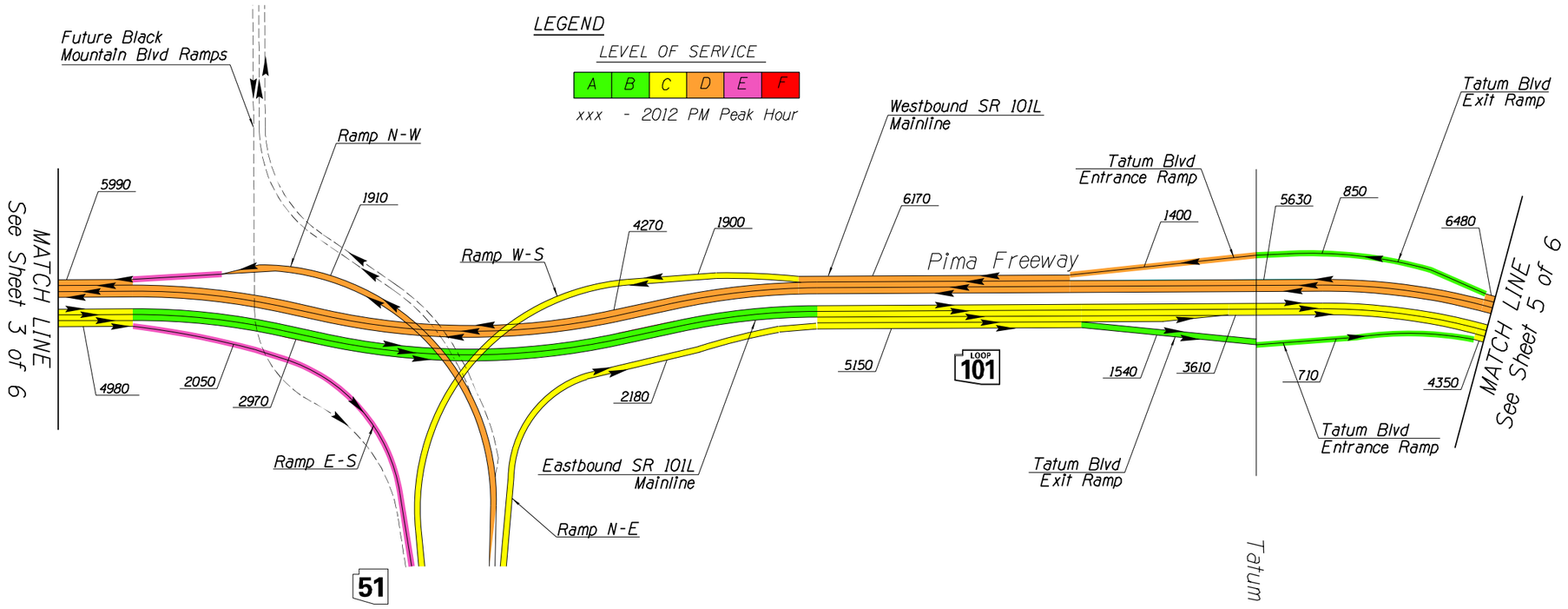
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 PM Peak Hour



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 4 OF 6

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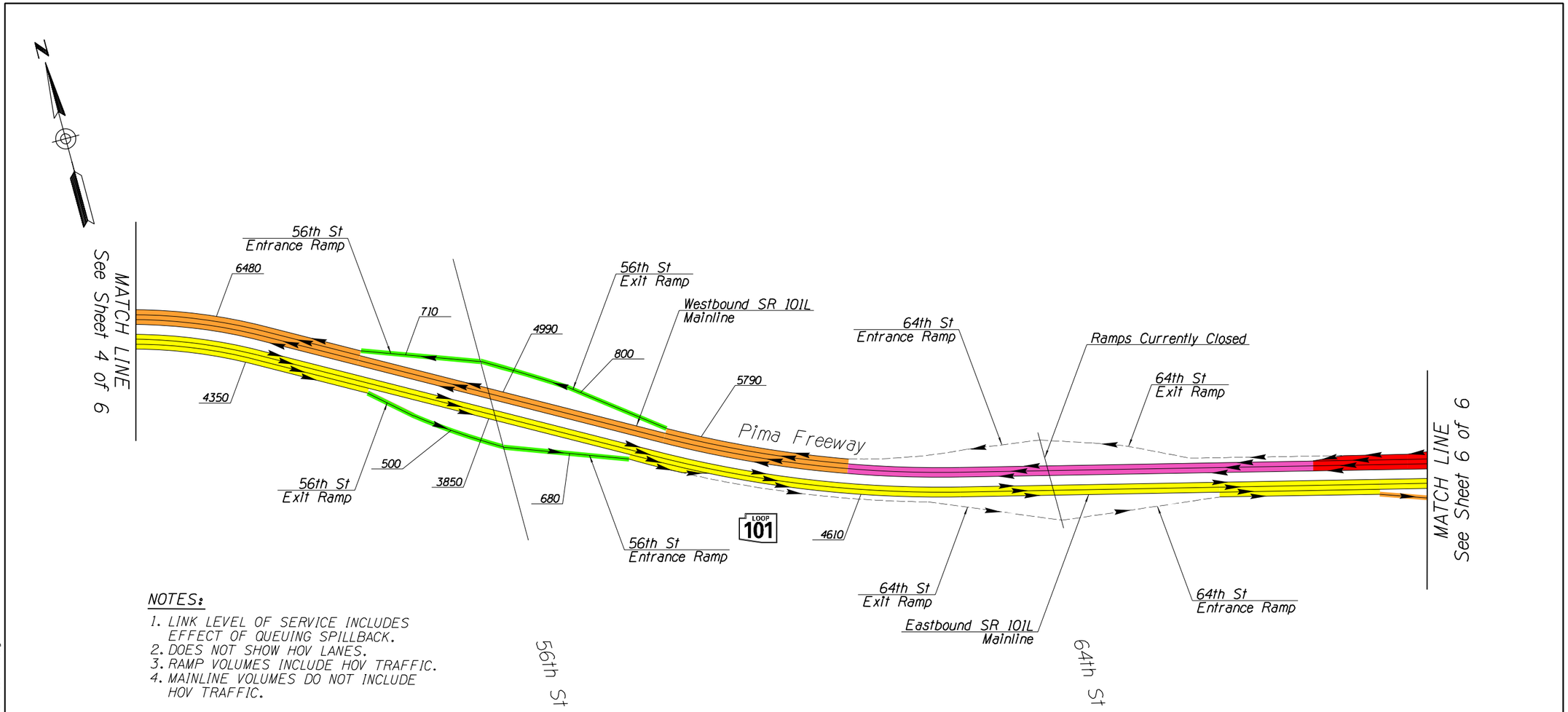
1/2/2014



NOTES:

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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2012 PM Peak Hour

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1/2/2014

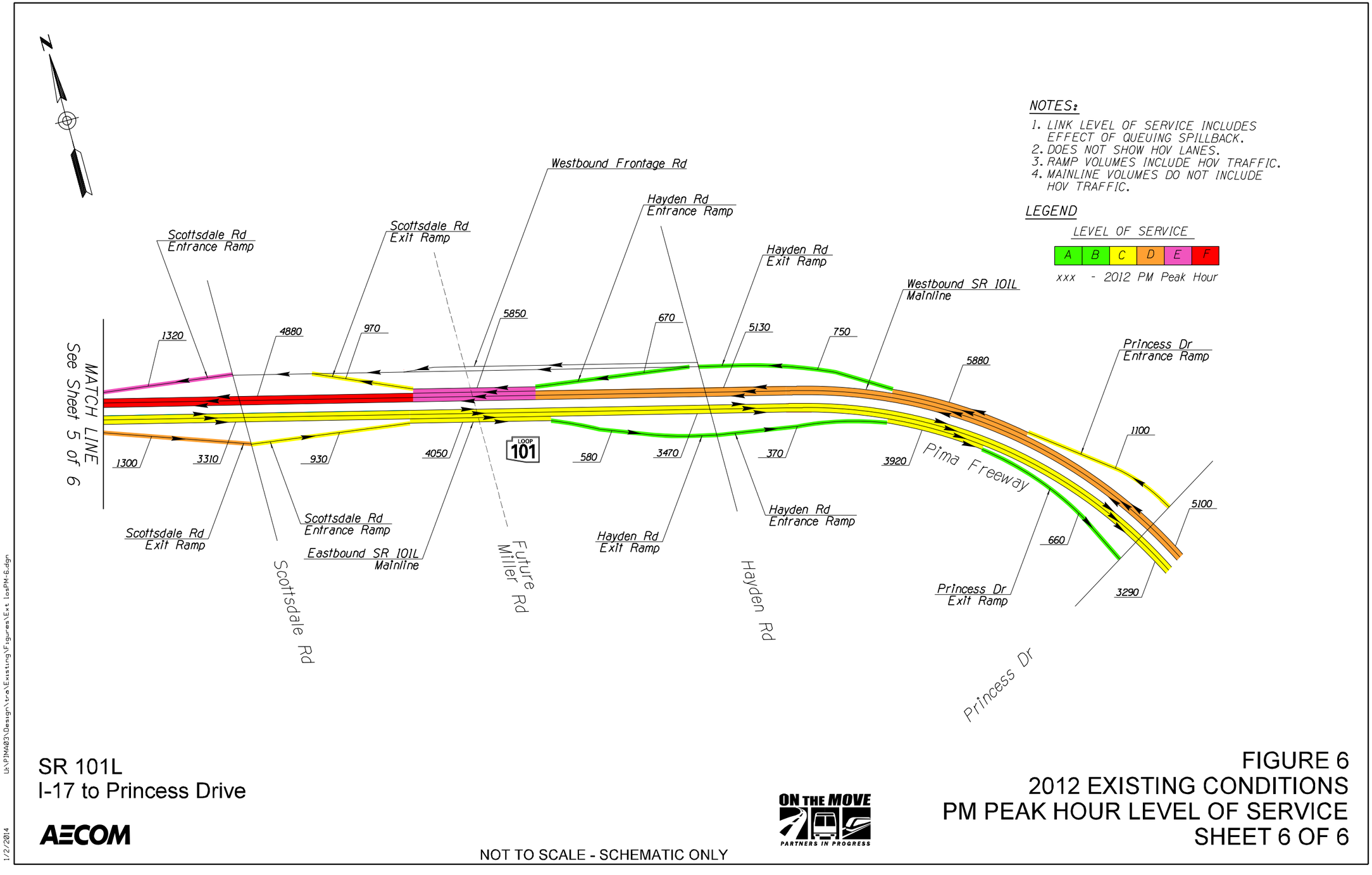
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

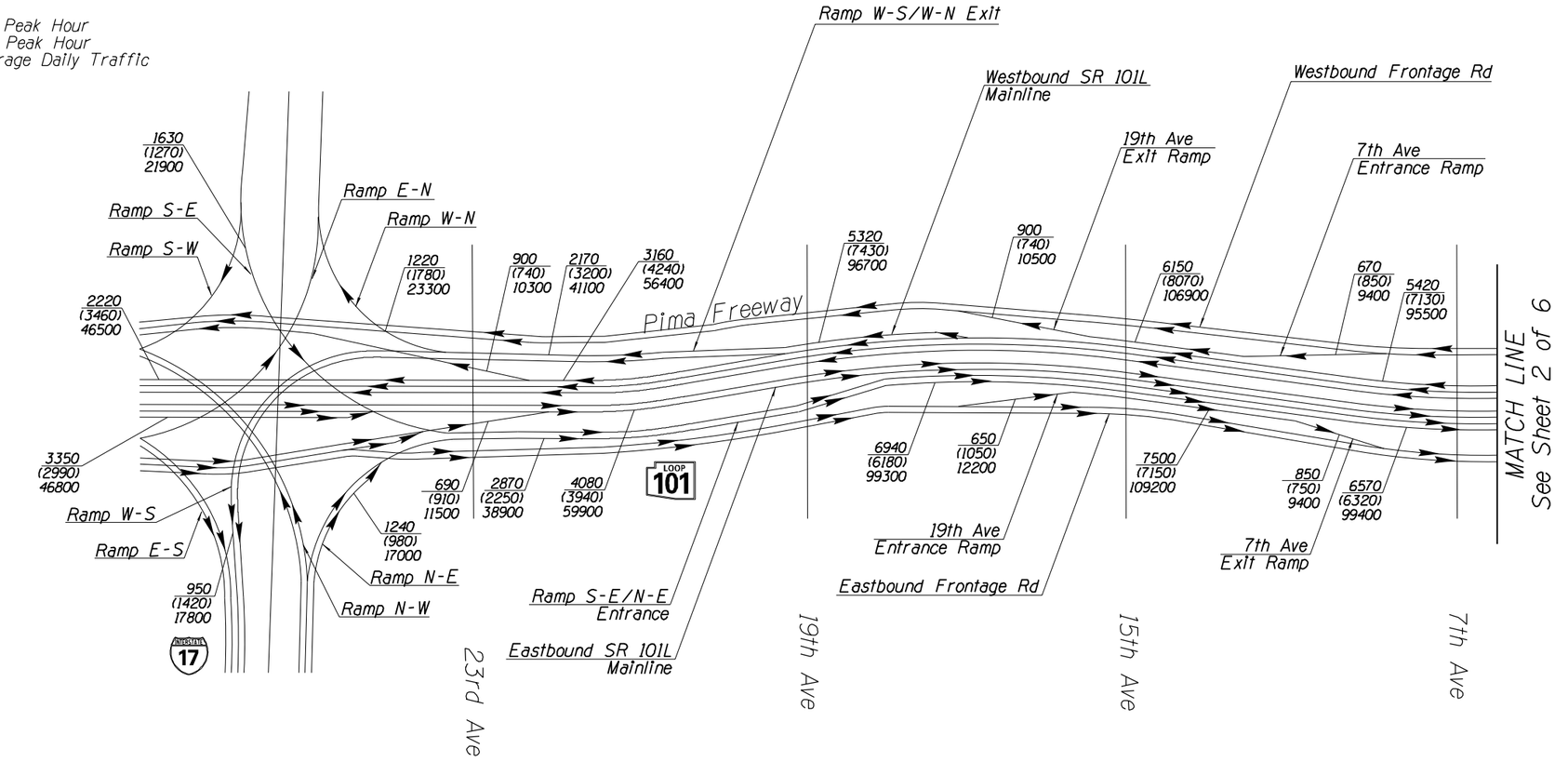
ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 6
2012 EXISTING CONDITIONS
PM PEAK HOUR LEVEL OF SERVICE
SHEET 6 OF 6

N

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic



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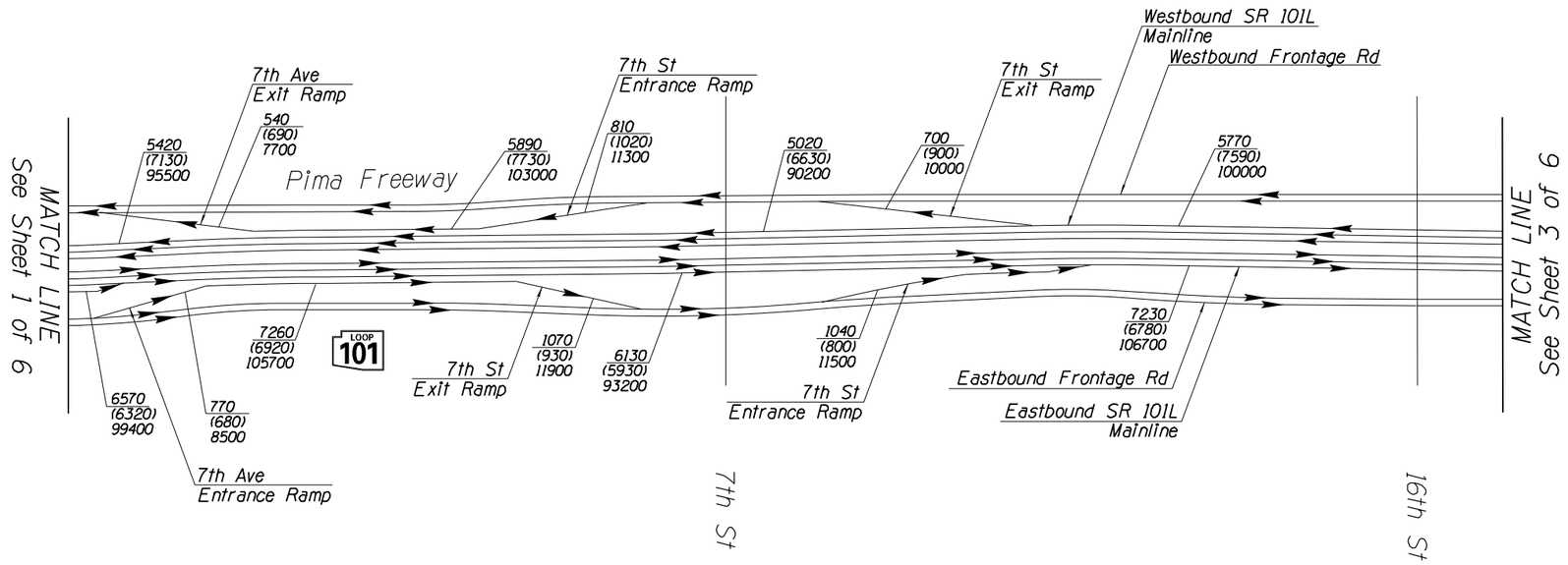
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 1 OF 6



NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 2 OF 6

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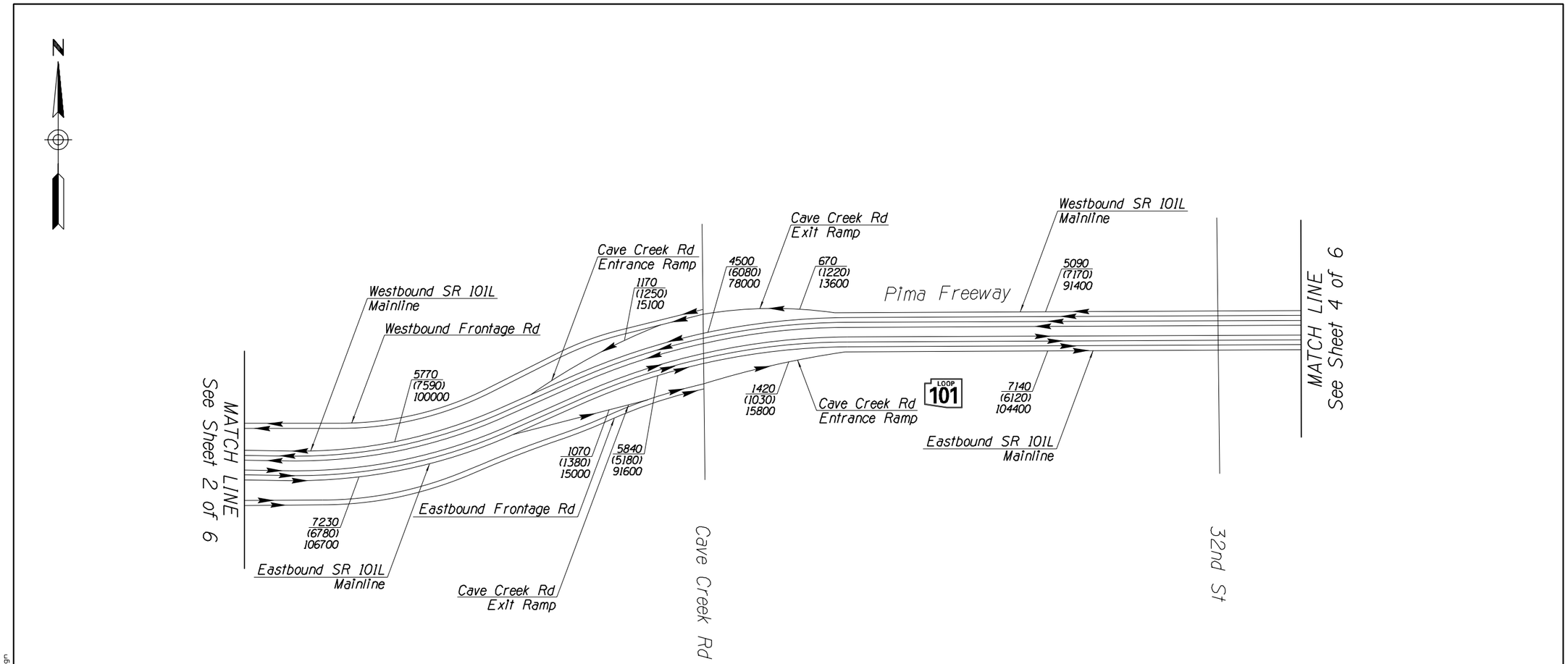
4/24/2014



