
California Transportation Commission Application for Toll Facility

STATE ROUTE 241/STATE ROUTE 91 (241/91) EXPRESS CONNECTOR PROJECT

SUBMITTED BY:

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY (F/ETCA)



IN PARTNERSHIP WITH:

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) DISTRICT 12
ORANGE COUNTY TRANSPORTATION AUTHORITY (OCTA)
RIVERSIDE COUNTY TRANSPORTATION COMMISSION (RCTC)



PREPARED FOR:

CALIFORNIA TRANSPORTATION COMMISSION



SEPTEMBER 2025

September 17, 2025

Tanisha Taylor
Executive Director
California Transportation Commission
1120 North Street
Mail Station 52, Room 2233
Sacramento, CA 95814

RE: Toll Facility Application for the 241/91 Express Connector Project

Director Taylor,

On behalf of the Foothill/Eastern Transportation Corridor Agency (F/ETCA), with support from the county transportation commission, Orange County Transportation Authority (OCTA), and in coordination with Caltrans and the Riverside County Transportation Commission (RCTC), I am pleased to submit the enclosed toll facility application for the 241/91 Express Connector (241/91 EC) for consideration by the California Transportation Commission (CTC) in accordance with Assembly Bill (AB) 194 (Frazier, 2015) guidelines and codified in Streets and Highways Code Section 149.7. While F/ETCA has existing tolling authority for its existing facilities (State Routes (SR's) 133, 261, and 241) and capital improvement projects on these toll roads, this application for supplemental tolling authority is being submitted specifically for the 241/91 EC toll facility as the preferred tolling authority path for F/ETCA and partner agencies for this project and as continued demonstration of F/ETCA's commitment to transparency and coordination with our regional partners and public stakeholders. The content of this final application is the outcome of a collaborative effort with partner agencies and ongoing coordination with the California Transportation Commission since July 2024.

SR-241 is a toll road starting at the Oso Parkway interchange in south Orange County and extending to its northern terminus at SR-91 in the City of Anaheim. Tolling on SR-241 has been operated by F/ETCA for over 25 years, increasing the confidence that the 241/91 EC can be operated effectively and efficiently. The 91 Express Lanes is a four-lane, high-occupancy tolled facility (two lanes in each direction) located within the median of SR-91. The 91 Express Lanes extend from SR-55 in Orange County to Interstate (I) 15 in Riverside County. Tolling on the 91 Express Lanes is operated by OCTA in Orange County and RCTC in Riverside County. While the existing 241/91 interchange connects all lanes of the northbound (NB) and southbound (SB) SR-241 toll road to the non-tolled general-purpose lanes of eastbound (EB) and westbound (WB) SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes.

Demand on the north end of SR-241, where it meets SR-91, is a direct result of trips generated between major job centers in central Orange County (along SR's 241 and 261) and the more affordable housing areas in the Inland Empire (along SR-91). Origin-destination studies show 60% of observed trips using the interchange travel to points beyond the limits of the existing tolled facilities. Affirming the interregional nature of the SR-91 and SR-241 transportation corridors. Additionally, the lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving adversely affects operations for all users by worsening the already congested SR-91 corridor during peak



hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor. Direct improvements on the corridors along with enhancements to multi-modal transportation choices are necessary to improve the movement of people, goods, and services through these critical transportation corridors to and from Orange County and the Inland Empire to reduce congestion, provide options for commuters, and increase the operational efficiency of the SR-241 and SR-91 corridors.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC will improve roadway operations by reducing weaving across EB SR-91 at the Orange-Riverside county line and decreasing queueing on NB SR-241 in the afternoon peak period, resulting in time savings up to 20 minutes for commuters. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and offers improvements to all users within the high-demand, interregional mobility transportation corridors. The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning two counties. As required by AB 194, the revenue generated by the 241/91 EC will directly fund repayment of project debt, operations, and maintenance. Any remaining revenue can be used to fund additional projects or programs for improvements to roadway operations and multi-modal options through an expenditure plan that will improve the functionality of the SR-241 and SR-91 corridors.

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. Other than the 241/91 EC, F/ETCA has no existing near-term obligations requiring these funds. However, F/ETCA expects to utilize the repayment of its 241/91 EC contribution to replenish these reserves so that the funds will be available to F/ETCA for uses under its existing legal authority such as early bond principal repayment or future capital projects outside of the 241/91 EC expenditure plan. The 241/91 EC is included in the F/ETCA Capital Improvement Plan (CIP), the 91 Implementation Plan, the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), and the OCTA 2022 Long Range Transportation Plan (LRTP). These documents demonstrate the consistency of the 241/91 EC with adopted regional plans.

The enclosed application provides the information required to meet, and in some areas exceed, the minimum eligibility criteria established by AB 194 and the supporting information requested through the toll facility application guidelines. We appreciate your consideration of this toll facility application and enclosed materials and look forward to your support in delivering this critical project. If you need any additional information or have questions on the information in this submittal, please contact Stephanie Blanco (sblanco@thetollroads.com, 949-754-3454).

Sincerely,

A handwritten signature in blue ink, appearing to read "Ryan Chamberlain", is written over a light blue horizontal line.

Ryan Chamberlain
Chief Executive Officer
Transportation Corridor Agencies

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ACRONYMS AND ABBREVIATIONS

AAA	Advertise, Award, Administer
AB	Assembly Bill
AM	morning
CA MUTCD	California Manual of Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CAPTI	Climate Action Plan for Transportation Infrastructure
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CIP	Corridor Improvement Project
CMCP	Comprehensive Multimodal Corridor Plan
CO ₂	Carbon Dioxide
CSS	coastal sage scrub
CTC	California Transportation Commission
CTP	California Transportation Plan
DMV	Department of Motor Vehicles
EB	Eastbound
ECOP	Eastbound Corridor Operations Project
EIR	environmental impact report
EIS	environmental impact statement
F/ETCA	Foothill/Eastern Transportation Corridor Agency
FHWA	Federal Highway Administration
FSP	Freeway Service Patrol
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
GP	General-purpose
HDM	Highway Design Manual
HOV	high-occupancy vehicle
I-	Interstate
LOS	Level of Service
L RTP	long range transportation plan
MOU	Memorandum of Understanding
Mph	Miles per hour
NB	Northbound
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NOP	Notice of Preparation
NTP	Notice to Proceed
O-D	Origin-Destination
O&M	Operations & Maintenance
OCTA	Orange County Transportation Authority
PA/ED	Project Approval/Environmental Document
PDM	progressive demand management
PDT	project development team
PII	personally identifiable information

ACRONYMS AND ABBREVIATIONS

PM	afternoon
PR	Project Report
PRM	Project Risk Management
PS&E	Plans, Specifications and Estimates
PSR/PDS	Project Study Report-Project Development Support
RCTC	Riverside County Transportation Authority
RFID	radio frequency identification
ROW	right-of-way
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	Southbound
SCAG	Southern California Association of Governments
SR-	State Route
TCM	Transportation Control Measure
TOC	Traffic Operations Center
TSP	Toll System Provider
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
WB	Westbound

1. MINIMUM ELIGIBILITY CRITERIA

The Commission must find, at a minimum, that the criteria identified in AB 194 are met. Therefore, every application should clearly discuss how it meets the following minimum criteria:

1.1. Improvement in Corridor Performance

1. A demonstration that the proposed toll facility will improve the corridor's performance by, for example, increasing passenger throughput or reducing delays for freight shipments and travelers, especially those traveling by carpool, vanpool, and transit.

Description of transportation corridors and 241/91 EC

SR-241 was approved and constructed as part of a unified Eastern Transportation Corridor (ETC) that also includes SR's 133 and 261 as an interconnected, tolled transportation corridor under the ETC environmental document approval in 1992. The initial construction of the ETC included multimodal improvements at local interchanges and the ultimate build-out concept includes accommodation for future carpool and transit facilities. The F/ETCA develops and approves a Capital Improvement Plan (CIP) annually which reflects the scope, schedule, and cost of projects for the ultimate build-out. The 91 Express Lanes transportation corridor has been identified and analyzed between SR-55 and I-15 since the 2003 inception of the 91 Implementation Plan, the guiding planning document for the corridor. The 91 Implementation Plan inventories projects across all modes that can contribute to the enhanced freeway capacity and/or improved mobility for SR-91. Both the ETC and 91 Express Lanes transportation corridors are connected by this project, the 241/91 EC.

Demand on the north end of SR-241, where it meets SR-91, is a direct result of trips generated between major job centers in central Orange County (along SR's 241 and 261) and the more affordable housing areas in the Inland Empire (along SR-91). Origin-destination studies show 60% of observed trips using the interchange travel to points beyond the limits of the existing tolled facilities. Affirming the interregional nature of the SR-91 and SR-241 transportation corridors. Direct improvements on these transportation corridors along with enhancements to multi-modal transportation choices are necessary to improve the movement of people, goods, and services through these critical transportation corridors to and from Orange County and the Inland Empire to reduce congestion, provide options for commuters, and increase the operational efficiency of the SR-241 and SR-91 corridors.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC is identified as a project in F/ETCA's CIP and the 91 Implementation Plan. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. Highway improvements, such as the 241/91 EC, result in improved operations and better throughput for passenger and freight vehicles. Coupled with projects and programs that address transportation demand management and multi-modal improvements can further optimize the performance and functionality of SR-241 and SR-91 corridors.

Operational performance metrics, defined below for the 241/91 EC, will maintain reliable travel times and operating conditions in the tolled facilities. These metrics will be controlled by an innovative approach termed progressive demand management¹ which are strategies that were developed from the 241/91 EC operational analyses.

- Maintaining at 60 miles per hour or more in the 91 Express Lanes critical zones
- Managing volumes to no more than 1,500 vehicles per hour on the 241/91 EC in either direction (north-to-east or west-to south)
- Managing volumes at the EB County Line egress to no more than 200 vehicles per hour
- Managing queue length not to exceed 100 vehicle storage at the Toll Connector Meter
- Monitoring performance of EB 91 Express Lanes East End conditions

The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning across two counties. These operational improvements improve system efficiency resulting in more fuel-efficient traffic operations and reduction of carbon dioxide (CO₂) emissions. Additionally, the 241/91 EC reduces friction in the SR-91 general-purpose lanes by reducing existing merging and weaving movements and decreases average queueing for the 241/91 NB connector; these effects improve the overall operations for SR-91 and SR-241 and will help reduce congestion and congestion related collisions such as sideswipe and rear-ends.

Improved operations in the transportation corridors – reduced delays for freight shipments and travelers

The initial traffic study area for the 241/91 EC included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona, SR-241 from north of the Santiago Canyon Road interchange, and SR-71 south of the Butterfield Ranch Road interchange. Prior to project approval, the traffic study area was expanded to include the SR-91 corridor from SR-55 to McKinley St, east of I-15 since it was determined that the 241/91 EC influences traffic behavior throughout the existing 91 Express Lanes corridor and to verify results of the initial traffic study. As project delivery progressed in final design, operational analyses scenarios were identified to further define the operational parameters and performance metrics necessary for efficient 241/91 EC operations and quantify network-wide benefits of the 241/91 EC. It is important to note for those unfamiliar with the existing 91 Express Lanes that access to the express lane facility is allowed at just three points along the 17-mile system - generally in the vicinity of SR-55, at the Orange-Riverside county line and in the vicinity I-15. As the 241/91 EC connects with the 91 Express Lanes west of the Orange-Riverside county line, for peak period NB SR-241 to EB SR-91 traffic on the 241/91 EC, the impact to EB SR-91 traffic can be felt upstream (or west of SR-55) as that is the point that 91 Express Lanes demand is managed prior to entering the facility. Analysis of existing conditions revealed key travel patterns: WB on SR-91 in the morning (AM) and EB in the afternoon (PM), with SR-241 volumes primarily moving south in the AM and north in the PM. In the AM peak, WB speeds are congested at 25-35 miles per hour (mph) east of the 241/91 interchange but recover to over 55 mph west of the interchange. In the PM peak, EB speeds drop significantly, averaging below 35 mph throughout the area and below 20 mph near the 241/91 interchange. The 241/91 EC decreases congestion, improves throughput, travel speeds and reduces delay, particularly in the WB direction.

¹ Progressive demand management are the operational control strategies that will be applied to the 241/91 EC to effectively manage demand such that the expected performance metrics are achieved. Strategies to be applied include Dynamic Pricing, Toll Connector Meter, HOV-only mode, and Bus/Registered Vanpool mode. See Section 2.4.3 for more detail.

Network-wide, vehicle hours traveled improves for all vehicles traveling in the peak direction in both the ELs and GP lanes in the study area.

- On westbound SR-91, average weekday morning travel time savings between SR-55 and I-15 are anticipated to be about 27 minutes across the peak period.
- On eastbound SR-91, average weekday afternoon travel time savings between SR-55 and I-15 are anticipated to be about 28 minutes across the peak period. On Fridays (and sometimes Thursdays) SR-91 eastbound travel time savings between SR-55 and I-15 are anticipated to be about 3 minutes across the peak period.
- The ingress/egress area for Express Lane traffic near the County Line, described as the “mixing bowl,” average travel speeds along SR-91 are anticipated to improve up to 30 mph (from 30 mph to 60 mph) in the Horizon Year during peak periods.
- On SR-241, a 2.5-to-5-mile reduction of north-to-east connector queue is anticipated and travel time savings of 22 to 55 minutes for 241/91 EC and GP connector users is anticipated.

As a major freight corridor serving seaports and inland ports, these improvements to SR-91 enhance the region’s economic vitality and ability to compete in the global markets. As a multi-modal commuting corridor, these improvements to SR-91 and SR-241 also serve to connect commuters from the Inland Empire to jobs in Orange and Riverside counties.

See Section 2.3.2 for more on traffic analyses results.

Demonstrating improved operations – reducing weaving and potential collisions

While the existing 241/91 interchange connects the SR-241 toll road to the non-tolled general-purpose lanes of SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes. The lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across five SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving of over 350 vehicles during the peak hour adversely affects operations for all users by worsening the already congested SR-91 corridor during peak hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor.

The 241/91 EC collision analysis indicates that, within the project area, there are five segments on SR-91 and five segments on SR-241 with greater than average statewide collision rates. The highest percentage of reported types of collisions for the segments are rear end and sideswipe collisions. 32% of collisions in these areas were rear end collisions and 19% of collisions were side swipe collisions during congested peak hours (6 AM to 9 AM and 3PM to 6PM), suggesting congestion may have been a primary reason for these collisions.

The 241/91 EC project need identifies existing weaving operations between the GP connectors and the median Express Lanes as a concern because the weaving contributes to sideswipe collisions, and also because the weaving degrades the level of service (LOS) due to increased density. The approved 241/91 EC project purpose affirms that direct access between toll facilities, provided by the 241/91 EC, will improve traffic flow and operations by reducing weaving across multiple SR-91 GP lanes between the SR-91 Express Lanes and the SR-241 GP lane connectors. The occurrence of sideswipe and rear end collisions may be mitigated by these improvements.

Increasing passenger throughput and encouraging carpool, vanpool, and transit

Partner agencies have also agreed that buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all

times on the 241/91 EC. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods². During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

Opportunities for further transportation system improvements

Excess revenue may be generated by the 241/91 EC. In compliance with SHC 149.7, “all remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency.” In partnership with OCTA, RCTC, and Caltrans, F/ETCA will coordinate and prioritize the use of all remaining revenue generated by the 241/91 EC in the corridors from which the revenue was generated. The expenditure plan shall be incorporated as part of the F/ETCA Capital Improvement Plan (CIP) and be adopted annually by the F/ETCA Board of Directors. F/ETCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs.

It is anticipated that excess revenue expenditure will include a variety of projects and programs to improve operations to all users within the high-demand, interregional mobility transportation corridors. Not limited to capital projects on the highway system, it is envisioned that multimodal projects, transportation control measures, and travel demand management programs will be eligible expenditures to increase vehicle occupancy and manage demand within the broader transportation corridors.

The 241/91 EC is part of the SR-91 Implementation Plan and the State Route 91 Comprehensive Multimodal Corridor Plan (CMCP), each of which includes improvements across Orange and Riverside counties. The CMCP, completed in 2022, is a multi-modal assessment that expands on projects and programs included in the OCTA LRTP. The plan defines characteristics of the corridor including demographics, economic data, disadvantaged and low-income communities, employment, existing facilities, and land uses. The purpose of the plan is to establish current conditions and needs along the corridor and identify a range of improvements. The Plan is intended to provide transportation choices for residents, commuters, and visitors to the corridor area. The SR-91 Implementation Plan, in compliance with AB 1010 and Senate Bill 1316, establishes a program of potential improvements to improve operations in the SR-91 corridor. The 241/91 EC has been included in the SR-91 Implementation Plan since the plan’s inception in 2003.

1.2. Regional Transportation Plan

2. A requirement that the proposed toll facility is contained in the constrained portion of a conforming regional transportation plan prepared pursuant to Section 65080 of the Government Code.

The 241/91 EC is included in the current Orange County Transportation Authority (OCTA) Long-Range Transportation Plan (LRTP) – Directions 2045 (dated May 2023) and in the Southern California Association of Governments (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), adopted in April 2024 (Project ID ORA111207). See Section 2.6 for more on the 241/91 EC’s compatibility with regional plans.

² During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.

EB - Monday through Thursday 2-6 PM; Friday 1-7 PM

WB - Monday through Thursday 5-9 AM; Friday toll-free all day

1.3. Regional Agency Coordination

3. For projects involving the state highway system, evidence of cooperation between the applicable regional transportation agency and Caltrans. Examples of acceptable evidence of cooperation could be in the form of a completed cooperative agreement or a signed letter between the parties to demonstrate that the parties are working cooperatively on the development of the toll facility.

The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is working in partnership with the California Department of Transportation (Caltrans), OCTA, and the Riverside County Transportation Commission (RCTC) on the 241/91 EC. A Project Study Report/Project Development Support (PSR/PDS) document was developed by F/ETCA and approved by Caltrans in 2012. Cooperative agreements between F/ETCA and Caltrans were executed May 2014 for the preparation of the Project Approval/Environmental Document (PA/ED) and February 2017 for the preparation of construction plans, specifications, estimates and right of way.

Since December 2017, all partner agencies have collaborated on the analysis and coordinated on planned/adjacent projects. The partnership was further solidified when each agency's respective Board formally approved the 241/91 Express Lanes Connector Term Sheet in 2019:

- OCTA's Board of Directors approved the term sheet on October 7, 2019
- F/ETCA's Board of Directors approved the term sheet on October 10, 2019
- RCTC's Board of Commissioners approved the term sheet on November 13, 2019

Additionally, as a partner to the arrangement, Caltrans provided a letter of support on the term sheet on September 26, 2019.

This partnership among OCTA, RCTC, Caltrans, and F/ETCA demonstrates the willingness of all agencies to proactively collaborate to deliver a regionally significant transportation improvement. Partners have agreed to the following division of responsibilities in the Term Sheet:

- F/ETCA to complete final design of the project with Caltrans oversight.
- Caltrans has final design approval of the project.
- F/ETCA will provide OCTA and RCTC ample opportunity to review and concur with all aspects of the final design.
 - Caltrans and F/ETCA shall consider all reasonable comments and requests from OCTA and RCTC, and OCTA and RCTC comments and requests to Caltrans and F/ETCA shall be fair and reasonable.
 - Caltrans District 12 to Advertise, Award, Administer (AAA) construction phase.

F/ETCA will fund the delivery and construction of the 241/91 EC using what amounts to a loan from its unrestricted cash reserves (see Section 2.5.1 for more detail) and operate the 241/91 EC; Caltrans will advertise, award, and administer the construction contract for the 241/91 EC; and OCTA and RCTC will coordinate with F/ETCA on the tolling operations of the connector in conjunction with the 91 Express Lanes system. Agreements associated with these matters are being finalized in a Master Agreement, Operating Agreement, Maintenance Agreement, Toll Facility Agreement, and various cooperative agreements among the agencies. See Section 2.4.2 for more on agreement timelines.

The PSR/PDS, Term Sheet, and Caltrans cooperative agreements are included as attachments to this application.

1.4. Streets and Highways Code Section 149.7 Compliance

4. A discussion of how the proposed toll facility meets the requirements of Streets and Highways Code Section 149.7.

This application for the 241/91 EC was prepared in compliance with the requirements outlined in California Streets and Highways Code Section 149.7 (SHC 149.7). The 241/91 EC meets all eligibility criteria set forth in the guidelines established by the Commission. See Section 2.1 for a detailed description of the 241/91 EC's compliance with each guideline, including how the 241/91 EC will be developed and operated in compliance with other state laws.

F/ETCA has tolling authority for its existing facilities (SR's 133, 261, and 241) and capital improvement projects on these toll roads. This application's supplemental tolling authority is being submitted specifically for the 241/91 EC facility for several reasons:

- Expand opportunities to use excess net toll revenue for projects and programs that would further improve conditions beyond the current ETC system to benefit the wider transportation system that is affected by the 241/91 EC connection
- Increased public transparency and opportunity to hear public input
- Ensuring tolling operations are maintained through a term consistent with the SR-91 Express Lanes

1.5. Project Initiation Document

5. A complete project initiation document for the proposed toll facility.

A PSR/PDS was completed and approved by Caltrans on January 12, 2012, and serves as the Project Initiation Document for the 241/91 EC. A copy is included as an attachment to this application.

1.6. Funding Plan

6. A complete funding plan for development and operation of the toll facility.

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves (see Section 2.5.1 for more detail). The 241/91 EC tolling operations and facility maintenance requirements are to be funded from 241/91 EC toll revenues.

2. SUPPORTING INFORMATION

In evaluating applications, the Commission will consider all provided information to determine whether to approve the proposed toll facility. Accordingly, in conjunction with responding to the statutorily defined minimum criteria, applicants are strongly encouraged to provide more information than necessary to meet the minimum criteria.

2.1. Compliance with State Law

Has the applicant demonstrated that the proposed project is consistent with the established standards, requirements, and limitations that apply to the toll facilities in Section 149.7 of the Streets and Highways Code as well as all other applicable sections of state law?

F/ETCA is submitting this application in compliance with SHC 149.7 of the California Streets and Highways Code. The application's compliance with the minimum requirements for California Transportation Commission (CTC) approval under SHC 149.7(c) is outlined in Section 1.

The 241/91 EC will also be subject to the additional requirements described in SHC 149.7(e) of the Streets and Highways Code, addressed below.

Throughout this application various references are made to the toll facilities that are connected to the 241/91 EC, namely SR-241 toll road and the 91 Express Lanes. It is important to note that this application is specific to the project features and tolling authority of the 241/91 EC. This application has no effect on F/ETCA's existing toll authority and related responsibilities, commitments, agreements, etc. for SR-241 toll road or OCTA and RCTCs separate existing toll authority and related responsibilities, commitments, agreements, etc. for the 91 Express Lanes.

- 1. A regional transportation agency sponsoring a toll facility shall enter into an agreement with the Department of the California Highway Patrol (CHP) that addresses all law enforcement matters related to the toll facility, including reimbursement of enforcement costs.**

CHP is the traffic violation enforcement and incident management lead for SR-241 and SR-91, and CHP enforcement and turnaround areas will be utilized at each end of the 241/91 EC. An incident management plan between F/ETCA, Caltrans, OCTA, RCTC, and CHP will be coordinated and developed with all partners to clearly define the incident management and enforcement responsibilities involving the operations of the 241/91 EC, which includes progressive demand management. CHP will make the final decisions on roadway closures due to emergencies and traffic management measures for clearing incidents, in the interest of public safety or investigations. F/ETCA will amend, as needed, its existing agreements with CHP for enforcement on its tolled facilities. See Section 2.4.3 for additional detail.

- 2. A regional transportation agency sponsoring a toll facility shall enter into an agreement with Caltrans that addresses all matters related to design, construction, maintenance, and operation of the toll facility, including, but not limited to, liability, financing, repair, rehabilitation, and reconstruction.**

A PSR/PDS was approved by Caltrans in 2012 initiating the 241/91 EC project. Subsequently, F/ETCA and Caltrans executed cooperative agreements for the planning, design, and right-of-way for the 241/91 EC. In 2019, a Term Sheet was developed and adopted by F/ETCA, OCTA, and RCTC, with a support letter from Caltrans solidifying the partnership between the four agencies and

providing terms for project delivery, funding, construction, maintenance, and operation for the 241/91 EC. The four agencies are currently finalizing a Master Agreement to specify and document each stakeholder's roles and responsibilities for ownership, operations, and ongoing maintenance of the 241/91 EC. Upon tolling authority being granted by the CTC per this application, F/ETCA and Caltrans will enter into a Toll Facility Agreement to capture the ongoing maintenance obligations and toll collection sunset. Upon execution of a Toll Facility Agreement and prior to opening the 241/91 EC to traffic, a separate Express Connector Maintenance Agreement between F/ETCA and Caltrans will detail the limits of 241/91 EC maintenance responsibilities, annual work planning, budgeting, and reimbursement. Additionally, a separate Construction Cooperative Agreement between F/ETCA and Caltrans will detail the responsibilities and reimbursement for the advertisement, award, and administration of the construction phase. See Sections 2.4.3 and 2.4.5 for additional detail.

3. That the sponsoring agency shall be responsible for activities related to toll collection.

F/ETCA will serve as the 241/91 EC operator. This includes operations of the roadside and back-office tolling infrastructure, customer service center, tolling back-office procedures and the overall toll and traffic monitoring system, as well as the maintenance of the toll system that includes the tolling infrastructure, toll collections, and violations processing.

To ensure optimal regional mobility and maintain performance metrics on the 91 Express Lanes with the operations of the 241/91 EC, F/ETCA is working with OCTA and RCTC to develop and approve an Operating Agreement. The agreement will include the operating requirements for the 241/91 EC including performance metrics and monitoring, progressive demand management details, maintenance of tolling infrastructure, and governance of operations. OCTA and RCTC shall have final approval of the dynamic pricing algorithms, input values, and traffic measurement/monitoring locations as necessary to support demand management measures including dynamic pricing systems and algorithms, toll connector meters, and occupancy restrictions.

4. That the revenue generated from the operation of the facility will be used to cover direct expenses related to debt issued to construct the toll facility and direct expenses related to the "development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of the toll facility" and a reserve fund with all remaining funds used in the corridor pursuant to an expenditure plan developed by the sponsoring agency.

F/ETCA is committed to managing the 241/91 EC toll revenue in accordance with the requirements of SHC 149.7. The toll revenue generated by the 241/91 EC shall be available to F/ETCA for direct expenses associated with scheduled repayment of F/ETCA's loan for the 241/91 EC, operating and maintenance costs, and the corresponding reserves. Remaining revenue generated by the 241/91 EC (excess revenue) will be used for additional projects and programs in the corridor from which the revenue was generated (see Section 2.5.2 for discussion of revenue-eligible corridors). Use of 241/91 EC toll revenue as described in this paragraph (i.e., the toll revenue "waterfall") and evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, will be incorporated as part of the F/ETCA Capital Improvement Plan and be adopted annually by the F/ETCA Board of Directors.

As described in Section 1.1, the 241/91 EC is a key connection to the unified ETC and to the interregional freight and commuting corridor of SR-91; the effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. Therefore, the use of excess revenue from the 241/91 EC may include investments across the transportation corridors improved by the key connection of the 241/91 EC, including multimodal projects outside of the highway right of way, for projects or programs that maintain or improve the safety, operation, or travel reliability for any transportation mode or provide for improve travel options; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). Evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, as part of the preparation of the expenditure plan. Revenue-eligible corridors will be defined in accordance with SHC 149.7.

- 5. For any project under this section involving the conversion of an existing high-occupancy vehicle lane to a high-occupancy toll lane, the sponsoring agency shall demonstrate that the project will, at a minimum, result in expanded efficiency of the corridor in terms of travel time reliability, passenger throughput, or other efficiency benefit.**

The 241/91 EC is a new, fully tolled connector between two existing tolled facilities and is not a conversion from an existing high occupancy vehicle facility.

- 6. That the sponsoring agency will provide information to the Commission or Legislative Analyst upon request.**

F/ETCA recognizes that the Commission is obligated by SHC 149.7(h), as amended by AB 194, to report to the State Legislature annually the progress in the development and operation of each toll facility approved under that section. F/ETCA will provide information as requested in support of CTC reporting requirements for the 241/91 EC such as:

- A progress report for the 241/91 EC project improvements.
- A comparison of the 241/91 EC project improvements baseline budget and the current or projected budget.
- A comparison of the current or projected schedule and the baseline schedule.
- If construction is complete and operations have begun, a discussion of the operations of the facility and how actual performance compares to the 241/91 EC original expected performance.
- A discussion of any other issues identified, and actions taken to address those issues.

- 7. That a regional transportation agency may issue bonds to finance construction and construction-related expenditures but that the bond must not pledge the full faith and credit of the State of California.**

Per the 2019 Term Sheet agreed to by F/ETCA, Caltrans, OCTA, and RCTC, any of the parties that contribute funds to the 241/91 EC will receive payback including interest. Through the project development process, it was determined that only F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. There will be no use of State

funds or liabilities to the State for the construction, operation or maintenance of the 241/91 EC. See Section 2.5.1 for more detail.

8. That a regional transportation agency will consult with local transportation authorities and congestion management agencies whose jurisdictions include the toll facility.

F/ETCA, and partner agencies Caltrans, OCTA, and RCTC, have met with local jurisdictions, resource agencies, the Federal Highway Administration (FHWA), and councils of government along the SR-241 and SR-91 corridors during the PA/ED and final design processes. Over the past two years, F/ETCA has worked closely with partner agencies at weekly meetings on technical and policy topics for the construction, operation, and maintenance of the 241/91 EC. Coordination will continue throughout further project development and during operations. See Section 2.6.5 for more detail.

9. Additional supplementary information.

Clean Air Vehicle Requirements

Partner agencies have agreed that municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all times. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods³ on the 241/91 EC. During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

Sections 21655.9 and 5205.5 of the California Vehicle Code provide for use of exclusive or preferential HOV lanes to vehicles displaying stickers issued by the Department of Motor Vehicles for vehicles meeting specified low and zero emissions standard regardless of vehicle occupancy. Both Sections are to be repealed as of January 1, 2027, by their own provisions. Because the 241/91 EC is scheduled to open to traffic in 2028, the referenced California Vehicle Code sections would no longer be applicable: single-occupant vehicles, even those adhering to low and zero emissions standards, will be tolled as single-occupant vehicles.

Privacy of Personal Account Information

F/ETCA has operated toll roads within Orange County since the first road segment opened in 1993. The Agency has robust protocols and security for personally identifiable information (PII). Consistent with existing tolling practices and procedures, during operations of the 241/91 EC, F/ETCA and its contractors will process all toll transactions and maintain all accounts. Privacy of personal account information will be strictly maintained and will comply with all applicable state and federal statutes, rules, and regulations consistent with the current F/ETCA tolling procedures.

Utility Relocation and Right of Way (ROW) Acquisitions

The 241/91 EC is designed with elements that require ROW acquisitions and utility relocations. These are being completed under the authority and guidance of local, state, and federal law, policies, and procedures. Federal compliance includes adherence to the Uniform Relocation

³ During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.

EB - Monday through Thursday 2-6 PM; Friday 1-7 PM

WB - Monday through Thursday 5-9 AM; Friday toll-free all day

Assistance and Real Property Acquisition Policies Act (the Uniform Act) and the *Code of Federal Regulations* (CFR) Section 49, Part 24. Any property acquisitions shall also be guided by the Caltrans Right of Way Manual. If legal proceedings are required to retain property rights, the entity responsible for right of way acquisition shall comply with all relevant state and federal constitutional provisions, statutory and case law, including but not limited to the California Code of Civil Procedure Section 1230.010-1273.050 (Eminent Domain Law) as well as any applicable Relocation Assistance requirements.

Caltrans and FHWA Design Criteria

The design of the 241/91 EC is subject to the standards outlined in the Caltrans Highway Design Manual (HDM), the California Manual of Uniform Traffic Control Devices (CA MUTCD), and FHWA design criteria. Design features that deviate from standards defined as boldfaced or underlined standards in these manuals and design criteria will require Caltrans and FHWA approval and a Design Standard Decision Document providing the justification for the deviation will be prepared for approval by Caltrans.

As mentioned previously, cooperative agreements between F/ETCA and Caltrans were executed May 2014 for the preparation of the PA/ED and February 2017 for the preparation of construction plans, specifications, estimates and right of way. Caltrans is reviewing the facility design to ensure compliance with requirements for the State Highway System.

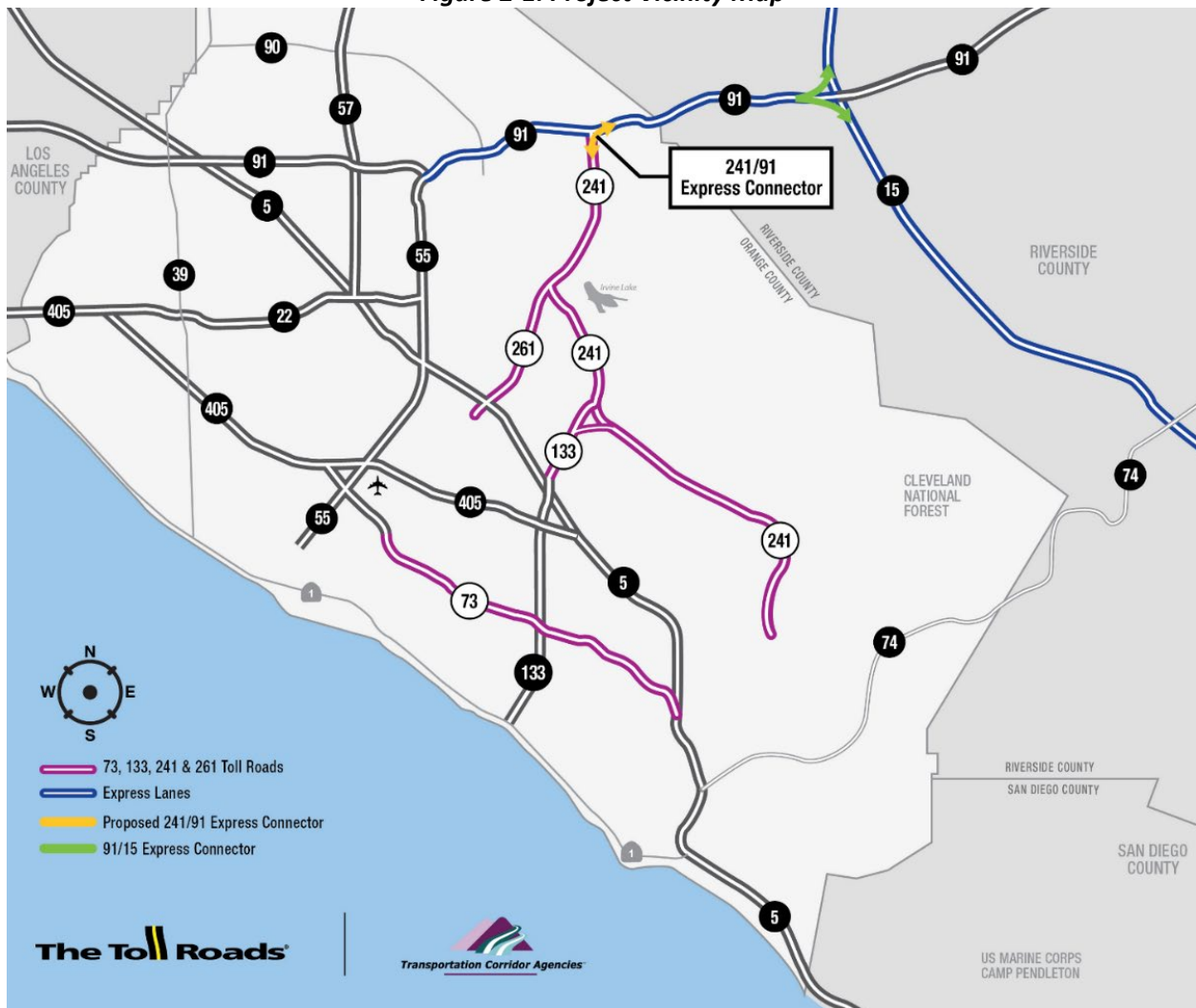
2.2. System Compatibility

If on the state system, has the applicant demonstrated that the project is consistent with State Highway System requirements? Does this project propose improvements that are compatible with the present and planned transportation system? Does the project provide continuity with existing and planned state and local facilities?

The 241/91 EC is included in the financially constrained portion of the adopted SCAG 2024 RTP/SCS as an Express Lane direct connector. As part of its goals to close gaps and improve highway access and connectivity, the RTP/SCS proposes a regional Express Lanes network that includes the 241/91 EC. The 241/91 EC is included in OCTA's 2022 LRTP, described as adding an express lane connector at 91/241. The 2024 SR-91 Implementation Plan also identifies the 241/91 EC as a means to address several existing deficiencies within the SR-91 corridor.

The 241/91 EC design is aligned with other planned improvements in the area including the Interstate (I) 15/91 Express Lanes Connector and the SR-71/SR-91 Interchange Project. In addition to these improvement projects, the 241/91 EC is designed in coordination with multiple Caltrans maintenance and improvement projects currently in development on both the SR-241 and SR-91 corridors and the 241/91 EC is designed to accommodate future planned improvements to SR-91, including the SR-91 Eastbound Corridor Operations Project (91 ECOP).

The 241/91 EC project vicinity is shown in Figure 2-1.

Figure 2-1. Project Vicinity Map

2.3. Corridor Improvement

AB 194 specified the Legislature's intent that highway tolling should be employed for the purpose of optimizing the performance of the transportation system on a transportation corridor and should not be employed strictly as a revenue generating facility. Has the applicant provided compelling evidence that demonstrates that the proposed toll facility will significantly improve the corridor's performance?

Description of transportation corridors and 241/91 EC

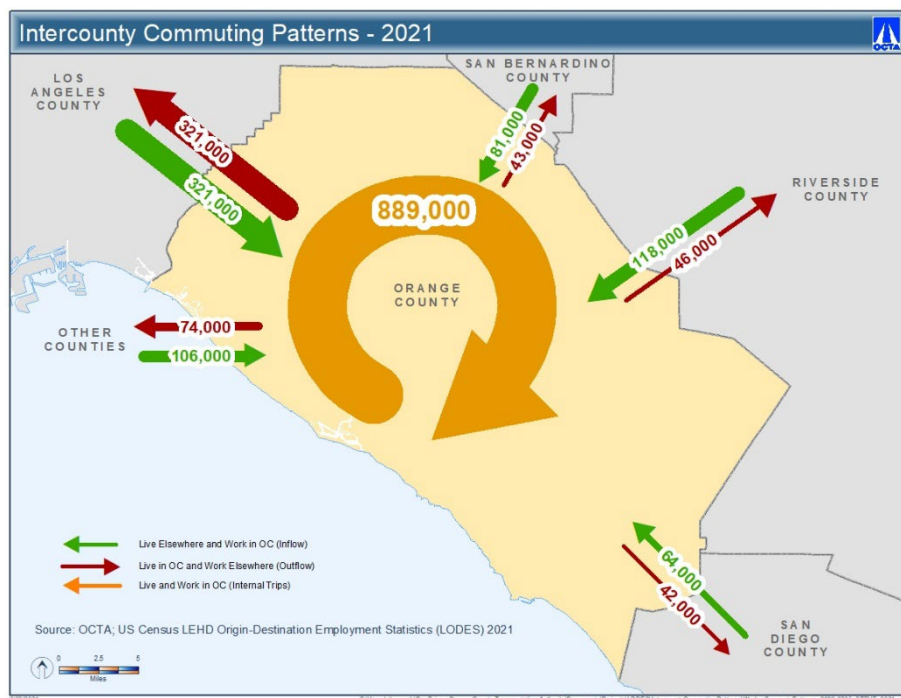
SR-241 was approved and constructed as part of a unified ETC that also includes SR's 133 and 261 as an interconnected, tolled transportation corridor under the ETC environmental document approval in 1992. The initial construction of the ETC included multimodal improvements at local interchanges and the ultimate build-out concept includes accommodation for future carpool and transit facilities. The F/ETCA develops and approves a CIP annually that describes the scope, schedule, and cost of projects of the ETC's ultimate build out. The 91 Express Lanes transportation corridor has been identified and analyzed between SR-55 and I-15 since the 2003 inception of the 91 Implementation Plan, the guiding planning document for the corridor. The 91 Implementation Plan inventories projects across all modes that can contribute to the enhanced freeway capacity and/or improved mobility for SR-91. Both the ETC and 91

Express Lanes transportation corridors are connected by this project, the 241/91 EC, as illustrated in Figure 2-1.

The growing population and relatively affordable housing market in Riverside County and beyond, coupled with increasing employment opportunities in Orange County, have resulted in a continued pattern of large numbers of Riverside County residents commuting to jobs in Orange County each weekday. Based on regional population and employment projections, this commute pattern is expected to continue into the future. SR-91 is the only significant highway corridor that provides the home-to-work connection for Riverside County residents working in Orange County. The average traffic volume on the SR-91 at the Orange-Riverside county line is approximately 328,000 vehicles per day.

Orange County commute inflows and outflows are presented in Figure 2-2.

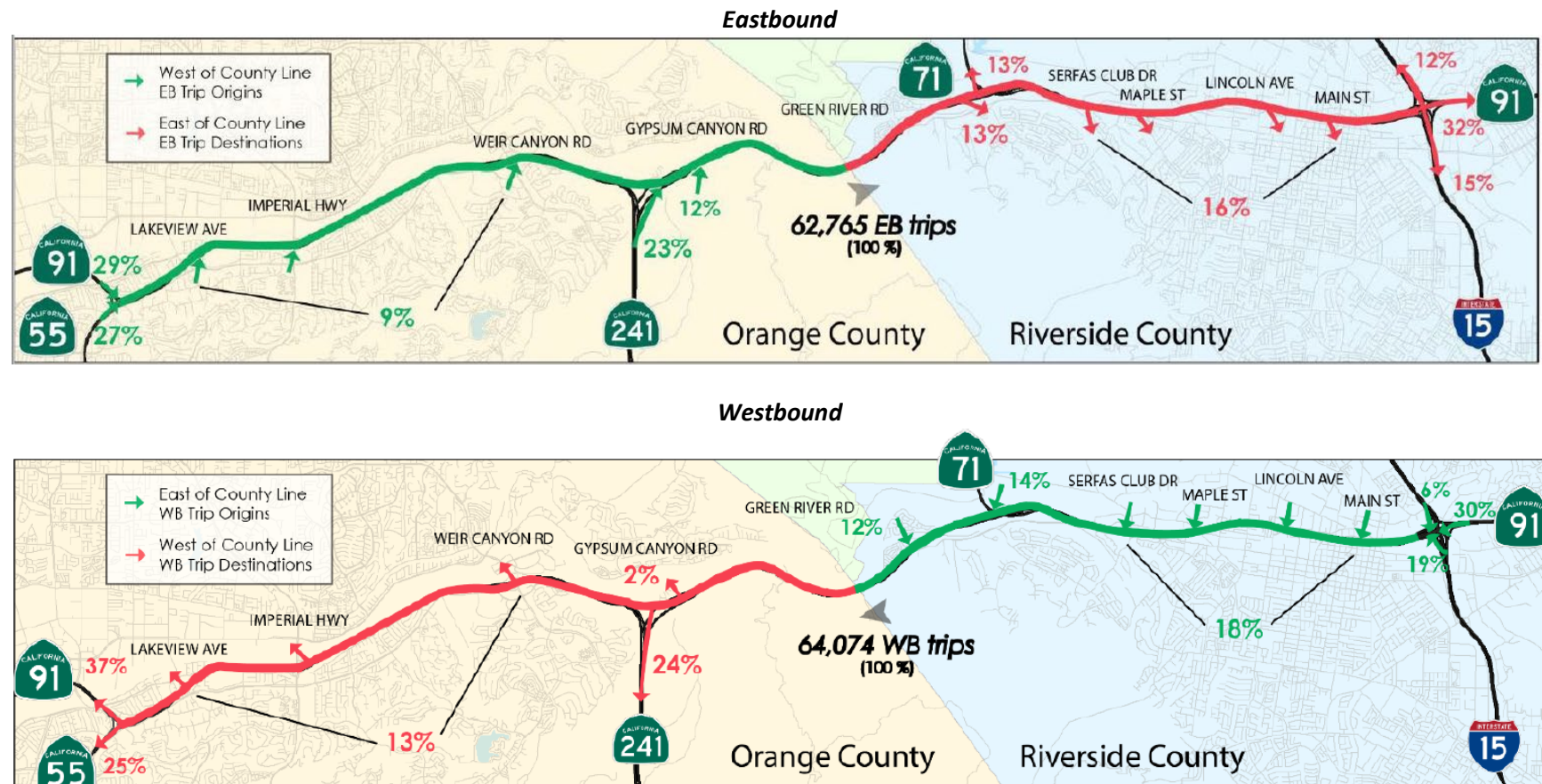
Figure 2-2. County Inflows and Outflows



Source: <https://ocbc.org/wp-content/uploads/2021/09/2021-OC-Community-Indicators-Report.pdf>

An origin-destination study performed for the project indicated that approximately 60% of the observed trips travel beyond the study area limits. Further affirming the interregional nature of the SR-91 transportation corridor. These trip origin-destination study results are illustrated in Figure 2-3.

See Section 2.3.1 for additional information on the existing conditions.

Figure 2-3. Trip Origin-Destination Study

The 241/91 EC will address operational deficiencies between SR-241 and SR-91 by enhancing the functionality of the existing 241/91 interchange from the WB 91 Express Lanes merging onto SB SR-241 toll road and from NB SR-241 toll road merging onto the EB 91 Express Lanes. SR-241 is a toll road, operated by F/ETCA, and SR-91 is a major regional freeway link with high occupancy tolled express lanes located in the median for both the EB and WB directions (91 Express Lanes). Currently, there is no direct connection from the WB 91 Express Lanes merging onto SB SR-241 toll road or from NB SR-241 toll road merging onto the EB 91 Express Lanes. Without this connection, users must weave across the congested SR-91 GP lanes to transition between the two tolled facilities.

The 241/91 EC is a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. The 241/91 EC is identified as a project in F/ETCA's CIP and the 91 Implementation Plan. The effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridors. The 241/91 EC will improve regional mobility by increasing customer transportation choices, encouraging increased person throughput at peak demand hours, and increasing travel time savings within the network spanning across two counties. These operational improvements improve system efficiency resulting in more fuel-efficient traffic operations and reduction of carbon dioxide (CO₂) emissions. Additionally, the 241/91 EC reduces friction in the SR-91 general-purpose lanes by reducing existing merging and weaving movements and decreases average queueing for the 241/91 NB connector; these effects improve the overall operations for SR-91 and SR-241 and will help reduce congestion and congestion related collisions such as sideswipe and rear-ends.

Improved operations in the transportation corridors – reduced delays for freight shipments and travelers

The initial traffic study area for the 241/91 EC included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona, SR-241 from north of the Santiago Canyon Road interchange, and SR-71 south of the Butterfield Ranch Road interchange. The study also identified a stretch of SR-91 located between Gypsum Canyon and Green River interchanges as the “mixing bowl,” named due to the nature of traffic patterns and the high instances of weaving in the area. A detailed analysis of traffic conditions in and around the mixing bowl area was completed as part of the traffic analyses completed for the approved Final Supplemental EIR/EIS. Prior to project approval, the traffic study area was expanded to include the SR-91 corridor from SR-55 to McKinley St, east of I-15 to verify results of the initial traffic study.

Analysis of existing conditions revealed key travel patterns: WB on SR-91 in the morning (AM) and EB in the afternoon (PM), with SR-241 volumes primarily moving south in the AM and north in the PM. In the AM peak, WB speeds are congested at 25-35 miles per hour (mph) east of the 241/91 interchange but recover to over 55 mph west of the interchange. In the PM peak, EB speeds drop significantly, averaging below 35 mph throughout the area and below 20 mph near the 241/91 interchange. The 241/91 EC contributes to decreased congestion, improved throughput, improved travel speeds and reduced delay, particularly in the WB direction.

The result of the traffic analysis for the 241/91 EC concluded that the project will provide the following operational benefits through the study area:

- Increase in vehicle throughput: +7% in the opening year and +3% in the horizon year
- Increase in travel speeds: +6% in the opening year and +7% in the horizon year
- Reduction in travel delay: -12% in the opening year and -17% in the horizon year
- Reduction in vehicle weaving conflicts
- Improved emissions by reducing congestion caused by merging and lower travel speeds
- Improved overall corridor performance for SR-91 GP lanes and SR-241 tolled facility

As project delivery progressed in final design, operational analyses scenarios were identified to further define the operational parameters and performance metrics necessary for the 241/91 EC operations and quantify network-wide benefits of the 241/91 EC and extracted SR-241 operational improvements. Network-wide, vehicle hours traveled improves for all vehicles traveling in the peak direction in both the ELs and GP lanes in the study area.

- On westbound SR-91, average weekday morning travel time savings between SR-55 and I-15 are anticipated to be about 27 minutes across the peak period.
- On eastbound SR-91, average weekday afternoon travel time savings between SR-55 and I-15 are anticipated to be about 28 minutes across the peak period. On Fridays (and sometimes Thursdays) SR-91 eastbound travel time savings between SR-55 and I-15 are anticipated to be about 3 minutes across the peak period.
- The ingress/egress area for EL traffic near the County Line, described as the “mixing bowl,” average travel speeds along SR-91 are anticipated to improve up to 30 mph (from 30 mph to 60 mph) in the Horizon Year during peak periods.
- On SR-241, a 2.5-to-5-mile reduction of north-to-east connector queue is anticipated and travel time savings of 22 to 55 minutes for Express Connector 241/91 EC and GP connector users is anticipated.

As a major freight corridor serving seaports and inland ports, these improvements to SR-91 enhance the region’s economic vitality and ability to compete in the global markets. As a commuting corridor, these improvements to the SR-91 and SR-241 corridors also serve to connect commuters from the Inland Empire to jobs in Orange County.

See Section 2.3.2 for more detail on how these improvements are distributed.

Since the original traffic analyses were performed as part of the Draft Supplemental EIR/EIS, periodic spot analyses of the traffic conditions in this area have been conducted for opening years in 2020, 2025, and 2028. These analyses determined that the overall change in volume growth in this area is nominal due to the oversaturated existing conditions in the SR-91 GP lanes and have negligible effects on the overall analysis results. Further, altered traffic patterns during the COVID-19 pandemic continue to have an effect on assessing and predicting traffic conditions due to temporary conditions which altered traffic baselines, lack of understanding on long-term changes in travel behavior, and disrupted seasonal variation. There is no validated traffic model currently available to use to update near-term projections⁴. As such, the traffic

⁴ The current (2022) countywide Long Range Transportation Plan (LRTP), prepared by OCTA states, “The long-term impacts to travel behavior from the pandemic will take years to fully understand. Adaptations due to the pandemic caused major travel changes for years and some of those adaptations will linger, but the trend has been moving toward pre-pandemic conditions. While this LRTP acknowledges that COVID-19 has had a profound impact over the past few years, the analysis of 2045 conditions is primarily based on pre-pandemic travel trends.”

operations results disclosed in the Approved Final Supplement EIR/EIS are determined to still be representative of the opening and horizon year conditions.

Demonstrating improved operations – reducing weaving and potential collisions

While the existing 241/91 interchange connects the SR-241 toll road to the non-tolled general-purpose lanes of SR-91, there is currently no direct connection between the SR-241 toll road and the 91 Express Lanes. The lack of connectivity between the SR-241 toll road and the 91 Express Lanes requires weaving across five SR-91 general-purpose lanes for users to transition between tolled facilities. This weaving of over 350 vehicles during the peak hour adversely affects operations for all users by worsening the already congested SR-91 corridor during peak hours and further degrading regional movement of people, goods, and services in the high-demand SR-91 corridor.

The 241/91 EC collision analysis indicates that, within the project area, there are five segments on SR-91 and five segments on SR-241 with greater than average statewide collision rates. The highest percentage of reported types of collisions for the segments are rear end and sideswipe collisions. 32% of collisions in these areas were rear end collisions and 19% of collisions were side swipe collisions during congested peak hours (6 AM to 9 AM and 3PM to 6PM), suggesting congestion may have been a primary reason for these collisions.

Sideswipe collisions are attributed to lane weaving in congested areas, which are exacerbated in the Project area due to steep downhill topography in areas like the NB SR-241 that require braking while weaving. These conditions can also lead to rear end collisions if drivers engage in queue jumping and cutting off others during congested times. Reducing congestion on the downhill grade of SR-241 will reduce queue jumping behavior and blocked through lanes caused by congestion-delayed merging.

The 241/91 EC project need identifies existing weaving operations between the GP connectors and the median Express Lanes as a concern because the weaving contributes to sideswipe collisions, and also because the weaving degrades the level of service (LOS) due to increased density. The approved 241/91 EC project purpose affirms that direct access between toll facilities, provided by the 241/91 EC, will improve traffic flow and operations by reducing weaving across multiple SR-91 GP lanes between the SR-91 Express Lanes and the SR-241 GP lane connectors. The occurrence of sideswipe and rear end collisions may be mitigated by these improvements.

The 241/91 EC will provide a direct median-to-median connection between the SR-241 toll road and the 91 Express Lanes as well as a separation between the GP connectors. This will reduce the friction caused by weaving, improve traffic operations, and reduce the number of lane change maneuvers, which will help reduce congestion and congestion related collisions such as sideswipes and rear-ends and thereby produce a safety benefit in this high-volume corridor. The 241/91 EC creates a tolled option that has long been envisioned as part of this system interchange.

2.3.1. Existing Conditions

The 241/91 EC is located at the junction of SR-241 and SR-91 within the Cities of Anaheim and Yorba Linda in the County of Orange, the City of Corona in the County of Riverside, and unincorporated Orange and Riverside counties.

SR-241 is a tolled facility starting at the Oso Parkway interchange in south Orange County to its terminus at SR-91 in the City of Anaheim. Within the 241/91 EC project improvement limits, SB SR-241 has five lanes and NB SR-241 has four lanes. At the SR-91 interchange, NB SR-241 lanes split with two lanes diverging to the NB SR-241/EB SR-91 connector and two lanes diverging to the NB SR-241/WB SR-91 connector.

Approaching the SR-91 interchange, enhanced striping, channelizers, and advanced signing have been installed on NB SR-241 to enhance safety and operations by minimizing the potential for the queue-jumping maneuvers that have been observed between traffic accessing the EB connectors.

SR-91 is a major east-west freeway facility used for commuting, goods movement, and interregional travel, and provides vital connections to Los Angeles County to the west and Riverside County to the east. Within the 241/91 EC project improvement limits, EB SR-91 has five lanes and WB SR-91 has six lanes. Located within the median of SR-91, the 91 Express Lanes is a four-lane tolled facility (two lanes in each direction) which extends from State Route 55 (SR-55) to Interstate 15 (I-15) in Riverside County. In each direction, the 91 Express Lanes are separated from the GP lanes by surface-mounted channelizers with points of ingress and egress at the SR-55 interchange, the Orange-Riverside County Line just west of Green River Road interchange, and the I-15 interchange. The 241/91 EC project improvement limits also encompass the Gypsum Canyon Road local street interchange and the Coal Canyon decommissioned undercrossing on SR-91.

The existing SR-241/SR-91 interchange connects the NB and SB SR-241 toll road to the non-tolled, GP lanes of EB and WB SR-91. SR-241 and SR-91 are State Highway System facilities owned and operated by Caltrans. There is currently no direct connection between the SR-241 Toll Road and the 91 Express Lanes.

SR-91 carries approximately 273,000 vehicles per day in the GP lanes near the project area and the SR-241 toll road carries approximately 55,000 vehicles per day in the vicinity of SR-91. The 91 Express Lanes carry approximately 61,500 vehicles per day within the Orange County segment operated by OCTA, and 45,000 vehicles per day within the Riverside County segment operated by RCTC.

These high volumes result in significant operational breakdown along both corridors in the vicinity of the 241/91 interchange. The most severe operational concern occurs on WB SR-91 during the AM peak period, and on EB SR-91 during the PM peak period. These conditions along SR-91 significantly impact operations on the SR-91 corridor, and transitioning movements to and from SR-241 at the 241/91 interchange. The operational condition is worsened by the high number of users that weave across GP lanes to access the 91 Express Lanes from the SR-241 and vice versa. The lack of a direct connection between the SR-241 toll road and the 91 Express Lanes negatively affects operations, worsens an already congested SR-91 during peak hours, and results in a long queue for users on NB SR-241 accessing EB SR-91 during the PM peak (Figure 2-4).

The traffic analyses completed for the Approved Final Supplemental EIR/EIS indicated that the primary directions of travel include WB on SR-91 in the AM and EB SR-91 in the PM, with the majority of SR-241 volumes traveling south in the AM and north in the PM. WB GP lane speeds in the AM peak period are congested east of the 241/91 interchange, averaging between 25 to 35 miles per hour near Serfas Club Drive in the early AM period. However, WB average speeds are shown to recover to near free-flow conditions (greater than 55 miles per hour) west of the 241/91 interchange. EB operational deficiency is much more severe in the PM, with average speeds below 35 miles per hour throughout the whole area, and below 20 miles per hour in the vicinity of the 241/91 interchange during the PM period.

Figure 2-4 Queue During PM Peak Period

Looking East



Looking South



2.3.2. Anticipated Impacts

The 241/91 EC provides an additional connection between the NB SR-241 and the EB SR-91 and from the WB SR-91 to the SB SR-241, which allows direct access between the SR-241 toll road and the 91 Express Lanes. This provides traffic performance, mobility, and economic benefits, and reduces vehicle weaving conflicts along the key regional corridors of SR-91 and SR-241 by reducing the impacts of an existing bottleneck, enhancing the 241/91 interchange, and providing a new choice to the traveling public. The 241/91 EC will strengthen a critical link in the regional transportation system by increasing throughput, velocity, and providing a direct connection. These outputs help to reduce strain on the road systems and improve their longevity. The encouraged use of toll facilities will generate revenue that, after covering necessary project expenses, can be used to further enhance options for the movement of people, goods, and services more effectively and efficiently throughout the system and transportation corridors. Alternative modes of transportation help distribute passenger loading and support sustainable infrastructure. See Section 2.5.2 for more information on potential uses of 241/91 EC toll revenue.

F/ETCA has completed the following efforts to demonstrate how the 241/91 EC will benefit and improve transportation system performance:

- **Traffic Analysis Related to the Draft and Final Supplemental EIR/EIS (2015 Traffic Analysis Report and 2019 Traffic Analysis):** These two interrelated traffic analysis reports document the traffic analysis performed for environmental review compliance (CEQA/NEPA), interagency planning coordination, public and stakeholder engagement support, and establishment of baseline conditions for future phases.
 - **The 2015 Traffic Analysis Report** was undertaken to support the 241/91 EC Draft Supplemental EIR/EIS. The study area included SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/Auto Center Drive interchange in Corona. The network also included SR-241 from north of the Santiago Canyon Road interchange and SR-71 south of the Butterfield Ranch Road interchange. During the review process for the draft document, OCTA requested that F/ETCA revise the 241/91 EC traffic analysis to incorporate results from the SR-91 Corridor Improvement Project. In support of this request, F/ETCA paused development of the Final Supplemental EIR/EIS to complete analysis.
 - **The 2019 Traffic Analysis** is an updated analysis based on comments received during the circulation of the Draft Supplemental EIR/EIS. F/ETCA worked collaboratively with OCTA, and RCTC on analysis methodology, baseline conditions, and expansion of the model boundaries to include the entire SR-91 corridor from SR-55 to McKinley St, east of I-15, generally consistent with the 91 Implementation Plan study area, to account for effects beyond the physical project limits through the broader, interregional transportation corridors. While this traffic analysis report updated several aspects of the original study, including opening year, it supported the findings of the 2015 Traffic Analysis report: that the 241/91 EC would increase throughput, decrease average delay, and increase average speed compared to the no build alternative.
- **Traffic Operations Review to Confirm Traffic Demand Management (TDM) Approach (2020-2025):** As the 241/91 EC operational concept was refined, a traffic operations review, using data from the approved Supplemental EIR/EIS, was completed to confirm feasibility of progressive demand management, which is inclusive of dynamic pricing, to be used as a TDM approach for 241/91 EC. The traffic operations review also served to confirm that traffic growth rates have remained nominal due to saturated conditions, supporting the concept that analysis results continue to be valid for the revised opening year.

More detail on the results from each effort is provided in the sections below.

Final Supplemental EIR/EIS Traffic Results

The Final Supplemental EIR/EIS describes that the 241/91 EC has been shown to improve traffic operational performance of the study corridor, by contributing to the achievement of the following objectives:

- *GP Lane Improvements*
 - WB SR-91 (AM Peak):
 - Opening Year (2019 Traffic Analysis)
 - Vehicle throughput will increase by approximately 4.8% averaged across all lanes.
 - Average Speeds are expected to improve to 28 mph (+9 mph) on mainline segments
 - Average delay per vehicle decreases from 4 to 3 minutes
 - Total travel time (VHT) is expected to decrease by 31%.
 - Reduction of approximately one mile in queue length between Serfas Club Drive and Lincoln Avenue
 - Horizon Year
 - Volume served will increase by 1% east of the interchange and decrease by approximately 9% west of the interchange due to shifts in demand volume and changing travel patterns. Increased efficiency on the direct connector ramp accommodates this shift.
 - Speeds are expected to stay the same, except for improvements on certain segments:
 - Between Express Lane Ingress and Gypsum Canyon Road: from 30-40 mph to 60 mph.
 - East of the Serfas Club Drive/Auto Center Drive interchange: from 30 mph to 60 mph.
 - Average speed per vehicle increases from 34 mph to 38 mph.
 - Average delay per vehicle decreases from 7.0 to 5.6 minutes.
 - Between major O-D points, travel times are expected to stay the same or decrease by up to 4.7 minutes.
 - Additionally, travel time between SR-71 SB to SR-91 EB will decrease by up to 11.9 minutes.
 - EB SR-91 (PM Peak):
 - Opening Year (2019 Traffic Analysis)
 - Vehicle throughput will increase by approximately 4.4% averaged across all lanes.
 - Average speeds are expected to improve to 35 mph (+13.6 mph).
 - Average delay per vehicle decreases from 7 to 4 minutes.
 - Total travel time (VHT) is expected to decrease by 34%.
 - Horizon Year
 - Volume served will increase slightly by about 300 vehicles in the PM peak period despite demand remaining the same when comparing No Build to Build. This is due to a shift of approximately 800 peak hour trips over the connector, lowering demand in GP lanes.
 - Speeds are expected to stay the same, except for improvements in the area between the SR-241 On Ramp and the Green River Road Interchange.
 - Average speed per vehicle increases from 45 to 46 mph.

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- Average delay per vehicle decreases from 3.4 to 3.1 minutes.
 - Between major O-D points, travel times are expected to stay the same or decrease by up to 2 minutes.
 - *Regional Connectivity and Mobility Improvements:*
 - Analysis of SR-241 transactions shows that of 19 million transactions in Fiscal Year 23, 41% originated from account holders in Riverside and San Bernardino counties, indicating the 241/91 EC's high utility for regional connectivity.
 - Improve the regional transportation system and help achieve regional mobility and operational efficiency goals by improving the bottleneck area at the interchange of SR-91 and SR-241.
 - Reduce weaving across multiple GP lanes between the 91 Express Lanes and the existing SR-241 GP connectors, which may lower the risk of collisions during merging, reducing stops/starts, and improving the health of commuters by reducing travel time. Guardrail upgrades and extended separation points from general traffic will also contribute to improved safety.
 - *Freight Movement:* Increase average travel speed along SR-91 in the WB direction (horizon year) by 4 mph (12%), and as much as 30 miles per hour in certain segments. As a major freight corridor that serves seaports and inland ports, improvements to the SR-91 corridor will enhance the region's economic vitality and ability to compete in the global markets.
 - *Health:* Operational improvements reduce emissions from transportation sources.

Generally, traffic analysis of horizon year conditions has demonstrated that the 241/91 EC will improve operational efficiency in the area of the 241/91 interchange. Average speed improvements demonstrate that the 241/91 EC can improve conditions in the vicinity of the 241/91 interchange by reducing the limits and duration of the WB AM bottleneck at the Countyline, compared to horizon year conditions without the 241/91 EC in place.

As described in Section 2.3.1, the existing operational condition in the EB direction in the PM period is severely saturated and much more severe than WB AM conditions. Traffic analysis of the horizon year conditions show that operational conditions cannot be completely resolved by this 241/91 EC in the EB direction during the PM. However, GP lane speeds along EB SR-91 between the SR-241 GP connector and the SR-71 off-ramp are anticipated to be approximately 5 miles per hour higher, additionally adding an increase in throughput of approximately 300 vehicles during the PM peak period.

Traffic Operations Review to Confirm TDM Approach (2020-2025)

To better inform and confirm the operations of the 241/91 EC, traffic operations review efforts were completed to determine how dynamic pricing and progressive demand management could be applied as the appropriate TDM approach for the 241/91 EC. This effort was completed in collaboration with OCTA and RCTC to determine how dynamic pricing and progressive demand management could be applied during peak period travel times to maintain the defined performance metrics. This traffic operations review has been performed to model the forecasted dynamic toll rates and expected progressive demand management strategies to be used to balance demand on the interconnected toll facilities for the best performance of the transportation system. The results listed below confirmed network-wide improvements on SR-91, SR-241, and SR-55 well beyond the physical project improvement limits offering improvements to all users within the high-demand, interregional mobility transportation corridors; quantified project benefits on SR-241; and confirmed progressive demand management strategies will adequately regulate demand within the defined performance metrics.

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- *Predicted Network-Wide Congestion Improvements on SR-91, SR-241, and SR-55:*
 - Network-wide vehicle hours traveled (VHT) also improved for all vehicles in the model traveling in the peak direction in the ELs and GP lanes on SR-91, SR-241, and SR-55.
 - Depending on the day, time, and direction of travel, travel time savings will vary.
 - Westbound average weekday morning VHT is expected to improve by 11,500 hours (over 6 minutes shorter per vehicle).
 - 91 westbound average weekday morning travel time savings between SR-55 and I-15 averages about 27 minutes across the peak period.
 - Eastbound VHT is expected to improve by about 18,800 hours (over 8 minutes shorter per vehicle) on an average weekday and by about 3,600 hours (1.3 minutes shorter per vehicle) on an average Friday.
 - 91 eastbound average weekday afternoon travel time savings between SR-55 and I-15 averages about 28 minutes across the peak period.
 - On Fridays (and sometimes Thursdays) eastbound travel time savings between SR-55 and I-15 averages about 3 minutes across the peak period.
 - *Quantified NB SR-241 Benefits from TDM Approach:*
 - Reduction of north-to-east connector queue by at least 2.5 miles and up to five miles.
 - Travel time savings from 22-55 minutes for 241/91 EC and GP connector users
 - Volumes on the 241/91 EC may be limited to approximately 370 vehicles per hour in the highest demand hour to balance demand of upstream and downstream toll facilities to optimize performance of the SR-91 corridor beyond the physical project improvement limits. Studies identified that 241/91 EC volumes affect upstream conditions at the 55/91 interchange and downstream conditions at the terminus of the 91 Express Lanes at McKinley Avenue.
 - *Identified Opportunities for System Efficiency:*
 - Improve person throughput with toll-free travel for municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder.
 - Prioritize carpools and vanpools with progressive demand management at peak hours.
 - Improve transit facilities and services with projects and programs eligible to use the excess toll revenues generated by the 241/91 EC to improve multimodal transportation, pending the establishment of an expenditure plan consistent with SHC 149.7.
 - *Defined 241/91 EC Performance Metric Measures⁵:*
 - Speeds to be maintained at 60 miles per hour or more in the 91 Express Lanes critical zones
 - Volumes not to exceed 1,500 vehicles per hour on the 241/91 EC in either direction (north-to-east or west-to south)
 - Volumes not to exceed 200 vehicles per hour at the EB County Line egress
 - Queue length not to exceed 100 vehicle storage at the Toll Connector Meter
 - Identified the highest demand periods as generally Thursday and Friday afternoons
 - Identified need to monitor performance of EB 91 Express Lanes East End conditions if north-to-east 241/91 EC volumes are greater than 370 vehicles per hour during East End super-peak conditions⁶

⁵ F/ETCA, OCTA, and RCTC will monitor and, if needed, update performance metric measures in accordance with a governance structure to be developed for operations.

⁶ East end super-peak conditions are defined as:

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- TDM Approach - Progressive Demand Management Strategies⁷
 - Dynamic pricing
 - Toll Connector Meter
 - HOV-Only Mode
 - Bus/Registered Vanpool only mode

Additional description of the progressive demand management modes, including dynamic pricing, anticipated application of each mode, and volumes served by the 241/91 EC during various operational periods are described in Section 2.4.3.

2.4. Technical Feasibility

2.4.1. Project Definition

Has the applicant described the proposed facility in sufficient detail to determine the type and size of the project, the location, all proposed interconnections with other transportation facilities, the communities that may be affected, and alternatives that may need to be evaluated?

The 241/91 EC project is focused on improving access between SR-241 and SR-91 by constructing a direct tolled freeway-to-freeway connector with left-side exits and entrances from the NB SR-241 toll road to the EB 91 Express Lanes and from the WB 91 Express Lanes to the SB SR-241 toll road. It is important to note that this application is specific to tolling authority on the 241/91 EC. This application has no effect on F/ETCA existing toll authority and related responsibilities, commitments, agreements, etc. to the SR-241 toll road.

Tolled facilities are a critical component of an improved transportation system that offer positive community and environmental benefits. This 241/91 EC project seamlessly integrates the existing tolled facilities to gain operational and system efficiencies that reduce travel times and vehicle conflicts and provide health benefits through reduced emissions. The 241/91 EC project will enhance a key regional connection between SR-241, SR-91, and the 91 Express Lanes, improving access for the traveling public between Orange, Riverside, and Los Angeles counties. A diagram of the project area is shown in Figure 2-5.

The 241/91 EC project as analyzed in the 2020 Final EIR/EIS is described as a tolled facility with a total project length of approximately 8.7 miles, including 5.9 miles of improvements and 2.8 miles of advanced signage. A California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) revalidation is currently being conducted as part of the Final Design Phase in order to revalidate the Final Supplemental EIR/EIS to include a revised project length total of approximately 9.1 miles of improvements within the cities of Anaheim, Yorba Linda, and unincorporated Orange and Riverside Counties, from just north of the Santiago Creek Bridge on SR-241 to Coal Canyon Undercrossing on SR-91. Approximately 2.9 additional miles of temporary advanced signage are also included in the revalidation of the final design.

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- i. Eastbound McKinley Toll Rate is 25% above pre-241/91 EC baseline;
 - ii. Density across 2-lanes at the RCTC EB 91 Express Lanes mainline toll gantry is 23 vehicles per mile per lane or greater; and
 - iii. Average speed across multiple sensors is below 65 miles per hour or queues observed at any location between ingress (approximately at Green River) and terminus (approximately at I-15) is longer than 0.5 miles.

⁷ OCTA and RCTC will have final approval of the dynamic pricing algorithm and dynamic pricing input values, including changes. Initial Progressive Demand Management systems inputs and future changes are subject to executive committee decision.

Current and proposed toll related infrastructure in the vicinity of the 241/91 EC is shown in Figure 2-6. Other major elements of the 241/91 EC are described later in this section.

Figure 2-55. Project Area

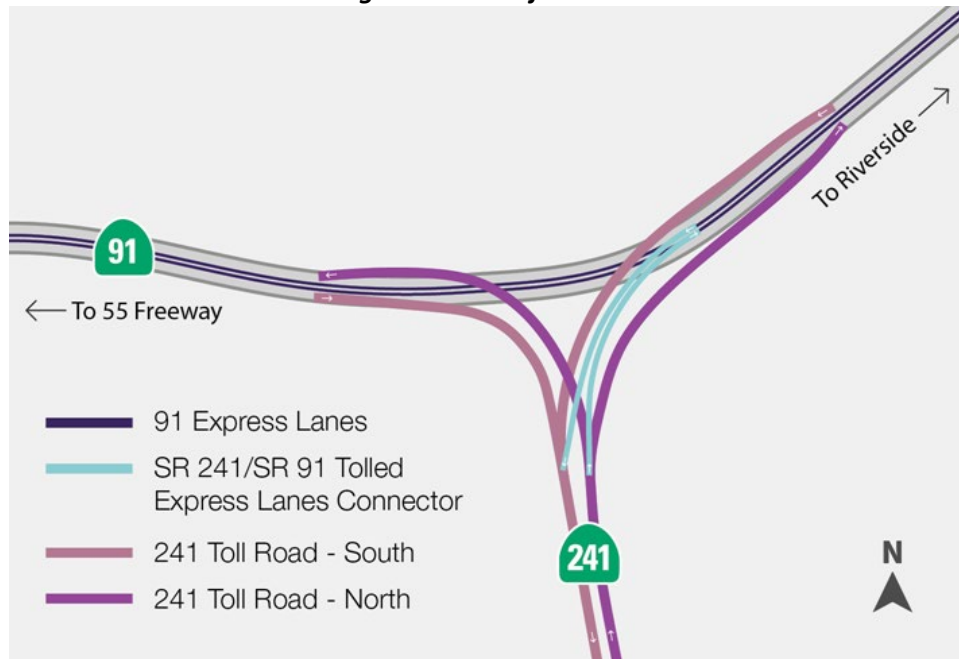
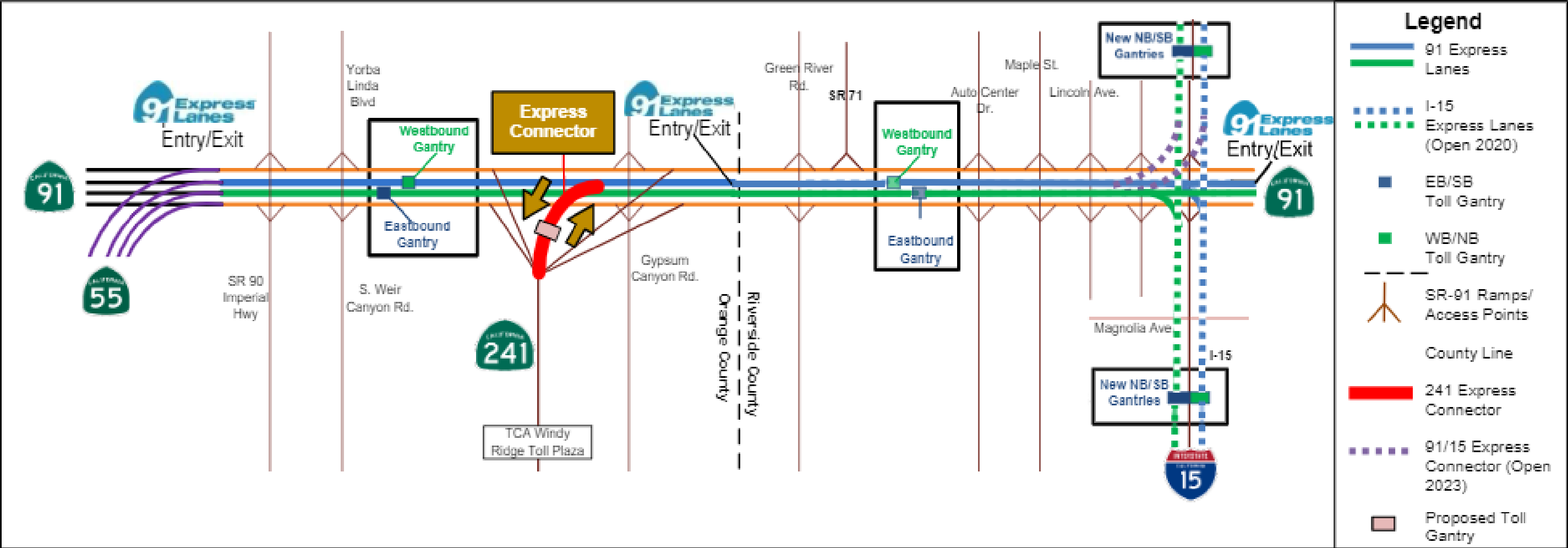


Figure 2-6 6. Current and Proposed Toll Facilities Diagram



Roadway Improvements

- **Direct Express Connector:** The main feature of the 241/91 EC is the direct-connect structure, which will accommodate two lanes: a single express lane connecting NB SR-241 toll road to EB 91 Express Lanes, and a single express lane connecting WB 91 Express Lanes to SB SR-241 toll road. Both lanes will be accessed from the left-side of the respective freeways utilizing the median area to achieve touchdown of the bridge structures. A single overhead toll gantry will be placed along the directional connector to facilitate toll collection.
- **SR-241:** On SB SR-241, an additional lane and reconstructed shoulder would be provided by widening into the existing median from the SR-91 interchange to just north of Windy Ridge Wildlife Undercrossing for approximately 2.5 miles. On NB SR-241, an additional lane and reconstructed shoulder would be added from 0.3 miles north of the Santiago Creek bridge to the Windy Ridge Mainline Toll Plaza by widening into the existing highway median for approximately five miles. The 241/91 EC project would also shift the NB SR-241 diverge point (the location where the NB SR-241 traffic must choose either the EB GP, WB GP, or EB tolled connector to SR-91) to the Windy Ridge Toll Plaza. The 241/91 EC (NB and SB lanes) would begin in the existing SR-241 median on fill. The 241/91 EC then spans over the existing NB SR-241-to-WB SR-91 GP connector and the SR-91/Gypsum Canyon Road interchange on two new bridge structures to merge into the median of SR-91.
- **SR-91:** EB SR-91 lanes would be realigned to the south from east of the Gypsum Canyon interchange to west of the Coal Canyon Undercrossing to accommodate space in the median for the 241/91 EC. The NB-to-EB 241/91 EC lane would create a new 241/91 EC auxiliary lane that continues along EB SR-91, merging just west of the Coal Canyon Undercrossing. In addition, the existing EB egress auxiliary express lane would be extended within the 91 Express Lanes. 241/91 EC users will be allowed to egress at the Orange/Riverside County Line. The WB-to-SB 241/91 EC lane would include a new WB 241/91 EC auxiliary lane as well as an additional auxiliary express lane merge west of the Coal Canyon Undercrossing. These improvements would accommodate users seeking to ingress or egress at the Orange/Riverside County Line. The number of existing SR-91 GP lanes would be maintained within the project limits.

Other Improvements

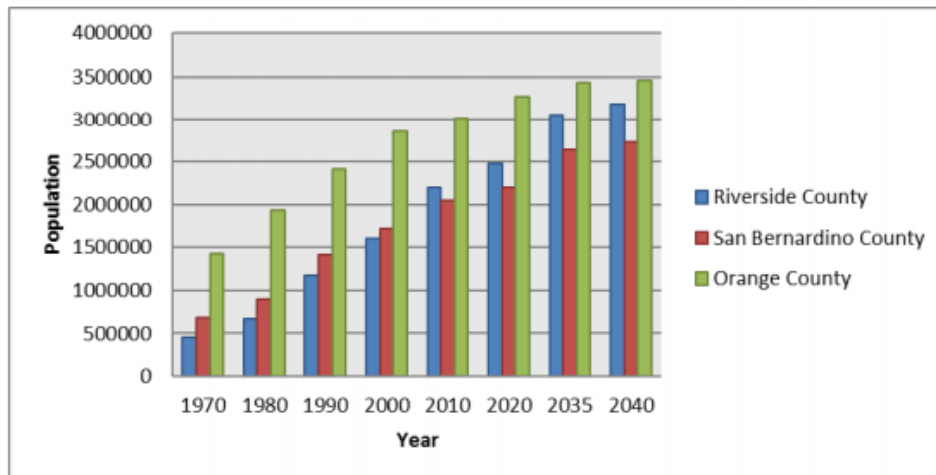
In addition to the improvements described above, the 241/91 EC project will also include the following elements:

- **Bridge Widening:** Four undercrossings will be widened, including the SCE Wildlife crossing and the Oak Canyon Wildlife crossing under NB SR-241, the Gypsum Canyon crossing under EB SR-91, and WB SR-91 over Coal Canyon.
- **Retaining Walls:** Due to the topography in the project area, up to 17 retaining walls will be constructed. Retaining walls are related to individual project needs, including CHP enforcement areas and embankments.
- **Advanced Signage:** On NB SR-241 at the southern approach to the 241/91 EC, signage would be modified beginning approximately 800 ft south of the Santiago Creek bridge. On SR-91, signage improvements would be made on WB SR-91 beginning at Green River Road and on EB SR-91 west of SR-241.
- **Gypsum Canyon Road:** Reconstruction of the EB interchange ramps and minor widening of Gypsum Canyon Road to accommodate construction of the 241/91 EC, as well as a new SB bike lane and sidewalk on Gypsum Canyon Road.
- **Right of Way:** Improvements would be constructed mostly within existing Caltrans right of way. A permanent footing easement from the City of Anaheim for a portion of the 241/91 EC structure footing is required.

Affected Communities

Based on projections from SCAG, between 2012 and the 2040, the population of Riverside County will grow approximately 42 percent, the population of San Bernardino County will grow approximately 32 percent, and the population of Orange County will grow approximately 13 percent (Figure 2-7). As a result, demand on SR-91 and SR-241 during peak periods is projected to increase by approximately 45 percent in the AM peak period (from 82,377 to 119,605 vehicles) and approximately 50 percent during the PM peak period (from 111,837 to 168,494 vehicles) between 2012 and 2040. This increase in demand would result in degraded operational conditions and increased travel times under existing conditions. These projections for growing population in the communities surrounding the 241/91 interchange, in addition to the associated increase in traffic volumes, further emphasizes the importance of the 241/91 EC to relieve a known bottleneck in the corridors and improve mobility for both local and regional trips throughout these communities.

Figure 2-7. County Population Growth Patterns - 1970 to 2040



Sources: United States Census Bureau (Years 1990–2010)¹; Southern California Association of Governments (Years 2020–2040).

SR-241 and SR-91 serve as major transportation routes within Orange and Riverside Counties and thus are critical evacuation routes for the surrounding communities. The communities near these state routes experience wildfires and floods almost annually. In the event of an evacuation, the surrounding cities and the County of Orange have recognized SR-241 and SR-91 as the best means to safety. Additionally, the Cities of Corona, Eastvale, and County of Riverside rely on SR-91 as a critical transportation corridor in the event of an evacuation. SR-91 provides access to many entry points for firefighters if there is a wildfire. During the recent Bond and Blue Ridge Fires, surrounding communities were impacted, and SR-241 and SR-91 were the primary means for people and animals to evacuate. The 2021 and 2022 rainstorms caused daily evacuations in Silverado, Modjeska, and Williams Canyons. Improvements to these vital corridors ensure that first responders, residents, workers, and visitors can continue to have a reliable evacuation route in the event of an emergency.

SR-91 is the primary route between more affordable housing in Riverside County and many job centers in Orange County, and hundreds of thousands of commuters rely on SR-91 daily. As jobs and populations grow and shift in the region, so will the number of commuters on the road. The 241/91 EC supports disadvantaged and low-income communities by improving this vital connection for commuters from their homes to their jobs by reducing travel times and improving the system operations which makes the route

a safer commute and improves the health and wellness of the travelers and their communities. Though the 241/91 EC will connect the SR-241 to the 91 Express Lanes, the benefits of the 241/91 EC will be to all corridor users, including GP lanes, high-occupancy vehicles, and truck traffic.

Other benefits include reduced weaving, merging, and lane changes which will help reduce congestion and congestion related collisions such as rear-end and sideswipe collisions. Additionally, with improved operations, the 241/91 EC will decrease GHGs and other harmful emissions, providing better air quality for surrounding communities.

SR-91 also supports freight traffic, providing an import link between the movement of goods from seaports in Los Angeles and Long Beach into inland ports in Riverside and San Bernardino. This supports the economic vitality of the region, state, and nation.

Alternatives

Two project alternatives were evaluated in the PA/ED phase:

- No-Build Alternative that would maintain existing conditions and no work would be conducted to improve corridor operations; and
- Build Alternative 1 (241/91 EC project improvements as described herein).

OCTA prepared the 91 Express Lanes Extension and SR-241 Connector Feasibility Study in March 2009. Initially, six Build Alternatives were studied in the feasibility study, and three of these were rejected (Alternative Concepts 2, 5, and 6) during the screening process. The remaining three Alternative Concepts (Alternative Concepts 1, 3, and 4) were carried forward for more detailed evaluation in the PSR/PDS phase. During preparation of the PSR/PDS, the remaining three Build Alternatives were evaluated, Alternative Concepts 3 and 4 were rejected, and Alternative Concept 1 was carried forward for further evaluation. The following provides a summary of the rejected alternative concepts:

- Alternative Concept 2 - Four-lane toll median-to-median connector between SR-241 and the existing 91 Express Lanes. The additional traffic added to the 91 Express Lanes would result in potential capacity deficiencies. In addition, this alternative would have resulted in additional impacts to coastal sage scrub (CSS) habitat compared to Alternative Concept 1. Therefore, this alternative concept was rejected in favor of Alternative Concept 4.
- Alternative Concept 3 - Reversible two-lane toll connector. While the connector could be built, it would not have addressed the project objective of reducing traffic congestion. Therefore, Alternative Concept 3 was dropped from further consideration.
- Alternative Concept 4 - Four-lane toll connector that addressed the operational issues of the additional traffic in the 91 Express Lanes by widening the 91 Express Lanes to three lanes in each direction to approximately the SR-71 interchange but the concept would have substantially higher costs and was not consistent with the ETC EIR/EIS. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat, drainages, and the Coal Canyon Undercrossing compared to Alternative Concept 1. Therefore, Alternative Concept 4 was dropped from further consideration.
- Alternative Concept 5 - Four-lane toll connector to the 91 Express Lanes. Alternative Concept 5 is similar to Alternative Concept 4, except that the third express lane would extend to I-15. Adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat, drainages, and the Coal Canyon Undercrossing compared to Alternative Concept 1. The physical constraints were considered a fatal flaw to the feasibility of Alternative Concept 5. Therefore, Alternative Concept 5 was not recommended for further consideration.

- Alternative Concept 6 - SR-241/SR-71 direct toll connector for SR-241 and SR-71 traffic. This would have been a relatively high-cost concept and only focused on a specific part of the travel demand between SR-241 and SR-71. In addition, this alternative would have resulted in additional impacts to coastal sage scrub habitat compared to Alternative Concept 1. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. Therefore, Alternative Concept 6 was not recommended for further consideration.

2.4.2. Proposed Project Timeline

Is the time frame for project completion clearly outlined? Is the proposed schedule reasonable given the scope and complexity of the project? Does the proposal contain adequate assurances that the project will be completed on time?

The proposed project schedule is provided in Table 2-1. A Term Sheet among major stakeholders has been completed and Master, Operating, and Cooperative Agreements are being finalized to specify and document project roles and responsibilities. The 241/91 EC project is now in the final design and environmental revalidation process, scheduled for completion in late 2025. Construction is scheduled to begin in early 2026, with the 241/91 EC open to traffic in late 2029.

Table 2-1: Proposed Project Timeline

Project Activity	Timeline
Term Sheet	Q3 2019
Environmental Document Approval (Final Supplemental EIR/EIS)	Q1 2020
Environmental Revalidation	Q2 2025
Master and Operating Agreements Executions and Partner Agency Support Letters	Q3 2025
CTC Supplemental Tolling Authority Consideration	Q4 2025
Caltrans-F/ETCA Toll Facility Agreement, Construction Cooperative Agreement, and Maintenance Agreement Executions	Q4 2025
Project Plans, Specifications, and Estimates (PS&E) Approval (Ready-To-List)	Q4 2025
Construction Advertisement	Q4 2025
Construction Notice to Proceed (NTP)	Q1 2026
Substantial Completion (Open to Traffic)	Q1 2029
Project Complete	Q3 2029

A number of methods will be used to ensure that the design and construction phases are completed on time, including regular project reports and status meetings as described below.

Project Reporting

Reports will be prepared to assess status and track progress on costs, budgets, schedules, quality, environmental mitigation status, safety, labor compliance, and many other items related to the project. These reports will cover periods ranging from one week to as long as one year. Additionally, special reports concerning a particular topic will be prepared, when necessary or requested.

A formal cost, schedule, and status report will be produced and reviewed monthly with agency management from F/ETCA and Caltrans. A status meeting will be held quarterly with major project stakeholders, or more frequently, upon request. Major project stakeholders consist of the four agencies partnering to deliver the 241/91 EC: F/ETCA, Caltrans (District 8 & District 12), OCTA, and RCTC.

Monthly Status Meeting

Senior representatives from F/ETCA, Caltrans, OCTA, and RCTC will attend periodic status meetings during project construction and operations, with the purpose of discussing costs, schedules, quality issues, compliance with Federal and State requirements, and other status items in sufficient detail to allow all involved parties to be fully aware of the significant issues and actions planned to mitigate any adverse impacts. F/ETCA will prepare a status report for discussion, which will include but not be limited to activities and deliverables, action items, schedule adherence, cost adherence, quality adherence, and safety performance.

Weekly Status Meeting

Throughout the final design and construction phases, a weekly progress meeting will be held among F/ETCA, Caltrans, design consultants, construction contractors, and other stakeholders as needed until project completion. The purpose of these meetings will be to review schedule and status, address issues, and provide an opportunity for coordination and dialogue. Another purpose of these meetings will be to identify key issues that need to be elevated to F/ETCA and Caltrans senior management. Immediate communication of progress and identification of issues will help to mitigate problems quickly and ensure that the project is delivered on time.

Risk Register:

Project Risk Management (PRM), as outlined in Caltrans Deputy Directive (PD-09), is applied throughout the project's various phases. The Project Development Team (PDT) has been engaged in planning for, identifying, analyzing, communicating, managing, and responding to project risks throughout project delivery. A risk register, prepared for the 241/91 EC project improvements, lists all identified risks, risk owners, and agreed-upon risk response strategies.

Additionally, the Proposed Project Timeline above is closely linked to the planned execution of several documents between F/ETCA, Caltrans, OCTA, RCTC, and other stakeholders. Table 2-2 lists these documents, their purpose, parties, status, and timeline.

Table 2-2: Historical and Future Agreement Timeline

Document	Purpose	Parties	Status	Timeline
OCTA-Caltrans 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	OCTA, Caltrans	Complete	2002
OCTA-RCTC 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	OCTA, RCTC	Complete	2011
Project Study Report/Project Development Support (PSR/PDS)	Project Approval	F/ETCA, Caltrans	Complete	2012
RCTC-Caltrans 91 Express Lanes Joint Agreement	Two-party agreement between Caltrans and operator	RCTC, Caltrans	Complete	2012
Cooperative Agreement (PA/ED)	Caltrans Participation in PA/ED	F/ETCA, Caltrans	Complete	2014
Cooperative Agreement (PS&E/ROW)	Caltrans Participation in PS&E/ROW	F/ETCA, Caltrans	Complete	2017
241/91 Express Lanes Connector Term Sheet	241/91 EC delivery and operation framework	F/ETCA, OCTA, RCTC, Caltrans	Complete	2019

Document	Purpose	Parties	Status	Timeline
April 4, 2024 Letter to CTC Executive re: Transportation Corridor Agencies' Ability to Utilize AB 194 and Reply (May 2024)	Confirms F/ETCA's eligibility to apply for supplemental tolling authority for the 241/91 EC	F/ETCA, CTC	Complete	2024
Master Agreement	Four-party agreement for project delivery, high-level operation, and revenue use	F/ETCA, OCTA, RCTC, Caltrans	In Process	September 2025
Operations Agreement	Three-party agreement among toll operators	F/ETCA, OCTA, RCTC	In Process	September 2025
OCTA Support Letter	CTC requirement	OCTA	In Process	September 2025
RCTC Support Letter	CTC recommendation	RCTC	In Process	September 2025
Cooperative Agreement (CON)	Caltrans Participation in CON (AAA)	F/ETCA, Caltrans	In Process	October 2025
Toll Facility Agreement	Incorporate the Connector into the State Highway System, capture ongoing maintenance obligations and toll collection sunset	F/ETCA, Caltrans	In Process	December 2025
Maintenance Agreement	Caltrans participation in M&R	F/ETCA, Caltrans (KLA)	In Process	December 2025
91 Express Lanes Traffic Operations Center (TOC) Amendment	Add F/ETCA to 91 EL TOC program	F/ETCA, OCTA, RCTC	In Development	Before Open to Traffic (2028)
Existing Enforcement Agreement Amendment	Add EC to F/ETCA's CHP enforcement program	F/ETCA, CHP	In Process	Before Open to Traffic (2028)
Incident Management Plan	Roles and responsibilities for monitoring, identification, and response to incidents (living document)	F/ETCA, Caltrans, OCTA, RCTC, and CHP	In Process	Before Open to Traffic (2028)

2.4.3. Operation

Has the applicant presented a reasonable statement setting forth plans for operation of the facility?

F/ETCA will operate the 241/91 EC, including the operation of the tolling equipment and traffic management system, the collection and processing of toll payments, and the provision of a Customer Service Center.

F/ETCA, in coordination with OCTA and RCTC, has developed the framework for the operational conditions of the 241/91 EC. The main components are described below:

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- **Toll Points:** The 241/91 EC will have one single toll point in each direction.
 - **Pricing:** The 241/91 EC will be dynamically priced in accordance with pre-defined performance metrics that preserve free-flow (60 mph) conditions in the 91 Express Lanes; limit 241/91 EC volume to 1,500 vehicles per hour and County Line egress volumes to 200 vehicles per hour; and limit queue length for the Connector to 100 vehicles. F/ETCA, OCTA, and RCTC will monitor the performance metrics weekly to determine if adjustments to pricing calculations are needed.
 - **Pricing Information:** 241/91 EC pricing information will be displayed on-road in compliance with the CA MUTCD. The WB-to-SB trip will have one destination and associated price to the SR-241 toll road. The NB-to-EB movement will have one destination and associated price to the Orange-Riverside County Line.
 - **Express Connector Meter:** Metering will be implemented on the 241/91 EC for the NB SR-241 to the EB SR-91 movement. If predetermined performance metrics in the 91 Express Lanes are exceeded, the toll connector meter located at the toll point would automatically be activated to restrict the inflow from the 241/91 EC to the 91 Express Lanes. An overhead changeable message sign prior to the Windy Ridge toll plaza and a series of five connector meter signs spaced approximately 1,000 feet apart leading up to the toll point would alert drivers to the toll connector meter activation.
 - **Progressive Demand Management:** The north-to-east direction of the 241/91 EC will be capable of deploying progressive demand management (PDM) which will allow the facility to operate in four modes of control - dynamic pricing, toll connector meter, HOV-only mode, and Bus/Registered Vanpool-only mode - to effectively manage demand such that the expected performance metrics are achieved. These four modes may be used individually, in combination, and/or in sequence to manage demand and maximize system performance. When demand is at its peak, HOV-only and Bus/Registered Vanpool modes prioritize carpools and transit when the system would most benefit from increased person throughput.
 - Dynamic Pricing - the price to use the north-to-east 241/91 EC will be tethered to the density in the EB 91 Express Lanes critical zone. This is the main control in managing demand on the 241/91 EC.
 - Toll Connector Meter (TCM) - similar to an on-ramp meter, the TCM signal will cycle at variable discharge rate to release cars from the 241/91 EC into the 91 Express Lanes.
 - HOV-only Mode - access to the 241/91 EC is restricted to HOVs. The TCM will be active during this mode.
 - Bus/Registered Vanpool Mode – This is the most restrictive and final level of control to be imposed. The TCM will be active during this mode.
 - Except as adopted in the toll policy (e.g., municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder), 241/91 EC customers will be required to pay the posted toll price during all progressive demand management modes.
 - Advanced static and changeable message signs will be located in the project area to provide drivers with notice of the price and operational mode of the 241/91 EC in compliance with highway design guidelines and manuals.

Anticipated application of progressive demand management strategies and volumes served by the 241/91 EC are shown in Table 2-3.

Table 2-3: Anticipated Application of Progressive Demand Management in Opening Scenario

North-to-East ⁸ Operating Period	Anticipated PDM Mode ⁹	Anticipated 241/1 EC Volume ¹⁰
<u>Super-Peak</u> Thursday 2-3 pm and Friday 1-3 pm	HOV-Only Mode	370 vehicles per hour
<u>Peak</u> Monday-Wednesday 2-6 pm Thursday 3-6 pm and Friday 3-7 pm	Dynamic Pricing	310 to 770 vehicles per hour
<u>Off-Peak</u> All other days/times not listed above	Dynamic Pricing	Up to 1500 vehicles per hour

- Incident Management/CHP Enforcement Areas: Enforcement areas will generally be located in the vicinity of each exit point (NB SR-241 and WB SR-91) from the 241/91 EC.

Toll Rate Setting

Toll rates for the 241/91 EC will be established via dynamic pricing, which is adjusted in real-time based on real-time facility conditions. The demand to use the NB-to-EB 241/91 EC movement is anticipated to be high during portions of the PM peak hours, and therefore a real-time pricing method will help maintain acceptable performance on the 241/91 EC and adjacent 91 Express Lanes. The use of dynamic pricing for this movement allows for the optimal flexibility and ability to maintain traffic volume continuity within the 91 Express Lanes. Toll rates will be determined based on the speed and volume performance metrics in the Express Lanes and other factors consistent with the dynamic pricing principles to optimize throughput within the system while balancing demand with available capacity. The actual dynamic pricing algorithm will be developed in collaboration between F/ETCA, OCTA and RCTC. Real-time conditions will be monitored for pre-established operational performance metrics to initiate toll rate adjustments and to trigger automated toll connector metering operations as needed for the NB to EB connector.

Toll Exemptions & Discounts

Partner agencies have agreed that municipal transit buses, vanpools registered with TCA, and toll-exempt vehicles as described in California Vehicle Code (CVC) § 23301.3, such as designated veteran license plates issued by the California Department of Motor Vehicles with a valid FasTrak® transponder, will travel toll-free at all times on the 241/91 EC. High-Occupancy Vehicles (HOV) with three or more passengers (3+) will travel toll-free except during weekday peak periods¹¹. During peak periods, HOV 3+ will pay full toll to better manage peak period demand in accordance with expected available capacity on the 91 Express Lanes. Electric vehicles and motorcycles will pay full tolls at all times.

⁸ Progressive demand management is only deployed in the north-to-east direction. Dynamic pricing will be applied in the west-to-south direction at all times. Indicated operating periods may be changed based on results of baseline analysis prior to opening of the 241/91EC.

⁹ This represents the potential progressive demand management mode and will be determined by the governance team. Additional strategies may be applied in each operational period if continuous critical zone monitoring determines further demand management is needed.

¹⁰ Indicated volumes are based on traffic estimated during 2024 modeling. During the operating period, 241/91 EC volumes will be limited to available capacity in the EB 91 Express Lanes using real-time monitoring data.

¹¹ During peak periods (below, subject to change based on demand), HOV 3+, pay full toll.

EB - Monday through Thursday 2-6 PM; Friday 1-7 PM

WB - Monday through Thursday 5-9 AM; Friday toll-free all day

Methods of Toll Collection

F/ETCA will build transactions, collect revenue, and process violations for the 241/91 EC. F/ETCA has an established process of toll collection, transaction processing, billing and violation processing, and customer service. If a driver is a non-account holder with F/ETCA and has a valid account with another California toll agency, tolls will be processed through the existing interoperable processes. Tolls will be collected for each motorist travelling between SR-241 and the 91 Express Lanes in the NB-to-EB and WB-to-SB directions. The 241/91 EC will use electronic toll collection to collect tolls. 241/91 EC signage will require customers to have a valid transponder. Tolls for FasTrak® transponder transactions will be processed to their respective accounts. All other transactions (i.e., no valid FasTrak® account) will be processed as a toll evasion violation. Transponders will be required to use the 241/91 EC.

Toll Enforcement/HOV Occupancy Non-Compliance

At all times, CHP enforcement, supplemented by automated enforcement technologies, will be used to provide additional deterrents to toll evasion and HOV occupancy non-compliance. TCA will amend its agreement with CHP and coordinate accordingly to ensure that adequate CHP resources can be provided to provide enforcement during Connector operations. CHP enforcement and turnaround areas will be utilized at each end of the 241/91 EC to provide CHP officers with direct line-of-sight to the connector diverge area to monitor aggressive driving, visual HOV occupancy compliance, and other traffic violations.

Toll violation collection will follow current F/ETCA practices. Enforcement of toll violations is technology based and supported by account matching and California Department of Motor Vehicles (DMV) lookup capabilities. This includes a combination of radio frequency identification (RFID) readers and cameras at the tolling point, along with image processing technology and human review, to form a toll transaction based on license plate image captures for vehicles with no transponder or non-valid transponders. This will be done to initiate a toll transaction or eventually a violation if necessary.

Traffic Management Center & Back Office

F/ETCA operations of the 241/91 EC will be integrated into the existing SR-241 toll road operations center in Irvine. F/ETCA will operate the roadside and back-office tolling infrastructure, customer service center, tolling back-office procedures, and the overall toll and traffic monitoring system. All equipment will communicate back to the existing F/ETCA Back Office in Irvine. In addition, F/ETCA, OCTA, and RCTC are currently discussing the interfacing of traffic monitoring equipment with the existing 91 Express Lanes Traffic Operations Center in Anaheim for incident monitoring and management.

F/ETCA will also be responsible for the maintenance of the toll system that includes the tolling infrastructure, toll collections, and violations processing. This would include routine lifecycle and emergency maintenance responsibilities of this infrastructure.

Successor Operator

The Term of the Master Agreement for the 241/91 EC is defined to be in alignment with 91 Express Lanes Toll Facility Agreement (currently set to expire in 2067) so that performance metrics for the 241/91 EC remain in effect for the duration of the 91 Express Lanes operation to ensure seamless operations and minimize disruption to the traveling public. F/ETCA's current tolling authority on its existing system (SRs 133, 241, and 261) is set to expire in 2053. For planning purposes, partner agencies have agreed to include language in the Master Agreement to identify OCTA as the successor operator if F/ETCA were to dissolve prior to the end of the Term to ensure continued operations and maintenance within the terms of the agreements in place at that time, provided that the following items are met:

- OCTA obtains the necessary legal authority to operate the 241/91 EC, which may include AB 194 or other legal requirements applicable at the time;
- OCTA will be responsible for the F/ETCA obligations and commitments to the operation and maintenance of the 241/91 EC consistent with the terms of the Master Agreement and the Operating Agreement including continued tolling and;
- OCTA will continue repayment of any 241/91 EC debt.

If OCTA does not become the successor operator, parties can identify another successor operator that has obtained the necessary legal authority, and, if no other successor operator is identified, then Caltrans will become the successor operator. If Caltrans' is the successor operator, then

- Any responsibility to pay 241/91 EC debt will be released and Caltrans will receive the 241/91 EC free and clear of all obligations;
- Caltrans would have to obtain the necessary legal authority to operate the 241/91 EC, which may include AB 194 or other legal requirements applicable at the time; and
- Will operate the 241/91 EC until the end of term in accordance with the Traffic Operations Metrics defined in the Master Agreement.

OCTA, RCTC, and Caltrans will meet and confer no later than five (5) years before such dissolution to confirm the successor operator can obtain the necessary legal authority to operate the 241/91 EC and facilitate the assignment and transfer of F/ETCA property, obligations, reserve accounts, and related items to the successor operator.

2.4.4. Federal Involvement

Is the project outside the purview of federal oversight, or will it require some level of federal involvement due to its location on the National Highway System or Federal Interstate System or because federal permits are required? If so, has the applicant provided a reasonable plan for addressing all federal responsibilities?

The 241/91 EC is a distinct facility, separate from the existing SR-91 and SR-241. The project is not located on the National Highway System, the Federal Interstate System or the Federal-aid highway system.

No federal funds will be used for the construction, operation or maintenance of the 241/91 EC. This new facility will be constructed using available F/ETCA funds and maintained and operated using the toll revenues collected on the 241/91 EC. The separation of the 241/91 EC from the adjoining SR-91 and SR-241 is clear and further evidenced by the fact that the 241/91 EC is pursuing tolling authority via this application process through the California Transportation Commission (CTC) and the 241/91 EC will have different business rules and toll policies from the 241 Toll Road and the 91 Express Lanes.

Federal involvement in the Project is limited to obtaining an air quality conformity analysis determination as not a project of air quality concern (POAQC), a Clean Water Action Section 404 permit for impacts to Waters of the United States and consultation with United States Fish and Wildlife Service for compliance with Section 7 of the Federal Endangered Species Act. To meet NEPA requirements to obtain these permits, F/ETCA worked with Caltrans District 12, the NEPA lead agency (as delegated by FHWA) to develop and approve the Final Supplemental EIR/EIS and Record of Decision. These NEPA documents were completed in 2020. F/ETCA received determination that the project is not a POAQC in October 2020, Section 404 permit in December 2024, and the Section 7 Amended Biological Opinion in March 2025.

As part of the multi-agency coordination effort in developing the project and proposed operations for the 241/91 EC, a concept of operations working group was convened. FHWA participated in this working group and provided input on the draft concept of operations that has since evolved into terms, processes,

and obligations required of the F/ETCA to manage and operate the 241/91 EC with partner agencies. FHWA approvals are not required for any 241/91 EC approvals because the 241/91 EC is not located on the Interstate System and will not use Federal funds; should federal funding ever be used on the facility, 23 U.S. Code § 129 shall apply.

2.4.5. Maintenance

Is there a process in place to clearly define assumptions and responsibilities during the operational phase including law enforcement, toll collection, and maintenance?

Maintenance roles, responsibilities, and expectations were defined by 241/91 EC stakeholders in the 2019 Term Sheet and will be further defined in a Maintenance Agreement currently being drafted. Caltrans, under contract to F/ETCA, will be responsible for all roadway maintenance related to the 241/91 EC including pavement and structures. Roadway maintenance will be performed on a reimbursement basis paid from revenue generated by the 241/91 EC. As the operator of the 241/91 EC, F/ETCA will be responsible for maintenance of the toll equipment, payment and enforcement infrastructure, and day-to-day operations of the tolling. F/ETCA will also establish (or amend existing) contracts with CHP for enforcement and with the Freeway Service Patrol for dedicated emergency management services for the 241/91 EC. All repair, maintenance, rehabilitation, and reconstruction costs for improvements constructed as part of this project will be covered using toll revenue from the 241/91 Express Connector. This includes, but is not limited to, structures, any new pavement added on SR-241 and SR-91, signage, traffic safety devices, TMS elements, and other related features with the exception of improvements constructed for the sole purpose and benefit of the general-purpose lanes.

2.5. Financial Feasibility

2.5.1. Funding Plan

Is the funding plan built on a reasonable basis for funding project development and operations? For example, are the assumptions on which the plan is based well defined and reasonable in nature? Are the plan's risk factors identified and dealt with sufficiently? Are the planned sources of funding and financing realistic? Has the applicant demonstrated evidence of its ability to obtain the necessary financing? Does the applicant have the ability to fund shortfalls if revenues do not meet projections?

Toll Revenue Waterfall

F/ETCA understands that, according to SHC 149.7, the revenue generated from the operation of the toll facility shall be available to the sponsoring agency for the direct expenses related to the following:

- A. Debt issued to construct, repair, rehabilitate, or reconstruct any portion of the toll facility, payment of debt service, and satisfaction of other covenants and obligations related to indebtedness of the toll facility.
- B. The development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of the toll facility, including toll collection and enforcement.
- C. Reserves for the purposes specified in subparagraphs (A) and (B).

All remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency.

F/ETCA is committed to managing the 241/91 EC toll revenue in accordance with the requirements of SHC 149.7. The revenue generated by the 241/91 EC shall be available to the F/ETCA for the direct expenses related to scheduled repayment of F/ETCA's loan for the 241/91 EC (item A above), the operating and maintenance costs and the corresponding reserves (items B and C above). Remaining revenue generated by the 241/91 EC (excess revenue) will be used for additional projects and programs

in the corridor from which the revenue was generated and included in an expenditure plan (see Section 2.5.2 for discussion of revenue-eligible corridors). Use of 241/91 EC toll revenue as described in this paragraph (i.e., the toll revenue “waterfall”) and evaluation criteria for projects and programs in corridors considered for use of excess revenue will be developed as part of the expenditure plan by F/ETCA, with input from Caltrans, OCTA, and RCTC, and will be incorporated as part of the F/ETCA Capital Improvement Plan to be adopted annually by the F/ETCA Board of Directors.

241/91 EC toll revenues shall be available to fund all direct costs associated with the debt repayment operation, and maintenance of the 241/91 EC. There is no expectation of use of State funds or liabilities to the State for any project debt, or the operation or maintenance of the 241/91 EC.

Loan and Repayment

Per the 2019 Term Sheet agreed to by F/ETCA, Caltrans, OCTA, and RCTC, any of the parties that contribute funds to the 241/91 EC will receive payback including interest. Through the project development process, it was determined that only F/ETCA will fund the delivery and construction of the Project using a loan from its unrestricted cash reserves. Other than the 241/91 EC, F/ETCA has no existing near-term obligations requiring these funds. However, F/ETCA expects to utilize the repayment of its 241/91 EC contribution to replenish these reserves so that the funds will be available to F/ETCA for uses under its existing legal authority such as early bond principal repayment or future capital projects outside of the 241/91 EC revenue-eligible corridors.

Unlike facilities with traditional third-party loans, the F/ETCA Board of Directors (Board) has discretion on the flexibility of debt repayment terms since it is an internal loan. As such, the F/ETCA Board has the flexibility to forego a portion of the loan repayment to fund a near-term set aside for projects and programs and decrease the outstanding loan balance by an amount equal to the set aside. The intention of this flexibility in the loan repayment is to free toll revenue to provide near-term funding for critical mobility improvements in the revenue-eligible corridors; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). F/ETCA recognizes the 241/91 EC is a critical component of a broader regional network in which mobility improvements of individual components of that network stand to generate wider system operations improvements. The 241/91 EC excess revenues offer an opportunity for investing strategically in improvements throughout the transportation corridors it serves.

A loan amortization schedule example has been developed for the 241/91 EC loan based on current assumptions and forecasting that reflects how debt will be paid and excess revenue for projects and programs will be funded through the term of operations. This schedule example shows the loan to be paid off prior to the end of the Master Agreement term (currently 2067) based on the projected traffic, revenue, and operating requirements. Prior to or upon revenue commencement of the 241/91 EC, an updated loan amortization schedule will be developed that uses the most recent inputs, forecasts, and modeling to confirm that debt can be paid off and if any excess revenues will be available through term.

As the 241/91 EC sponsor and facility operator, F/ETCA is fully responsible for the 241/91 EC costs and, if F/ETCA dissolves prior to the end of the Master Agreement term, all 241/91 EC cost responsibilities will be imposed on a successor agency other than Caltrans. When Caltrans become the operator of the 241/91 EC (either as successor agency or at the end of the term), responsibility to repay any remaining 241/91 EC debt will be released by F/ETCA.

Capital Funding

F/ETCA will fund the delivery and construction of the 241/91 EC using a loan from its unrestricted cash reserves. Table 2-4 reflects project costs that will be repaid from toll revenues from the 241/91 EC.

Table 2-4: Project Cost and Identified Funding Sources

Fund Status	Fund Type	Source	Project Component (\$1000)						Total
			PA&ED	PS&E	ROW Support	CON Support	ROW Capital	CON Capital	
Committed	Local	Private (F/ETCA Cash Reserves)	\$7,991	\$45,340	\$10	\$91,389	\$30	\$371,450	\$516,210

Toll Revenues, Operations, and Maintenance

Table 2-5 outlines the expected average annual revenue, expected average annual operations and maintenance (O&M) cost, expected average annual O&M reserve deposits, and net operating toll revenue, demonstrating that the 241/91 EC is expected to generate enough revenue to cover operations and revenue leakage.

Table 2-5: Estimated Average (2029-2067) Annual Net Operating Toll Revenue (Year of Expenditure Dollars, \$1,000,000)

Operations Summary	Average Annual Total ¹²
Average Annual Revenue ¹³	\$30.7
Average Annual O&M Cost ¹⁴	\$3.7
Average Annual O&M Reserve Deposits ¹⁵	\$3.5
Net Operating Toll Revenue	\$23.5

Administrative expenses related to the operation of the 241/91 EC will not exceed 3 percent of the toll revenues.

2.5.2. Expenditure Plan for Excess Revenues

If an expenditure plan for excess revenues has not yet been adopted by the appropriate governing entity, has the applicant included a discussion of its intentions for revenues collected beyond those necessary for any debt service, operations, and reserved as defined in AB 194?

Per SHC 149.7, all remaining revenue generated by the toll facility shall be used in the corridor from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency. In partnership with OCTA, RCTC, and Caltrans, F/ETCA will coordinate and prioritize the use of all remaining revenue generated by the 241/91 EC in the corridors from which the revenue was generated. The expenditure plan shall be incorporated as part of the F/ETCA Capital Improvement Plan (CIP) and be adopted annually by the F/ETCA Board of Directors. F/ETCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs. Planned expenditures for the identified projects or programs shall be approved through the appropriate planning document for F/ETCA, Caltrans, OCTA or RCTC. Projects within the 91 Corridor will also be included in the 91 Implementation Plan by that project's sponsor.

¹² Average calculated over 38-year analysis period (2029-2067).

¹³ Includes violation revenues and estimated leakage.

¹⁴ Includes toll systems equipment maintenance, including spare parts.

¹⁵ Includes civil infrastructure (roadway, structures, signs, etc.) maintenance

Revenue-Eligible Corridors

As described in Section 1.1 and 2.3, the 241/91 EC is a key connection to the unified ETC and to the interregional freight and commuting corridor of SR-91; the effects of this key connection between tolled facilities extend well beyond the physical project improvement limits and will offer improvements to all users within the high-demand, interregional mobility transportation corridor. Therefore, the use of excess revenue from the 241/91 EC may include investments across the transportation corridors improved by the key connection of the 241/91 EC, including multimodal projects outside of the highway right of way, for projects or programs that maintain or improve the safety, operation, or travel reliability for any transportation mode or provide or improve travel options; all uses of excess revenue within the corridors will be consistent with Streets and Highways Code (SHC) Section 149.7, 23 U.S. Code § 129, and the defined limits as established in the environmental document and supporting technical studies (e.g., Traffic Analysis Report). Evaluation criteria for projects and programs considered for use of excess revenue will be developed by F/ETCA, with input from Caltrans, OCTA, and RCTC, as part of the preparation of the expenditure plan. Revenue-eligible corridors will be defined in accordance with SHC 149.7.

2.6. Regional Transportation Plan & Community Support

2.6.1. Consistency with Existing Plans

Is the project consistent with the regional transportation plan and affected city and county comprehensive plans? If not, does the applicant discuss strategies that may help achieve consistency with such plans when possible or practicable?

The 241/91 EC is consistent with city, county, and regional plans, and is connected to ongoing planning efforts. The 241/91 EC is programmed in the financially constrained portion of the adopted SCAG 2024 RTP/SCS as an Express Lane direct connector. The OCTA 2022 LRTP also identifies the 241/91 EC in the Preferred Plan. In addition, the 241/91 EC is included in the 2023 Federal Transportation Improvement Program (FTIP) Amendment #25-00 as FTIP ID ORA111207 and is programmed for construction in Fiscal Year 2026/2027.

The 241/91 EC is stand-alone and not part of a larger phased project. However, the 241/91 EC is part of the SR-91 Implementation Plan and the State Route 91 Comprehensive Multimodal Corridor Plan (CMCP), each of which includes improvements across Orange and Riverside counties. The CMCP, completed in 2022, is a multi-modal assessment that expands on projects and programs included in the OCTA LRTP. The plan defines characteristics of the corridor including demographics, economic data, disadvantaged and low-income communities, employment, existing facilities, and land uses. The purpose of the plan is to establish current conditions and needs along the corridor and identify a range of improvements. The Plan is intended to provide transportation choices for residents, commuters, and visitors to the area of the corridor. The SR-91 Implementation Plan, in compliance with AB 1010 and Senate Bill 1316, establishes a program of potential improvements to improve operations in the SR-91 corridor. The 241/91 EC has been included in the SR-91 Implementation Plan since the plan's inception in 2003.

In addition to these regional and countywide plans, the CEQA/NEPA Supplemental Final EIR/EIS was completed in early 2020. The EIR/EIS process included preliminary engineering, detailed alternatives, and impact analysis, as well as substantial agency outreach with the local municipalities of Anaheim and Yorba Linda.

The 241/91 EC is consistent with recommendations in State-level planning documents. The 241/91 EC enables "Travelers to opt Out of Congestion" on SR-241 which is consistent with Key Action S1.1 in the State's Climate Action Plan for Infrastructure (CAPTI, July 2021). The 241/91 EC also aligns with California Transportation Plan

(CTP, February 2021) goal 10) “price roadways to improve efficiency of auto travel” by using behavioral pricing policy of dynamic pricing and by improving GP lane conditions for those who choose not to use the priced facilities on SR-91.

2.6.2. Considerations of Impacts

Does the applicant explicitly consider the potential diversions of vehicles onto adjacent routes that could lead to congestion, safety problems, and infrastructure damage due to the imposition of tolls on particular facilities?

The 241/91 EC Final Supplemental EIR/EIS and Traffic Analysis Report considered and evaluated potential impacts related to the diversion of vehicles onto adjacent routes with the 241/91 EC being a tolled facility. The 241/91 EC will be a direct connection to two existing tolled facilities, the SR 241 and the SR 91 Express Lanes. In addition to providing a seamless connection for drivers that choose to use the toll facilities, it is expected that the project will reduce the existing queue experienced on the 241/91 general purpose connector and reduce congestion in the SR 91 GP lanes. The 241/91 EC is expected to decrease overall lane density and therefore improve corridor performance in the GP lanes in the vicinity of the 91 Express Lanes ingress/egress areas. These operational improvements to the transportation corridors are anticipated to reduce diversion from the highway to adjacent routes. The 241/91 EC will redirect a portion of the vehicle volumes from general purpose lanes onto the tolled facilities whose infrastructure maintenance and repair is funded by toll revenue; existing infrastructure will not incur increased damage with the implementation of the project.

241/91 EC operations coordination has been developed among partner agencies to commit to maintaining 91 Express Lanes performance. The Operations Term Sheet outlines the following goals:

- EB: Utilize available EB 91 Express Lanes capacities without negatively impacting its operations beyond established capacity thresholds.
- Dynamic Pricing Algorithm: The algorithm and input values will be developed in partnership between F/ETCA, OCTA, and RCTC based on the operational parameters. OCTA and RCTC shall have final approval for the dynamic pricing algorithms and input values. F/ETCA, OCTA, and RCTC shall work jointly to calibrate the dynamic pricing algorithm and dynamic pricing input values. OCTA and RCTC shall have final approval for changes to the dynamic pricing algorithm and input values.
- Metering: Connector metering shall be developed to facilitate the operation of the 241/91 EC. The 241/91 EC may be metered based on established capacity threshold values due to excessive congestion in the 91 Express Lanes.
- HOV Modes: On-road messaging will display access restrictions for single-occupant vehicles during the highest demand periods to reduce and manage volumes to meet performance metrics in the 91 Express Lanes.
- Bus/Registered Vanpool-Only Mode: On-road messaging will display access restrictions for vehicles except for Bus/Registered Vanpool vehicles during highest demand periods that further reduce volumes to meet performance metrics in the 91 Express Lanes.

Closure of the 241/91 EC will only be allowed for incidents, emergencies, and maintenance and will require approval by Caltrans.

Generally, travel times on EB SR-91 are also expected to improve. This decrease in travel time is due to changes in regional travel patterns which shift NB SR-241 trips from the SR-91 EB GP ramp to the 241/91 EC. This lowers the GP lane demand in the 91 Express Lanes ingress/egress area. Additionally, the 241/91 EC would be able to serve more users in the WB direction of SR-91 and more users along SR-241 SB, which represents an overall improvement in the efficiency of the system. These operational improvements to

the transportation corridors are anticipated to reduce diversion from the highway to adjacent routes. The 241/91 EC will redirect a portion of the vehicle volumes from GP lanes onto the tolled facilities whose infrastructure maintenance and repair is funded by toll revenue; existing infrastructure will not incur increased damage with the implementation of the project.

2.6.3. Fulfilling Policies and Goals

In what ways does the proposed project help achieve performance, safety, mobility, economic, or transportation demand management goals?

The 241/91 EC will achieve significant performance, mobility, economic, and transportation management improvements and reduce vehicle conflicts. The 241/91 EC will strengthen a critical link in the regional transportation system by increasing throughput and velocity. These outputs help to reduce strain on the road systems and improve their longevity. The encouraged use of toll facilities will generate revenue to further improve transportation facilities and multimodal options. Alternative modes of transportation help distribute passenger loading and support sustainable infrastructure. The Final Supplemental EIR/EIS and Traffic Analysis Report thoroughly evaluated the performance of the 241/91 EC compared to existing conditions and horizon year conditions without the project improvements, separating out anticipated effects by year, direction, and time of day. See Section 2.3 for a more detailed description of how anticipated impacts fulfil policy goals.

2.6.4. Environmental Considerations

Is the proposed project consistent with applicable state and federal environmental statutes and regulations? Does the proposal adequately address or improve air quality and other environmental concerns?

The 241/91 EC is consistent with applicable state and federal environmental statutes and regulations. The 241/91 EC is included in the 2024 SCAG RTP/SCS financially constrained list of projects and thereby meets the requirements for regional air quality conformity. The environmental process of the 241/91 EC was completed in January 2020 with Caltrans approval of the joint CEQA/NEPA Final Supplemental EIR/EIS, which identified potential environmental impacts associated with the 241/91 EC project improvements. The Final Supplemental EIR/EIS established all the mitigations to be implemented in response to significant environmental impacts of the 241/91 EC project improvements identified during the CEQA/NEPA process. A copy of the Final Supplemental EIR/EIS is attached to this application. By letter dated May 3, 2017, FHWA has agreed that the 241/91 EC meets project level conformity and localized Particulate Matter 2.5 and Particulate Matter 10 requirements. Additionally, the 241/91 EC is included in Amendment #25-00 to the 2025 FTIP, which was found to be conforming by the FHWA/Federal Transit Administration (FTA) on December 16, 2024.

Based on the data presented in the Final Supplemental EIR/EIS, the 241/91 EC is expected to contribute to a nearly 19 percent decrease in CO₂ emissions in the horizon year, compared to existing conditions (Table 2-6). This is possible due to the decrease in average delay and increased average speed, contributing to more fuel-efficient traffic operations and improved system efficiency, which would result in fewer emissions. This reduction from existing levels demonstrates progress toward meeting statewide greenhouse gas (GHG) reduction goals.

Table 2-6: Modeled Regional GHG Emissions

Year and Condition	CO ₂ Emissions (metric tons/year)	CH ₄ Emissions (metric tons/year)	CO _{2e} Emissions (metric tons/year)	Percent Reduction from Existing CO _{2e} Emissions
2013 Existing Conditions	1,444,221	43	1,445,287	-
2040 With Project	1,176,806	33	1,177,627	-18.53%

Source: EMFAC (2014) emissions compiled by LSA Associates, Inc. (2017).

2.6.5. Community and Stakeholder Support

What is the extent of support or opposition for the project? Does the project proposal demonstrate an understanding of the national and regional transportation issues and needs, as well as the impacts this project may have on those needs? Is there a demonstrated ability to work with the affected communities?

Agency consultation and public participation for this project has been accomplished through a variety of formal and informal methods, including PDT meetings, interagency coordination/consultation meetings, and public announcements. A PDT was identified during the PSR/PDS phase in January 2011 to ensure collaborative communication among the stakeholders, including representatives from Caltrans, F/ETCA, OCTA, and RCTC. With the completion of the PSR/PDS phase in January 2012 and initiation of the PA/ED phase in February 2013, the PDT conducted monthly meetings to discuss project-specific issues and work together to ensure that the Proposed Project meets the Purpose and Need.

A 30-day scoping period was initiated for the Final Supplemental EIR/EIS on March 13, 2015, and ended on April 13, 2015. A public notice, Notice of Preparation (NOP) and Notice of Intent (NOI), was prepared and distributed to federal, state, regional, county, and local agencies; elected officials; special districts; groups and organizations; and businesses and property owners within 0.25 miles of the project footprint in order to inform the public of the preparation of the Final Supplemental EIR/EIS. Ten written comment letters were received on the NOP and NOI from federal, state, regional, and local agencies. No comment letters were received from the public and no comments were received requesting a Public Information Meeting.

The Draft Supplemental EIR/EIS was circulated for public review and comment between November 7, 2016, and January 9, 2017. An Open House Public Hearing was held on November 29, 2016. English and Spanish public notices were posted in newspapers on November 7 and November 21, 2016. The English and Spanish published notices were also mailed to the distribution list of the Draft Supplemental EIR/EIS, as well as to property owners and occupants of all addresses within a 0.25-mile radius of the project limits. Most of the comments received at the Public Hearing expressed support for the 241/91 EC and urged the timely completion of the 241/91 EC.

In fall 2019, a Term Sheet was developed and adopted by the governing boards of F/ETCA, OCTA, and RCTC, and supported by Caltrans District 12, solidifying the partnership between the four agencies (including Caltrans), and providing terms for project delivery, funding, construction, maintenance, and operation for the 241/91 EC. Caltrans also provided a support letter for the Term Sheet subsequent to the Board adoptions. Caltrans approved the Final Supplemental EIR/EIS in January 2020, completing the project environmental process. In addition, a Caltrans Project Report (PR) was approved for the 241/91 EC in February 2020.

The PDT will continue to convene and meet with stakeholders to receive input and resolve issues through the design and construction phases of the 241/91 EC project improvements. The PDT will deliver regular

241/91 EC project improvements updates at public Board and Committee meetings to keep the community informed, engaged, and to provide an accessible platform for input. The project website will also be kept current to give community members opportunities to learn about project details and its progress, as well as submit feedback.

F/ETCA is committed to communicating with stakeholders, particularly the public, throughout the construction phase of the project. A public communications team will be procured by F/ETCA to interact with stakeholders and the public prior to and through the construction phase to educate and inform the public regarding construction activities and operational characteristics of the facility upon completion.

2.7. Supplementary Topics

This section provides supplementary information not specifically requested in the Commission's "Guidelines for Toll Facility Applications." Additional items in this section provide the Commission with a more robust understanding of the Project.

2.7.1. Commission Annual Report to the Legislature

See Section 2.1, Item 6 for information on F/ETCA's commitment to providing information or data requested by the Commission or Legislative Analyst.

2.7.2. Performance Assessment

F/ETCA, in coordination with OCTA and RCTC, will define and monitor the 241/91 EC performance measures in a comprehensive manner consistent with regional and state requirements. The performance measures will provide criteria for evaluating the 241/91 EC and the effects of pricing, eligibility, and congestion management.

Performance measures currently collected for other similar express lanes include:

- Number of trips
- Trip types
- Traffic speeds
- Tolls generated
- Trip length and distribution
- CHP enforcement activity

2.7.3. Procurement Approach

The 241/91 EC civil infrastructure construction will follow the traditional design-bid-build model. Final design is anticipated to be completed in 2025. The construction contract will be advertised, awarded, and administered (AAA) by Caltrans. Construction advertisement is anticipated in late-2025/early 2026.

The 241/91 EC roadside toll systems equipment installation and modification will be performed by the existing toll systems providers (TSPs) for F/ETCA, OCTA, and RCTC. The new 241/91 EC toll point will be added to F/ETCA's existing system for back office and customer service functions.

F/ETCA, OCTA, and RCTC are currently discussing how to utilize the existing OCTA-RCTC 91 Express Lanes joint agreement for incident monitoring and management and Freeway Service Patrol (FSP) located at the 91 Express Lanes Traffic Operations Center (TOC) in Anaheim, CA.

2.7.4. Cost Estimates

Is the estimated cost of the facility reasonable in relation to the cost of similar projects?

While median-to-median connectors are common, the 241/91 EC mix of improvements and existing conditions are unique – connection between a toll road and express lanes in a location where three tolling agencies and two Caltrans Districts converge. There are no directly analogous projects to which costs could be effectively compared. The 241/91 EC cost estimate has been updated through the project delivery process using the most recent and relevant construction cost data. All parties agree that the 241/91 EC is reasonable and deliverable.

The closest comparison available is the recently completed 15/91 Express Lanes Connector (ELC) delivered by RCTC for \$270 million. Similar to the 241/91 EC, the 15/91 ELC project connects existing express lanes facilities and is part of a phased ultimate system build out. The current cost comparison of major project expenditures are shown in Table 2-7.

Table 2-7: Project Cost Comparison

	241/91 EC	15/91 EC
PE	\$53,331	\$19,000
ROW	\$40	\$10,000
CON	\$462,839	\$241,000
Total	\$516,210	\$270,000

**amounts in \$1,000's*

When the 241/91 EC project restarted in 2020 the project costs was estimated at \$250 million. As the 241/91 project progressed through final engineering and operations development new project elements have been added, scope increased, and construction costs have dramatically risen at historic rates. Consequently, the engineer's estimate for construction of the 241/91 EC has doubled since the project re-start in 2020. Additional complexity related to engineering, design, and administrative items has resulted in a higher cost of the 241/91 EC when compared to the 15/91 ELC, which, includes the following:

- Additional scope and larger project area than the 15/91 EC
- Increased costs of engineering and design to incorporate new design standards and
- Additional consultant contract rates upon restarting the project after the 2019 Term Sheet agreement,
- Two environmental revalidation efforts with two different Caltrans District offices,
- Three separate toll systems providers contracts required during construction at this confluence of three toll systems,
- Significant toll systems design effort to implement the innovative progressive demand management strategies,
- Separate construction management contract administration for the civil construction (by Caltrans) and toll systems installation (by F/ETCA),
- Legal support for complex and protracted drafting and review of project-related agreements.

Also, the 15/91 ELC project had cost-saving elements that are not available to the 241/91 EC project, including connecting express lanes facilities that are owned and operated by the same entity in a single county, coordinating reviews and approvals within a single Caltrans District office, and delivering using design-build contracting.

2.7.5. Equity

F/ETCA recognizes that equity is a guiding principle in the development and operation of transportation infrastructure in the State with the goal to be inclusive and beneficial to all communities, particularly underserved and disadvantaged communities.

The current 241/91 EC already addresses several key equity considerations. These include:

- Measures to improve traffic flow and reduce congestion, which will benefit all commuters by providing faster and more reliable access to job centers and provide this benefit for free to buses and registered vanpool modes. F/ETCA will also adopt a discount policy in which HOV 3+ will be able to use the 241/91 EC for free during off-peak periods.
- Public and stakeholder engagement efforts to date have sought input from a diverse array of stakeholders as part of the environmental process, regular opportunity for comment at recent project-related public meetings, and neighborhood meetings requested by TCA member cities, such as the City of Anaheim. In addition to 241/91 EC information posted on The Toll Roads website, TCA's community engagement staff provides a 241/91 EC fact sheet at each public event it participates in throughout the year. In 2024, TCA had a booth at 47 events, with a total attendance of 240,000 people from various areas throughout the Southern California region.
- Flexible payment options include unbanked solutions like PayNearMe to ensure users can replenish FasTrak® accounts and resolve violations regardless of banking status.
- Additionally, one of the reasons F/ETCA is pursuing supplemental tolling authority is to expand opportunities to use excess net toll revenue for projects and programs that would further improve conditions beyond the current ETC system to benefit the wider transportation system that is affected by the 241/91 EC connection.

F/ETCA is committed to working with the CTC and partner agencies to confirm that the 241/91 EC is meeting equity considerations and will make adjustments as necessary, prior to and during operations.

3. SUPPLEMENTAL INFORMATION

- 3.1. Term Sheet and Caltrans Support Letter (2019)**
- 3.2. Project Study Report / Project Development Support (PSR/PDS) (2012)**
- 3.3. Executed Project Cooperative Agreements (Caltrans) – PA/ED (2014),
PS&E and Right of Way (2017)**
- 3.4. Summary of Final Supplemental Environmental Impact
Report/Environmental Impact Statement (2020)**
- 3.5. 241/91 Express Lanes Connector Traffic Analysis Report (2015)**
- 3.6. Letter of Consent (OCTA) (anticipated September 2025)**



SR-241 / 91 Express Connector Term Sheet

Program of Projects

- 91 Corridor program of projects and sequencing¹
 - 15/91 EB/NB Express Lanes Connector (ELC)
 - SR-91 WB Corridor Operations Project (COP)
 - SR-91/SR-71 EB/NB Connector²
 - SR-241/91 Express Connector (EC)
- All parties agree to work together to resolve geometric and operations issues between 91 COP, SR-241 / 91 EC, and future 6th Lane with the mutual goal of minimizing cost, scope, schedule and construction impacts to all projects.
 - The SR-91 COP schedule will not be delayed.

Project Approval / Environmental Documentation (PA/ED)

- TCA to deliver the SR-241/91 EC PA/ED. TCA and Caltrans will update the environmental document with consideration of the comments received.
- Caltrans shall not finalize / approve PA/ED until RCTC and OCTA have had a 30-day opportunity to review response to comments. Caltrans shall not sign the Notice of Determination or Record of Decision any sooner than January 2, 2020.
- OCTA to process the Federal Transportation Improvement Program (FTIP) amendment for SR-241/91 EC for Right-of-Way (ROW) and Construction phases immediately following RCTC and OCTA having had a 30-day opportunity to review response to comments.

Project Delivery

- TCA to complete final design of SR-241/91 EC with Caltrans oversight.
- Caltrans has final design approval of SR-241/91 EC.

¹ See Appendix A for SR-91 Projects Sequencing Priorities dated September 12, 2019.

² SR-241/91 EC is not dependent upon completion of SR-71/SR-91 Interchange Improvements.

- TCA will provide OCTA and RCTC ample opportunity to review and concur with all aspects of the final design. OCTA and RCTC shall focus on the interface of the SR-241/91 EC with the existing 91 Express Lanes facility and agreed upon projects in the attached SR-91 Projects Sequencing Priorities.
 - Caltrans and TCA shall consider all reasonable comments and requests from OCTA and RCTC, and OCTA and RCTC comments and requests to Caltrans and TCA shall be fair and reasonable.
- Caltrans District 12 to Advertise, Award, Administer (AAA) construction phase.

SR-241/91 EC Capital and Support Funding

- TCA to fund 100% of Plan, Specification and Estimate (PS&E), ROW, and Construction including tolling infrastructure.
- Project will not be financed.
- OCTA, RCTC, TCA and Caltrans to seek eligible funds from external discretionary and/or competitive non-TCA funds (i.e. SB1).
 - TCA funds to be reduced by receipt of any external discretionary and/or competitive non-TCA funds.
 - Attempts to seek external discretionary and/or competitive non-TCA funds would not delay the project.

Roadway Maintenance Responsibility

- Caltrans to be responsible for performing maintenance of all improvements constructed as part of SR-241/91 EC (roadway, structures, etc.).
- Maintenance requirements to be funded from SR-241/91 EC toll revenues.

Toll Revenues

- Parties to receive toll revenue from SR-241/91 EC equal to percentage of capital and support funding provided (e.g., 100% of capital and support funding = 100% EC toll revenue, 80% of capital and support funding = 80% EC toll revenue).
- Term of tolling shall be consistent with latest sunset date for existing 91 Express Lanes, TCA agreements or any subsequent amendments in the future.
- 91 Express Lanes to be paid/reimbursed for any 91 Express Lanes operating cost or maintenance cost incurred, if any.
- Use of toll revenues shall be consistent with AB 194, modified as follows:
 - A. Repayment of funds with interest, excluding external discretionary funds, used to construct the SR-241/91 EC. Interest rate will be based upon the Surplus

Money Investment Fund rate as defined in the California Streets and Highway Code.

- B. The development, maintenance, repair, rehabilitation, improvement, reconstruction, administration, and operation of improvements constructed as part of SR-241/91 EC, including toll collection and enforcement.
- C. Reserves for the purposes specified in subparagraph (B).
- D. All remaining revenue generated by the toll facility shall be used in the corridors from which the revenue was generated pursuant to an expenditure plan developed by the sponsoring agency.
- E. The expenditure plan shall be incorporated as part of the TCA Capital Improvement Plan (CIP) and be adopted annually by the TCA Board of Directors. TCA shall submit the CIP to OCTA for consistency review with the Regional Transportation Plan and related programs.
- F. The administrative expenses related to operation of SR-241/91 EC facility shall not exceed 3 percent of the toll revenues.

241 / 91 EC Operations

- OCTA/RCTC to operate the SR-241/91 EC including calculating and posting dynamic pricing, traffic/incident monitoring via CCTV in the Traffic Operations Center, management of SR-241/91 EC closures, dispatch of CHP and tow trucks for incidents, creation and processing of toll transactions, revenue collection, violation processing, etc.
- Additional operations terms will be included in an operations term sheet and will also be memorialized in a future operating agreement between TCA, OCTA, and RCTC.

APPENDIX A

SR 91 PROJECTS SEQUENCING PRIORITIES

1. 15/91 Express Lanes Connector

- Design-Build Request for Proposals (RFP) Due – November 2019
- Design-Build Contract – March 2020
- Design-Build Notice to Proceed – Spring 2020
- Open to Traffic – End of 2022

2. SR-91 Corridor Operations Project

- PA/ED – October 2019
- Construction Advertisement – March 2020
- Open to Traffic – End of 2021

3. SR-71/SR-91 Interchange Improvements

- Environmental Document and Re-evaluation – Completed
- Ready to List Target – 2021 Design update needed due to new structures standards
- Open to Traffic – Early 2023

3. SR-241 / SR-91 Express Connector

- PA/ED – November 2019
- Construction – Notice to Proceed for construction in early 2023, or sooner if mutually agreed to based on a technical review of construction staging, traffic handling / lane closure for SR-241/91 EC and 15/91 ELC. This effort will not impact the delivery of the 15/91 ELC which is the priority.

Related Project Responsibilities

- Caltrans District 8 to be the lead Caltrans district for all RCTC-led projects.
 - District 12 coordinates through District 8 on all issues related to Geometric Approval Drawings (GAD), operations, etc.
- Caltrans District 12 to be lead Caltrans district for all OCTA-led and TCA-led projects.
 - District 8 coordinates through District 12 on all issues related to GAD, operations, etc.

Other Items

- Team will continue to work together to evaluate the Westbound Third Express Lane and if determined to be necessary, implementation will be jointly developed.
- SR-71/SR-91 Interchange Improvements and SR-241/91 EC are not contingent upon each other. Specifically, completion of the SR-71/SR-91 Interchange Improvements are not required prior to the SR-241/ 91 EC going to construction.
- 6th General Purpose Lane Addition (SR-241 to SR-71)
 - Team would work together to investigate the feasibility of the addition, including the potential of an interim option.

DEPARTMENT OF TRANSPORTATION

District 8 and 12
PHONE (657) 328-6000
FAX (657) 328-6522
TTY 711



*Making Conservation
a California Way of Life.*

September 26, 2019

Mr. Darrell Johnson, Chief Executive Officer
Orange County Transportation Authority
550 South Main Street
Orange, CA 92863

Mr. Michael A. Kraman, Chief Executive Officer
Transportation Corridor Agencies
125 Pacifica, Suite 100
Irvine, CA 92618

Ms. Anne Mayer, Executive Director
Riverside County Transportation Commission
P.O. Box 12008
Riverside, CA 92502

Dear Mr. Johnson, Mr. Kraman, and Ms. Mayer:

The California Department of Transportation (Caltrans), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC) and Transportation Corridor Agencies (TCA), have collaborated on drafting a term sheet for the SR-241/91 Express Connector project and other State Route 91 project sequencing of near-term projects, with the mutual goal of minimizing cost, scope, schedule and construction impacts to all projects.

Caltrans Districts 8 and 12 agree with and support the items included in the term sheet, dated September 12, 2019.

Caltrans looks forward to continuing to partner and collaborate with OCTA, RCTC, and TCA in efficiently implementing these crucial projects on State Route 241 and 91.

If you have any questions or concerns, please contact me at (657) 328-6000, Director Beauchamp at (909)-383-6914, or Adnan Maiah, Deputy District Director, District 12 Capital Outlay Program, at (657) 328-6307 or by e-mail sent to <adnan_maiah@dot.ca.gov>

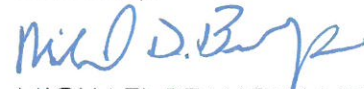
Mr. Kraman, Mr. Johnson, and Ms. Mayer
September 26, 2019
Page 2

Sincerely,



RYAN CHAMBERLAIN
District 12 Director

Sincerely,



MICHAEL BEAUCHAMP
District 8 Director

Enclosures

c: Jim Beil, OCTA
David Thomas, RCTC
Adnan Maiah, Caltrans
Syed Raza, Caltrans
Roger Yoh, Caltrans

241 / 91 Express Connector

Operations Term Sheet

October 4, 2019

All agencies to provide input to the design of signage, traffic measurement/monitoring locations and considerations for toll collection system data. OCTA and RCTC to have final approval for the traffic measurement/monitoring locations.

241 / 91 EC to be dynamically priced with no price cap.

Traffic utilizing the 241 / 91 EC eastbound shall be required to continue using the 91 Express Lanes all the way to I-15 unless otherwise directed by OCTA/RCTC in consultation with Caltrans. The agencies will jointly develop the technical mechanisms to ensure vehicles stay in the 91 Express Lanes to the eastern terminus. Pricing may be used as a mechanism.

241 / 91 EC dynamic pricing operational parameters to be negotiated and memorialized in an operating agreement between TCA, OCTA, RCTC.

- Operational parameters shall be based on existing operating policies where they exist. 91 Express Lanes operating policies shall govern where there is a conflict with other agencies operating policies.
- Eastbound – Goal is to utilize available EB 91 Express Lanes capacities without negatively impacting its operations beyond established capacity thresholds.

The dynamic pricing algorithm and input values to be developed in partnership between TCA, OCTA, and RCTC based on the operational parameters.

- OCTA and RCTC shall have final approval for the dynamic pricing algorithms and input values.

TCA, OCTA, and RCTC shall work jointly to calibrate the dynamic pricing algorithm and dynamic pricing input values. OCTA and RCTC shall have final approval for changes to the dynamic pricing algorithm and dynamic pricing input values. TCA may request changes to the dynamic pricing algorithm and input values. OCTA and RCTC shall reasonably assess a request and respond to the TCA timely.

241 / 91 Express Connector Operations Term Sheet October 4, 2019

A 241 / 91 EC operational and performance data report shall be published monthly. If desired, Parties shall be provided access to an operational performance data portal.

OCTA and RCTC shall present a Quarterly Operational and Performance Report to the Foothill / Eastern Transportation Corridor Agency Board of Directors.

OCTA and RCTC shall have control of all of the dynamic pricing systems.

Separate FSP-type services and CHP required for the 241 / 91 EC

Ramp metering and physical closure capabilities shall be developed to facilitate operation of the 241 / 91 EC.

- The 241 / 91 EC may be metered based on established capacity threshold values due to excessive congestion in the 91 Express Lanes.
- The 241 / 91 EC can be closed to traffic at the request of Caltrans, OCTA, RCTC or TCA due to:
 - Planned or unplanned closures of the 91 Express Lanes or SB 241;
 - Incidents and emergency situations; or
 - Excessive congestion.

All agencies agree to develop an interfacility incident management plan.

12-ORA-241-PM36.10/91-PM14.7-PM17.9

EA 0K970K

Project ID: 1200020097

January 2012

**PROJECT STUDY REPORT –
PROJECT DEVELOPMENT STUDY
(PSR-PDS)**

TO

**Request Programming for
Capital Support
(Project Approval and Environmental Document Phase)**

On Route SR-241 and SR-91

Between SR-241 Windy Ridge Toll Plaza

And SR-91/Coal Canyon Road

APPROVAL RECOMMENDED:



Lisa Ramsey, PE

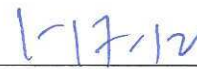
Project Manager

AM APPROVED:



Cindy Quon, PE

District Director



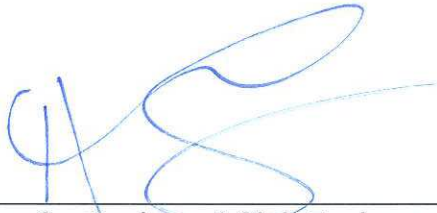
Date

January 2012

A black and white map of Orange County, California, illustrating the project location. The map shows major highways including SR 91, SR 5, SR 22, SR 55, SR 261, SR 405, SR 133, SR 241, and SR 74. Key cities and towns labeled are Seal Beach, Huntington Beach, Costa Mesa, Newport Beach, Laguna Beach, Laguna Niguel, San Juan Capistrano, San Clemente, Dana Point, Mission Viejo, Yorba Linda, Anaheim, Orange, Tustin, and Santa Ana. The Pacific Ocean is to the west. The project location is marked with a black dot near Yorba Linda, with the text "PROJECT LOCATION" in bold. A north arrow is located in the bottom right corner.

And SR-91/Coal Canyon Road

This Project Study Report (PDS) has been prepared under the direction of the following Registered Engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.



Alan Su, Registered Civil Engineer

1/5/12

Date

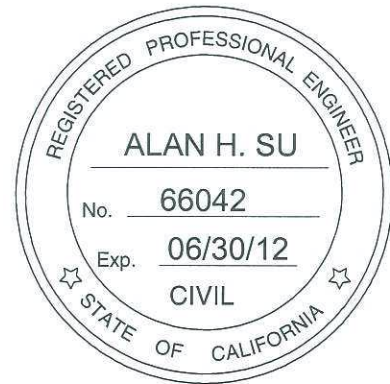


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1. INTRODUCTION

The Foothill/Eastern Transportation Corridor Agency (F/ETCA) proposes to construct a new median to median connector ramp from State Route 241 (SR-241) to State Route 91 (SR-91) in the City of Anaheim. The proposed connector ramp would provide additional access to SR-91 east of SR-241. The proposed median to median ramp that will connect SR-241 and the SR-91 Express Lanes, which are tolled facilities, is also proposed to be a tolled facility.

Six alternative ramp connection concepts have been considered in addition to the “no-build” alternative. Alternative 1 is the recommended alternative as it best meets the purpose and need of the project. Alternatives 2 through 6 were rejected as described in Section 6 – Alternatives.

The Project Development Category is 4B as it will not require right of way and will not substantially increase traffic capacity.

Project Limits Dist., Co., Rte., PM	12-ORA-241-36.10/91-17.95
Number of Alternatives:	1 build and no-build (five rejected)
Capital Outlay Support for PA/ED	\$2 million
Capital Construction Cost Range (excluding “no build”).	\$135 million to \$150 million
Right of Way Cost Range (excluding “no build”).	\$0
Funding Source:	Local and Possible Federal Funding
Type of Facility (conventional, expressway, freeway):	Freeway
Number of Structures:	Four
Anticipated Environmental Determination of Document:	Revalidation/Re-evaluation and Addendum to previously approved EIS/EIR
Legal Description	Anaheim, Orange County, CA
Project Category	4B

The remaining support, right of way and construction components of the project are preliminary estimates and are not suitable for programming purposes. A Project Report will serve as the programming document for the remaining support and capital components of the project. A Project Report will serve as approval of the selected alternative.

2. BACKGROUND

SR-241 is a toll-only facility, starting at the Oso Parkway interchange in south Orange County, to its terminus at State Route 91 (SR-91). The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from State Route 55 (SR-55) to the Orange/Riverside County line (east of the SR-241 interchange). SR-91 and SR-241 are publicly owned facilities. Currently, there is no connection between the SR-241 toll lanes and the SR-91 Express Lanes.

In March 2009, the 91 Express Lanes Extension and State Route 241 Connector Feasibility Study was prepared with the following objectives:

- Develop and evaluate concepts for a median-to-median connection between State Route 241 (SR-241) and the 91 Express Lanes;
- Identify where to drop and start the added lanes merging to and from SR-241; and
- Propose how an extension of the new median-to-median connection could be integrated into planned freeway improvements in Orange County and Riverside County.

The study activities included a review of current plans and programs, identification of issues, development of a range of project alternative concepts, and conducting conceptual engineering and evaluation of six alternative concepts (ACs). The evaluation included environmental, traffic, geotechnical, right-of-way, utilities and consideration. Financial feasibility was not considered as a part of that study, however, toll revenue impacts were considered in a parallel study and summarized in the conclusion of the feasibility study.

Stakeholders that were identified and included preparation of the Feasibility Study included:

- Orange County Transportation Authority (OCTA)
- Caltrans District 8 and District 12
- Riverside County Transportation Commission (RCTC)
- F/ETCA
- City of Anaheim
- City of Corona

3. PURPOSE AND NEED STATEMENT

NEED:

The need for the project arises from the lack of connectivity between SR-241 and SR-91 Express Lanes, which results in a variety of deficiencies that negatively affect traffic flow and worsen an already congested SR-91 during peak hours. These deficiencies are described below.

- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes. Northbound vehicles PM peak period on SR-241 backup prior to entering eastbound SR-91 mainline. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two-lane connector that merges with the SR-91 general-purpose lanes.
- Northbound SR-241 motorists that want to use the eastbound SR-91 high-occupancy vehicle (HOV) lanes must weave across four lanes to access them.
- Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 to southbound SR-241 is provided by means of a two-lane connector that diverges from the general-purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 high-occupancy vehicle (HOV) lane weave across four lanes to access the southbound SR-241 connector ramp.

PURPOSE:

The purpose of the Project is to implement the buildout of the ETC as approved in 1994, be compatible with the proposed SR-91 Corridor Improvement Project (CIP), while minimizing

environmental and financial impacts. The study area includes the SR-241 from the SR-91/SR-241 interchange to 12,600 feet south of the interchange and SR-91 from the SR-91/SR-241 interchange to the Coal Canyon/SR-91 Undercrossing.

The median to median connector (Project) was previously evaluated in the ETC Final EIR/EIS. As stated in the Final EIR/EIS, the overall objective of the proposed ETC project was to accommodate traffic growth associated with planned and approved development in Orange County. Specifically, the ETC project was proposed to meet the following objectives:

- To provide relief for existing freeways.
- To help achieve the Regional Mobility Plan goals of reducing emissions from transportation sources.
- To improve traffic flow on the regional transportation system.
- To reduce current and projected congestion and air pollution along portions of SR-91, Costa Mesa Freeway (SR-55) and I-5 by providing an alternative travel route in northeast Orange County.
- To service existing and planned development consistent with the General Plans of the County and the cities in areas that will benefit from the project.
- To employ advanced transportation technology for the maximum operational and design efficiency and automatic vehicle monitoring for toll collections.
- To implement the County of Orange Master Plan of Arterial Highways.

4. DEFICIENCIES

Currently, northbound SR-241 vehicles cannot access the eastbound SR-91 Express Lanes. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two lane connector that merges with the SR-91 general purpose lanes. Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 is provided by means of a two lane connector that diverges from the general purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 HOV lane weave across four lanes to access the southbound SR-241 connector ramp. Northbound SR-241 vehicles that want to use the eastbound SR-91 HOV lanes must weave across four lanes to access them. The existing deficiency that results from the lack of a median connector between the two freeway facilities will be exacerbated with the construction of the SR-91 CIP which proposes to extend the existing Express SR-91 Lanes to I-15.

Hourly Speed Trends

Weekday speed data were extracted from PeMS at specific locations along SR-91 and SR-241. Tables 4-1 and 4-2 are lists of the locations reported.

Table 4-1

Speed Data Locations on SR-91

No.	EB Locations	WB Locations
1	West of Gypsum Canyon	West of Coal Canyon
2	Gypsum Canyon 1 (before SB on-ramp)	East of Gypsum Canyon
3	Gypsum Canyon 2 (before NB on-ramp)	Gypsum Canyon (before Gypsum on-ramp)
4	East of Gypsum Canyon (0.44 miles from Gypsum 2)	West of Gypsum Canyon

Table 4-2

Speed Data Locations on SR-241

Approach	Location
NB SR-241	500 ft South of NB 241 to EB 91 off-ramp
SB SR-241	1800 ft South of EB 91 to SB 241 on-ramp

Hourly speed trends are shown in Figures 4-3, 4-4 and 4-5 for eastbound SR-91, westbound SR-91, and SR-241. The figures illustrate significant reductions in the eastbound SR-91 speeds and northbound SR-241 speeds in the vicinity of the SR-241/SR-91 interchange that occur in the evening peak hour period between 3:00 pm and 6:00 pm. The significant speed reductions are consistent with the weaving volumes and congestion in the interchange area.

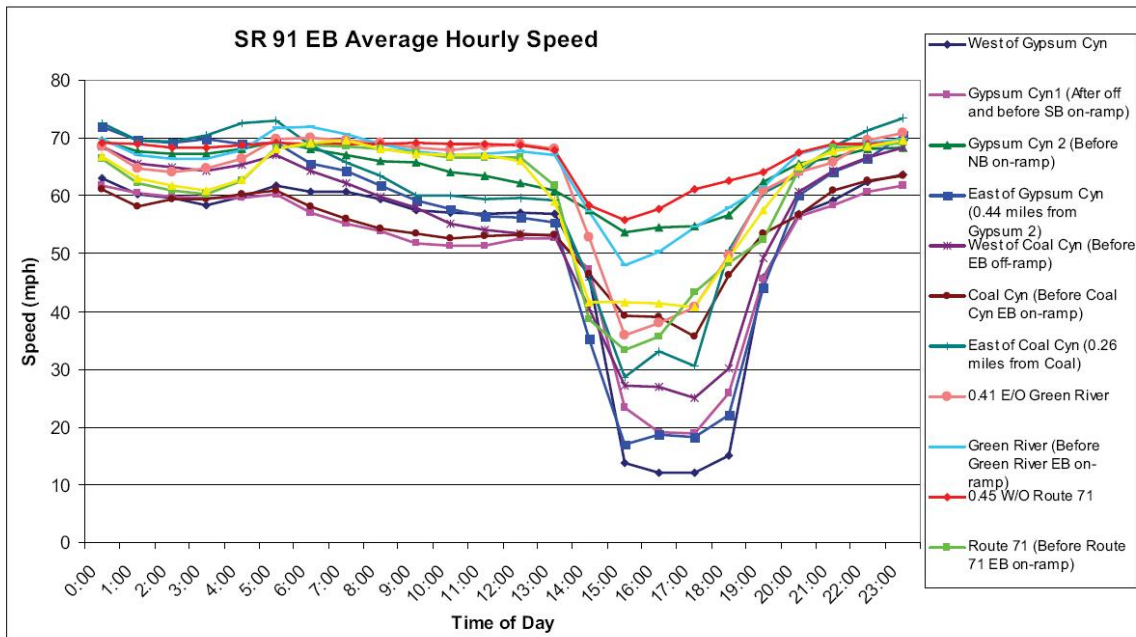
Figure 4-3

Figure 4-4

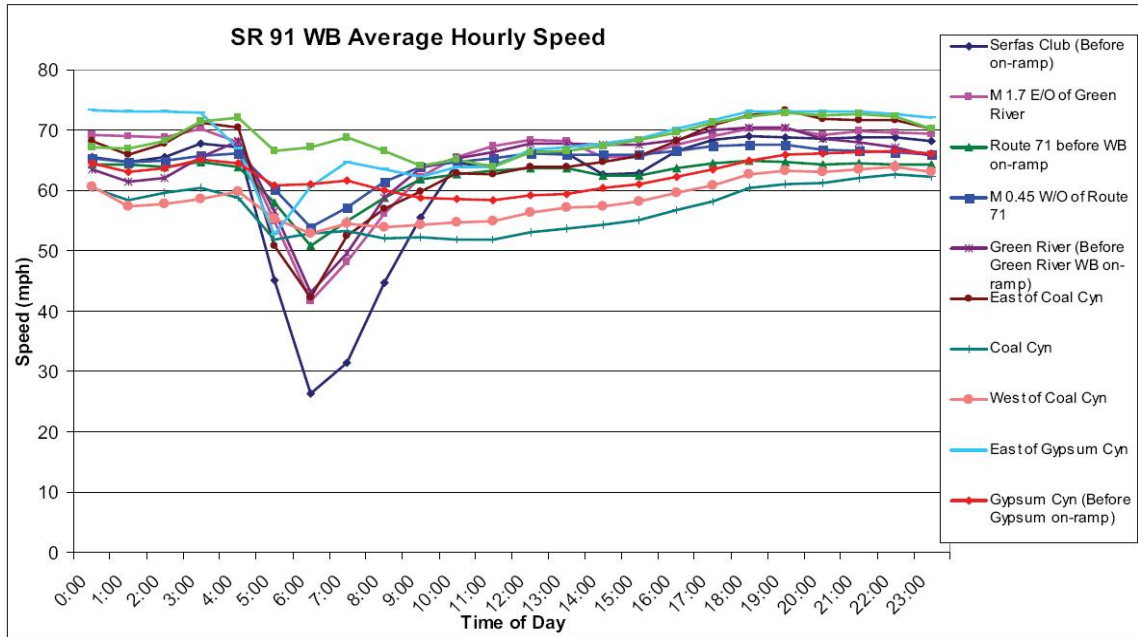
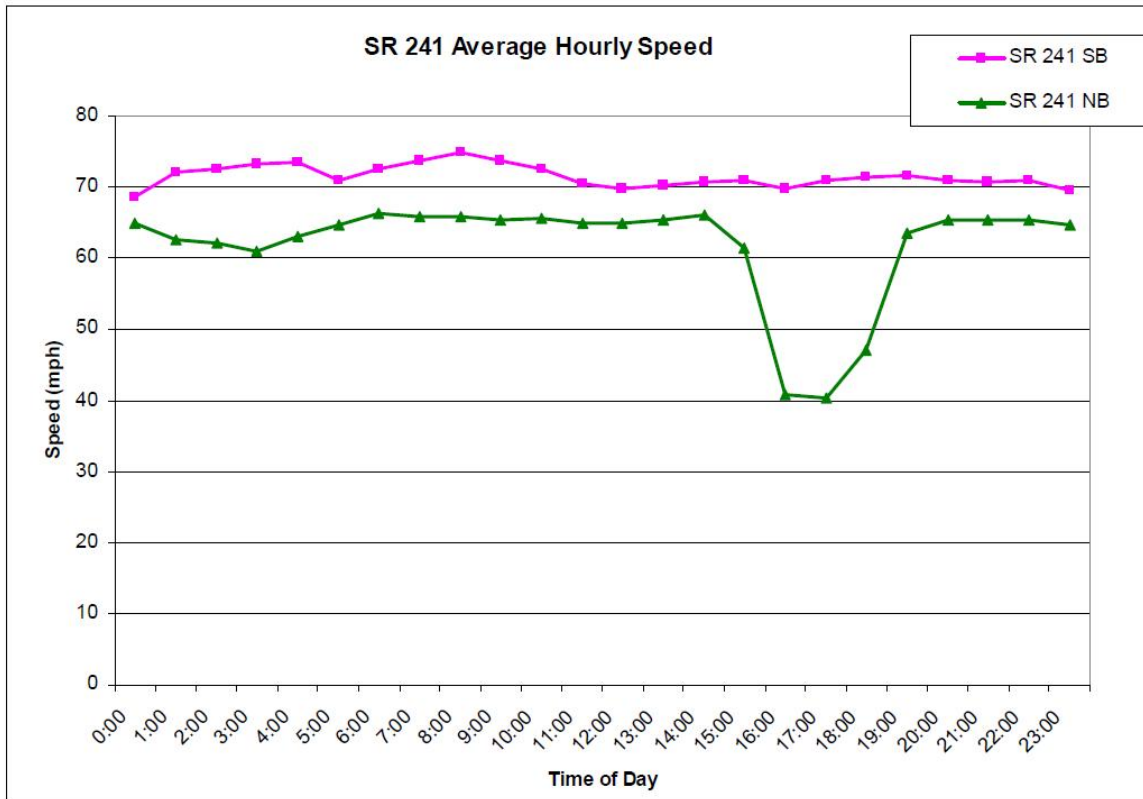


Figure 4-5



Accident Analysis

Caltrans provided Traffic Accident surveillance and Analysis System (TASAS) accident data for SR-241 and SR-91 mainline and ramps for the period of July 1, 2003 through June 30, 2006. Table 4-6 is a summary of the accident data for the mainline. The locations where the actual accident rates are higher than the state average rate are highlighted. The rates are particularly high in the eastbound and westbound sections of SR-91 immediately east of SR-241. These higher accident rates are consistent with the weaving volumes and congestion in these sections.

Table 4-6

TASAS Data on Mainline SR-91 and SR-241

Route	PM	Location	Total	Actual Rates			Average Rates		
				Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
SR-241	32.640/ 39.078	SR-241 Southbound	44	0.012	0.11	0.27	0.005	0.18	0.54
SR-241	32.640/ 39.078	SR-241 Northbound	83	0.012	0.11	0.52	0.005	0.18	0.54
SR-91	14.430/ 15.140	SR-91 Eastbound (Weir Canyon to SR-241) – 0.71 miles	235	0.000	0.66	2.26	0.004	0.26	0.84
SR-91	15.164/ 18.904	SR-91 Eastbound (SR-241-County line) – 3.74 miles	643	0.006	0.37	1.34	0.006	0.39	1.23
SR-91	0.000/ 7.450	SR-91 Eastbound (County line to I-15) – 7.45 miles	1283	0.004	0.33	1.21	0.006	0.37	1.15
SR-91	7.450/ 0.000	SR-91 Westbound (I-15 to County line) – 7.45 miles	1486	0.005	0.40	1.38	0.006	0.37	1.15
SR-91	18.904/ 15.164	SR-91 Westbound (County line – SR-241) – 3.74 miles	65	0.008	0.28	0.99	0.006	0.39	1.23
SR-91	14.681/ 14.430	SR-91 Westbound (SR-241 to Weir Canyon) – 0.35 miles	480	0.000	0.60	1.82	0.004	0.27	0.86

Note: Accident Rates expressed as number of accidents / million vehicle miles

5. CORRIDOR AND SYSTEM COORDINATION

The project is consistent with statewide, regional and local planning. It is included in the SR-91 Implementation Plan and is planned for construction after the SR-91 CIP is completed.

6. ALTERNATIVES

Six alternative build concepts were developed for a new median to median connector ramp from SR-241 to SR-91. Each of the alternatives was evaluated with respect to the project's purpose and need. Evaluation criteria included:

- Freeway Traffic Operations
- Local Impacts
- Toll Revenue
- Design/Safety
- Physical and Environmental Constraints
- Planning Consistency
- Construction Staging and Traffic Handling
- Cost

The following traffic analysis will be developed during the PA/ED phase of the project:

- Traffic operation analysis within the project area,
- Traffic weaving analysis within the project area,
- Traffic accident analysis

The project traffic operation analysis does not include a tolling/revenue component to test the sensitivity of the proposed toll mitigation on the Direct Connector. A copy of the PSR-PDS comment response matrix is included in the attachment section of this report.

Following is a description of the no-build alternative and six alternative build concepts that have been evaluated. Figures illustrating the concepts, features, potential benefits and issues are included in the report attachments. The Final Feasibility Study Report dated March 2009 is an attachment to this report and is provided under separate cover.

No Build Alternative

Under this alternative, no direct connector would be constructed between SR-241 and SR-91. This alternative would not close the toll connector gap between the SR-241 and the SR-91 and would not meet the project purpose and need.

Alternative Concept 1

Alternative 1 allows for tolled vehicles and HOVs to bypass congestion via a two-lane median-to-median connection between SR-241 and SR-91. The connection to the existing Express Lanes would be done with standard HOV tapers, which would not require extensive widening of SR-91. The physical footprint of the concept would be compatible with potential future improvements to SR-91. Also, it is consistent with the original environmental document prepared by TCA for the SR-241 project. The length of the two-lane connector exceeds the Highway Design Manual (HDM) Advisory Design Standard 504.3(5) that stipulates a maximum 1,000 of length for a single lane ramp. This nonstandard design feature will require approval of an Advisory Design Exception Fact Sheet in the Project Approval/Environmental Document (PA/ED) phase of the project. This alternative can also be operated as a High Occupancy Toll (HOT) facility.

A total of four (4) structures will be improved/constructed as part of the proposed project. The following is a list of the bridge structures, with approximate cost estimate from the project Feasibility Study Report, within the project area:

- Construct a new SR-241/SR-91 Direct Connector Bridge Structure, approximately \$29.1 million
- Construct a new SR-241/SR-91 NW Direct Connector Undercrossing Bridge Structure, approximately \$8.4 million
- Widen an existing eastbound SR-91 Gypsum Canyon Road Undercrossing Bridge Structure (55-0506), approximately \$2.4 million
- Widen an existing SR-241 Wildlife Undercrossing Bridge Structure (55-0724L), approximately \$1.7 million

Alternative 1 is the recommended build alternative.

REJECTED ALTERNATIVES

Alternative Concept 2

The concept is a four-lane High Occupancy Toll (HOT) connector to existing 91 Express Lanes. This alternative is similar to Alternative Concept 4 except that no additional capacity would be added to the 91 Express Lanes. The additional traffic added to the Express Lanes would result in potential capacity deficiencies (whether or not the Express Lanes were extended) and weaving issues (if the Express Lanes were not extended). This concept would have environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 3

This concept is a reversible two-lane connector. Although the concept of a reversible connector was feasible from a design consideration, the additional traffic associated with a tolled connector would be an issue for the Express Lanes, and not the connector itself. The two-lane connector provides sufficient capacity, but the concept would not include any additional capacity on the critical section of the Express Lanes east of SR-241. While the connector could be built, it would not address the project objective of improving traffic congestion. This concept would have environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 4

This concept provides a standard four-lane connector and addresses the operational issues of the additional traffic in the Express Lanes by widening the Express Lanes to three lanes in each direction to approximately the SR-71 interchange. It provides a median-to-median connection, addresses issues of congestion relief and complies with the HDM Advisory Design Standard 504.3(5), but the concept would have significantly higher costs and environmental impacts beyond those identified in the original EIR/EIS and is not recommended for further consideration.

Alternative Concept 5

This concept is a four-Lane Toll Connector to Extended 91 Express Lanes (to I-15). Alternative 5 is similar to Alternative 4, except that the third Express Lane extends to I-15. The section of SR-91 between SR-71 and I-15 is constrained, and adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. The physical constraints were considered a fatal flaw to the feasibility of Alternative 5.

Alternative Concept 6

This concept would provide a SR-241/SR-71 Direct Toll Connector for SR-241 and SR-71 traffic. This would be a relatively high-cost concept, and only focused on a specific portion of the travel demand between SR-241 and SR-71. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. It is not recommended for further consideration.