NOTES:
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- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 3 OF 6

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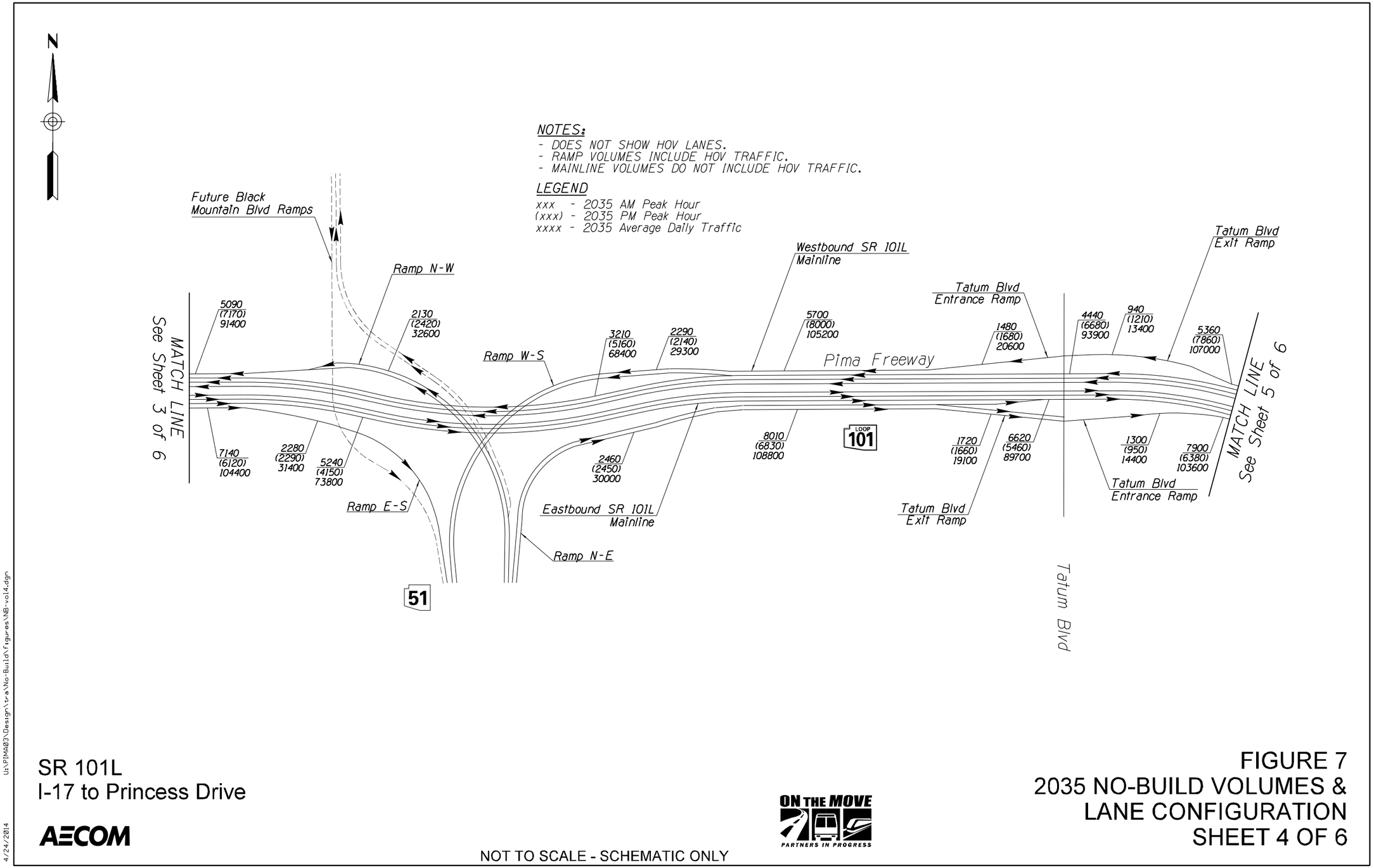
4/24/2014



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 4 OF 6

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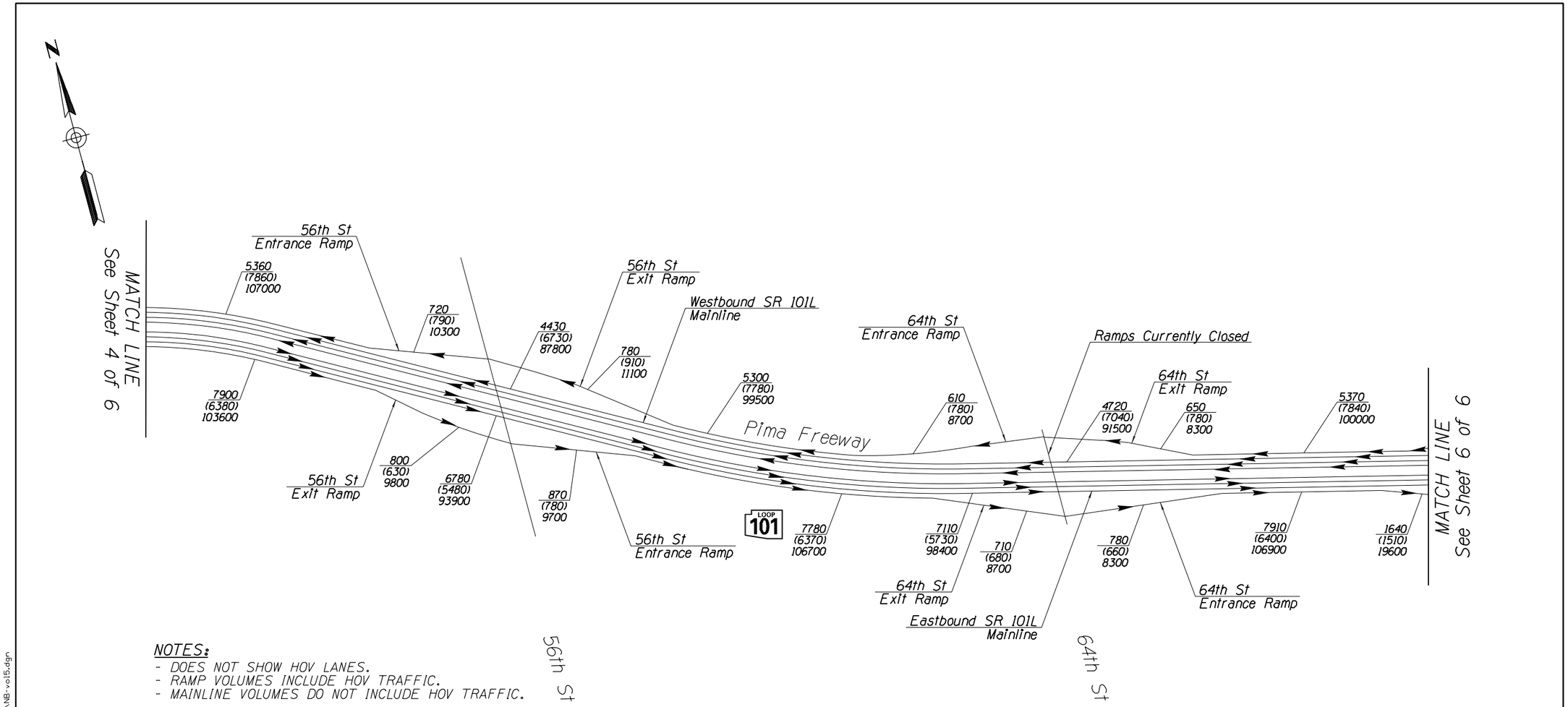
4/24/2014



NOTES:
- *DOES NOT SHOW HOV LANES.*
- *RAMP VOLUMES INCLUDE HOV TRAFFIC.*
- *MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.*

LEGEND

xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

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4/24/2014

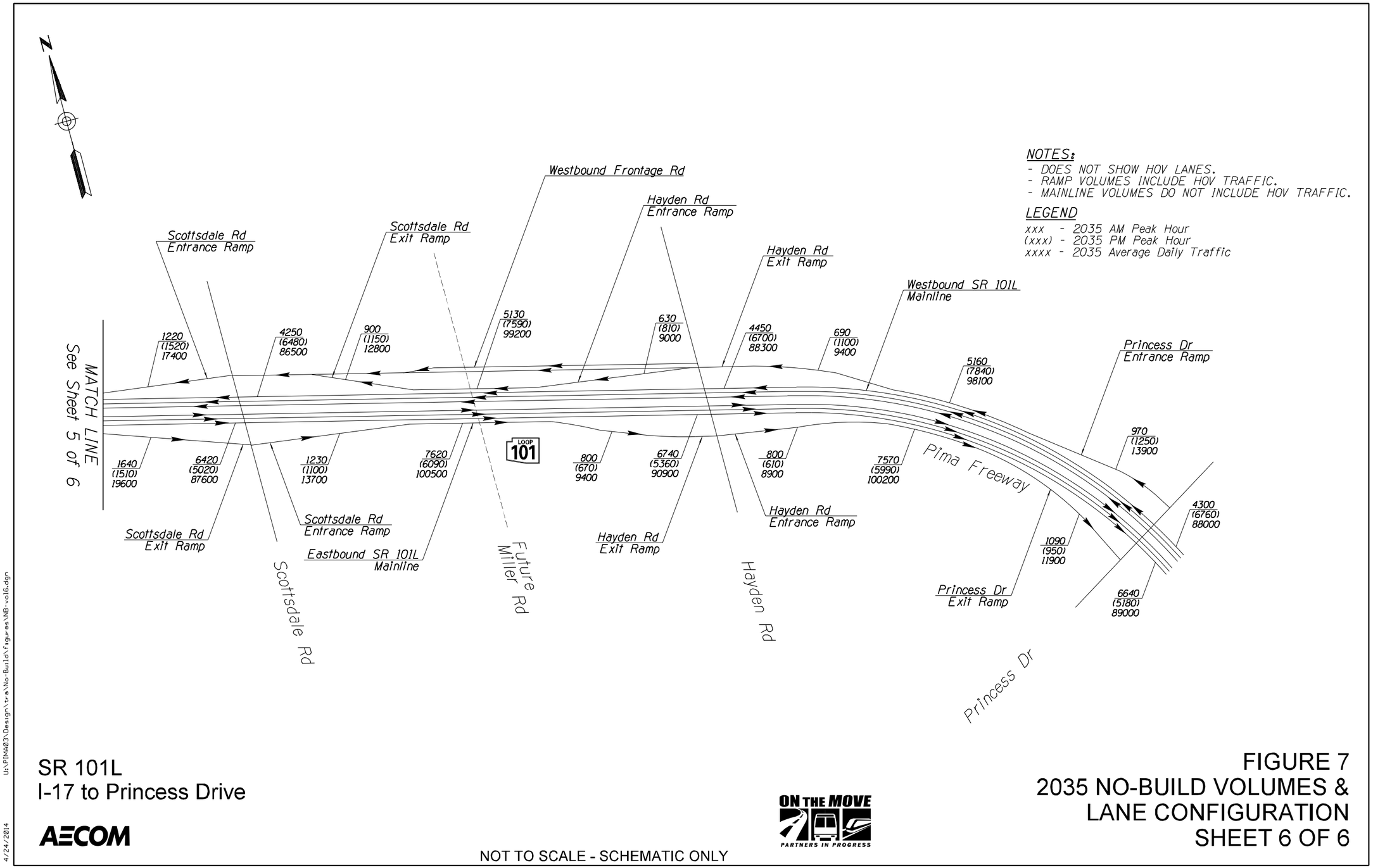
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 7
2035 NO-BUILD VOLUMES &
LANE CONFIGURATION
SHEET 6 OF 6

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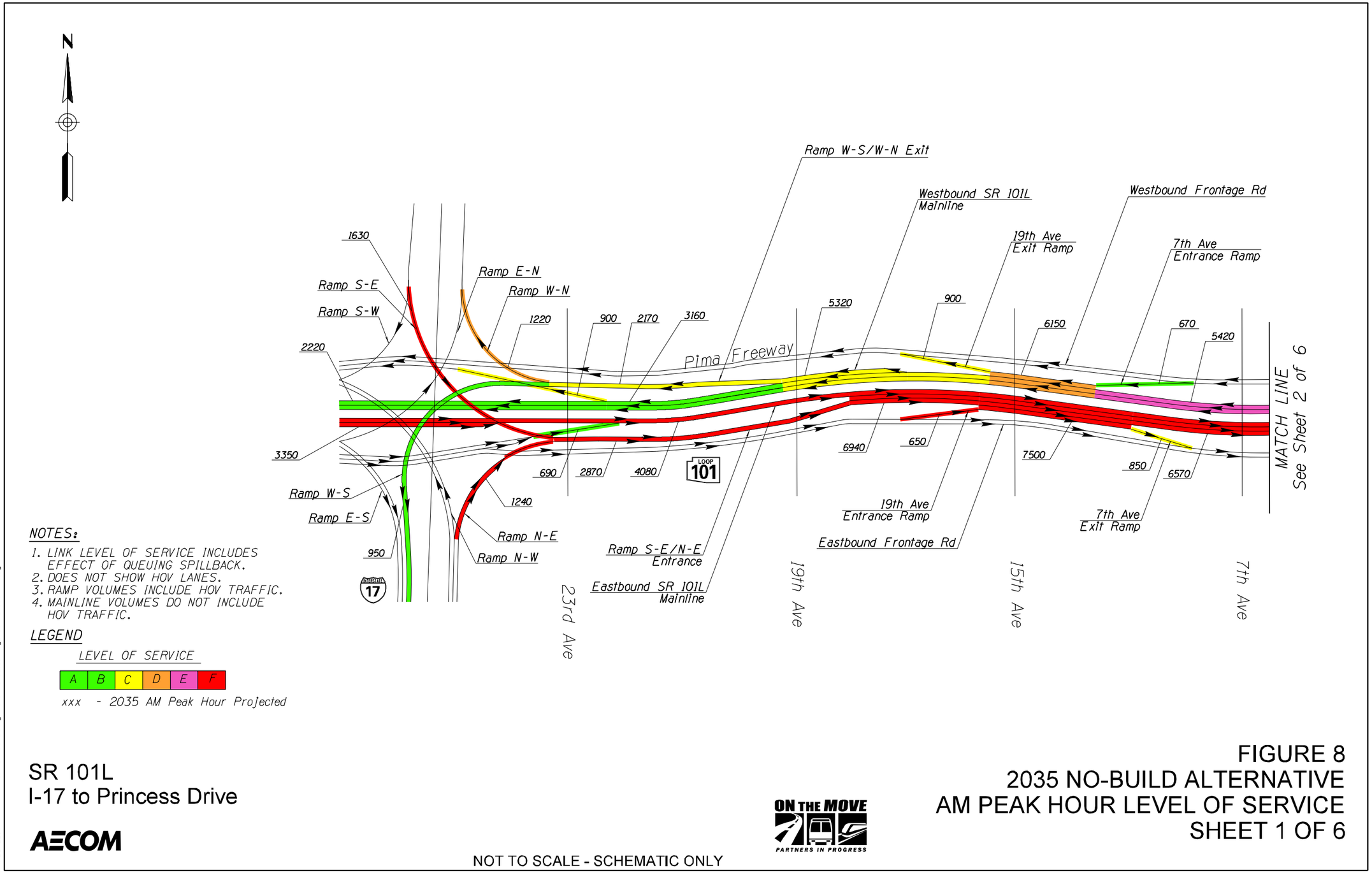
4/24/2014



NOTES:

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4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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4/28/2014

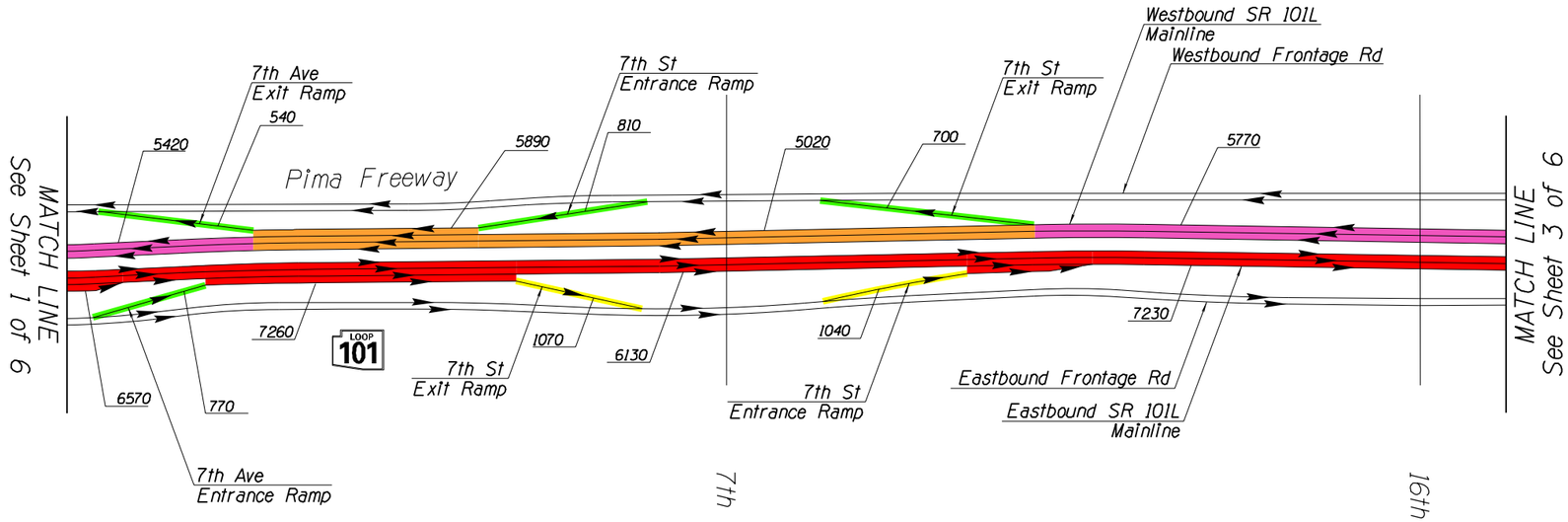
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 1 OF 6



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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

SR 101L
I-17 to Princess Drive

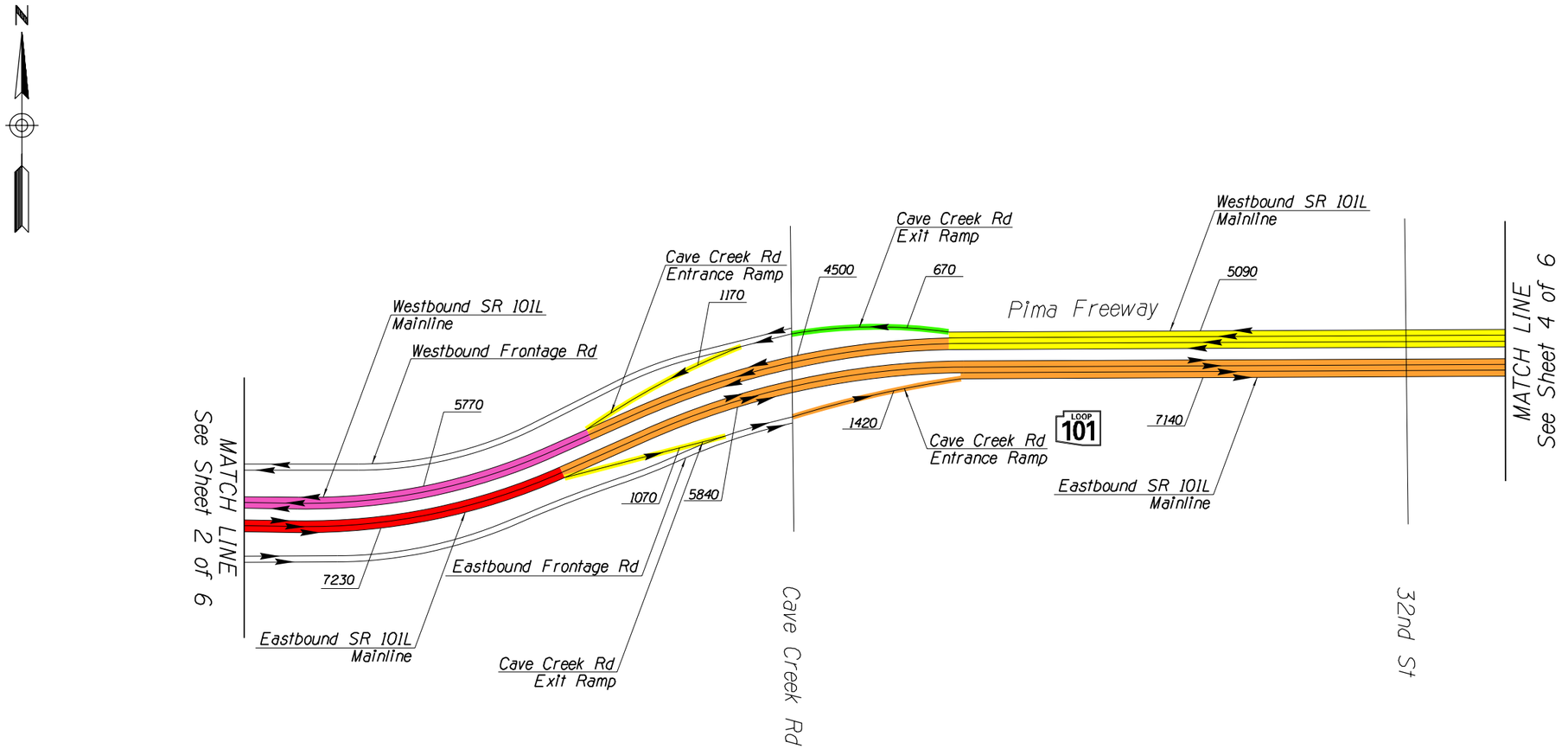
AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 2 OF 6

U:\PIMA03\Design\tra\No-Build\figures\NB-losAM 2.dgn
4/24/2014



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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 3 OF 6

NOT TO SCALE - SCHEMATIC ONLY

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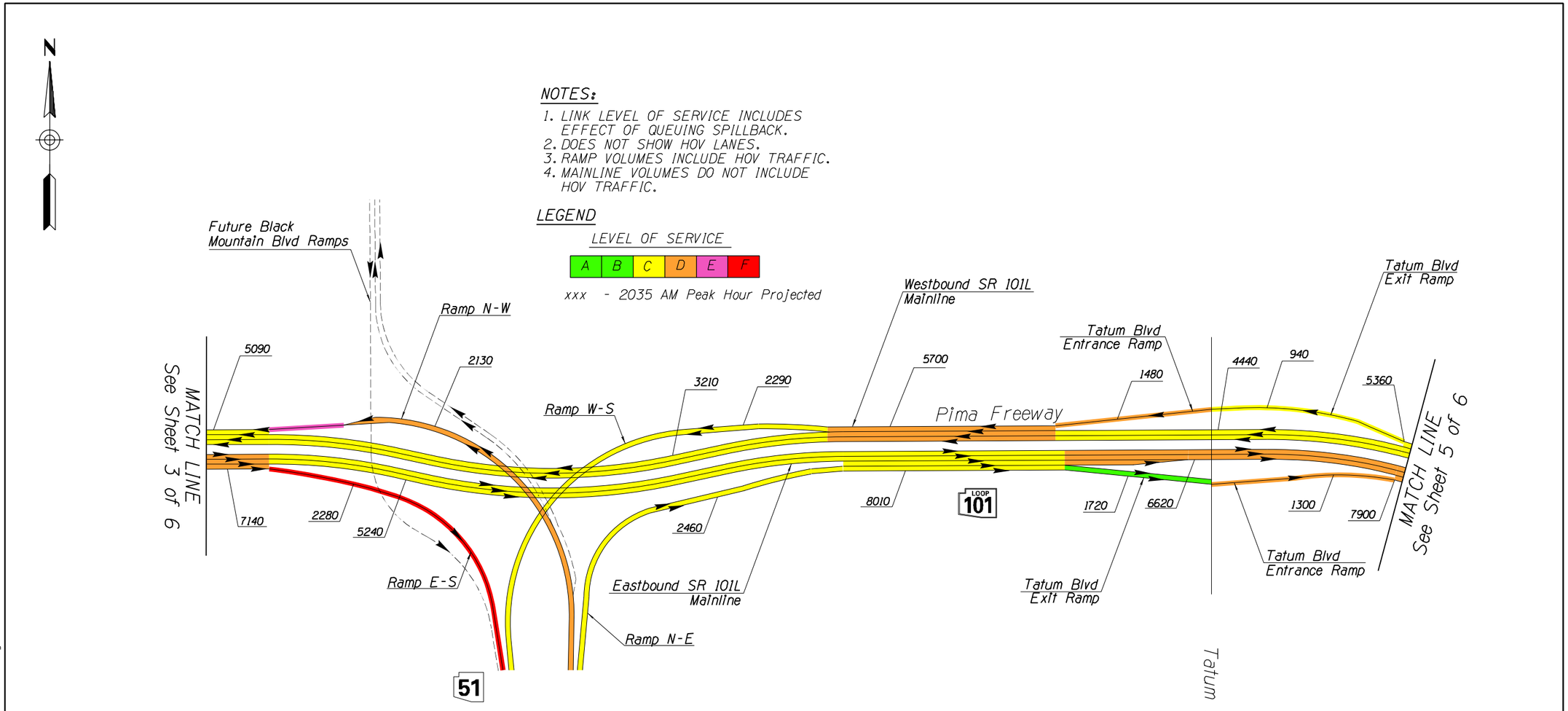
4/24/2014



SR 101L
I-17 to Princess Drive

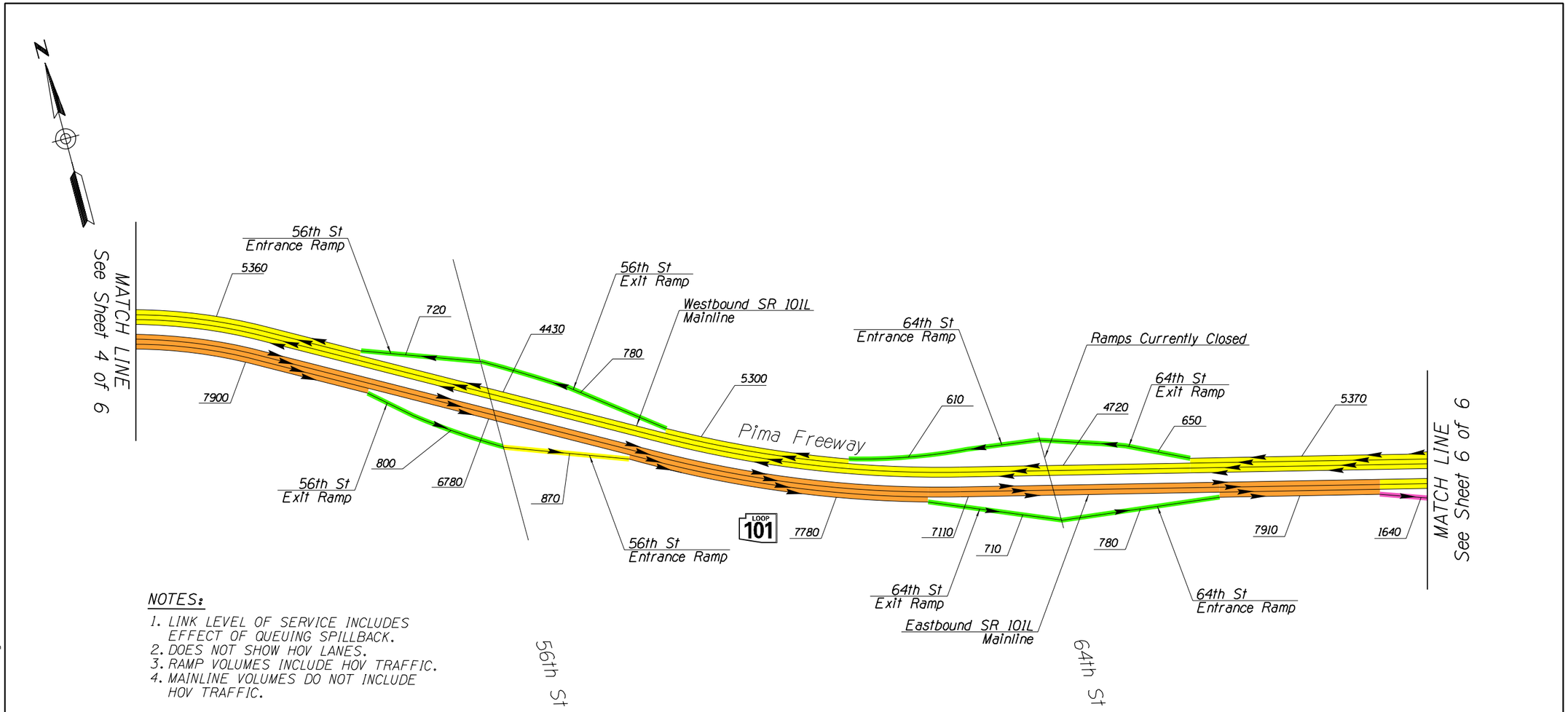
AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 4 OF 6

U:\PIMA03\Design\tra\No-Build\figures\NB-losAM 4.dgn
4/24/2014



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LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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4/24/2014

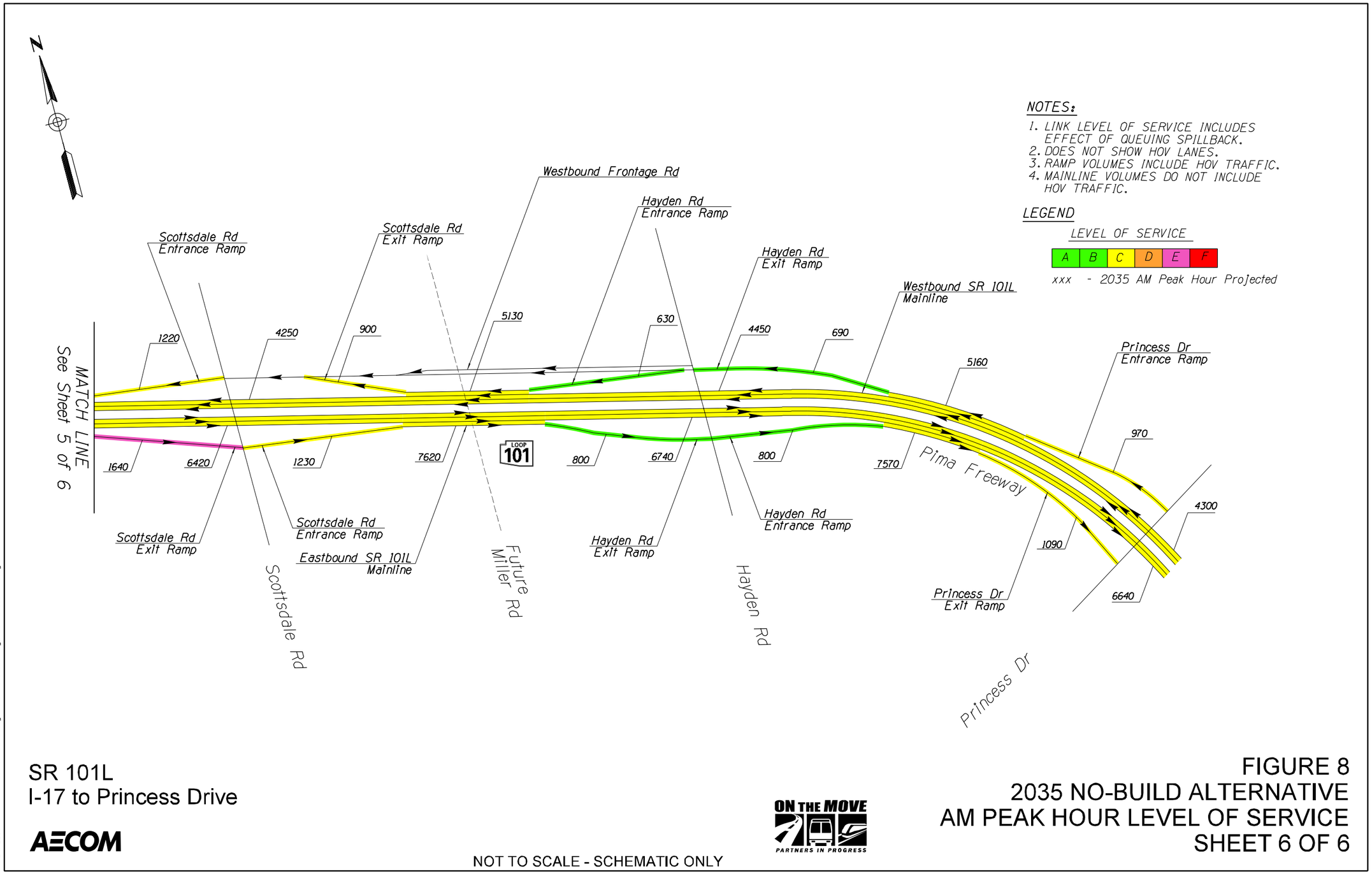
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 5 OF 6


N
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2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.
LEGEND
LEVEL OF SERVICE
A B C D E F
xxx - 2035 AM Peak Hour Projected
MATCH LINE
See Sheet 5 of 6
Scottsdale Rd
Entrance Ramp
Scottsdale Rd
Exit Ramp
Westbound Frontage Rd
Hayden Rd
Entrance Ramp
Hayden Rd
Exit Ramp
Westbound SR 101L
Mainline
Princess Dr
Entrance Ramp
1220
4250
900
5130
630
4450
690
5160
970
1640
6420
1230
7620
800
6740
800
7570
4300
1090
6640
LOOP
101
Pima Freeway
Scottsdale Rd
Exit Ramp
Scottsdale Rd
Entrance Ramp
Eastbound SR 101L
Mainline
Future
Miller Rd
Hayden Rd
Exit Ramp
Hayden Rd
Entrance Ramp
Princess Dr
Exit Ramp
Scottsdale Rd
Hayden Rd
Princess Dr
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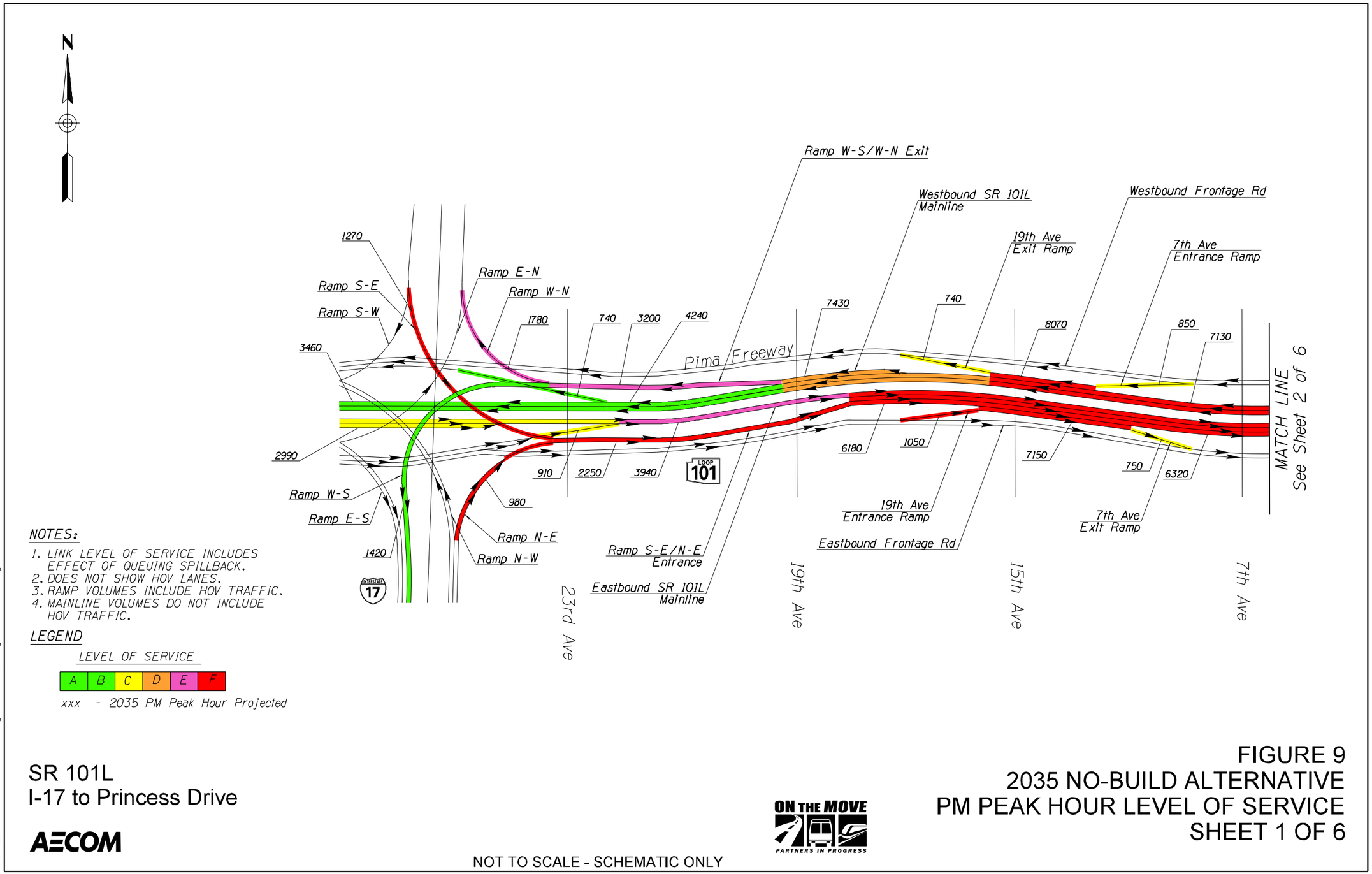
4/24/2014
SR 101L
I-17 to Princess Drive
AECOM
NOT TO SCALE - SCHEMATIC ONLY
ON THE MOVE
PARTNERS IN PROGRESS
FIGURE 8
2035 NO-BUILD ALTERNATIVE
AM PEAK HOUR LEVEL OF SERVICE
SHEET 6 OF 6