7. COMMUNITY INVOLVEMENT

The recommended build alternative was evaluated in the original EIR/EIS which included a process for public involvement. The proposed project will require the continued involvement of stakeholders throughout the project development process.

8. ENVIRONMENTAL DETERMINATION/DOCUMENT

A Revalidation/Re-evaluation and Addendum document is anticipated for CEQA and NEPA compliance for the proposed project, and are estimated to be completed in 10 months. The findings of the environmental technical studies to be prepared during the PA/ED phase for the proposed project may change this conclusion to require preparation of a new Environmental Document.

The proposed project:

- Should add express lanes in the existing median with minimal outside widening and median barrier replacement;
- Would not require additional right-of-way;
- Would not involve large cuts and/or fills;
- Would not result in displacements;
- Would not generate a need for additional public utilities;
- Would not result in changes to access control and local traffic patterns;
- Would result in temporary construction impacts;
- May impact sensitive biological resources.

To address potential impacts of the proposed project, the following studies will be required: Traffic Study, Air Quality Analysis, HPSR, ASR, Natural Environmental Study (NES), Noise Analysis, Water Quality Assessment Report, Hazardous Waste Initial Site Assessment (ISA), Paleontology Memorandum, Preliminary Geotechnical Report, Water Quality Report and Visual Impact Memorandum.

The limits of the proposed project are within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). This project must conform to all applicable water quality regulations and/or permit requirements of the State Water Resources Control Board (SWRCB) and any applicable local Regional Water Quality Control Board(s) (RWQCB), including, but not limited to the Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ, NPDES No. CAS000003), the Statewide General NPDES Permit for Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and the Caltrans Storm Water Management Plan (May 2003), and any subsequent revision and/or additional requirements at the time of construction. A

Storm Water Data Report (SWDR) will be prepared at PID, PA/ED, and PS&E phases. Caltrans-approved Treatment BMPs will be considered during planning and design phases.

9. FUNDING

9A. CAPITAL COST

Capital Cost Estimate for the Alternative Identified for Programming

	Range of Total Cost	STIP Funds	Fund Source
Alternative 1	\$135M to \$150M	N/A	Transportation Corridor Agencies – Toll Revenue Fund and Possible Federal Fund

The level of detail available to develop this capital cost estimate is only accurate to within the above ranges and are useful for long-range planning purposes only. The capital costs should not be used to program or commit capital funds. The Project Report will serve as the appropriate document from which the remaining support and capital components of the project will be programmed.

A specific federal funding program has not been identified for the proposed project currently. However, it is anticipated that a federal funding program will be part of the project funding source, most likely from 91 corridor related funding.

See attached “ready to sign” cooperative agreement for cooperative features.

9B. CAPITAL SUPPORT ESTIMATE FOR THE PROGRAMMABLE ALTERNATIVE

	PROJECT SUPPORT COMPONENTS			
	PA&ED (Caltrans) 0 Phase		PA&ED (TCA) 0 Phase	Total
	Dist	DES	TCA - Consultant	
Estimated PY's	2.6	0.21	Consultant	2.81 (Caltrans Only)
Estimated PS \$'s	460,000	35,000	2,153,400	2,648,400
Estimated PYE \$'s (\$1000's)	0	0		0
Total \$'s	460,000	35,000	2,153,400	2,648,400

10. SCHEDULE

HQ Milestones	Delivery Date (Month, Day, Year)
Begin Environmental	06/01/11
Notice of Intent (NOI)	N/A
Circulate DED	N/A
PA&ED	1/9/13

Regular Right of Way	1/9/13
Project PS&E	4/01/14
Right of Way Certification	4/01/14
Ready to List	10/01/14
Approve Contract	1/02/15
Contract Acceptance	1/02/17
End Project	7/01/17

11. FHWA COORDINATION

No FHWA action is anticipated for this project at this time.

12. DISTRICT/PROJECT CONTACTS

Caltrans

Lisa Ramsey	(949) 724-2102
Constantino Stamation	(949) 724-2249
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Charles Baker	(949) 724-2252
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Gary Slater	(949) 756-7685
Bassem Barsoum	(949) 724-2331
Karl Dreher	(916) 653-4937
Robert Enriquez	(949) 724-2406

Transportation Corridor Agency

Thomas Wheeler	(949) 754-3430
Romi Archer	(949) 553-0666

LSA

Lisa Williams	(949) 553-0666
---------------	----------------

RBF

Mike Chesney	(949) 855-5792
Alan Su	(949) 855-5788
Gary Warkentin	(949) 855-3625

13. PROJECT REVIEWS

Field Review: _____

Date: 4/21/11

HQ Design Coordinator: _____

Date: 9/14/11

14. ATTACHMENTS

Alternative Concepts 1 through 6
 Alternative 1 Preliminary Plans
 Right of Way Data Sheet (Alternative 1)
 PSR-PDS Comment Response Matrix
 Preliminary Environmental Analysis Report

12-ORA-241-PM36.10/91-PM14.7-PM17.9

EA 0K970K

Project ID: 1200020097

January 2012

Draft Cooperative Agreement

Final Feasibility Study Report (provided under separate cover)

Storm Water Data Report (provided under separate cover)

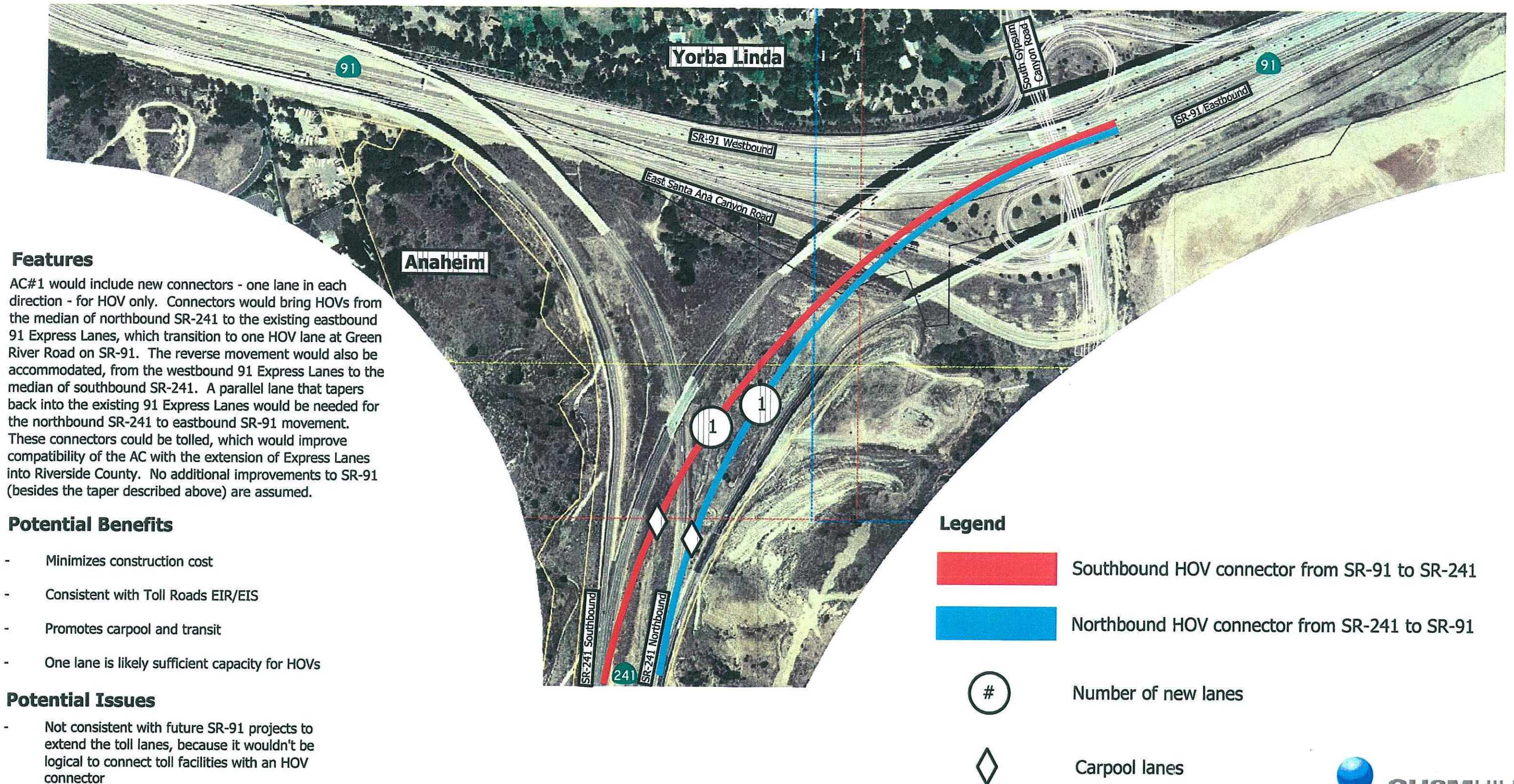
Alternative Concepts 1 through 6

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #1

TWO-LANE HOV CONNECTOR TO EXISTING 91 EXPRESS LANES

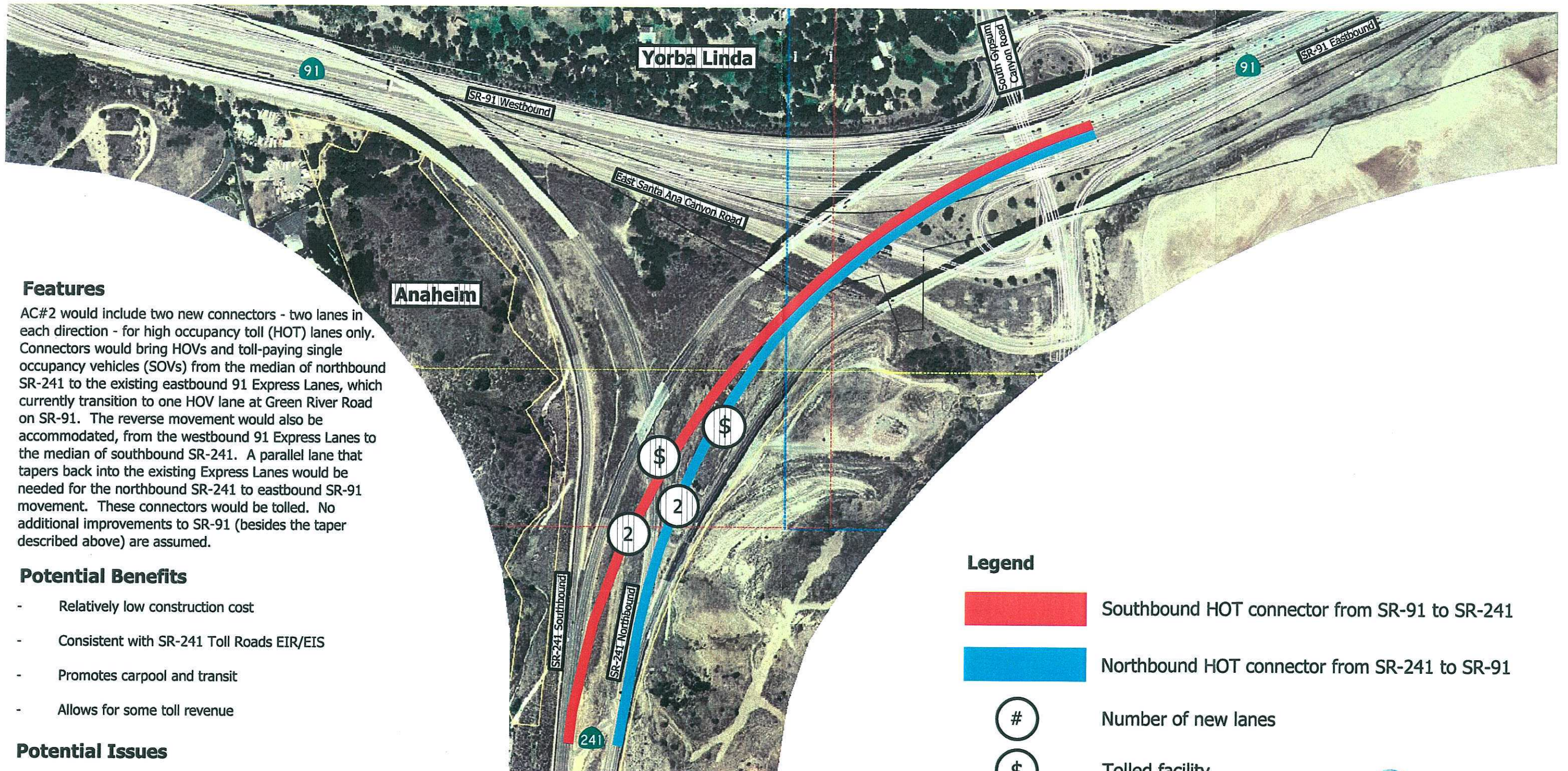


91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT#2

FOUR-LANE HOT CONNECTOR TO EXISTING 91 EXPRESS LANES

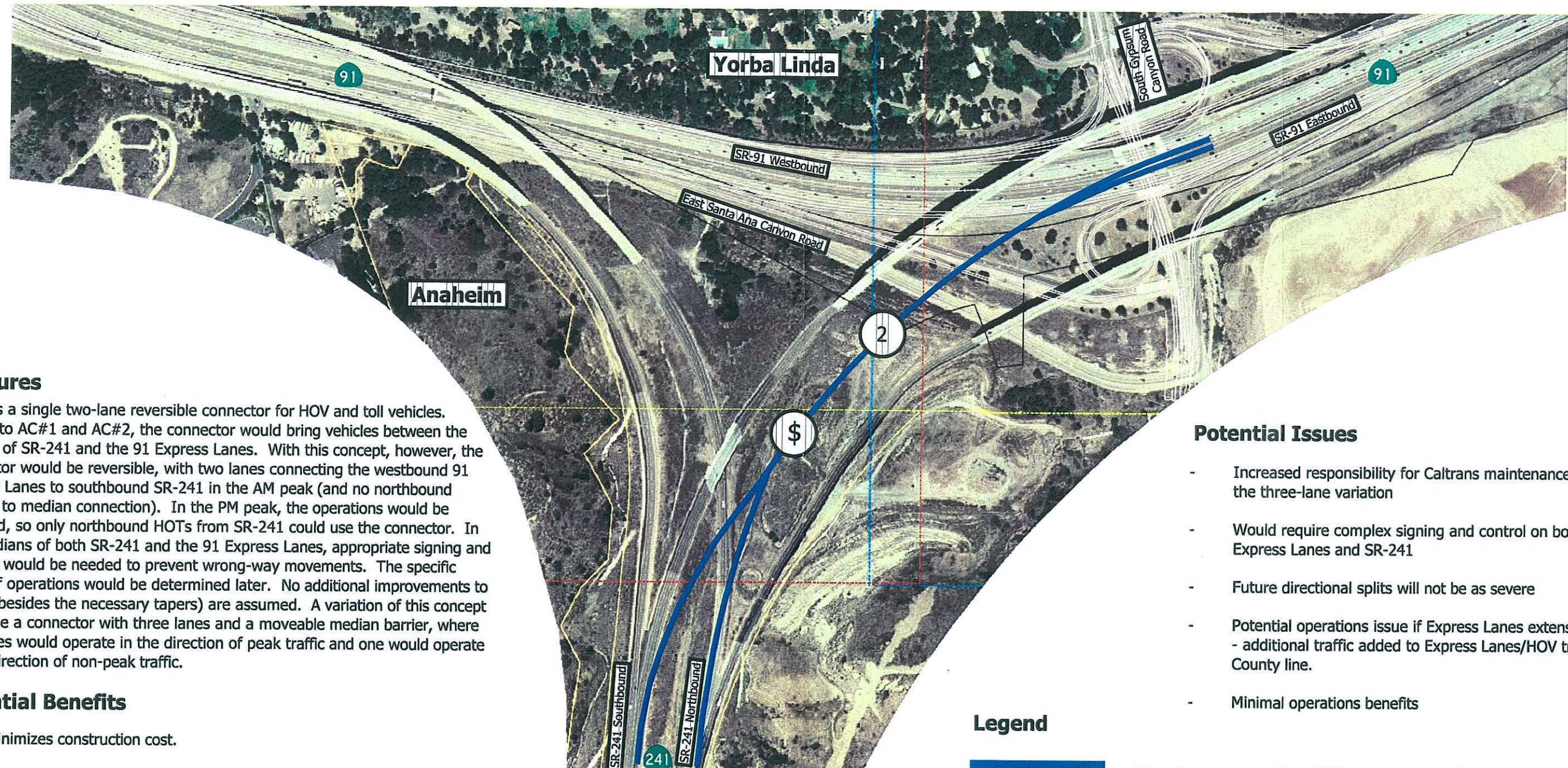


91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #3

TWO-LANE REVERSIBLE HOT CONNECTOR TO EXISTING 91 EXPRESS LANES



Features

AC#3 is a single two-lane reversible connector for HOV and toll vehicles. Similar to AC#1 and AC#2, the connector would bring vehicles between the median of SR-241 and the 91 Express Lanes. With this concept, however, the connector would be reversible, with two lanes connecting the westbound 91 Express Lanes to southbound SR-241 in the AM peak (and no northbound median to median connection). In the PM peak, the operations would be reversed, so only northbound HOTs from SR-241 could use the connector. In the medians of both SR-241 and the 91 Express Lanes, appropriate signing and barriers would be needed to prevent wrong-way movements. The specific times of operations would be determined later. No additional improvements to SR-91 (besides the necessary tapers) are assumed. A variation of this concept would be a connector with three lanes and a moveable median barrier, where two lanes would operate in the direction of peak traffic and one would operate in the direction of non-peak traffic.

Potential Benefits

- Minimizes construction cost.
- Promotes carpool and transit
- Focuses on critical operations
- Allows for some toll revenue

Potential Issues

- Increased responsibility for Caltrans maintenance, especially with the three-lane variation
- Would require complex signing and control on both the 91 Express Lanes and SR-241
- Future directional splits will not be as severe
- Potential operations issue if Express Lanes extension is not built - additional traffic added to Express Lanes/HOV transition at County line.
- Minimal operations benefits

Legend



Two-lane reversible HOT connector from SR-241 to SR-91



Number of new lanes



Tolled facility



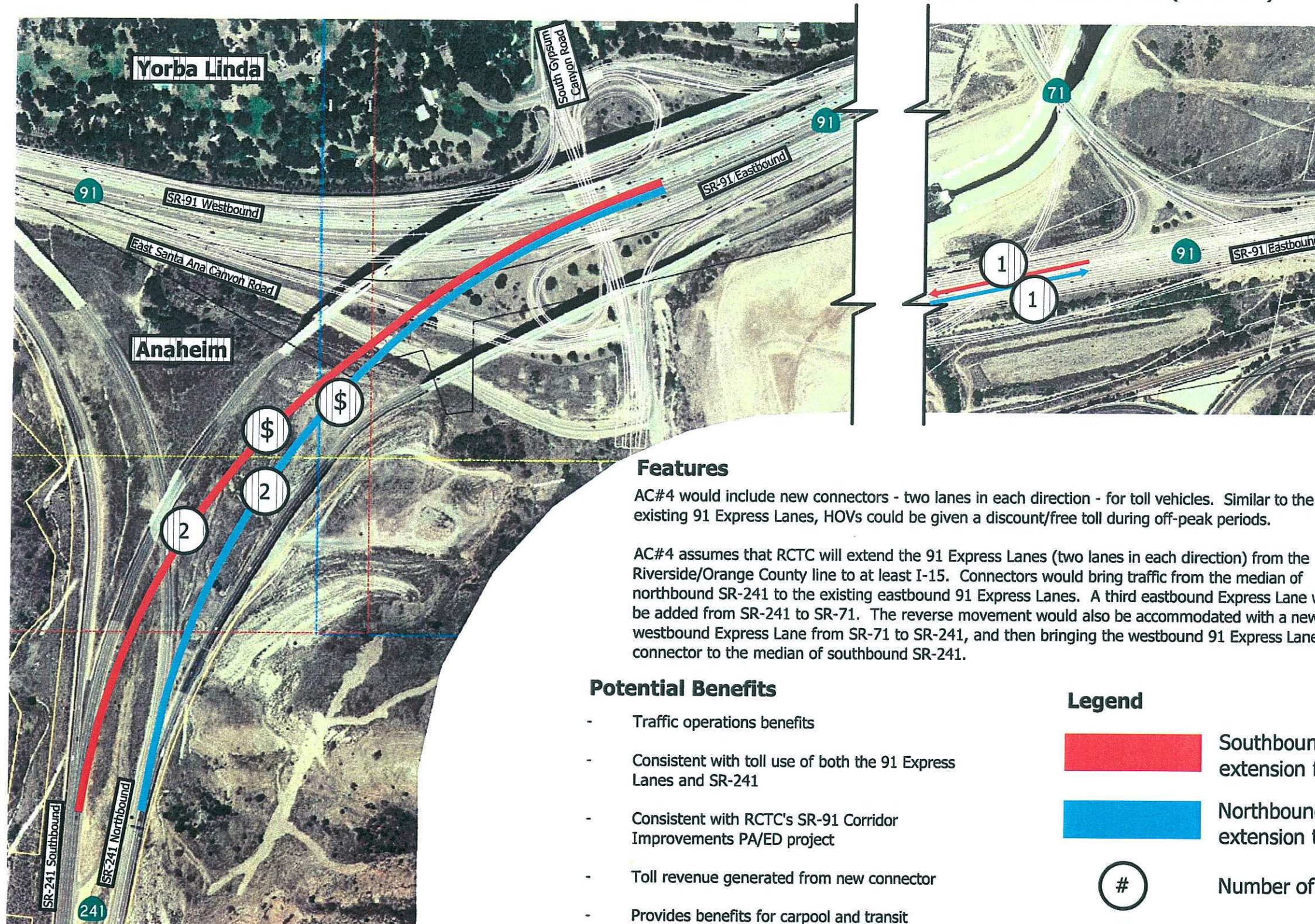
FIGURE #3

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #4

FOUR-LANE TOLL CONNECTOR TO EXTENDED 91 EXPRESS LANES (TO SR-71)



Potential Issues

- Relatively high cost, especially along SR-91
- Requires coordination with RCTC's SR-91 Improvements PA/ED project
- SR-71 may not be the most logical location to terminate the new third Express Lane

Features

AC#4 would include new connectors - two lanes in each direction - for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given a discount/free toll during off-peak periods.

AC#4 assumes that RCTC will extend the 91 Express Lanes (two lanes in each direction) from the Riverside/Orange County line to at least I-15. Connectors would bring traffic from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. A third eastbound Express Lane would be added from SR-241 to SR-71. The reverse movement would also be accommodated with a new third westbound Express Lane from SR-71 to SR-241, and then bringing the westbound 91 Express Lanes connector to the median of southbound SR-241.

Potential Benefits

- Traffic operations benefits
- Consistent with toll use of both the 91 Express Lanes and SR-241
- Consistent with RCTC's SR-91 Corridor Improvements PA/ED project
- Toll revenue generated from new connector
- Provides benefits for carpool and transit
- Focuses on critical operations

Legend

- Southbound HOT connector from SR-91 to SR-241 and extension from SR-71
- Northbound HOT connector from SR-241 to SR-91 and extension to SR-71
- # Number of new lanes
- \$ Tolled facility



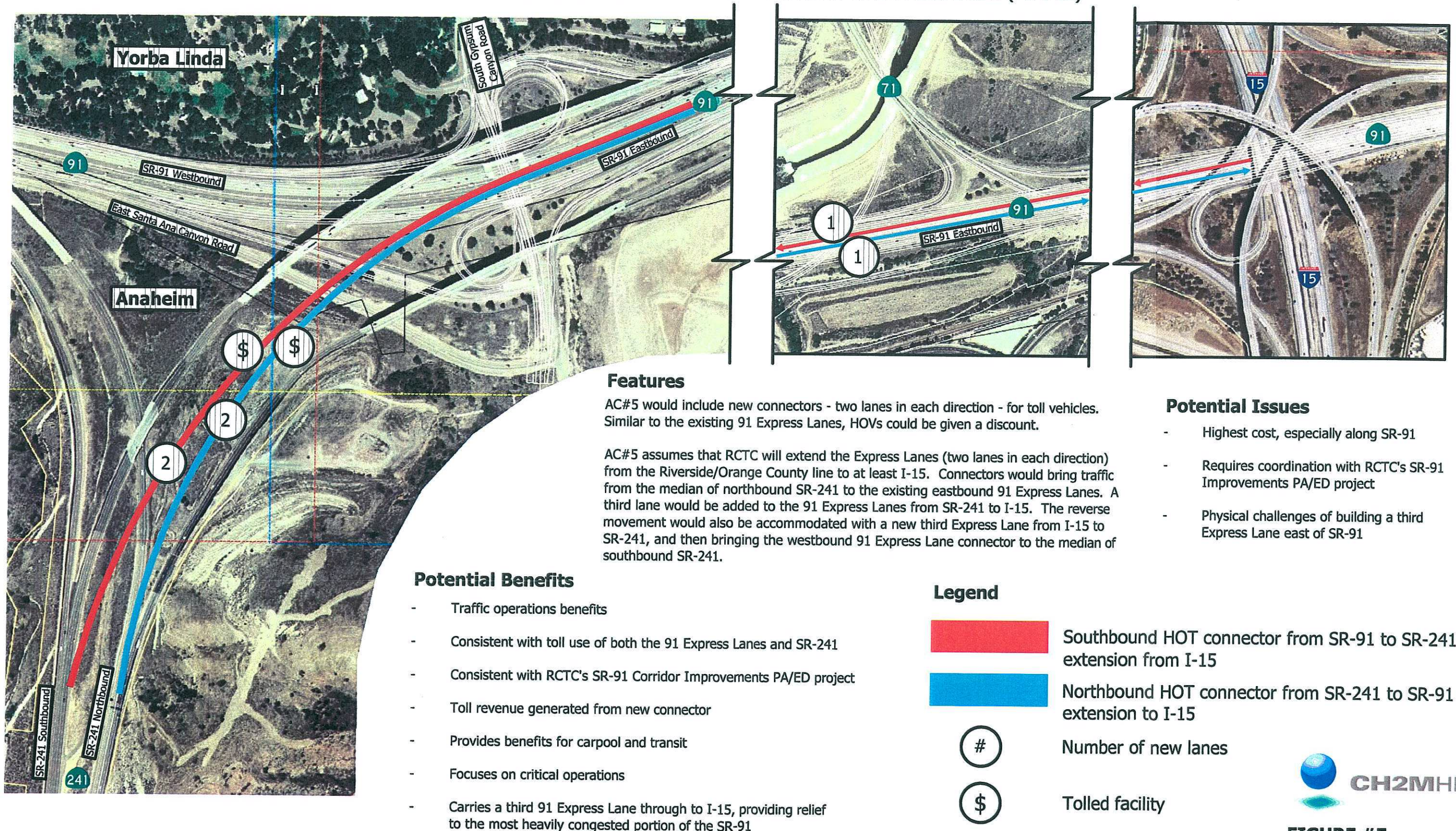
FIGURE #4

91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #5

FOUR-LANE TOLL CONNECTOR TO EXTEND 91 EXPRESS LANES (TO I-15)

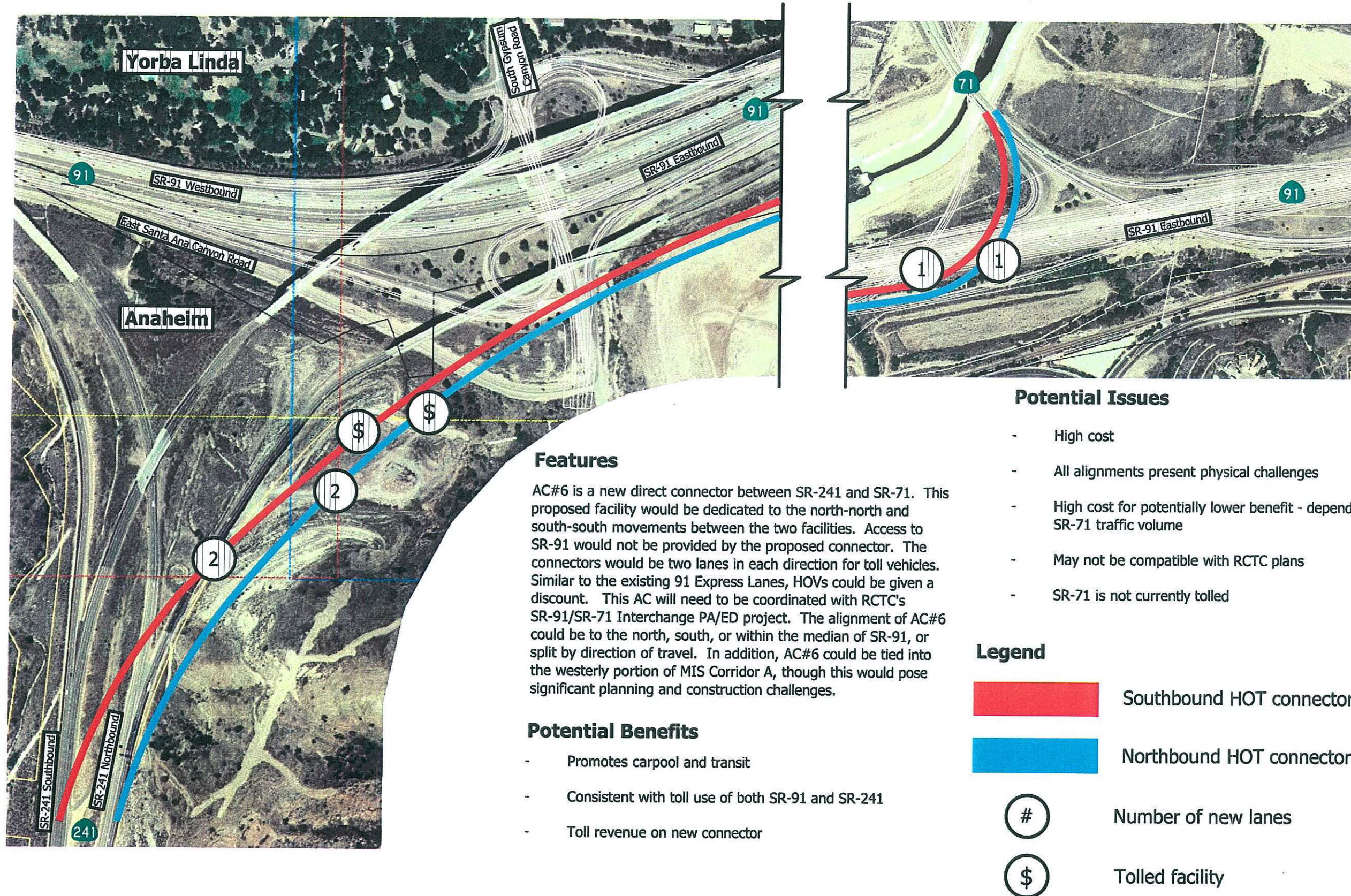


91 EXPRESS LANES AND STATE ROUTE 241 CONNECTOR FEASIBILITY STUDY

OPERATIONS CONCEPTS DEVELOPMENT AND SCREENING

ALTERNATIVE CONCEPT #6

SR-241/SR-71 DIRECT TOLL CONNECTOR FOR SR-241 AND SR-71 TRAFFIC



Alternative 1 Preliminary Plans

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PROJECT PLANS FOR BUILDING CONSTRUCTION
STATE HIGHWAY
IN ORANGE COUNTY
ON ROUTE 241 FROM WINDY RIDGE TO ROUTE 91
AND ON ROUTE 91 FROM ROUTE 241 TO COAL CANYON ROAD

To be supplemented by Standard Plans dated May, 2006

BEGIN WORK AND CONSTRUCTION (ROUTE 91)
STA 427+74.47 PM 16.06

ANAHEIM

YORBA LINDA

ORANGE COUNTY

END WORK AND CONSTRUCTION (ROUTE 91)
STA 525+64.38 PM 17.90

BEGIN WORK AND CONSTRUCTION (ROUTE 241)
STA 815+18.90 PM 36.76

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	241/91	36.76-38.30/ 16.06-17.90	1	33



LOCATION MAP

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

To get to the Caltrans web site, go to: <http://www.dot.ca.gov>

PROJECT ENGINEER	DATE
PROJECT MANAGER	DATE

The Contractor shall possess the class (or classes) of license as specified in the "Notice to Contractors."

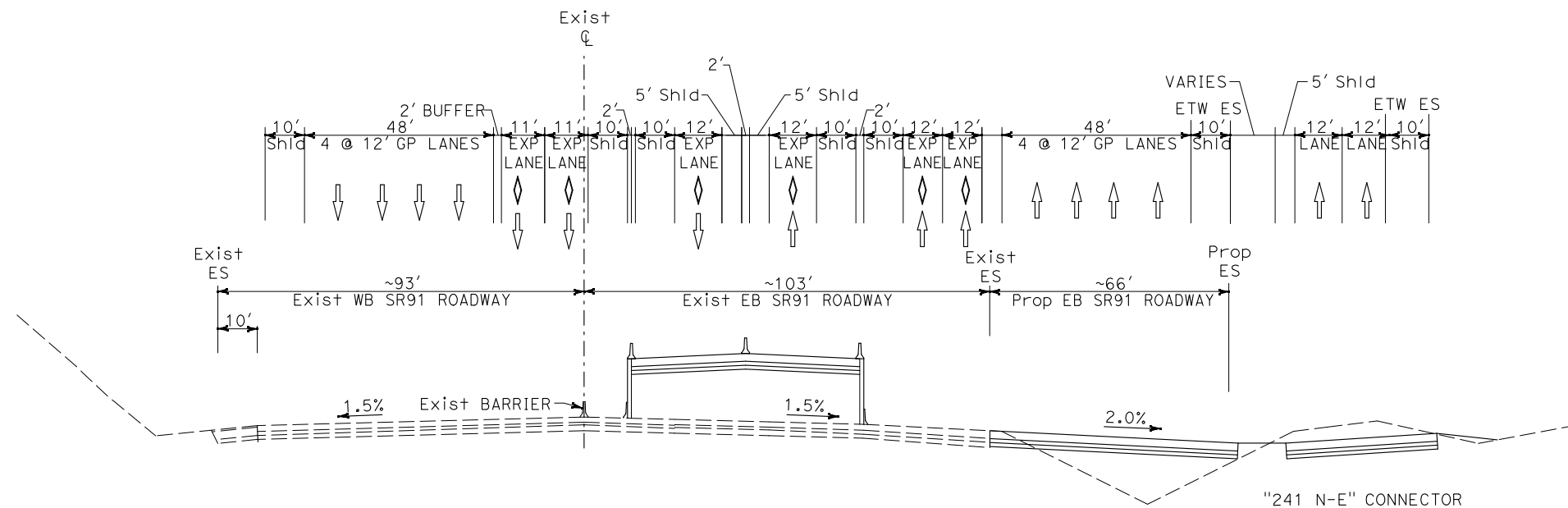
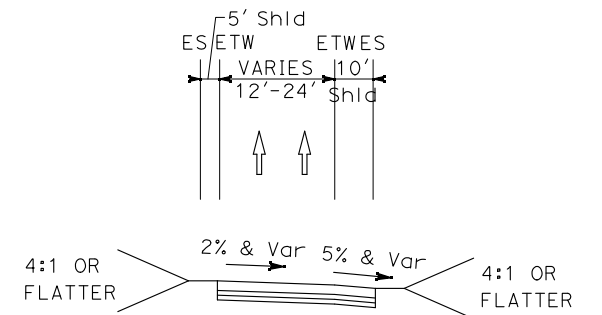
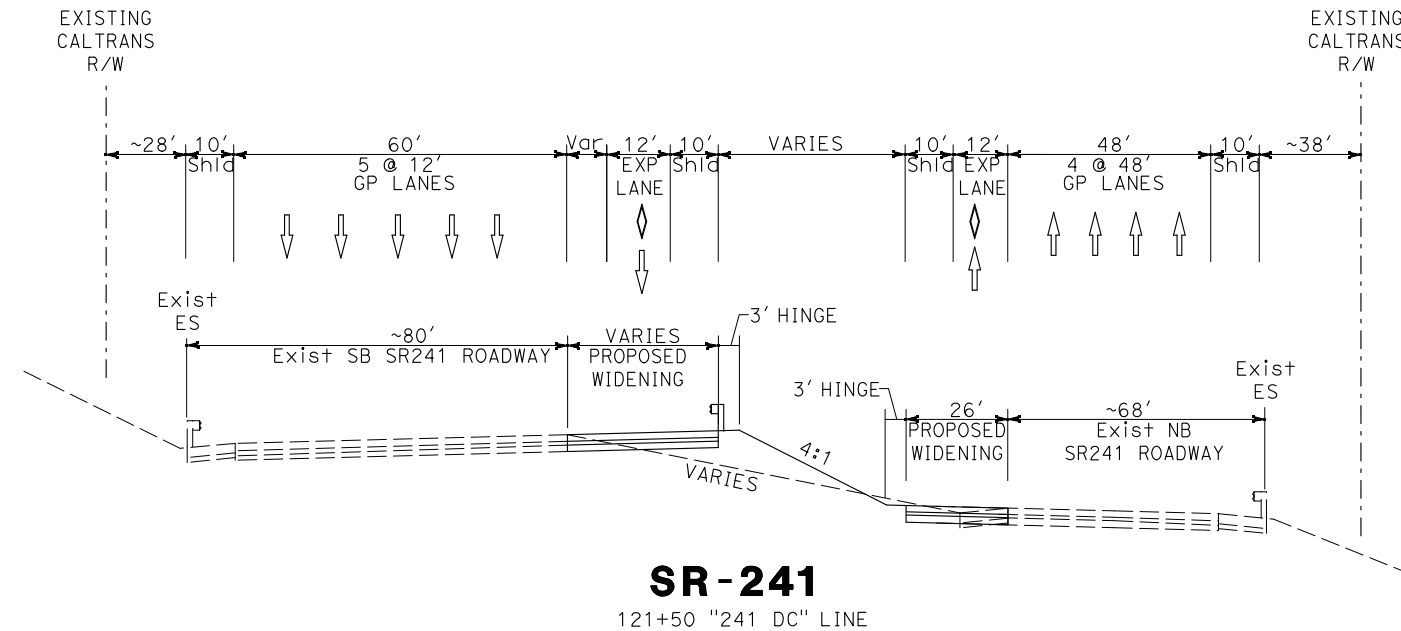
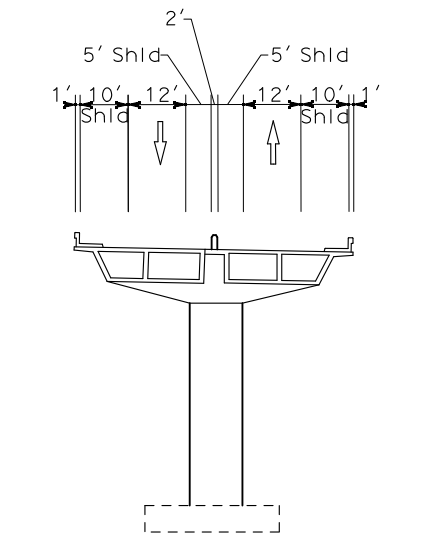
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Contract No.

CU 00000

EA 000000

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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<u>REGISTERED CIVIL ENGINEER</u> <u>DATE</u>  <u>PLANS APPROVAL DATE</u> <i>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</i>					
RBF CONSULTING 14725 ALTON PARKWAY IRVINE, CA 92618			FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY 125 PACIFICA, SUITE 100 IRVINE CA 92618		



SR-91
186+50 "241 DC" LINE

TYPICAL CROSS SECTIONS

NO SCALE

X-1

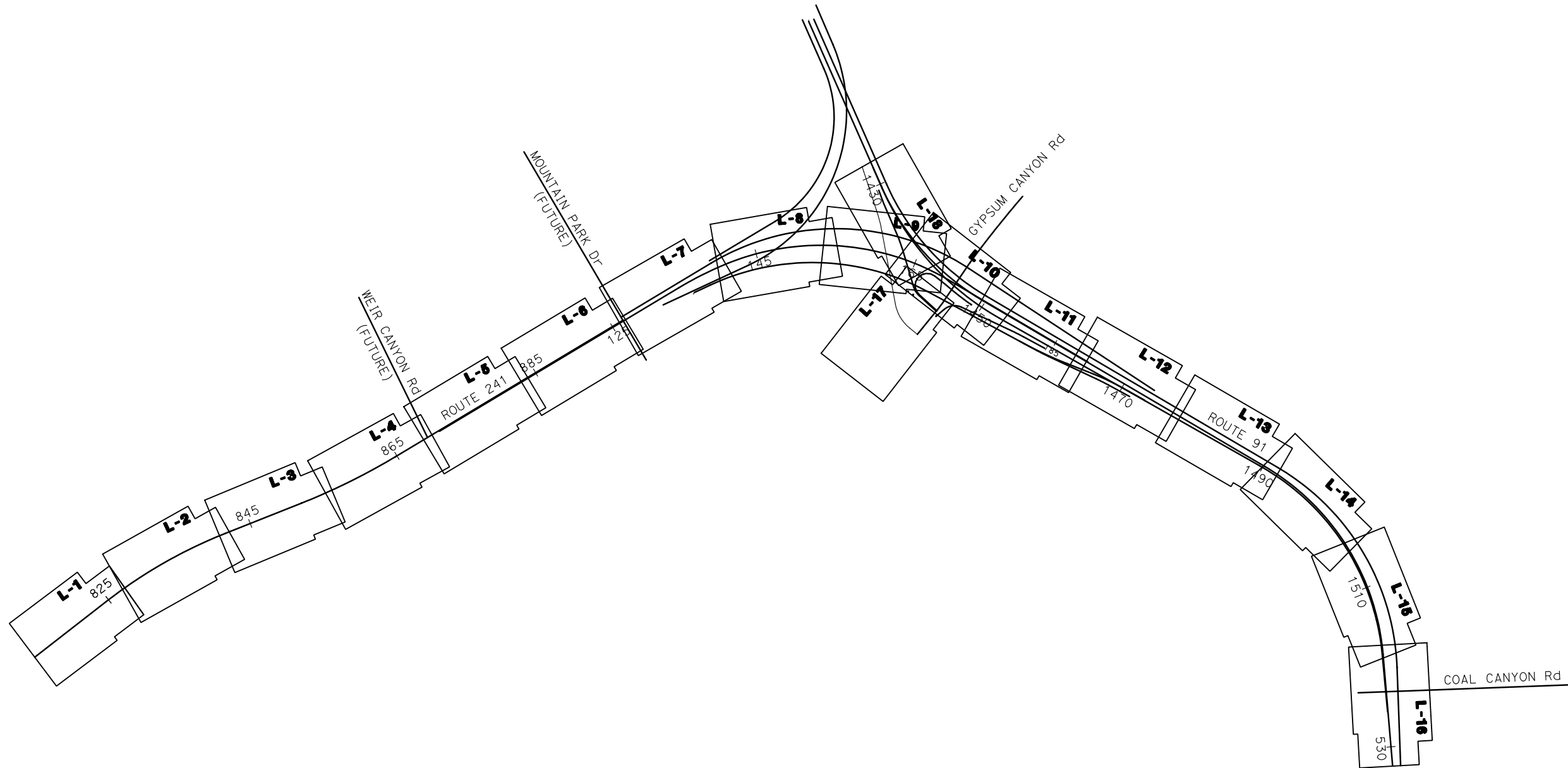
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REGISTERED CIVIL ENGINEER	DATE
PLANS APPROVAL DATE	



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KEY MAP

NO SCALE

K-1

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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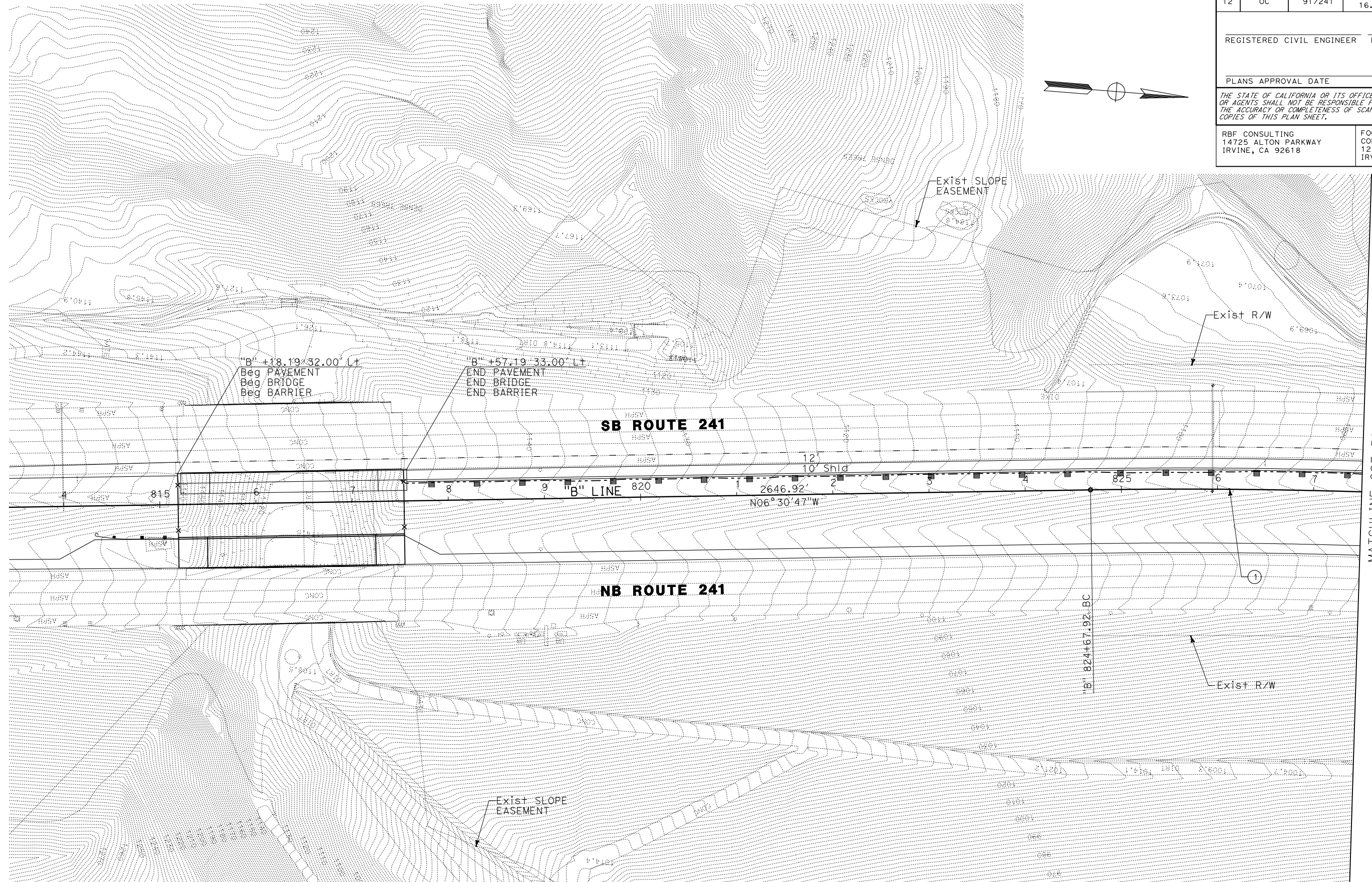
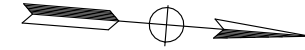
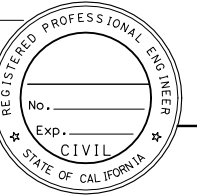
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PLANS APPROVAL DATE

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IRVINE, CA 92618

FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



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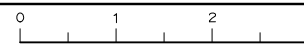
LAYOUT

SCALE 1"=50'

L-1

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE
IS IN INCHES



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DGN FILE => ...\\Initial 2 Lane L-01.dgn

CU 00000

EA 000000

DATE PLOTTED => 8/17/2011	LAST REVISION
TIME PLOTTED => 9:34:29 AM	00-00-00

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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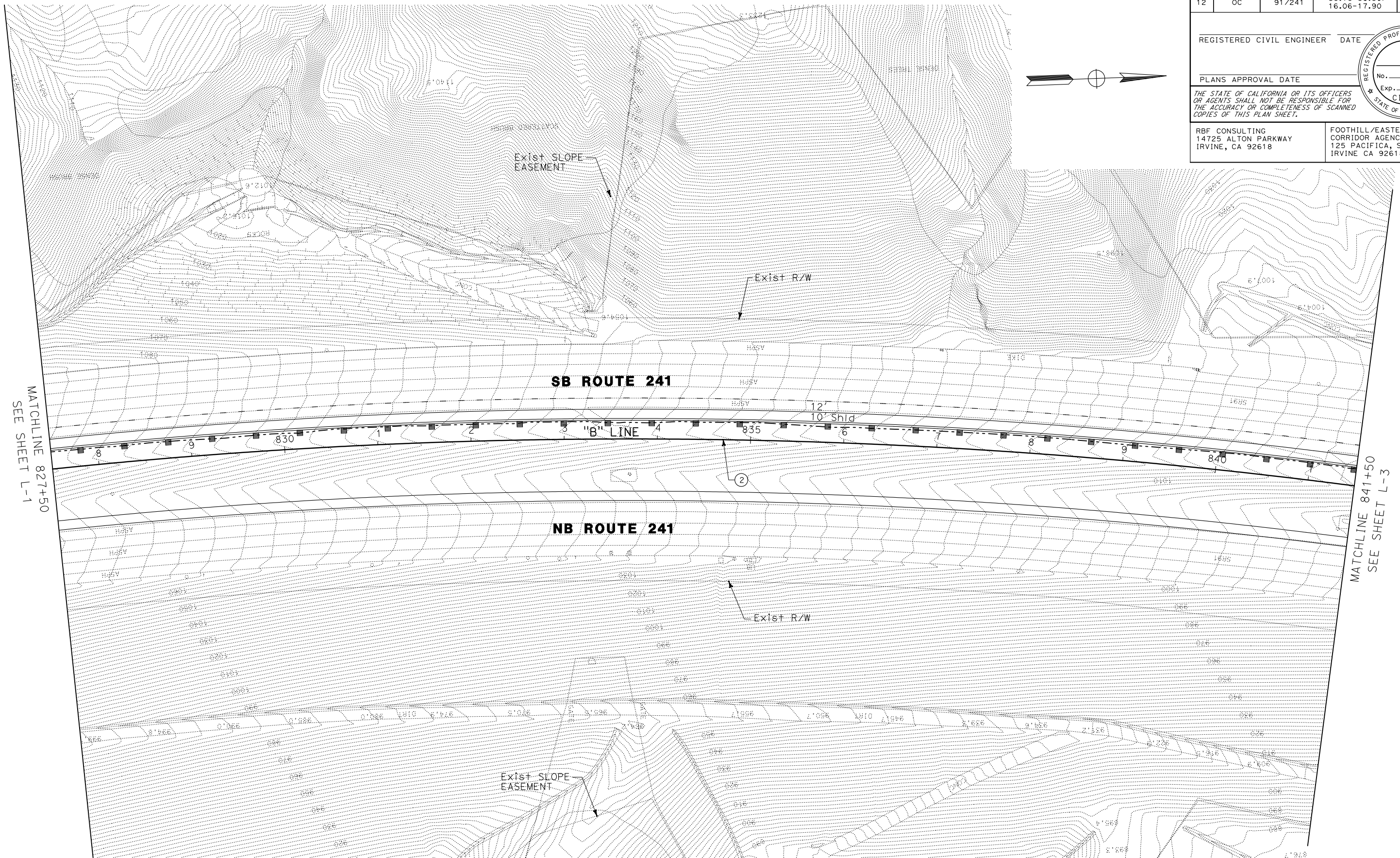
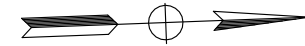
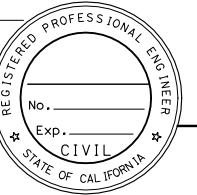
REGISTERED CIVIL ENGINEER DATE / /

PLANS APPROVAL DATE

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IRVINE, CA 92618

FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA

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LAYOUT

SCALE 1"=50'

L-2

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE
IS IN INCHES



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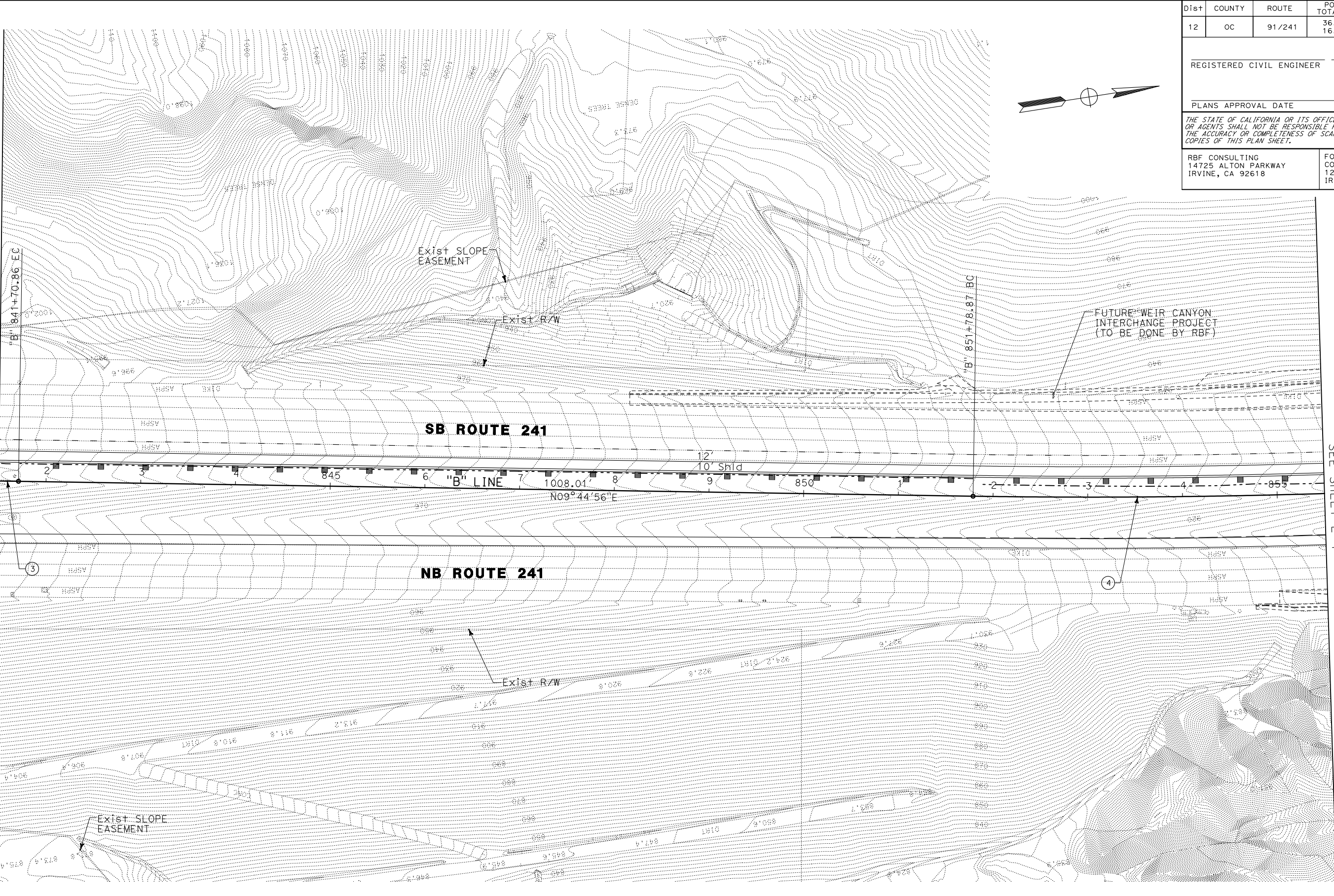
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CU 00000

EA 000000

DATE PLOTTED => 8/17/2011	LAST REVISION
TIME PLOTTED => 9:35:00 AM	



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(4)	8000.00	09°18'59"	651.85	1300.83

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	7	33

REGISTERED CIVIL ENGINEER

DATE

PLANS APPROVAL DATE

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IRVINE, CA 92618

FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

REGISTERED PROFESSIONAL ENGINEER

No.

Exp.

CIVIL

STATE OF CALIFORNIA

MATCHLINE 855+50
SEE SHEET L-4

LAYOUT

SCALE 1"=50'

L-3

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE
IS IN INCHES

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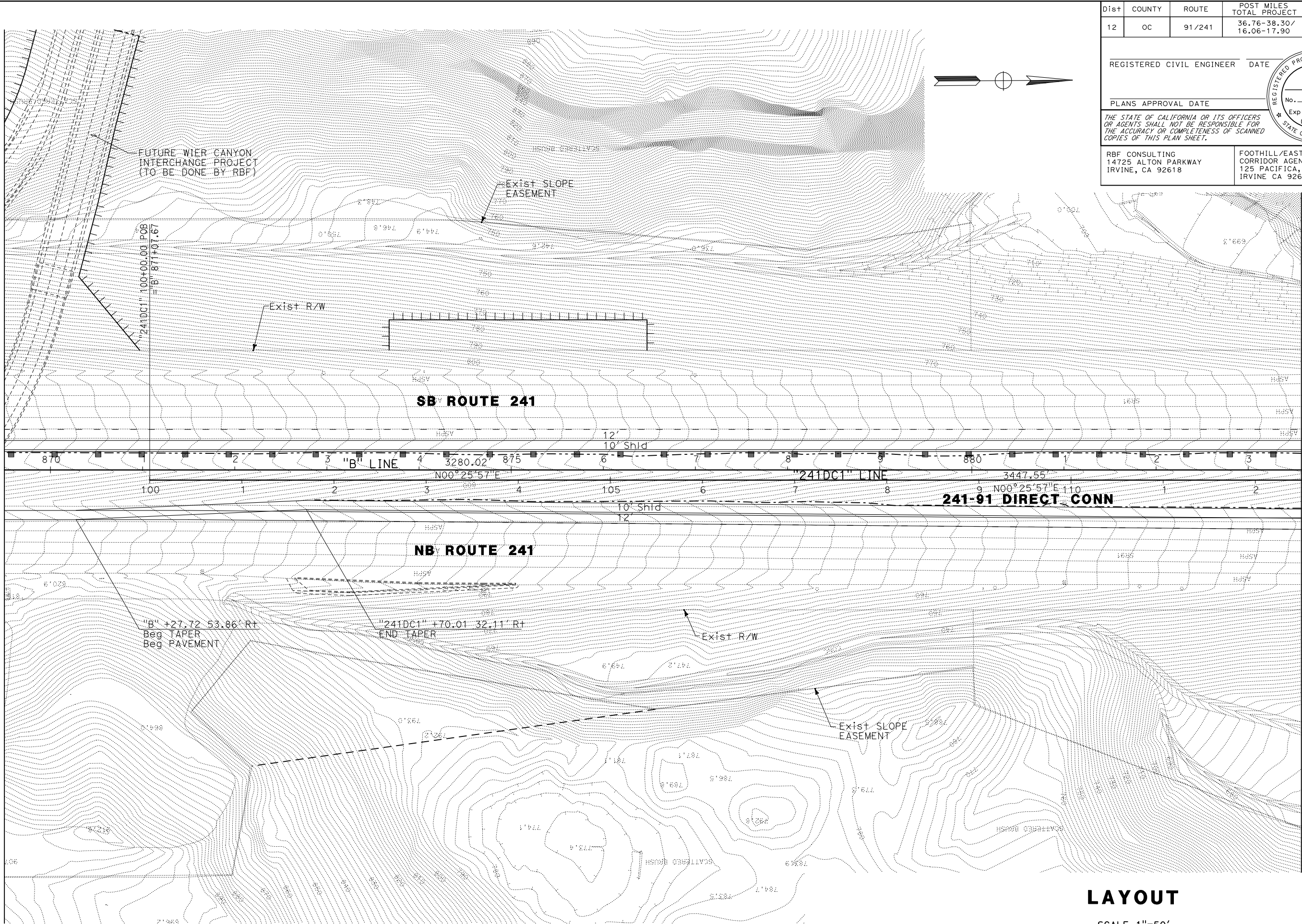
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00-00-00
TIME PLOTTED => 9:35:32 AM

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	8	33

MATCHLINE 869+50
SEE SHEET L-4



MATCHLINE 112+50
SEE SHEET L-6

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	9	33

REGISTERED CIVIL ENGINEER

DATE

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CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

LAYOUT

SCALE 1"=50'

L-5

BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE
IS IN INCHES

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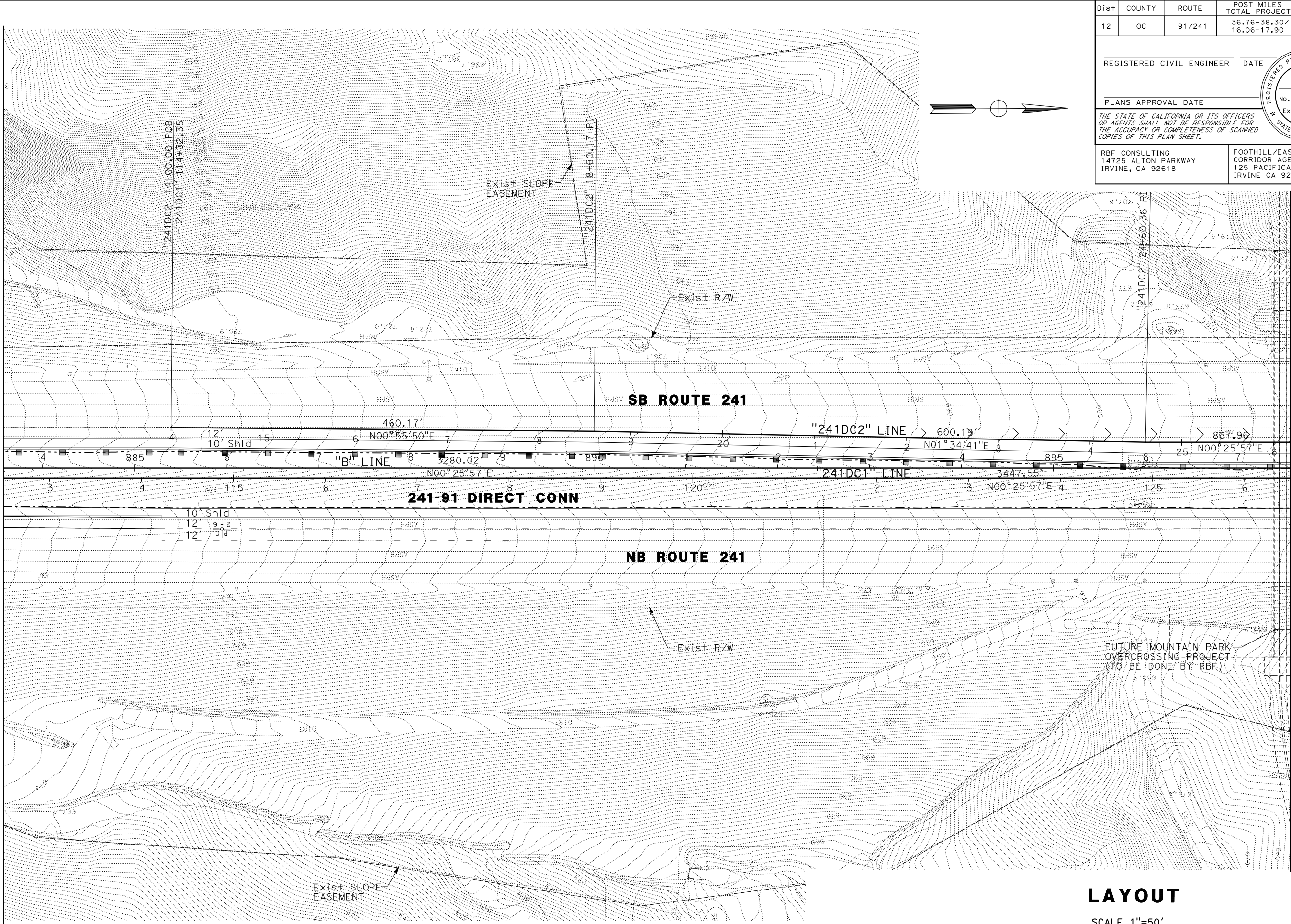
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DATE PLOTTED => 8/17/2011
TIME PLOTTED => 9:42:08 AM

MATCHLINE 112+50
SEE SHEET L-5



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	10	33

REGISTERED CIVIL ENGINEER

DATE

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IRVINE CA 92618

REGISTERED PROFESSIONAL ENGINEER

No.

Exp.

CIVIL

STATE OF CALIFORNIA

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
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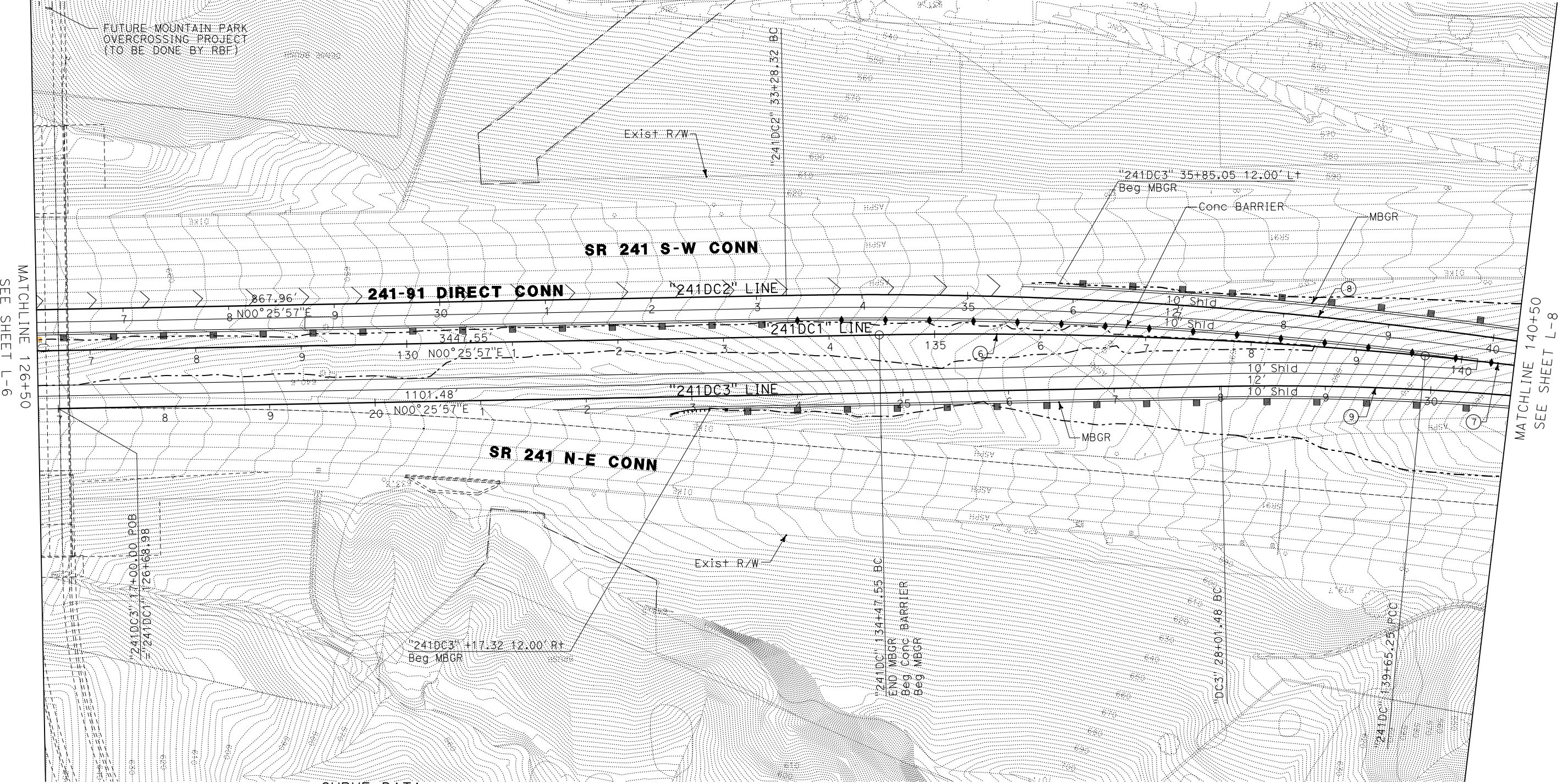
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PLANS APPROVAL DATE

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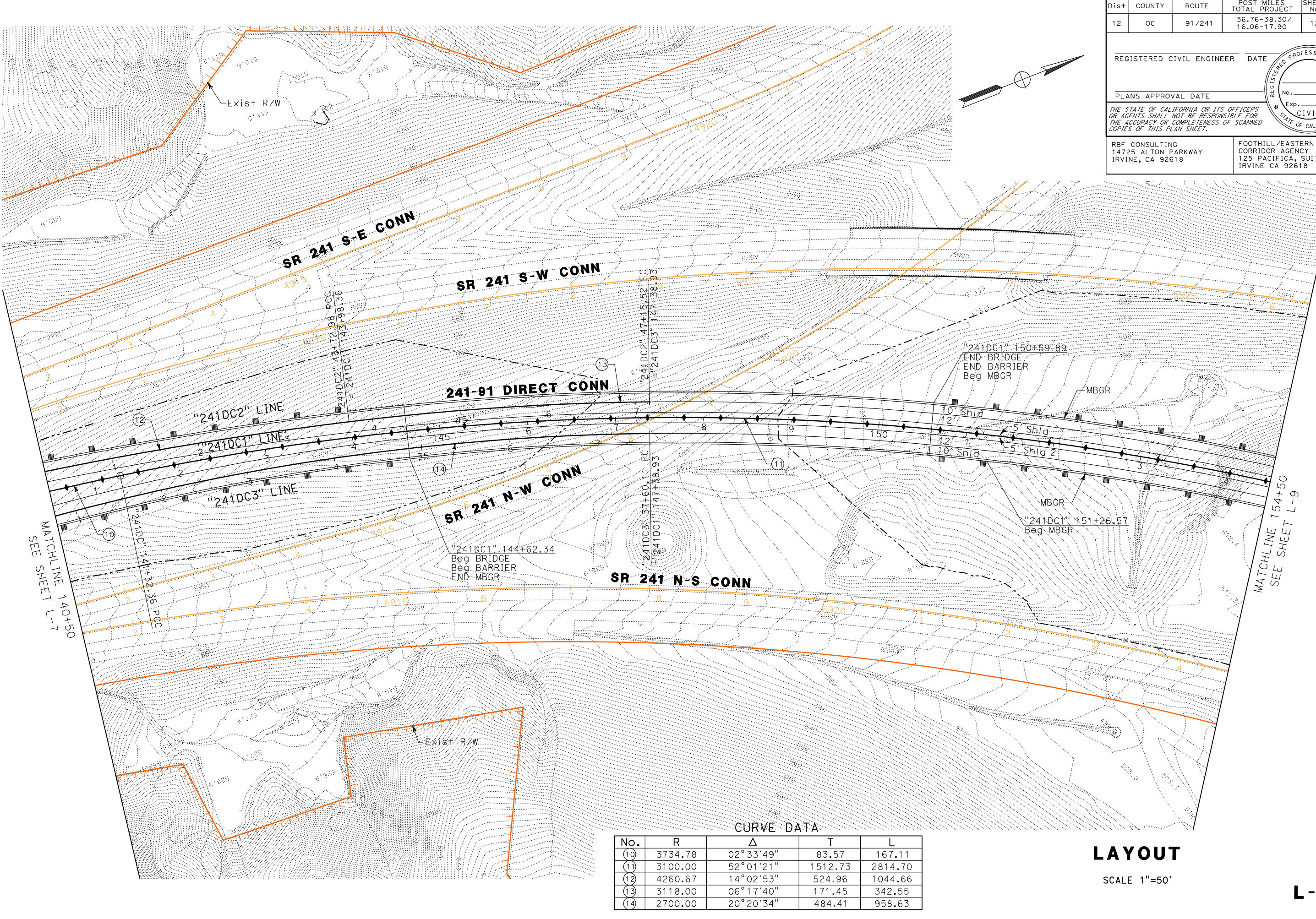
FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



CURVE DATA				
No.	R	Δ	T	L
6	4516.29	06°34'40"	259.13	517.70
7	3734.78	02°33'49"	83.57	167.11
8	4260.67	14°02'53"	524.96	1044.66
9	4516.29	06°34'04"	259.13	517.70

SCALE 1"=50'

L-7



CURVE DATA				
No.	R	Δ	T	L
(10)	3734.78	02°33'49"	83.57	167.11
(11)	3100.00	52°01'21"	1512.73	2814.70
(12)	4260.67	14°02'53"	524.96	1044.66
(13)	3118.00	06°17'40"	171.45	342.55
(14)	2700.00	20°20'34"	484.41	958.63

Dist 12

COUNTY OC

ROUTE 91/241

POST MILES TOTAL PROJECT 36.76-38.30/16.06-17.90

SHEET No. 12

TOTAL SHEETS 33

REGISTERED CIVIL ENGINEER

DATE

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CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

REGISTERED PROFESSIONAL ENGINEER

No.

Exp.

CIVIL

STATE OF CALIFORNIA

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	13	33

REGISTERED CIVIL ENGINEER DATE / /

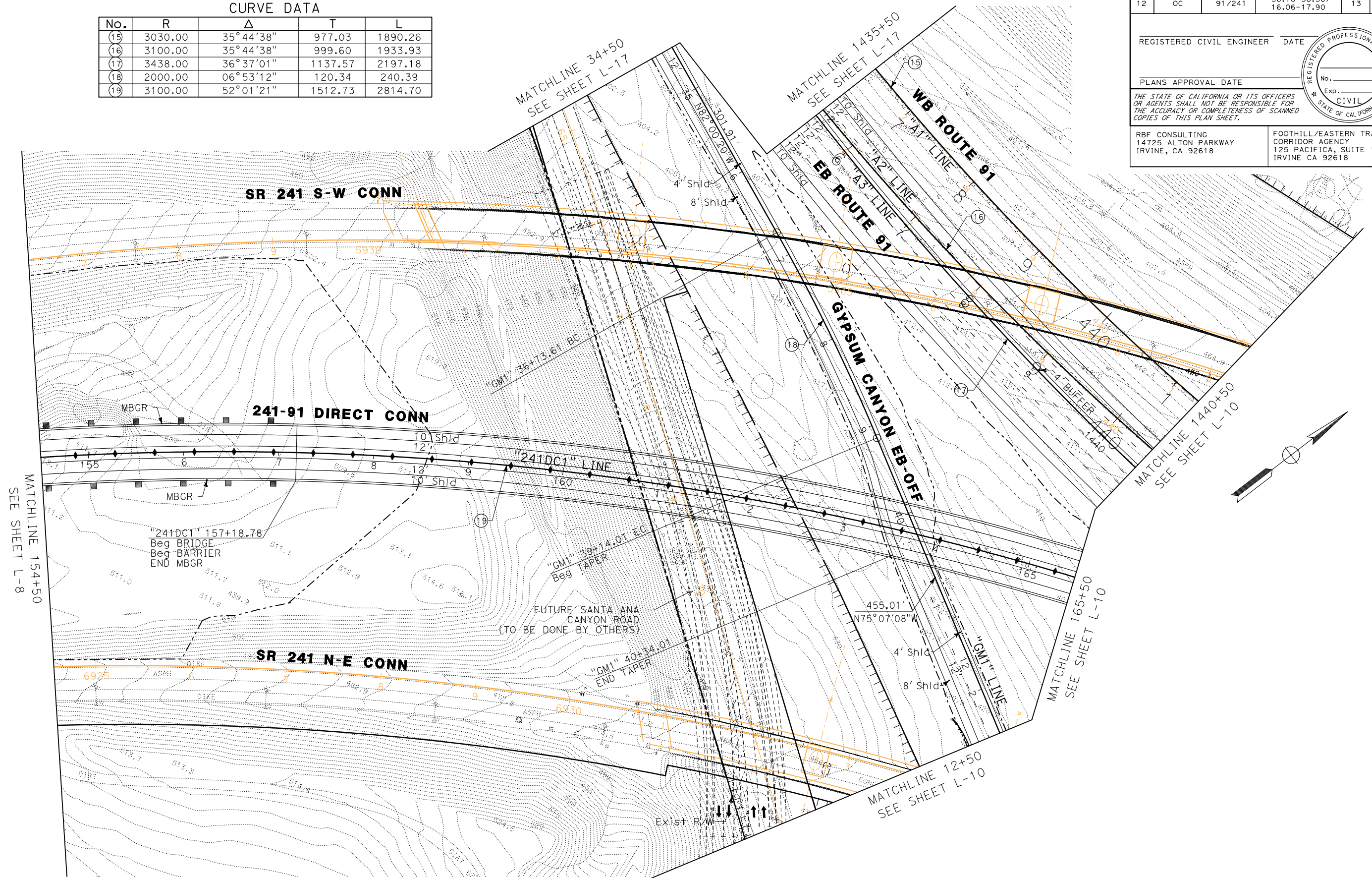


PLANS APPROVAL DATE

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CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618



LAYOUT

SCALE 1"=50'

L-9

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	OC	91/241	36.76-38.30/ 16.06-17.90	14	33

REGISTERED CIVIL ENGINEER	DATE
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PLANS APPROVAL DATE

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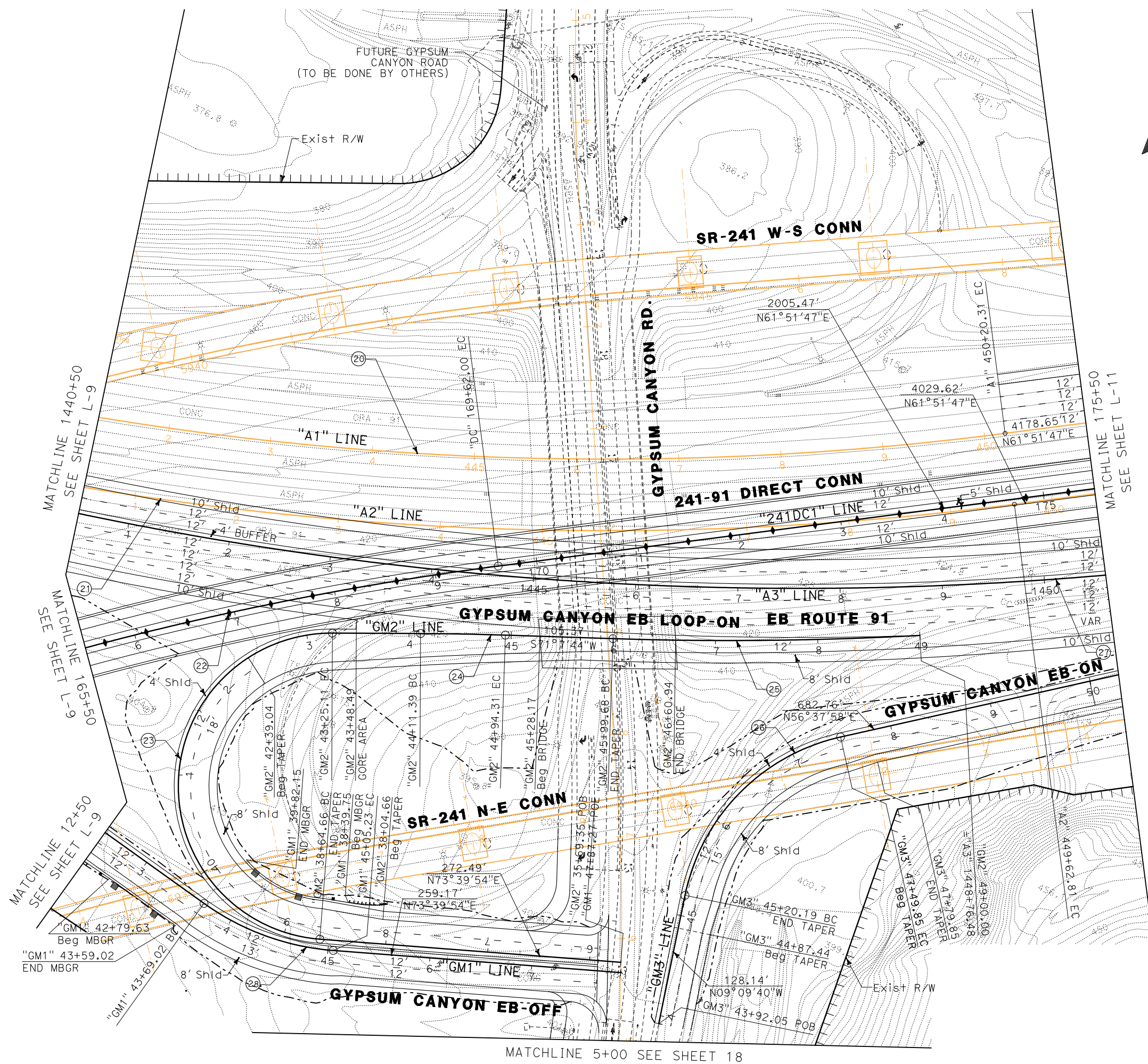
FOOTHILL/EASTERN TRANS.
CORRIDOR AGENCY
125 PACIFICA, SUITE 100
IRVINE CA 92618

No.	R	Δ	T	L
(20)	3030.00	35° 44' 38"	977.03	1890.26
(21)	3100.00	35° 44' 38"	999.60	1933.93
(22)	3100.00	52° 17' 56"	1521.99	2829.64
(23)	150.00	175° 52' 48"	4170.22	460.45
(24)	3000.00	01° 35' 01"	41.46	82.92
(25)	3486.00	04° 56' 10"	150.25	300.32
(26)	200.00	65° 47' 38"	129.37	229.66
(27)	3438.00	36° 37' 01"	1137.57	2197.18
(28)	250.00	31° 12' 57"	69.84	136.21

LAYOUT

SCALE 1"=50'

L-10



BORDER LAST REVISED 4/11/2008

RELATIVE BORDER SCALE
IS IN INCHES

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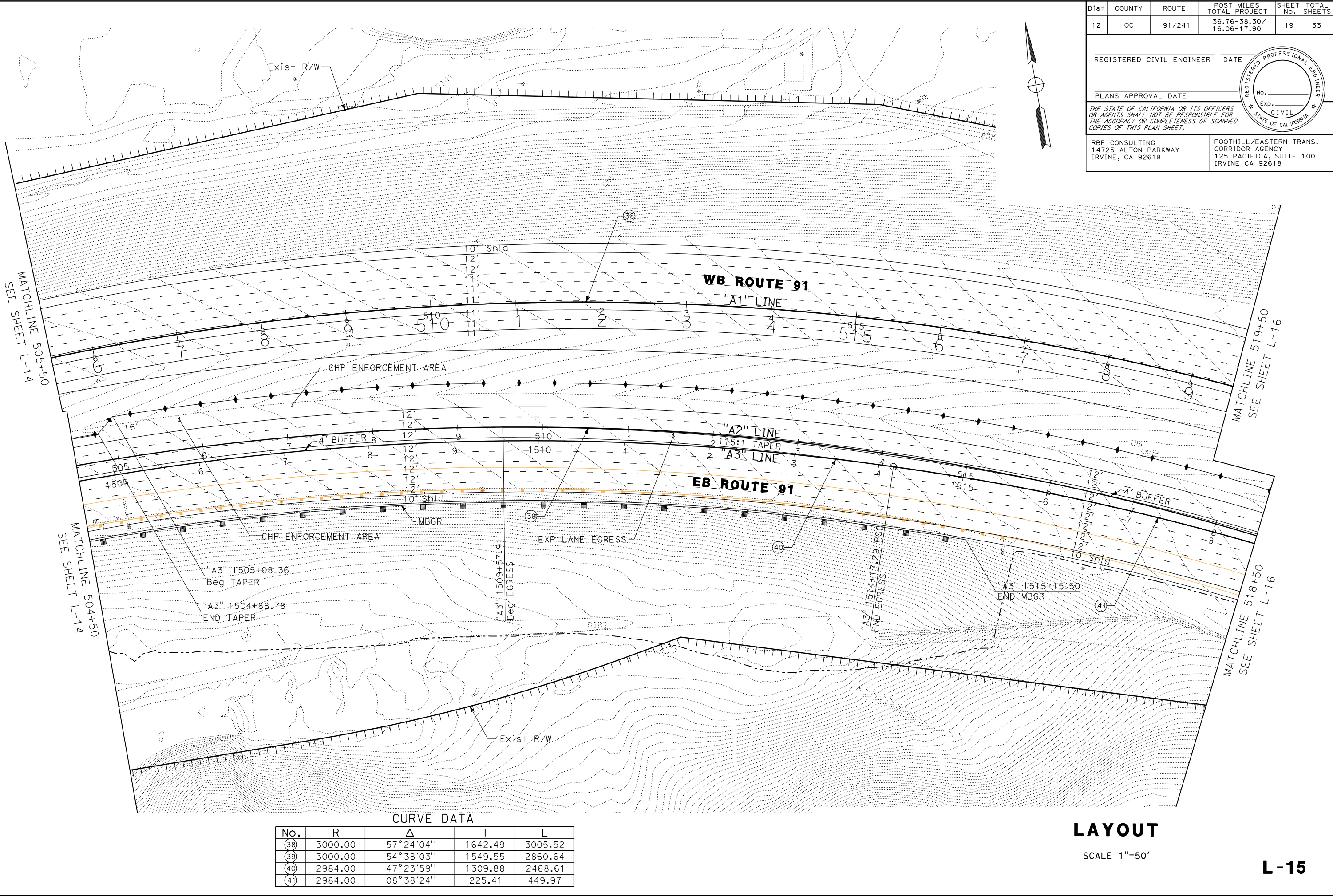
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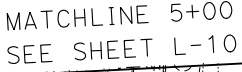
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CU	00000
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LAST REVISION	DATE PLOTTED => 8/17/2011
00-00-00	TIME PLOTTED => 9:48:57 AM





GYP SUM³ CANYON RD.

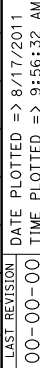
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FUTURE SANTA ANA
CANYON ROAD
(TO BE DONE BY OTHERS)

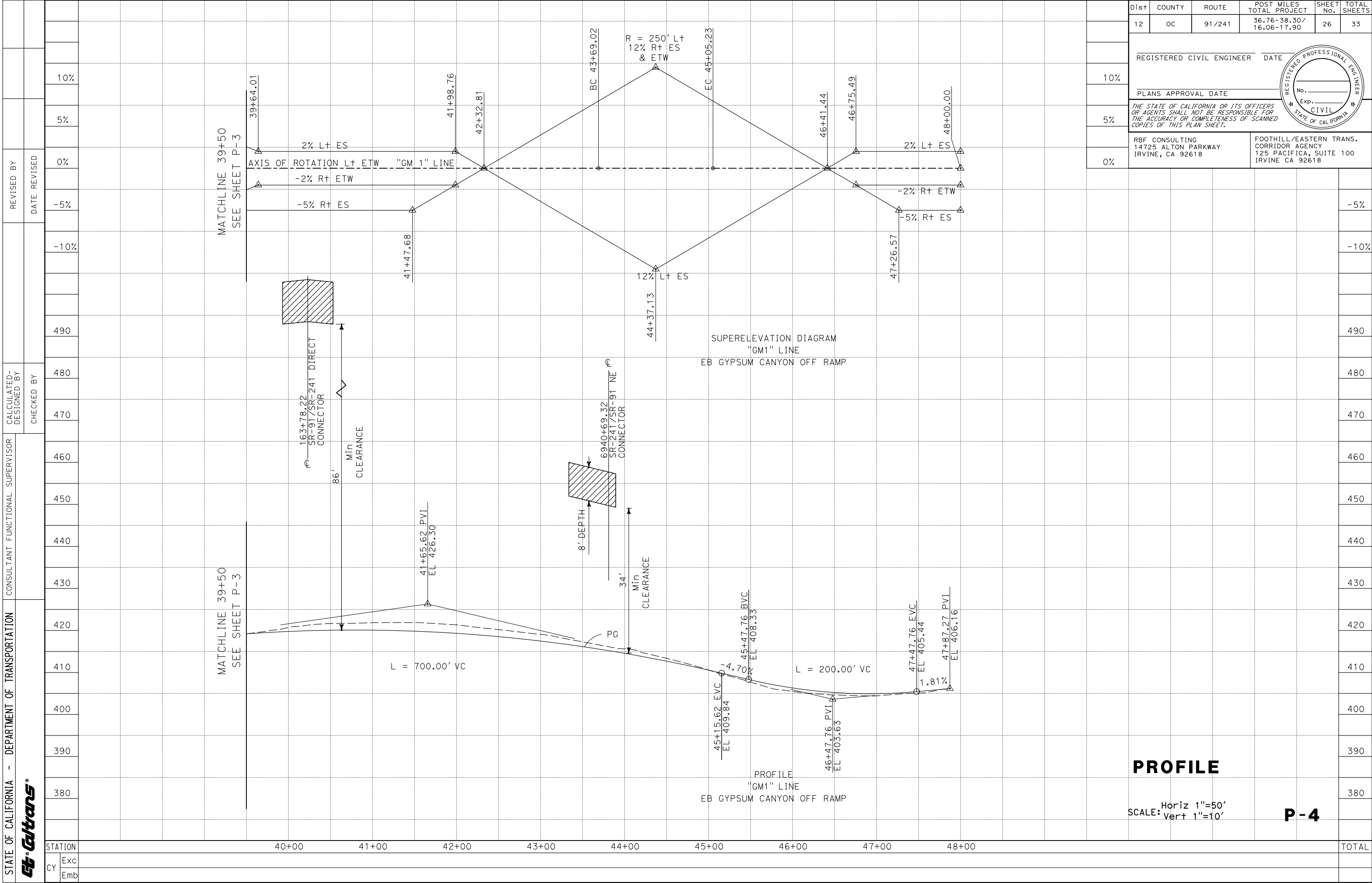
SCALE 1"=50'

L - 18

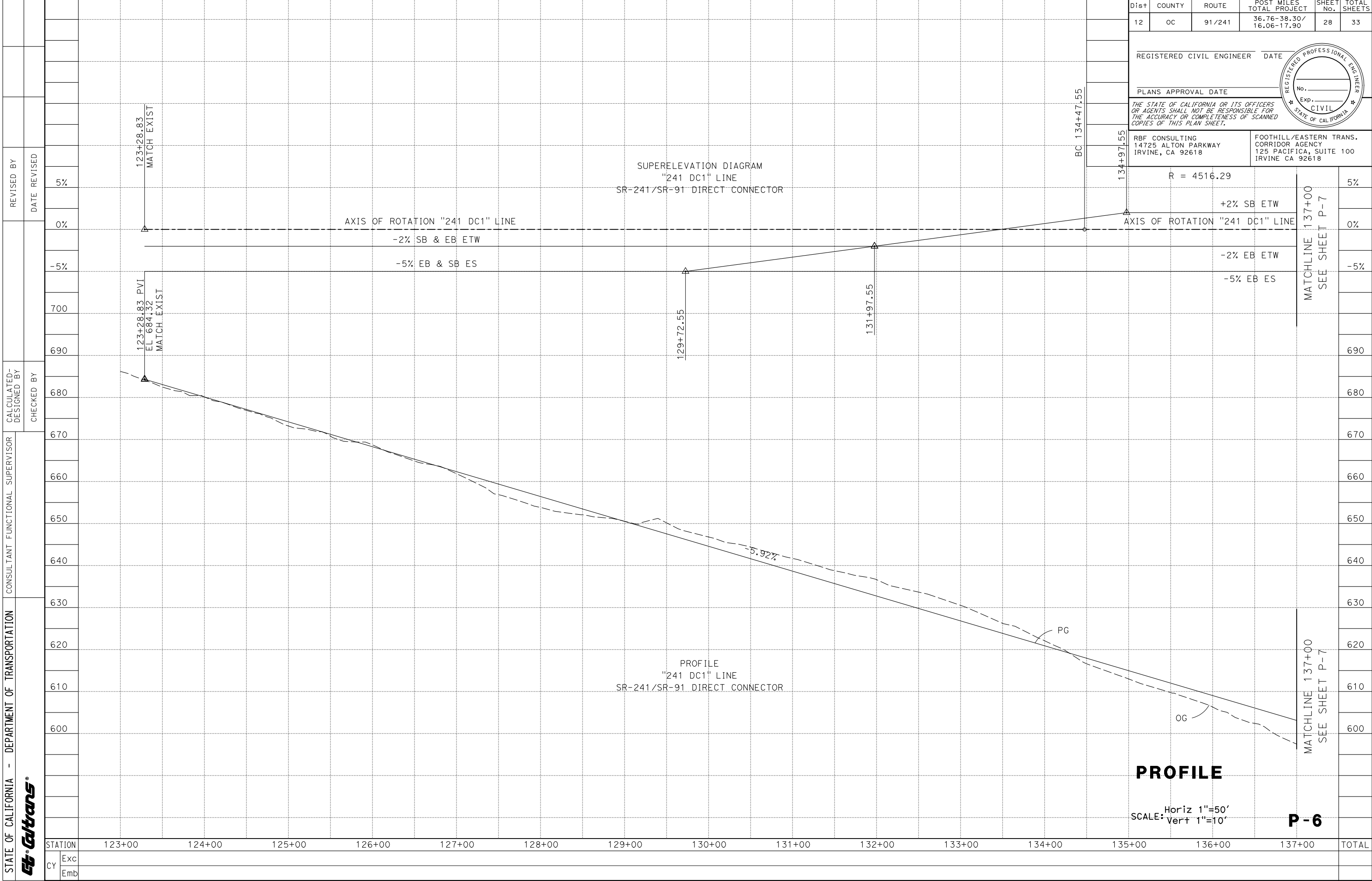
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CY	Exc																
	Emb																

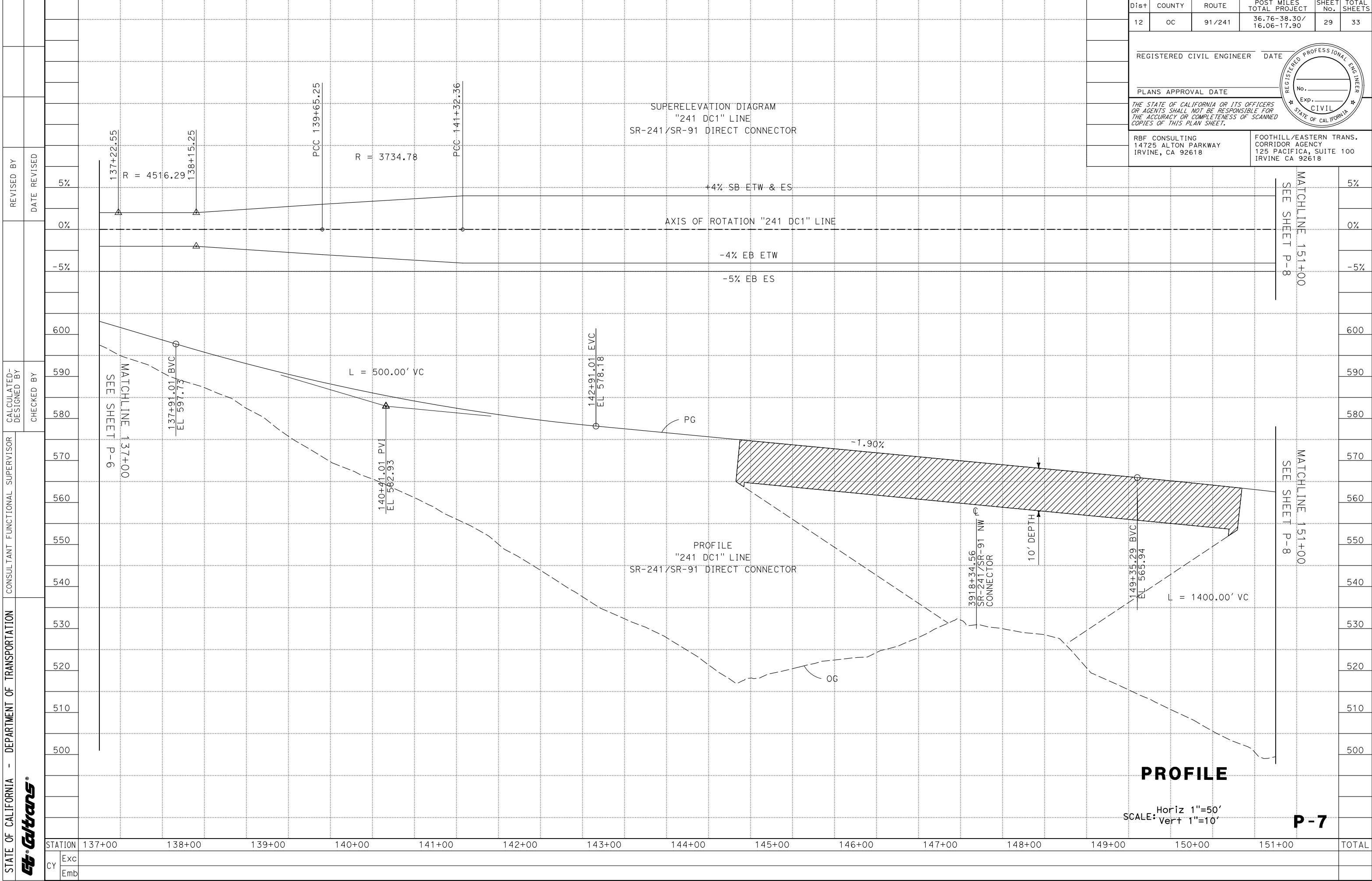


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DATE PLOTTED => 8/17/2011	LAST REVISION
TIME PLOTTED => 9:58:38 AM	00-00-00





STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION		CONSULTANT FUNCTIONAL SUPERVISOR		CALCULATED-DESIGNED BY		REVISOR		DATE		DIST		COUNTY		ROUTE		POST MILES TOTAL PROJECT		SHEET No.		TOTAL SHEETS	
										12		OC		91/241		36.76-38.30/ 16.06-17.90		30		33	
RBF CONSULTING 14725 ALTON PARKWAY IRVINE, CA 92618		FOOTHILL/EASTERN TRANS. CORRIDOR AGENCY 125 PACIFICA, SUITE 100 IRVINE CA 92618		REGISTERED CIVIL ENGINEER		DATE		REGISTERED PROFESSIONAL ENGINEER No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA		5%		PLANS APPROVAL DATE		THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.							
				0%																	
STATION		151+00 152+00 153+00 154+00 155+00 156+00 157+00 158+00 159+00 160+00 161+00																		TOTAL	
CY		Exc Emb																			

SUPERELEVATION DIAGRAM "241 DC1" LINE SR-241/SR-91 DIRECT CONNECTOR R = 3100'																			
+4% SB ETW & ES																			
AXIS OF ROTATION "241 DC1" LINE																			
-4% EB ETW																			
-5% EB ES																			
MATCHLINE 151+00 SEE SHEET P-07																			
MATCHLINE 160+50 SEE SHEET P-9																			
PG																			
L = 1400.00' VC																			
156+35.29 PVI EL 552.64																			
PROFILE "241 DC1" LINE SR-241/SR-91 DIRECT CONNECTOR																			
SCALE: Horiz 1"=50' Vert 1"=10'																			
P-8																			

LAST REVISION	DATE PLOTTED => 8/17/2011
00-00-00	TIME PLOTTED => 10:00:11 AM

[illegible]

Right of Way Data Sheet (Alternative 1)

To: Caltrans, District 12 Date: October 18, 2011
 Attention: Dist 12 Co ORA Rte 241 P/M 36.1 Rte 91 P/M 14.7-17.9
 Subject: Right of Way Data EA 0K970K
 Project Description SR-241 / SR-91 Direct Connector
 Alternate No. 1 (Build Alt.)

This Alternate meets the criteria for a Design/Build project: Yes ☒ No ☐

1. Right of Way Cost Estimate: To be entered into PMCS COST RW1-5 Screens.

	Current Value Future Use	Escalation Rate	Escalated Value
A. Total Acquisition Cost			<u>\$ 2,000</u>
Acquisition, including Excess Lands, Damages, and Goodwill.	<u>\$ 0</u>	<u>10%</u>	<u>\$ 0</u>
Project Permit Fees.			<u>\$ 2,000*</u>
B. Utility Relocation (Owner Share)	<u>\$ 27,000</u>	<u>10%</u>	<u>\$ 29,700</u>
C. Relocation Assistance	<u>\$ 0</u>	<u>%</u>	<u>\$ 0</u>
D. Clearance/Demolition	<u>\$ 0</u>	<u>%</u>	<u>\$ 0</u>
E. Title and Escrow	<u>\$ 0</u>	<u>%</u>	<u>\$ 0</u>
F. Total Estimated Cost	<u>\$ 27,000</u>		<u>\$ 31,700</u>
G. Construction Contract Work	<u>\$ 0</u>		

(These are construction costs that are
to be included in the projects PS&E.)

*Note: Does not include costs for inspection during construction. Initial cost for permit fees.

2. Current Date of Right of Way Certification: N/A

3. Parcel Data: To be entered into PMCS EVNT RW Screen.

Type	Dual/Appr	Utilities	RR Involvements	
X	N/A	U4-1	None	X
A	N/A	-2	C & M Agrmt	
B	N/A	-3	Sve Contract	
C	N/A	-4	Design	
D	N/A	U5-7	Const.	
E	XXXX	-8	Lic/RE/Clauses	
F	XXXX	-9		
Total	0		Misc. R/W Work	
			RAP Displ	N/A
			Clear/Demo	N/A
			Const Permits	N/A
			Condemnation	N/A
			Excess	0

Areas: R/W 0 sf No. Excess Parcels 0
 Entered PMCS Screens / / by
 Entered AGRE Screen (Railroad data only) / / by

4. Are there any major items of construction contract work? Yes ☐ No ☒ (If "Yes", explain)

5. Provide a general description of the right of way and excess lands required (zoning, use, major improvements, critical or sensitive parcels, etc.). No right of way required. ☒

Right of way acquisition is not required for the proposed project.

6. Is there an effect on assessed valuation? Yes ☐ Not Significant ☐ No ☒ (If "Yes", explain)

7. Are utility facilities or rights of way affected?

Yes ☒ No ☐ (If "yes", attach Utility Information Sheet, Exhibit 4-EX-5.)

The following checked items may seriously impact lead time for utility relocation:

- ☐ Longitudinal policy conflict(s)
 - ☐ Environmental concerns impacting acquisition of potential easements
 - ☐ Power lines operating in excess of 50 KV and substations
- (See attached Exhibit 4-EX-5 for explanation.)

Utility relocations are not anticipated. However, utility verifications will be required. The following existing utilities are within or adjacent to the project construction area:

- Southern California Gas Company
- AT&T California
- Southern California Edison (Distribution)
- Sprint
- Metropolitan Water District of Southern California
- Questar Line 90 Company
- Transportation Corridor Agencies

These utilities will be protected in place and any potential interference with any existing utilities will be designed around these utilities. Utilities in the project vicinity will need to be potholed prior to PS&E to determine utility depths to avoid potential conflicts. Preliminary contacts have been initiated with utility owners and the scope of project communicated. Utility coordination and verification will continue through PS&E and construction.

8. Are Railroad facilities or rights of way affected?

Yes ☐ No ☒ (If "Yes", attach Railroad Information Sheet, Exhibit 4-EX-6.)

9. Were any previously unidentified sites with hazardous waste and/or material found?

Yes ☐ None Evident ☒ (If "Yes", attach memorandum per R/W Manual, Chapter 4, Section 4.01.10.00.)

10. Are RAP displacements required? Yes ☐ No ☒ (If "Yes", provide the following information.)

No. of single family _____ No. of business/nonprofit _____

No. of multi-family _____ No. of farms _____

Based on Draft/Final Relocation Impact Statement/Study dated _____ N/A _____, it is anticipated that sufficient replacement housing (will/will not) be available without Last Resort Housing.

11. Are there Material Borrow and/or Disposal Sites required? Yes ☒ No ☐ (If "Yes", explain)

It is anticipated that a material borrow site will be required due to the likely use of MSE walls and fill for the structure approach within the SR-91 median.

12. Are there potential relinquishments and/or abandonments? Yes ☐ No ☒ (If "Yes", explain)

13. Are there any existing and/or potential airspace sites? Yes ☐ No ☒ (If "Yes", explain)

14. Indicate the anticipated Right of Way schedule of lead time requirements. (Discuss if district proposes less than PMCS lead time and/or if significant pressures for project advancement are anticipated).

Based on the R/W requirements on Page 1 of this Data Sheet, R/W will require a lead time of N/A months* from the date regular appraisals can begin to project certification.

In any event, RW Maps will require N/A months from Final Maps to project certification.

15. It is anticipated that Caltrans staff perform all Right of Way work? Yes ☐ No ☒ (If "No," discuss).

Right of way activities, if any, will be conducted by the TCA's right-of-way consultant. Legal descriptions and exhibits will be prepared by consultants and approved by the Department if required.

Evaluation Prepared By:

Right of Way: Name: Alan Su, P.E. Date 10/18/2011

Railroad: Name Alan Su, P.E. Date 10/18/2011

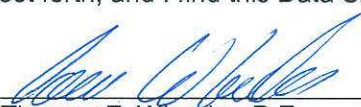
Utilities: Name Alan Su, P.E. Date 10/18/2011

Recommended for Approval:



Alan Su, P.E.
Senior Associate
RBF Consulting

I have personally reviewed this Right of Way Data Sheet and all supporting information. I certify that the probable Highest and Best Use, estimated values, escalation rates, and assumptions are reasonable and proper subject to the limiting conditions set forth, and I find this Data Sheet complete and current.



Thomas E. Wheeler, P.E.
Corridor Manager - Design
Transportation Corridor Agencies

10/19/11

Date

PSR-PDS Comment Response Matrix

CALTRANS TECHNICAL COMMENT REVIEW AND RESPONSE FORM				
SR91/SR241 MEDIAN-TO-MEDIAN CONNECTOR				
EA: 0C970K PROJECT ID#: 1200020097 IMPLEMENTING AGENCY: OCTA CONSULTANT: <u>RBF CONSULTING</u>				
ACTION CODE: A=WILL COMPLY; B=WILL FURTHER EVALUATE IN NEXT PHASE; C=DELETE COMMENT;				
DOCUMENT TITLE AND DISTRIBUTED DATE: 90% PSR(PDS) August 23, 2011		REVIEW DISCIPLINE:	REVIEWED BY DATE:	TOTAL PAGES: THIS PAGE:
ITEM NO.	DRAWING NO., SPEC. OR CALC.	COMMENT	REVIEW ACTION	FINAL DISPOSITION
		ENVIRONMENTAL BRANCH		
1	Report: Title Page	Please use the correct Expenditure Authorization "0K970K" and include "Project ID # 1200020097". Correct where appropriate.	A	Report has been revised.
2	Report: Page 8	Environmental Determination Document: For both the PEAR and the PSR/PDS, please revise to say: "The additional Environmental Document will either be a Revalidation/Addendum or a new Environmental Document".	A	Report has been revised.
3	Report: Page 8	Environmental Determination Document: It should be noted that although the old Environmental document does mention HOV to HOV connectors, Air, Noise, and Traffic Study analyses specifically for the connectors, were not prepared. Also, a new soundwall have been proposed outside of the study area.	A	Comment noted. The proposed project does not have any soundwall within the project study area.
4	Report: Page 9	Environmental Determination Document: Please include Traffic Study, Geotechnical Survey Report, Community Impacts Assessment, visual Impacts Assessment, and Floodplain/Hydraulics Encroachment Report in the paragraph regarding technical studies.	A	A separate Floodplain/Hydraulics Encroachment Report is not anticipated to be required but will be discussed in the Addendum document.
5	Report: Page 11	Funding: Verify that there are no federal funds involved for this project.	A	The proposed project does not have any federal funds.
6	Report: Page 11	District./Project Contacts: Please replace "Kathleen Dove" with Bahar Heydari. Her contact number is 949-724-2703	A	Report has been revised.
7	Report: Page 11	Attachments: Please include "Right of Way Data sheet (Alternative One) before the PEAR.	A	Report has been revised.
8	Report:	Attachments: The PEAR should be signed and approved.		Comment noted. The PEAR should be signed and approved by Caltrans staff.
8a	Report: Page 8	Environmental Determination Document: Please disregard the statement about a new soundwall being proposed outside the original study area.	A	Comment noted.

8b	Report: Page 9	Environmental Determination Document: In regards to the tie back wall being proposed, ROW acquisition will be required in order to build the tie back wall. Furthermore, it is imperative to include Aesthetic treatment for the wall as part of the Visual Impact Assessment as well as the Geotechnical Report (this comment ties in to comment #4 of the previous comments)	A	1. The proposed project does not have any proposed tie-back wall. Plan sheet has been revised. Additionally, the proposed project is within the existing Caltrans right of way, therefore, no right of way acquisition will be required. 2. Visual Impact Assessment and Preliminary Geotechnical Report will be developed during the PA&ED phase.
8c	Report: Alternative Concepts 1 through 6	Figures #1 & 2: Clarify why Alternative Concept #1 is entitled Two Lane HOV Connector to Existing 91 Express Lanes, and Alternative Concept # 2 is entitled as Four Lane HOT Connector To Existing 91 Express Lanes. Why are the two maps labeled differently?	A	1. Alternative Concept (AC) #1 is one of the alternatives from the Feasibility Study. This alternative consists of one lane in each direction connector for HOV only. However, this AC can also be operated as a High Occupancy Toll (HOT) facility as described in the Feasibility Study. 2. AC #2 is one of the alternatives from the Feasibility Study. This alternative consists of a four-lane connector to the existing SR-91 Express Lanes. This alternative was defined as a HOT connector facility in the Feasibility Study report.
9	Report	During the Design Phase, the final plans will need to depict any Environmentally Sensitive Areas (ESAs)	A	Comment noted.
		RIGHT-OF-WAY BRANCH		
11	Report	There is no discussion in the Report regarding the utility involvement?	A	This discussion is included in the Right of Way Data Sheet.
12	Report	There is no discussion in the report regarding no other R/W involvement (Acquisition & Railroad).	A	This discussion is included in the Right of Way Data Sheet.
13	Report	Section 12, should add District Contact, Robert Enriquez, (949) 724-2406	A	Report has been revised.
14	Report	Data Sheet indicates there is \$2,000 for permits, and \$29,700 for utility	A	Comment noted.

		relocation, for total R/W cost of \$31,700. Cost needs to be included in project cost.		
15	R/W Data Sheet: Page 2	Item 7 needs to be corrected to show Yes.	A	Right of Way Data Sheet has been revised.
		PROJECT STUDIES UNIT BRANCH		
16	Design Exception	General: Review of the attached preliminary geometric layout sheets indicate both Advisory and Mandatory non-standard features exist. All non-standard design features must be shown in the report for each viable alternative.	A	The proposed connector project consists only Advisory non-standard design feature. The non-standard westbound travel lane widths of 11 ft. are part of the proposed SR-91 CIP project.
17	Design Exception	A non-standard lane width of 11' exists elsewhere in the layout sheet. This information may not be correct from a recently completed SR-91 Eastbound Widening Project from SR-241 to SR-71 that widened these lanes to 12' to meet current standards. However, an 11' lane will require a Mandatory Fact Sheet. Justification for an 11' lane may be difficult when a recent project was just completed to standardized the lane widths.	A	The westbound non-standard travel lane widths are being proposed and implemented as part of the SR-91 CIP project. The proposed connector project does not have non-standard travel lane widths. Therefore, mandatory non-standard design exception fact sheet is not required.
18	Design Exception	Review of the layout sheets show that there could be a non-standard Stopping Sight Distance elsewhere. This will require a Mandatory Fact Sheet.	A	Based on the proposed connector geometry, we do not have any Stopping Sight Distance (horizontal and vertical) issue. Any additional non-standard features will be addressed in the PA&ED phase.
19	Report	Title Sheet: To read "Project Study Report – Project Development Study (PSR-PDS)"	C	This is consistent with the Project Study Report – PDS template as defined in the Project Development Procedures Manual (PDPM.)
20	Report	Second Sheet: Title for this sheet is "Vicinity Map"	A	Report has been revised.
21	Report	Introduction: Under Funding Source: Any federal funds for this project? Section * refers to NEPA compliance. Last paragraph/Last sentence to read: "A project report.....of the selected alternative"	A	There is no federal funding for this project.

22	Report	General: The alternatives must show that the proposed improvements shall not degrade the overall operational integrity of both the mainline SR91 and SR241. During the PA&ED phase, a detailed traffic analysis, with current traffic numbers, shall be developed to show compatibility and improvements to the level of service from the existing condition.	A	Comment noted. A detailed traffic analysis will be included in the PA&ED phase.
23	Report	Alternatives: A standard alternative was not discussed in the report. For a PSR/PDS, a standard alternative needs to be included and discussed in the report.	A	Alternative 4 is a full standard alternative as discussed on page 8 of the report.
24	Report	The feasibility study (page 9) recommended AC#1, AC#3, and AC#4 carry forward to the PSR/PDS for further study. It was mentioned that variations will need to be explored. However, the PSR/PDS showed only AC#1 and rejected AC#3 and AC#4 without discussing whether any variations of these alternatives were even considered.	A	AC#3 and 4 were discussed on page 8 of the report including reasons for rejections. Variations of the basic concepts explored in AC#3 and 4 would not eliminate the reasons why that they were rejected.
25	Report	General: This report is being reviewed and commented on as a stand-alone project. The planning of an unfunded ultimate project offers any justification or mitigation for this project's nonstandard features.		Comment noted.
26	Cooperative Agreement	Section 46: List all required environmental permits	B	This information will not be known until the PA/ED phase and will be included in the Project Report.
27	Cooperative Agreement	Signatures: Replace Frank Lin with Adnan Maiah	A	Agreement has been revised.
28	Report	Section 4 Deficiencies: Need to identify all secondary deficiencies (deficiencies that should be addressed when scoping the project, but not related directly to the stated need and purpose)?	B	Comment noted.
29	Report	Alternatives: The report should additionally discuss the boundaries of the study area required for formal investigations during the PA&ED phase, resources needed to complete the engineering, environmental, and right of way studies to achieve PA&ED, estimated order of magnitude of capital cost for each alternative, discuss Stormwater Best Management Practices that could affect the project cost, discuss Context Sensitive Solutions or Complete Streets that could affect the estimated resources and PA&ED delivery milestone date. Briefly discuss any constructability issues such as full closure and staged construction.	B	Comment noted.
30	Report	Schedule: Update as necessary	A	The current schedule in the PSR-PDS is still valid. A better defined schedule will be provided in the PA/ED phase of the project.
31	Report	District Project Contacts: Replace Jose Hernandez to Gary Slater (949)	A	Report has been revised.

		756-7685		
		TRAFFIC STUDIES BRANCH		
32	Report	General: A Median Barrier Study will be required in the next Phase	A	Comment noted.
33	Report	General: A Traffic Safety Analysis will be required in the next phase. Caltrans is required to prepare the Traffic Analysis. TCA will need to coordinate closely with Caltrans Traffic Safety Branch in developing this report.	A	Comment noted.
34	Report	General: Pertinent requirements to Chapter 7 of the latest version of the Caltrans Traffic Manual shall be adhered to.	A	Comment noted.
35	Report	General: All traffic volumes, accident data and other traffic data must be updated for use in the PA&ED Phase.	A	Comment noted.
36	Report	General: A new crash testing study has recently been completed by Caltrans HQ. Relevant findings for the report indicates that attachments on top of a concrete barrier or guard rail, except barrier markers or chain link fence, are a potential snagging issue as vehicles roll into the barrier during impact and their hoods override the top. Other attachments, such as sign post or electroliers, may be placed on top of concrete guard rail based on the following restrictions to prevent snagging: (a) The top of the barrier is ramped up to 48", at minimum 4:1 slope, where the attachment is placed or (b) the barrier is widened at minimum 20:1 taper on the approach side to provide a minimum 14-inch setback from the attachment to the face of the barrier. Further safety requirements from this test is shown in Chapter 7 of the latest version of the Caltrans Traffic Manual.	A	Comment noted.
37	Report	Layout sheets show guard rails at various locations. Warrants for guard rails must be followed according to Chapter 7 of the current version of the Caltrans Traffic Manual.	A	Comment noted. Additional analysis will be conducted during the PA&ED phase of the project.
38	Report	During the next phase, cross-slopes for the mainline SR-91 between PM 14.439 and PM 16.950 will need to be re-evaluated to avoid potential flooding. A hydraulic analysis of the facility may be required. This may impact the cost estimate for this project.	A	Comment noted.
		NPDES / STORM WATER UNIT		
39	General	A Water Quality Report will be needed for the Environmental Document at PA/ED to discuss effects to receiving water due to the project. Please ensure adequate resourcing.	A	Comment noted.
40	Report	Section 8 "Environmental Determination/Document" should include	A	Report has been revised.

		language for NPDES / Storm Water: “The limits of the proposed project are within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). This project must conform to all applicable water quality regulations and/or permit requirements of the State Water Resources Control Board (SWRCB) and any applicable local Regional Water Quality Control Board(s) (RWQCB), including, but not limited to the Caltrans Statewide NPDES Permit (Order No. 99-06-DWQ, NPDES No. CAS000003), the Statewide General NPDES Permit for Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002), and the Caltrans Storm Water Management Plan (June 2007), and any subsequent revision and/or additional requirements at the time of construction. A Storm Water Data Report (SWDR) will be prepared at PID, PA/ED, and PS&E phases. Caltrans-approved Treatment BMPs will be considered during planning and design phases.”		
41	SWDR	Cover Sheet i. Include the Project ID (EA) in the appropriate section.	A	Report has been revised.
42	SWDR	Section 1 Project Description i. Language of Purpose and Need is not to be included in this section. Please remove. ii. What are the length and width of the proposed connectors? iii. Does the calculated disturbed soil area of 25 acres include construction yards and stockpiles? If not, please include in the calculations. iv. This project falls under the Anaheim MS4 rather than the Orange County MS4. v. Of the 23.5 acres of net impervious surface, quantify the additional net impervious. vi. The Anaheim MS4 permit order number is “R8-2009-0030”not “RB8-2002-0010). Please double check the MS4 permit number for Riverside County.	A	Report will be revised as noted.
43	SWDR	Section 2 Site Data and Storm Water Quality Design Issues i. Verify with Environmental for season construction restrictions due to biological restrictions such as birds nesting and/or wildlife breeding time frames. ii. Discussion of Groundwater includes groundwater elevations. How far is the groundwater from the surface?	A	Will include statement about avoidance and minimization measures as determined by the Environmental Analysis Report. The groundwater elevations are an approximation based on a SWDR recently

		iii. Update this section with the calculated Risk Level. iv. Did the determination of Right-of-Way acquisition not being anticipated consider the needs to fulfill Treatment requirements?		approved in our project area. The project SWDR was for Santa Ana River Reach 9 Phase IIB Project approved September 2009 under encroachment permit no. 12-09-N-DD-0451. In the PS&E phase when a Geotechnical Report has been completed, the groundwater elevations will be updated. The calculated risk level will be included in this section. The permanent BMPs being explored are within the existing right of way.
44	SWDR	Section 4 Proposed Design Pollution Prevention BMPs i. Discuss how runoff will be conveyed from the connectors. ii. What is meant by: “There will not be placed off-limits to the Contractor”? iii. Narrative discusses that a portion of the road will be widened. Is roadway widening involved in this project?	B	Storm drain systems will be further evaluated during the PA/ED phase. The statement will be clarified. The existing roadway (SR-241) will be widened in the median then transition to direct connectors that drop in the median of SR-91.
45	SWDR	Section 5 Proposed Treatment BMPs i. The percentage WQV to be treated may be unknown, but state that the goal is 100%.	A	Comment noted.
46	SWDR	Evaluation Documentation Form (EDF) i. Please include the Project ID (EA) ii. Change the MS4 to Anaheim and correct the permit numbers.	A	Comment noted.
47	SWDR	Risk Level Evaluation i. Documentation for determination of the value for the K Factor needs to show how “0.26” was obtained. ii. Include documentation as to how the LS Factor Value was obtained.	A	Comment noted.
		TRAFFIC OPERATIONS		
48		General: There is no discussion or efforts shown to address the weaving that will be expected for traffic going NB on SR-241 who will be using the new connector then weaving across EB SR-91 to access SR-71	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project

		connector. Such weave needs to be analyzed and addressed. Earlier discussions on this project by consultant indicated that the Direct connector to SR-71 project will eliminate such weave by placing such move on a Structure to cross over SR-91 lanes and merge with SR-71. Such project is not expected to be funded in the near future according to District 8. A suggested mitigation was proposed by Ferdinand with PSR may provide such mitigation from an Operational standpoint. Such suggestion is to increase the toll charge significantly on the connector, then credit the users back at the next toll facility after passing the exit location to SR-71 to the normal planned rate. Such option will provide financial penalty to traffic who use the hot lane to access SR-71. It will not provide any financial penalty for Riverside long range commuter. From Traffic Operation's standpoint this will limit and possibly discourage such weaving traffic and will have minimal impact on SR-91 GP lane traffic.		Report. The weaving area between SR 241 and SR 71 will be modeled in detail and will be included in the Project Report. The traffic operational analysis being prepared for the PA/ED does not have a tolling/revenue component to test the sensitivity of the proposed toll mitigation on the Direct Connector.
49		On Page 10 under Caltrans Project Contacts, list Caltrans contacts title, and unit they represents from Caltrans. Also this project is not Under Jose Hernandez's area. It is under Gary Slater's area. You need to shown Gary Slater, PE, Branch Chief, Traffic Operations North (949) 756-7685 and show my name, Bassem Barsoum, MSCE, PE, Area Traffic Engineer (949) 724-2331	A	Report has been revised.
50		There is no traffic analysis discussion or even summary of performance to compare all concepts in this PSR PDS document. In the feasibility stage which took place back in 2008, I have seen some analysis done but no reference in this document to any study or even an appendix.	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report. The feasibility study did include detailed traffic analysis, and it is referenced in the PSR(PDS).
51		There is no travel time, delay performance comparison between the provided alternative concepts. This will need to be included as means of comparison.	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report.
52		Accident analysis shown on table 4-6 needs to further analyze the type of accident and discuss the cause of the accidents and how this project is expected to provide any potential improvement on certain type of accident. You need to get TSAR report to perform such study as part of the Accident Analysis and show your assessment and evaluation of such accident data.	A	Comment noted. Further traffic accident analysis will be conducted during the PA/ED phase of the project.

53		Under the discussion on " Rejected Alternatives", It shows that all alternatives (Concepts 2 through 6) were rejected except Alternative Concept # 1 with no discussion on traffic/ Operational performance. The dominating reason of being rejected .	A	A detailed traffic operational analysis is in progress as part of the ongoing PA/ED study and will be included in the Project Report.
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Preliminary Environmental Analysis Report



PRELIMINARY ENVIRONMENTAL ANALYSIS REPORT

1. Project Information

District 12	County ORA	Route 91 241	PM 17.95 (SR-91) 36.10 (SR-241)	EA
Project Title: SR-241/91 Express Lanes Direct Connector Project				
Project Manager Lisa Ramsey, Caltrans District 12			Phone # (949) 724-2102	
Project Engineer Alan Su, RBF			Phone # (949) 855-5788	
Environmental Office Chief/Manager Charles Baker, Caltrans District 12			Phone # (949) 724-2252	
PEAR Preparers Lisa Williams and Nicole West, LSA			Phone # (949) 553-0666	

2. Project Description

Purpose and Need

The median to median connector (Project) was previously evaluated in the ETC Final EIR/EIS. As stated in the Final EIR/EIS, the overall objective of the proposed ETC project was to accommodate traffic growth associated with planned and approved development in Orange County. Specifically, the ETC project was proposed to meet the following objectives:

- To provide relief for existing freeways;
- To help achieve the Regional Mobility Plan goals of reducing emissions from transportation sources;
- To improve traffic flow on the regional transportation system
- To reduce current and projected congestion and air pollution along portions of SR-91, Costa Mesa Freeway (SR-55) and I-5 by providing an alternative travel route in northeast Orange County;
- To service existing and planned development consistent with the General Plans of the County and the cities in areas that will benefit from the project;
- To employ advanced transportation technology for the maximum operational and design efficiency and automatic vehicle monitoring for toll collections; and

- To implement the County of Orange Master Plan of Arterial Highways.

The purpose of the Project is to implement the buildout of the ETC as approved in 1994, be compatible with the proposed SR-91 Corridor Improvement Project (CIP), while minimizing environmental and financial impacts. The study area includes the SR-241 from the SR-91/SR-241 interchange to 12,600 feet south of the interchange and SR-91 from the SR-91/SR-241 interchange to the Coal Canyon/SR-91 Undercrossing.

The need for the project arises from the lack of connectivity between SR-241 and SR-91 Express Lanes, which results in a variety of deficiencies that negatively affect traffic flow and worsen an already congested SR-91 during peak hours. These deficiencies are described below.

- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes. Access from northbound SR-241 to eastbound SR-91 is provided by means of a two-lane connector that merges with the SR-91 general-purpose lanes.
- Northbound SR-241 motorists that want to use the eastbound SR-91 HOV lanes must weave across four lanes to access them.
- Westbound SR-91 Express Lanes cannot access southbound SR-241. Access from westbound SR-91 to southbound SR-241 is provided by means of a two-lane connector that diverges from the general-purpose lanes. The limitations of the existing interchange connections require that vehicles using the westbound SR-91 high-occupancy vehicle (HOV) lane weave across four lanes to access the southbound SR-241 connector ramp.

Description of Work

The Transportation Corridor Agencies (TCA), in cooperation with the California Department of Transportation (Department), proposes to construct new direct connectors between SR-241 and SR-91. The connector would bring lanes from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of southbound SR-241. A parallel lane that merges into the existing 91 Express Lanes would be needed for the northbound SR-241 to eastbound SR-91 movement. The connector would be tolled and compatible with the extension of the 91 Express Lanes into Riverside County.

The project was previously evaluated in the ETC EIR/EIS. The Systems Management Concept (SMC) for the ETC project proposed that each build alternative would be staged, incorporating general purpose traffic and eventually HOV lanes, to meet the forecasted demand. Under the SMC, ETC construction would be completed in one stage and three or more phases. The HOV lane connectors were identified for Phase 2 of the ETC project.

The project location and vicinity are shown in Figure 1, and the study area is shown in Figure 2; all figures are attached. For this Preliminary Environmental Analysis Report

(PEAR), the study area includes the project limits within the existing right-of-way. Construction access and staging areas would occur within existing right-of-way.

Alternatives

The Orange County Transportation Agency (OCTA) prepared the 91 Express Lanes Extension and State Route 241 Connector Feasibility Study in March 2009. The objectives were to:

- Develop and evaluate concepts for a median-to-median connection between SR-241 and the 91 Express Lanes;
- Identify where to drop and start the added lanes merging to and from SR-241; and
- Propose how an extension of the new median-to-median connection could be integrated into planned freeway improvements in Orange County and Riverside County.

Initially, six Build Alternatives were studied in the feasibility study, and three of these were rejected (Alternative Concepts 2, 5, and 6) during the screening process. A description of the rejected alternatives is provided below.

Alternative Concept 2. The concept is a four-lane high-occupancy toll (HOT) connector to the existing 91 Express Lanes. This alternative is similar to the Alternative Concept 4 except that no additional capacity would be added to the 91 Express Lanes. The additional traffic added to the Express Lanes would result in potential capacity deficiencies (whether or not the Express Lanes were extended) and weaving issues (if the Express Lanes were not extended). Further study of Alternative Concept 4 rather than Alternative Concept 2 would allow the logical termination point for the proposed third Express Lane between SR-241 and SR-71 to be determined based on needed capacity. Therefore, this alternative concept was rejected in favor of Alternative Concept 4.

Alternative Concept 5. This concept is a four-lane toll connector to the extended 91 Express Lanes (to I-15). Alternative Concept 5 is similar to Alternative Concept 4, except that the third Express Lane extends to I-15. The section of SR-91 between SR-71 and I-15 is constrained, and adding a third Express Lane would result in significant right-of-way impacts in the City of Corona. The physical constraints were considered a fatal flaw to the feasibility of Alternative Concept 5.

Alternative Concept 6. This concept would provide a SR-241/SR-71 Direct Toll Connector for SR-241 and SR-71 traffic. This would be a relatively high-cost concept and only focused on a specific portion of the travel demand between SR-241 and SR-71. Given the physical challenges and cost of this concept, the other alternatives were viewed as more feasible. It was not recommended for further consideration.

During preparation of the Project Study Report/Project Development Support (PSR/PDS), the remaining build alternatives were evaluated, and Alternatives 3 and 4 were rejected. A description of these alternatives is provided below.

Alternative 3 (Two-lane Reversible HOT Connector). This concept is a reversible two-lane connector. Although the concept of a reversible connector was feasible from a design consideration, the additional traffic associated with a tolled connector would be an issue for the Express Lanes, and not the connector itself. The two-lane connector provides sufficient capacity, but the concept would not include any additional capacity on the critical section of the Express Lanes east of SR-241. While the connector could be built, it would not address the project objective of improving traffic congestion.

Alternative 4 (Four-lane Toll Connector). This concept provides a four-lane connector and addresses the operational issues of the additional traffic in the Express Lanes by widening the Express Lanes to three lanes in each direction to approximately the SR-71 interchange. It provides a median-to-median connection and addresses issues of congestion relief, but the concept would have significantly higher costs and is not consistent with the ETC EIR/EIS.

Proposed Build Alternative.

Alternative 1 (Two-lane HOV Connector). Alternative 1 allows for tolled vehicles and HOVs to bypass congestion via a median-to-median connection between SR-241 and SR-91. The connection to the existing Express Lanes could be done with standard HOV tapers, which would not require extensive widening of SR-91. The physical footprint of the concept would be compatible with potential future improvements to SR-91. Also, it is consistent with the ETC EIR/EIS. Alternative 1 is the recommended build alternative.

No Build Alternative. Under this alternative, no direct connector would be constructed between SR-241 and SR-91. This alternative would not close the toll connector gap between the SR-241 and the SR-91.

3. Anticipated Environmental Approval

CEQA		NEPA	
Environmental Determination			
Statutory Exemption	☐		☐
Categorical Exemption	☐	Categorical Exclusion	☐
Environmental Document			
Initial Study or Focused Initial Study with Negative Declaration or Mitigated ND	☐	Environmental Assessment with Finding of No Significant Impact	☐
Environmental Impact Report	☐	Environmental Impact Statement	☐
CEQA Lead Agency (if determined):		Caltrans District 12	
Estimated length of time (months) to obtain environmental approval:		12 Months	
Estimated person hours to complete identified tasks:		1,523 hours	

Based on the project description, Alternative 1 is anticipated to qualify for a Revalidation/Reevaluation and Addendum of the previously approved EIR/EIS.

It is not anticipated that the build alternative would substantially impact natural, cultural, recreational, or historic resources or air quality, water quality, or the noise environment.

4. Special Environmental Considerations

The project will be required to go through the Section 7 Consultation Process between the Department and United States Fish and Wildlife Service (USFWS) to comply with the federal Endangered Species Act (ESA) consistent with the Biological Opinion for the ETC EIR/EIS.

5. Anticipated Environmental Commitments

Environmental commitments may be required for air quality, noise, water quality, visual, hazardous waste, and cultural resources impacts.

Environmental commitments for temporary and permanent impacts to sensitive biological resources will be required. Bird species covered by the federal Migratory Bird Treaty Act (MBTA) may be present in the study area during construction. Avoidance and minimization measures would be required. For this project, biological resources mitigation could include restricted construction scheduling, habitat enhancement, habitat restoration, and/or habitat replacement.

6. Permits and Approvals

The following is a list of regulatory permits anticipated to be required for the proposed project:

- National Pollutant Discharge Elimination System (NPDES) Permit (Notice of Intent to Comply with the General Construction Permit)
- State Right-of-Way Encroachment Permit
- Section 7 Consultation with USFWS

7. Risks and Assumptions

The project will be designed to be compatible with the SR-91 CIP and to tie into this project after construction. Delays in the SR-91 CIP schedule would result in corresponding delays of the proposed project. It is possible that external factors beyond Department/TCA control, such as resources agency staffing shortages, may lengthen consultation time frames.

8. PEAR Technical Studies

- 8.1 Land Use:** The properties surrounding the study area are mostly vacant, although the Mountain Park residential development is proposed in the southeast quadrant of SR-241 and SR-91. Section 4(f) resources adjacent to the study area include: Featherly Regional Park, Chino Hills State Park, Green River Golf Club, and the Santa Ana River Trail. These properties are not anticipated to be impacted by the project; therefore, a Section 4(f) Resources report is not anticipated to be required. Any changes to land use impacts will be evaluated in the California Environmental Quality Act/National Environmental Policy Act (CEQA/NEPA) document
- 8.2 Growth:** Growth impacts have been previously evaluated in the EIR/EIS. Any changes to growth impacts will be evaluated in the Revalidation/Reevaluation and Addendum document
- 8.3 Farmlands/Timberlands:** The study area does not contain any designated farmlands/timberlands.
- 8.4 Community Impacts:** The project would be constructed entirely within Department right-of-way. Construction of the direct connector would be coordinated with construction of the SR-91 CIP in order to minimize the disruption in this area. Temporary lane closures may be required during construction. No other community impacts are anticipated.

- 8.5 Visual/Aesthetics:** Visual impacts were evaluated in the EIR/EIS. The Orange County Master Plan of Scenic Highways designates SR-91 as a Type I Scenic Highway (Viewscape Corridor). The Orange County segment of the study area falls within these boundaries. SR-91 is only designated as a State Scenic Highway between SR-55 and the City of Anaheim limits, which is outside of the study area. Changes to visual impacts will be evaluated in a Visual Memorandum.
- 8.6 Cultural Resources:** The records searches conducted as part of the feasibility study indicated that 40 surveys have been completed within the alternatives limits and a 0.5-mile (mi) radius. Two previously recorded sites are within the alternatives footprints. One resource, 33-10819/CA-RIV-6532H, is the remains of the town of Alta Vista, also known as the Green River Camp; it was determined not to be eligible for the National Register of Historic Places (National Register) per the State Historic Preservation Officer (SHPO) in a letter dated March 8, 2001. The other site is CA-ORA-303. This prehistoric site consists of several caves (rock shelters).

A windshield and pedestrian reconnaissance-level survey was conducted on February 25, 2008, and site CA-ORA-303 was closely examined. The site was completely destroyed during construction of SR-241. Nothing remains of the rock shelters.

The following documentation will be required: Native American consultation; an Area of Potential Effects map; a Supplemental Historic Property Survey Report (HPSR); and an updated Archaeological Survey Report (ASR).

- 8.7 Hydrology and Floodplain:** The most prominent water feature in the study area is the Santa Ana River, which runs parallel to SR-91. The study area along SR-91 north of the freeway is within the 100-year Flood Zone AE (Federal Insurance Rate Map [FIRM] No. 06059C0180J, December 3, 2009). For this FIRM, Zone AE identifies a special flood hazard area for which Base Flood Elevations have been provided. The project is not anticipated to encroach on the 100-year floodplain.
- 8.8 Water Quality and Storm Water Runoff:** Construction of the project is subject to the requirements of the NPDES Permit, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity (Order No. 99-08, NPDES No. CAS000002), and any subsequent statewide permit in effect at the time of construction. Permit compliance is anticipated to be sufficient to minimize erosion and construction-related water quality impacts during construction of the proposed project.

Operation of the project is subject to the requirements of the Statewide Storm Water Permit and WDRs for Caltrans (Order No. 99-08, NPDES No. CAS000003) or subsequent permit. The policy document for implementing the requirements of the NPDES permit are set forth in the Caltrans Storm Water Management Plan.

Consistent with the NPDES permits, construction site, design pollution prevention, and treatment best management practices (BMPs) will be implemented to minimize potential water pollution during construction and future operation of the proposed project. The feasibility of various treatment, design pollution prevention, and temporary construction BMPs will be documented in the Storm Water Data Report for the project. Construction site BMPs will be detailed in and implemented via a Storm Water Pollution Prevention Plan. A Water Quality Assessment will be prepared.

8.9 Geology, Soils, Seismic, and Topography: The following conditions are evident in the study area:

- The foundations at the south end of the connectors are expected to be located on either bedrock or shallow bedrock.
- The depth to bedrock increases from the Windy Ridge area toward Gypsum Canyon road along the alignment.
- The groundwater table is expected to be shallow and can be expected less than 20 feet (ft) from the surface at some locations.
- The alluvium at the eastern half may contain some potentially liquefiable layers.
- The central portion of the alignment may consist of medium dense to dense alluvial material.
- Multiple foundations were used for the existing connectors. The foundation consisted of spread footing, to cast-in-place drilled hole (CIDH) concrete piles, to H-piles. Where liquefaction was expected, the piles were designed to account for the downdrag loads.

Three other structures are also planned as part of the proposed improvements, including the wildlife structure on SR-241, the SR-91/SR-241 separation, and widening at Gypsum Canyon Road. Foundations for these structures could consist of CIDH piles and driven steel and/or concrete piles.

8.10 Paleontology: Based on the results of the locality and literature search, there are sediments in the immediate area of the project that have a high sensitivity for containing paleontological resources. Based on the geology, the project may encounter sediments from the Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation Pleistocene-aged alluvium and landslide deposits, and recent alluvium. All but the Santiago Peak Volcanics, landslides, and recent alluvium have high paleontological sensitivities. A Paleontology Study or Addendum will be prepared.

8.11 Hazardous Waste/Materials: Technical studies prepared for the SR-91 Eastbound Lane Addition project determined that off-site hazardous waste locations were not likely to have impacted the SR-91 alignment. The Aerially Deposited Lead (ADL) Survey conducted for this project found that soil could be reused on site in

compliance with the variances issued to Caltrans Districts 8 and 12 by the Department of Toxic Substances Control. Asbestos-containing materials were not found in accessible locations of affected bridge structures. For this project, a Hazardous Waste Initial Site Assessment (ISA), including a record search, will be required. A supplementary ADL Survey and Asbestos Survey may be required.

- 8.12 Air Quality:** Although the ETC EIR/EIS included an air quality analysis and received a conformity consistency determination from the Federal Highway Administration (FHWA), the air quality regulations have changed substantially since this document was approved. An Air Quality Analysis that analyzes both regional and project-level air quality will be prepared for the project in accordance with the Caltrans Transportation Project-Level Carbon Monoxide Protocol, the United States Environmental Protection Agency's (EPA) fugitive dust conformity rule, and the South Coast Air Quality Management District (SCAQMD) CEQA Handbook air quality guidelines. Conformity determinations will be made by Department staff, the Transportation Conformity Working Group, and FHWA.
- 8.13 Noise and Vibration:** The proposed project qualifies as a Type 1 project as defined in 23 Code of Federal Regulations (CFR) 772. Therefore, a Noise Screening prepared in accordance with the Caltrans Traffic Noise Analysis Protocol is required. The results of the screening will be compared to the Noise Abatement Criteria to determine the need for a Noise Study Report. If a Noise Study Report is warranted, it will determine the potential long-term traffic impacts of the proposed project and will determine if any noise abatement measures are required to be implemented.
- To minimize the construction noise impact for sensitive land adjacent to the project site, construction activities will comply with Caltrans Standard Specifications Section 14-8.02, "Noise Control," and Standard Special Provision S5-310, "Noise Control."
- 8.14 Energy and Climate Change:** It is anticipated that the project will reduce vehicle hours traveled (VHT) since it will reduce congestion. A vehicle miles traveled (VMT)/VHT analysis will be conducted as part of the traffic analysis and will be incorporated into the Air Quality Analysis. A quantitative assessment of greenhouse gas emissions will be conducted.
- 8.15 Biological Environment:** A literature review and analysis was conducted in 2008. This analysis identified a total of 73 special-interest species (species listed by the California Department of Fish and Game (CDFG) Natural Diversity Database as "Special Plants" or "Special Animals") as potentially present in the build alternatives limits, including 12 species currently listed as federal or State threatened or endangered. Of the 73 species listed, 40 have a moderate or high probability of being present in the study area, including three species listed as federal or State threatened or endangered. The three listed species include Branton's milkvetch (*Astragalus brauntonii*), least Bell's vireo (*Vireo bellii*

pusillus), and coastal California gnatcatcher (*Polioptila californica californica*). Least Bell's vireo, coastal California gnatcatcher, and southwestern willow flycatcher have been found in the Wardlow Wash and Prado Basin areas during prior focused surveys. California gnatcatcher critical habitat is designated in the Chino Hills State Park area.

The project would impact the undercrossing at SR-241 in Gypsum Canyon and the Gypsum Canyon undercrossing at SR-91. These undercrossings have a high potential for wildlife usage. The Coal Canyon undercrossing is an important regional wildlife corridor that connects the Santa Ana Mountains to the Chino Hills and Puente Hills; however, this crossing would not be impacted.

A Natural Environment Study (NES) will be prepared. Section 7 consultation consistent with the prior consultation on the ETC EIR/EIS will be required to help determine if any additional measures are needed to minimize impacts to biological resources.

8.16 Cumulative Impacts: There are two highway projects within the study area either in the planning, environmental, design, or construction phase (SR-241/SR-91 to Tustin Avenue and SR-91 CIP). The Mountain Park Specific Plan EIR has been approved but has not been developed. There is the potential for cumulative impacts to environmental resources and nearby sensitive receptors (air quality, biology, cultural, noise, and water quality). Cumulative impacts should be discussed within the technical reports prepared for the proposed project and the environmental document.

8.17 Context-Sensitive Solutions: Context-Sensitive Solutions (CSS) is an approach that considers the total context within which a transportation improvement project will exist. CSS principles include the employment of early, continuous, and meaningful involvement of the public and all stakeholders throughout the project development process. As the proposed project was evaluated in the EIR/EIS, public input has been provided. As the process progresses, additional opportunities will be available for public input and involvement through the project's public outreach program.

9. Summary Statement for PSR or PSR-PDS

A Revalidation/Reevaluation and Addendum document is anticipated for CEQA and NEPA compliance for the proposed project and is estimated to be completed in 12 months. The findings of the environmental technical studies to be prepared during the Project Approval/Environmental Documentation (PA/ED) phase for the proposed project may change this conclusion.

The proposed project:

- Would add express lanes in the existing median with minimal outside widening and median barrier replacement
- Would not involve large cuts and/or fills
- Would not result in displacements
- Would not generate a need for additional public utilities
- Would not result in changes to access control and local traffic patterns
- Would result in temporary construction impacts
- May impact sensitive biological resources

Required Technical Studies. To address potential impacts of the proposed project, the following studies will be required: Visual Memorandum, Supplemental HPSR, ASR, Water Quality Assessment Report, Paleontology Study or Addendum, Hazardous Waste ISA, Air Quality Analysis, Air Quality Conformity Analysis, and NES.

10. Disclaimer

This PEAR provides information to support programming of the proposed project. It is not an environmental determination document. Preliminary analysis, determinations, and estimates of mitigation costs are based on the project description provided in the PSR/PDS. The estimates and conclusions in the PEAR are approximate and are based on cursory analyses of probable effects. A reevaluation of the PEAR will be needed for changes in project scope or alternatives, or in environmental laws, regulations, or guidelines.

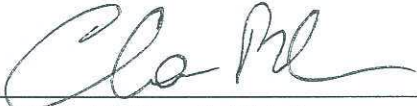
11. List of Preparers

Community Impacts Specialist Agnieszka Napiatek	Date: 5/19/11
Cultural Resources Specialist Debbie McLean	Date: 5/19/11
Biologist Richard Erickson	Date: 5/16/11
Noise and Vibration Specialist Jason Lui	Date: 5/17/11
Air Quality Specialist Keith Lay	Date: 5/17/11
Energy/Climate Change Specialist Eddie Torres	Date: 5/13/11
Paleontology Specialist Brooks Smith	Date: 5/19/11
Water Quality Specialist	Date: 5/9/11

Nicole West	
Hydrology and Floodplain Specialist Nicole West	Date: 5/9/11
Hazardous Waste/Materials Specialist Lisa Williams	Date: 5/23/11
Visual/Aesthetics Specialist Erin Razban	Date: 5/19/11
Other:	Date:
PEAR Preparers (Name and Title) Nicole West, Senior Environmental Specialist Lisa Williams, Associate	Date: 5/26/11

12. Review and Approval

I confirm that environmental cost, scope, and schedule have been satisfactorily completed and that the PEAR meets all Caltrans requirements. Also, if the project is scoped as an EA or EIS, I verify that the HQ DEA Coordinator has concurred in the Class of Action.



Environmental Branch Chief

Date: 11-21-2011



Project Manager

Date: 11-22-11

REQUIRED ATTACHMENTS:

Figures

Attachment A: PEAR Environmental Studies Checklist

Attachment B: Estimated Resources by WBS Code

Attachment C: Schedule (Gantt Chart)

ADDITIONAL ATTACHMENTS:

Attachment D: Cultural Resources Memorandum

Attachment E: Flood Insurance RATE Map

Attachment F: Paleontological Resources Memorandum

Attachment G: RTP Page

Attachment H: Biological Resources Memorandum

ATTACHMENT A
PEAR ENVIRONMENTAL STUDIES CHECKLIST

Attachment A: PEAR Environmental Studies Checklist

Rev. 11/08

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Land Use	☒	☐	☐	<u>L</u>	
Growth	☒	☐	☐	<u>L</u>	
Farmlands/Timberlands	☒	☐	☐	<u>L</u>	
Community Impacts	☒	☐	☐	<u>L</u>	
Community Character and Cohesion	☒	☐	☐	<u>L</u>	
Relocations	☒	☐	☐	<u>L</u>	
Environmental Justice	☒	☐	☐	<u>L</u>	
Utilities/Emergency Services	☒	☐	☐	<u>L</u>	
Visual/Aesthetics	☐	☒	☐	<u>L</u>	
Cultural Resources:	☐	☐	☒	<u>L</u>	
Archaeological Survey Report	☐	☐	☒	<u>L</u>	
Historic Resources Evaluation Report	☒	☐	☐	<u>L</u>	
Historic Property Survey Report	☐	☐	☒	<u>L</u>	
Historic Resource Compliance Report	☐	☐	☐	<u>L</u>	
Section 106 / PRC 5024 & 5024.5	☐	☐	☒	<u>L</u>	
Native American Coordination	☐	☐	☒	<u>L</u>	
Finding of Effect	☒	☐	☐	<u>L</u>	
Data Recovery Plan	☒	☐	☐	<u>L</u>	
Memorandum of Agreement	☒	☐	☐	<u>L</u>	
Other:	☒	☐	☐	<u>L</u>	
Hydrology and Floodplain	☒	☐	☐	<u>L</u>	
Water Quality and Stormwater Runoff	☐	☐	☒	<u>L</u>	
Geology, Soils, Seismic and Topography	☐	☐	☒	<u>L</u>	
Paleontology	☐	☐	☒	<u>M</u>	
PER	☐	☐	☒	<u>M</u>	
PMP	☐	☐	☒	<u>M</u>	
Hazardous Waste/Materials:	☐	☐	☒	<u>L</u>	
ISA (Additional)	☐	☐	☒	<u>L</u>	
PSI	☒	☐	☐	<u>L</u>	
Other:	☐	☐	☒	<u>L</u>	ADL/Asbestos
Air Quality	☐	☐	☒	<u>L</u>	
Noise and Vibration	☒	☐	☐	<u>L</u>	
Energy and Climate Change	☐	☐	☒	<u>L</u>	
Biological Environment	☐	☐	☒	<u>M</u>	
Natural Environment Study	☐	☐	☒	<u>M</u>	
Section 7:	☐	☐	☒	<u>M</u>	
Formal	☒	☐	☐	<u>L</u>	
Informal	☐	☐	☒	<u>M</u>	
No effect	☐	☐	☒	<u>M</u>	
Section 10	☒	☐	☐	<u>L</u>	
USFWS Consultation	☐	☐	☒	<u>M</u>	
NMFS Consultation	☒	☐	☐	<u>L</u>	
Species of Concern (CNPS, USFS, BLM, S, F)	☐	☐	☒	<u>M</u>	

Environmental Studies for PA&ED Checklist

	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Wetlands & Other Waters/Delineation	☒	☐	☐	<u>L</u>	
404(b)(1) Alternatives Analysis	☒	☐	☐	<u>L</u>	
Invasive Species	☐	☐	☒	<u>L</u>	
Wild & Scenic River Consistency	☒	☐	☐	<u>L</u>	
Coastal Management Plan	☒	☐	☐	<u>L</u>	
HMMP	☒	☐	☐	<u>L</u>	
DFG Consistency Determination	☒	☐	☐	<u>L</u>	
2081	☒	☐	☐	<u>L</u>	
Other:	☐	☐	☐	<u>L</u>	
Cumulative Impacts	☒	☐	☐	<u>L</u>	
Context Sensitive Solutions	☒	☐	☐	<u>L</u>	
Section 4(f) Evaluation	☒	☐	☐	<u>L</u>	
Permits:					
401 Certification Coordination	☒	☐	☐	<u>L</u>	
404 Permit Coordination, IP, NWP, or LOP	☒	☐	☐	<u>L</u>	
1602 Agreement Coordination	☒	☐	☒	<u>L</u>	
Local Coastal Development Permit Coordination	☒	☐	☐	<u>L</u>	
State Coastal Development Permit Coordination	☒	☐	☐	<u>L</u>	
NPDES Coordination	☐	☐	☒	<u>L</u>	
US Coast Guard (Section 10)	☒	☐	☐	<u>L</u>	
TRPA	☒	☐	☐	<u>L</u>	
BCDC	☒	☐	☐	<u>L</u>	

ATTACHMENT B

ESTIMATED RESOURCES BY WBS CODE

PROJECT SCHEDULE

01/05/2012

TASK NAME	IDENTIFIER	START DATES	END DATES	RESOURCES	DUR DAYS	% Complete
12-OK970_PROJ MGMT - PA&ED CMPNT	CT.12.CO.OK970_.0.100.10	01/01/2012	01/09/2013	1689	374.00	0
12-OK970_PERF PREL ENGRG STUDIES & DRAFT PR	CT.12.CO.OK970_.2.160	01/01/2012	10/01/2012	1139	274.00	0
12-OK970_PERF ENV STUDIES & PREP DED	CT.12.CO.OK970_.2.165	01/01/2012	10/01/2012	1053	274.00	0
12-OK970_PMTS AGRES & RAS DURING PA&ED CMPNT	CT.12.CO.OK970_.2.170	01/10/2012	01/09/2013	58	365.00	0
12-OK970_CIRC DED & SLT PRFD PROJ ALT ID	CT.12.CO.OK970_.2.175	10/01/2012	11/01/2012	191	31.00	0
12-OK970_PREP & APV PR & FED	CT.12.CO.OK970_.2.180	11/01/2012	01/09/2013	459	69.00	0
12-OK970_PA & ED	CT.12.CO.OK970_.2.M200	01/09/2013	01/09/2013	0	0.00	0

Total

4589

PROJECT SCHEDULE

01/05/2012

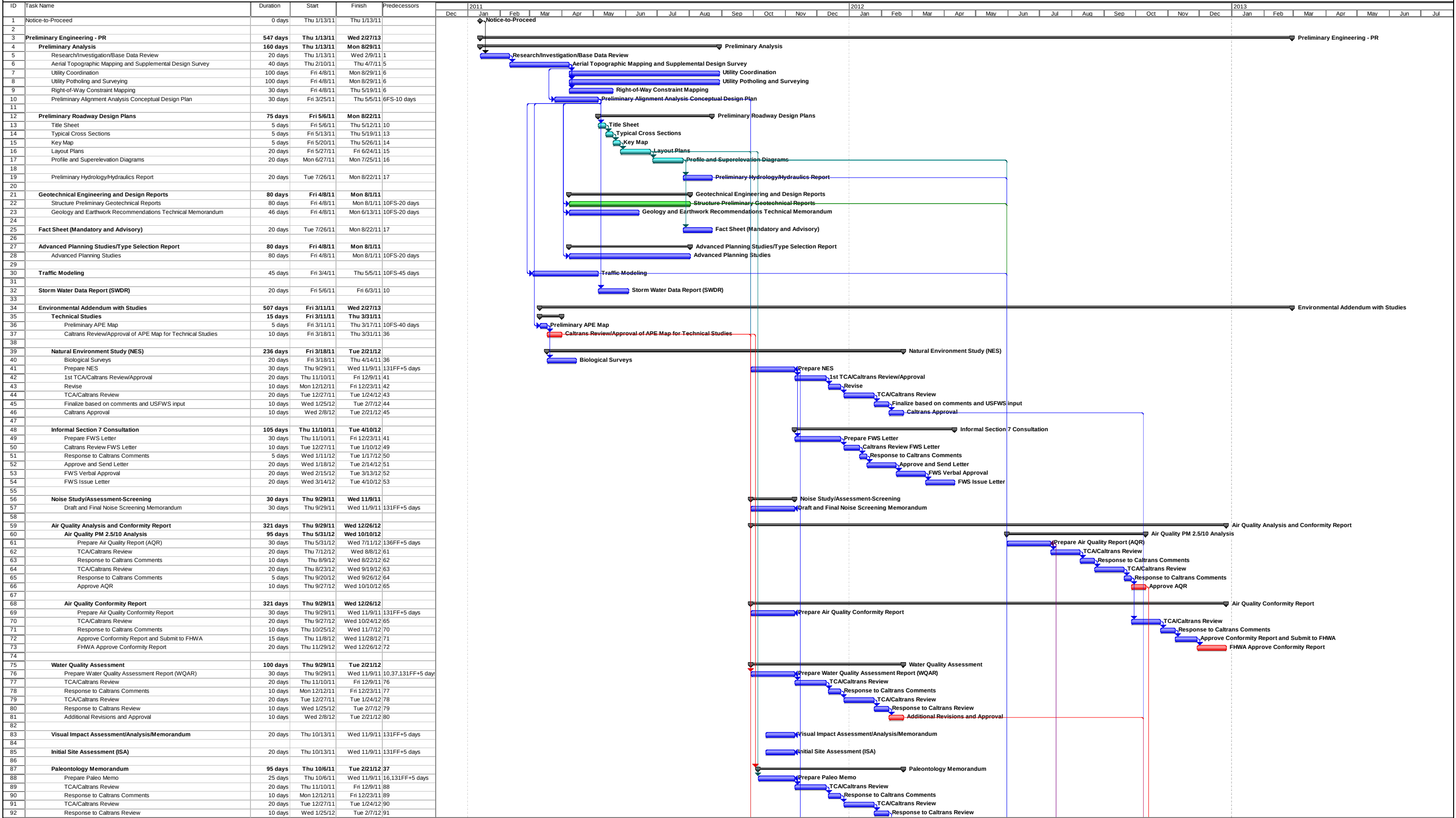
TASK NAME	IDENTIFIER	START DATES	END DATES	RESOURCES	DUR DAYS	% Complete
12-OK970_PROJ MGMT - PA&ED CMPNT	CT.12.CO.0K970_.0.100.10	01/01/2012	01/09/2013	169	374.00	0
12-OK970_PERF PREL ENGRG STUDIES & DRAFT PR	CT.12.CO.0K970_.2.160	01/01/2012	10/01/2012	194	274.00	0
12-OK970_PERF ENV STUDIES & PREP DED	CT.12.CO.0K970_.2.165	01/01/2012	10/01/2012	0	274.00	0
12-OK970_PMTS AGRES & RAS DURING PA&ED CMPNT	CT.12.CO.0K970_.2.170	01/10/2012	01/09/2013	0	365.00	0
12-OK970_CIRC DED & SLT PRFD PROJ ALT ID	CT.12.CO.0K970_.2.175	10/01/2012	11/01/2012	0	31.00	0
12-OK970_PREP & APV PR & FED	CT.12.CO.0K970_.2.180	11/01/2012	01/09/2013	0	69.00	0
12-OK970_PA & ED	CT.12.CO.0K970_.2.M200	01/09/2013	01/09/2013	0	0.00	0
Total				362		

ATTACHMENT C
SCHEDULE (GANTT CHART)



Transportation Corridor Agencies
SR-241/SR-91 Direct Connector
Project Report Schedule

JN: 10-107774



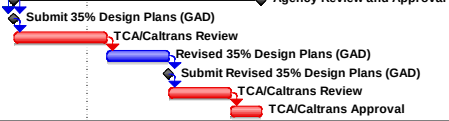
Project: SR-241/SR-91 Direct Connecto Date: Tue 11/1/11	Task		Split		Progress		Milestone		Summary		Project Summary		External Tasks		External MileTask		Split	
SR241-SR91 Direct Connector Schedule 12.mpp										Page 2					Tue 11/1/11			



Transportation Corridor Agencies
SR-241/SR-91 Direct Connector
Project Report Schedule

JN: 10-107774

Task Name	Duration	Start	Finish	Predecessors	2011												2012												2013																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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ATTACHMENT D
CULTURAL RESOURCES MEMORANDUM

MEMORANDUM

DATE: April 2, 2008

TO: Lisa Williams

FROM: Debbie McLean

SUBJECT: Cultural Resource Analysis of State Route 241 Connector to State Route 91 in Orange and Riverside Counties, California

Records Search. Cultural resources records searches include the project area (Area of Potential Effects [APE] or Study Area) and a buffer (of varying distances). For this project, the project area and 0.25-mile buffer fall within three different counties; thus, three separate records searches were completed through the California Historical Resources Information System. Findings indicate that 40 surveys have been completed within the project area and the 0.5-mile radius. Of these, 29 included various portions of the project area. The only portion of the project area that has not been surveyed is the actual path of State Route 91. Five previously recorded sites are within the 0.25-mile buffer. Two previously recorded sites are within the proposed project area. One resource, 33-10819/CA-RIV-6532H, is the remains of the town of Alta Vista, also known as the Green River Camp; it was determined not to be eligible for listing in the National Register of Historic Places (National Register) per the State Historic Preservation Officer (SHPO) in a letter dated March 8, 2001. The other site is CA-ORA-303. This prehistoric site consists of several caves (rock shelters).

Survey. On February 25, 2008, LSA conducted a windshield and pedestrian reconnaissance-level survey of the project area. The vicinity of site CA-ORA-303 was closely examined. The site was completely destroyed during the construction of State Route 241. Nothing remains of the rock shelters.

Recommendations. Based on the results of the records searches and the field survey, only one cultural resource site (33-10819/CA-RIV-6532H, the remains of the town of Alta Vista, also known as the Green River Camp) is within the project area, and this site has been determined not eligible for listing in the National Register. While the findings of this preliminary study suggest that no cultural resources will be encountered during project-related construction activities, the project APE has not yet been defined. It is possible that once the APE has been determined, areas previously unsurveyed for cultural resources may be included and there may be potential for these as yet undetermined areas to contain cultural resources. Therefore, pending the finalization of the APE, archaeological monitoring is recommended during excavation in areas of native (previously undisturbed) sediments.

If human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be Native American, the County Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely

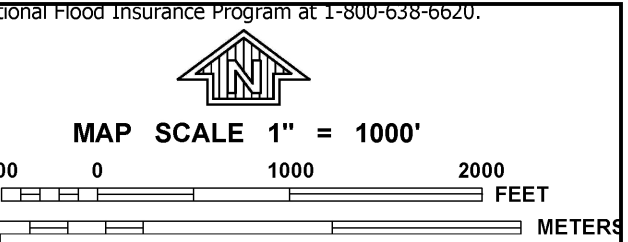
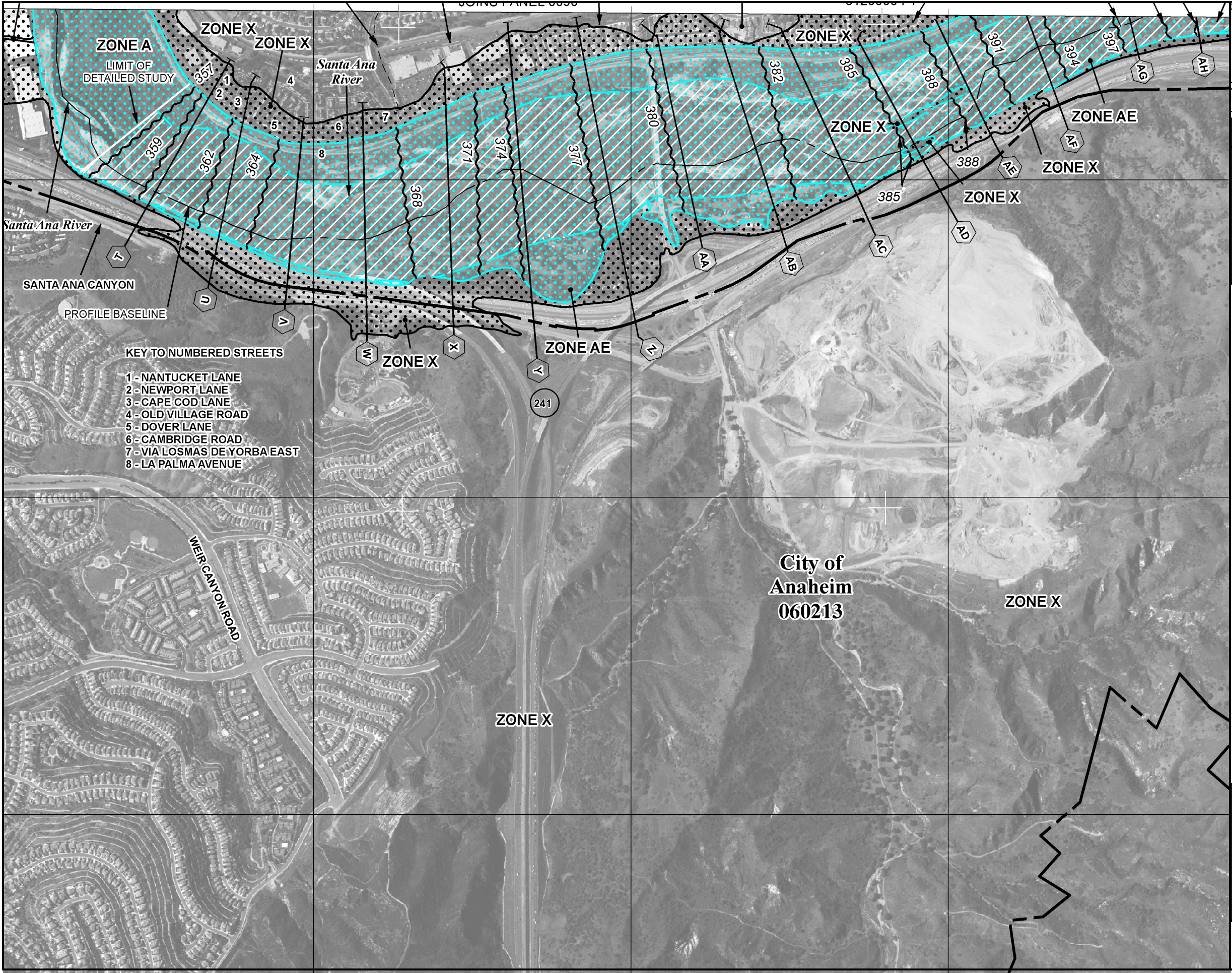
Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

During the Project Report/Environmental Document phase, the following tasks will need to be completed: Native American consultation; an Area of Potential Effects map; a Historic Property Survey Report; and an Archaeological Survey Report.

Additional Tasks for Alternative 4

Architectural Study. The Proposed Impact Line for this alternative passes immediately adjacent to a number of commercial and residential buildings, and it passes through a number of other commercial and residential buildings. Build dates will need to be obtained for all of these buildings. If any of the buildings are at least 45 years old, they will need to be recorded and evaluated on Department of Parks and Recreation (DPR) Series 523 forms. Historical research pertaining to the buildings and the specific vicinity of the buildings will need to be conducted. A Historical Resources Evaluation Report (HRER) will need to be prepared. If none of the buildings are at least 45 years old, they can be addressed per the Section 106 Programmatic Agreement, and neither DPRs, historical research, nor an HRER will be required. This proposal assume that none of the buildings will be at least 45 years old and therefore, the only architectural task that will be necessary is to obtain build dates. If any of the buildings require additional documentation, a budget augment will be required.

ATTACHMENT E
FLOOD INSURANCE RATE MAP



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0180J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY,
CALIFORNIA
AND INCORPORATED AREAS

PANEL 180 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANAHEIM, CITY OF	060213	0180	J
ORANGE COUNTY	060212	0180	J
ORANGE, CITY OF	060228	0180	J
YORBA LINDA, CITY OF	060238	0180	J

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER

06059C0180J

MAP REVISED

DECEMBER 3, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ATTACHMENT F
PALEONTOLOGICAL RESOURCES MEMORANDUM

MEMORANDUM

DATE: February 29, 2008

TO: Lisa Williams

FROM: Brooks Smith, County of Orange Certified Paleontologist

SUBJECT: Paleontological Resource Analysis of State Route 241 Connector to State Route 91 in Orange and Riverside Counties, California

INTRODUCTION

LSA Associates, Inc. (LSA) has prepared this memorandum to address the potential to encounter paleontological resources for the State Route 241 (SR-241) connector to State Route 91 (SR-91) in the City of Anaheim, County of Orange, and the City of Corona, County of Riverside, California. This memorandum will present the results of a paleontological literature and locality search, and recommendations will be made as to the need for additional studies.

PROJECT ALTERNATIVES

The project is being developed to link the SR-241 with the 91 Express Lanes. Although six Alternatives Concepts (ACs) were developed, AC 1, AC 3, and AC 4 are the most likely to be carried forward for more detailed analysis in the PSR/PDS. AC 1 and AC 3 would extend along SR-91 to approximately Coal Canyon in Orange County, a distance of approximately 1.7 miles (mi) (2.7 kilometers [km]), while AC 4 would extend as far as State Route 71 (SR-71) in Riverside County, a distance of approximately 4.5 mi (7.2 km). All three would extend approximately 1.4 mi (2.3 km) south on SR-241. A more detailed description for each is given below.

AC 1

AC 1 would include new connectors, one lane in each direction for HOV only. Connectors would bring HOVs from the median of the northbound SR-241 to the existing eastbound 91 Express Lanes, which taper into one HOV lane at Green River Road on SR-91. The reverse movement would also be accommodated, from the westbound 91 Express Lanes to the median of the SR-241. A parallel lane that tapers back into the existing 91 Express Lanes would be needed for the northbound SR-241 to the eastbound SR-91 movement. These connectors could be tolled, which would improve the compatibility of AC 1 with the extension of the Express Lanes into Riverside County. No additional improvements to SR-91 (besides the taper described above) are assumed.

AC 3

AC 3 is a single two-lane reversible connector for HOV and toll vehicles. Similar to AC 1, the connector would bring vehicles between the median of SR-241 and the 91 Express Lanes. With AC 2,

however, the connector would be reversible, with two lanes connecting the westbound 91 Express Lanes to the southbound SR-241 in the a.m. peak hour (and no northbound median to median connection). In the p.m. peak hour, the operations would be reversed, so only northbound high-occupancy toll (HOT) lanes from SR-241 could use the connector. In the median of both SR-241 and the 91 Express Lanes, appropriate signage and barriers would be needed to prevent wrong-way movements. The specific times of the operations would be determined later. No additional improvements to SR-91 (other than the necessary tapers) are assumed. A variation of this concept would be a connector with three lanes and a movable median barrier, where two lanes would operate in the direction of peak traffic and one lane would operate in the direction of nonpeak traffic.

AC 4

AC 4 would include new connectors (two lanes in each direction) for toll vehicles. Similar to the existing 91 Express Lanes, HOVs could be given discount/free toll during off-peak periods.

AC 4 assumes that the Riverside County Transportation Commission (RCTC) will extend the 91 Express Lanes (two in each direction) from the Riverside/Orange County line to at least Interstate 15 (I-15). Connectors would bring traffic from the median of northbound SR-241 to the existing eastbound 91 Express Lanes. A third eastbound Express Lane would be added from SR-241 to State Route 71 (SR-71). The extra lane would drop in the vicinity of the SR-71 interchange, without a direct connection to SR-71. The reverse movement would also be accommodated with a third westbound Express Lane from SR-71 to SR-241, and then bring the westbound Express Lane connector to the median of southbound SR-241.

PURPOSE OF THIS MEMO

As this project is along State highways, the project will be obligated to follow the guidelines specified in the Caltrans Standard Environmental Reference (SER). Specifically, the SER Environmental Handbook, Volume 1 Chapter 8, deals with paleontology. The guidelines are designed to address impacts to paleontological resources prior to the beginning of construction. In most cases, three documents are required to be prepared: a Paleontological Investigation Report (PIR), a Paleontological Evaluation Report (PER), and a Paleontological Mitigation Plan (PMP). The PIR and PER are often combined into a single document. The PIR and PER must be prepared prior to completion of Project Approval/ Environmental Document (PA/ED) phase in order to minimize construction delays. The PMP must be developed prior to the beginning of construction.

The purpose of the PIR is to identify whether or not paleontological resources may be present within the project area; the purpose of the PER is to evaluate the significance of the resources, if it is determined that resources are likely to be present; and the purpose of the PMP is to develop mitigation for significant resources. Occasionally the PIR/PER will determine that, despite the results of the literature search, it is unlikely that the project will encounter significant resources during construction. This may be due to the removal of sensitive sediments as a result of previous construction in the area, or burying the sensitive sediments with fill deeper than depths that will be encountered during construction related to the project. In these cases, a PMP will not be required, and the reason will be specified in the PIR/PER.

State Regulations

Under State law, paleontological resources are protected by both the California Environmental Quality Act (CEQA), and the California Public Resource Code (PRC) Section 5097.5.

Under CEQA, Appendix G, lead agencies are required to consider impacts to the direct or indirect destruction of unique resources that are of value to the region or State. Appendix G is a checklist with several choices given, including: Potentially Significant Impact, Less than Significant with Mitigation Incorporation, Less than Significant Impact, and No Impact. Specifically, in Appendix G, Section V(c), lead agencies are required to consider impacts to paleontological resources.

The California PRC Section 5097.5 states:

“(a) No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

(b) As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.”

METHODS

Locality Search

The locality search included a review of area geology and any fossil resources recovered within similar sediment to those that will be encountered during the project.

In February 2007, a locality search was completed through the Natural History Museum of Los Angeles County (LACM), the San Bernardino County Museum (SBCM), and records maintained at LSA. Individuals contacted included Eric Scott, Curator of Vertebrate Paleontology at the SBCM, and Dr. Sam McLeod, Curator of Vertebrate Paleontology at the LACM. The results letters from the LACM and SBCM are provided in Attachments A and B, respectively.

The purpose of the search was to establish the status and extent of previously recorded paleontological resources within and adjacent to the SR-241 connector to SR-91 project area and to determine which geologic sediments were likely to be exposed during ground-disturbing activities associated with the proposed improvements. With this knowledge, LSA could make an informed assessment of the potential effects of the proposed project on paleontological resources, anticipate the kinds of resources that might be encountered during earthmoving activities, determine the paleontological sensitivities for each geologic formation or unit exposed in the project area, and make recommendations for additional studies, if necessary.

Paleontological Sensitivity

Planners and paleontologists have worked together to help preserve California's long fossil heritage. A system is used to determine the potential for the occurrence of fossils during the initial scoping phase of each project. These sensitivity ratings are high, low, no, or undetermined potential. This classification, commonly used by paleontologists, was developed by the Society of Vertebrate Paleontology (SVP 1995).

Low Potential. Following a literature search, records check, and field survey, areas may be determined by a qualified vertebrate paleontologist as having low potential for containing significant paleontological resources subject to adverse impacts. Low potential cannot be determined simply by looking for rock unit qualifications on a geologic map. For instance, an area mapped as alluvium may actually be a thin surficial layer of nonfossiliferous sediments that cover fossil-rich Pleistocene sediments. Also, an area mapped as granite may be covered by a Pleistocene soil horizon that contains fossils. The actual sensitivity must be determined by both a records search and a field inspection.

High Potential. Sedimentary rock units with high potential for containing significant nonrenewable paleontological resources are rock units within which vertebrate or significant invertebrate fossils have been determined to be present or likely to be present. These units include but are not limited to sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. High sensitivity ratings include not only the potential for yielding abundant vertebrate fossils but also for production of a few significant fossils that may provide new and significant data (taxonomic, phylogenetic, ecologic, and/or stratigraphic data):

- **High sensitivity (High A)** is based on geologic formations or mappable rock units that are known to contain fossilized body elements and trace fossils such as tracks, nests, and eggs.
- **High sensitivity (High B)** is a sensitivity equivalent to High A, but is based on the occurrence of fossils at a specified depth below the surface that may be impacted during excavation by construction activities. A standard condition is often attached to the environmental planning document for the project, specifying that mitigation will only be required if excavation reaches or exceeds a specified depth.
- **No Potential.** This category includes rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks, as well as areas underlain by artificial fill classified as having no potential for containing significant paleontological resources.
- **Undetermined Potential.** Areas underlain by sedimentary rocks for which literature and unpublished studies are not available have an undetermined potential for containing significant paleontological resources. These areas must be inspected during a field survey conducted by a qualified vertebrate paleontologist. A specific determination of high or low potential for containing significant nonrenewable paleontological resources can then be made.

Field Survey

Neither a field survey nor a windshield survey were completed during preparation of this memo.

Surveys were not warranted because most areas within the project alignment have been covered during previous paleontological studies in the area, namely Lander (2003) along the SR-241 and Wagner (2006) along the SR-91. These studies included field surveys and paleontological mitigation monitoring directly within the current project area.

RESULTS

Geology

The project area is located at the northern end of the Peninsular Range Geomorphic Province, a 1,450-kilometer (km) (900-mile [mi]) long northwest-southeast trending structural block that extends from the tip of Baja California to the Transverse Ranges and includes the Los Angeles Basin (Norris and Webb, 1976). The total width of the province is approximately 362 km (225 mi), with a maximum landbound width of 105 km (65 mi) (Sharp, 1976). This region is characterized by a series of mountain ranges separated by northwest-trending valleys subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to that of the Coast Ranges Geomorphic Province located to the north, but the geology is more like that of the Sierra Nevada, with granitic rock intruding on the older metamorphic rocks. It contains extensive pre-Cretaceous (> 65 million years ago) igneous and metamorphic rocks covered by limited exposures of post-Cretaceous sedimentary deposits.

Specifically, the project is located in Santa Ana Canyon, where the Santa Ana River passes between the Santa Ana Mountains on the south and the Chino Hills to the north. According to the geology map prepared by Morton et al. (2004) various geological units and formations have the potential to be encountered while excavating for this project. The formations and units that have the potential to be encountered include: the Santiago Peak Volcanics, the Ladd Formation, the Silverado Formation, the Santiago Formation, the Undifferentiated Sespe/Vaqueros Formation, and the Sycamore Canyon Member of the Puente Formation. In addition, Quaternary-aged deposits that include Pleistocene-aged nonmarine terrace deposits, Pleistocene-aged landslides, and Holocene alluvium also occur within the project alignment. Each of these is briefly described below.

Santiago Peak Volcanics. The Late Jurassic (165–145 million years ago [Ma]) Santiago Peak Volcanics consist of mildly metamorphosed, extrusive volcanic flows, dikes, and pyroclastics of andesitic to dacitic composition, with interbedded metasediments. Also present are flow breccias, greenstone, volcanic “slate-chip” breccia, intrusive granodiorite, and tonalite.

Ladd Formation. The Cretaceous (Turonian-Campainian) Ladd Formation is primarily deposited in a marine environment. It was named by Popenoe (1937). It is divided into two members: the Baker Canyon Member and the Holtz Shale Member. It can contain conglomerate beds, sandstone beds, or shaly beds.

Silverado Formation. The Paleocene Silverado Formation was deposited during the Thanetian Stage (also known as the Landenian or the Heersian) (58.7 ± 0.2 Ma and 55.8 ± 0.2 Ma), which is the last stage of the Paleocene Epoch (McCulloh et al., 2000). The formation is divided into four units: “A,” an unfossiliferous basal conglomerate; “B,” a thin sequence of sandstone and siltstone; “C,” the

Claymont Clay Bed; and “D,” a thick sequence of sandstone, siltstone, and conglomerate, plus the Serrano Clay Bed (Schoellhamer et al., 1981). Only Unit D is marine in origin, and probably only in a region northeast of Silverado Canyon.

Santiago Formation. The middle-Eocene Santiago Formation is composed of marine to nonmarine sediments up to 820 m (2,690 ft) thick. It conformably overlies the Silverado Formation and is in turn conformably overlain by the Undifferentiated Sespe/Vaqueros Formation. In general, the lower beds appear to be marine in origin, while the upper beds are nonmarine in origin. It can contain conglomerate beds, sandstone beds or shaly beds.

Undifferentiated Sespe/Vaqueros Formation. Late Oligocene (Arikareean) to early Miocene Undifferentiated Sespe/Vaqueros Formation is composed of a varied sequence of interbedded marine and nonmarine siltstones, sandstones, and conglomerates. The Undifferentiated Sespe/Vaqueros Formation represents an interfingering of the Sespe Formation (primarily nonmarine) and Vaqueros Formation (primarily marine). Schoellhamer (1981) viewed the Undifferentiated Vaqueros/Sespe Formation as contemporaneous units by their interfingering.

Puente Formation. The Late Miocene marine Puente Formation is divided into four members: the La Vida Member (Tplv), predominantly siltstones; the Soquel Member (Tps), predominantly sandstones; the Yorba Member (Tpy), predominantly siltstones; and the Sycamore Canyon Member (Tpsc), predominantly sandstones. Only the Sycamore Canyon Member is exposed within the project area.

Nonmarine Terrace Deposits. Nonmarine terrace deposits represent the remnants of abandoned floodplains, stream beds, or valley/canyon floors produced during an earlier stage of deposition. These deposits can consist of interbedded silt, clayey sand, and conglomeratic coarse-grained sands. These deposits are sometimes referred to as Pleistocene alluvium, Pleistocene fan deposits, or older alluvium. They can range in age from 10,000 to 2 million years.

Pleistocene to Holocene Landslide Deposits. Pleistocene to Holocene landslide deposits consist of blocks and flows of the underlying sediments and formations. They formed during the last 2 million years as canyon cutting and aqueous erosion caused slope failure. Their composition is dependent on the underlying units that have slid. Sometimes they are no deeper than 1–2 m (several feet) and only involve movement of soil. However, sometimes they are massive, covering several hectares (several acres) with ruptures 6–12 m (tens of feet) deep extending well into the underlying bedrock.

Holocene Alluvium. Holocene alluvium is a geologically recent deposit of gravel, sand, silt, or mud that was deposited by flowing water in a stream or river. It is found within or very close to active stream and river drainages and is usually loosely consolidated. Sand grains are generally subangular to subrounded, while the gravels and cobbles are rounded to well-rounded.

Artificial Fill. Artificial fill is soil/dirt that is placed by humans and can be either unconsolidated or loosely compacted, or engineered and densely compacted. Composition varies and is dependent on the source. It is often mixed with modern debris such as bricks, concrete, asphalt, glass, or wood. Depending on the area, thickness can be less than 0.3 to over 75 m (1 ft or less to several hundred ft).

Paleontology

Locality Search. The LACM has one record of a vertebrate paleontological find within the project area and numerous other localities recovered nearby from formations/units that outcrop within the project area. LACM states that all units that the project crosses except for the Santiago Peak Volcanics and the young alluvial deposits have the potential to contain significant paleontological remains.

The LACM recommends that a mitigation plan be developed that includes monitoring to quickly and professionally recover any fossils that may be encountered while not impeding development during grading within the older alluvium, the Puente Formation, Topanga Formation, Sespe/Vaqueros Formation, Santiago Formation, Silverado Formation, or the Ladd Formation. Any recovered fossils should be placed into a scientific institution for the benefit of current and future generations. A copy of the LACM locality search letter is attached at the end of this memorandum (Attachment A).

The SBCM does not have any recorded localities within the project area. However, it has numerous localities, some within 0.5 mi (0.8 km) of the project alignment, within similar formations/units that are within the alignment and may be encountered during ground-disturbing activities. The SBCM states that the following formations may be encountered during ground-disturbing activities within the project area and have a high paleontological sensitivity: The Ladd Formation, Silverado Formation, Santiago Formation, Sespe and Vaqueros Formations, Topanga Formation, Puente Formation, and the older alluvium (nonmarine terrace deposits).

Because there are sediments within the project area that have high paleontological sensitivity, the SBCM recommends that a qualified vertebrate paleontologist develop a program to mitigate impacts to the nonrenewable resources that may be encountered during excavation in these sediments. The mitigation program should be consistent with California Environmental Quality Act (CEQA) and County of Riverside regulations and follow guidelines of the Society of Vertebrate Paleontology (see Attachment B).

Paleontological Sensitivities. The paleontological sensitivities for each of the units that may be encountered during ground-disturbing activities within the project area are listed in Table A. Table A also lists which formations/units may be encountered in each AC. A brief reasoning for each sensitivity designation is also discussed below.

Table A: Paleontological Sensitivities of Units within the Project Area

Formation/Unit	Sensitivity	Location
Santiago Peak Volcanics	No; Low	AC 4
Ladd Formation	High	AC 1, 3, and 4
Silverado Formation	High	AC 1, 3, and 4
Santiago Formation	High	AC 1, 3, and 4
Undifferentiated Sespe/Vaqueros Formation	High	AC 1, 3, and 4
Topanga Formation	High	AC 1, 3, and 4
Sycamore Canyon Member of the Puente Formation	High	AC 4
Nonmarine terrace deposits	High	AC 1, 3, and 4
Landslide deposits	Low	AC 1, 3, and 4
Recent alluvium	Low	AC 1, 3, and 4
Artificial fill	No Sensitivity	AC 1, 3, and 4

The Santiago Peak Volcanics are primarily igneous and metamorphic rocks and do not contain fossils. Occasionally, fossil impressions of plants and invertebrates have been found in flow breccias or volcanic ash layers in San Diego County within rocks assigned to this unit. However, these are extremely rare and unlikely under most conditions.

The Ladd Formation can contain bivalve, gastropod, and cephalopod fossils that are up to 80 million years old. These are scientifically important.

The Silverado Formation can contain important plant fossils as well as many invertebrates. Any fossils from this formation should be considered important.

The Santiago Formation has produced an important collection of fossils from invertebrates and leaves as well as the bones and teeth of lizards, snakes, turtles, crocodiles, birds, marsupials, and mammals. Any additional fossils from this unit will also be considered important.

The Undifferentiated Sespe/Vaqueros Formation has produced a diverse assemblage of both invertebrate and vertebrate fossils that have added to our understanding of the early Miocene. In addition, new species are continually being discovered whenever these units are encountered. As such, this formation has a high paleontological sensitivity rating.

The Topanga Formation can contain a diverse collection of shallow water invertebrates as well as marine mammals such as seals, whales, dolphins, and sea cows. In addition, other vertebrates such as bony fishes, sharks, turtles, and birds have been collected. As this formation contains such a diverse assemblage of fossils, it is considered to have a high paleontologic sensitivity rating.

The Sycamore Canyon Member of the Puente Formation can contain a diverse collection of fossils including marine and terrestrial vertebrates, marine invertebrates, and marine and terrestrial plants from the late Miocene. These fossils help add to the body of scientific knowledge of life in the late Miocene. As such, this unit is considered to have a high paleontological sensitivity rating.

The nonmarine terrace deposits can contain Pleistocene vertebrate fossils that are scientifically significant, as they add to our understanding of the diversity of life during Pleistocene times in southern California. As such, these sediments have a high paleontological sensitivity rating.

Although landslide deposits can occasionally contain the remains of animals that became trapped within the landslide as it was moving, these occur very infrequently. In addition, although landslide deposits can contain fossils within the bedrock units that moved within the slide mass, these have been transported away from the source area and are less important to science. In addition, much of the large landslide mapped within the project area in the vicinity of the Orange and Riverside County line is within the nonfossiliferous, Santiago Peak Volcanics. Thus, landslide deposits are given a low sensitivity. However, any fossils found within these deposits should still be collected.

Recent alluvium, because of its young age, generally does not contain fossils. As such, these recent alluvial deposits are assigned a low paleontological sensitivity rating.

Artificial fill can contain fossils, but because it has been placed at its current location by humans, any fossils that may be in the fill matrix are out of context and would not be scientifically important. Thus, artificial has no paleontological sensitivity.

Field Survey

Although a field survey was not completed during preparation of this memo, two previous paleontological studies have been completed in the vicinity of the project that cover the same area. During the grading of SR-241, Paleo Environmental Associates, Inc. (PEA) provided paleontological mitigation monitoring. During this monitoring program, PEA collected numerous fossils, including some that are within the current project limits (Lander, 2002).

During preparation of the initial paleontological assessment of the SR-91 lane additions between SR-241 and SR-71, Chambers Group, Inc. (Chambers) completed a field survey of a majority of the project area (Wagner, 2006). This included walking the areas of the proposed project and examining the exposed sediments in the areas of the proposed earthwork. The purpose of this survey was to confirm the geology as it is mapped, determine where potential cuts will occur, and also determine if any fossils were exposed on the surface. Chambers did not observe any fossils within any of the units that outcrop along the SR-91, but was able to confirm most of the mapped geology where it was exposed (Wagner, 2006).

RECOMMENDATIONS

Based on the results of the locality and literature search, there are sediments in the immediate area of the project that have a high sensitivity for containing paleontological resources. Based on the geology, AC 1 and AC 3 may encounter sediments from the Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation Pleistocene aged alluvium and landslide deposits, and recent alluvium. AC 4 has the potential to encounter the Santiago Peak Volcanics, Ladd Formation, Silverado Formation, Santiago Formation, Undifferentiated Sespe/Vaqueros Formation, Topanga Formation, Sycamore Canyon Member of the Puente Formation, the nonmarine terrace deposits, landslides, and recent alluvium. All but the Santiago Peak Volcanics, landslides, and the recent alluvium have high paleontological sensitivities.

However, as this project is within existing freeway rights-of-way, it is possible that excavation will not extend below disturbed sediments or any artificial fill that has been placed during previous roadway projects. Therefore, as exact excavation depths and exact alignments have not yet been fully determined at this stage in the project, it is recommended that additional studies such as a PIR, PER, and, possibly, a PMP following the formats specified in the Caltrans SER Environmental Handbook, Volume 1, Chapter 8, be developed as project plans are better refined. These documents will better determine exact project impacts to paleontological resources. These documents will also address the need for a mitigation program, as recommended by both the LACM and the SBCM.

At a minimum, the mitigation program, if needed, should be consistent with the guidelines of the Society for Vertebrate Paleontology (SVP; SVP, 1995) and should include, but not be limited to, the following.

- Attendance at the pregrade meeting by a qualified paleontologist or his/her representative. At this meeting, the paleontologist will explain the likelihood for encountering paleontological resources, what resources may be discovered, and the methods that will be employed if anything is discovered (see below).
- During construction excavation, a qualified vertebrate paleontological monitor shall initially be present on a full-time basis whenever excavation will occur within the sediments that have a high sensitivity rating and on a spot-check basis in sediments that have a low sensitivity rating. Monitoring may be reduced to a part-time basis if no resources are being discovered in sediments with a high sensitivity rating (monitoring reductions and when they occur will be determined by the qualified Principal Paleontologist). The monitor shall inspect fresh cuts and/or spoils piles to recover paleontological resources. The monitor shall be empowered to temporarily divert construction equipment away from the immediate area of the discovery. The monitor shall be equipped to rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the developer shall consider using heavy equipment on site to assist in the removal and collection of large materials.
- Localized concentrations of small (or micro-) vertebrates may be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened through 1/8-inch to 1/20-inch mesh screens to determine whether microfossils are present. If microfossils are encountered, additional sediment samples (up to 3 cubic yards or 6,000 pounds [2,721 kilograms]) shall be collected and processed through 1/20-inch mesh screens to recover additional fossils.
- Any recovered specimens shall be prepared to the point of identification and permanent preservation. This includes the picking of any washed mass samples to recover small invertebrate and vertebrate fossils, the removal of surplus sediment from around larger specimens to reduce the volume of storage for the repository and the storage cost, and the addition of approved chemical hardeners/stabilizers to fragile specimens.
- Specimens shall be identified to the lowest taxonomic level possible and curated into an institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens on request.

- Preparation of a final report of findings. This report should include, but not be limited to, describing the methods and results of the monitoring program, even if the results are negative. If applicable, the report shall include an appended itemized inventory of identified specimens, discussions on the paleontological significance of any finds, and how they fit into the overall geological context of the area. A copy of the final report and the accession inventory shall be forwarded to the repository institution.

Attachments: A: Locality Search Results from the LACM
B: Locality Search Results from the SBCM

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ATTACHMENT A

LOCALITY SEARCH RESULTS FROM THE LACM

Natural History Museum

of Los Angeles County

900 Exposition Boulevard • Los Angeles, CA 90007

Vertebrate Paleontology Section
Telephone: (213) 763-3325
FAX: (213) 746-7431
e-mail: smcleod@nhm.org

LSA
FEB - 1 2008
RECEIVED
IRVINE

31 January 2008

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731

Attn: Brooks Smith, Cultural and Paleontological Resources Group

re: Paleontological Resources Records Search for the proposed State Route 241 Connector to
State Route 91 Project, LSA Project # CHM0702, near the City of Corona, Orange and
Riverside Counties, project area

Dear Brooks:

I have searched our paleontology collection records for the locality and specimen data for the proposed State Route 241 Connector to State Route 91 Project, LSA Project # CHM0702, near the City of Corona, Orange and Riverside Counties, project area as outlined on the sections of the Prado Dam and Black Star Canyon USGS topographic quadrangle maps that you sent to me via e-mail on 30 January 2008. We have one vertebrate fossil locality that lies directly within the proposed project area, and other localities nearby from the same sedimentary deposits that occur in the proposed project area.

Along the Riverside Freeway (Highway 91) surface deposits in the lower lying portions of the proposed project route area in the Santa Ana River channel consist of younger Quaternary Alluvium, either as fluvial sands and gravels from the Santa Ana River or as fan deposits from the adjacent hills to the south. At the eastern end of the proposed project route area around the intersection with the Corona Freeway (Highway 71) there are exposures of older Quaternary Alluvium in the less steeply inclined portions of the elevated terrain. The more steeply inclined portions of the elevated terrain in the eastern end of the proposed project route area have exposures of the marine late Miocene Puente Formation (also known as the Sycamore Canyon Formation or members of the Monterey Formation in this area). Just west of the intersection of the Riverside Freeway (Highway 91) with Green River Road there are exposures of the marine middle Miocene Topanga Formation, the late Oligocene or early Miocene Sespe and Vaqueros Formations (these may be difficult to distinguish in this area but the Sespe Formation is typically terrestrial and the Vaqueros is typically marine), the Eocene Santiago Formation, the marine Paleocene Silverado Formation and the marine late Cretaceous Ladd Formation. On the west side of the Whittier Fault, just west of Riverside / Orange County line, there are exposures of the

Mesozoic Santiago Peak volcanics and then a reversal of the sequence of rocks from the Silverado Formation up through the Topanga Formation.

Further west along the proposed project route area, from just east of the intersection of the Riverside Freeway (Highway 91) with Coal Canyon Road, there are additional exposures of the marine late Cretaceous Ladd Formation, then exposures of the Paleocene Silverado Formation, the marine Eocene Santiago Formation, and late Oligocene to early Miocene Sespe / Vaqueros Formations undifferentiated. Where the proposed project route area turns south at the intersection of the Riverside Freeway (Highway 91) and the Eastern Transportation Corridor (Highway 241) there are further exposures of the late Oligocene to early Miocene Sespe / Vaqueros Formations undifferentiated and of the marine Middle Miocene Topanga Formation.

The igneous rocks of the Santiago Peak volcanics, of course, will be devoid of fossils. The younger Quaternary alluvial deposits found in the lower lying portions of the proposed project route area on the southern side of the Santa Ana River drainage typically do not contain significant vertebrate fossils, at least in the uppermost layers, and we have no vertebrate fossil localities anywhere nearby from such deposits. Our closest fossil vertebrate locality from older Quaternary deposits is LACM 1207, almost due east of the eastern-most portion of the proposed project route area between Corona and Norco, that produced a fossil specimen of deer, *Odocoileus*.

Our closest fossil vertebrate localities in the Puente Formation are about sixty localities, LACM 5560, 6307-6337, 7266-7267, 7269-7270, 7272-7284, 7373-7381, 7383, and 7386, just south of Los Serranos and west of the Corona Freeway (Highway 71) directly north of the western portion of the proposed project route area. These localities have produced a rich fauna of fossil fish and marine mammals (see attached for composite fauna from these localities). Our closest vertebrate fossil locality from the Topanga Formation is LACM 6292, along Santiago Canyon Road directly west of the Santiago Reservoir south-southwest of the proposed project route area, that produced a fossil specimen of dog shark, *Mustelus*. We have one vertebrate fossil locality, LACM 4315, from the marine Vaqueros portion of the Sespe / Vaqueros Formations undifferentiated, that lies directly within the proposed project route area. Locality LACM 4315, on the southwest side of the intersection of the intersection of the Riverside Freeway (Highway 91) and Gypsum Canyon Road, produced fossil specimens of basking shark, *Cetorhinus*, sand shark, *Carcharhinus*, angel shark, *Squatina*, and stingray, *Dasyatis*.

Our closest vertebrate fossil localities from the Santiago Formation all occur in San Diego County far to the south-southeast of the proposed project route area, but specimens from one of those localities, LACM 68102, including the fossil camel *Protylopus pearsonensis* and the fossil horned artiodactyl *Leptoreodon leptolophus*, were published in the scientific literature by D.J. Golz (1976. Eocene Artiodactyla of southern California. LACM Science Bulletin, 26:1-85). Our only Silverado Formation locality from this area, LACM 4634, produced a specimen of a fossil

turtle, Testudinidae. Our closest vertebrate fossil locality from the Ladd Formation is LACM 4221, in Silverado Canyon directly south of the eastern portion of the proposed project route area, produced specimens of the fossil sharks *Squalicorax* and *Cretolamna appendiculata*.

Excavations in the small exposures of the Santiago Peak volcanics in the proposed project route area will not encounter any fossils. Surface grading or shallow excavations in the younger Quaternary Alluvium exposed in the lower lying portions of the proposed project area are unlikely to encounter significant vertebrate fossils. Deeper excavations in those areas that extend down into older Quaternary deposits, however, as well as any excavations in the exposures of the Puente Formation, the Topanga Formation, the Sespe / Vaqueros Formations, the Santiago Formation, the Silverado Formation, or the Ladd Formation found in the more elevated portions of the proposed project route area, may well encounter significant remains of fossil vertebrates. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script, reading "Samuel A. McLeod".

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosures: appendix, invoice

Composite fossil fauna from Puente Formation localities just south of Los Serranos, Chino Hills
Localities LACM 5560, 6307-6337, 7266-7267, 7269-7270, 7272-7284, 7373-7381, 7383, and 7386

Osteichthyes

Clupeiformes

Clupeidae

- herrings

Ganolytes

cameo

Xyne

grex

Gadiformes

Gadidae

- cods

Eclipes

Moridae

- moras

Myctophiformes

Myctophidae

- lanternfishes

Perciformes

Carangidae

- jacks; amberjacks; pompanos

Decapterus

Pseudoseriola

Gempylidae

- snake mackerels; escolar; oilfishes

Thyrsoles

kriegeri

Sciaenidae

- croakers

Lompoquia

Scombridae

- mackerels & tunas

Sarda

Scomber

Serranidae

- sea basses & groupers

Sparidae

- porgies

Plectrutes

classeni

Salmoniformes

Bathylagidae

- deep sea smelts

Salmonidae

- trouts & salmons

Oncorhynchus

Scorpaeniformes

Scorpaenidae

- scorpionfishes & rockfishes

Stomiiformes

Chauliodontidae

- viperfish

Chauliodus

eximius

Sternoptychidae

- hatchetfishes

Argyropelecus

Mammalia

Carnivora

Otariidae

- eared seal [sea lions]

Pithanotaria

Cetacea

Balaenopteridae

- rorqual baleen whales

Phocoenidae

- porpoises

Physeteridae

- sperm whales

Scaldicetus

ATTACHMENT B

LOCALITY SEARCH RESULTS FROM THE SBCM



SAN BERNARDINO COUNTY MUSEUM

2024 Orange Tree Lane • Redlands, California USA 92374-4560
(909) 307-2569 • Fax (909) 307-0539 • www.sbcountymuseum.org
TDD (909) 792-1462



COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

ROBERT L. MCKERNAN
Director

11 February 2008

LSA

FEB 21 2008

RECEIVED
IRVINE

LSA Associates, Inc.
attn: Brooks Smith
20 Executive Park, Suite 200
Irvine, CA 92614

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, SR-241
CONNECTOR TO SR-91, ORANGE AND RIVERSIDE COUNTIES, CALIFORNIA**

Dear Mr. Smith,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named project alignment in Orange and Riverside Counties, California. The proposed project alignment traverses portions of sections 29, 30, and 31, Township 3 South, Range 7 West; sections 25, 26 (projected), 33 (projected), 34 (projected), 35 (projected), and 36, Township 3 South, Range 8 West; and section 4 (projected), Township 4 South, Range 8 West, San Bernardino Base and Meridian, as seen on the Black Star Canyon, California (1967 edition) and the Prado Dam, California (1967 edition, photorevised 1981) 7.5' United States Geological Survey topographic quadrangle maps.

Previous geologic mapping of the area (Durham and Yerkes, 1964; Rogers, 1965; Morton, 2004) indicates that the proposed project alignment traverses a number of geologic units with high potential to yield significant nonrenewable paleontologic resources, including (from oldest to youngest): the Baker Canyon and Holz Shale Members of the Ladd Formation (late Cretaceous Period) (= units **Klbc**, **Klhs**); the Silverado Formation (Paleocene Epoch) (= **Tsi**); the Santiago Formation (middle Eocene) (= **Tsa**); undifferentiated rocks of the Vaqueros and Sespe Formations (late Eocene through early Miocene Epochs) (= **Tvs**); the Topanga Formation (middle Miocene) (= **Tt**); the Yorba and Sycamore Canyon Members of the Puente Formation (Miocene and early Pliocene) (= **Tpy**, **Tpsc**); Quaternary very old fan deposits (early Pleistocene Epoch) (= **Qvof**); and Quaternary fan deposits (middle to later Pleistocene Epoch) (= unit **Qof**). The undifferentiated Sespe and Vaqueros rocks have high potential to yield significant nonrenewable paleontologic resources, and so are assigned high paleontologic sensitivity. The Quaternary fan gravels have undetermined paleontologic potential; depending upon their lithology, they may have high paleontologic sensitivity.

The late Cretaceous Ladd Formation consists of marine and locally nonmarine conglomerate, sandstone, siltstone and shale, and is fossiliferous throughout its extent. The Baker Canyon Conglomerate (**Klbc**) consists of marine and, possibly, locally nonmarine conglomerate; sparsely distributed sandstone beds yield abundant mollusc fossils (Morton, 2004). The Holz Shale Member

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(= **Klhs**) consists of marine shale, siltstone, sandstone, localized conglomerate, and yields abundant foraminifera and megafossils (Morton, 2004). Although primarily marine in nature, the Ladd Formation has also yielded fossil remains of terrestrial vertebrates, particularly several fossils of extinct hadrosaurian dinosaurs (Hilton, 2003). This formation is therefore assigned high paleontologic sensitivity.

The Paleocene Silverado Formation (**Tsi**) contains coal seams, lignite beds and commercial clay deposits, as well as abundant fossil mollusks (Woodring and Popenoe, 1945) and vertebrate fossils. The Silverado Formation grades upwards into the Santiago Formation (**Tsa**), a continental and marine sandstone and conglomerate rock unit (Woodring and Popenoe, 1945; Schoellhamer and others, 1981). The lower part of this formation contains abundant marine mollusks, while the upper portion commonly yields silicified wood that is likely of terrestrial rather than marine origin (Morton, 2004).

Rocks of the undifferentiated Sespe and Vaqueros Formations (**Tvs**) consist of interbedded marine and nonmarine sandstones and conglomerates. Locally, marine fossil-bearing strata of the Vaqueros Formation are bed-by-bed interlayered with nonmarine rocks of the Sespe Formation, to such a degree that the formations cannot be mapped as separate units (Morton, 2004). The continental Sespe Formation and interbedded marine Vaqueros Formation are both abundantly fossiliferous; the former has yielded fossil remains of terrestrial vertebrate fossils ranging in age from the Eocene through to the early Miocene, while the marine Vaqueros Formation has yielded shallow water marine megafossils (Morton, 2004).

The Topanga Formation (**Tt**) is a shallow-water marine sandstone unit with small amounts of siltstone and conglomerate deposited during the middle Miocene Epoch, ~18 million years ago (mya) to 16 mya. Exposures of the Topanga Formation are highly fossiliferous throughout Los Angeles and Orange Counties. Marine vertebrates including pinnipeds, whales, dolphins and sea cows, as well as microplankton, clams, snails, bony fish, sharks, sea turtles, and birds have all been collected from this unit. The Topanga Formation has high paleontologic sensitivity throughout its extent.

The Puente Formation was originally named by Eldridge and Arnold (1907) from exposures in the Puente Hills. The Puente Formation is considered to be equivalent to the Upper Miocene Monterey Formation (Blake, 1856) which is widespread in the Coast Range province of California as well as in the Palos Verdes Hills and the San Juan Capistrano area (Bramlette, 1946; Vedder and others, 1957; Vedder, 1975; Woodring and others, 1940; Woodring and others, 1946; Schoellhamer and others, 1981). The Yorba and Sycamore Canyon Members of the Puente Formation (**Tpy**, **Tpsc**) are the uppermost and youngest of the Miocene sediments in this formation (Durham and Yerkes, 1964; Rogers, 1965). The Yorba Member has yielded foraminifera and fish scales from exposures in the Santa Ana Mountains; foraminifera are also abundant in a few sites in the Puente Hills. The fossils indicate a deep water depositional environment, probably greater than 1,800 feet. The thin-bedded, well-laminated sandstone probably reflects deposition by turbidity currents from shallower depths (Durham and Yerkes, 1964; Schoellhamer and others, 1981). The shoreline may have extended as far east as Ontario before trending south to the Santa Ana River (Woodford and others, 1946).

Until 1985, diagnostic fossils were reported to be sparse in the Sycamore Canyon Member both in the Santa Ana Mountains (Schoellhamer and others, 1981) and in exposures in the Puente Hills, although foraminifera are locally common. However, several thousand specimens have since been exposed and recovered from the Sycamore Canyon Member, representing a minimum of 62 identified taxa of microfossil invertebrates and megafossil vertebrates, invertebrates, plants, and marine algae. Taxa identified include whales, bird, marine turtle, shark, bony fishes, terrestrial leaves, wood, reeds, and seaweeds. These fossils, in conjunction with lithologic and stratigraphic data gathered during monitoring, indicated that deposition occurred in near-shore water at a depth near the oxygen-minimum boundary during the latest Miocene Epoch, approximately 8 million years before present.

Surface and subsurface deposits of Pleistocene fan sediments (**Qvof** and **Qof**) include gravels, sands, and clays (Morton, 2004). Of these lithologies, the sands and clays have high paleontologic sensitivity, while the gravels may not be as conducive to the preservation of paleontologic resources (although occasionally significant fossil remains can be recovered from such sediments). Pleistocene older alluvial sediments throughout Riverside County and the Inland Empire have been extensively reported to yield significant fossils of plants and extinct animals from the Ice Age (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999, 2007; Anderson and others, 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999, 2007; Anderson and others, 2002).

For this review, Craig R. Manker of the Division of Geological Sciences, SBCM conducted a search of the Regional Paleontologic Locality Inventory (RPLI). The results of this records search indicated that no paleontologic localities are recorded from along the proposed project alignment. However, exposures of the Baker Canyon and Holz Shale Members of the Ladd Formation have yielded fossils from within ½ mile of the project corridor. Localities SBCM 5.5.4 - 5.5.6 are recorded in the RPLI as yielding leaf fragments, water reeds, and molluscs from this formation. The proximity of these localities to the project corridor demonstrates the high paleontologic sensitivity of the Ladd Formation in this region.

Exposures of the Silverado Formation within ½ mile of the proposed project alignment have yielded fossil remains from four localities (SBCM 5.5.7 - 5.5.9 and 5.5.11). Fossils recovered from these localities include water reeds, leaves, wood fragments (including some with insect borings), and abundant molluscs. These localities demonstrate the high paleontologic sensitivity of the Silverado Formation near the project alignment.

Exposures of the Santiago Formation immediately adjacent to the proposed project alignment have yielded fossils from locality SBCM 5.5.12. Fossils recovered from this locality include abundant gastropods. The proximity of this locality to the proposed project corridor demonstrate the high paleontologic sensitivity of the Santiago Formation in this area.

Exposures of the Puente Formation in the near vicinity of the proposed project alignment have yielded fossil resources from thirty-nine (39) resource localities (SBCM 1.116.16 to 1.116.23, 1.116.180 to 1.116.205, 5.5.35, 5.5.40, 5.5.44 - 5.5.45, and 5.5.47). Fossils identified from these localities include fish bones and scales, as well as shark teeth. Nearby exposures of the Puente Formation in Chino Hills to the northwest have yielded several hundred vertebrate fossils of Miocene age from over one hundred discrete resource localities. This wealth of fossil material clearly demonstrates the high paleontologic sensitivity of the Puente Formation in the vicinity of the proposed project corridor.

Additionally, numerous localities in the Chino Hills region have yielded fossil remains of extinct Pleistocene vertebrates from Pleistocene older alluvial sediments mapped (Durham and Yerkes, 1964; Rogers, 1965) as similar to the sediments present along the proposed project corridor.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation for the proposed project has high potential to impact significant nonrenewable paleontologic resources. This property is therefore assigned high paleontologic sensitivity along much of its length. Excavation into the Ladd Formation, the Silverado Formation, the Santiago Formation, undifferentiated rocks of the Vaqueros and Sespe Formations, the Topanga Formation, the Puente Formation, and/or older alluvium of Pleistocene age will require a qualified vertebrate paleontologist to develop a program to mitigate impacts to nonrenewable paleontologic resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to:

1. A full paleontologic resource assessment in advance of excavation or development, including a field survey, to locate and recover significant nonrenewable paleontologic resources exposed at the surface.
2. Monitoring of excavation in areas identified as likely to contain paleontologic resources by qualified paleontologic monitors. Based upon the results of this review, areas of concern along the proposed alignment include undisturbed surficial and subsurface rocks of the Ladd Formation, the Silverado Formation, the Santiago Formation, the Vaqueros and Sespe Formations, the Topanga Formation, the Puente Formation, and/or older alluvium of Pleistocene age. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.
3. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation

and stabilization of recovered fossils are essential in order to fully mitigate adverse impacts to significant resources (Scott and others, 2004).

4. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g. SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.
5. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources.

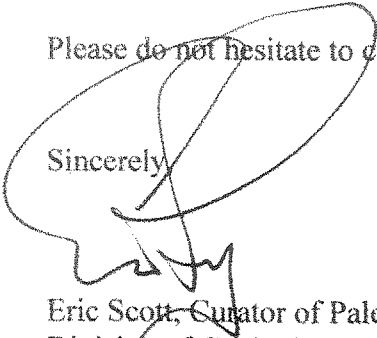
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Please do not hesitate to contact us with any further questions you may have.

Sincerely,



Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

ATTACHMENT G

RTP PAGE

ORANGE COUNTY RTP PROJECTS

CATEGORY	RTP ID	ROUTE #	ROUTE NAME	FROM	TO	DESCRIPTION	PROJECT COMPLETION BY	PROJECT COST (\$1,000'S)
MIXED FLOW	2M0735B	57	SR-57 NB	LINCOLN	ORANGETHORPE	ADD 1 MF LANE NB AND INTERCHANGE IMPROVEMENTS AT SR-91	2020	\$39,318
MIXED FLOW	2M01126	91	SR-91 WB	SR-57	I-5	ON SR-91 WB FROM SR-57 TO I-5, TIE EXISTING AUX LANES TOGETHER TO FORM A NEW 4TH MF LANE	2018	\$193,863
MIXED FLOW	2M0736	91	SR-91 EB	SR-57	SR-55	ADD 1 MF LANE	2023	\$25,295
MIXED FLOW	2M0737	91	SR-91	SR-241	I-15	IN ORANGE COUNTY, ADD A WB MF LANE FROM 241 OFF RAMP TO GYPSUM CANYON AND AUX LANES EACH DIRECTION BETWEEN 241 AND COUNTY LINE. SEE RIVERSIDE COUNTY FOR ADDITIONAL IMPROVEMENTS.	2018	\$219,678
MIXED FLOW	2M0728	405	I-405	I-5	SR-55	ADD 1 MF LANE EACH DIRECTION	2035	\$1,009,468
NON-MOTORIZED	2L224	0	OTHER TEA	COUNTYWIDE		TRANSPORTATION ENHANCEMENT ACTIVITIES	ONGOING	\$330,855
NON-MOTORIZED	2L220	0	NON-MOTORIZED	COUNTYWIDE		BUILD THE COMMUTER BIKEWAYS STRATEGIC PLAN	ONGOING	\$124,092
O&M	20M0701	0	OPERATIONS & MAINTENANCE	COUNTYWIDE		STATE HIGHWAY, ARTERIAL, AND TRANSIT PRESERVATION/ MAINTENANCE AND OPERATIONS	ONGOING	\$885,154
OPERATIONAL	2L149	0	MOTORIST SERVICES	COUNTYWIDE		FREEWAY SERVICE PATROL AND CALLBOX PROGRAM	ONGOING	\$492,036
OTHER	2SL04	0	CORRIDOR STUDIES			ONGOING CORRIDOR STUDIES AND OTHER STUDIES INCLUDED IN FY 07-08 WORK PROGRAM	ONGOING	\$3,881
OTHER	2L150	0	SOUNDWALLS	COUNTYWIDE		RETROFIT SOUNDWALL PROGRAM	ONGOING	\$79,045
OTHER	2S1	0	CAL NEVADA HS RAIL	ANAHEIM	ONTARIO AIRPORT	STUDY FEASIBILITY OF ADDING HIGH SPEED RAIL BETWEEN ANAHEIM AND ONTARIO AIRPORT	2020	\$1,645
TOLL	2T04128	91	SR-91	FAIRMONT DRIVE		CONSTRUCT NEW PARTIAL OVERCROSSING AT FAIRMONT BLVD TO PROVIDE NORTHERLY ACCESS FOR YORBA LINDA TO/FROM SR-91 EXPRESS LANES; DROP RAMPS ON EAST SIDE OF OVERCROSSING, TO EB AND FROM WB EXPRESS LANES	2018	\$91,107
TOLL	2T01135	91	SR-91	SR-241		HOV/HOT CONNECTOR NB 241 TO EB 91, WB 91 TO SB 241	2020	\$404,398



ATTACHMENT H
BIOLOGICAL RESOURCES MEMORANDUM

MEMORANDUM

DATE: February 29, 2008

TO: Lisa Williams

FROM: Richard Erickson

SUBJECT: State Route 91 Express Lanes Extension and SR-241 Connector Modifications—
Preliminary Environmental Evaluation of Biological Resources

This memo documents the potential biological resource constraints associated with the proposed State Route 91 (SR-91) Express Lanes Extension and State Route 241 (SR-241) Connector modifications in Orange County, California.

METHODS

A literature review was conducted to assist in determining the existence or potential occurrence of sensitive plant and animal species in the project vicinity. Database records for the *Orange, Yorba Linda, Prado Dam, and Black Star Canyon, California* United States Geological Survey (USGS) 7.5-minute quadrangles were searched using the California Department of Fish and Game (CDFG) *RareFind 2* (Version 3.1.0) and the California Native Plant Society (CNPS) *Electronic Inventory of Rare and Endangered Vascular Plants of California* (2007). LSA biologists visited the project area earlier while working on the Eastbound SR-91 Lane Addition project.

EXISTING SETTING

Only limited grading is anticipated as part of the project. SR-91 runs in a generally east-west direction in the study area. Featherly Regional Park and the Santa Ana River are adjacent to SR-91 on the north side from Gypsum Canyon Road to Coal Canyon Road. A sand and gravel mining operation was formerly located near Gypsum Canyon Road, south of SR-91. The steep canyons and hillsides of the northernmost extent of the Santa Ana Mountains border the south side of SR-91. Creeks crossing under SR-91 in the study area include Coal Canyon Creek and Gypsum Canyon Creek. The area east of the sand and gravel mining operation south of SR-91 at Gypsum Canyon Road is designated as preserved as part of the Irvine Ranch Land Reserve. The area south of SR-91 around Coal Canyon Creek is also preserved as part of Chino Hills State Park, primarily because it serves as a critical wildlife linkage between the Santa Ana Mountains and Chino/Puente Hills. Further study is required to determine the consistency of the proposed project with reserve and conservation plan designations.

RESULTS

LSA's analysis, including the literature review, identified a total of 73 special-interest species as potentially present in the study area, including 12 species currently listed as federal- or State-threatened or endangered. Of the 73 species listed, 40 have a moderate or high probability of being

present in the project area, including three species listed as federal- or State-threatened or endangered. The three listed species include Branton's milkvetch (*Astragalus brauntonii*), least Bell's vireo (*Vireo bellii pusillus*), and coastal California gnatcatcher (*Polioptila californica californica*). Attachment A lists the special-interest species along with short summaries of habitat requirements, legal protection status, and potential for occurrence in the project area.

This assessment is based in part upon site visits to the study area conducted as part of other LSA assignments in the immediate area (e.g., Eastbound SR-91 Lane Addition project). Appropriate habitats for sensitive species that are present in the vicinity of the project site include coastal sage scrub, chaparral, riparian woodland, and oak woodland.

The United States Fish and Wildlife Service (USFWS) has designated critical habitat for the least Bell's vireo within the Prado Dam Basin and within the Santa Ana River upstream of the Prado Basin. For the coastal California gnatcatcher, the USFWS has designated critical habitat south of SR-91 from approximately Gypsum Canyon Road to Green River Road. Further study is required to determine whether the project will have any effect on any designated or proposed critical habitat areas and the species they support. If the areas are determined to be affected by the proposed project, then any federal action related to the project would be subject to formal Section 7 consultation pursuant to the Endangered Species Act.

The proximity to the Santa Ana River and the presence of hydrophytic vegetation such as mulefat (*Baccharis salicifolia*) and cattails (*Typha latifolia*) in tributary washes and canyon drainages indicate the possible presence of wetland habitat in the general vicinity. A wetlands delineation study is required to determine whether wetland habitats may be affected by the proposed project. If wetlands are determined to be affected by the proposed project, then it would be subject to permitting requirements of Section 404 of the Clean Water Act of 1972.

Gypsum and Coal Canyons convey water to the Santa Ana River under SR-91 via culverts. Crossings such as these, and bridges, can also provide important wildlife corridors for animals passing between the Santa Ana Mountains and the Santa Ana River and the Chino Hills beyond. Coal Canyon has been identified as a critical wildlife corridor linking the Puente-Chino Hills and the Santa Ana Mountains. A detailed wildlife corridor study will be required to determine potential impacts on wildlife corridors in the area.

If the project impacts suitable habitat for sensitive species, particularly in the Santa Ana River and the scrub and chaparral areas to the south of SR-91, a general biological survey will be required, and sensitive species surveys may be required to determine the potential biological impacts of the project, as summarized in Table A.

Table A: Potentially Required Special-Interest Species Surveys

Species	Schedule
Coastal California gnatcatcher	Best March through June
Least Bell's vireo	April through July
Southwestern willow flycatcher	May through July
Rare plants	As necessary during flowering period for species
Wetland delineation	Not time sensitive
Wildlife corridors	Not time sensitive

The proposed project is subject to United States Army Corps of Engineers regulatory jurisdiction pursuant to Section 404 of the federal Clean Water Act and to water quality certification by the Regional Water Quality Control Board (Section 401), a California Department of Fish and Game Streambed Alteration Agreement (Section 1602), and compliance with the Endangered Species Act.

During the Project Report/Environmental Document phase, a Natural Environment Study will be required that will identify further studies needed, permit requirements, and mitigation.

Attachment: A: Special-Interest Species Summary

ATTACHMENT A
SPECIAL-INTEREST SPECIES SUMMARY

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
PLANTS				
Chaparral sand-verbena <i>Abronia villosa</i> var. <i>aurita</i>	Chaparral, coastal scrub, and sandy areas below 5,000 ft elevation Occurs from Riverside to Baja California and into Arizona. Thought to be extirpated from Orange County.	Annual; Jan.–Aug.	US: — CA: SP CNPS: 1B	Low. Thought to be extirpated from Orange County.
Braunton's milkvetch <i>Astragalus brauntonii</i>	Coastal sage scrub, chaparral, and grasslands below 1,500 ft elevation Los Angeles, San Bernardino, Orange, and Riverside Counties. May require fire to clear areas for colonization.	Year-round; Apr.–May	US: END CA: SP CNPS: 1B	Moderate. Known in chaparral habitat and slopes in the project area.
Coulter's saltbush <i>Atriplex coulteri</i>	Alkaline depressions or clay soils in Coastal Bluff Scrub, Coastal Dunes, Coastal Scrub, Valley & Foothill Grassland; Los Angeles County east to west San Bernardino County and south to Baja California including the Southern California islands.	Perennial; Mar.–Oct.	US: — State: SP CNPS: 1B	Low. Known from <i>Prado Dam</i> quadrangle. Relatively non-descript habitat. Often associated with clay or alkaline soils on the coast.
Davidson's saltbush <i>Atriplex serenana</i> var. <i>davidsonii</i>	Alkaline flats and coastal bluffs below 660 ft elevation Coastal Bluff Scrub, Coastal Sage Scrub; Coastal Ventura County to Baja California and the coastal islands of Southern California.	Annual; Apr.–Oct.	US: — State: SP CNPS: 1B	Low. Known from the <i>Yorba Linda</i> quadrangle. Somewhat inconspicuous with minute leaves. Often associated with alkaline soils and the coast.
Plummer's mariposa-lily <i>Calochortus plummerae</i>	Dry, rocky places, often in brush, below 5,000 ft elevation Usually on granitic soils. Found in grassland, chaparral, coastal sage scrub, yellow pine forest. Santa Monica Mts. to San Jacinto Mts. Riverside, San Bernardino, Los Angeles, and Ventura Counties.	Perennial; May–July	US: — CA: SP CNPS: 1B	Moderate to High. Suitable habitat present in dry coastal sage scrub, rocky slopes, and chaparral of canyons adjacent to the project area.
Intermediate mariposa-lily <i>Calochortus weedii</i> var. <i>intermedius</i>	Rocky areas in hills with annual grassland and coastal sage scrub. Below 2,000 ft Los Angeles, Orange and Riverside Counties.	Perennial; June–July	US: — CA: SP CNPS: 1B	High. Known in Gypsum Canyon. Suitable habitat present on slopes and canyons adjacent to the project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Southern tarplant <i>Centromadia parryi</i> ssp. <i>australis</i>	Marshes and swamp margins, valley and foothill grasslands and vernal pools below 1,200 ft elevation; Santa Barbara to Baja California and Santa Catalina Island.	Annual; May–Nov.	US: — CA: SP CNPS: 1B	Moderate. Suitable habitat may be present in disturbed marginally wet flat areas.
Smooth tarplant <i>Centromadia pungens</i> ssp. <i>laevis</i>	Often in alkaline soils assoc. with Chenopod Scrub, Meadows, Playas, Riparian Woodland, Valley and Foothill Grassland below 1,600 ft elevation Riverside and San Bernardino Counties.	Annual; Apr.–Sept.	US: — CA: SP CNPS: 1B	Low. Some marginal habitat may be present, but generally outside of the project area.
San Fernando Valley spineflower <i>Chorizanthe parryi</i> var. <i>fernandina</i>	This annual herb known in sandy soils of Coastal Sage Scrub and silty (Calabasas Formation) soils on benches of Riversidean Alluvial Fan Sage Scrub from 400 to 4,000 ft elevation. Identified historically in San Diego, Orange, Los Angeles, and Ventura Counties. Presumed extinct in California until rediscovered in spring 1999 in Los Angeles County.	Apr.–Jun.	US: C CA: END CNPS: 1B	Low. Suitable habitat may be present in sandy soils and coastal sage scrub. Presumed extirpated from Orange County.
Tecate cypress <i>Cupressus forbesii</i>	This tree occurs in closed-cone coniferous forest and chaparral between 760-4,500 ft elevation in Orange and San Diego Counties, and Baja California.	Evergreen	US: — CA: SP CNPS: 1B	Moderate. Northernmost occurrence of this species is in Coal Canyon.
Many-stemmed dudleya <i>Dudleya multicaulis</i>	Often on clay soils also around granitic outcrops in chaparral, coastal sage scrub, and grassland; below 2,500 ft elevation Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties.	May–July	US: — CA: SP CNPS: 1B	High. Known in foothills adjacent to SR-91. Suitable habitat present on slopes and canyons adjacent to the project area.
Santa Ana River woolly star <i>Eriastrum densifolium</i> var. <i>sanctorum</i>	Perennial sub-shrub found in alluvial fan sage scrub and coastal sage scrub habitats on alluvial deposits along the Santa Ana River, San Bernardino County.	Year-round	US: END CA: END CNPS: 1B	Low. Known in the Santa Ana River, but not likely on slopes adjacent to SR-91.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Vernal barley <i>Hordeum intercedens</i>	Coastal dunes, coastal scrub, and valley and foothill grasslands with saline depressions and vernal pools below 3,000 ft elevation Range includes counties from Mono to San Diego in the coast range and some of the islands off Southern California.	Annual; Mar.–June	US: — CA: SP CNPS: 3	Low. No suitable habitat is present within the project area.
California walnut <i>Juglans californica</i>	Locally common, however, now more rare, below 4,500 ft in scrub oak woodland and canyons. Also occurs in numbers in California Walnut Woodland. Occasionally hybridizes with the English walnut.	Evergreen; April–May	US: — CA: SP CNPS: 4	High. Known to be present in areas with mature trees.
Heart-leaved pitcher sage <i>Lepechinia cardiophylla</i>	Habitat type is closed-cone coniferous forest, chaparral, and cismontane woodland. Range includes Orange, Riverside, and San Diego Counties and Baja California.	Shrub; Apr.–July	US: — CA: SP CNPS: 1B	Moderate. Known in Gypsum Canyon. Suitable habitat may be present in dense chaparral canyons.
Chaparral nolina <i>Nolina cismontana</i>	Occurs in chaparral, coastal scrub, and sandstone or gabbro soils between 420 ft and 3,800 ft elevation in Los Angeles, Ventura, Orange, and San Diego Counties.	Evergreen; May–July	US: — CA: SP CNPS: 1B	High. Known in Coal and Gypsum Canyon watersheds. Suitable habitat present along dry roadside slopes with chaparral and coastal scrub.
BUTTERFLIES				
Quino checkerspot <i>Euphydryas editha quino</i>	Historically occupied open grassy sites from the vicinity of Los Angeles and Riverside south to northern Baja California, always in the vicinity of the larval foodplants, California plantain (<i>Plantago erecta</i>) and purple owls-clover (<i>Castilleja exserta</i>). Baja California numbers may still be stable but in California, the species is now known from only a few sites in San Diego and western Riverside Counties.	Jan.–May	US.: END CA: SA	Low. Nearest USFWS-recommended survey area is Santiago Reservoir (Irvine Lake), which is outside of the project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation		Occurrence Probability
FISH					
Santa Ana sucker <i>Catostomus santannae</i>	The Santa Ana sucker's historical range includes the Los Angeles, San Gabriel, and Santa Ana River drainage systems located in Southern California. An introduced population also occurs in the Santa Clara River drainage system. Found in shallow, cool, running water.	Year-round	US: CA:	THR CSC	Low. Known in the Santa Ana River but probably no habitat in project area.
AMPHIBIANS					
California red-legged frog <i>Rana [aurora] draytonii</i>	Streams with slow-moving water and deep pools; dense, shrubby riparian vegetation at pool edges. Coastal streams from Marin County to northern Baja California, but now extirpated from most of southern California.	Dec.–Apr.	US: CA:	THR CSC	No Potential. No confirmed records exist for all of Orange County since the late 1960s. The species is believed to be extirpated.
Western spadefoot <i>Spea hammondii</i>	Grasslands and occasionally hardwood woodlands; largely terrestrial but for breeding, requires rainpools or other ponded water for 3+ weeks; burrows in loose soils during dry season; Central Valley and foothills, coast ranges, inland valleys, to northern Baja California.	Oct.–Apr. (following onset of winter rains)	US: CA:	— CSC	Moderate. Suitable habitat and breeding areas are potentially present within or near the project area. Loose soils occur along the bottom of slopes and in canyon drainages.
Arroyo toad <i>Anaxyrus [Bufo] californicus</i>	Washes and arroyos with open water; sand or gravel beds; for breeding, pools with sparse overstory vegetation. Coastal and a few desert streams from Santa Barbara County to northern Baja California.	Mar– July	US: CA:	END CSC	Low. Potential habitat in Santa Ana River but unrecorded there.
Coast Range newt <i>Taricha torosa torosa</i>	Breeds in ponds, reservoirs, and slow-moving streams; uses nearby upland areas including grassland, chaparral, and woodland; coastal drainages from Mendocino County to San Diego County.	Oct.–May	US: CA: (Monterey Co. south)	— CSC	Low. Suitable habitat for this species is generally lacking.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
REPTILES				
Western pond turtle <i>Actinemys marmorata</i>	Permanent or nearly permanent water in a wide variety of habitat types; marshes, sloughs, ponds, slow-moving streams; requires basking sites such as partially submerged logs, rocks, or open mud banks. Most Pacific slope drainages below 4,500 ft elevation from western Washington (formerly) to northwestern Baja California.	Year-round with reduced activity Nov.–Mar.	US: — CA: CSC	Moderate. Reported in the Prado Flood Control Basin.
San Diego banded gecko <i>Coleonyx variegatus abbotti</i>	Chaparral, coastal sage, and desert habitats (often with rocks) from southwestern California to northern Baja California Sur.	Year-round, but primarily the warmer months.	US: — CA: SA	Low. Unknown from the Puente Hills, and habitat quality is probably marginal.
San Diego [Blainville's] horned lizard <i>Phrynosoma [coronatum] blainvillei</i>	Wide variety of habitats including coastal sage scrub, grassland, riparian woodland; typically on or near loose sandy soils; coastal and inland areas from Ventura County to northern Baja California.	Apr.–July with reduced activity Aug.–Oct.	US: — CA: CSC	Moderate. Suitable habitat present in canyons adjacent to the project area.
Orange-throated whiptail <i>Aspidoscelis hyperthra</i>	Floodplains and terraces with perennial plants and open areas nearby; sea level to 3,000 ft elevation; inland and coastal valleys of Riverside, Orange, and San Diego counties to Baja California Sur.	Mar.–July with reduced activity Aug.–Oct.	US: — CA: CSC	High. Known in areas on both sides of SR-91. Suitable habitat is present in open, sandy areas with light cover, including roadsides.
Coastal western whiptail <i>Aspidoscelis tigris multiscutatus</i>	Wide variety of habitats including coastal sage scrub, sparse grassland, and riparian woodland; coastal and inland valleys and foothills; Ventura County to northern Baja California.	Apr.–Aug.	US: — CA: SA	Moderate. Roadside habitat is marginal but moderate potential exists in less disturbed areas.
Silvery legless lizard <i>Anniella pulchra pulchra</i>	Central California to northern Baja California. Frequents loose soil and humus of relatively open habitats. Susceptible to drying and live only where they can reach damp soil.	Nearly year round	US.: — CA: CSC	Low. Habitat is marginal and presence is unlikely in immediate project area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Rosy boa <i>Lichanura trivirgata</i>	Inhabits rock outcrops and rocky shrublands from southwestern California to northern Baja California.	Warmer months	US: — CA: SA	Low. Possibly present in undisturbed rocky slopes, but unlikely.
San Bernardino ringneck snake <i>Diadophis punctatus modestus</i>	Under surface objects along drainage courses, in mesic chaparral and oak and walnut woodland communities. Moist habitats of southwestern California from Ventura to Orange Counties.	Year-round	US: — CA: SA	Moderate. Suitable habitat is present in the project area.
Coast patch-nosed snake <i>Salvadora hexalepis virgulata</i>	Coastal chaparral, washes, sandy flats and rocky areas. Widely distributed throughout lowlands, up to 7,000 ft in Pacific drainages from San Luis Obispo County to northern Baja California.	Active diurnally throughout most of the year	US: — CA: CSC	Moderate. Potential habitat in canyon washes and rocky areas. Known in the Chino Basin.
Two-striped garter snake <i>Thamnophis hammondi</i>	Highly aquatic. Only in or near permanent sources of water. Streams with rocky beds supporting willows or other riparian vegetation. From Monterey County to northwest Baja California.	Diurnal year round	US: — CA: CSC	Low. Rare in the project area.
Northern red-diamond rattlesnake <i>Crotalus ruber ruber</i>	Desert scrub, thornscrub, open chaparral and woodland; occasional in grassland and cultivated areas. Prefers rocky areas and dense vegetation. Orange and western Riverside counties south to Baja California Sur.	Year-round, but mainly mid-spring to mid-fall	US: — CA: CSC	Moderate. Suitable habitat in chaparral and woodland canyons.
BIRDS				
White-tailed kite <i>Elanus leucurus</i>	Breeds in riparian trees such as oaks, willows, and cottonwoods in lower elevation areas. Southern California range from San Luis Obispo County to San Diego County.	Year-round	US: — CA: FP	Moderate. Suitable habitat for foraging and breeding is present in the project area.
Northern harrier <i>Circus cyaneus</i>	Open country in the Temperate Zone worldwide. Forages over grasslands and moderate to sparsely vegetated habitat such as coastal sage scrub and grasslands.	Year-round	US: — CA: CSC (nesting)	Low. Foraging potential, but nesting habitat is generally lacking.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Cooper's hawk <i>Accipiter cooperi</i>	Primarily forests and woodlands throughout North America. Becoming more common in residential areas with mature trees.	Year-round	US: — CA: CSC (nesting)	Moderate. Habitat is suitable for foraging and nesting.
Golden eagle <i>Aquila chrysaetos</i>	Grasslands, brushlands, deserts, oak savannas, open coniferous forests and montane valleys. Nesting primarily in rugged mountainous country. Generally open country of the Temperate Zone worldwide. Uncommon resident in southwestern California.	Year-round diurnal	US: — CA: CSC, FP	Moderate. Possible foraging in the project area.
Merlin <i>Falco columbarius</i>	Open country; breeds in the Holarctic and winters south to the Tropics.	Fall-Winter	US: — CA: CSC	Moderate. Probably forages infrequently within the project area.
American peregrine falcon <i>Falco peregrinus anatum</i>	Widespread, but scarce and local throughout North America. Nests on buildings and bridges in the L.A. Basin.	Year-round	US: — CA: END, CFP	Low. Not known to occur in the immediate area, but foraging birds wander widely and can be found almost anywhere.
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	Breeds and nests in extensive stands of riparian forest in western North America; winters in South America.	May-Sept.	US: C CA: END	Low. Riparian habitat within project area is fragmented and disturbed.
Burrowing owl <i>Athene cunicularia</i>	Grasslands and rangelands, usually occupying ground squirrel burrows. Resident in much of North and South America.	Year-round	US: — CA: CSC (burrow sites)	Low. Habitat generally unsuitable.
Long-eared owl <i>Asio otus</i>	Scarce and local in forests and woodlands throughout much of the Northern Hemisphere.	Nocturnal year round	US: — CA: CSC (nesting)	Low. Prefers quiet woodland areas with suitable roosting and foraging areas.
Costa's hummingbird <i>Calypte costae</i>	Primarily deserts, arid brushy foothills, and chaparral in the southwestern United States and northwestern Mexico.	Spring through fall.	US: — CA: SA (nesting)	High. Habitat suitable and the species is widespread in the area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Allen's hummingbird <i>Selasphorus sasin</i>	Chaparral, open oak woodland riparian woodland and residential areas on the breeding grounds from southwestern Oregon to southwestern California; primarily montane woodland on the wintering grounds in central Mexico.	Spring through fall.	US: — CA: SA (nesting)	Low. Conditions may be unsuitable for nesting.
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	Rare and local breeder in riparian habitat usually with standing water, in the southwestern U.S. and (formerly?) northwestern Mexico. Winters in Central and South America.	May–Sept.	US: END CA: END	Low. Known in Prado Basin. Riparian habitat fragmented in the project area.
Loggerhead shrike <i>Lanius ludovicianus</i>	Open country in much of North America.	Year-round	US: — CA: CSC (nesting)	Low. Possible presence in coastal sage scrub near the project area.
Least Bell's vireo <i>Vireo bellii pusillus</i>	Riparian forests and willow thickets. Breeds and nests only in central and Southern California and Baja California; winters in Baja California Sur.	Apr.–Sept.	US: END CA: END	Moderate. Known in Prado Dam and the Santa Ana River. Riparian habitat fragmented in the project area.
California horned lark <i>Eremophila alpestris actia</i>	Open grasslands and fields, agricultural areas from northern coastal California to northwestern Baja California.	Year-round	US: — CA: CSC	Moderate. Possibly present, but grasslands are limited within the project area.
Oak titmouse <i>Baeolophus inornatus</i>	Primarily oak woodland from southern Oregon to southern Baja California Sur.	Year-round	US: — CA: SA	Moderate. Habitat suitable and the species occurs in the area.
San Diego cactus wren <i>Campylorhynchus brunneicapillus sandiegensis</i>	Resident in cactus scrub in Orange and San Diego Counties and extreme northwestern Baja California.	Year-round	US: — CA: CSC	Low. Habitat suitability marginal in the project area.
Coastal California gnatcatcher <i>Poliophtila californica californica</i>	Coastal sage scrub; occurs only cismontane southwestern California and Baja California in low-lying foothills and valleys.	Year-round	US: THR CA: CSC	Moderate. Possible presence in coastal sage scrub and canyons near the project area.
California thrasher <i>Toxostoma redivivum</i>	Primarily chaparral and riparian woodland from northern California to northwestern Baja California.	Year-round	US: — CA:	High. Habitat suitable and the species is widespread in the area.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
California yellow warbler <i>Dendroica petechia brewsteri</i>	Riparian woodland while nesting in the western U.S. and northwestern Baja California; more widespread in brushy areas and woodlands during migration and winter, when occurring from western Mexico to northern South America.	Apr.–Sept.	US: — CA: CSC (nesting)	Moderate. Known in Prado Dam and the Santa Ana River, but riparian habitat fragmented in the project area.
Yellow-breasted chat <i>Icteria virens</i>	Riparian thickets of willow, brushy tangles near watercourses. Nests in riparian woodland throughout much of North America. Winters in Central America.	Apr.–Sept.	US: — CA: CSC (nesting)	Moderate. Possible presence in bushy riparian thickets along canyon washes and drainage areas.
Southern California rufous-crowned sparrow <i>Aimophila ruficeps canescens</i>	Steep, rocky coastal sage scrub and open chaparral habitats, particularly scrubby areas mixed with grasslands. From Santa Barbara County to northwestern Baja California.	Year-round, diurnal activity	US: — CA: CSC	High. Suitable habitat present in the coastal sage scrub and chaparral in the project area.
Black-chinned sparrow <i>Spizella atrogularis</i>	Breeds in chaparral, sagebrush, and arid scrub in the southwestern U.S. and northwestern Mexico and winters primarily in Mexico.	Mar.–Aug.	US: — CA: SA (nesting)	Low. Nests in nearby hills, but habitat in project area is probably unsuitable.
Lark sparrow <i>Chondestes grammacus</i>	Open situations with scattered bushes or trees. Breeds throughout much of western North America and winters from the southern United States to southern Mexico.	Year-round	US: — CA: SA (nesting)	Moderate. Occurs in the area, but habitat in the project area may be unsuitable for nesting.
Bell's sage sparrow <i>Amphispiza belli belli</i>	Chaparral and coastal sage scrub from west-central California to northwestern Baja California.	Year-round, diurnal activity	US: — CA: CSC (nesting)	Low. Suitable habitat is fragmented and patchy in the project area.
Lawrence's goldfinch <i>Carduelis lawrencei</i>	Oak woodland chaparral, riparian woodland and other habitats in arid regions, but usually near water; from northern California to northern Baja California, but periodically wandering throughout much of western North America.	Primarily spring and summer.	US: — CA: SA (nesting)	Moderate. Occurs in the area, but habitat in the project area may be unsuitable for nesting.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
MAMMALS				
Northwestern San Diego pocket mouse <i>Chaetodipus fallax fallax</i>	Open habitat on the Pacific slope from southwestern San Bernardino County to northwestern Baja California	Year-round	US: — CA: CSC	High. Suitable habitat present in the project area.
San Diego desert woodrat <i>Neotoma lepida intermedia</i>	Frequents poorly vegetated arid lands and is especially associated with cactus patches. Occurs along the Pacific slope from about San Luis Obispo to northwestern Baja California.	Year-round	US: — CA: CSC	High. Possible presence in coastal sage scrub and canyons near the project area.
San Diego black-tailed jackrabbit <i>Lepus californicus bennettii</i>	Open country of coastal Southern California and northern Baja California.	Year-round	US: — CA: CSC	Low. Possible presence in undisturbed areas.
Yuma myotis <i>Myotis yumanensis</i>	Varied habitats in western North America.	Nocturnal; warmer months	US: — CA: SA	High. Suitable habitat present in the project area. The species is widespread in the area.
Long-eared myotis <i>Myotis evotis</i>	Varied habitats in western North America.	Warmer months	US: — CA: SA	Low. Uncommon and poorly known.
Fringed myotis <i>Myotis thysanodes</i>	Varied habitats in western North America.	Warmer months	US: — CA: SA	Low. Generally uncommon and local.
Long-legged myotis <i>Myotis volans</i>	Varied habitats in western North America.	Warmer months	US: — CA: SA	Low. Generally uncommon and local.
Small-footed myotis <i>Myotis ciliolabrum</i>	Varied habitats in western North America.	Warmer months	US: — CA: SA	Moderate. Suitable habitat present.
Western red bat <i>Lasiurus blossevillii</i>	Forages over a wide range of habitats, but generally roosts in woodlands and forests. Ranges from southwestern Canada through the western United States and Middle America to South America.	Year-round; primarily warmer months	US: — CA: SA	High. Suitable habitat present in the project area. The species is widespread in the area.
Southwestern yellow bat <i>Lasiurus xanthinus</i>	Varied habitats, but usually near water; often associated with palm trees. Southwestern United States to southern Mexico.	Year-round; primarily warmer months	US: — CA: SA	Moderate. Habitat suitability may be marginal.
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	Varied habitats. Ranges from southwestern Canada through the western United States to southern Mexico.	Year-round; primarily warmer months	US: — CA: CSC	Low. Presumably rare and local in the Los Angeles Basin.

Special-Interest Species Summary

Species	Habitat And Distribution	Activity Period	Status Designation	Occurrence Probability
Pallid bat <i>Antrozous pallidus</i>	Varied habitats in western North America.	Year-round, nocturnal	US: — CA: CSC	High. Suitable habitat present in crevices, rocks, and hollow trees, with foraging areas throughout the project vicinity.
California mastiff bat <i>Eumops perotis californicus</i>	Ranged historically throughout much of the southwestern United States and northwestern Mexico. In California, most records are from rocky areas at low elevations where roosting occurs primarily in crevices.	Year-round, nocturnal	US: — CA: CSC	High. Suitable habitat present in crevices and rocks near the project area, with foraging areas throughout the project vicinity.
Ringtail <i>Bassariscus astutus</i>	Woody and rocky areas of the southwestern U.S. and most of Mexico.	Year-round	US: — CA: FP	Low. Apparently rare in the local area.

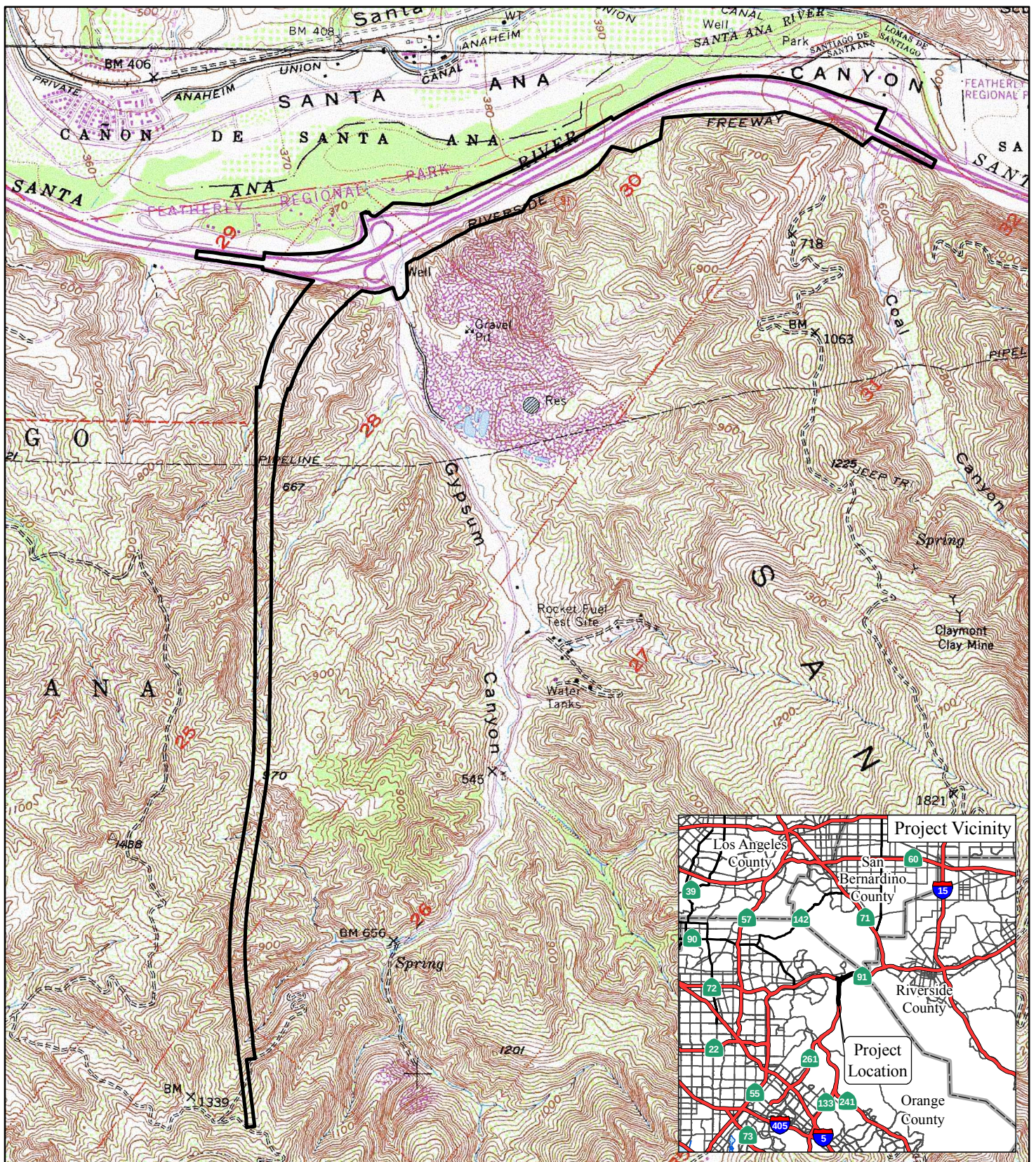
Legend

- US: Federal Classifications
 END Taxa listed as Endangered.
 THR Taxa listed as Threatened.
 P END Taxa proposed to be listed as Endangered.
 P THR Taxa proposed to be listed as Threatened.
 C Candidate for listing. Refers to taxa for which the USFWS has sufficient information to support a proposal to list as Endangered or Threatened; issuance of the proposal(s) is anticipated but precluded at this time.
 CA: State Classifications
 END Taxa State-listed as Endangered.
 THR Taxa State-listed as Threatened.
 C END State candidate (Endangered).
 C THR State candidate (Threatened).
 CSC California Species of Special Concern. Refers to taxa with populations declining seriously or otherwise highly vulnerable to human developments.
 FP Taxa listed as Fully Protected by the California Department of Fish and Game
 SA Special Animal. Refers to taxa of concern to the Natural Diversity Data Base regardless of their legal or protection status.
 SP Special Plant. Refers to taxa of concern to the Natural Diversity Data Base regardless of their legal or protection status.
 CNPS: California Native Plant Society Classifications
 1A Plants presumed by CNPS to be extinct in California.
 1B Plants considered by CNPS to be rare, threatened or endangered in California and elsewhere.
 2 Plants considered by CNPS to be rare, threatened or endangered in California, but more common elsewhere.
 3 Plants suggested by CNPS for consideration as endangered but about which more information is needed.
 4 Plants of limited distribution whose status is monitored by CNPS.

FIGURES

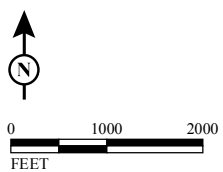
Figure 1: Project Location Map

Figure 2: Study Area



LEGEND

Study Area



SOURCE: USGS 7.5' Quad, BLACK STAR CANYON ('88)
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FIGURE 1

SR-91/SR-241 Express Lanes Direct Connector Project

Project Location



LEGEND

 Study Area

 Existing Caltrans ROW

 Potential Wildlife Crossings

 Known Culverts/Wildlife Access Points

 LBVi Locations (SAWA 2003, Gonzalez 2007)



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FEET

SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

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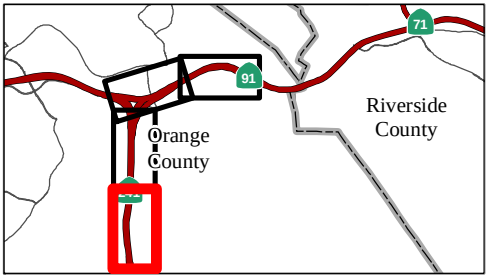
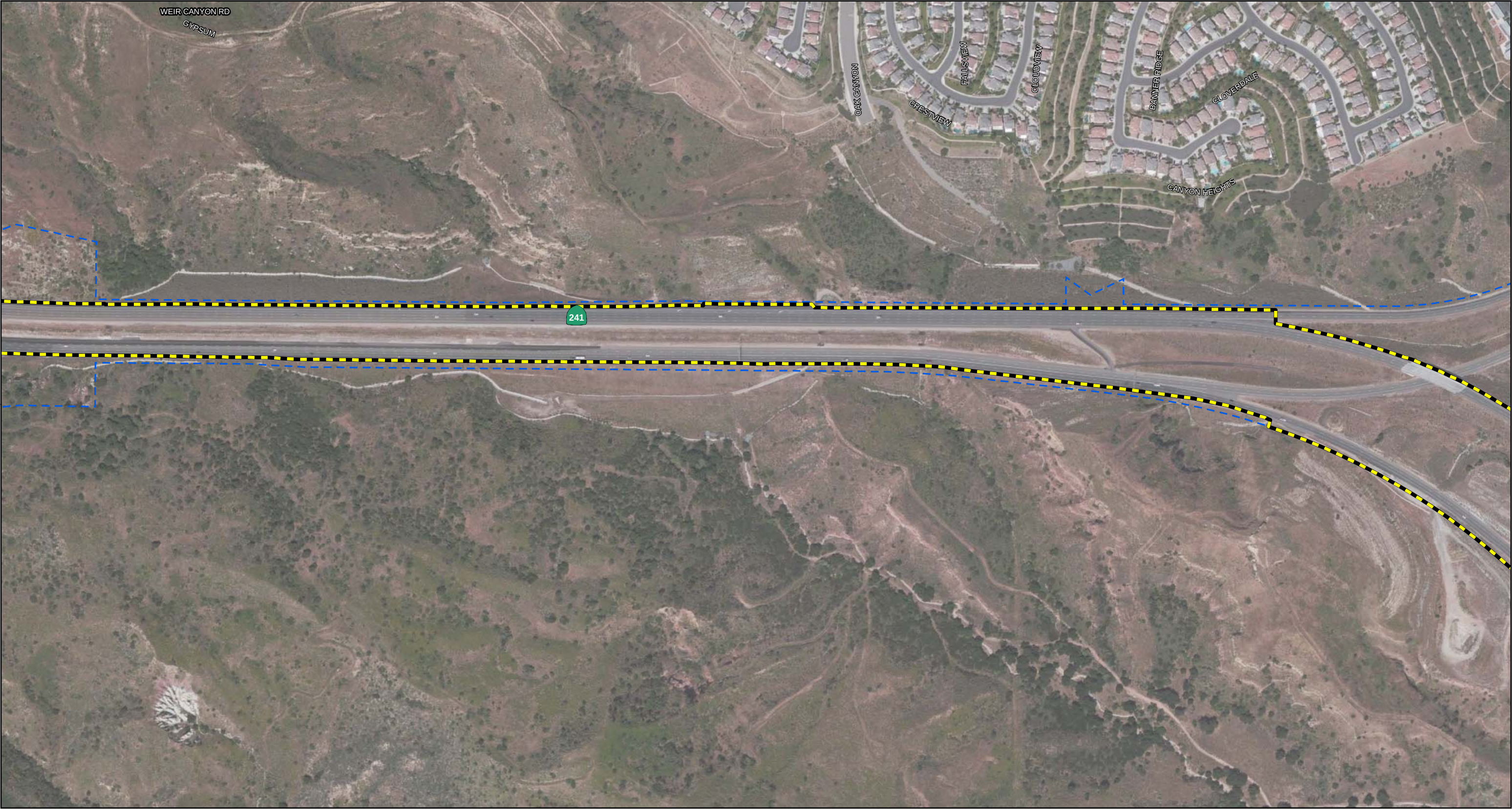


FIGURE 2
Sheet 1 of 4

SR-91/SR-241 Express Lanes Direct Connector Project
Study Area



LEGEND

 Study Area

 Existing Caltrans ROW

 Potential Wildlife Crossings

 Known Culverts/Wildlife Access Points

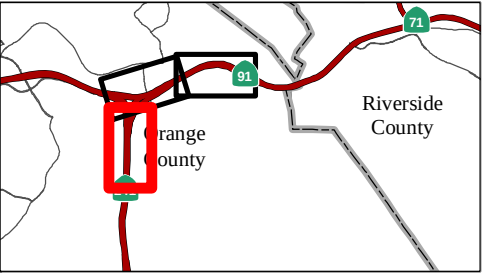
 LBVi Locations (SAWA 2003, Gonzalez 2007)



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SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

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SR-91/SR-241 Express Lanes Direct Connector Project
Study Area

FIGURE 2
Sheet 2 of 4



LEGEND

 Study Area

 Existing Caltrans ROW

 Potential Wildlife Crossings

 Known Culverts/Wildlife Access Points

 LBVi Locations (SAWA 2003, Gonzalez 2007)



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SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

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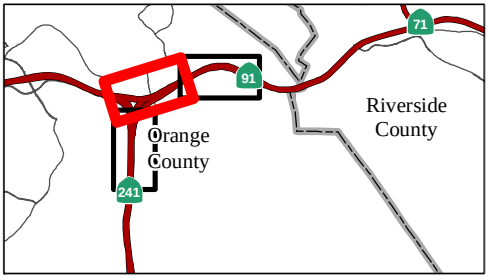


FIGURE 2

Sheet 3 of 4

SR-91/SR-241 Express Lanes Direct Connector Project

Study Area



LEGEND

 Study Area

 Existing Caltrans ROW

 Potential Wildlife Crossings

 Known Culverts/Wildlife Access Points

 LBVi Locations (SAWA 2003, Gonzalez 2007)



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SOURCE: Bing Maps (c. 2008); RBF (3/2011); Parsons Brinckerhoff (9/2009)

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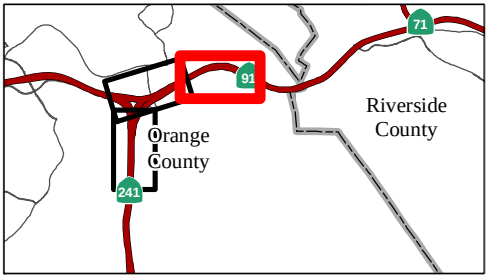


FIGURE 2
Sheet 4 of 4

SR-91/SR-241 Express Lanes Direct Connector Project
Study Area

Draft Cooperative Agreement

**This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.**

COOPERATIVE AGREEMENT

This agreement, effective on _____, 2011, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY, a California Joint Powers Authority, referred to as TCA.

For the purpose of this agreement, the term PARTNERS collectively refers to CALTRANS and TCA (all signatory parties to this agreement). The term PARTNER refers to any one of those signatory parties individually.

RECITALS

1. California Streets and Highways Code sections 114 and 130 authorize PARTNERS to enter into a cooperative agreement for performance of work within the State Highway System (SHS) right of way.
2. This agreement outlines the terms and conditions of cooperation between PARTNERS to provide IQA to PROJECT for freeway improvement to construct a direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east.

For the purpose of this agreement, freeway improvement may include the construction of a direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east will be referred to as PROJECT. All responsibilities assigned in this agreement to provide IQA to PROJECT will be referred to as OBLIGATIONS.

3. This agreement is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding PROJECT.
4. This Agreement shall not be deemed to be a waiver or modification of any terms, conditions or covenants of the current Cooperative Agreement No. 12-081, for the Eastern Transportation Corridor, and all terms and conditions set forth in that document are hereby affirmed by STATE and AGENCY and shall remain in full force and effect.
5. No PROJECT deliverables have been completed prior to this agreement.

**This agreement is not approvable.
Please coordinate with the HQ Office of Cooperative Agreements for review.**

6. The estimated date for OBLIGATION COMPLETION is December 31, 2017.
7. In this agreement capitalized words represent defined terms and acronyms. The Definitions section contains a complete definition for each capitalized term.
8. From this point forward, PARTNERS define in this agreement the terms and conditions under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

9. TCA is SPONSOR for 100% of PROJECT.
10. CALTRANS will provide IQA for the portions of WORK within existing and proposed SHS right of way. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS. As NEPA and CEQA lead agency, CALTRANS will perform Quality Control Program (QCP) process review for environmental documentation.
11. TCA may provide IQA for the portions of WORK outside existing and proposed SHS right of way.
12. TCA is the only FUNDING PARTNER for this agreement. TCA's funding commitment is defined in the FUNDING SUMMARY.
13. CALTRANS is the CEQA lead agency for PROJECT.
14. CALTRANS is the NEPA lead agency for PROJECT.
15. TCA is IMPLEMENTING AGENCY for PA&ED.

SCOPE

Scope: General

16. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and standards; FHWA STANDARDS; and CALTRANS STANDARDS.
17. IMPLEMENTING AGENCY for a PROJECT COMPONENT will provide a Quality Management Plan (QMP) for that component as part of the PROJECT MANAGEMENT PLAN.

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18. Any PARTNER may, at its own expense, have representatives observe any OBLIGATIONS performed by another PARTNER. Observation does not constitute authority over those OBLIGATIONS.
19. Each PARTNER will ensure that all of its personnel participating in OBLIGATIONS are appropriately qualified, and if necessary licensed, to perform the tasks assigned to them.
20. PARTNERS will invite each other to participate in the selection and retention of any consultants who participate in OBLIGATIONS.
21. If WORK is done under contract (not completed by a PARTNER's own employees) and is governed by the California Labor Code's definition of "public works" (section 1720(a)(a)), that PARTNER will conform to sections 1720 – 1815 of the California Labor Code and all applicable regulations and coverage determinations issued by the Director of Industrial Relations.
22. IMPLEMENTING AGENCY for each PROJECT COMPONENT included in this agreement will be available to help resolve problems generated by that component for the entire duration of PROJECT.
23. CALTRANS will issue, upon proper application, the encroachment permits required for WORK within SHS right of way.

Contractors and/or agents, and utility owners will not perform WORK without an encroachment permit issued in their name.
24. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within 24 hours of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.
25. PARTNERS will hold all administrative draft and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for PROJECT in confidence to the extent permitted by law. Where applicable, the provisions of California Government Code section 6254.5(e) will govern the disclosure of such documents in the event that PARTNERS share said documents with each other.

PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete PROJECT without the written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.
26. If any PARTNER receives a public records request, pertaining to OBLIGATIONS, that PARTNER will notify PARTNERS within five (5) working days of receipt and make

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PARTNERS aware of any disclosed public records. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.

27. If HM-1 or HM-2 is found during a PROJECT COMPONENT, IMPLEMENTING AGENCY for that PROJECT COMPONENT will immediately notify PARTNERS.
28. CALTRANS, independent of PROJECT, is responsible for any HM-1 found within the existing SHS right of way. CALTRANS will undertake HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.
29. TCA, independent of PROJECT, is responsible for any HM-1 found within PROJECT limits and outside the existing SHS right of way. TCA will undertake or cause to be undertaken HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.
30. If HM-2 is found within PROJECT limits, the public agency responsible for the advertisement, award, and administration (AAA) of the PROJECT construction contract will be responsible for HM MANAGEMENT ACTIVITIES related to HM-2.
31. CALTRANS' acquisition or acceptance of title to any property on which any HM-1 or HM-2 is found will proceed in accordance with CALTRANS' policy on such acquisition.
32. PARTNERS will comply with all of the commitments and conditions set forth in the environmental documentation, environmental permits, approvals, and applicable agreements as those commitments and conditions apply to each PARTNER's responsibilities in this agreement.
33. IMPLEMENTING AGENCY for each PROJECT COMPONENT will furnish PARTNERS with written monthly progress reports during the implementation of OBLIGATIONS completed in that component.
34. Upon OBLIGATION COMPLETION, ownership or title to all materials and equipment constructed or installed for the operations and/or maintenance of the SHS within SHS right of way as part of WORK become the property of CALTRANS.

CALTRANS will not accept ownership or title to any materials or equipment constructed or installed outside SHS right of way.
35. IMPLEMENTING AGENCY for a PROJECT COMPONENT will accept, reject, compromise, settle, or litigate claims of any non-agreement parties hired to do WORK in that component.
36. PARTNERS will confer on any claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this agreement in order to retain resolution possibilities for

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potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on claim.

37. PARTNERS will maintain, and will ensure that any party hired by PARTNERS to participate in OBLIGATIONS will maintain, a financial management system that conforms to Generally Accepted Accounting Principles (GAAP), and that can properly accumulate and segregate incurred PROJECT costs, and provide billing and payment support.
38. PARTNERS will comply with the appropriate federal cost principles and administrative requirements outlined in the Applicable Cost Principles and Administrative Requirements table below. These principles and requirements apply to all funding types included in this agreement.

Applicable Cost Principles and Administration Requirements		
The federal cost principles and administrative requirements associated with each organization type apply to that organization.		
Organization Type	Cost Principles	Administrative Requirements
Federal Governments	2 CFR Part 225	OMB A-102
State and Local Government	2 CFR, Part 225	49 CFR, Part 18
Educational Institutions	2 CFR, Part 220	2 CFR, Part 215
Non-Profit Organizations	2 CFR, Part 230	2 CFR, Part 215
For Profit Organizations	48 CFR, Chapter 1, Part 31	49 CFR, Part 18
CFR (Code of Federal Regulations) OMB (Office of Management and Budget)		
Related URLs:		
• Various OMB Circular:	http://www.whitehouse.gov/omb/grants_circulars	
• Code of Federal Regulations:	http://www.gpoaccess.gov/CFR	

39. PARTNERS will maintain and make available to each other all OBLIGATIONS-related documents, including financial data, during the term of this agreement.
40. PARTNERS will retain all OBLIGATIONS-related records for three (3) years after the final voucher.
41. PARTNERS have the right to audit each other in accordance with generally accepted governmental audit standards.

CALTRANS, the state auditor, FHWA, and TCA will have access to all OBLIGATIONS-related records of each PARTNER, and any party hired by a PARTNER to participate in OBLIGATIONS, for audit, examination, excerpt, or transcription.

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The examination of any records will take place in the offices and locations where said records are generated and/or stored and will be accomplished during reasonable hours of operation. The auditing PARTNER will be permitted to make copies of any OBLIGATIONS-related records needed for the audit.

The audited PARTNER will review the draft audit, findings, and recommendations, and provide written comments within 30 calendar days of receipt.

Upon completion of the final audit, PARTNERS have 30 days to refund or invoice as necessary in order to satisfy the obligation of the audit.

Any audit dispute not resolved by PARTNERS is subject to dispute resolution. Any costs arising out of the dispute resolution process will be paid within 30 calendar days of the final audit or dispute resolution findings.

42. Any PARTNER that hires another party to participate in OBLIGATIONS will conduct a pre-award audit of that party in accordance with the *Local Assistance Procedures Manual*.
43. If WORK stops for any reason, IMPLEMENTING AGENCY will place all facilities impacted by WORK in a safe and operable condition acceptable to CALTRANS.
44. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this agreement, in order to keep PROJECT in environmental compliance until WORK resumes.
45. Each PARTNER accepts responsibility to complete the activities that it selected on the SCOPE SUMMARY. Activities marked with "N/A" on the SCOPE SUMMARY are not included in the scope of this agreement.

Scope: Environmental Permits, Approvals and Agreements

46. Each PARTNER identified in the Environmental Permits table below accepts the responsibility to complete the assigned activities.

Environmental Permits						
Permit	Coordinate	Prepare	Obtain	Implement	Renew	Amend
NPDES SWRCB	CT	TCA	TCA/CT	TCA/CT	TCA/CT	TCA/CT

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Scope: Project Approval and Environmental Document (PA&ED)

47. CALTRANS is the CEQA lead agency for PROJECT. CALTRANS will determine the type of environmental documentation required and will cause that documentation to be prepared.
48. Any PARTNER involved in the preparation of CEQA environmental documentation will follow the CALTRANS STANDARDS that apply to the CEQA process including, but not limited to, the guidance provided in the Standard Environmental Reference available at www.dot.ca.gov/ser.
49. Pursuant to SAFETEA-LU Section 6004 and/or 6005, CALTRANS is the NEPA lead agency for PROJECT. CALTRANS will assume responsibility for NEPA compliance and will cause that documentation to be prepared.
50. Any PARTNER involved in the preparation of NEPA environmental documentation will follow FHWA STANDARDS that apply to the NEPA process including, but not limited to, the guidance provided in the FHWA Environmental Guidebook available at www.fhwa.dot.gov/hep/index.htm.
51. TCA / Contracted Consultants will prepare the appropriate CEQA environmental documentation to meet CEQA requirements.
52. TCA / Contracted Consultants will prepare the appropriate NEPA environmental documentation to meet NEPA requirements.
53. Any PARTNER preparing any portion of the CEQA environmental documentation, including any studies and reports, will submit that portion of the documentation to the CEQA lead agency for the QCP review, comment, and approval at appropriate stages of development prior to public availability.
54. Any PARTNER preparing any portion of the NEPA environmental documentation including any studies and reports will submit that portion of the documentation to CALTRANS for the QCP review, comment, and approval prior to public availability.
55. TCA will prepare, publicize, and circulate all CEQA-related public notices and will submit said notices to the CEQA lead agency for review, comment, and approval prior to publication and circulation.

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56. TCA will prepare, publicize, and circulate all NEPA-related public notices, and CALTRANS will submit any Federal Register notices to FHWA for publication. TCA will submit all notices to CALTRANS for review, comment, and approval prior to publication and circulation.

CALTRANS will work with the appropriate federal agency to publish notices in the Federal Register.

57. The CEQA lead agency will attend all CEQA-related public meetings.
58. TCA will plan, schedule, prepare materials for, and host all CEQA-related public hearings/meetings and will submit all materials to the CEQA lead agency for review, comment, and approval.
59. The NEPA lead agency will attend all NEPA-related public meetings.
60. TCA will plan, schedule, prepare materials for, and host all NEPA-related public meetings. TCA will submit all materials to CALTRANS for CALTRANS' review, comment, and approval.
61. If a PARTNER who is not the CEQA or NEPA lead agency holds a public meeting about PROJECT, that PARTNER must clearly state its role in PROJECT and the identity of the CEQA and NEPA lead agencies on all meeting publications. All meeting publications must also inform the attendees that public comments collected at the meetings are not part of the CEQA or NEPA public review process.

That PARTNER will submit all meeting advertisements, agendas, exhibits, handouts, and materials to the CEQA and/or NEPA lead agency for review, comment, and approval. If that PARTNER makes any changes to the materials, it will allow the lead agency to review, comment, and approve those changes.

The CEQA lead agency maintains final editorial control with respect to text or graphics. The NEPA lead agency has final approval authority with respect to text or graphics.

62. The PARTNER preparing the environmental documentation, including the studies and reports, will ensure that qualified personnel remain available to help resolve environmental issues and perform any necessary work to ensure that PROJECT remains in environmental compliance.

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COST

Cost: General

63. The cost of any awards, judgments, or settlements generated by OBLIGATIONS is an OBLIGATIONS COST.
64. CALTRANS, independent of PROJECT, will pay all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right of way.
65. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within PROJECT limits and outside of the existing SHS right of way.
66. HM MANAGEMENT ACTIVITIES costs related to HM-2 are CONSTRUCTION SUPPORT and CONSTRUCTION CAPITAL costs.
67. The cost to comply with and implement the commitments set forth in the environmental documentation is an OBLIGATIONS COST.
68. The cost to ensure that PROJECT remains in environmental compliance is an OBLIGATIONS COST.
69. The cost of any legal challenges to the CEQA or NEPA environmental process or documentation is an OBLIGATIONS COST.
70. Independent of OBLIGATIONS COST, CALTRANS will fund the cost of its own IQA for WORK done within existing or proposed future SHS right of way.

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71. Independent of OBLIGATIONS COST, TCA will fund the cost of its own IQA for WORK done outside existing or proposed future SHS right of way.
72. CALTRANS will provide encroachment permits to PARTNERS, their contractors, consultants and agents, at no cost.
73. Fines, interest, or penalties levied against a PARTNER will be paid, independent of OBLIGATIONS cost, by the PARTNER whose actions or lack of action caused the levy. That PARTNER will indemnify and defend each other PARTNER.
74. The cost of any engineering support performed by CALTRANS includes all direct and applicable indirect costs. CALTRANS calculates indirect costs based solely on the type of funds used to pay support costs. State and federal funds are subject the current Program Functional Rate. Local funds are subject to the current Program Functional Rate and the current Administration Rate. Caltrans periodically adjusts the Program Functional Rate and the Administration Rate.
75. If CALTRANS reimburses TCA for any costs later determined to be unallowable, TCA will reimburse those funds.
76. The cost to place PROJECT right of way in a safe and operable condition and meet all environmental commitments is an OBLIGATIONS cost.
77. Because IMPLEMENTING AGENCY is responsible for managing the scope, cost, and schedule of a project component, if there are insufficient funds available in this agreement to place the right of way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY accepts responsibility to fund these activities until such time as PARTNERS amend this agreement.

That IMPLEMENTING AGENCY may request reimbursement for these costs during the amendment process.

78. If there are insufficient funds in this agreement to implement applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, and/or approvals that are in effect at a time that WORK stops, each PARTNER implementing commitments or conditions accepts responsibility to fund these activities, as they apply to each PARTNER's responsibilities, until such time are PARTNERS amend this agreement.

Each PARTNER may request reimbursement for these costs during the amendment process.

79. PARTNERS will pay invoices within 30 calendar days of receipt of invoice.

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Cost: Environmental Permits, Approvals and Agreements

80. The cost of coordinating, obtaining, complying with, implementing, and if necessary renewing and amending resource agency permits, agreements, and/or approvals is an OBLIGATIONS COST.

Cost: Project Approval and Environmental Document (PA&ED)

81. The cost to prepare, publicize, and circulate all CEQA and NEPA-related public notices is an OBLIGATIONS COST.
82. The cost to plan, schedule, prepare, materials for, and host all CEQA and NEPA-related public hearings is an OBLIGATIONS COST.

SCHEDULE

83. PARTNERS will manage the schedule for OBLIGATIONS through the work plan included in the PROJECT MANAGEMENT PLAN.

GENERAL CONDITIONS

84. PARTNERS understand that this agreement is in accordance with and governed by the Constitution and laws of the State of California. This agreement will be enforceable in the State of California. Any PARTNER initiating legal action arising from this agreement will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this agreement resides, or in the Superior Court of the county in which PROJECT is physically located.
85. All OBLIGATIONS of CALTRANS under the terms of this agreement are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission.
86. Any PARTNER performing IQA does so for its own benefit. No one can assign liability to that PARTNER due to its IQA activities.
87. Neither TCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this agreement.

It is understood and agreed that CALTRANS and/or its agents will fully defend, indemnify, and save harmless TCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or

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assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under this agreement.

88. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon TCA under this agreement.

It is understood and agreed that TCA and/or its agents will fully defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under this agreement.

89. PARTNERS do not intend this agreement to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this agreement. PARTNERS do not intend this agreement to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.
90. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this agreement.
91. PARTNERS will not interpret any ambiguity contained in this agreement against each other. PARTNERS waive the provisions of California Civil Code section 1654.
92. A waiver of a PARTNER's performance under this agreement will not constitute a continuous waiver of any other provision. An amendment made to any article or section of this agreement does not constitute an amendment to or negate all other articles or sections of this agreement.
93. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.
94. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within 30 calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.
95. PARTNERS will first attempt to resolve agreement disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the executive officer of TCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

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Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this agreement. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or 45 calendar days after filing the written mediation request, whichever occurs first.

PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this agreement resides. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this agreement or to enforce the provisions of this article including equitable relief.

96. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.
97. If any provisions in this agreement are deemed to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other agreement provisions invalid, inoperative, or unenforceable, and PARTNERS will automatically sever those provisions from this agreement.
98. PARTNERS intend this agreement to be their final expression and supersede any oral understanding or writings pertaining to OBLIGATIONS.
99. If during performance of WORK additional activities or environmental documentation is necessary to keep PROJECT in environmental compliance, PARTNERS will amend this agreement to include completion of those additional tasks.
100. PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS.
101. This agreement will terminate upon OBLIGATION COMPLETION or an amendment to terminate this agreement, whichever occurs first.

However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, and ownership articles will remain in effect until terminated or modified in writing by mutual agreement.

102. The following documents are attached to, and made an express part of this agreement: SCOPE SUMMARY, FUNDING SUMMARY.

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DEFINITIONS

CALTRANS – The California Department of Transportation

CALTRANS STANDARDS – CALTRANS policies and procedures, including, but not limited to, the guidance provided in the *Guide to Capital Project Delivery Workplan Standards* (previously known as WBS Guide) available at <http://www.dot.ca.gov/hq/projmgmt/guidance.htm>.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

COOPERATIVE AGREEMENT CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this agreement and in all amendments to this agreement.

COST – The responsibility for cost responsibilities in this agreement can take one of three assignments:

- **OBLIGATIONS COST** – A cost associated with fulfilling OBLIGATIONS that will be funded as part of this agreement. The responsibility is defined by the funding commitments in this agreement.
- **PROJECT COST** – A cost associated with PROJECT that can be funded outside of OBLIGATIONS. A PROJECT COST may not necessarily be part of this agreement. This responsibility is defined by the PARTNERS' funding commitments at the time the cost is incurred.
- **PARTNER cost** – A cost that is the responsibility of a specific PARTNER, independent of PROJECT.

FHWA – Federal Highway Administration

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to, the guidance provided at www.fhwa.dot.gov/topics.htm.

FUNDING PARTNER – A PARTNER that commits a defined dollar amount to fulfill OBLIGATIONS. Each FUNDING PARTNER accepts responsibility to provide the funds identified on the FUNDING SUMMARY under its name.

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FUNDING SUMMARY – The table that designates an agreement’s funding sources, types of funds, and the PROJECT COMPONENT in which the funds are to be spent. Funds listed on the FUNDING SUMMARY are “not-to-exceed” amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards Advisory Board that serve to achieve some level of standardization. See <http://www.fasab.gov/accepted.html>.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – Ensuring that IMPLEMENTING AGENCY’s quality assurance activities result in WORK being developed in accordance with the applicable standards and within an established Quality Management Plan (QMP). IQA does not include any work necessary to actually develop or deliver WORK or any validation by verifying or rechecking work performed by another partner.

NEPA (National Environmental Policy Act of 1969) – The federal act that establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this agreement, and all amendments to this agreement, and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

OBLIGATIONS – All responsibilities included in this agreement.

OBLIGATIONS COST – See COST.

OMB (Office of Management and Budget) – The federal office that oversees preparation of the federal budget and supervises its administration in Executive Branch agencies.

PA&ED (Project Approval and Environmental Document) – See PROJECT COMPONENT.

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PARTNER – Any individual signatory party to this agreement.

PARTNERS – The term that collectively references all of the signatory agencies to this agreement. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other partners.

PROJECT – The undertaking to construct direct connector between the existing toll facilities of SR-241 and SR-91 Express Lanes to and from the east.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- **PID (Project Initiation Document)** – The activities required to deliver the project initiation document for PROJECT.
- **PA&ED (Project Approval and Environmental Document)** – The activities required to deliver the project approval and environmental documentation for PROJECT.
- **PS&E (Plans, Specifications, and Estimate)** – The activities required to deliver the plans, specifications, and estimate for PROJECT.
- **R/W (Right of Way) SUPPORT** – The activities required to obtain all property interests for PROJECT.
- **R/W (Right of Way) CAPITAL** – The funds for acquisition of property rights for PROJECT.
- **CONSTRUCTION SUPPORT** – The activities required for the administration, acceptance, and final documentation of the construction contract for PROJECT.
- **CONSTRUCTION CAPITAL** – The funds for the construction contract.

PROJECT COST – See COST.

PROJECT MANAGEMENT PLAN – A group of documents used to guide a project's execution and control throughout that project's lifecycle.

QCP (Quality Control Program) – Caltrans quality control procedures requiring five reviews for all environmental documents as described in the Jay Norvell Memo dated July 2, 2007. The five reviews are Resource/Technical Specialist Review, Internal Peer Review, Technical Editor Review, NEPA Quality Control Review and Environmental Branch Chief Review.

QMP (Quality Management Plan) – An integral part of the Project Management Plan that describes IMPLEMENTING AGENCY's quality policy and how it will be used.

SAFETEA-LU – Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

SCOPE SUMMARY – The attachment in which each PARTNER designates its commitment to specific scope activities within each PROJECT COMPONENT as outlined by the *Guide to*

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Capital Project Delivery Workplan Standards (previously known as WBS Guide) available at <http://www.dot.ca.gov/hq/projmgmt/guidance.htm>.

SHS (State Highway System) – All highways, right of way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

SPONSOR – Any PARTNER that accepts the responsibility to establish scope of PROJECT and the obligation to secure financial resources to fund PROJECT. SPONSOR is responsible for adjusting the PROJECT scope to match committed funds or securing additional funds to fully fund the PROJECT scope. If a PROJECT has more than one SPONSOR, funding adjustments will be made by percentage (as outlined in Responsibilities). Scope adjustments must be developed through the project development process and must be approved by CALTRANS as the owner/operator of the SHS.

WORK – All scope activities included in this agreement.

CONTACT INFORMATION

The information provided below indicates the primary contact data for each PARTNER to this agreement. PARTNERS will notify each other in writing of any personnel or location changes. Contact information changes do not require an amendment to this agreement.

The primary agreement contact person for CALTRANS is:

Lisa Ramsey, Office Chief/Corridor Project Manager
3347 Michelson Dr., Suite 100
Irvine, California 92612
Office Phone: 949-724-2102
Mobile Phone: 949-279-8867
Email: lisa_ramsey@dot.ca.gov

The primary agreement contact person for TCA is:

Tom Wheeler, Corridor Manager-Design
125 Pacifica
Irvine, California 92618
Office Phone: 949-754-3430
Fax Number: 949-754-3491
Email: twheeler@thetollroads.com

**This agreement is not approvable.
It must be sent to the HQ Office of Cooperative Agreements for review.**

SIGNATURES

PARTNERS declare that:

1. Each PARTNER is an authorized legal entity under California state law.
2. Each PARTNER has the authority to enter into this agreement.
3. The people signing this agreement have the authority to do so on behalf of their public agencies.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

FOOTHILL/EASTERN TRANSPORTATION
CORRIDOR AGENCY

APPROVED

APPROVED

By: _____
ADNAN MAIAH
Acting Deputy District Director
Capital Projects Outlay Program

By: _____
THOMAS E. MARGRO
Chief Executive Officer

CERTIFIED AS TO FUNDS:

By: _____
CAROLYN LeBAIL
Assistant Secretary of the Board

By: _____
NEDA SABER
District Budget Manager

APPROVED AS TO FORM AND PROCEDURE

By: _____
ROBERT THORNTON
General Counsel

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SCOPE SUMMARY

4	5	6	7	8	Description	CALTRANS	TCA	N/A
2	160				Perform Preliminary Engineering Studies and Draft Project Report	X	X	
		05			Updated Project information		X	
		10			Engineering Studies		X	
		15			Draft Project Report		X	
		20			Engineering and Land Net Surveys		X	
		30			Environmental Study Request (ESR)		X	
		40			NEPA Delegation	X		
		45			Base Maps and Plan Sheets for Project Report and Environmental Studies		X	
2	165				Perform Environmental Studies and Prepare Draft Environmental Document		X	
		05			Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document		X	
		10			General Environmental Studies		X	
		15			Biological Studies		X	
		20			Cultural Resource Studies		X	
		25			Draft Environmental Document or Categorical Exemption/Exclusion	X	X	
			10		Section 4(F) Evaluation	X	X	
			20		Environmental Quality Control and Other Reviews	X	X	
			25		Approval to Circulate Resolution	X		
			30		Environmental Coordination	X	X	
			99		Other Draft Environmental Document Products		X	
		30			NEPA Delegation	X		
2	170				Permits, Agreements, and Route Adoptions during PA&ED component	X	X	
		05			Required permits	X	X	
		15			Railroad Agreements		X	
		20			Freeway Agreements		X	
		25			Agreement for Material Sites		X	
		30			Executed Maintenance Agreement		X	
		40			Route Adoptions		X	
		45			MOU From Tribal Employment Rights Office (TERO)		X	
		55			NEPA Delegation	X		
2	175				Circulate Draft Environmental Document and Select Preferred Project Alternative Identification	X	X	
		05			DED Circulation		X	
			05		Master Distribution and Invitation Lists		X	
			10		Notices Regarding Public Hearing and Availability of Draft Environmental Document		X	
			15		DED Publication and Circulation		X	

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		20	Federal Consistency Determination (Coastal Zone)			X
		99	Other DED Circulation Products	X	X	
	10		Public Hearing		X	
		05	Need for Public Hearing Determination	X		
		10	Public Hearing Logistics		X	
		15	Displays for Public Hearing		X	
		20	Second Notices of Public Hearing and Availability of DED		X	
		25	Map Display and Public Hearing Plan		X	
		30	Display Public Hearing Maps		X	
		35	Public Hearing	X	X	
		40	Record of Public Hearing		X	
		99	Other Public Hearing Products		X	
	15		Public Comment Responses and Correspondence		X	
	20		Project Preferred Alternative	X		
	25		NEPA Delegation	X		
2	180		Prepare and Approve Project Report and Final Environmental Document	X	X	
	05		Final Project Report	X	X	
	10		Final Environmental Document	X	X	
		05	Approved Final Environmental Document	X	X	
		05	Draft Final Environmental Document Review	X	X	
		10	Revised Draft Final Environmental Document	X	X	
		15	Section 4(F) Evaluation	X	X	
		20	Findings	X	X	
		25	Statement of Overriding Considerations	X	X	
		30	CEQA Certification	X		
		40	Section 106 Consultation and MOA	X		
		45	Section 7 Consultation	X		
		50	Final Section 4(F) Statement	X	X	
		55	Floodplain Only Practicable Alternative Finding	X	X	
		60	Wetlands Only Practicable Alternative Finding	X	X	
		65	Section 404 Compliance	X	X	
		70	Mitigation Measures	X	X	
		10	Public Distribution of Final Environmental Document and Respond To Comments	X	X	
		15	Final Right of Way Relocation Impact Document	X	X	
		99	Other Final Environmental Document Products	X	X	
	15		Completed Environmental Document	X	X	
		05	Record of Decision (NEPA)	X	X	
		10	Notice of Determination (CEQA)	X	X	
		20	Environmental Commitments Record	X	X	
		99	Other Completed Environmental Document Products		X	
	20		NEPA Delegation	X		

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FUNDING SUMMARY

Funding Source	Funding Partner	Fund Type	PA&ED	Subtotal Support	Subtotal Capital	Total Funds Type
LOCAL	OCTA	Measure M	\$2,000,000	\$2,000,000	\$0	\$2,000,000
LOCAL	TCA	Local	\$1,000,000	\$1,000,000	\$0	\$1,000,000
		Subtotals by Component	\$3,000,000	\$3,000,000	\$0	\$3,000,000

Final Feasibility Study Report
(provided under separate cover)

Storm Water Data Report
(provided under separate cover)

COOPERATIVE AGREEMENT

This Agreement, effective on May 22, 2014, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

Foothill/Eastern Transportation Corridor Agency, a California joint powers authority, referred to hereinafter as TCA.

RECITALS

1. PARTNERS are authorized to enter into a cooperative agreement for improvements to the state highway system (SHS) per the California Streets and Highways Code sections 114 and 130.
2. For the purpose of this Agreement, freeway improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east and will be referred to hereinafter as PROJECT.
3. All responsibilities assigned in this Agreement to complete the following PROJECT COMPONENTS will be referred to hereinafter as OBLIGATIONS:
 - Project Approval and Environmental Document (PA&ED)
4. PS&E (Plans, Specifications, and Estimate), R/W (Right of Way) CAPITAL, R/W (Right of Way) SUPPORT, CONSTRUCTION CAPITAL and CONSTRUCTION SUPPORT PROJECT COMPONENTS of PROJECT will be the subject of a separate future Agreement.
5. This Agreement is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding the PROJECT. Cooperative Agreement 12-081 and its executed amendments are not superseded by this agreement.
6. Prior to this Agreement:
 - TCA developed the Project Initiation Document, Project Study Report/Project Development Support (PSR-PDS), for the PROJECT which was approved by CALTRANS on January 17, 2012.
7. In this Agreement capitalized words represent defined terms and acronyms. The Definitions section contains a complete definition for each capitalized term.

8. PARTNERS hereby set forth the terms, covenants, and conditions of this Agreement, under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

9. TCA is responsible for 100% of its OBLIGATIONS as set forth in this Agreement. CALTRANS is responsible for 100% of its OBLIGATIONS as set forth in this Agreement.
10. TCA and CALTRANS are FUNDING PARTNERS and the details of their funding commitments are documented in the latest FUNDING SUMMARY between PARTNERS. Each PARTNER is responsible for the costs of its OBLIGATIONS.
11. TCA is the IMPLEMENTING AGENCY for PA&ED.
12. CALTRANS is the CEQA lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.
13. CALTRANS is the NEPA lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.
14. CALTRANS will provide Independent Quality Assurance (IQA) for the portions of WORK within existing and proposed SHS right of way, except those mentioned above in Articles 12 and 13.

SCOPE

Scope: General

15. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and published standards; FHWA STANDARDS; and CALTRANS STANDARDS current as of the date of performance. TCA shall require its design consultant to (a) promptly respond to comments provided by reviewers and (b) revise design in response to any reviewer comments identifying failure of design to comply with aforesaid laws, regulations or published standards. TCA will consult with CALTRANS with regard to any comments submitted by CALTRANS reviewers that are not required to be incorporated under the foregoing criteria.
16. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS. CALTRANS will perform applicable process review for environmental documentation or technical studies submitted for its review prior to approval of any documentation or studies.

17. Any PARTNER may, at its own expense, have representatives observe any OBLIGATIONS performed by another PARTNER. Observation does not constitute authority over those OBLIGATIONS.
18. Each PARTNER will ensure that personnel participating in OBLIGATIONS are appropriately qualified or licensed to perform the tasks assigned to them.
19. If WORK is done under contract (not completed by a PARTNER's own employees) and is governed by the California Labor Code's definition of "public works" (section 1720(a)), that PARTNER will conform to sections 1720 – 1815 of the California Labor Code and all applicable regulations and coverage determinations issued by the Director of Industrial Relations.
20. IMPLEMENTING AGENCY will be available to help resolve WORK related problems generated by the PA&ED PROJECT COMPONENT until construction of PROJECT is complete and PROJECT is open to the public.
21. Within 60 days of receipt by CALTRANS of proper application, CALTRANS will issue to TCA, their contractors, consultants and agents, the encroachment permits required for WORK within SHS right of way, at no cost to TCA, their contractors, consultants or agents. PARTNERS will not permit their contractors and/or agents, or utility owners to perform activities within the SHS right of way without an encroachment permit issued in their name.
22. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within 24 hours of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.
23. PARTNERS will hold all administrative drafts and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for PROJECT in confidence to the extent permitted by law and where applicable, the provisions of California Government Code section 6254.5(e) shall protect the confidentiality of such documents in the event that said documents are shared between PARTNERS.

PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete PROJECT without the prior written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.

24. If a PARTNER receives a public records request pertaining to OBLIGATIONS, that PARTNER will use all reasonable efforts to notify the other PARTNER within five (5)

working days of receipt and make such PARTNER aware of any disclosed public documents. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.

25. If HM-1 or HM-2 is found during performance of the WORK, IMPLEMENTING AGENCY will immediately notify the other PARTNER and responsible control agencies of such discovery.
26. CALTRANS, independent of PROJECT, is responsible for and shall pay directly all costs and expenses relating to any HM-1 found within the existing SHS right of way. CALTRANS will undertake HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to PROJECT schedule.
27. If HM-1 is found within PROJECT limits and outside the existing SHS right of way, responsibility for such HM-1 rests with the owner(s) of the parcel(s) on which the HM-1 is found. TCA, in concert with the local agency having land use jurisdiction over such parcel(s), will ensure that HM MANAGEMENT ACTIVITIES related to HM-1 are undertaken with minimum impact to PROJECT schedule.
28. If HM-2 is found within PROJECT limits, TCA will determine HM MANAGEMENT ACTIVITIES related to HM-2 required for OBLIGATIONS of this PROJECT COMPONENT with minimum impact to PROJECT schedule.
29. The PARTNER delivering an OBLIGATION will be responsible for accepting, rejecting, compromising, settling, or litigating claims of any non-Agreement parties hired to do WORK with respect to that OBLIGATION.
30. PARTNERS will confer on any claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this Agreement in order to retain resolution possibilities for potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on claim.
31. PARTNERS will maintain, and will ensure that any party hired by PARTNERS to participate in OBLIGATIONS will maintain, a financial management system that conforms to Generally Accepted Accounting Principles (GAAP), and that can properly accumulate and segregate incurred PROJECT costs and billings.
32. If FUNDING PARTNER funds any part of OBLIGATIONS with state or federal funds, each PARTNER will comply, and will ensure that any party hired to participate in OBLIGATIONS will comply with the federal cost principles of 2 CFR, Part 225, and administrative requirements outlined in 49 CFR, Part 18. These principles and requirements apply to all funding types included in this Agreement.

33. PARTNERS will maintain and make available to each other all OBLIGATIONS-related documents, including financial data, during the term of this Agreement.
34. PARTNERS will retain all OBLIGATIONS-related records for three (3) years after IMPLEMENTING AGENCY makes final payment for the WORK.
35. PARTNERS have the right to audit each other in accordance with generally accepted governmental audit standards.

CALTRANS, the state auditor, FHWA (if PROJECT utilizes federal funds), and TCA will have access to all OBLIGATIONS-related records of each PARTNER, and any party hired by a PARTNER to participate in OBLIGATIONS, for audit, examination, excerpt, or transcription.

The examination of any records will take place in the offices and locations where said records are generated and/or stored and will be accomplished during reasonable hours of operation. The auditing PARTNER will be permitted to make copies of any OBLIGATIONS-related records needed for the audit.

The audited PARTNER will review the draft audit, findings, and recommendations, and provide written comments within thirty (30) calendar days of receipt.

Any audit dispute not resolved by PARTNERS is subject to mediation. Mediation will follow the process described in the General Conditions section of this Agreement.

36. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this Agreement, in order to keep PROJECT in environmental compliance until WORK resumes.
37. Each PARTNER accepts responsibility to complete the activities that it selected on the SCOPE SUMMARY. Activities marked with "N/A" on the SCOPE SUMMARY are not included in the scope of this Agreement.
38. CALTRANS will make available existing data and documents, including but not limited to, as-builts, Microstation files, traffic counts and historic traffic and accident data for these State Highway segments of PROJECT roadway upon proper written request by TCA or its consultants.

Scope: Environmental Permits, Approvals and Agreements

39. If PARTNERS later determine that an environmental permit, approval or agreement is necessary PARTNERS will ensure completion and implementation of all environmental permits, approvals, and agreements.

Scope: Project Approval and Environmental Document (PA&ED)

40. CALTRANS is the CEQA lead agency for PROJECT. CALTRANS will determine the type of environmental documentation required and will cause that documentation to be prepared.
41. Any PARTNER involved in the preparation of CEQA environmental documentation will follow the CALTRANS STANDARDS that apply to the CEQA process including the guidance provided in the Standard Environmental Reference (SER) available at www.dot.ca.gov/ser.
42. Pursuant to Chapter 3 of title 23, United States Code (23 U.S.C 326) and 23 U.S.C 327, CALTRANS is the NEPA lead agency for PROJECT. CALTRANS is responsible for NEPA compliance and will determine the type of environmental documentation required and will cause that documentation to be prepared.
43. Any PARTNER involved in the preparation of NEPA environmental documentation will follow FHWA and CALTRANS STANDARDS that apply to the NEPA process including, but not limited to, the guidance provided in the FHWA Environmental Guidebook (available at fhwa.dot.gov/hep/index.htm) and the Standard Environmental Reference (SER available at dot.ca.gov/ser).
44. TCA will prepare the appropriate CEQA environmental documentation to meet CEQA requirements, in coordination with CALTRANS as the CEQA lead agency.
45. TCA will prepare the appropriate NEPA environmental documentation (as determined by CALTRANS) to meet NEPA requirements, in coordination with CALTRANS as the NEPA lead agency.
46. Any PARTNER preparing any portion of the CEQA environmental documentation, including any studies and reports, will submit that portion of the documentation to the CEQA lead agency for review, comment, and approval at appropriate stages of development prior to public availability.
47. Any PARTNER preparing any portion of the NEPA environmental documentation (including, but not limited to, studies, reports, public notices, and public meeting materials, determinations, administrative drafts, and final environmental documents) will submit that

portion of the documentation to CALTRANS for CALTRANS' review, comment, and approval prior to public availability.

48. TCA will prepare, publicize, and circulate all CEQA-related public notices and will submit said notices to the CEQA lead agency for review, comment, and approval prior to publication and circulation.
49. TCA will prepare, publicize, and circulate all NEPA-related public notices, except Federal Register notices. TCA will submit all notices to CALTRANS for CALTRANS' review, comment, and approval prior to publication and circulation.

CALTRANS will coordinate with the appropriate federal agency to publish notices in the Federal Register.

50. The CEQA lead agency will attend all CEQA-related public meetings.
51. The NEPA lead agency will attend all NEPA-related public meetings.
52. The scheduling and the preparation of draft and final materials for CEQA- and NEPA-related public meetings and public notices relating to such meetings shall be coordinated by PARTNERS.
53. If a PARTNER who is not the CEQA or NEPA lead agency holds a public meeting about PROJECT (excluding any properly noticed meetings of TCA's governing board or any committee of the board or any properly noticed meetings of the governing bodies of TCA's member agencies or committees of such governing bodies), that PARTNER must clearly state its role in PROJECT and the identity of the CEQA and NEPA lead agencies on all meeting publications. All meeting publications subject to the foregoing requirement must also inform the attendees that public comments collected at the meetings are not part of the CEQA or NEPA public review process.

That PARTNER will submit all meeting advertisements, agendas, exhibits, handouts, and materials that are subject to the foregoing requirement to the appropriate lead agency for review, comment, and approval at least ten (10) working days prior to publication or use. If that PARTNER makes any changes to the materials, it will allow the appropriate lead agency to review, comment on, and approve those changes at least three (3) working days prior to the public meeting date.

The CEQA lead agency maintains final editorial control with respect to text or graphics that could lead to public confusion over CEQA-related roles and responsibilities. The NEPA lead agency has final approval authority with respect to text or graphics that could lead to public confusion over NEPA-related roles and responsibilities.

54. The PARTNER preparing the environmental documentation, including the studies and reports, will ensure that qualified personnel remain available to help resolve environmental issues and perform any necessary work to ensure that PROJECT remains in environmental compliance.

COST

Cost: General

55. PARTNERS will document specific funding details in a FUNDING SUMMARY. The FUNDING SUMMARY is incorporated and made an express part of this agreement.

A valid FUNDING SUMMARY must be in place at all times until OBLIGATION COMPLETION.

PARTNERS will create a new FUNDING SUMMARY each time the funding details of PROJECT change. The FUNDING SUMMARY is only valid after each FUNDING PARTNER signs and dates the FUNDING SUMMARY. The most current fully executed FUNDING SUMMARY supersedes any previous FUNDING SUMMARY created for this Agreement.

Replacement of the FUNDING SUMMARY will not require an amendment to the body of this Agreement unless the rules of the new funds require it.

Each PARTNER will designate a legally authorized representative to sign the FUNDING SUMMARY on its behalf.

56. The cost of any awards, judgments, or settlements generated by OBLIGATIONS is an OBLIGATIONS cost.
57. CALTRANS, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right of way.
58. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within PROJECT limits and outside of the existing SHS right of way.
59. TCA, independent of PROJECT, will pay, or cause to be paid, all costs for HM MANAGEMENT ACTIVITIES costs related to HM-2 if required for OBLIGATIONS of this PROJECT COMPONENT with minimum impact to PROJECT schedule.

60. The cost of any legal challenges to the CEQA or NEPA environmental process or documentation, including supporting technical studies, documentation, and if applicable, the mitigation, monitoring, or remedial actions which are required by the environmental documentation, PROJECT permits and/or agreements, is an OBLIGATIONS cost.
61. Independent of OBLIGATIONS cost, each PARTNER will fund the cost of its own IQA for WORK done within existing or proposed future SHS right of way.

Independent of OBLIGATIONS cost, CALTRANS will fund the cost of its QC/QAP process review for environmental documentation.
62. CALTRANS will provide encroachment permits at no cost to PARTNERS, their contractors, consultants and agents. The term “no cost” is not intended to relieve the permittee from responsibility for compliance with insurance and other requirements of the permits, including the obligation to pay insurance premiums and other costs.
63. Evaluation of unanticipated cultural, archaeological, paleontological, or other protected resources found during WORK and development and implementation of plan for its removal or protection required for this PROJECT COMPONENT is an OBLIGATIONS cost.
64. Fines, interest, or penalties levied against a PARTNER will be paid, independent of OBLIGATIONS cost, by the PARTNER whose actions or lack of action caused the levy.
65. Fulfillment of public records requests pertaining to OBLIGATIONS will be paid, independent of OBLIGATIONS cost, by the PARTNER who received the request.
66. The cost to place PROJECT right of way in a safe and operable condition and meet all environmental commitments is an OBLIGATIONS cost.
67. Because IMPLEMENTING AGENCY is responsible for managing the scope, cost, and schedule of a project component, if there are insufficient funds available in this Agreement to place PROJECT right of way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY accepts responsibility to fund these activities until such time as PARTNERS amend this Agreement.
68. TCA will fund all PROJECT COMPONENT costs, except for those costs associated with any CALTRANS OBLIGATIONS or WORK to be performed by CALTRANS under this Agreement. CALTRANS has no funds allocated to PROJECT and, except for CALTRANS’ duty to provide or perform all OBLIGATIONS and WORK assigned herein at no cost to TCA, TCA will have no right to seek a CALTRANS contribution of funds under the term of this Agreement.

Cost: Environmental Permits, Approvals and Agreements

69. The cost of coordinating, obtaining, complying with, implementing, including renewing and amending resource agency permits, agreements, and approvals is an OBLIGATIONS cost.

Cost: Project Approval and Environmental Document (PA&ED)

70. The cost to prepare, publicize, and circulate all CEQA and NEPA-related public notices is an OBLIGATIONS cost.
71. The cost to plan, schedule, prepare, materials for, and host all CEQA and NEPA-related public meetings is an OBLIGATIONS cost.

SCHEDULE

72. PARTNERS will manage the schedule for OBLIGATIONS through monthly meetings and monthly written progress reports.
73. CALTRANS commits to review and provide written comments to all initial submittals within 30 calendar days and resubmittals within 30 calendar days of the date of transmittal to the District office for timely processing of PROJECT documents, including providing quality assurance reviews and approvals consistent with its existing policies, for all WORK.

Whenever CALTRANS approval is required by the terms of this Agreement, that approval shall not be unreasonably withheld or delayed.

GENERAL CONDITIONS

74. PARTNERS understand that this Agreement is in accordance with and governed by the Constitution and laws of the State of California. This Agreement will be enforceable in the State of California. Any PARTNER initiating legal action arising from this Agreement will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this Agreement resides, or in the Superior Court of the county in which PROJECT is physically located.
75. All OBLIGATIONS of CALTRANS under the terms of this Agreement are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission to CALTRANS for the purposes of fulfilling CALTRANS' OBLIGATIONS herein.
76. All OBLIGATIONS of TCA under the terms of this Agreement are subject to the TCA Board of Directors approval.

77. When CALTRANS performs IQA activities it does so for its own benefit. No one can assign liability to CALTRANS due to its IQA activities.
78. Neither TCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this Agreement. It is understood and agreed that CALTRANS, to the extent permitted by law, will defend, indemnify, and save harmless TCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS and/or its agents under this Agreement.
79. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon TCA under this Agreement. It is understood and agreed that TCA, to the extent permitted by law, will defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories or assertions of liability occurring by reason of anything done or omitted to be done by TCA and/or its agents under this Agreement.
80. PARTNERS do not intend this Agreement to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this Agreement. PARTNERS do not intend this Agreement to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.
81. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this Agreement except to another entity formed pursuant to Government Code Section 66484.3(f) or (m) that assumes full responsibility for performance of the obligation of TCA under this Agreement.
82. This agreement shall not be deemed to be a waiver or modification of any terms, conditions or covenants of Cooperative Agreement No. 12-081 and its executed amendments, for the Eastern Transportation corridor, and all terms and conditions set forth in that document are hereby affirmed by CALTRANS and TCA and shall remain in full force and effect.
83. A waiver of a PARTNER's performance under this Agreement will not constitute a continuous waiver of any other provision. An amendment made to any article or section of this Agreement does not constitute an amendment to or negate all other articles or sections of this Agreement.

84. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.
85. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within thirty (30) calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.
86. PARTNERS will first attempt to resolve Agreement disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the executive officer of TCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this Agreement. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or forty-five (45) calendar days after filing the written mediation request, whichever occurs first.

PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this Agreement resides or in the Superior Court of the county in which PROJECT is physically located. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this Agreement or to enforce the provisions of this article including equitable relief.

87. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.
88. If any provisions in this Agreement are found by a court of competent jurisdiction to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other Agreement provisions invalid, inoperative, or unenforceable, and those provisions will be automatically severed from this Agreement.
89. PARTNERS intend this Agreement to be their final expression and supersedes any oral understanding or writings pertaining to OBLIGATIONS.

90. If during performance of WORK additional activities or environmental documentation is necessary to keep PROJECT in environmental compliance, PARTNERS will amend this Agreement to include completion of those additional tasks.
91. Except as otherwise provided in the Agreement, PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS or provisions contained herein.
92. PARTNERS agree to sign a COOPERATIVE AGREEMENT CLOSURE STATEMENT to terminate this Agreement. However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, maintenance and ownership articles will remain in effect until terminated or modified in writing by mutual agreement.
93. The following documents are attached to, and made an express part of this Agreement: SCOPE SUMMARY, FUNDING SUMMARY.

DEFINITIONS

CALTRANS – The California Department of Transportation.

CALTRANS STANDARDS – As used herein, the term “CALTRANS STANDARDS” shall mean and refer to those STATE documents including the FHWA STANDARDS, Caltrans Standard Specifications dated 2010, Caltrans manuals (including but not limited to the Right of Way Manual, Construction Manual, Highway Design Manual, etc.), technical memoranda, standards, guidelines, and modifications to such standards that are set forth in or expressly incorporated into this Agreement, or are in effect as of the effective date of this Agreement.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government

COOPERATIVE AGREEMENT CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this Agreement and in all amendments to this Agreement.

FHWA – Federal Highway Administration

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to FHWA manuals, technical memoranda, standards, guidelines, and modifications to such standards, including the guidance provided at www.fhwa.dot.gov/topics.htm which are in effect as of the effective date of this Agreement.

FUNDING PARTNER – A PARTNER, designated in the FUNDING SUMMARY, that commits a defined dollar amount to fulfill OBLIGATIONS. Each FUNDING PARTNER accepts responsibility to provide the funds it commits in this Agreement.

FUNDING SUMMARY – An executed document that lists the funding, billing, and payment commitments. Commitments include, but are not limited to, FUNDING PARTNER(S), fund source, fund type, payment method, invoice frequency, deposit amounts, and PROJECT COMPONENT(S) in which funds are to be spent. Funds listed on the FUNDING SUMMARY are “not-to-exceed” amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards

Advisory Board that serve to achieve some level of standardization. See <http://www.fasab.gov/accepted.html>.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – Ensuring that the IMPLEMENTING AGENCY's quality assurance activities result in WORK being developed in accordance with the applicable standards. IQA does not include any work necessary to actually develop or deliver WORK.

NEPA (National Environmental Policy Act of 1969) – This federal act establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this Agreement, and all amendments to this Agreement, and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

OBLIGATIONS – All responsibilities described in this Agreement to complete the PA&ED PROJECT COMPONENT.

PA&ED (Project Approval and Environmental Document) – See PROJECT COMPONENT.

PARTNER – Any individual signatory party to this Agreement.

PARTNERS – The term that collectively references all of the signatory agencies to this Agreement. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other PARTNER.

PROJECT – Improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- **PID (Project Initiation Document)** – The activities required to deliver the project initiation document for PROJECT.
- **PSR-PDS (Project Study Report-Project Development Support)** – The activities required to gain approval of the project studies to move into the PA&ED phase for PROJECT and to estimate and program the capital outlay support cost necessary to complete the studies and work needed during PA&ED.
- **PA&ED (Project Approval and Environmental Document)** – The activities required to deliver the project approval and environmental documentation for PROJECT.
- **PS&E (Plans, Specifications, and Estimate)** – The activities required to deliver the plans, specifications, and estimate for PROJECT.
- **R/W (Right of Way) SUPPORT** – The activities required to obtain all property interests for PROJECT.
- **R/W (Right of Way) CAPITAL** – The funds for acquisition of property rights for PROJECT.
- **CONSTRUCTION SUPPORT** – The activities required for the administration, acceptance, and final documentation of the construction contract for PROJECT.
- **CONSTRUCTION CAPITAL** – The funds for the construction contract.

QC/QAP (QUALITY CONTROL/QUALITY ASSURANCE PROGRAM) - Caltrans quality control and quality assurance procedures for all environmental documents as described in the Jay Norvell Memos dated July 2, 2007 (available at http://www.dot.ca.gov/ser/memos.htm#LinkTarget_705). This also includes the independent judgment analysis and determination under CEQA or NEPA that the environmental documentation meets CEQA or NEPA requirements.

SCOPE SUMMARY – The attachment in which each PARTNER designates its commitment to specific scope activities within each PROJECT COMPONENT as outlined by the *Workplan Standards Guide for the Delivery of Capital Projects* available at <http://www.dot.ca.gov/hq/projmgmt/guidance.htm>.

SHS (State Highway System) – All highways, right of way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

STATE – refers to the State of California.

TCA – The Foothill/Eastern Transportation Corridor Agency, a California joint powers authority.

12-ORA-241/91-36.3/39.1 & 15.8/18.1
Project Number: 1200020097
EA: 0K9700
District Agreement 12-643

WORK – All scope activities included in this Agreement.

CONTACT INFORMATION

The information provided below indicates the primary contact information for each PARTNER to this Agreement. PARTNERS will notify each other in writing of any personnel or location changes. Contact information changes do not require an amendment to this Agreement.

The primary Agreement contact person for CALTRANS is:

Leo Chen, Project Manager
3347 Michelson Drive, Suite 100
Irvine, California 92612
Office Phone: (949) 223-5431
Mobile Phone: (949) 279-9363
Fax Number: (949) 440-4465
Email: Leo_Chen@dot.ca.gov

The primary Agreement contact person for TCA is:

David Lowe, Director, Design & Construction
125 Pacifica, Suite 100
Irvine, CA 92618-3304
Office Phone: (949) 754-3488
Fax Number: (949) 754-3491
Email: dlowe@thetollroads.com

SIGNATURES

PARTNERS declare that:

1. Each PARTNER is an authorized legal entity under California state law.
2. Each PARTNER has the authority to enter into this Agreement.
3. The people signing this Agreement have the authority to do so on behalf of their public agencies.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

By: Adnan A Maiah
Adnan Maiah
Deputy District Director,
Capital Projects Outlay Program

CERTIFIED AS TO FUNDS:

By: Neda Saber
for Neda Saber
District Budget Manager

APPROVED AS TO FORM AND
PROCEDURE:

By: Glenn B. Mueller
Glenn B. Mueller
Assistant Chief Counsel

FOOTHILL/EASTERN
TRANSPORTATION CORRIDOR
AGENCY

By: Michael Kraman
Michael Kraman
Chief Executive Officer

ATTEST:

By: Sherri McKaig
Sherri McKaig
Assistant Secretary of the Board

APPROVED AS TO FORM AND
PROCEDURE:

By: E. George Joseph
E. George Joseph
General Counsel

SCOPE SUMMARY

4	5	6	7	8	Description	CALTRANS	TCA	N/A
2	160				Perform Preliminary Engineering Studies and Draft Project Report	X	X	
		05			Updated Project information		X	
			05		Approved Project Initiation Document Review		X	
			10		Geotechnical Information Review		X	
			15		Materials Information Review		X	
			20		Traffic Data and Forecasts Review		X	
			25		Geometrics Review		X	
			30		Project Scope Review		X	
			35		Project Cost Estimate Review		X	
			99		Other Project Information Products		X	
		10			Engineering Studies		X	
			10		Traffic Forecasts/Modeling		X	
			15		Geometric Plans for Project Alternatives		X	
			20		Value Analysis (*if applicable, refer to Deputy Directive DD-92-R1)		X*	
			25		Hydraulics/Hydrology Studies		X	
			30		Highway Planting Design Concepts		X	
			35		Traffic Operational Analysis		X	
			40		Updated Right of Way Data Sheet		X	
			45		Utility Locations Determined for Preliminary Engineering		X	
			50		Railroad Study			X
			55		Multi-Modal Study			X
			60		Park and Ride Study			X
			65		Right of Way Relinquishment and Vacation Study			X
			70		Traffic Studies		X	
			75		Updated Materials Information		X	
			80		Updated Geotechnical Information		X	
			85		Structures Advance Planning Study (APS) and Preliminary Engineering		X	
			90		High Occupancy Vehicle Report			X
			95		Updated Preliminary Transportation Management Plan		X	
			99		Other Engineering Studies		X	
		15			Draft Project Report		X	
			05		Cost Estimates for Alternatives		X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
			10		Fact Sheet for Exceptions to Design Standards		X	
			15		Approved Exceptions to Encroachment Policy		X	
			20		Draft Project Report		X	
			25		Draft Project Report Circulation, Review, and Approval		X	
			99		Other Draft Project Report Products		X	
		20			Engineering and Land Net Surveys		X	
			25		Existing Records		X	
			30		Land Net Surveys			X
			35		Land Net Map			X
			40		Right of Way Engineering Products		X	
			50		Control Surveys		X	
			55		Photogrammetric Maps and Products		X	
			60		Engineering Surveys		X	
			65		As-Built Centerline Surveys		X	
			70		Pavement Surveys		X	
		30			Environmental Study Request (ESR)		X	
			05		Maps for ESR		X	
			10		Surveys and Mapping for Environmental Studies		X	
			15		Property Access Rights for Environmental/Engineering Studies		X	
		40			NEPA Delegation	X		
		45			Base Maps and Plan Sheets for Project Report and Environmental Studies		X	
2	165				Perform Environmental Studies and Prepare Draft Environmental Document	X	X	
		05			Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document			X
			05		Project Information Review	X	X	
			10		Public and Agency Scoping Process			X
			15		Alternatives for Further Study			X
			99		Other Environmental Scoping of Alternatives Identified for Studies in Project Initiation Document			X
		10			General Environmental Studies		X	
			15		Community Impact Analysis, Land Use, and Growth Studies			X
			20		Visual Impact Assessment and Scenic Resource Evaluation		X	
			25		Noise Study		X	
			30		Air Quality Study		X	
			35		Water Quality Studies		X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
			40		Energy Studies			X
			45		Summary of Geotechnical Report		X	
			55		Draft Right of Way Relocation Impact Document			X
			60		Location Hydraulic and Floodplain Study Report			X
			65		Paleontology Study		X	
			70		Wild and Scenic Rivers Coordination			X
			75		Environmental Commitments Record		X	
			80		Hazardous Waste Initial Site Assessments/Investigations		X	
			85		Hazardous Waste Preliminary Site Investigation		X	
			99		Other Environmental Studies		X	
		15			Biological Studies		X	
			05		Biological Assessment		X	
			10		Wetlands Study		X	
			15		Resource Agency Permit Related Coordination		X	
			20		Natural Environment Study Report		X	
			99		Other Biological Studies		X	
		20			Cultural Resource Studies		X	
			05		Archaeological Survey		X	
				05	Area of Potential Effects/Study Area Maps		X	
				10	Native American Consultation		X	
				15	Records and Literature Search		X	
				20	Field Survey		X	
				25	Archaeological Survey Report		X	
				99	Other Archaeological Survey Products		X	
			10		Extended Phase I Archaeological Studies			X
				05	Native American Consultation			X
				10	Extended Phase I Proposal			X
				15	Extended Phase I Field Investigation			X
				20	Extended Phase I Materials Analysis			X
				25	Extended Phase I Report			X
				99	Other Phase I Archaeological Study Products			X
			15		Phase II Archaeological Studies			X
				05	Native American Consultation			X
				10	Phase II Proposal			X
				15	Phase II Field Investigation			X

4	5	6	7	8	Description	CALTRANS	TCA	N/A
				20	Phase II Materials Analysis			X
				25	Phase II Report			X
				99	Other Phase II Archaeological Study Products			X
			20		Historical and Architectural Resource Studies		X	
				05	Preliminary Area of Potential Effects/Study Area Maps for Architecture		X	
				10	Historic Resources Evaluation Report - Archaeology			X
				15	Historic Resource Evaluation Report - Architecture (HRER)			X
				20	Bridge Evaluation			X
				99	Other Historical and Architectural Resource Study Products			X
			25		Cultural Resource Compliance Consultation Documents		X	
				05	Final Area of Potential Effects/Study Area Maps		X	
				10	PRC 5024.5 Consultation		X	
				15	Historic Property Survey Report/Historic Resources Compliance Report		X	
				20	Finding of Effect			X
				25	Archaeological Data Recovery Plan/Treatment Plan			X
				30	Memorandum of Agreement			X
				99	Other Cultural Resources Compliance Consultation Products			X
		25			Draft Environmental Document or Categorical Exemption/Exclusion	X	X	
			10		Section 4(F) Evaluation		X	
			15		Categorical Exemption/Categorical Exclusion (CE)			X
			20		Environmental Quality Control and Other Reviews	X	X	
			25		Approval to Circulate Resolution	X		
			30		Environmental Coordination	X	X	
			99		Other Draft Environmental Document Products		X	
		30			NEPA Delegation	X		
2	170				Permits, Agreements, and Route Adoptions during PA&ED component	X	X	
		05			Required permits	X	X	
		15			Railroad Agreements			X
			05		Plan Approval			X
			10		Special Provisions and Insurance Clauses			X
			15		Service Contract for Railroad Services			X
			20		Construction and Maintenance Agreement			X
			25		PUC Exhibits and Application			X
			99		Other Railroad Agreement Products			X

4	5	6	7	8	Description	CALTRANS	TCA	N/A
		20			Freeway Agreements			X
			05		Draft Freeway Agreement			X
			10		Draft Freeway Agreement Review			X
			15		Final Freeway Agreement			X
			20		Executed Freeway Agreement			X
			99		Other Freeway Agreement Products			X
		25			Agreement for Material Sites	X	X	
		30			Executed Maintenance Agreement	X	X	
		40			Route Adoptions		X	
			05		Route Adoption Map		X	
			10		New Connection Request and Route Adoption CTC Submittal		X	
			15		Route Adoption and Public Road Connection Placed on CTC Agenda		X	
			99		Other Route Adoption Products		X	
		45			MOU From Tribal Employment Rights Office (TERO)		X	
		55			NEPA Delegation	X		
2	175				Circulate Draft Environmental Document and Select Preferred Project Alternative Identification	X	X	
		05			DED Circulation	X	X	
			05		Master Distribution and Invitation Lists	X	X	
			10		Notices Regarding Public Hearing and Availability of Draft Environmental Document	X	X	
			15		DED Publication and Circulation	X	X	
			20		Federal Consistency Determination (Coastal Zone)		X	
			99		Other DED Circulation Products		X	
		10			Public Hearing	X	X	
			05		Need for Public Hearing Determination	X	X	
			10		Public Hearing Logistics		X	
			15		Displays for Public Hearing		X	
			20		Second Notices of Public Hearing and Availability of DED	X	X	
			25		Map Display and Public Hearing Plan		X	
			30		Display Public Hearing Maps		X	
			35		Public Hearing	X	X	
			40		Record of Public Hearing		X	
			99		Other Public Hearing Products		X	
		15			Public Comment Responses and Correspondence	X	X	
		20			Project Preferred Alternative	X	X	

4	5	6	7	8	Description	CALTRANS	TCA	N/A
		25			NEPA Delegation	X		
2	180				Prepare and Approve Project Report and Final Environmental Document	X	X	
		05			Final Project Report		X	
			05		Updated Draft Project Report		X	
			10		Approved Project Report	X	X	
			15		Updated Storm Water Data Report		X	
			99		Other Project Report Products		X	
		10			Final Environmental Document	X	X	
			05		Approved Final Environmental Document	X		
				05	Draft Final Environmental Document Review	X		
				10	Revised Draft Final Environmental Document	X		
				15	Section 4(F) Evaluation		X	
				20	Findings	X		
				25	Statement of Overriding Considerations			X
				30	CEQA Certification	X		
				35	FHWA Approval	X		
				40	Section 106 Consultation and MOA	X		
				45	Section 7 Consultation	X		
				50	Final Section 4(F) Statement			X
				55	Floodplain Only Practicable Alternative Finding			X
				60	Wetlands Only Practicable Alternative Finding	X		
				65	Section 404 Compliance	X	X	
				70	Mitigation Measures	X	X	
			10		Public Distribution of Final Environmental Document and Respond To Comments	X	X	
			15		Final Right of Way Relocation Impact Document			X
			99		Other Final Environmental Document Products		X	
		15			Completed Environmental Document	X	X	
			05		Record of Decision (NEPA)	X	X	
			10		Notice of Determination (CEQA)	X	X	
			20		Environmental Commitments Record	X	X	
			99		Other Completed Environmental Document Products		X	
		20			NEPA Delegation	X		

FUNDING SUMMARY Number 1

Project Number: 1200020097

Agreement: 12-643

Part I – FUNDING SUMMARY Table

Funding Source	Funding Partner	Fund Type	PA&ED Support	PS&E Support	RW Capital	RW Support	CON Capital	CON Support	Totals by Fund Type
IMPLEMENTING AGENCY - >			TCA						
LOCAL	TCA	Toll Revenue Funds	\$3,020,000	\$0	\$0	\$0	\$0	\$0	\$3,020,000
		Totals by Component	\$3,020,000	\$0	\$0	\$0	\$0	\$0	\$3,020,000

This table represents full funding of each PROJECT COMPONENT in Agreement 12-643.
Billing and payment details follow.

FUNDING SUMMARY Number 1

Project Number: 1200020097

Agreement: 12-643

Part II – Billing and Payment Details

Cost: PA&ED (Project Approval and Environmental Document)

Each PARTNER listed below will do WORK for PA&ED as described in the SCOPE SUMMARY of this Agreement:

- TCA
- CALTRANS

Therefore, based on the funding types displayed in the FUNDING SUMMARY table for this PROJECT COMPONENT:

- TCA will fund one hundred percent (100%) of all WORK costs, except for costs of OBLIGATIONS and WORK to be performed by CALTRANS.
- CALTRANS will perform all OBLIGATIONS and WORK at no cost to TCA.
- CALTRANS, other than the duty to provide and perform all OBLIGATIONS and WORK assigned herein at no cost to TCA, has no funds allocated to PROJECT and TCA will have no right, under any circumstance, to seek a CALTRANS contribution of funds under the term of this Agreement

FUNDING SUMMARY Number 1

Project Number: 1200020097

Agreement: 12-643

Part III – Signature Page

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

By: Adnan A Maiah
Adnan Maiah
Deputy District Director
Capital Outlay Program

Date 5/22/14

By: Neda Saber
for Neda Saber
District Budget Manager

By: HQ Accounting 5/21/14

FOOTHILL/EASTERN
TRANSPORTATION CORRIDOR
AGENCY

By: David W. Lowe
David W. Lowe
Director, Design and Construction

Date 5-8-2014

COOPERATIVE AGREEMENT COVER SHEET

Work Description

Perform PS&E, Right-of-Way Support and Right-of-Way Capital Work necessary for construction of a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east.

Contact Information

CALTRANS

Leo Chen, Project Manager
1750 E. 4th Street, Suite 100
Santa Ana, CA 92705
Office Phone: (657) 328-6301
Email: leo.chen@dot.ca.gov

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY

Juliet Su, Corridor Manager
125 Pacifica, Suite 100
Irvine, CA 92618
Office Phone: (949) 754-3430
Email: Jsu@thetollroads.com

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Please note:

1. TCA'S R/W Support work is not covered by the Spending Summary.

COOPERATIVE AGREEMENT

State Independent Quality Assurance

This AGREEMENT, effective on February 17, 2017, is between the State of California, acting through its Department of Transportation, referred to as CALTRANS, and:

Foothill/Eastern Transportation Corridor Agency, a California joint powers authority, referred to hereinafter as F/ETCA.

RECITALS

1. PARTNERS are authorized to enter into a cooperative agreement for improvements to the state highway system (SHS) per the California Streets and Highways Code sections 114 and 130.
2. For the purpose of this AGREEMENT, *improvements including a direct connector between the toll facilities of State Route 241 and State Route 91 Express Lanes to and from the east* will be referred to hereinafter as PROJECT.
3. All responsibilities assigned in this AGREEMENT to complete the following PROJECT COMPONENTS will be referred to hereinafter as OBLIGATIONS:
 - Plans, Specifications, and Estimate (PS&E)
 - Right of Way Support (R/W SUPPORT)
 - Right of Way Capital (R/W CAPITAL)
4. This AGREEMENT is separate from and does not modify or replace any other cooperative agreement or memorandum of understanding between PARTNERS regarding the PROJECT.

5. The following work associated with this PROJECT has been completed or is in progress:
 - F/ETCA developed the Project Initiation Document, Project Study Report/Project Development Support (PSR-PDS), for the PROJECT which was approved by CALTRANS on January 17, 2012.
 - F/ETCA is developing the Supplemental Environmental Impact Report/Supplemental Environmental Impact Statement (SEIR/SEIS) anticipated to be delivered on June 27, 2017 (Cooperative Agreement No. 12-643).
 - F/ETCA is developing the Project Report anticipated to be delivered on July 4, 2017 (Cooperative Agreement No. 12-643).
6. In this AGREEMENT capitalized words represent defined terms, initialisms, or acronyms. The Definitions section contains a complete definition for each capitalized term.
7. PARTNERS hereby set forth the terms, covenants, and conditions of this AGREEMENT, under which they will accomplish OBLIGATIONS.

RESPONSIBILITIES

Sponsorship

8. F/ETCA is the SPONSOR for the PROJECT COMPONENTS in this AGREEMENT.

Funding

9. Funding sources, funding amounts, and invoicing/payment details are documented in the FUNDING SUMMARY. The FUNDING SUMMARY is incorporated and made an express part of this AGREEMENT.

PARTNERS will execute a new FUNDING SUMMARY each time the funding details change. The FUNDING SUMMARY will be executed by a legally authorized representative of the respective PARTNERS. The most current fully executed FUNDING SUMMARY supersedes any previous FUNDING SUMMARY created for this AGREEMENT.

Replacement of the FUNDING SUMMARY will not require an amendment to the body of this AGREEMENT unless the funding changes require it.

10. Each PARTNER is responsible for and shall pay directly all of the costs and expenses it incurs in performing the OBLIGATIONS of this AGREEMENT unless otherwise stated in this AGREEMENT.

Implementing Agency

11. F/ETCA is the IMPLEMENTING AGENCY for PS&E.
12. F/ETCA is the IMPLEMENTING AGENCY for RIGHT OF WAY.
13. The IMPLEMENTING AGENCY for a PROJECT COMPONENT will provide a Quality Management Plan (QMP) for that component as part of the PROJECT MANAGEMENT PLAN. The Quality Management Plan describes the IMPLEMENTING AGENCY's quality policy and how it will be used. The Quality Management Plan is subject to CALTRANS review and approval.
14. Any PARTNER responsible for completing WORK shall make its personnel and consultants that prepare WORK available to help resolve WORK-related problems and changes for the entire duration of the PROJECT including PROJECT COMPONENT work that may occur under separate agreements or memoranda.

Independent Quality Assurance

15. CALTRANS will provide Independent Quality Assurance for the portions of WORK within the existing and proposed SHS right-of-way.

CALTRANS' Independent Quality Assurance efforts are to ensure that F/ETCA's quality assurance activities result in WORK being developed in accordance with the applicable standards and within an established Quality Management Plan. Independent Quality Assurance does not include any efforts necessary to develop or deliver WORK or any validation by verifying or rechecking work performed by another party.

When CALTRANS performs Independent Quality Assurance it does so for its own benefit. No one can assign liability to CALTRANS due to its Independent Quality Assurance.

CEQA Lead Agency

16. CALTRANS is the California Environmental Quality Act (CEQA) Lead Agency for the PROJECT.
17. CALTRANS is the National Environmental Policy Act of 1969 (NEPA) lead agency for PROJECT, and will provide Quality Assurance/Quality Control for the development of the Environmental Document.

Environmental Permits, Approvals and Agreements

18. PARTNERS will comply with the commitments and conditions set forth in the environmental documentation, environmental permits, approvals, and applicable agreements as those commitments and conditions apply to each PARTNER's responsibilities in this AGREEMENT.
19. Unless otherwise assigned in this AGREEMENT, the IMPLEMENTING AGENCY for a PROJECT COMPONENT is responsible for all PROJECT COMPONENT WORK associated with coordinating, obtaining, implementing, renewing, and amending the PROJECT permits, agreements, and approvals whether they are identified in the planned project scope of work or become necessary in the course of completing the PROJECT.

Plans, Specifications, and Estimate (PS&E)

20. As IMPLEMENTING AGENCY for PS&E, F/ETCA is responsible for all PS&E WORK except those PS&E activities and responsibilities that are assigned to another PARTNER in this AGREEMENT and those activities that may be specifically excluded.
21. F/ETCA will prepare Utility Conflict Maps identifying the accommodation, protection, relocation, or removal of any existing utility facilities that conflict with construction of the PROJECT or that violate CALTRANS' encroachment policy.

F/ETCA will provide CALTRANS a copy of Utility Conflict Maps for CALTRANS' concurrence prior to issuing the Notices to Owner and executing the Utility Agreement. All utility conflicts will be addressed in the PROJECT plans, specifications, and estimate.

Right of Way (R/W)

22. As the RIGHT OF WAY IMPLEMENTING AGENCY for R/W, F/ETCA is responsible for all R/W WORK except those activities and responsibilities that are assigned to another party in this AGREEMENT and those activities that may be specifically excluded.
23. The selection of personnel performing RIGHT-OF-WAY WORK will be in accordance with federal and California laws and regulations, and CALTRANS' policies, procedures, standards, practices, and applicable agreements.
24. F/ETCA will make all necessary arrangements with utility owners for the timely accommodation, protection, relocation, or removal of any existing utility facilities that conflict with construction of the PROJECT or that violate CALTRANS' encroachment policy.

25. F/ETCA will provide CALTRANS a copy of conflict maps, relocation plans, proposed notices to owner, reports of investigation, and utility agreements (if applicable) for CALTRANS' concurrence prior to issuing the notices to owner and executing the utility agreements. All utility conflicts will be fully addressed prior to Right of Way Certification and all arrangements for the protection, relocation, or removal of all conflicting facilities will be completed prior to construction contract award and included in the PROJECT plans, specifications, and estimate.
26. F/ETCA to provide all Right of Way Engineering (RWE) services for the project including but not limited to acquire Title Reports, prepare Land Net Map, prepare Right of Way and Record of Surveys Maps, prepare Acquisition Documents, prepare Resolution of Necessity and Plats, prepare Director's Deed and Plats, and prepare Parcel Files, as required for the PROJECT. All work shall be in accordance with State law and local regulation (the "Laws"), and surveying and mapping work affecting the STATE Right of Way in the PROJECT area shall be in accordance with the procedures and instructions contained in the Caltrans District 12 R/W Engineering Requirements for the Preparation of Documents and Maps, (the "Requirements"), published by Caltrans District 12, R/W Engineering (D12 RWE), which by this reference are incorporated into this document and made a part hereof. A copy of the "Requirements" can be obtained from the Chief of D12RWE. Work shall not be considered complete until the Chief of D12RWE has approved the work for inclusion into D12RWE files.
27. F/ETCA will determine the cost to positively identify and locate, protect, relocate, or remove any utility facilities whether inside or outside SHS right-of-way in accordance with federal and California laws and regulations, and CALTRANS' policies, procedures, standards, practices, and applicable agreements including but not limited to Freeway Master Contracts as defined in Caltrans Right of Way Manual, Chapter 13 Utility Section 13.04.03.00.
28. F/ETCA will provide a land surveyor licensed in the State of California to be responsible for surveying and right-of-way engineering. All survey and right-of-way engineering documents will bear the professional seal, certificate number, registration classification, expiration date of certificate, and signature of the responsible surveyor.
29. F/ETCA will utilize a public agency currently qualified by CALTRANS or a properly licensed consultant for all right-of-way activities. A qualified right-of-way agent will administer all right-of-way consultant contracts.

F/ETCA will submit a draft Right of Way Certification document to CALTRANS six (6) weeks prior to the scheduled Right of Way Certification milestone date for review.

F/ETCA will submit a final Right of Way Certification to CALTRANS for approval prior to the advertising the construction contract.

30. Physical and legal possession of right-of-way must be completed prior to construction advertisement, unless PARTNERS mutually agree to other arrangements in writing. Right of way conveyances must be completed prior to OBLIGATION COMPLETION, unless PARTNERS mutually agree to other arrangements in writing.
31. If F/ETCA acquires any right-of-way to be incorporated into the State Highway System, F/ETCA shall first acquire in its own name. Title the State Highway System right-of-way shall ultimately be vested in the State.
32. CALTRANS' acceptance of right-of-way title is subject to review of an Updated Preliminary Title Report provided by F/ETCA verifying that the title is free of all encumbrances and liens in writing. Upon acceptance, F/ETCA will provide CALTRANS with a Policy of Title Insurance in CALTRANS' name.

F/ETCA agrees to first acquire any necessary rights-of-way for the PROJECT in its own name. Prior to the closeout of this AGREEMENT, F/ETCA shall transfer title to said rights-of-way to CALTRANS, free and clear of all encumbrances and liens, except as to those items which CALTRANS agrees are not in conflict with CALTRANS' use for highway purposes. CALTRANS' acceptance of right-of-way title is subject to review of an updated preliminary title report provided by F/ETCA. The PARTNERS shall cooperate and use their best efforts to ensure the transfer of title of properties incorporated into the SHS right of way is accomplished no more than 90 days after presentation of properties for acceptance. Upon acceptance, F/ETCA will provide CALTRANS with a policy of title insurance in CALTRANS' name.

33. F/ETCA certifies that it is authorized to hear and, if appropriate, adopt Resolutions of Necessity for PROJECT. F/ETCA agrees to be responsible for hearing and adopting Resolutions of Necessity for PROJECT. F/ETCA is responsible for all work associated with hearing and adopting Resolutions of Necessity for PROJECT.

F/ETCA shall follow its standard policies and procedures for acquisitions of real property necessary for the PROJECT in accordance with all applicable state and federal laws, rules, and requirements.

Schedule

34. PARTNERS will manage the schedule for OBLIGATIONS through the work plan included in the PROJECT MANAGEMENT PLAN.

35. CALTRANS shall review and provide written comments to all initial submittals within 21 calendar days and resubmittals within 21 calendar days of the date of transmittal to the District office for timely processing of PROJECT documents, including providing quality assurance review and approvals consistent with its existing policies, for all WORK.

Whenever CALTRANS approval is required by the terms of this Agreement, that approval shall not be unreasonably withheld or delayed.

Maintenance

36. The maintenance responsibility of PROJECT, on State Route 241 and up to the point where the direct connector joins State Route 91 Express Lanes, will be per Cooperative Agreement 12-081.

Additional Provisions

37. PARTNERS will perform all OBLIGATIONS in accordance with federal and California laws, regulations, and published standards; FHWA STANDARDS; and CALTRANS STANDARDS current as of the date of performance. Approvals required hereunder shall not be withheld unreasonably. F/ETCA will consult with CALTRANS with regard to any comments submitted by CALTRANS reviewers that are not required to be incorporated in any PROJECT deliverables under the foregoing criteria.
38. CALTRANS retains the right to reject noncompliant WORK, protect public safety, preserve property rights, and ensure that all WORK is in the best interest of the SHS.
39. Each PARTNER will ensure that personnel participating in OBLIGATIONS are appropriately qualified or licensed to perform the tasks assigned to them.
40. PARTNERS will invite each other to participate in the selection of any consultants who participate in OBLIGATIONS.
41. Within 28 calendar days of receipt by CALTRANS of proper application, CALTRANS will issue the encroachment permits required for WORK within SHS right-of-way. PARTNERS will not permit their contractors and/or agents, or utility owners to perform work within the SHS right-of-way without an encroachment permit issued in their name. CALTRANS will provide encroachment permits to PARTNERS, their contractors, consultants and agents, at no cost. If the encroachment permit and this AGREEMENT conflict, the requirements of this AGREEMENT shall prevail.

42. The IMPLEMENTING AGENCY for a PROJECT COMPONENT will coordinate, prepare, obtain, implement, renew, and amend any encroachment permits needed to complete the PROJECT COMPONENT WORK.
43. If any PARTNER discovers unanticipated cultural, archaeological, paleontological, or other protected resources during WORK, all WORK in that area will stop and that PARTNER will notify all PARTNERS within one (1) working day of discovery. WORK may only resume after a qualified professional has evaluated the nature and significance of the discovery and a plan is approved for its removal or protection.
44. PARTNERS will hold all administrative drafts and administrative final reports, studies, materials, and documentation relied upon, produced, created, or utilized for the PROJECT in confidence to the extent permitted by law and where applicable, the provisions of California Government Code section 6254.5(e) shall protect the confidentiality of such documents in the event that said documents are shared between PARTNERS.

PARTNERS will not distribute, release, or share said documents with anyone other than employees, agents, and consultants who require access to complete the PROJECT without the written consent of the PARTNER authorized to release them, unless required or authorized to do so by law.

45. If a PARTNER receives a public records request pertaining to OBLIGATIONS, that PARTNER will notify the other PARTNER within five (5) working days of receipt and make such PARTNER aware of any disclosed public documents. PARTNERS will consult with each other prior to the release of any public documents related to the PROJECT.
46. If HM-1 or HM-2 is found during performance of the WORK, the IMPLEMENTING AGENCY will immediately notify the other PARTNER.
47. CALTRANS, independent of the PROJECT, is responsible for any HM-1 found within the existing SHS right-of-way. CALTRANS will undertake, or cause to be undertaken, HM MANAGEMENT ACTIVITIES related to HM-1 with minimum impact to the PROJECT schedule.

CALTRANS, independent of the PROJECT will pay, or cause to be paid, the cost of HM MANAGEMENT ACTIVITIES related to HM-1 found within the existing SHS right-of-way.

48. If HM-1 is found within the PROJECT limits and outside the existing SHS right-of-way, responsibility for such HM-1 rests with the owner(s) of the parcel(s) on which the HM-1 is found. F/ETCA, in concert with the local agency having land use jurisdiction over such parcel(s), will ensure that HM MANAGEMENT ACTIVITIES related to HM-1 are undertaken with minimum impact to PROJECT schedule.

The costs for HM MANAGEMENT ACTIVITIES related to HM-1 found within the PROJECT limits and outside the existing SHS right-of-way will be the responsibility of the owner(s) of the parcel(s) where the HM-1 is located.