NOTES:

1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 PM Peak Hour Projected

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4/24/2014

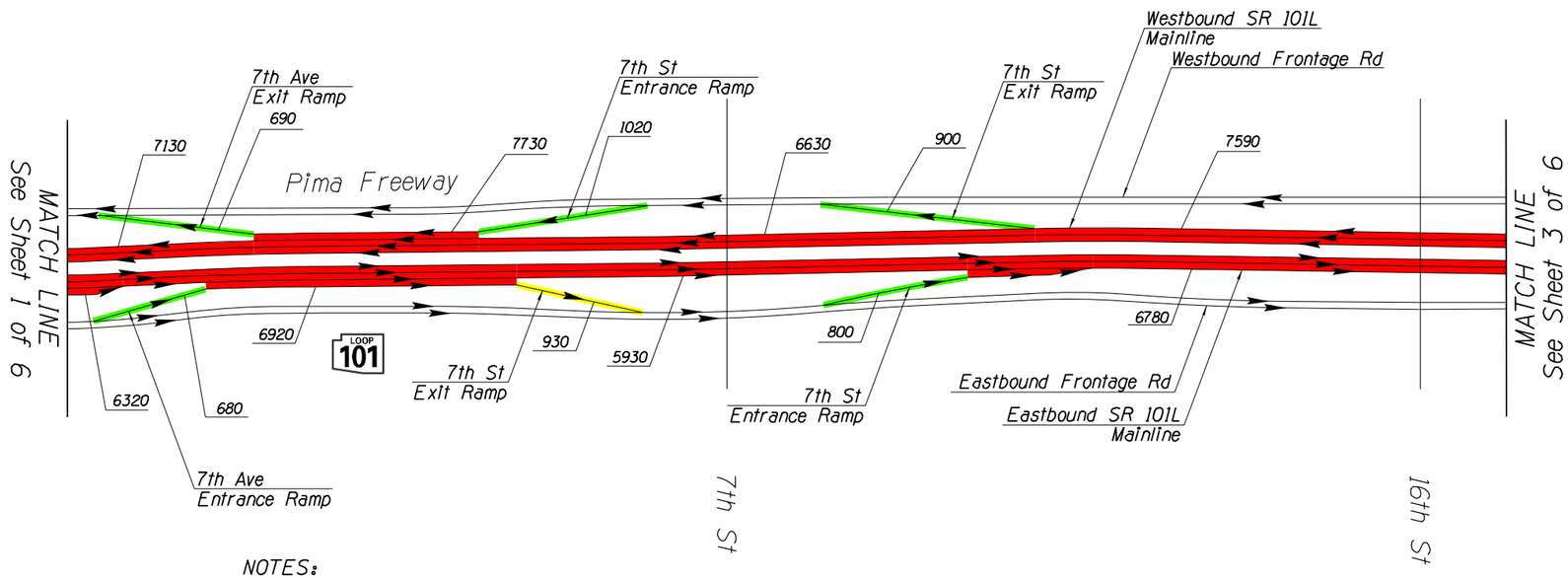
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 1 OF 6



NOTES:

1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 PM Peak Hour Projected

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 2 OF 6

NOT TO SCALE - SCHEMATIC ONLY

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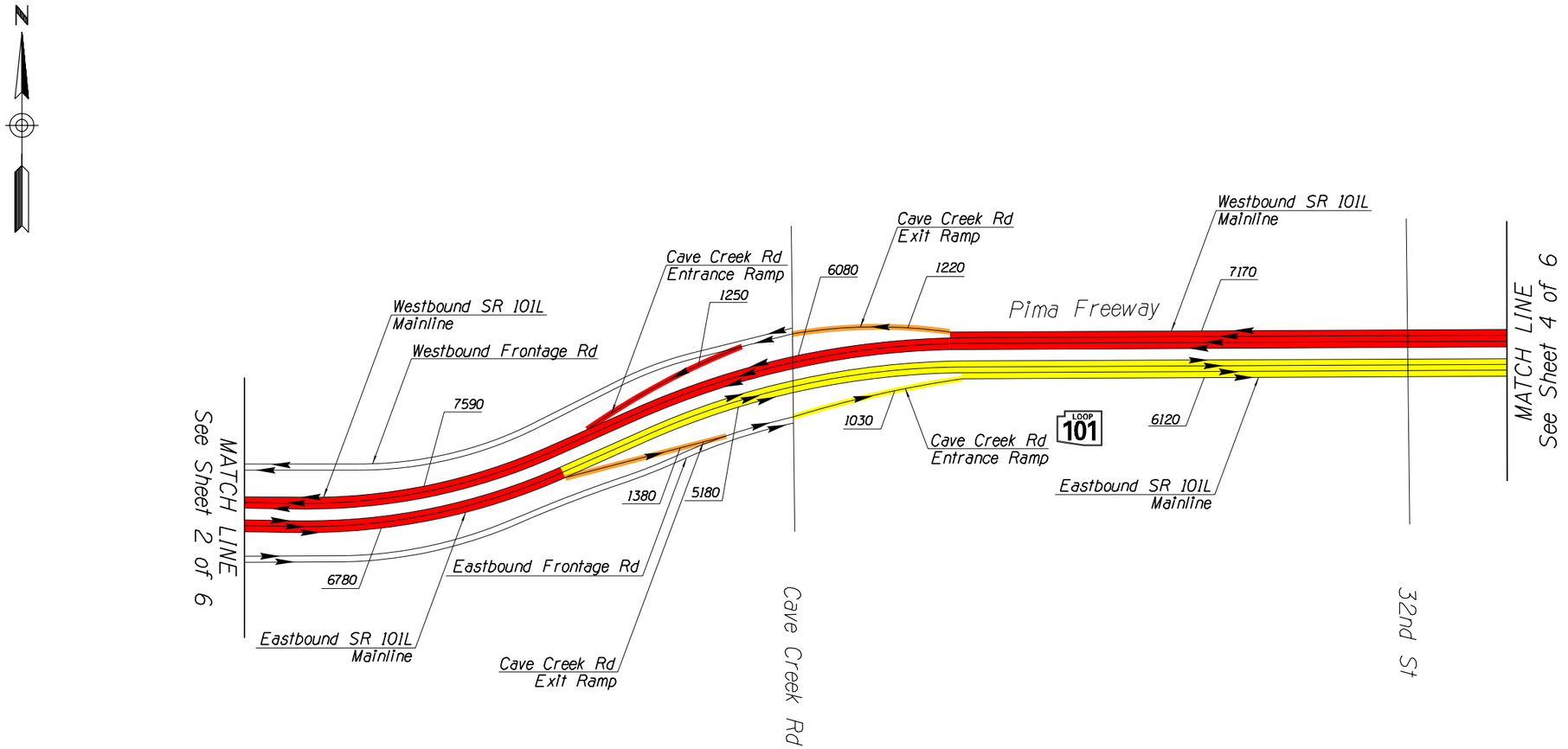
4/24/2014



NOTES:

1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 PM Peak Hour Projected

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4/24/2014

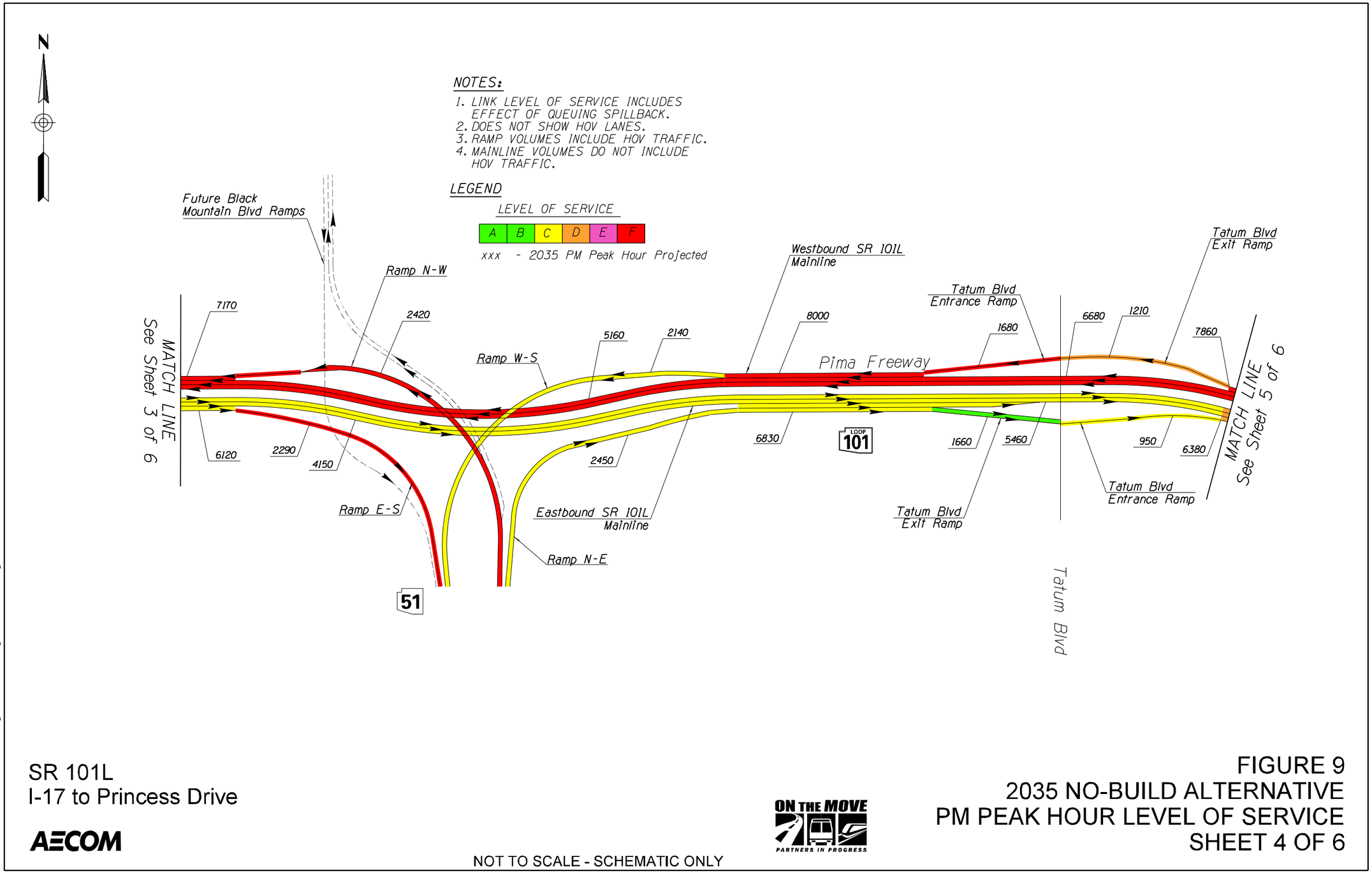
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 3 OF 6

NOT TO SCALE - SCHEMATIC ONLY



SR 101L
I-17 to Princess Drive

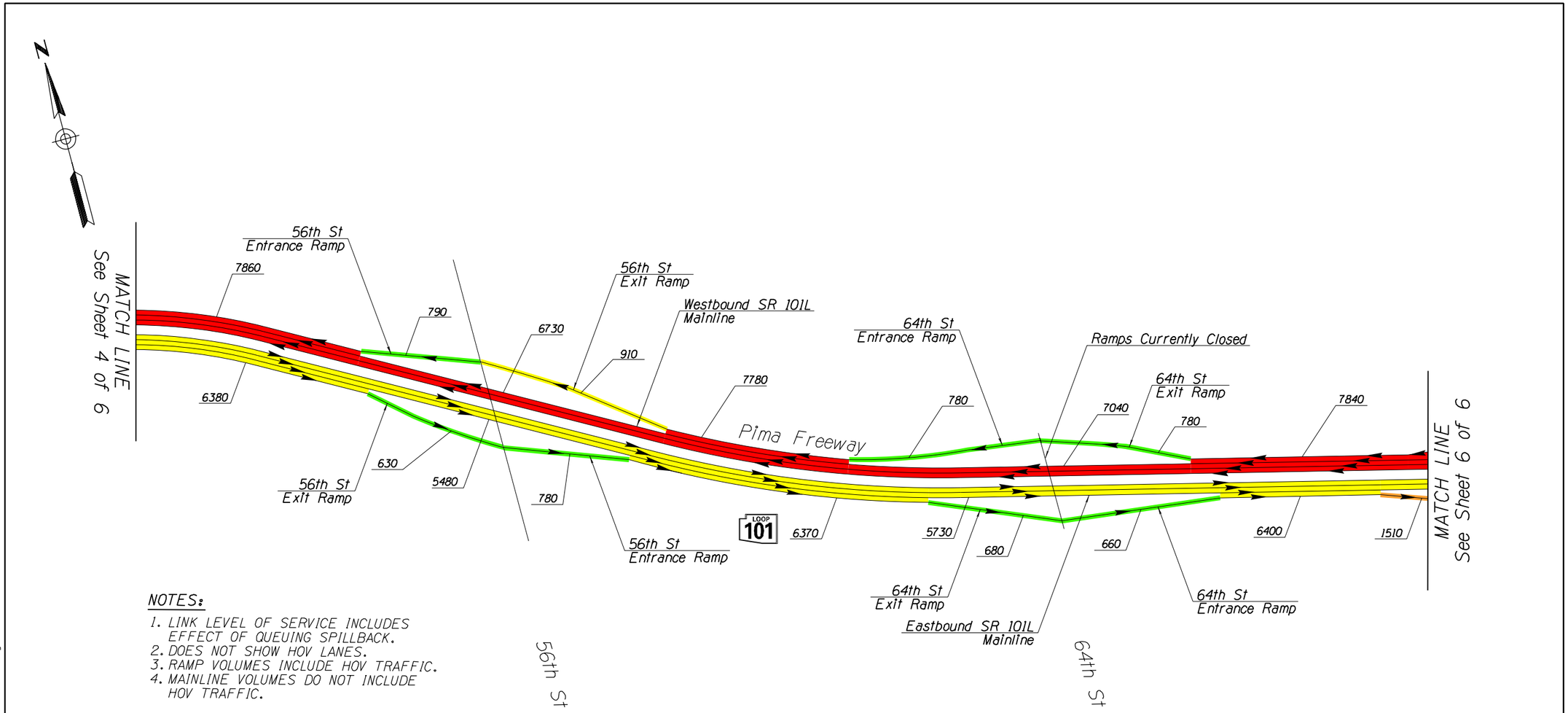
AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE PARTNERS IN PROGRESS

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 4 OF 6

U:\PIMA03\Design\tra\No-Build\figures\NB-losPM 4.dgn
4/24/2014



NOTES:

1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 PM Peak Hour Projected

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4/24/2014

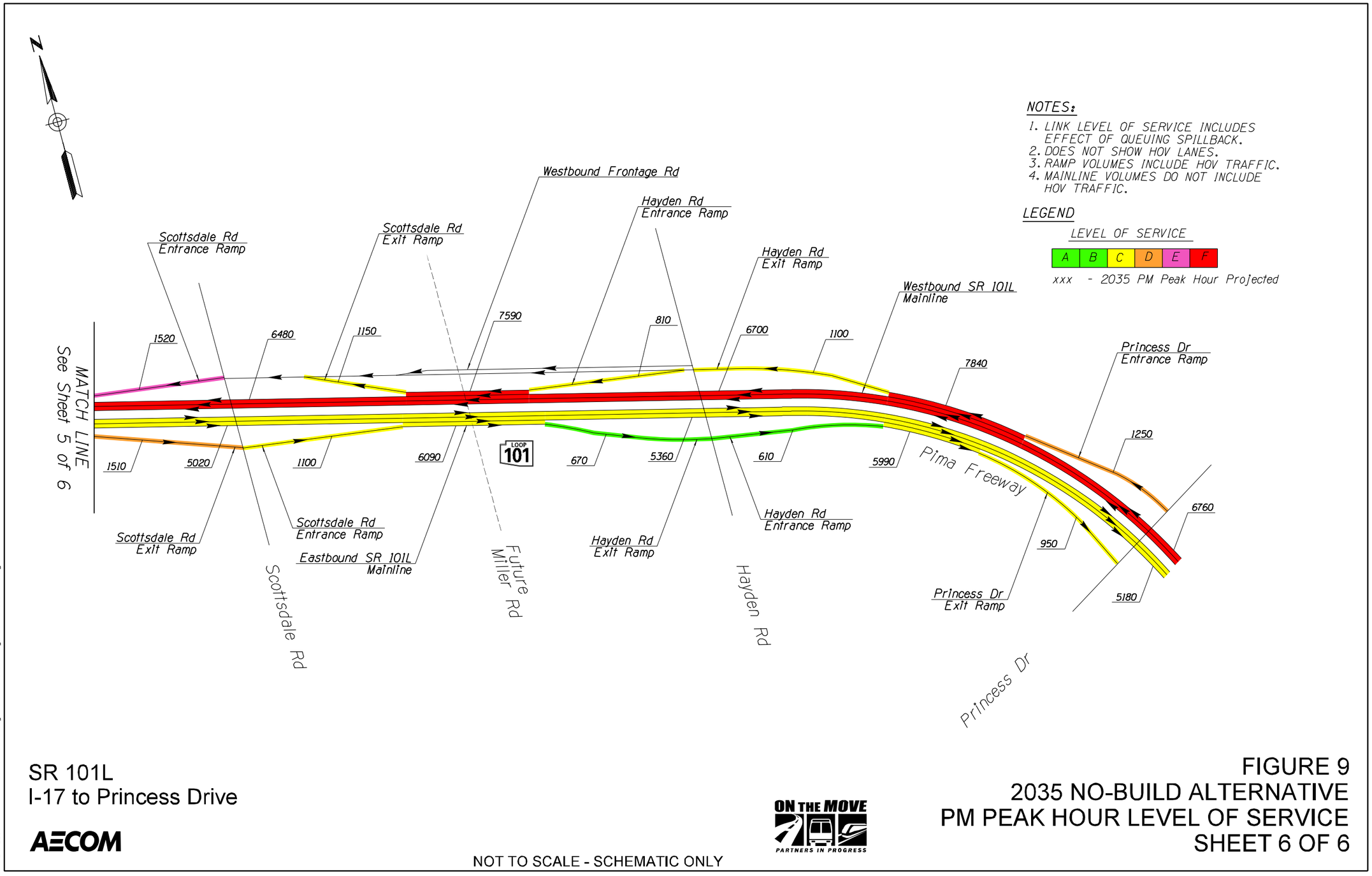
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 9
2035 NO-BUILD ALTERNATIVE
PM PEAK HOUR LEVEL OF SERVICE
SHEET 6 OF 6

The proposed improvements between I-17 and 7th Avenue would not remove the existing "bottleneck" that occurs at the 15th Avenue Underpass. The number of HOV, general-purpose and auxiliary lanes is the same as the No-Build Alternative (at the 15th Avenue Underpass), except the Ramp 'S-E/N-E' entrance would enter eastbound on the SR101L mainline with a single lane "lane-add" configuration.