49. If HM-2 is found within the PROJECT limits, the public agency responsible for the advertisement, award, and administration (AAA) of the PROJECT construction contract will be responsible for HM MANAGEMENT ACTIVITIES related to HM-2.
50. CALTRANS' acquisition or acceptance of title to any property on which any HM-1 or HM-2 is found will proceed in accordance with CALTRANS' policy on such acquisition.
51. F/ETCA will accept, reject, compromise, settle, or litigate claims of any non-AGREEMENT parties hired to complete OBLIGATIONS.
52. PARTNERS will confer on any potential future claim that may affect OBLIGATIONS or PARTNERS' liability or responsibility under this AGREEMENT in order to retain resolution possibilities for potential future claims. No PARTNER will prejudice the rights of another PARTNER until after PARTNERS confer on the claim.
53. If the PROJECT expends state or federal funds, each PARTNER will comply with the federal Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards of 2 CFR, Part 200. PARTNERS will ensure that any for-profit party hired to participate in the OBLIGATIONS will comply with the requirements in 48 CFR, Chapter 1, Part 31. When state or federal funds are expended on the PROJECT these principles and requirements apply to all funding types included in this AGREEMENT.
54. Each PARTNER that expends state or federal funds on the PROJECT will undergo an annual audit in accordance with the Single Audit Act and the federal Office of Management and Budget (OMB) Circular A-133.
55. If federal funds are expended for the PROJECT, any PARTNER that hires an Architectural & Engineering (A&E) consultant to perform WORK on any part of the PROJECT will ensure that the procurement of the consultant and the consultant overhead costs are in accordance with Chapter 10 of the *Local Assistance Procedures Manual*.

56. If WORK stops for any reason, IMPLEMENTING AGENCY will place the PROJECT right-of-way in a safe and operable condition acceptable to CALTRANS.
57. If WORK stops for any reason, each PARTNER will continue to implement all of its applicable commitments and conditions included in the PROJECT environmental documentation, permits, agreements, or approvals that are in effect at the time that WORK stops, as they apply to each PARTNER's responsibilities in this AGREEMENT, in order to keep the PROJECT in environmental compliance until WORK resumes.
58. Fines, interest, or penalties levied against a PARTNER will be paid by the PARTNER whose action or lack of action caused the levy.
59. If there are insufficient funds available in this AGREEMENT to place PROJECT right-of-way in a safe and operable condition, the appropriate IMPLEMENTING AGENCY will fund these activities until such time as PARTNERS amend this AGREEMENT and fund activities necessary to place the PROJECT right-of-way in a safe and operable condition acceptable to CALTRANS, and the PARTNERS shall undertake to amend this AGREEMENT to address the funding shortfall.
60. F/ETCA will furnish CALTRANS with the Project History Files related to the PROJECT facilities on SHS within sixty (60) days following the completion of each PROJECT COMPONENT. F/ETCA will prepare the Project History Files in accordance with the Project Development Procedures Manual, Chapter 7. All material will be submitted neatly in a three-ring binder and on a CD ROM in PDF format.

GENERAL CONDITIONS

61. PARTNERS understand that this AGREEMENT is in accordance with and governed by the Constitution and laws of the State of California. This AGREEMENT will be enforceable in the State of California. Any PARTNER initiating legal action arising from this AGREEMENT will file and maintain that legal action in the Superior Court of the county in which the CALTRANS district office that is signatory to this AGREEMENT resides, or in the Superior Court of the county in which the PROJECT is physically located.
62. All CALTRANS' OBLIGATIONS under this AGREEMENT are subject to the appropriation of resources by the Legislature, the State Budget Act authority, and the allocation of funds by the California Transportation Commission.

63. Neither F/ETCA nor any officer or employee thereof is responsible for any injury, damage or liability occurring by reason of anything done or omitted to be done by CALTRANS, its contractors, sub-contractors, and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon CALTRANS under this AGREEMENT. It is understood and agreed that CALTRANS, to the extent permitted by law, will defend, indemnify, and save harmless F/ETCA and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories and assertions of liability occurring by reason of anything done or omitted to be done by CALTRANS, its contractors, sub-contractors, and/or its agents under this AGREEMENT.
64. Neither CALTRANS nor any officer or employee thereof is responsible for any injury, damage, or liability occurring by reason of anything done or omitted to be done by F/ETCA, its contractors, sub-contractors, and/or its agents under or in connection with any work, authority, or jurisdiction conferred upon F/ETCA under this AGREEMENT. It is understood and agreed that F/ETCA, to the extent permitted by law, will defend, indemnify, and save harmless CALTRANS and all of its officers and employees from all claims, suits, or actions of every name, kind, and description brought forth under, but not limited to, tortious, contractual, inverse condemnation, or other theories and assertions of liability occurring by reason of anything done or omitted to be done by F/ETCA, its contractors, sub-contractors, and/or its agents under this AGREEMENT.
65. PARTNERS do not intend this AGREEMENT to create a third party beneficiary or define duties, obligations, or rights in parties not signatory to this AGREEMENT. PARTNERS do not intend this AGREEMENT to affect their legal liability by imposing any standard of care for fulfilling OBLIGATIONS different from the standards imposed by law.
66. PARTNERS will not assign or attempt to assign OBLIGATIONS to parties not signatory to this AGREEMENT without an amendment to this AGREEMENT.
67. F/ETCA waives the provisions of California Civil Code section 1654. A waiver of a PARTNER's performance under this AGREEMENT will not constitute a continuous waiver of any other provision.
68. A delay or omission to exercise a right or power due to a default does not negate the use of that right or power in the future when deemed necessary.
69. If any PARTNER defaults in its OBLIGATIONS, a non-defaulting PARTNER will request in writing that the default be remedied within thirty (30) calendar days. If the defaulting PARTNER fails to do so, the non-defaulting PARTNER may initiate dispute resolution.

70. PARTNERS will first attempt to resolve AGREEMENT disputes at the PROJECT team level. If they cannot resolve the dispute themselves, the CALTRANS district director and the chief executive officer of F/ETCA will attempt to negotiate a resolution. If PARTNERS do not reach a resolution, PARTNERS' legal counsel will initiate mediation. PARTNERS agree to participate in mediation in good faith and will share equally in its costs.

Neither the dispute nor the mediation process relieves PARTNERS from full and timely performance of OBLIGATIONS in accordance with the terms of this AGREEMENT. However, if any PARTNER stops fulfilling OBLIGATIONS, any other PARTNER may seek equitable relief to ensure that OBLIGATIONS continue.

Except for equitable relief, no PARTNER may file a civil complaint until after mediation, or forty-five (45) calendar days after filing the written mediation request, whichever occurs first.

PARTNERS will file any civil complaints in the Superior Court of the county in which the CALTRANS district office signatory to this AGREEMENT resides or in the Superior Court of the county in which the PROJECT is physically located. The prevailing PARTNER will be entitled to an award of all costs, fees, and expenses, including reasonable attorney fees as a result of litigating a dispute under this AGREEMENT or to enforce the provisions of this article including equitable relief.

71. PARTNERS maintain the ability to pursue alternative or additional dispute remedies if a previously selected remedy does not achieve resolution.
72. If any provisions in this AGREEMENT are found by a court of competent jurisdiction to be, or are in fact, illegal, inoperative, or unenforceable, those provisions do not render any or all other AGREEMENT provisions invalid, inoperative, or unenforceable, and those provisions will be automatically severed from this AGREEMENT.
73. If during performance of WORK additional activities or environmental documentation is necessary to keep the PROJECT in environmental compliance, PARTNERS will amend this AGREEMENT to include completion of those additional tasks.
74. Except as otherwise provided in the AGREEMENT, PARTNERS will execute a formal written amendment if there are any changes to OBLIGATIONS.

75. When WORK performed on the PROJECT is done under contract and falls within the Labor Code section 1720(a)(1) definition of "public works" in that it is construction, alteration, demolition, installation, or repair; or maintenance work under Labor Code section 1771, PARTNERS shall conform to the provisions of Labor Code sections 1720 through 1815, and all applicable provisions of California Code of Regulations found in Title 8, Division 1, Chapter 8, Subchapter 3, Articles 1-7. PARTNERS shall include prevailing wage requirements in contracts for public work and require contractors to include the same prevailing wage requirements in all subcontracts. Work performed by a PARTNER's own employees is exempt from the Labor Code's Prevailing Wage requirements.
76. If WORK is paid for, in whole or part, with federal funds and is of the type of work subject to federal prevailing wage requirements, PARTNERS shall conform to the provisions of the Davis-Bacon and Related Acts, 40 U.S.C. § 276(a).

When applicable, PARTNERS shall include federal prevailing wage requirements in contracts for public work. WORK performed by a PARTNER's employees is exempt from federal prevailing wage requirements.

77. PARTNERS agree to sign a CLOSURE STATEMENT to terminate this AGREEMENT. However, all indemnification, document retention, audit, claims, environmental commitment, legal challenge, maintenance and ownership articles will remain in effect until terminated or modified in writing by mutual agreement or expire by the statute of limitations.
78. PARTNERS intend this AGREEMENT to be their final expression that supersedes any oral understanding or writings pertaining to the OBLIGATIONS. The requirements of this agreement shall preside over any conflicting requirements in any documents that are made an express part of this AGREEMENT.

DEFINITIONS

AGREEMENT – This agreement including any attachments, exhibits, and amendments.

CALTRANS STANDARDS – CALTRANS policies and procedures, including, but not limited to, the guidance provided in the Project Development Procedures Manual (PDPM) and the CALTRANS Workplan Standards Guide for the Delivery of Capital Projects (WSG) [which contains the CALTRANS Work Breakdown Structure (WBS) and was previously known as the WBS Guide] and is available at <http://www.dot.ca.gov/hq/projmgmt/guidance.htm>.

CEQA (California Environmental Quality Act) – The act (California Public Resources Code, sections 21000 et seq.) that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those significant impacts, if feasible.

CFR (Code of Federal Regulations) – The general and permanent rules published in the Federal Register by the executive departments and agencies of the federal government.

CLOSURE STATEMENT – A document signed by PARTNERS that verifies the completion of all OBLIGATIONS included in this AGREEMENT and in all amendments to this AGREEMENT.

FHWA – Federal Highway Administration.

FHWA STANDARDS – FHWA regulations, policies and procedures, including, but not limited to, the guidance provided at www.fhwa.dot.gov/topics.htm.

FUNDING PARTNER – A PARTNER that commits funds in this AGREEMENT to fulfill OBLIGATIONS. A FUNDING PARTNER accepts the responsibility to provide the funds it commits in this Agreement.

FUNDING SUMMARY – An executed document that includes a FUNDING TABLE and invoicing and payment methods.

FUNDING TABLE – The table that designates funding sources, types of funds, and the PROJECT COMPONENT in which the funds are to be spent. Funds listed on the FUNDING TABLE are “not-to-exceed” amounts for each FUNDING PARTNER.

GAAP (Generally Accepted Accounting Principles) – Uniform minimum standards and guidelines for financial accounting and reporting issued by the Federal Accounting Standards Advisory Board that serve to achieve some level of standardization. See <http://www.fasab.gov/accepted.html>.

HM-1 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law whether it is disturbed by the PROJECT or not.

HM-2 – Hazardous material (including, but not limited to, hazardous waste) that may require removal and disposal pursuant to federal or state law only if disturbed by the PROJECT.

HM MANAGEMENT ACTIVITIES – Management activities related to either HM-1 or HM-2 including, without limitation, any necessary manifest requirements and disposal facility designations.

IMPLEMENTING AGENCY – The PARTNER responsible for managing the scope, cost, and schedule of a PROJECT COMPONENT to ensure the completion of that component.

IQA (Independent Quality Assurance) – CALTRANS' efforts to ensure that another PARTNER's quality assurance activities are in accordance with the applicable standards and the PROJECT's Quality Management Plan (QMP). When CALTRANS performs Independent Quality Assurance it does not develop, produce, validate, verify, re-check, or quality control another PARTNER's work products.

NEPA (National Environmental Policy Act of 1969) – This federal act establishes a national policy for the environment and a process to disclose the adverse impacts of projects with a federal nexus.

OBLIGATIONS – All WORK responsibilities and their associated costs.

OBLIGATION COMPLETION – PARTNERS have fulfilled all OBLIGATIONS included in this AGREEMENT and have signed a COOPERATIVE AGREEMENT CLOSURE STATEMENT.

PARTNER – Any individual signatory party to this AGREEMENT.

PARTNERS – The term that collectively references all of the signatory agencies to this AGREEMENT. This term only describes the relationship between these agencies to work together to achieve a mutually beneficial goal. It is not used in the traditional legal sense in which one PARTNER's individual actions legally bind the other PARTNER.

PROJECT COMPONENT – A distinct portion of the planning and project development process of a capital project as outlined in California Government Code, section 14529(b).

- **PID (Project Initiation Document)** – The work required to deliver the project initiation document for the PROJECT in accordance with CALTRANS STANDARDS.
 - **PA&ED (Project Approval and Environmental Document)** – The work required to deliver the project approval and environmental documentation for the PROJECT in accordance with CALTRANS STANDARDS.
 - **PS&E (Plans, Specifications, and Estimate)** – The work required to deliver the plans, specifications, and estimate for the PROJECT in accordance with CALTRANS STANDARDS.
 - **R/W (Right of Way)** – The project components for the purpose of acquiring real property interests for the PROJECT in accordance with CALTRANS STANDARDS.
- **R/W (Right of Way) SUPPORT** – The work required to obtain all property interests for the PROJECT.
- **R/W (Right of Way) CAPITAL** – The funds for acquisition of property rights for the PROJECT.
- **CONSTRUCTION** – The project components for the purpose of completing the construction of the PROJECT in accordance with CALTRANS STANDARDS.
- **CONSTRUCTION SUPPORT** – The work required for the administration, acceptance, and final documentation of the construction contract for the PROJECT.
- **CONSTRUCTION CAPITAL** – The funds for the construction contract.

PROJECT MANAGEMENT PLAN – A group of documents used to guide the PROJECT's execution and control throughout that project's lifecycle.

PS&E (Plans, Specifications, and Estimate) – See PROJECT COMPONENT.

QMP (Quality Management Plan) – An integral part of the PROJECT MANAGEMENT PLAN that describes IMPLEMENTING AGENCY's quality policy and how it will be used.

R/W (Right of Way) CAPITAL – See PROJECT COMPONENT.

R/W (Right of Way) SUPPORT – See PROJECT COMPONENT.

SHS (State Highway System) – All highways, right-of-way, and related facilities acquired, laid out, constructed, improved, or maintained as a state highway pursuant to constitutional or legislative authorization.

SPONSOR – Any PARTNER that accepts the responsibility to establish scope of the PROJECT and the obligation to secure financial resources to fund the PROJECT COMPONENTS in this AGREEMENT. A SPONSOR is responsible for adjusting the PROJECT scope to match committed funds or securing additional funds to fully fund the PROJECT COMPONENTS in this AGREEMENT. If this AGREEMENT has more than one SPONSOR, funding adjustments will be made by percentage (as outlined in Responsibilities). Scope adjustments must be developed through the project development process and must be approved by CALTRANS as the owner/operator of the SHS.

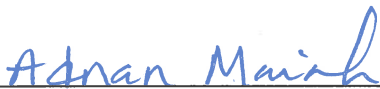
WORK – All efforts to complete the responsibilities included in this AGREEMENT as described by the activities in the CALTRANS Workplan Standards Guide for the Delivery of Capital Projects (WSG).

SIGNATURES

PARTNERS are empowered by California Streets and Highways Code section 114 and 130 to enter into this AGREEMENT and have delegated to the undersigned the authority to execute this AGREEMENT on behalf of the respective agencies and covenants to have followed all the necessary legal requirements to validly execute this AGREEMENT.

Signatories may execute this AGREEMENT through individual signature pages provided that each signature is an original. This AGREEMENT is not fully executed until all original signatures are attached.

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

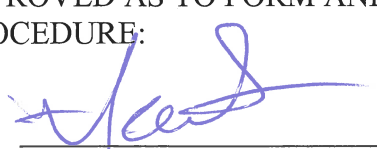


Adnan Maiah
Deputy District Director
Capital Outlay Program

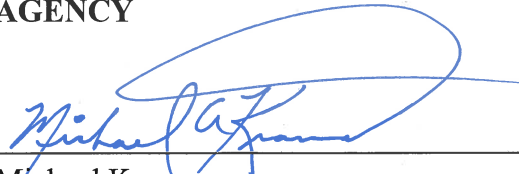
Certified as to funds:

for 
Neda Saber
District Budget Manager

APPROVED AS TO FORM AND
PROCEDURE:

By: 

FOOTHILL/EASTERN TRANSPORTATION CORRIDOR AGENCY



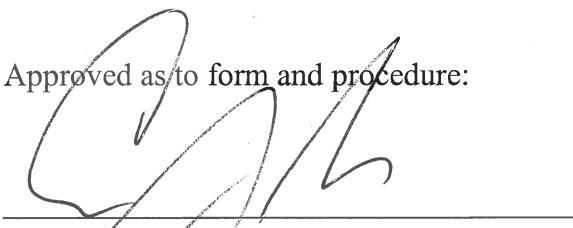
Michael Kraman
Chief Executive Officer

Attest:



Martha M. Ochoa,
Clerk of the Board

Approved as to form and procedure:


E. George Joseph
General Counsel

FUNDING SUMMARY

FUNDING TABLE						
v. 12						
		IMPLEMENTING AGENCY →				
Source	FUNDING PARTNER	Fund Type	F/ETCA	PS&E	R/W SUPPORT	R/W CAPITAL
Local	F/ETCA	Local		25,000,000	0	500,000
Totals				25,000,000	0	500,000
						Totals
						25,500,000
						25,500,000

Funding

F/ETCA will fund one hundred percent (100%) of all WORK costs, except for costs associated with any CALTRANS OBLIGATIONS or WORK to be performed by CALTRANS under this AGREEMENT.

CALTRANS will perform all OBLIGATIONS and WORK to be performed by it at no cost to F/ETCA.

CALTRANS, other than the duty to provide and perform all OBLIGATIONS and WORK assigned to it herein at no cost to F/ETCA, has no funds allocated to PROJECT and F/ETCA will have no right to seek a CALTRANS contribution of funds under the terms of this AGREEMENT.

Invoicing and Payment

Plans, Specifications, and Estimate (PS&E)

1. No invoicing or reimbursement will occur for the PS&E PROJECT COMPONENT.

Right of Way Support (R/W SUPPORT)

2. No invoicing or reimbursement will occur for the R/W SUPPORT PROJECT COMPONENT.

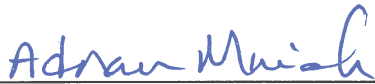
Right of Way Capital (R/W CAPITAL)

3. No invoicing or reimbursement will occur for the R/W CAPITAL PROJECT COMPONENT.

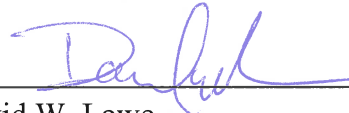
Signatures

PARTNERS are empowered by California Streets and Highways Code sections 114 and 130 to enter into this AGREEMENT and have delegated to the undersigned the authority to execute this FUNDING SUMMARY on behalf of the respective agencies and represent that they have followed all the necessary legal requirements to validly execute this FUNDING SUMMARY.

Signatories may execute this FUNDING SUMMARY through individual signature pages provided that each signature is an original. This FUNDING SUMMARY is not fully executed until all original signatures are attached.

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

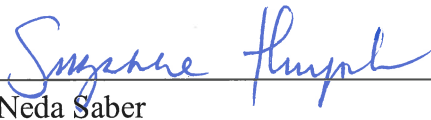
Adnan Maiah
Deputy District Director
Capital Outlay Program

**FOOTHILL/EASTERN
TRANSPORTATION CORRIDOR
AGENCY**

David W. Lowe
Chief Engineer

Date 2/17/2017

Date 1/31/17

for 

Neda Saber
District Budget Manager

For Darwin Salmas



HQ Accounting

Summary

S.1 NEPA Assignment

California participated in the “Surface Transportation Project Delivery Pilot Program” (Pilot Program) pursuant to 23 United States Code (USC) 327, for more than 5 years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, the California Department of Transportation (Caltrans) entered into a Memorandum of Understanding (MOU) pursuant to 23 USC 327 (National Environmental Policy Act [NEPA] Assignment MOU) with the Federal Highway Administration (FHWA). The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016, for a term of 5 years. In summary, Caltrans continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned, and Caltrans assumed, all of the United States Department of Transportation (USDOT) Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical exclusions that FHWA assigned to Caltrans under the 23 USC 326 Categorical Exclusion Assignment MOU, projects excluded by definition, and specific project exclusions.

S.2 Joint CEQA/NEPA Document

The Proposed Project is a joint project by Caltrans and the FHWA, and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and NEPA. Caltrans is the lead agency under both CEQA and NEPA. In addition, FHWA's responsibility for environmental review, consultation, and any other action required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 USC 327 and the MOU dated December 23, 2016, and executed by FHWA and Caltrans.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the

significance of the Project as a whole, often a “lower level” document is prepared for NEPA.

This Final Supplemental Environmental Impact Report/Environmental Impact Statement (EIR/EIS) includes responses to comments received on the Draft Supplemental EIR/EIS (Chapter 5) and identifies the Preferred Alternative (the Build Alternative). Locations in this Final Supplemental EIR/EIS where changes were made to the document following publication of the Draft Supplemental EIR/EIS are underlined and shown with a vertical line in the side margin.

As the owner-operator and lead agency, Caltrans is the approving agency for the Proposed Project. Upon approval of the Proposed Project, a Notice of Determination will be published for compliance with CEQA. With respect to the National Environmental Policy Act (NEPA), Caltrans, as assigned by the FHWA, will document and explain its decision regarding the selected alternative, project impacts, and mitigation measures in a Record of Decision (ROD).

Caltrans, in cooperation with the Foothill/Eastern Transportation Corridor Agency (F/ETCA) (responsible agency pursuant to the *State CEQA Guidelines* Section 15381 and sponsoring agency), proposes the State Route 241 (SR-241)/State Route 91 (SR-91) Tolled Express Lanes Connector Project (Proposed Project) to construct a median-to-median connector between SR-241 and the tolled lanes in the median of SR-91 (*91 Express Lanes*). SR-241 is a tolled facility, starting at the Oso Parkway interchange, in south Orange County, to its terminus at SR-91. The Orange County Transportation Authority (OCTA) *91 Express Lanes* is a tolled facility, two lanes in each direction, located in the median of SR-91, from State Route 55 (SR-55), to the Orange/Riverside County Line (east of the SR-241 interchange). The existing junction of SR-241 and SR-91 connects all lanes of northbound SR-241 to the non-tolled, general-purpose lanes of eastbound and westbound SR-91 and the eastbound and westbound SR-91 to southbound SR-241. There is currently no direct connection between the SR-241 and the *91 Express Lanes*.

S.3 Project Background/History

In May 1994, F/ETCA, in cooperation with Caltrans/FHWA, prepared and approved a Final EIR and Final EIS to construct the Eastern Transportation Corridor (ETC) (SR-241) as a limited access highway (tollway), starting at the Santa Ana Freeway (Interstate 5/State Route 133 [I-5/SR-133]) interchange, to its terminus at SR-91.

The Systems Management Concept (SMC)¹ for the ETC projected that each Build Alternative would be staged, incorporating general-purpose traffic and eventually high-occupancy vehicle (HOV) “carpool” lanes, to meet the forecasted demand. Under the SMC, ETC construction would be completed in one stage, with three or more phases.

The Preferred Alternative selected for the ETC as documented in the Final EIR and Final EIS included a single alignment called the North Leg through Gypsum and Blind Canyons transitioning to the East Leg south of Santiago Canyon Road. The East Leg crosses Loma Ridge near Rattlesnake Canyon, extends southeasterly toward Siphon Reservoir where the ETC interchanges with the Foothill Transportation Corridor (FTC) and then extends southerly along the Orange County Great Park to the I-5/SR-133 interchange. Construction of the ETC began in 1996 and finished in 1998.

The Proposed Project is a later phase of the ETC. It was originally evaluated as an SR-241/SR-91 HOV direct connector in the 1991 ETC Draft EIR/EIS, the 1992 ETC Final EIR, and the 1994 ETC Final EIS.

To implement this later phase of the ETC, this Supplemental EIR/EIS has been prepared to:

- Focus on the northern end of the original project
- Address changes to environmental conditions and regulatory requirements
- Address the extended Project Limits on SR-91 to the east; and
- Comply with 23 Code of Federal Regulations (CFR) 771.129(b): *A written evaluation of the final EIS will be required before further approvals may be granted if major steps to advance the action (e.g., authority to undertake final design, authority to acquire a significant portion of the right-of-way, or approval of the plans, specifications, and estimates) have not occurred within three years after the approval of the final EIS...* Because the SR-241/SR-91 Express Lanes Connector design was postponed longer than 3 years after the ETC Final EIS approval, the median-to-median connector is required to be re-evaluated in compliance with NEPA.

¹ The SMC defines the environment in which the freeway is to operate, and the needs of the users. It is a tool by which regions, agencies, and traffic management centers identify the optimal solution on their preferred approach, capabilities, and constraints.

S.4 Purpose and Need

The Project Purpose is a set of objectives the Proposed Project is intended to meet. The Project Need is the range of transportation deficiencies that the Proposed Project was initiated to address.

S.4.1 Purpose of the Proposed Project

In addition to the originally intended objectives of the ETC, changed circumstances at the junction of SR-241 and SR-91 have led to the following objectives for the Proposed Project:

- Implement the build out of the ETC, as approved in 1994
- Attain compatibility with the SR-91 mainline and SR-91 Express Lanes
- Improve traffic flow and operations by reducing weaving across multiple general-purpose lanes between the SR-91 Express Lanes and the SR-241 general-purpose lane connectors
- Enhance the efficiency of the tolled system, thereby reducing congestion on the non-tolled system on the SR-91

S.4.2 Need for the Proposed Project

There is a need for improved access between SR-241 and SR-91. Roadway deficiencies are described below:

- Demand exceeds capacity on the northbound SR-241 connector to the eastbound SR-91 and on the westbound SR-91 connector to the southbound SR-241
- Northbound vehicles on SR-241 cannot access the eastbound SR-91 Express Lanes.
- Westbound SR-91 Express Lanes motorists cannot access southbound SR-241.
- The weaving between the general-purpose connectors and the median lanes is an issue because it degrades the level of service due to increased vehicle density. In addition, the weaving operations contribute to sideswipe accidents.

S.5 Project Description

The Proposed Project proposes to improve access and reduce congestion at the SR-241/SR-91 interchange by providing a direct connector between SR-241 and the *91 Express Lanes*. The Proposed Project, located in the cities of Anaheim, Yorba Linda, and Corona, and the counties of Orange and Riverside is proposed to be a tolled facility with a total length of approximately 8.7 miles (mi).

The improvements for the connector include 5.9 mi in the cities of Anaheim and Yorba Linda and unincorporated areas of Orange and Riverside counties, from south of Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project include signage improvements (advance signage) in the cities of Anaheim (1.2 mi), Yorba Linda (0.1 mi), and Corona (1.5 mi) and unincorporated Orange and Riverside counties, with exact placement of the signage pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition required adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way. The area where the partial acquisition would be located, adjacent to eastbound SR-91, would be used for construction access but not for construction staging. The partial acquisition would not result in the displacement or relocation of any residents or businesses.

This Supplemental EIR/EIS includes a No Build Alternative and only one Build Alternative (Preferred Alternative) for the median-to-median connector for the following reasons:

- The median-to-median connector is a component of a previously approved project and alternative selected during the 1992 EIR Certification and 1994 ROD for the original ETC project;
- Various alternatives were studied for the previously approved project that included consideration of a reasonable range of potentially feasible alternatives; and
- There are limited locations for a median-to-median connector between SR-241 and SR-91.

S.5.1 Build Alternative (Two-Lane Tolled Express Lanes Connector) (Preferred Alternative)

The Build Alternative would construct a two-lane tolled express lane median-to-median connector between SR-241 and SR-91, which would connect lanes from the median of northbound SR-241 to the existing eastbound median *91 Express Lanes*. The reverse movement would also be accommodated, from the westbound median *91 Express Lanes* to the median of southbound SR-241.

The Build Alternative would merge into the existing *91 Express Lanes* at Coal Canyon Undercrossing. The Riverside County Transportation Commission's (RCTC) SR-91 CIP Initial Phase extended the express lanes on SR-91 east to Interstate 15

(I-15) and opened to traffic on March 20, 2017. The Build Alternative is compatible with the approved SR-91 CIP for both the initial and ultimate configurations, including the number and widths of the express lanes, express auxiliary lanes, and general-purpose lanes.

On March 24, 2016, the Project Development Team evaluated the Build Alternative and the No Build Alternative to develop a recommendation to Caltrans for the Preferred Alternative. Due to the fact that there was only one Build Alternative, no systematic criteria were developed to compare the Build Alternative to the No Build Alternative. However, the reasons for selecting the Build Alternative as the Preferred Alternative include:

- Meeting the Proposed Project's Purpose and Need
- Consistency with the planned facility
- Consistency with regional transportation and air quality planning

In addition, the environmental impacts of the Build Alternative were in an acceptable range (all substantial environmental impacts can be avoided, minimized, or mitigated) when compared to the No Build Alternative. The Build Alternative would implement the selected alternative in the ETC Final EIR and ROD for the Final EIS. While the Build Alternative meets the Proposed Project's Purpose and Need, the identification of it as the Preferred Alternative was also based upon the following factors:

- Various alternatives were studied for the previously approved project that included consideration of a reasonable range of potentially feasible alternatives; and
- There are limited locations for a median-to-median connector between SR-241 and SR-91.

The following sections describe the permanent and temporary features of the Build Alternative. Additional details and a corresponding figure are provided in Chapter 2.

S.5.1.1 Permanent Project Features

New Lanes and Roadway Alignment

Improvements on Southbound SR-241

On southbound SR-241, an additional lane and shoulder would be provided by widening Windy Ridge Wildlife Undercrossing into the existing median and improving the highway median for approximately 10,000 feet (ft) to the north.

Improvements on Northbound SR-241

Starting approximately 3,700 ft north of the Windy Ridge Wildlife Undercrossing, an additional lane and shoulder would be provided by widening into the existing highway median for approximately 5,000 ft. The two express (northbound and southbound) connector lanes would converge in the existing SR-241 median on fill for approximately 800 ft. The connector then spans over the existing northbound SR-241 to the westbound SR-91 general-purpose lane connector and the SR-91/Gypsum Canyon Road interchange on two new bridge structures approximately 570 ft and 1,590 ft in length, respectively (to merge in the median of SR-91).

Improvements on Eastbound SR-91

To accommodate the addition of the median-to-median connector, eastbound SR-91 would be realigned to the south. The northbound SR-241 to eastbound 91 Express Lanes connector would continue on eastbound SR-91, ending approximately 1,000 ft west of Coal Canyon Undercrossing. An eastbound auxiliary express lane would be constructed within the 91 Express Lanes. The proposed auxiliary express lane would begin approximately 2,000 ft east of Gypsum Canyon Road Undercrossing to Coal Canyon Undercrossing joining the initial phase of the SR-91 CIP at Coal Canyon Undercrossing. These improvements would provide a four-lane express lane facility, tapering down to three lanes between the connector and Coal Canyon Undercrossing. The number of existing eastbound SR-91 general-purpose lanes would be maintained within the project limits. The eastbound 91 Express Lanes would have a 4 ft buffer on the right separating the general-purpose lanes, and a 4 ft buffer to the left separating the express connector lane. The buffers would transition to 0 ft to join the SR-91 CIP at the eastern terminus of the Project Limits. Approximately 4,500 ft west of Coal Canyon Undercrossing, grading into an existing slope on the south side of SR-91 would be required to accommodate the realigned eastbound SR-91 lanes. The grading would span approximately 1,300 ft along eastbound SR-91. A maintenance access road would be provided along the edge of slope grading. The purpose of the access road is to maintain the slope and facilitate a smooth and seamless transition where natural and built slopes intersect. These improvements would provide a four-lane express lane facility, tapering down to three lanes between the connector and Coal Canyon Undercrossing.

Improvements on Westbound SR-91

At the eastern terminus of the Project, the westbound 91 *Express Lanes* would be restriped and the median widened to accommodate the addition of the express connector lane within the 91 *Express Lanes* to the southbound SR-241 median-to-

median connector. The connector lane would begin approximately 1,000 ft west of Coal Canyon Undercrossing and extend west for approximately 4,500 ft in the SR-91 median ending at the express lanes connector. The auxiliary express lane at the SR-91 CIP connection would be extended in the westbound direction ending 2,000 ft west of Coal Canyon Undercrossing. These improvements would provide a four-lane overlap section along westbound SR-91 for approximately 1,000 ft. This 1,000 ft overlap would accommodate weaving between traffic accessing the southbound SR-241 median-to-median connector and the westbound *91 Express Lanes*. The existing eastbound SR-91 lanes would be shifted to the south.

Striped Buffers and Channelizers

The Build Alternative would provide a striped buffer with surface mounted channelizers to separate the SR-91 general-purpose lanes from the *91 Express Lanes* and a new striped buffer to separate the eastbound express lane connector lane from the *91 Express Lanes*. The eastbound express lane buffers would taper from 0 to 4 ft and the westbound express lane buffers would taper from 0 to 2 ft.

Ramp Realignment

The SR-91/Gypsum Canyon Road interchange on- and off-ramps and the northbound SR-241 to eastbound SR-91 general-purpose connector would be realigned to accommodate the median-to-median connector. A design variation for this interchange is a roundabout configuration.

Bridge Structures and Bridge Widening

Two new overcrossing structures would be constructed and two existing bridges would be widened as follows:

- **SR-241/SR-91 Connector Overcrossing Structures:** Two new structures would connect traffic from northbound SR-241 to eastbound SR-91 and from westbound SR-91 to southbound SR-241.
- **Gypsum Canyon Undercrossing Widening:** On eastbound SR-91, the existing Gypsum Canyon Undercrossing would be widened to the south.
- **Windy Ridge Wildlife Undercrossing Widening:** On southbound SR-241, the Windy Ridge Wildlife Undercrossing would be widened to the east.

All structures would be constructed using a cast-in-place, pre-stressed, concrete box girder.

Graded Slopes

Manufactured fill slopes would not exceed a 4:1 ratio. Manufactured cut slopes would not exceed a 2:1 ratio. Graded slopes would be contoured consistent with the existing topography, and would be seeded with native plant species consistent with existing vegetation.

Guard Rails/Barriers

Additional pavement would be added between the existing northbound SR-241/eastbound SR-91 and the northbound SR-241/westbound SR-91 general-purpose connectors to accommodate a future concrete barrier separation to prevent vehicles traveling on the northbound SR-241/westbound SR-91 general-purpose connector to “queue jump” into the eastbound SR-91 general-purpose connector. This feature would improve traffic flow on SR-241 and would be added in a later phase of the Proposed Project if queue jumping continues after pavement marking and striping are implemented in this area.

Guard rails would be constructed along the new SR-241/SR-91 median-to-median connector embankments and structures.

An existing barrier along the inside shoulder of north SR-241 (just south of the Windy Ridge Undercrossing) would be removed to allow for advance signage.

Retaining Walls

Four retaining walls are required for the Proposed Project. One wall would be constructed in the median of SR-241 to support median widening and to accommodate the future addition of a southbound lane per the ETC Ultimate Project. This wall would be approximately 2,900 ft long and up to 15 ft high. Two Mechanically Stabilized Earth (MSE) retaining walls would be constructed in the median of SR-91 to support the connector as it transitions to an elevated structure. These walls would be approximately 1,350 ft long and up to 15 ft high, but views would be blocked by the existing structures associated with the junction of SR-241 and SR-91. One retaining wall would be constructed adjacent to eastbound SR-91, approximately 2,200 ft west of the Coal Canyon Undercrossing and would be approximately 1,025 ft long and up to 28 ft high. However, this retaining wall would face vacant land to the south; only the top 3 ft of the retaining wall cap would be visible from SR-91.

Advance Signage

On SR-241 at the southern end of the Proposed Project, signage would be modified approximately 0.2 mi south of the Windy Ridge Wildlife Undercrossing. In addition, signage improvements would also be made on SR-91 between Coal Canyon Undercrossing and Green River Road and west of SR-241 within the existing SR-91 median and highway footprint.

Water Quality Best Management Practices

Design Pollution Prevention best management practices (BMPs) proposed as part of the Proposed Project include dikes, overside drains, ditches, berms, swales, modifications to the existing storm drain system, the preservation of existing vegetation, and replanting new slopes with appropriate native vegetation. Proposed Treatment BMPs include five biofiltration swales and strips and two media filters along eastbound SR-91.

Drainage Improvements

New drainage features would be constructed and existing features would be modified along SR-241 and within the SR-241/SR-91 interchange. The improvements include the construction of new drop inlets with connecting pipes, new guard rails with dikes, median drainage, and deck drains; modification of existing drop inlets; replacement of edge drains; and removal or abandonment of existing drop inlets and existing culverts. The proposed drainage improvements would be linked to the existing drainage system and would preserve the existing drainage patterns as much as possible, including draining all storm water to the Santa Ana River.

Landscaping

Replacement landscaping will be provided in the following areas: (1) the area between the SR-241 general-purpose connector (northbound SR-241 to eastbound SR-91) and the SR-241 general-purpose connector (westbound SR-91 to southbound SR-241); and (2) the slope and other vegetated areas on the south side of SR-91, within the disturbance limits.

Transportation System Management (TSM)/Transportation Demand Management (TDM) Features

TSM elements include ramp metering, auxiliary lanes, and traffic signal coordination. In addition, the Build Alternative proposes to have dynamic traffic management technology (toll pricing varies based on express lanes demand). Toll operations are being coordinated among the F/ETCA, OCTA, and RCTC and are being evaluated in

a separate Concept of Operations report, which will be completed during Final Design.

The addition of a median-to-median toll connector included in the Build Alternative is a TDM feature in and of itself because it would provide additional capacity for HOVs and buses. The Build Alternative would improve travel time, increase the efficiency of the freeway system within the traffic Study Area, and reduce congestion and delay.

Noise Attenuation

No feasible noise attenuation (sound barrier) has been identified for the Proposed Project.

Right-of-Way Acquisition

The Build Alternative would be constructed mostly within existing Caltrans right-of-way. However, one partial acquisition adjacent to eastbound SR-91 would be required. Approximately 5 acres (ac) of land on the slope approximately 3,600 ft west of Coal Canyon, on Assessor's Parcel Number 085-071-56 would be acquired. This parcel is currently part of the Irvine Ranch National Natural Landmark, owned by the County of Orange with a Conservation Easement held by The Nature Conservancy. The Conservation Easement allows for "necessary infrastructure improvement." A maintenance access road would be constructed on this slope.

Design Exceptions (Bold and Underline)

The Build Alternative would require design exceptions. Design exceptions are necessary when the proposed design deviates from the standard design features in the Caltrans *Highway Design Manual*. For example, the design standard for a freeway travel lane is 12 ft; design exceptions would be requested for locations where the lane widths would be 11 ft to match the lane widths approved for the SR-91 CIP. The Build Alternative would require design exceptions (both bold and underline features) for stopping sight distance, superelevation rate, travelway width, minimum shoulder width, and minimum ramp to local road intersection distance, for superelevation transition, single lane connector through lane, and side slopes.

S.5.1.2 Temporary Project Features

Temporary Restriping

The existing number of through lanes on the mainlines of SR-241 and SR-91 would be maintained during construction by restriping the existing lanes using reduced lane widths and shifting traffic within those corridors to maintain the existing capacity.

The *91 Express Lanes* would also be temporarily restriped to maintain two lanes in the eastbound direction.

The eastbound off-ramp and eastbound loop on-ramp at Gypsum Canyon Road would be restriped to allow construction of the two realigned eastbound ramps. One lane would be provided on the off-ramp, and two lanes would be provided on the loop on-ramp. In addition, the existing northbound SR-241 to the eastbound SR-91 connector would be restriped to provide two lanes during construction of the eastbound SR-91 widening, as well as construction of the realigned northbound SR-241 to the eastbound SR-91 connector.

Construction Barriers

During construction, all work areas would be protected by temporary safety devices, such as Temporary Railing (Type K), Temporary Crash Cushions, and other safety features in accordance with federal, State, and local agency requirements.

Detours and Closures

Temporary detours and weekend or nighttime closures would be required at the Gypsum Canyon Road interchange on- and off-ramps and the northbound SR-241 to eastbound SR-91 connector.

Construction Access and Staging Areas

Construction access and staging areas would be located within the junction of SR-241 and SR-91 in existing Caltrans right-of-way. As discussed above, the partial property acquisition adjacent to SR-91 would be used for construction access but not for construction staging. Access would also be required to the SR-91 median at Coal Canyon (only limited daytime access), at Gypsum Canyon, and for scheduled maintenance.

S.5.2 No Build (No Action) Alternative

The No Build Alternative would maintain the current configurations of SR-241 and SR-91 in the Project Area. The SR-91 CIP Initial Phase extended the existing OCTA *91 Express Lanes* east from the Orange/Riverside County line to I-15 in the City of Corona. With completion of the SR-91 CIP Initial Phase on March 20, 2017, SR-91 now has continuous express lanes between SR-55 and I-15. The No Build Alternative would not include a direct connector between the SR-241 and the *91 Express Lanes*; therefore, the gap between SR-241 and the *91 Express Lanes* would not be closed. As a result, motorists traveling north on SR-241 would have to use the general-purpose lane connector to SR-91 and then weave across several lanes to access the eastbound

RCTC SR-91 Express Lanes at the merge area near Green River Road. Similarly, motorists traveling west in the RCTC SR-91 Express Lanes would have to exit at Green River Road, merge across lanes, and use the general-purpose lane connector to southbound SR-241. In addition, under the No Build Alternative, motorists would not be prevented from inappropriately “queue jumping” during congested traffic periods, thereby disrupting traffic flow on the northbound SR-241 connector to the eastbound SR-91 general-purpose lanes during PM peak hours.

Although smaller localized projects could be considered, approved, and implemented on their own merits, no other major corridor improvements would be implemented on the project segments of SR-241 and SR-91 under the No Build Alternative.

Because the No Build Alternative does not include the improvements proposed as part of the Build Alternative, the No Build Alternative provides a benchmark by which the public and decision-makers can compare the magnitude of the effects of the Build Alternative.

S.6 Project Impacts

Table S-1 summarizes the potential impacts of the Proposed Project and the No Build Alternative and identifies avoidance and minimization measures. Where applicable, some of these measures are sometimes also mitigation measures, as discussed in Chapter 4 of this Supplemental EIR/EIS. For detailed information regarding the impacts of each alternative, see Chapters 3 and 4 of this Supplemental EIR/EIS and the associated technical studies.

S.7 Coordination with Public and Other Agencies

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process. It helps planners determine the necessary scope of environmental documentation and level of analysis required, and to identify potential impacts, mitigation measures, and related environmental requirements. Agency consultation and public participation for this project has been accomplished through a variety of formal and informal methods, including Project Development Team meetings, Conceptual Operations Meetings, interagency coordination/consultation meetings, and public announcements placed in local newspapers, the *Federal Register*, at the Orange County Clerk’s office, and in public libraries. Chapter 5 discusses the results of Caltrans’ efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cost	Not applicable	\$120 million	Not applicable
Construction Duration	Not applicable	24 months	Not applicable
Land Use	Land Use Conversion - No impacts Land Use Consistency - Inconsistent with several plans and policies to improve regional mobility. Parks and Recreational Effects and Section 4(f) Use - No impacts	Land Use Conversion - Permanent conversion, through acquisition, of approximately 5 acres of land designated as parkland/reserve to transportation. - No temporary impacts. Land Use Consistency - Consistent with the goals, objectives, and policies of all surrounding communities' General Plans; the 2016 RTP/SCS; 2017 FTIP; the Orange County Central and Coastal NCCP/HCP; the Western Riverside MSHCP; the Orange County MPAH; and the Orange County LRTP. - No temporary impacts. Parks and Recreational Effects and Section 4(f) Use - Noise levels during operation would increase by 3 A-weighted decibels (dBA) or less, which is barely perceptible to the human ear. <i>Gypsum Canyon Nature Preserve</i> - Permanent use: approximately 5 acres (preliminary de minimis finding for the use). - Temporary use: none. - Temporary minimal visual, dust, and noise proximity effects. <i>Weir Canyon Nature Preserve</i> - No temporary or permanent use.	Effects to parks and recreation and Section 4(f) resources will be minimized by implementation of Measures AQ-1 through AQ-5, provided in Section 3.12, Air Quality, and Measures N-1 and N-2, provided in Section 3.13, Noise, as well as Measure LU-1, Uniform Act and Park Preservation Act Compliance, provided in Section 3.1, Land Use.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		- Temporary minimal visual, dust, and noise proximity effects. <i>Chino Hills State Park</i> - No temporary or permanent use. - Temporary minimal visual, dust, and noise proximity effects. <i>Santa Ana River Trail/Bike Lane</i> - No temporary or permanent use. - Temporary minimal visual, dust, and noise proximity effects. <i>Featherly Regional Park</i> - No temporary or permanent use. - Temporary minimal visual, dust, and noise proximity effects. <i>Green River Golf Club</i> - No temporary or permanent use. - Temporary minimal visual, dust, and noise proximity effects. <i>Brush Canyon Park</i> - No temporary or permanent use. <i>Santiago Oaks Regional Park</i> - No temporary or permanent use. <i>Running Springs Elementary School Recreational Facilities</i> - No temporary or permanent use. <i>Other Trails and Fire Roads</i> - No temporary or permanent use. - Temporary minimal visual, dust, and noise proximity effects.	

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Growth	No impacts	No impacts	None
Community Impacts	Community Character and Cohesion - Accessibility to and mobility in the SR-241/SR-91 interchange area would continue to deteriorate. Relocations and Real Property Acquisition - No Impacts Environmental Justice - Similar to the overall communities, environmental justice populations would receive no benefits by the reduction in access and mobility in the Project Area.	Community Character and Cohesion <i>Temporary Impacts</i> - Minimal impacts due to construction noise and dust. - Closure of one lane in each direction on SR-241 and SR-91 at various times to construct the median-to-median connector and install advance signage. - Detours and weekend or nighttime closures at the SR-91/Gypsum Canyon Road interchange ramps to realign the ramps and construct bridge supports for the new connector. - Detours and weekend or nighttime closures at the existing northbound SR-241 to eastbound SR-91 connector to widen SR-91 to the south. - Construction lighting. <i>Permanent Impacts</i> - Long-term visual changes because of permanent alteration of existing visual environment at the junction of SR-241 and SR-91 (retaining walls, piers/ supports, and buffers. - Noise levels would increase by 3 A-weighted decibels (dBA) or less, which is barely perceptible to the human ear. - Improved access and circulation along SR-241 and SR-91 in the Project Area by providing a direct connection between SR-241 and the 91 Express Lanes.	- Measure TR-1 in Section 3.5 (implementation of a TMP) would minimize temporary impacts to community character and cohesion. - Temporary air quality impacts would be minimized based on implementation of Measures AQ-1 through AQ-5, which are provided in Section 3.12, Air Quality. - Temporary noise impacts would be minimized based on implementation of Measure N-1, which is provided in Section 3.13, Noise. Measures V-1 through V-7, found in Section 3.6.5, will be implemented to minimize potential impacts to visual resources. These measures include lighting fixtures, context-sensitive design, architectural treatments, and landscaping. - Operational noise impacts would be minimized based on implementation of Measure N-2, which is provided in Section 3.13, Noise.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		Relocations and Real Property Acquisition <i>Temporary Impacts</i> - No impacts. <i>Permanent Impacts</i> - Partial acquisition of one undeveloped County of Orange-owned property (Assessor's Parcel Number 085-071-56). - No displacement or relocation of any residents or businesses. Environmental Justice <i>Temporary Impacts</i> - With implementation of Measures N-1, AQ-1 through AQ-5, TR-1, and V-1 through V-7, construction of the Build Alternative would not result in adverse impacts that are appreciably more severe or greater in magnitude on environmental justice populations than the adverse effects experienced by non-environmental justice populations. Therefore, the Build Alternative would not cause disproportionately high and adverse temporary effects on minority or low-income populations, as listed above. <i>Permanent Impacts</i> - Similar to the overall communities, environmental justice populations would receive the benefits of an increase in access and mobility in the Project Area. Operation of the Build Alternative would not result in adverse impacts that are appreciably more severe or greater in magnitude on environmental justice populations than the adverse effects experienced by non-environmental justice populations.	- Temporary noise impacts would be minimized based on implementation of Measure N-1, which is provided in Section 3.13, Noise. - Temporary air quality impacts would be minimized based on implementation of Measures AQ-1 through AQ-5, which are provided in Section 3.12, Air Quality. - Measure TR-1 in Section 3.5 (implementation of a TMP) would minimize temporary impacts to community character and cohesion. - Temporary visual impacts to environmental justice communities would be minimized based on implementation of Measures V-1 through V-7.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Utilities and Emergency Services	Utilities - No impacts Emergency Services - Providers would not benefit from improved mobility and reduced traffic congestion.	Utilities <i>Temporary Impacts</i> - Utility disruptions could occur. <i>Permanent Impacts</i> - No impacts to utilities. Emergency Services <i>Temporary Impacts</i> - Delay in response time for emergency services. <i>Permanent Impacts</i> - May improve response times for emergency services using SR-241 and SR-91. - Emergency service providers would be able to use the express lanes connector when the general-purpose lane connector is experiencing heavy traffic volumes and slow travel speeds.	Minimization Measure UES-1: Utilities. During final design, utility protection-in-place plans will be prepared in consultation with the affected utility providers/owners for those utility facilities anticipated to be relocated, removed, and protected in-place. Final design will focus on avoiding utility relocations. If relocation is necessary, final design will focus on relocating utilities within the State right-of-way or within other existing public rights-of-way and/or easements. If relocation outside of existing or the additional public rights-of-way and/or easements required for the Proposed Project is necessary, final design will focus on relocating those facilities in such a manner as to minimize environmental impacts as a result of project construction and ongoing maintenance and repair activities. The utility relocation plans will be included in the project specifications. Prior to and during construction F/ETCA will ensure that the components of any utility relocation plans provided in the project specifications are properly implemented by the construction contractor. Minimization Measure UES-2: Law Enforcement, Fire Protection, and Emergency Medical Service Providers. Prior to and during construction, F/ETCA will require the construction contractor to coordinate all temporary ramp and lane closures and detour plans with law enforcement, fire protection, and emergency medical service providers to minimize temporary delays in emergency response times.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			The plans shall be developed in coordination with the affected agencies and shall include the identification of alternative routes and access to construction areas for emergency vehicles. Minimization Measure UES-3: Law Enforcement, Fire Protection, and Emergency Medical Service Providers. Prior to operation of the connector, an emergency call box shall be placed along the alignment in compliance with OCTA Call Box placement policies. ETC Final EIR and Final EIS Measure U-2. <i>In conjunction with Final Design, the TCA shall explore the joint use of Corridor maintenance roads, if needed, by the County and utility companies. (North and East Legs)</i> ETC Final EIR and Final EIS Measure PS-2. <i>The impact on other law enforcement agencies is considered to be minor. Implementation of several measures by the TCA shall assist law enforcement agencies in fulfilling their responsibilities and in avoiding confusion in providing service to their jurisdictions. These measures are: clear identification of jurisdictional boundaries along the Corridor, clearly signed and well lit intersections, and distance location markers along the Corridor. (North and East Legs)</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Traffic and Transportation	<i>Temporary Impacts</i> - No impacts <i>Permanent Impacts</i> - Overall, increased travel time, reduced speed, increased vehicle hours traveled, and increased queues in the SR-91 corridor study area.	<i>Temporary Impacts</i> - Detours and closures are expected to result in some delays to the traveling public. <i>Permanent Impacts</i> - Vehicle throughput in the SR-91 corridor would improve, vehicles miles traveled would increase, and travel time would decrease. - Traffic would shift from other regional routes (SR-91 between SR-55 and SR-241, SR-55, and surface streets) to SR-241 as a result of the additional capacity of the new connector. - The length of the northbound SR-241 to the eastbound SR-91 queue on the general-purpose ramp would shorten in the PM peak period. - The length of the queues would shorten at the SR-91 westbound mainline bottleneck between the Green River Road interchange and the <i>91 Express Lanes</i> ingress in the AM peak period. - There would be a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to the eastbound SR-91 general-purpose ramp to the RCTC SR-91 Express lanes. - There would be an increase in friction on eastbound SR-91, because more vehicles must exit the <i>91 Express Lanes</i> and enter the general-purpose lanes and fewer cars can leave the general-purpose lanes and enter the RCTC SR-91 Express Lanes due to the increase in traffic volumes on the express lanes connector.	Minimization Measure TR-1: Transportation Management Plan. Ensure that a Transportation Management Plan (TMP) is completed in consultation with the California Department of Transportation (Caltrans) and included in the Plans, Specifications, and Estimates for implementation by the contractor prior to and during construction of any project improvements. The TMP will be consistent with the Caltrans <i>Transportation Management Plan Guidelines</i> (November 2015), which include coordination with affected jurisdictions, transportation agencies, and public outreach. The TMP will be prepared by a qualified traffic engineer and will address traffic impacts from temporary detours and weekend or nighttime closures to reduce traveler delays and enhance traveler safety during project construction. The TMP may include the following elements: - Public awareness campaign - Highway advisory radio - Portable changeable message signs - Temporary loop sensor/signals - Bus or shuttle service - Construction Zone Enhanced Enforcement Program - Incident management - Staging construction - Traffic control plan - Freeway service patrol - Transportation management team (TMT) ETC Final EIR and Final EIS Measure T-13. During final design, the TCA shall establish ETC bridge structure clearances to provide an absolute minimum construction false work vertical clearance of 14.0 feet over existing and planned arterial undercrossing identified in the Orange County Master Plan of Arterial Highways.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure C-15. <i>All traffic control measures shall conform with applicable local and State Regulations.</i>
Visual and Aesthetics	No impacts	<i>Temporary Impacts</i> - Sensitive viewers, including motorists and residents, would be exposed to views of cleared vegetation, graded slopes, construction vehicles, equipment, and other materials. - Periodic nighttime construction, safety/security lighting would be used during some stages of construction. <i>Permanent Impacts</i> - The proposed median-to-median connector would appear similar to the existing general-purpose lane connectors at the SR-241/SR-91 interchange because the new structure would be of similar profile as the existing structures and would be in the Caltrans right-of-way between the existing SR-241/SR-91 northbound-to-southbound connectors. - Motorists traveling on SR-91 would experience views of the express lane bridge connector and retaining walls, but views of open space and other visual resources in the vicinity of the SR-241/SR-91 interchange would not be obstructed. - Residents with high viewer sensitivity with views of the Project Area would experience permanent views of the proposed express lanes connector but the existing views of hillsides, ridgelines, and open space would not be obstructed.	Minimization Measure V-1: Lighting Fixtures. In conjunction with Final Design, proposed lighting fixtures shall be hooded where feasible and lighting shall be directed on the site to minimize potential intrusion of light and glare onto nearby land uses. Lighting shall be designed consistent with the existing lighting along the State Route 241 corridor. Minimization Measure V-2: Hillsides. To avoid visual impacts resulting from cut hillsides and filled topography, hills should be preserved where possible. All disturbed areas associated with cut-and-fill activities should appear similar in color to existing topography. Manufactured fill slopes should not exceed a four-to-one ratio. Manufactured cut slopes should not exceed a two-to-one ratio. Rounding of manufactured slopes should be applied. Minimization Measure V-3: Architectural Treatments. To maintain consistency with the existing infrastructure (i.e., bridges and walls, etc.) in the Project Area, landscape and/or architectural treatments (i.e., color, texture, etc.) for the structure elements of the Proposed Project shall be determined in consultation with the District Landscape Architect during the Final Design process. Minimization Measure V-4: Landscaping. To maintain the context of the Project Area (color, form, and texture) the Proposed Project shall install landscaping that is compatible with the existing landscape along the freeway. The landscape concept and plant palette shall be determined in consultation with the District

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		Grading for the Proposed Project features would remove vegetation and modify slopes.	Landscape Architect during the Final Design process. Erosion control plant species utilized shall be determined by the District Landscape Architect to ensure that the mix and application strategy is appropriate for the specific soil composition of the area. Drought-tolerant native species shall be used adjacent to areas of native habitat. Enhanced plantings shall occur adjacent to wildlife crossings. Minimization Measure V-5: Construction Lighting. For all nighttime construction activities, necessary lighting for safety and construction purposes shall be contained and directed toward the specific area of construction. Measure V-6: Context-Sensitive Solutions. Context-sensitive solutions will be used. Slopes graded for the Build Alternative will be contoured consistent with the existing topography, and all disturbed soil areas will be seeded with drought-tolerant native plant species consistent with existing vegetation. Measure V-7: Tree Planting. Permanently impacted Coast live oak, California walnut, and sycamore trees will be replaced at a minimum 2:1 ratio. Heritage oaks (oaks greater than 36 inches in diameter at breast height) will be replaced at a minimum 3:1 ratio. ETC Final EIR and Final EIS Measure C-19. <i>Where appropriate and feasible, construction staging areas shall be located inconspicuously to minimize adverse visual effects on residential and recreation areas. They shall be located to avoid any additional impacts on biological, historical or cultural resources. (Construction Staging, North and East Legs)</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cultural Resources	No impacts	<i>Temporary Impacts</i> - Not applicable. <i>Permanent Impacts</i> - No impacts to known archaeological or historic resources. - Potential for impacts to previously unknown buried cultural materials or human remains.	Avoidance and Minimization Measure CR-1: Cultural Materials. If cultural materials are discovered during construction, all earthmoving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find. At that time, the Caltrans District 12 Environmental Branch Chief will be contacted to ensure that Section 106 compliance is maintained. Section 106 compliance could include: excavation in accordance with a data recovery plan and standard archaeological field methods and procedures; laboratory and technical analyses; report of findings; curation at an appropriate facility for future research and/or display; an interpretive display at a local school, museum, or library; and public lectures at local schools and/or historical societies on the findings and significance of the site and recovered archaeological materials. Avoidance and Minimization Measure CR-2: Human Remains. If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities will cease in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. Pursuant to Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the Coroner will notify the Native American Heritage Commission (NAHC), who will designate the Most Likely Descendent (MLD). At this time, the Caltrans District 12 Environmental Branch Chief will be contacted so that they may work with the MLD on the respectful treatment and disposition of the remains. The MLD recommendations may include scientific removal and nondestructive analysis, preservation in place, relinquishment to the descendants for treatment, or any other culturally appropriate

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			treatment. Further provisions of PRC 5097.98 are to be followed as applicable.
Water Quality and Storm Water Runoff	No impacts	<i>Temporary Impacts</i> - Potential for soil erosion, sediment transport, release of hazardous materials, increased pollutants in runoff, groundwater dewatering. <i>Permanent Impacts</i> - Increase in impervious area by approximately 20.5 acres. - Potential increased pollutants in runoff due to increased impervious area and volume of runoff. - Proposed treatment BMPs would reduce pollutants.	Minimization Measure WQ-1: Construction General Permit. The Proposed Project will comply with the requirements prescribed in the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) Order No. 2009-009-DWQ, as amended, or any future replacement permit. The Proposed Project shall comply with the Construction General Permit by preparing and implementing a Storm Water Pollution Prevention Plan (SWPPP) to address all construction-related activities, equipment, and materials that have the potential to impact water quality for the appropriate Risk Level. The SWPPP will identify the sources of pollutants that may affect the quality of storm water and include Best Management Practices (BMPs) to control the pollutants, such as Sediment Control, Catch Basin Inlet Protection, Construction Materials Management and Nonstorm Water BMPs. All work shall conform to the Construction Site BMP requirements specified in the latest edition of the Caltrans <i>Storm Water Quality Handbooks: Construction Site Best Management Practices Manual</i> to control and minimize the impacts of construction and construction-related activities, materials, and pollutants on the watershed. These include, but are not limited to, temporary sediment control, temporary soil stabilization, waste management and materials pollution control, wind erosion control, and other nonstorm water BMPs. Minimization Measure WQ-2: Caltrans Permit. The Proposed Project will comply with the provisions of the National Pollutant Discharge Elimination System

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			(NPDES) Statewide Storm Water Permit, <i>Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation</i>, Order No. 2012-0011-DWQ, NPDES No. CAS000003 (Caltrans Permit), as amended, or any future replacement permit. Minimization Measure WQ-3: Design Pollution Prevention Best Management Practices. Caltrans-approved Design Pollution Prevention BMPs will be implemented to the maximum extent practicable (MEP) consistent with the requirements of the <i>Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation</i>, Order No. 2012-0011-DWQ, NPDES No. CAS000003 (Caltrans Permit) and the Caltrans Project Planning and Design Guide. Design Pollution Prevention BMPs include preservation of existing vegetation, slope/surface protection systems (erosion control/reseeding and replanting of vegetation) dikes, overside drains, and concentrated flow conveyance systems such as ditches, berms, and biofiltration swales and strips. Minimization Measure WQ-4: Treatment Best Management Practices. Caltrans-approved Treatment BMPs will be implemented to the MEP consistent with the requirements of the Caltrans Permit, which is described in Measure WQ-2 and the Project Planning and Design Guide. Treatment BMPs may include biofiltration swales, biofiltration strips, and media filters. Minimization Measure WQ-5: Groundwater Dewatering. If groundwater dewatering is required, the Proposed Project will comply with the provisions of General Waste Discharge Requirements for Discharges to Surface Waters that Pose an

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Insignificant (De Minimus) Threat to Water Quality, Order No. R8-2015-0004, NPDES No. CAG998001, as they relate to discharge of non-storm water dewatering wastes for the Proposed Project. ETC Final EIR and Final EIS Measure W-12. <i>In conjunction with final design, entry into drainages shall be avoided during site preparation, grading and construction, except where required for construction. Activity in drainages shall be limited to crossings rather than using the lengths of drainage courses for access or for parking automobiles, trucks, and construction equipment. In addition, these areas will be marked for "limited access" on construction plans.</i> ETC Final EIR and Final EIS Measure W-14. <i>During site preparation, grading, and construction, vehicles and equipment shall not be parked in washes or other drainages.</i> ETC Final EIR and Final EIS Measure W-15. <i>During site preparation, grading and construction, overwatering shall be avoided in washes and other drainages.</i> ETC Final EIR and Final EIS Measure WQ-2. <i>The TCA will ensure that all herbicides used in landscaping and weed control are handled, stored, applied, and disposed of consistent with all applicable federal, state, and local regulations.</i> ETC Final EIR and Final EIS Measure WQ-3. <i>Whenever feasible, construction vehicles will be rinsed before leaving the construction area to remove mud and other materials before the vehicles leave the site.</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure E-1. <i>In conjunction with final design, the TCA shall map native vegetation outside the right-of-way on grading and construction plans to indicate vegetation to protect from use as vehicle travel or parking areas, storage of equipment and storage of debris or building materials.</i> ETC Final EIR and Final EIS Measure E-3. <i>During final design, the TCA shall ensure that all proposed grading shall conform to the Caltrans Highway Design Manual and the TCA Project Manual Guidelines. All applicable policies and guidelines shall be listed in the grading plans.</i> ETC Final EIR and Final EIS Measure E-6. <i>In conjunction with final design, the TCA shall ensure that cut and fill slopes shall not be steeper than 2:1. Where steeper slopes are indicated, TCA shall, in conjunction with final design, prepare geologic and engineering analyses. These analyses shall determine the safety of those slopes and proposed erosion control measures consistent with Caltrans design standards.</i> ETC Final EIR and Final EIS Measure E-9. <i>As part of final design, TCA shall ensure that all slopes shall conform to slope criteria developed by TCA and Caltrans. All slope criteria shall be noted on final plans.</i> ETC Final EIR and Final EIS Measure E-10. <i>Fills shall not encroach on natural watercourses or improved channels except as shown on the approved project plans.</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			ETC Final EIR and Final EIS Measure E-11. <i>Fills placed against watercourses shall have suitable protection against erosion during storm flows, such as riprap, protective walls, and culverts.</i> ETC Final EIR and Final EIS Measure E-12. <i>During site preparation, grading, and construction, the TCA shall ensure that excavated materials shall not be deposited or stored in or alongside watercourses where the materials can be washed away by high water or storm runoff.</i> ETC Final EIR and Final EIS Measure E-13. <i>During site preparation and grading, the TCA shall ensure that all land shall be graded to drain and dispose of surface water without ponding, except where approved by Caltrans or the affected responsible public agency.</i>
Geology, Soils, Seismic, and Topography	No impacts	<i>Temporary Impacts</i> • Ground motion from seismic activities, liquefaction, and landslides. • Potential for unstable slopes and erosion. <i>Permanent Impacts</i> • Potential for seismic impacts to structures. • Potential for unstable slopes and erosion. • Potential for liquefaction. • Minor changes to topography.	Minimization Measure GEO-1: Final Geotechnical Report. During Final Design, a qualified geotechnical engineer will conduct a comprehensive geologic and geotechnical investigation and prepare a design-level geotechnical report. This report will document geology-related constraints and hazards such as fault-induced ground rupture, slope instability, settlement, liquefaction, or related secondary seismic impacts that may be present along the alignment of the Build Alternative. The performance standard for this report will be the California Department of Transportation's (Caltrans) Geotechnical Manual (2012 or most recent version) standards as they apply to the project features and structures. The measures recommended in the design-level geotechnical report will be incorporated into the Final Design and project specifications. The construction contractor will implement the measures recommended in the design-level geotechnical reports as included in the project

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			design and specifications. Minimization Measure GEO-2: Quality Assurance/Quality Control Plan. During Final Design, a quality assurance/quality control (QA/QC) plan will be prepared and implemented during construction. The QA/QC plan will include observing, monitoring, and testing by the Project Geotechnical Engineer and/or the Project Geologist prior to and during construction to confirm that the geotechnical/geologic recommendations from the design-level geotechnical report and standard design and construction practices are fulfilled by the contractor, or if different site conditions are encountered, appropriate changes are made to accommodate such issues. Weekly reports will be prepared during all project-related grading, excavation, and construction activities.
Paleontology	No impacts	<i>Temporary Impacts</i> - Not applicable. <i>Permanent Impacts</i> - Potential to impact scientifically valuable fossils and fossil-bearing formations.¹	Mitigation Measure PAL-1: Paleontological Mitigation Plan. During Final Design, a Paleontological Mitigation Plan (PMP) will be prepared and adhered to during construction. The PMP will follow the guidelines of the Society of Vertebrate Paleontologists (SVP) and Caltrans. The PMP requires inclusion of, but is not limited to, the following items a through h: - Attendance at the pregrade meeting by a qualified paleontologist or representative; - Preconstruction field survey by the paleontological mitigation team; - Monitoring during construction excavation by the paleontological mitigation team;

¹ This impact is less than significant with mitigation under CEQA.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			d. Collection of representative samples from geologic formations; e. Sieving of bulk samples for microfossil recovery; f. Preparation of specimens to the point of identification and permanent preservation; g. Curation of fossils into a repository with permanent retrievable storage that meets Caltrans' requirements; and h. Preparation of a Paleontological Mitigation Report documenting the implementation of the Paleontological Mitigation Plan.
Hazardous Wastes and Materials	No impacts	<i>Temporary Impacts</i> - Potential to encounter aerially deposited lead (unpaved areas adjacent to SR-91), asbestos-containing materials (Gypsum Canyon bridge structure 55-0506), chemically treated wood waste (guardrails, and landscape timber, etc.), and lead-based paint in traffic striping (SR-241 and SR-91). - Potential to rupture an unused petroleum pipeline with an unspecified location that may contain residual material that would need disposal. - Due to historical uses in the area, there is a potential to encounter unrecorded hazardous waste during construction. <i>Permanent Impacts</i> - No impacts other than routine use of hazardous materials associated with maintenance of a transportation facility.	Minimization Measure HAZ-1: Aerially Deposited Lead. Consistent with Minimization Measure MW-3 of the State Route 91 Corridor Improvement Project Final Environmental Impact Report/Environmental Impact Statement (SR-91 CIP 2012 Final EIR/EIS), dated August 2012, the Project Engineer will ensure that a qualified consultant conducts a new soil Aerially Deposited Lead (ADL) evaluation and/or investigation for this project at the Design Phase. The previous ADL test results may be used if applicable along with any new ADL test results. The new soil ADL evaluation and/or investigation will be consistent with the new DTSC Lead Agreement contaminant concentration limits. In addition, new DTSC Lead Agreement soil reuse requirements and restrictions will apply. A Lead Compliance Plan will be prepared to address workers' health and safety. Minimization Measure HAZ-2: Asbestos-Containing Materials. During the design phase, a certified specialist will confirm the presence or absence of asbestos in the Gypsum Canyon Road Undercrossing, if demolition/renovation of the bridge structure will occur as part of the Proposed Project. If

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			asbestos is present, the certified asbestos abatement specialist should monitor the disposal of the asbestos-containing materials as they are uncovered. The construction contractor will comply with the Caltrans Standard Specifications Section 14-9.02 pertaining to air pollution control compliance with rules, regulations, ordinances, and statutes during renovation and demolition activities.
			Minimization Measure HAZ-3: Treated Wood Waste. During construction, the construction contractor will comply with Caltrans Standard Specifications Section 14-10 pertaining to the handling and disposal of treated wood waste. Minimization Measure HAZ-4: Traffic Striping. During construction, the construction contractor will comply with Caltrans Standard Specifications Section 14-11 pertaining to the testing, removal, and disposal of any traffic striping and pavement-marking materials. Minimization Measure HAZ-5: Petroleum Pipeline. During construction, the construction contractor will comply with Caltrans Standard Specifications pertaining to excavation. The contractor shall notify the regional notification center, ensuring that all utility owners within the project disturbance limits identify the locations of underground transmission lines and facilities (including underground petroleum pipelines). Minimization Measure HAZ-6: Construction Contingency Plan. Prior to the start of construction, the construction contractor will prepare a Construction Contingency Plan (CCP) in accordance with Caltrans Unknown Hazards Procedures for Construction, in the Caltrans Construction Manual. The CCP will include

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			provisions for emergency response in the event that unidentified hazardous materials, petroleum hydrocarbons, or hazardous or solid wastes are discovered during construction activities. The CCP will address field screening, contaminant materials testing methods, mitigation and contaminate management requirements, and health and safety requirements for construction workers. The construction contractor will implement the CCP during all construction activities. During construction, the Resident Engineer will require the construction contractor to cease work immediately if an unexpected release of hazardous substances is found in reportable quantities. If an unexpected release of hazardous substances is found in reportable quantities, the Resident Engineer will require the construction contractor to notify the National Response Center by calling 1-800-424-8802. The construction contractor will perform clean up of unexpected releases under the appropriate federal, State, and local agency oversight. ETC Final EIR and Final EIS Measure HW-2. <i>Hazardous substances are strictly regulated by the Environmental Protection Agency (U.S. EPA), the California and National Occupational Safety and Health Administration (OSHA) and the United States Department of Transportation (DOT). The DOT specifies the procedures for safely transporting hazardous materials, as well as the procedures to follow in case of accidental spills during transport, in the 49 Code of Federal Regulations (CFR) series of regulations (parts 100 through 177). U.S. EPA specifies the requirements for proper labeling and placarding of hazardous substances. The American National Standards Institute recommends safety procedures for handling and storing hazardous</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>materials, and OSHA specifies the procedures required for using and storing hazardous materials. These procedures shall be followed during all ETC site preparation, grading, construction, operations, and maintenance.</i>
Air Quality	May have an incremental detrimental effect due to no reduction of congestion on roadway links in the Proposed Project vicinity.	<i>Temporary Impacts</i> - Short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other construction activities. <i>Permanent Impacts</i> - No new regional vehicular emission impacts. - May have a beneficial effect in helping to reduce congestion on roads in the Proposed Project vicinity.	Minimization Measure AQ-1: Fugitive Dust Source Controls. During clearing, grading, earthmoving, and excavation operations, excessive fugitive dust emissions will be controlled by regular watering or other dust preventive measures using the following procedures, as specified in the South Coast Air Quality Management District (SCAQMD) Rule 403. - All material excavated or graded will be sufficiently watered to prevent excessive amounts of dust. - Watering will occur at least twice daily with complete coverage, preferably in the late morning and after work is done for the day. - All material transported on site or off site will be either sufficiently watered or securely covered to prevent excessive amounts of dust. The area disturbed by clearing, grading, earthmoving, or excavation operations will be minimized so as to prevent excessive amounts of dust. - These control techniques will be indicated in project specifications. Visible dust beyond the property line emanating from the Proposed Project will be prevented to the maximum extent feasible. Minimization Measure AQ-2: Ozone Precursor Emission Controls. Project grading plans will show the duration of construction. Ozone precursor emissions from construction equipment vehicles will

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			be controlled by maintaining equipment engines in good condition and in proper tune per manufacturers' specifications. Minimization Measure AQ-3: Prevention of Spills onto Public Streets. All trucks hauling excavated or graded material on site will comply with State Vehicle Code Section 23114, with special attention to Sections 23114(b)(F), (e)(2), and (e)(4), as amended, regarding the prevention of such material spilling onto public streets and roads. Minimization Measure AQ-4: Caltrans Standard Specifications for Construction. The contractor will adhere to Caltrans Standard Specifications for Construction (Sections 14.9 02 and 14.9.03). Minimization Measure AQ-5: Construction Vehicles Prohibition. All construction vehicles both on- and off-site shall be prohibited from idling in excess of 5 minutes.
Noise	No impacts	<i>Temporary Impacts</i> - Noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. However, construction noise would be short-term, intermittent, and overshadowed by local traffic noise. <i>Permanent Impacts</i> - Noise levels would increase by 3 dBA or less, which is barely perceptible to the human ear.	Minimization Measure N-1: Control of Construction Noise Levels. The control of noise from construction activities will conform to the California Department of Transportation (Caltrans) Standard Specifications, Section 14-8.02, "Noise Control." The nighttime noise level from the contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., will not exceed 86 A-weighted decibels (dBA) one-hour A weighted equivalent continuous sound level ($L_{eq}(h)$) at a distance of 50 feet. Measure N-2: Deck Specifications. To ensure that noise impacts are minimized, the deck texture on the direct connector ramps will be constructed using the new quieter longitudinally-tined Groove and Grind

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			deck specifications, instead of a transversely-tined texture.
Energy	- Temporary indirect impacts from the manufacture of vehicles that operate on SR-241 and SR-91. - Increase in VHT in 2017 and 2040, which will increase energy consumption when compared to the Build Alternative.	<i>Temporary Impacts</i> - Indirect energy impacts from the manufacture of vehicles that would operate on the project facilities and be used for project construction. However, the Proposed Project would not, on its own, increase the manufacture of vehicles; therefore, the per-vehicle indirect energy impacts for the baseline (No Build), the Build Alternative, and the existing condition would all be the same. - Energy costs associated with construction of roads and structures. <i>Permanent Impacts</i> - Total net change in VHT in 2017 would decrease by 726 VHT, indicating a slight increase in efficiency compared to the No Build Alternative. Therefore, vehicle fuel/energy consumption would be reduced. - A 0.3 percent reduction in direct energy use annually in 2040 due to reduction in VMT. - A 1.5 percent increase in maintenance-related permanent indirect energy consumption in 2040 due to increase in VMT.	None

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Natural Communities	No impacts	<i>Temporary Impacts</i> - Impacts to 31.26 acres of coastal sage scrub within the NCCP/HCP Plan Area. - Impacts to 0.02 acre of coastal sage scrub outside the NCCP/HCP Plan Area. - Impacts to 8 coast live oak and 15 sycamore trees. - Impacts to Windy Ridge Wildlife Undercrossing. <i>Permanent Impacts</i> - Impacts to 13.66 acres of coastal sage scrub within the NCCP/HCP Plan Area. - Impacts to 6 coast live oak trees.	Minimization Measure NC-1: Coastal California Gnatcatcher Environmentally Sensitive Areas. Prior to the commencement of grading operations or other activities involving substantial soil disturbance, all areas of CSS habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of CSS, a survey will be conducted to locate CAGN and cactus wrens within 100 ft of the outer extent of projected soil disturbance activities. The locations of any such species shall be clearly marked and identified on the construction/grading plans. Minimization Measure NC-2: Nesting Coastal California Gnatcatchers. During clearing or construction, to the maximum extent practicable, no grading of CSS habitat that is occupied by nesting CAGN will occur during the breeding season (February 15 through July 15). It is expressly understood that this provision and the remaining provisions of these “construction-related minimization measures” are subject to public health and safety considerations. These considerations include unexpected slope stabilization, erosion control measures, and emergency facility repairs. In the event of such public health and safety circumstances, landowners or public agencies/utilities will provide USFWS/CDFW with the maximum practicable notice (or such notice as is specified in the NCCP/HCP) to allow for capture of CAGN, cactus wrens (<i>Campylorhynchus brunneicapillus</i>), and any other CSS Identified Species that are not otherwise flushed and will carry out the following measures only to the extent practicable in the context of the public health

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			and safety considerations. (Note: While this text is taken directly from NCCP/HCP Construction Minimization Measures, to preserve their integrity, the capture and relocation of birds is not encouraged or authorized by the USFWS.) The breeding season is now considered to be from February 15 through August 31; therefore, these dates are applicable to this measure. Minimization Measure NC-3: Biological Monitor. A monitoring biologist acceptable to USFWS/CDFW will be on site during any clearing of CSS. The landowner or relevant public agency/utility will advise USFWS/CDFW at least 7 calendar days (preferably 14 calendar days) prior to the clearing of any habitat occupied by Identified Species to allow USFWS/CDFW to work with the monitoring biologist in connection with bird flushing/capture activities. The monitoring biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP Reserve System. (Note: While this text is taken directly from NCCP/HCP Construction Minimization Measures, to preserve their integrity, the capture and relocation of birds is not encouraged or authorized by the USFWS.) It will be the responsibility of the monitoring biologist to ensure that Identified Species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis. Minimization Measure NC-4: Coastal Sage Scrub Environmentally Sensitive Area. Following the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			completion of initial grading/earth movement activities, all areas of CSS habitat to be avoided by construction equipment and personnel will be marked with temporary fencing or other appropriate markers clearly visible to construction personnel. No construction access, parking, or storage of equipment or materials will be permitted within such marked areas. Minimization Measure NC-5: Coastal Sage Scrub Access Restrictions. In areas bordering the NCCP/HCP Reserve System or Special Linkage/ Special Management areas containing substantial CSS identified in the NCCP/HCP for protection, vehicle transportation routes between cut-and-fill locations will be restricted to a minimum number during construction consistent with project construction requirements. Waste dirt or rubble will not be deposited on adjacent CSS identified in the NCCP/HCP for protection. Preconstruction meetings involving the monitoring biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures. Minimization Measure NC-6: Coastal Sage Scrub Dust Control. CSS identified in the NCCP/HCP for protection and located within the likely dust drift radius of construction areas shall be periodically sprayed with water to reduce accumulated dust on the leaves as recommended by the monitoring biologist. Minimization Measure NC-7: Coast Live Oak Tree Environmentally Sensitive Areas. Prior to clearing or construction, highly visible barriers and, as needed, silt fencing will be installed around the protected zone of any oak tree or oak habitat. Such areas will be

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			designated on the project specifications as Environmentally Sensitive Areas (ESAs) to be preserved. The ESAs will extend 5 ft outside the dripline or 15 ft from the trunk of each tree, whichever is greater, unless the area includes a road shoulder or existing asphalt. In those instances, safety requires the road shoulder or existing asphalt not be included in the ESA and the boundary of the ESA will be modified accordingly. These modified ESAs are included because impacts to oaks may occur within these road shoulder and asphalt areas if roots become exposed, soil surrounding roots is excessively compacted, material is deposited over roots, or branches or roots are broken or damaged. In addition, to avoid breaking overhanging branches, branch trimming may be required. Proper tree pruning procedures will be followed. No grading or fill activity of any type will be permitted within the ESAs for trees that are expected to be preserved. In addition, heavy equipment, including motor vehicles, will not be allowed to operate in the ESAs. All construction equipment will be operated in such a manner as to prevent accidental damage to nearby oaks. No structure of any kind, or incidental storage of equipment or supplies, will be allowed in the ESAs. Silt fence barriers will be installed at the ESA boundaries to prevent accidental deposition of fill material in areas where trees are immediately adjacent to planned construction activities. Minimization Measure NC-8: Coast Live Oak Tree Replacement. During Final Design, the TCA will develop a revegetation program to help compensate for lost oak trees with spacing criteria to be determined by the Project Biologist. Senate

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Concurrent Resolution No. 17 (filed with the Secretary of State on September 1, 1989) requests all State agencies to preserve and protect native oak woodlands to the maximum extent feasible or to provide for replacement plantings. Impacts to any oak trees (excluding California scrub oaks) with trunk sizes greater than 8 inches diameter at breast height (dbh), but less than 36 inches dbh, will be replaced at a minimum mitigation-to-impact ratio of 1:1. Heritage oaks (oaks greater than 36 inches dbh) will be replaced at a minimum mitigation-to-impact ratio of 3:1. Replacement resources will include a combination of plantings such as acorns, 5-gallon, and 15-gallon trees and/or transplantation where feasible. Replacement plantings may take place in TCA or Caltrans right-of-way or suitable areas in proximity to the project limits. Minimization Measure NC-9: Existing Wildlife Fencing. If necessary for construction access, the existing wildlife fencing will be removed only after installation of temporary fencing to protect against wildlife-vehicle incidents during construction. Temporary fencing will be the same or greater height than the existing wildlife fencing and must be maintained and functional throughout project construction. After construction, any temporary fencing will be replaced with new permanent fencing consistent with the existing wildlife fencing. Minimization Measure NC-10: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Revegetation. Following the completion of the project construction, all disturbed habitat adjacent to Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be restored with native vegetation consistent with the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			1994 Biological Opinion and the 2019 Biological Opinion, as applicable. Minimization Measure NC-11: Construction Lighting and Staging. Construction equipment maintenance, lighting, and staging must be in designated areas, away from Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing. Minimization Measure NC-12: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Avoidance. During construction, Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be avoided as much as is feasible. Activity that must take place at the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be done as quickly as possible and only during daylight hours. Noise levels generated from construction activities at Coal Canyon Undercrossing shall not exceed 5 A-weighted decibels (dBA) above the ambient noise level within 100 ft from the edge of roadway. Minimization Measure NC-13: Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing Access. Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be kept clear of all equipment or structures that could potentially serve as barriers to wildlife passage. Minimization Measure NC-14: Windy Ridge Wildlife Undercrossing Construction Staging. Within Windy Ridge Wildlife Undercrossing, structures required for bridgework will be erected as to not block the main underpass. Scaffolding and false work will be restricted to the sides of the underpass to maintain the functionality of the crossing for wildlife movement.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Minimization Measure NC-15: Western Riverside County Multiple Species Habitat Conservation Plan Construction Guidelines. Construction activities in the SR-91 Advanced Signage Area in Riverside County will comply with the objectives, policies, procedures, and guidelines from Section 7.5.3, Construction Guidelines, as well as BMPs outlined in Appendix C (WR-MSHCP Volume 1) of the Western Riverside County Multiple Species Habitat Conservation Plan (WR-MSHCP). The applicable guidelines from Section 7.5.3: Construction Guidelines are: - When work is conducted during the fire season (as identified by the Riverside County Fire Department) adjacent to coastal sage scrub or chaparral vegetation, appropriate fire-fighting equipment (e.g., extinguishers, shovels, and water tankers) shall be available on the site during all phases of project construction to help minimize the chance of human-caused wildfires. Shields, protective mats, and/or additional fire preventative methods shall be used during grinding, welding, and other spark-inducing activities. Personnel trained in fire hazards, preventative actions, and responses to fires shall advise contractors regarding fire risk from all construction-related activities. - Waste, dirt, rubble, or trash shall not be deposited in the Conservation Area or on native habitat. The applicable practices from the 15 practices listed in Appendix C: Standard Best Management Practices are:

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			- The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible. - To avoid attracting predators of the species of concern, the project site shall be kept clean of debris. All food-related trash items shall be enclosed in sealed containers and regularly removed from the project site. - Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project construction activities and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas. - The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions including these BMPs. Avoidance and Minimization Measure NC-16: Sensitive Species and Habitats. In conjunction with the final design and prior to site preparation, all sensitive species and special habitats within 300 feet of the Project Area shall be mapped on the grading plans by a qualified biologist. Sensitive and candidate species and special habitats shall be defined as:

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			• Coastal California gnatcatcher • Cactus wren • Designated critical habitat for Coastal California gnatcatcher • Thread-leaved brodiaea • Designated critical habitat for Branton's milk-vetch • Least Bell's vireo • Southwestern willow flycatcher • Drainages and streambeds • Coastal sage scrub • Coast Live Oak Woodland Avoidance and Minimization Measure NC-17: Cactus. Prior to clearing and grubbing and construction, cactus will be saved where feasible, for use in revegetation efforts. ETC Final EIR and Final EIS Measure B-2. <i>Prior to grading and site preparation, all native oak, sycamore, and willow trees of 4 inches in diameter at breast height (DBH-4.5 ft from mean ground level) within the Project limits and within 20 ft of grading and construction operations shall be tagged and numbered with permanent tags. The tag numbers of the trees to be protected and those to be removed shall be noted. Records of these numbers shall be kept by TCA, the Resource Management Coordinator/Monitor and the Orange County Environmental Management Agency/Environmental Planning Division for use in mitigation/replacement and monitoring of tree resources before, during and after grading and construction activities.</i> ETC Final EIR and Final EIS Measure B-3. <i>Prior to grading and site preparation, all trees subject to</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>removal shall be marked with a red "X" on the trunk. Trees to be preserved shall be marked with yellow flagging visible from all direction.</i> ETC Final EIR and Final EIS Measure B-4. <i>In conjunction with grading, site preparation and construction, short term soil stabilization using accepted soil protection techniques and native species shall be conducted under the direction of a qualified biologist, where determined to be appropriate to protect sage scrub communities.</i> ETC Final EIR and Final EIS. Measure B-8. <i>For the period covering all site preparation, grading and construction, a resource management coordinator shall monitor wildlife [and plant] habitat preservation to ensure that the ESAs and areas outside the Caltrans right-of-way are not adversely impacted. The monitor shall be on site before, during, and after the completion of site preparation, grading and construction.</i> ETC Final EIR and Final EIS Measure B-11. <i>Prior to site preparation, grading and construction, the TCA shall implement procedures for protecting sensitive and candidate species and special habitats [particularly Braunton's milk-vetch critical habitat] identified and mapped on grading plans during site preparation, grading, construction and maintenance activities by following Caltrans Environmentally Sensitive Area procedures</i> ETC Final EIR and Final EIS Measure B-25. <i>During site preparation and grading, the TCA shall phase operations around important habitat areas to allow for completion of nesting and breeding activities for the</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>coastal California gnatcatcher and raptor species occurring in oak woodland. This measure will be conducted and overseen by a qualified biologist.</i>
Wetlands and Other Waters	No impacts	<i>Temporary Impacts</i> - Impacts to less than 0.53 acre of non-wetland USACE waters inside Caltrans right-of-way and less than 0.01 acres outside Caltrans right-of-way. - Potential for indirect impacts to functions and values of on-site drainages and downstream areas. - Impacts to approximately 1.01 acres of CDFW jurisdictional areas inside Caltrans right-of-way and approximately 0.03 acre outside Caltrans right-of-way. - Impacts to less than 0.53 acre of RWQCB jurisdictional areas inside Caltrans right-of-way and less than 0.01 acre outside Caltrans right-of-way. <i>Permanent Impacts</i> - Impacts to approximately 0.45 acre of USACE jurisdictional non-wetland waters inside Caltrans right-of-way and approximately 0.02 acre outside Caltrans right-of-way. - Impacts to approximately 0.66 acre of CDFW jurisdictional areas inside Caltrans right-of-way and approximately 0.20 acre outside Caltrans right-of-way. - Impacts to approximately 0.45 acre of RWQCB jurisdictional areas inside Caltrans right-of-way and approximately 0.02 acre outside Caltrans right-of-way.	Minimization Measure WET-1: Nationwide Permit. Prior to initiation of construction, a permit will be obtained through the United States Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act. As part of coordination with the USACE, a Nationwide Permit will be pursued, if appropriate. Minimization Measure WET-2: Streambed Alteration Agreement. Prior to initiation of construction, a Streambed Alteration Agreement (SAA) with the California Department of Fish and Wildlife will be obtained and any specifications in the SAA will be implemented. Minimization Measure WET-3: Water Quality Certification. Prior to initiation of construction, a Section 401 Water Quality Certification from the Santa Ana Regional Water Quality Control Board will be obtained and any specifications in the Certification will be implemented. ETC Final EIR and Final EIS Measure B-13. <i>In conjunction with final design, the TCA shall, to the extent feasible, construct stream bank reinforcements of ungrouted riprap gabions or other appropriate material at the shallowest possible slope (2:1 or less), allowing for the replacement of soil and the subsequent revegetation of these areas with riparian plant species.</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Plant Species	No impacts	<i>Temporary Impacts</i> - Potential indirect impacts to California black walnut trees near the Gypsum Canyon off-ramp due to the potential for fuel spills from construction equipment and activities of construction equipment or personnel outside designated construction areas and ESAs in the vicinity of the trees. - Potential direct impacts to Coulter's Matilija poppy and potential temporary indirect impacts due to the potential for fuel spills from construction equipment and activities of construction equipment or personnel outside designated construction areas and ESAs. <i>Permanent Impacts</i> - Potential direct impacts to 3 California black walnut saplings. - Coulter's Matilija poppies in the slope area south of SR-91 would be removed.	Minimization Measure PS-1: California Black Walnut Environmentally Sensitive Areas. Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any southern California black walnut tree and designated as an Environmentally Sensitive Area (ESA) to be preserved for those trees not within the footprint of project structures or areas of ground disturbance. The protected zone will extend 5 feet (ft) outside of the drip line or 15 ft from the trunk of the tree, whichever is greater. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby California black walnut trees. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where trees are immediately adjacent to planned grading activities. Minimization Measure PS-2: California Black Walnut Sapling Relocations. The California black walnut saplings in the median of the SR-241/SR-91 interchange will be assessed at the time of construction and relocated within Caltrans right-of-way, if feasible. If not feasible, replacement planting of the California black walnut saplings will be done at a minimum 2:1 ratio. Minimization Measure PS-3: Coulter's Matilija Poppies Environmentally Sensitive Areas. Prior to clearing or construction, highly visible barriers (such as orange construction fencing)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			will be installed around the protected zone of any Coulter's Matilija poppies and designated as an ESA to be preserved to the extent feasible. The protected zone will extend 5 ft outside of the vegetation edge. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby Coulter's Matilija poppies. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where Coulter's Matilija poppies are adjacent to planned grading activities.
Animal Species	No impacts	<i>Temporary Impacts</i> • May redirect foraging golden eagles away from the borders of the BSA during construction. • Potential indirect impacts to species that occupy the coastal sage scrub and chaparral natural communities through the disturbance of potentially suitable habitat. • Impacts to special-status bat species including noise, dust, night lighting, and human encroachment, and reduced access to roost sites in the crevices of bridges and overhead structures. • Potential indirect impacts to grassland and open space species through the disturbance of approximately 14.1 acres of potential habitat. • Direct impacts to nesting birds through vegetation clearing, grading, and tree removal.	Minimization Measure AS-1: Nesting Birds. Prior to clearing or construction, to avoid impacts to nesting birds, any native vegetation removal or tree- (native or exotic) trimming activities will occur outside of the bird nesting season (February 15 through August 31). In the event that vegetation clearing is necessary during the nesting season or if construction activities or access have the potential to impact nesting birds, a qualified biologist will conduct a preconstruction survey to identify the locations of nests. Should nesting birds be found, an exclusionary buffer will be established by the qualified biologist. This buffer will be clearly marked in the field by construction personnel under guidance of the qualified biologist, and construction or clearing will not be conducted within this zone until the qualified biologist determines that the young have fledged or the nest is no longer active. Construction of the Coal Canyon Undercrossing access ramp and widening of Windy Ridge Wildlife

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		- Potential indirect impacts to nesting birds due to disturbances near trees occupied by nesting birds if tree-trimming activities were to occur during the nesting season. <i>Permanent Impacts</i> - Indirect impacts to species that occupy coastal sage scrub and chaparral through the removal of potential suitable habitat. - Indirect impacts to special-status grassland animal species through potential habitat loss. - Potential indirect impacts to nesting birds due to loss of foraging and nesting habitat as a result of loss of vegetation or changes in habitat types.	Undercrossing will be conducted outside the bird nesting season (February 15 through August 31). Periodic monitoring by the project biologist will be conducted as needed to ensure that construction activities do not impact bridge-nesting birds at Coal Canyon Undercrossing and Windy Ridge Wildlife Undercrossing. Minimization Measure AS-2: Bat Maternity Roosting Survey. A qualified bat biologist will survey the Project Area during the maternity roosting period, typically in June, to assess the potential for its use as a maternity roost because maternity roosts are generally formed in late spring. The qualified bat biologist will also perform preconstruction surveys because bat roosts can change seasonally. The surveys will include a combination of structure inspection, sampling, exit counts, and acoustic surveys. Minimization Measure AS-3: Bridgework Schedule. To prevent impacts to bridge and crevice-roosting bats, all bridgework will be scheduled between September 1 and November 30 to avoid hibernating bats and the maternity season. If this is not feasible, temporary bat eviction and exclusion devices will be installed between September 1 and November 20 prior to the initiation of construction activities and under the supervision of a qualified bat biologist. Exclusion devices will be installed during the fall, or as otherwise directed by a qualified biologist, to avoid trapping flightless young inside during the summer months or hibernating individuals during the winter. Such exclusion efforts will be continued to keep the structures free of bats until the completion of construction on those structures, at which time the

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			devices will be removed to allow the bats to resume roosting in the structure and prevent any permanent loss of bat-roosting habitat. All bat exclusion techniques will be coordinated between the District Biologist and the resource agencies. Avoidance and Minimization Measure AS-4: Construction Work Activities. To avoid or minimize impacts to bats at a night roost, work activities are not to occur within 100 feet of the structure between sunset and sunrise. If construction work must be performed at night in the vicinity of the bridge structure containing a night roost, noise and direct lighting will be directed away from the structure or lighting will be specifically focused on the section of the bridge actively under construction to minimize impacts to night-roosting bats. Avoidance and Minimization Measure AS-5: Bird Exclusion Netting. Airspace access to and from a bridge structure containing a night roost will not be restricted. Bird exclusion netting will not be used unless made from thick plastic and installed with no exposed overlap joints. Clearing of vegetation in the vicinity of the structure will also be minimized to the greatest extent practicable. Minimization Measure AS-6: Unfilled Expansion. Subject to public health and safety considerations, existing unfilled expansion joints will remain unfilled and unobstructed to prevent permanent loss of existing day- and/or night-roosting habitat. Habitat for bats may be enhanced in the project limits by leaving newly created expansion joints unrubberized so that they are available to bats for day roosting after construction is complete.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Avoidance Measure AS-7: Burrowing Owl Survey. In accordance with the California Department of Fish and Wildlife survey guidelines for burrowing owl, a take avoidance survey shall be conducted no less than 14 days prior to initiating ground-disturbance activities and, if time lapses between project activities, a final survey may be conducted within 24 hours prior to ground disturbance.
Threatened and Endangered Species	No impacts	<i>Temporary Impacts</i> - Potential indirect impacts through the accumulation of dust on the leaves of any Braunton's milk-vetch plants in designated critical habitat. - Potential to impact thread-leaved brodiaea. - Potential to redirect foraging bald eagles, least Bell's vireo, and southwestern willow flycatcher away from the BSA. - Indirect impacts to coastal California gnatcatcher due to increased exposure to noise, vibration, dust, nighttime lighting, and human presence. - Direct impacts to coastal California gnatcatcher through habitat disturbance and removal. - Impacts to 11.85 acres of coastal California gnatcatcher occupied habitat in the median of the SR-241/SR-91 interchange in the NCCP/HCP Plan Area. - Impacts to 12.8 acres of designated coastal California gnatcatcher critical habitat in the NCCP/HCP Plan Area. - Impacts to 7.96 acres of designated coastal California gnatcatcher habitat outside the NCCP/HCP Plan Area in Caltrans right-of-way.	Avoidance Measure TE-1: Construction Work Limits Review. During Final Design, the construction work limits will be reviewed to ensure that the lateral work limits are reduced to avoid designated Braunton's milk-vetch critical habitat and that construction staging areas are located in areas that have been previously disturbed or developed. All designated critical habitat for Braunton's milk-vetch adjacent to and outside the project disturbance limits will be delineated on the project specifications as environmentally sensitive areas (ESAs) prior to any construction activities near those areas. Avoidance Measure TE-2: Thread-Leaved Brodiaea Preconstruction Surveys and Environmentally Sensitive Areas. Preconstruction surveys will be conducted to determine if thread-leaved brodiaea is present in the Project Area. If this species is found in the Project Area, prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around the protected zone of any thread-leaved brodiaea individuals and designated as an ESA to be preserved to the extent feasible. The protected zone will extend 5 feet (ft) outside of the vegetation edge. No grading or fill activity of any type will be permitted within the ESA. In addition, no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
		<i>Permanent Impacts</i> • Potential minor impacts to thread-leaved brodiaea habitat. • Indirect impacts to coastal California gnatcatcher as a result of increased exposure to noise, vibration, and dust. • Take of coastal California gnatcatcher in the NCCP/HCP Plan Area through the permanent loss of 2.98 acres of occupied habitat in the median of the existing junction of SR-241 and SR-91.¹ • Take of designated coastal California gnatcatcher critical habitat in the NCCP/HCP Plan Area through the permanent loss of approximately 19.72 acres.¹ • Take of designated coastal California gnatcatcher habitat outside the NCCP/HCP Plan Area as a result of impacts to 1.18 acres in Caltrans right-of-way.¹ • Potential loss of a minimal amount (approximately 1 acre of chaparral) of potential foraging habitat for least Bell's vireo and southwestern willow flycatcher.	so as to prevent accidental damage to nearby thread-leaved brodiaea. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESA. Silt fence barriers will be installed at the ESA boundary to prevent accidental deposition of fill material in areas where thread-leaved brodiaea is adjacent to planned grading activities. Avoidance Measure TE-3: Coastal California Gnatcatcher Survey. Prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub or areas of coastal California gnatcatcher designated critical habitat (with constituent elements), a survey will be conducted to locate coastal California gnatcatcher within 100 ft of the outer extent of projected soil disturbance activities and the locations of coastal California gnatcatchers shall be clearly marked and identified on the construction/grading plans. The 100 ft buffer outside the project soil disturbance limits will be clearly marked in the field by construction personnel under the guidance of the biologist. Construction or clearing will not be conducted within the project disturbance limits adjacent to the 100 ft buffer until the biologist determines that the young have fledged or the nest is no longer active. Avoidance Measure TE-4: Barrier Installation. Prior to clearing or construction, highly visible barriers (such as orange construction fencing) will be installed around coastal sage scrub and coastal California gnatcatcher designated critical habitat (with constituent elements) adjacent to and outside the project footprint to designate ESAs. No grading or fill

¹ This impact is less than significant with mitigation under CEQA.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			activity of any type will be permitted within the ESAs and no construction activities, materials, or equipment will be allowed within the ESAs. All construction equipment will be operated in a manner so as to prevent accidental damage to nearby ESAs. No structure of any kind, or incidental storage of equipment or supplies, will be allowed within the ESAs. Silt fence barriers will be installed at the ESA boundaries adjacent to the project footprint to prevent accidental deposition of fill material in areas where vegetation is adjacent to planned grading activities. Avoidance Measure TE-5: Construction Activities Monitoring. A qualified biologist will monitor all construction activities for the duration of the project construction in areas adjacent to ESAs to flush out any wildlife species present from the construction areas prior to construction and to ensure that vegetation removal, best management practices, ESAs, and all avoidance and minimization measures are properly followed. Avoidance and Minimization Measure TE-6: Shielded Lighting. Shielded lighting will be used for any nighttime construction adjacent to coastal sage scrub within coastal California gnatcatcher designated critical habitat to avoid and minimize artificial night lighting effects on the gnatcatcher. Mitigation Measure TE-7: Section 7 Consultation and Biological Opinion. Section 7 consultation was conducted with the United States Fish and Wildlife Service (USFWS) to address effects to coastal California gnatcatcher and coastal California gnatcatcher-occupied and/or critical habitat outside the Natural Communities Conservation Plan (NCCP)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			Area. Requirements from the 2019 Biological Opinion are listed below. Temporary impacts to coastal sage scrub and native plant restoration will be offset through restoration of 6.84 acres with coastal sage scrub (not as mitigation slopes; coastal sage scrub will be the baseline condition for future consultations). Temporary impacts to chaparral, oak woodland, nonnative grassland, and ruderal in designated critical habitat will be offset through restoration of 7.31 acres with native fuel modification zone species¹ (not mitigation slopes). Permanent impacts to coastal sage scrub and native plant restoration will be offset through: on-site restoration of 8.73 acres (6.98 acres with coastal sage scrub and 1.75 acres with native fuel modification zone species [not mitigation slopes]); off-site mitigation of 19.63 acres including advance restoration of 13.3 acres at Strawberry Farms (9.75 acres of coastal sage scrub restoration, 1.86 acres of coastal sage scrub and prickly pear cactus restoration, 0.39 acre of native perennial grassland restoration, and 1.3 acre of coastal sage scrub enhancement); and off-site mitigation of 6.33 acres at Saddle Club (2.63 acres of coastal sage scrub and 3.7 acres of coastal sage scrub/chaparral mix). Permanent impacts to chaparral, oak woodland, nonnative grassland, and ruderal in designated critical habitat will be offset through: on-site restoration of

¹ A fuel modification zone is an area where combustible vegetation in the landscaping is modified or replaced with drought-tolerant or fire-resistant vegetation to provide protection against wildfires. These drought-tolerant and fire-resistant species are considered fuel modification zone species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			7.31 acres with native fuel modification zone species (not mitigation slopes); on-site restoration of 0.28 acre with native fuel modification zone species, with maintenance activities within 14 ft from edge of pavement (not mitigation slopes); and off-site mitigation of 4.24 acres at Saddle Club with coast live oak woodland. The conservation measures (CMs) included in the 2019 Biological Opinion that will be implemented as part of the Proposed Project to avoid and minimize impacts to gnatcatchers are as follows: Avoidance and Minimization through Project Design CM 1. <i>If feasible, the Soil Nail Wall Design Option will be selected to minimize permanent impacts to approximately 5 acres of land located within the Gypsum Canyon Nature Preserve. The final engineering design for this area will be reported to the CFWO at least 15 working days prior to initiating project impacts.</i> CM 2. <i>Permanent project lighting will be of the lowest illumination necessary for safety and will be directed toward the roadway and away from sensitive habitats and wildlife crossing areas. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. The Caltrans Project Biologist¹ will review the permanent lighting plans and then submit them to the CFWO for review and approval at least 15 working days prior to initiating project impacts.</i>

¹ The Caltrans Project Biologist will be a Caltrans biologist familiar with the federally listed species potentially affected by the project and with the habitats that support these species; he/she will be the primary contact for the CFWO during project implementation.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 3. A wildlife connectivity plan will be developed and implemented to ensure that ecosystem functions¹ are maintained by the project for the benefit of listed species. The plan will be provided to the CFWO for review and approval at least 60 days prior to initiating project impacts. The plan will include the following requirements: a. Animals may not be able to navigate steep vertical bends and they may not utilize culverts or crossing structures that have horizontal bends that limit visibility. The culvert at drainage feature 4 will be lengthened by the project but no vertical or horizontal bends will be constructed in the culvert extension; b. To the maximum extent feasible, rock slope protection will be avoided at culvert and wildlife crossing openings. If rock slope protection is required, modifications (e.g., small pebble, dirt, or grouted movement pathways) will be made such that animals of all sizes can access culverts and wildlife crossings; c. If stream bank reinforcements are required at wildlife crossing and culvert areas, project proponents will design them in the manner most conducive to wildlife movement. If stream bank reinforcements of ungrouted riprap gabions or other material are required, they will be constructed at the shallowest possible slope (2:1 or less), and will be covered with soil and revegetated with native riparian plant species in a manner that will allow for the movement of wildlife of all sizes.

¹ For example, dispersal of top predators to control meso-predators that prey on avifauna, such as gnatcatchers (e.g., Crooks and Soule 1999)

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>Project proponents will ensure that soil placement on top of stream bank reinforcements will occur in a manner that does not result in erosion holes in the soil surface over time;</i> <i>d. Restoration of temporary impact areas at wildlife crossings will be planned in a manner that will encourage wildlife use and movement. Project proponents will ensure that plantings will not obscure culvert or wildlife crossing openings. Native vegetation may be used to funnel wildlife toward the crossings and create a visual barrier between the roadway and habitat in a manner that will encourage wildlife movement;</i> <i>e. Culvert openings will be flush with the road slope and ground to allow animals to easily find and access the culverts. Culvert openings that provide for wildlife movement under the roadway will not be blocked with grates, with the exception of openings from culverts to those portions of the roadway median that are not intended for wildlife access or movement;</i> <i>f. Where the project will result in new roadside fencing, project proponents will ensure that fencing ties into culvert and wildlife crossing openings such that animals following the fencing can easily find and access culverts and crossings. Any new roadside fencing will be 10 to 12-foot high chain link fence with an 18-inch "outrigger" (three strands of barbed wire) angled away from the road, located within the Caltrans right-of-way, subject to the Biological Monitor's¹ recommendations, and will be buried 24 inches into the ground to discourage wildlife from digging under the fence. In areas</i>

¹ See CM 14 for a description of the Biological Monitor.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			where new fencing is installed, old fencing that blocks access to culverts and crossings will be removed. Any new fencing constructed by the project at the SR-241/SR-91 interchange will incorporate recommendations on page 194 of USGS 2013; g. Project proponents will coordinate with the Orange County Transportation Authority (OCTA) to ensure that the project will not negatively affect the camera study and native plantings planned by OCTA at the Coal Canyon Undercrossing; h. Equipment maintenance, lighting, and staging for the project will be in designated areas, away from the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing. Construction in the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing will be limited to daylight hours. These areas will be kept clear of all equipment or structures that could potentially serve as barriers to wildlife passage. Structures required for bridgework at the Windy Ridge Wildlife Undercrossing will be erected so as not to block the main underpass, and scaffolding and false work will be restricted to the side of the underpass to maintain the functionality of the crossing for wildlife movement. Construction access to the SR-91 median at Coal Canyon will be provided within the fenced access area at Coal Canyon Road, and no project work or access will take place beyond the fencing within the existing dirt wildlife crossing area at Coal Canyon; i. Freeway signage with lighting, including changeable message signs, will be located in areas away from the Windy Ridge Wildlife Undercrossing and Coal Canyon Undercrossing;

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			j. Construction noise at the Coal Canyon Undercrossing will be limited to no more than 5 dBA hourly L_{eq} above ambient levels beyond 100 feet from the edge of the roadway to avoid noise disturbance to wildlife within the crossing; k. A new turnaround has been constructed in the SR-91 median west of Coal Canyon that benefits both wildlife connectivity and human safety by providing a more accessible and rapid turnaround location that is outside of the wildlife undercrossing. This turnaround is not large enough to accommodate construction vehicles and will continue to be accessible to emergency vehicles during project work, maintaining the recent benefits to wildlife movement that the turnaround provides; and l. Subject to approval by California Highway Patrol (CHP) and Orange County Fire Authority (OCFA), install a permanent access control gate near the top of the eastbound off-ramp at Coal Canyon, leaving enough room in front of the gate for personnel in authorized vehicles to exit SR-91 and open the gate, but encouraging unauthorized vehicles to use the new median turnaround. Signage will be posted and maintained at the gate to inform the public about adjacent sensitive habitats and species as well as access restrictions (e.g., wildlife crossing, no unauthorized access, no night access). The gate and signage will be installed prior to completion of project construction. If installation of the gate is not approved, Caltrans and TCA will coordinate with the CFWO to identify an alternative measure to enhance connectivity or improve safety for dispersing wildlife to offset temporal impacts resulting from the substantially degraded functioning of Coal Canyon as a wildlife undercrossing during the 2-year construction

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			period. If enhancing connectivity at Coal Canyon itself is not practicable, then improvements may occur at a different location identified in coordination with the CFWO. Avoidance and Minimization during Vegetation Clearing/Project Construction CM 4. The clearing and grubbing of native upland habitats for the project will occur between September 1 and February 14, to avoid the gnatcatcher breeding season (or sooner than September 1, if a biologist knowledgeable of gnatcatcher biology and ecology approved by the CFWO demonstrates to the satisfaction of the CFWO that all gnatcatcher nesting is complete). The project proponents will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 15 working days prior to initiating project impacts. CM 5. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, or any other such activities will be restricted to designated staging areas that are a minimum of 100 feet from sensitive habitats and drainages. CM 6. All lighting used at night for project construction will be selectively placed and directed at the immediate work area and away from adjacent sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. CM 7. Erosion and sediment control devices used for the project, including fiber rolls and bonded fiber matrix, will be made from biodegradable materials

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			such as jute, with no plastic mesh, to avoid creating a wildlife entanglement hazard. CM 8. The project site will be kept as clear of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site. All spoils and material disposal will be disposed of properly. CM 9. If fill must be borrowed from or disposed of offsite, the construction contractor will identify any necessary borrow and disposal sites and provide this information to Caltrans for review. Caltrans will review borrow and disposal site information and if borrow or disposal activities may affect a listed species or critical habitat, Caltrans will reinitiate Section 7 consultation. CM 10. Impacts from fugitive dust will be avoided and minimized through watering and other appropriate measures. CM 11. Project personnel will be prohibited from bringing domestic pets to construction sites to avoid disturbance and depredation of wildlife by domestic pets in adjacent habitats. CM 12. During project construction, all invasive species included on the National Invasive Species Management Plan, the State of California Noxious Weed List, and the California Invasive Plant Council's Invasive Plant Inventory list (Cal-IPC 2006) found growing within the project impact area will be removed. Special care will be taken during transport, use, and disposal of soils containing invasive weed seeds and all weedy vegetation removed during construction will be properly disposed of to prevent

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			spread into areas outside of the construction area. CM 13. All native or sensitive habitats outside and adjacent to the construction limits will be designated as Environmentally Sensitive Areas (ESAs) on project maps. ESAs will be temporarily fenced during construction with orange plastic snow fence, orange silt fencing, or in areas of flowing water, with stakes and flagging. No personnel, equipment, or debris will be allowed within the ESAs. Temporary ESA fencing and flagging will be installed in a manner that does not impact habitats to be avoided and such that it is clearly visible to personnel on foot and operating heavy equipment. The project proponents will submit to the CFWO, at least 5 days prior to initiating project impacts (except for impacts resulting from clearing to install temporary fencing), the final plans for initial clearing and grubbing of habitat and project construction. These final plans will include photographs that show the fenced and flagged limits of impact and all areas to be impacted or avoided. Field maps indicating the location of temporary ESA fencing and/or staking will also be provided. If work occurs within gnatcatcher habitat beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the CFWO. Temporary ESA fencing and markers will be maintained in good repair until the completion of project work adjacent to each ESA and removed upon completion of project work adjacent to each ESA. CM 14. A CFWO-approved biologist (Biological Monitor)¹ will be on site during all initial vegetation clearing/grubbing and weekly during project

¹ The Biological Monitor will be familiar with the federally listed species potentially affected by the project (i.e., gnatcatcher) and with the habitats that support this species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			construction within 500 feet of gnatcatcher habitat to monitor compliance with all conservation measures. The project proponents will submit the biologist's name, address, telephone number, and work schedule on the project to the CFWO at least 15 working days prior to initiating project impacts. The contract of the Biological Monitor will allow direct communication with the CFWO at any time regarding the proposed project. The Biological Monitor will be provided with a copy of this consultation. The Biological Monitor will be available during pre-construction and construction phases to address protection of sensitive biological resources, monitor ongoing work, and maintain communications with construction personnel to facilitate the appropriate and lawful management of issues relating to biological resources. The Biological Monitor will perform the following duties: a. Perform a minimum of three focused preconstruction surveys, on separate days, to determine the presence of gnatcatchers in the upland project impact footprint. Surveys will begin a maximum of 30 days prior to performing vegetation clearing/grubbing, and one survey will be conducted the day immediately prior to the initiation of vegetation clearing. If any gnatcatchers are found in the upland project impact footprint, the Biological Monitor will direct construction personnel to begin vegetation clearing/grubbing in an area away from the gnatcatchers. It will be the responsibility of the Biological Monitor to implement measures (e.g., direct vegetation clearing away from gnatcatchers, flush gnatcatchers out of the active work area) to avoid death and injury of gnatcatchers by vegetation clearing/grubbing. The Biological Monitor will also record the number and

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>location of gnatcatchers disturbed by vegetation clearing/grubbing. Caltrans will notify the CFWO at least 7 days prior to vegetation clearing/grubbing to allow the CFWO to coordinate with the Caltrans Project Biologist on potential bird flushing activities;</i> <i>b. Perform a minimum of three focused surveys, on separate days, to determine the presence of gnatcatcher nest building activities, egg incubation activities, or brood rearing activities within 500 feet of project construction that is initiated during the February 15 to August 31 breeding season for the gnatcatcher. Surveys will begin a maximum of 7 days prior to performing construction within 500 feet of gnatcatcher habitat during the breeding season, and one survey will be conducted the day immediately prior to the initiation of construction within 500 feet of gnatcatcher habitat during the breeding season. Additional surveys will be done once a week during project construction within 500 feet of gnatcatcher habitat during the breeding season. These additional surveys may be suspended as approved by the CFWO;</i> <i>c. If active gnatcatcher nests are identified within 500 feet of noise generating construction activities and noise is in excess of 60 dBA hourly L_{eq} or if noise is in excess of ambient noise levels if ambient noise levels exceed 60 dBA hourly L_{eq}, noise attenuation structures will be installed at the noise source to reduce noise levels to 60 dBA hourly L_{eq} or to ambient noise levels if ambient noise levels exceed 60 dBA hourly L_{eq} at the nest location. Noise monitoring will occur during the breeding season and be reported monthly to the CFWO. If the Biological Monitor suspects that avoidance and minimization measures are ineffective, and project activities may be adversely affecting the</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			<i>gnatcatcher, culpable activities will be suspended within 500 feet of active nests until nesting activity is completed and fledglings are no longer in the area or until effective avoidance and minimization measures can be identified, implemented, and demonstrated to be effective. If the specified noise targets cannot be met or the Biological Monitor observes potential adverse effects to gnatcatchers from project-related noise, activities that are resulting in potential adverse effects will be halted, and the CFWO will be contacted to determine if reinitiation of consultation is necessary;</i> <i>d. Oversee installation of and inspect erosion control measures a minimum of once per week to document and bring to the attention of the contractor any breaks in erosion control measures such that they are repaired immediately;</i> <i>e. Oversee installation of and inspect ESA fencing a minimum of once per week to document and bring to the attention of the contractor any breaks in the fence such that they are repaired immediately;</i> <i>f. Train contractors and construction personnel expected to be in the project impact area on the biological resources associated with the project and document that training is implemented by construction personnel. At a minimum, training will include:</i> <i>i. The purpose for resource protection;</i> <i>ii. A description of the gnatcatcher and its habitats;</i> <i>iii. The CMs that should be implemented during project construction to conserve the gnatcatcher, including strictly limiting activities, vehicles, equipment, and construction materials to the</i>

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			project footprint to avoid adjacent sensitive resource areas; iv. Environmentally responsible construction practices; v. The protocol to resolve conflicts that may arise at any time during the construction process; and vi. The general provisions of the Act, the need to adhere to the provisions of the Act, and the penalties associated with violating the Act; g. Monitor the project site immediately prior to and during construction to identify the presence of invasive weeds and recommend measures to avoid their inadvertent spread in association with the project. Such measures may include inspection and cleaning of construction equipment and use of eradication strategies; h. Periodically monitor the work area to document that work activities do not generate excessive amounts of dust; i. Submit monthly email reports (including photographs of impact areas) to the CFWO during clearing of, and construction within, 500 feet of gnatcatcher habitat. The monthly reports will document that authorized impacts were not exceeded and in general compliance with all conditions. The reports will also outline the location of construction activities, the type of construction that occurred, and equipment used. These reports will specify numbers and locations of gnatcatchers (if observed), their observed behavior (especially in relation to construction activities), and remedial measures employed to avoid and minimize impacts to these species. Raw field notes should be

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			available upon request by the CFWO; and j. Submit a final report to the CFWO within 120 days of the completion of construction for the project that includes: photographs of habitat areas that were to be avoided and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved. Measures to Offset Impacts to Gnatcatcher and its Habitat CM 15. Areas of temporary impact, as quantified in Tables 1 and 3, will be revegetated and restored with native species as specified in Tables 4 and 5. These areas will be returned to original grade, as feasible. Prior to initiating project impacts, a restoration plan will be developed for the temporary impact areas. The plan will be submitted to the CFWO for review and approval at least 15 working days prior to initiating project impacts. This plan will include a detailed description of restoration methods, slope stabilization, and erosion control, criteria for restoration to be considered successful, and monitoring protocol(s). Following the completion of construction activities within each area of impact, the restoration plan will be implemented for a minimum of 5 years, unless success criteria are met earlier and all artificial water has been off for at least 2 years. Temporary impact areas will be planted as soon as possible, with consideration of seasonal timing, following re-grading after completion of construction to prevent encroachment by nonnative plants.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 16. Some permanent impact cut and fill slopes for the project will be revegetated with native species as specified in Table 4. Duff and rare plants may be salvaged from the project impact footprint to aid in revegetating slopes with native habitats. The revegetated areas will have temporary irrigation and will be planted with native container plants and seeds. At least 3 years of plant establishment/ maintenance on these slopes will be conducted to control nonnative plants. These areas will be planted as soon as possible, with consideration of seasonal timing, following the completion of construction to prevent encroachment by nonnative plants. CM 17. If maintenance of a coastal sage scrub restoration area is necessary between February 15 and August 31, a CFWO-approved biologist¹ will survey for gnatcatchers within the restoration area, access paths to it, and other areas susceptible to disturbances by site maintenance. Surveys will consist of three visits separated by 2 weeks starting March 1 of each maintenance/monitoring year. Work will be allowed to continue on the site during the survey period. However, if gnatcatchers are found during any of the visits, the applicant will notify and coordinate with the CFWO to identify measures to avoid and/or minimize effects to the gnatcatcher (e.g., nests and an appropriate buffer will be flagged by the biologist and avoided by the maintenance work).

¹ The biologist for this measure will be a trained ornithologist with at least 40 hours of observing gnatcatchers in the field and documented experience locating and monitoring nests of the target species.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CM 18. Permanent and temporary impacts to the gnatcatcher and its habitat¹ (as summarized in Tables 1, 2, and 3) will be offset as specified in Tables 4 and 5. CM 19. Portions of the Saddle Club property used to offset project-related impacts will be conserved and managed in perpetuity. Each of the sub-measures below will be implemented prior to initiating project-related impacts: a. A CFWO-approved conservation easement will be recorded over conserved land in favor of a CFWO-approved entity (e.g., a non-profit environmental organization or government agency). The conservation easement will prohibit all activities that significantly disturb wildlife or detrimentally impact habitat for the gnatcatcher. Potential recreation uses that do not impact habitat or result in significant disturbance to gnatcatchers (e.g., hiking along existing trails) may be proposed in a CFWO-approved habitat management plan for the property provided that the management plan includes sufficient measures and funding to ensure that these activities are appropriately monitored and managed; b. A CFWO-approved habitat management plan will be prepared that addresses potential threats to the conserved habitat, such as unauthorized human access, monitoring and management of any authorized recreational activities, control of non-native invasive plant species, and habitat

¹ Permanent and temporary impacts to 3.81 acres and 26.63 acres of habitat, respectively, have already been offset in accordance with the requirements of Biological Opinion 1-6-94-F-17.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			degradation from fire; c. A CFWO-approved land manager will be identified to implement the habitat management plan; and d. A CFWO-approved non-wasting endowment or endowments will be established with sufficient funds to implement the habitat management plan and to monitor and enforce the conservation easement. The funding for the endowment(s) will be determined through a Property Analysis Record (PAR) or equivalent analysis. Caltrans will monitor and report on compliance with the established take exemptions for gnatcatchers associated with the proposed action. The terms and conditions of the 2019 Biological Opinion are as follows: Coastal California Gnatcatcher 1.1 Prior to initiating project work, three preconstruction surveys will be conducted within all suitable gnatcatcher habitat within the project footprint, within 30 days prior to initiation of vegetation removal activities, to verify that no more than 1 pair of gnatcatchers will be harmed as a result of the project. 1.2 Prior to initiating project work, Caltrans will provide to the CFWO a map showing the distribution of gnatcatchers relative to the project footprint and an estimate of the number of gnatcatcher territories that will be impacted by the project, or confirm in writing that maps, distribution information, and the number of territories that will be impacted by the project remain correct.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			1.3 Prior to project construction, the project proponent will submit to the CFWO Geographic Information System (GIS) shapefiles in UTM, Zone 11N (meters), NAD 83 coordinate system that show the following: anticipated permanent impacts, temporary impacts, habitat restoration sites, and habitat conservation sites. Please note that these polygons may overlap. For example, one location could be temporarily impacted and subsequently restored and conserved. Include the following metadata for each shapefile: summary/description of the data, attribute definitions, coordinate system/ projection information or any other pertinent information. If there are any changes to the boundaries anticipated impacts, restoration, or conservation sites, such changes must be addressed consistent with the Reinitiation Notice below. In addition, updated GIS shapefiles will be submitted to the CFWO. 1.4 Caltrans will notify the CFWO within 30 days of completing removal of gnatcatcher occupied habitat. The purpose of this notification is to ensure that impacts to gnatcatcher-occupied habitat from the proposed project do not exceed the take thresholds. Avoidance and Minimization Measure TE-8: Foraging Special-Status Riparian Birds. Prior to vegetation clearing or construction within the species foraging habitat areas during the nesting period, a qualified biologist will conduct a preconstruction survey to identify the locations of any special-status riparian birds. If foraging individuals are found within the vegetation clearing area during the breeding season, clearing will be delayed until the species are absent. Per the NCCP/HCP construction minimization measures, outside the breeding season, the monitoring biologist will flush NCCP/HCP identified

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			species from the area, prior to brush-clearing and earth-moving activities. ETC Final EIR and Final EIS Measure B-27. <i>Grading and construction activities shall be redirected temporarily around any nesting sites for a distance of 500 ft for candidate and listed species of birds and at a distance of 1,000 ft for raptors during nesting and breeding seasons. In the event that a coyote, bobcat, or mountain lion den is located, grading and construction operations shall be redirected around the den for a distance of 1,000 ft. The nesting sites and dens should be resurveyed toward the end of the breeding seasons of these species to verify completion of the breeding cycle. Nests and dens that will be removed due to ETC must be removed during the nonbreeding season only.</i>
Invasive Species	No impacts	Potential to spread invasive species by the entering and exiting of construction equipment contaminated by invasive species, disturbances to soil surfaces, and improper removal and disposal of invasive species that result in the seed being spread along the highway.	Minimization Measure IS-1: Weed Abatement Program/Non-Standard Special Provisions. During Final Design, a qualified landscape architect will develop a Weed Abatement Program/Non-Standard Special Provisions (NSSP) for inclusion in the project specifications. The Weed Abatement Program/NSSP will be developed in compliance with Executive Order 13112 to minimize the potential for intrusion or export of invasive plant species to and from the Biological Study Area during project construction. At a minimum, the following will be included in the Weed Abatement Program/NSSP and implemented prior to and during construction to address potential effects associated with invasive species. The Weed Abatement Program/NSSP will define the specific details, frequency, and, if applicable, performance standards for the following individual activities and requirements: Inspect and clean construction equipment at the beginning and end of each day and prior to

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			transporting equipment from one project location to another. - Limit soil and vegetation disturbance to those areas specifically required for the project construction. - Obtain soil, gravel, and rock from weed-free sources.
			- Use only certified weed-free straw, mulch, and/or fiber rolls for erosion control during construction. - Prior to the completion of construction, revegetate affected areas adjacent to native vegetation with plant species that are native to the vicinity and approved by California Department of Transportation (Caltrans) District 12 Biologists. - Not use any species listed in the California Invasive Plant Council Invasive Plant Inventory with a High or Moderate rating in revegetation. - After construction, ensure that erosion control and revegetation sites are monitored until achievement of the project-specific performance standards defined in the Weed Abatement Program/NSSP or a period of 1 year, whichever is greater, after installation, to detect nonnative species prior to the establishment of the native vegetation. - Implement eradication procedures (e.g., spraying and/or hand weeding) should an infestation occur during or after construction. The use of herbicides will be prohibited within and adjacent to native vegetation, except as specifically authorized and monitored by Caltrans District 12 Biologists during and after project construction. - During construction, reduce indirect impacts of exotic plant infestations and litter by roadside maintenance at least once daily during construction to remove litter and weeds from the right-of-way.

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
Cumulative Impacts	No impacts	The Build Alternative, when considered with other cumulative projects as stated in Table 3.1.3 would contribute incrementally to cumulatively considerable impacts related to: • Potential permanent impacts to paleontological resources when excavations extend into fossiliferous formations. • Permanent and/or temporary removal of coastal sage scrub and grassland, which has the potential to result in adverse impacts to special-status plant and animal species.	Project-specific measures described within this table would avoid or reduce and minimize potential cumulative impacts.
Climate Change	No impacts	• The increase in average vehicle speeds in the Project Area by 2–4 miles per hour would decrease the average delay per vehicle by up to 20 percent, which would help offset the 3,400–7,800 increase in daily trips. • No substantial change to greenhouse gas emissions.	See Measures AQ-2, AQ-4, AQ-5, and TR-1 above. • Landscaping reduces surface warming, and through photosynthesis, decreases CO₂. Landscaping would be provided where necessary within the corridor to provide aesthetic treatment, replacement planting, or mitigation planting for the Proposed Project. The landscape planting would help offset any potential CO₂ emissions increase. The project will plant native trees and shrubs within the project area and right of way; see visual measure V-7. • The Proposed Project would specify the use of energy-efficient lighting, such as LED traffic signals. LED bulbs consume 10 percent of the electricity of traditional lights, which will also help reduce the Proposed Project's operational CO₂ emissions. • According to Caltrans Standard Specifications, idling time for lane closure during construction is restricted to 10 minutes in each direction. In addition, the contractor must comply with Title 13,

Table S-1 Summary of Project Impacts

Resource Impacts	No Build Alternative	Build Alternative (Preferred Alternative)	Avoidance, Minimization, and/or Mitigation Measures
			CCR Section 2449(d)(3) that was adopted by the ARB on June 15, 2008. This regulation restricts idling of construction vehicles to no longer than 5 consecutive minutes. Compliance with this regulation reduces harmful emissions from diesel-powered construction vehicles. • TSM/TDM elements, described more fully in Section 2.2.1.2, are included in the scope of the Build Alternatives. • Legally enforceable measures intended to reduce GHG emissions from the 2016 SCAG RTP/SCS will be included in the Plans, Specifications, and Estimates package prepared for the Project. For example, the new toll lanes would be available for high occupancy vehicles such as buses and vehicles with three or more persons.

ARB = California Air Resources Board
 BMPs = Best Management Practices
 BSA = biological study area
 Caltrans = California Department of Transportation
 CCR = California Code of Regulations
 CDFW = California Department of Fish and Wildlife
 CO₂ = carbon dioxide
 dBA = A-weighted decibels
 ESA = Environmental Site Assessment
 FTIP = Federal Transportation Improvement Program
 GHG = greenhouse gas
 HCP = Habitat Conservation Plan
 HOV = High Occupancy Vehicle
 LED = light emitting diode
 LRTP = Long-Range Transportation Plan
 MPAH = Master Plan of Arterial Highways

NCCP = Natural Communities Conservation Plan
 RCTC = Riverside County Transportation Commission
 RTP = Regional Transportation Plan
 RWQCB = Regional Water Quality Control Board
 SCAG = Southern California Association of Governments
 SCS = Sustainable Communities Strategy
 SR-241 = State Route 241
 SR-55 = State Route 55
 SR-91 = State Route 91
 TDM = Transportation Demand Management
 TSM = Transportation System Management
 USACE = United States Army Corps of Engineers
 VHT = vehicle hours traveled
 VMT = vehicle miles traveled
 MSHCP = Multiple Species Habitat Conservation Plan

S.7.1 Unresolved Issues or Areas of Controversy

The Proposed Project is a later phase of the ETC that would be constructed in the median of SR-241 and SR-91, and therefore, there are no known unresolved issues or areas of controversy.

S.7.2 Project Schedule

Table S.2 summarizes the general schedule for the Proposed Project, subject to funding availability and obtaining all required approvals and permits. Final Design is expected to be completed in spring 2021.

Table S.2 Project Schedule

Milestone	Estimated Date
Completion of Final Supplemental EIR/EIS and Record of Decision	Early 2020
Completion of anticipated permits, licenses, and approvals after Record of Decision	Mid 2021
Anticipated start of construction	Late 2021
Opening Year	2023

S.7.3 Permits and Approvals Needed

Table S.3 identifies the permits and/or approvals that are or may be required prior to or during construction and/or operation of the Build Alternative.

Table S.3 Permits and Approvals Needed

Agency	Permit/Approval	Status/When Required
Federal Highway Administration (FHWA)	Air Quality Conformity Analysis Determination	FHWA determined that the Proposed Project conforms to the State Implementation Plan (SIP) in accordance with 40 CFR Part 93 on May 3, 2017.
United States Fish and Wildlife Service (USFWS)	Section 7 consultation for threatened and endangered species	A new Biological Opinion was issued on April 17, 2019.
United States Army Corps of Engineers (USACE)	Section 404 Permit for filling or dredging of waters of the United States	A Nationwide Permit will be obtained during Final Design.
California Department of Fish and Wildlife (CDFW)	1602 Lake or Streambed Alteration Agreement for impacts to jurisdictional areas	An agreement will be obtained during Final Design.
California Department of Transportation (Caltrans)	Encroachment Permit	An Encroachment Permit will be obtained by the F/ETCA during Final Design.
California Transportation Commission (CTC)	CTC vote to approve funds and approve new public road connection	Following the approval of the Final Supplemental EIR/EIS, the CTC will be required to vote to approve funding for the project if federal funding is sought, as well as approve the new SR-91/SR-241 Express Lanes Connector.
State Water Resources Control Board (SWRCB)	Caltrans NPDES Permit	Permit issued to Caltrans on September 19, 2012, for discharges from State right-of-way. The SWRCB and the Santa Ana RWQCB will be notified of the Project during final design pursuant to the permit requirements.
	Section 402 NPDES Permit (Construction Activity) for waste discharge requirements during construction	Permit Registration Documents, including an NOI, will be submitted at least 7 days prior to the start of construction.
Santa Ana Regional Water Quality Control Board (RWQCB)	Section 401 Water Quality Certification for impacts to jurisdictional areas	Certification will be obtained during final design.
	Section 402 NPDES Permit (Groundwater Dewatering)	If groundwater dewatering is required, an NOI will be submitted at least 60 days prior to the start of construction.
Various Utilities	Encroachment Permits for protection-in-place and possible relocations	During Final Design
City of Anaheim	Potential Encroachment Permit	During Final Design
Orange County Parks (OC Parks)	Concurrence on Section 4(f) De Minimis Determination	OC Parks provided written concurrence with the Section 4(f) De Minimis Determination on July 25, 2017 (see Appendix B).
	Approval of land transfer (partial acquisition)	During right-of-way acquisition process.
Riverside County Transportation Commission (RCTC) and Orange County Transportation Authority (OCTA)	Concept of Operations Report preparation and coordination (tolling operations)	Toll operations are being coordinated among the F/ETCA, OCTA, and RCTC and are evaluated in a separate Concept of Operations report. That report will be completed during Final Design.

CFR = Code of Federal Regulations

EIR/EIS = Environmental Impact Report/Environmental Impact Statement

F/ETCA = Foothill/Eastern Transportation Corridor Agency

NOI = Notice of Intent

NPDES = National Pollutant

Discharge Elimination System

SR-241 = State Route 241

SR-91 = State Route 91

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SR-241 / SR-91 Express Lanes Connector Project

ORANGE COUNTY AND RIVERSIDE COUNTY, CALIFORNIA

City of Anaheim, City of Yorba Linda and City of Corona

12-ORA-241 PM 36.1/39.1

12-ORA-91 PM 14.7/18.9

08-RIV-91 PM 0.0/1.5

OK9700 / 1200020097

Traffic Analysis Report



Prepared for:

Foothill/Eastern Transportation Corridor Agency, Project Sponsor

and for:

State of California Department of Transportation, Lead Agency



July 24, 2015

The environmental review, consultation, and any other action required in accordance with applicable Federal laws for this project is being, or has been, carried-out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

Signature Page

12-ORA-241 PM 36.1/39.1

12-ORA-91 PM 14.7/18.9

08-RIV-91 PM 0.0/1.5

This Traffic Analysis Report has been prepared under the direction of the following Registered Traffic Engineer. The Registered Traffic Engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.


James Roldan

REGISTERED TRAFFIC ENGINEER

7.24.15

DATE



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Executive Summary

The purpose of this report is to document the traffic analysis for the State Route 241/State Route 91 (SR-241/SR-91) Express Lane Connector Project Approval/Environmental Documentation (PA/ED). The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is developing the PA/ED for the proposed improvements to the SR-241/SR-91 interchange in Orange County. The proposed improvements evaluated in the PA/ED focus on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes (“proposed project”). That alternative would construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and from the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). The goal of the traffic analysis in this report is to conduct operational analysis to refine and study the PA/ED alternative. The analysis is focused on the interaction of the Express Lane weaving section with the congested general purpose (GP) lanes.

SR-241 is a toll-only facility, from the Oso Parkway interchange in south Orange County to its terminus at SR-91. There are two mainline toll stations, including one at Windy Ridge south of the SR-91 interchange. Approximately half of the ramps are tolled as well, depending on the direction of travel and proximity to the mainline stations. Toll stations have both FasTrak and license plate readers and no cash is accepted. The toll pricing structure on SR-241 is the same for all vehicle types, regardless of occupancy. The existing SR-241 is owned and maintained by Caltrans, with the F/ETCA operating the toll facilities.

The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from SR-55 to the Orange/Riverside County line (east of the SR-241 interchange). To the west and east of the 91 Express Lanes termini, there are HOV lanes on SR-91 that extend from the Interstate 110 (I-110) freeway in Gardena to the west and to the Madison Street interchange in Riverside to the east. The Orange County Transportation Authority (OCTA) operates the 91 Express Lanes. The Riverside County Transportation Commission (RCTC) is currently constructing the SR-91 Corridor Improvement Project (CIP). The SR-91 CIP will extend the tolled express lanes on SR-91 between the Orange County/Riverside County line and I-15, add one GP lane between SR-71 and I-15, add one GP lane from the I-15/SR-91 interchange to Pierce Street, and improve five local interchanges and the I-15/SR-91 interchange.

A detailed traffic operations analysis was conducted to evaluate potential design variations of the PA/ED alternative. This report focuses on that analysis. Simulation modeling was the primary tool for analysis, using VISSIM, a microscopic, behavior-based multi-purpose traffic simulation program. VISSIM was used to simulate operations on the SR-91 and SR-241 corridors, including mainline segments, ramps, interchanges, and freeway connections. One of the key benefits of VISSIM is the ability to visually simulate traffic operations to reveal the operational effects of various design solutions. The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. The volume of northbound SR-241 to eastbound SR-91 traffic using the

direct connector was developed by determining the volume of traffic that would optimize (maintain speeds in excess of 60 mph) the express lane operations in the mixing bowl. The volume using the new connector will ultimately be influenced by pricing. The amount of traffic exiting the eastbound SR-91 express lanes (from OCTA) and entering the eastbound express lanes (to RCTC) is generally fixed based on the data gathered from the Bluetooth study. The third contributing stream of traffic is the volume coming from the new direct connector. The volume used in the analysis is the volume that will optimize express lane operations and still be acceptable to all three tolling agencies (OCTA, RCTC, and F/ETCA). A separate Tolling and Revenue Study and Concept of Operations Study will be developed to determine toll rates. The Tolling and Revenue Study and Concept of Operations Study will investigate the tolling policy that will provide the optimized direct connector demand determined in this study.

Table E-1 summarizes the overall traffic operational benefits of the proposed project.

FIGURE E-1
Overall Project Benefit Summary¹

Measure	Year	Results
Increase in Throughput in the Mixing Bowl	2017	2,586 vehicles in the peak direction (+7%)
	2040	1,239 vehicles in the peak direction (+3%)
Increase in Corridor Vehicle Miles Traveled (VMT)	2017	34,301 VMT (+4%)
	2040	17,403 VMT (+2%)
Change in Speed	2017	+1.9 mph (+6%)
	2040	+2.7 mph (+7%)
Change in Delay	2017	-0.6 minutes/vehicle (-12%)
	2040	-0.8 minutes/vehicle (-17%)

¹ Based on seven hours of results for the combined AM peak (three hours) and PM peak (four hours).

In the build scenario, the overall findings of the traffic analysis are as follows:

- The overall throughput on SR-91 increases.
- On the eastbound SR-91 GP lanes, more vehicles must exit the OCTA Express Lanes and enter the GP lanes and fewer cars can leave the GP lanes and enter the RCTC Express Lanes. More vehicles are in the Express Lanes in the mixing bowl area because the northbound SR-241 to eastbound SR-91 Express Lane Connector adds more traffic to the mixing bowl. More vehicles will exit, increasing friction, because the downstream constraint remains the same (3,200 vehicles/hour in the RCTC Express Lanes).
- However, there is also a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to eastbound SR-91 GP ramp to the RCTC Express lanes with the project (i.e., most of these vehicles will now use the SR-241 to SR-91 Express Lane Connector.).

- The result is an overall net zero effect on the eastbound SR-91 GP lanes in the PM peak period. The overall average difference in vehicle throughput (Build minus No-Build) in the 2017 PM peak period is -0.3% and 0.6% in the 2040 PM peak period.

A more detailed summary of the overall findings of the traffic analysis for the SR-241/SR-91 Express Lane Connector Project is provided below:

- Traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector.
- In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.
- In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.
- The project increases the toll road system throughput and revenue in both 2017 and 2040.
- The project will reduce the length of the northbound SR-241 to eastbound SR-91 queue on the general purpose ramp in the PM peak period.
- The project provides measureable system benefits in the AM peak period in the form of increased vehicle throughput on SR-91 in the mixing bowl (7% in 2017 and 3% in 2040), increased corridor-wide VMT (4% in 2017 and 2% in 2040), increased average speed (+1.9 mph in 2017 and +2.7 mph in 2040), and reduced average delay (-0.6 minutes/vehicle in 2017 and -0.8 minutes/vehicle in 2040).
- During the PM peak period, system benefits are mixed in 2017 but show an overall improvement by 2040. SR-91 vehicle throughput and VMT both increase in 2017, but the average speed drops (1 mph) and delay increases (0.4 minutes/vehicle) due to the regional shift that increases demand in the GP lanes. However, all system measures show positive impact by 2040 (average speed increases by 2 mph and delay decreases by 0.4 minutes/vehicle).
- At the SR-91 westbound mainline bottleneck between the Green River Road interchange and the Express Lane Ingress (AM peak period), the project provides benefit in the form of shorter queues, higher vehicle throughput, higher speed and lower density, and shorter travel times in both 2017 and 2040.
- At the SR-91 eastbound mainline bottleneck between the Express Lane Ingress and the Green River Road interchange (PM peak period), the project increases vehicle throughput in both 2017 and 2040. By the 2040 Design Year, the project will improve conditions at the bottleneck by increasing average speed (5 mph) and vehicle

throughput (between 0.5 and 1.5%) while reducing density and lowering travel time (from 1 to 4.5 minutes depending on path).

- With the project, high-speed operations of the SR-91 Express Lanes can be maintained with a maximum eastbound exiting Express Lane volume of 1800 vehicles/hour in 2017 (1600 vehicles/hour in 2040). The mix of OCTA/F/ETCA/RCTC toll traffic is critical to the successful operations of the mixing bowl.
- Analysis of three design variations for the SR-91 Eastbound Express Lane weaving section shows that there is very little difference between the variations from a traffic operations perspective, and the optimal configuration should be chosen based on other design considerations.
- The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

Overall Advantages

The proposed SR-241/SR-91 Express Lane Connector Project has several advantages:

- The direct connection closes the gap between two major toll systems (SR-91 Express Lanes and SR-241 Toll Roads)
- The project improves vehicle throughput in SR 91 corridor since more vehicles can be pushed through the SR-91 Express Lanes (i.e., the project brings more cars into the express lanes in the mixing bowl and therefore the combined GP and Express Lane throughput increases in the mixing bowl). The Express Lanes throughput upstream and downstream of the mixing bowl (i.e., in the OCTA and RCTC Express Lanes) remains the same with or without the project (approximately 3,200 vehicles/hour), consistent with the OCTA and RCTC tolling policy assumptions.
- The project improves vehicle miles traveled throughout study area.
- The project will pull 1,700 vehicles during the peak hours (AM/PM) from I-5, SR-55 and surrounding local arterials to SR-241 in the 2017 Opening Year.
- Travel time will be reduced by 24% for northbound SR-241 to eastbound SR-91 toll users in the 2017 Opening Year.

Overall Challenges

The proposed project also has challenges that will need to be addressed in future design/operations efforts:

- The operations through the SR-91/SR-241 interchange ingress/egress area require that flows to/from each system are controlled to ensure that the Express Lanes do not break down. This will require coordinating the pricing schemes for three different systems and for different entry points.
- The direct connection proposed by the project will integrate three tolling facilities (SR-91 Express Lanes, SR-241 Toll Roads, RCTC Express Lanes) operated by three different agencies (OCTA, F/ETCA, and RCTC). The operation and setting of toll rates for all three systems will require careful planning and coordination.

Both of the above items will be addressed in the Concept of Operations Report.

1 Introduction

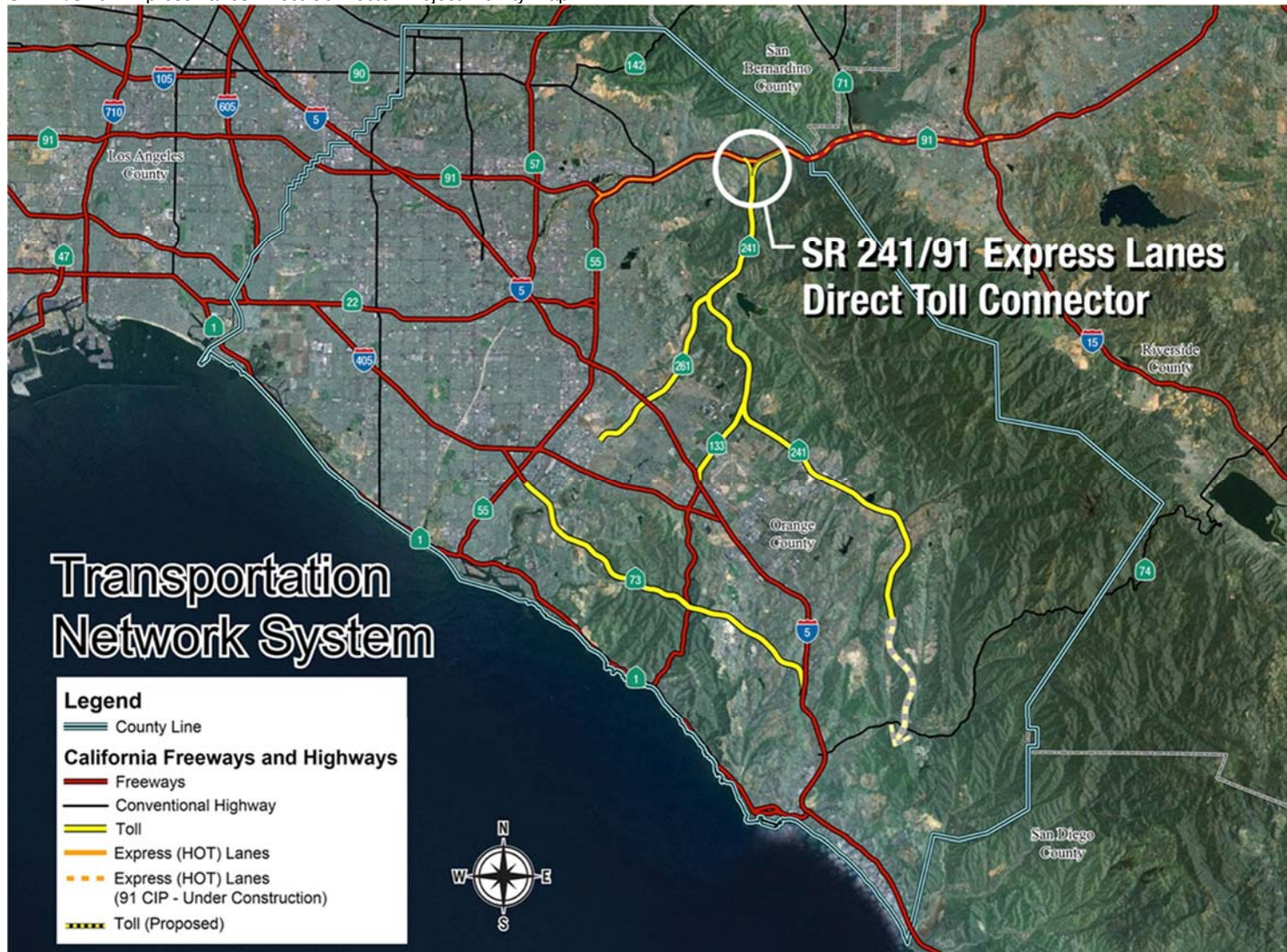
The purpose of this report is to document the traffic analysis for the State Route 241/State Route 91 (SR-241/SR-91) Express Lane Connector Project Approval/Environmental Documentation (PA/ED). The Foothill/Eastern Transportation Corridor Agency (F/ETCA) is developing the PA/ED for the proposed improvements to the SR-241/SR-91 interchange in Orange County. The proposed improvements evaluated in the PA/ED focus on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes (“proposed project”). That alternative would construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). The goal of the traffic analysis in this report is to conduct operational analysis to refine and study the PA/ED alternative. The analysis is focused on the interaction of the Express Lane weaving section with the congested general purpose (GP) lanes.

The Proposed Project, located at the junction of SR-241 and SR-91 within the cities of Anaheim, Yorba Linda, and Corona and counties of Orange and Riverside, would provide improved access between SR-241 and SR-91 and is proposed to be a tolled facility. The proposed median-to-median connector project encompasses 12-ORA-241 (PM 36.1/39.1), 12-ORA-91 (PM 14.7/18.9), and 08 RIV-91 (PM 0.0/1.5) for a length of approximately 8.7 mi. A vicinity map of the project in relation to the toll road system in Orange County is provided in **Figure 1-1**.

Improvements for the connector are limited to 5.9 mi in the cities of Anaheim and Yorba Linda from south of the Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project is limited to FasTrak signage improvements (advance signage) in the cities of Anaheim (1.2 mi total), Yorba Linda (0.1 mi) and Corona (1.5 mi), with exact placement pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way. The project layout plan is provided in Appendix G.

SR-241 is a toll-only facility, from the Oso Parkway interchange in south Orange County to its terminus at SR-91. There are two mainline toll stations, including one at Windy Ridge south of the SR-91 interchange. Approximately half of the ramps are tolled as well, depending on the direction of travel and proximity to the mainline stations. Toll stations have both FasTrak and license plate readers and no cash is accepted. The toll pricing structure on SR-241 is the same for all vehicle types, regardless of occupancy. The existing SR-241 is owned and maintained by Caltrans, with the F/ETCA operating the toll facilities.

FIGURE 1-1
SR241/SR91 Express Lanes Direct Connector Project Vicinity Map



The 91 Express Lanes is a two-lane toll facility on SR-91 in each direction from SR-55 to the Orange/Riverside County line (east of the SR-241 interchange). To the west and east of the 91 Express Lanes termini, there are HOV lanes on SR-91 that extend from the Interstate 110 (I-110) freeway in Gardena to the west and to the Madison Street interchange in Riverside to the east. The Orange County Transportation Authority (OCTA) operates the 91 Express Lanes. The Riverside County Transportation Commission (RCTC) is currently constructing the SR-91 Corridor Improvement Project (CIP). The SR-91 CIP will extend the tolled express lanes on SR-91 between the Orange County/Riverside County line and I-15, add one GP lane between SR-71 and I-15, add one GP lane from the I-15/SR-91 interchange to Pierce Street, and improve five local interchanges and the I-15/SR-91 interchange.

The 91 Express Lanes require all drivers to have a FasTrak transponder to pay for the toll. There is no ingress/egress except at the endpoints, so there is only a single toll station in the middle of the tolled segment. Toll rates vary by day-of-week and time-of-day, and these are set in advance by OCTA, using historical traffic patterns. These rates remain the same for several months until they are updated again. OCTA maintains a toll policy that describes the criteria for changing the tolls (<http://www.91expresslanes.com/policies.asp>).

Vehicles on the SR-91 Express Lanes with three or more persons can use the 3+ lane toll-free (although they still are required to have a transponder), except when traveling eastbound (EB) on Monday through Friday between the hours of 4 and 6 PM. During that peak time, when traveling through the 3+ lane, drivers receive a 50% discount on the posted toll. The discount policy also applies to zero emission vehicles (ZEVs), motorcycles, disabled plates and disabled veterans.

A detailed traffic operations analysis was conducted to evaluate potential design variations of the PA/ED alternative. This report focuses on that analysis. Simulation modeling was the primary tool for analysis, using VISSIM, a microscopic, behavior-based multi-purpose traffic simulation program. VISSIM was used to simulate operations on the SR-91 and SR-241 corridors, including mainline segments, ramps, interchanges, and freeway connections. One of the key benefits of VISSIM is the ability to visually simulate traffic operations to reveal the operational effects of various design solutions. The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

In this report, following the introduction (Section 1), the report is organized as follows:

- Section 2 is a description of the study overview and methodology used to complete the analysis.
- Section 3 includes a detailed description of input data.
- Section 4 contains the coding of the baseline VISSIM model.
- Section 5 explains the calibration of the base model.
- Section 6 describes the development of future year travel demands.
- Section 7 discusses the traffic analysis methodology.
- Section 8 summarizes the results.
- Section 9 is the overview of findings and recommendations from the analysis.

2 Study Overview and Methodology

This section includes the details of the microsimulation analysis approach and assumptions and limitations of this study.

2.1 Study Area

The study area was chosen to be wide enough to capture the changes in traffic operations caused by the proposed project. The traffic analysis study area is illustrated in **Figure 2-1**. The freeway network includes SR-91 from west of the Weir Canyon Road interchange in Anaheim Hills to east of the Serfas Club Drive/ Auto Center Drive interchange in Corona. The network also includes SR-241 from north of the Santiago Canyon Road interchange and SR-71 south of the Butterfield Ranch Road interchange.

FIGURE 2-1
Study Area



All on- and off-ramps within the freeway study area are included in the traffic analysis. The study area includes the SR-91 GP lanes, SR-91 Express Lanes, the SR-241 and SR-71 interchange connector ramps, and the service interchange ramps (i.e., local street interchange ramps). No ramp terminal intersections or other local streets are included in the study area. Off-ramps were modeled to a point just upstream of the stop bar at the intersection. On-ramps were modeled from the curb return on the local street, and include ramp meters if present.

During the development of the study area, consideration was given to the effect of the I-15 interchange (east of the project). Including SR-91 out to I-15 in the model would have substantially increased the complexity and data requirements for the analysis, without providing any more information about the SR-241/SR-91 connector benefits and impacts.

Therefore, the approach agreed upon by the technical stakeholders (Caltrans, OCTA, F/ETCA, and RCTC) was to replicate the effects of any bottlenecks caused by I-15 on eastbound traffic during the calibration process. For the calibration of existing conditions (see Section 5), the effects of downstream bottlenecks were modeled with reduced speed areas. These agreements were made at the traffic modeling methods and assumptions workshop held on April 25, 2013 at the F/ETCA offices.

2.2 Microsimulation Analysis Approach

This study followed the guidelines set forth in the Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, Federal Highway Administration (FHWA), July 2004. A base year (2013) model for the study area was built in VISSIM (version 5.40-09) to reflect current conditions. The focus areas for the model were mainline segments, ramps, and freeway connections. The intersections at the freeway ramp termini were not included in the network since the focus of the analysis was the freeway operations (mainline and express lanes).

The VISSIM model developed for this study was based on the SR-91 CIP Final Traffic Study Paramics model (prepared by Parsons Brinckerhoff for RCTC in 2009) and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study VISSIM model (prepared by Stantec for OCTA and F/ETCA in 2011). Validation of the simulation model will be accomplished by comparing the inputs/outputs to these previously-developed models.

The AM and PM peak periods were modeled, using the hours of 6 to 9 AM and 3 to 7 PM as the analysis windows. Three basic vehicle types were included in the model: non-toll paying vehicles (includes single-occupant and high occupancy vehicles); toll paying vehicles (includes single-occupant and high occupancy vehicles); and heavy trucks. The vehicle operational characteristics for non-toll paying vehicles and toll paying vehicles were considered identical.

After the existing conditions VISSIM microsimulation model was coded, an error checking process was conducted by reviewing the network coding for accurate lane geometry, lane channelization, lane alignment, and traffic controls. Once this error checking process was completed, low (e.g., 10%) traffic demands were coded into the model to ensure reasonable driver behavior at low volumes. Static routing in VISSIM was used for the origin/destination (O-D) assignment. Base year (2013) and future year (2017 and 2040) models, which were calibrated to match existing conditions, were used to analyze alternative scenarios. The planned opening year is 2018. The year 2017 was chosen to represent the opening year of the project. 2017 is considered by F/ETCA a reasonable estimate for opening year (plus or minus two years, 2017 to 2019). The year 2040 was chosen to represent the long-term horizon year.

The following outputs and measures of effectiveness (MOEs) were reported from the VISSIM analysis for both the GP and Express Lanes in the study area:

- Volume served (GP and Express Lanes)
- Density (GP and Express Lanes)
- Speed (GP and Express Lanes)

- Level of Service (GP and Express Lanes)
- Travel time by direction/O-D (GP and Express Lanes)
- Vehicle hours travelled (VHT)
- Vehicle miles travelled (VMT)

2.3 Technical Assumptions and Details

Table 2-1 summarizes assumptions for the VISSIM operational parameters.

TABLE 2-1
VISSIM Freeway Operational Parameters

Parameter	Approach
Vehicle Types and Classes	Non-toll, Toll, Trucks
Driving Behavior: Freeway Mainline and Ramps	Wiedemann 99 ¹ Freeway default parameters for car following and lane changing behavior; Adjustments may be made at bottleneck locations to match observed congestion as part of calibration process
Vehicle Acceleration	VISSIM default parameters
Vehicle Deceleration	VISSIM default parameters
Free-Flow Speed	Estimated from field surveys ²
Reduced-Speed Areas on Ramps	From speed advisory signs and field surveys ²
Off-Ramp Lane Change Distance	Initially based on location of exit-signs and upstream ramps, but could change as part of network calibration
Simulation Speed	5 time steps ³ per second

¹ The Wiedemann 99 model consists of ten calibration parameters, all labeled with a 'CC' prefix. Each of the parameters controls a unique aspect of the car following model. Additional discussion of these CC parameters and how they were adjusted during calibration is discussed in Section 5.2.2.

² Field survey data is based on PeMS data collected in the first and fourth quarter of 2013.

³ The number of simulation seconds to a real time second. The change of the Simulation Speed does not affect the results of the simulation.

Other technical details are as follows:

- Trucks were restricted from using the left-most lane in the VISSIM model on SR-91 GP lanes. In addition, trucks were restricted from using Express/HOV lanes.
- Transit vehicles were not modeled in VISSIM.
- Pedestrians were not be modeled in VISSIM ^{since} the operations are focused on freeway operations.

3 Input Data

Detailed data were needed for both model input and calibration. Model input data included geometric data (supply), traffic data (demand), and control data. Calibration data were focused on performance data, including speed and queues. Both model input and calibration data were obtained from Bluetooth data collected in November/December 2013, field visits, aerial photographs (Google Earth), previous studies (SR-91 CIP Final Traffic Study Report prepared by Parsons Brinckerhoff for RCTC in 2009, SR-91 Corridor System Management Plans (CSMP) prepared by System Metrics Group in 2010), and historical archived data from the Caltrans Freeway Performance Measurement (PeMS) System (<http://pems.eecs.berkeley.edu/State/>, data taken from the first and fourth quarter of 2013).

3.1 Existing Traffic Data

Most of the detailed, historical data for mainline and ramp locations were extracted from PeMS. **Tables 3-1** and **3-2** summarize the availability of PeMS data for the ramps. Where PeMS data were not available (i.e., PeMS detectors not present at some locations), Caltrans published data and/or data from other studies (SR-91 CSMP Studies, SR-91 CIP Final Traffic Study Report) in the area were used to supplement the database.

TABLE 3-1
SR-91 Corridor – Eastbound Ramp Data Summary

#	Study Ramp	PeMS Data?	#	Study Ramp	PeMS Data?
1	Off-Ramp to Weir Canyon Road	Yes	9	Off-Ramp to Green River Road	Yes
2	On-Ramp from SB Weir Canyon Road	Yes	10	On-Ramp from Green River Road	Yes
3	On-Ramp from NB Weir Canyon Road	Yes	11	Off-Ramp to NB SR 71	No
4	Off-Ramp to SB SR 241 GP	Yes	12	On-Ramp from SB SR 71	Yes
5	Off-Ramp to Gypsum Canyon Road	Yes	13	Off-Ramp to Serfas Club Drive/Auto Center Drive	Yes
6	On-Ramp from SB Gypsum Canyon Road	Yes	14	On-Ramp from Serfas Club Drive/Auto Center Drive	Yes
7	On-Ramp from NB Gypsum Canyon Road	Yes	15	Off-Ramp to South Maple Street	Yes
8	On-Ramp from NB SR 241 GP	Yes			

Note: Where PeMS ramp data was not available, data from the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) was used.

TABLE 3-2
SR-91 Corridor – Westbound Ramp Data Summary

#	Study Ramp	PeMS Data?	#	Study Ramp	PeMS Data?
1	Off-Ramp to Serfas Club Drive/Auto Center Drive	No	8	Off-Ramp to Gypsum Canyon Road	No
2	On-Ramp from Serfas Club Drive/Auto Center Drive	Yes	9	On-Ramp from NB Gypsum Canyon Road	No
3	Off-Ramp to NB SR 71	No	10	On-Ramp from SB Gypsum Canyon Road	No
4	On-Ramp from SB SR 71	No	11	On-Ramp from NB SR 241	Yes
5	Off-Ramp to Green River Road	No	12	Off-Ramp to Weir Canyon Road	Yes
6	On-Ramp from Green River Road	No	13	On-Ramp from NB Weir Canyon Road	Yes
7	Off-Ramp to SB SR 241 GP	Yes	14	On-Ramp from SB Weir Canyon Road	Yes

Note: Where PeMS ramp data was not available, data from the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) was used.

3.2 Performance Data

Travel speeds and bottleneck locations along the study corridor were required for the calibration of the VISSIM model. For the SR-91 corridor, 2013 PeMS data were available throughout a majority of the study area. **Figures 3-1** and **3-2** illustrate the existing conditions temporal speed diagrams for the GP lanes in the AM and PM peak hours, respectively, based on 2013 PeMS data. The diagrams are based on speed measurements taken from PeMS at stations within the study area and reported every 15 minutes.

The horizontal scale is the location (with a postmile reference); traffic moves from left to right in the eastbound direction and right to left in the westbound direction. For reference, Table 3-3 provides a geographic listing of postmile locations. The vertical scale is the time within the peak period (6 to 9 AM and 3 to 7 PM), with time progressing from bottom to top. Green colors indicate higher speeds (roughly 55 mph and higher) with red colors indicating speeds under 30 mph. In general, bottleneck locations are the vertical lines transitioning between red and green areas. The queues are the red colors upstream of the bottlenecks.

3.3 Roadway Geometry

Field visits and aerial photographs (Google Earth) were used to obtain roadway geometry.

FIGURE 3-1
SR-91 Existing Condition Temporal Speed Diagram – AM Peak Period (6-9 AM)

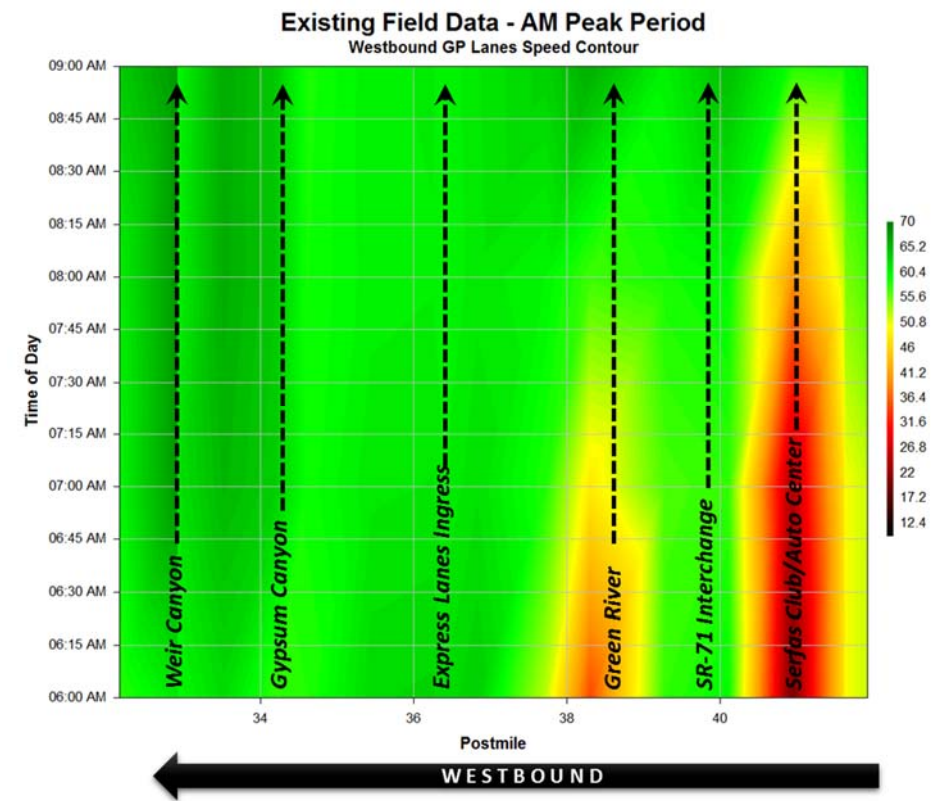
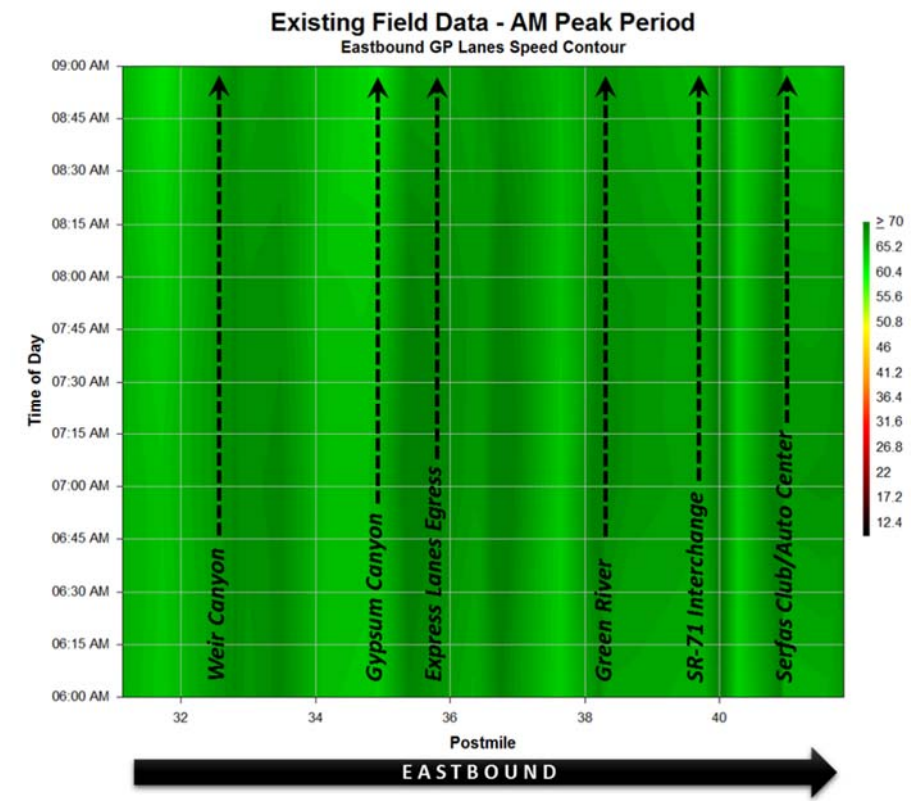


FIGURE 3-2
SR-91 Existing Condition Temporal Speed Diagram – PM Peak Period (3-7 PM)

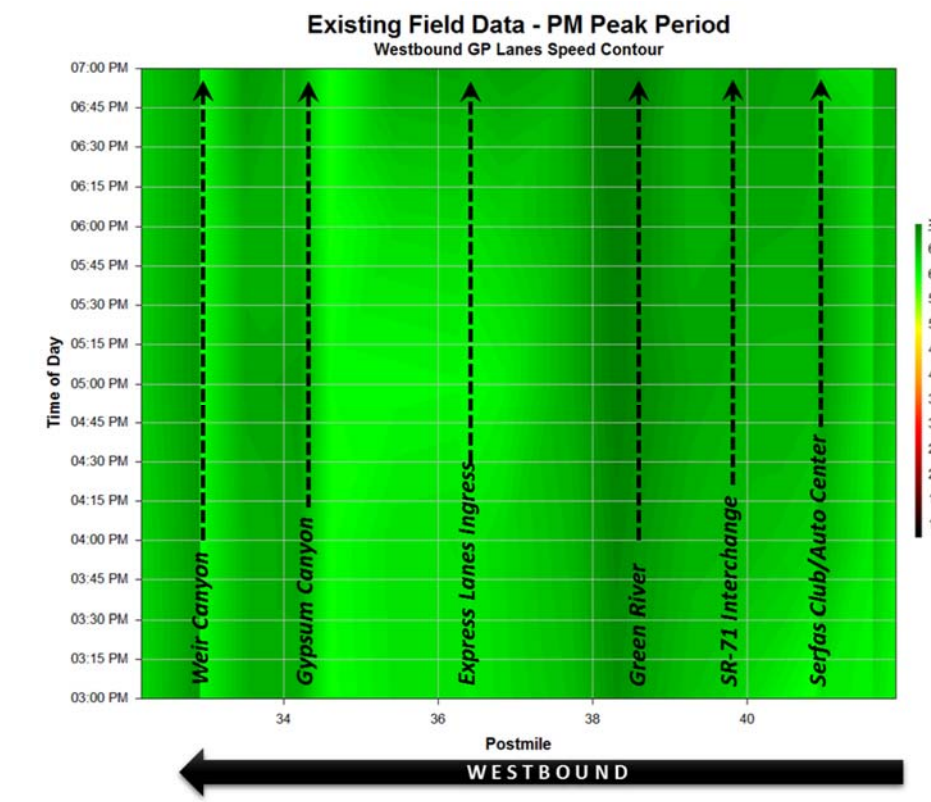
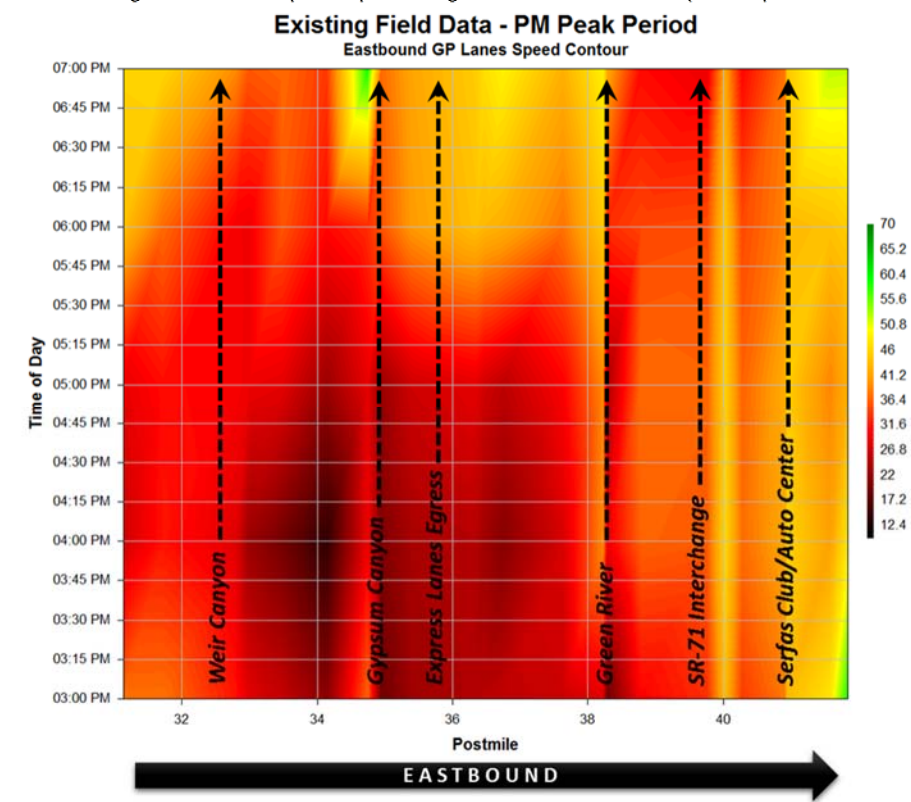


TABLE 3-3
SR-91 Geographic Post Mile Reference

SR-91 Eastbound	
Absolute Postmile	Description
32.21	EB ON TRUCK WEIGH STATION
32.57	EB OFF WEIR CANYON ROAD
34.51	EB OFF GYPSUM CANYON ROAD
36.12	EB OFF COAL CANYON ROAD
36.48	EB ON COAL CANYON ROAD
<i>Riverside County Line (Abs PM = 37.23)</i>	
38.12	EB OFF TO GREEN RIVER DRIVE
38.40	EB ON FROM GREEN RIVER DRIVE
40.81	EB OFF TO SERFAS CLUB DRIVE
41.06	EB ON FROM SERFAS CLUB DRIVE
41.32	EB OFF TO MAPLE STREET
SR-91 Westbound	
Absolute Postmile	Description
32.00	WB ON TRUCK WEIGH STATION
32.22	WB OFF TRUCK WEIGH STATION
33.10	WB OFF WEIR CANYON ROAD
35.08	WB OFF GYPSUM CANYON ROAD
36.21	WB ON COAL CANYON ROAD
36.61	WB OFF COAL CANYON ROAD
37.17	WB ON FROM GREEN RIVER ROAD
<i>Riverside County Line (Abs PM = 37.32)</i>	
38.22	WB ON FROM GREEN RIVER DRIVE
38.46	WB OFF TO GREEN RIVER DRIVE
40.87	WB ON FROM SERFAS CLUB DRIVE
41.25	WB OFF TO SERFAS CLUB DRIVE
41.62	WB ON FROM MAPLE STREET

3.4 Bluetooth Study

Data collection was needed to support the existing conditions simulation model. O-D data were needed as input to the model, and travel time data were needed for calibration. Because traffic patterns and congestion in the corridor are variable from day to day, a comprehensive data collection effort using Bluetooth detectors was recommended by the technical stakeholders during the development of the traffic study approach.

The Bluetooth data collection effort occurred over three separate weeks:

- Monday, November 4, 2013 through Sunday, November 17, 2013 (two weeks)
- Monday, December 9, 2013 through Sunday, December 15, 2013 (one week)

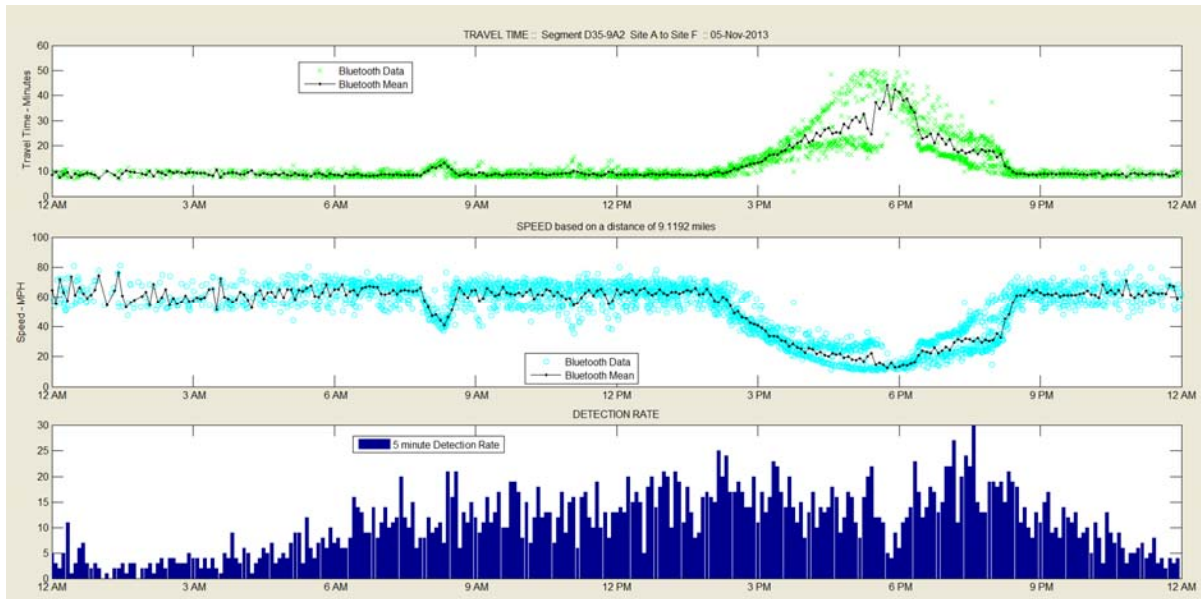
Bluetooth readers were installed at 10 locations along SR-91, SR-241, SR-71, and I-15 as illustrated on **Figure 3-3**. The Bluetooth readers collected data 24 hours per day over the entire three-week study period. The data were recorded and processed to provide information (from thousands of matched records) on O-D and travel time.

The Bluetooth study observed 2,287,722 unique Bluetooth users over the three-week study period. Below is a summary of the amount of daily users captured at each study location:

- Site A (SR-91, west of Weir Canyon Road): 13,665 vehicles/day
- Site B (SR-241, Windy Ridge): 3,501 vehicles/day
- Site C (SR-91, northbound SR-241 merge): 8,857 vehicles/day
- Site D (SR-91, County Line): 16,008 vehicles/day
- Site E (SR-71, north of SR-91): 1,716 vehicles/day
- Site F (SR-91, east of Serfas Club Drive/ Auto Center Drive): 16,077 vehicles/day
- Site G (I-15, north of SR-91): 9,732 vehicles/day
- Site H (SR-91, east of I-15): 12,957 vehicles/day
- Site I (I-15, south of SR-91): 11,624 vehicles/day
- Site Z (SR-91, east of SR-55): 17,655 vehicles/day

The Bluetooth study yielded a large amount of valuable data within the study area. Statistics such as travel time, speed, and detection rate can be reported for all possible O-D pairs within the study area. Figure 3-4 illustrates sample statistics taken from the Bluetooth study that graphically illustrate the average travel time, speed, and detection rate along the eastbound SR-91 from the Weir Canyon Road interchange to the Serfas Club Drive/ Auto Center Drive interchange over the course of the day. A sample set of summary statistics from the Bluetooth study are provided in Appendix A.

FIGURE 3-4
Bluetooth Study Sample Statistics, Eastbound SR-91



O-D data were needed to understand the traffic patterns used in the study area. While there are a wide variety of issues that could be evaluated with O-D data, the study focused on three main questions:

- How much of the eastbound SR-91 Express Lane traffic ends up in Corona versus points east of I-15?
- How much of the eastbound SR-91 general purpose lane traffic ends up in Corona versus points east of I-15?
- What are the destinations of the northbound SR-241 traffic – are they potential users of the connector?

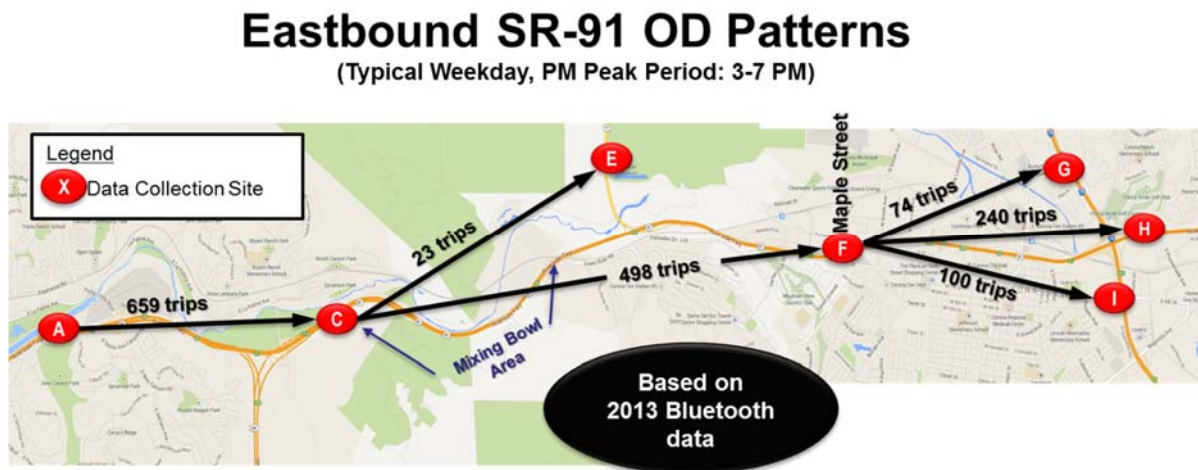
The O-D pairs referenced in the three questions above result in multiple weaving movements on SR-91 between the SR-91/SR-241 interchange and the SR-91/I-15 interchange. Understanding these O-D data helped develop future modeling assumptions that were paired with the geometric improvements associated with the SR-91 CIP Project and the proposed SR-241/SR-91 Express Lane Connector Project. The answers to the questions listed above helped to determine the following assumptions used in the project analysis:

- The number of eastbound SR-91 Express Lane users that will travel from the existing OCTA Express Lanes and continue to Riverside on the RCTC Express Lanes.
- The number of eastbound SR-91 Express Lane users that will travel from the existing OCTA Express Lanes and exit to the GP lanes in the “mixing bowl” to destinations in Corona or along SR-71. The mixing bowl is defined as the eastbound SR-91 ingress/egress area for Express Lane traffic. The limits of the mixing bowl are approximately from the northbound SR-241 to eastbound SR-91 GP lane ramp gore area to the eastbound Green River Road off-ramp.

- The number of eastbound SR-91 general purpose lane users who may enter the RCTC Express Lanes and continue east.
- The number of eastbound SR-91 users who will not use the SR-91 Express Lanes (OCTA or RCTC).
- The amount of northbound SR-241 users who are potential users of the eastbound RCTC Express Lanes.

Figure 3-5 summarizes the O-D patterns observed on the eastbound SR-91 in the PM peak period. Of the traffic travelling eastbound on the SR-91 OCTA express lanes, approximately 25% exits between the proposed mixing bowl and Maple Street in Corona (161 trips/25%). An additional 24% will have to exit the express lanes due to the proposed SR-91 CIP project because they wish to exit on ramps between Maple Street and I-15 (84 trips/13%) or they want to travel to northbound I-15 (74 trips/11%). Therefore, a total of 49% of the eastbound SR-91 OCTA express lane traffic must exit in the proposed mixing bowl area in the eastbound direction. That observation was a critical input into the future modeling assumptions of the mixing bowl area in the eastbound direction.

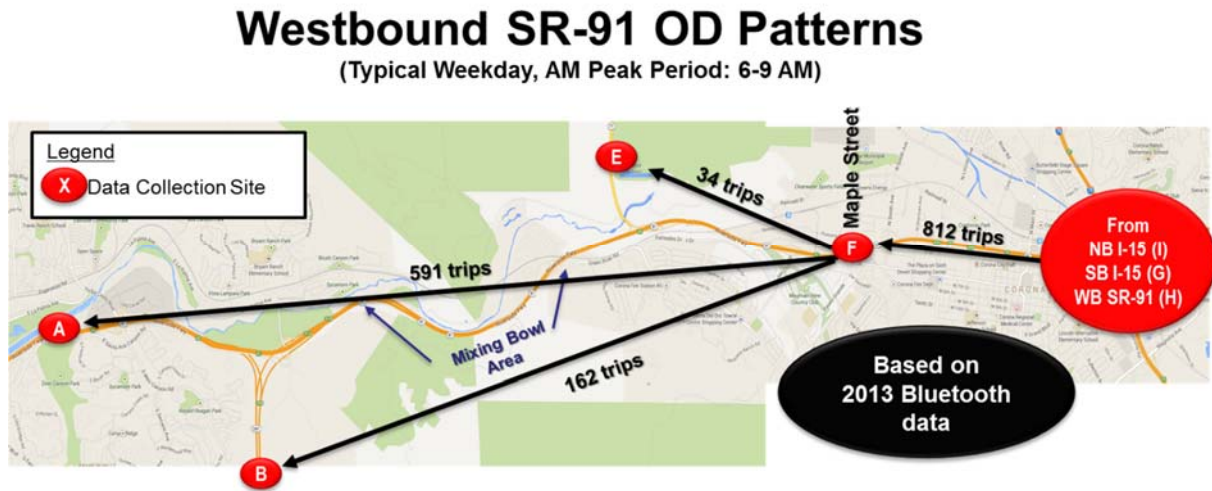
FIGURE 3-5
Bluetooth Study, Eastbound SR-91 O-D Patterns in the PM Peak Period



Note: Volumes reported represent the average four-hour Bluetooth volume captured between the hours of 3-7 PM during the study period.

Figure 3-6 summarizes the O-D patterns observed on westbound SR-91 in the AM peak period. Of the traffic travelling westbound on SR-91, approximately 73% (591 of the 812 trips) continues into Orange County west of the SR-241 interchange. Approximately 20% (162 of the 812 trips) travels to southbound SR-241. The remaining 7% of the westbound SR-91 traffic exits at SR-71 or destinations in Corona. These observations were also a critical input into the future modeling assumptions of the mixing bowl area in the westbound direction.

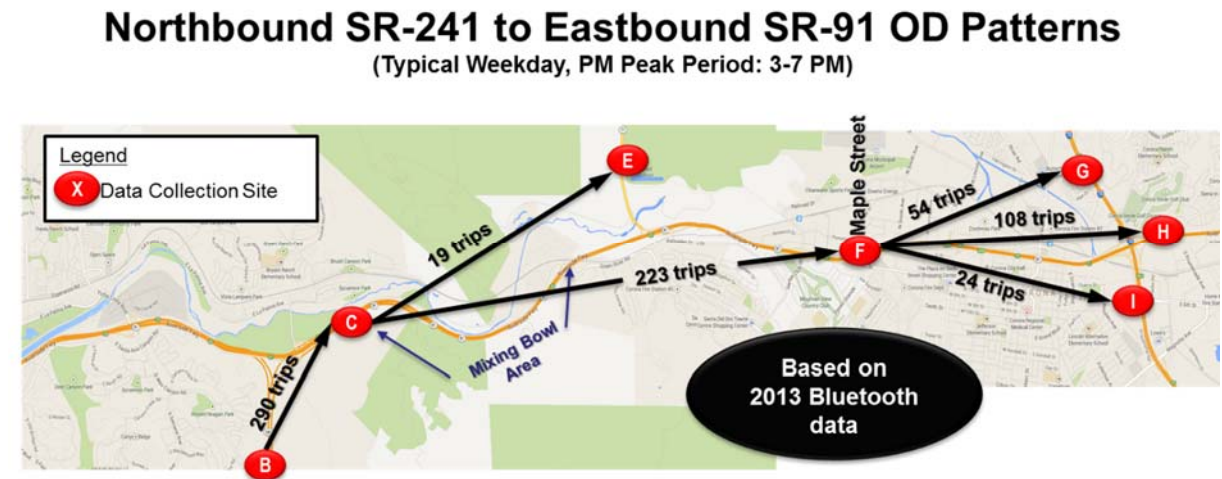
FIGURE 3-6
Bluetooth Study, Westbound SR-91 O-D Patterns in the AM Peak Period



Note: Volumes reported represent the average three-hour Bluetooth volume captured between the hours of 6-9 AM during the study period.

Figure 3-7 summarizes the O-D patterns observed for the northbound SR-241 to eastbound SR-91 movement in the PM peak period. Of the traffic travelling northbound on SR-241 to eastbound on SR-91, approximately 23% exits between proposed mixing bowl and Maple Street in Corona (67 trips/23%). An additional 31% will have to use the GP connector because they wish to exit on ramps between Maple Street and I-15 (37 trips/13%) or they want to travel to northbound I-15 (54 trips/18%). Therefore, a total of 54% of the northbound SR-241 to eastbound SR-91 movement must use the GP connector because of their final destination. That observation was a critical input into the future modeling assumptions of the mixing bowl area in the eastbound direction.

FIGURE 3-7
Bluetooth Study, Northbound SR-241 to Eastbound SR-91 O-D Patterns in the PM Peak Period



Note: Volumes reported represent the average four-hour Bluetooth volume captured between the hours of 3-7 PM during the study period.

4 Baseline VISSIM Coding

Simulation software, like VISSIM, requires three core building blocks: the network geometry, control elements, and traffic demand. Each is described in this section.

4.1 Geometry

The VISSIM network was developed from the VISSIM model applied for the “SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study” VISSIM model (prepared by Stantec in 2011). The baseline geometric configuration was coded to reflect the roadway design developed for this PA/ED. The layout plan for this project is included in Appendix G. Improvements for the connector are limited to 5.9 mi in the cities of Anaheim and Yorba Linda from south of the Windy Ridge Wildlife Undercrossing on SR-241 to Coal Canyon Undercrossing on SR-91. The remaining 2.8 mi of the Proposed Project is limited to FasTrak signage improvements (advance signage) in the cities of Anaheim (1.2 mi total), Yorba Linda (0.1 mi) and Corona (1.5 mi), with exact placement pending the Final Design process. The Proposed Project is mostly within existing Caltrans right-of-way, with one partial acquisition adjacent to eastbound SR-91. Construction access and staging areas would occur within existing Caltrans right-of-way.

All freeway mainline segments (GP and Express Lanes), ramps, and interchanges in the study area were verified and coded as needed to reflect the most recent conditions in the field and the planned improvements for this project and other projects in the area (including the SR-91 CIP project). Aerial photography (Google Earth) and design plans were used to establish gore points, horizontal curvature, and locations of interchanges. Specific geometric elements added to the VISSIM networks included:

- Freeway mainline and ramps
- Freeway auxiliary lanes
- Freeway merge and diverge lanes (tapers)
- Express/HOV lane ingress and egress locations
- Freeway interchange spacing and configuration

4.2 Control Elements

Control elements such as signals, stop signs, or roundabouts are typically needed at ramp terminal intersections to control conflicting traffic movements. However, the VISSIM network for the SR-91/SR-241 Connector project did not include ramp terminal intersections, as the primary area of focus was the freeway GP and Express Lanes and ramps. Ramp meters were included at all on-ramp locations in the VISSIM model where all existing ramp meters are known to be operated during the AM and PM peak periods. Meter rates varied at each location depending on the on-ramp demand volumes, with a range between 200 and 900 vehicles per hour per lane (vphpl). Each ramp meter was set at a rate to allow 100% of the ramp demand volumes to be accommodated without causing spillback

to the ramp terminal intersections. If on-ramp demand volumes were anticipated to exceed the 900 vphpl rate, then the meter was turned off, consistent with Caltrans policy.

4.3 Traffic Demands

Freeway traffic demands are a critical input for VISSIM modeling. It was not possible to report mainline freeway data collected in the field as freeway demand without adjusting the data. The reason is that freeway traffic volumes are different than freeway traffic demands on SR-91. With congestion, not all traffic can be served, so traffic demands are invariably higher than traffic volumes. This issue affects freeway traffic in the peak direction (westbound in the AM peak, eastbound in the PM peak) on SR-91, during both peak periods.

Discussion of the traffic forecasting is provided in Section 6.

5 Existing Conditions Calibration

The purpose of a simulation model is to investigate the effects of improvement alternatives. Simulation models are an efficient tool for evaluating improvements, but are only reliable when the base model matches real-world conditions. VISSIM, like all simulation models, was designed to be flexible enough that an analyst can correctly calibrate the network to match the local conditions at a reasonably accurate level. However, the default values will (almost) never give accurate results for a specific area. Therefore, calibration is required to adjust the VISSIM model parameters to replicate the traffic characteristics. This section summarizes the calibration approach and calibration parameters.

5.1 Testing and Verification

Verification is a form of error checking where the modeler verifies that the simulation model is built correctly. It basically ensures the model is performing reasonably. Verification occurs prior to calibration. Verification occurred in two basic steps.

The first step in the verification was a model review by the modeling team. Coding of the network and control components was completed at this point. Test volumes (10% of the actual demand) were added in order to observe the operations related to the network and controls. Any coding errors or needed enhancements were addressed at this time.

5.2 Calibration Approach

Calibrating the SR-91/SR-241 models occurred in three steps, following guidance from *Guidelines for Applying Traffic Microsimulation Modeling Software* (separate documents from both FHWA (June 2004) and Caltrans (September 2002)):

1. Calibrate the model to mainline and ramp volume data in the field
2. Calibrate the model to mainline speed and travel time data in the field
3. Review bottlenecks and queues between the model and the field

5.2.1 FHWA and Caltrans Guidelines

Volumes and speeds were calibrated to the criteria listed in **Table 5-1**. The criteria are based on tables in the Caltrans and FHWA guidelines. In both guides, a calibration target table is presented that was originally developed by the Wisconsin Department of Transportation (WisDOT) based upon guidelines developed in the United Kingdom.

TABLE 5-1
Calibration Criteria

Criteria and Measures	Calibration Acceptance Targets
Hourly Flows, Model Versus Observed	
--Individual Link Flows	
Within 400 vph, for Flow > 2700 vph	>85% of cases
Within 15%, for 700 vph < Flow < 2700 vph	>85% of cases
Within 100 vph, for Flow < 700 vph	>85% of cases
--Sum of All Link Flows	Within 5% of sum of all link counts
*GEH Statistic < 5 for Individual Link Flows	> 85% of cases
Travel Times, Model Versus Observed	
--Journey Times, Network	>85% of cases
Within 15% (or one min, if higher)	
*The GEH Statistic is computed as $GEH = \sqrt{\frac{(E - V)^2}{(E + V) / 2}}$ Where: E= model estimated volume V=Field Count	

5.2.2 VISSIM Calibration Adjustments

Calibrating the peak period VISSIM models involved adjusting the default parameters to achieve the target volume and travel time thresholds. The primary parameters that were adjusted included:

- Car following parameters
- Lane change behaviors
- Lane change look back distances
- Speed distributions

VISSIM incorporates two car following models – one for freeways and one for arterials. In combination with other operational parameters, users have the ability to adjust these parameters as needed to achieve desired flow conditions. The default parameter network-wide settings for the freeway car following model (Wiedemann 99) are shown in **Figure 5-1**.

FIGURE 5-1
VISSIM v5.40-09 Default Freeway Car Following Parameters

Driving Behavior Parameter Sets

No.: 3 Name: Freeway (free lane selection)

Following Lane Change Lateral Signal Control

Look ahead distance

min.: 0.00 ft

max.: 820.21 ft

2 Observed vehicles

Look back distance

min.: 0.00 ft

max.: 492.13 ft

Temporary lack of attention

Duration: 0.00 s

Probability: 0.00 %

☐ Smooth closeup behavior

☐ Standstill distance for static obstacles: 1.64 ft

Car following model

Wiedemann 99

Model parameters

CC0 (Standstill Distance):	4.92	ft
CC1 (Headway Time):	0.90	s
CC2 ('Following' Variation):	13.12	ft
CC3 (Threshold for Entering 'Following'):	-8.00	
CC4 (Negative 'Following' Threshold):	-0.35	
CC5 (Positive 'Following' Threshold):	0.35	
CC6 (Speed dependency of Oscillation):	11.44	
CC7 (Oscillation Acceleration):	0.82	ft/s ²
CC8 (Standstill Acceleration):	11.48	ft/s ²
CC9 (Acceleration at 50 mph):	4.92	ft/s ²

OK Cancel

The car following parameters adjusted during the calibration process are listed below with a brief definition (from the [VISSIM 5.40 User Manual](#)). These parameters were adjusted, to achieve the calibration targets and reflect the operational conditions in the study area. Although there are nine different adjustable parameters in the Wiedemann 99 car following model, only the three listed below are typically adjusted during calibration.

- *CC0 – Standstill Distance* defines the desired distance between stopped cars. This parameter can have an effect on the length of queues observed during congested conditions.
- *CC1 – Headway Time* is not a direct measure of headway time, but rather a factor that affects the following (minimum desired safety) distance. Lower values allow the vehicles to travel closer together and increases capacity. In the case of high volumes (like those on SR-91), it is the following distance that has the strongest influence on capacity.
- *CC2 – Following Variation* restricts the longitudinal oscillation of vehicles in the car following state. It controls how much more distance than the desired safety distance a driver allows before he intentionally moves closer to the car in front. The reduction in the CC2 value means the driver allows less distance beyond the desired safety distance before he moves closer to the car in front.

Another important parametric change focused on the lane changing parameters. VISSIM includes parameters for necessary and discretionary lane changes. The default parameter network-wide settings for freeway lane changes are shown in **Figure 5-2**.

FIGURE 5-2
VISSIM v5.40-09 Default Freeway Lane Change Parameters

The screenshot shows the 'Driving Behavior Parameter Sets' dialog box in VISSIM v5.40-09. The 'Lane Change' tab is selected for parameter set No. 3, 'Freeway (free lane selection)'. The 'General behavior' dropdown is set to 'Free Lane Selection'. The parameters are organized into sections: 'Necessary lane change (route)' with values for 'Own' and 'Trailing vehicle' (Maximum deceleration, -1 ft/s² per distance, Accepted deceleration); 'Waiting time before diffusion' (60.00 s); 'Min. headway (front/rear)' (1.64 ft); 'To slower lane if collision time above:' (0.00 s); 'Safety distance reduction factor' (0.60); 'Maximum deceleration for cooperative braking' (-9.84 ft/s²); 'Overtake reduced speed areas' (unchecked); 'Advanced merging' (checked); 'Cooperative lane change' (unchecked); 'Maximum speed difference' (6.71 mph); and 'Maximum collision time' (10.00 s). The 'OK' and 'Cancel' buttons are at the bottom right.

No.	Name
1	Urban (motorized)
2	Right-side rule (motorized)
3	Freeway (free lane selection)
4	Footpath (no interaction)
5	Cycle-Track (free overtaking)

No.: 3 Name: Freeway (free lane selection)

Following Lane Change Lateral Signal Control

General behavior: Free Lane Selection

Necessary lane change (route)		Own	Trailing vehicle
Maximum deceleration:		-13.12 ft/s²	-9.84 ft/s²
- 1 ft/s² per distance:		200.00 ft	200.00 ft
Accepted deceleration:		-3.28 ft/s²	-1.64 ft/s²

Waiting time before diffusion:	60.00 s
Min. headway (front/rear):	1.64 ft
To slower lane if collision time above:	0.00 s
Safety distance reduction factor:	0.60
Maximum deceleration for cooperative braking:	-9.84 ft/s²
Overtake reduced speed areas	☐
Advanced merging	☒

☐ Cooperative lane change

Maximum speed difference:	6.71 mph
Maximum collision time:	10.00 s

OK Cancel

Tables 5-2 and **5-3** are a summary of the driver behavior parameter changes made during the calibration process for the SR-91/SR-241 networks. **Table 5-2** is for the eastbound direction (AM and PM peak) and **Table 5-3** is for the westbound direction (AM and PM peak). Note that many of these changes are link-specific to account for the variations in geometric and accompanying driver behavior in the corridor.

The seeding period is the period of time between the start of the simulation and when results start to be recorded. During the seeding period, vehicles are entering the network and the model requires adequate time for the network-wide volumes to become stable. Considering the size of the network and level of congestion that was observed at the start of the recording periods, a seeding period of one hour was used in the study. Visual observation of the simulation shows that after the one hour seeding period, vehicles are able to reach their destinations and congestion throughout the corridor matches field conditions at the start of the peak period.

TABLE 5-2
SR-91 Eastbound AM/PM Peak Calibration Parameters

Location	Car Following Parameters					Lane Changing				
	CC0 Standstill Distance (ft)	CC1 Headway (sec)	CC2 Following Variation (ft)	Max Decel. Rate (ft/s ²)	Accepted Decel. Rate (ft/s ²)	Min. Headway (front/rear) (ft)	Safety Distance Reduction Factor	Max decel. for cooperative braking (ft/s ²)	Advanced Merging	Cooperative Lane Change
Mainline West of Weir Canyon	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.40	-14.9	No	No
HOV weave between SR-241 and Green River	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.10	-27.9	Yes	Yes
All Merge Segments	4.9	1.10	13.1	-13.1/ - 18.0	-3.3/ -3.3	1.6	0.10	-29.5	Yes	Yes
Mainline between Green River and Serfas Club	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.40	-14.9	No	No
VISSIM Default	4.9	0.90	13.1	-13.1/ -9.8	-3.3/ -1.6	1.6	0.60	-9.8	Yes	No

Note: Bold values indicate changes from default values

TABLE 5-3
SR-91 Westbound AM/PM Peak Calibration Parameters

Location	Car Following Parameters				Lane Changing					
	CC0 Standstill Distance (ft)	CC1 Headway (sec)	CC2 Following Variation (ft)	Max Decel. Rate (ft/s ²)	Accepted Decel. Rate (ft/s ²)	Min. Headway (front/rear) (ft)	Safety Distance Reduction Factor	Max decel. for cooperative braking (ft/s ²)	Advanced Merging	Cooperative Lane Change
Mainline between Serfas Club ramps	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.10	-27.9	No	No
HOV weave segments	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.10	-27.9	Yes	Yes
All Merge Segments	4.9	1.10	13.1	-13.1/ -18.0	-3.3/ -3.3	1.6	0.10	-29.5	Yes	Yes
Mainline between SR-71 and Green River	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.40	-14.9	No	No
Diverge to SR-241 and Diverge to Weir Canyon Rd	4.9	1.10	13.1	-26.0/ -184.0	-14.0/ -9.0	1.8	0.10	-27.9	Yes	Yes
VISSIM Default	4.9	0.90	13.1	-13.1/ -9.8	-3.3/ -1.6	1.6	0.60	-9.8	Yes	No

Note: Bold values indicate changes from default values

5.2.3 Visual Audit Criteria

A final step in the calibration process was a visual inspection by the modeling team. The visual audit is needed to ensure that the operations observed in the simulation model approximate expectations for the freeway and network performance. Key focus areas included the location of bottlenecks, duration and extent of queues, and traffic patterns in the network. Bottlenecks and queuing are the key elements of the visual audits. While bottlenecks and queuing affect volume and travel time, they also require a separate focus during calibration.

The first and most important characteristic of a bottleneck is its occurrence at a particular location. Bottlenecks may be formed at particular locations due to factors such as ramp merges or diverges, lane drops, and increases in traffic demand or even due to traffic accidents which cause a reduction in capacity. The bottlenecks formed due to temporary traffic conditions such as accidents are isolated incidents whereas the ones formed due to roadway geometric/design changes and increases in demand occur regularly. However, these recurring bottlenecks do not necessarily occur every day, and they may start and stop over time.

The second defining characteristic of a bottleneck is the distance of the queuing and is defined as the length/extent of the bottleneck.

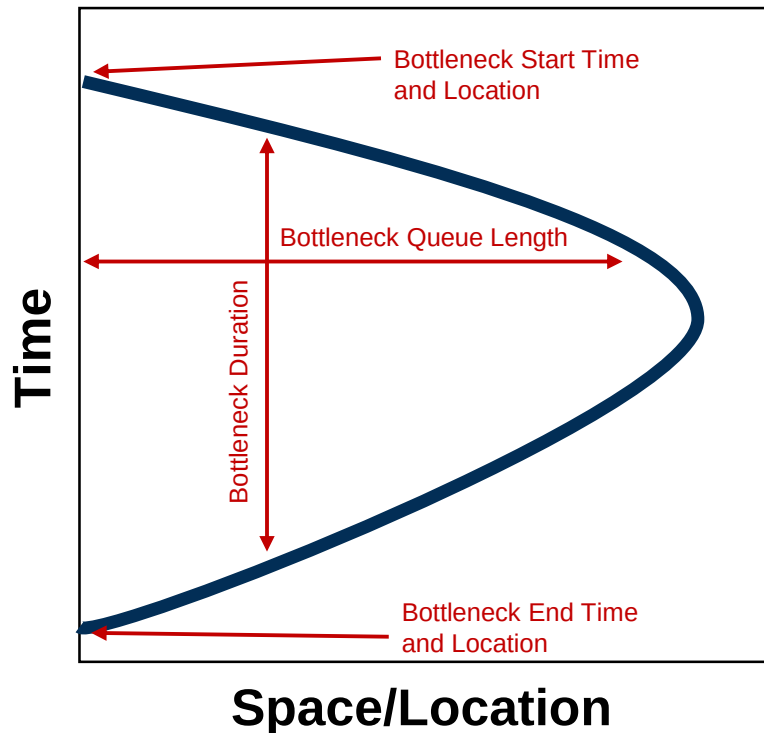
The last defining characteristics are the duration and start time of the bottleneck, which are the temporal components of the bottleneck at particular locations. In the effort to understand the cause of a bottleneck and find potential solutions, it is important to know where the bottleneck actually terminates and free-flow conditions are restored. This is typically found where speeds change from slow congested speeds to 30 to 50 miles per hour, often in a very short distance.

The length/extent and duration/time of a bottleneck often vary greatly from day to day. Both of these factors are very sensitive to the capacity and demand at the bottleneck. Because capacity and demand vary from day to day, the length/extent and duration/time also vary greatly from day to day.

To describe bottlenecks, four quantitative measures can be used (see **Figure 5-3**):

- Location
- Queue length upstream of each bottleneck (this varies over time),
- Time duration
- Starting time

FIGURE 5-3
Graphical Representation of a Typical Bottleneck



Bottlenecks can be assessed by analyzing the speed profile data obtained from PeMS or other data archival systems, combined with external sources such as travel time runs. These locations can then be confirmed using field observations. However, review of the field data suggests that there is a wide variation in bottlenecks and queues over time.

Section 5.3 compares the bottlenecks in the field with the modeling output of the existing conditions VISSIM model and explains the calibration results based on these comparisons. The comparison of the VISSIM output to the field target for queues and bottlenecks was subjective, but based on the general characteristics described in **Figure 5-3**.

5.3 Calibration Results

Calibration results for the VISSIM modeling consist of three MOEs:

- volume calibration
- travel time calibration
- visual calibration

The calibration results for all three elements are discussed in detail below.

5.3.1 Volume Calibration Results

Traffic volume from field counts was compared to VISSIM model throughput volume at all mainline and ramp links using the FHWA link flow criteria explained in Section 5.2.1.

Volume calibration results are presented in **Table 5-4** and **5-5** for the AM and PM periods.

During the AM period, the VISSIM model individual link flow results for all hours and directions of travel are within the acceptable range (greater than 85% of cases for individual link flows and within 5% for sum of all link flows), with exception of the hour from 6 to 7 AM in the westbound direction (refer to Section 5.3.4 for additional explanation on calibration exceptions). In addition, the sum of all link flows is within the acceptable range for all hours and directions.

During the PM period, the VISSIM model individual link flows are close to the acceptable range (greater than 85% of cases for individual link flows and within 5% for sum of all link flows) in the peak eastbound direction (within two percentage points for the 4-5 PM peak hour), while the sum of all link flows is within the acceptable range. Refer to Section 5.3.4 for additional explanation on calibration exceptions. The off-peak westbound direction is within the acceptable range for both individual link flow and sum of all links for all hours except for the 5-6 PM hour, which is at 84% for individual link flows.

Table 5-4 Volume Calibration Results – Existing AM Peak Period (6-9 AM)								
Measurement Type	Total Links	SR-91 Eastbound			Total Links	SR-91 Westbound		
		6-7 AM	7-8 AM	6-7 AM		6-7 AM	7-8 AM	6-7 AM
Individual Link Flows	42	100%	90%	93%	37	78%	86%	86%
Sum of All Link Flows		-2%	3%	3%	--	4%	1%	3%
Note: Calibration range based on FHWA Link Flow Criteria. Acceptable range is >85% of cases for individual link flows and within 5% for sum of all link flows. Bold numbers indicate values outside of accepted range.								

Table 5-5 Volume Calibration Results – Existing PM Peak Period (3-7 PM)										
Measurement Type	Total Links	SR-91 Eastbound				Total Links	SR-91 Westbound			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Individual Link Flows	42	76%	83%	81%	76%	37	89%	89%	84%	95%
Sum of All Link Flows		-1%	2%	-2%	-2%	--	-2%	0%	-3%	1%
Note: Calibration range based on FHWA Link Flow Criteria. Acceptable range is >85% of cases for individual link flows and within 5% for sum of all link flows. Bold numbers indicate values outside of accepted range.										

5.3.2 Travel Time Calibration Results

Travel time from the field (Bluetooth study) was compared to travel time from the VISSIM model using the FHWA criteria outlined in Section 5.2.1. Journey times from VISSIM should be within 15% of field-measured times, or within 1 minute, whichever is higher. Travel time was measured along the SR-91 GP lanes from west of the Weir Canyon Road interchange to east of the Serfas Club Drive/Auto Center Drive interchange, which is approximately 9.6 miles in length. Travel time results are presented in **Table 5-6** and **5-7** for the AM and PM periods.

Travel time results show that the VISSIM model is within the acceptable range for both the AM and PM periods for all hours and directions modeled, with the exception of the 6-7 AM hour.

Table 5-6 Travel Time Calibration Results – Existing AM Peak Period (6-9 AM)						
Type	SR-91 Eastbound (minutes)			SR-91 Westbound (minutes)		
	6-7 AM	7-8 AM	6-7 AM	6-7 AM	7-8 AM	6-7 AM
Field-Measured	8.8	8.8	8.9	14.3	12.1	11.3
VISSIM	8.6	8.7	8.7	11.1	11.5	10.4
Percent Difference	-3%	-1%	-2%	-22%	-5%	-8%
Note: Calibration range based on FHWA Guidelines. Acceptable range is within 15% of field measured travel time, or within 1 minute, whichever is higher. Bold numbers indicate values outside of accepted range.						

Table 5-7 Travel Time Calibration Results – Existing PM Peak Period (3-7 PM)								
Type	SR-91 Eastbound (minutes)				SR-91 Westbound (minutes)			
	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Field-Measured	24.5	35.2	34.6	35.3	9.3	9.1	9.1	9.0
VISSIM	27.8	31.3	35.6	31.3	8.9	9.0	9.0	9.0
Percent Difference	13%	-11%	3%	-11%	-3%	-2%	-2%	-1%
Note: Calibration range based on FHWA Guidelines. Acceptable range is within 15% of field measured travel time, or within 1 minute, whichever is higher. Bold numbers indicate values outside of accepted range.								

5.3.3 Visual Calibration Results

Temporal speed diagrams based on data from the field were compared with output data from VISSIM to verify the model was calibrated and replicating the traffic characteristics in the field. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation.

Figures 5-4 and **5-5** provide comparisons of the speed contour plots for the AM and PM peak periods in the GP lanes. The graph on the top illustrates the speed contours for the field data, and the graph at the bottom is for the VISSIM output.

The horizontal scale is the location (with a postmile reference); traffic moves from left to right in the eastbound direction and right to left in the westbound direction. The vertical scale is the time within the peak period (6 to 9 AM and 3 to 7 PM), with time progressing from bottom to top. Green colors indicate higher speeds (roughly 55 mph and higher) with red colors indicating speeds under 30 mph. In general, bottleneck locations are

FIGURE 5-4
SR-91 Temporal Speed Diagram – GP Lane Calibration Comparisons, AM Peak Period (6-9 AM)

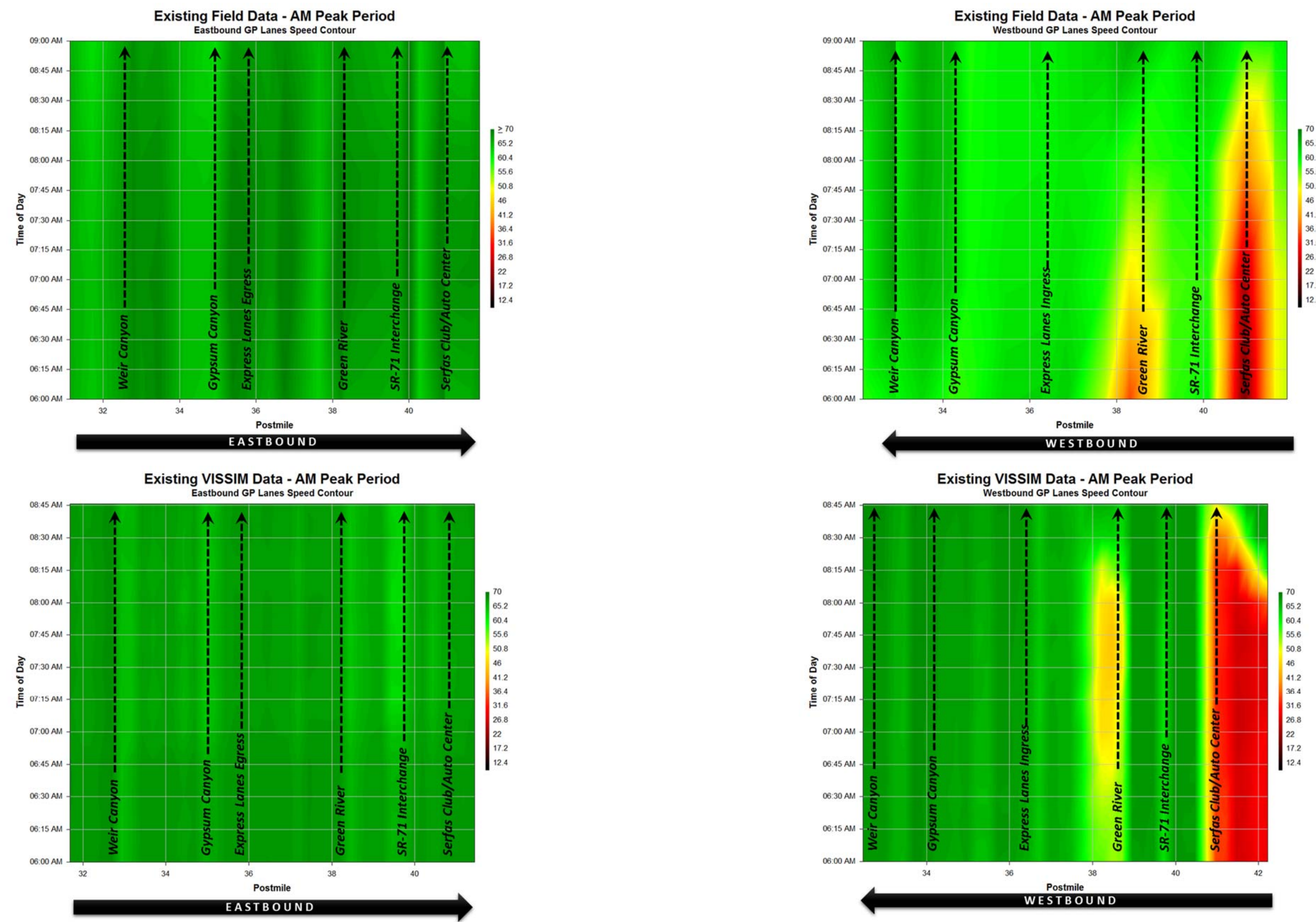
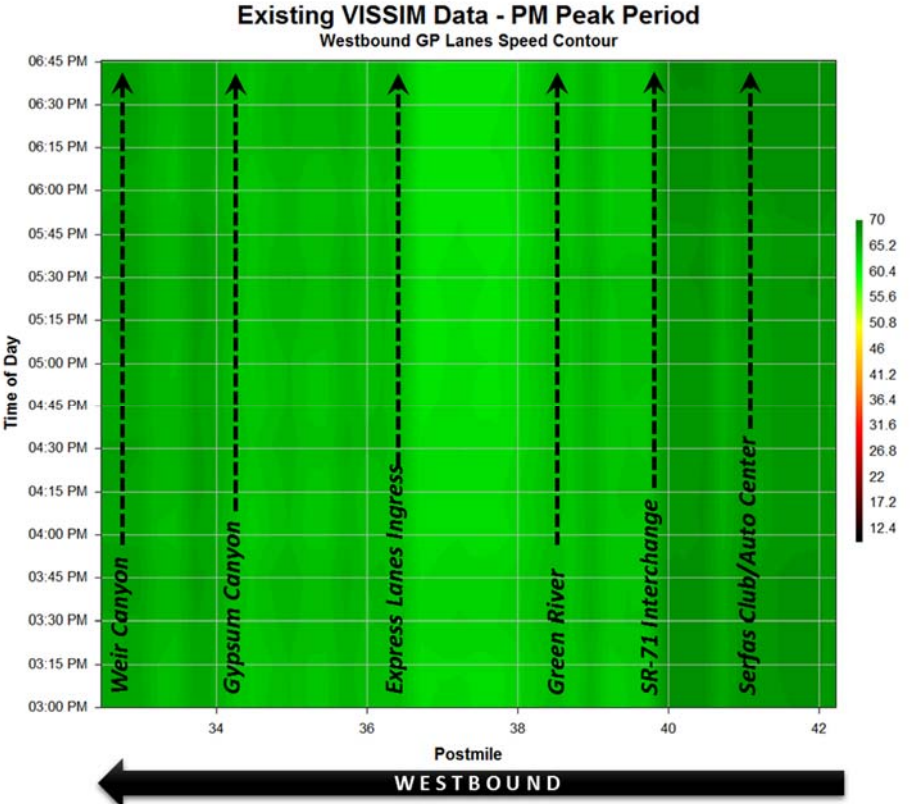
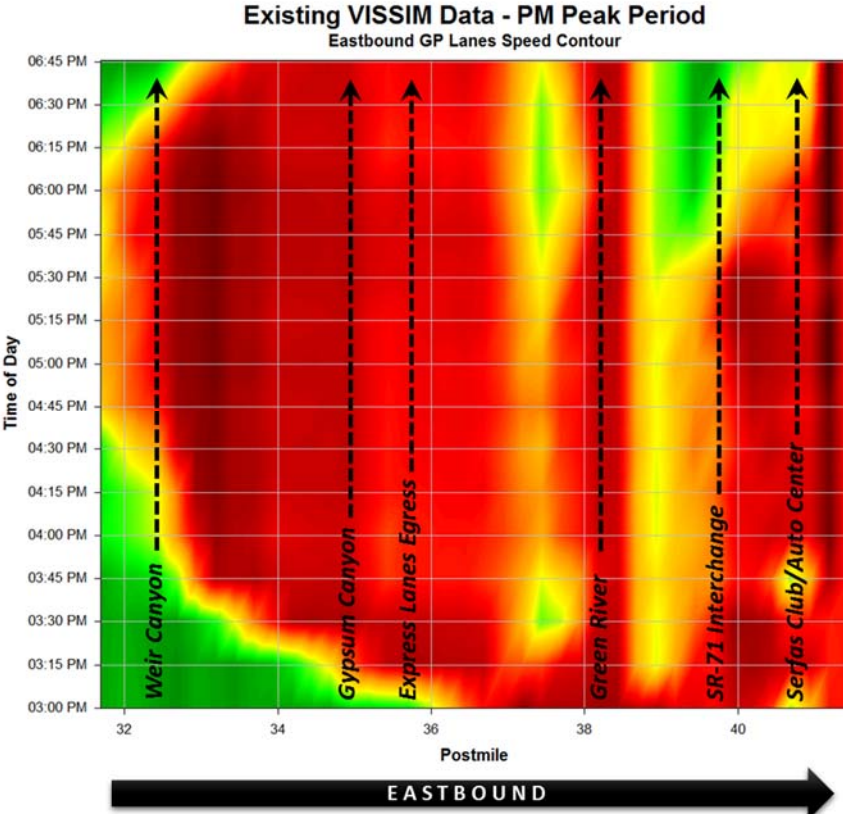
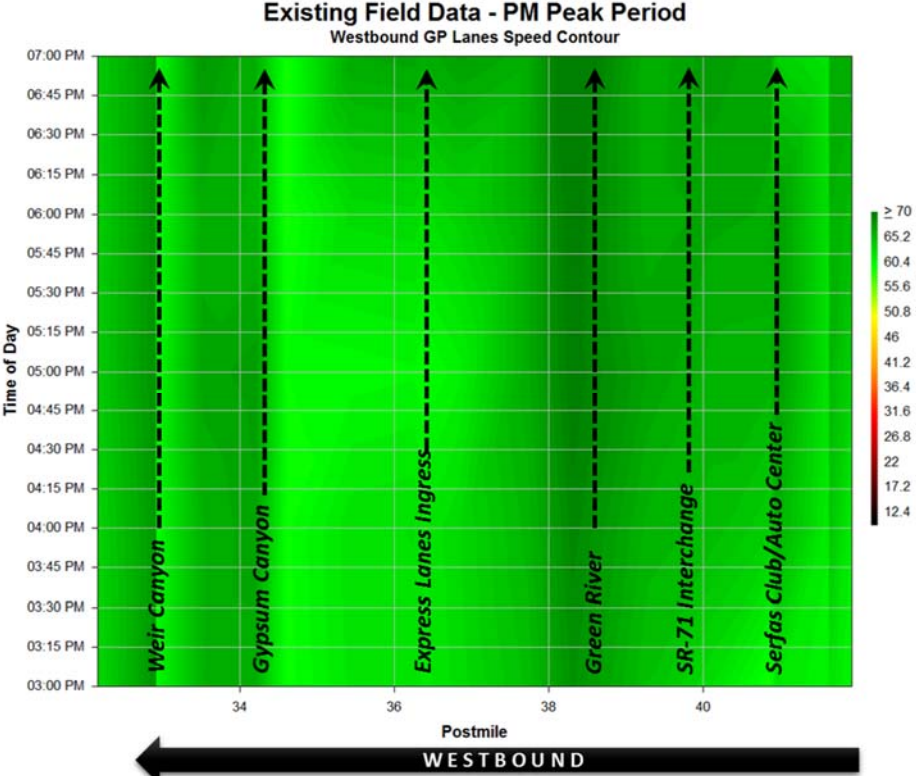
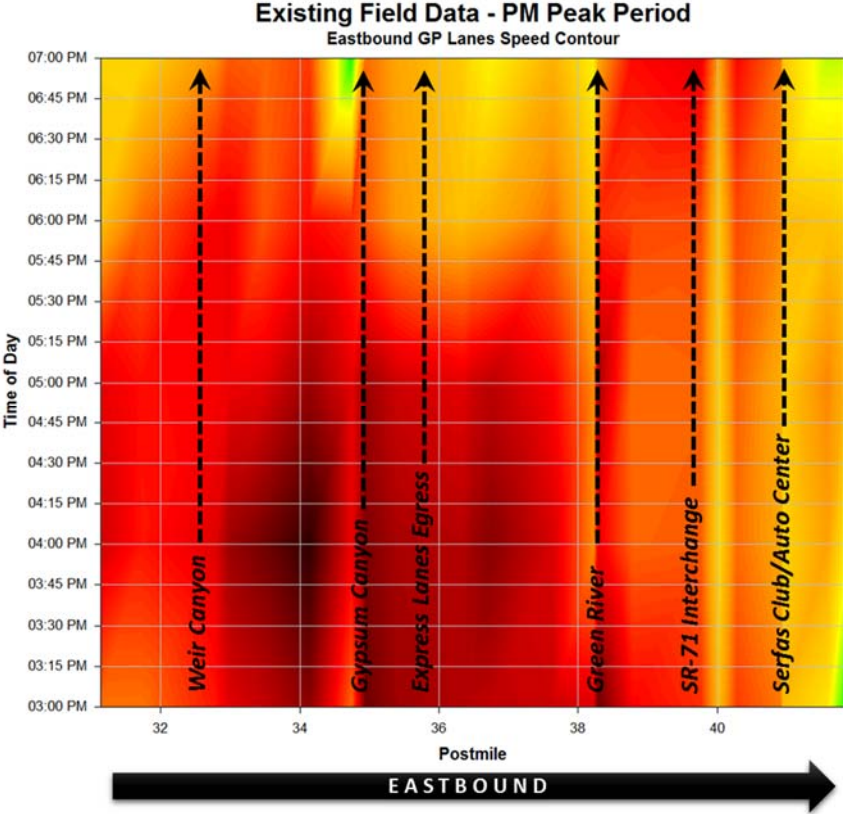


FIGURE 5-5
SR-91 Temporal Speed Diagram – GP Lane Calibration Comparisons, PM Peak Period (3-7 PM)



the vertical lines transitioning between red and green areas. The queues are the red colors upstream of the bottlenecks.

The speed contour plots were a critical tool to ensure that the operations observed in the simulation model approximate expectations for the freeway and network performance. Key focus areas were the location of bottlenecks, duration and extent of queues, and traffic patterns in the network. In general, a comparison of the field and VISSIM plots shows that the “recurring” bottlenecks observed in the existing field data are replicated in the VISSIM model. In the AM peak, the field data shows westbound SR-91 bottlenecks at the westbound Green River on-ramp and at the westbound Serfas Club Drive/ Auto Center Drive on-ramp. Figure 5-4 shows that the calibrated VISSIM model replicates the field reported bottleneck locations, durations, and extent of queues. In the PM peak, the field data shows congestion on eastbound SR-91 throughout the entire study area. Overlapping bottlenecks at Serfas Club Drive/ Auto Center Drive, SR-71, SR-241, and Gypsum Canyon Road cause low speeds and an extended queue through the entire eastbound SR-91 in the study area. Figure 5-5 shows that the calibrated VISSIM model replicates the field reported bottleneck locations, duration, and extent of queues.

AM Peak – GP Lanes

For the AM peak (**Figure 5-4**), in the eastbound direction on the GP lanes, the field and VISSIM speed contour plots match well. Generally, traffic conditions are near free flow speeds in both the field and the model.

In the westbound direction, the field data shows two areas with reduced speeds:

- Near the SR-71 interchange (postmile 40)
- Near the Express Lanes Ingress at the Riverside/Orange County line (postmile 37)

The model shows slowing in both of these locations (SR-71 interchange and the County boundary), although the model has less severe congestion starting at the Express Lane ingress (postmile 37) compared to field data. Although the speed contour plot shows overall higher speed from the model than field data in the AM period westbound direction, travel time and volume throughput are well calibrated during the AM peak hour of 7-8 AM.

PM Peak – GP Lanes

For the PM peak (**Figure 5-5**), in the westbound direction on the GP lanes, the field and VISSIM speed contour plots match well. Generally, traffic conditions are near free flow speeds in both the field and the model, with the exception of the SR-71 interchange (postmile 40) showing speeds dropping to around 50 mph in the field.

In the eastbound direction, the field data shows most locations within the study area with reduced speeds that last the entire duration of the PM period. The model shows slowing in the same locations and generally to the same degree and duration.

5.3.4 Calibration Summary

When reviewing the results, it is important to note that the calibration targets are guidelines (not absolute criteria). It is quite common for calibrated models to not meet all calibration targets over the entire study area. It is ultimately up to the reviewer to determine that the calibrated model is producing results that reflect field conditions at an acceptable level. The goal was not to meet every criterion but to demonstrate that the calibrated model was producing results that reflect field conditions at an acceptable level. After extensive calibration efforts, it was determined by the F/ETCA and the modeling team that the models were calibrated to an acceptable level. In the AM and peak periods, only one of the hours falls outside the target calibration range (>85%).

Based on the comparisons of volumes, travel times, and the temporal speed diagrams between the field and VISSIM data, the AM and PM VISSIM models were considered calibrated and acceptable for use in the development of the future models. The exceptions noted in Sections 5.3.1 and 5.3.2 are considered acceptable given the adherence to the remaining calibration targets (volume, speed, and travel time).

6 Traffic Forecasting Methodology

Future traffic demands were developed for each freeway segment and ramp within the project study limits. There are several traffic studies that have recently been completed or are currently in process that study the SR-91 corridor. The future traffic demands developed for this study were based on two recent traffic studies:

- SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010)
- SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (Stantec, 2011)

To develop the future traffic demands for this study, the forecasts from these studies were compiled into a hybrid forecast that is generally consistent with the forecasts in the previous studies. No new travel/demand modeling was performed as part of this study.

The SR-91 Corridor A project is a long-range project that proposes to build an elevated four-lane facility along the SR-91 corridor from SR-241 to I-15. The design year demands for the 2040 model assumes the Corridor A improvements will not be in place. This assumption is consistent with the 2012 Southern California Association of Governments (SCAG) regional transportation planning (RTP) model (i.e., Corridor A is not included in the 2012 SCAG RTP model).

6.1 Overview of Future Year Demand Development

To develop an estimate of future freeway traffic demands, four data sources were used:

- Existing freeway and ramp volumes (2013)
- Existing travel/demand model data from the Orange County Transportation Analysis Model (OCTAM Version 3.2, provided by OCTA in January 2008)
- Short-term future (2015) travel/demand model data from the SR-91 CIP Final Traffic Study Report (prepared by Parsons Brinckerhoff in 2010)
- Long-term future (2035) travel/demand model data from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (prepared by Stantec in 2011)

Demand for the different years (existing, 2017 and 2040) were all derived from the different models and different studies listed above. When feasible, it is usually preferable to try to use the same model for different years to ensure consistency. However, the decision to use these models was made by the Project Development Team (PDT) prior to the start of the analysis during the development of the methods and assumptions. At that time, the group agreed to build upon the traffic forecasting that had already been done in the study area through the SR-91 CSMP Studies, SR-91 CIP Final Traffic Study Report, and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study. All of these models/studies have limitations. However, the approach in this study was to use the best sources of data which is not necessarily the same model for all years. A discussion of each of these data sources and how they were used to develop the future freeway traffic demands is provided in the following sections.

6.1.1 Existing Traffic Data

The first step in developing future freeway traffic demands was to extract existing traffic volume data from available sources, including PeMS and freeway traffic counts from Caltrans.

Existing traffic volumes were used to help validate the future travel/demand numbers. In cases where existing volumes were found to be higher than the future forecast, adjustments were made to show reasonable growth (i.e., demands that are higher than existing volumes).

6.1.2 Existing OCTAM Data

The OCTAM model incorporates modeling components that are consistent with the SCAG model and provides a regional travel forecasting base for transportation planning work in Orange County. The OCTAM model is regional in nature and suited for macro-level analysis.

The next step in developing future freeway traffic demands was to look at existing OCTAM model data. Peak hour and daily demands for existing conditions were provided to CH2M HILL as part of the SR-91 Express Lanes Extension and State Route 241 Connector Feasibility Study (prepared by CH2M HILL, 2009).

6.1.3 Short-Term Future Data

The SR-91 CIP Final Traffic Study developed 2015 traffic forecasts for the SR-91 corridor (between SR-241 and Magnolia Avenue). The 2015 traffic forecasts represent the opening year of the Initial SR-91 CIP Project. These forecasts were used to develop the 2017 forecasts in this study.

6.1.4 Long-Term Future Data

The SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study developed 2035 traffic forecasts for the SR-91 corridor (between SR-241 and Magnolia Avenue). The 2035 traffic forecasts represent the opening year of the Ultimate SR-91 CIP Project. These forecasts were used to develop the 2040 forecasts in this study.

6.2 Estimate Future Mainline/Ramp Demands

Future freeway traffic demands were a critical input to the traffic modeling. It is important to note that freeway traffic volumes are different than freeway traffic demands. With congestion, not all traffic can be served, so traffic demands are invariably higher than traffic volumes. Along a congested corridor such as SR-91, this issue affects all freeway traffic in the corridor, during both peak periods.

Data analysis of existing volumes and future traffic forecasts was conducted to validate the future mainline and ramp demands from the other studies. In all of the data, westbound SR-91 is the peak directional flow in the morning peak period and eastbound SR-91 is the peak directional flow in the afternoon peak period.

Section 7 discusses the analysis scenarios in detail. However, 2017 and 2040 are the future analysis years of this study. To develop 2017 and 2040 traffic demands from the 2015 and

2035 forecasts available from the SR-91 CIP Final Traffic Study and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue studies, an adjustment process was required.

The steps below outline the process used to develop the 2017 traffic demands for the mainline and ramps in the study area:

- Compared existing volumes with future demands (2015) to ensure that future demands are higher than existing volumes. There were no instances where the existing volumes were higher than the future demands.
- Compared existing OCTAM demands (2000) with future demands from the SR-91 CIP Final Traffic Study (2015) and calculated two average annual growth rates for two sub-areas:
 - o Mainline segments and ramps from the west study limit (Weir Canyon) to the Orange/Riverside County line
 - o Mainline segments and ramps from the Orange/Riverside County line to the east study limit (Serfas Club)
- Applied these growth rates in each sub-area to grow the 2015 demands from the SR-91 CIP Final Traffic Study by two years to develop 2017 traffic demands.
- Balanced the demands along the ramps so that the mainline demand entering the study area minus demands leaving the mainline (via off-ramps) plus demands entering the mainline (via on-ramps) equals the mainline demands leaving the study area.
- Express Lane demands were estimated based on input from OCTA staff to reflect peak operating conditions. These demands were also compared with the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study to ensure consistency.

The steps below outline the process used to develop the 2040 traffic demands for the mainline and ramps in the study area:

- Compared existing volumes with future demands (2035) to ensure that future demands are higher than existing volumes. There were no instances where the existing volumes were higher than the future demands.
- Compared the future demands from the SR-91 CIP Final Traffic Study (2015) with future demands from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (2035) and calculate two average annual growth rates for two sub-areas:
 - o Mainline segments and ramps from the west study limit (Weir Canyon) to the Orange/Riverside County line
 - o Mainline segments and ramps from the Orange/Riverside County line to the east study limit (Serfas Club)
- Applied these growth rates in each sub-area to grow the 2035 demands from the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study by five years to develop 2040 traffic demands.
- Balanced the demands along the ramps so that the mainline demand entering the study area minus demands leaving the mainline (via off-ramps) plus demands entering the mainline (via on-ramps) equals the mainline demands leaving the study area.

- Express Lane demands were estimated based on input from OCTA staff to reflect peak operating conditions. These demands were also compared with the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study to ensure consistency.

With a variety of studies recently completed in this area, it was not feasible to pick one set of forecasts that provided the future demand estimates for the study years in this analysis and also covered the entire study area. It was therefore necessary to use the synthesis approach outlined above, using forecasts from the most applicable studies (SR-91 CIP Final Traffic Study Report and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study).

While the PDT team and technical team determined this was the best approach, there are risks associated with using demand forecasts from multiple studies. The biggest risk associated with the traffic forecasting approach is the perception of error in the forecasts because they are different. In fact, this approach minimizes the likelihood of projection errors, because the forecasts most applicable to each scenario were used. Also, in the next phase of project development, additional traffic forecasting and traffic analysis will be performed as part of the tolling and revenue study. The more detailed forecasting will serve as a method to validate and adjust the traffic forecasts used in the analysis in this study.

6.3 Forecast Results in the Mixing Bowl

The future traffic forecasts served as a direct input into the future VISSIM traffic analysis models. The model results are discussed in Section 8. The subsections below provide more details on the forecasts.

6.3.1 2017 Forecasts

Figures 6-1 (no-build) and 6-2 (build) illustrate the 2017 AM traffic demands applied for the analysis in the mixing bowl area on westbound SR-91. These traffic demands were developed using the process outlined in Section 6.2. The forecasts show that the project will result in approximately 850 vehicles per hour shifting from westbound SR-91 to southbound SR-241. The demand change will lead to fewer vehicles on the westbound SR-91 GP lanes, west of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west. It is also important to note that the westbound Express Lane demand is highest (4,250 vehicles per hour) immediately upstream of the direct connector. Additional discussion of how this demand can be handled is provided in section 8.3.2 (westbound design variation).

FIGURE 6-1
2017 No-Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour

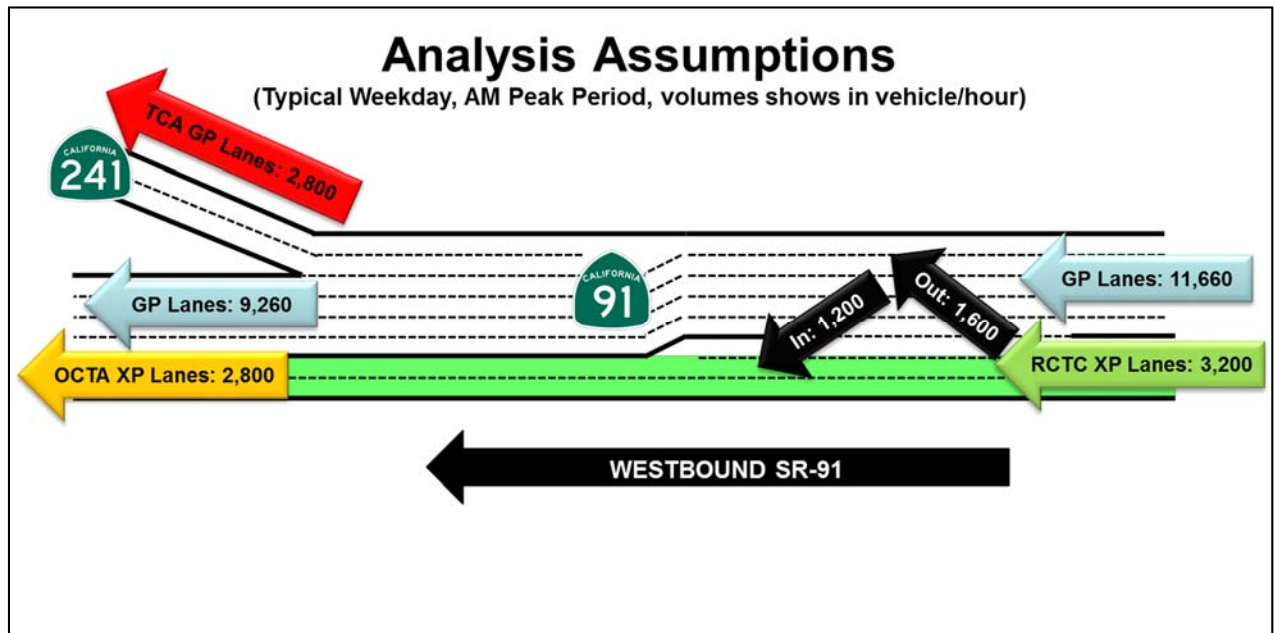
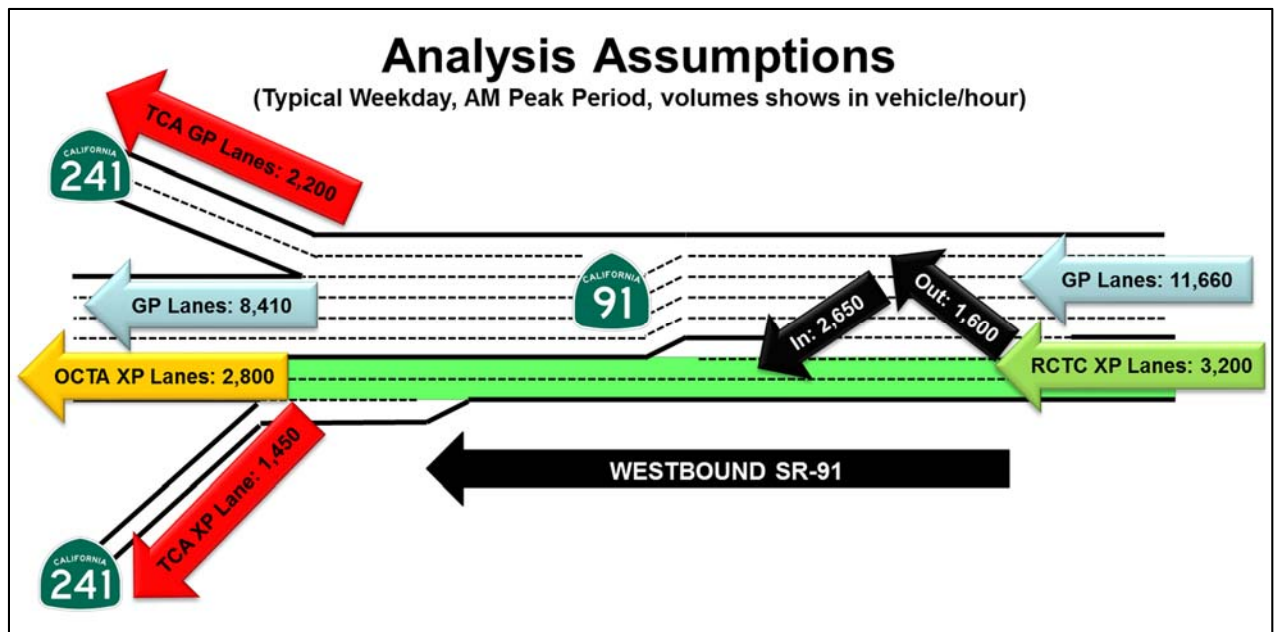


FIGURE 6-2
2017 Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour



Figures 6-3 (no-build) and 6-4 (build) illustrate the 2017 PM traffic demands applied for the analysis in the mixing bowl area on eastbound SR-91. A total of 660 vehicles/hour will shift to northbound SR-241 from other routes (i.e., surface streets, SR-55, and SR-91) with the project. This total includes approximately 190 vehicles per hour that will shift from

eastbound SR-91 to northbound SR-241. The net result of the shifts will be changes in the number of vehicles on the eastbound SR-91 GP lanes. There will be fewer vehicles west of the SR-91/SR-241 interchange and more vehicles east of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west.

FIGURE 6-3
2017 No-Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour

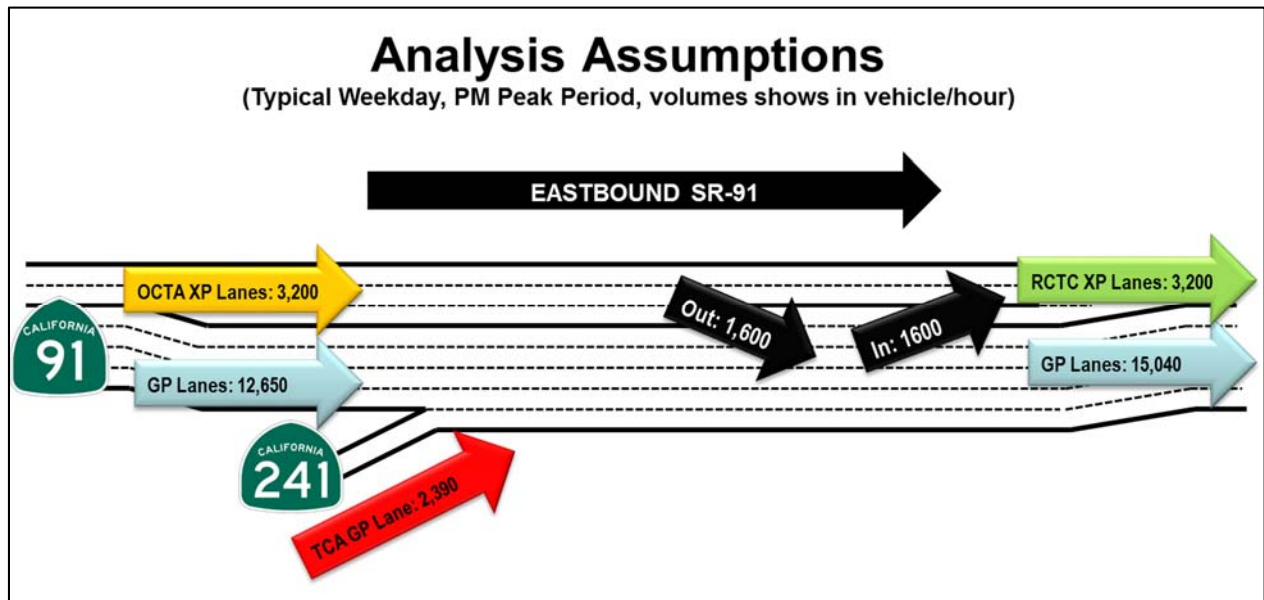
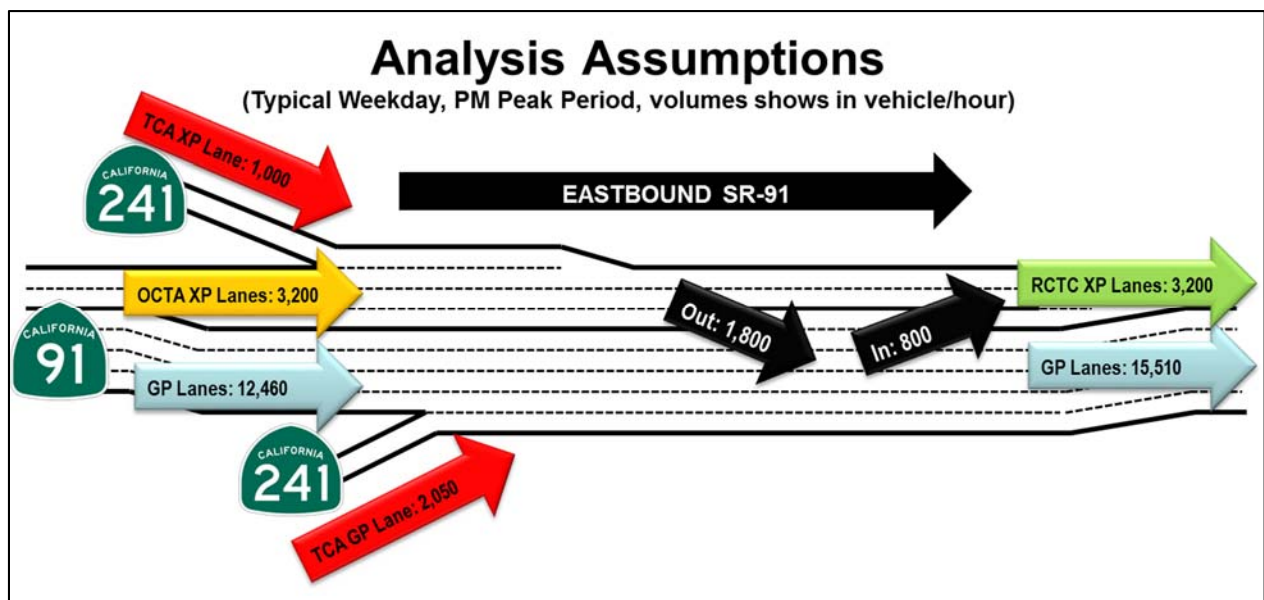


FIGURE 6-4
2017 Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour



6.3.2 2040 Forecasts

Figures 6-5 (no-build) and 6-6 (build) illustrate the 2040 AM traffic demands applied for the analysis in the mixing bowl area on westbound SR-91. The forecasts show that the project will result in approximately 1,320 vehicles per hour shifting from westbound SR-91 to southbound SR-241. The demand change will lead to fewer vehicles on the westbound SR-91 GP lanes, west of the SR-91/SR-241 interchange. This traffic shift will have a positive effect, reducing the demand in the bottleneck area to the west. The westbound Express Lane demand is highest (4,250 vehicles per hour) immediately upstream of the direct connector. Additional discussion of how this demand can be handled is provided in section 8.3.2 (westbound design variation).

FIGURE 6-5
2040 No-Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour

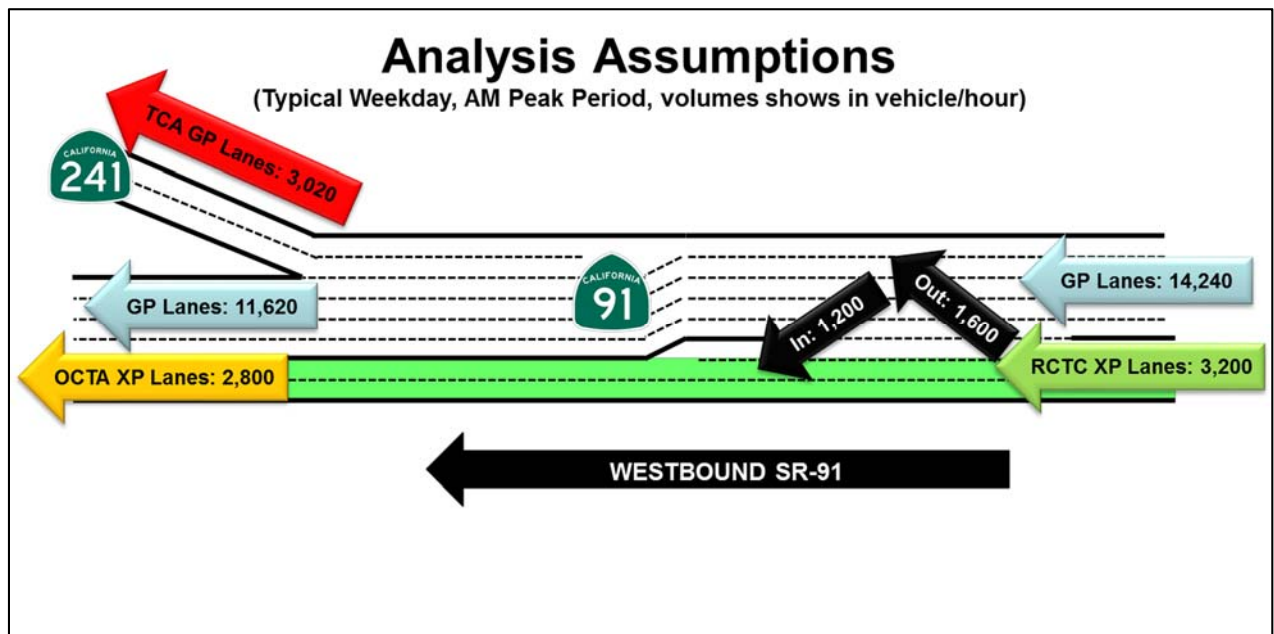
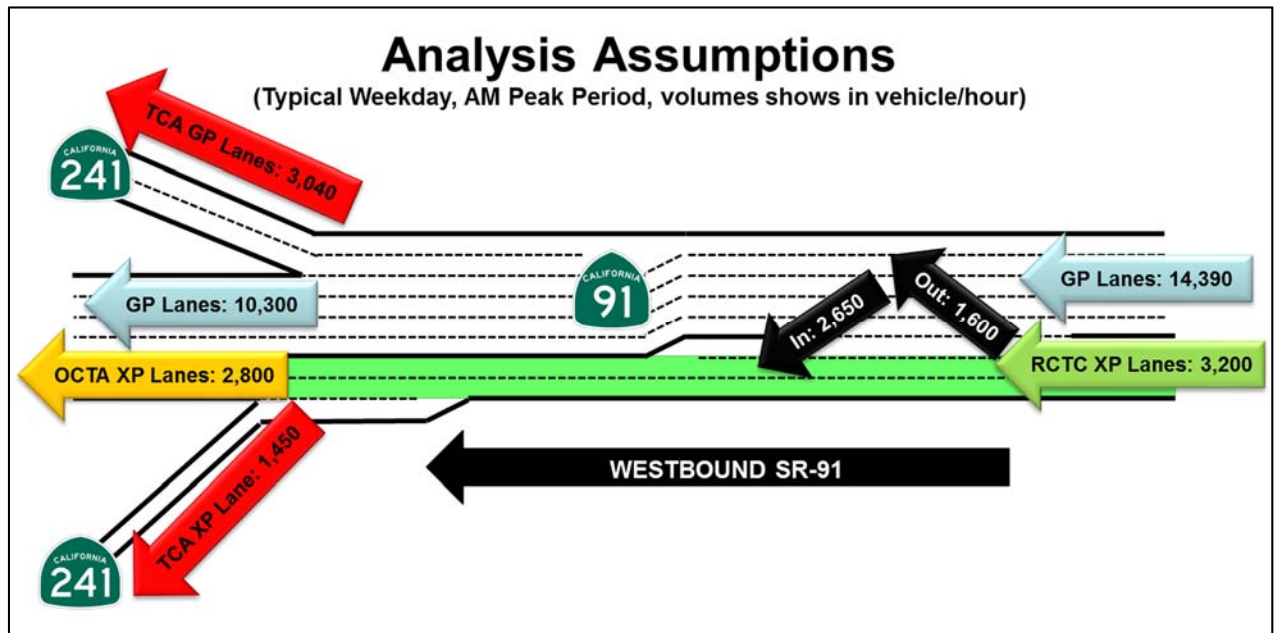


FIGURE 6-6
2040 Build Demand Assumptions in the Mixing Bowl: Westbound SR-91, AM Peak Hour



Figures 6-7 (no-build) and 6-8 (build) illustrate the 2040 PM traffic demands applied for the analysis in the mixing bowl area on eastbound SR-91. The forecasts show that the project will not cause traffic to shift from eastbound SR-91 or other routes (i.e., surface streets, SR-55) to northbound SR-241 in 2040.

FIGURE 6-7
2040 No-Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour

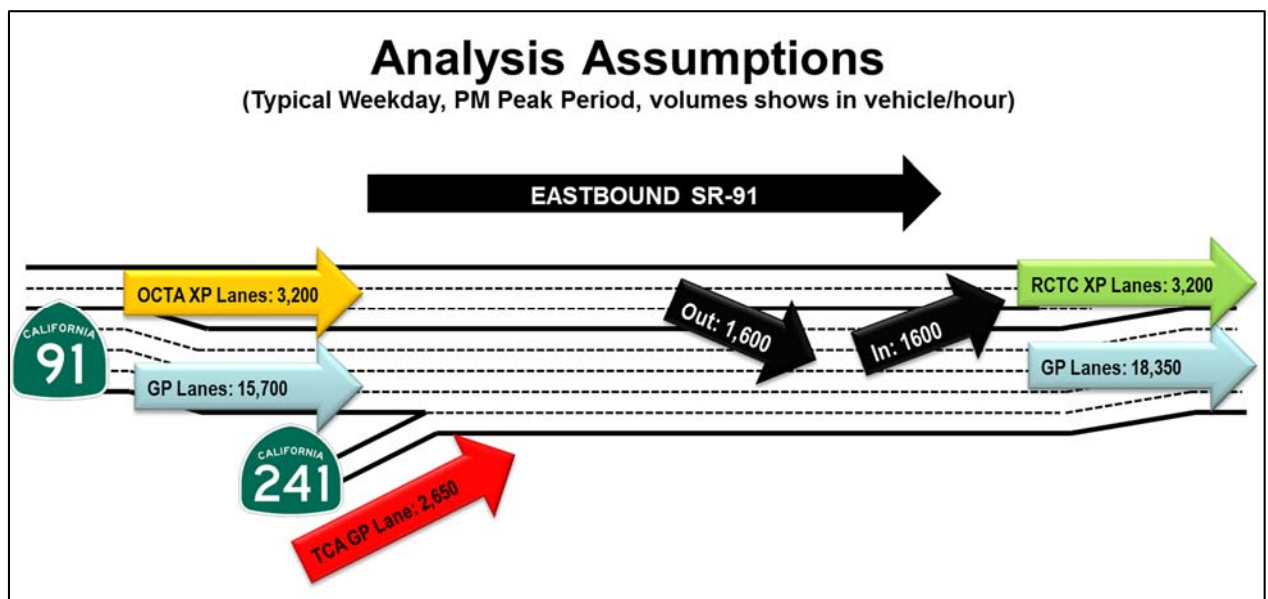
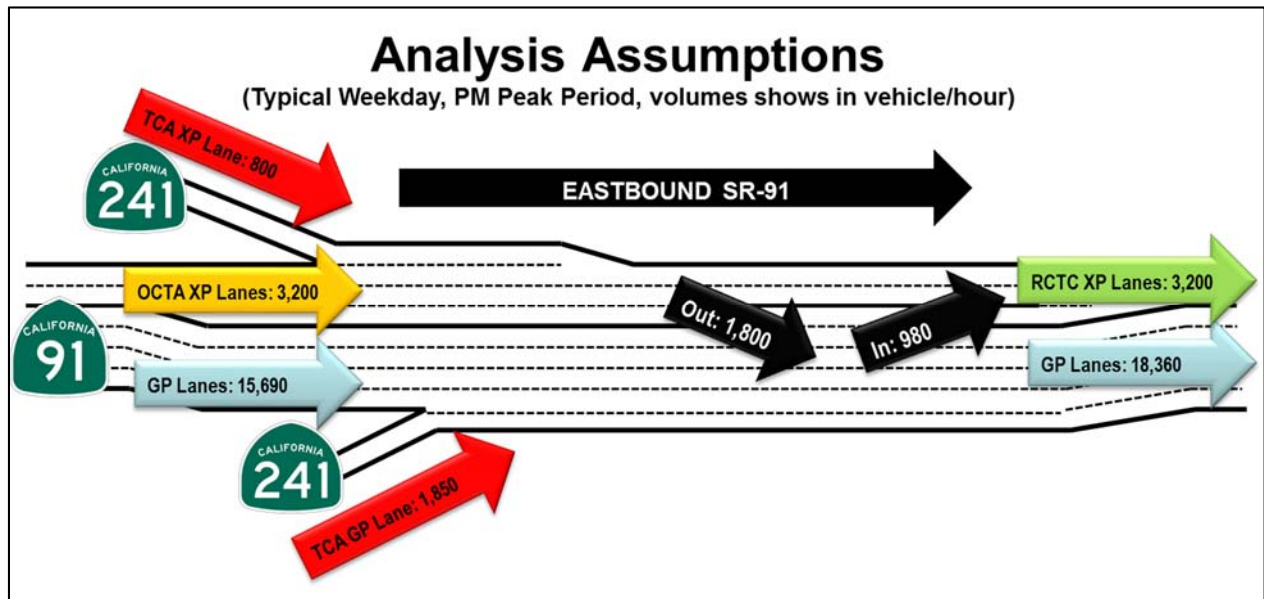


FIGURE 6-8
2040 Build Demand Assumptions in the Mixing Bowl: Eastbound SR-91, PM Peak Hour



6.3.3 Regional Shift to SR-241 with Project

Sections 6.3.1 and 6.3.2 indicate where traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector. The regional shift patterns discussed below are consistent with the data provided in the SR-91 CIP Final Traffic Study Report (Parsons Brinckerhoff, 2010) and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study (Stantec, 2011). As stated earlier in this chapter, the forecasts from the SR-91 CIP Final Traffic Study Report and the SR-91/SR-241 Express Lane Direct Connector Traffic and Revenue Study were compiled into a hybrid forecast and used in this study.

In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.

In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes.

There is one scenario where no regional shift is predicted. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. In 2040, the Ultimate CIP improvements on eastbound SR-91 improve operations to the point that fewer vehicles (200 vehicles/hr less than 2040 no-build)

choose to use the direct connector to access the express lanes because the eastbound GP lanes in the mixing bowl operate with high speeds. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.

7 Traffic Analysis Methodology

7.1 Traffic Analysis Purpose

The goal of the traffic analysis was to identify any critical issues (“fatal flaws”) with the traffic operations of the proposed project (and several variations of the proposed project). Since both existing and future operations on SR-91 will be heavily congested in the peak periods, the goal was not to achieve a specific level of service (LOS). Given the projected demands, the proposed project will not eliminate the congestion on SR-91. In fact, many of the benefits of the operational improvements associated with the proposed project could be hidden by the excess demand in the corridor. For example, if a given improvement reduces congestion at a bottleneck, the excess demand (that previously could not enter the corridor) will “fill in” the newly available capacity. Therefore, the traffic analysis was focused on identifying any new operational issues that could result from the project.

7.2 Overall Approach

The focus of the future year analysis was to assess the benefits of proposed improvements to the SR-91/SR-241 interchange and SR-91 mainline and Express Lanes. The tool for doing so was the VISSIM model, and the existing conditions calibrated model was the starting point for the future year analysis. The demand and supply features of the model were updated for the future year analysis.

- Traffic demands for 2017 and 2040 were coded as model input. The process for estimating the future traffic volumes is described in Chapter 6 (Traffic Forecasting).
- The network supply included the roadway configuration (number of lanes, connections, Express lanes, etc.). F/ETCA has developed plans for the SR-91/SR-241 Direct Connector improvements. RCTC has developed plans for the SR-91 CIP improvements.

Once the demand and supply features were updated, the VISSIM model was run for the 2017 and 2040 peak periods. The output results were compared for various future alternatives of the proposed project as described in Section 7.4.

7.3 Description of Scenarios

The following analysis scenarios were analyzed:

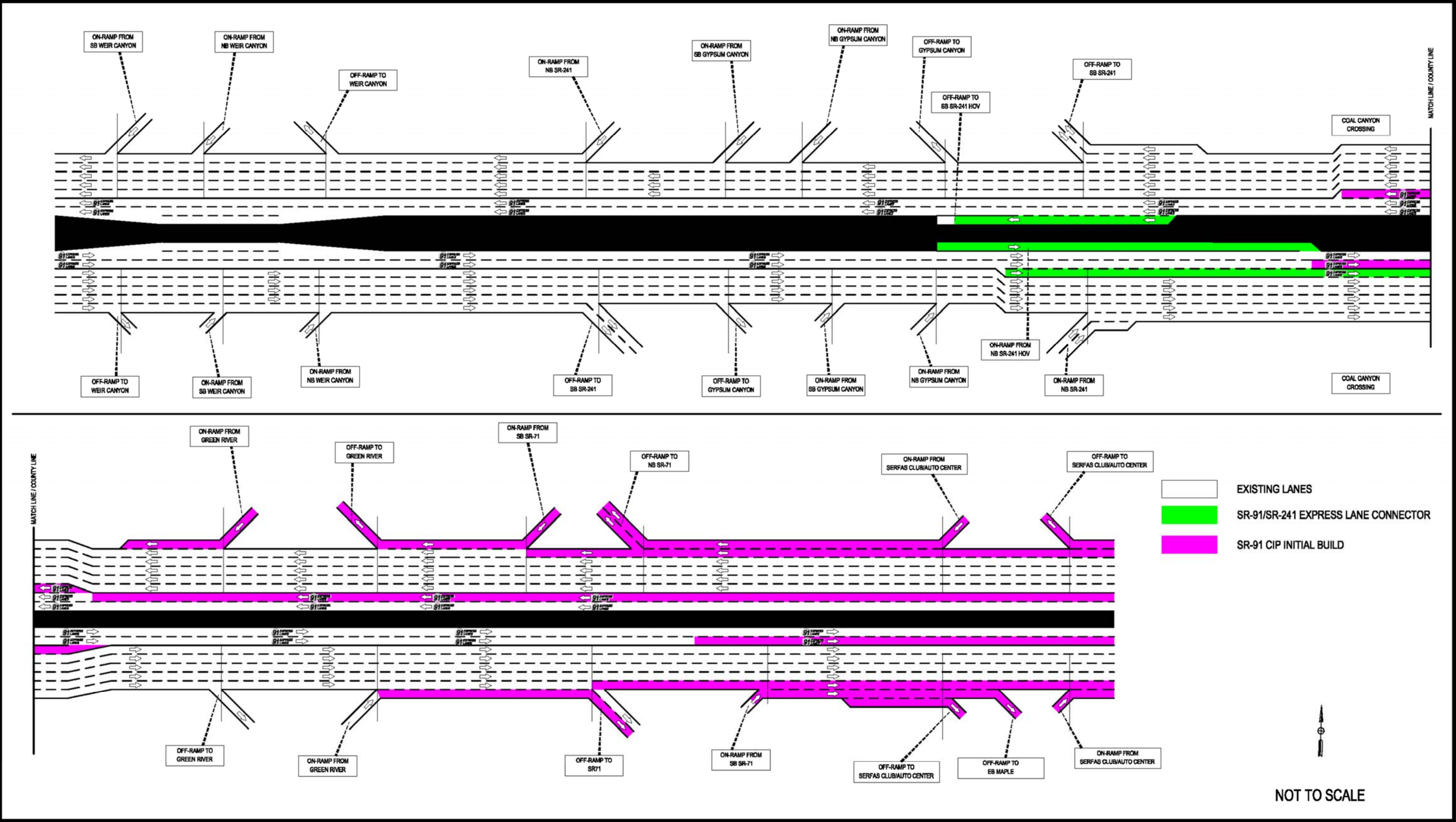
- Opening Year (2017) No Build
- Opening Year (2017) Build
- Design Year (2040) No Build
- Design Year (2040) Build

For each analysis scenario, the morning (6 to 9 AM) and evening (3 to 7 PM) peak periods were analyzed. Volumes were split by vehicle type (toll, non-toll, truck, etc.).

In the study area, there are several other projects that may be constructed before and after the opening of the SR-241/SR-91 Express Lane Connector project. These projects were considered in capturing the future lane geometry. Figures 7-1 and 7-2 illustrate the study area and lane geometry inputs that were used for the Opening Year and Design Year traffic analysis, respectively. The shaded lanes on the figures illustrate which project will provide lanes that do not exist today.

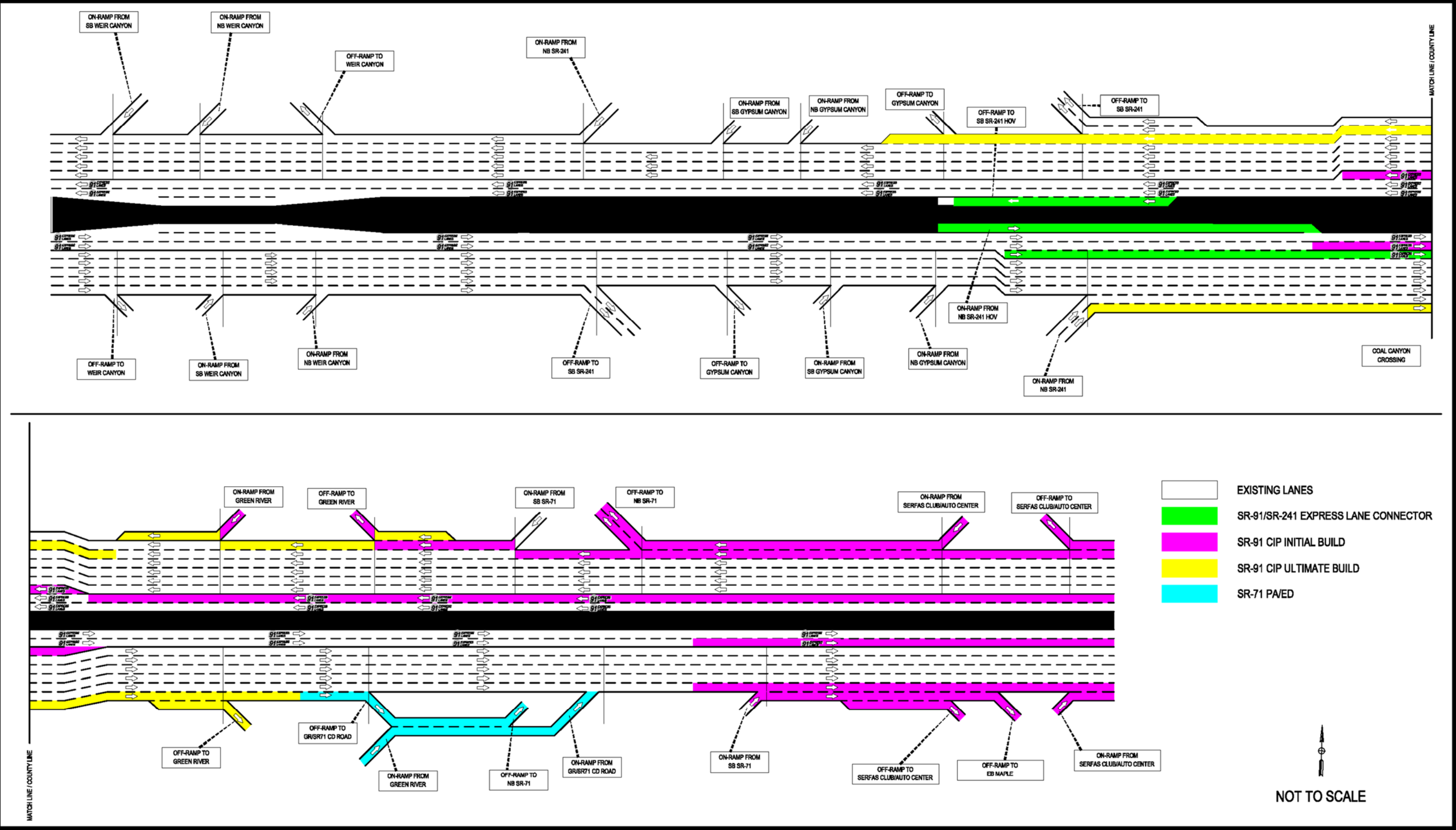
These results are summarized in Chapter 8.

FIGURE 7-1
Lane Geometry – Opening Year Analysis (2017)



Source: CH2M HILL

FIGURE 7-2
Lane Geometry – Design Year Analysis (2040 without Corridor A)



Source: CH2M HILL

8 Traffic Analysis Results

The results of the VISSIM model runs are discussed in this section. The detailed results are for an average of multiple runs (10) with different random number seeds. Detailed model output is provided in Appendix B through F.

Several MOEs are summarized for each scenario to best understand the relative differences between each scenario.

8.1 2017 Conditions (No-Build vs. Build)

8.1.1 Volume Served

Throughput volumes and percent of demand unserved were compared between the 2017 No-Build and Build scenarios. Throughput volume and percent of demand unserved are both measured by combining the GP and Express lanes along SR-91 between Weir Canyon Road and Serfas Club/ Auto Center Drive in the AM and PM peak periods.

AM Peak Period

Table 8-1 compares volume throughput and percent demand unserved between the 2017 No-Build and Build scenarios in the AM peak period (6 to 9 AM).

Figure 8-1 illustrates the volume throughput comparisons in the westbound GP and Express lanes between the 2017 No-Build and Build scenarios in the AM peak hour (worst hour of the peak period). The No-Build and Build scenarios have similar combined demand (GP and Express lane trips) in the peak westbound direction of travel east of the SR-91/SR-241 interchange, but the Build scenario has approximately 7% lower combined demand (or 2,400 vehicles) west of the SR-91/SR-241 interchange, due to a shift of travel patterns that increases demand southbound on SR-241.

In the 2017 AM peak, building the connector will allow the corridor to serve more vehicles (about 2%) and more vehicles are able to enter the study area. This represents a significant improvement in the overall efficiency of the system.

Under the Build scenarios, the volume served on SR-91 westbound east of the SR-91/SR-241 interchange is on average 5% greater than the No-Build scenarios. Also, the Build scenario has similar throughput volume to the No-Build scenario west of the SR-91/SR-241 interchange, while the percent unserved is approximately 6% lower in the Build scenario compared to the No-Build scenario. The SR-91 westbound-to-SR-241 southbound ramps serve approximately 2,800 more vehicles in the AM peak period in the Build scenario compared to the No-Build scenario, due to the addition of the direct-connector ramp. The conclusion is that in the 2017 AM peak, building the connector will allow the corridor to serve more vehicles (about 2%) and more vehicles are able to enter the study area. This represents a significant improvement in the overall efficiency of the study area.

PM Peak Period

Table 8-2 compares volume throughput and percent demand unserved between the 2017 No-Build and Build scenarios in the PM peak period (3 to 7 PM). **Figure 8-2** illustrates the volume throughput comparisons in the eastbound GP and Express lanes between the 2017 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). The Build scenario has slightly less combined demand (GP and Express lane trips) in the peak eastbound direction of travel on SR-91 west of the SR-91/SR-241 interchange when compared to the No-Build scenario (approximately 700 vehicles less during the PM peak period). However, the Build scenario has slightly higher combined demand east of the SR-91/SR-241 interchange (approximately 1,800 vehicles more during the PM peak period). This is due to an increase in demand at the SR-241 northbound-to-SR-91 eastbound movement in the Build scenario caused by the addition of the direct-connector ramp. This implies that the project will pull trips to SR-241 from the regional freeway system (e.g. SR-55), and local arterials. Under the Build scenario, the changes in volume served are summarized below:

- West of the SR-91/SR-241 interchange, the volume served is slightly lower (approximately 940 total fewer vehicles during the PM peak period) than the No-Build scenario along the peak direction of travel (eastbound). This change is due to the heavy GP lane demand on SR-91 eastbound just downstream of the Express Lane egress/ingress.
- East of the SR-91/SR-241 interchange, the volume served is slightly higher (approximately 900 total more vehicles during the PM peak period) than the No-Build scenario along the peak direction of travel (eastbound). This change is due to the increase in demand through the Express Lanes in the mixing bowl with the project.

Table 8-2 shows that the 2017 PM overall average difference between the No-Build and Build scenarios in volume served in the eastbound direction is -0.3%. This is because of the negative and positive segment differences summarized in the bullets above. This overall eastbound corridor difference is considered nominal and the Build scenario is not projected to have a noticeable effect on the GP lanes in comparison to the No-Build scenario.

TABLE 8-1

Vehicle Throughput Comparison – SR-91 Westbound GP and Express Lanes, 2017 No-Build and Build, AM Peak Period (6-9 AM)

Screenline Location	2017 No-Build AM									2017 Build AM									Throughput Volume Difference	
	Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved			Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
East of Serfas Club/Auto Center Drive	22367	9185	31552	21575	9143	30718	3.5%	0.5%	2.6%	22349	9184	31533	21866	9143	31009	2.2%	0.4%	1.7%	291	0.9%
Between Serfas Club/Auto Center Drive and SR-71	25820	9185	35005	24038	9143	33180	6.9%	0.5%	5.2%	25794	9184	34978	25261	9143	34405	2.1%	0.4%	1.6%	1225	3.7%
Between SR-71 and Green River Road	26530	9185	35715	21917	9143	31059	17.4%	0.5%	13.0%	26511	9184	35695	24077	9143	33220	9.2%	0.4%	6.9%	2161	7.0%
Between Green River Road and SR-241 Ramp (WB to SB)	33680	9185	42865	26256	9143	35398	22.0%	0.5%	17.4%	33659	9184	42843	29011	9143	38154	13.8%	0.4%	10.9%	2756	7.8%
Between SR-241 GP Ramp (WB to SB) and Gypsum Canyon Road	26790	8040	34830	21368	7421	28789	20.2%	7.7%	17.3%	24334	8033	32367	21119	7605	28724	13.2%	5.3%	11.3%	-66	-0.2%
Between Gypsum Canyon Road and SR-241 Ramp (NB to WB)	25631	8040	33671	20951	7421	28372	18.3%	7.7%	15.7%	23187	8033	31220	20641	7605	28245	11.0%	5.3%	9.5%	-127	-0.4%
Between SR-241 Ramp (NB to WB) and Weir Canyon Road	26493	8040	34533	21738	7421	29159	17.9%	7.7%	15.6%	24049	8033	32082	21456	7605	29061	10.8%	5.3%	9.4%	-99	-0.3%
West of Weir Canyon Road	26041	8040	34081	22091	7421	29512	15.2%	7.7%	13.4%	23598	8033	31631	21513	7605	29117	8.8%	5.3%	7.9%	-395	-1.3%
Average =																			2.1%	

FIGURE 8-1

SR-91 Westbound Mainline and Toll Facility Vehicle Volume by Location - 2017 No-Build and Build, AM Peak Hour (7-8 AM)

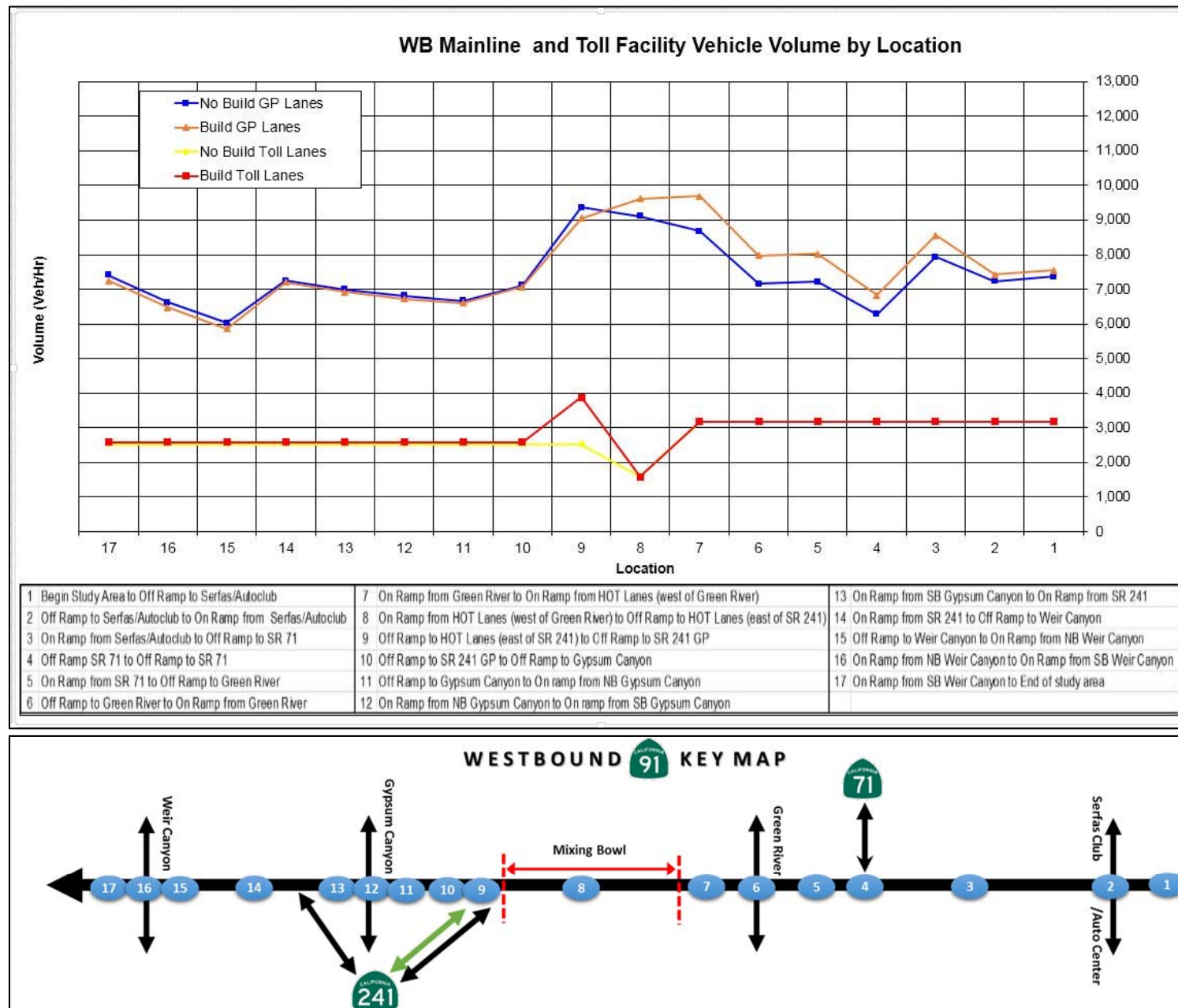


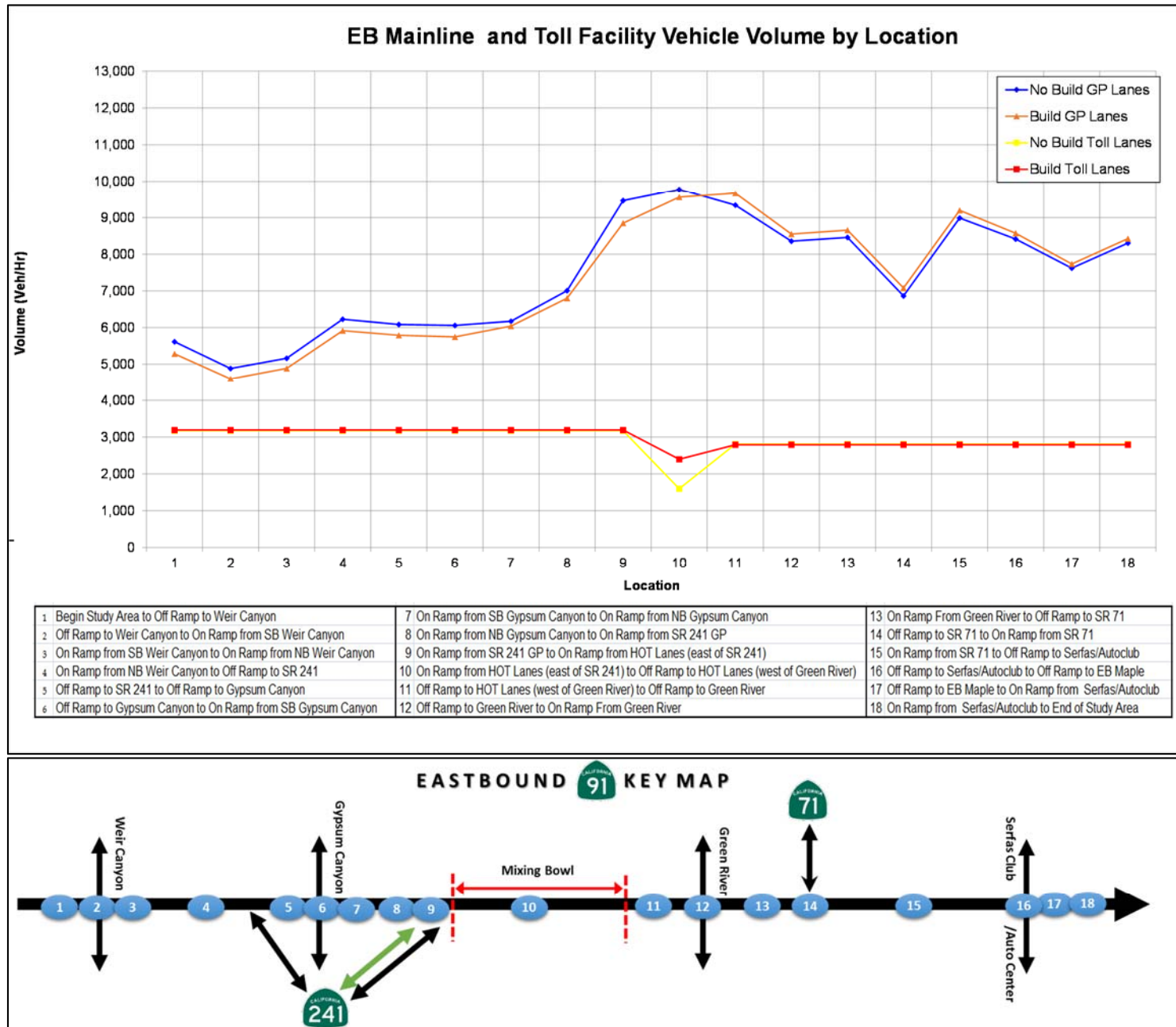
TABLE 8-2

Vehicle Throughput Comparison – SR-91 Eastbound GP and Express Lanes, 2017 No-Build and Build, PM Peak Period (3-7 PM)

Screenline Location	2017 No-Build PM									2017 Build PM									Throughput Volume Difference	
	Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved			Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
West of Weir Canyon Road	44952	12164	57116	23492	12079	35570	47.7%	0.7%	37.7%	44278	12160	56438	22231	12147	34379	49.8%	0.1%	39.1%	-1192	-3.4%
Between Weir Canyon Road and SR-241 Ramp (EB to SB)	43963	12164	56127	25622	12079	37701	41.7%	0.7%	32.8%	43288	12160	55448	24469	12147	36616	43.5%	0.1%	34.0%	-1085	-2.9%
Between SR-241 Ramp (EB to SB) and Gypsum Canyon Road	42981	12164	55145	25006	12079	37084	41.8%	0.7%	32.8%	42303	12160	54463	23997	12147	36144	43.3%	0.1%	33.6%	-940	-2.5%
Between Gypsum Canyon Road and SR-241 Ramp (NB to EB)	46765	12164	58929	28490	12079	40569	39.1%	0.7%	31.2%	46080	12160	58240	27876	12147	40023	39.5%	0.1%	31.3%	-546	-1.3%
Between SR-241 Ramp (NB to EB) and Green River Road	56264	12160	68424	37201	10845	48046	33.9%	10.8%	29.8%	58075	12160	70235	38555	10804	49359	33.6%	11.2%	29.7%	1313	2.7%
Between Green River Road and SR-71	47246	12160	59406	33517	10845	44363	29.1%	10.8%	25.3%	49097	12160	61257	34409	10804	45213	29.9%	11.2%	26.2%	850	1.9%
Between SR-71 and Serfas Club/Auto Center Drive	46179	12160	58339	35152	10845	45997	23.9%	10.8%	21.2%	48034	12160	60194	36088	10804	46892	24.9%	11.2%	22.1%	895	1.9%
East of Serfas Club/Auto Center Drive	41019	12160	53179	32247	10845	43092	21.4%	10.8%	19.0%	42816	12160	54976	32876	10804	43680	23.2%	11.2%	20.5%	588	1.4%
Average =																			-0.3%	

FIGURE 8-2

Eastbound Mainline and Toll Facility Vehicle Volume by Location - 2017 No-Build and Build, PM Peak Hour (4-5 PM)



8.1.2 Speed

Average speeds along the SR-91 GP lanes were compared between the 2017 No-Build and 2017 Build scenarios using temporal speed diagrams for the peak period. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation. Average speeds were also compared along the SR-91 GP and Express lanes for the peak hour using line charts.

AM Peak Period

Figure 8-3 illustrates the average speed contours for the westbound GP Lanes on the SR-91 corridor in both the 2017 No-Build and Build AM peak period scenarios. The contour plots are assigned a different color and depict a profile of speeds along the corridor throughout the entire AM peak period. The speed profiles make it easy to identify the beginning and end locations and intensity of the congestion within the corridor. They also help identify the length of queues in a particular direction.

In the AM peak period, both the 2017 No-Build and Build scenarios show a similar congestion pattern upstream (or east) of the weaving segment between the SR-241 and the Green River Road interchange (the Express Lane ingress/egress area). The No Build scenario queue extends almost one mile further upstream (or east) than the Build scenario, which shows that the Build scenario provides some congestion relief.

In the 2017 AM Build scenario, an increase in speed of 13 mph is expected on the mainline westbound segments west of SR-241 interchange.

Figure 8-4 also illustrates the speed comparisons in the westbound GP and Express Lanes between the 2017 No-Build and Build scenarios in the AM peak hour (7 to 8 AM worst hour of the peak period). In the 2017 Build scenario, an increase in speed of approximately 13 miles per hour (mph) is expected on the mainline westbound segments east of SR-241 interchange (from 15 mph in the No-Build scenario up to 28 mph in the Build scenario).

The conclusion is the project will provide some congestion relief in the 2017 AM peak period by reducing the extent of the westbound bottleneck by approximately one mile.

PM Peak Period

Figure 8-5 illustrates the average speed contours for the eastbound GP Lanes on the SR-91 corridor in both the 2017 No-Build and Build PM peak period scenarios.

In the PM peak period, the mainline segments in the eastbound direction show the same congestion pattern in both 2017 No-Build and Build scenarios. In the 2017 Build scenario, a slight decrease in speed is expected on the GP segments east of the SR-91/SR-241 interchange between SR-241 and Green River Road interchange. The additional friction in the ingress/egress area between the Express Lanes and the slow-moving GP lanes is the reason for the slight decrease in speed in these areas with the addition of the project.

Figure 8-6 also illustrates the speed comparisons in the eastbound GP and Express Lanes between the 2017 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). In the 2017 Build scenario, a slight decrease in speed is expected on the mainline eastbound segments upstream (or west) of the Express Lane ingress/egress locations. This decrease is due to the increased demand on the GP lanes downstream of the Express Lane ingress/egress caused by the Build scenario. This slight decrease in speeds (one to six mph) on the eastbound GP lanes (west of the Express Lane ingress/egress locations) with the project is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1).

FIGURE 8-3
SR-91 Westbound Temporal Speed Diagram – 2017 GP Lane Comparisons, AM Peak Period (6-9 AM)

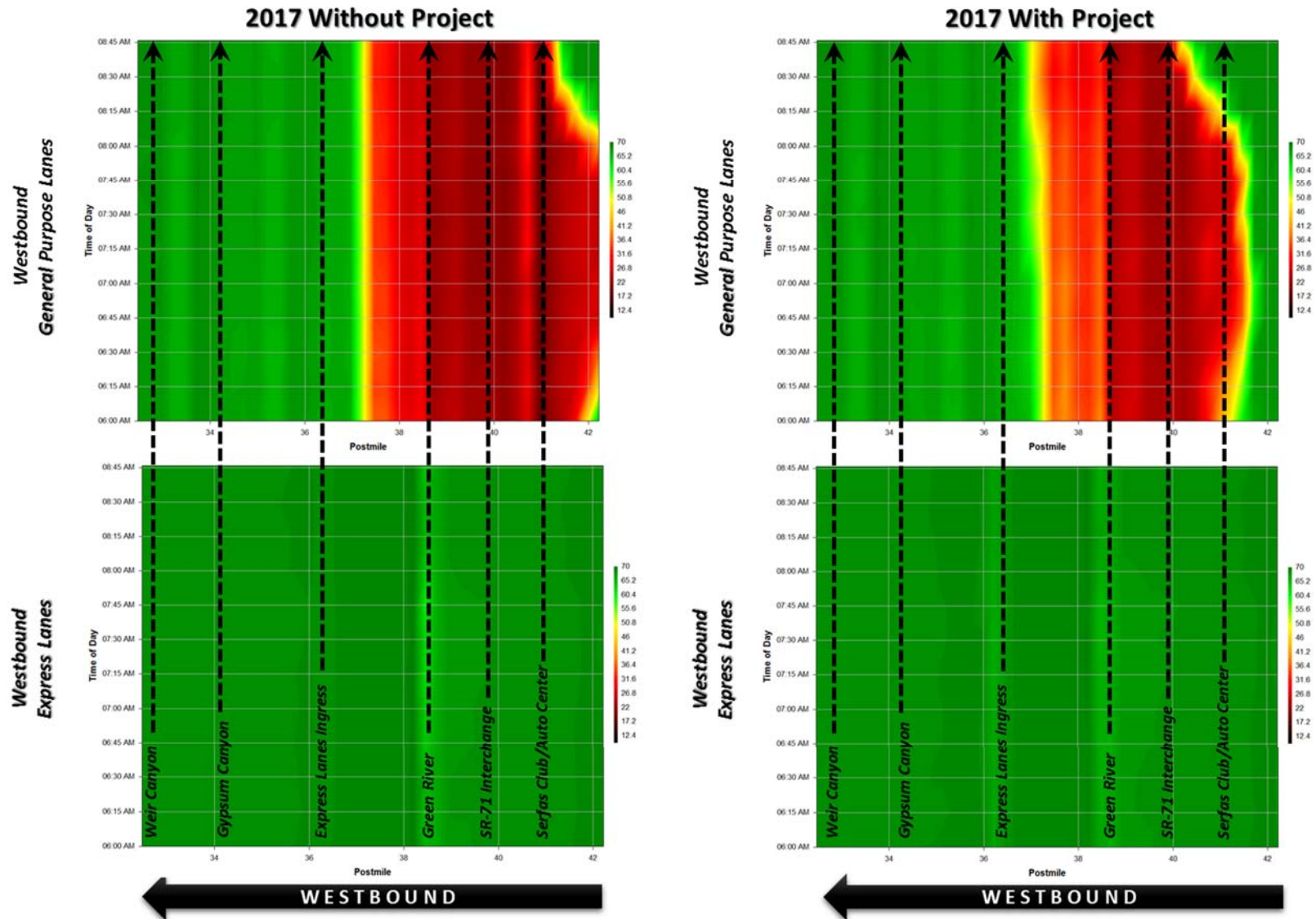


FIGURE 8-4

SR-91 Westbound Mainline and Toll Facility Speed Comparisons - 2017 No-Build and Build, AM Peak Hour (7-8 AM)

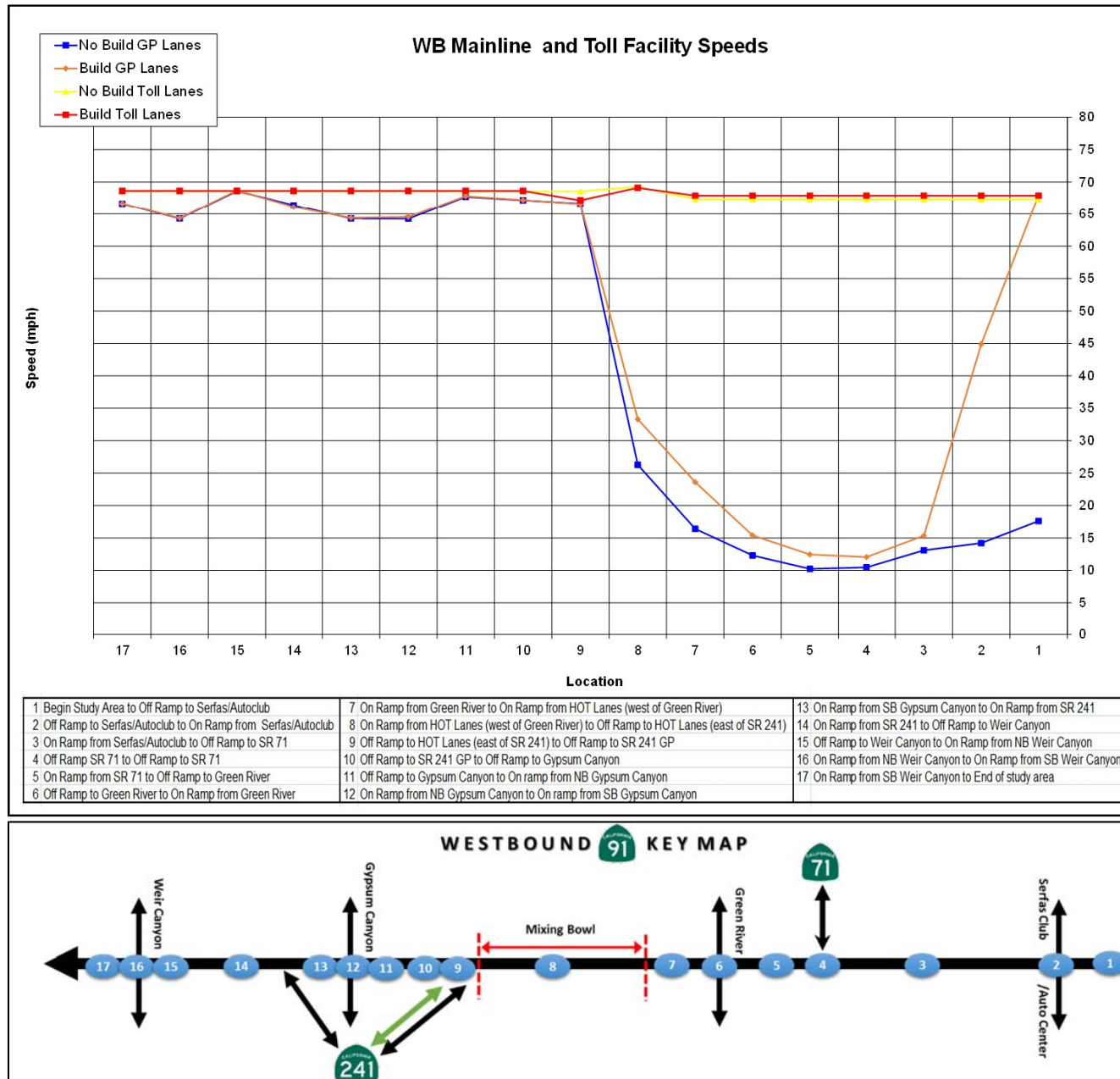


FIGURE 8-5
SR-91 Eastbound Temporal Speed Diagram – 2017 GP Lane Comparisons, PM Peak Period (3-7 PM)

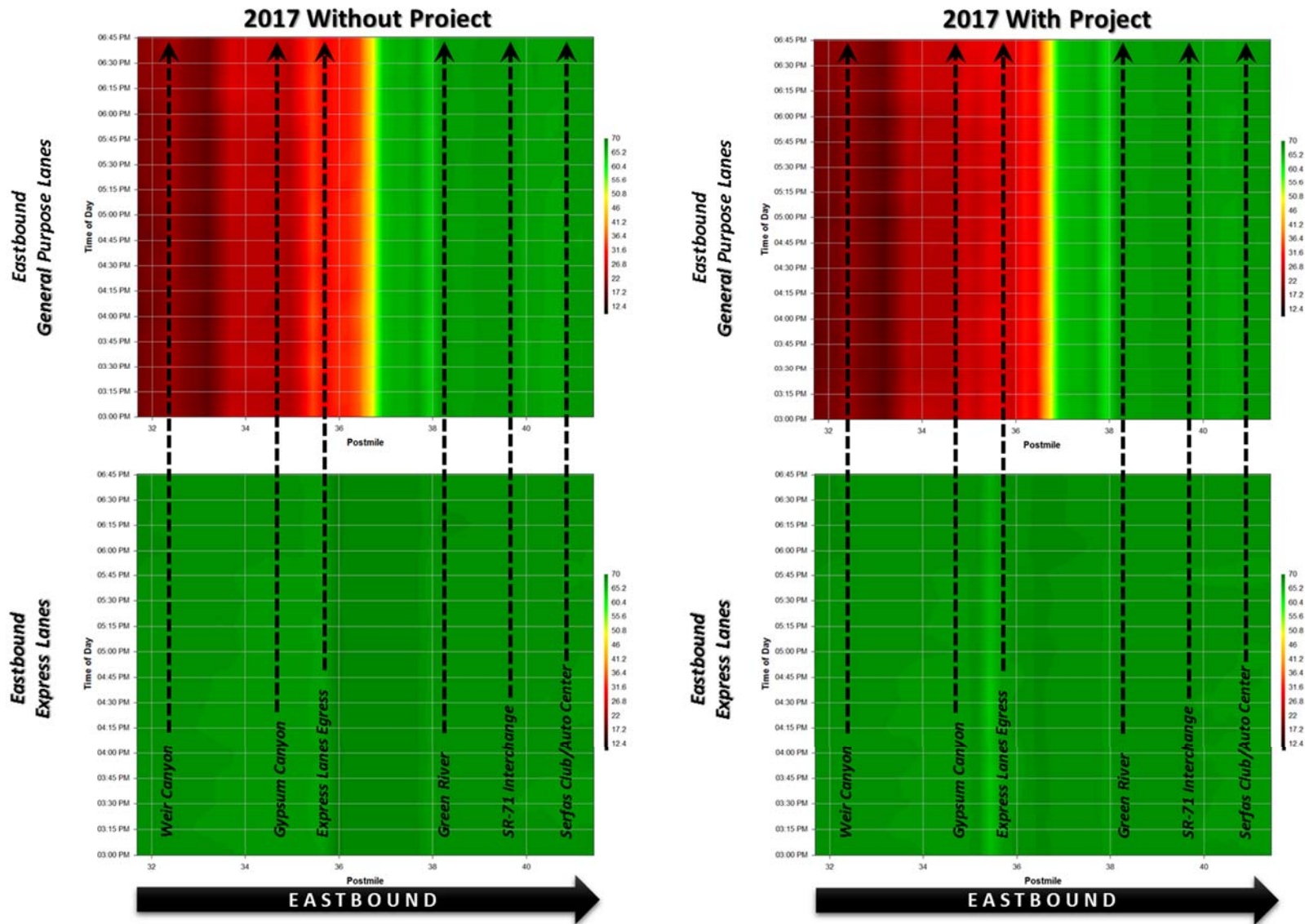
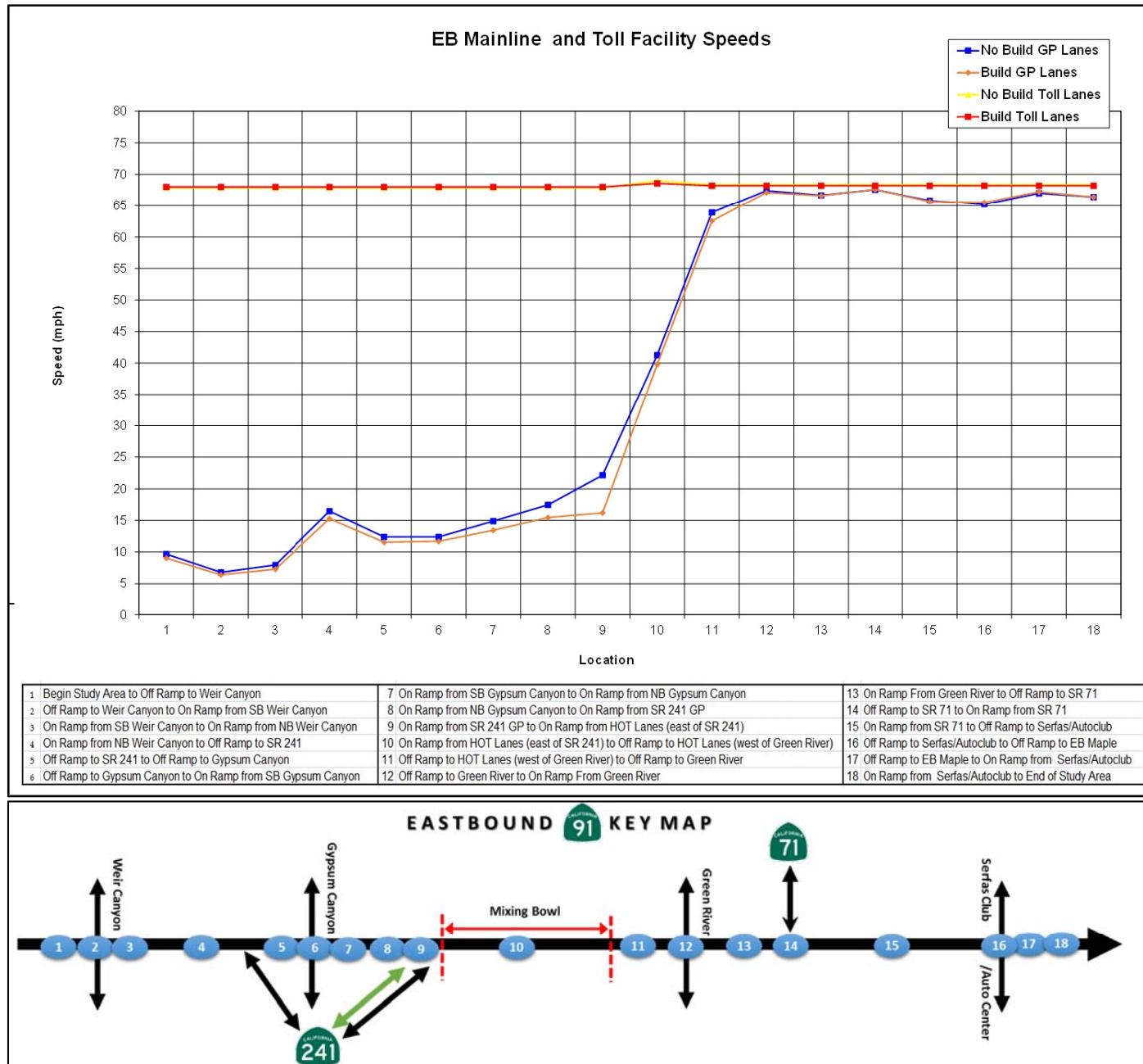


FIGURE 8-6
SR-91 Eastbound Mainline and Toll Facility Speed Comparisons - 2017 No-Build and Build PM Peak Hour (4-5 PM)



8.1.3 Density and LOS

AM Peak Period

Figure 8-7 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the westbound AM peak direction. The Express Lane results are not reported because the Express Lanes are tolled in a manner that maintains LOS D or better operations throughout the study area during all times of the day.

In the AM peak hour (7 to 8 AM), the mainline segments in the westbound direction will operate at the same or better LOS in the 2017 Build scenario compared to the No-Build scenario. In the 2017 Build scenario, a slight decrease in density is expected on the westbound mainline segments already operating at LOS F in the No-Build scenario (east of SR-241).

In the AM peak hour (7 to 8 AM), the mainline segments in the westbound direction will operate at the same or better LOS in the 2017 Build scenario compared to the No-Build scenario.

The project will therefore slightly improve density/LOS in the 2017 AM peak period on the SR-91 GP lanes in the westbound direction between the Express Lane ingress/egress area and the eastern limits of the study area (Serfas Club Drive/Auto Center Drive).

PM Peak Period

Figure 8-8 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the eastbound PM peak direction.

In the PM peak hour (4-5 PM), the mainline segments in the eastbound direction west of the Express Lane ingress/egress will operate at the same LOS in both 2017 No-Build and Build scenarios. In the 2017 Build scenario, an increase in density is expected on the GP segments operating in LOS F (west of Green River Road interchange) due to an increase in demand in the GP lanes downstream of the Express Lane ingress/egress area between SR-241 and Green River Road interchange.

The project will therefore slightly worsen density/LOS in the 2017 PM peak period on the SR-91 GP lanes in the eastbound direction between the Express Lane ingress/egress area and the western limits of the study area (Weir Canyon Road), but is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1). Density will increase in the eastbound SR-91 GP lanes by approximately 4.8% on average with the project in the 2017 PM peak period. However, combined throughput (GP and Express Lanes) will increase by 5.2% (approximately 600 veh/hr) in the eastbound SR-91 mixing bowl. The increase in combined throughput is considered to offset the relatively small increase in density. Potential mitigation measures for the GP lanes was also considered. However, physical improvements are not feasible given the right-of-way and topographical constraints.

FIGURE 8-7
SR-91 Westbound Mainline Vehicle Density and LOS Comparisons - 2017 No-Build and Build, AM Peak Hour (7-8 AM)

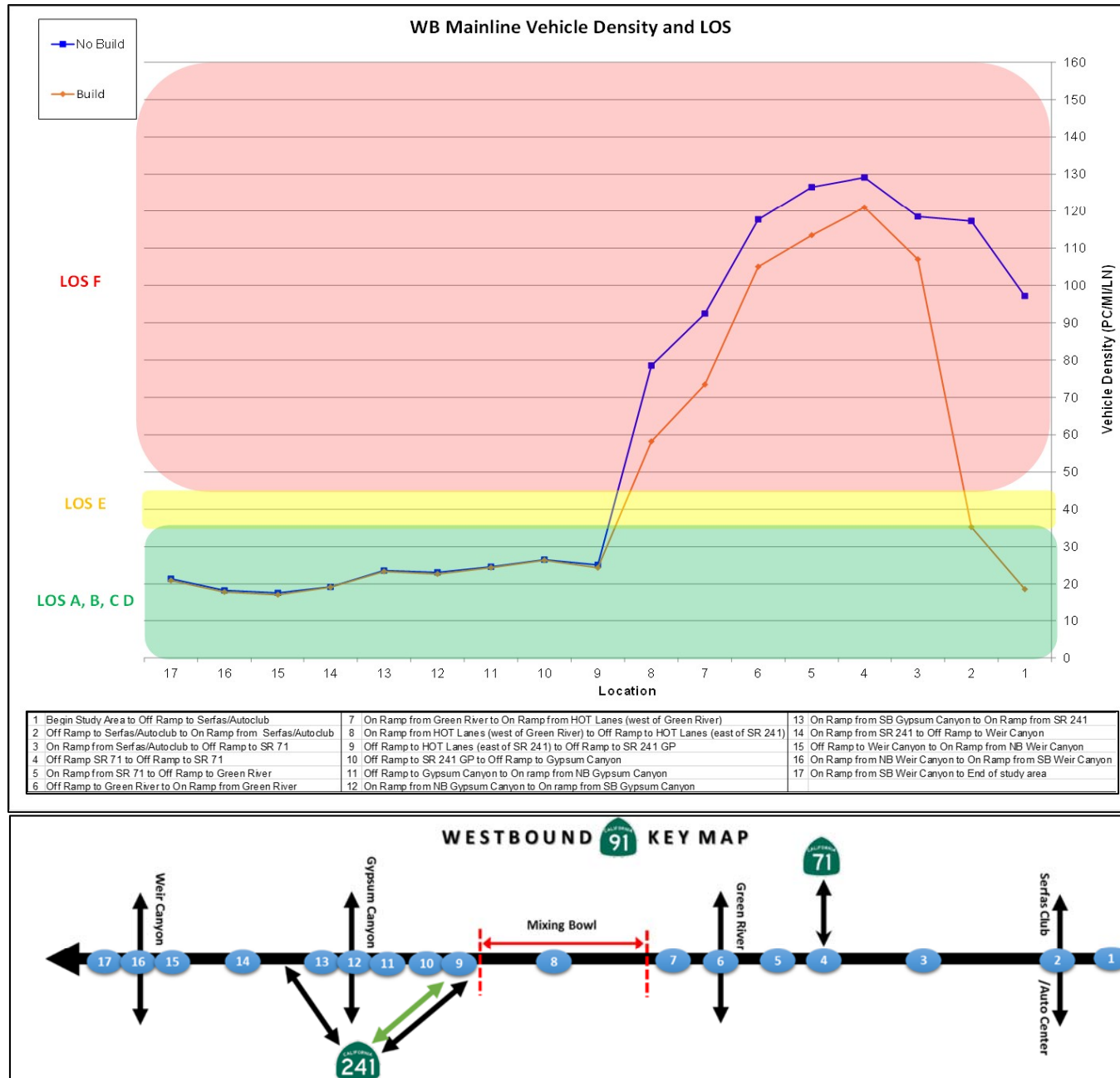
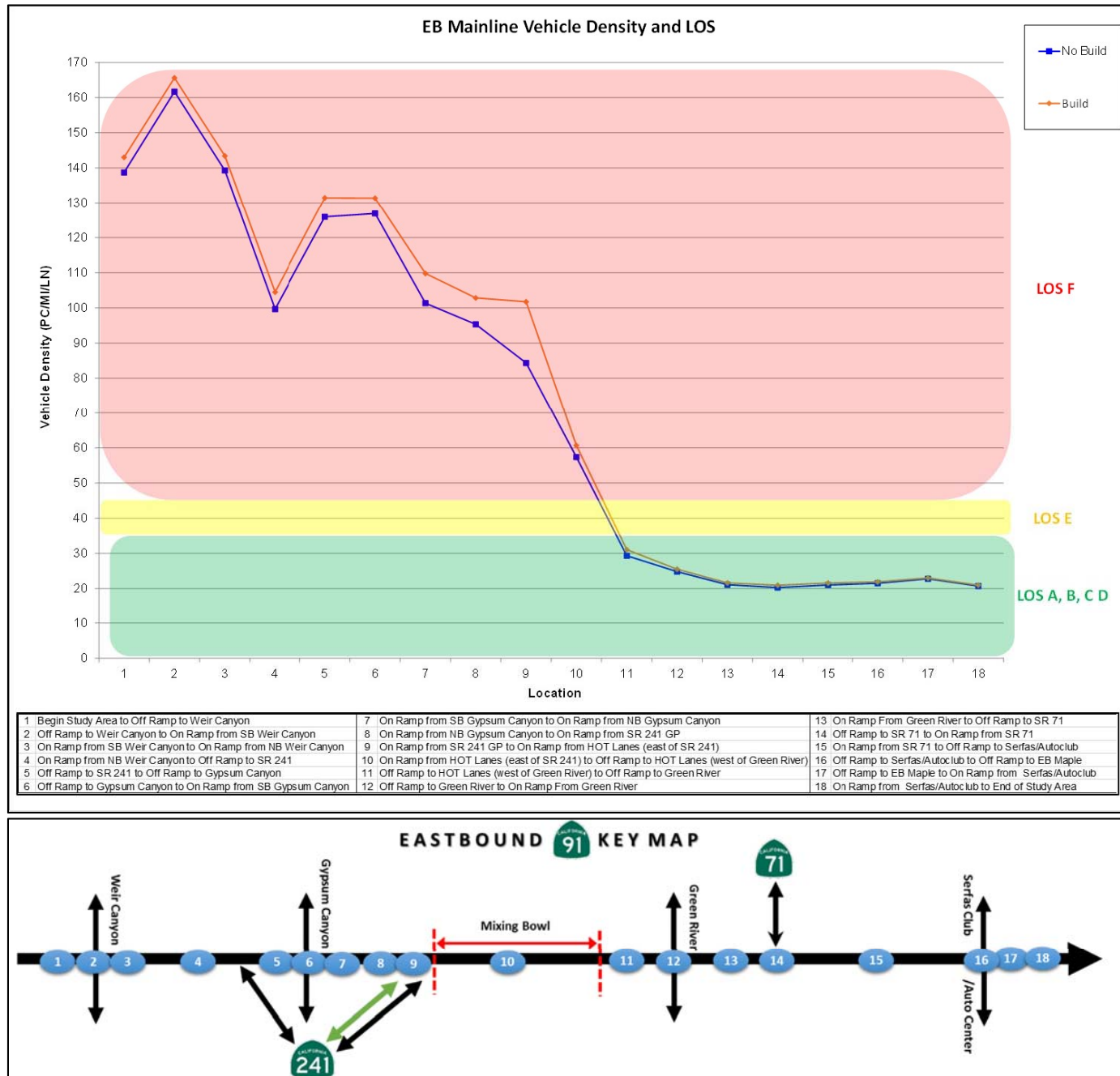


FIGURE 8-8

SR-91 Eastbound Mainline Vehicle Density and LOS Comparisons - 2017 No-Build and Build, PM Peak Hour (4-5 PM)



8.1.4 Travel Time

Travel time between major O-D points within the study area was compared between the 2017 No Build and Build scenarios using the VISSIM model. **Figure 8-9** shows how the O-D zones were numbered so that comparisons between No Build and Build can be made. The zones are as follows:

1. SR 91 GP Lanes west of Weir Canyon Road
2. SR 91 Express Lanes west of Weir Canyon Road
3. SR 91 GP Lanes east of Serfas Club Drive
4. SR 91 Express Lanes east of Serfas Club Drive
5. SR 241 (via GP ramp) south of SR 91
6. SR 241 (via Express Lanes ramp) south of SR 91
7. SR 71 north of SR 91

In the AM peak period, all of the travel times for the select O-D pairs will either decrease or stay the same in the westbound direction on SR-91 in the 2017 Build scenario due to the project improvements.

FIGURE 8-9
Travel Time – Origin/Destination Zones



AM Peak Period

Table 8-3 compares travel times between 2017 No-Build and Build scenarios in the AM peak period (6-9 AM) for selected O-D pairs. The O-D pairs were selected to represent all possible movements that capture end to end trips through the study area (e.g., the entry point on northbound SR-241 to the exit point on eastbound SR-91).

In the AM peak period, all of the travel times for the select O-D pairs will either decrease (between 3.3 and 4.5 minutes) or stay the same in the westbound direction on SR-91 in the 2017 Build scenario due to the project improvements. In addition, the travel time for the O-D pair between SR-71 southbound to SR-91 eastbound (off-peak direction) will also decrease (between 8.2 to 11.2 minutes), due to improvements on SR-91 westbound (peak direction) that reduce the queue spillback onto the SR-71 southbound direction that occurs in the No-Build scenario.

PM Peak Period

Table 8-4 compares travel times between 2017 No-Build and 2017 Build scenarios in the PM peak period (3-7 PM) for select O-D pairs.

In the 2017 PM peak period, the travel time for select O-D pairs for SR-91 eastbound GP lanes will slightly increase in the Build scenarios (between 1 to 2.5 minutes) due to an increase in demand in the Express Lane ingress/egress area between SR-241 and the Green River Road interchange. The travel time for the O-D pair for SR-241 northbound to SR-91 eastbound via the GP ramp will also increase in the Build scenario by approximately 1.5 minutes. However, the travel time for the O-D pair for SR-241 northbound to SR-91 eastbound via the new Express Lane ramp will decrease by 2.5 minutes. The travel time from northbound SR-241 to eastbound SR-91 via the GP connector is slightly longer in the build condition because the density on the eastbound SR-91 GP lanes is slightly worse with the project. The increase in the eastbound mixing bowl therefore leads to slower travel times in spite of the drop in demand on the northbound SR-241 to eastbound SR-91 GP connector. The increases in travel times for the SR-91 eastbound GP select O-D pairs discussed above is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.1.1).

TABLE 8-3
Travel Time Comparisons - 2017 No-Build and Build, AM Peak Period (6-9 AM)

				2017 No Build			2017 Build			Change		
				VISSIM Travel Time (Minutes)			VISSIM Travel Time (Minutes)			VISSIM Travel Time (Minutes)		
#	Origin	#	Destination	6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.6	8.7	8.6	8.7	8.7	8.6	0.1	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.6	8.6	8.6	8.6	8.6	8.6	0.0	0.0	0.0
		5	SR 241 SB south of SR 91	7.1	7.2	7.2	7.2	7.2	7.2	0.1	0.0	0.0
		7	SR 71 NB north of SR 91	11.0	11.1	11.0	11.1	11.1	11.0	0.1	0.0	0.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	10.9	10.9	10.9	10.9	11.0	10.9	0.0	0.1	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	23.1	24.8	24.1	18.7	20.4	19.5	-4.4	-4.4	-4.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	23.0	24.7	24.0	18.6	20.3	19.5	-4.4	-4.4	-4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	25.4	27.1	26.5	21.1	22.8	22.0	-4.3	-4.3	-4.5
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	21.0	22.7	21.9	-4.4	-4.4	-4.6
		7	SR 71 NB north of SR 91	12.4	13.3	12.0	9.0	10.1	7.7	-3.4	-3.2	-4.3
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	12.0	12.4	12.6	11.1	11.4	11.9	-0.9	-1.0	-0.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.5	8.5	8.4	0.1	0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	14.4	14.8	15.0	13.6	13.9	14.4	-0.8	-0.9	-0.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	10.8	10.9	10.8	-3.6	-3.9	-4.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.0	11.0	11.0	11.0	11.0	10.9	0.0	0.0	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	13.4	13.4	13.4	13.4	13.4	13.3	0.0	0.0	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.9	10.9	10.9	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	13.3	13.4	13.3	-0.1	0.0	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	43.0	54.1	55.9	32.0	39.5	40.5	-11.0	-14.6	-15.4
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	42.9	54.0	55.8	31.9	39.4	40.5	-11.0	-14.6	-15.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	28.7	37.2	38.3	20.5	26.7	27.0	-8.2	-10.5	-11.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	45.3	56.4	58.3	34.4	42.0	43.1	-10.9	-14.4	-15.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	34.3	41.8	42.9	-11.0	-14.6	-15.4
Decrease in travel time with project is greater than 0.5 minutes												
Increase in travel time with project is greater than 0.5 minutes												

TABLE 8-4
Travel Time Comparisons - 2017 No-Build and Build, PM Peak Period (3-7 PM)

			2017 No Build				2017 Build				Change				
			VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)				
#	Origin	#	Destination	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	28.3	29.6	29.4	27.6	30.3	31.9	32.0	29.4	2.0	2.3	2.6	1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	28.3	29.5	29.4	27.6	30.3	31.9	31.9	29.4	2.0	2.4	2.5	1.8
		5	SR 241 SB south of SR 91	18.4	19.1	19.0	17.7	19.3	20.8	20.6	18.7	0.9	1.7	1.6	1.0
		7	SR 71 NB north of SR 91	30.6	31.9	31.8	30.0	32.7	34.3	34.3	31.7	2.1	2.4	2.5	1.7
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	10.4	10.5	10.5	10.5	11.2	11.3	11.3	11.2	0.8	0.8	0.8	0.7
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.1	0.1	0.1	0.0
		7	SR 71 NB north of SR 91	12.7	12.8	12.9	12.9	13.6	13.6	13.7	13.5	0.9	0.8	0.8	0.6
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10.9	11.0	10.9	10.9	10.9	10.9	10.9	10.9	0.0	-0.1	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.9	10.8	10.8	10.8	0.0	-0.2	-0.1	-0.1
		7	SR 71 NB north of SR 91	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.4	0.0	0.0	0.0	-0.1
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.7	-0.1	-0.1	-0.1	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	13.4	13.5	13.6	13.6	15.0	15.2	15.1	14.9	1.6	1.7	1.5	1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	13.4	13.4	13.5	13.5	15.0	15.2	15.1	14.8	1.6	1.8	1.6	1.3
		7	SR 71 NB north of SR 91	15.7	15.8	15.9	15.9	17.3	17.5	17.5	17.2	1.6	1.7	1.6	1.3
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	13.6	13.7	13.7	13.6	0.2	0.2	0.1	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-2.6	-2.6	-2.7	-2.7
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	n/a	15.9	16.0	16.0	15.9	0.2	0.2	0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	10.2	10.2	10.1	9.9	10.2	10.2	10.1	9.9	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	10.2	10.2	10.0	9.9	10.2	10.2	10.0	9.8	0.0	0.0	0.0	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	6.4	6.7	6.2	5.8	6.5	6.6	6.2	5.8	0.1	-0.1	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	12.6	12.7	12.5	12.3	12.7	12.6	12.5	12.3	0.1	-0.1	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	12.6	12.6	12.4	12.2	0.0	-0.1	-0.1	-0.1
Decrease in travel time with project is greater than 0.5 minutes															
Increase in travel time with project is greater than 0.5 minutes															

8.1.5 Network Performance

In addition to freeway performance results, network performance measures were recorded. The network performance MOEs include:

- Total vehicle demand and volume served (vehicles)
- Total vehicle-miles traveled (VMT measured in miles)
- Total network travel time (hours)
- Average speed per vehicle (mph)
- Average delay time per vehicle (minutes/vehicle)

In the AM peak period, the average delay per vehicle decreases by approximately 28% (from 6.8 to 4.9 minutes per vehicle) in the Build scenario.

AM Peak Period

Table 8-5 compares the network performance results from the 2017 No-Build and Build scenarios in the AM peak period (6 to 9 AM). The following points highlight the 2017 No-Build versus Build comparisons in the AM peak period:

- The Build scenario will slightly increase demand in the study area (by an additional 940 vehicles or less than 1%) by attracting vehicles from surrounding roadways to SR-241.
- The Build scenario will increase vehicle throughput (by 4,500 vehicles or 5%) and decrease the percent of unserved traffic (from 9% in the No-Build scenario to 5% in the Build scenario).
- VMT increases by 6% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases by approximately 6 mph (from 34 mph to 40 mph) in the Build scenario.
- The average delay per vehicle decreases by approximately 28% (from 6.8 to 4.9 minutes per vehicle) in the Build scenario.

PM Peak Period

Table 8-6 compares the network performance results from the 2017 No-Build and Build scenarios in the PM peak period (3 to 7 PM). The following points highlight the 2017 No-Build versus Build comparisons in the PM peak period:

- The Build scenario will increase demand in the study area (by an additional 2,800 vehicles or 2%) by pulling additional demand to SR-241 from surrounding roadways.
- The Build scenario will increase vehicle throughput (by 1,200 vehicles or 1%). Although the amount of unserved vehicles will increase in the Build scenario (by 1,600 vehicles), the percent of unserved vehicles will remain at 15% for both scenarios.
- VMT increases by 2% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle decreases by 1 mph (from 39 to 38 mph) in the Build scenario due to the additional demand in the GP lanes downstream of the Express Lane ingress/egress.
- The average delay per vehicle increases by approximately 0.4 minutes (from 5.3 to 5.7 minutes) in the Build scenario.

The decrease in speed (-1.0 mph) and increase in travel time (+0.4 min/veh) are balanced by the benefits of the increase in vehicle throughput (+1,200 vehicles or 1%).

TABLE 8-5
Summary of Network Performance - No-Build vs. Build Scenarios, 2017 AM Peak Period (6-9 AM)

Performance Measure (all vehicle types, 6:00 - 9:00 AM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	100,741	101,682	941
Total number of vehicles that did not reach their destination (vehicles)	9,016	5,420	-3,596
Total number of vehicles that have reached their destination (vehicles)	91,725	96,262	4,537
Total vehicle-miles traveled - VMT (miles)	796,551	845,966	49,415
Total travel time - VHT (hours)	23,068	21,012	-2,056
Average speed (mph)	34.5	40.3	5.8
Average delay time per vehicle (min/veh)	6.8	4.9	-1.9

Note: Results are based on the total three hours and are an average of all runs.

TABLE 8-6
Summary of Network Performance - No-Build vs. Build Scenarios, 2017 PM Peak Period (3-7 PM)

Performance Measure (all vehicle types, 3:00 - 7:00 PM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	141,937	144,727	2,790
Total number of vehicles that did not reach their destination (vehicles)	20,812	22,405	1,593
Total number of vehicles that have reached their destination (vehicles)	121,125	122,322	1,197
Total vehicle-miles traveled - VMT (miles)	1,014,001	1,036,967	22,966
Total travel time - VHT (hours)	26,278	27,608	1,330
Average speed (mph)	38.6	37.6	-1.0
Average delay time per vehicle (min/veh)	5.3	5.7	0.4

Note: Results are based on the total four hours and are an average of all runs.

8.1.6 Express Lane Operations

AM Peak Period

Express lane operations were studied as part of the 2017 AM peak period analysis in both the No-Build and Build scenarios. Operational metrics such as volume served, speed, queues, and LOS were presented for the AM peak period earlier in Section 8. For quick reference, these metrics are summarized in **Table 8-7**. In the AM peak period, the westbound Express Lanes throughout the study area are projected to operate the same with and without the project. **Table 8-7** shows that there is no appreciable difference in volume served, speed, or LOS in the westbound Express Lanes with or without the project.

TABLE 8-7

Summary of Westbound Express Lane Operations - No-Build vs. Build Scenarios, 2017 AM Peak Period (6-9 AM)

Operational Metric	Scenario	Study Segment		
		Between SR-71 and Green River	Between Green River and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Weir Canyon
Volume Served (percent of demand served)	No-Build	99.5%	99.5%	92.3%
	Build	99.6%	99.6%	94.7%
Speed	No-Build	68	69	69
	Build	68	68	69
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	B
	Build	C	B	B

PM Peak Period

In the PM peak period, the eastbound Express Lanes throughout the study area are also projected to operate the same with and without the project in 2017. **Table 8-8** shows that there is no appreciable difference in volume served, speed, or LOS in the eastbound Express Lanes with or without the project.

TABLE 8-8

Summary of Eastbound Express Lane Operations - No-Build vs. Build Scenarios, 2017 PM Peak Period (3-7 PM)

Operational Metric	Scenario	Study Segment		
		Between Weir Canyon and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Green River	Between Green River and SR-71
Volume Served (percent of demand served)	No-Build	99.3%	99.3%	89.2%
	Build	99.9%	99.9%	88.8%
Speed (mph)	No-Build	68	69	68
	Build	68	69	68
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	C
	Build	C	B	C

Additional weaving analysis of the Express Lane operations in the mixing bowl was performed to supplement the microsimulation analysis. Per the Highway Design Manual (Section 504.7), the Leisch Method was applied to study the weaving condition in the mixing bowl. However, the Leisch method will not work for this study segment because the weaving volume (V_w) exceeds the "Turning Line for K" and the weaving section is greater than the chart boundary (7,400 feet). As noted on Figure 504.7A in the Highway Design Manual, extrapolation beyond the chart boundaries is not advised for the Leisch method. The Highway Capacity Manual (HCM) weaving analysis methodology was also attempted for the mixing bowl. However, based on the weaving volumes, the maximum weaving segment that can be analyzed is 4,093 feet. The mixing bowl segment is 7,400 feet and therefore cannot be analyzed using the HCM weaving methodology. Therefore, microsimulation is the only analysis tool that can be used for a segment as long as the mixing bowl. As summarized in this chapter, microsimulation analysis shows that weaving between the eastbound Express Lanes and eastbound GP lanes is not an issue due to the 7,400 foot mixing bowl segment.

8.2 2040 Conditions (No-Build vs. Build)

8.2.1 Volume Served

Throughput volumes and percent of demand unserved were compared between the 2040 No-Build and Build scenarios. Throughput volume and percent of demand unserved are both measured by combining the GP and Express lanes along SR-91 between Weir Canyon Road and Serfas Club Drive/Auto Center Drive in the AM and PM peak periods.

AM Peak Period

Table 8-9 compares volume throughput and percent demand unserved between the 2040 No-Build and Build scenarios in the AM peak period (6 to 9 AM). **Figure 8-10** illustrates the volume throughput comparisons in the westbound GP and Express lanes between the 2040 No-Build and Build scenarios in the AM peak hour (7 to 8 AM). The Build scenario has slightly higher combined demand on SR-91 westbound east of the SR-91/SR-241 interchange when compared to the No-Build scenario (approximately 440 vehicles during the AM peak period), but the Build scenario has approximately 9% lower demand west of the SR-91/SR-241 interchange (approximately 3,700 vehicles during the AM peak period). This is due to a shift of travel patterns that increases demand southbound on SR-241.

In the 2040 AM peak, building the connector will increase the volume served on SR-91 westbound by 1% upstream of the Express Lane weaving area and by 47% downstream of the weaving area along SR-241 southbound.

The Build scenario serves slightly more vehicles east of the SR-91/SR-241 interchange than the No Build scenario (approximately 430 more vehicles or 1%), but approximately 3,500 fewer vehicles in west of the SR-91/SR-241 interchange. However, the SR-91 westbound to SR-241 southbound movement serves approximately 3,300 more vehicles in the Build scenario compared to the No Build scenario due to the addition of the direct connector ramp, offsetting this difference. Furthermore, the average percent unserved traffic along the entire length of SR-91 is the same between the Build and No-Build scenarios. The

conclusion is that the Build scenario is able to serve the same or slightly more vehicles in the peak direction of SR-91 upstream of the Express Lane ingress/egress area, and more vehicles along SR-241 southbound. Due to a shift in travel patterns, the Build scenario serves more vehicles along southbound SR-241 and less vehicles along westbound SR-91 downstream of the Express Lane ingress/egress area. This represents a slight improvement in the overall efficiency of the system.

PM Peak Period

Table 8-10 compares volume throughput and percent demand unserved between the 2040 No-Build and Build scenarios in the PM peak period (3 to 7 PM). **Figure 8-11** illustrates the volume throughput comparisons in the eastbound GP and Express lanes between the 2040 No-Build and Build scenarios in the PM peak hour (4 to 5 PM). The Build scenario has the same combined demand (GP and Express lane trips) in the peak eastbound direction of travel when compared to the No-Build scenario. Under the Build scenario, the volume served is slightly greater (about 300 vehicles during the PM peak period) than the No-Build scenario in the peak direction of travel (eastbound). This change is due to the shift of approximately 800 peak hour trips from the SR-241 northbound to SR-91 eastbound GP ramp over to the Express Lane ramp, which slightly lowers demand in the GP lanes in that area. The conclusion is that the Build scenario is able to serve slightly more vehicles and more vehicles are able to enter the study area. With the project, there will be an improvement in the overall efficiency of the system.