The 7th Avenue entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the 7th Street exit. The 7th Street exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 7th Street entrance ramp (1 lane) would be designed with a parallel entrance configuration that merges into the adjacent general-purpose lane. The Cave Creek Road exit ramp (1 lane) would be a tapered exit configuration from the outside travel lane.

The Cave Creek Road entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the SR51/SR101L TI Ramp 'E-S' exit. The SR51/SR101L TI Ramp 'E-S' would be a parallel exit configuration with a mandatory exit from the auxiliary lane. East of the Ramp 'E-S' gore, the eastbound mainline would transition from four general-purpose lanes to three general-purpose lanes with an AASHTO lane drop configuration. Three general-purpose lanes and one HOV lane would continue to the east through the system interchange.

The SR51/SR101L TI Ramp 'N-E' (2 lanes) would enter the SR 101L mainline and continue to the east to Tatum Boulevard and provide five general-purpose lanes plus one HOV lane within this area. The Tatum Boulevard exit ramp (2 lanes) would be a parallel exit configuration with a mandatory exit from the outside general-purpose lane, and the second lane designed as an optional lane with the SR 101L through movement. Four existing general-purpose lanes and one HOV lane would continue to the east.

This alternative would improve the eastbound SR 101L mainline east of the Tatum Boulevard overpass by extending the fourth general-purpose lane to Princess Drive. The Tatum Boulevard entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the 56th Street exit. The 56th Street exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 56th Street entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the 64th Street exit. The 64th Street exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 64th Street entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Scottsdale Road exit. The Scottsdale Road exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Scottsdale Road entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Hayden Road exit. The Hayden Road exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Hayden Road entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Princess Drive exit. The Princess Drive exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane. Four general-purpose lanes and one HOV lane would continue to the east to match the planned freeway section for the remainder of the route.

<u>Westbound SR 101L Mainline</u>

Alternative A would provide four general-purpose lanes and one HOV lane on westbound SR 101L between Princess Drive and the SR51/SR101L TI. The Princess Drive entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Hayden Road exit. The Hayden Road exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Hayden Road entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Scottsdale Road exit. The Scottsdale Road exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Scottsdale Road entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the 64th Street exit. The 64th Street exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 64th Street entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to 56th Street exit. The 56th Street exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 56th Street entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the Tatum Boulevard exit. The Tatum Boulevard exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The Tatum Boulevard entrance ramp (1 lane) would be configured as a parallel entrance that transitions into an auxiliary lane that continues to the SR51/SR101L TI Ramp 'W-S' exit. The SR51/SR101L TI Ramp 'W-S' exit ramp (2 lanes) would be reconfigured to provide a two lane mandatory exit from the outside freeway lanes. Three general-purpose lanes and one HOV lane would continue to the west through the system interchange.
.
The SR51/SR101L TI Ramp 'N-W' would be reconfigured to provide a two lane directional ramp that would enter the SR 101L mainline with a "lane-add" design. Five general-purpose lanes and one HOV lane would depart the system interchange.

The Cave Creek Road exit ramp (2 lanes) would be designed with a parallel exit configuration with a mandatory exit from the outside lane, and the second lane designed as an optional lane with the SR 101L through movement. Four general-purpose lanes and one HOV lane would continue to the west to the I-17/SR101L TI.

The Cave Creek Road entrance ramp would be designed with a parallel entrance configuration that merges into the adjacent travel lane. The 7th Street exit ramp (1 lane) would be a tapered exit configuration from the outside travel lane.

The 7th Street entrance ramp would be designed as a parallel entrance ramp that transitions into an auxiliary lane that continues to the 7th Avenue exit. The 7th Avenue exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane.

The 7th Avenue entrance ramp would be designed as a parallel entrance ramp that transitions into an auxiliary lane that continues to the 19th Avenue exit. The 19th Avenue exit ramp (1 lane) would be a parallel exit configuration with a mandatory exit from the auxiliary lane. The I-17/SR101L TI Ramp 'W-S/W-N' exit ramp (2 lanes) would remain a two lane ramp with a mandatory exit from the outside lane, and the second lane designed as an optional lane with the SR 101L though movement. Three general-purpose lanes and one HOV lane would continue to the west on the SR 101L mainline.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - I-17/SR101L TI Ramp 'S-E'
  - I I-17/SR101L TI Ramp 'N-E'
  - -17/SR101L TI Ramp 'S-E/N-E' entrance
  - Eastbound SR 101L mainline from the Ramp 'S-E/N-E' entrance to the 19th Avenue entrance ramp
  - Eastbound SR 101L mainline from the 7th Street entrance ramp to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit
  - Westbound SR 101L mainline between the I-17/SR101L TI Ramp 'W-S/W-N' exit and the 7th Avenue entrance ramp
  - Westbound SR 101L mainline between the 7th Street exit ramp and the Cave Creek Road entrance ramp

The analysis results indicate significant congestion would occur on the I-17/SR101L TI Ramp 'S-E/N-E' entrance, as well as the individual Ramp 'S-E' (which would queue back onto the I-17 mainline) during the A.M. peak travel period. The segment of the eastbound and westbound SR 101L mainline between 7th Street and Cave Creek Road would also be anticipated to experience congestion during the A.M. and P.M. peak travel periods.

2.4.5 Alternative B

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. Alternative B is generally the same as Alternative A, except for the following design elements:

- The eastbound SR 101L mainline was modified at the I-17/SR101L TI to provide two general-purpose lanes and one HOV lane approaching the Ramp 'S-E/N-E' gore
- The Ramp 'S-E/N-E' entrance was modified to allow each directional ramp lane (2 lanes) to enter the eastbound SR 101L mainline with a "lane-add" configuration (to provide 4 general-purpose lanes and 1 HOV lane between the I-17/SR101L TI and the SR51/SR101L TI)
- The westbound 7th Avenue entrance ramp would be designed with a "lane-add" configuration that would continue to the I-17/SR101L TI Ramp 'W-S/W-N' exit
- The I-17/SR101L TI Ramp 'W-S/W-N' exit ramp (2 lanes) would be designed as a two-lane mandatory exit from the outside freeway lanes. Three general-purpose lanes and one HOV lane would continue to the west.
- The 19th Avenue westbound exit ramp would be designed with a tapered exit configuration from the outside general-purpose lane
- The SR51/SR101L TI Ramp 'W-S' exit ramp (2 lanes) would be designed as a mandatory exit from the outside lane, with the second lane designed as an optional lane with the SR 101L through movement. The westbound SR 101L mainline would then transition from four general-purpose lanes to three general-purpose lanes with an AASHTO lane drop configuration.

The proposed improvements on the eastbound SR 101L mainline departing the I-17/SR101L TI would be similar to the No-Build Alternative due to the "bottleneck" at the 15th Avenue Underpass. The purpose of the roadway configuration modifications was to determine the traffic operation effects of these modifications on the I-17/SR101L TI ramps, and on the SR 101L mainline approaching and departing the I-17/SR01L TI.

The modification of the configuration of the SR51/SR101L TI Ramp 'W-S' exit was developed to determine if this directional ramp exit configuration would provide an operational benefit to the SR 101L mainline approaching the system interchange.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - Eastbound SR 101L mainline from west of I-17 to the 19th Avenue entrance ramp
  - Eastbound SR 101L mainline from the 7th Street entrance ramp to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit
  - Westbound SR 101L mainline between the 7th Street exit ramp and the Cave Creek Road entrance ramp

The analysis results indicate significant congestion would occur on the eastbound SR 101L mainline to the west of the 19th Avenue entrance ramp during the A.M. peak travel period. The segment of SR 101L between 7th Street and Cave Creek Road would also be anticipated to experience congestion during the A.M. and P.M. peak travel periods.

The I-17/SR101L TI Ramp 'W-S/W-N' (2 lanes) mandatory exit configuration would provide a better level-of-service on the westbound SR 101L mainline approaching the system interchange when compared to Alternative A. The SR51/SR101L TI Ramp 'W-S' (2 lanes) optional lane exit configuration would provide a similar level-of-service on the westbound SR 101L mainline approaching the system interchange as Alternative A.

2.4.6 Alternative C

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. Alternative C is generally the same as Alternative A, except for the following design elements:

- The eastbound SR 101L mainline was modified at the I-17/SR101L TI to provide three general-purpose lanes and one HOV lane approaching the Ramp 'S-E/N-E' gore
- The Ramp 'S-E/N-E' entrance was modified to allow each directional ramp lane (2 lanes) to enter the SR 101L mainline with a "lane-add" configuration (to provide 5 general-purpose lanes and 1 HOV lane between the I-17/SR101L TI and 7th Avenue)
- The 7th Avenue exit ramp (2 lanes) would be designed as a mandatory exit from the auxiliary lane, and the second lane designed as an optional lane with the eastbound SR 101L through-movement
- The number of general-purpose lanes would be reduced from five to four with an AASHTO lane-drop that would occur prior to the 7th Avenue entrance ramp gore
- The westbound 7th Avenue entrance ramp would be designed with a "lane-add" configuration that would continue to the I-17/SR101L TI Ramp 'W-S/W-N' exit
- The I-17/SR101L TI Ramp 'W-S/W-N' exit ramp (2 lanes) would be designed as a mandatory two lane exit from the outside freeway lanes. Three general-purpose lanes and one HOV lane would continue to the west.
- The 19th Avenue westbound exit ramp would be designed with a tapered exit configuration from the outside general-purpose lane

The purpose of the roadway configuration modifications was to determine the traffic operational effects of these modifications on the I-17/SR101L TI directional ramps, and on the SR 101L mainline approaching and departing the I-17/SR101L TI by reconstructing the 15th Avenue Underpass and eliminating the existing "bottleneck" at this location.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - Eastbound SR 101L mainline from the 7th Street entrance ramp to the Cave Creek Road exit ramp
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit
  - Westbound SR 101L mainline between the 7th Street exit ramp and the Cave Creek Road entrance ramp

The removal of the existing "bottleneck" at 15th Avenue would allow the SR 101L mainline and the I-17/SR101L TI directional ramps to operate with an acceptable level-of-service during the A.M. and P.M. peak travel periods. The segment of the eastbound SR 101L mainline between 7th Street and Cave Creek Road would experience increased congestion during the A.M. and P.M. peak travel periods primarily due to the increase travel demand due to the elimination of the existing "bottleneck" at the 15th Avenue Underpass. The westbound SR 101L mainline between 7th Street and Cave Creek Road would experience congestion during the A.M. and P.M. peak travel periods similar to Alternatives A and B.

2.4.7 Alternative C (With 7th Street to Cave Creek Road Auxiliary Lanes)

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. This alternative is the same as Alternative C, but would provide auxiliary lanes on the SR 101L mainline in each direction of travel between the 7th Street TI east ramps and the Cave Creek Road

TI west ramps, and would reconfigure the Scottsdale Road TI eastbound exit ramp to provide a two-lane exit ramp.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit

By implementing all of the improvements identified with this alternative, the SR 101L mainline would operate with an acceptable level-of-service throughout the project limits. Congestion may still occur on the directional interchange ramps noted above. Individual ramp improvement projects may be considered as warranted in the future.

2.4.8 Alternative D

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. Alternative D is generally the same as Alternative C (With 7th Street to Cave Creek Road Auxiliary Lanes), except the 19th Avenue TI east ramps would be removed from service and the eastbound Scottsdale Road TI exit ramp would remain a single lane exit ramp.

The removal of the 19th Avenue TI ramps would eliminate one entrance/exit ramp conflict area on the SR 101L mainline approaching and departing the I-17/SR101L TI, along with the need for auxiliary lanes between the 19th Avenue and 7th Avenue TI ramps. The traffic currently using the 19th Avenue TI to access the freeway would be re-routed to other arterial streets, or would use the existing frontage roads to access SR 101L at the 7th Avenue TI.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit

The elimination of the 19th Avenue ramps would allow the SR 101L mainline, and the I-17/SR101L TI directional ramps to operate with an acceptable level-of-service during the A.M. and P.M. peak travel periods.

2.4.9 Alternative E

Description of Alternative

The Year 2035 traffic volume projections and lane diagrams are provided in Appendix F. Alternative E is generally the same as Alternative D except the 7th Avenue eastbound exit ramp (1 lane) would be reconfigured with a tapered exit configuration from the outside general-purpose lane. The eastbound mainline would then transition from five general-purpose lanes to four general-purpose lanes with an AASHTO lane drop that would occur in advance of the 7th Street entrance ramp gore.

Operational Analysis Results

The level-of-service analysis results for the A.M. and P.M. peak hours are provided in Appendix F. The results of the level-of-service analysis indicate SR 101L would operate with congestion during the A.M. and P.M. peak hours at the following locations:

- A.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - Scottsdale Road TI eastbound exit ramp

- P.M. Peak Hour
  - SR51/SR101L TI Ramp 'E-S'
  - I-17/SR101L TI Ramp 'W-N'
  - I-17/SR101L TI Ramp 'W-S/W-N' exit

The elimination of the 19th Avenue ramps would allow the SR 101L mainline, and the I-17/SR101L TI directional ramps to operate with an acceptable level-of-service during the A.M. and P.M. peak travel periods.

2.4.10 Summary and Recommendation

Section 3.0 of this report provides a detailed evaluation of each of the Build Alternatives which resulted in the selection of Alternative C (With 7th Street to Cave Creek Road Auxiliary Lanes) as the Preferred Alternative.

The Year 2035 traffic volume projections and lane diagrams for the Preferred Alternative are shown in Figure 10 (pages 84-89). Figure 11 (pages 90–95) and Figure 12 (pages 96-101) summarize the level-of-service analysis results for the A.M. and P.M. peak hours

The additional capacity provided with the Preferred Alternative is anticipated to meet the projected 2035 traffic demand. The Preferred Alternative would provide additional capacity to carry, on average, approximately 2,400 and 3,100 more vehicles (total eastbound and westbound) than the No-Build Alternative during both the A.M. and P.M. peak hours, respectively.

As shown in Table 19, the Preferred Alternative would operate with no congestion (LOS 'E' or 'F') on the SR 101L mainline within the study corridor during both the A.M. and P.M. peak hours.

Table 19 – Miles of LOS 'E' or 'F' for Each Alternative

Description	Miles of LOS 'E' or 'F'		
	Eastbound	Westbound	Total
2035 No-Build, A.M. Peak Hour	4.6*	1.9	6.5
2035 No-Build, P.M. Peak Hour	4.0*	12.1*	16.1
Alternative A, A.M. Peak Hour	1.8*	0	1.8
Alternative A, P.M. Peak Hour	0	2.2	2.2
Alternative B, A.M. Peak Hour	2.8*	0	2.8
Alternative B, P.M. Peak Hour	0	1.5	1.5
Alternative C, A.M. Peak Hour	1.4	0	1.4
Alternative C, P.M. Peak Hour	0	1.5	1.5
Alternative C with 7th Street to Cave Creek Road Auxiliary Lane, A.M. Peak Hour	0	0	0
Alternative C with 7th Street to Cave Creek Road Auxiliary Lane, P.M. Peak Hour	0	0	0
Alternative D, A.M. Peak Hour	0	0	0
Alternative D, P.M. Peak Hour	0	0	0
Alternative E, A.M. Peak Hour	0	0	0
Alternative E, P.M. Peak Hour	0	0	0

*LOS 'E' or 'F' may extend beyond the project limits including on to I-17 or SR 51.

Performance measures for each eastbound and westbound segment of the SR 101L mainline that would operate at LOS 'E' and LOS 'F' for each of the alternatives is presented in Tables 20 and 21.

The existing eastbound "bottlenecks" at the 15th Avenue Underpass, and between the 7th Street entrance ramp at Cave Creek Road exit ramp, would be eliminated with the Preferred Alternative. The existing "bottleneck" on westbound SR 101L between the Cave Creek Road entrance ramp of the 7th Street exit ramp would also be eliminated with the Preferred Alternative.

The SR51/SR101L TI Ramp 'E-S' is anticipated to experience congestion (within the limits of the ramp) during the A.M. and P.M. peak hours. In addition, the I-17/SR101L TI Ramp 'W-S/W-N' exit ramp is also anticipated to be congested (within the limits of the ramp) during the P.M. peak hour. Capacity improvements may be warranted on these directional ramps in the future, but would not be included with the SR 101L mainline improvements that are included with this study.

Table 20 – A.M. Peak Hour Performance Measures

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Eastbound							
Begin Project to 19th Avenue							
Number of General Purpose Lanes	2	3	3	3	3	3	3
Traffic Volume (vph)	3470	4590	4330	4590	4590	4700	4680
Travel Speed (mph)	15	60	16	60	60	59	60
Density (veh/ln-mile) (LOS)	119 (F)	27 (D)(2)	109 (F)	26 (C)	26 (C)	27 (D)	26 (D)
19th Avenue to 7th Avenue							
Number of General Purpose Lanes	4	4	4	5	5	4	5
Traffic Volume (vph)	5540	7880	8200	8310	8280	7760	7730
Travel Speed (mph)	14	53	52	57	57	54	57
Density (veh/ln-mile) (LOS)	112 (F)	32 (D)	33 (D)	28 (D)	28 (D)	32 (D)	27 (D)
7th Avenue to 7th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5710	7820	8150	8260	8130	8050	8020
Travel Speed (mph)	17	53	52	52	53	53	53
Density (veh/ln-mile) (LOS)	95 (F)	30 (D)	32 (D)	33 (D)	32 (D)	32 (D)	32 (D)
7th Street to Cave Creek Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5720	7770	8110	8280	8120	8140	8050
Travel Speed (mph)	38	46	43	42	51	51	51
Density (veh/ln-mile) (LOS)	53 (F)	39 (E)	44 (E)	46 (F)	33 (D)	33 (D)	32 (D)
Cave Creek Road to SR 51							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	6050	8110	8480	8620	8450	8450	8350
Travel Speed (mph)	59	58	57	56	56	56	57
Density (veh/ln-mile) (LOS)	27 (D)	30 (D)	33 (D)	35 (D)	33 (D)	33 (D)	32 (D)
SR 51 to Tatum Boulevard							
Number of General Purpose Lanes	4	4	4	4	4	4	4
Traffic Volume (vph)	6220	8410	8650	8760	8610	8600	8560
Travel Speed (mph)	60	59	58	58	58	58	58
Density (veh/ln-mile) (LOS)	25 (C)	31 (D)	32 (D)	33 (D)	32 (D)	32 (D)	32 (D)
Tatum Boulevard to 56th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5800	7920	8170	8280	8150	8060	8050
Travel Speed (mph)	58	58	57	57	57	57	57
Density (veh/ln-mile) (LOS)	27 (D)	29 (D)	31 (D)	31 (D)	30 (D)	29 (D)	30 (D)
56th Street to 64th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5890	8020	8330	8400	8280	8110	8130
Travel Speed (mph)	58	56	55	55	55	56	56
Density (veh/ln-mile) (LOS)	27 (D)	30 (D)	32 (D)	32 (D)	32 (D)	31 (D)	31 (D)
64th Street to Scottsdale Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5950	7980	8300	8330	8280	8130	8080
Travel Speed (mph)	58	57	57	57	54	57	57
Density (veh/ln-mile) (LOS)	26 (D)	29 (D)	30 (D)	30 (D)	35 (D)	29 (D)	29 (D)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.
2) Results reflect a LOS 'D' on the mainline. However note this alternative has LOS 'F' on the I-17/SR011L TI Ramp 'S-E' entrance ramp that continues onto the I-17 mainline.