TABLE 8-9

Vehicle Throughput Comparison – SR-91 Westbound GP and Express Lanes, 2040 No-Build and Build, AM Peak Period (6-9 AM)

Screenline Location	2040 No-Build AM									2040 Build AM									Throughput Volume Difference	
	Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved			Demand Volume (3 hr volume)			Throughput Volume (3 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
East of Serfas Club/Auto Center Drive	27218	9185	36403	25992	9135	35127	4.5%	0.5%	3.5%	27744	9184	36928	27121	9136	36257	2.2%	0.5%	1.8%	1129	3.2%
Between Serfas Club/Auto Center Drive and SR-71	31564	9185	40749	30055	9135	39191	4.8%	0.5%	3.8%	31983	9184	41167	30821	9136	39956	3.6%	0.5%	2.9%	766	2.0%
Between SR-71 and Green River Road	32331	9185	41516	28451	9135	37586	12.0%	0.5%	9.5%	32744	9184	41928	28684	9136	37820	12.4%	0.5%	9.8%	234	0.6%
Between Green River Road and SR-241 Ramp (WB to SB)	41137	9185	50322	33034	9135	42169	19.7%	0.5%	16.2%	41540	9184	50724	32613	9136	41749	21.5%	0.5%	17.7%	-421	-1.0%
Between SR-241 GP Ramp (WB to SB) and Gypsum Canyon Road	33614	8040	41654	27200	7518	34718	19.1%	6.5%	16.7%	29804	8033	37837	23724	7364	31088	20.4%	8.3%	17.8%	-3630	-10.5%
Between Gypsum Canyon Road and SR-241 Ramp (NB to WB)	32124	8040	40164	27028	7518	34546	15.9%	6.5%	14.0%	28388	8033	36421	23641	7364	31005	16.7%	8.3%	14.9%	-3541	-10.3%
Between SR-241 Ramp (NB to WB) and Weir Canyon Road	33188	8040	41228	28005	7518	35523	15.6%	6.5%	13.8%	29444	8033	37477	24662	7364	32026	16.2%	8.3%	14.5%	-3497	-9.8%
West of Weir Canyon Road	32492	8040	40532	28228	7518	35746	13.1%	6.5%	11.8%	28894	8033	36927	25081	7364	32445	13.2%	8.3%	12.1%	-3301	-9.2%
Average =																			-4.4%	

FIGURE 8-10

SR-91 Westbound Mainline and Toll Facility Vehicle Volume by Location - 2040 No-Build and Build, AM Peak Hour (7-8 AM)

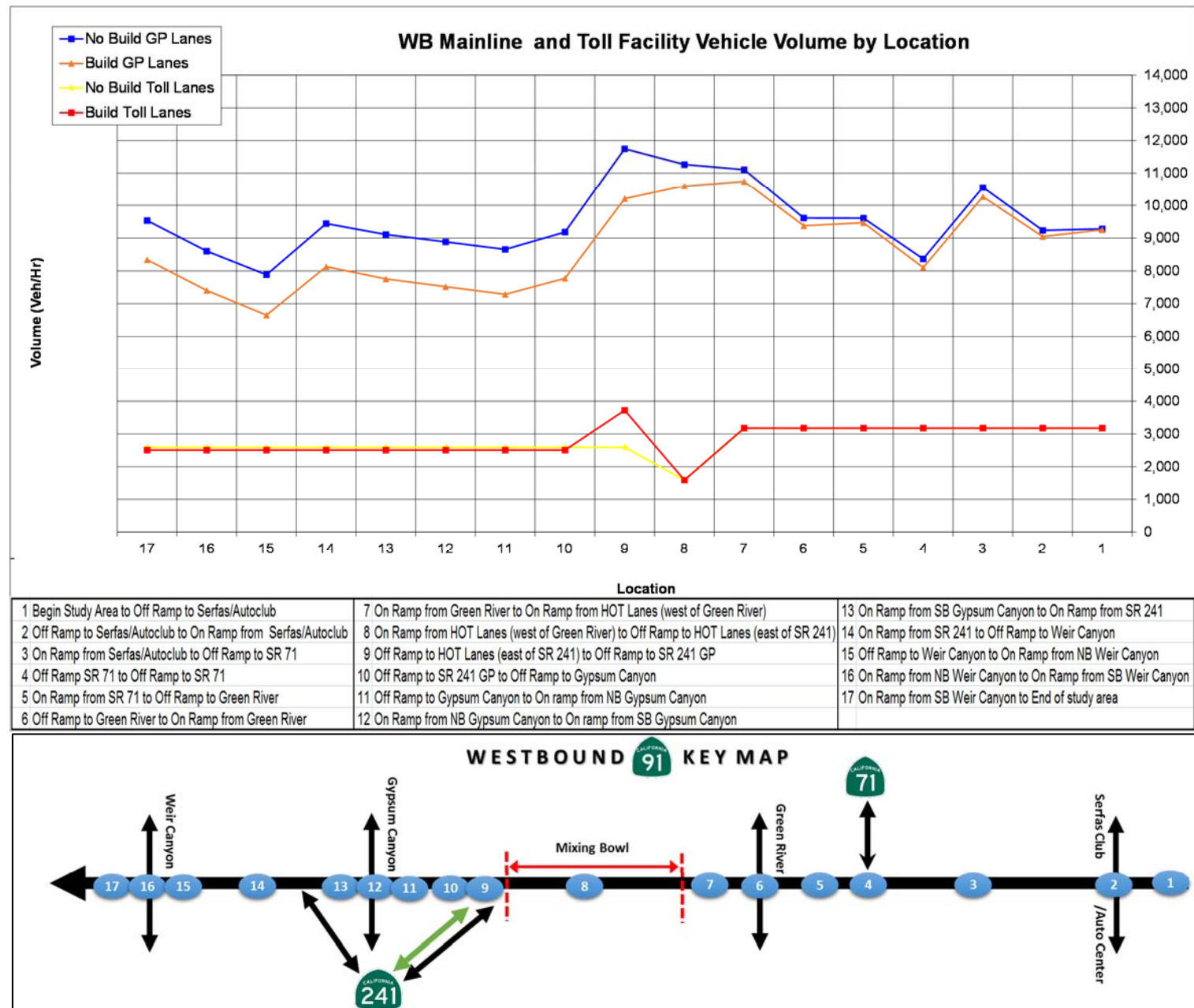


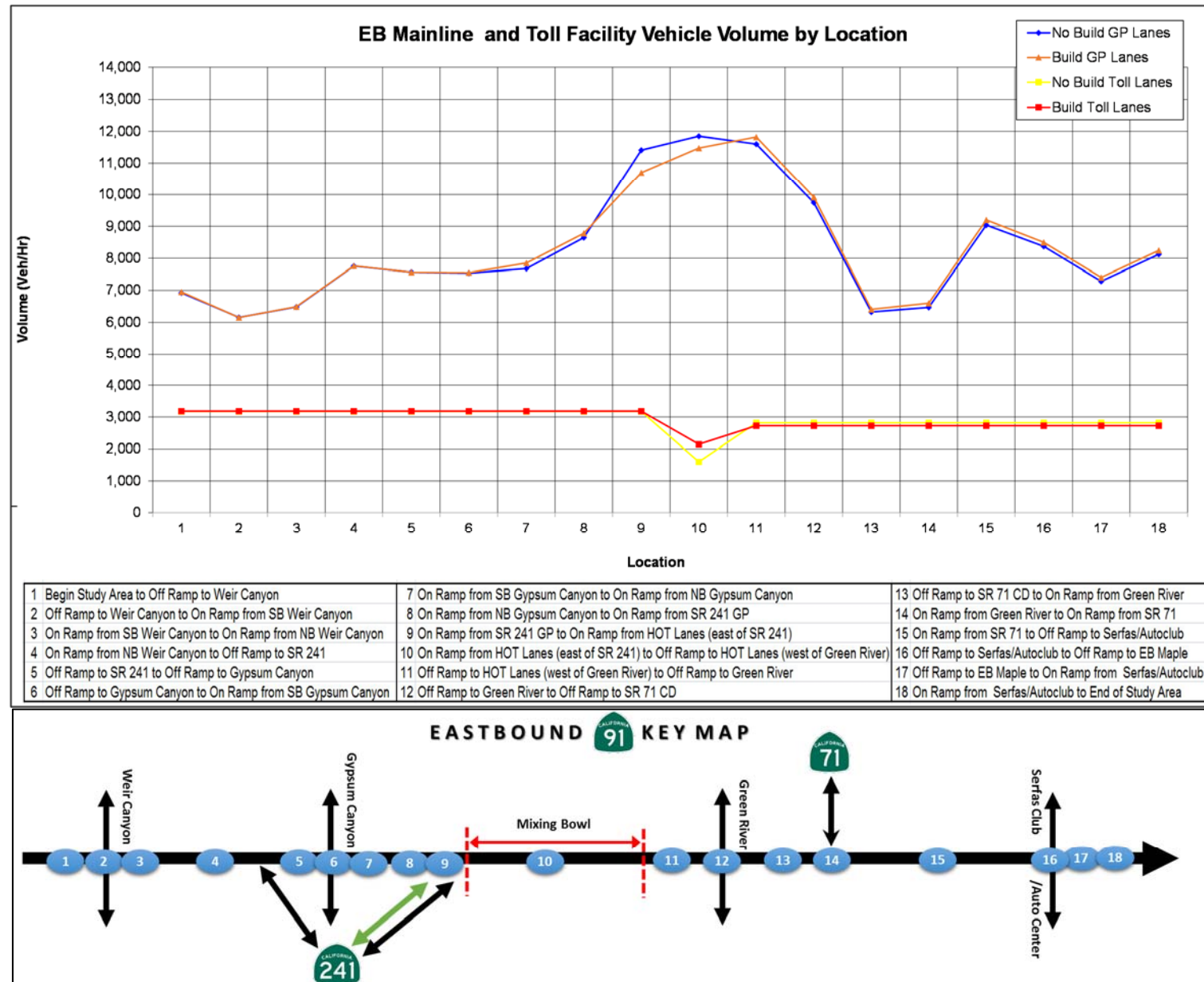
TABLE 8-10

Vehicle Throughput Comparison – SR-91 Eastbound GP and Express Lanes, 2040 No-Build and Build, PM Peak Period (3-7 PM)

Screenline Location	2040 No-Build PM									2040 Build PM									Throughput Volume Difference	
	Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved			Demand Volume (4 hr volume)			Throughput Volume (4 hr volume)			Percent Unserved				
	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	GP Lanes	Express Lanes	Overall	Abs Diff	% Diff
West of Weir Canyon Road	55164	12164	67328	28247	12079	40326	48.8%	0.7%	40.1%	55162	12160	67322	28476	12121	40597	48.4%	0.3%	39.7%	270	0.7%
Between Weir Canyon Road and SR-241 Ramp (EB to SB)	54771	12164	66935	31232	12079	43311	43.0%	0.7%	35.3%	54614	12160	66774	31362	12121	43483	42.6%	0.3%	34.9%	172	0.4%
Between SR-241 Ramp (EB to SB) and Gypsum Canyon Road	53563	12164	65727	30457	12079	42536	43.1%	0.7%	35.3%	53382	12160	65542	30548	12121	42669	42.8%	0.3%	34.9%	134	0.3%
Between Gypsum Canyon Road and SR-241 Ramp (NB to EB)	58054	12164	70218	34548	12079	46627	40.5%	0.7%	33.6%	58009	12160	70169	35202	12121	47323	39.3%	0.3%	32.6%	696	1.5%
Between SR-241 Ramp (NB to EB) and Green River Road	68537	12160	80697	45851	10863	56714	33.1%	10.7%	29.7%	68157	12097	80254	46653	10539	57192	31.6%	12.9%	28.7%	478	0.8%
Between Green River Road and SR-71	35516	12160	47676	24751	10863	35614	30.3%	10.7%	25.3%	35662	12097	47759	25022	10539	35561	29.8%	12.9%	25.5%	-53	-0.1%
Between SR-71 and Serfas Club/Auto Center Drive	46089	12160	58249	35080	10863	45943	23.9%	10.7%	21.1%	46576	12097	58673	35683	10539	46223	23.4%	12.9%	21.2%	280	0.6%
East of Serfas Club/Auto Center Drive	39790	12160	51950	31361	10863	42224	21.2%	10.7%	18.7%	40044	12097	52141	31858	10539	42398	20.4%	12.9%	18.7%	174	0.4%
Average =																			0.6%	

FIGURE 8-11

SR-91 Eastbound Mainline and Toll Facility Vehicle Volume by Location – 2040 No-Build and Build, PM Peak Hour (4-5 PM)



8.2.2 Speed

Average speeds along the SR-91 GP lanes were compared between the 2040 No-Build and Build scenarios during the peak period using temporal speed diagrams. The data are based on speed measurements taken from the VISSIM model every 0.5 miles and every 15 minutes of simulation. Average speeds were also compared along the SR-91 GP and Express Lanes during the peak hour using line charts.

AM Peak Period

Figure 8-12 illustrates the average speed contours for the westbound GP lanes on the SR-91 corridor in both the 2040 No-Build and Build AM peak period scenarios.

In the AM peak period, the project will increase speeds (from between 30 and 40 mph to 60 mph) between the Express Lane Ingress and Gypsum Canyon Road between 6:45 AM and 8:30 AM. This is due to an increase in the throughput volume in the ingress/egress area between the Green River Road interchange and SR-241. Speeds are also higher in the Build scenario (approximately 60 mph) east of the Serfas Club Drive/Auto Center Drive interchange during the 6-7 AM hour compared to the No Build scenario (approximately 30 mph).

Figure 8-13 also illustrates the speed comparisons in the westbound GP and Express lanes between the 2040 No-Build and Build scenarios in the AM peak hour (worst hour of the peak period). In the 2040 Build scenario, an increase in speed of approximately 30 mph (from 33 to 63 mph) is expected compared to the No Build scenario on the mainline segments west of SR-241 interchange.

The conclusion is the project will provide some congestion relief in the 2040 AM peak period by reducing the limits and duration of the westbound bottleneck.

PM Peak Period

Figure 8-14 illustrates the average speed contours for the eastbound GP lanes on the SR-91 corridor in both the 2040 No-Build and Build PM peak period scenarios.

In the PM peak period, the speeds in the GP lanes in the eastbound direction are generally the same between the No Build and Build scenarios, with the exception of the area between the SR-241 GP On Ramp and the Green River Road interchange. Speeds are approximately 5 mph higher in the Build scenario (60 to 65 mph) in this area compared to the No Build scenario (55 to 60 mph). The improvements associated with the ultimate SR-91 CIP improvements were found to provide enough capacity in 2040 to accommodate the friction between the Express Lanes and the GP lanes in the eastbound ingress/egress area.

In the 2040 PM peak, the speeds in the GP lanes in the eastbound direction are generally the same between the No Build and Build scenarios, with the exception of the area between the SR-241 GP On Ramp and the Green River Road interchange. In this area, speeds are 5 mph higher with the project.

Figure 8-15 also illustrates the speed comparisons in the eastbound GP and Express lanes between the 2040 No-Build and Build scenarios in the PM peak hour (worst hour of the peak period). Speeds along SR-91 eastbound are generally the same between the Build and No-Build scenario in most segments of the corridor, with the exception of the segment between the SR-241 on-ramp and SR-71 Collector-Distributor (C-D) off-ramp. Speeds are approximately 5 mph higher in the Build scenario in this area compared to the No-Build scenario. In the Express Lanes, the speeds are projected to remain near free-flow in the ingress/egress area. The project therefore provides benefit in terms of increased speeds in the eastbound general purpose lanes in the 2040 Build scenario.

FIGURE 8-12
SR-91 Westbound Temporal Speed Diagram – 2040 GP and Express Lane Comparisons, AM Peak Period (6-9 AM)

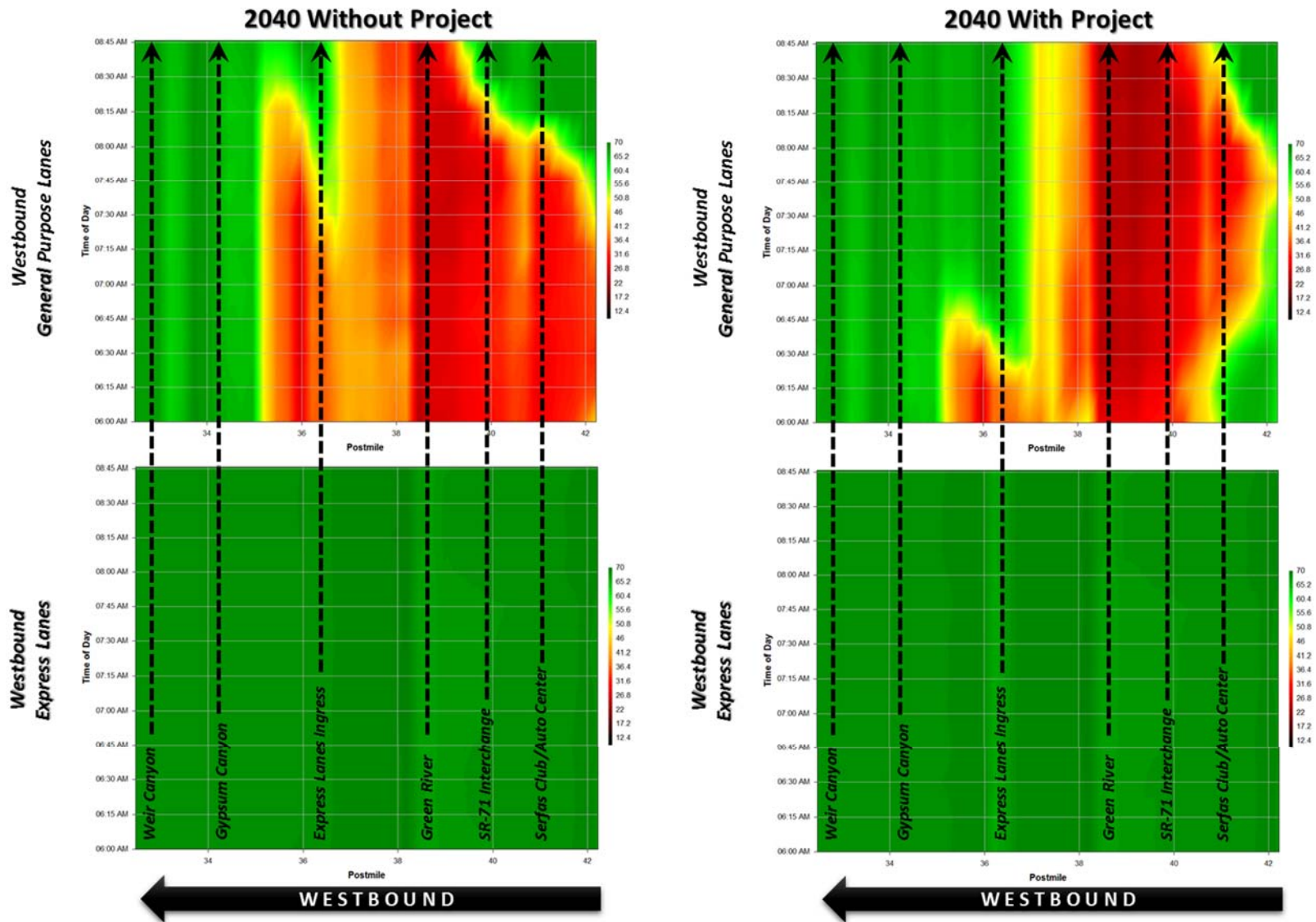


FIGURE 8-13
SR-91 Westbound Mainline and Toll Facility Speed Comparisons - 2040 No-Build and Build, AM Peak Hour (7-8 AM)

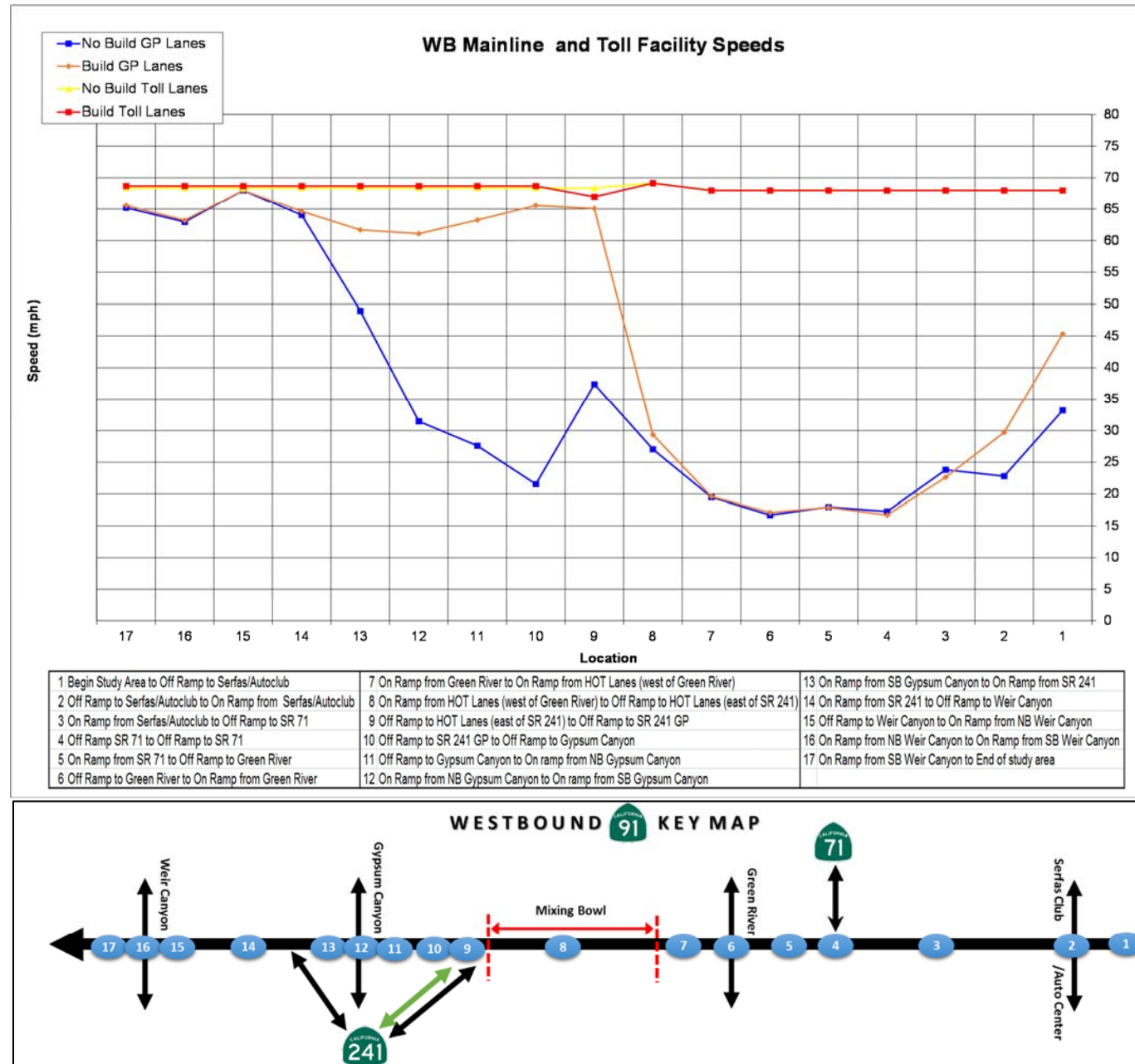


FIGURE 8-14

SR-91 Eastbound Temporal Speed Diagram – 2040 GP and Express Lane Comparisons, PM Peak Period (3-7 PM)

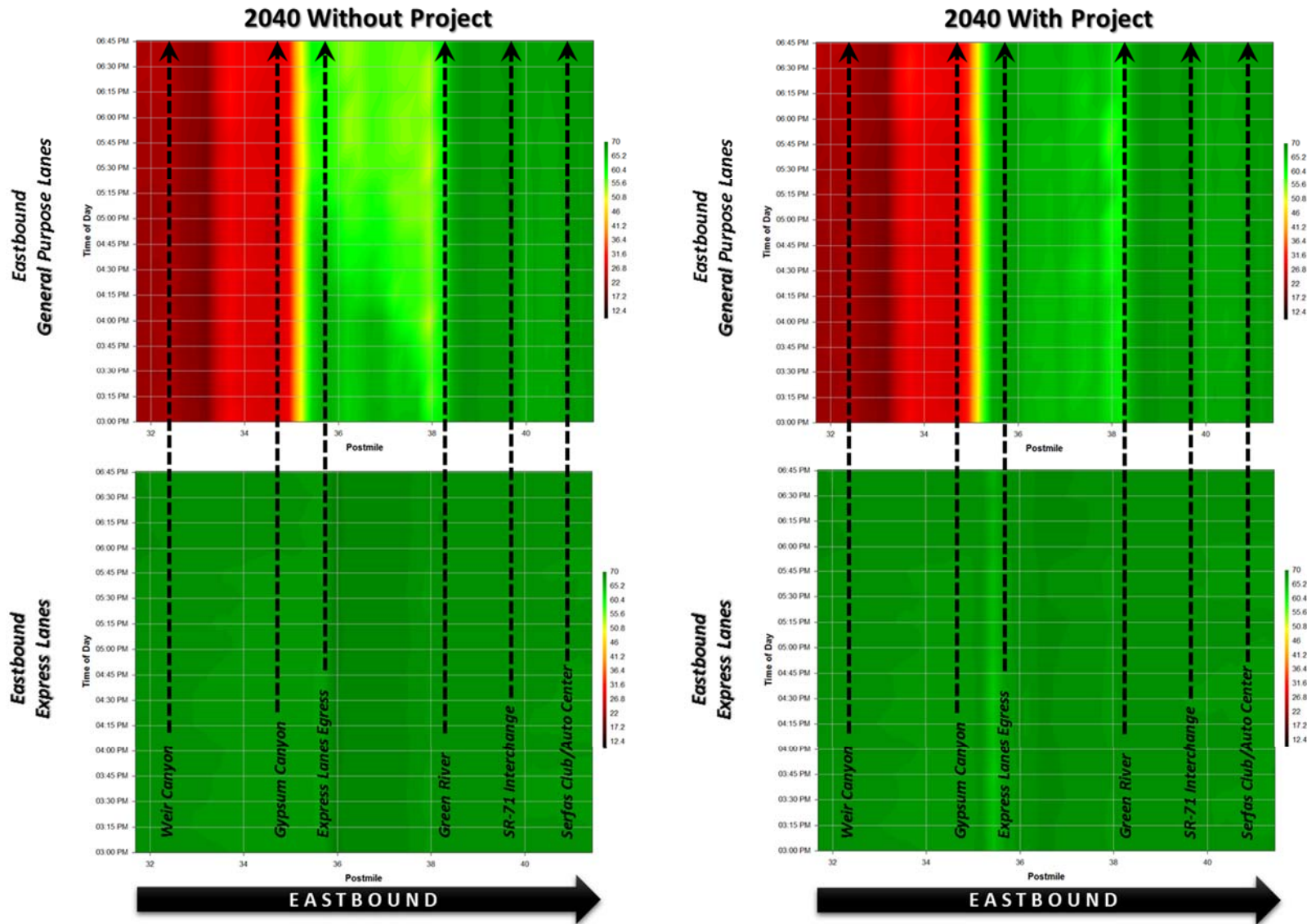
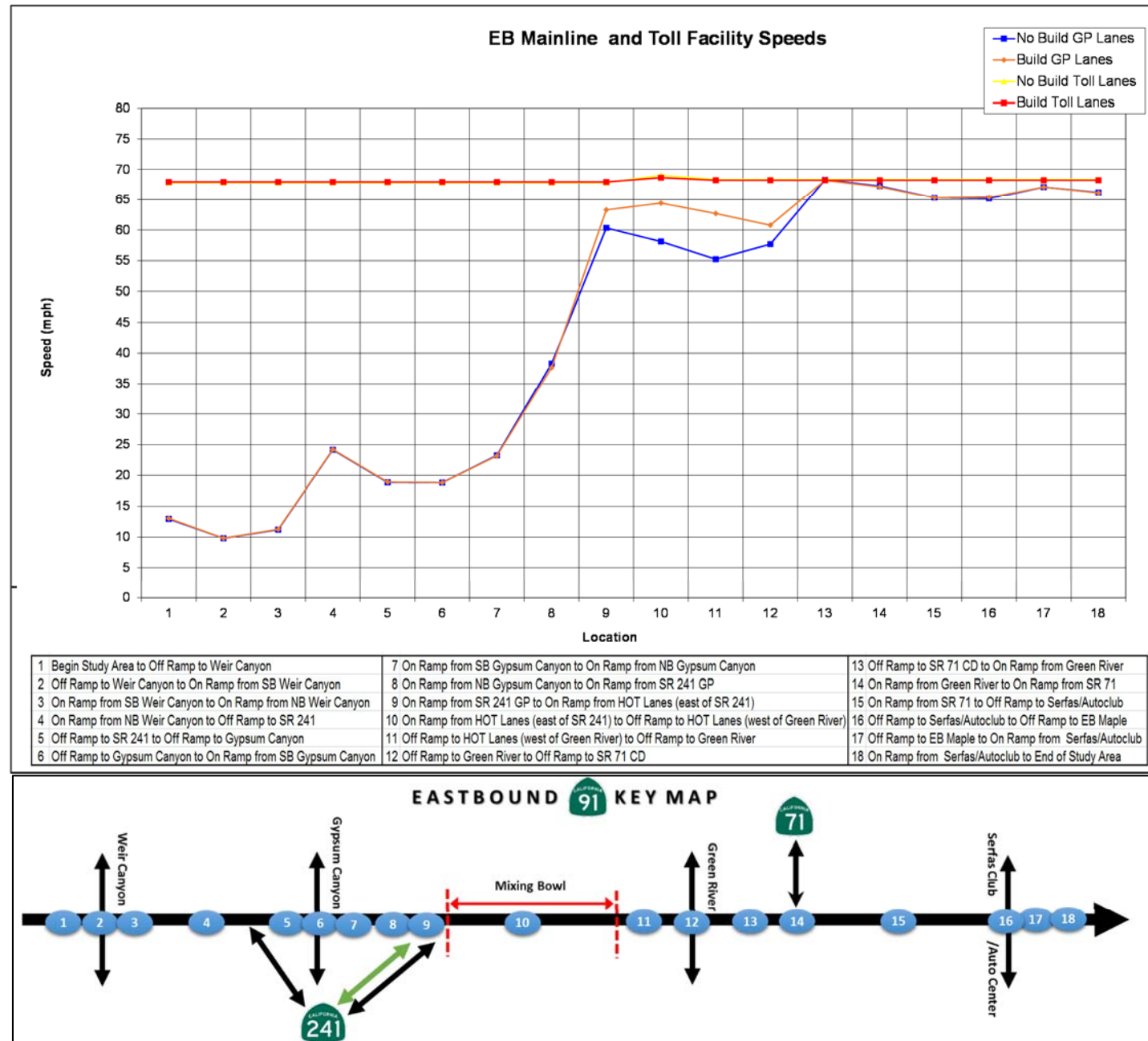


FIGURE 8-15
SR-91 Eastbound Mainline and Toll Facility Speed Comparisons - 2040 No-Build and Build, PM Peak Hour (4-5 PM)



8.2.3 Density and LOS

AM Peak Period

Figure 8-16 is a summary of the traffic operational conditions based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the westbound AM peak direction. The Express Lane results are not reported because the Express Lanes are tolled in a manner that maintains LOS D or better operations throughout the study area during all times of the day.

In the AM peak period, the GP lanes in the westbound direction will operate at the same LOS in both 2040 No-Build and Build scenarios except in the area between the Green River Road interchange and the SR-241 interchange. The GP lane segment between the Green River Road and SR-241 interchanges is expected to operate at LOS D or better in the Build scenario, compared to LOS F in the No-Build scenario. This is caused by higher demand in the GP lanes of this segment in the No-Build scenario compared to the Build scenario.

The project will therefore provide substantial improvements in density/LOS on the SR-91 GP lanes in the 2040 AM peak period in the westbound direction between the Express Lane ingress/egress area and the SR-241 interchange.

PM Peak Period

Figure 8-17 is a summary of the traffic operations based on freeway segment density measured in vehicles per mile per lane along the SR-91 GP lanes in the eastbound PM peak direction.

In the 2040 Build scenario, a decrease in density is expected in the GP lanes in the vicinity of the Express Lane ingress/egress area when compared to the No-Build scenario. These segments between the SR-241 and Green River Road interchanges are expected to operate at LOS E without the project compared to LOS D or better with the project. The decrease in density in the GP lanes is due to slightly lower demand in the Build scenario caused by the shift of approximately 800 trips from the SR-241 northbound-to-SR-91 eastbound GP ramp over to the Express Lane ramp.

In the 2040 PM peak, the project will lead to a decrease in density (and improvement in LOS) in the GP lanes in the vicinity of the Express Lane ingress/egress area.

The project will therefore slightly worsen the density/LOS in the 2040 PM peak period on the SR-91 GP lanes in the eastbound direction between the Express Lane ingress/egress area and the western limits of the study area (Weir Canyon Road), but is considered nominal given the increase in combined throughput (GP and Express Lanes) experienced in the same area (see Section 8.2.1).

FIGURE 8-16
SR-91 Westbound Mainline Vehicle Density and LOS Comparisons - 2040 No-Build and Build, AM Peak Hour (7-8 AM)

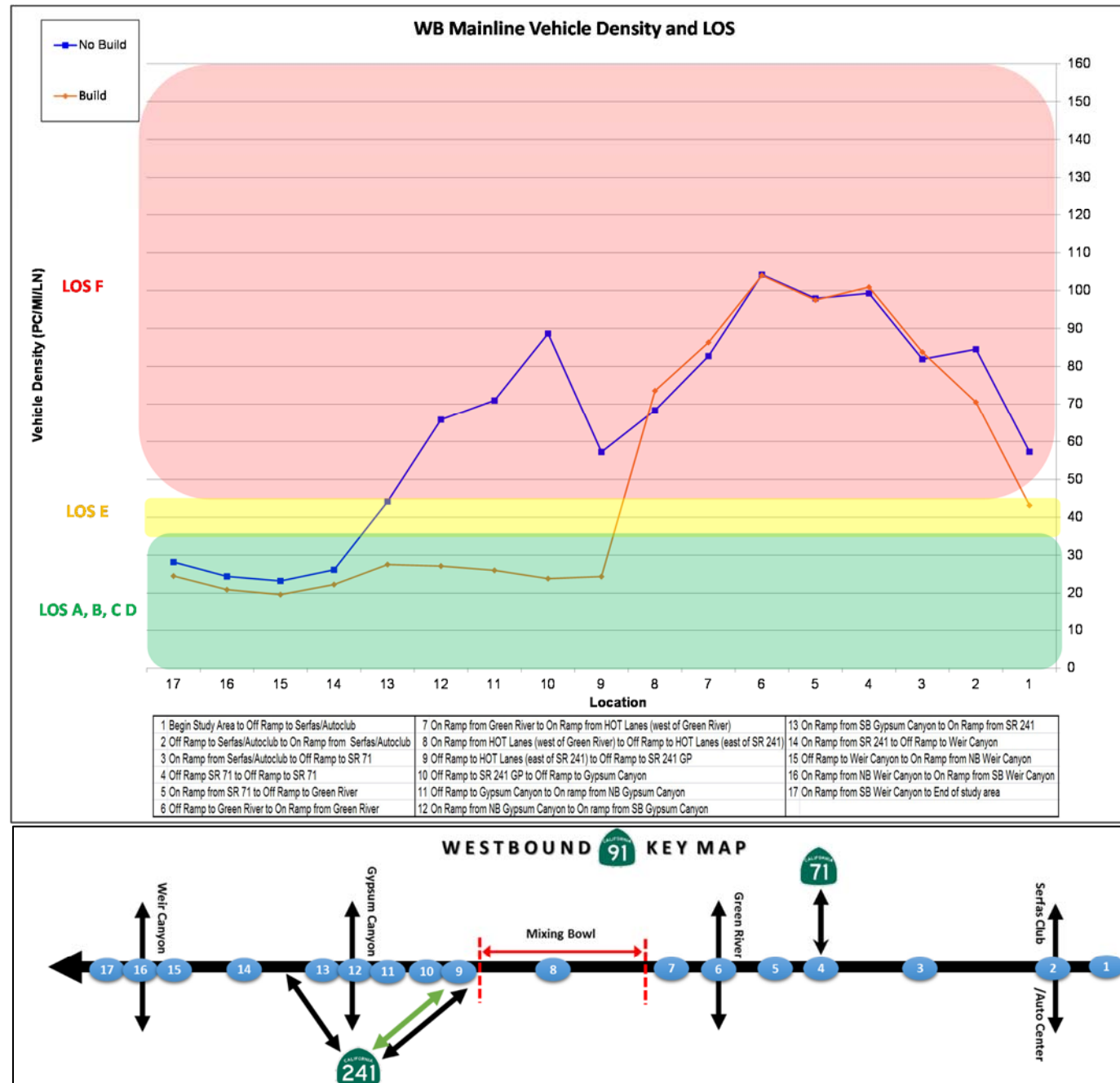
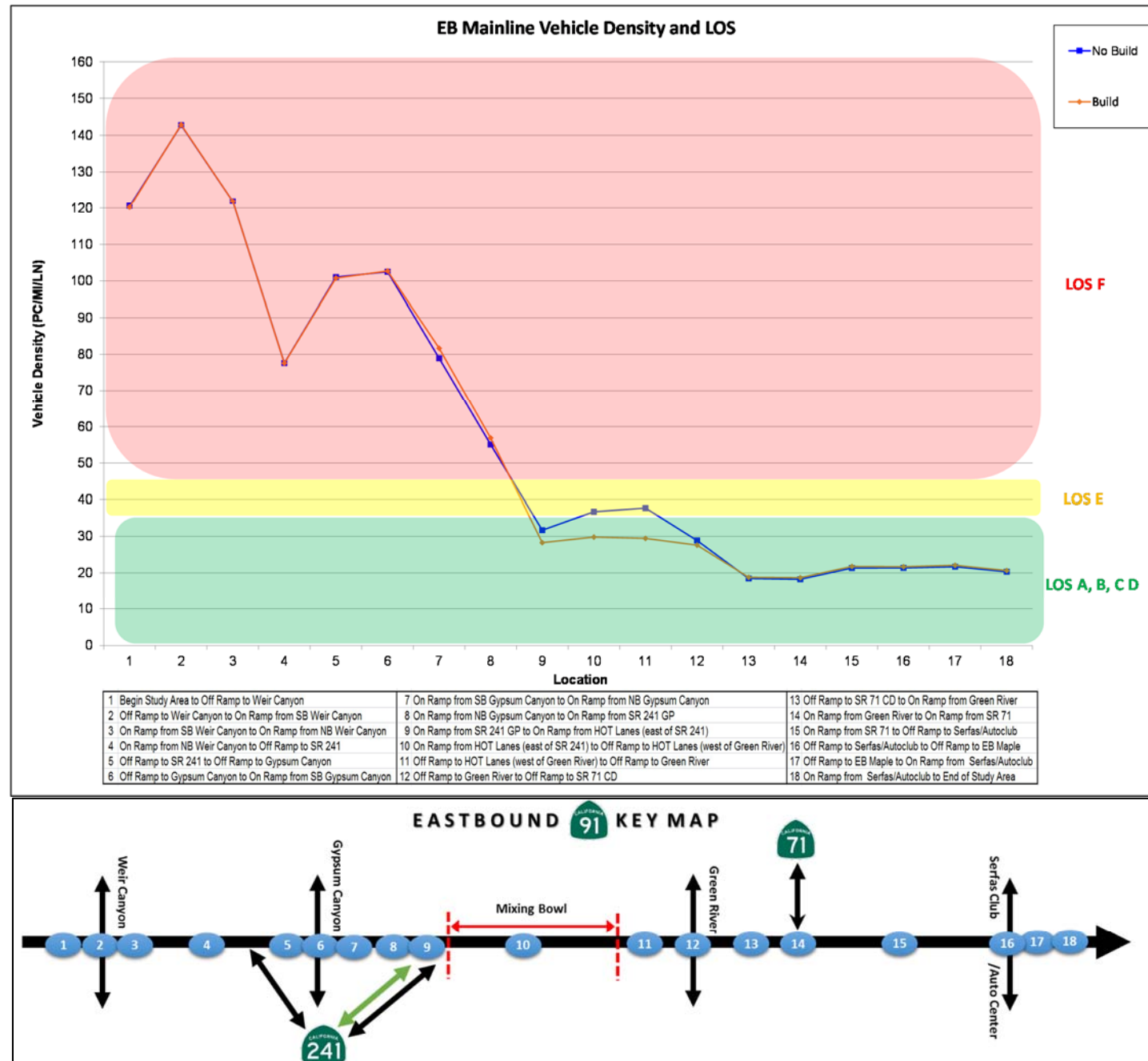


FIGURE 8-17
SR-91 Eastbound Mainline Vehicle Density and LOS Comparisons - 2040 No-Build and Build, PM Peak Hour (4-5 PM)



8.2.4 Travel Time

Travel time between major O-D points within the study area was compared between the 2040 No Build and Build scenarios using the VISSIM model. **Figure 8-9** shows how the O-D zones were numbered so that comparisons between No Build and Build can be made.

AM Peak Period

Table 8-11 compares westbound travel times between 2040 No-Build and Build scenarios in the AM peak hour for select O-D pairs.

In the AM peak period, travel times for most of the O-D pairs will either stay the same or decrease in the westbound direction on SR-91 in the 2040 Build scenario due to project improvements. Travel times in the SR-91 eastbound (off peak) direction are also expected to improve in the Build scenario compared to the No-Build scenario. This change is caused by a shift in regional travel patterns that causes lower GP lane demand on SR-91 eastbound west of the SR-241 interchange in the Build scenario.

PM Peak Period

Table 8-12 compares eastbound travel times between 2040 No-Build and Build scenarios in the PM peak hour for select O-D pairs in the study area.

In the PM peak period, all of the travel times for the select O-D pairs will either stay the same or decrease in the Build scenario compared to the No-Build scenario. The decrease in travel time is due to the shift of trips from the SR-241 northbound to SR-91 eastbound GP ramp over to the Express Lane ramp, which lowers the GP lane demand in the Express Lane ingress/egress area.

In the 2040 PM peak, all of the travel times for the select O-D pairs will either stay the same or decrease in the Build scenario compared to the No-Build scenario.

TABLE 8-11
Travel Time Comparisons - 2040 No-Build and Build, AM Peak Period (6-9 AM)

#	Origin	#	Destination	2040 No Build VISSIM Travel Time (Minutes)			2040 Build VISSIM Travel Time (Minutes)			Change VISSIM Travel Time (Minutes)		
				6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM	6-7 AM	7-8 AM	8-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	9.7	12.6	13.7	8.9	9.5	9.4	-0.8	-3.1	-4.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	9.5	12.4	13.5	8.8	9.4	9.3	-0.7	-3.0	-4.2
		5	SR 241 SB south of SR 91	7.9	10.7	12.0	7.3	7.7	7.9	-0.6	-3.0	-4.1
		7	SR 71 NB north of SR 91	11.0	13.9	15.0	10.2	10.8	10.7	-0.8	-3.1	-4.3
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.7	8.7	8.6	8.6	8.6	8.5	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.3	8.3	8.3	8.4	8.4	8.4	0.1	0.1	0.1
		7	SR 71 NB north of SR 91	10.0	10.0	9.9	9.9	9.9	9.9	-0.1	-0.1	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	22.8	21.2	16.3	18.1	19.4	20.0	-4.7	-1.8	3.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	20.8	19.3	15.4	16.4	19.2	19.9	-4.4	-0.1	4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	23.2	21.8	17.8	18.9	21.7	22.4	-4.3	-0.1	4.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	18.8	21.6	22.3	-4.4	-0.2	4.5
		7	SR 71 NB north of SR 91	8.5	8.0	5.7	6.2	8.2	7.8	-2.3	0.2	2.1
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	15.0	14.5	13.2	14.1	12.9	13.5	-0.9	-1.6	0.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15.5	15.0	14.7	14.8	15.2	15.9	-0.7	0.2	1.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	10.8	10.8	10.8	-4.7	-4.2	-3.9
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.3	7.3	7.3	7.3	7.3	7.2	0.0	0.0	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.1	11.1	11.1	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	12.4	12.4	12.4	12.3	12.3	12.3	-0.1	-0.1	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	12.3	12.3	12.3	-0.1	-0.1	-0.1
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	39.6	56.0	59.3	29.5	44.1	54.6	-10.1	-11.9	-4.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	37.6	54.2	58.4	27.8	44.0	54.5	-9.8	-10.2	-3.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	23.5	38.6	44.5	15.2	28.8	35.5	-8.3	-9.8	-9.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	40.1	56.6	60.9	30.2	46.4	57.0	-9.9	-10.2	-3.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	30.2	46.3	56.9	-9.9	-10.3	-4.0
Decrease in travel time with project is greater than 0.5 minutes												
Increase in travel time with project is greater than 0.5 minutes												

TABLE 8-12
Travel Time Comparisons - 2040 No-Build and Build, PM Peak Period (3-7 PM)

				2040 No Build				2040 Build				Change			
				VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)			
#	Origin	#	Destination	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	19.8	20.3	20.9	20.5	19.6	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19.7	20.3	20.8	20.5	19.5	19.7	19.6	18.7	-0.2	-0.6	-1.2	-1.8
		5	SR 241 SB south of SR 91	14.7	14.7	14.6	14.3	14.5	14.7	14.6	14.0	-0.2	0.0	0.0	-0.3
		7	SR 71 NB north of SR 91	21.2	21.8	22.3	22.0	21.0	21.2	21.1	20.2	-0.2	-0.6	-1.2	-1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	8.8	9.2	9.7	9.9	8.7	8.7	8.7	8.6	-0.1	-0.5	-1.0	-1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.1	0.1	0.1	0.0
		7	SR 71 NB north of SR 91	10.2	10.6	11.2	11.4	10.1	10.2	10.2	10.1	-0.1	-0.4	-1.0	-1.3
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.7	8.7	8.7	8.5	8.5	8.5	8.5	8.5	-0.2	-0.2	-0.2	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.4	-0.1	-0.1	-0.1	-0.1
		5	SR 241 SB south of SR 91 (Via GP Ramp)	11.0	11.1	11.0	10.9	10.9	11.0	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.9	10.9	10.8	10.8	-0.1	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8.6	8.7	8.6	8.5	8.5	8.5	8.5	8.5	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	8.4	8.4	8.4	8.3	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.1
		5	SR 241 SB south of SR 91 (Via GP Ramp)	11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	10.8	10.8	10.7	10.7	-0.2	-0.2	-0.3	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	7.2	7.2	7.5	7.3	7.2	7.2	7.3	7.2	0.0	0.0	-0.2	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	11.2	11.6	12.7	12.6	11.0	11.1	11.1	11.0	-0.2	-0.5	-1.6	-1.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	11.2	11.6	12.7	12.5	11.0	11.0	11.0	11.0	-0.2	-0.6	-1.7	-1.5
		7	SR 71 NB north of SR 91	12.6	13.1	14.2	14.0	12.5	12.5	12.5	12.5	-0.1	-0.6	-1.7	-1.5
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	11.0	11.0	11.1	11.0	-0.2	-0.6	-1.6	-1.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-0.4	-0.8	-1.9	-1.7
		7	SR 71 NB north of SR 91	n/a	n/a	n/a	n/a	12.5	12.5	12.5	12.5	-0.1	-0.6	-1.7	-1.5
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	10.0	10.1	10.0	9.8	9.9	9.9	9.9	9.8	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9.9	10.0	9.9	9.8	9.8	9.8	9.8	9.7	-0.1	-0.2	-0.1	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	5.7	5.7	5.6	5.4	5.8	5.9	5.6	5.4	0.1	0.2	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	12.4	12.5	12.4	12.2	12.3	12.3	12.3	12.2	-0.1	-0.2	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	n/a	n/a	n/a	n/a	12.2	12.2	12.2	12.1	-0.2	-0.3	-0.2	-0.1
Decrease in travel time with project is greater than 0.5 minutes															
Increase in travel time with project is greater than 0.5 minutes															

8.2.5 Network Performance

AM Peak Period

Table 8-13 compares the network performance results from the 2040 No-Build and Build scenarios in the AM peak period (6 to 9 AM). The following points highlight the 2040 No-Build versus Build comparisons in the AM peak period:

- The No Build and Build scenario have generally the same demand.
- The Build scenario will increase vehicle throughput (by an additional 930 vehicles or 1%) and decrease percent unserved (from 9% in No-Build to 8% in Build).
- VMT increases by 1% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases by approximately 4 mph (from 34 mph to 38 mph) in the Build scenario.
- The average delay per vehicle decreases by approximately 20% (from 7.0 to 5.6 minutes per vehicle) in the Build scenario.

In the 2040, the project will increase vehicle throughput by 1% in the AM and PM peak periods.

PM Peak Period

Table 8-14 compares the network performance results from the 2040 No-Build and Build scenarios in the PM peak period (3 to 7 PM). The following points highlight the 2040 No-Build versus Build comparisons in the PM peak period:

- The No Build and Build scenario have generally the same demand.
- The Build scenario will increase vehicle throughput (by 1,450 vehicles or 1%) while decreasing the amount of unserved vehicles (by 1,000 vehicles). The percent unserved will decrease from 16% in the No-Build scenario to 15% for the Build scenario.
- VMT increases by 2% in the Build scenario because vehicle throughput increases.
- The average speed per vehicle increases in the Build scenario by about 2 mph (from 45 to 47 mph).
- The average delay per vehicle slightly decreases with the Build scenario by less than half a minute (from 3.4 to 3.1 minutes) when compared to the No Build scenario.

TABLE 8-13
Summary of Network Performance - No-Build vs. Build Scenarios, 2040 AM Peak Period (6-9 AM)

Performance Measure (all vehicle types, 6:00 - 9:00 AM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	119,605	120,167	562
Total number of vehicles that did not reach their destination (vehicles)	10,264	9,895	-369
Total number of vehicles that have reached their destination (vehicles)	109,342	110,273	931
Total vehicle-miles traveled - VMT (miles)	939,671	953,732	14,061
Total travel time - VHT (hours)	27,641	25,219	-2,422
Average speed (mph)	34.0	37.8	3.8
Average delay time per vehicle (min/veh)	7.0	5.6	-1.4

Note: Results are based on the total three hours and are an average of all runs.

TABLE 8-14
Summary of Network Performance - No-Build vs. Build Scenarios, 2040 PM Peak Period (3-7 PM)

Performance Measure (all vehicle types, 3:00 - 7:00 PM)	No-Build Condition Value	Build Condition Value	Net Change with Project
Total Vehicle Demand (vehicles)	168,494	168,944	450
Total number of vehicles that did not reach their destination (vehicles)	26,918	25,914	-1,004
Total number of vehicles that have reached their destination (vehicles)	141,576	143,030	1,454
Total vehicle-miles traveled - VMT (miles)	1,173,727	1,193,635	19,908
Total travel time - VHT (hours)	26,063	25,477	-586
Average speed (mph)	45.1	46.9	1.8
Average delay time per vehicle (min/veh)	3.4	3.1	-0.3

Note: Results are based on the total four hours and are an average of all runs.

8.2.6 Express Lane Operations

AM Peak Period

Express lane operations were studied as part of the 2040 AM peak period analysis in both the No-Build and Build scenarios. Operational metrics such as volume served, speed, queues, and LOS were presented for the AM peak period earlier in Section 8. For quick reference, these metrics are summarized in **Table 8-15**. In the AM peak period, the westbound Express Lanes throughout the study area are projected to operate the same with and without the project.

Table 8-15 shows that there is relatively no difference in volume served, speed, or LOS in the westbound Express Lanes with or without the project.

TABLE 8-15

Summary of Westbound Express Lane Operations - No-Build vs. Build Scenarios, 2040 AM Peak Period (6-9 AM)

Operational Metric	Scenario	Study Segment		
		Between SR-71 and Green River	Between Green River and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Weir Canyon
Volume Served (percent of demand served)	No-Build	99.5%	99.5%	93.5%
	Build	99.5%	99.5%	91.7%
Speed	No-Build	68	69	68
	Build	68	68	69
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	B
	Build	C	B	B

PM Peak Period

In the PM peak period, the eastbound Express Lanes throughout the study area are also projected to operate the same with and without the project in 2040. **Table 8-16** shows that there is relatively no difference in volume served, speed, or LOS in the eastbound Express Lanes with or without the project.

TABLE 8-16

Summary of Eastbound Express Lane Operations - No-Build vs. Build Scenarios, 2040 PM Peak Period (3-7 PM)

Operational Metric	Scenario	Study Segment		
		Between Weir Canyon and SR-241 Express Lane Connector	Between SR-241 Express Lane Connector and Green River	Between Green River and SR-71
Volume Served (percent of demand served)	No-Build	99.3%	99.3%	89.3%
	Build	99.7%	99.7%	87.1%
Speed (mph)	No-Build	68	69	68
	Build	68	69	68
Queues in the Express Lanes?	No-Build	No	No	No
	Build	No	No	No
Level of Service	No-Build	C	B	C
	Build	C	B	C

Additional weaving analysis of the Express Lane operations in the mixing bowl was performed to supplement the microsimulation analysis. Per the Highway Design Manual (Section 504.7), the Leisch Method was applied to study the weaving condition in the mixing bowl. However, the Leisch method will not work for this study segment because the weaving volume (V_w) exceeds the "Turning Line for K" and the weaving section is greater than the chart boundary (7,400 feet). As noted on Figure 504.7A in the Highway Design Manual, extrapolation beyond the chart boundaries is not advised for the Leisch method. The Highway Capacity Manual (HCM) weaving analysis methodology was also attempted for the mixing bowl. However, based on the weaving volumes, the maximum weaving segment that can be analyzed is 4,093 feet. The mixing bowl segment is 7,400 feet and therefore cannot be analyzed using the HCM weaving methodology. Therefore, microsimulation is the only analysis tool that can be used for a segment as long as the mixing bowl.

8.3 Additional Design Variations

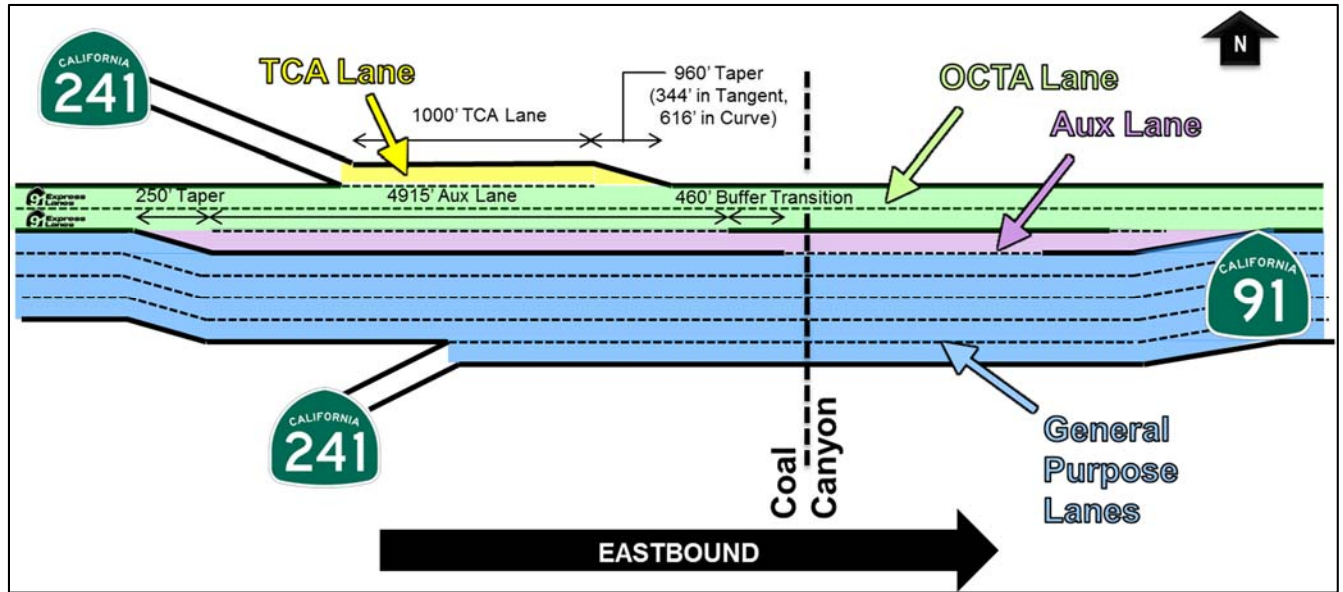
The proposed improvements evaluated in this analysis focused on a single build alternative: a new direct connection between SR-241 and the SR-91 Express Lanes. That alternative proposes to construct direct connectors from northbound SR-241 to the eastbound SR-91 Express Lanes, and the westbound SR-91 Express Lanes to southbound SR-241 (one lane in each direction). However, several design variations of the project were analyzed in VISSIM to determine the optimal configuration. Three eastbound design variations (Design Variations 1, 2, and 3) and one westbound design variation (Design Variation 4) are summarized in the following subsections (8.3.1 through 8.3.4). Design Variation 2 was found to optimize operations and was therefore carried forward for the 2017 and 2040 Build scenarios to be compared to the No Build scenario. The layout plan for this project (Design Variation 2) is included in Appendix G.

8.3.1 Eastbound Design Variations

Design Variation 1

Figure 8-18 illustrates the geometric configuration of Design Variation 1 (not to scale). The northbound-to-eastbound SR-241/SR-91 Express Lane Connector has a minimum length of 1,000 feet followed by a 960-foot left-side merge taper with the inside OCTA Express Lane. In addition, the Express Lane Connector joins the OCTA Express Lanes with no buffer (i.e., Express Lane Connector traffic can merge with OCTA Express Lane traffic immediately). There is approximately 3,900 feet of total weaving distance provided in Design Variation 1 between the Express Lane Connector and the entrance to the GP lanes, although this movement is not anticipated to have any demand.

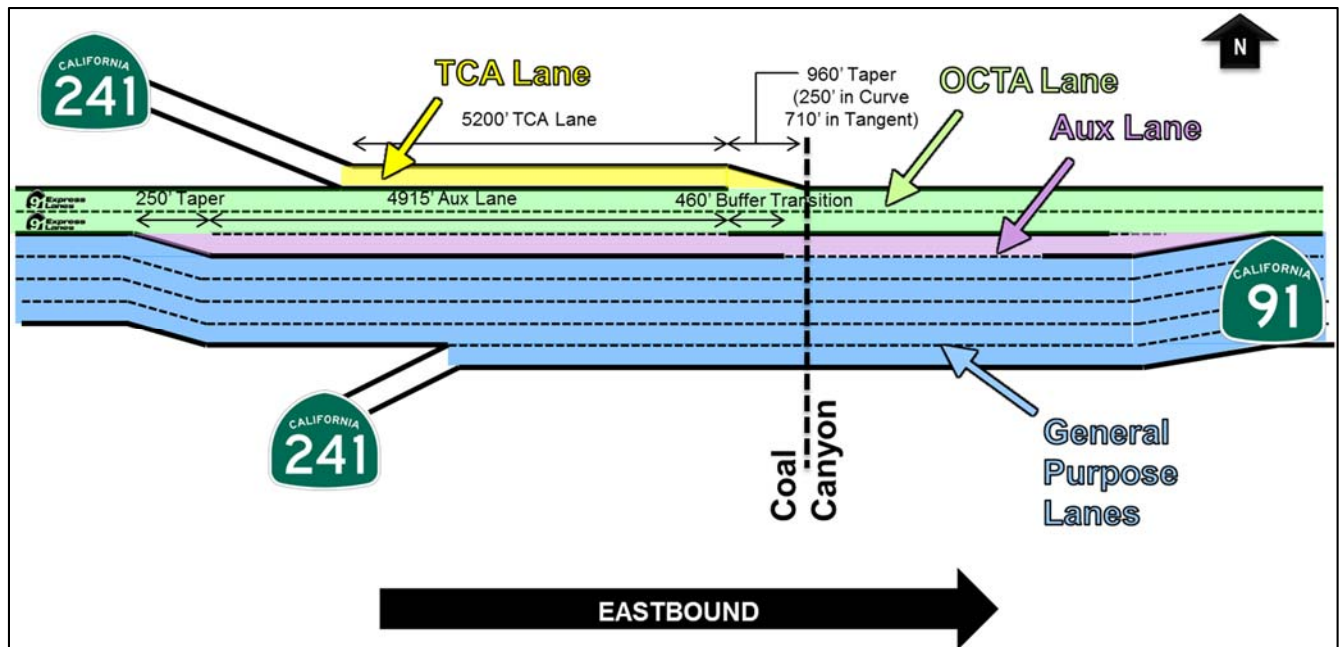
FIGURE 8-18
SR-91 Eastbound Express Lanes – Design Variation 1



Design Variation 2

Figure 8-19 illustrates the geometric configuration of Design Variation 2 (not to scale). The Express Lane Connector (northbound SR-241 to eastbound SR-91) tapers off at Coal Canyon and merges with the inside OCTA Express Lane (i.e., has a length longer than 1,000 feet). In this variation, part of the taper occurs in the SR-91 curve, west of Coal Canyon. In addition, the Express Lane Connector joins the OCTA Express Lanes with a 4-foot buffer (i.e., Express Lane Connector traffic cannot merge with OCTA Express Lanes due to the buffer and must merge at the end of the buffer limit).

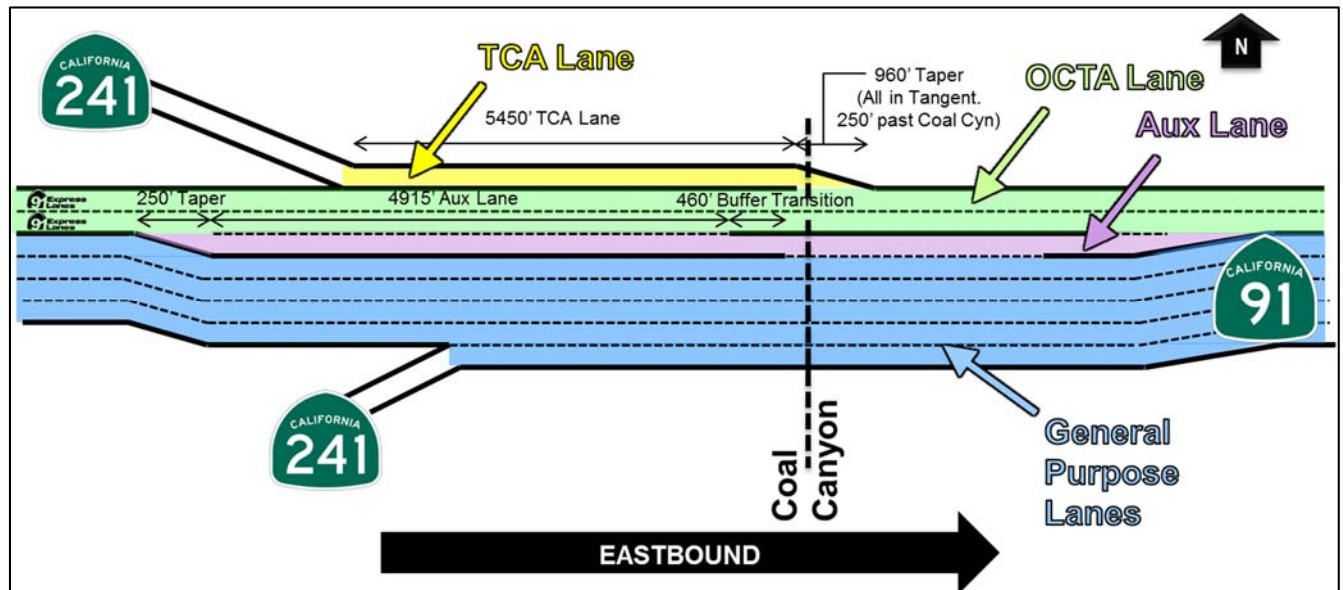
FIGURE 8-19
SR-91 Eastbound Express Lanes – Design Variation 2



Design Variation 3

Figure 8-20 illustrates the geometric configuration of Design Variation 3 (not to scale). The Express Lane Connector (northbound SR-241 to eastbound SR-91) tapers off east of the Coal Canyon project limit and merges with the inside OCTA Express Lane (i.e., has a length longer than 1,000 feet). In this variation, part of the taper occurs on the tangent section of SR-91, west of Coal Canyon. In addition, the Express Lane Connector joins the OCTA Express Lanes with a four-foot buffer (i.e., Express Lane Connector traffic cannot merge with OCTA Express Lanes due to the buffer and must merge at the end of the buffer limit).

FIGURE 8-20
SR-91 Eastbound Express Lanes – Design Variation 3



8.3.2 Eastbound Design Variation Results Comparison

The results from the VISSIM analysis of the three eastbound design variations is discussed below. The 2017 and 2040 PM peak period was used to make the comparison, as the PM peak period is the worst case for demand volume in this segment of the SR-91 Eastbound Express Lanes. MOEs used to compare the design variations include volume served, speed, density, travel time, and network performance. The results from the VISSIM analysis of the three design variations showed there was very little difference in traffic operations, and that the configuration should be based on other design elements. Design Variation 2 was carried forward for the 2017 and 2040 Build scenarios to be compared to the No Build scenario. The build scenario results shown in Sections 8.1 and 8.2 represent the results of Design Variation 2.

Volume Served

Throughput volumes were measured at the SR-91 Eastbound GP and Express Lanes between the SR-241 interchange and the Express Lane egress ramps and compared between the three design variations and No Build scenario. **Table 8-15** compares volume throughput for both the 2017 and 2040 PM peak hour (4-5 PM). All three design variations have similar throughput volumes (within 0.3%).

TABLE 8-15

Vehicle Throughput Comparison –SR-91 Eastbound between SR-241 and Express Lane egress, PM Peak Hour (4-5 PM)

Scenario	2017 PM				2040 PM			
	Throughput Volume (veh/hr)			Overall Change from No Build	Throughput Volume (veh/hr)			Overall Change from No Build
	GP Lanes	Express Lanes	Overall		GP Lanes	Express Lanes	Overall	
No Build	9468	3174	12641	0.0%	11409	3174	14583	0.0%
Option 1	8866	4202	13068	3.4%	10702	3926	14628	0.3%
Option 2	8850	4200	13050	3.2%	10702	3941	14642	0.4%
Option 3	8886	4200	13086	3.5%	10707	3941	14648	0.4%

Speed and Density

Speed and density were measured along SR-91 eastbound in both the GP and Express Lanes upstream, within, and downstream of the mixing bowl and compared among the three design variations and No Build scenario. **Figures 8-21 and 8-22** compares speed and density, respectively, during the 2017 and 2040 PM peak hour (4-5 PM) for all three design variations. The results show there is very little difference in either speed or density within the areas evaluated.

FIGURE 8-21

Speed Comparison – SR-91 Eastbound GP and Express Lanes at the SR-241 Mixing Bowl, PM Peak Hour (4-5 PM)

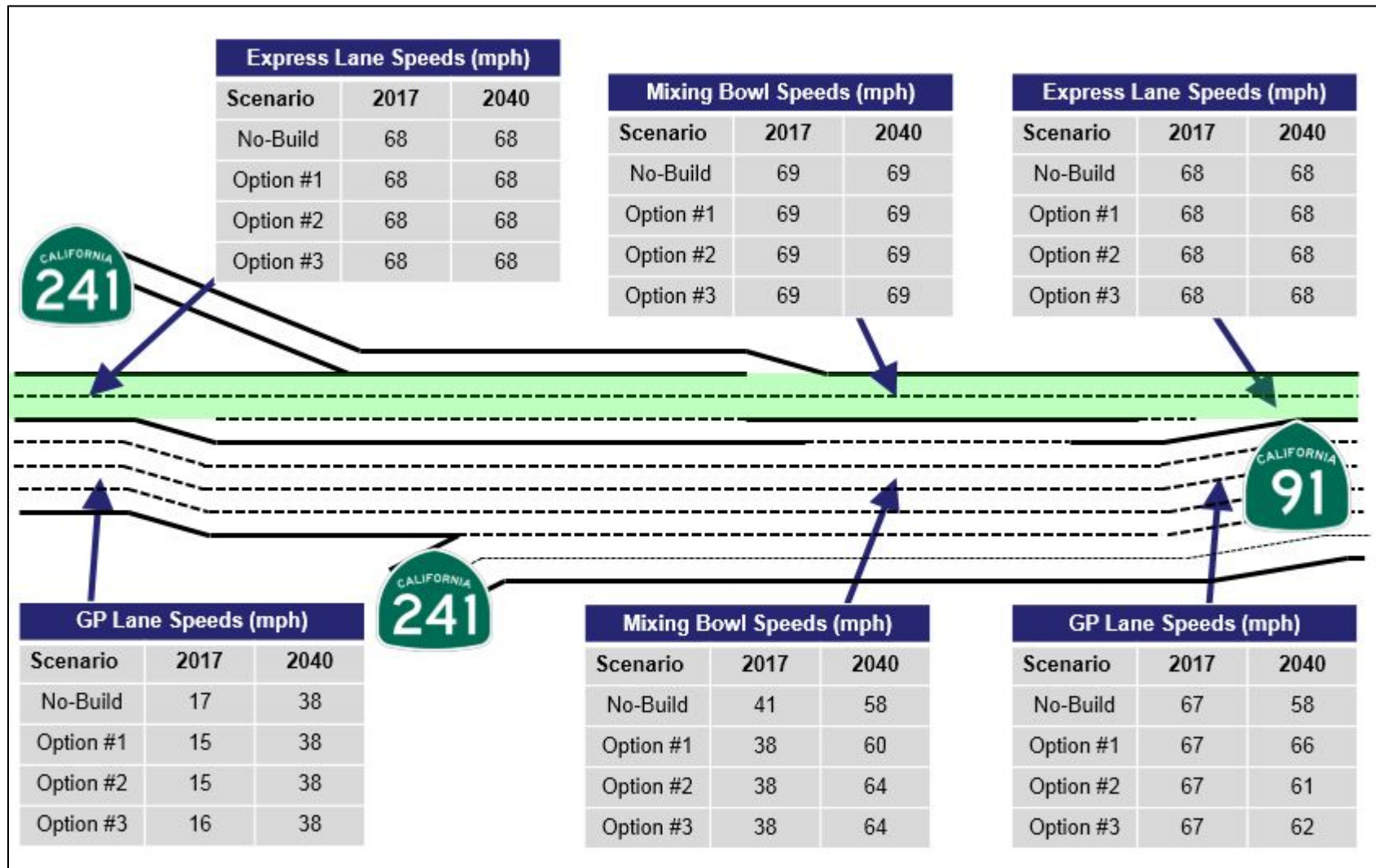
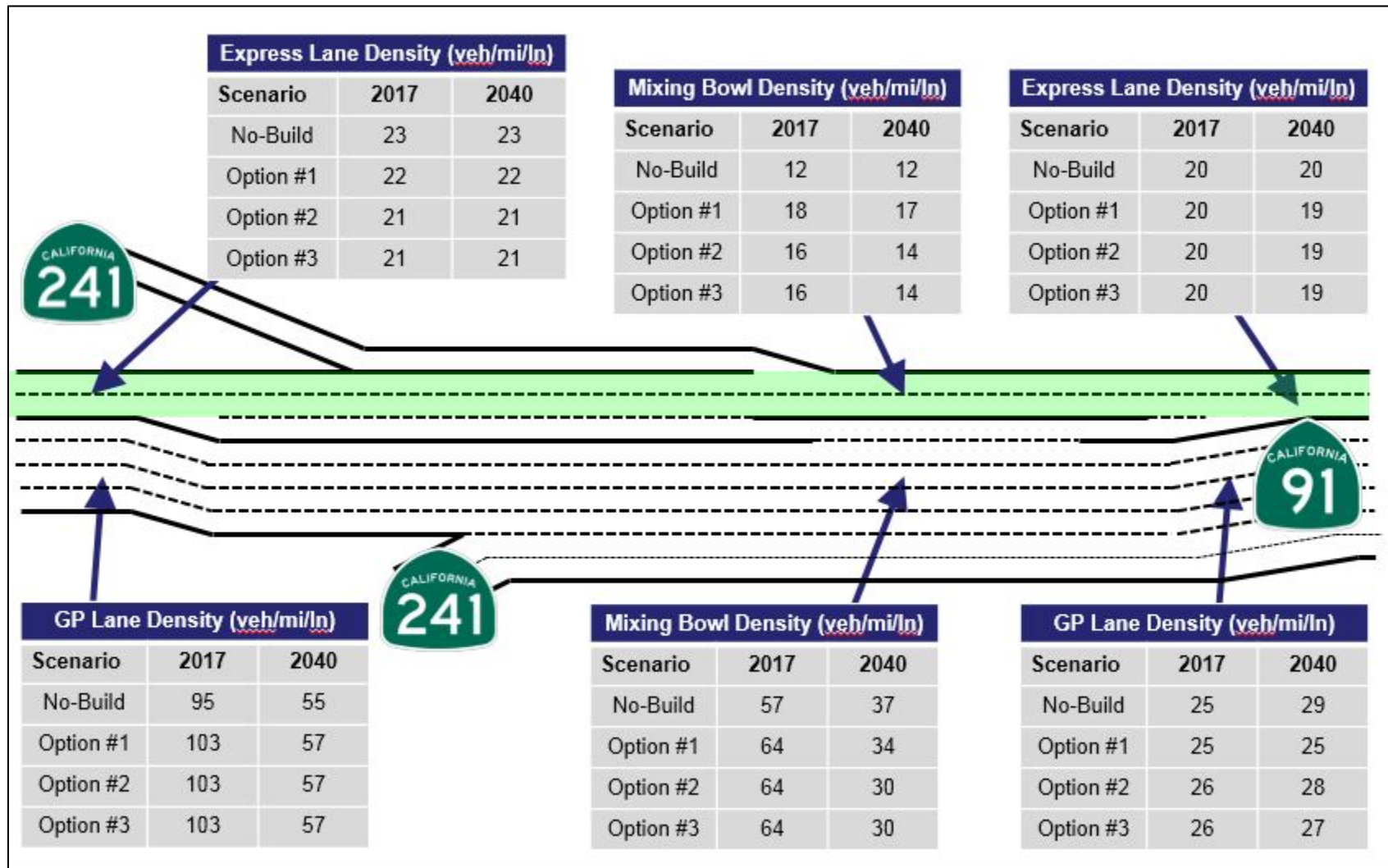


FIGURE 8-22

Density Comparison – SR-91 Eastbound GP and Express Lanes at the SR-241 Mixing Bowl, PM Peak Hour (4-5 PM)



8.3.3 Westbound Design Variations

Design Variation 4

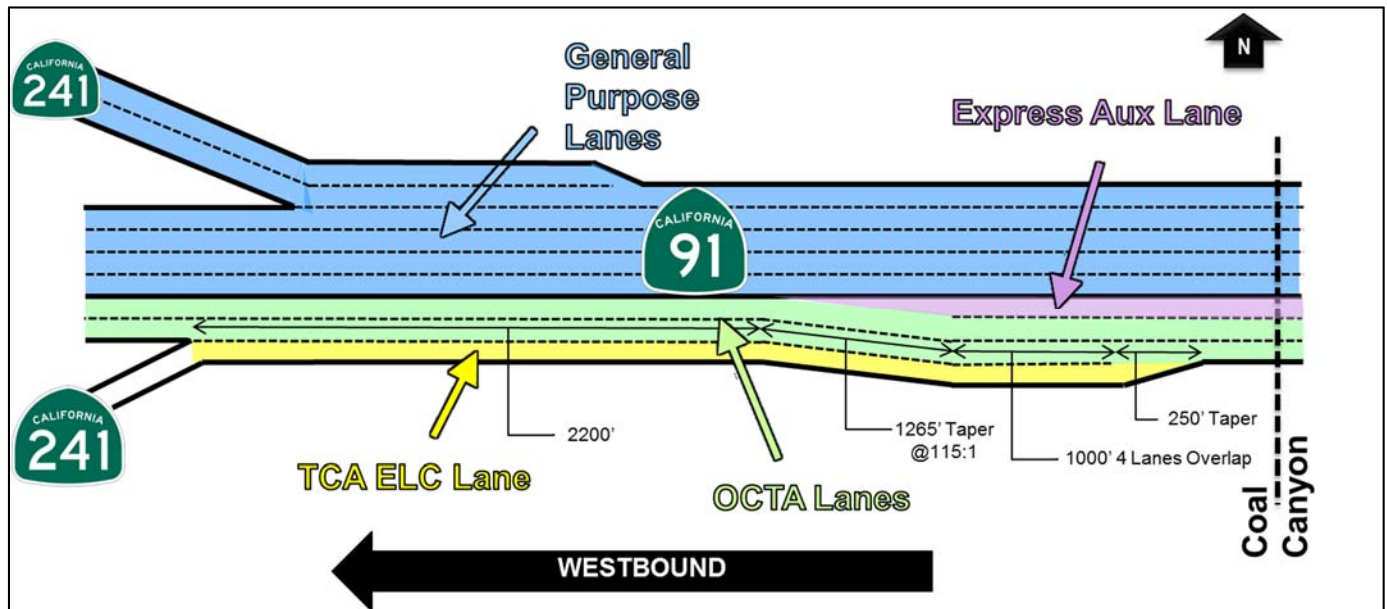
Figure 8-23 illustrates the geometric configuration of Design Variation 4 (not to scale). Design Variation 4 is similar to the base design and only involves modification of the westbound SR-91 Express Lane geometry between the westbound ingress/egress area and the SR-241 direct connector. In this design variation, the Express Lane Connector lane is extended to the east so that there is a 1000-foot section where there are four lanes in the Express Lanes (one Express Lane auxiliary lane, two OCTA Express Lanes, one Express Lane Connector lane). Similar to the baseline geometry, the Express Lane auxiliary lane merges into the outside OCTA Express Lane. At this point, the Express Lane cross section will be three lanes until the Express Lane Connector lane diverges.

OCTA's tolling policy is to maintain a maximum vehicle flow rate of approximately 1,700 vehicles per hour per lane (1,600 vehicles per hour per lane is preferred). As noted in Section 6.3.1 and Section 6.3.2, the future forecasts show that the project will generate a demand of 4,250 vehicles per hour in the AM peak period between the westbound ingress/egress area and the Express Lane connector. This equates to 2,125 vehicles per hour per lane in the baseline design concept where there are only two lanes between the westbound ingress/egress area and the Express Lane connector (see Figures 7-1 and 7-2). Design Variation 4 would provide three lanes in this critical Express Lane area and would equate to approximately 1,420 vehicles per hour per lane which is in compliance with OCTA's per lane tolling policy parameters.

The configuration of Design Variation 4 provides optimal lane balance and utilization. Westbound Express Lane drivers travelling from the RCTC Express Lanes who wish to continue through to the OCTA Express Lanes do not need to change lanes to make this movement. As shown in Figure 8-23, the two westbound RCTC Express Lanes channel directly into the two OCTA Express Lanes. This configuration provides for optimal lane balance and lane utilization in the westbound Express Lane ingress/egress area.

Additional traffic analysis was not needed for Design Variation 4 because the operations are projected to be better than the base design. The base design, which narrows down to two lanes between the westbound ingress/egress area and the Express Lane connector, was found to operate with speeds in excess of 65 mph (see Section 8.1.2 and 8.2.2). Design Variation 4 would provide three to four lanes in this critical Express Lane area so this additional capacity will only improve the operations in the Express Lanes. These findings were discussed with F/ETCA, OCTA, and Caltrans in a meeting on October 16, 2014. In this meeting, it was agreed that additional traffic analysis was not required for Design Variation 4 due to the reasons stated above.

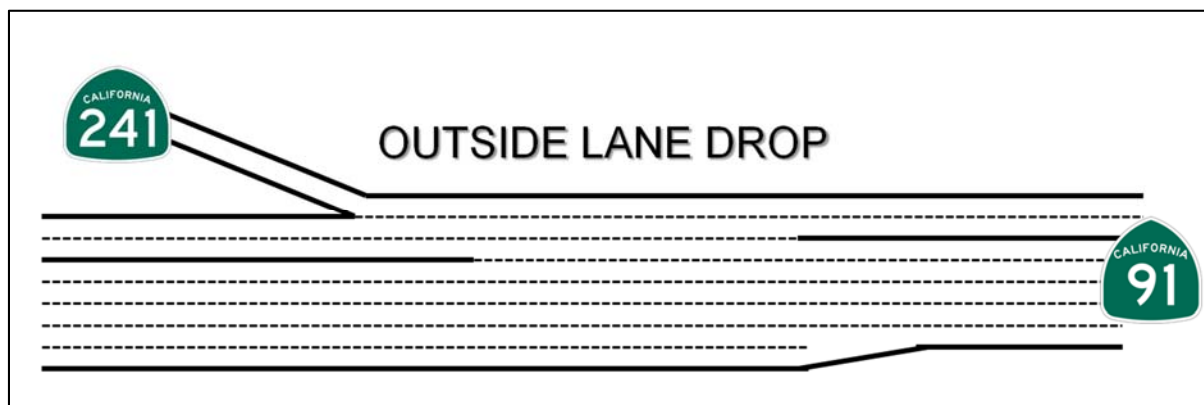
FIGURE 8-23
SR-91 Westbound Express Lanes – Design Variation 4



8.3.4 Design Variations Considered during Earlier Stages of Project Development

In earlier phases of project development for this project, a variety of other design variations were considered and analyzed. During the Project Study Report/Project Report (PSR/PR) phase of the project, the way in which the outside eastbound Express Lane was terminated at the end of the mixing bowl was analyzed using VISSIM. As part of this analysis, an alternative method for dropping the third eastbound SR-91 Express Lane was analyzed. The alternative method for dropping the third Express Lane was to drop it in the outside GP lane. Figure 8-24 illustrates the geometric configuration of the outside lane drop.

FIGURE 8-24
SR-91 Eastbound Express Lanes - Outside Lane Drop Schematic



The analysis showed that dropping the 3rd Express Lane via an outside GP lane drop increased congestion in GP lanes compared to project baseline, created a bottleneck at end of weaving section, and caused the Express lanes to operate below 50 mph. For these reasons, the outside lane drop alternative was dropped from further consideration and therefore not considered in the PA/ED analysis.

9 Summary of Findings

The purpose of this report is to document the traffic analysis for the SR-241/SR-91 Express Lane Connector Project Study Report/Project Report. The goal of the traffic analysis is to conduct operational analysis to refine the PA/ED alternative, focused on the interaction of the Express Lane weaving section with the congested GP lanes. This section summarizes the overall findings of the traffic analysis.

9.1 Overall Traffic Operations Findings

Table 9-1 summarizes the overall traffic operational benefits of the proposed project.

FIGURE 9-1
Overall Project Benefit Summary¹

Measure	Year	Results
Increase in Throughput in the Mixing Bowl	2017	2,586 vehicles in the peak direction (+7%)
	2040	1,239 vehicles in the peak direction (+3%)
Increase in Corridor VMT	2017	34,301 (+4%)
	2040	17,403 (+2%)
Change in Speed	2017	+1.9 mph (+6%)
	2040	+2.7 mph (+7%)
Change in Delay	2017	-0.6 minutes/vehicle (-12%)
	2040	-0.8 minutes/vehicle (-17%)

¹ Based on seven hours of results for the combined AM peak (three hours) and PM peak (four hours).

In the build scenario, the overall findings of the traffic analysis can be summarized as follows:

- The overall throughput on SR-91 increases.
- On the eastbound SR-91 GP lanes, more vehicles must exit the OCTA Express Lanes and enter the GP lanes and fewer cars can leave the GP lanes and enter the RCTC Express Lanes. More vehicles are in the Express Lanes in the mixing bowl area because the northbound SR-241 to eastbound SR-91 Express Lane Connector adds more traffic to the mixing bowl. To help handle the additional vehicles in the Express lanes, the project does add an additional two lanes of capacity in the mixing bowl. More vehicles will exit, increasing friction, because the downstream constraint remains the same (3,200 vehicles/hour in the RCTC Express Lanes).

- However, there is also a reduction in friction due to fewer vehicles weaving from the northbound SR-241 to eastbound SR-91 GP ramp to the RCTC Express lanes with the project (i.e., most of these vehicles will now use the SR-241 to SR-91 Express Lane Connector).
- The result is an overall net zero effect on the eastbound SR-91 GP lanes with the project in the PM peak period. The overall average difference in vehicle throughput (Build minus No-Build) in the 2017 PM peak period is -0.3% and 0.6% in the 2040 PM peak period.

A more detailed summary of the overall findings of the traffic analysis for the SR-241/SR-91 Express Lane Connector Project is provided below:

- Traffic is projected to shift from other regional routes (SR-91, SR-55, surface streets) to SR-241. This regional shift is a result of the additional capacity of the new connector.
- In the AM peak period, more traffic is forecasted to travel from westbound SR-91 to southbound SR-241 in the build scenario. The resulting shift leads to fewer vehicles in the westbound SR-91 GP lanes (850 vehicles/hour in 2017 and 1,320 vehicles/hour in 2040), west of the SR-91/SR-241 interchange.
- A design variation for the westbound Express Lanes between the ingress/egress area and the Express Lane Connector was assessed (Design Variation 4). In this design variation, the Express Lane Connector lane is extended to the east so that there is a 1000-foot section where there are four lanes in the Express Lanes (one Express Lane auxiliary lane, two OCTA Express Lanes, one Express Lane Connector lane). Similar to the baseline geometry, the Express Lane auxiliary lane merges into the outside OCTA Express Lane. At this point, the Express Lane cross section will be three lanes until the Express Lane Connector lane diverges. Design Variation 4 would provide three lanes in this critical Express Lane area and would equate to approximately 1,420 vehicles per hour per lane which is in compliance with OCTA's per lane tolling policy parameters. Additional traffic analysis was not needed for Design Variation 4 because the operations are projected to be better than the base design. The base design, which narrows down to two lanes between the westbound ingress/egress area and the Express Lane connector, was found to operate with speeds in excess of 65 mph. Design Variation 4 would provide three to four lanes in this critical Express Lane area and there is therefore assumed that this additional capacity will only improve the operations in the Express Lanes (i.e., speeds will be 65 mph or higher).
- In the 2017 PM peak period, more traffic is forecasted to travel from northbound SR-241 to eastbound SR-91 in the build scenario. The resulting shift leads to fewer vehicles in the eastbound SR-91 GP lanes (190 vehicles/hour in 2017), west of the SR-91/SR-241 interchange. Once these vehicles shift to SR-241, they are projected to use the northbound SR-241 to eastbound SR-91 Express Lane Connector and continue on to the RCTC Express Lanes. By the 2040 Design Year, background growth and the additional eastbound capacity provided by the SR-91 Ultimate CIP project is anticipated to balance traffic demand within the corridor between the No Build and Build scenario. Therefore, for the 2040 PM peak, there is no eastbound SR-91 regional shift to SR-241 projected.
- The project increases the toll road system throughput and revenue in both 2017 and 2040.
- The project will reduce the length of the northbound SR-241 to eastbound SR-91 queue on the general purpose ramp in the PM peak period.

- The project provides measureable system benefits in the AM peak period in the form of increased vehicle throughput on SR-91 in the mixing bowl (7% in 2017 and 3% in 2040), increased corridor-wide VMT (4% in 2017 and 2% in 2040), increased average speed (+1.9 mph in 2017 and +2.7 mph in 2040), and reduced average delay (-0.6 minutes/vehicle in 2017 and -0.8 minutes/vehicle in 2040).
- During the PM peak period, system benefits are mixed in 2017 but show an overall improvement by 2040. SR-91 vehicle throughput and VMT both increase in 2017, but the average speed drops (1 mph) and delay increases (0.4 minutes/vehicle) due to the regional shift that increases demand in the GP lanes. However, all system measures show positive impact by 2040 (average speed increases by 2 mph and delay decreases by 0.4 minutes/vehicle).
- At the SR-91 westbound mainline bottleneck between the Green River Road interchange and the Express Lane Ingress (AM peak period), the project provides benefit in the form of shorter queues, higher vehicle throughput, higher speed and lower density, and shorter travel times in both 2017 and 2040.
- At the SR-91 eastbound mainline bottleneck between the Express Lane Ingress and the Green River Road interchange (PM peak period), the project increases vehicle throughput in both 2017 and 2040. By the 2040 Design Year, the project will improve conditions at the bottleneck by increasing average speed (5 mph) and vehicle throughput (between 0.5 and 1.5%) while reducing density and lowering travel time (from 1 to 4.5 minutes depending on path).
- With the project, high-speed operations of the SR-91 Express Lanes can be maintained with a maximum eastbound exiting Express Lane volume of 1800 vehicles/hour in 2017 (1600 vehicles/hour in 2040). The mix of OCTA/F/ETCA/RCTC toll traffic is critical to the successful operations of the mixing bowl.
- Analysis of three design variations for the SR-91 Eastbound Express Lane weaving section shows that there is very little difference between the variations from a traffic operations perspective, and the optimal configuration should be chosen based on other design considerations.
- The VISSIM modeling done as part of this analysis does not include dynamic behavior based on toll rate policy. Instead, the modeling is intended to optimize operations within the study area and assumes that tolling policies will be set to match the travel-demand assumptions used on the toll facilities in the VISSIM model. A separate tolling and revenue study will determine toll rates.

9.2 Overall Advantages

The proposed SR-241/SR-91 Express Lane Connector Project has several advantages:

- The direct connection closes the gap between two major toll systems (SR-91 Express Lanes and SR-241 Toll Roads)
- The project improves vehicle throughput in SR-91 corridor since more vehicles can be pushed through the SR-91 Express Lanes (i.e., the project brings more cars into the express lanes in the mixing bowl and therefore the combined GP and Express Lane throughput increases in the mixing bowl). The Express Lanes throughput upstream and downstream of the mixing bowl (i.e., in the OCTA and RCTC Express Lanes) remains the same with or

without the project (approximately 3,200 vehicles/hour), consistent with the OCTA and RCTC tolling policy assumptions.

- The project improves vehicle miles traveled throughout study area.
- The project will pull 1,700 vehicles during the peak hours (AM/PM) from I-5, SR-55 and surrounding local arterials to SR-241 in the 2017 Opening Year.
- Travel time will be reduced by 24% for northbound SR-241 to eastbound SR-91 toll users in the 2017 Opening Year.

9.3 Overall Challenges

The proposed project also has challenges that will need to be addressed in future design/operations efforts:

- The operations through the SR-91/SR-241 interchange ingress/egress area require that flows to/from each system are controlled to ensure that the Express Lanes do not break down. This will require coordinating the pricing schemes for three different systems and for different entry points.
- The direct connection proposed by the project will integrate three tolling facilities (SR-91 Express Lanes, SR-241 Toll Roads, RCTC Express Lanes) operated by three different agencies (OCTA, F/ETCA, and RCTC). The operation and setting of toll rates for all three systems will require careful planning and coordination.
- Both of the above items will be addressed in the Concept of Operations Report.

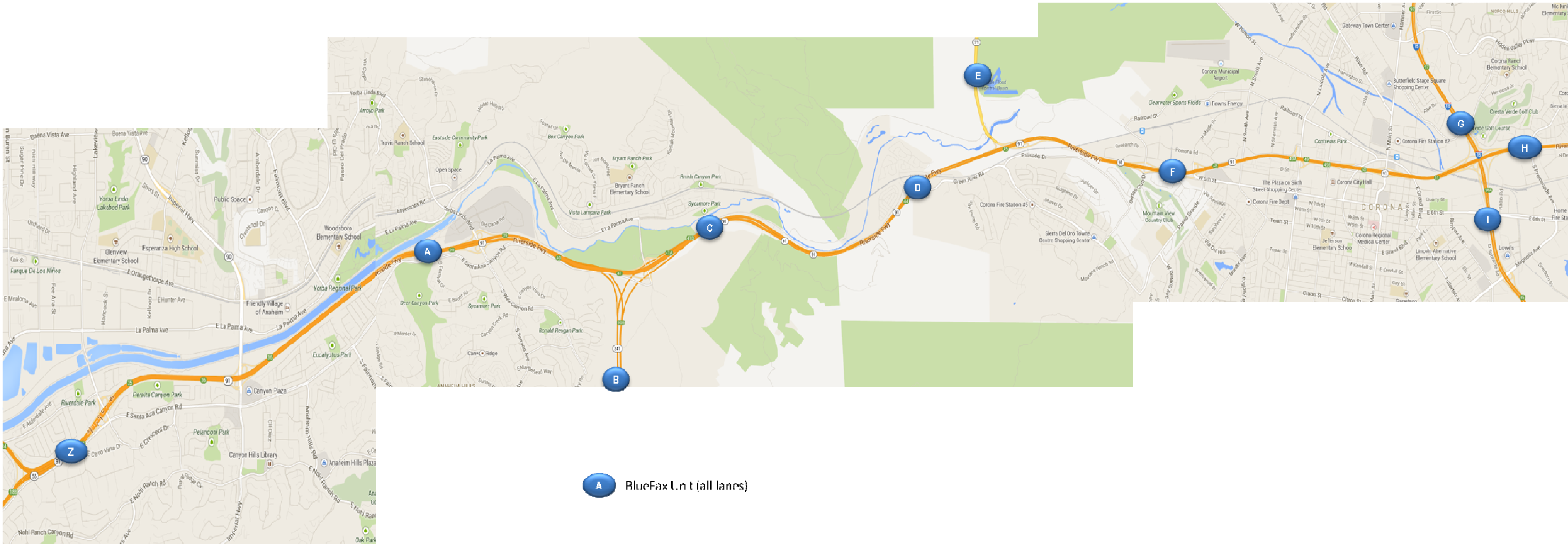
10 Project Reviewers

Agency	Reviewer	Review Date
Foothill/Eastern Transportation Corridor Agency	Juliet Su	7/2/14
	King Thomas	7/2/14
	Doug Feremenga	7/2/14
	Valarie McFall	7/2/14
	David Lowe	7/2/14
	Steven Abendschein	7/2/14
	Jeff Fromhertz	7/2/14
	Mike Kraman	7/2/14
	Lisa Telles	7/2/14
Caltrans District 12	Bassem Barsoum	2/4/15
Orange County Transportation Authority	Anup Kulkarni	2/17/15
Riverside County Transportation Commission	Craig Schneider	12/23/14
Federal Highway Administration	Jesse Glazer	3/25/15

Appendix A

Bluetooth Study Summary Statistics

FIGURE 1
Bluetooth Study Area



Origin-Destination Reporting Parameters

Date/Time Filtering Method:	Origin
Date Range Filter	OFF
DATETIME BEGIN	---
DATETIME END	---
LENGTH IN HOURS	---
Trip Length Filter	OFF
MINIMUM	---
MAXIMUM	---
Outliers are:	INCLUDED
Time of Day Filter	OFF
BEGIN	---
END	---
Day of Week Filter	ON
Monday	Yes
Tuesday	Yes
Wednesday	Yes
Thursday	Yes
Friday	Yes
Saturday	No
Sunday	No

Segment Status

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I	No Segment	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site H	OK	No Segment	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site G	OK	OK	No Segment	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site D	OK	OK	OK	No Segment	OK	OK	OK	OK	OK	OK	OK	OK
Site H-1	OK	OK	OK	OK	No Segment	OK	OK	OK	OK	OK	OK	OK
Site F	OK	OK	OK	OK	OK	No Segment	OK	OK	OK	OK	OK	OK
Site E	OK	OK	OK	OK	OK	OK	No Segment	OK	OK	OK	OK	OK
Site C	OK	OK	OK	OK	OK	OK	OK	No Segment	OK	OK	OK	OK
Site B	OK	OK	OK	OK	OK	OK	OK	OK	No Segment	OK	OK	OK
Site A	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segment	OK	OK
Site Z-1	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segment	OK
Site Z	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	No Segment

OD Counts

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		5134	11797	6949	6069	8152	719	3088	739	5935	6016	4941
Site H	4815		5026	13827	36700	13694	426	6196	1796	11231	11411	9418
Site G	9456	3652		4917	4076	4740	87	2429	994	3619	3570	3180
Site D	5171	11509	4259		11990	24510	1034	18245	6633	29599	29194	24042
Site H-1	4378	20708	4462	12671		12733	355	5777	1632	10359	10456	8905
Site F	8374	15438	5897	27271	17032		1378	13074	3741	21105	20758	18139
Site E	1262	670	60	3618	681	2740		2035	1101	1925	1810	1632
Site C	4116	9269	3685	21194	9937	20246	892		3486	13036	12396	11354
Site B	562	1810	1143	4576	1932	4053	313	4048		658	326	269
Site A	4322	9150	3136	19590	9427	18623	588	15286	411		32619	26897
Site Z-1	4402	9141	3239	19692	9535	18843	576	15243	246	22049		36211
Site Z	5112	10992	3940	22255	11949	23146	611	18180	253	24604	31060	

Mean Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		2.055964	1.548925	11.73464	1.903792	8.176877	13.15342	17.63664	24.15607	19.32526	23.45216	24.17709
Site H	2.411566		1.461882	9.920863	0.252427	6.537709	11.78087	15.14342	21.33436	17.0841	20.93165	21.59669
Site G	2.685343	2.756526		9.933937	2.784746	6.836053	15.25038	14.9826	20.60211	18.2936	22.877	23.46729
Site D	11.87459	10.77883	10.76692		10.79129	5.252516	6.688427	3.048814	8.67583	6.488313	10.07878	10.60466
Site H-1	2.314072	0.665971	1.527697	9.914642		6.449683	11.58254	14.96633	21.21544	17.08444	20.98695	21.43719
Site F	6.857449	5.633658	6.013404	3.679573	5.655189		5.602467	6.932444	12.69573	10.18543	13.929	14.37352
Site E	14.92419	13.53241	15.66431	7.054411	13.74939	8.530408		10.42995	16.67408	13.60113	17.79452	18.23465
Site C	14.70665	13.85505	13.90061	3.184293	13.71395	8.097811	9.803578		5.822528	4.041663	7.618093	8.093808
Site B	23.9844	23.81951	22.95427	12.68314	23.7548	17.63313	19.08307	9.817383		8.071771	12.67771	13.48256
Site A	20.76496	20.31101	21.08795	8.358504	20.09296	13.88156	14.40791	6.148444	7.998378		3.554103	4.012316
Site Z-1	24.72219	23.88021	25.38691	12.09314	23.60885	17.29493	19.46207	9.462861	11.61782	3.150622		0.519349
Site Z	25.31089	24.40054	25.63126	12.6045	23.90441	17.76422	20.06232	10.04305	11.62628	3.483005	0.540791	

Minimum Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		0.625	0.075	2.983333	0.566667	1.25	4.558333	6.833333	11.65833	6.775	1.183333	1.016667
Site H	0.125		0.058333	4.45	0	1.183333	6.6	6.533333	11.43333	9.091667	11.075	4.883333
Site G	0.116667	0.141667		1.816667	0	0.05	7.7	4.766667	11.05	8.083333	0.466667	9.4
Site D	5.158333	4.575	4.883333		4.6	2.116667	3.316667	0.133333	6.016667	3.983333	6.125	2.341667
Site H-1	0.066667	0	0	4.366667		1.1	6.791667	6.516667	11.375	9.166667	7.958333	11
Site F	2.408333	2.266667	2.291667	1.775	2.416667		3.733333	3.533333	8.283333	1.3	2.075	2.833333
Site E	7.416667	6.408333	7.233333	3.066667	6.55	3.725		4.983333	9.55	2.466667	6.941667	7.7
Site C	7	2.866667	6.641667	1.333333	2.766667	3.508333	0.966667		4.066667	2.558333	3.683333	4.791667
Site B	11.66667	11.04167	10.73333	3.666667	9.316667	6.266667	10.70833	1.883333		5.6	8.133333	8.325
Site A	9.425	5.333333	3.133333	4.008333	1.95	2.4	8.991667	2.533333	3.283333		1.891667	2.15
Site Z-1	11.49167	10.58333	10.95	6.008333	10.60833	8.175	11.14167	3.733333	8.183333	1.833333		0
Site Z	11.71667	8.116667	10.50833	6.191667	10.79167	5.716667	11.44167	3.933333	8.5	2.183333	0	

Max Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		29.78333	29.94167	36.91667	29.95	29.96667	41.325	48.94167	65.20833	70.31667	86.11667	86.95
Site H	29.89167		29.75	38.16667	29.875	29.93333	39.21667	50.39167	68.55833	71.075	87.89167	89.10833
Site G	29.95	29.65		34.18333	29.96667	29.875	34.65833	46.01667	65.35	67.775	84.48333	85.30833
Site D	36.73333	38.15	34.11667		38.39167	29.96667	28.83333	29.8	37.88333	33.78333	50.20833	51.4
Site H-1	29.99167	29.89167	29.99167	38.43333		29.99167	40.51667	50.66667	68.78333	71.98333	87.88333	89.36667
Site F	29.91667	29.85	29.65833	29.85833	29.9		29.89167	29.98333	49.33333	49.83333	66.53333	67.6
Site E	41.80833	40.24167	35.25	29.71667	40.25833	29.925		29.33333	52.125	40.85833	57.29167	57.80833
Site C	48.9	50.4	45.675	28.575	50.53333	29.825	29.73333		30.23333	29.75833	37.9	38.99167
Site B	64.55	68.66667	65.56667	37.90833	68.84167	49.99167	54.625	30.68333		28.61667	33.38333	33.59167
Site A	70.26667	71.56667	67.8	33.78333	72.1	50.175	41.05	29.99167	29.91667		29.95	29.98333
Site Z-1	86.35	88.2	84.18333	50.21667	88.38333	66.56667	57.84167	38.05	33.58333	29.9		29.99167
Site Z	87.10833	89.18333	85.24167	51.46667	89.08333	67.73333	59.21667	39.19167	33.69167	29.925	29.98333	

Median Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.5	1.3	9.35	1.508333	6.325	11.15	13.49167	18.66667	15.525	18.97917	19.54167
Site H	1.375		0.891667	6.466666	0.083333	3.766667	9.2875	10	14.84167	12.575	16.29167	16.84167
Site G	1.516667	1.658333		6.916667	1.691667	4.15	10.9	10.25833	15.1875	13.48333	17.225	17.73333
Site D	8.325	7.383333	7.725		7.408333	3.408333	5.466667	2.666667	8.208333	5.966667	9.108333	9.5
Site H-1	1.325	0.05	0.808333	6.433333		3.708334	8.975	9.858333	14.76667	12.54167	16.24583	16.75
Site F	4.783333	3.9	4.366667	2.816667	3.925		5.208333	5.766667	11.21667	8.841667	12.35	12.79167
Site E	10.89583	9.491667	9.7	5.7	9.541667	5.741667		9.966667	16.475	12.26667	16.2875	16.66667
Site C	10.45	9.55	9.916667	2.341667	9.533333	5.645833	7.783333		5.3	3.65	6.925	7.366667
Site B	17.94583	16.2125	16.14167	8.495833	16.05	12.15	14.01667	6.283333		7.05	10.40833	11
Site A	14.925	13.95	14.575	6.225	13.925	9.866667	11.9375	3.833333	6.825		2.916667	3.275
Site Z-1	18.18333	17.15833	17.88333	9.15	17.06667	12.96667	15.37917	6.666667	9.691667	2.725		0.383333
Site Z	18.49167	17.42083	18.12917	9.45	17.24167	13.23333	15.66667	6.95	9.783333	3.016667	0.283333	

25th Percentile Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.25	1.191667	7.191667	1.283333	4.5375	9.725	10.04167	15.33542	12.99167	15.8	16.17292
Site H	1.25		0.825	5.966667	0.041667	3.441667	8.275	8.533333	13.43333	11.58333	14.325	14.69167
Site G	1.35	1.508333		6.316667	1.541667	3.766667	9.677083	9	13.83333	12.04167	14.90833	15.3
Site D	6.977083	6.116667	6.633333		6.166667	2.833333	4.85	2.341667	7.425	5.6	8.291667	8.583333
Site H-1	1.191667	0.025	0.708333	5.933333		3.408333	8.108333	8.48125	13.39167	11.56667	14.30833	14.64167
Site F	4.1	3.316667	3.766667	2.55	3.358333		4.741667	5.008333	10.03333	8.175	10.91667	11.225
Site E	9.375	8.258333	8.583333	4.183333	8.316667	5.008333		6.916667	12.65	10.05	13.28333	13.7
Site C	8.995833	8.133333	8.622917	2.058333	8.166667	4.875	6.883333		5.058333	3.416667	6.183333	6.491667
Site B	14.625	13.41667	13.86667	7.275	13.46667	10.13333	12.07292	5.2		6.658333	9.608333	9.939583
Site A	12.61667	11.75	12.36667	5.55	11.75833	8.4	10.45417	3.491667	6.510417		2.633333	2.916667
Site Z-1	15.3	14.38333	15.10208	8.183333	14.375	11.03333	13.13333	6.091667	9.141667	2.566667		0.275
Site Z	15.51667	14.64167	15.29167	8.458333	14.63125	11.3	13.50208	6.366667	9.358333	2.841667	0.225	

75th Percentile Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.95	1.466667	12.30208	1.916667	8.783333	13.73125	23.05417	29.84375	20.27292	25.34583	26.42083
Site H	1.608333		0.966667	9.291667	0.141667	5.633333	11.675	18.78333	27.80833	16.875	21.225	22.05
Site G	1.875	2.6375		9.15	2.65	5.9	20.625	18.67917	23.03333	19.65833	24.59167	25.24167
Site D	15.78333	14.80833	14.375		14.8	7.566667	7.541666	3.5	9.408333	6.741667	10.75	11.31667
Site H-1	1.566667	0.1	0.908333	9.033333		5.116667	11.21875	18.40208	26.8125	16.68125	21.19583	21.71667
Site F	7.958333	6.233333	7.110417	3.733333	6.233333		5.783333	8.391667	14.46667	10.61667	14.90833	15.45833
Site E	17.625	15.75833	24.575	9.566667	16.60208	10.54583		13.43333	19.52708	16.3375	20.35833	20.90833
Site C	18.5125	19.025	18.36458	3.741667	18.775	11.48333	12.0125		5.975	4.05	7.891667	8.525
Site B	30.58333	33.54167	30.20833	17.1375	33.475	24.41042	23.98542	13.51667		7.716667	13.31667	14.30417
Site A	24.625	24.15833	24.6875	7.483333	23.95	15.975	15.16667	4.583333	7.404167		3.733333	4.35
Site Z-1	28.63333	28.56875	29.29792	11.10833	28.16667	19.69167	20.27917	8.297917	10.94167	3.033333		0.55
Site Z	29.8	29.275	29.66667	11.775	28.64583	20.33333	20.975	9.083333	10.90417	3.35	0.375	

15th Percentile Travel Time in Minutes

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.15	1.15	6.775	1.183333	4.233333	9.069583	9.166667	14.54458	12.38333	15.01667	15.34167
Site H	1.191667		0.783333	5.808333	0.025	3.325	7.983333	8.183333	13.11667	11.31667	13.925	14.24167
Site G	1.291667	1.441667		6.141667	1.466667	3.633333	8.879167	8.591667	13.46667	11.7	14.34167	14.67917
Site D	6.641667	5.866667	6.333333		5.916667	2.7	4.65	2.233333	7.208333	5.45	8.041667	8.316667
Site H-1	1.116667	0.008333	0.633333	5.783333		3.316667	7.891667	8.15	13.0775	11.30833	13.91667	14.225
Site F	3.883333	3.175	3.566667	2.466667	3.225		4.56	4.808333	9.766667	7.975	10.575	10.86667
Site E	8.891667	7.916667	8.266667	3.941667	8.035833	4.808333		6.466667	11.625	9.616667	12.48333	12.78333
Site C	8.616667	7.833333	8.25	1.958333	7.875	4.683333	6.65		4.941667	3.316667	5.933333	6.233333
Site B	13.9	12.875	13.33292	7.025	12.94417	9.766667	11.75	5.016667		6.491667	9.245	9.575
Site A	12.11667	11.275	11.80833	5.35	11.31667	8.1	10.10583	3.383333	6.333333		2.541667	2.816667
Site Z-1	14.7	13.84167	14.43333	7.908333	13.86667	10.65	12.7	5.908333	8.941667	2.5		0.241667
Site Z	14.93333	14.1	14.64167	8.183333	14.11667	10.90833	13.04292	6.175	9.145417	2.766667	0.2	

Mean Speed in MPH - Conversion of Mean Travel Time to Speed

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		29.19995	56.9892	34.08517	30.96912	27.38384	34.57497	30.07353	29.26553	39.42422	39.90817	39.14985
Site H	24.89421		35.22797	41.67706	14.19478	35.87261	37.3776	36.07186	34.97242	45.60504	45.69652	44.81479
Site G	32.87178	18.68261		37.29844	19.77591	28.1923	25.50757	33.61981	34.91257	40.26354	40.01425	39.50853
Site D	33.68346	38.35969	34.41285		38.5839	34.07173	30.30657	43.69292	47.57931	56.41698	54.11668	52.57734
Site H-1	25.47837	5.380325	36.04831	41.99546		36.80969	38.32326	36.68897	35.24908	45.76978	45.70542	45.2734
Site F	32.65271	41.62921	32.04908	48.63671	41.98106		45.84013	44.97322	42.74623	53.47682	51.89369	51.10025
Site E	30.47261	32.5397	24.83354	28.73426	32.28366	30.10616		25.29879	35.58196	32.93048	35.25547	35.23364
Site C	36.06504	39.42615	36.2367	41.83396	40.03949	38.50106	26.91519		57.26293	57.63056	54.13953	52.48408
Site B	29.47499	31.32366	31.33504	32.54635	31.481	30.77698	31.09022	33.9617		38.99282	29.19439	27.40487
Site A	36.69081	38.35954	34.92825	43.79384	38.91667	39.23797	31.08653	37.88329	39.35062		51.42547	49.02732
Site Z-1	37.85801	40.05425	36.05819	45.10241	40.62958	41.79418	32.23471	43.58512	31.85778	58.01122		32.31621
Site Z	37.39613	39.66515	36.17294	44.23537	40.60064	41.34661	32.02387	42.29754	31.78038	56.47797	31.03487	

Mean Speed in MPH - Mean of Individual Speed Observations

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		39.2287	65.81561	42.1438	38.44167	36.03107	39.21707	38.45659	34.99662	46.44992	46.94982	46.11678
Site H	40.73514		59.42411	55.2052	65535	53.29344	43.72535	47.55301	42.762	54.78613	53.85463	52.95354
Site G	51.7164	29.34402		47.26624	65535	41.23727	31.29983	42.73419	41.58162	48.87396	48.91047	47.69586
Site D	42.54564	49.20931	42.31182		49.36981	45.39215	34.29612	47.72636	49.19597	58.86377	57.35688	56.2058
Site H-1	42.30602	65535	65535	55.88666		54.72474	45.34568	48.42654	43.15457	55.13817	54.0648	53.40665
Site F	41.95188	53.81939	39.7835	57.4041	53.94073		48.38027	50.26557	45.62391	57.51787	56.26236	55.44248
Site E	37.36631	41.00225	33.02906	35.08214	40.87185	38.55703		28.66053	38.17517	35.87086	38.58426	38.54123
Site C	44.99773	50.04584	44.73707	51.00483	50.45952	48.08902	30.97162		59.63196	61.55649	57.98033	56.29095
Site B	36.24337	40.33268	39.18175	42.14623	40.49528	39.27703	37.59252	46.19571		42.20514	32.4675	30.7826
Site A	45.76671	49.50765	44.92602	54.14157	49.89491	49.52891	35.17675	53.73917	43.26049		57.99318	55.61669
Site Z-1	46.69789	50.09771	45.77587	54.56517	50.53588	50.80931	38.11288	54.97834	35.35734	64.01158		65535
Site Z	46.25837	49.72073	45.74712	53.69703	50.39379	50.32677	38.02276	53.76873	34.78823	62.19721	65535	

35th Percentile Speed in MPH

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		34.97128	63.42899	36.69515	34.34492	28.37351	36.00191	30.39809	29.77791	43.80738	42.57465	41.43872
Site H	40.93229		55.17762	57.2941	30.71262	55.83922	41.80449	41.59274	37.90749	55.6515	52.7969	51.64168
Site G	53.49818	28.09043		49.12976	29.63456	42.7484	26.66515	37.90397	40.96864	49.68398	46.38881	45.35628
Site D	33.73792	36.21656	34.36046		36.84689	31.07884	32.43253	44.28086	46.25098	57.64583	54.58848	53.39805
Site H-1	41.13404	47.77513	63.54333	58.16576		57.78763	45.13083	43.63703	39.17193	56.18809	53.21841	52.34343
Site F	37.58002	48.35561	35.20074	57.11563	49.37487		46.48287	45.84916	41.21338	55.96071	53.27965	52.40121
Site E	33.85452	38.04239	21.52145	24.24197	37.94932	32.372		21.64307	32.53689	29.82632	33.26667	33.30457
Site C	40.49082	41.22652	39.38456	49.03494	42.98233	39.63233	29.16174		60.25572	60.23878	55.92406	53.9995
Site B	29.92761	29.6175	34.01956	36.10408	30.20193	30.23437	32.46641	37.05641		42.77342	30.37073	29.02211
Site A	39.89266	41.27794	39.14603	53.76514	42.43967	43.74974	33.91621	55.34811	44.43404		56.52725	53.33989
Site Z-1	40.91808	42.38335	39.74482	54.67969	43.40351	45.60424	36.98294	55.92406	36.60306	63.57267		35.96442
Site Z	40.26357	41.92403	39.59394	53.95787	43.57546	44.92295	37.10767	54.8714	36.13866	62.11992	50.3502	

Median Speed in MPH

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		40.02269	67.90154	42.77831	39.0887	35.40147	40.78736	39.31286	37.87179	49.07461	49.31369	48.43648
Site H	43.66111		57.75601	63.93904	42.99765	62.2632	47.41218	54.62514	50.27159	61.95794	58.71123	57.46766
Site G	58.20131	31.05474		53.5692	32.55422	46.43953	35.68809	49.10273	47.35952	54.62782	53.14403	52.28335
Site D	48.0453	56.00078	47.96379		56.20291	52.50728	37.07987	49.95434	50.28914	61.34933	59.88251	58.69101
Site H-1	44.49719	71.6627	68.12893	64.72071		64.0209	49.45744	55.699	50.64277	62.34825	59.04391	57.94236
Site F	46.81135	60.13454	44.13528	63.53691	60.48683		49.30903	54.06491	48.38286	61.60425	58.52852	57.41943
Site E	41.73881	46.39234	40.10311	35.56198	46.52023	44.7288		26.47476	36.01194	36.51292	38.51751	38.54838
Site C	50.7556	57.1991	50.7945	56.8875	57.59783	55.22202	33.9013		62.90849	63.8146	59.55812	57.66463
Site B	39.39299	46.02092	44.56001	48.58735	46.59345	44.66621	42.32794	53.0634		44.64413	35.55977	33.58979
Site A	51.04746	55.85097	50.5362	58.80337	56.15447	55.20448	37.51974	60.7626	46.11591		62.66449	60.06506
Site Z-1	51.47202	55.74573	51.18766	59.60982	56.20415	55.74503	40.79246	61.86599	38.1893	67.07208		43.78277
Site Z	51.18681	55.55711	51.14179	59.00155	56.29006	55.50304	41.00891	61.12174	37.76706	65.20875	59.23551	

15th Percentile Speed in MPH

BEGIN STATION	END STATION											
	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		52.2035	76.75826	59.03722	49.82433	52.89314	50.14333	57.86139	48.60504	61.5249	62.32627	61.69665
Site H	50.3782		65.74354	71.18607	143.3254	70.53375	55.15749	66.75169	56.88292	68.84722	68.68968	67.95912
Site G	68.33961	35.72193		60.32895	37.54833	53.04331	43.81044	58.62799	53.41134	62.95428	63.82842	63.16149
Site D	60.22241	70.47826	58.50321		70.37238	66.28234	43.59211	59.64698	57.26567	67.16532	67.82548	67.04184
Site H-1	52.79891	429.9704	86.95402	71.9948		71.58116	56.24674	67.37415	57.18408	69.14821	68.92581	68.22738
Site F	57.66034	73.86605	54.03478	72.55229	73.61576		56.3197	64.84041	55.56598	68.29896	68.35246	67.59113
Site E	51.14667	55.62198	47.05647	51.42578	55.23765	53.41099		40.80389	51.03627	46.57454	50.25533	50.25864
Site C	61.55467	69.73422	61.05601	68.02293	69.7269	66.57103	39.67897		67.47016	70.22813	69.51235	68.14911
Site B	50.859	57.95062	53.94714	58.76015	57.77312	55.56598	50.49333	66.46146		48.48387	40.03439	38.5888
Site A	62.87895	69.10165	62.37672	68.42075	69.09729	67.24497	44.32013	68.84432	49.69596		71.91007	69.83896
Site Z-1	63.6689	69.10323	63.42305	68.96901	69.17434	67.87111	49.39795	69.80648	41.3925	73.10857		69.44852
Site Z	63.38367	68.64192	63.32326	68.13417	68.75097	67.33295	49.25838	68.79289	40.40141	71.10111	83.91693	

Travel Time Report Parameters
METHOD ALL
OUTLIERS EXCLUDED

Status of Station Pairs

		END STATION										
BEGIN STA	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site H	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Site G	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK	OK
Site D	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK	OK
Site H-1	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK	OK
Site F	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK	OK
Site E	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK	OK
Site C	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK	OK
Site B	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK	OK
Site A	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK	OK
Site Z-1	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK		OK
Site Z	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	

Mean Travel Time in Minutes

		END STATION										
BEGIN STA	Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z
Site I		1.64	1.38	10.44	1.65	7.26	11.76	15.49	21.75	17.12	20.59	21.17
Site H	1.71		0.95	8.75	0.11	5.61	10.28	13.41	19.16	15.07	18.53	18.96
Site G	2.25	2.08		8.76	2.12	5.82	13.91	13.26	18.54	15.44	19.06	19.65
Site D	10.85	9.88	9.92		9.93	4.85	6.17	2.87	8.36	6.24	9.71	10.1
Site H-1	1.63	0.39	0.84	8.73		5.53	9.72	13.2	19.03	15	18.46	18.83
Site F	6.1	5.02	5.3	3.3	5.07		5.18	6.41	11.85	9.48	12.92	13.32
Site E	13.81	12.17	14.57	6.4	12.29	7.84		9.82	15.85	12.59	16.15	16.61
Site C	13.24	12.45	12.53	2.96	12.42	7.51	9.21		5.54	3.75	7.11	7.56
Site B	21.87	21.86	21.36	11.7	21.8	16.34	17.8	9.08		7.28	11.3	12.12
Site A	18.31	17.84	18.09	7.64	17.9	12.66	13.19	5.55	7.49		3.5	3.91
Site Z-1	21.4	20.7	21.35	11	20.64	15.64	16.62	8.64	10.5	2.94		0.43
Site Z	21.93	21.21	21.64	11.46	21.11	16.11	16.87	9.13	10.62	3.24	0.3	

All Measured Parameters

		END STATION												
BEGIN STATION		Site I	Site H	Site G	Site D	Site H-1	Site F	Site E	Site C	Site B	Site A	Site Z-1	Site Z	
Site I	count		6410	14876	9408	7758	11113	1022	3824	937	7840	7941	6447	
	mean_minutes		1.64	1.38	10.44	1.65	7.26	11.76	15.49	21.75	17.12	20.59	21.17	
	min_minutes		0.65	0.73	5.09	0.57	2.92	4.56	6.83	11.66	9.52	11.67	11.97	
	max_minutes		10.31	7.44	36.92	11.3	29.97	40.87	48.73	63.7	67.16	81.23	71.75	
	median_minutes		1.42	1.28	8.6	1.47	5.59	10.47	11.8	17.64	14.69	17.95	18.42	
	PCT25_minutes		1.21	1.18	6.91	1.25	4.32	9.05	9.35	15	12.63	15.39	15.72	
	PCT75_minutes		1.82	1.44	11.1	1.85	8.13	12.72	17.74	23.92	17.6	22.14	23	
	PCT15_minutes		1.13	1.13	6.59	1.16	4.08	8.66	8.86	14.38	12.14	14.78	15.09	
Site H	count	5824			6150	17917	47534	17747	579	7515	2264	14345	14593	11983
	mean_min	1.71			0.95	8.75	0.11	5.61	10.28	13.41	19.16	15.07	18.53	18.96
	min_minut	0.53			0.38	4.41	0	2.47	6.6	6.38	11.11	7.18	11.14	11.18
	max_minu	11.67			8.97	38.17	1.57	29.93	39.22	50.36	65.54	65.62	67.21	68.06
	median_m	1.35			0.88	6.23	0.1	3.62	8.78	9.33	14.26	12.1	15.5	16
	PCT25_mir	1.24			0.82	5.88	0.05	3.38	8.04	8.25	13.29	11.45	14.17	14.48
	PCT75_mir	1.5			0.95	7.33	0.17	4.26	10.46	14.28	20.14	14.13	18.78	19.39
	PCT15_mir	1.19			0.79	5.75	0.03	3.28	7.83	8	12.98	11.22	13.83	14.12
Site G	count	11879	4311		6403	4851	6137	110	2989	1242	4490	4397	3903	
	mean_min	2.25	2.08		8.76	2.12	5.82	13.91	13.26	18.54	15.44	19.06	19.65	
	min_minut	0.88	0.47		4.48	0	0.05	7.52	6.2	11.01	8.08	11.28	9.4	
	max_minu	15.47	7.99		34.18	8.48	29.87	34.66	45.77	65.35	57.62	79.83	82.2	
	median_m	1.47	1.63		6.67	1.68	4	10.41	9.77	14.66	12.77	16.4	16.98	
	PCT25_mir	1.33	1.51		6.23	1.55	3.69	8.87	8.68	13.63	11.86	14.62	14.98	
	PCT75_mir	1.73	1.92		7.65	1.96	4.59	15.67	13.9	18.18	14.77	19.55	20.38	
	PCT15_mir	1.28	1.46		6.05	1.48	3.57	8.38	8.39	13.3	11.56	14.18	14.49	
Site D	count	6769	14622	5334		15235	31634	1308	22302	7887	38586	37994	31205	
	mean_min	10.85	9.88	9.92		9.93	4.85	6.17	2.87	8.36	6.24	9.71	10.1	
	min_minut	5.16	4.57	4.33		4.6	2.03	3.81	1.65	6.02	3.98	6.33	6.4	
	max_minu	36.73	37.97	32.85		38.35	23.9	21.49	10.39	17.22	15.02	31	31.45	
	median_m	7.85	6.95	7.41		6.97	3.22	5.21	2.53	7.92	5.87	8.93	9.28	
	PCT25_mir	6.8	6.01	6.52		6.07	2.78	4.78	2.25	7.33	5.56	8.24	8.53	
	PCT75_mir	13.52	13.28	12.64		13.32	6.93	6.69	3.22	9.1	6.48	10.59	11.08	

	PCT15_mir	6.52	5.81	6.24		5.86	2.67	4.62	2.16	7.15	5.42	8.02	8.28
Site H-1	count	5300	26182	5319	16368		16601	491	7030	2037	13115	13264	11261
	mean_min	1.63	0.39	0.84	8.73		5.53	9.72	13.2	19.03	15	18.46	18.83
	min_minut	0.1	0	0.1	4.34		2.48	6.77	6.42	11.33	7.03	11.08	9.95
	max_minu	12.43	29.98	8.42	38.43		29.96	40.52	50.67	65.63	61.52	67.08	68.35
	median_m	1.3	0.06	0.79	6.21		3.57	8.46	9.22	14.2	12.07	15.47	15.92
	PCT25_mir	1.17	0.03	0.69	5.85		3.35	7.9	8.23	13.25	11.43	14.15	14.46
	PCT75_mir	1.47	0.09	0.88	7.28		4.18	9.62	13.46	19.69	14.07	18.62	19.14
	PCT15_mir	1.1	0.02	0.63	5.72		3.26	7.73	8	12.94	11.2	13.82	14.1
Site F	count	11397	20176	7582	35412	22272		1937	15969	4570	27145	26733	23337
	mean_min	6.1	5.02	5.3	3.3	5.07		5.18	6.41	11.85	9.48	12.92	13.32
	min_minut	2.82	2.09	2.29	1.6	2.42		3.73	3.65	8.28	6.22	8.35	8.37
	max_minu	29.9	28.29	28.02	13.43	27.79		12.72	17.81	26.64	26.58	35.9	36.21
	median_m	4.53	3.71	4.17	2.72	3.73		4.97	5.44	10.68	8.58	11.84	12.25
	PCT25_mir	3.99	3.27	3.68	2.51	3.32		4.6	4.87	9.9	8.09	10.8	11.11
	PCT75_mir	6.86	5.42	6.13	3.22	5.47		5.52	7.29	13.32	9.87	14.08	14.6
	PCT15_mir	3.81	3.14	3.52	2.43	3.2		4.47	4.72	9.66	7.91	10.51	10.8
Site E	count	1714	887	87	4398	898	3712		2329	1213	2392	2231	2014
	mean_min	13.81	12.17	14.57	6.4	12.29	7.84		9.82	15.85	12.59	16.15	16.61
	min_minut	6.65	6.38	7.13	2.98	6.55	3.73		4.98	9.55	7.48	9.58	9.8
	max_minu	41.43	40.56	35.25	17.42	40.69	27.97		22.53	31.42	23.83	29.91	33.84
	median_m	10.2	8.91	9.24	4.76	8.96	5.38		8.69	15.55	11.19	14.98	15.43
	PCT25_mir	9	8.11	8.48	4.01	8.2	4.87		6.57	12.02	9.74	12.8	13.09
	PCT75_mir	14.93	11.96	21.87	8.81	12.2	9.17		12.85	18.88	15.26	19.13	19.66
	PCT15_mir	8.63	7.81	8.05	3.84	7.9	4.69		6.25	11.43	9.41	12.22	12.49
Site C	count	5129	11388	4443	26139	12281	25361	1075		3901	15696	14963	13776
	mean_min	13.24	12.45	12.53	2.96	12.42	7.51	9.21		5.54	3.75	7.11	7.56
	min_minut	7	2.87	6.64	1.3	2.77	3.51	5.83		4.07	2.62	3.68	4.79
	max_minu	48.7	43.44	40.98	10.6	43.47	27.78	29.73		10.94	9.85	17.68	18.08
	median_m	9.86	8.97	9.47	2.25	8.94	5.34	7.43		5.25	3.58	6.68	7.09
	PCT25_mir	8.8	8.01	8.48	2.03	8.04	4.79	6.8		5.02	3.37	6.08	6.39
	PCT75_mir	14.74	15.8	14.4	3.03	15.47	9.81	10.53		5.68	3.93	7.52	8.06
	PCT15_mir	8.49	7.76	8.18	1.93	7.8	4.63	6.61		4.9	3.29	5.89	6.18
Site B	count	707	2210	1388	5416	2376	4968	364	4649		663	330	270
	mean_min	21.87	21.86	21.36	11.7	21.8	16.34	17.8	9.08		7.28	11.3	12.12
	min_minut	11.67	11.04	10.73	3.67	9.32	6.27	10.71	1.88		5.6	8.13	8.33
	max_minu	64.36	68.67	65.57	37.91	68.84	49.99	52.85	30.68		17.9	30.54	30.07
	median_m	16.63	15.2	15.38	7.99	15.13	11.42	12.92	5.68		6.94	10.24	10.68
	PCT25_mir	14.35	13.34	13.72	7.22	13.38	10.05	11.95	5.13		6.59	9.49	9.83
	PCT75_mir	26.36	27.89	25.16	13.23	27.45	20.64	20.32	11.72		7.42	12.48	13.23
	PCT15_mir	13.77	12.83	13.3	6.98	12.89	9.73	11.71	4.98		6.44	9.2	9.55
Site A	count	5548	11369	3758	25015	11777	23922	754	18954	430		43096	35347
	mean_min	18.31	17.84	18.09	7.64	17.9	12.66	13.19	5.55	7.49		3.5	3.91
	min_minut	9.43	8.58	3.13	3.9	8.61	6.05	8.56	2.58	3.28		1.89	2.15
	max_minu	70.27	71.16	67.46	33.76	72.1	50.17	40.99	29.99	29.92		18.38	15.16
	median_m	13.99	13.06	13.78	5.96	13.07	9.27	11.2	3.72	6.75		2.88	3.22
	PCT25_mir	12.3	11.53	12.1	5.47	11.57	8.27	10.23	3.45	6.47		2.63	2.92
	PCT75_mir	20.18	20.48	19.68	7	20.45	14.03	13.25	4.32	7.17		3.79	4.37
	PCT15_mir	11.91	11.14	11.64	5.29	11.2	8	9.98	3.35	6.32		2.54	2.82
Site Z-1	count	5557	11365	3807	24958	11916	24110	718	18918	253	28227		47893
	mean_min	21.4	20.7	21.35	11	20.64	15.64	16.62	8.64	10.5	2.94		0.43
	min_minut	11.49	10.56	9.84	5.63	10.61	8.03	10.65	3.73	8.18	1.83		0
	max_minu	85.63	86.99	81.72	49.93	87.03	66.14	57.84	38.05	30.79	28.18		2.58
	median_m	16.83	15.89	16.86	8.75	15.82	12.08	14.16	6.45	9.62	2.69		0.37
	PCT25_mir	14.94	14.1	14.76	8.05	14.14	10.86	12.86	6.02	9.08	2.55		0.27
	PCT75_mir	23.42	23.58	23.18	10.18	23.42	17.15	16.73	7.57	10.4	2.93		0.52
	PCT15_mir	14.44	13.67	14.19	7.82	13.72	10.53	12.49	5.85	8.91	2.47		0.24
Site Z	count	6583	13930	4807	28437	15342	30266	771	22803	262	31526	39988	
	mean_min	21.93	21.21	21.64	11.46	21.11	16.11	16.87	9.13	10.62	3.24	0.3	
	min_minut	11.72	10.77	10.17	5.83	10.79	5.72	10.9	3.93	8.32	2.14	0	
	max_minu	86.78	88.93	85.08	51.12	88.82	66.4	58.3	39.19	32.77	28.38	6.44	
	median_m	17.05	16.12	16.9	9.04	16.02	12.32	14.42	6.73	9.72	2.97	0.28	
	PCT25_mir	15.17	14.37	14.95	8.33	14.4	11.12	13.19	6.28	9.32	2.82	0.22	
	PCT75_mir	24.2	24.16	23.52	10.55	23.75	17.73	17.04	7.92	10.57	3.23	0.36	
	PCT15_mir	14.69	13.95	14.43	8.09	13.98	10.79	12.83	6.12	9.13	2.74	0.2	

TRAVEL TIME DATA

1 HOUR CORRIDOR STATISTICAL SUMMARIES

ROUTE INFORMATION

Name / Number:
Direction:

Project Name:
Date:
Day of Week:
Measure:
Units:

CH2M Hill
8 Dec 13
Sunday
Mean Travel Time
Minutes

Time	Segment Length (miles)																			SEER DEED	SEER C-45				
		DEED C-45	DEED SEER	DEED SAS	DEED BSB	DEED SA2	DEED DMR	DEED BBL	DEED DYC	DEED D35	DEED DMD	DEED DBE	C-45 DEED	C-45 SEER	C-45 SAS	C-45 BSB	C-45 SA2	C-45 DMR	C-45 BBL	C-45 DYC					
		Site I to Site H	Site I to Site G	Site I to Site D	Site I to Site L	Site I to Site F	Site I to Site E	Site I to Site C	Site I to Site B	Site I to Site A	Site I to Site Z-1	Site I to Site Z	Site H to Site I	Site H to Site G	Site H to Site D	Site H to Site L	Site H to Site F	Site H to Site E	Site H to Site C	Site H to Site B					
	Begin Time	1.001	1.471	6.666	0.883	3.732	7.580	8.840	11.782	12.699	15.599	15.775	1.001	0.858	6.891	0.060	3.909	7.339010836	9.104189480	12.43523739	12.98530509	15.94173031	16.1108516	1.471199888	0.858318054
Midnight	12:00 AM																								
	1:00 AM																								
	2:00 AM																								
	3:00 AM																								
	4:00 AM																								
	5:00 AM																								
	6:00 AM																								
	7:00 AM																								
	8:00 AM	1.102	1.183	6.343	1.033	3.648	8.243			11.580			1.297	0.823	5.899	0.053	2.981	7.357142874			11.38835329			1.314288734	1.404168678
	9:00 AM	1.122	1.170	6.469	1.087	3.736	8.277			12.174			1.215	0.828	5.810	0.050	3.177	7.880565531			11.66064356			1.309042654	1.470312477
	10:00 AM	1.101	1.173	6.505	1.076	3.580	8.359			11.851	20.916	15.692	1.225	0.820	5.853	0.051	3.333	8.013888925	13.25000001	11.20533236	14.80804587	15.42358490	1.302312501	1.488000584	
11:00 AM	1.275	1.183	6.842	1.237	3.967	8.715	8.622	13.671	12.404	15.529	15.968	1.262	0.837	5.841	0.054	3.271	8.298333299	8.061666662	13.56875003	11.30593481	14.88774427	15.46259292	1.362777789	1.476851863	
Noon	12:00 PM	1.899	1.142	6.888	1.139	4.214	8.317	9.627	14.156	12.317	15.144	15.484	1.252	0.829	6.141	0.050	3.225	8.186111125	8.004347623	14.21291688	11.78786118	14.02606824	14.37912688	1.52038515	1.488888948
	1:00 PM	1.215	1.180	6.711	1.161	4.158	8.588	9.084	14.410	12.225	15.081	15.382	1.254	0.842	5.862	0.041	3.419	7.86844445	8.742516996	13.36786619	11.32404173	14.58530324	14.78100818	1.34022397	1.52171645
	2:00 PM	1.238	1.203	7.070	1.211	4.075	8.798	8.922	14.350	12.425	14.973	15.260	1.301	0.851	5.951	0.055	3.242	7.643749989	7.990634939	13.15217391	11.34514929	14.01647584	14.26682696	1.333249162	1.516666668
	3:00 PM	1.205	1.158	6.650	1.150	4.496	10.020	9.021	14.387	11.956	14.949	15.287	1.300	0.863	5.965	0.040	3.205	7.670833361	8.17352529	13.26072214	11.43784327	13.84588134	14.30143846	1.39888571	1.503001052
	4:00 PM	1.250	1.172	6.143	1.172	5.899	10.600	10.681	16.020	14.745	16.581	16.727	1.277	0.829	6.092	0.061	3.333	8.066666666	8.138609572	13.22586154	11.56400999	14.04854013	14.25654208	1.321840937	1.534496124
	5:00 PM	1.235	1.180	10.483	1.204	8.419	12.892	11.390	15.882	16.050	17.486	17.749	1.310	0.830	6.417	0.038	3.417	8.39327777	8.24627777	12.04127297	14.29678103	14.54031114	14.7142881	1.588122336	1.58124983
	6:00 PM	1.622	1.453	9.513	1.908	7.845	11.529	12.693	17.722	15.966	18.687	19.038	1.321	0.862	6.109	0.052	3.468	7.598323114	8.15177866	11.88746956	14.88006596	15.11566118	14.96448111	1.677488058	1.589305669
	7:00 PM	1.527	1.291	6.894	1.622	6.954	9.062	12.303	18.527	12.851	18.894	19.158	1.365	0.864	6.032	0.057	3.393	8.606249999	8.465128811	14.01197917	11.5405142	14.65177994	14.83695287	1.397284645	1.589305669
	8:00 PM	1.185	1.226	6.750	1.125	4.135	9.005	9.009	13.600	12.395	15.381	15.605	1.304	0.850	6.007	0.063	3.132	7.9699999	8.305700788	14.18800522	11.53878978	14.21145613	14.56807317	1.368444448	1.583039405
	9:00 PM	1.190	1.228	6.571	1.116	4.088	8.836	8.897	14.950	12.067	14.861	15.080	1.292	0.839	5.909	0.048	3.335	10.06250007	8.116558434	13.14916669	11.30538217	14.31938762	14.56071428	1.369305648	1.513877779
	10:00 PM	1.137	1.212	6.612	1.105	3.984	8.746	8.739	15.745	12.079	14.796	14.951	1.288	0.847	5.957	0.054	3.082	8.029861127	14.22045499	11.47785324	13.98864276	14.24155501	14.72214448	1.496428972	
	Midnight	11:00 PM	1.168	1.177	6.786	1.144	3.926	9.084	8.831	12.368	14.630	14.827	14.957	1.295	0.847	5.765	0.058	3.253	8.126484826	14.04153117	11.13574013	14.02765862	14.18433504	1.310277788	1.505897425
12:00 AM		1.146	1.242	6.650	1.139	3.908	8.545	9.073	26.375	11.949	15.154	15.254	1.405	0.807	6.120	0.087	3.200	7.89722224	7.951754391	12.21666679	11.68194443	13.78405909	14.17424242	1.412688414	1.504546509

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 8-Dec-13
Day of Week: Sunday
Measure: Mean Travel Time
Units: minutes

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number:
Direction:

Project Name:
Date:
Day of Week:
Measure:
Units:

CH2M Hill
8 Dec 13
Sunday
Mean Travel Time
Minutes

Time	Segment Label	Length (miles)																											
		Begin Time																											
		End Time																											
Midnight	12:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	1:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	2:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	3:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	4:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	5:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	6:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	7:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	8:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	9:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
Noon	10:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	11:00 AM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	12:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	1:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	2:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	3:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	4:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	5:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	6:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	7:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	8:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	9:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
Midnight	10:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017
	11:00 PM	B5A B2	1.16477128	B5A D1	1.00000000	B5B B1	0.85818017	B5B D1C	0.85818017	B5B D3	0.85818017	B5B D4	0.85818017	B5B D5	0.85818017	B5B D6	0.85818017	B5B D7	0.85818017	B5B D8	0.85818017	B5B D9	0.85818017	B5B D10	0.85818017	B5B D11	0.85818017	B5B D12	0.85818017

TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number:
Direction:

Project Name:
Date:
Day of Week:
Measure:
Units:

CH2M Hill
9 Dec 13
Sunday
Main Travel Time
Minutes

Time	Segment	Length (miles)	Segment																																																																																																																																																																																																																																																																																																																						
			D7C D3S Site B to Site A	D7C D4D Site B to Site Z-1	D7C D8E Site B to Site Z	D3S DED Site A to Site I	D3S C4E Site A to Site H	D3S E8E Site A to Site D	D3S ZAS Site A to Site D	D3S B8E Site A to Site H-1	D3S BA2 Site A to Site F	D3S D6S Site A to Site E	D3S B81 Site A to Site C	D7C D7C Site A to Site B	D3D D4D Site Z-1 to Site I	D3D D8E Site Z-1 to Site Z	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F	D3D D2S Site Z-1 to Site F

ROUTE INFORMATION	
Name / Number:	
Direction:	
Project Name:	CH2M Hill
Date:	8-Dec-13
Day of Week:	Sunday
Measure:	Mean Travel Time
Units:	minutes

Time	Segment Length (miles)	D2D 2B1		D2D 2B2		D2D 2B3		D2D 2B4		D2D 2B5		D2D 2B6		D2D 2B7		D2D 2B8		D2D 2B9		D2D 2B10		D2D 2B11		D2D 2B12		D2D 2B13		D2D 2B14		D2D 2B15		D2D 2B16		D2D 2B17		D2D 2B18		D2D 2B19		D2D 2B20		D2D 2B21		D2D 2B22		D2D 2B23		D2D 2B24		D2D 2B25		D2D 2B26		D2D 2B27		D2D 2B28		D2D 2B29		D2D 2B30		D2D 2B31		D2D 2B32		D2D 2B33		D2D 2B34		D2D 2B35		D2D 2B36		D2D 2B37		D2D 2B38		D2D 2B39		D2D 2B40		D2D 2B41		D2D 2B42		D2D 2B43		D2D 2B44		D2D 2B45		D2D 2B46		D2D 2B47		D2D 2B48		D2D 2B49		D2D 2B50		D2D 2B51		D2D 2B52		D2D 2B53		D2D 2B54		D2D 2B55		D2D 2B56		D2D 2B57		D2D 2B58		D2D 2B59		D2D 2B60		D2D 2B61		D2D 2B62		D2D 2B63		D2D 2B64		D2D 2B65		D2D 2B66		D2D 2B67		D2D 2B68		D2D 2B69		D2D 2B70		D2D 2B71		D2D 2B72		D2D 2B73		D2D 2B74		D2D 2B75		D2D 2B76		D2D 2B77		D2D 2B78		D2D 2B79		D2D 2B80		D2D 2B81		D2D 2B82		D2D 2B83		D2D 2B84		D2D 2B85		D2D 2B86		D2D 2B87		D2D 2B88		D2D 2B89		D2D 2B90		D2D 2B91		D2D 2B92		D2D 2B93		D2D 2B94		D2D 2B95		D2D 2B96		D2D 2B97		D2D 2B98		D2D 2B99		D2D 2B100		D2D 2B101		D2D 2B102		D2D 2B103		D2D 2B104		D2D 2B105		D2D 2B106		D2D 2B107		D2D 2B108		D2D 2B109		D2D 2B110		D2D 2B111		D2D 2B112		D2D 2B113		D2D 2B114		D2D 2B115		D2D 2B116		D2D 2B117		D2D 2B118		D2D 2B119		D2D 2B120		D2D 2B121		D2D 2B122		D2D 2B123		D2D 2B124		D2D 2B125		D2D 2B126		D2D 2B127		D2D 2B128		D2D 2B129		D2D 2B130	
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1 HOUR CORRIDOR STATISTICAL SUMMARIES

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	CGM Hill
Date:	9-Dec-12
Day of Week:	Monday
Measure:	Mean Travel
Units:	minutes

[illegible]

ROUTE INFORMATION
Name / Number
Direction

Project Name:	CIGM Hill
Date:	9-Dec-12
Day of Week:	Monday
Measure:	Mean Travel
Units:	minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M Hill
Date: 9-Dec-13
Day of Week: Monday
Measure: Mean Travel Time
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Segment	Label	Length (mi)
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[illegible]

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	CGM H8
Date:	10-Dec-1
Day of Week:	Tuesday
Measure:	Mean Travel
Units:	minutes

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number:

Direction:

Project Name: CH2M 160

Date: 10/Dec/13

Day of Week:

Weekend:

Measure:

Units:

Time	Segment	Lat	R05 R06		R05 R07		R05 R08		R05 R09		R05 R10		R05 R11		R05 R12		R05 R13		R05 R14		R05 R15		R05 R16		R05 R17		R05 R18		R05 R19		R05 R20		R05 R21		R05 R22		R05 R23		R05 R24		R05 R25		R05 R26		R05 R27		R05 R28		R05 R29		R05 R30		R05 R31		R05 R32		R05 R33		R05 R34		R05 R35		R05 R36		R05 R37		R05 R38		R05 R39		R05 R40		R05 R41		R05 R42		R05 R43		R05 R44		R05 R45		R05 R46		R05 R47		R05 R48		R05 R49		R05 R50		R05 R51		R05 R52		R05 R53		R05 R54		R05 R55		R05 R56		R05 R57		R05 R58		R05 R59		R05 R60		R05 R61		R05 R62		R05 R63		R05 R64		R05 R65		R05 R66		R05 R67		R05 R68		R05 R69		R05 R70		R05 R71		R05 R72		R05 R73		R05 R74		R05 R75		R05 R76		R05 R77		R05 R78		R05 R79		R05 R80		R05 R81		R05 R82		R05 R83		R05 R84		R05 R85		R05 R86		R05 R87		R05 R88		R05 R89		R05 R90		R05 R91		R05 R92		R05 R93		R05 R94		R05 R95		R05 R96		R05 R97		R05 R98		R05 R99		R05 R100		R05 R101		R05 R102		R05 R103		R05 R104		R05 R105		R05 R106		R05 R107		R05 R108		R05 R109		R05 R110		R05 R111		R05 R112		R05 R113		R05 R114		R05 R115		R05 R116		R05 R117		R05 R118		R05 R119		R05 R120		R05 R121		R05 R122		R05 R123		R05 R124		R05 R125		R05 R126		R05 R127		R05 R128		R05 R129		R05 R130		R05 R131		R05 R132		R05 R133		R05 R134		R05 R135		R05 R136		R05 R137		R05 R138		R05 R139		R05 R140		R05 R141		R05 R142		R05 R143		R05 R144		R05 R145		R05 R146		R05 R147		R05 R148		R05 R149		R05 R150		R05 R151		R05 R152		R05 R153		R05 R154		R05 R155		R05 R156		R05 R157		R05 R158		R05 R159		R05 R160		R05 R161		R05 R162		R05 R163		R05 R164		R05 R165		R05 R166		R05 R167		R05 R168		R05 R169		R05 R170		R05 R171		R05 R172		R05 R173		R05 R174		R05 R175		R05 R176		R05 R177		R05 R178		R05 R179		R05 R180		R05 R181		R05 R182		R05 R183		R05 R184		R05 R185		R05 R186		R05 R187		R05 R188		R05 R189		R05 R190		R05 R191		R05 R192		R05 R193		R05 R194		R05 R195		R05 R196		R05 R197		R05 R198		R05 R199		R05 R200		R05 R201		R05 R202		R05 R203		R05 R204		R05 R205		R05 R206		R05 R207		R05 R208		R05 R209		R05 R210		R05 R211		R05 R212		R05 R213		R05 R214		R05 R215		R05 R216		R05 R217		R05 R218		R05 R219		R05 R220		R05 R221		R05 R222		R05 R223		R05 R224		R05 R225		R05 R226		R05 R227		R05 R228		R05 R229		R05 R230		R05 R231		R05 R232		R05 R233		R05 R234		R05 R235		R05 R236		R05 R237		R05 R238		R05 R239		R05 R240		R05 R241		R05 R242		R05 R243		R05 R244		R05 R245		R05 R246		R05 R247		R05 R248		R05 R249		R05 R250		R05 R251		R05 R252		R05 R253		R05 R254		R05 R255		R05 R256		R05 R257		R05 R258		R05 R259		R05 R260		R05 R261		R05 R262		R05 R263		R05 R264		R05 R265		R05 R266		R05 R267		R05 R268		R05 R269		R05 R270		R05 R271		R05 R272		R05 R273		R05 R274		R05 R275		R05 R276		R05 R277		R05 R278		R05 R279		R05 R280		R05 R281		R05 R282		R05 R283		R05 R284		R05 R285		R05 R286		R05 R287		R05 R288		R05 R289		R05 R290		R05 R291		R05 R292		R05 R293		R05 R294		R05 R295		R05 R296		R05 R297		R05 R298		R05 R299		R05 R300		R05 R301		R05 R302		R05 R303		R05 R304		R05 R305		R05 R306		R05 R307		R05 R308		R05 R309		R05 R310		R05 R311		R05 R312		R05 R313		R05 R314		R05 R315		R05 R316		R05 R317		R05 R318		R05 R319		R05 R320		R05 R321		R05 R322		R05 R323		R05 R324		R05 R325		R05 R326		R05 R327		R05 R328		R05 R329		R05 R330		R05 R331		R05 R332		R05 R333		R05 R334		R05 R335		R05 R336		R05 R337		R05 R338		R05 R339		R05 R340		R05 R341		R05 R342		R05 R343		R05 R344		R05 R345		R05 R346		R05 R347		R05 R348		R05 R349		R05 R350		R05 R351		R05 R352		R05 R353		R05 R354		R05 R355		R05 R356		R05 R357		R05 R358		R05 R359		R05 R360		R05 R361		R05 R362		R05 R363		R05 R364		R05 R365		R05 R366		R05 R367		R05 R368		R05 R369		R05 R370		R05 R371		R05 R372		R05 R373		R05 R374		R05 R375		R05 R376		R05 R377		R05 R378		R05 R379		R05 R380		R05 R381		R05 R382		R05 R383		R05 R384		R05 R385		R05 R386		R05 R387		R05 R388		R05 R389		R05 R390		R05 R391		R05 R392		R05 R393		R05 R394		R05 R395		R05 R396		R05 R397		R05 R398		R05 R399		R05 R400		R05 R401		R05 R402		R05 R403		R05 R404		R05 R405		R05 R406		R05 R407		R05 R408		R05 R409		R05 R410		R05 R411		R05 R412		R05 R413		R05 R414		R05 R415		R05 R416		R05 R417		R05 R418		R05 R419		R05 R420		R05 R421		R05 R422		R05 R423		R05 R424		R05 R425		R05 R426		R05 R427		R05 R428		R05 R429		R05 R430		R05 R431		R05 R432		R05 R433		R05 R434		R05 R435		R05 R436		R05 R437		R05 R438		R05 R439		R05 R440		R05 R441		R05 R442		R05 R443		R05 R444		R05 R445		R05 R446		R05 R447		R05 R448		R05 R449		R05 R450		R05 R451		R05 R452		R05 R453		R05 R454		R05 R455		R05 R456		R05 R457		R05 R458		R05 R459		R05 R460		R05 R461		R05 R462		R05 R463		R05 R464		R05 R465		R05 R466		R05 R467		R05 R468		R05 R469		R05 R470		R05 R471		R05 R472		R05 R473		R05 R474		R05 R475		R05 R476		R05 R477		R05 R478		R05 R479		R05 R480		R05 R481		R05 R482		R05 R483		R05 R484		R05 R485		R05 R486		R05 R487		R05 R488		R05 R489		R05 R490		R05 R491		R05 R492		R05 R493		R05 R494		R05 R495		R05 R496		R05 R497		R05 R498		R05 R499		R05 R500		R05 R501		R05 R502		R05 R503		R05 R504		R05 R505		R05 R506		R05 R507		R05 R508		R05 R509		R05 R510		R05 R511		R05 R512		R05 R513		R05 R514		R05 R515		R05 R516		R05 R517		R05 R518		R05 R519		R05 R520		R05 R521		R05 R522		R05 R523		R05 R524		R05 R525		R05 R526		R05 R527		R05 R528		R05 R529		R05 R530		R05 R531		R05 R532		R05 R533		R05 R534		R05 R535		R05 R536		R05 R537		R05 R538		R05 R539		R05 R540		R05 R541		R05 R542		R05 R543		R05 R544		R05 R545		R05 R546		R05 R547		R05 R548		R05 R549		R05 R550		R05 R551		R05 R552		R05 R553		R05 R554		R05 R555		R05 R556		R05 R557		R05 R558		R05 R559		R05 R560		R05 R561		R05 R562		R05 R563		R05 R564		R05 R565		R05 R566		R05 R567		R05 R568		R05 R569		R05 R570		R05 R571		R05 R572		R05 R573		R05 R574		R05 R575		R05 R576		R05 R577		R05 R578		R05 R579		R05 R580		R05 R581		R05 R582		R05 R583		R05 R584		R05 R585		R05 R586		R05 R587		R05 R588		R05 R589		R05 R590		R05 R591		R05 R592		R05 R593		R05 R594		R05 R595		R05 R596		R05 R597		R05 R598		R05 R599		R05 R600		R05 R601		R05 R602		R05 R603		R05 R604		R05 R605		R05 R606		R05 R607		R05 R608		R05 R609		R05 R610		R05 R611		R05 R612		R05 R613		R05 R614		R05 R615		R05 R616		R05 R617		R05 R618		R05 R619		R05 R620		R05 R621		R05 R622		R05 R623		R05 R624		R05 R625		R05 R626		R05 R627		R05 R628		R05 R629		R05 R630		R05 R631		R05 R632		R05 R633		R05 R634		R05 R635		R05 R636		R05 R637		R05 R638		R05 R639		R05 R640		R05 R641		R05 R642		R05 R643		R05 R644		R05 R645		R05 R646		R05 R647		R05 R648		R05 R649		R05 R650		R05 R651		R05 R652		R05 R653		R05 R654		R05 R655		R05 R656		R05 R657		R05 R658		R05 R659		R05 R660		R05 R661		R05 R662		R05 R663		R05 R664		R05 R665		R05 R666		R05 R667		R05 R668		R05 R669		R05 R670		R05 R671		R05 R672		R05 R673		R05 R674		R05 R675		R05 R676		R05 R677		R05 R678		R05 R679		R05 R680		R05 R681		R05 R682		R05 R683		R05 R684		R05 R685		R05 R686		R05 R687		R05 R688		R05 R689		R05 R690		R05 R691		R05 R692		R05 R693		R05 R694		R05 R695		R05 R696		R05 R697		R05 R698		R05 R699		R05 R700		R05 R701		R05 R702		R05 R703		R05 R704		R05 R705		R05 R706		R05 R707		R05 R708		R05 R709		R05 R710		R05 R711		R05 R712		R05 R713		R05 R714		R05 R715		R05 R716		R05 R717		R05 R718		R05 R719		R05 R720		R05 R721		R05 R722		R05 R723		R05 R724		R05 R725		R05 R726		R05 R727		R05 R728		R05 R729		R05 R730		R05 R731		R05 R732		R05 R733		R05 R734		R05 R735		R05 R736		R05 R737		R05 R738		R05 R739		R05 R740		R05 R741		R05 R742		R05 R743		R05 R744		R05 R745		R05 R746		R05 R747		R05 R748		R05 R749		R05 R750		R05 R751		R05 R752		R05 R753		R05 R754		R05 R755		R05 R756		R05 R757		R05 R758		R05 R759		R05 R760		R05 R761		R05 R762		R05 R763		R05 R764		R05 R765		R05 R766		R05 R767		R05 R768		R05 R769		R05 R770		R05 R771		R05 R772		R05 R773		R05 R774		R05 R775		R05 R776		R05 R777		R05 R778		R05 R779		R05 R780		R05 R781		R05 R782		R05 R783		R05 R784		R05 R785		R05 R786		R05 R787		R05 R788		R05 R789		R05 R790		R05 R791		R05 R792		R05 R793		R05 R794		R05 R795		R05 R796		R05 R797		R05 R798		R05 R799		R05 R800		R05 R801		R05 R802		R05 R803		R05 R804		R05 R805		R05 R806		R05 R807		R05 R808		R05 R809		R05 R810		R05 R811		R05 R812		R05 R813		R05 R814		R05 R815		R05 R816		R05 R817		R05 R818		R05 R819		R05 R820		R05 R821		R05 R822		R05 R823		R05 R824		R05 R825		R05 R826		R05 R827		R05 R828		R05 R829		R05 R830		R05 R831		R05 R832		R05 R833		R05 R834		R05 R835	
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TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number: Direction:

Project Name: CH2M HILL
Date: 10/Dec/13
Travel: Minutes
Day of Week: Monday
Units: Minutes

Time	Segment	S101		S102		S103		S104		S105		S106		S107		S108		S109		S110		S111		S112		S113		S114		S115		S116		S117		S118		S119		S120		S121		S122		S123		S124		S125		S126		S127		S128		S129		S130		S131		S132		S133		S134		S135		S136		S137		S138		S139		S140		S141		S142		S143		S144		S145		S146		S147		S148		S149		S150		S151		S152		S153		S154		S155		S156		S157		S158		S159		S160		S161		S162		S163		S164		S165		S166		S167		S168		S169		S170		S171		S172		S173		S174		S175		S176		S177		S178		S179		S180		S181		S182		S183		S184		S185		S186		S187		S188		S189		S190		S191		S192		S193		S194		S195		S196		S197		S198		S199		S200		S201		S202		S203		S204		S205		S206		S207		S208		S209		S210		S211		S212		S213		S214		S215		S216		S217		S218		S219		S220		S221		S222		S223		S224		S225		S226		S227		S228		S229		S230		S231		S232		S233		S234		S235		S236		S237		S238		S239		S240		S241		S242		S243		S244		S245		S246		S247		S248		S249		S250		S251		S252		S253		S254		S255		S256		S257		S258		S259		S260		S261		S262		S263		S264		S265		S266		S267		S268		S269		S270		S271		S272		S273		S274		S275		S276		S277		S278		S279		S280		S281		S282		S283		S284		S285		S286		S287		S288		S289		S290		S291		S292		S293		S294		S295		S296		S297		S298		S299		S300		S301		S302		S303		S304		S305		S306		S307		S308		S309		S310		S311		S312		S313		S314		S315		S316		S317		S318		S319		S320		S321		S322		S323		S324		S325		S326		S327		S328		S329		S330		S331		S332		S333		S334		S335		S336		S337		S338		S339		S340		S341		S342		S343		S344		S345		S346		S347		S348		S349		S350		S351		S352		S353		S354		S355		S356		S357		S358		S359		S360		S361		S362		S363		S364		S365		S366		S367		S368		S369		S370		S371		S372		S373		S374		S375		S376		S377		S378		S379		S380		S381		S382		S383		S384		S385		S386		S387		S388		S389		S390		S391		S392		S393		S394		S395		S396		S397		S398		S399		S400		S401		S402		S403		S404		S405		S406		S407		S408		S409		S410		S411		S412		S413		S414		S415		S416		S417		S418		S419		S420		S421		S422		S423		S424		S425		S426		S427		S428		S429		S430		S431		S432		S433		S434		S435		S436		S437		S438		S439		S440		S441		S442		S443		S444		S445		S446		S447		S448		S449		S450		S451		S452		S453		S454		S455		S456		S457		S458		S459		S460		S461		S462		S463		S464		S465		S466		S467		S468		S469		S470		S471		S472		S473		S474		S475		S476		S477		S478		S479		S480		S481		S482		S483		S484		S485		S486		S487		S488		S489		S490		S491		S492		S493		S494		S495		S496		S497		S498		S499		S500		S501		S502		S503		S504		S505		S506		S507		S508		S509		S510		S511		S512		S513		S514		S515		S516		S517		S518		S519		S520		S521		S522		S523		S524		S525		S526		S527		S528		S529		S530		S531		S532		S533		S534		S535		S536		S537		S538		S539		S540		S541		S542		S543		S544		S545		S546		S547		S548		S549		S550	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start</																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

ROUTE INFORMATION
Name / Number
Direction

Project Name: CH2M Hill
Date: 10-Dec-11
Day of Week: Tuesday
Measure: Mean Travel Time
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:
Project Name:
Date:
Day of Week:
Measure:
Units:

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number:

Direction:

Project Name:

Date:

Day of Week:

Measure:

Units:

Method:

Notes:

Comments:

Remarks:

Details:

Information:

Summary:

Analysis:

Conclusion:

Recommendation:

Next Steps:

Follow-up:

Review:

Approval:

Signature:

Date:

Location:

Contact:

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ROUTE INFORMATION
Name / Number:
Direction:

Project Name: O2M HSE
Date: 11-Dec-17
Day of Week: Wednesday
Measure: Mean Travel Time
Units: minutes

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M 160
Date: 11-Dec-13
Day of Week: Wednesday
Measure: Mean Travel Time
Units: Minutes

Time	Segment Label	DTC 000		DTC 040		DTC 080		DTC 120		DTC 160		DTC 200		DTC 240		DTC 280		DTC 320		DTC 360		DTC 400		DTC 440		DTC 480		DTC 520		DTC 560		DTC 600		DTC 640		DTC 680		DTC 720		DTC 760		DTC 800		DTC 840		DTC 880		DTC 920		DTC 960		DTC 1000		DTC 1040		DTC 1080		DTC 1120		DTC 1160		DTC 1200		DTC 1240		DTC 1280		DTC 1320		DTC 1360		DTC 1400		DTC 1440		DTC 1480		DTC 1520		DTC 1560		DTC 1600		DTC 1640		DTC 1680		DTC 1720		DTC 1760		DTC 1800		DTC 1840		DTC 1880		DTC 1920		DTC 1960		DTC 2000		DTC 2040		DTC 2080		DTC 2120		DTC 2160		DTC 2200		DTC 2240		DTC 2280		DTC 2320		DTC 2360		DTC 2400		DTC 2440		DTC 2480		DTC 2520		DTC 2560		DTC 2600		DTC 2640		DTC 2680		DTC 2720		DTC 2760		DTC 2800		DTC 2840		DTC 2880		DTC 2920		DTC 2960		DTC 3000		DTC 3040		DTC 3080		DTC 3120		DTC 3160		DTC 3200		DTC 3240		DTC 3280		DTC 3320		DTC 3360		DTC 3400		DTC 3440		DTC 3480		DTC 3520		DTC 3560		DTC 3600		DTC 3640		DTC 3680		DTC 3720		DTC 3760		DTC 3800		DTC 3840		DTC 3880		DTC 3920		DTC 3960		DTC 4000		DTC 4040		DTC 4080		DTC 4120		DTC 4160		DTC 4200		DTC 4240		DTC 4280		DTC 4320		DTC 4360		DTC 4400		DTC 4440		DTC 4480		DTC 4520		DTC 4560		DTC 4600		DTC 4640		DTC 4680		DTC 4720		DTC 4760		DTC 4800		DTC 4840		DTC 4880		DTC 4920		DTC 4960		DTC 5000		DTC 5040		DTC 5080		DTC 5120		DTC 5160		DTC 5200		DTC 5240		DTC 5280		DTC 5320		DTC 5360		DTC 5400		DTC 5440		DTC 5480		DTC 5520		DTC 5560		DTC 5600		DTC 5640		DTC 5680		DTC 5720		DTC 5760		DTC 5800		DTC 5840		DTC 5880		DTC 5920		DTC 5960		DTC 6000		DTC 6040		DTC 6080		DTC 6120		DTC 6160		DTC 6200		DTC 6240		DTC 6280		DTC 6320		DTC 6360		DTC 6400		DTC 6440		DTC 6480		DTC 6520		DTC 6560		DTC 6600		DTC 6640		DTC 6680		DTC 6720		DTC 6760		DTC 6800		DTC 6840		DTC 6880		DTC 6920		DTC 6960		DTC 7000		DTC 7040		DTC 7080		DTC 7120		DTC 7160		DTC 7200		DTC 7240		DTC 7280		DTC 7320		DTC 7360		DTC 7400		DTC 7440		DTC 7480		DTC 7520		DTC 7560		DTC 7600		DTC 7640		DTC 7680		DTC 7720		DTC 7760		DTC 7800		DTC 7840		DTC 7880		DTC 7920		DTC 7960		DTC 8000		DTC 8040		DTC 8080		DTC 8120		DTC 8160		DTC 8200		DTC 8240		DTC 8280		DTC 8320		DTC 8360		DTC 8400		DTC 8440		DTC 8480		DTC 8520		DTC 8560		DTC 8600		DTC 8640		DTC 8680		DTC 8720		DTC 8760		DTC 8800		DTC 8840		DTC 8880		DTC 8920		DTC 8960		DTC 9000		DTC 9040		DTC 9080		DTC 9120		DTC 9160		DTC 9200		DTC 9240		DTC 9280		DTC 9320		DTC 9360		DTC 9400		DTC 9440		DTC 9480		DTC 9520		DTC 9560		DTC 9600		DTC 9640		DTC 9680		DTC 9720		DTC 9760		DTC 9800		DTC 9840		DTC 9880		DTC 9920		DTC 9960		DTC 10000		DTC 10040		DTC 10080		DTC 10120		DTC 10160		DTC 10200		DTC 10240		DTC 10280		DTC 10320		DTC 10360		DTC 10400		DTC 10440		DTC 10480		DTC 10520		DTC 10560		DTC 10600		DTC 10640		DTC 10680		DTC 10720		DTC 10760		DTC 10800		DTC 10840		DTC 10880		DTC 10920		DTC 10960		DTC 11000		DTC 11040		DTC 11080		DTC 11120		DTC 11160		DTC 11200		DTC 11240		DTC 11280		DTC 11320		DTC 11360		DTC 11400		DTC 11440		DTC 11480		DTC 11520		DTC 11560		DTC 11600		DTC 11640		DTC 11680		DTC 11720		DTC 11760		DTC 11800		DTC 11840		DTC 11880		DTC 11920		DTC 11960		DTC 12000		DTC 12040		DTC 12080		DTC 12120		DTC 12160		DTC 12200		DTC 12240		DTC 12280		DTC 12320		DTC 12360		DTC 12400		DTC 12440		DTC 12480		DTC 12520		DTC 12560		DTC 12600		DTC 12640		DTC 12680		DTC 12720		DTC 12760		DTC 12800		DTC 12840		DTC 12880		DTC 12920		DTC 12960		DTC 13000		DTC 13040		DTC 13080		DTC 13120		DTC 13160		DTC 13200		DTC 13240		DTC 13280		DTC 13320		DTC 13360		DTC 13400		DTC 13440		DTC 13480		DTC 13520		DTC 13560		DTC 13600		DTC 13640		DTC 13680		DTC 13720		DTC 13760		DTC 13800		DTC 13840		DTC 13880		DTC 13920		DTC 13960		DTC 14000		DTC 14040		DTC 14080		DTC 14120		DTC 14160		DTC 14200		DTC 14240		DTC 14280		DTC 14320		DTC 14360		DTC 14400		DTC 14440		DTC 14480		DTC 14520		DTC 14560		DTC 14600		DTC 14640		DTC 14680		DTC 14720		DTC 14760		DTC 14800		DTC 14840		DTC 14880		DTC 14920		DTC 14960		DTC 15000		DTC 15040		DTC 15080		DTC 15120		DTC 15160		DTC 15200		DTC 15240		DTC 15280		DTC 15320		DTC 15360		DTC 15400		DTC 15440		DTC 15480		DTC 15520		DTC 15560		DTC 15600		DTC 15640		DTC 15680		DTC 15720		DTC 15760		DTC 15800		DTC 15840		DTC 15880		DTC 15920		DTC 15960		DTC 16000		DTC 16040		DTC 16080		DTC 16120		DTC 16160		DTC 16200		DTC 16240		DTC 16280		DTC 16320		DTC 16360		DTC 16400		DTC 16440		DTC 16480		DTC 16520		DTC 16560		DTC 16600		DTC 16640		DTC 16680		DTC 16720		DTC 16760		DTC 16800		DTC 16840		DTC 16880		DTC 16920		DTC 16960		DTC 17000		DTC 17040		DTC 17080		DTC 17120		DTC 17160		DTC 17200		DTC 17240		DTC 17280		DTC 17320		DTC 17360		DTC 17400		DTC 17440		DTC 17480		DTC 17520		DTC 17560		DTC 17600		DTC 17640		DTC 17680		DTC 17720		DTC 17760		DTC 17800		DTC 17840		DTC 17880		DTC 17920		DTC 17960		DTC 18000		DTC 18040		DTC 18080		DTC 18120		DTC 18160		DTC 18200		DTC 18240		DTC 18280		DTC 18320		DTC 18360		DTC 18400		DTC 18440		DTC 18480		DTC 18520		DTC 18560		DTC 18600		DTC 18640		DTC 18680		DTC 18720		DTC 18760		DTC 18800		DTC 18840		DTC 18880		DTC 18920		DTC 18960		DTC 19000		DTC 19040		DTC 19080		DTC 19120		DTC 19160		DTC 19200		DTC 19240		DTC 19280		DTC 19320		DTC 19360		DTC 19400		DTC 19440		DTC 19480		DTC 19520		DTC 19560		DTC 19600		DTC 19640		DTC 19680		DTC 19720		DTC 19760		DTC 19800		DTC 19840		DTC 19880		DTC 19920		DTC 19960		DTC 20000		DTC 20040		DTC 20080		DTC 20120		DTC 20160		DTC 20200		DTC 20240		DTC 20280		DTC 20320		DTC 20360		DTC 20400		DTC 20440		DTC 20480		DTC 20520		DTC 20560		DTC 20600		DTC 20640		DTC 20680		DTC 20720		DTC 20760		DTC 20800		DTC 20840		DTC 20880		DTC 20920		DTC 20960		DTC 21000		DTC 21040		DTC 21080		DTC 21120		DTC 21160		DTC 21200		DTC 21240		DTC 21280		DTC 21320		DTC 21360		DTC 21400		DTC 21440		DTC 21480		DTC 21520		DTC 21560		DTC 21600		DTC 21640		DTC 21680		DTC 21720		DTC 21760		DTC 21800		DTC 21840		DTC 21880		DTC 21920		DTC 21960		DTC 22000		DTC 22040		DTC 22080		DTC 22120		DTC 22160		DTC 22200		DTC 22240		DTC 22280		DTC 22320		DTC 22360		DTC 22400		DTC 22440		DTC 22480		DTC 22520		DTC 22560		DTC 22600		DTC 22640		DTC 22680		DTC 22720		DTC 22760		DTC 22800		DTC 22840		DTC 22880		DTC 22920		DTC 22960		DTC 23000		DTC 23040		DTC 23080		DTC 23120		DTC 23160		DTC 23200		DTC 23240		DTC 23280		DTC 23320		DTC 23360		DTC 23400		DTC 23440		DTC 23480		DTC 23520		DTC 23560		DTC 23600		DTC 23640		DTC 23680		DTC 23720		DTC 23760		DTC 23800		DTC 23840		DTC 23880		DTC 23920		DTC 23960		DTC 24000		DTC 24040		DTC 24080		DTC 24120		DTC 24160		DTC 24200		DTC 24240		DTC 24280		DTC 24320		DTC 24360		DTC 24400		DTC 24440		DTC 24480		DTC 24520		DTC 24560		DTC 24600		DTC 24640		DTC 24680		DTC 24720		DTC 24760		DTC 24800		DTC 24840		DTC 24880		DTC 24920		DTC 24960		DTC 25000		DTC 25040		DTC 25080		DTC 25120		DTC 25160		DTC 25200		DTC 25240		DTC 25280		DTC 25320		DTC 25360		DTC 25400		DTC 25440		DTC 25480		DTC 25520		DTC 25560		DTC 25600		DTC 25640		DTC 25680		DTC 25720		DTC 25760		DTC 25800		DTC 25840		DTC 25880		DTC 25920		DTC 25960		DTC 26000		DTC 26040		DTC 26080		DTC 26120		DTC 26160		DTC 26200		DTC 26240		DTC 26280		DTC 26320		DTC 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TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number:

Direction:

Project Name:

Date:

Day of Week:

Measure:

Units:

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TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: CH2M 160
Date: 11-Dec-13
Day of Week:
Month:
Units: Minutes

Segment		SEB C4B		SEB C4S		SEB C5B		SEB C5S		SEB C6B		SEB C6S		SEB C7B		SEB C7S		SEB C8B		SEB C8S		SEB C9B		SEB C9S		SEB C10B		SEB C10S		SEB C11B		SEB C11S		SEB C12B		SEB C12S		SEB C13B		SEB C13S		SEB C14B		SEB C14S		SEB C15B		SEB C15S		SEB C16B		SEB C16S		SEB C17B		SEB C17S		SEB C18B		SEB C18S		SEB C19B		SEB C19S		SEB C20B		SEB C20S		SEB C21B		SEB C21S		SEB C22B		SEB C22S		SEB C23B		SEB C23S		SEB C24B		SEB C24S		SEB C25B		SEB C25S		SEB C26B		SEB C26S		SEB C27B		SEB C27S		SEB C28B		SEB C28S		SEB C29B		SEB C29S		SEB C30B		SEB C30S		SEB C31B		SEB C31S		SEB C32B		SEB C32S		SEB C33B		SEB C33S		SEB C34B		SEB C34S		SEB C35B		SEB C35S		SEB C36B		SEB C36S		SEB C37B		SEB C37S		SEB C38B		SEB C38S		SEB C39B		SEB C39S		SEB C40B		SEB C40S		SEB C41B		SEB C41S		SEB C42B		SEB C42S		SEB C43B		SEB C43S		SEB C44B		SEB C44S		SEB C45B		SEB C45S		SEB C46B		SEB C46S		SEB C47B		SEB C47S		SEB C48B		SEB C48S		SEB C49B		SEB C49S		SEB C50B		SEB C50S		SEB C51B		SEB C51S		SEB C52B		SEB C52S		SEB C53B		SEB C53S		SEB C54B		SEB C54S		SEB C55B		SEB C55S		SEB C56B		SEB C56S		SEB C57B		SEB C57S		SEB C58B		SEB C58S		SEB C59B		SEB C59S		SEB C60B		SEB C60S		SEB C61B		SEB C61S		SEB C62B		SEB C62S		SEB C63B		SEB C63S		SEB C64B		SEB C64S		SEB C65B		SEB C65S		SEB C66B		SEB C66S		SEB C67B		SEB C67S		SEB C68B		SEB C68S		SEB C69B		SEB C69S		SEB C70B		SEB C70S		SEB C71B		SEB C71S		SEB C72B		SEB C72S		SEB C73B		SEB C73S		SEB C74B		SEB C74S		SEB C75B		SEB C75S		SEB C76B		SEB C76S		SEB C77B		SEB C77S		SEB C78B		SEB C78S		SEB C79B		SEB C79S		SEB C80B		SEB C80S		SEB C81B		SEB C81S		SEB C82B		SEB C82S		SEB C83B		SEB C83S		SEB C84B		SEB C84S		SEB C85B		SEB C85S		SEB C86B		SEB C86S		SEB C87B		SEB C87S		SEB C88B		SEB C88S		SEB C89B		SEB C89S		SEB C90B		SEB C90S		SEB C91B		SEB C91S		SEB C92B		SEB C92S		SEB C93B		SEB C93S		SEB C94B		SEB C94S		SEB C95B		SEB C95S		SEB C96B		SEB C96S		SEB C97B		SEB C97S		SEB C98B		SEB C98S		SEB C99B		SEB C99S		SEB C100B		SEB C100S		SEB C101B		SEB C101S		SEB C102B		SEB C102S		SEB C103B		SEB C103S		SEB C104B		SEB C104S		SEB C105B		SEB C105S		SEB C106B		SEB C106S		SEB C107B		SEB C107S		SEB C108B		SEB C108S		SEB C109B		SEB C109S		SEB C110B		SEB C110S		SEB C111B		SEB C111S		SEB C112B		SEB C112S		SEB C113B		SEB C113S		SEB C114B		SEB C114S		SEB C115B		SEB C115S		SEB C116B		SEB C116S		SEB C117B		SEB C117S		SEB C118B		SEB C118S		SEB C119B		SEB C119S		SEB C120B		SEB C120S		SEB C121B		SEB C121S		SEB C122B		SEB C122S		SEB C123B		SEB C123S		SEB C124B		SEB C124S		SEB C125B		SEB C125S		SEB C126B		SEB C126S		SEB C127B		SEB C127S		SEB C128B		SEB C128S		SEB C129B		SEB C129S		SEB C130B		SEB C130S		SEB C131B		SEB C131S		SEB C132B		SEB C132S		SEB C133B		SEB C133S		SEB C134B		SEB C134S		SEB C135B		SEB C135S		SEB C136B		SEB C136S		SEB C137B		SEB C137S		SEB C138B		SEB C138S		SEB C139B		SEB C139S		SEB C140B		SEB C140S		SEB C141B		SEB C141S		SEB C142B		SEB C142S		SEB C143B		SEB C143S		SEB C144B		SEB C144S		SEB C145B		SEB C145S		SEB C146B		SEB C146S		SEB C147B		SEB C147S		SEB C148B		SEB C148S		SEB C149B		SEB C149S		SEB C150B		SEB C150S		SEB C151B		SEB C151S		SEB C152B		SEB C152S		SEB C153B		SEB C153S		SEB C154B		SEB C154S		SEB C155B		SEB C155S		SEB C156B		SEB C156S		SEB C157B		SEB C157S		SEB C158B		SEB C158S		SEB C159B		SEB C159S		SEB C160B		SEB C160S		SEB C161B		SEB C161S		SEB C162B		SEB C162S		SEB C163B		SEB C163S		SEB C164B		SEB C164S		SEB C165B		SEB C165S		SEB C166B		SEB C166S		SEB C167B		SEB C167S		SEB C168B		SEB C168S		SEB C169B		SEB C169S		SEB C170B		SEB C170S		SEB C171B		SEB C171S		SEB C172B		SEB C172S		SEB C173B		SEB C173S		SEB C174B		SEB C174S		SEB C175B		SEB C175S		SEB C176B		SEB C176S		SEB C177B		SEB C177S		SEB C178B		SEB C178S		SEB C179B		SEB C179S		SEB C180B		SEB C180S		SEB C181B		SEB C181S		SEB C182B		SEB C182S		SEB C183B		SEB C183S		SEB C184B		SEB C184S		SEB C185B		SEB C185S		SEB C186B		SEB C186S		SEB C187B		SEB C187S		SEB C188B		SEB C188S		SEB C189B		SEB C189S		SEB C190B		SEB C190S		SEB C191B		SEB C191S		SEB C192B		SEB C192S		SEB C193B		SEB C193S		SEB C194B		SEB 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C240B		SEB C240S		SEB C241B		SEB C241S		SEB C242B		SEB C242S		SEB C243B		SEB C243S		SEB C244B		SEB C244S		SEB C245B		SEB C245S		SEB C246B		SEB C246S		SEB C247B		SEB C247S		SEB C248B		SEB C248S		SEB C249B		SEB C249S		SEB C250B		SEB C250S		SEB C251B		SEB C251S		SEB C252B		SEB C252S		SEB C253B		SEB C253S		SEB C254B		SEB C254S		SEB C255B		SEB C255S		SEB C256B		SEB C256S		SEB C257B		SEB C257S		SEB C258B		SEB C258S		SEB C259B		SEB C259S		SEB C260B		SEB C260S		SEB C261B		SEB C261S		SEB C262B		SEB C262S		SEB C263B		SEB C263S		SEB C264B		SEB C264S		SEB C265B		SEB C265S		SEB C266B		SEB C266S		SEB C267B		SEB C267S		SEB C268B		SEB C268S		SEB C269B		SEB C269S		SEB C270B		SEB C270S		SEB C271B		SEB C271S		SEB C272B		SEB C272S		SEB C273B		SEB C273S		SEB C274B		SEB C274S		SEB C275B		SEB C275S		SEB C276B		SEB C276S		SEB C277B		SEB C277S		SEB C278B		SEB C278S		SEB C279B		SEB C279S		SEB C280B		SEB C280S		SEB C281B		SEB C281S		SEB C282B		SEB C282S		SEB C283B		SEB C283S		SEB C284B		SEB C284S		SEB C285B		SEB C285S		SEB C286B		SEB C286S		SEB C287B		SEB C287S		SEB C288B		SEB C288S		SEB C289B		SEB C289S		SEB C290B		SEB C290S		SEB C291B		SEB C291S		SEB C292B		SEB C292S		SEB C293B		SEB C293S		SEB C294B		SEB C294S		SEB C295B		SEB C295S		SEB C296B		SEB C296S		SEB C297B		SEB C297S		SEB C298B		SEB C298S		SEB C299B		SEB C299S		SEB C300B		SEB C300S		SEB C301B		SEB C301S		SEB C302B		SEB C302S		SEB C303B		SEB C303S		SEB C304B		SEB C304S		SEB C305B		SEB C305S		SEB C306B		SEB C306S		SEB C307B		SEB C307S		SEB C308B		SEB C308S		SEB C309B		SEB C309S		SEB C310B		SEB C310S		SEB C311B		SEB C311S		SEB C312B		SEB C312S		SEB C313B		SEB C313S		SEB C314B		SEB C314S		SEB C315B		SEB C315S		SEB C316B		SEB C316S		SEB C317B		SEB C317S		SEB C318B		SEB C318S		SEB C319B		SEB C319S		SEB C320B		SEB C320S		SEB C321B		SEB C321S		SEB C322B		SEB C322S		SEB C323B		SEB C323S		SEB C324B		SEB C324S		SEB C325B		SEB C325S		SEB C326B		SEB C326S		SEB C327B		SEB C327S		SEB C328B		SEB C328S		SEB C329B		SEB C329S		SEB C330B		SEB C330S		SEB C331B		SEB C331S		SEB C332B		SEB C332S		SEB C333B		SEB C333S		SEB C334B		SEB C334S		SEB C335B		SEB C335S		SEB C336B		SEB C336S		SEB C337B		SEB C337S		SEB C338B		SEB C338S		SEB C339B		SEB C339S		SEB C340B		SEB C340S		SEB C341B		SEB C341S		SEB C342B		SEB C342S		SEB C343B		SEB C343S		SEB C344B		SEB C344S		SEB C345B		SEB C345S		SEB C346B		SEB C346S		SEB C347B		SEB C347S		SEB C348B		SEB C348S		SEB C349B		SEB C349S		SEB C350B		SEB C350S		SEB C351B		SEB C351S		SEB C352B		SEB C352S		SEB C353B		SEB C353S		SEB C354B		SEB C354S		SEB C355B		SEB C355S		SEB C356B		SEB C356S		SEB C357B		SEB C357S		SEB C358B		SEB C358S		SEB C359B		SEB C359S		SEB C360B		SEB C360S		SEB C361B		SEB C361S		SEB C362B		SEB C362S		SEB C363B		SEB C363S		SEB C364B		SEB C364S		SEB C365B		SEB C365S		SEB C366B		SEB C366S		SEB C367B		SEB C367S		SEB C368B		SEB C368S		SEB C369B		SEB C369S		SEB C370B		SEB C370S		SEB C371B		SEB C371S		SEB C372B		SEB C372S		SEB C373B		SEB C373S		SEB C374B		SEB C374S		SEB C375B		SEB C375S		SEB C376B		SEB C376S		SEB C377B		SEB C377S		SEB C378B		SEB C378S		SEB C379B		SEB C379S		SEB C380B		SEB C380S		SEB C381B		SEB C381S		SEB C382B		SEB C382S		SEB C383B		SEB C383S		SEB C384B		SEB C384S		SEB C385B		SEB C385S		SEB C386B		SEB C386S		SEB C387B		SEB C387S		SEB C388B		SEB C388S		SEB C389B		SEB C389S		SEB C390B		SEB C390S		SEB C391B		SEB C391S		SEB C392B		SEB C392S		SEB C393B		SEB C393S		SEB C394B		SEB C394S		SEB C395B		SEB C395S		SEB C396B		SEB C396S		SEB C397B		SEB C397S		SEB C398B		SEB C398S		SEB C399B		SEB C399S		SEB C400B		SEB C400S		SEB C401B		SEB C401S		SEB C402B		SEB C402S		SEB C403B		SEB C403S		SEB C404B		SEB C404S		SEB C405B		SEB C405S		SEB C406B		SEB C406S		SEB C407B		SEB C407S		SEB C408B		SEB C408S		SEB C409B		SEB C409S		SEB C410B		SEB C410S		SEB C411B		SEB C411S		SEB C412B		SEB C412S		SEB C413B		SEB C413S		SEB C414B		SEB C414S		SEB C415B		SEB C415S		SEB C416B		SEB C416S		SEB C417B		SEB C417S		SEB C418B		SEB C418S		SEB C419B		SEB C419S		SEB C420B		SEB C420S		SEB C421B		SEB C421S		SEB C422B		SEB C422S			
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ROUTE INFORMATION
Name / Number:
Direction:

Project Name: OGM Hill
Date: 12-Dec-13
Day of Week: Thursday
Measure: Mean Travel Time
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	O2M H1
Date:	12-Dec-12
Day of Week:	Thursday
Measure:	Mean Travel
Units:	minutes

Segment		DTC_R58		DTC_R62		DTC_R69		DTC_R76		DTC_R83		DTC_R90		DTC_R96		DTC_R103		DTC_R110		DTC_R117		DTC_R124		DTC_R131		DTC_R138		DTC_R145		DTC_R152		DTC_R159		DTC_R166		DTC_R173		DTC_R180		DTC_R187		DTC_R194		DTC_R201		DTC_R208		DTC_R215		DTC_R222		DTC_R229		DTC_R236		DTC_R243		DTC_R250		DTC_R257		DTC_R264		DTC_R271		DTC_R278		DTC_R285		DTC_R292		DTC_R299		DTC_R306		DTC_R313		DTC_R320		DTC_R327		DTC_R334		DTC_R341		DTC_R348		DTC_R355		DTC_R362		DTC_R369		DTC_R376		DTC_R383		DTC_R390		DTC_R397		DTC_R404		DTC_R411		DTC_R418		DTC_R425		DTC_R432		DTC_R439		DTC_R446		DTC_R453		DTC_R460		DTC_R467		DTC_R474		DTC_R481		DTC_R488		DTC_R495		DTC_R502		DTC_R509		DTC_R516		DTC_R523		DTC_R530		DTC_R537		DTC_R544		DTC_R551		DTC_R558		DTC_R565		DTC_R572		DTC_R579		DTC_R586		DTC_R593		DTC_R600		DTC_R607		DTC_R614		DTC_R621		DTC_R628		DTC_R635		DTC_R642		DTC_R649		DTC_R656		DTC_R663		DTC_R670		DTC_R677		DTC_R684		DTC_R691		DTC_R698		DTC_R705		DTC_R712		DTC_R719		DTC_R726		DTC_R733		DTC_R740		DTC_R747		DTC_R754		DTC_R761		DTC_R768		DTC_R775		DTC_R782		DTC_R789		DTC_R796		DTC_R803		DTC_R810		DTC_R817		DTC_R824		DTC_R831		DTC_R838		DTC_R845		DTC_R852		DTC_R859		DTC_R866		DTC_R873		DTC_R880		DTC_R887		DTC_R894		DTC_R901		DTC_R908		DTC_R915		DTC_R922		DTC_R929		DTC_R936		DTC_R943		DTC_R950		DTC_R957		DTC_R964		DTC_R971		DTC_R978		DTC_R985		DTC_R992		DTC_R999		DTC_R1006		DTC_R1013		DTC_R1020		DTC_R1027		DTC_R1034		DTC_R1041		DTC_R1048		DTC_R1055		DTC_R1062		DTC_R1069		DTC_R1076		DTC_R1083		DTC_R1090		DTC_R1097		DTC_R1104		DTC_R1111		DTC_R1118		DTC_R1125		DTC_R1132		DTC_R1139		DTC_R1146		DTC_R1153		DTC_R1160		DTC_R1167		DTC_R1174		DTC_R1181		DTC_R1188		DTC_R1195		DTC_R1202		DTC_R1209		DTC_R1216		DTC_R1223		DTC_R1230		DTC_R1237		DTC_R1244		DTC_R1251		DTC_R1258		DTC_R1265		DTC_R1272		DTC_R1279		DTC_R1286		DTC_R1293		DTC_R1300		DTC_R1307		DTC_R1314		DTC_R1321		DTC_R1328		DTC_R1335		DTC_R1342		DTC_R1349		DTC_R1356		DTC_R1363		DTC_R1370		DTC_R1377		DTC_R1384		DTC_R1391		DTC_R1398		DTC_R1405		DTC_R1412		DTC_R1419		DTC_R1426		DTC_R1433		DTC_R1440		DTC_R1447		DTC_R1454		DTC_R1461		DTC_R1468		DTC_R1475		DTC_R1482		DTC_R1489		DTC_R1496		DTC_R1503		DTC_R1510		DTC_R1517		DTC_R1524		DTC_R1531		DTC_R1538		DTC_R1545		DTC_R1552		DTC_R1559		DTC_R1566		DTC_R1573		DTC_R1580		DTC_R1587		DTC_R1594		DTC_R1601		DTC_R1608		DTC_R1615		DTC_R1622		DTC_R1629		DTC_R1636		DTC_R1643		DTC_R1650		DTC_R1657		DTC_R1664		DTC_R1671		DTC_R1678		DTC_R1685		DTC_R1692		DTC_R1699		DTC_R1706		DTC_R1713		DTC_R1720		DTC_R1727		DTC_R1734		DTC_R1741		DTC_R1748		DTC_R1755		DTC_R1762		DTC_R1769		DTC_R1776		DTC_R1783		DTC_R1790		DTC_R1797		DTC_R1804		DTC_R1811		DTC_R1818		DTC_R1825		DTC_R1832		DTC_R1839		DTC_R1846		DTC_R1853		DTC_R1860		DTC_R1867		DTC_R1874		DTC_R1881		DTC_R1888		DTC_R1895		DTC_R1902		DTC_R1909		DTC_R1916		DTC_R1923		DTC_R1930		DTC_R1937		DTC_R1944		DTC_R1951		DTC_R1958		DTC_R1965		DTC_R1972		DTC_R1979		DTC_R1986		DTC_R1993		DTC_R2000		DTC_R2007		DTC_R2014		DTC_R2021		DTC_R2028		DTC_R2035		DTC_R2042		DTC_R2049		DTC_R2056		DTC_R2063		DTC_R2070		DTC_R2077		DTC_R2084		DTC_R2091		DTC_R2098		DTC_R2105		DTC_R2112		DTC_R2119		DTC_R2126		DTC_R2133		DTC_R2140		DTC_R2147		DTC_R2154		DTC_R2161		DTC_R2168		DTC_R2175		DTC_R2182		DTC_R2189		DTC_R2196		DTC_R2203		DTC_R2210		DTC_R2217		DTC_R2224		DTC_R2231		DTC_R2238		DTC_R2245		DTC_R2252		DTC_R2259		DTC_R2266		DTC_R2273		DTC_R2280		DTC_R2287		DTC_R2294		DTC_R2301		DTC_R2308		DTC_R2315		DTC_R2322		DTC_R2329		DTC_R2336		DTC_R2343		DTC_R2350		DTC_R2357		DTC_R2364		DTC_R2371		DTC_R2378		DTC_R2385		DTC_R2392		DTC_R2399		DTC_R2406		DTC_R2413		DTC_R2420		DTC_R2427		DTC_R2434		DTC_R2441		DTC_R2448		DTC_R2455		DTC_R2462		DTC_R2469		DTC_R2476		DTC_R2483		DTC_R2490		DTC_R2497		DTC_R2504		DTC_R2511		DTC_R2518		DTC_R2525		DTC_R2532		DTC_R2539		DTC_R2546		DTC_R2553		DTC_R2560		DTC_R2567		DTC_R2574		DTC_R2581		DTC_R2588		DTC_R2595		DTC_R2602		DTC_R2609		DTC_R2616		DTC_R2623		DTC_R2630		DTC_R2637		DTC_R2644		DTC_R2651		DTC_R2658		DTC_R2665		DTC_R2672		DTC_R2679		DTC_R2686		DTC_R2693		DTC_R2700		DTC_R2707		DTC_R2714		DTC_R2721		DTC_R2728		DTC_R2735		DTC_R2742		DTC_R2749		DTC_R2756		DTC_R2763		DTC_R2770		DTC_R2777		DTC_R2784		DTC_R2791		DTC_R2798		DTC_R2805		DTC_R2812		DTC_R2819		DTC_R2826		DTC_R2833		DTC_R2840		DTC_R2847		DTC_R2854		DTC_R2861		DTC_R2868		DTC_R2875		DTC_R2882		DTC_R2889		DTC_R2896		DTC_R2903		DTC_R2910		DTC_R2917		DTC_R2924		DTC_R2931		DTC_R2938		DTC_R2945		DTC_R2952		DTC_R2959		DTC_R2966		DTC_R2973		DTC_R2980		DTC_R2987		DTC_R2994		DTC_R3001		DTC_R3008		DTC_R3015		DTC_R3022		DTC_R3029		DTC_R3036		DTC_R3043		DTC_R3050		DTC_R3057		DTC_R3064		DTC_R3071		DTC_R3078		DTC_R3085		DTC_R3092		DTC_R3099		DTC_R3106		DTC_R3113		DTC_R3120		DTC_R3127		DTC_R3134		DTC_R3141		DTC_R3148		DTC_R3155		DTC_R3162		DTC_R3169		DTC_R3176		DTC_R3183		DTC_R3190		DTC_R3197		DTC_R3204		DTC_R3211		DTC_R3218		DTC_R3225		DTC_R3232		DTC_R3239		DTC_R3246		DTC_R3253		DTC_R3260		DTC_R3267		DTC_R3274		DTC_R3281		DTC_R3288		DTC_R3295		DTC_R3302		DTC_R3309		DTC_R3316		DTC_R3323		DTC_R3330		DTC_R3337		DTC_R3344		DTC_R3351		DTC_R3358		DTC_R3365		DTC_R3372		DTC_R3379		DTC_R3386		DTC_R3393		DTC_R3400		DTC_R3407		DTC_R3414		DTC_R3421		DTC_R3428		DTC_R3435		DTC_R3442		DTC_R3449		DTC_R3456		DTC_R3463		DTC_R3470		DTC_R3477		DTC_R3484		DTC_R3491		DTC_R3498		DTC_R3505		DTC_R3512		DTC_R3519		DTC_R3526		DTC_R3533		DTC_R3540		DTC_R3547		DTC_R3554		DTC_R3561		DTC_R3568		DTC_R3575		DTC_R3582		DTC_R3589		DTC_R3596		DTC_R3603		DTC_R3610		DTC_R3617		DTC_R3624		DTC_R3631		DTC_R3638		DTC_R3645		DTC_R3652		DTC_R3659		DTC_R3666		DTC_R3673		DTC_R3680		DTC_R3687		DTC_R3694		DTC_R3701		DTC_R3708		DTC_R3715		DTC_R3722		DTC_R3729		DTC_R3736		DTC_R3743		DTC_R3750		DTC_R3757		DTC_R3764		DTC_R3771		DTC_R3778		DTC_R3785		DTC_R3792		DTC_R3799		DTC_R3806		DTC_R3813		DTC_R3820		DTC_R3827		DTC_R3834		DTC_R3841		DTC_R3848		DTC_R3855		DTC_R3862		DTC_R3869		DTC_R3876		DTC_R3883		DTC_R3890		DTC_R3897		DTC_R3904		DTC_R3911		DTC_R3918		DTC_R3925		DTC_R3932		DTC_R3939		DTC_R3946		DTC_R3953		DTC_R3960		DTC_R3967		DTC_R3974		DTC_R3981		DTC_R3988		DTC_R3995		DTC_R4002		DTC_R4009		DTC_R4016		DTC_R4023		DTC_R4030		DTC_R4037		DTC_R4044		DTC_R4051		DTC_R4058		DTC_R4065		DTC_R4072		DTC_R4079		DTC_R4086		DTC_R4093		DTC_R4100		DTC_R4107		DTC_R4114		DTC_R4121		DTC_R4128		DTC_R4135		DTC_R4142		DTC_R4149		DTC_R4156		DTC_R4163		DTC_R4170		DTC_R4177		DTC_R4184		DTC_R4191		DTC_R4198		DTC_R4205		DTC_R4212		DTC_R4219		DTC_R4226		DTC_R4233		DTC_R4240		DTC_R4247		DTC_R4254		DTC_R4261		DTC_R4268		DTC_R4275		DTC_R4282		DTC_R4289		DTC_R4296		DTC_R4303		DTC_R4310		DTC_R4317		DTC_R4324		DTC_R4331		DTC_R4338		DTC_R4345		DTC_R4352		DTC_R4359		DTC_R4366		DTC_R4373		DTC_R4380		DTC_R4387		DTC_R4394		DTC_R4401		DTC_R4408		DTC_R4415		DTC_R4422		DTC_R4429		DTC_R4436		DTC_R4443		DTC_R4450		DTC_R4457		DTC_R4464		DTC_R4471		DTC_R4478		DTC_R4485		DTC_R4492		DTC_R4499		DTC_R4506		DTC_R4513		DTC_R4520		DTC_R4527		DTC_R4534		DTC_R4541		DTC_R4548		DTC_R4555		DTC_R4562		DTC_R4569		DTC_R4576		DTC_R4583		DTC_R4590		DTC_R4597		DTC_R4604		DTC_R4611		DTC_R4618		DTC_R4625		DTC_R4632		DTC_R4639		DTC_R4646		DTC_R4653		DTC_R4660		DTC_R4667		DTC_R4674		DTC_R4681		DTC_R4688		DTC_R4695		DTC_R4702		DTC_R4709		DTC_R4716		DTC_R4723		DTC_R4730		DTC_R4737		DTC_R4744		DTC_R4751		DTC_R4758		DTC_R4765		DTC_R4772		DTC_R4779		DTC_R4786		DTC_R4793		DTC_R4800		DTC_R4807		DTC_R4814		DTC_R4821		DTC_R4828		DTC_R4835		DTC_R4842		DTC_R4849		DTC_R4856		DTC_R4863		DTC_R4870		DTC_R4877		DTC_R4884		DTC_R4891		DTC_R4898		DTC_R4905		DTC_R4912		DTC_R4919		DTC_R4926		DTC_R4933		DTC_R4940		DTC_R4947		DTC_R4954		DTC_R4961		DTC_R4968		DTC_R4975		DTC_R4982		DTC_R4989		DTC_R4996		DTC_R5003		DTC_R5010		DTC_R5017		DTC_R5024		DTC_R5031		DTC_R5038		DTC_R5045		DTC_R5052		DTC_R5059		DTC_R5066		DTC_R5073		DTC_R5080		DTC_R5087		DTC_R5094		DTC_R5101		DTC_R5108		DTC_R5115		DTC_R5122		DTC_R5129		DTC_R5136		DTC_R5143		DTC_R5150		DTC_R5157		DTC_R5164		DTC_R5171		DTC_R5178		DTC_R5185		DTC_R5192		DTC_R5199		DTC_R5206		DTC_R5213		DTC_R5220		DTC_R5227		DTC_R5234		DTC_R5241		DTC_R5248		DTC_R5255		DTC_R5262		DTC_R5269		DTC_R5276		DTC_R5283		DTC_R5290		DTC_R5297		DTC_R5304		DTC_R5311		DTC_R5318		DTC_R5325		DTC_R5332		DTC_R5339		DTC_R5346		DTC_R5353		DTC_R5360		DTC_R5367		DTC_R5374		DTC_R5381		DTC_R5388		DTC_R5395		DTC_R5402		DTC_R5409		DTC_R5416		DTC_R5423		DTC_R5430		DTC_R5437		DTC_R5444		DTC_R5451		DTC_R5458		DTC_R5465		DTC_R5472		DTC_R5479		DTC_R5486		DTC_R5493		DTC_R5500		DTC_R5507		DTC_R5514		DTC_R5521		DTC_R5528		DTC_R5535		DTC_R5542		DTC_R5549		DTC_R5556		DTC_R5563		DTC_R5570		DTC_R5577		DTC_R5584		DTC_R5591		DTC_R5598		DTC_R5605		DTC_R5612		DTC_R5619		DTC_R5626		DTC_R5633		DTC_R5640		DTC_R5647		DTC_R5654		DTC_R5661		DTC_R5668		DTC_R5675		DTC_R5682		DTC_R5689		DTC_R5696		DTC_R5703		DTC_R5710		DTC_R5717		DTC_R5724		DTC_R5731		DTC_R5738		DTC_R5745		DTC_R5752		DTC_R5759		DTC_R5766		DTC_R5773		DTC_R5780		DTC_R5787		DTC_R5794		DTC_R5801		DTC_R5808		DTC_R5815		DTC_R5822		DTC_R5829		DTC_R5836		DTC_R5843		DTC_R5850		DTC_R5857		DTC_R5864		DTC_R5871		DTC_R5878		DTC_R5885	
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Time	Segment Length Lat (miles) Long (miles)	DND 363		DND 368		DND 373		DND 378		DND 383		DND 388		DND 393		DND 398		DND 403		DND 408		DND 413		DND 418		DND 423		DND 428		DND 433		DND 438		DND 443		DND 448		DND 453		DND 458		DND 463		DND 468		DND 473		DND 478		DND 483		DND 488		DND 493		DND 498		DND 503		DND 508		DND 513		DND 518		DND 523		DND 528		DND 533		DND 538		DND 543		DND 548		DND 553		DND 558		DND 563		DND 568		DND 573		DND 578		DND 583		DND 588		DND 593		DND 598		DND 603		DND 608		DND 613		DND 618		DND 623		DND 628		DND 633		DND 638		DND 643		DND 648		DND 653		DND 658		DND 663		DND 668		DND 673		DND 678		DND 683		DND 688		DND 693		DND 698		DND 703		DND 708		DND 713		DND 718		DND 723		DND 728		DND 733		DND 738		DND 743		DND 748		DND 753		DND 758		DND 763		DND 768		DND 773		DND 778		DND 783		DND 788		DND 793		DND 798		DND 803		DND 808		DND 813		DND 818		DND 823		DND 828		DND 833		DND 838		DND 843		DND 848		DND 853		DND 858		DND 863		DND 868		DND 873		DND 878		DND 883		DND 888		DND 893		DND 898		DND 903		DND 908		DND 913		DND 918		DND 923		DND 928		DND 933		DND 938		DND 943		DND 948		DND 953		DND 958		DND 963		DND 968		DND 973		DND 978		DND 983		DND 988		DND 993		DND 998		DND 1003		DND 1008		DND 1013		DND 1018		DND 1023		DND 1028		DND 1033		DND 1038		DND 1043		DND 1048		DND 1053	
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Name / Number:
Direction:

Time	Segment (Length in hours)	Segment		DEO-DE4		DEO-DE5		DEO-DE6		DEO-DE7		DEO-DE8		DEO-DE9		DEO-DE10		DEO-DE11		DEO-DE12		DEO-DE13		DEO-DE14		DEO-DE15		DEO-DE16		DEO-DE17		DEO-DE18		DEO-DE19		DEO-DE20		DEO-DE21		DEO-DE22		DEO-DE23		DEO-DE24		DEO-DE25		DEO-DE26		DEO-DE27		DEO-DE28		DEO-DE29		DEO-DE30		DEO-DE31		DEO-DE32		DEO-DE33		DEO-DE34		DEO-DE35		DEO-DE36		DEO-DE37		DEO-DE38		DEO-DE39		DEO-DE40		DEO-DE41		DEO-DE42		DEO-DE43		DEO-DE44		DEO-DE45		DEO-DE46		DEO-DE47		DEO-DE48		DEO-DE49		DEO-DE50		DEO-DE51		DEO-DE52		DEO-DE53		DEO-DE54		DEO-DE55		DEO-DE56		DEO-DE57		DEO-DE58		DEO-DE59		DEO-DE60		DEO-DE61		DEO-DE62		DEO-DE63		DEO-DE64		DEO-DE65		DEO-DE66		DEO-DE67		DEO-DE68		DEO-DE69		DEO-DE70		DEO-DE71		DEO-DE72		DEO-DE73		DEO-DE74		DEO-DE75		DEO-DE76		DEO-DE77		DEO-DE78		DEO-DE79		DEO-DE80		DEO-DE81		DEO-DE82		DEO-DE83		DEO-DE84		DEO-DE85		DEO-DE86		DEO-DE87		DEO-DE88		DEO-DE89		DEO-DE90		DEO-DE91		DEO-DE92		DEO-DE93		DEO-DE94		DEO-DE95		DEO-DE96		DEO-DE97		DEO-DE98		DEO-DE99		DEO-DE100		DEO-DE101		DEO-DE102		DEO-DE103		DEO-DE104		DEO-DE105		DEO-DE106		DEO-DE107		DEO-DE108		DEO-DE109		DEO-DE110		DEO-DE111		DEO-DE112		DEO-DE113		DEO-DE114		DEO-DE115		DEO-DE116		DEO-DE117		DEO-DE118		DEO-DE119		DEO-DE120		DEO-DE121		DEO-DE122		DEO-DE123		DEO-DE124		DEO-DE125		DEO-DE126		DEO-DE127		DEO-DE128		DEO-DE129		DEO-DE130		DEO-DE131		DEO-DE132		DEO-DE133		DEO-DE134		DEO-DE135		DEO-DE136		DEO-DE137		DEO-DE138		DEO-DE139		DEO-DE140		DEO-DE141
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ROUTE INFORMATION
Name / Number:
Direction:

Project Name: O2M H8
Date: 13-Dec-13
Day of Week: Friday
Measure: Mean Travel
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	CH2M Hill
Date:	13-Dec-13
Day of Week:	Friday
Measure:	Mean Travel Time
Units:	minutes

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number: Direction:

Project Name: CH2M 160
Date: 11/Dec/13
Day of Week: Friday
Measure: Mean Travel Time
Units: minutes

Time	Segment Label	SMD_A62 SMD 2.1 to SMD 2	SMD_C09 SMD 2.1 to SMD 3	SMD_R01 SMD 2.1 to SMD 4	SMD_C7C SMD 2.1 to SMD 5	SMD_R05 SMD 2.1 to SMD 6	SMD_C06 SMD 2.1 to SMD 7	SMD_R02 SMD 2.1 to SMD 8	SMD_C45 SMD 2.1 to SMD 9	SMD_R08 SMD 2.1 to SMD 10	SMD_C43 SMD 2.1 to SMD 11	SMD_R03 SMD 2.1 to SMD 12	SMD_C08 SMD 2.1 to SMD 13	SMD_R06 SMD 2.1 to SMD 14	SMD_C7E SMD 2.1 to SMD 15	SMD_R04 SMD 2.1 to SMD 16	SMD_C05 SMD 2.1 to SMD 17	SMD_R07 SMD 2.1 to SMD 18
Midnight	Begin Time	14:52:17.414	14:52:59.664	14:53:41.914	14:54:24.164	14:55:06.414	14:55:48.664	14:56:30.914	14:57:13.164	14:57:55.414	14:58:37.664	14:59:19.914	14:59:59.664	15:00:41.914	15:01:24.164	15:02:06.414	15:02:48.664	15:03:30.914
	1:00 AM	15:02:06.414	15:02:48.664	15:03:30.914	15:04:13.164	15:04:55.414	15:05:37.664	15:06:19.914	15:07:02.164	15:07:44.414	15:08:26.664	15:09:08.914	15:09:51.164	15:10:33.414	15:11:15.664	15:11:57.914	15:12:40.164	15:13:22.414
	2:00 AM	15:12:40.164	15:13:22.414	15:14:04.664	15:14:46.914	15:15:29.164	15:16:11.414	15:16:53.664	15:17:35.914	15:18:18.164	15:19:00.414	15:19:42.664	15:20:24.914	15:21:07.164	15:21:49.414	15:22:31.664	15:23:13.914	15:23:56.164
	3:00 AM	15:23:56.164	15:24:38.414	15:25:20.664	15:26:02.914	15:26:45.164	15:27:27.414	15:28:09.664	15:28:51.914	15:29:34.164	15:30:16.414	15:30:98.664	15:31:40.914	15:32:23.164	15:33:05.414	15:33:47.664	15:34:29.914	15:35:12.164
	4:00 AM	15:35:12.164	15:35:54.414	15:36:36.664	15:37:18.914	15:38:01.164	15:38:43.414	15:39:25.664	15:40:07.914	15:40:50.164	15:41:32.414	15:42:14.664	15:42:56.914	15:43:39.164	15:44:21.414	15:45:03.664	15:45:45.914	15:46:28.164
	5:00 AM	15:46:28.164	15:47:10.414	15:47:52.664	15:48:34.914	15:49:17.164	15:49:59.414	15:50:41.664	15:51:23.914	15:52:06.164	15:52:48.414	15:53:30.664	15:54:12.914	15:54:55.164	15:55:37.414	15:56:19.664	15:57:01.914	15:57:44.164
	6:00 AM	15:57:44.164	15:58:26.414	15:59:08.664	15:59:50.914	16:00:33.164	16:01:15.414	16:01:57.664	16:02:39.914	16:03:22.164	16:04:04.414	16:04:46.664	16:05:28.914	16:06:11.164	16:06:53.414	16:07:35.664	16:08:17.914	16:09:00.164
	7:00 AM	16:09:00.164	16:09:42.414	16:10:24.664	16:11:06.914	16:11:49.164	16:12:31.414	16:13:13.664	16:13:55.914	16:14:38.164	16:15:20.414	16:16:02.664	16:16:44.914	16:17:27.164	16:18:09.414	16:18:51.664	16:19:33.914	16:20:16.164
	8:00 AM	16:20:16.164	16:20:58.414	16:21:40.664	16:22:22.914	16:23:05.164	16:23:47.414	16:24:29.664	16:25:11.914	16:25:54.164	16:26:36.414	16:27:18.664	16:28:00.914	16:28:43.164	16:29:25.414	16:30:07.664	16:30:49.914	16:31:32.164
	9:00 AM	16:31:32.164	16:32:14.414	16:32:56.664	16:33:38.914	16:34:21.164	16:35:03.414	16:35:45.664	16:36:27.914	16:37:10.164	16:37:52.414	16:38:34.664	16:39:16.914	16:40:00.164	16:40:42.414	16:41:24.664	16:42:06.914	16:42:49.164
Noon	10:00 AM	16:42:49.164	16:43:31.414	16:44:13.664	16:44:55.914	16:45:38.164	16:46:20.414	16:47:02.664	16:47:44.914	16:48:27.164	16:49:09.414	16:49:51.664	16:50:33.914	16:51:16.164	16:51:58.414	16:52:40.664	16:53:22.914	16:54:05.164
	11:00 AM	16:54:05.164	16:54:47.414	16:55:29.664	16:56:11.914	16:56:54.164	16:57:36.414	16:58:18.664	16:59:00.914	16:59:43.164	17:00:25.414	17:01:07.664	17:01:49.914	17:02:32.164	17:03:14.414	17:03:56.664	17:04:38.914	17:05:21.164
	12:00 PM	17:05:21.164	17:06:03.414	17:06:45.664	17:07:27.914	17:08:10.164	17:08:52.414	17:09:34.664	17:10:16.914	17:10:99.164	17:11:41.414	17:12:23.664	17:13:05.914	17:13:48.164	17:14:30.414	17:15:12.664	17:15:54.914	17:16:37.164
	1:00 PM	17:16:37.164	17:17:19.414	17:18:01.664	17:18:43.914	17:19:26.164	17:20:08.414	17:20:50.664	17:21:32.914	17:22:15.164	17:22:57.414	17:23:39.664	17:24:21.914	17:25:04.164	17:25:46.414	17:26:28.664	17:27:10.914	17:27:53.164
	2:00 PM	17:27:53.164	17:28:35.414	17:29:17.664	17:30:00.914	17:30:43.164	17:31:25.414	17:32:07.664	17:32:49.914	17:33:32.164	17:34:14.414	17:34:56.664	17:35:38.914	17:36:21.164	17:37:03.414	17:37:45.664	17:38:27.914	17:39:10.164
	3:00 PM	17:39:10.164	17:39:52.414	17:40:34.664	17:41:16.914	17:41:99.164	17:42:41.414	17:43:23.664	17:44:05.914	17:44:48.164	17:45:30.414	17:46:12.664	17:46:54.914	17:47:37.164	17:48:19.414	17:49:01.664	17:49:43.914	17:50:26.164
	4:00 PM	17:50:26.164	17:51:08.414	17:51:50.664	17:52:32.914	17:53:15.164	17:53:57.414	17:54:39.664	17:55:21.914	17:56:04.164	17:56:46.414	17:57:28.664	17:58:10.914	17:58:53.164	17:59:35.414	18:00:17.664	18:00:59.914	18:01:42.164
	5:00 PM	18:01:42.164	18:02:24.414	18:03:06.664	18:03:48.914	18:04:31.164	18:05:13.414	18:05:55.664	18:06:37.914	18:07:20.164	18:08:02.414	18:08:44.664	18:09:26.914	18:10:09.164	18:10:51.414	18:11:33.664	18:12:15.914	18:12:58.164
	6:00 PM	18:12:58.164	18:13:40.414	18:14:22.664	18:15:04.914	18:15:47.164	18:16:29.414	18:17:11.664	18:17:53.914	18:18:36.164	18:19:18.414	18:20:00.664	18:20:42.914	18:21:25.164	18:22:07.414	18:22:49.664	18:23:31.914	18:24:14.164
	7:00 PM	18:24:14.164	18:24:56.414	18:25:38.664	18:26:20.914	18:27:03.164	18:27:45.414	18:28:27.664	18:29:09.914	18:29:52.164	18:30:34.414	18:31:16.664	18:31:98.914	18:32:41.164	18:33:23.414	18:34:05.664	18:34:47.914	18:35:30.164
Midnight	8:00 PM	18:35:30.164	18:36:12.414	18:36:54.664	18:37:36.914	18:38:19.164	18:39:01.414	18:39:43.664	18:40:25.914	18:41:08.164	18:41:50.414	18:42:32.664	18:43:14.914	18:43:57.164	18:44:39.414	18:45:21.664	18:46:03.914	18:46:46.164
	10:00 PM	18:46:46.164	18:47:28.414	18:48:10.664	18:48:52.914	18:49:35.164	18:50:17.414	18:50:59.664	18:51:41.914	18:52:24.164	18:53:06.414	18:53:48.664	18:54:30.914	18:55:13.164	18:55:55.414	18:56:37.664	18:57:19.914	18:58:02.164

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name: O2M HSE
Date: 14-Dec-17
Day of Week: Saturday
Measure: Mean Travel
Units: minutes

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	CH2M Hill
Date:	14-Dec-13
Day of Week:	Saturday
Measure:	Mean Travel Time
Units:	minutes

[illegible]

[illegible]

ROUTE INFORMATION
Name / Number:
Direction:
Project Name:
Date:
Day of Week:
Measure:
Unit:

[illegible]

TRAVEL TIME DATA

ROUTE INFORMATION
Name / Number: Direction:

Project Name: CH2M 160
Date: 15/Dec/13
Day of Week: Sunday
Measure: Mean Travel Time
Units: Minutes

Segment Label	SECT 005		SECT 045		SECT 050		SECT 060		SECT 065		SECT 070		SECT 075		SECT 080		SECT 085		SECT 090		SECT 095		SECT 100		SECT 105		SECT 110		SECT 115		SECT 120		SECT 125		SECT 130		SECT 135		SECT 140		SECT 145		SECT 150		SECT 155		SECT 160		SECT 165		SECT 170		SECT 175		SECT 180		SECT 185		SECT 190		SECT 195		SECT 200		SECT 205		SECT 210		SECT 215		SECT 220		SECT 225		SECT 230		SECT 235		SECT 240		SECT 245		SECT 250		SECT 255		SECT 260		SECT 265		SECT 270		SECT 275		SECT 280		SECT 285		SECT 290		SECT 295		SECT 300		SECT 305		SECT 310		SECT 315		SECT 320		SECT 325		SECT 330		SECT 335		SECT 340		SECT 345		SECT 350		SECT 355		SECT 360		SECT 365		SECT 370		SECT 375		SECT 380		SECT 385		SECT 390		SECT 395		SECT 400		SECT 405		SECT 410		SECT 415		SECT 420		SECT 425		SECT 430		SECT 435		SECT 440		SECT 445		SECT 450		SECT 455		SECT 460		SECT 465		SECT 470		SECT 475		SECT 480		SECT 485		SECT 490		SECT 495		SECT 500		SECT 505		SECT 510		SECT 515		SECT 520		SECT 525		SECT 530		SECT 535		SECT 540		SECT 545		SECT 550		SECT 555		SECT 560		SECT 565		SECT 570		SECT 575		SECT 580		SECT 585		SECT 590		SECT 595		SECT 600		SECT 605		SECT 610		SECT 615		SECT 620		SECT 625		SECT 630		SECT 635		SECT 640		SECT 645		SECT 650		SECT 655		SECT 660		SECT 665		SECT 670		SECT 675		SECT 680		SECT 685		SECT 690		SECT 695		SECT 700		SECT 705		SECT 710		SECT 715		SECT 720		SECT 725		SECT 730		SECT 735		SECT 740		SECT 745		SECT 750		SECT 755		SECT 760		SECT 765		SECT 770		SECT 775		SECT 780		SECT 785		SECT 790		SECT 795		SECT 800		SECT 805		SECT 810		SECT 815		SECT 820		SECT 825		SECT 830		SECT 835		SECT 840		SECT 845		SECT 850		SECT 855		SECT 860		SECT 865		SECT 870		SECT 875		SECT 880		SECT 885		SECT 890		SECT 895		SECT 900		SECT 905		SECT 910		SECT 915		SECT 920		SECT 925		SECT 930		SECT 935		SECT 940		SECT 945		SECT 950		SECT 955		SECT 960		SECT 965		SECT 970		SECT 975		SECT 980		SECT 985		SECT 990		SECT 995		SECT 1000		SECT 1005		SECT 1010		SECT 1015		SECT 1020		SECT 1025		SECT 1030		SECT 1035		SECT 1040		SECT 1045		SECT 1050		SECT 1055		SECT 1060		SECT 1065		SECT 1070		SECT 1075		SECT 1080		SECT 1085		SECT 1090		SECT 1095		SECT 1100		SECT 1105		SECT 1110		SECT 1115		SECT 1120		SECT 1125		SECT 1130		SECT 1135		SECT 1140		SECT 1145		SECT 1150		SECT 1155		SECT 1160		SECT 1165		SECT 1170		SECT 1175		SECT 1180		SECT 1185		SECT 1190		SECT 1195		SECT 1200		SECT 1205		SECT 1210		SECT 1215		SECT 1220		SECT 1225		SECT 1230		SECT 1235		SECT 1240		SECT 1245		SECT 1250		SECT 1255		SECT 1260		SECT 1265		SECT 1270		SECT 1275		SECT 1280		SECT 1285		SECT 1290		SECT 1295		SECT 1300		SECT 1305		SECT 1310		SECT 1315		SECT 1320		SECT 1325		SECT 1330		SECT 1335		SECT 1340		SECT 1345		SECT 1350		SECT 1355		SECT 1360		SECT 1365		SECT 1370		SECT 1375		SECT 1380		SECT 1385		SECT 1390		SECT 1395		SECT 1400		SECT 1405		SECT 1410		SECT 1415		SECT 1420		SECT 1425		SECT 1430		SECT 1435		SECT 1440		SECT 1445		SECT 1450		SECT 1455		SECT 1460		SECT 1465		SECT 1470		SECT 1475		SECT 1480		SECT 1485		SECT 1490		SECT 1495		SECT 1500		SECT 1505		SECT 1510		SECT 1515		SECT 1520		SECT 1525		SECT 1530		SECT 1535		SECT 1540		SECT 1545		SECT 1550		SECT 1555		SECT 1560		SECT 1565		SECT 1570		SECT 1575		SECT 1580		SECT 1585		SECT 1590		SECT 1595		SECT 1600		SECT 1605		SECT 1610		SECT 1615		SECT 1620		SECT 1625		SECT 1630		SECT 1635		SECT 1640		SECT 1645		SECT 1650		SECT 1655		SECT 1660		SECT 1665		SECT 1670		SECT 1675		SECT 1680		SECT 1685		SECT 1690		SECT 1695		SECT 1700		SECT 1705		SECT 1710		SECT 1715		SECT 1720		SECT 1725		SECT 1730		SECT 1735		SECT 1740		SECT 1745		SECT 1750		SECT 1755		SECT 1760		SECT 1765		SECT 1770		SECT 1775		SECT 1780		SECT 1785		SECT 1790		SECT 1795		SECT 1800		SECT 1805		SECT 1810		SECT 1815		SECT 1820		SECT 1825		SECT 1830		SECT 1835		SECT 1840		SECT 1845		SECT 1850		SECT 1855		SECT 1860		SECT 1865		SECT 1870		SECT 1875		SECT 1880		SECT 1885		SECT 1890		SECT 1895		SECT 1900		SECT 1905		SECT 1910		SECT 1915		SECT 1920		SECT 1925		SECT 1930		SECT 1935		SECT 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TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number: Direction:

Project Name: CH2M 160

Date: 15/Dec/13

Day of Week: Sunday

Measure: Mean Travel Time

Units: Minutes

Segment		S001		S002		S003		S004		S005		S006		S007		S008		S009		S010		S011		S012		S013		S014		S015		S016		S017		S018		S019		S020		S021		S022		S023		S024		S025		S026		S027		S028		S029		S030		S031		S032		S033		S034		S035		S036		S037		S038		S039		S040		S041		S042		S043		S044		S045		S046		S047		S048		S049		S050		S051		S052		S053		S054		S055		S056		S057		S058		S059		S060		S061		S062		S063		S064		S065		S066		S067		S068		S069		S070		S071		S072		S073		S074		S075		S076		S077		S078		S079		S080		S081		S082		S083		S084		S085		S086		S087		S088		S089		S090		S091		S092		S093		S094		S095		S096		S097		S098		S099		S100		S101		S102		S103		S104		S105		S106		S107		S108		S109		S110		S111		S112		S113		S114		S115		S116		S117		S118		S119		S120		S121		S122		S123		S124		S125		S126		S127		S128		S129		S130		S131		S132		S133		S134		S135		S136		S137		S138		S139		S140		S141		S142		S143		S144		S145		S146		S147		S148		S149		S150		S151		S152		S153		S154		S155		S156		S157		S158		S159		S160		S161		S162		S163		S164		S165		S166		S167		S168		S169		S170		S171		S172		S173		S174		S175		S176		S177		S178		S179		S180		S181		S182		S183		S184		S185		S186		S187		S188		S189		S190		S191		S192		S193		S194		S195		S196		S197		S198		S199		S200		S201		S202		S203		S204		S205		S206		S207		S208		S209		S210		S211		S212		S213		S214		S215		S216		S217		S218		S219		S220		S221		S222		S223		S224		S225		S226		S227		S228		S229		S230		S231		S232		S233		S234		S235		S236		S237		S238		S239		S240		S241		S242		S243		S244		S245		S246		S247		S248		S249		S250		S251		S252		S253		S254		S255		S256		S257		S258		S259		S260		S261		S262		S263		S264		S265		S266		S267		S268		S269		S270		S271		S272		S273		S274		S275		S276		S277		S278		S279		S280		S281		S282		S283		S284		S285		S286		S287		S288		S289		S290		S291		S292		S293		S294		S295		S296		S297		S298		S299		S300		S301		S302		S303		S304		S305		S306		S307		S308		S309		S310		S311		S312		S313		S314		S315		S316		S317		S318		S319		S320		S321		S322		S323		S324		S325		S326		S327		S328		S329		S330		S331		S332		S333		S334		S335		S336		S337		S338		S339		S340		S341		S342		S343		S344		S345		S346		S347		S348		S349		S350		S351		S352		S353		S354		S355		S356		S357		S358		S359		S360		S361		S362		S363		S364		S365		S366		S367		S368		S369		S370		S371		S372		S373		S374		S375		S376		S377		S378		S379		S380		S381		S382		S383		S384		S385		S386		S387		S388		S389		S390		S391		S392		S393		S394		S395		S396		S397		S398		S399		S400		S401		S402		S403		S404		S405		S406		S407		S408		S409		S410		S411		S412		S413		S414		S415		S416		S417		S418		S419		S420		S421		S422		S423		S424		S425		S426		S427		S428		S429		S430		S431		S432		S433		S434		S435		S436		S437		S438		S439		S440		S441		S442		S443		S444		S445		S446		S447		S448		S449		S450		S451		S452		S453		S454		S455		S456		S457		S458		S459		S460		S461		S462		S463		S464		S465		S466		S467		S468		S469		S470		S471		S472		S473		S474		S475		S476		S477		S478		S479		S480		S481		S482		S483		S484		S485		S486		S487		S488		S489		S490		S491		S492		S493		S494		S495		S496		S497		S498		S499		S500	
Time	Midnight	Length	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start</																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

ROUTE INFORMATION
Name / Number:
Direction:

Project Name:	CH2M Hill
Date:	15-Dec-1
Day of Week:	Sunday
Measure:	Mean Travel
Units:	minutes

Time	Segment	DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS 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DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS		DMS JUN		DMS JAS		DMS JUN		DMS DTC		DMS DJS		DMS DDO		DMS DMS		DMS DED		DMS CJS		DMS EES		DMS JAS	
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ROUTE INFORMATION
Name / Number
Direction

Project Name:	CH2M Hill
Date:	15-Dec-12
Day of Week:	Sunday
Measure:	Mean Travel Time

Time	Segment	SVC_008		SVC_042		SVC_058		SVC_083		SVC_098		SVC_108		SVC_128		SVC_148		SVC_168		SVC_188		SVC_208		SVC_228		SVC_248		SVC_268		SVC_288		SVC_308		SVC_328		SVC_348		SVC_368		SVC_388		SVC_408		SVC_428		SVC_448		SVC_468		SVC_488		SVC_508		SVC_528		SVC_548		SVC_568		SVC_588		SVC_608		SVC_628		SVC_648		SVC_668		SVC_688		SVC_708		SVC_728		SVC_748		SVC_768		SVC_788		SVC_808		SVC_828		SVC_848		SVC_868		SVC_888		SVC_908		SVC_928		SVC_948		SVC_968		SVC_988		SVC_1008		SVC_1028		SVC_1048		SVC_1068		SVC_1088		SVC_1108		SVC_1128		SVC_1148		SVC_1168		SVC_1188		SVC_1208		SVC_1228		SVC_1248		SVC_1268		SVC_1288		SVC_1308		SVC_1328		SVC_1348		SVC_1368		SVC_1388		SVC_1408		SVC_1428		SVC_1448		SVC_1468		SVC_1488		SVC_1508		SVC_1528		SVC_1548		SVC_1568		SVC_1588		SVC_1608		SVC_1628		SVC_1648		SVC_1668		SVC_1688		SVC_1708		SVC_1728		SVC_1748		SVC_1768		SVC_1788		SVC_1808		SVC_1828		SVC_1848		SVC_1868		SVC_1888		SVC_1908		SVC_1928		SVC_1948		SVC_1968		SVC_1988		SVC_2008		SVC_2028		SVC_2048		SVC_2068		SVC_2088		SVC_2108		SVC_2128		SVC_2148		SVC_2168		SVC_2188		SVC_2208		SVC_2228		SVC_2248		SVC_2268		SVC_2288		SVC_2308		SVC_2328		SVC_2348		SVC_2368		SVC_2388		SVC_2408		SVC_2428		SVC_2448		SVC_2468		SVC_2488		SVC_2508		SVC_2528		SVC_2548		SVC_2568		SVC_2588		SVC_2608		SVC_2628		SVC_2648		SVC_2668		SVC_2688		SVC_2708		SVC_2728	
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TRAVEL TIME DATA

ROUTE INFORMATION

Name / Number: Direction:

Project Name: CH2M 160
Date: 15/Dec/13
Day of Week: Sunday
Measure: Mean Travel Time
Units: Minutes

Segment		SMPD 404		SMPD 405		SMPD 406		SMPD 410		SMPD 415		SMPD 420		SMPD 425		SMPD 430		SMPD 435		SMPD 440		SMPD 445		SMPD 450		SMPD 455		SMPD 460		SMPD 465		SMPD 470		SMPD 475		SMPD 480		SMPD 485		SMPD 490		SMPD 495		SMPD 500		SMPD 505		SMPD 510		SMPD 515		SMPD 520		SMPD 525		SMPD 530		SMPD 535		SMPD 540		SMPD 545		SMPD 550		SMPD 555		SMPD 560		SMPD 565		SMPD 570		SMPD 575		SMPD 580		SMPD 585		SMPD 590		SMPD 595		SMPD 600		SMPD 605		SMPD 610		SMPD 615		SMPD 620		SMPD 625		SMPD 630		SMPD 635		SMPD 640		SMPD 645		SMPD 650		SMPD 655		SMPD 660		SMPD 665		SMPD 670		SMPD 675		SMPD 680		SMPD 685		SMPD 690		SMPD 695		SMPD 700		SMPD 705		SMPD 710		SMPD 715		SMPD 720		SMPD 725		SMPD 730		SMPD 735		SMPD 740		SMPD 745		SMPD 750		SMPD 755		SMPD 760		SMPD 765		SMPD 770		SMPD 775		SMPD 780		SMPD 785		SMPD 790		SMPD 795		SMPD 800		SMPD 805		SMPD 810		SMPD 815		SMPD 820		SMPD 825		SMPD 830		SMPD 835		SMPD 840		SMPD 845		SMPD 850		SMPD 855		SMPD 860		SMPD 865		SMPD 870		SMPD 875		SMPD 880		SMPD 885		SMPD 890		SMPD 895		SMPD 900		SMPD 905		SMPD 910		SMPD 915		SMPD 920		SMPD 925		SMPD 930		SMPD 935		SMPD 940		SMPD 945		SMPD 950		SMPD 955		SMPD 960		SMPD 965		SMPD 970		SMPD 975		SMPD 980		SMPD 985		SMPD 990		SMPD 995		SMPD 1000		SMPD 1005		SMPD 1010		SMPD 1015		SMPD 1020		SMPD 1025		SMPD 1030		SMPD 1035		SMPD 1040		SMPD 1045		SMPD 1050		SMPD 1055		SMPD 1060		SMPD 1065		SMPD 1070		SMPD 1075		SMPD 1080		SMPD 1085		SMPD 1090		SMPD 1095		SMPD 1100		SMPD 1105		SMPD 1110		SMPD 1115		SMPD 1120		SMPD 1125		SMPD 1130		SMPD 1135		SMPD 1140		SMPD 1145		SMPD 1150		SMPD 1155		SMPD 1160		SMPD 1165		SMPD 1170		SMPD 1175		SMPD 1180		SMPD 1185		SMPD 1190		SMPD 1195		SMPD 1200		SMPD 1205		SMPD 1210		SMPD 1215		SMPD 1220		SMPD 1225		SMPD 1230		SMPD 1235		SMPD 1240		SMPD 1245		SMPD 1250		SMPD 1255		SMPD 1260		SMPD 1265		SMPD 1270		SMPD 1275		SMPD 1280		SMPD 1285		SMPD 1290		SMPD 1295		SMPD 1300		SMPD 1305		SMPD 1310		SMPD 1315		SMPD 1320		SMPD 1325		SMPD 1330		SMPD 1335		SMPD 1340		SMPD 1345		SMPD 1350		SMPD 1355		SMPD 1360		SMPD 1365		SMPD 1370		SMPD 1375		SMPD 1380		SMPD 1385		SMPD 1390		SMPD 1395		SMPD 1400		SMPD 1405		SMPD 1410		SMPD 1415		SMPD 1420		SMPD 1425		SMPD 1430		SMPD 1435		SMPD 1440		SMPD 1445		SMPD 1450		SMPD 1455		SMPD 1460		SMPD 1465		SMPD 1470		SMPD 1475		SMPD 1480		SMPD 1485		SMPD 1490		SMPD 1495		SMPD 1500		SMPD 1505		SMPD 1510		SMPD 1515		SMPD 1520		SMPD 1525		SMPD 1530		SMPD 1535		SMPD 1540		SMPD 1545		SMPD 1550		SMPD 1555		SMPD 1560		SMPD 1565		SMPD 1570		SMPD 1575		SMPD 1580		SMPD 1585		SMPD 1590		SMPD 1595		SMPD 1600		SMPD 1605		SMPD 1610		SMPD 1615		SMPD 1620		SMPD 1625		SMPD 1630		SMPD 1635		SMPD 1640		SMPD 1645		SMPD 1650		SMPD 1655		SMPD 1660		SMPD 1665		SMPD 1670		SMPD 1675		SMPD 1680		SMPD 1685		SMPD 1690		SMPD 1695		SMPD 1700		SMPD 1705		SMPD 1710		SMPD 1715		SMPD 1720		SMPD 1725		SMPD 1730		SMPD 1735		SMPD 1740		SMPD 1745		SMPD 1750		SMPD 1755		SMPD 1760		SMPD 1765		SMPD 1770		SMPD 1775		SMPD 1780		SMPD 1785		SMPD 1790		SMPD 1795		SMPD 1800		SMPD 1805		SMPD 1810		SMPD 1815		SMPD 1820		SMPD 1825		SMPD 1830		SMPD 1835		SMPD 1840		SMPD 1845		SMPD 1850		SMPD 1855		SMPD 1860		SMPD 1865		SMPD 1870		SMPD 1875		SMPD 1880		SMPD 1885		SMPD 1890		SMPD 1895		SMPD 1900		SMPD 1905		SMPD 1910		SMPD 1915		SMPD 1920		SMPD 1925		SMPD 1930		SMPD 1935		SMPD 1940		SMPD 1945		SMPD 1950		SMPD 1955		SMPD 1960		SMPD 1965		SMPD 1970		SMPD 1975		SMPD 1980		SMPD 1985		SMPD 1990		SMPD 1995		SMPD 2000		SMPD 2005		SMPD 2010		SMPD 2015		SMPD 2020		SMPD 2025		SMPD 2030		SMPD 2035		SMPD 2040		SMPD 2045		SMPD 2050		SMPD 2055		SMPD 2060		SMPD 2065		SMPD 2070		SMPD 2075		SMPD 2080		SMPD 2085		SMPD 2090		SMPD 2095		SMPD 2100		SMPD 2105		SMPD 2110		SMPD 2115		SMPD 2120		SMPD 2125		SMPD 2130		SMPD 2135		SMPD 2140		SMPD 2145		SMPD 2150		SMPD 2155		SMPD 2160		SMPD 2165		SMPD 2170		SMPD 2175		SMPD 2180		SMPD 2185		SMPD 2190		SMPD 2195		SMPD 2200		SMPD 2205		SMPD 2210		SMPD 2215		SMPD 2220		SMPD 2225		SMPD 2230		SMPD 2235		SMPD 2240		SMPD 2245		SMPD 2250		SMPD 2255		SMPD 2260		SMPD 2265		SMPD 2270		SMPD 2275		SMPD 2280		SMPD 2285		SMPD 2290		SMPD 2295		SMPD 2300		SMPD 2305		SMPD 2310		SMPD 2315		SMPD 2320		SMPD 2325		SMPD 2330		SMPD 2335		SMPD 2340		SMPD 2345		SMPD 2350		SMPD 2355		SMPD 2360		SMPD 2365		SMPD 2370		SMPD 2375		SMPD 2380		SMPD 2385		SMPD 2390		SMPD 2395		SMPD 2400		SMPD 2405		SMPD 2410		SMPD 2415		SMPD 2420		SMPD 2425		SMPD 2430		SMPD 2435		SMPD 2440		SMPD 2445		SMPD 2450		SMPD 2455		SMPD 2460		SMPD 2465		SMPD 2470		SMPD 2475		SMPD 2480		SMPD 2485		SMPD 2490		SMPD 2495		SMPD 2500		SMPD 2505		SMPD 2510		SMPD 2515		SMPD 2520		SMPD 2525		SMPD 2530		SMPD 2535		SMPD 2540		SMPD 2545		SMPD 2550		SMPD 2555		SMPD 2560		SMPD 2565		SMPD 2570		SMPD 2575		SMPD 2580		SMPD 2585		SMPD 2590		SMPD 2595		SMPD 2600		SMPD 2605		SMPD 2610		SMPD 2615		SMPD 2620		SMPD 2625		SMPD 2630		SMPD 2635		SMPD 2640		SMPD 2645		SMPD 2650		SMPD 2655		SMPD 2660		SMPD 2665		SMPD 2670		SMPD 2675		SMPD 2680		SMPD 2685		SMPD 2690		SMPD 2695		SMPD 2700		SMPD 2705		SMPD 2710		SMPD 2715		SMPD 2720		SMPD 2725		SMPD 2730		SMPD 2735		SMPD 2740		SMPD 2745		SMPD 2750		SMPD 2755		SMPD 2760		SMPD 2765		SMPD 2770		SMPD 2775		SMPD 2780		SMPD 2785		SMPD 2790		SMPD 2795		SMPD 2800		SMPD 2805		SMPD 2810		SMPD 2815		SMPD 2820		SMPD 2825		SMPD 2830		SMPD 2835		SMPD 2840		SMPD 2845		SMPD 2850		SMPD 2855		SMPD 2860		SMPD 2865		SMPD 2870		SMPD 2875		SMPD 2880		SMPD 2885		SMPD 2890		SMPD 2895		SMPD 2900		SMPD 2905		SMPD 2910		SMPD 2915		SMPD 2920		SMPD 2925		SMPD 2930		SMPD 2935		SMPD 2940		SMPD 2945		SMPD 2950		SMPD 2955		SMPD 2960		SMPD 2965		SMPD 2970		SMPD 2975		SMPD 2980		SMPD 2985		SMPD 2990		SMPD 2995		SMPD 3000		SMPD 3005		SMPD 3010		SMPD 3015		SMPD 3020		SMPD 3025		SMPD 3030		SMPD 3035		SMPD 3040		SMPD 3045		SMPD 3050		SMPD 3055		SMPD 3060		SMPD 3065		SMPD 3070		SMPD 3075		SMPD 3080		SMPD 3085		SMPD 3090		SMPD 3095		SMPD 3100		SMPD 3105		SMPD 3110		SMPD 3115		SMPD 3120		SMPD 3125		SMPD 3130		SMPD 3135		SMPD 3140		SMPD 3145		SMPD 3150		SMPD 3155		SMPD 3160		SMPD 3165		SMPD 3170		SMPD 3175		SMPD 3180		SMPD 3185		SMPD 3190		SMPD 3195		SMPD 3200		SMPD 3205		SMPD 3210		SMPD 3215		SMPD 3220		SMPD 3225		SMPD 3230		SMPD 3235		SMPD 3240		SMPD 3245		SMPD 3250		SMPD 3255		SMPD 3260		SMPD 3265		SMPD 3270		SMPD 3275		SMPD 3280		SMPD 3285		SMPD 3290		SMPD 3295		SMPD 3300		SMPD 3305		SMPD 3310		SMPD 3315		SMPD 3320		SMPD 3325		SMPD 3330		SMPD 3335		SMPD 3340		SMPD 3345		SMPD 3350		SMPD 3355		SMPD 3360		SMPD 3365		SMPD 3370		SMPD 3375		SMPD 3380		SMPD 3385		SMPD 3390		SMPD 3395		SMPD 3400		SMPD 3405		SMPD 3410		SMPD 3415		SMPD 3420		SMPD 3425		SMPD 3430		SMPD 3435		SMPD 3440		SMPD 3445		SMPD 3450		SMPD 3455		SMPD 3460		SMPD 3465		SMPD 3470		SMPD 3475		SMPD 3480		SMPD 3485		SMPD 3490		SMPD 3495		SMPD 3500		SMPD 3505		SMPD 3510		SMPD 3515		SMPD 3520		SMPD 3525		SMPD 3530		SMPD 3535		SMPD 3540		SMPD 3545		SMPD 3550		SMPD 3555		SMPD 3560		SMPD 3565		SMPD 3570		SMPD 3575		SMPD 3580		SMPD 3585		SMPD 3590		SMPD 3595		SMPD 3600		SMPD 3605		SMPD 3610		SMPD 3615		SMPD 3620		SMPD 3625		SMPD 3630		SMPD 3635		SMPD 3640		SMPD 3645		SMPD 3650		SMPD 3655		SMPD 3660		SMPD 3665		SMPD 3670		SMPD 3675		SMPD 3680		SMPD 3685		SMPD 3690		SMPD 3695		SMPD 3700		SMPD 3705		SMPD 3710		SMPD 3715		SMPD 3720		SMPD 3725		SMPD 3730		SMPD 3735		SMPD 3740		SMPD 3745		SMPD 3750		SMPD 3755		SMPD 3760		SMPD 3765		SMPD 3770		SMPD 3775		SMPD 3780		SMPD 3785		SMPD 3790		SMPD 3795		SMPD 3800		SMPD 3805		SMPD 3810		SMPD 3815		SMPD 3820		SMPD 3825		SMPD 3830		SMPD 3835		SMPD 3840		SMPD 3845		SMPD 3850		SMPD 3855		SMPD 3860		SMPD 3865		SMPD 3870		SMPD 3875		SMPD 3880		SMPD 3885		SMPD 3890		SMPD 3895		SMPD 3900		SMPD 3905		SMPD 3910		SMPD 3915		SMPD 3920		SMPD 3925		SMPD 3930		SMPD 3935		SMPD 3940		SMPD 3945		SMPD 3950		SMPD 3955		SMPD 3960		SMPD 3965		SMPD 3970		SMPD 3975		SMPD 3980		SMPD 3985		SMPD 3990		SMPD 3995		SMPD 4000		SMPD 4005		SMPD 4010		SMPD 4015		SMPD 4020		SMPD 4025		SMPD 4030		SMPD 4035		SMPD 4040		SMPD 4045		SMPD 4050		SMPD 4055		SMPD 4060		SMPD 4065		SMPD 4070		SMPD 4075		SMPD 4080		SMPD 4085		SMPD 4090		SMPD 4095		SMPD 4100		SMPD 4105		SMPD 4110		SMPD 4115		SMPD 4120		SMPD 4125		SMPD 4130		SMPD 4135		SMPD 4140		SMPD 4145		SMPD 4150		SMPD 4155		SMPD 4160		SMPD 4165		SMPD 4170		SMPD 4175		SMPD 4180		SMPD 4185		SMPD 4190		SMPD 4195		SMPD 4200		SMPD 4205		SMPD 4210		SMPD 4215		SMPD 4220		SMPD 4225		SMPD 4230		SMPD 4235		SMPD 4240		SMPD 4245		SMPD 4250		SMPD 4255		SMPD 4260		SMPD 4265		SMPD 4270		SMPD 4275		SMPD 4280		SMPD 4285		SMPD 4290		SMPD 429	
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Appendix B

VISSIM Summary of Results

Existing Conditions

SR 91/241 CALIBRATION - AM PEAK PERIOD

Vissim Model Calibration Results (FHWA Criteria)

FHWA Performance Criteria and Measures	Calibration Acceptance Target
Individual link flows	
Flow < 700 veh/h, Within 100 veh/h	> 85% of cases
700 veh/h < Flow < 2700 veh/h, Within 15%	> 85% of cases
Flow > 2700 veh/h, Within 400 veh/h	> 85% of cases
Difference in sum of all link flows	Within 5%
GEH Statistic Value	
GEH Statistic Value < 5, for individual link flows	> 85% cases
GEH Statistic Value for Sum of All Link Flows	< 4

Lane Type	Freeway Volume Calibration (FHWA Link Flow Criteria)									
	Eastbound					Westbound				
	Total Links	Calibration Results Achieved				Total Links	Calibration Results Achieved			
		6-7 AM	7-8 AM	8-9 AM			6-7 AM	7-8 AM	8-9 AM	
Mainline	21	100%	86%	86%		18	78%	94%	94%	
Ramps	14	100%	93%	100%		14	100%	93%	93%	
All Links	35	100%	89%	91%		32	88%	94%	94%	
Total Link Flow % Difference		-2%	3%	3%			4%	1%	3%	

Lane Type	Freeway Volume Calibration (GEH Criteria)									
	Eastbound					Westbound				
	Total Links	Calibration Results Achieved				Total Links	Calibration Results Achieved			
		6-7 AM	7-8 AM	8-9 AM			6-7 AM	7-8 AM	8-9 AM	
Mainline	21	100%	95%	95%		18	94%	100%	100%	
Ramps	14	100%	93%	100%		14	93%	93%	86%	
All Links	35	100%	94%	97%		32	94%	97%	94%	
Total Link Flow GEH		8.3	11.3	10.6			14.9	4.2	12.9	

Network Travel Time calibration: PM Peak Period

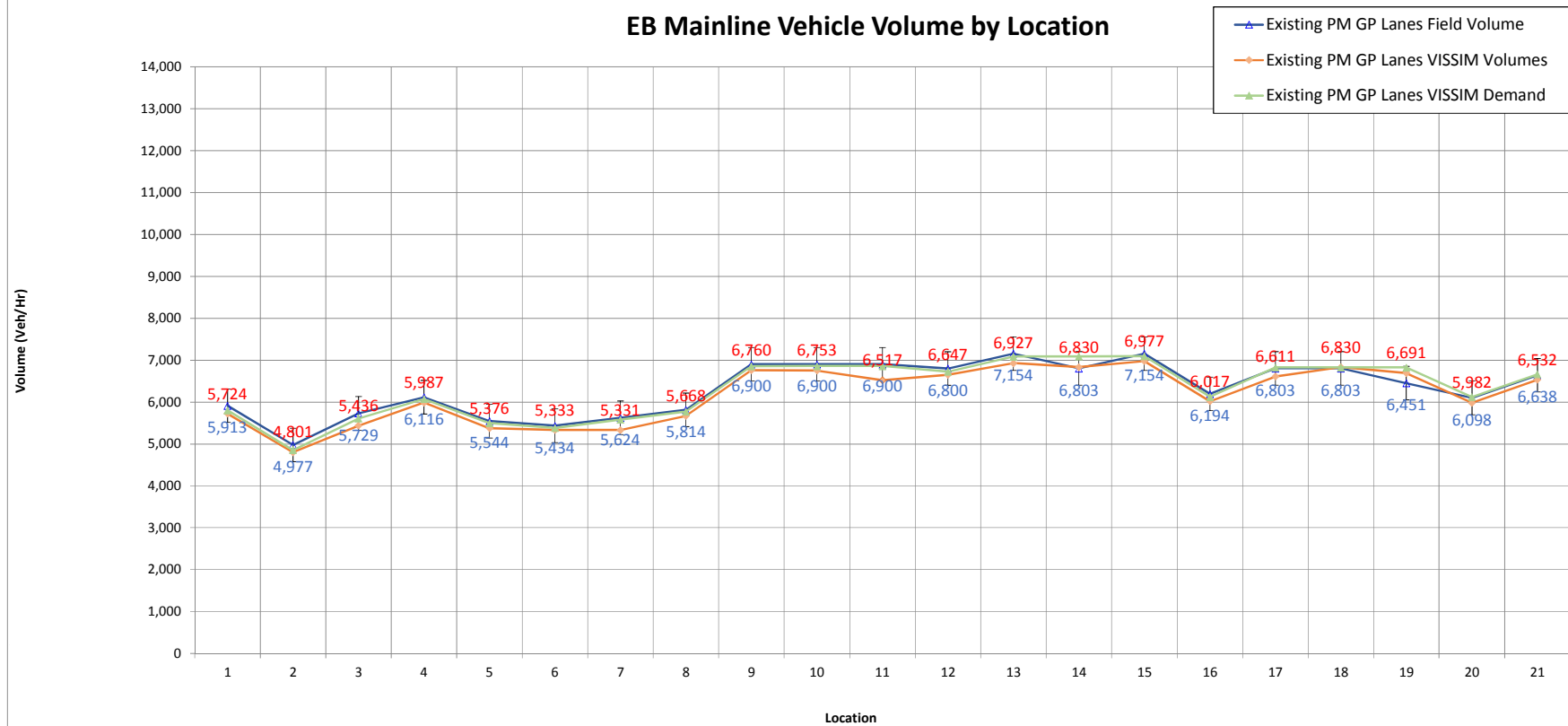
Corridor		Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff. %		
		6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM
Eastbound SR-91		8.8	8.8	8.9		8.6	8.7	8.7		-3%	-1%	-2%
Westbound SR-91		14.3	12.1	11.3		11.1	11.5	10.4		-22%	-5%	-8%

Table 5

Segment Travel Time Calibration: PM Peak Period

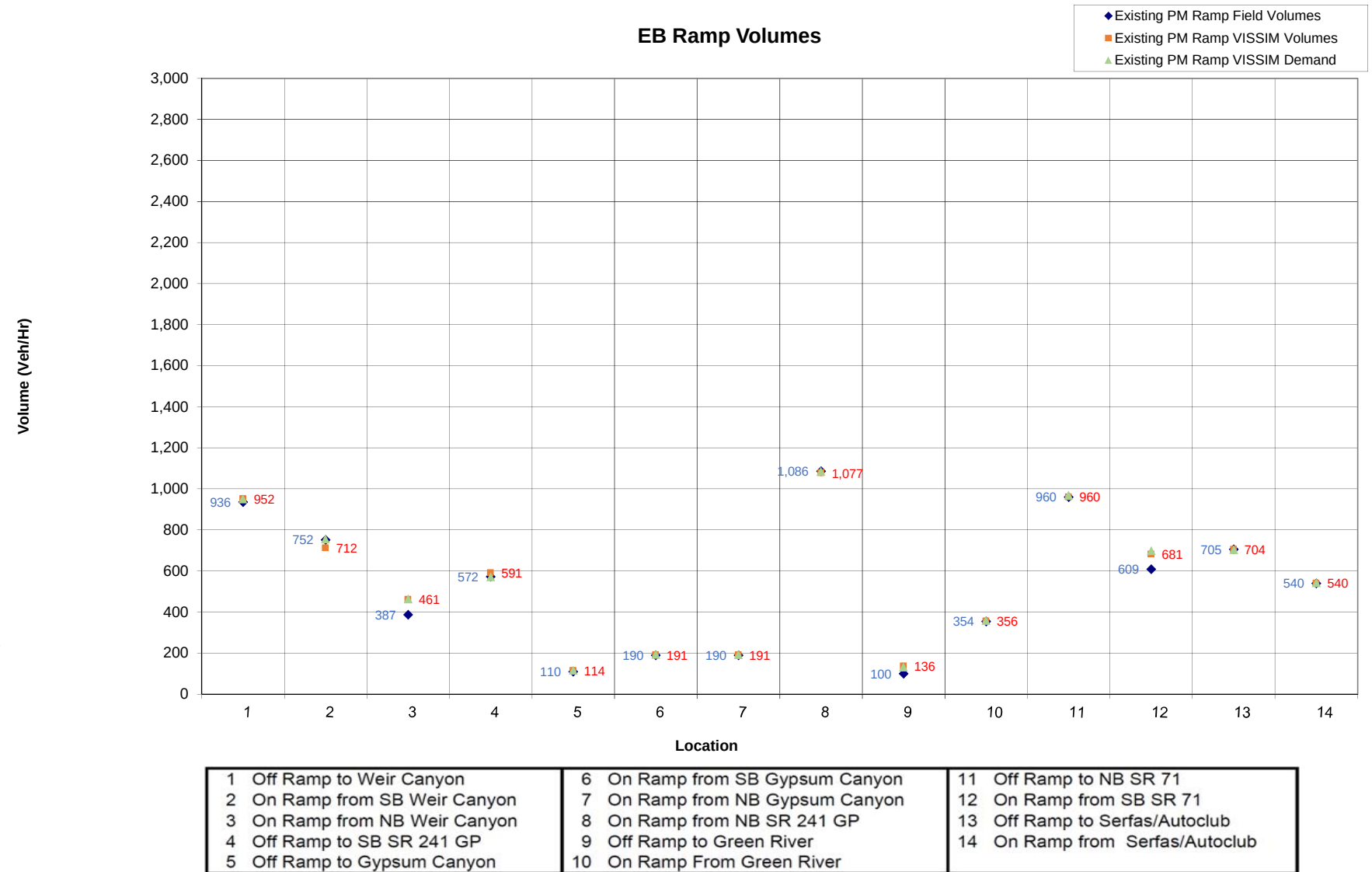
Corridor	Segment	Location	Distance	Field Speed				VISSIM Speed				Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff. %			
				6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM		6-7 AM	7-8 AM	8-9 AM	
Eastbound SR-91	Site A to Site C	1002	20751	63	63	63		68	67	67		3.8	3.7	3.8		3.5	3.5	3.5		-8%	-6%	-7%	
	Site C to Site D	1003	13681	71	71	70		68	67	67		2.2	2.2	2.2		2.3	2.3	2.3		4%	6%	5%	
	Site D to Site F	1005	16332	64	65	64		67	65	65		2.9	2.9	2.9		2.8	2.8	2.8		-3%	-1%	-2%	
	Site B to Site C	1007	32177	71	72	71		63	63	63		5.1	5.1	5.1		5.8	5.8	5.8		12%	13%	12%	
	Site E to Site F	1008	28639	33	44	63		30	38	59		9.9	7.4	5.1		10.9	8.6	5.5		9%	14%	7%	
	Site A to Site B	1001	40145	63	67	68		64	64	64		7.3	6.8	6.7		7.1	7.2	7.2		-2%	5%	7%	
Westbound SR-91	Site D to Site E	1004	27065	58	58	57		61	60	60		5.3	5.3	5.4		5.0	5.1	5.1		-6%	-4%	-7%	
	Site F to Site D	1011	16460	31	39	53		38	37	45		6.0	4.8	3.5		4.9	5.1	4.2		-23%	5%	15%	
	Site D to Site C	1012	13628	36	43	38		57	52	58		4.3	3.6	4.1		2.7	3.0	2.7		-57%	-22%	-54%	
	Site C to Site A	1014	20820	60	64	64		67	67	68		4.0	3.7	3.7		3.5	3.5	3.5		-12%	-5%	-6%	
	Site E to Site D	1009	23283	25	37	64		24	31	56		10.7	7.2	4.1		10.9	8.5	4.8		1%	15%	14%	
	Site B to Site A	1006	40738	70	72	66		64	64	64		6.6	6.5	7.0		7.2	7.2	7.2		9%	11%	3%	

EB Mainline Vehicle Volume by Location

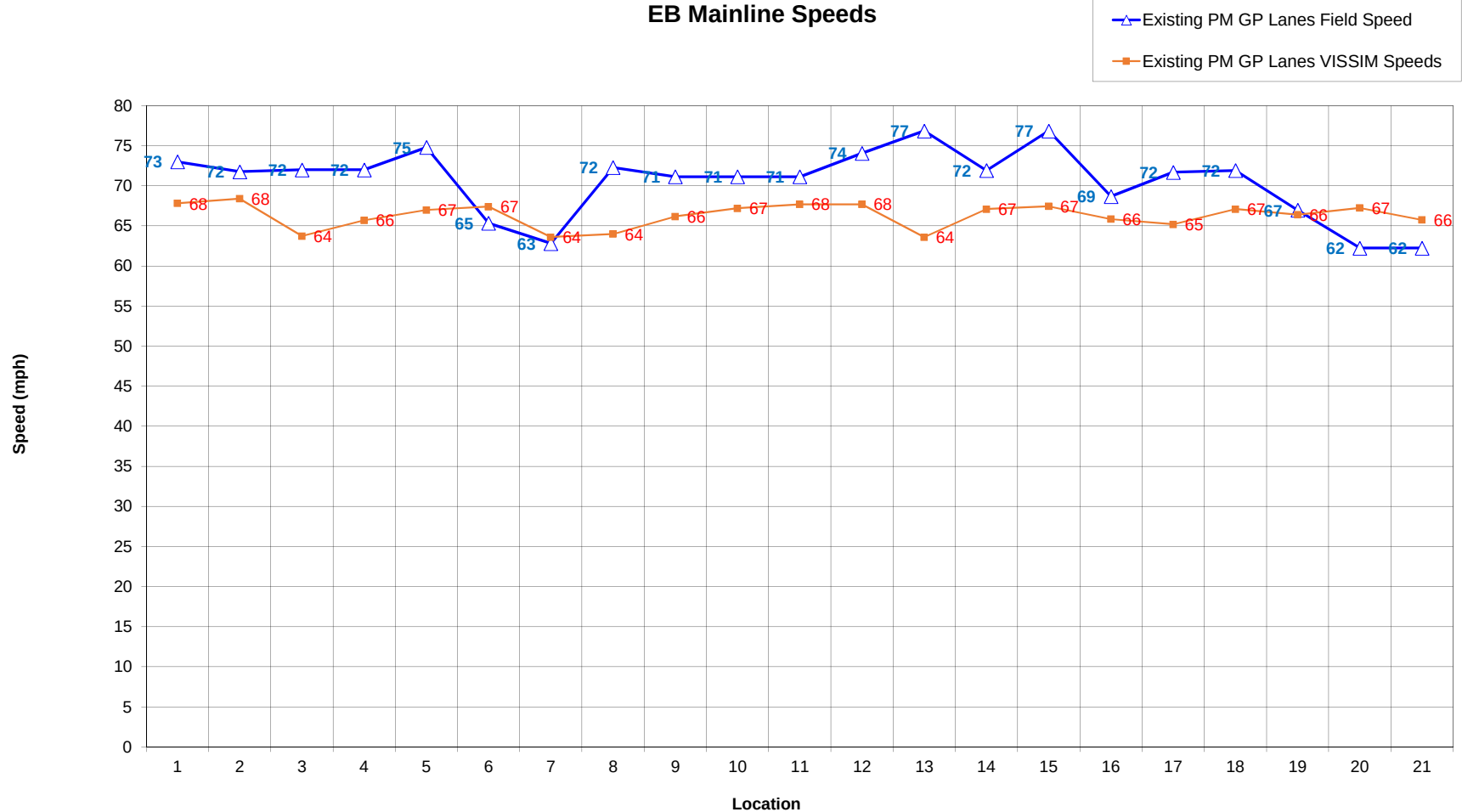


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

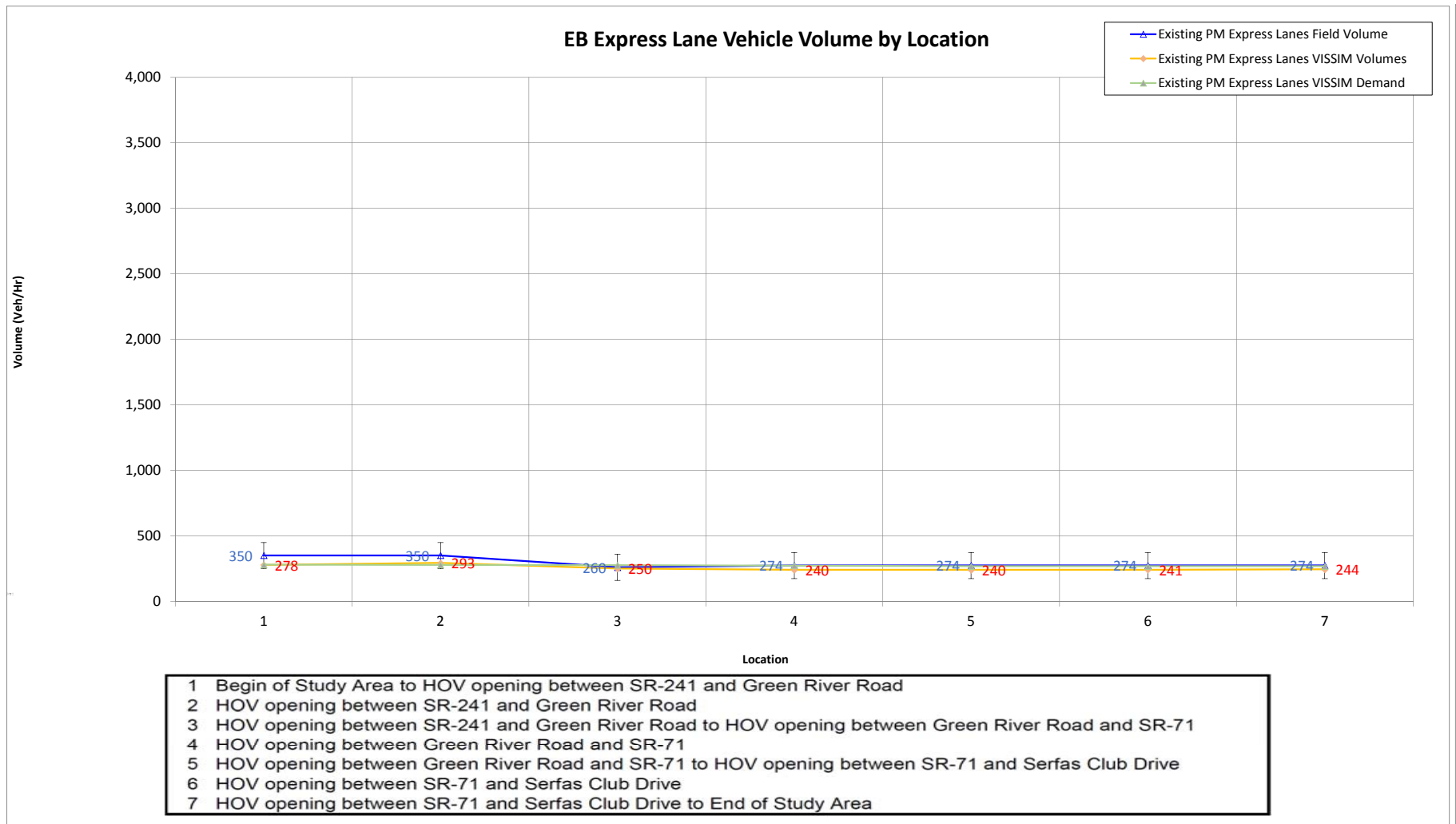
EB Ramp Volumes



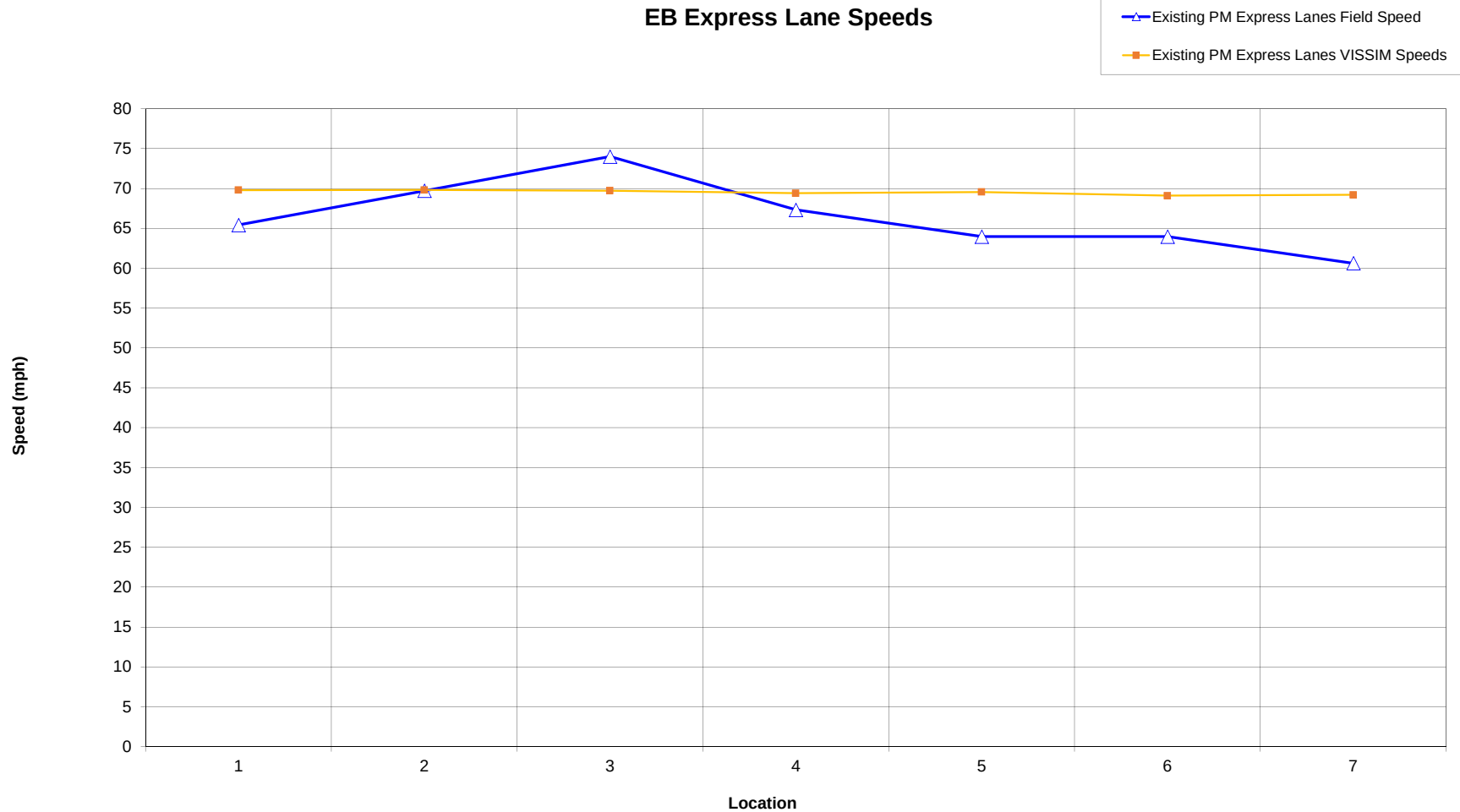
EB Mainline Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

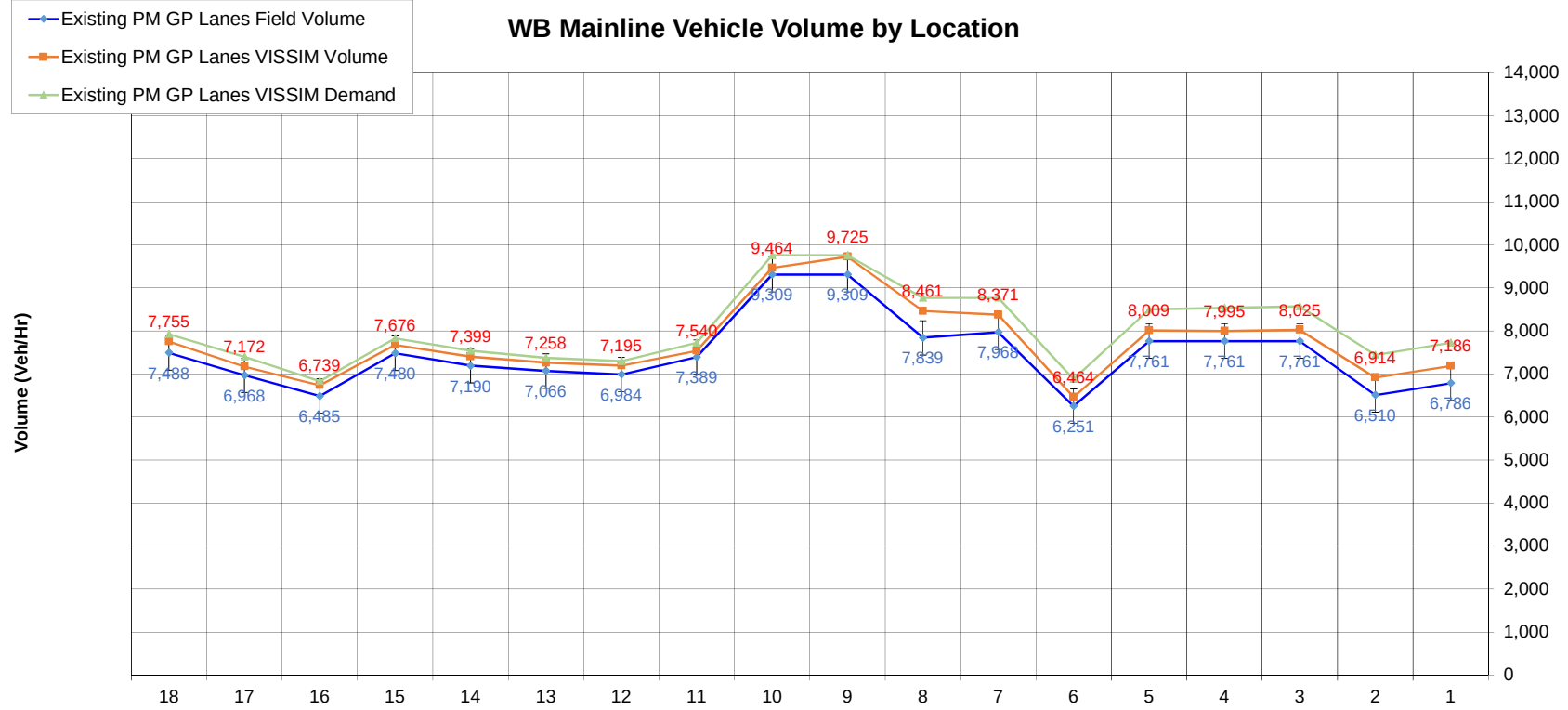


EB Express Lane Speeds



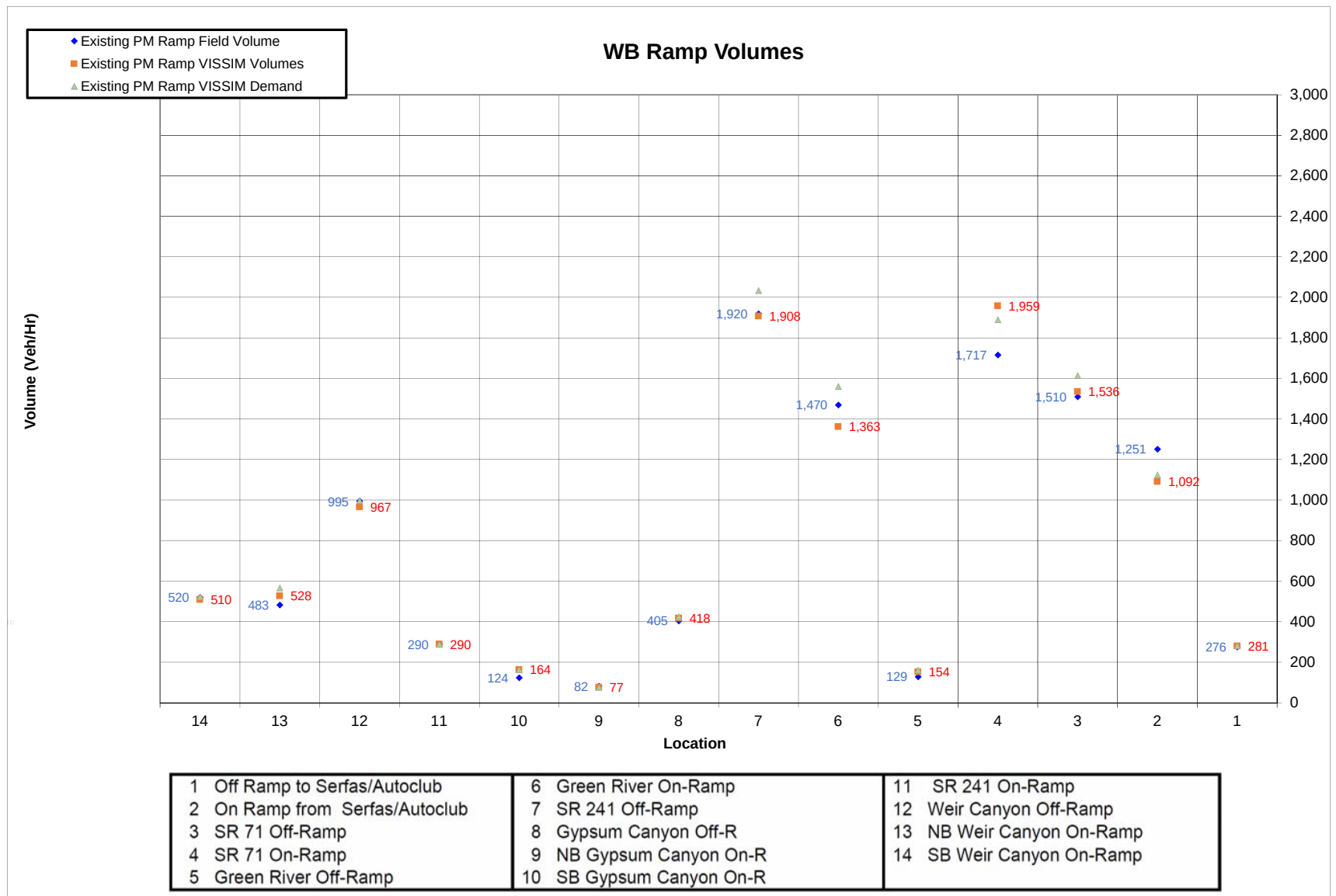
- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

WB Mainline Vehicle Volume by Location



Location

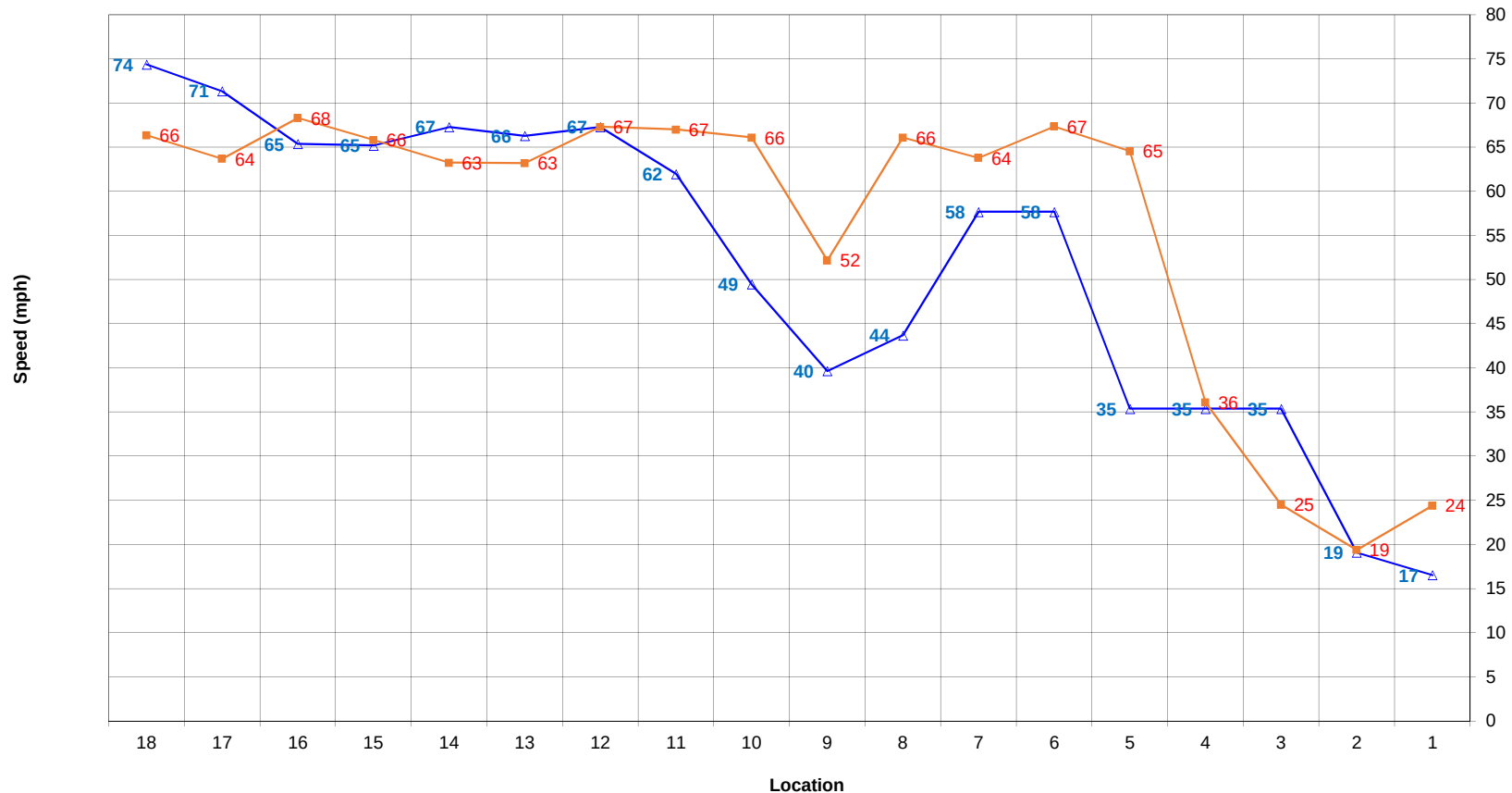
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



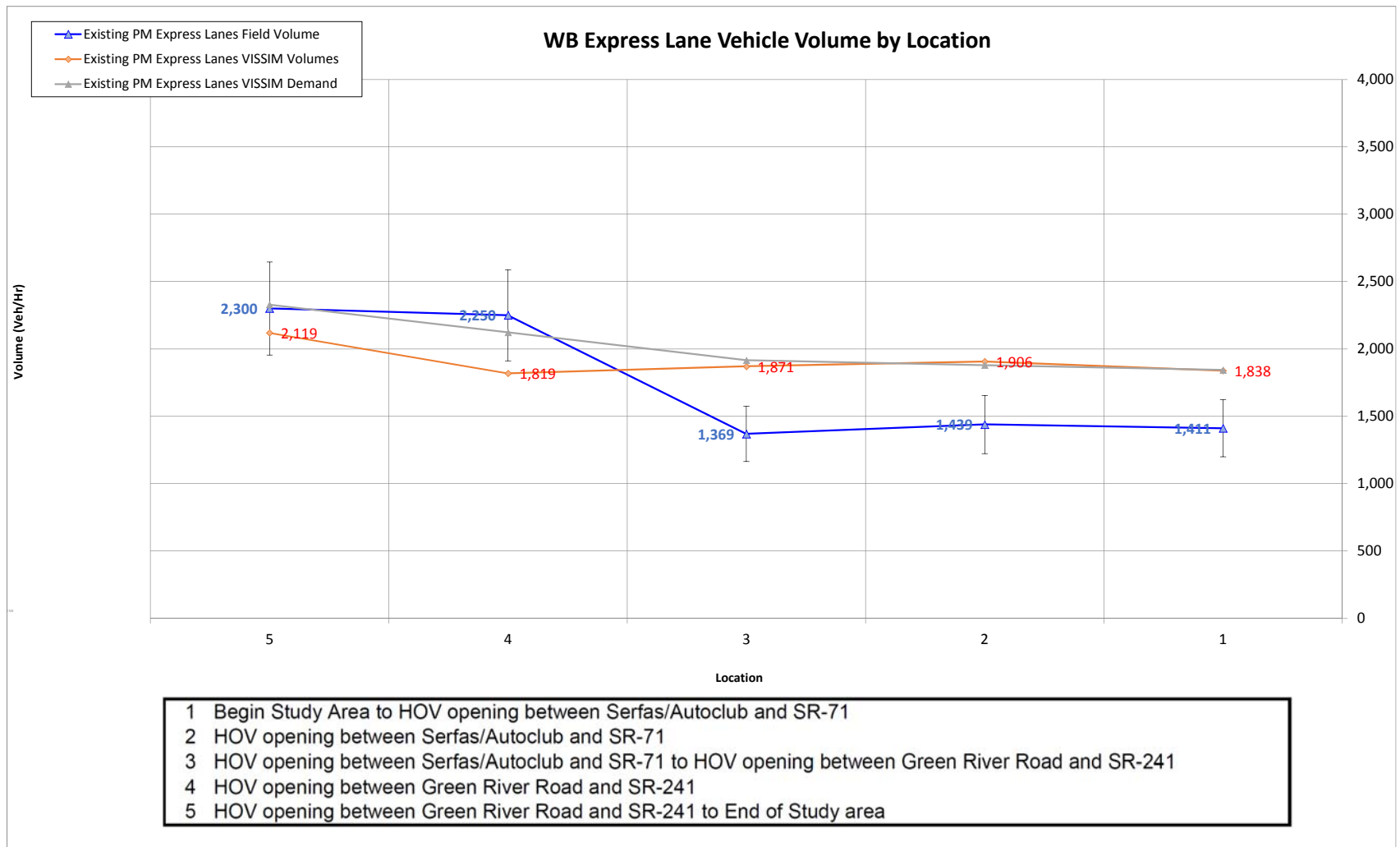
Charts 6-7 AM-Calibration

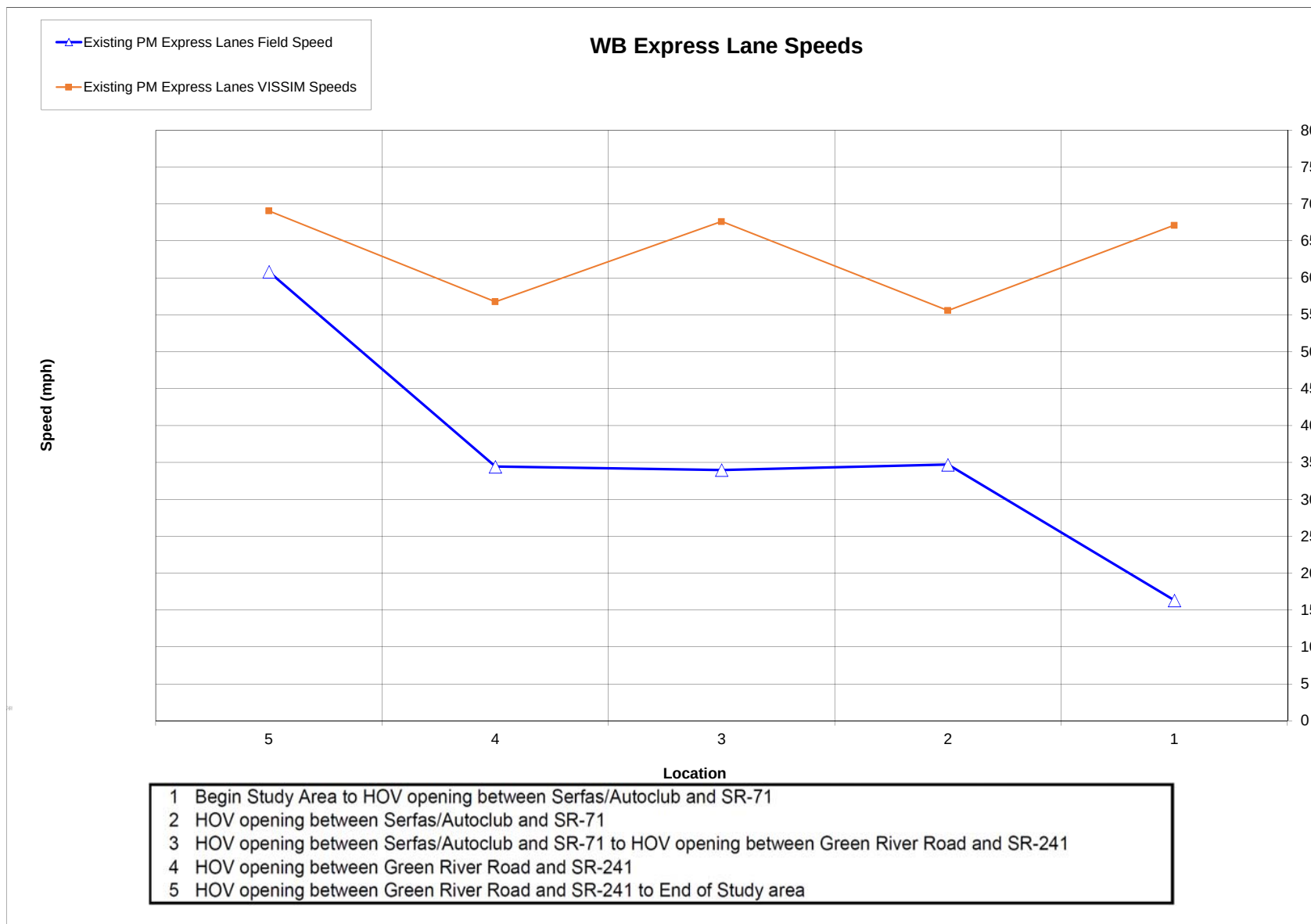
WB Mainline Speeds

Existing PM GP Lanes Field Speeds
Existing PM GP Lane VISSIM Speeds

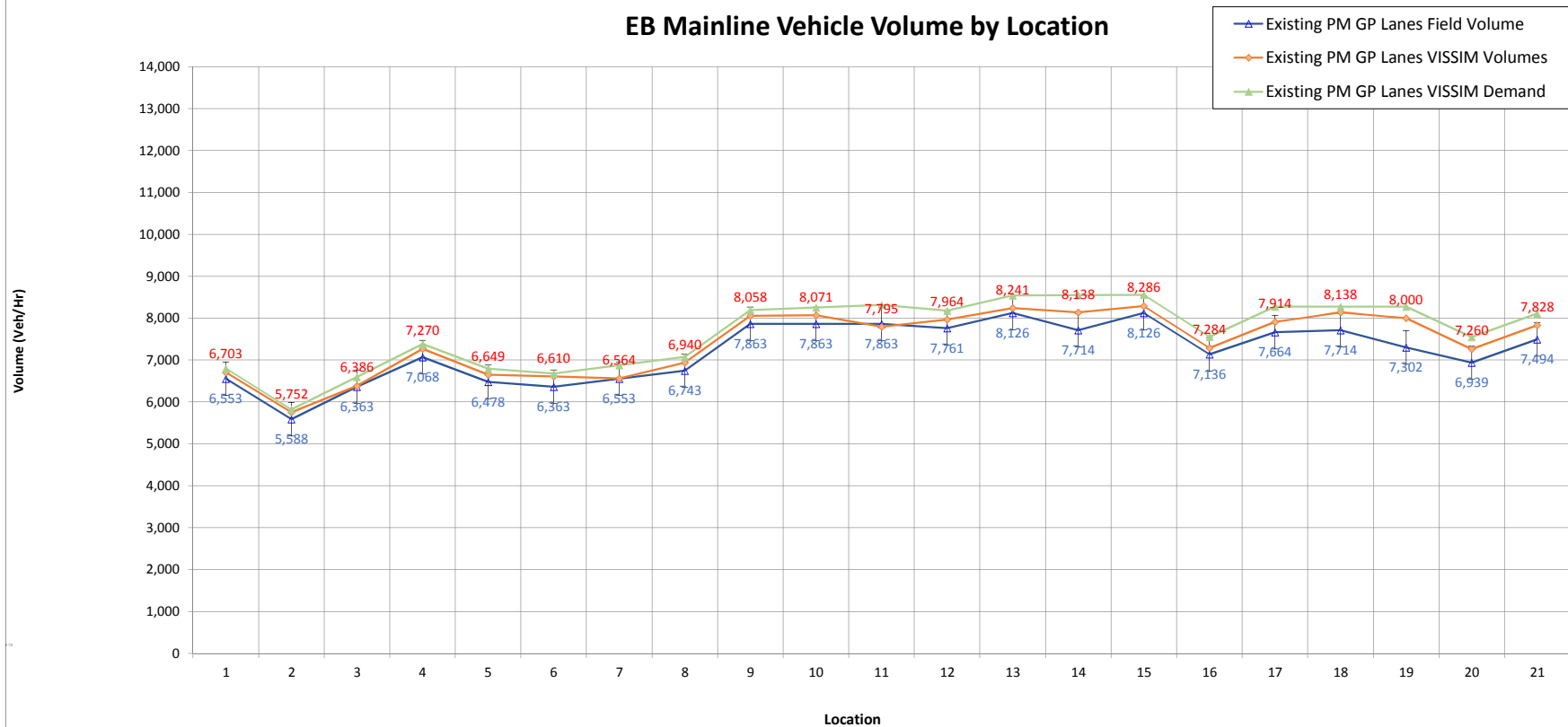


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

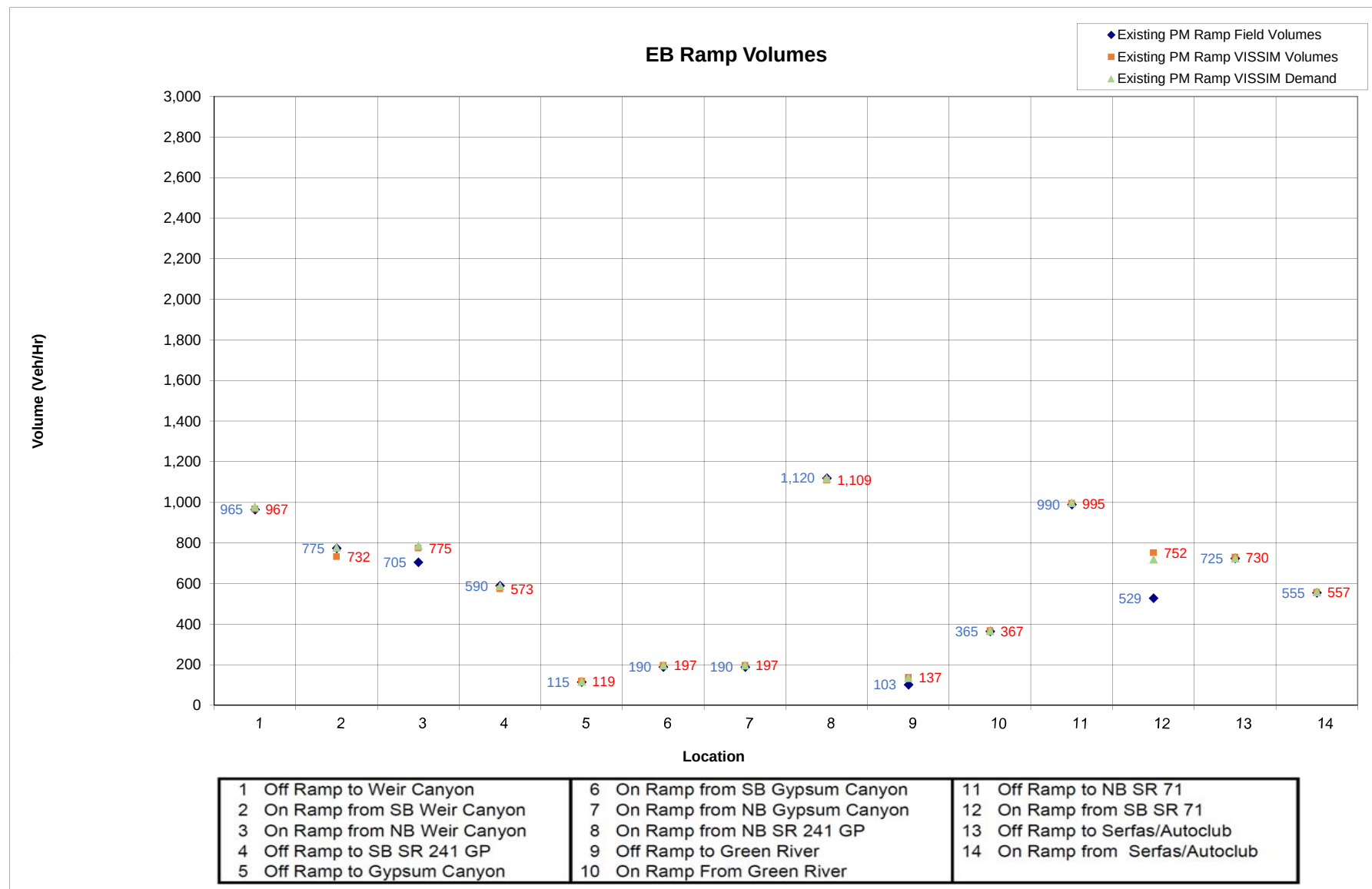




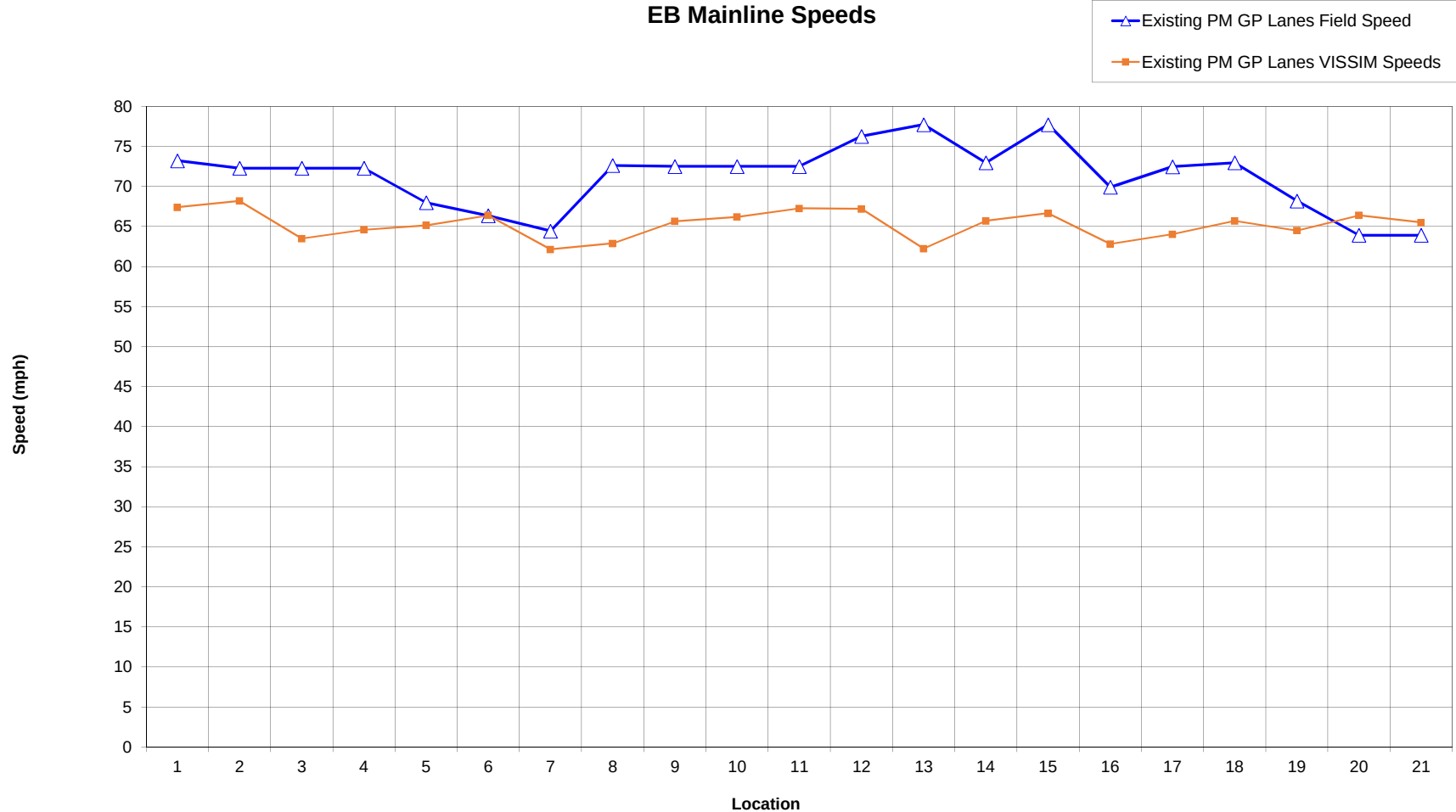
EB Mainline Vehicle Volume by Location



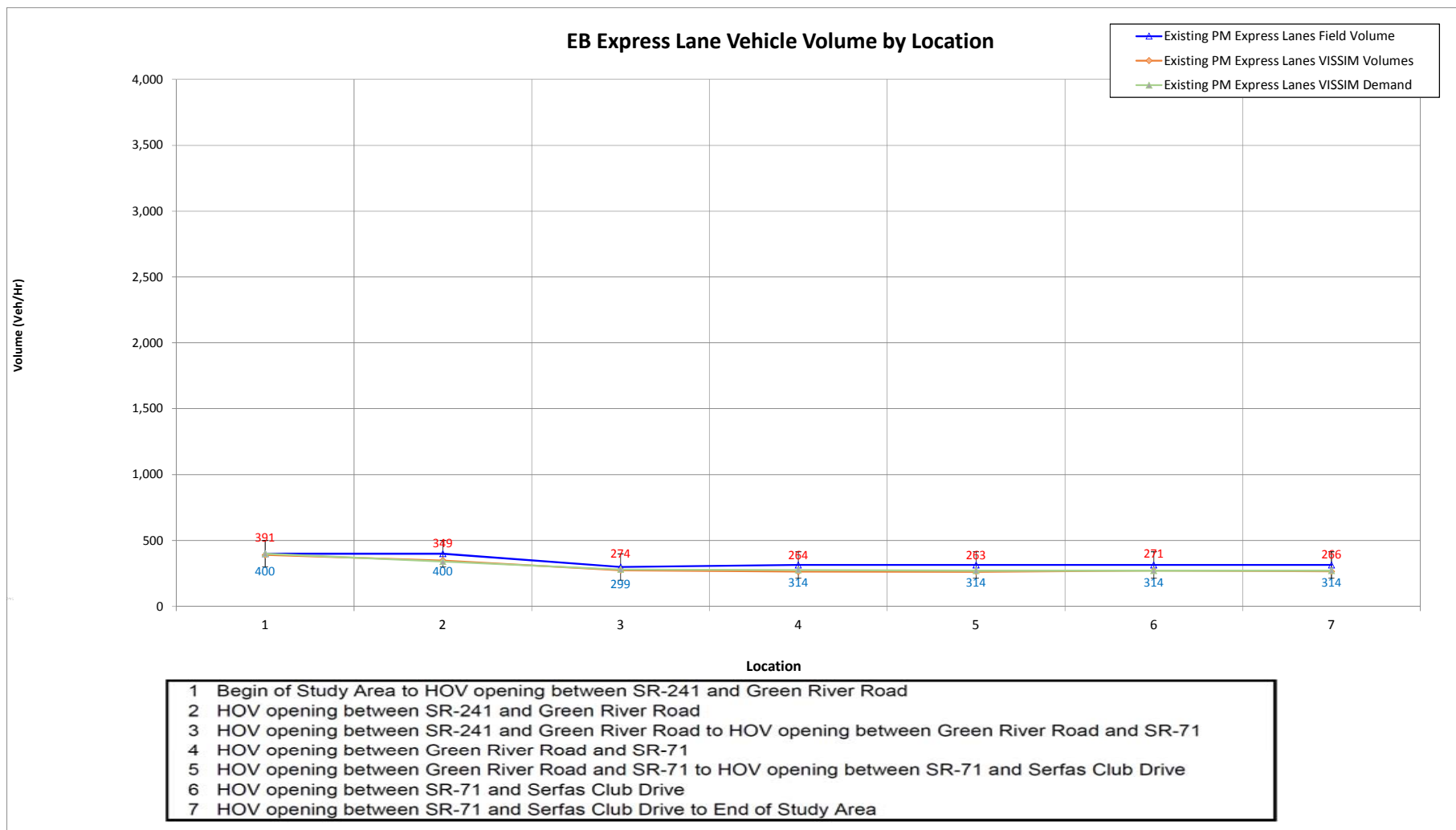
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



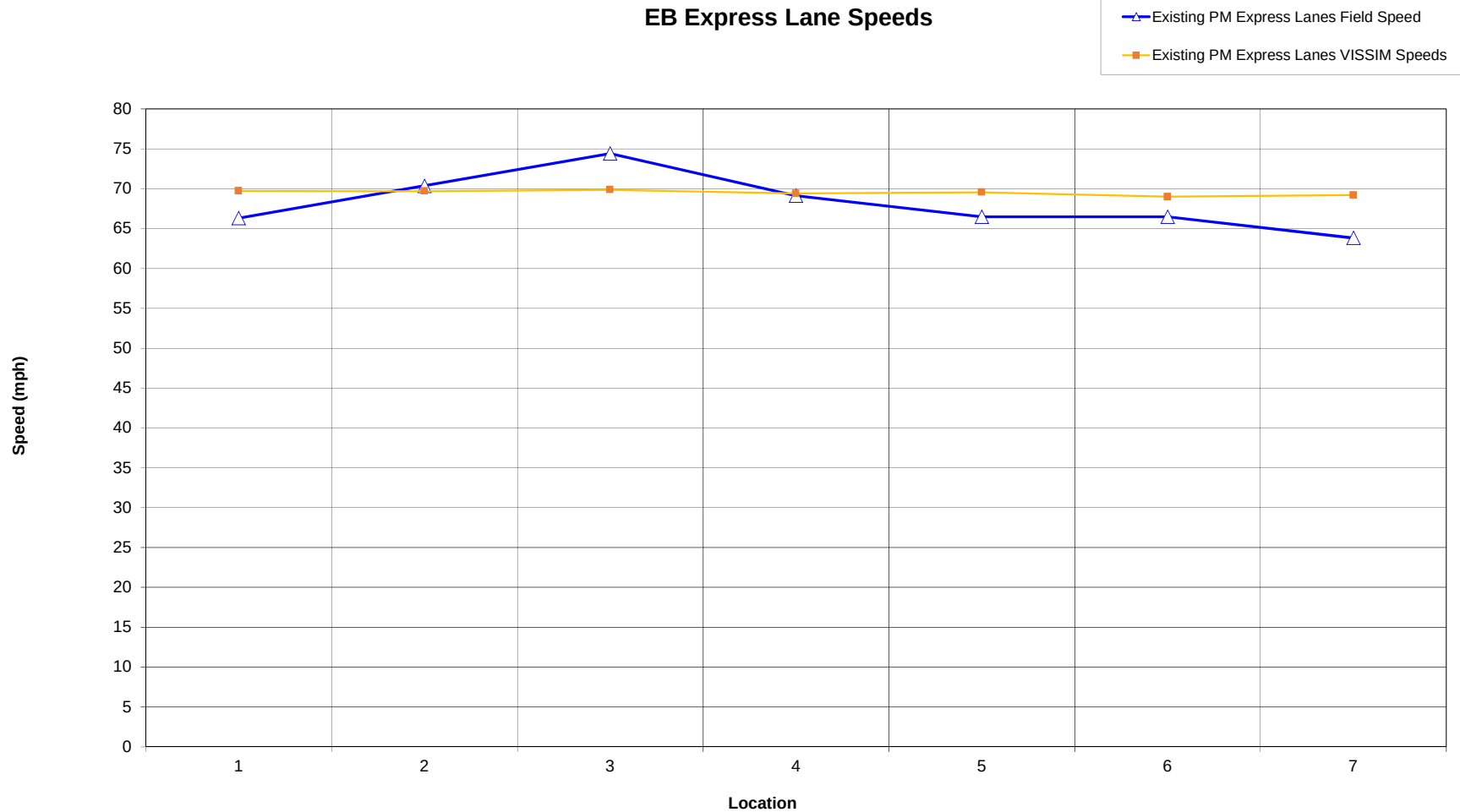
EB Mainline Speeds



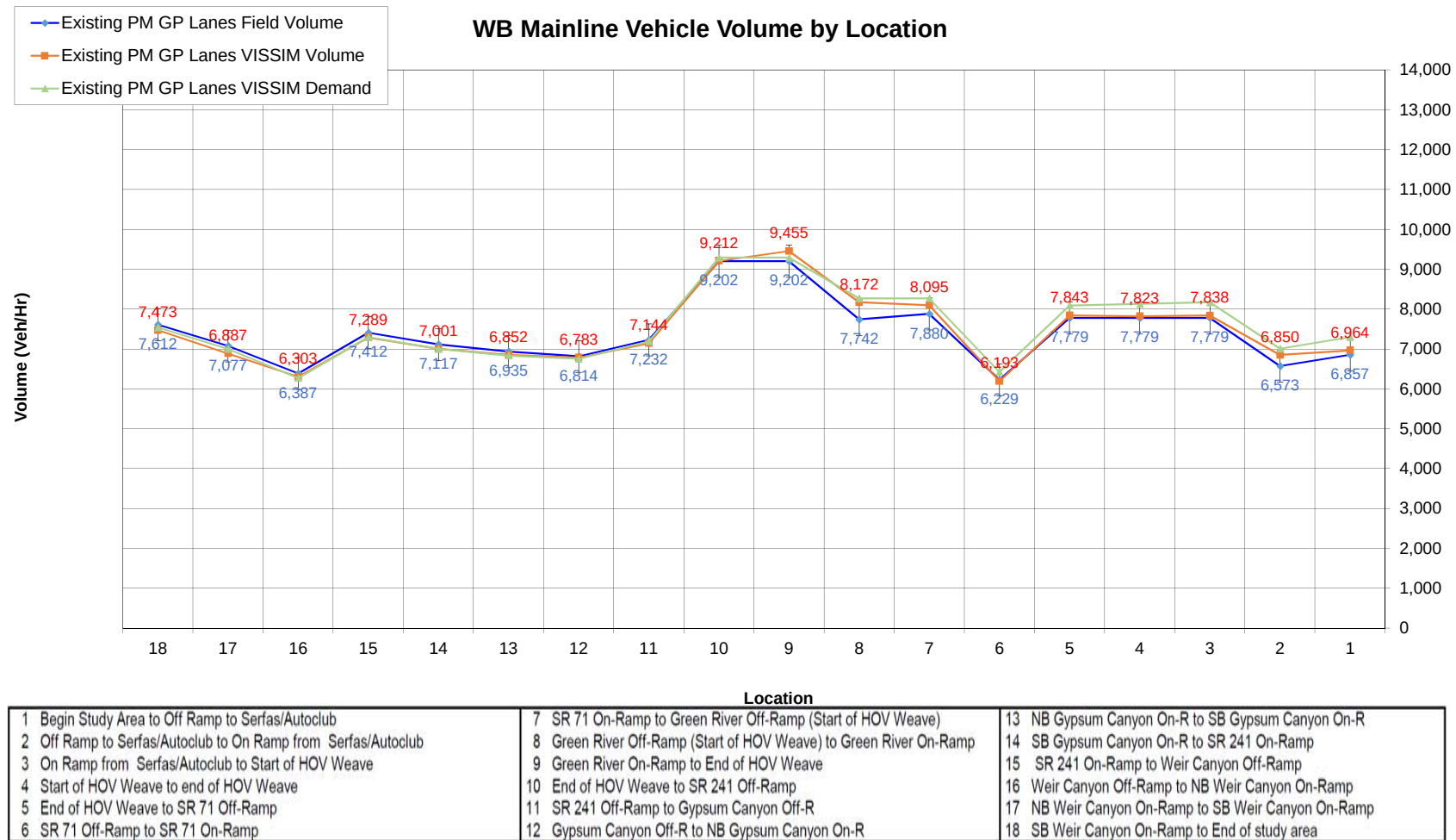
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

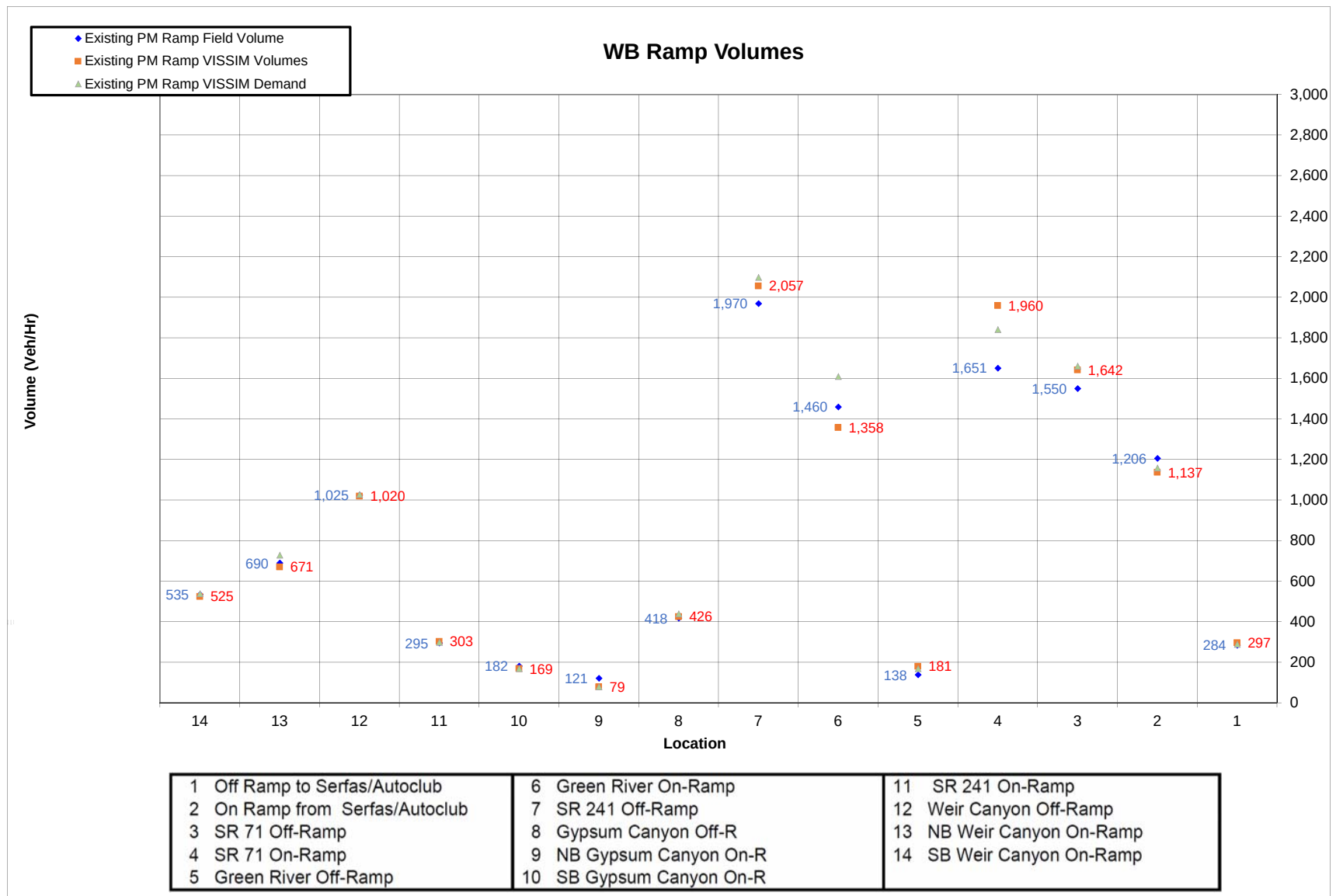


EB Express Lane Speeds



- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

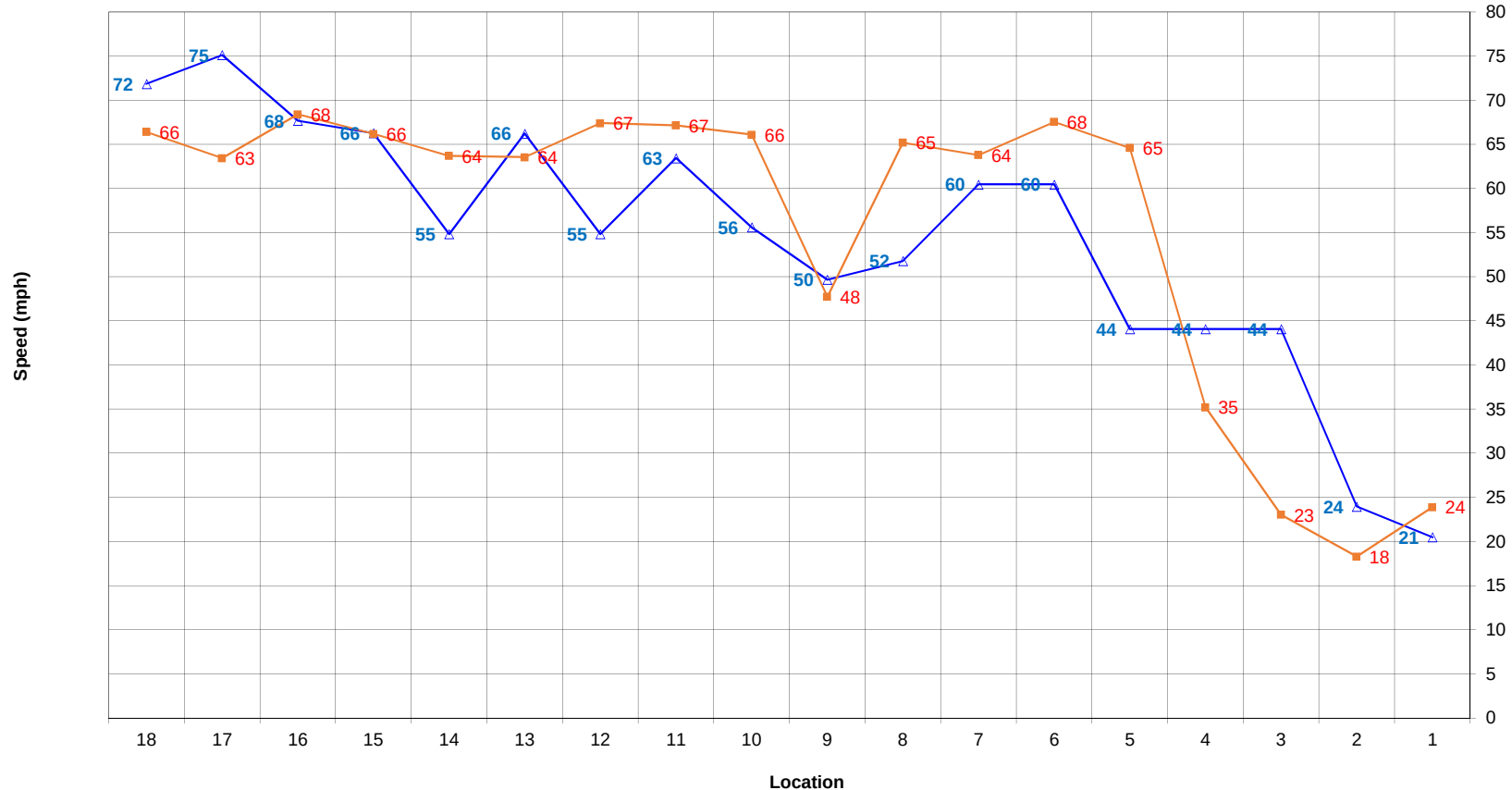




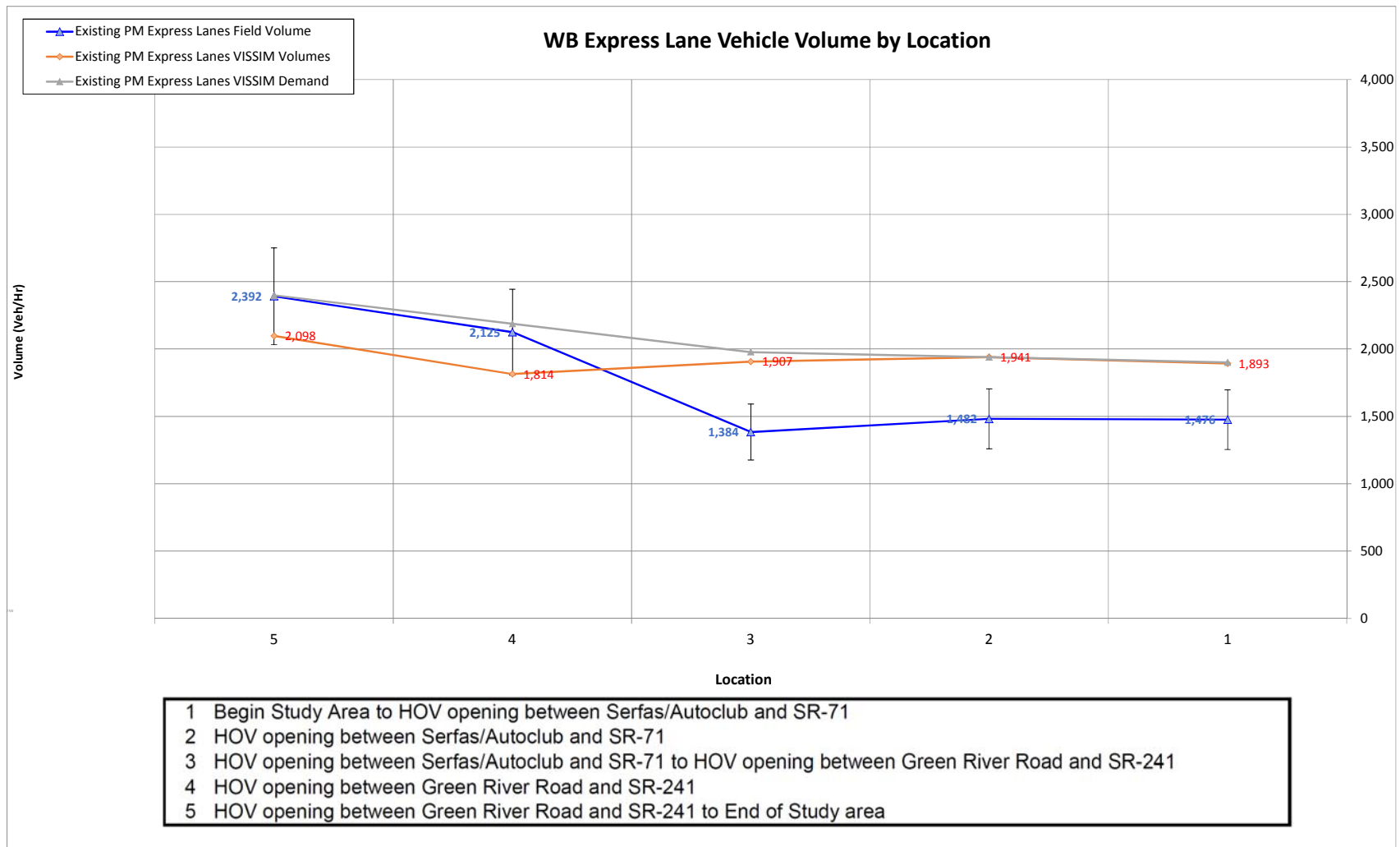
Charts 7-8 AM-Calibration

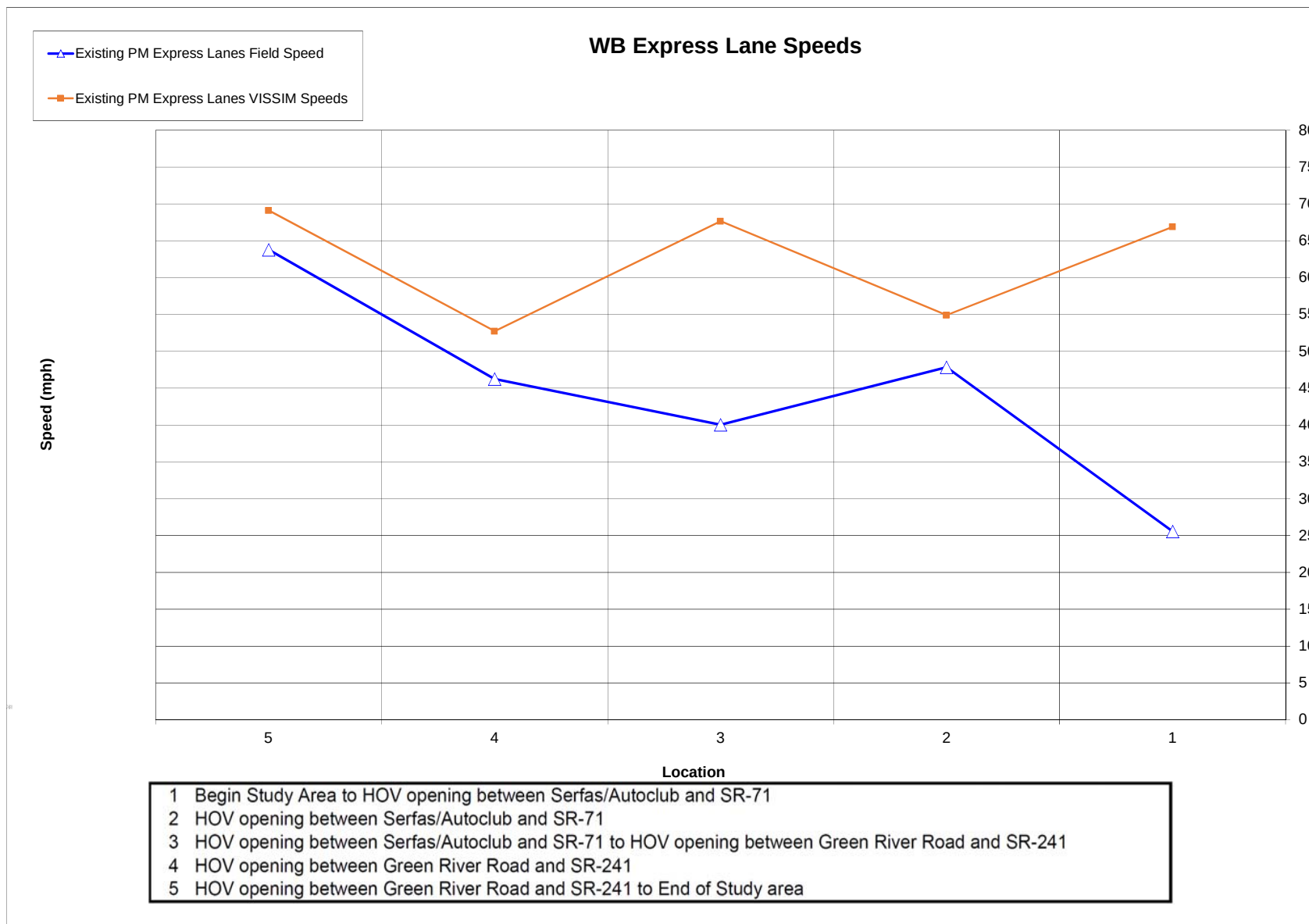
WB Mainline Speeds

- Existing PM GP Lanes Field Speeds
- Existing PM GP Lane VISSIM Speeds

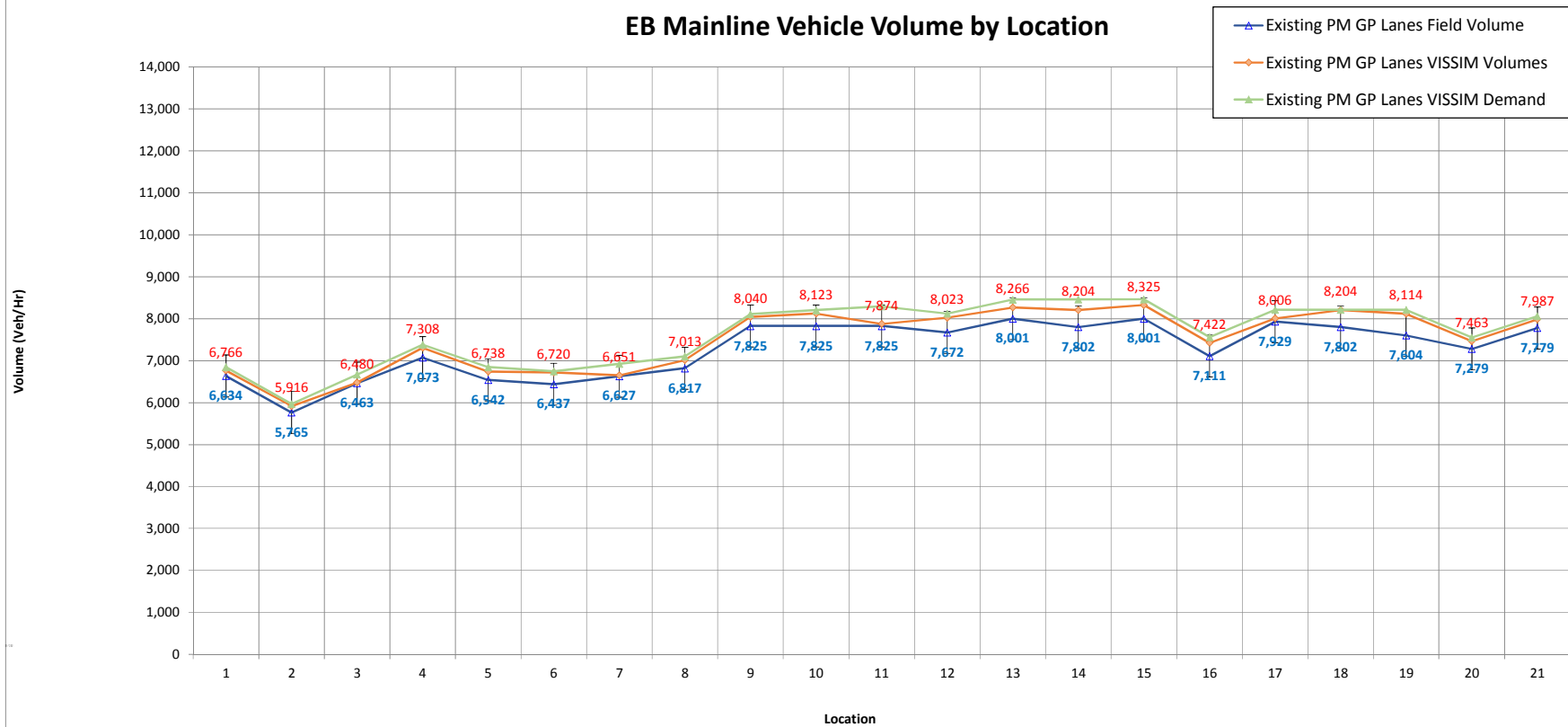


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area

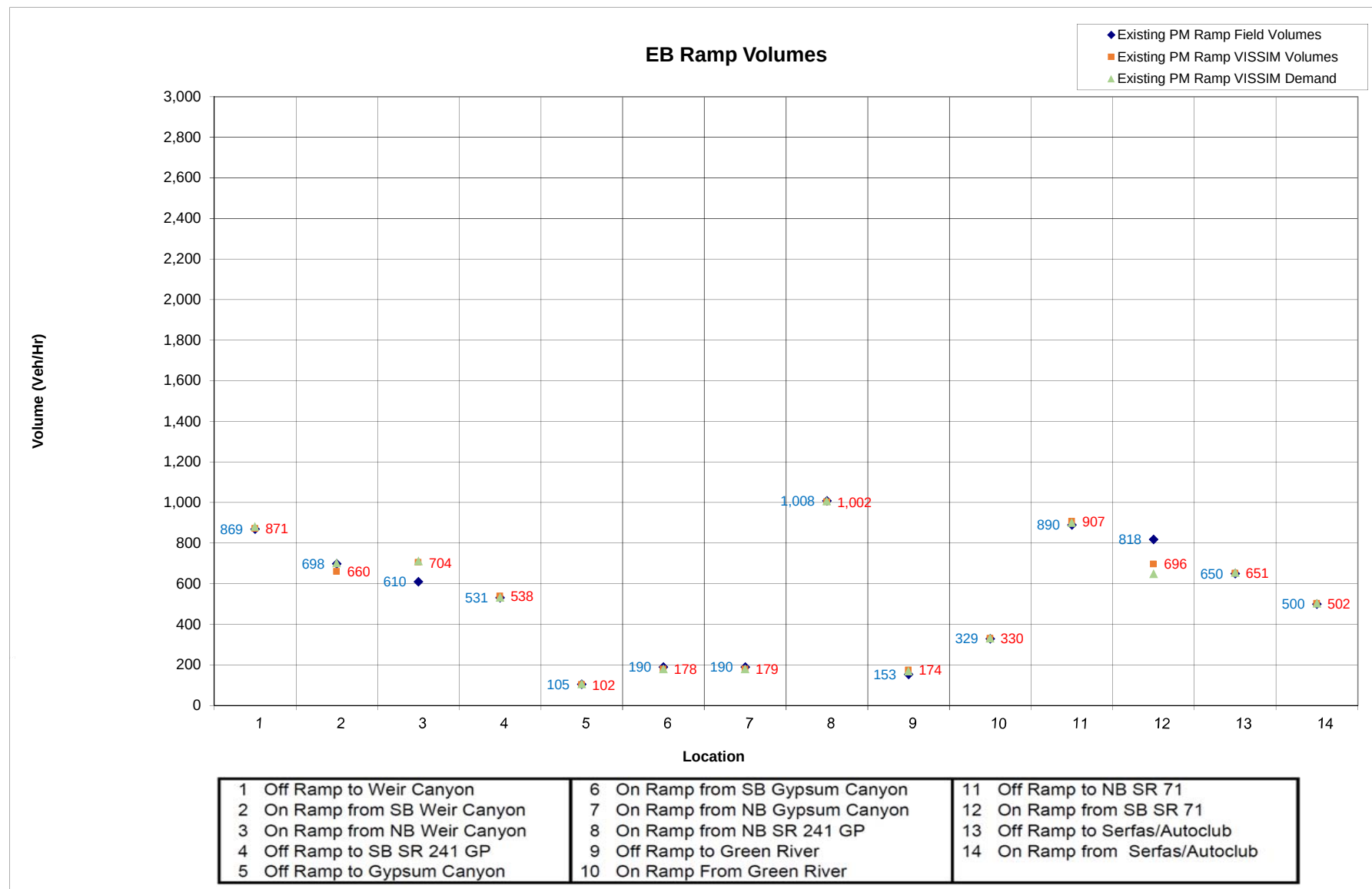




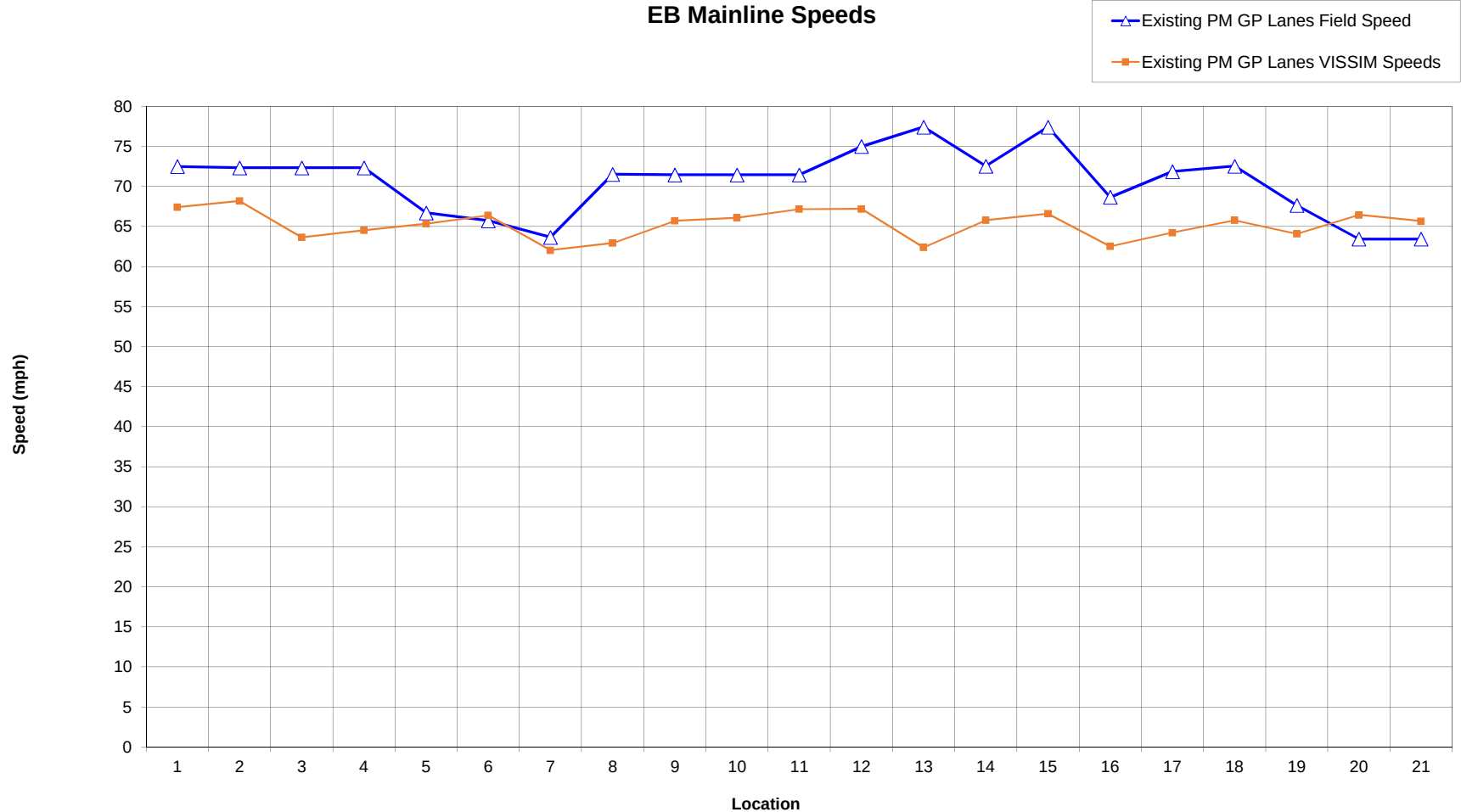
EB Mainline Vehicle Volume by Location



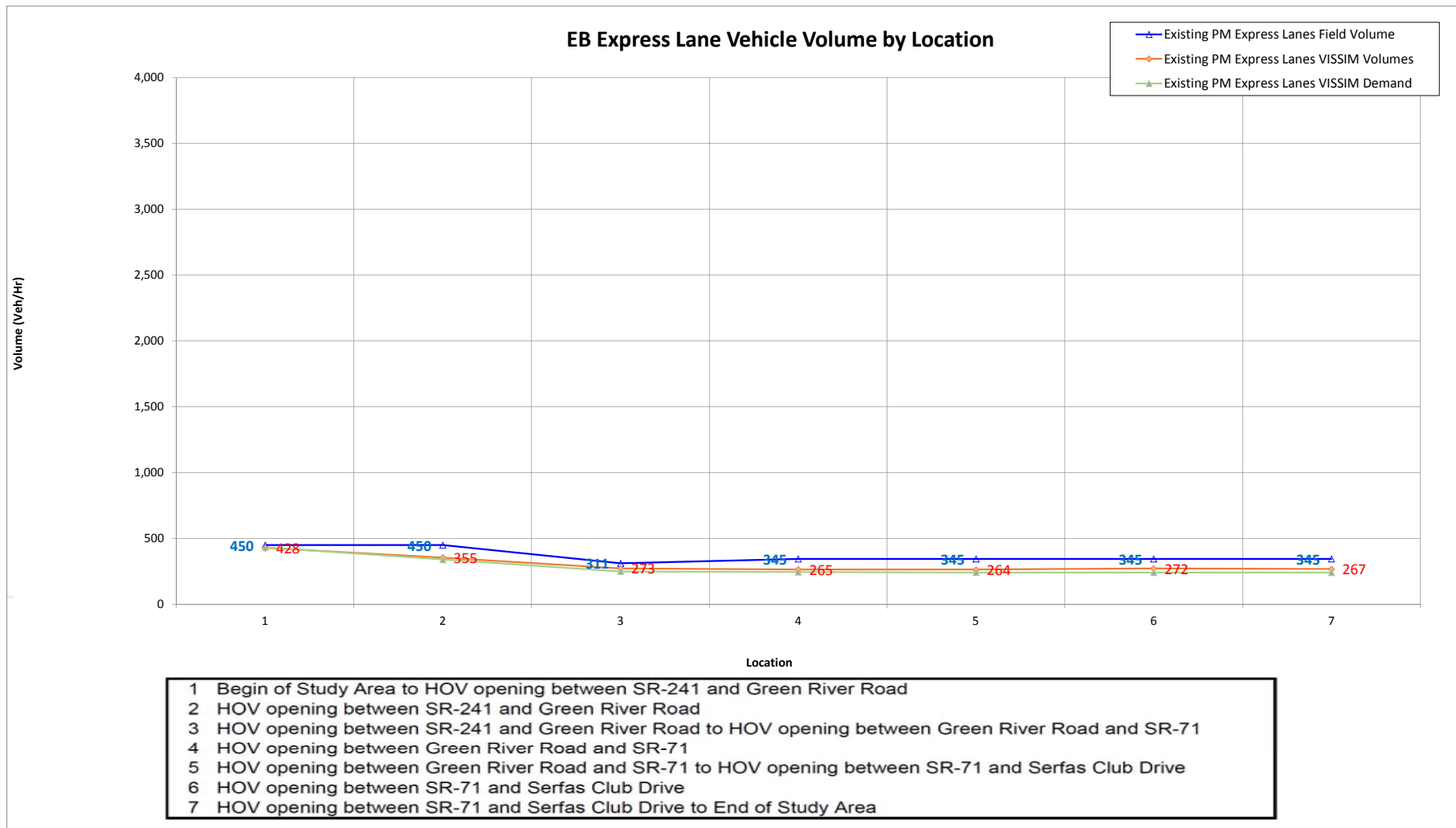
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



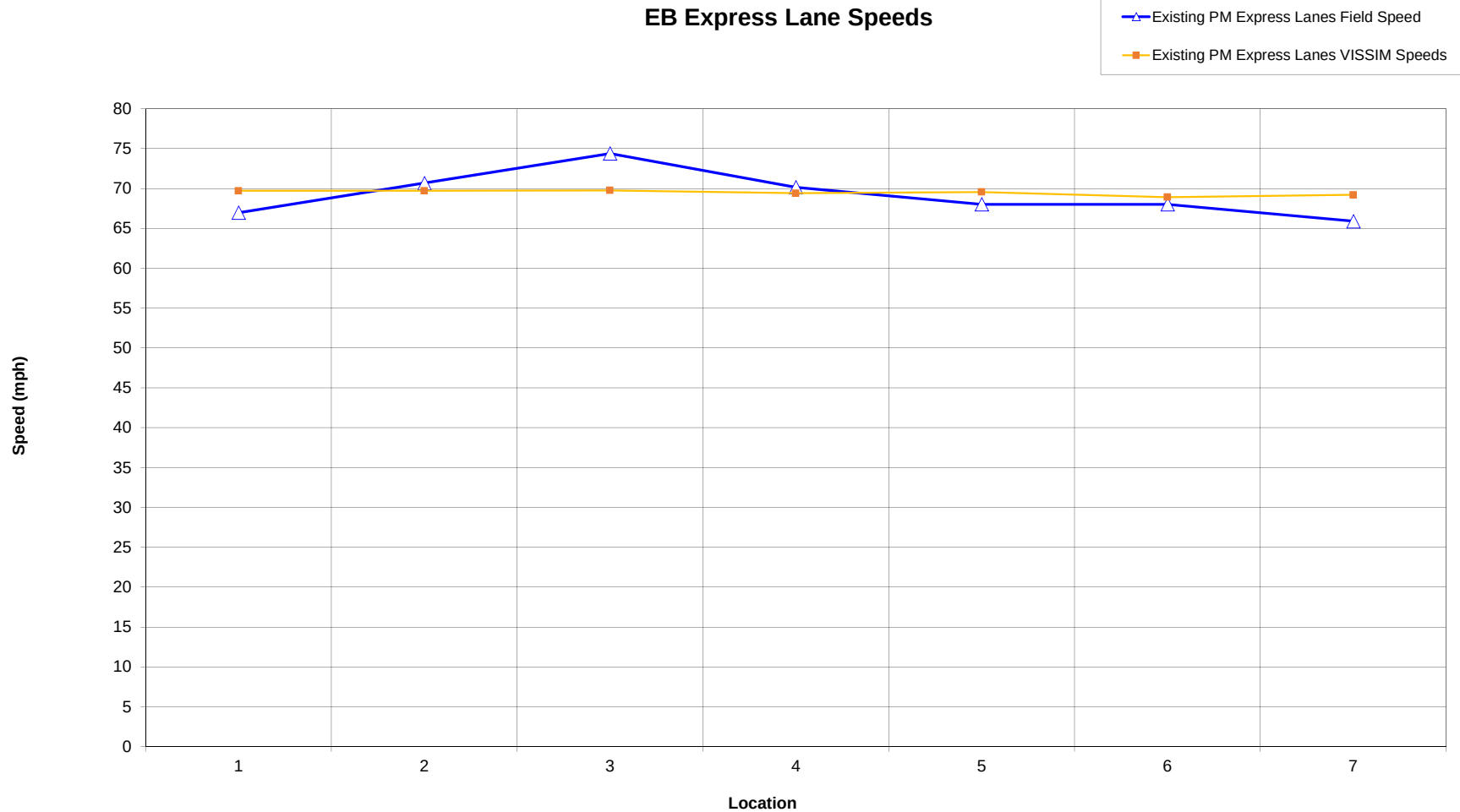
EB Mainline Speeds



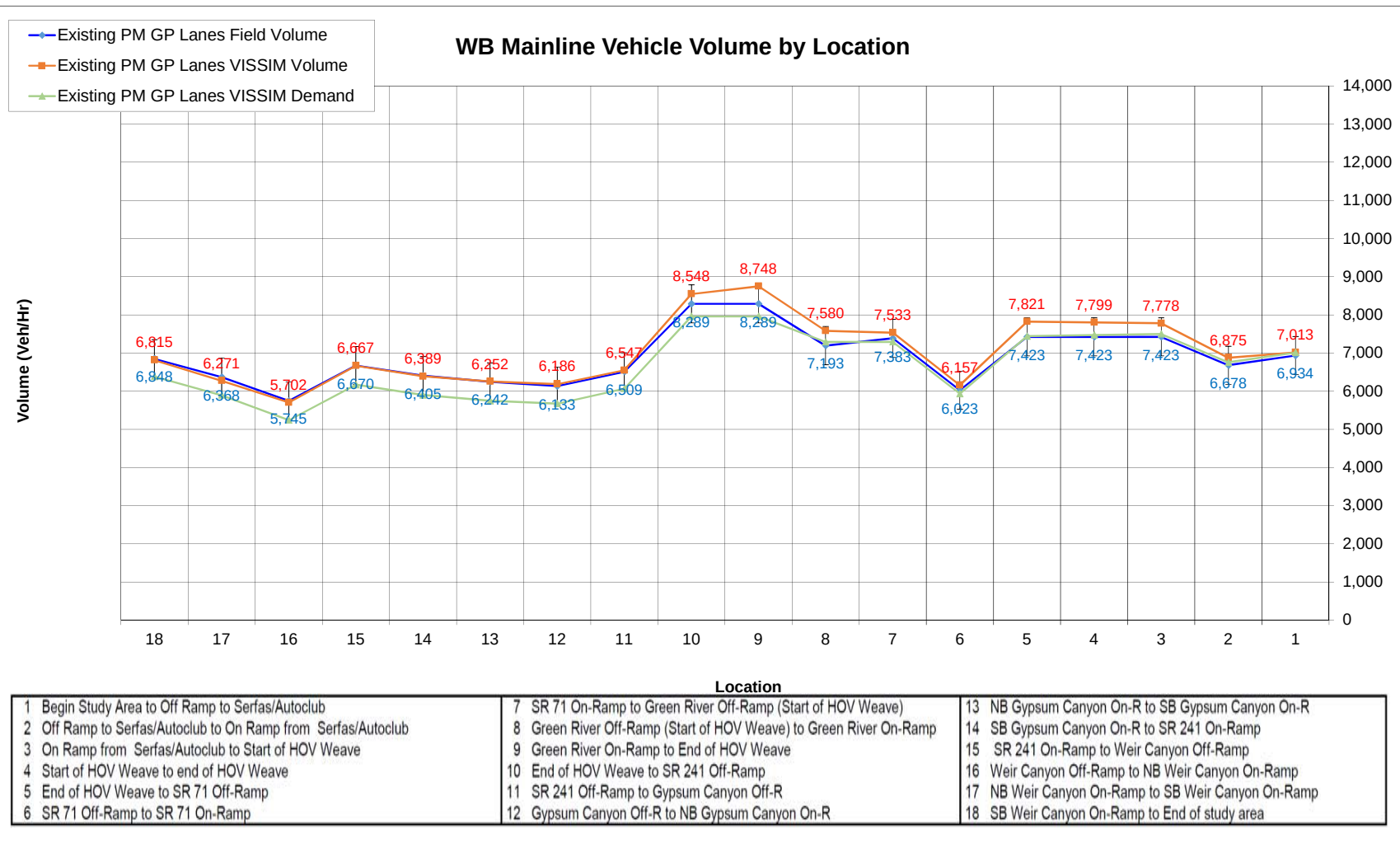
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