Table 20 – A.M. Peak Hour Performance Measures (Continued)

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Eastbound (Continued)							
Scottsdale Road to Hayden Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5510	7520	7890	7910	7860	7740	7640
Travel Speed (mph)	60	60	59	59	60	59	59
Density (veh/ln-mile) (LOS)	25 (C)	27 (D)	29 (D)	29 (D)	28 (D)	28 (D)	28 (D)
Hayden Road to Princess Drive							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5530	7440	7830	7870	7730	7690	7540
Travel Speed (mph)	60	60	60	59	60	60	60
Density (veh/ln-mile) (LOS)	24 (C)	26 (D)	28 (D)	28 (D)	27 (D)	27 (D)	27 (D)
Westbound							
Princess Drive to Hayden Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5230	5600	5620	5600	5600	5520	5460
Travel Speed (mph)	61	62	62	62	62	62	62
Density (veh/ln-mile) (LOS)	23 (C)	19 (C)	20 (C)	19 (C)	19 (C)	19 (C)	19 (C)
Hayden Road to Scottsdale Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5140	5590	5620	5590	5600	5510	5460
Travel Speed (mph)	60	61	61	61	61	60	61
Density (veh/ln-mile) (LOS)	22 (C)	19 (C)	20 (C)	19 (C)	19 (C)	19 (C)	19 (C)
Scottsdale Road to 64th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5390	5930	6000	5910	5920	5780	5750
Travel Speed (mph)	59	60	60	60	60	60	60
Density (veh/ln-mile) (LOS)	25 (C)	22 (C)	22 (C)	22 (C)	22 (C)	21 (C)	21 (C)
64th Street to 56th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5360	5910	5950	5880	5900	5750	5740
Travel Speed (mph)	60	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	24 (C)	21 (C)	21 (C)	21 (C)	21 (C)	20 (C)	20 (C)
56th Street to Tatum Boulevard							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5320	5890	5920	5860	5880	5730	5700
Travel Speed (mph)	61	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	23 (C)	20 (C)	20 (C)	20 (C)	20 (C)	20 (C)	20 (C)
Tatum Boulevard to SR 51							
Number of General Purpose Lanes	3	3	4	3	3	3	3
Traffic Volume (vph)	5800	6430	6480	6420	6420	6210	6200
Travel Speed (mph)	58	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	30 (D)	23 (C)	23 (C)	23 (C)	23 (C)	22 (C)	22 (C)
SR 51 to Cave Creek Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5650	5790	5750	5650	5680	5540	5460
Travel Speed (mph)	61	62	62	62	62	62	62
Density (veh/ln-mile) (LOS)	24 (C)	20 (C)	20 (C)	20 (C)	20 (C)	19 (C)	19 (C)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.

Table 20 – A.M. Peak Hour Performance Measures (Continued)

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Westbound (Continued)							
Cave Creek Road to 7th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	6110	6180	6150	6060	6100	5920	5830
Travel Speed (mph)	56	60	60	60	62	62	62
Density (veh/ln-mile) (LOS)	36 (E)	26 (D)	26 (D)	26 (D)	21 (C)	20 (C)	20 (C)
7th Street to 7th Avenue							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	6260	6280	6300	6220	6210	5890	5850
Travel Speed (mph)	57	60	60	60	60	60	60
Density (veh/ln-mile) (LOS)	32 (D)	23 (C)	23 (C)	23 (C)	23 (C)	20 (C)	20 (C)
7th Avenue to 19th Avenue							
Number of General Purpose Lanes	3	4	5	5	5	5	5
Traffic Volume (vph)	6390	6410	6430	6350	6350	5470	5460
Travel Speed (mph)	54	59	60	60	60	61	61
Density (veh/ln-mile) (LOS)	32 (D)	24 (C)	22 (C)	22 (C)	22 (C)	21 (C)	21 (C)
19th Avenue to Begin Project							
Number of General Purpose Lanes	3	3	3	3	3	3	3
Traffic Volume (vph)	3300	3270	3220	3240	3140	3190	3130
Travel Speed (mph)	61	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	17 (B)	18 (C)	19 (C)	19 (C)	18 (C)	19 (C)	19 (C)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.

Table 21 – P.M. Peak Hour Performance Measures

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Eastbound							
Begin Project to 19th Avenue							
Number of General Purpose Lanes	2	3	3	3	3	3	3
Traffic Volume (vph)	3870	4090	4080	4090	4120	4260	4260
Travel Speed (mph)	48	60	55	61	61	60	60
Density (veh/ln-mile) (LOS)	42 (E)	23 (C)	27 (D)	23 (C)	23 (C)	24 (C)	24 (C)
19th Avenue to 7th Avenue							
Number of General Purpose Lanes	4	4	4	5	5	4	5
Traffic Volume (vph)	5920	7430	7450	7430	7520	6650	6640
Travel Speed (mph)	16	54	56	58	58	57	59
Density (veh/ln-mile) (LOS)	103 (F)	29 (D)	28 (D)	26 (C)	26 (D)	26 (C)	23 (C)
7th Avenue to 7th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5900	7360	7380	7320	7420	7190	7190
Travel Speed (mph)	18	54	55	55	54	55	54
Density (veh/ln-mile) (LOS)	91 (F)	28 (D)	29 (D)	29 (D)	29 (D)	28 (D)	29 (D)
7th Street to Cave Creek Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5710	7230	7250	7170	7350	7190	7210
Travel Speed (mph)	34	51	51	51	55	55	55
Density (veh/ln-mile) (LOS)	58 (F)	33 (D)	33 (D)	33 (D)	27 (D)	27 (D)	27 (D)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.

Table 21 – P.M. Peak Hour Performance Measures (Continued)

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Eastbound (Continued)							
Cave Creek Road to SR 51							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5330	6930	6910	6780	6980	6800	6810
Travel Speed (mph)	60	56	57	57	58	58	57
Density (veh/ln-mile) (LOS)	24 (C)	31 (D)	29 (D)	29 (D)	28 (D)	28 (D)	28 (D)
SR 51 to Tatum Boulevard							
Number of General Purpose Lanes	4	4	4	4	4	4	4
Traffic Volume (vph)	5530	6980	7010	6890	7120	6900	6930
Travel Speed (mph)	60	59	59	59	59	59	59
Density (veh/ln-mile) (LOS)	24 (C)	27 (D)	27 (D)	27 (D)	28 (D)	27 (D)	27 (D)
Tatum Boulevard to 56th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	4760	6280	6320	6120	6350	6170	6200
Travel Speed (mph)	60	60	60	60	60	60	60
Density (veh/ln-mile) (LOS)	22 (C)	22 (C)	22 (C)	21 (C)	22 (C)	22 (C)	22 (C)
56th Street to 64th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	4930	6360	6340	6180	6400	6200	6230
Travel Speed (mph)	60	59	59	60	59	60	60
Density (veh/ln-mile) (LOS)	22 (C)	23 (C)	23 (C)	22 (C)	23 (C)	22 (C)	22 (C)
64th Street to Scottsdale Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	4860	6320	6260	6120	6380	6150	6160
Travel Speed (mph)	59	59	59	59	57	59	59
Density (veh/ln-mile) (LOS)	21 (C)	22 (C)	22 (C)	22 (C)	27 (D)	22 (C)	22 (C)
Scottsdale Road to Hayden Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	4490	5920	5860	5610	5970	5730	5770
Travel Speed (mph)	61	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	20 (C)	21 (C)	21 (C)	20 (C)	21 (C)	21 (C)	21 (C)
Hayden Road to Princess Drive							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	4440	5770	5740	5490	5810	5540	5600
Travel Speed (mph)	61	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	19 (C)	20 (C)	20 (C)	19 (C)	20 (C)	19 (C)	19 (C)
Westbound							
Princess Drive to Hayden Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	7420	8580	8580	8580	8590	8520	8530
Travel Speed (mph)	25	60	60	59	59	60	60
Density (veh/ln-mile) (LOS)	86 (F)	30 (D)	30 (D)	30 (D)	31 (D)	30 (D)	30 (D)
Hayden Road to Scottsdale Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	7120	8290	8300	8310	8340	8250	8240
Travel Speed (mph)	23	57	58	58	58	58	58
Density (veh/ln-mile) (LOS)	85 (F)	30 (D)	30 (D)	30 (D)	30 (D)	30 (D)	30 (D)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.

Table 21 – P.M. Peak Hour Performance Measures (Continued)

Description	2035 No-Build Alt	Alt A	Alt B	Alt C	Alt C w/7th St to Cave Creek Auxiliary Lane	Alt D	Alt E
Westbound (Continued)							
Scottsdale Road to 64th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	7440	8570	8560	8580	8640	8560	8560
Travel Speed (mph)	33	54	55	54	54	54	54
Density (veh/ln-mile) (LOS)	65 (F)	35 (D)	34 (D)	35 (D)	35 (D)	35 (D)	35 (D)
64th Street to 56th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	7350	8600	8540	8600	8670	8570	8600
Travel Speed (mph)	43	59	59	59	59	59	59
Density (veh/ln-mile) (LOS)	51 (F)	31 (D)	31 (D)	31 (D)	31 (D)	31 (D)	31 (D)
56th Street to Tatum Boulevard							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	6990	8470	8360	8480	8530	8410	8410
Travel Speed (mph)	30	59	60	60	60	60	60
Density (veh/ln-mile) (LOS)	68 (F)	30 (D)	29 (D)	30 (D)	30 (D)	29 (D)	29 (D)
Tatum Boulevard to SR 51							
Number of General Purpose Lanes	3	3	4	3	3	3	3
Traffic Volume (vph)	7070	8800	8700	8790	8810	8740	8760
Travel Speed (mph)	22	56	54	55	55	56	56
Density (veh/ln-mile) (LOS)	92 (F)	35 (D)	35 (D)	35 (D)	35 (D)	35 (D)	35 (D)
SR 51 to Cave Creek Road							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5990	8490	8430	8570	8500	8440	8420
8360	14	60	60	59	60	60	60
Density (veh/ln-mile) (LOS)	135 (F)	31 (D)	31 (D)	31 (D)	31 (D)	31 (D)	31 (D)
Cave Creek Road to 7th Street							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	5960	8260	8210	8330	8280	8170	8180
Travel Speed (mph)	23	55	55	55	60	60	60
Density (veh/ln-mile) (LOS)	88 (F)	38 (E)	37 (E)	38 (E)	29 (D)	28 (D)	28 (D)
7th Street to 7th Avenue							
Number of General Purpose Lanes	3	4	4	4	4	4	4
Traffic Volume (vph)	6120	8390	8350	8420	8400	8120	8140
Travel Speed (mph)	23	59	59	59	58	58	58
Density (veh/ln-mile) (LOS)	81 (F)	31 (D)	31 (D)	31 (D)	32 (D)	29 (D)	29 (D)
7th Avenue to 19th Avenue							
Number of General Purpose Lanes	3	4	5	5	5	5	5
Traffic Volume (vph)	6330	8600	8580	8620	8630	7810	7830
Travel Speed (mph)	37	50	57	57	57	58	58
Density (veh/ln-mile) (LOS)	54 (F)	40 (E)	32 (D)	32 (D)	32 (D)	30 (D)	30 (D)
19th Avenue to Begin Project							
Number of General Purpose Lanes	3	3	3	3	3	3	3
Traffic Volume (vph)	2520	4430	4410	4430	4460	4480	4470
Travel Speed (mph)	62	61	61	61	61	61	61
Density (veh/ln-mile) (LOS)	14 (B)	24 (C)	24 (C)	24 (C)	24 (C)	25 (C)	25 (C)

Notes: 1) Traffic volumes shown reflect the volume that can be accommodated based on the CORSIM model output.

(Text continued on page 102)

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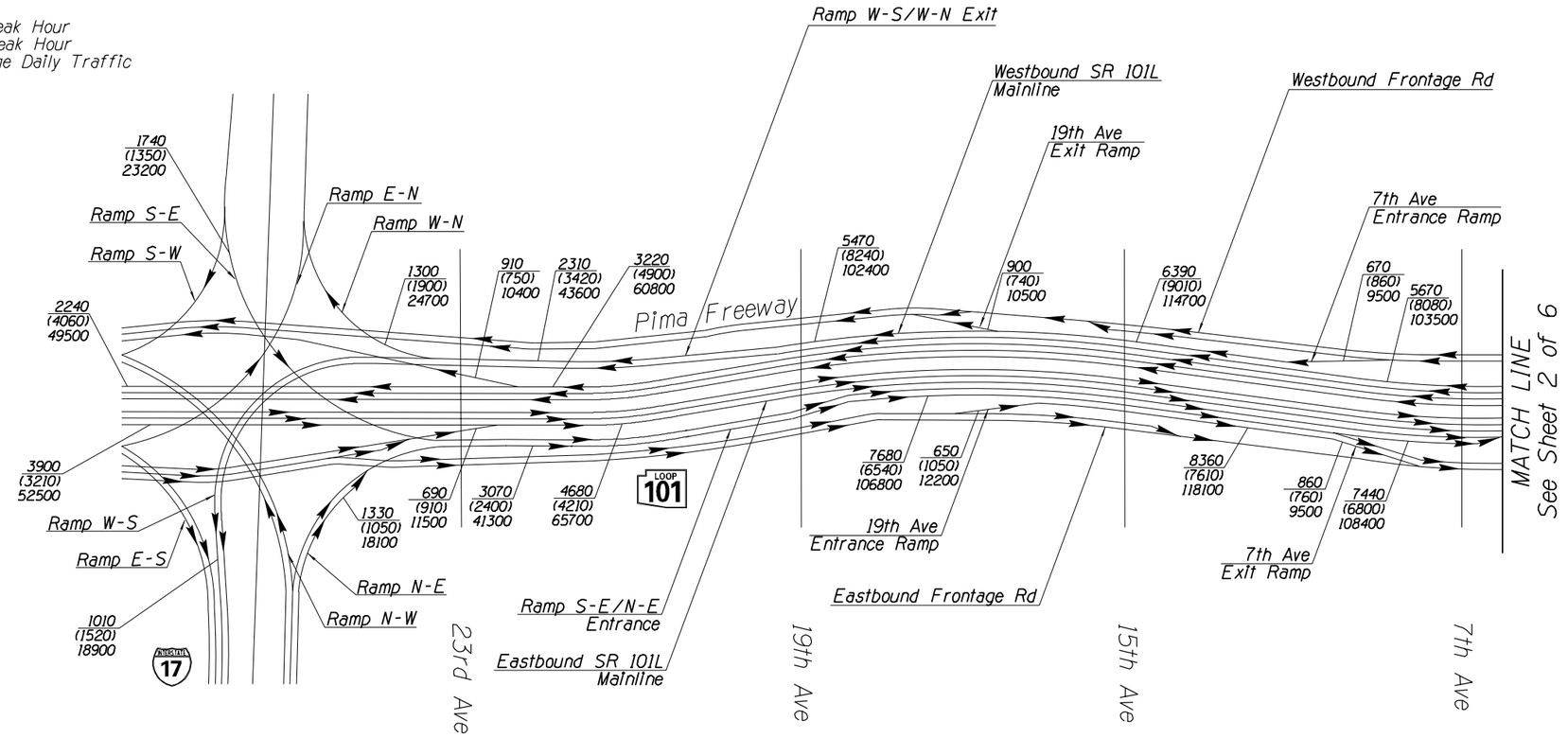
NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic



SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 1 OF 6

NOT TO SCALE - SCHEMATIC ONLY

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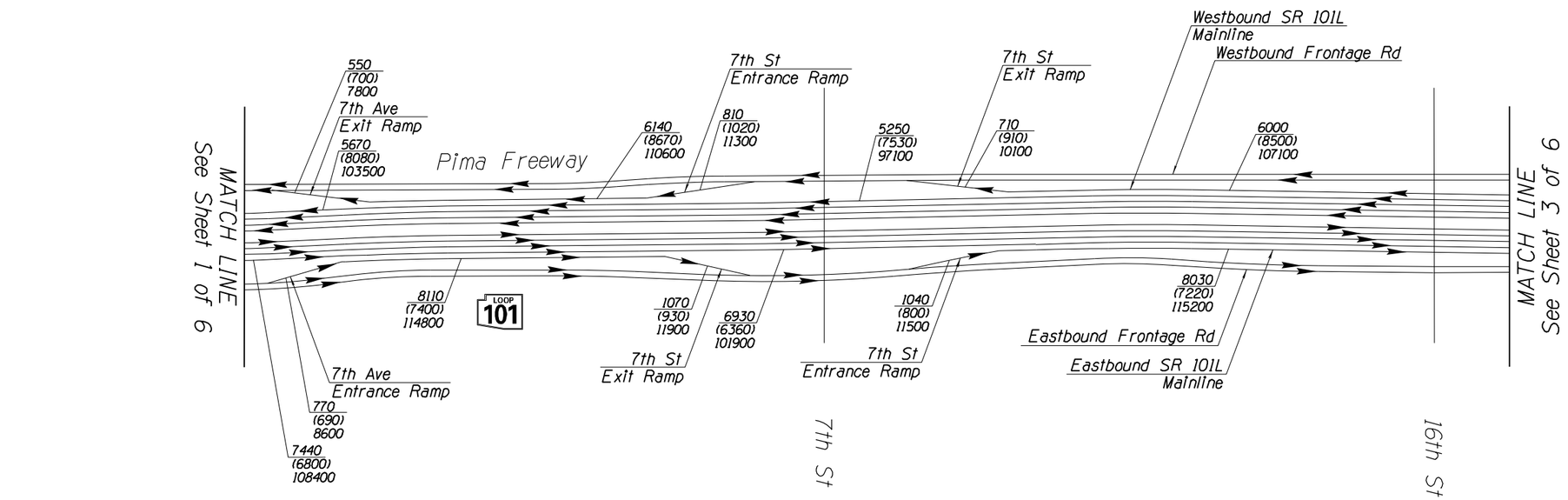

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 2 OF 6

NOT TO SCALE - SCHEMATIC ONLY

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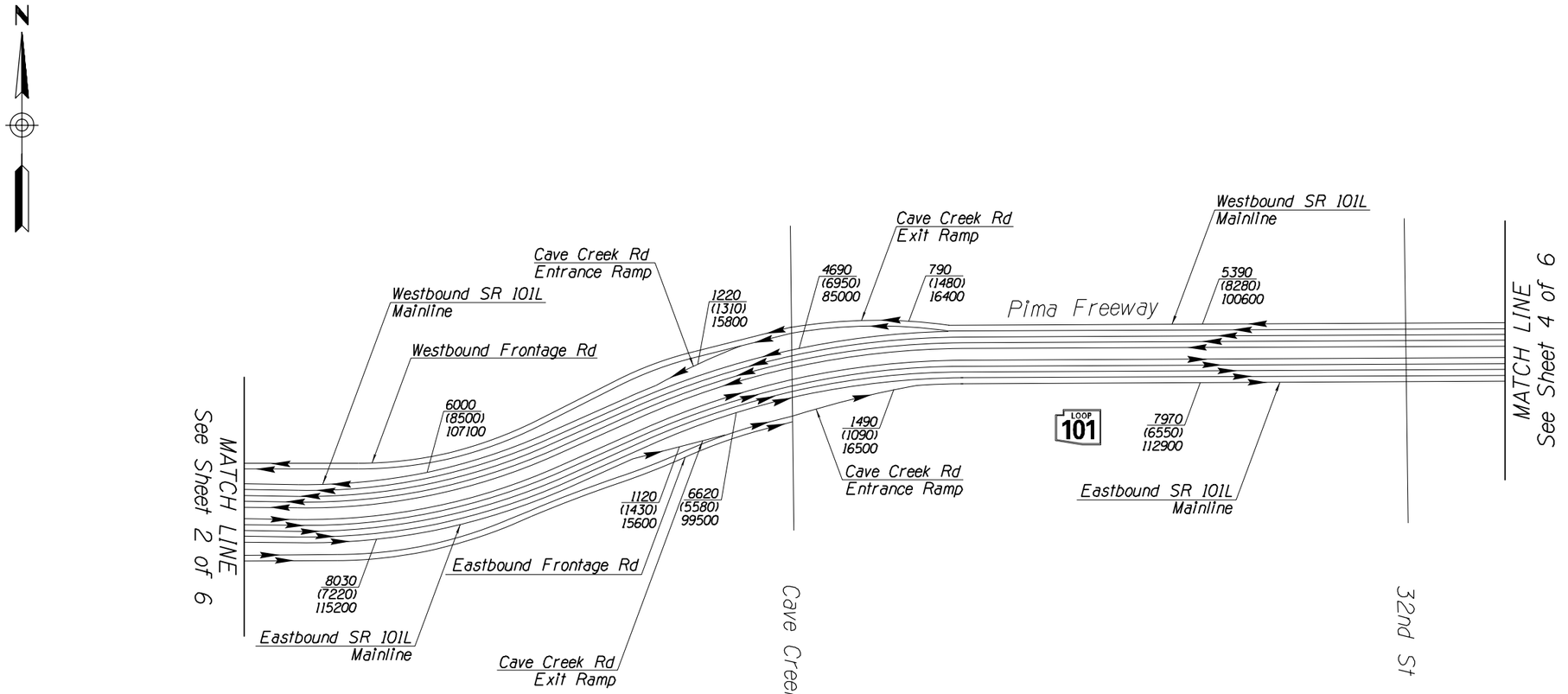

NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

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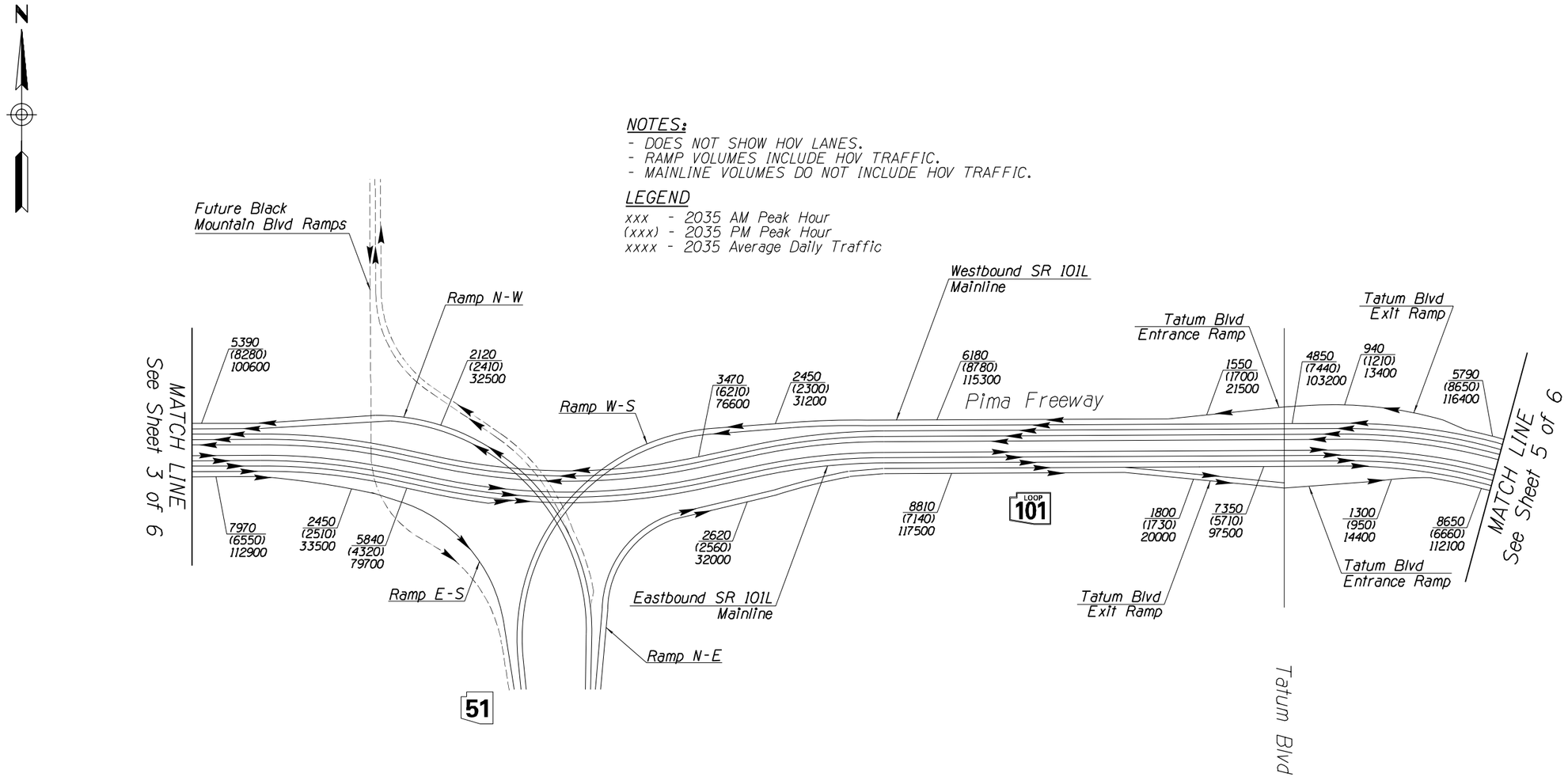
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 3 OF 6



SR 101L
I-17 to Princess Drive

AECOM

FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 4 OF 6

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

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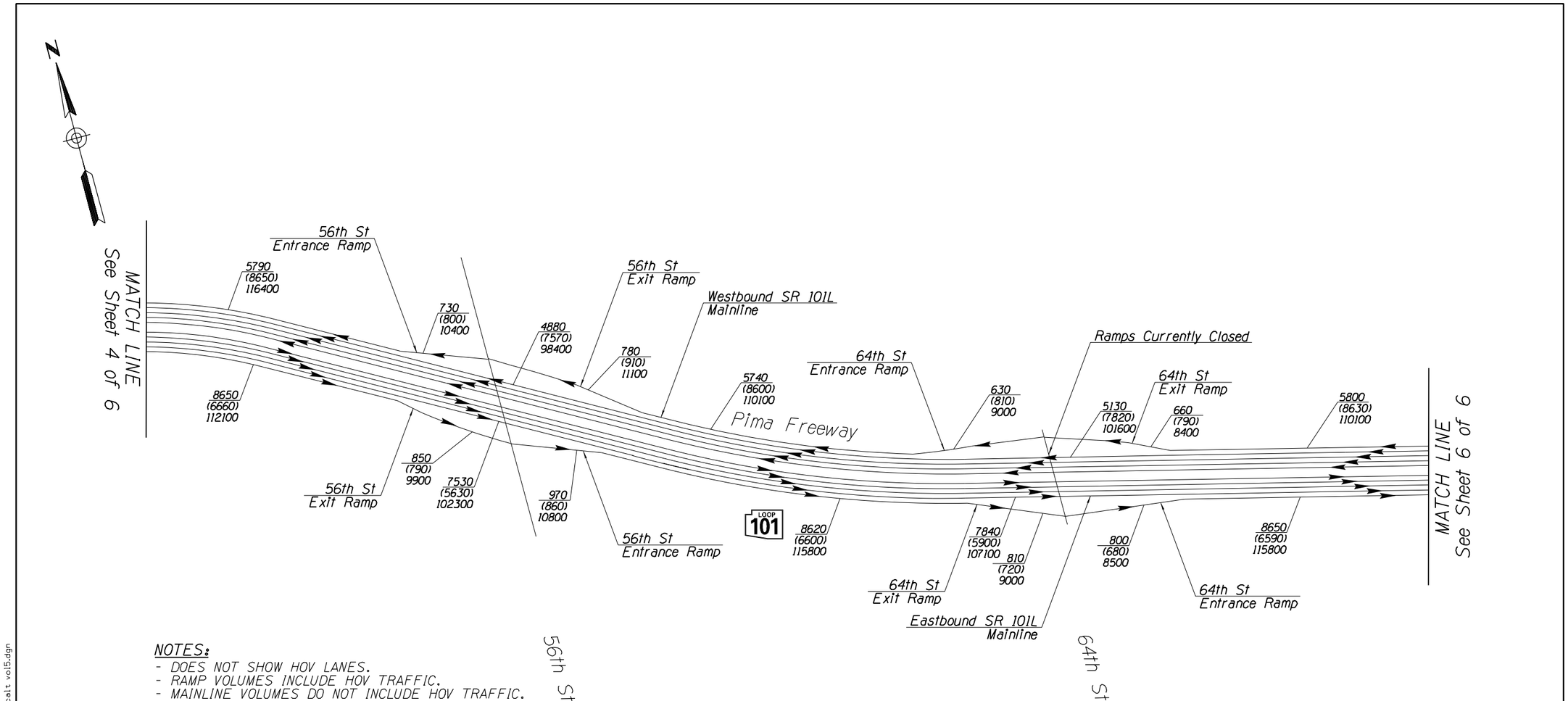
11/24/2015



NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic

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11/24/2015

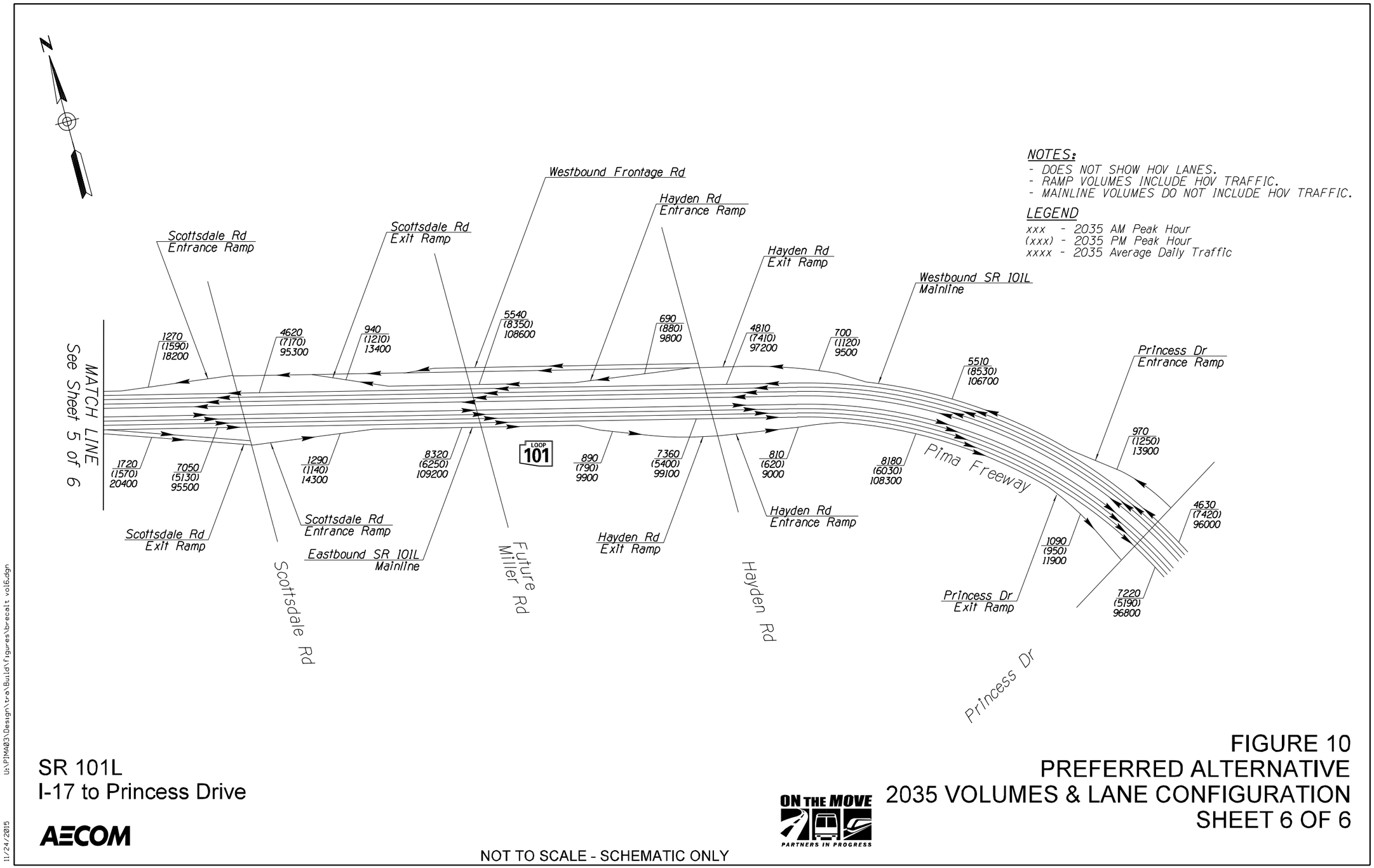
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 5 OF 6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NOTES:
- DOES NOT SHOW HOV LANES.
- RAMP VOLUMES INCLUDE HOV TRAFFIC.
- MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.
LEGEND
xxx - 2035 AM Peak Hour
(xxx) - 2035 PM Peak Hour
xxxx - 2035 Average Daily Traffic
MATCH LINE See Sheet 5 of 6
Scottsdale Rd Entrance Ramp
Scottsdale Rd Exit Ramp
Westbound Frontage Rd
Hayden Rd Entrance Ramp
Hayden Rd Exit Ramp
Westbound SR 101L Mainline
Princess Dr Entrance Ramp
1270 (1590) 18200
4620 (7170) 95300
940 (1210) 13400
5540 (8350) 108600
690 (880) 9800
4810 (7410) 97200
700 (1120) 9500
5510 (8530) 106700
970 (1250) 13900
1720 (1570) 20400
7050 (5130) 95500
1290 (1140) 14300
8320 (6250) 109200
LOOP 101
890 (790) 9900
7360 (5400) 99100
810 (620) 9000
8180 (6030) 108300
Pima Freeway
4630 (7420) 96000
1090 (950) 11900
7220 (5190) 96800
Scottsdale Rd Exit Ramp
Scottsdale Rd Entrance Ramp
Eastbound SR 101L Mainline
Future Miller Rd
Hayden Rd Exit Ramp
Hayden Rd Entrance Ramp
Princess Dr Exit Ramp
Scottsdale Rd
Hayden Rd
Princess Dr
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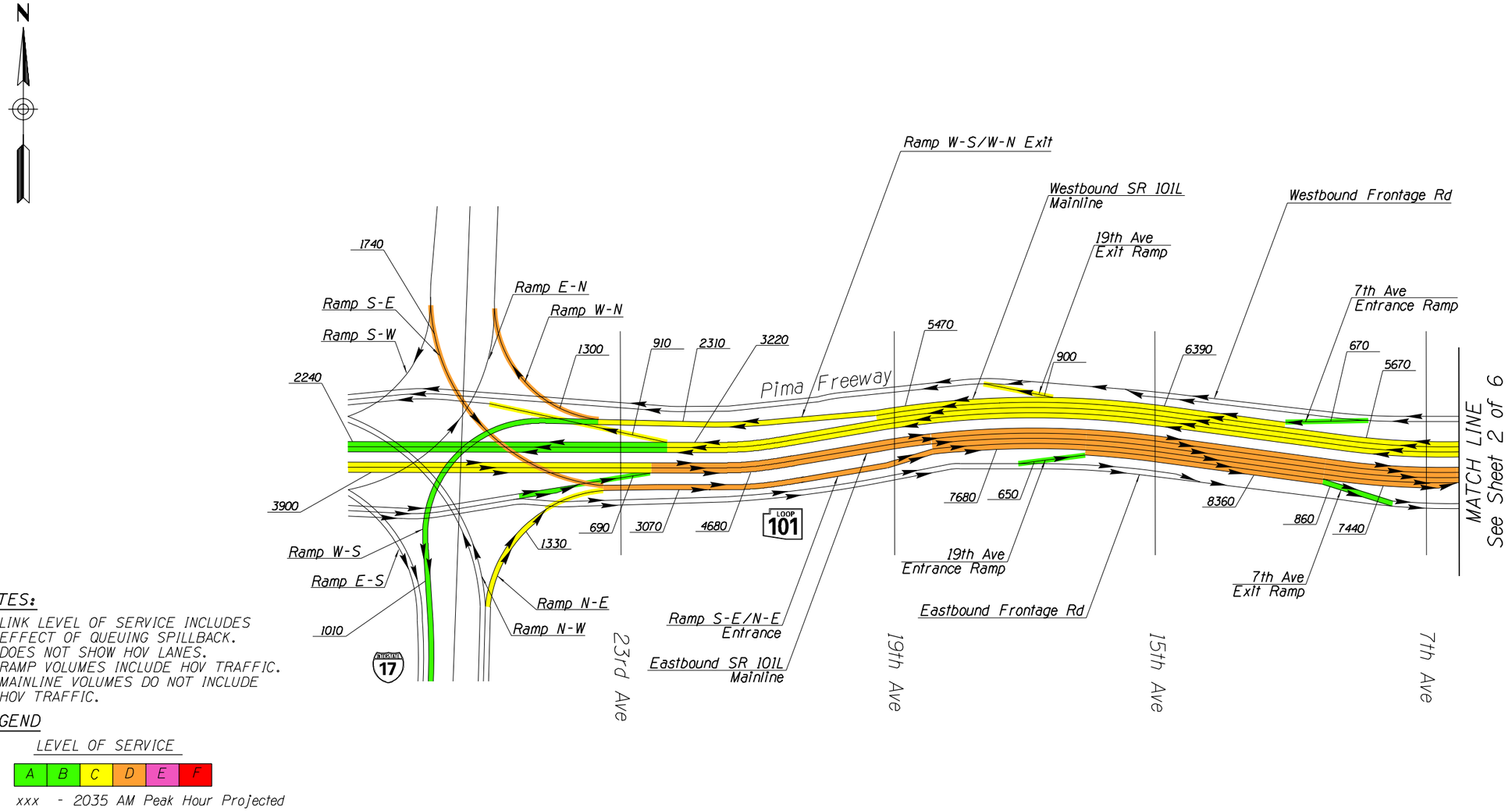
11/24/2015
SR 101L
I-17 to Princess Drive
AECOM
NOT TO SCALE - SCHEMATIC ONLY
ON THE MOVE
PARTNERS IN PROGRESS
FIGURE 10
PREFERRED ALTERNATIVE
2035 VOLUMES & LANE CONFIGURATION
SHEET 6 OF 6



NOTES:

1. LINK LEVEL OF SERVICE INCLUDES EFFECT OF QUEUING SPILLBACK.
2. DOES NOT SHOW HOV LANES.
3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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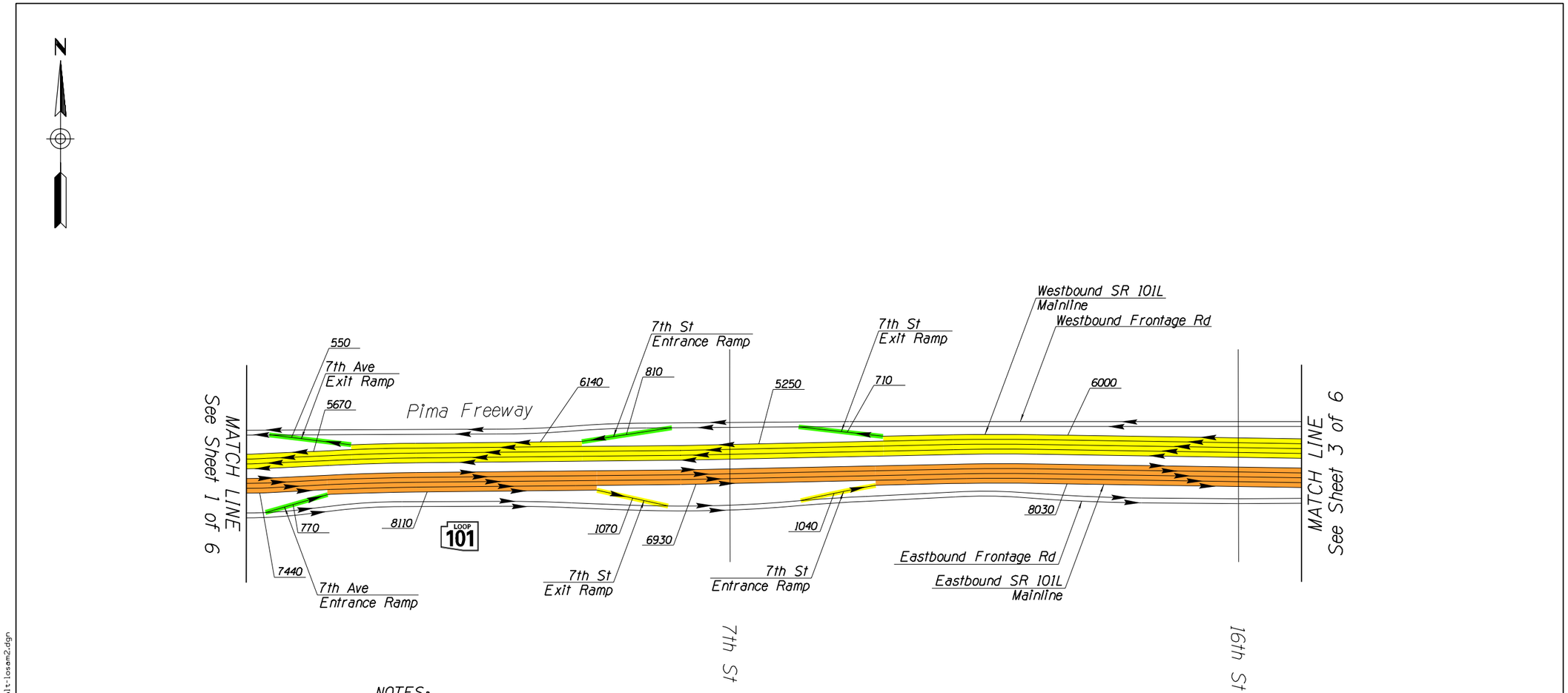
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 1 OF 6



NOTES:

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3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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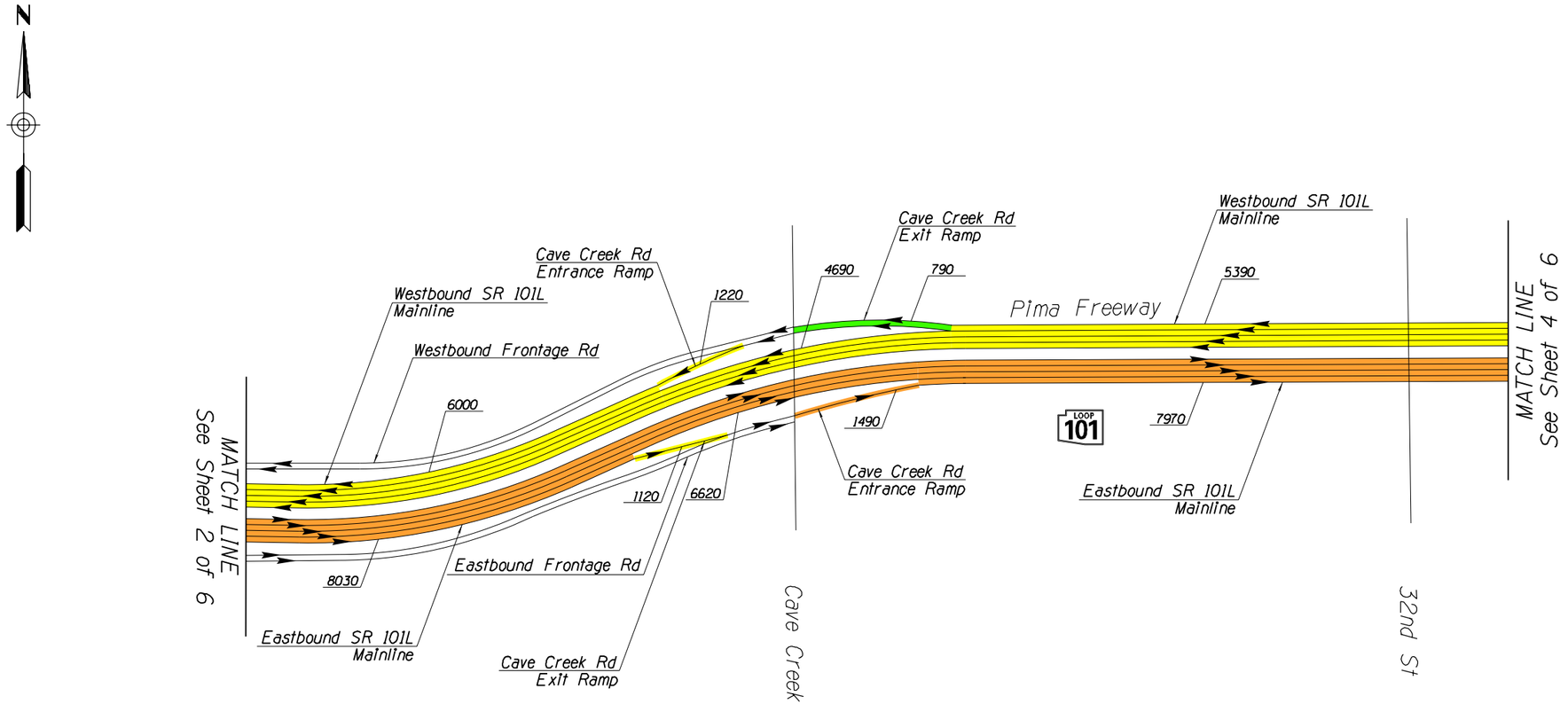
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 2 OF 6

NOT TO SCALE - SCHEMATIC ONLY



NOTES:

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3. RAMP VOLUMES INCLUDE HOV TRAFFIC.
4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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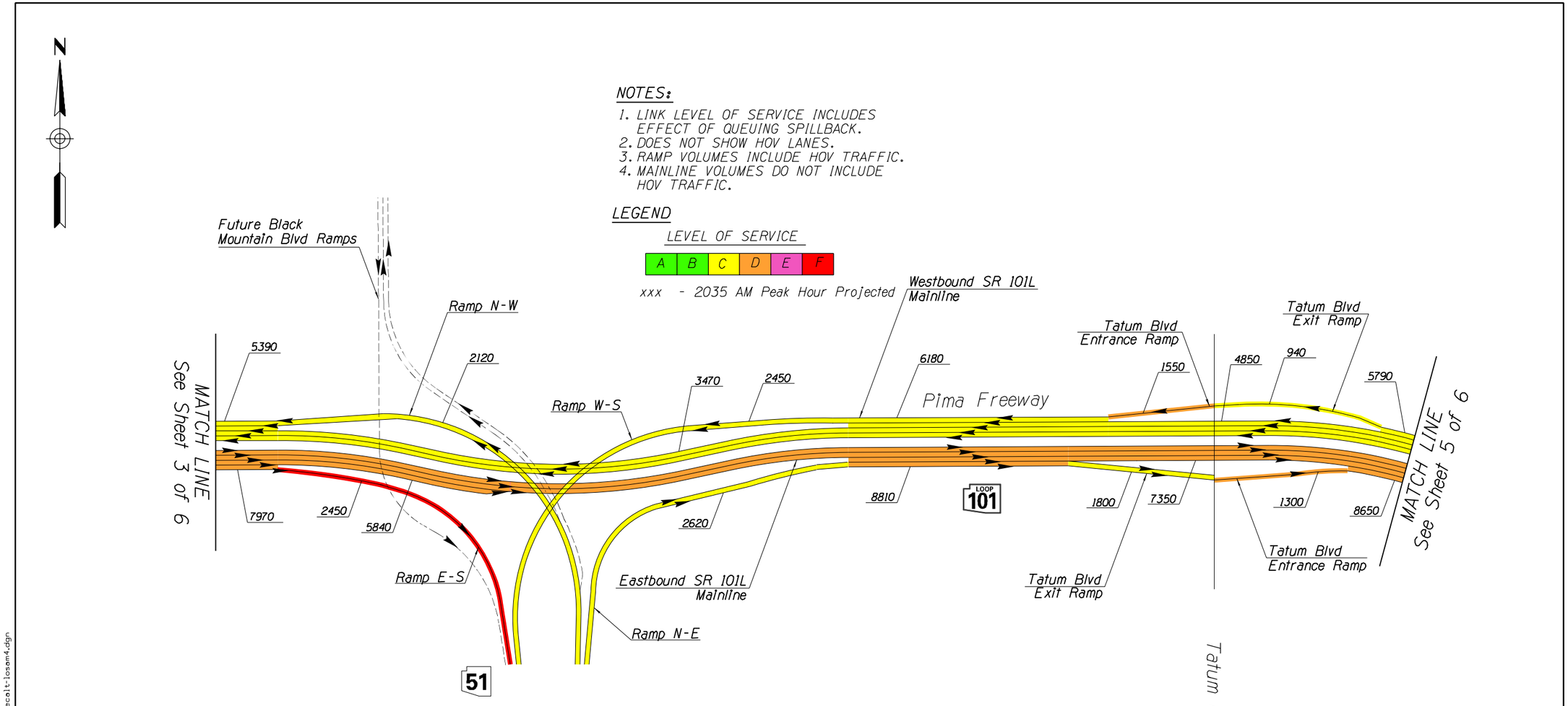
SR 101L
I-17 to Princess Drive

AECOM

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 3 OF 6



SR 101L
I-17 to Princess Drive

AECOM

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 4 OF 6

ON THE MOVE
PARTNERS IN PROGRESS

NOT TO SCALE - SCHEMATIC ONLY

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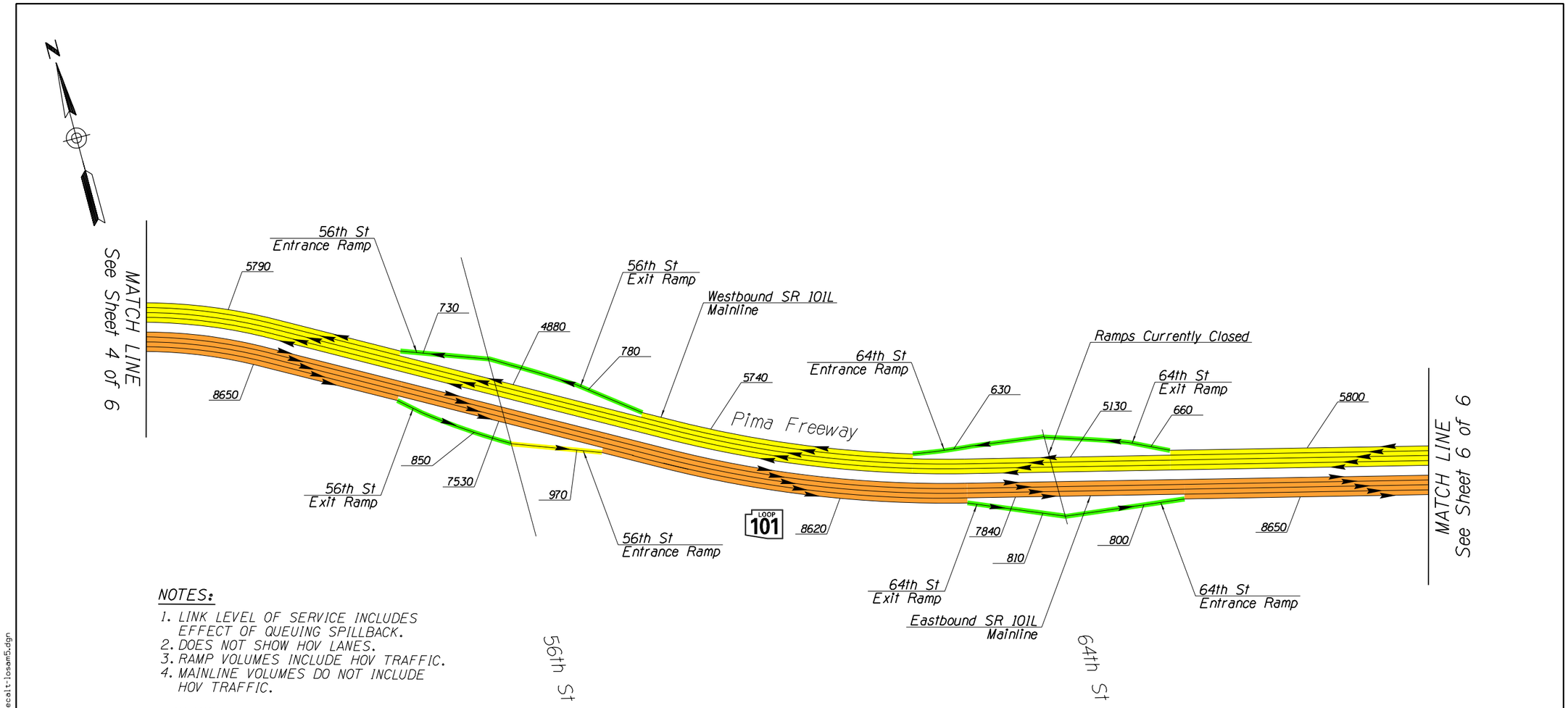

NOTES:

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4. MAINLINE VOLUMES DO NOT INCLUDE HOV TRAFFIC.

LEGEND

LEVEL OF SERVICE

A	B	C	D	E	F

xxx - 2035 AM Peak Hour Projected

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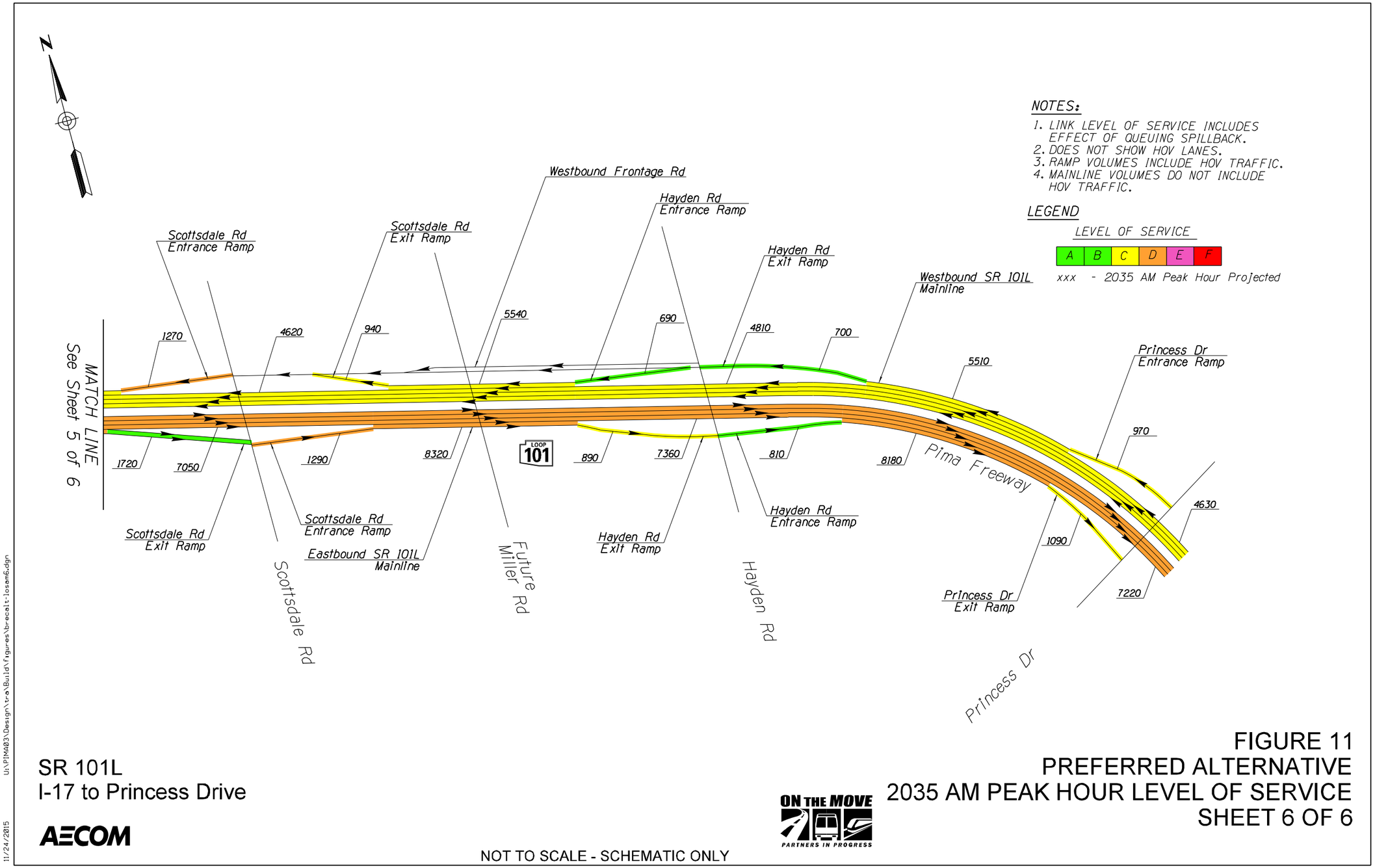
SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 5 OF 6



SR 101L
I-17 to Princess Drive

AECOM

NOT TO SCALE - SCHEMATIC ONLY

ON THE MOVE
PARTNERS IN PROGRESS

FIGURE 11
PREFERRED ALTERNATIVE
2035 AM PEAK HOUR LEVEL OF SERVICE
SHEET 6 OF 6