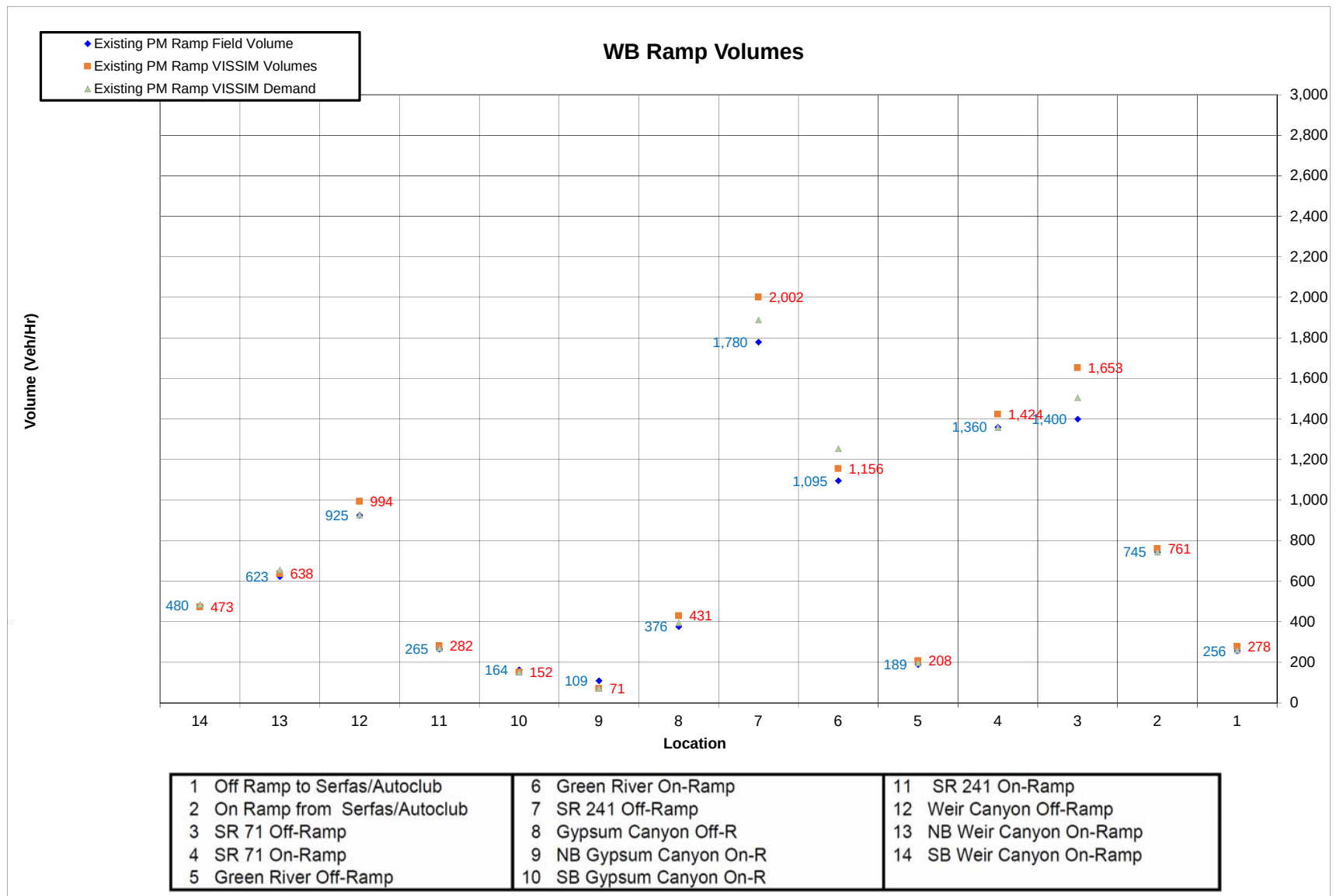


EB Express Lane Speeds



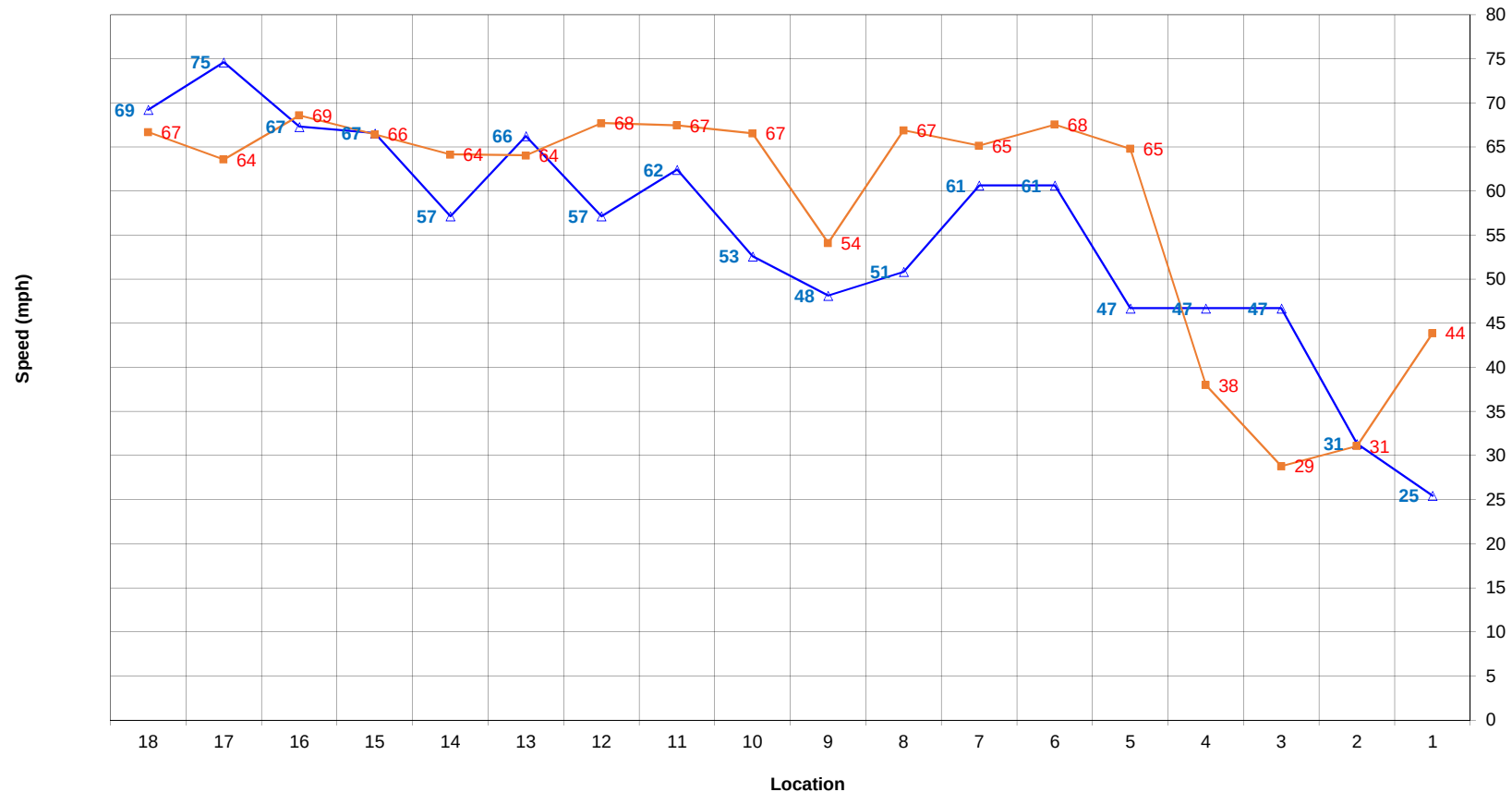
- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area



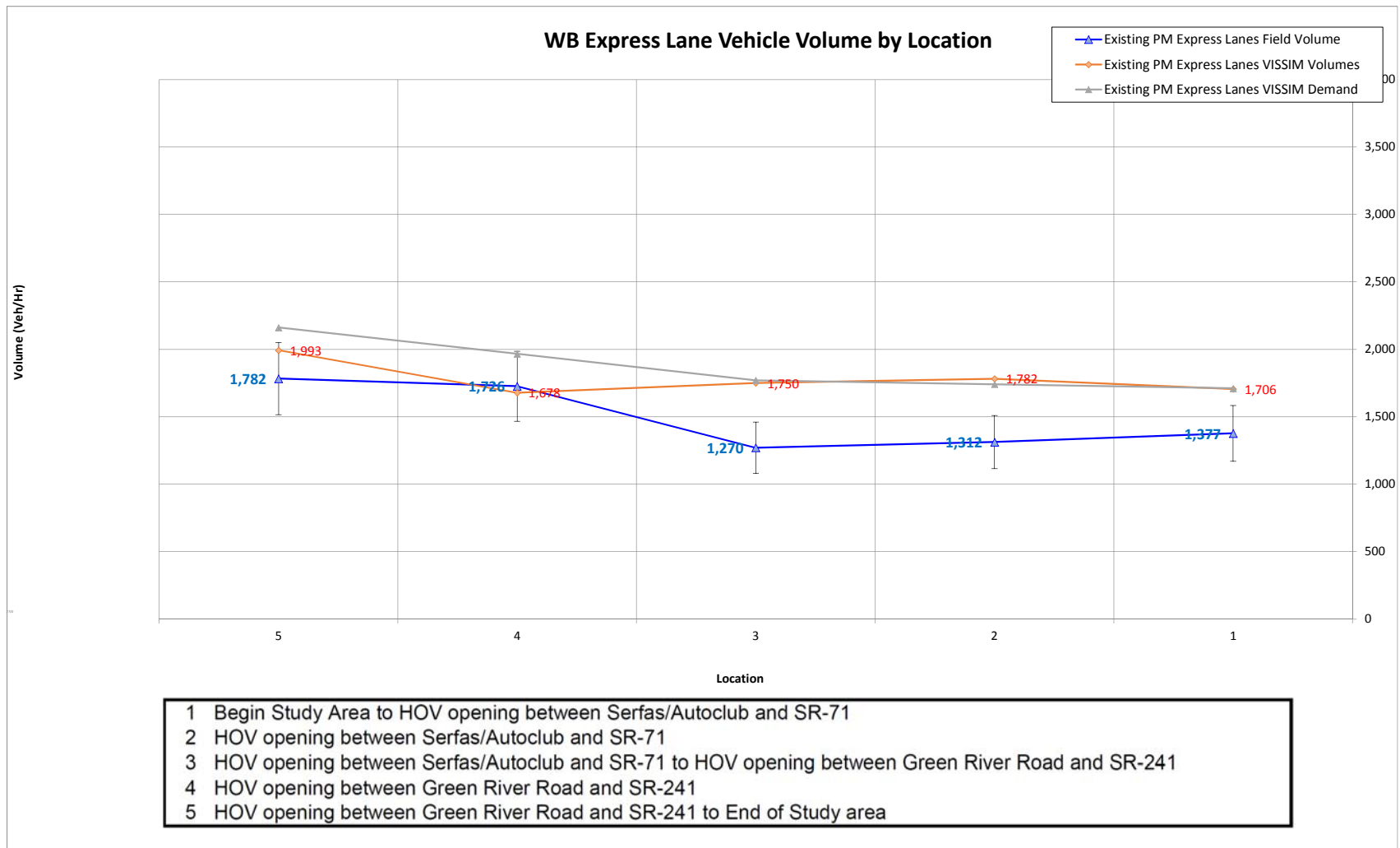


WB Mainline Speeds

- Existing PM GP Lanes Field Speeds
- Existing PM GP Lane VISSIM Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 SR 71 On-Ramp to Green River Off-Ramp (Start of HOV Weave)	13 NB Gypsum Canyon On-R to SB Gypsum Canyon On-R
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 Green River Off-Ramp (Start of HOV Weave) to Green River On-Ramp	14 SB Gypsum Canyon On-R to SR 241 On-Ramp
3 On Ramp from Serfas/Autoclub to Start of HOV Weave	9 Green River On-Ramp to End of HOV Weave	15 SR 241 On-Ramp to Weir Canyon Off-Ramp
4 Start of HOV Weave to end of HOV Weave	10 End of HOV Weave to SR 241 Off-Ramp	16 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
5 End of HOV Weave to SR 71 Off-Ramp	11 SR 241 Off-Ramp to Gypsum Canyon Off-R	17 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
6 SR 71 Off-Ramp to SR 71 On-Ramp	12 Gypsum Canyon Off-R to NB Gypsum Canyon On-R	18 SB Weir Canyon On-Ramp to End of study area



WB Express Lane Speeds



- 1 Begin Study Area to HOV opening between Serfas/Autoclub and SR-71
- 2 HOV opening between Serfas/Autoclub and SR-71
- 3 HOV opening between Serfas/Autoclub and SR-71 to HOV opening between Green River Road and SR-241
- 4 HOV opening between Green River Road and SR-241
- 5 HOV opening between Green River Road and SR-241 to End of Study area

SR 91/241 CALIBRATION - PM PEAK PERIOD

Vissim Model Calibration Results (FHWA Criteria)

FHWA Performance Criteria and Measures	Calibration Acceptance Target
Individual link flows	
Flow < 700 veh/h, Within 100 veh/h	> 85% of cases
700 veh/h < Flow < 2700 veh/h, Within 15%	> 85% of cases
Flow > 2700 veh/h, Within 400 veh/h	> 85% of cases
Difference in sum of all link flows	Within 5%
GEH Statistic Value	
GEH Statistic Value < 5, for individual link flows	> 85% cases
GEH Statistic Value for Sum of All Link Flows	< 4

Freeway Volume Calibration (FHWA Link Flow Criteria)										
Lane Type	Eastbound					Westbound				
	Total Links	Calibration Results Achieved				Total Links	Calibration Results Achieved			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Mainline	21	62%	81%	67%	62%	18	94%	100%	94%	100%
Ramps	14	93%	93%	100%	86%	14	93%	93%	86%	93%
All Links	35	74%	86%	80%	71%	32	94%	97%	91%	97%
Total Link Flow % Difference		-1%	2%	-2%	-2%		-2%	0%	-3%	1%

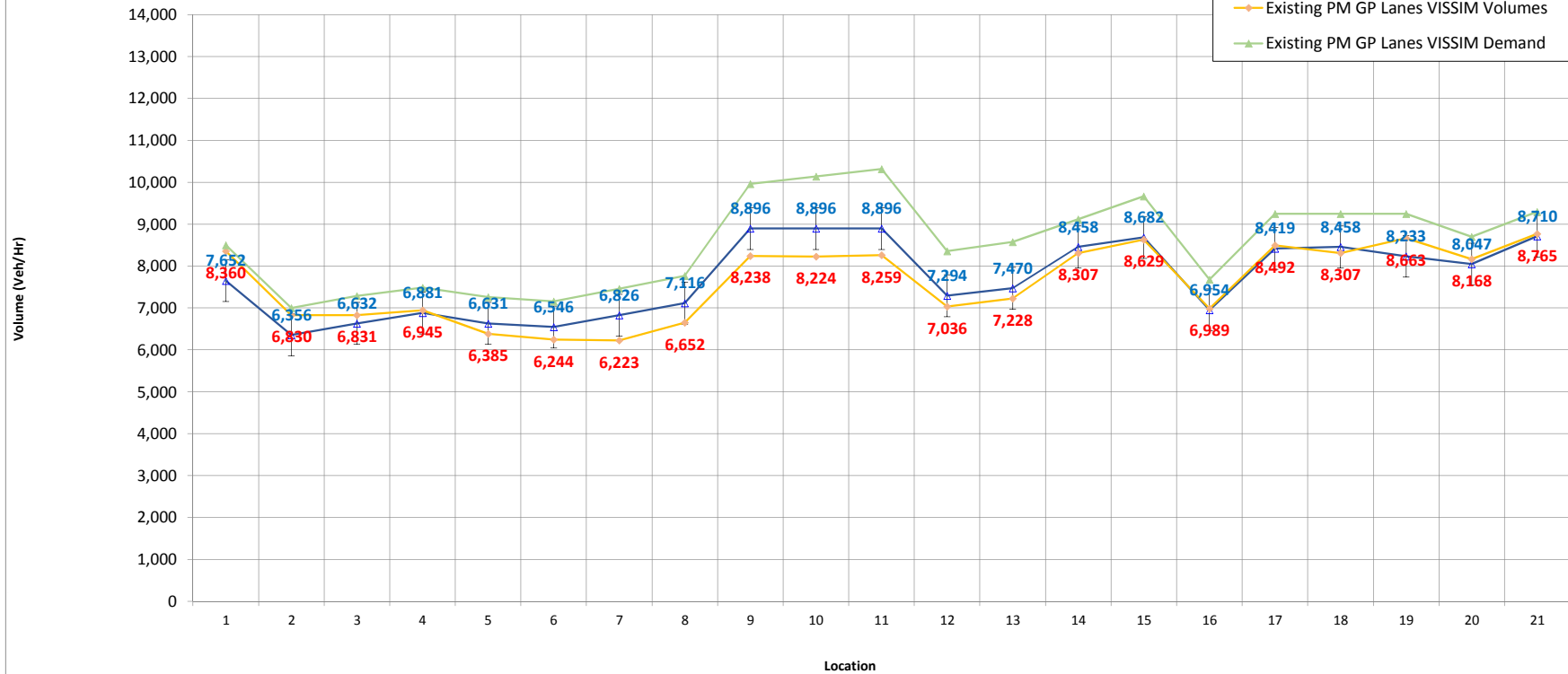
Freeway Volume Calibration (GEH Criteria)										
Lane Type	Total Links	Eastbound				Total Links	Westbound			
		Calibration Results Achieved					Calibration Results Achieved			
		3-4 PM	4-5 PM	5-6 PM	6-7 PM		3-4 PM	4-5 PM	5-6 PM	6-7 PM
Mainline	21	67%	86%	71%	62%	18	89%	100%	94%	100%
Ramps	14	93%	93%	93%	86%	14	93%	100%	86%	93%
All Links	35	77%	89%	80%	71%	32	91%	100%	91%	97%
Total Link Flow GEH		3.0	9.4	10.5	9.6		7.9	0.7	10.7	3.3

Network Travel Time calibration: PM Peak Period

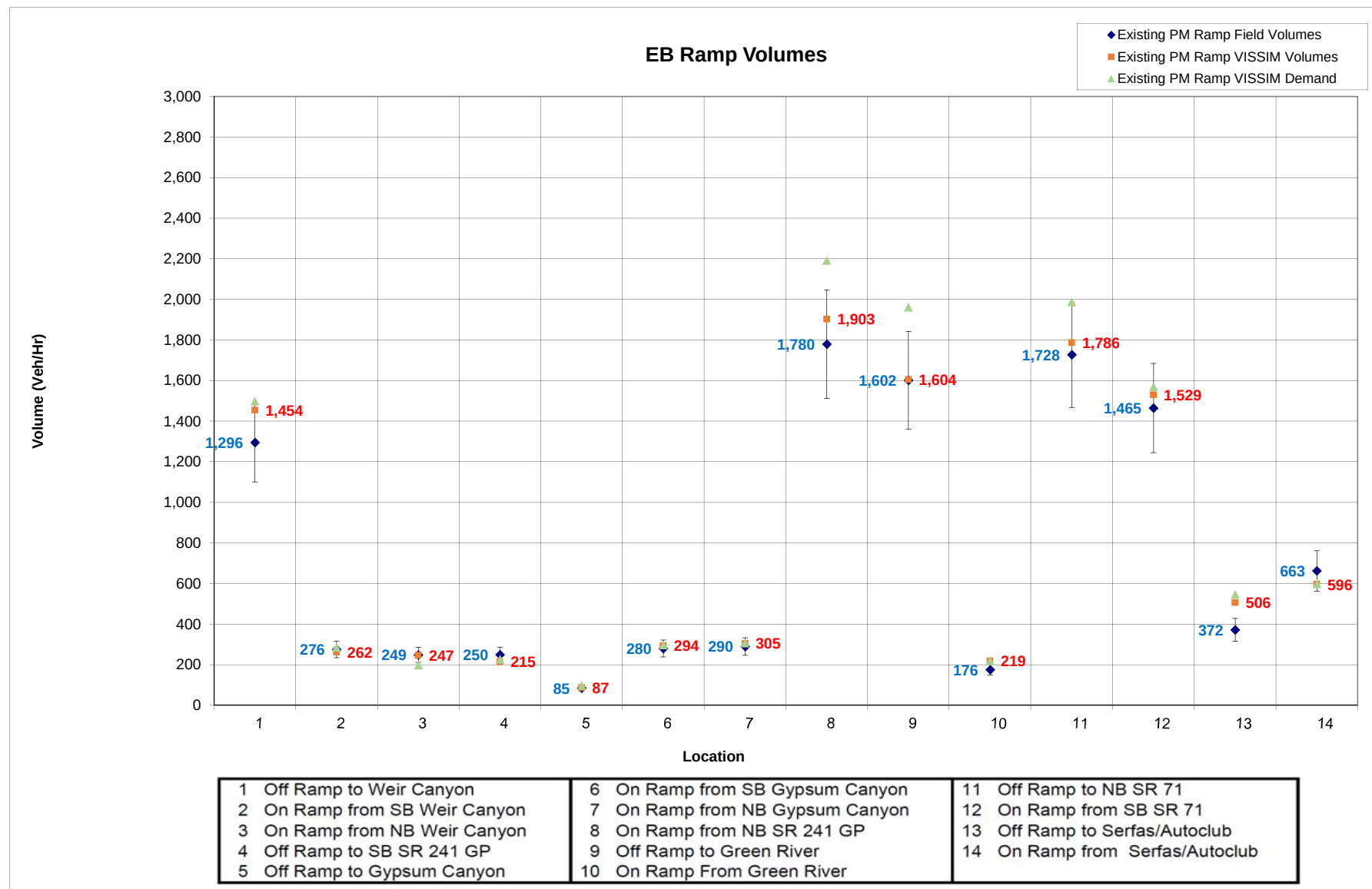
Corridor	Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff. %			
	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
	24.5	35.2	34.6	35.3	27.8	31.3	35.6	31.3	13%	-11%	3%	-11%
Eastbound SR-91												
Westbound SR-91	9.3	9.1	9.1	9.0	8.9	9.0	9.0	9.0	-3%	-2%	-2%	-1%

Table 5 Segment Travel Time Calibration: PM Peak Period																							
Corridor	Segment	Location	Distance	Field Speed				VISSIM Speed				Field Travel Time (Minutes)				VISSIM Travel Time (Minutes)				Diff. %			
				3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
Eastbound SR-91	Site A to Site C	1002	20751	26	12	11	11	28	16	13	13	9.1	19.6	20.5	21.4	8.5	15.0	18.6	18.0	-7%	-31%	-10%	-19%
	Site C to Site D	1003	13681	25	22	23	26	18	21	20	22	6.3	7.0	6.7	6.0	8.7	7.5	7.9	7.0	28%	7%	15%	14%
	Site D to Site F	1005	16332	20	22	25	24	18	21	20	29	9.1	8.6	7.4	7.9	10.5	8.8	9.1	6.4	13%	2%	19%	-23%
	Site B to Site C	1007	32177	43	22	18	17	29	20	16	14	8.5	16.8	20.1	21.3	12.8	17.9	22.5	26.7	34%	6%	11%	20%
	Site E to Site F	1008	28639	21	20	27	37	29	27	24	34	15.7	16.4	12.2	8.9	11.3	12.1	13.6	9.4	-39%	-36%	10%	6%
	Site A to Site B	1001	40145	51	36	27	19	56	30	25	26	9.0	12.8	16.8	23.5	8.1	15.4	18.4	17.6	-11%	17%	9%	-33%
	Site D to Site E	1004	27065	31	19	26	34	29	34	32	31	9.8	16.2	11.9	9.1	10.7	9.0	9.5	9.8	8%	-80%	-25%	7%
Westbound SR-91	Site F to Site D	1011	16460	69	67	71	71	68	67	67	68	2.7	2.8	2.6	2.6	2.8	2.8	2.8	2.7	2%	-1%	3%	4%
	Site D to Site C	1012	13628	60	62	60	61	62	62	61	61	2.6	2.5	2.6	2.5	2.5	2.5	2.5	2.5	-3%	1%	-2%	0%
	Site C to Site A	1014	20820	59	61	61	61	64	65	65	64	4.0	3.9	3.9	3.9	3.7	3.7	3.7	3.7	-8%	-5%	-7%	-4%
	Site E to Site D	1009	23283	46	38	52	66	53	45	37	46	5.8	7.0	5.0	4.0	5.0	5.9	7.1	5.7	-15%	-18%	29%	30%
	Site B to Site A	1006	40738	60	57	57	69	64	60	48	36	7.7	8.2	8.1	6.7	7.2	7.7	9.7	12.9	-7%	-6%	17%	48%

EB Mainline Vehicle Volume by Location

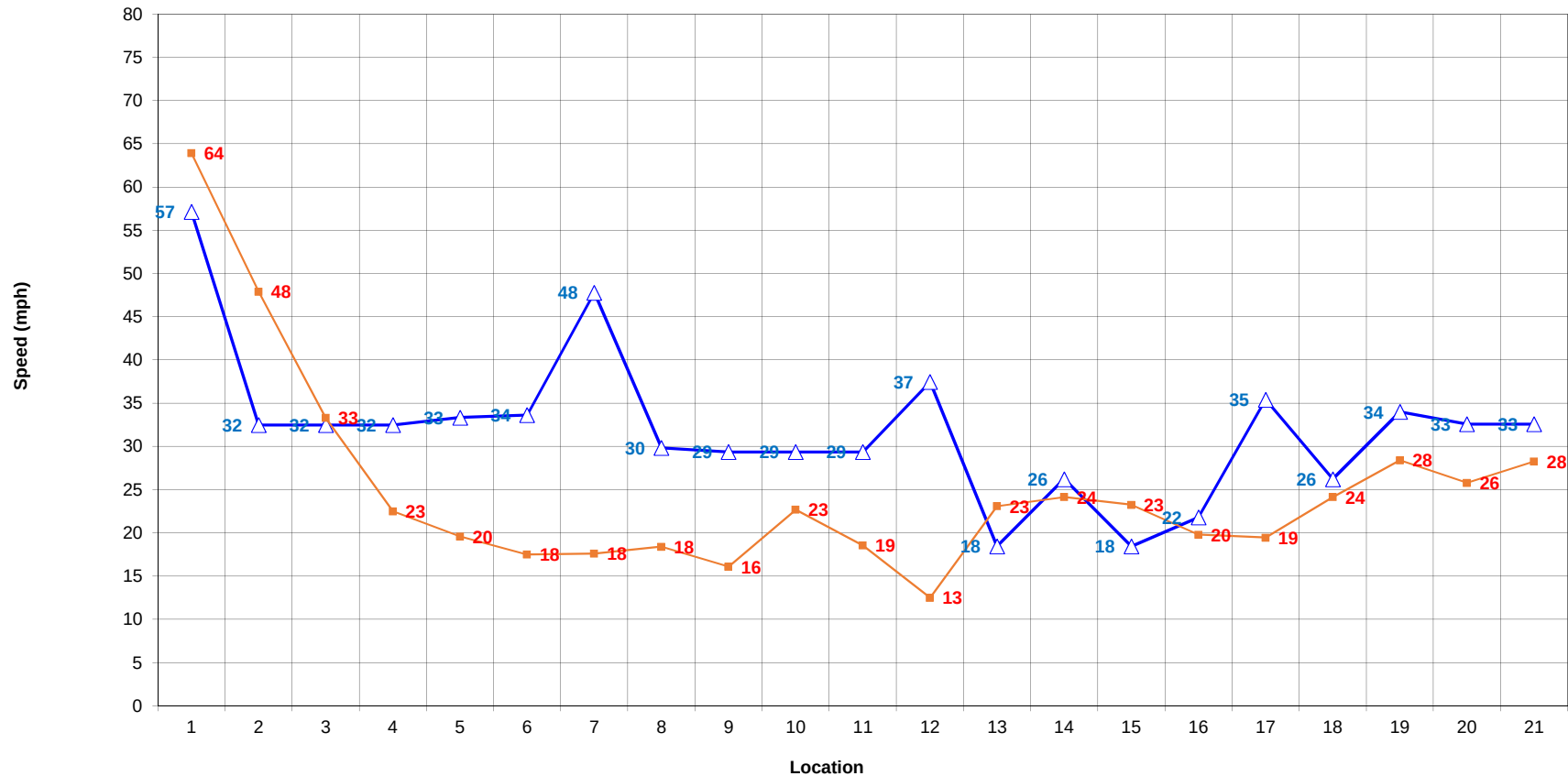
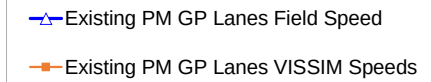


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

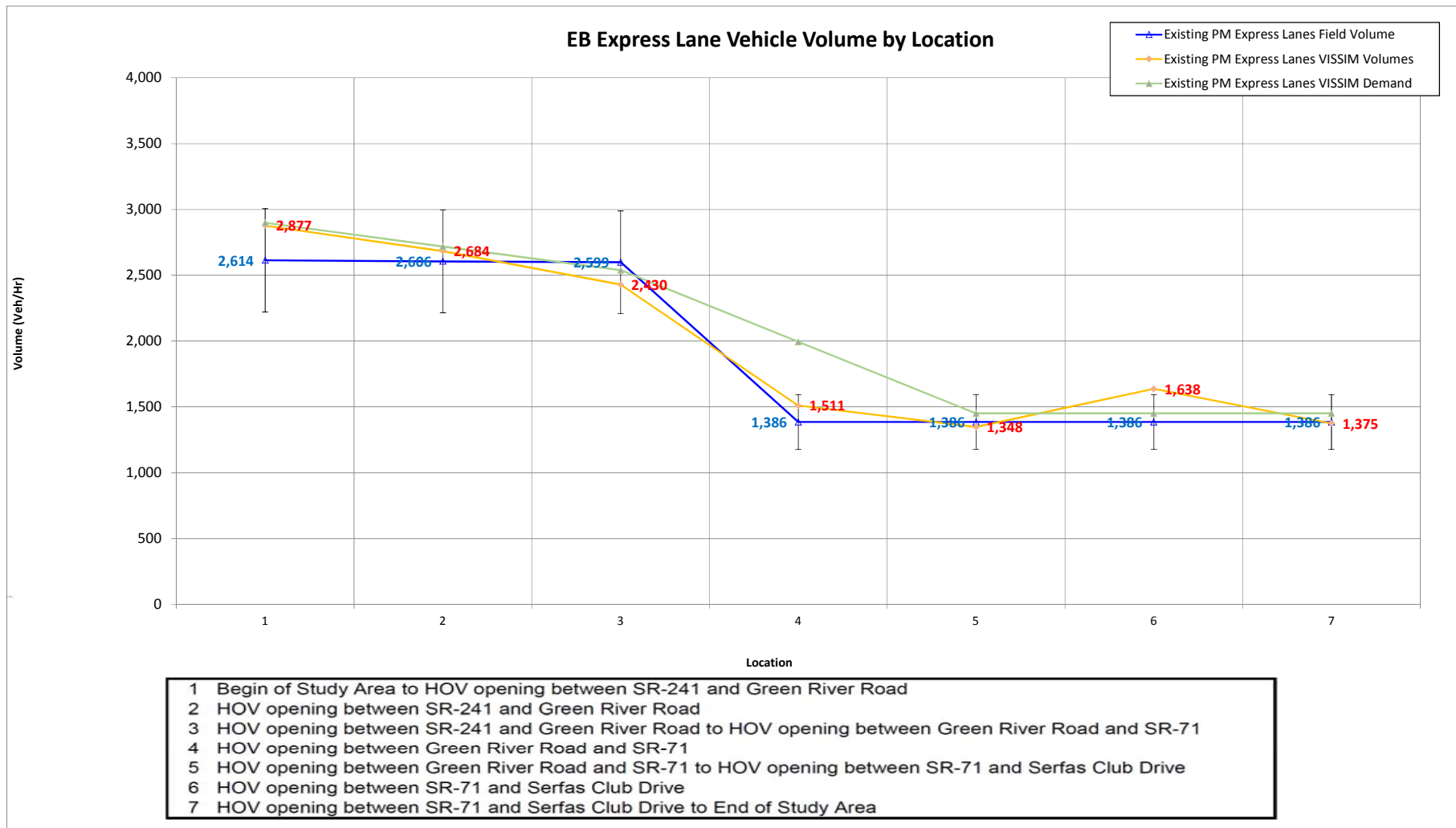


Charts 3-4 PM-Calibration

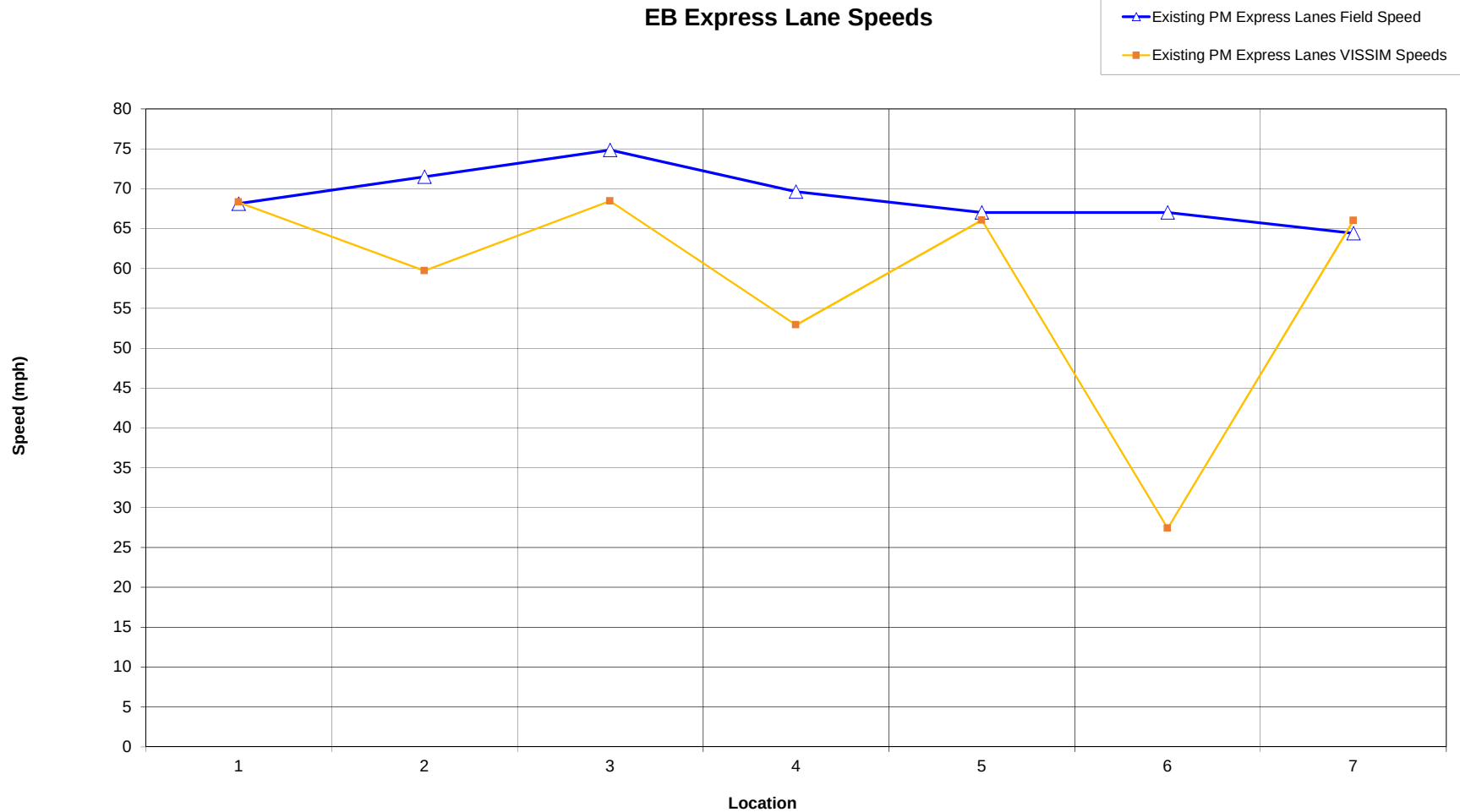
EB Mainline Speeds



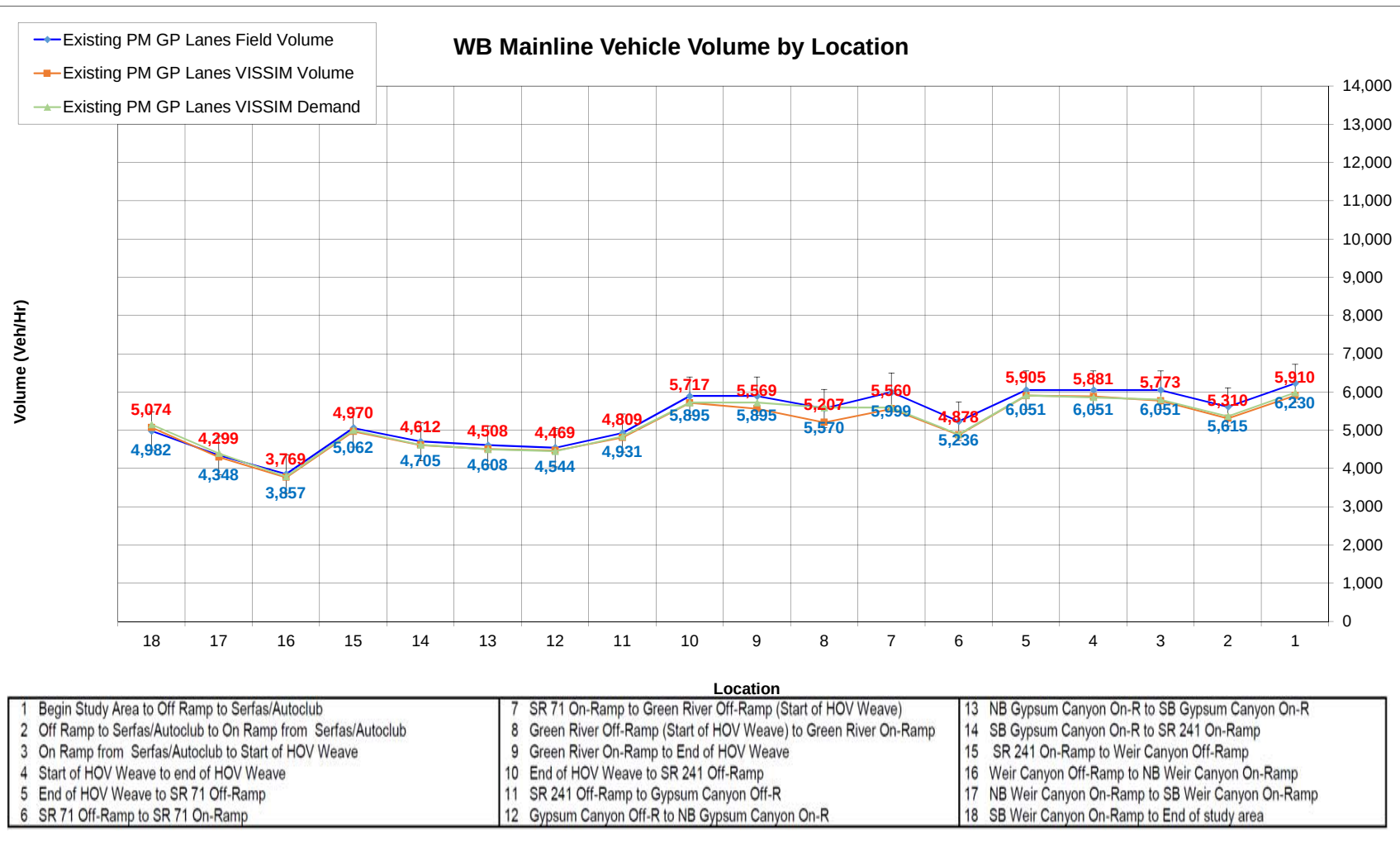
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



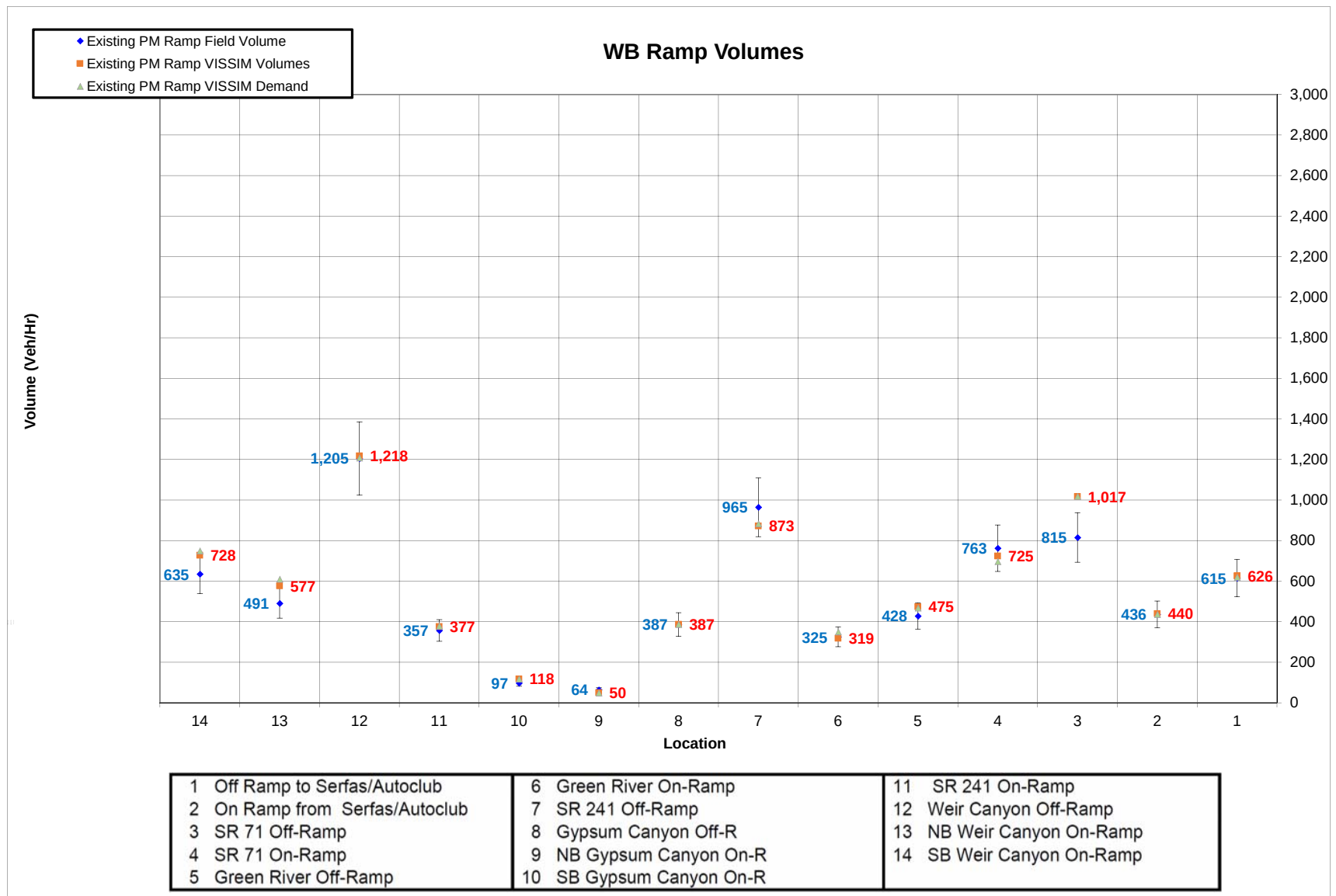
EB Express Lane Speeds



- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

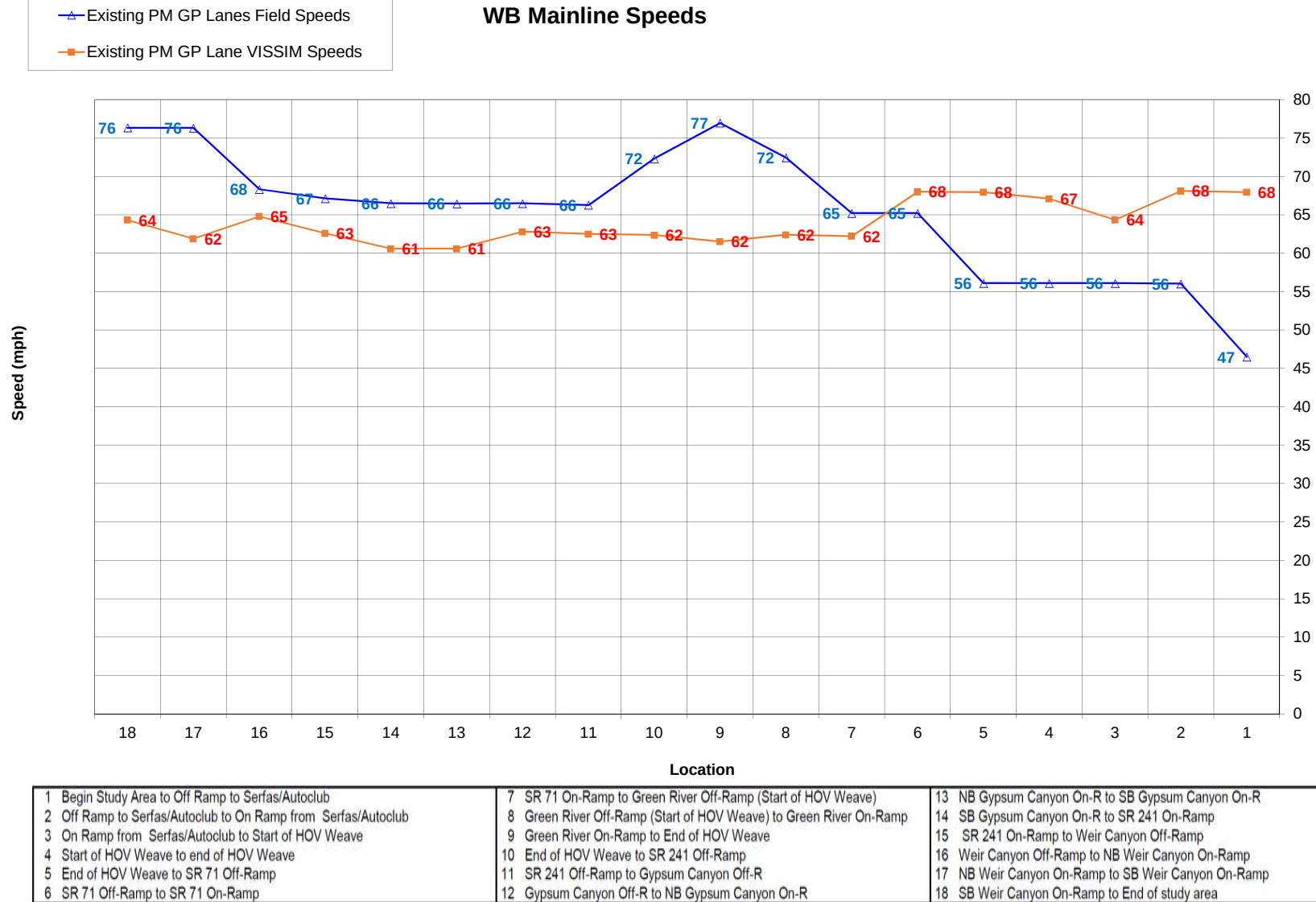


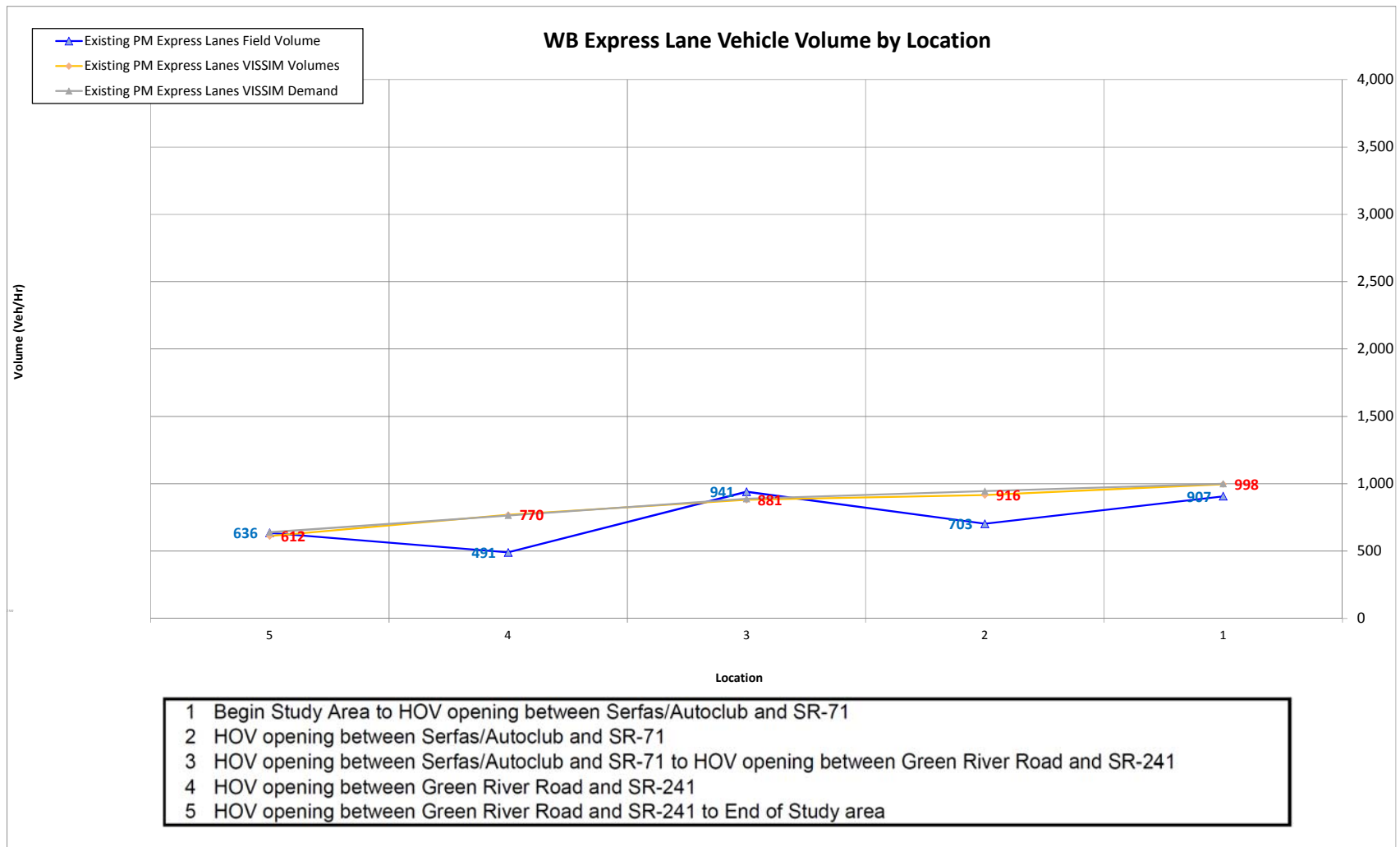
Charts 3-4 PM-Calibration

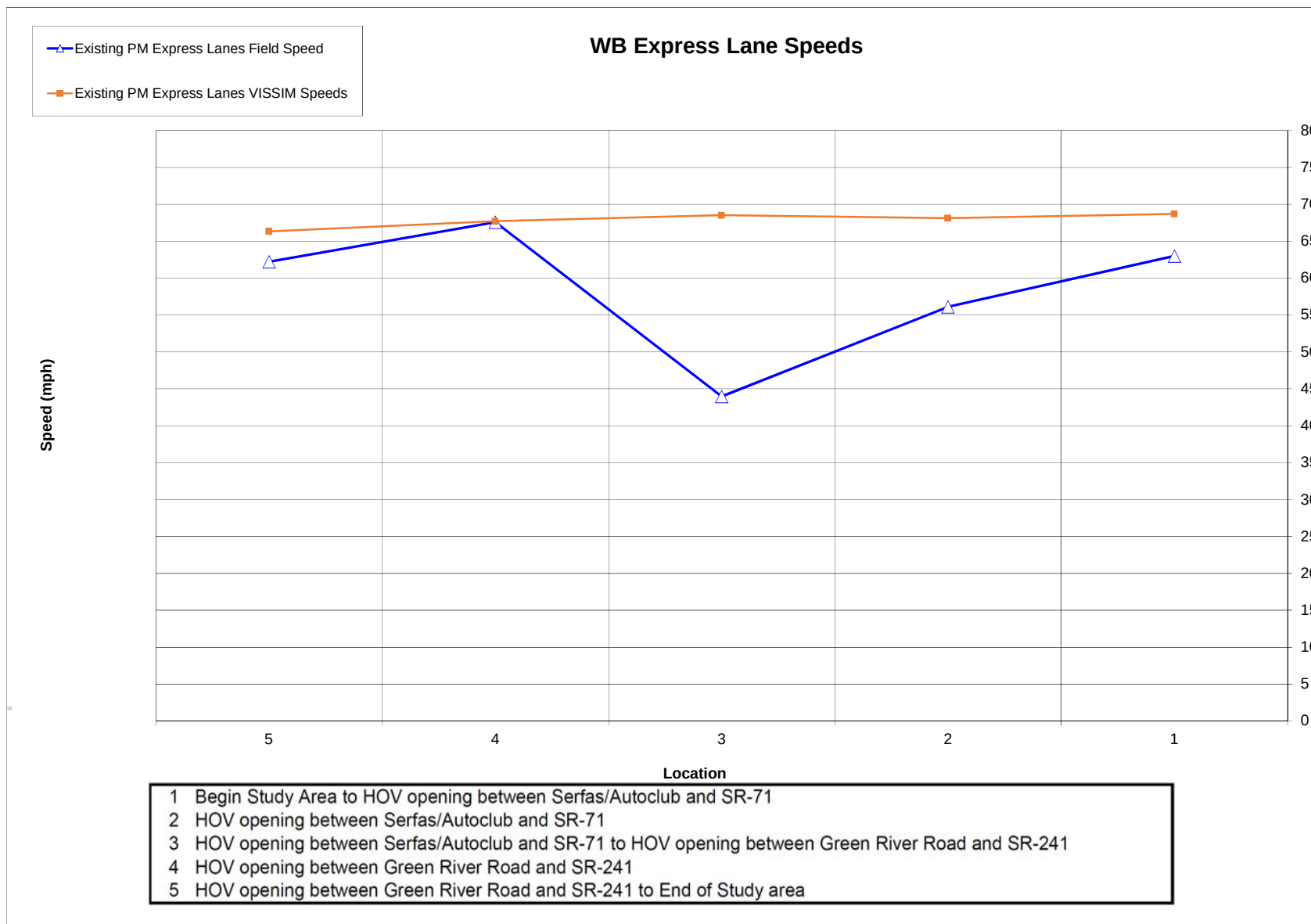


Charts 3-4 PM-Calibration

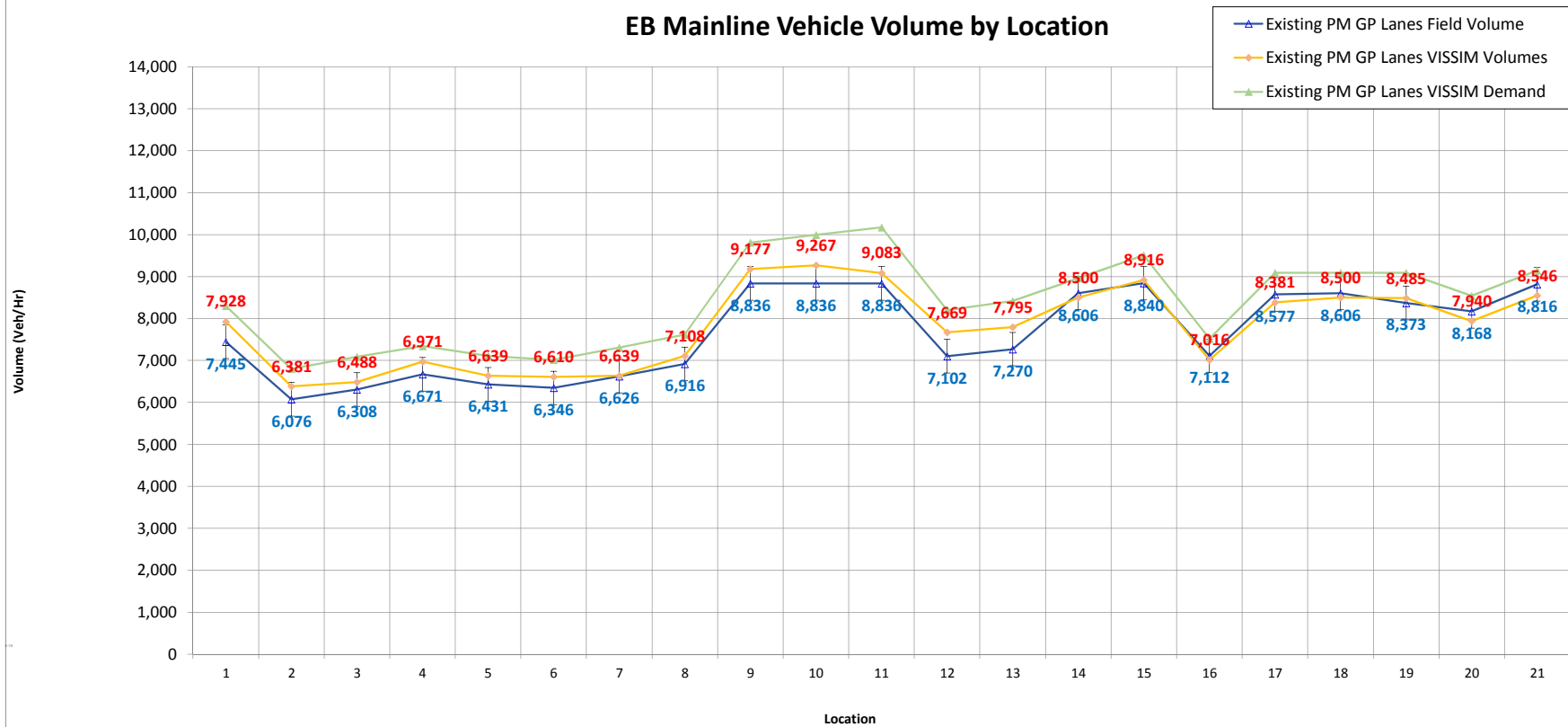
WB Mainline Speeds



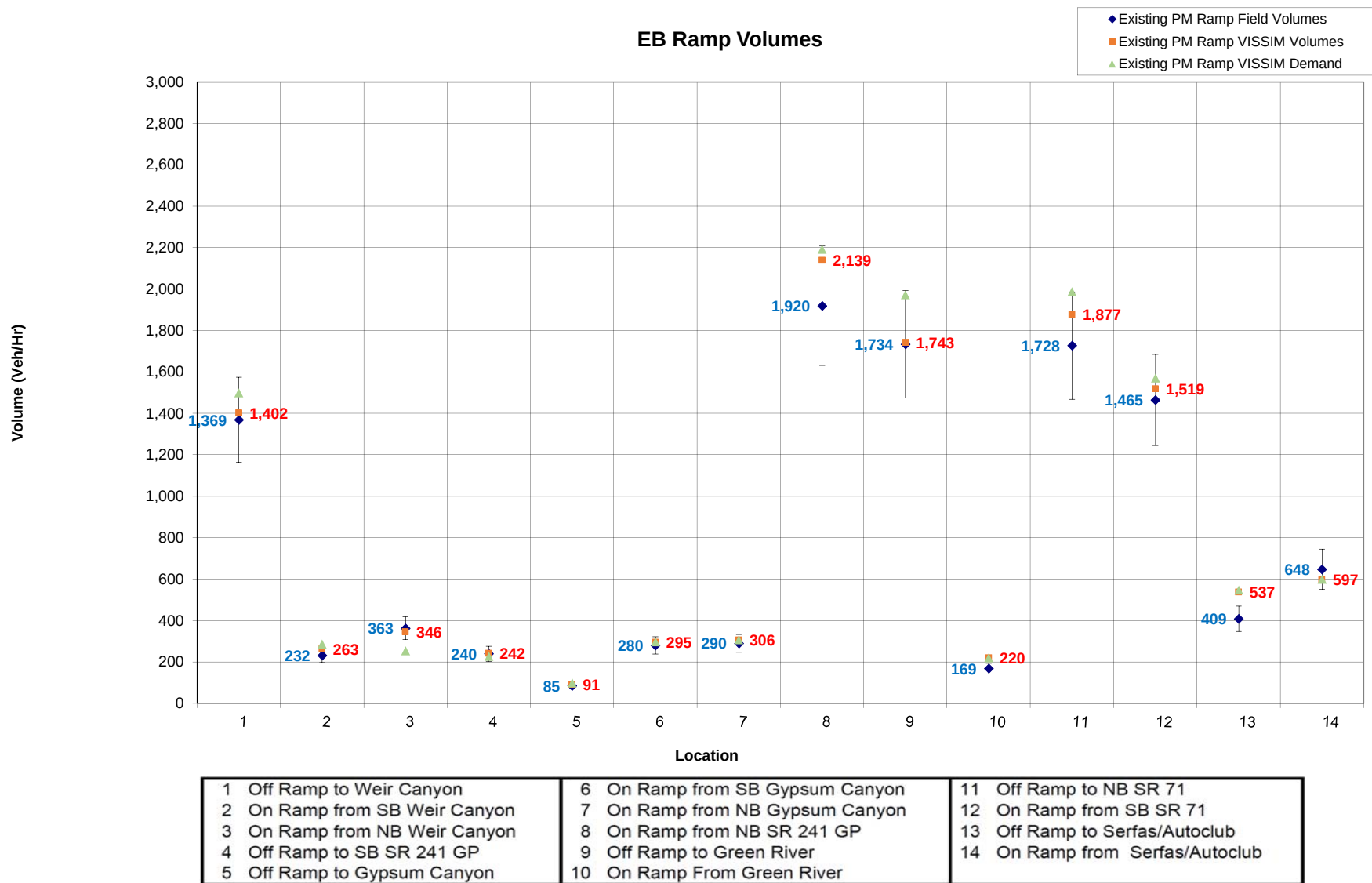




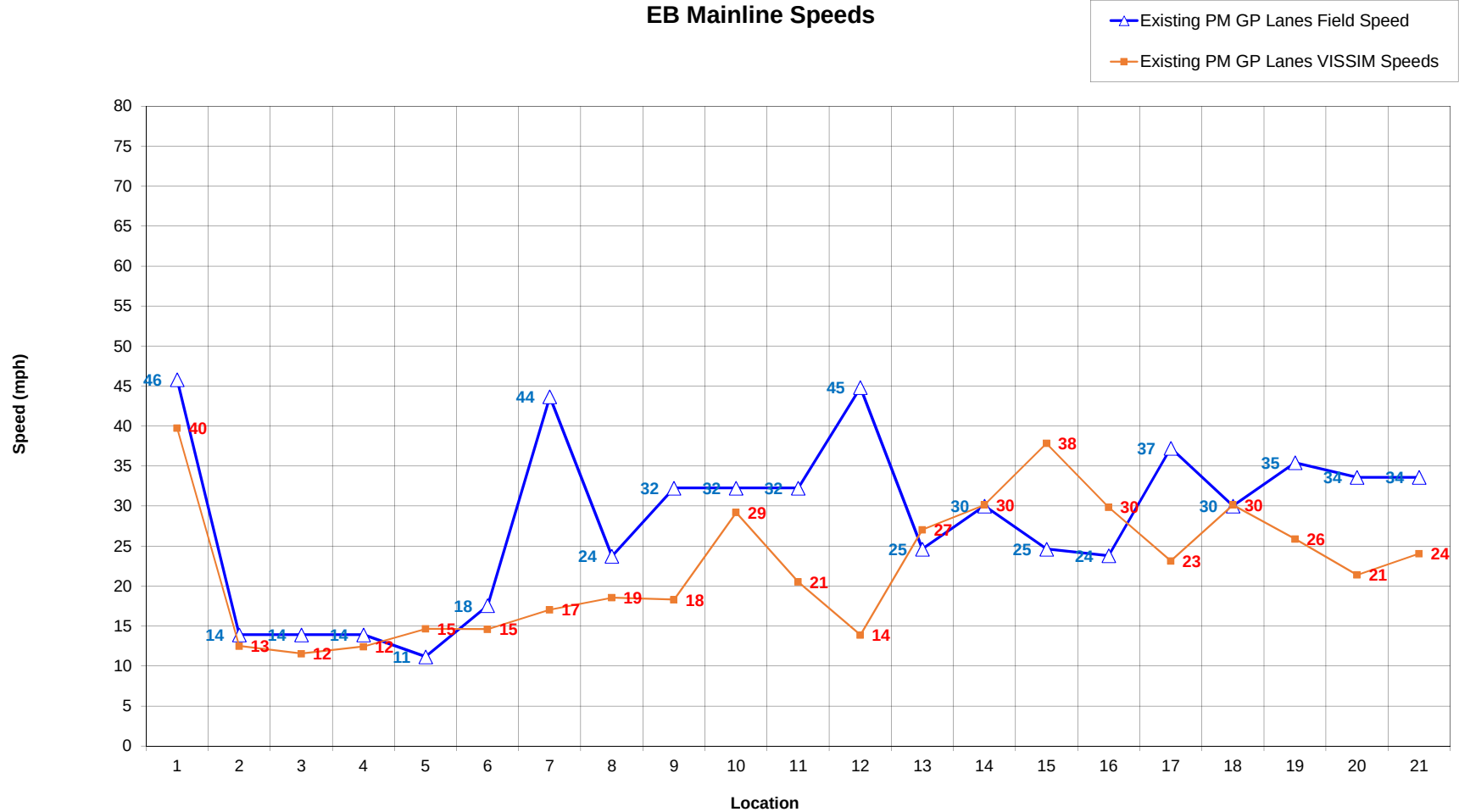
EB Mainline Vehicle Volume by Location



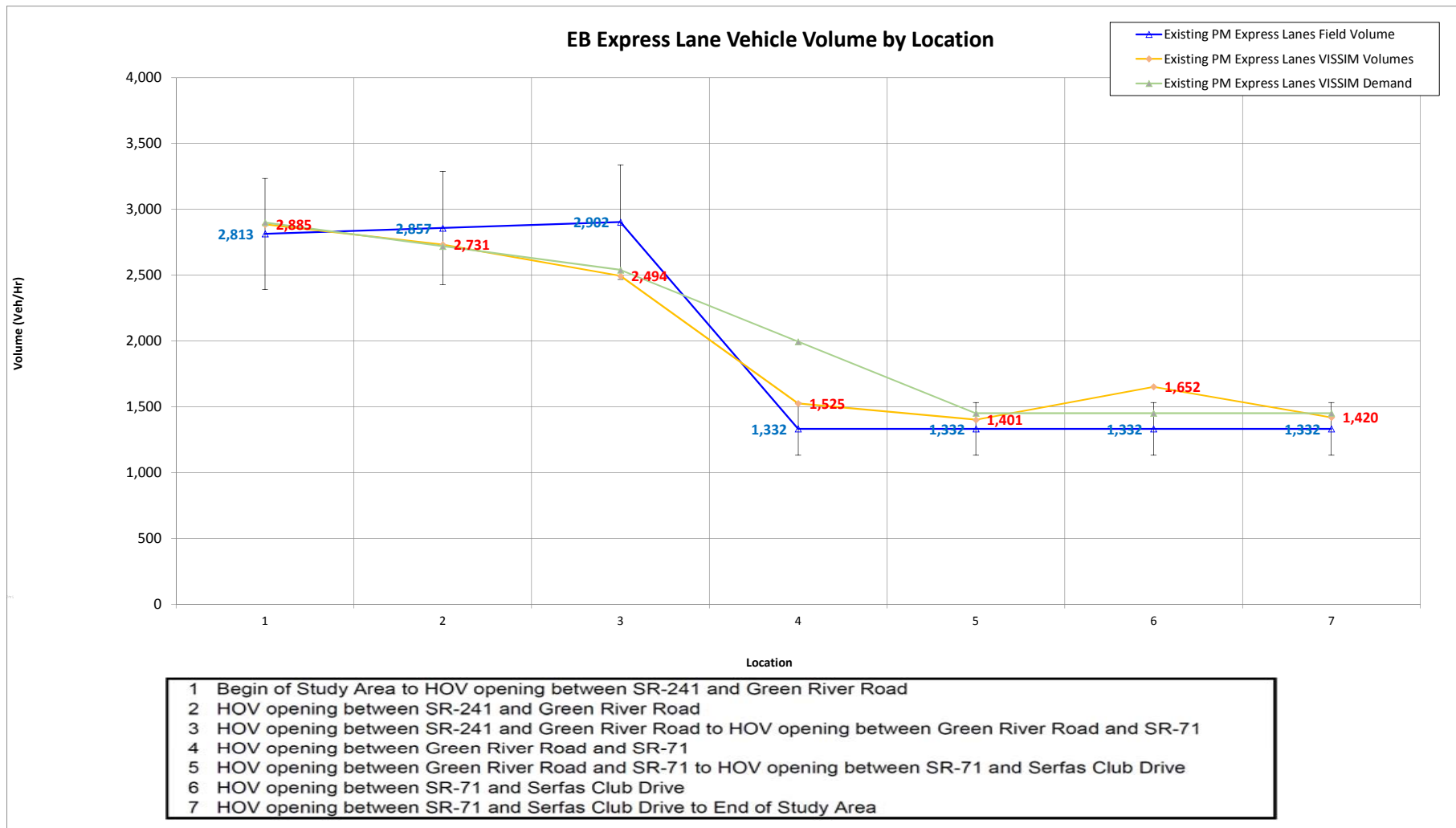
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



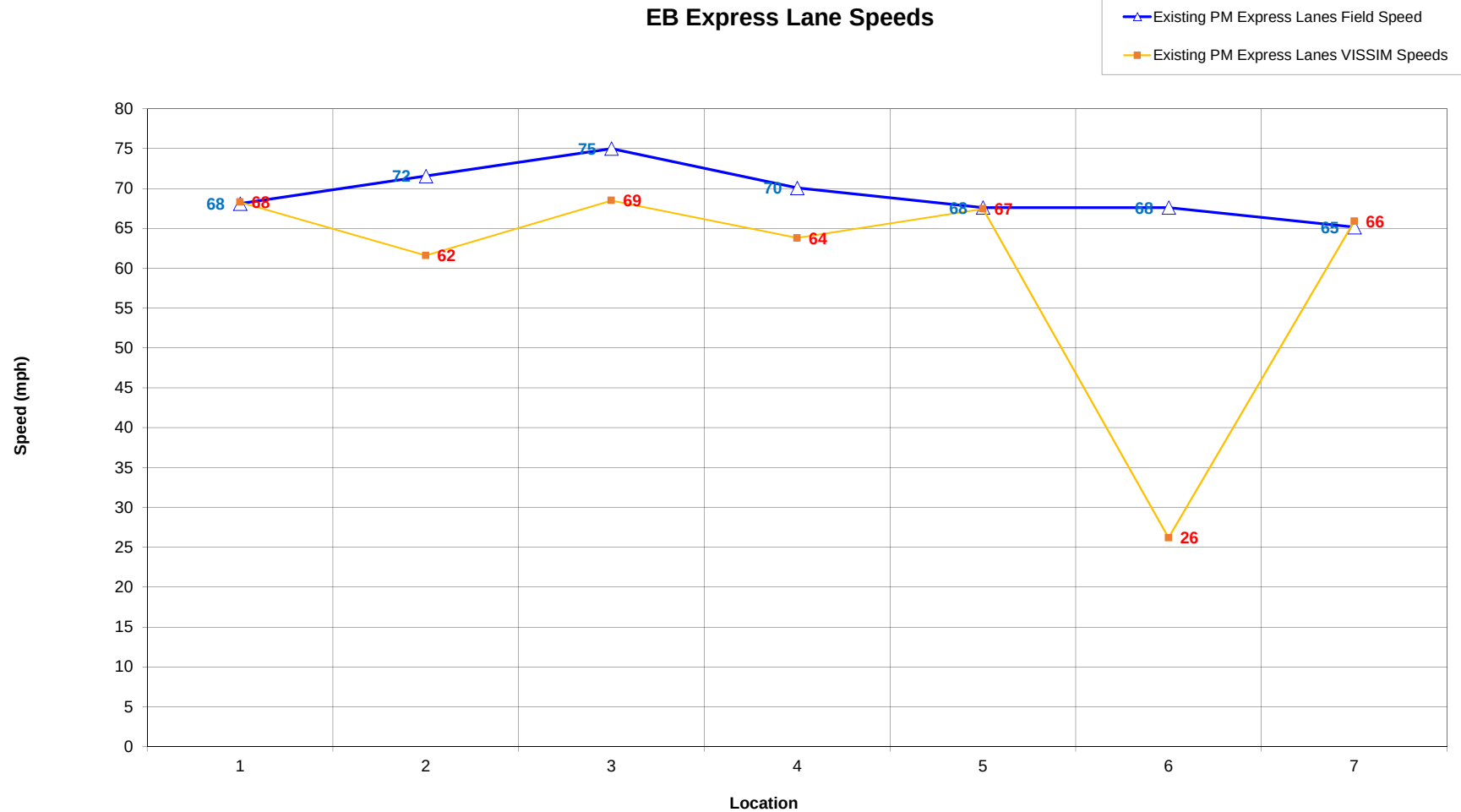
EB Mainline Speeds



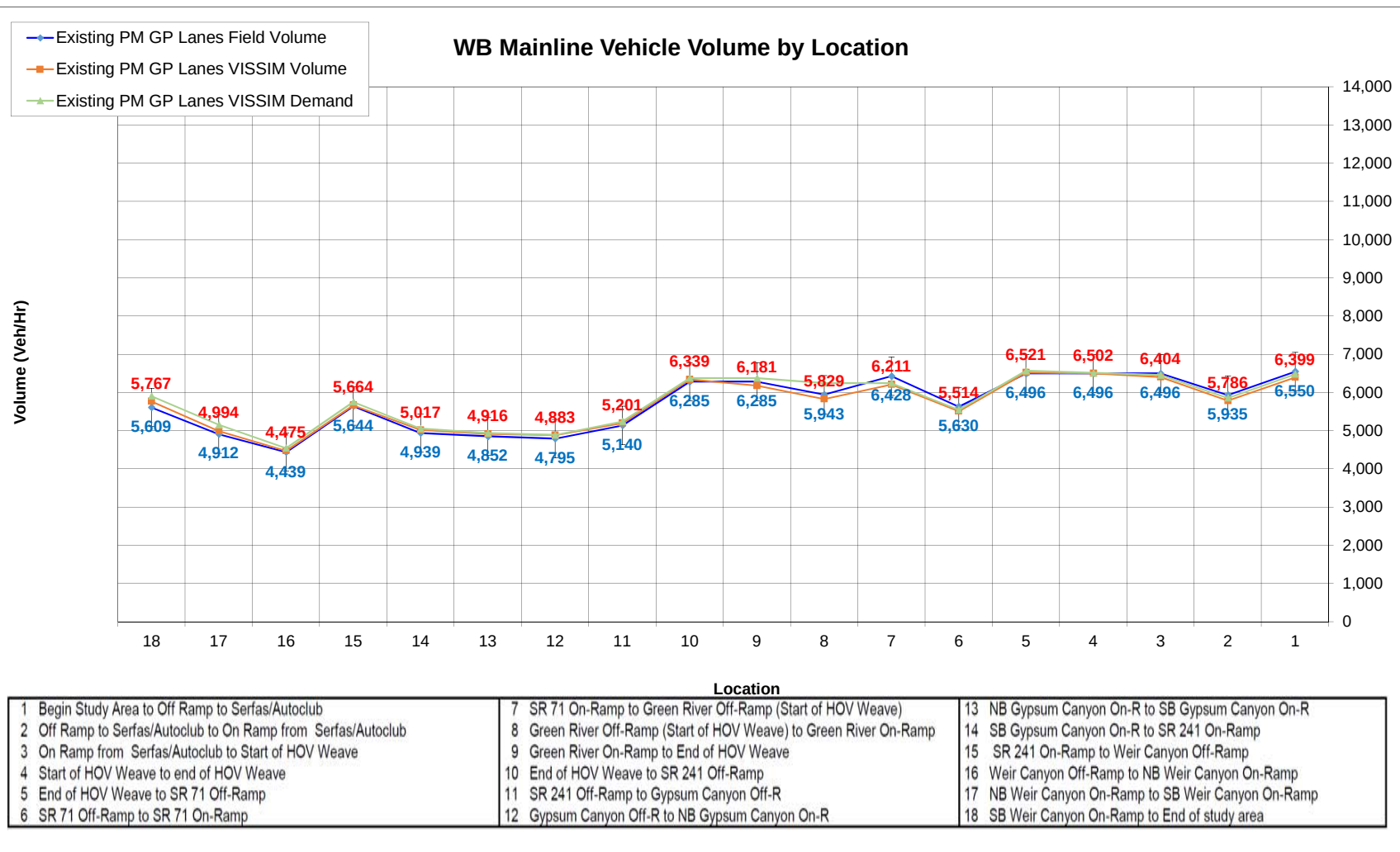
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

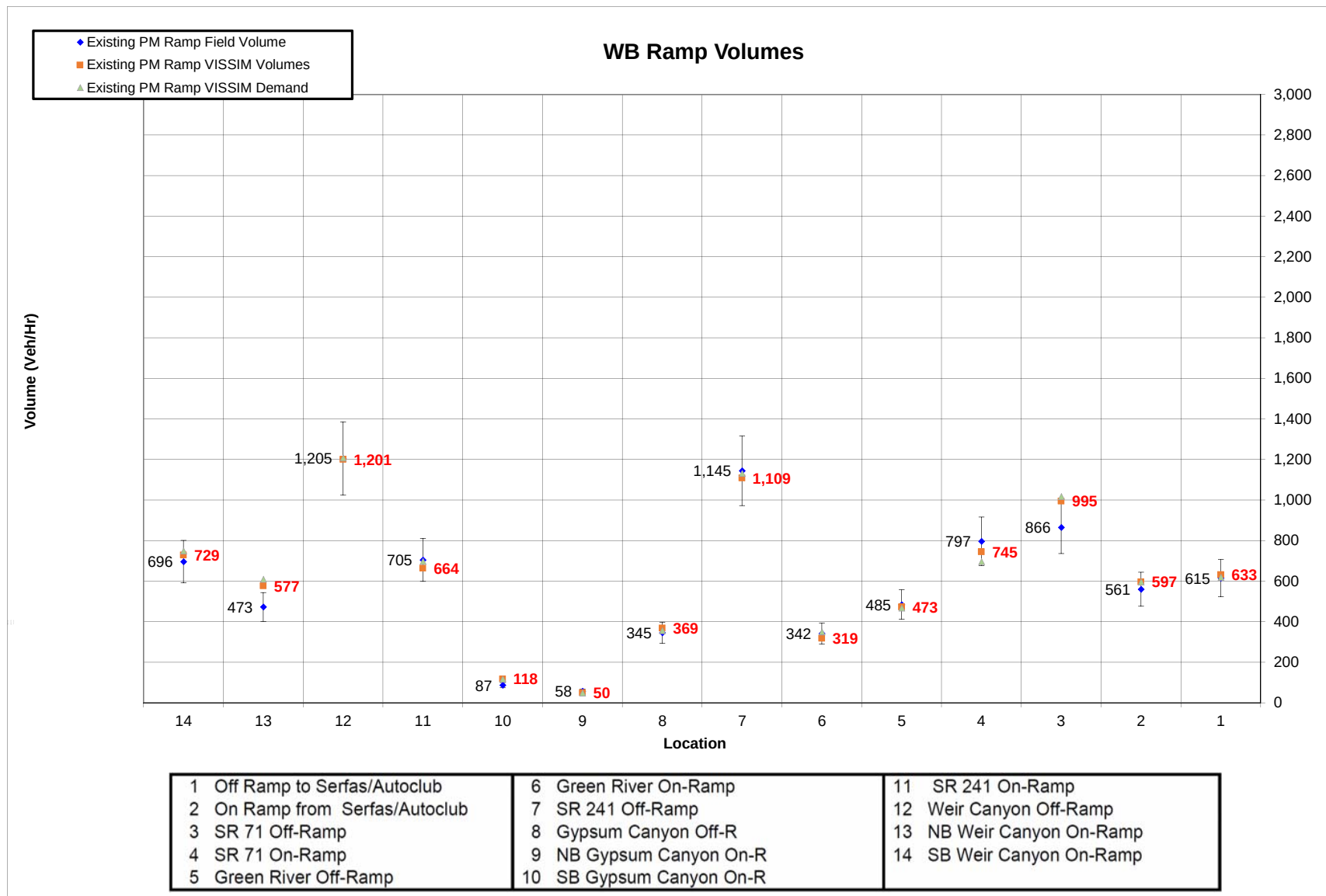


EB Express Lane Speeds

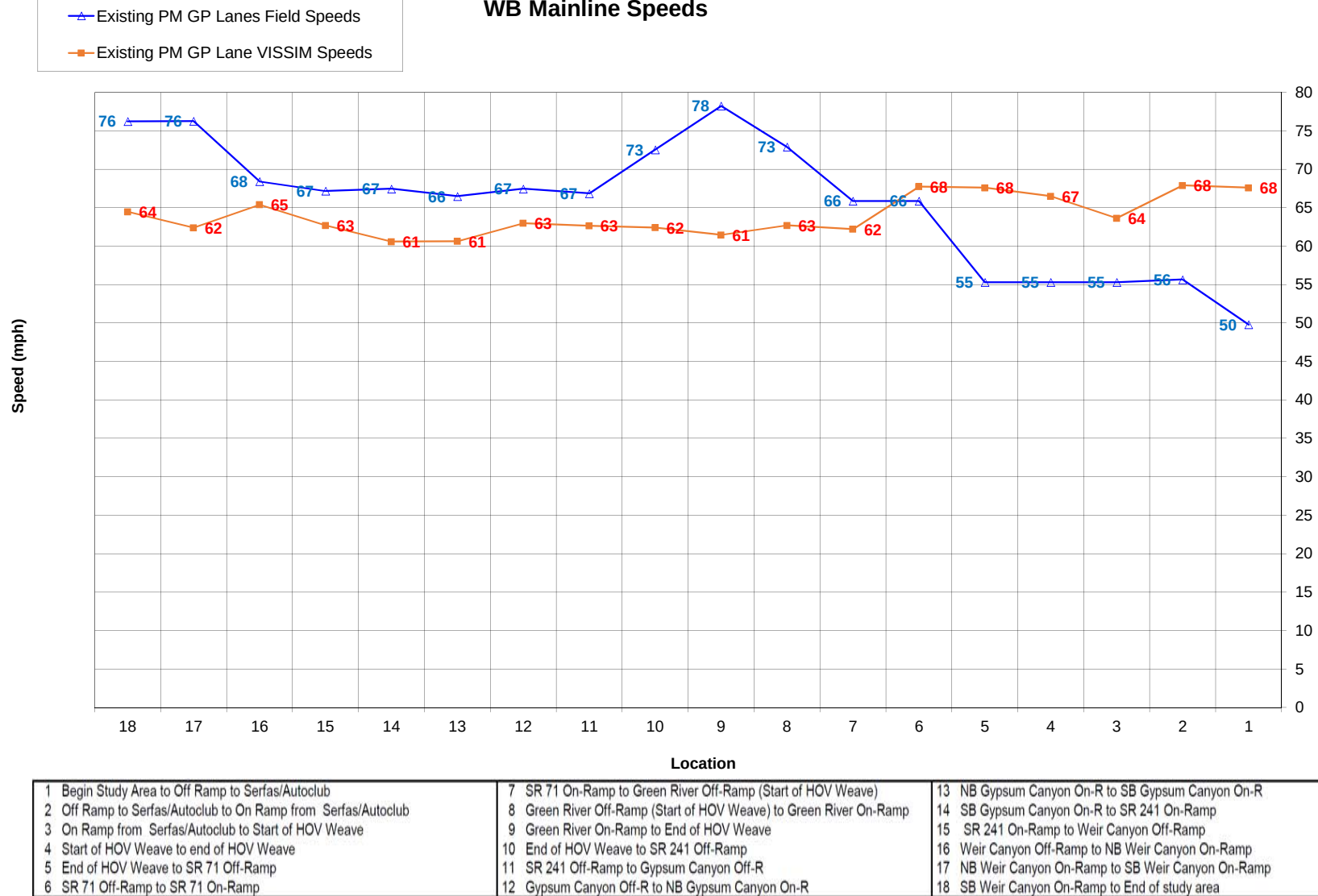


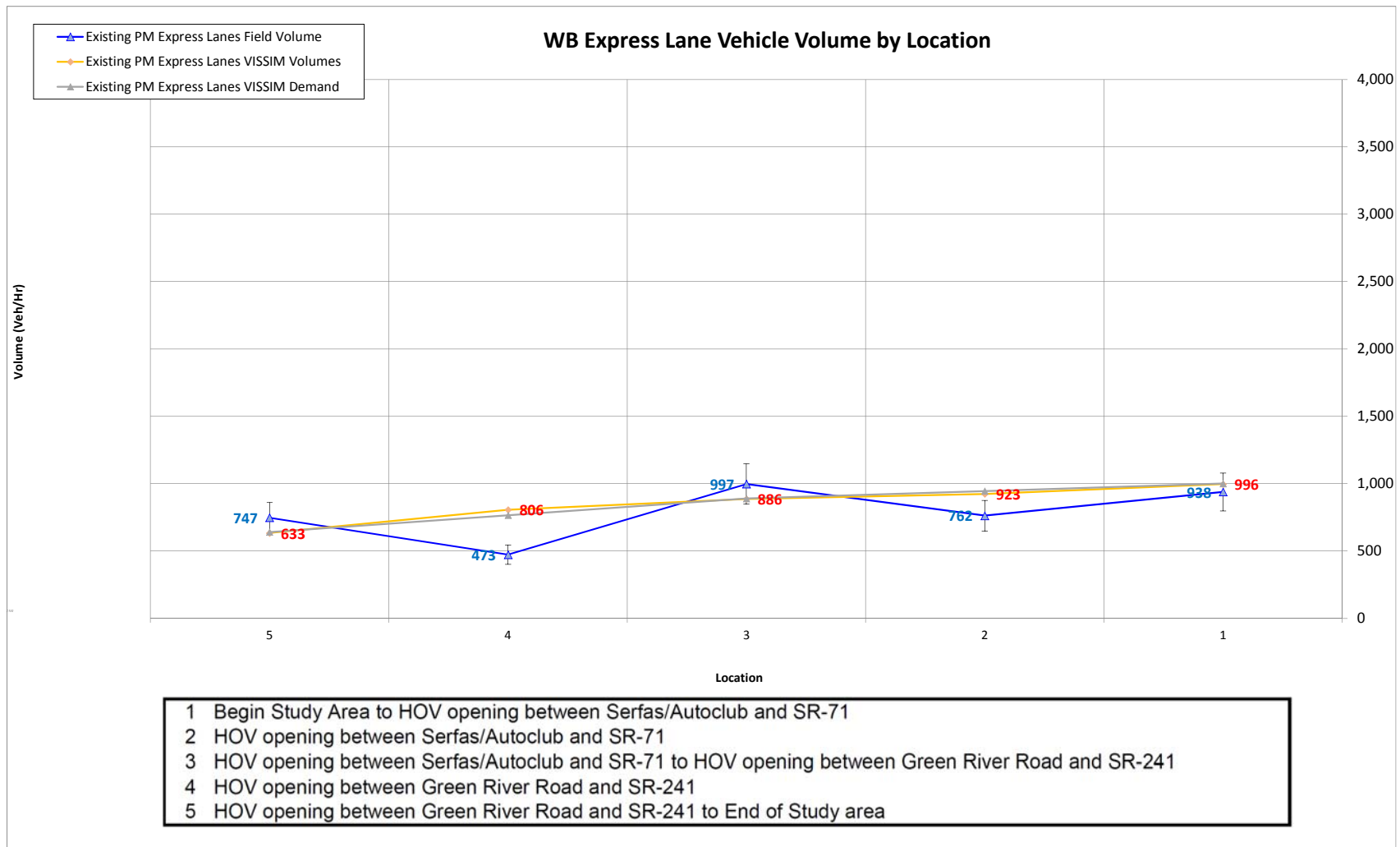
- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

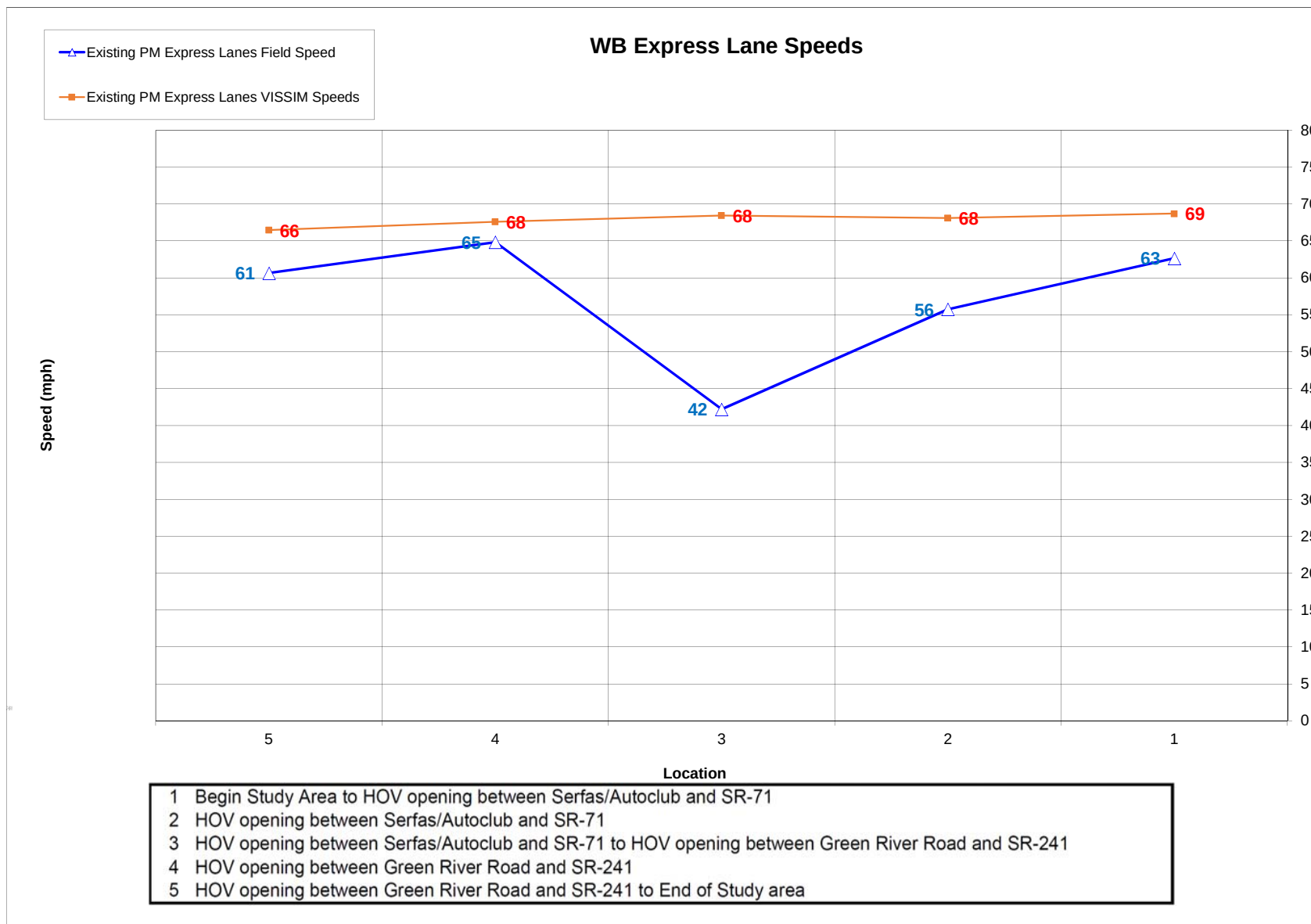




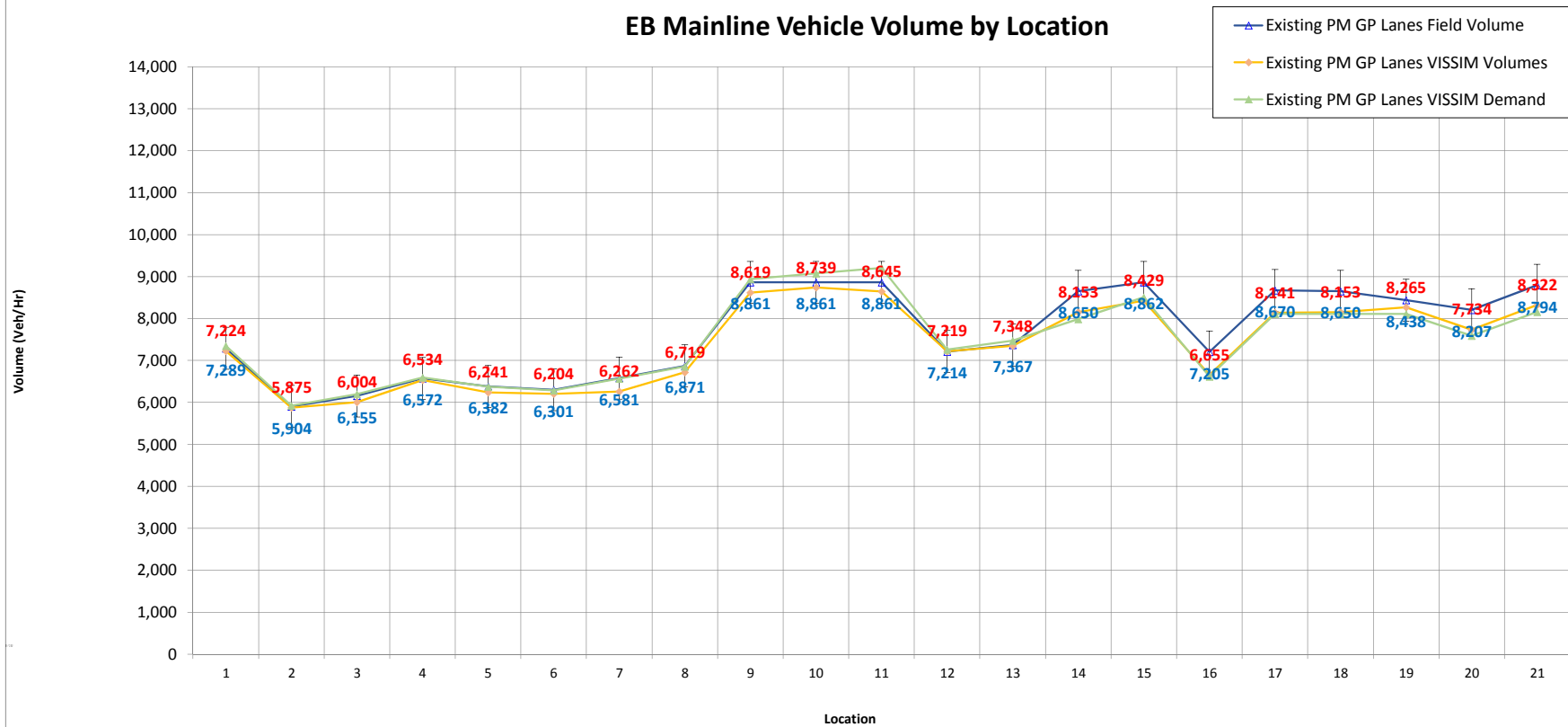
WB Mainline Speeds



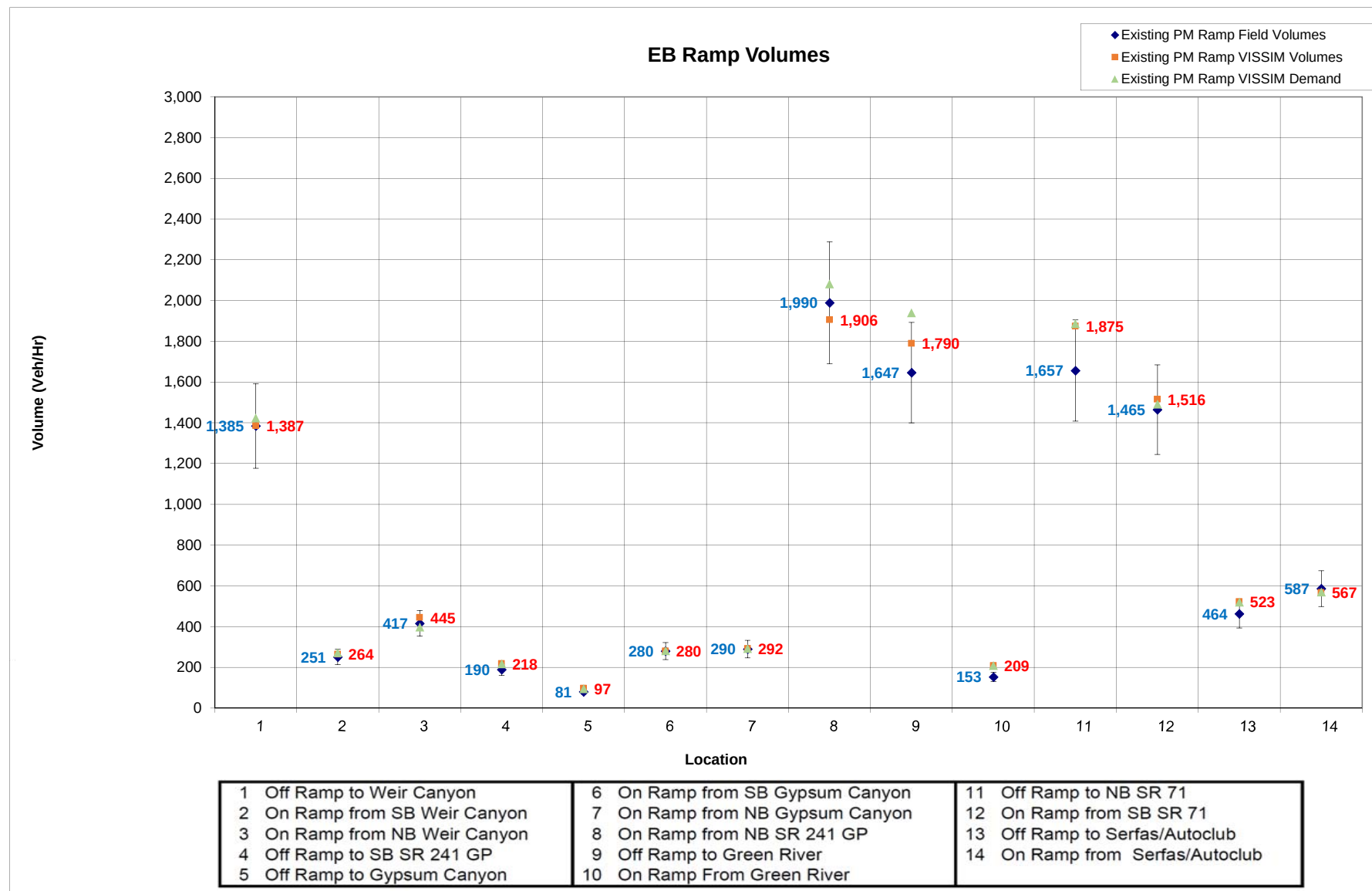




EB Mainline Vehicle Volume by Location

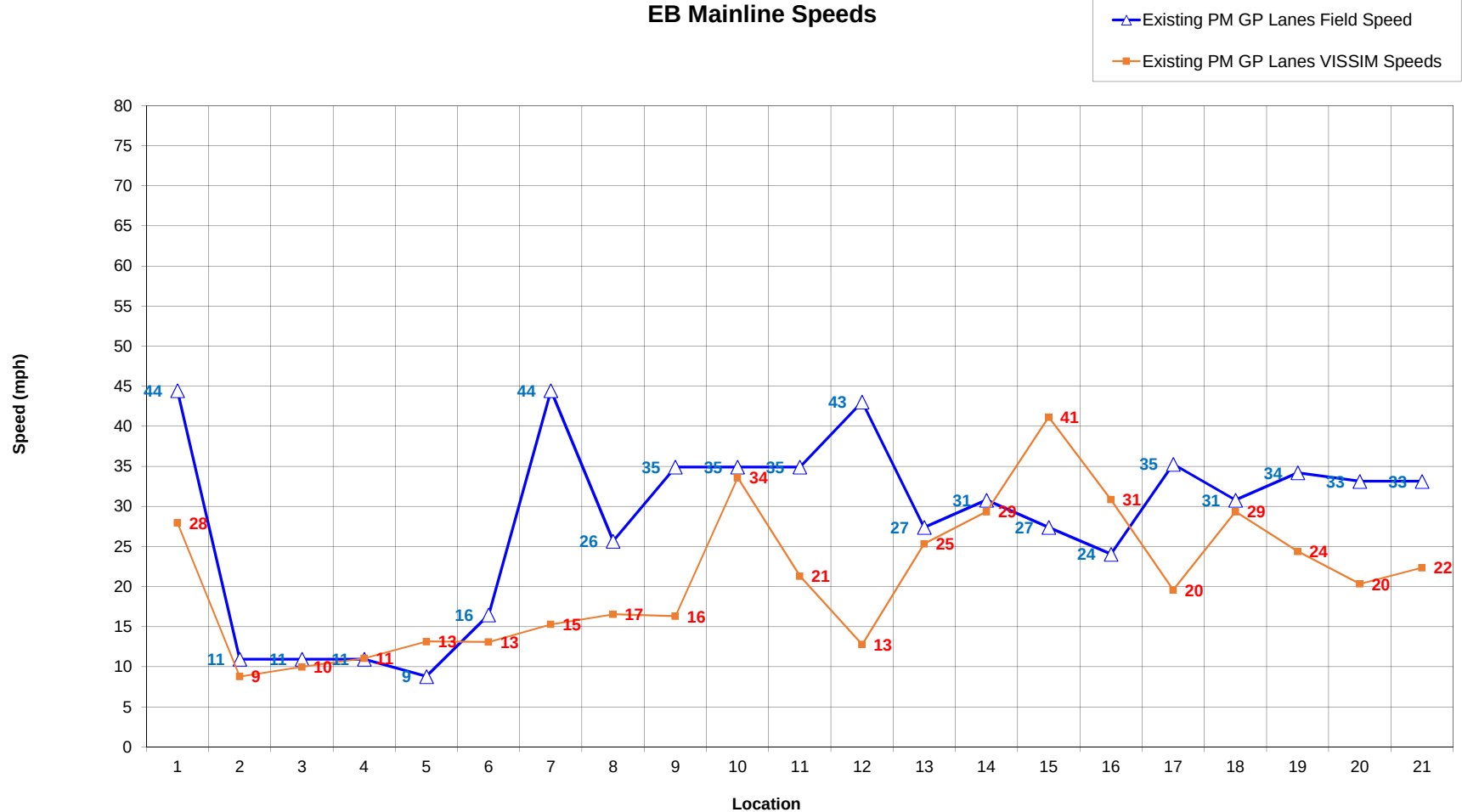


1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

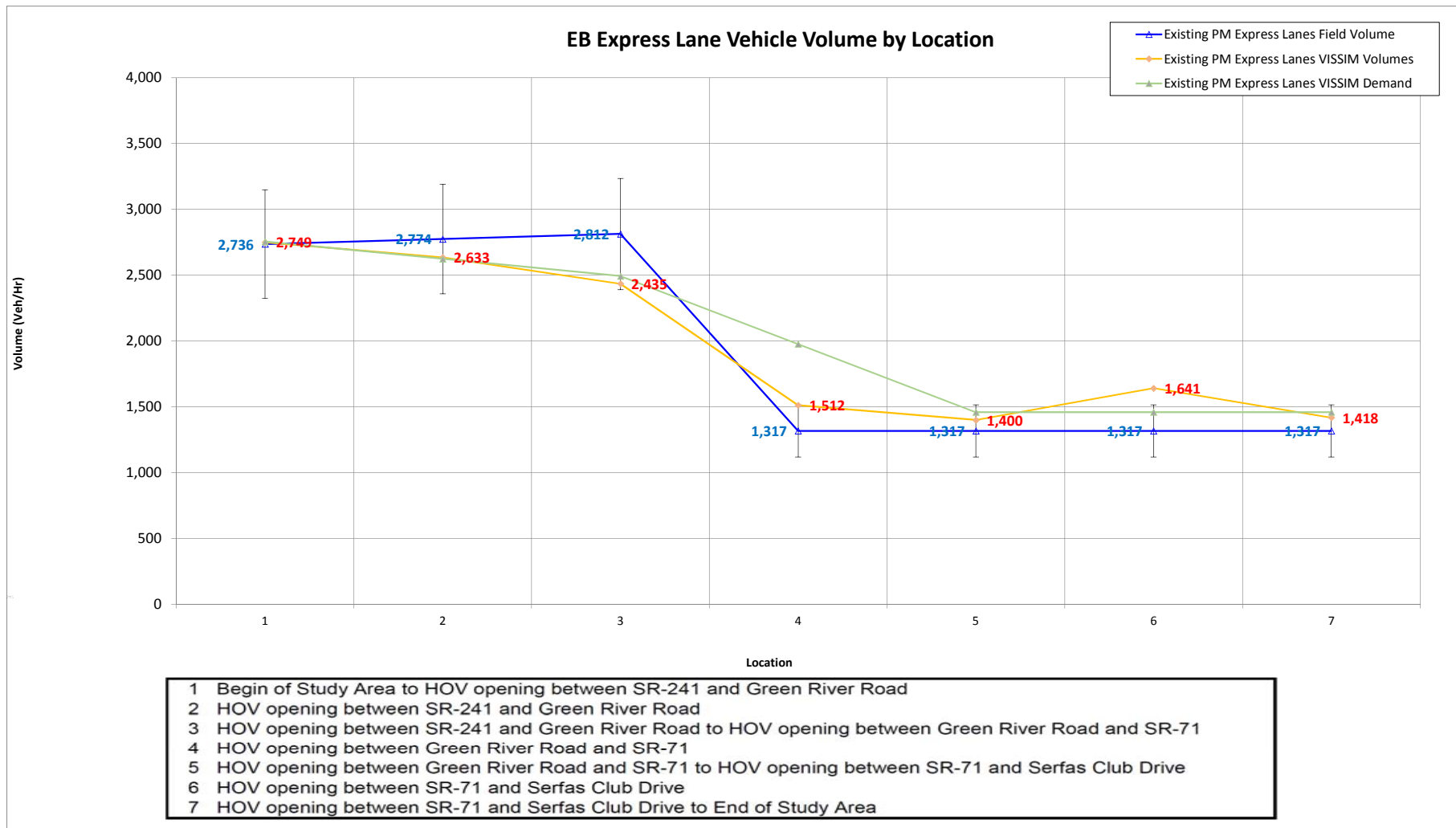


Charts 5-6 PM-Calibration

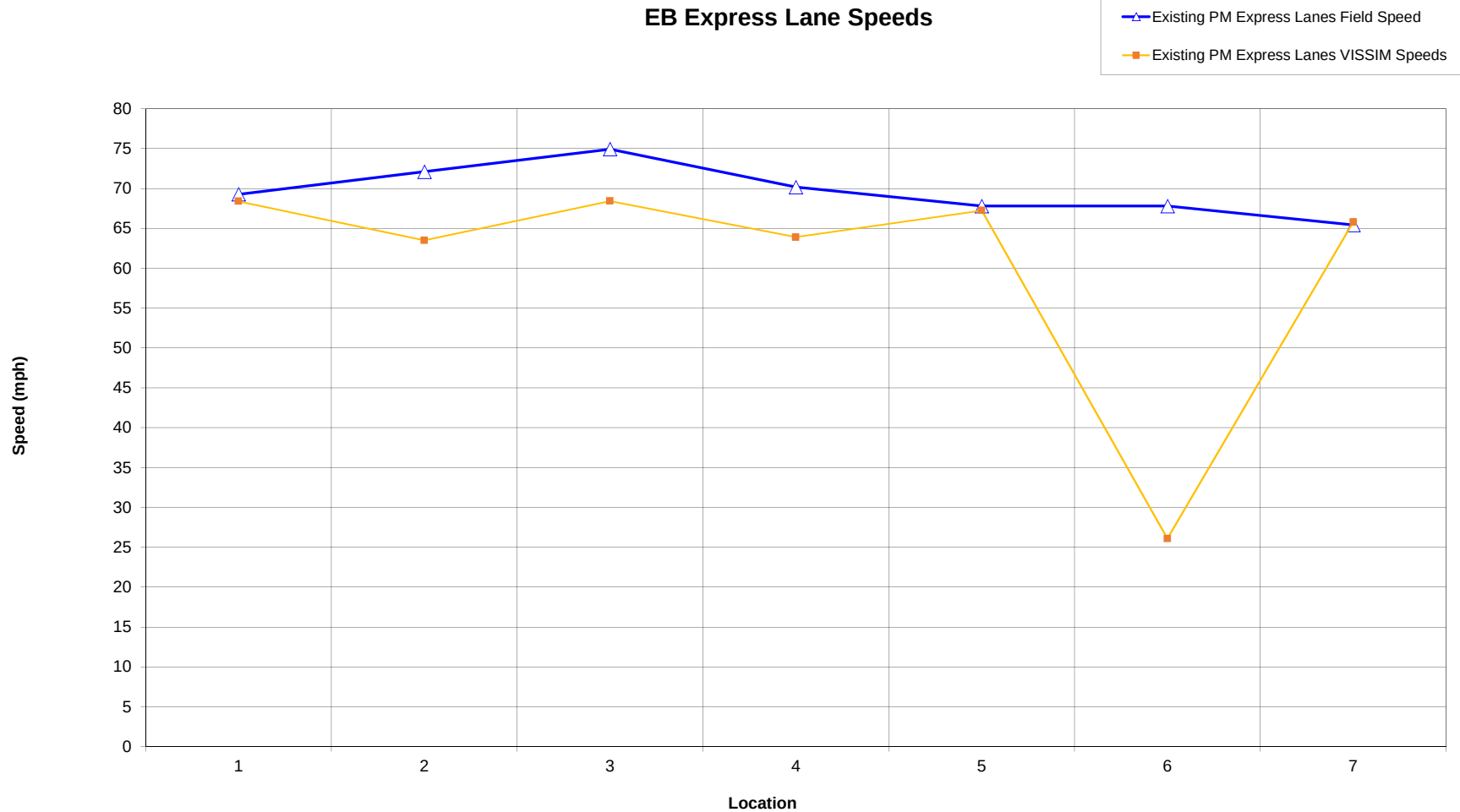
EB Mainline Speeds



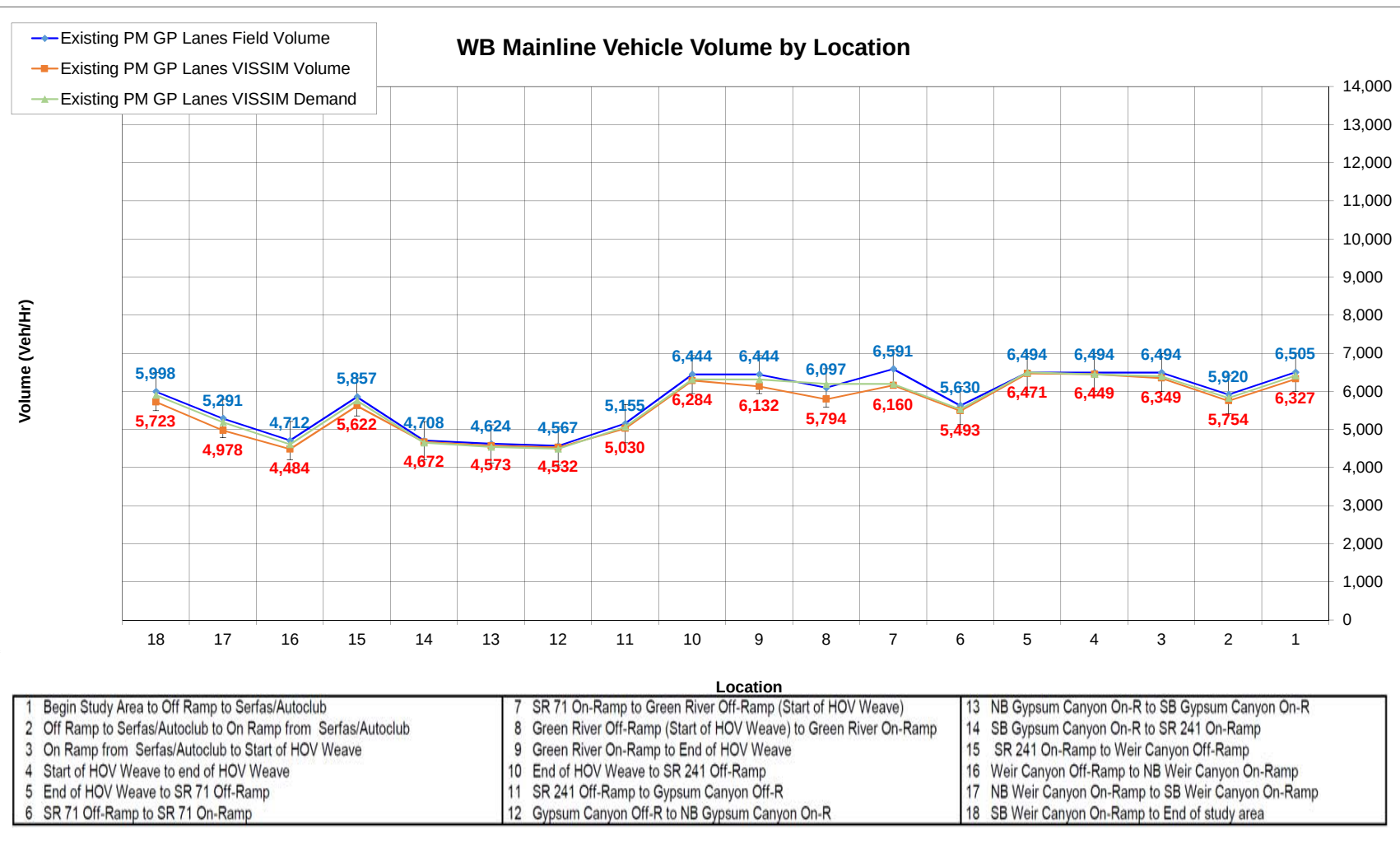
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



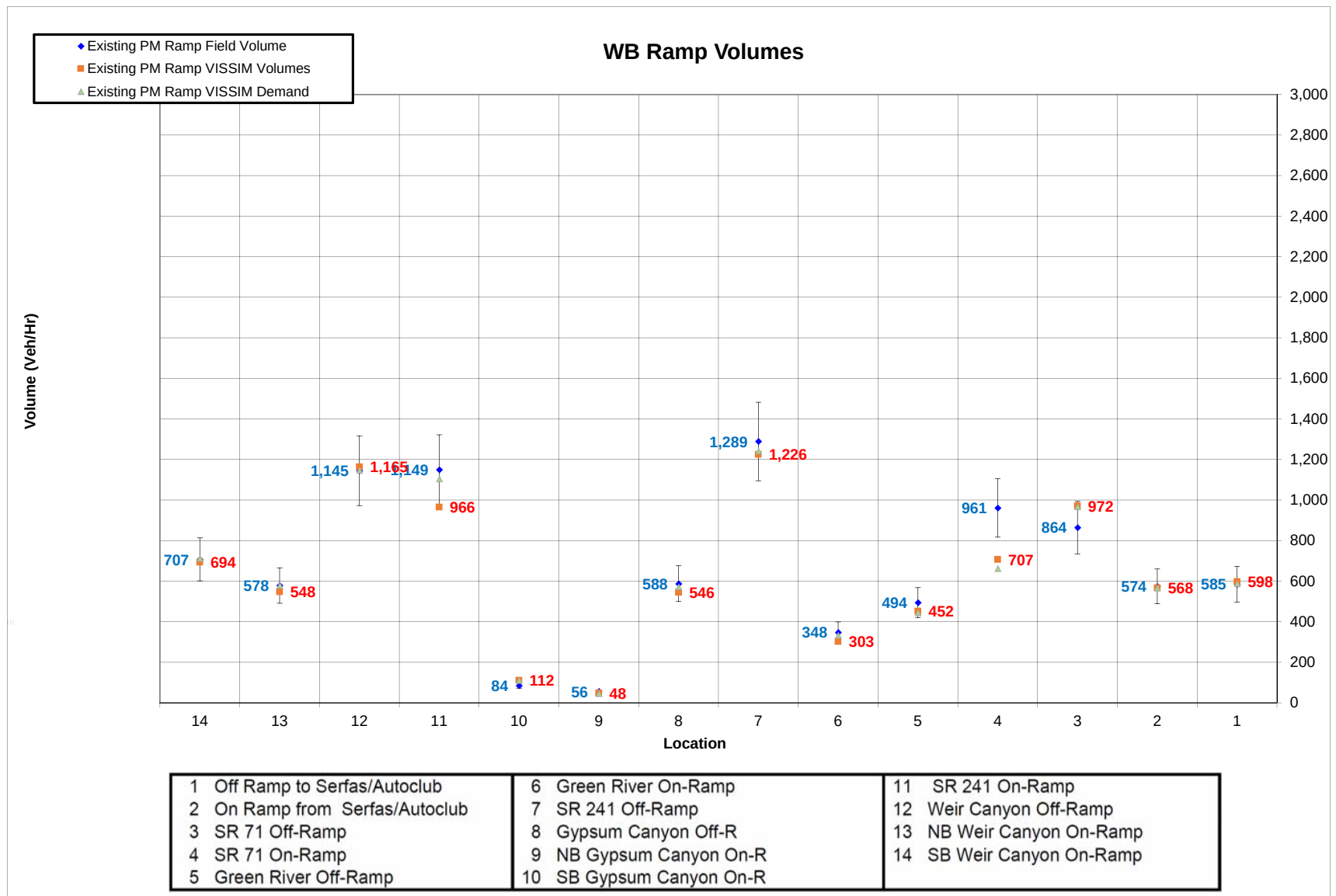
EB Express Lane Speeds



- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

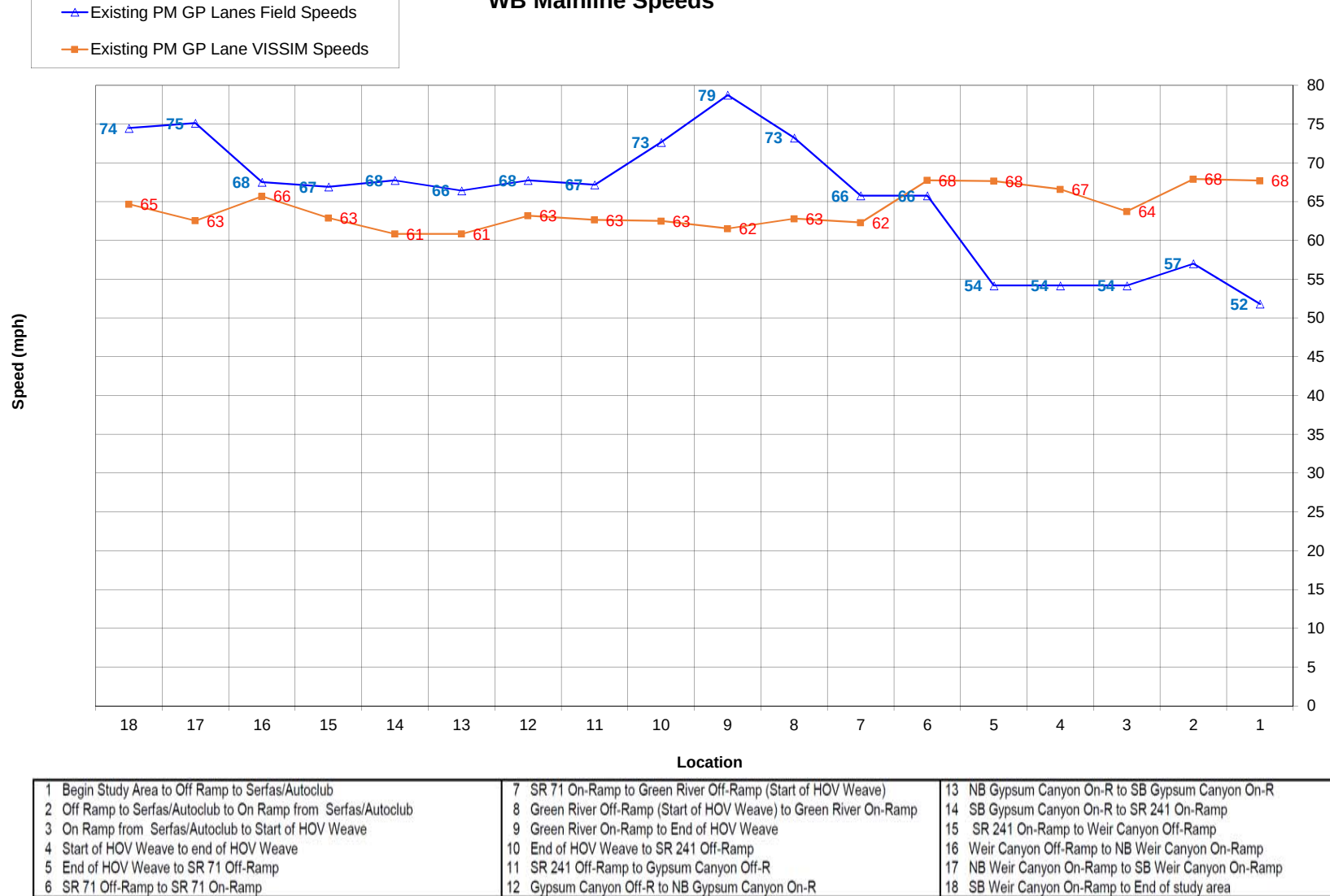


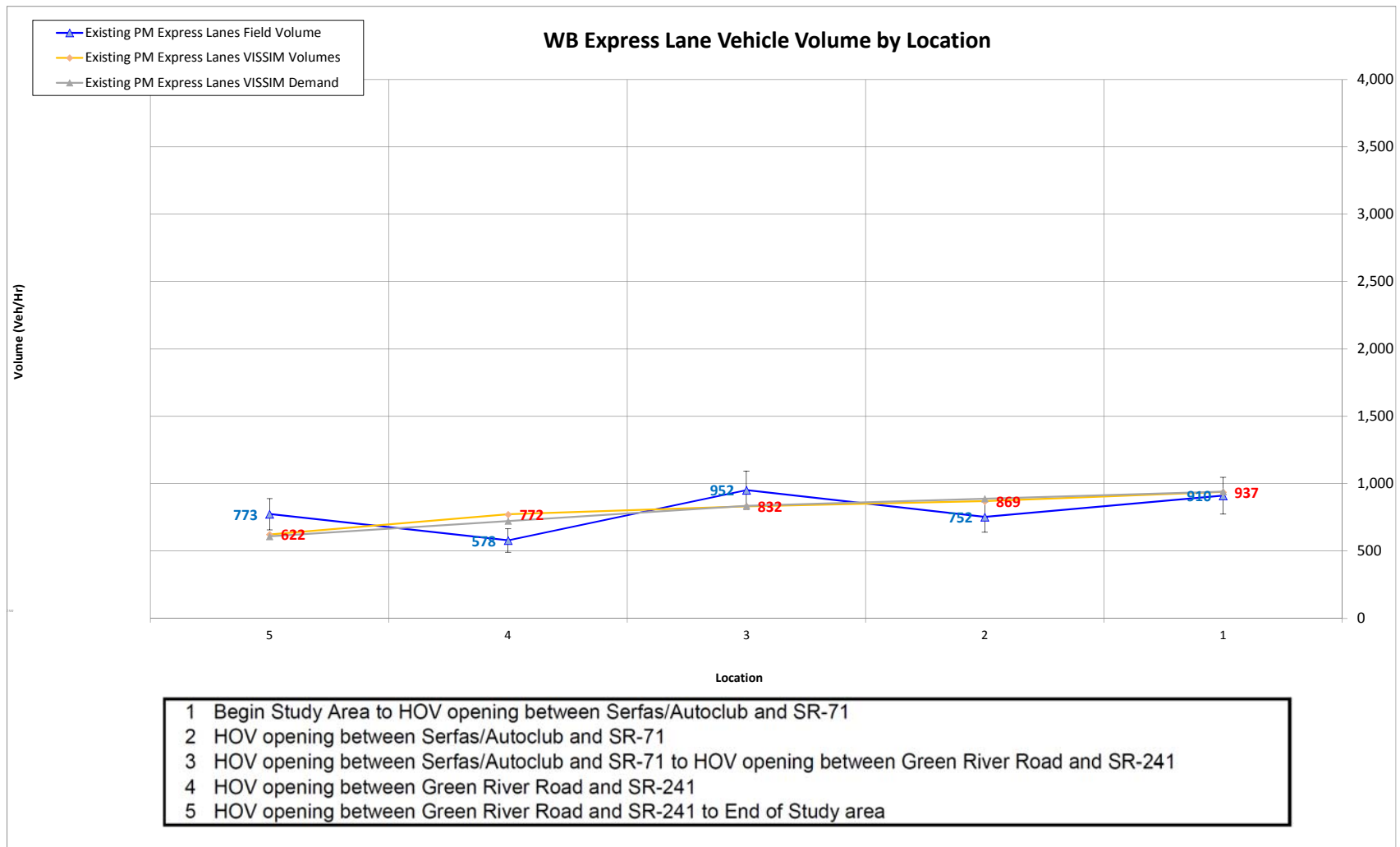
Charts 5-6 PM-Calibration

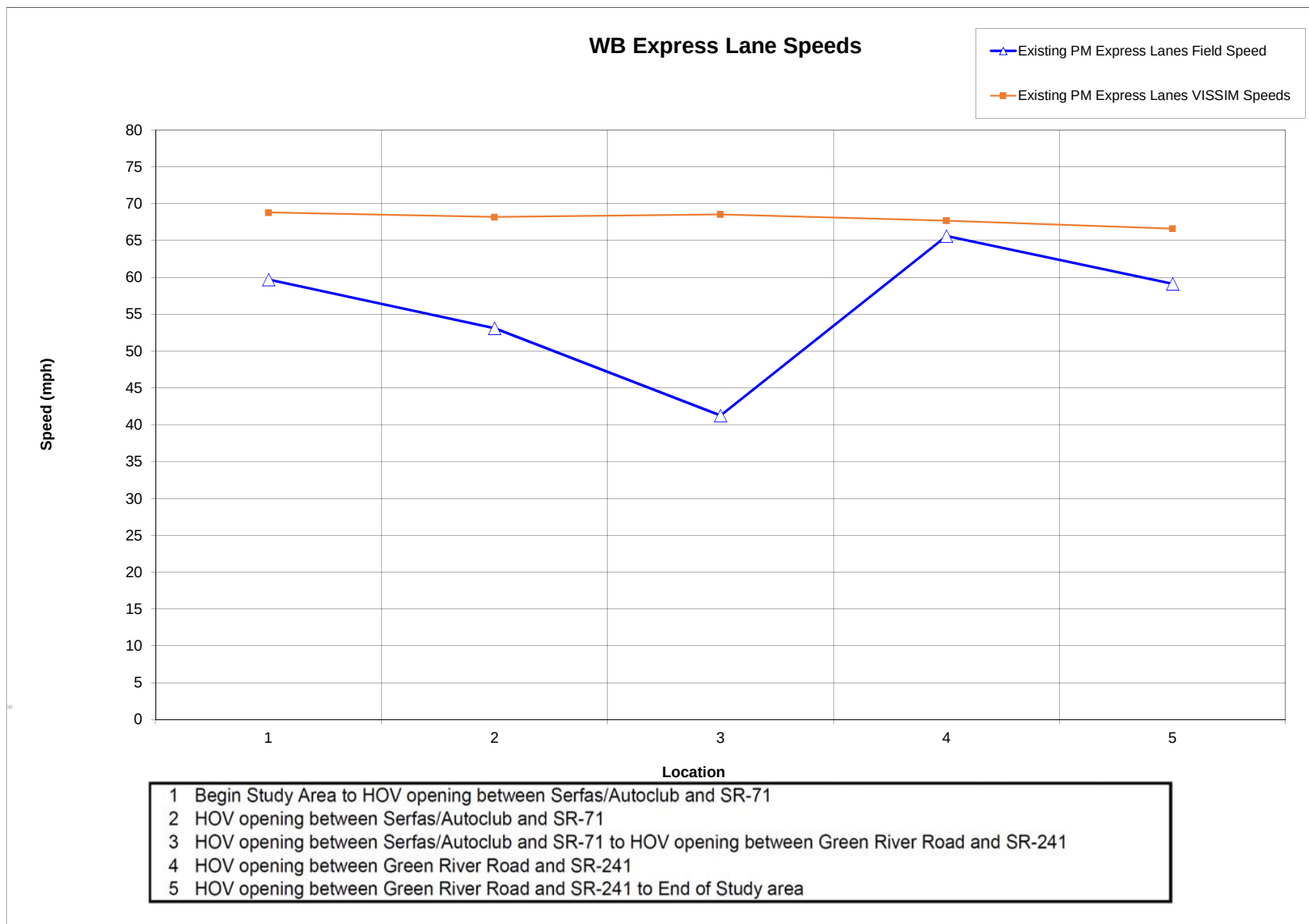


Charts 5-6 PM-Calibration

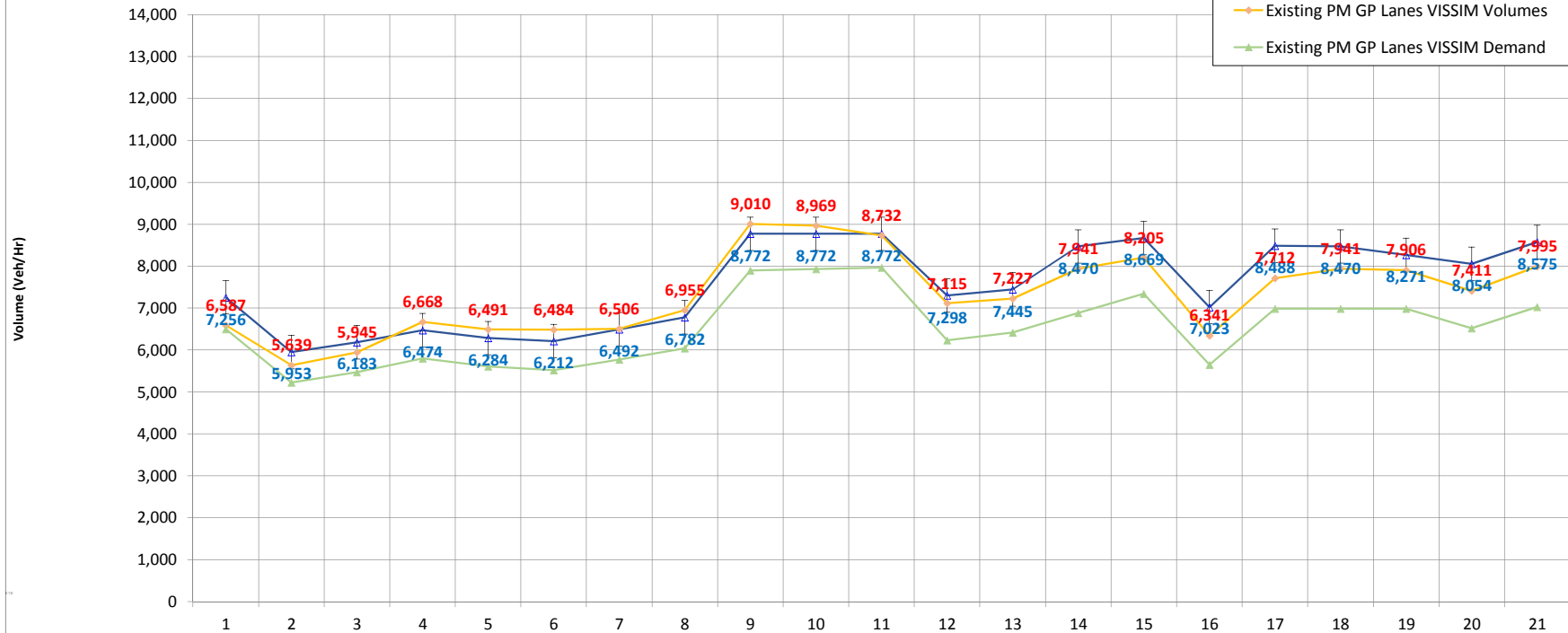
WB Mainline Speeds



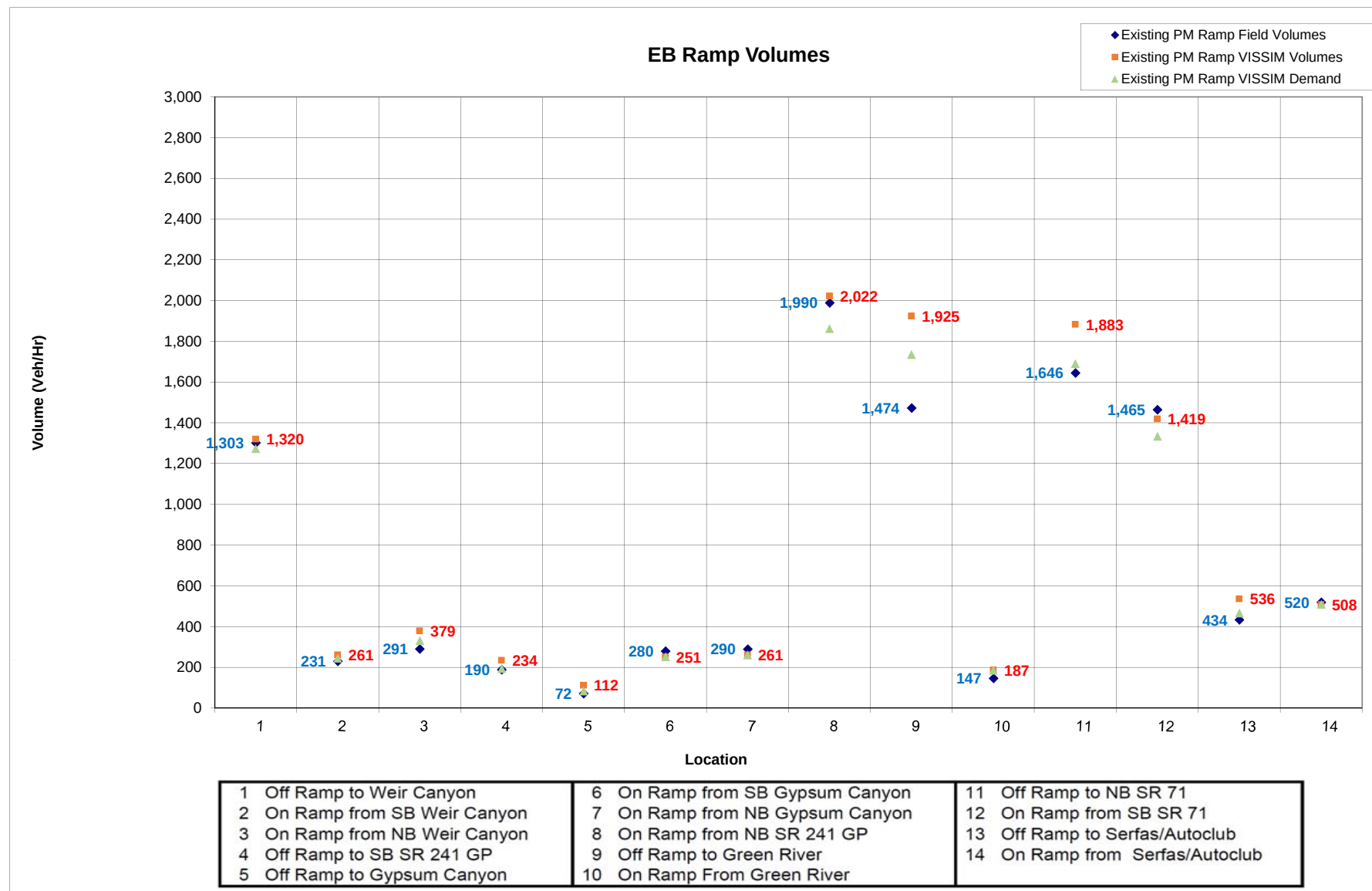




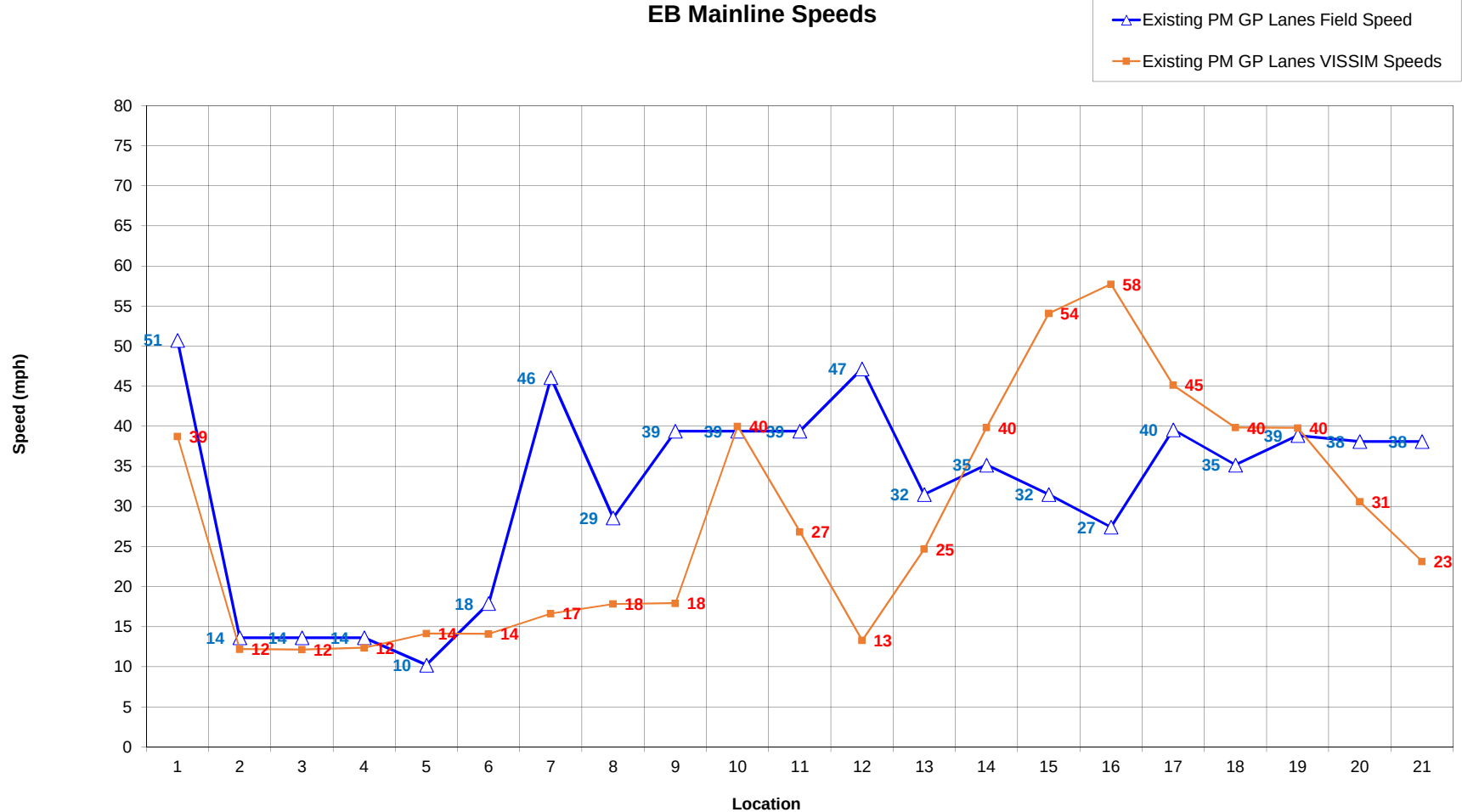
EB Mainline Vehicle Volume by Location



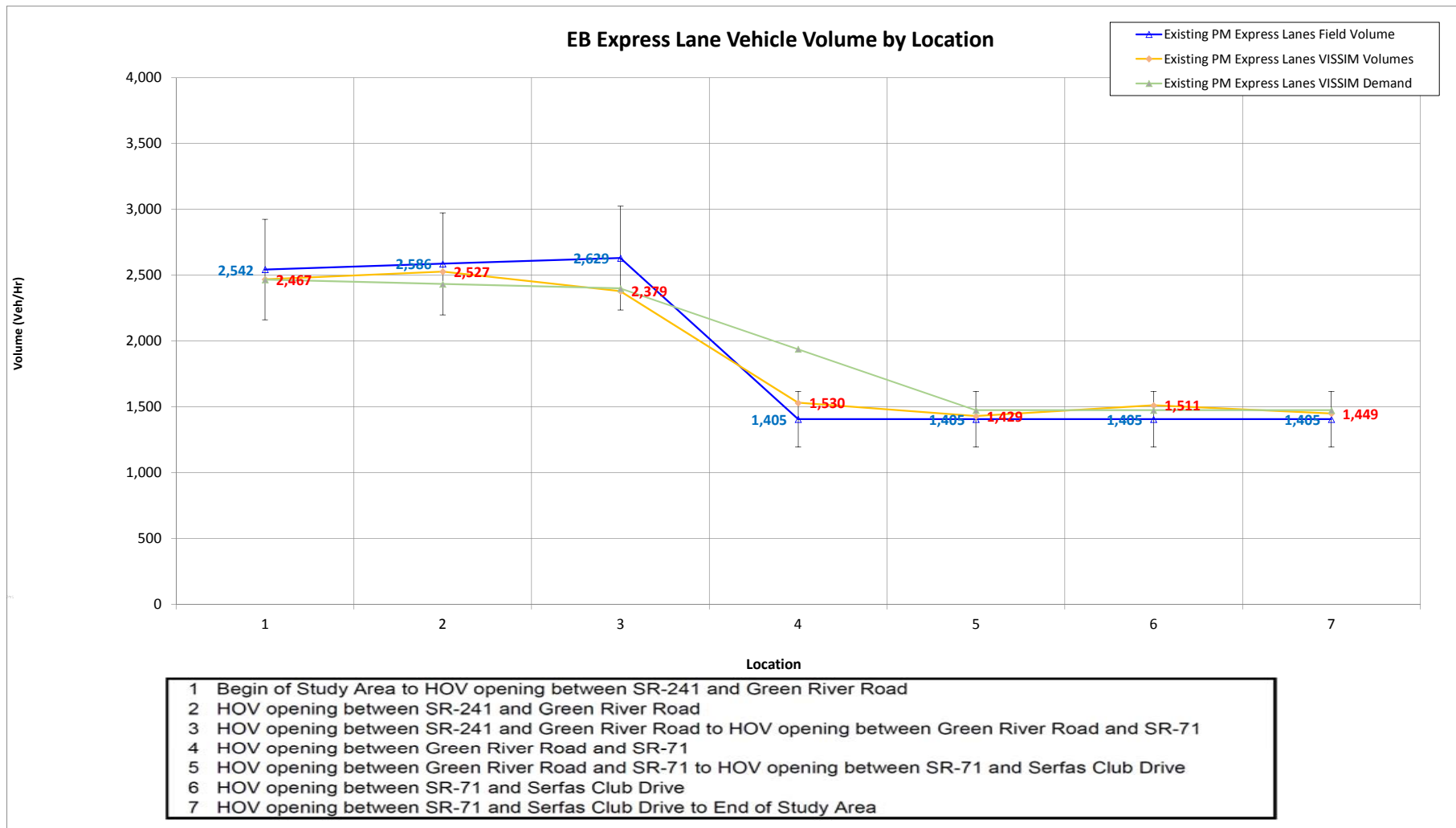
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple



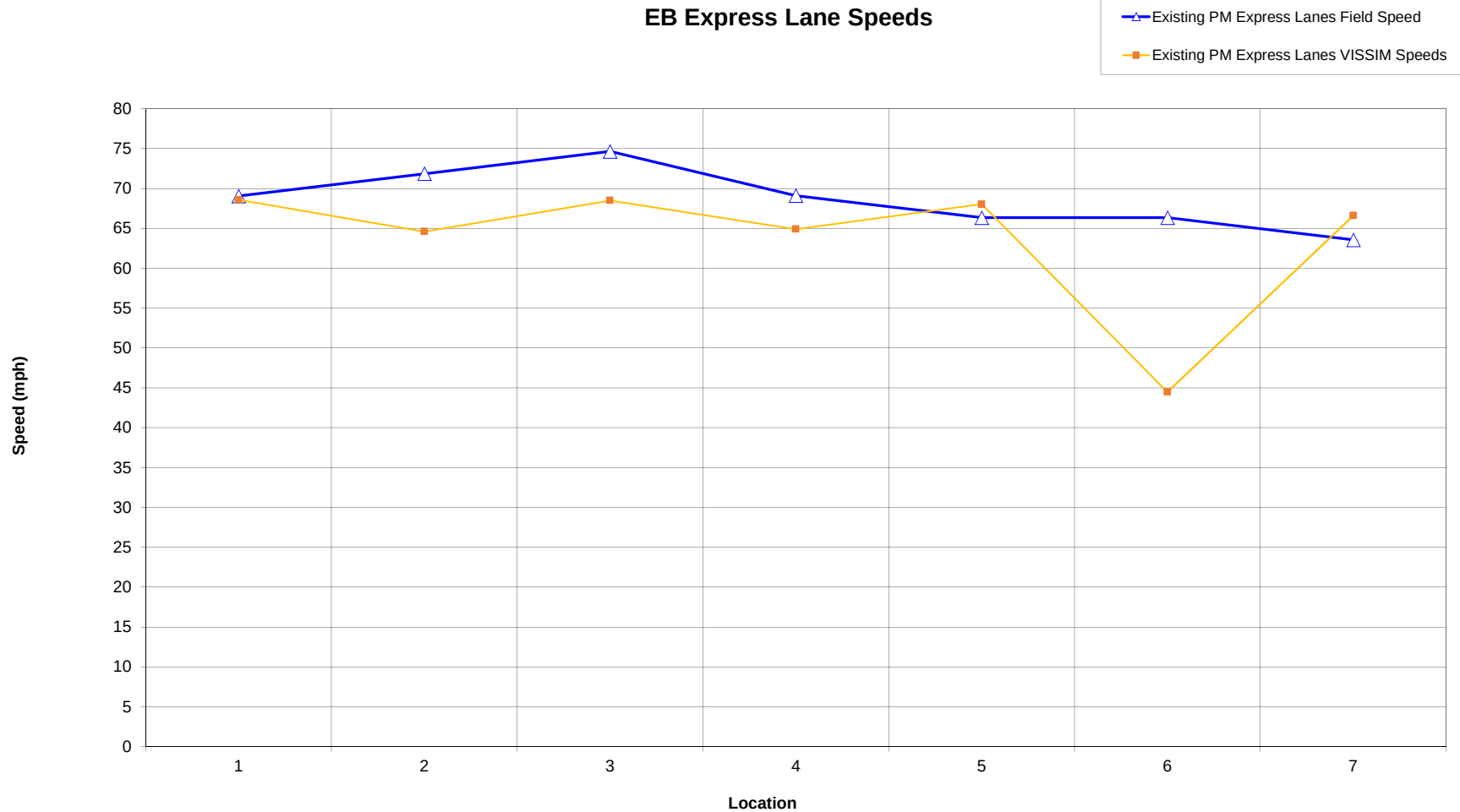
EB Mainline Speeds



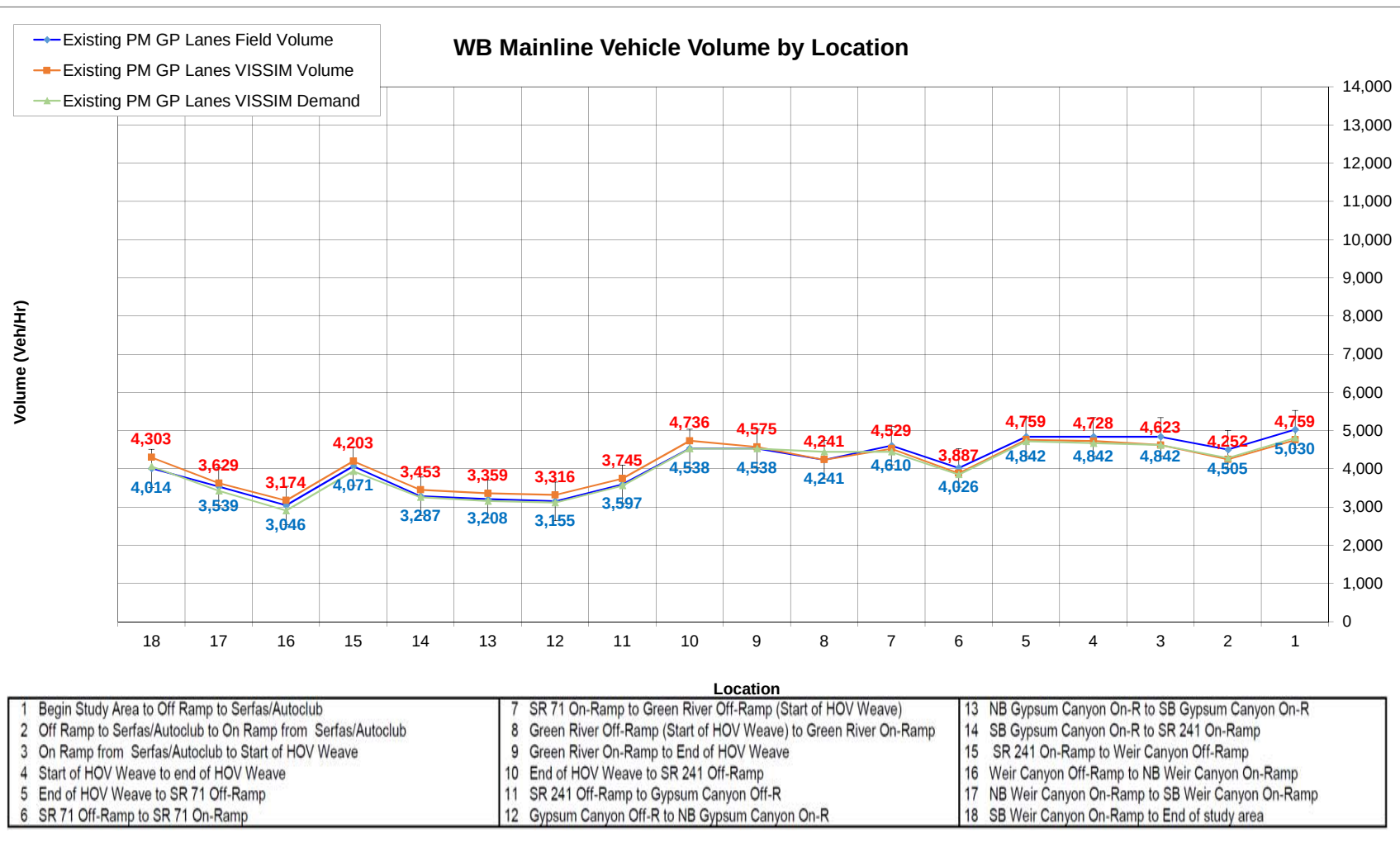
1 Begin Study Area to Off Ramp to Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	15 End of HOV weave to SR 71 Off-Ramp
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	16 SR 71 Off-Ramp to On Ramp from SB SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	10 Start Managed Lanes Weave to End Managed Lanes Weave	17 On Ramp from SB SR 71 to Start of HOV Weave
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	11 End Managed Lanes Weave to Off Ramp to Green River	18 Start of HOV weave to End of HOV weave
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	19 End of HOV weave to Off Ramp to Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	13 On Ramp From Green River to Start of HOV Weave	20 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	14 Start of HOV weave to End of HOV weave	21 On Ramp from Serfas/Autoclub to Off Ramp to EB Maple

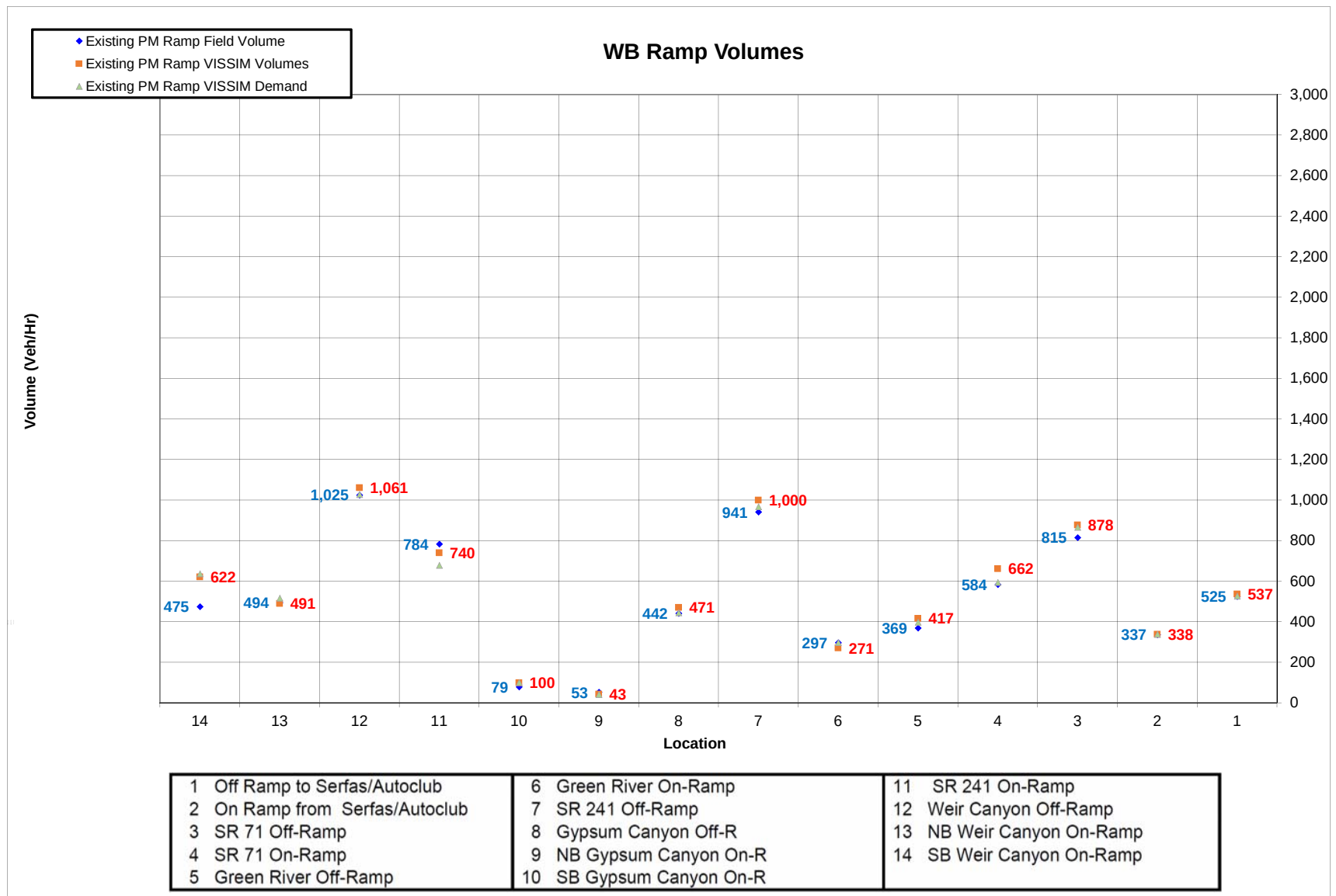


EB Express Lane Speeds



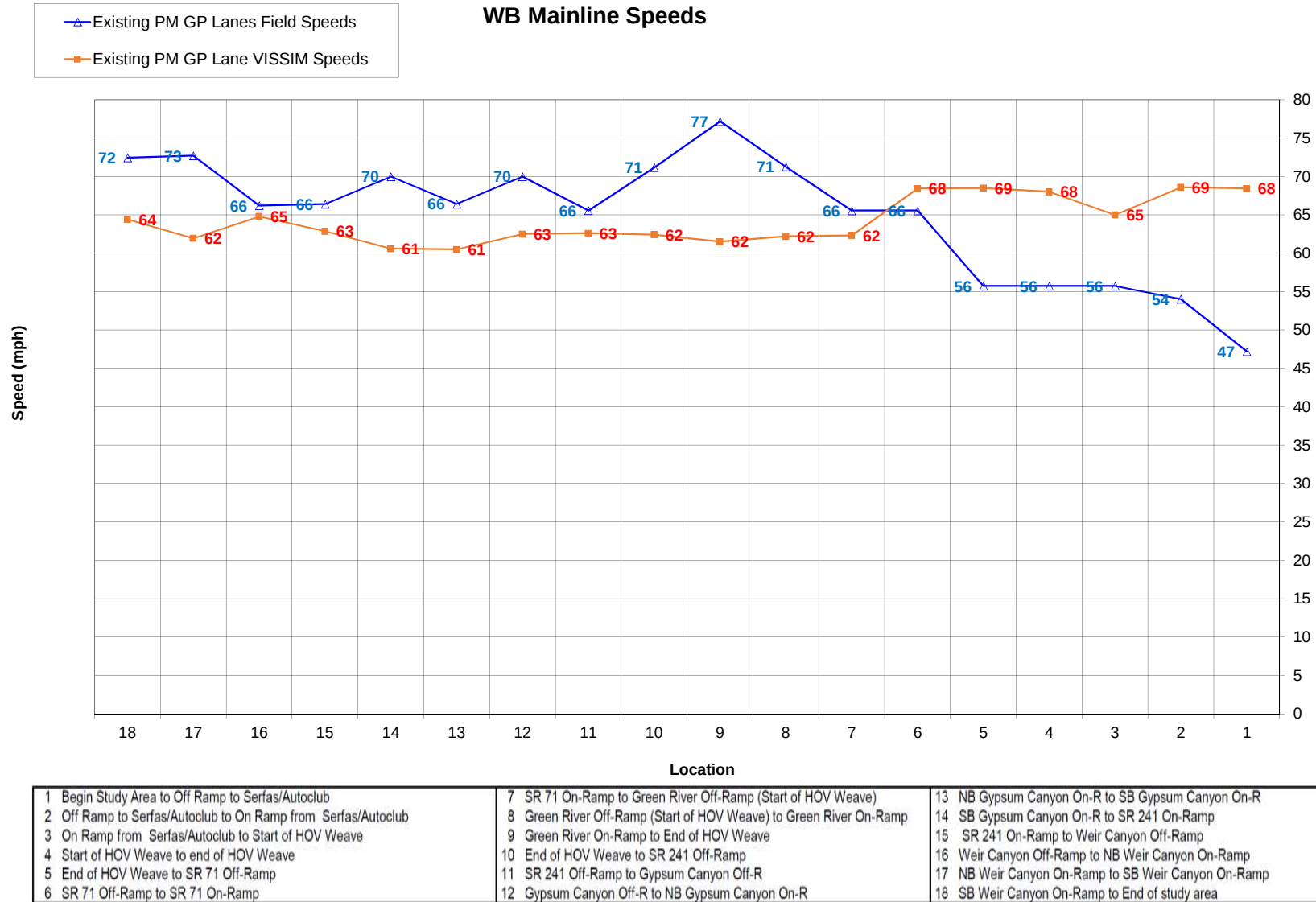
- 1 Begin of Study Area to HOV opening between SR-241 and Green River Road
- 2 HOV opening between SR-241 and Green River Road
- 3 HOV opening between SR-241 and Green River Road to HOV opening between Green River Road and SR-71
- 4 HOV opening between Green River Road and SR-71
- 5 HOV opening between Green River Road and SR-71 to HOV opening between SR-71 and Serfas Club Drive
- 6 HOV opening between SR-71 and Serfas Club Drive
- 7 HOV opening between SR-71 and Serfas Club Drive to End of Study Area

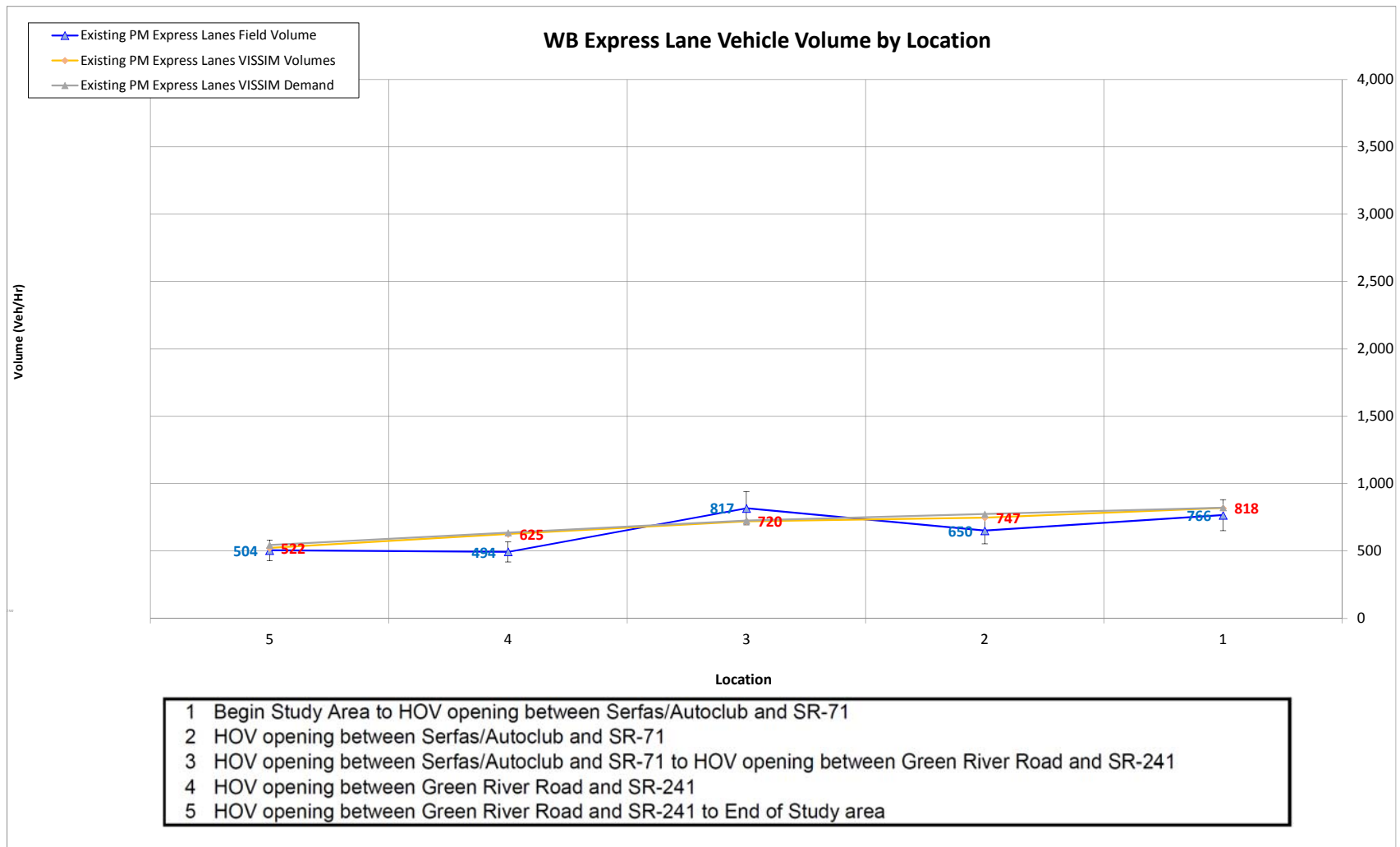


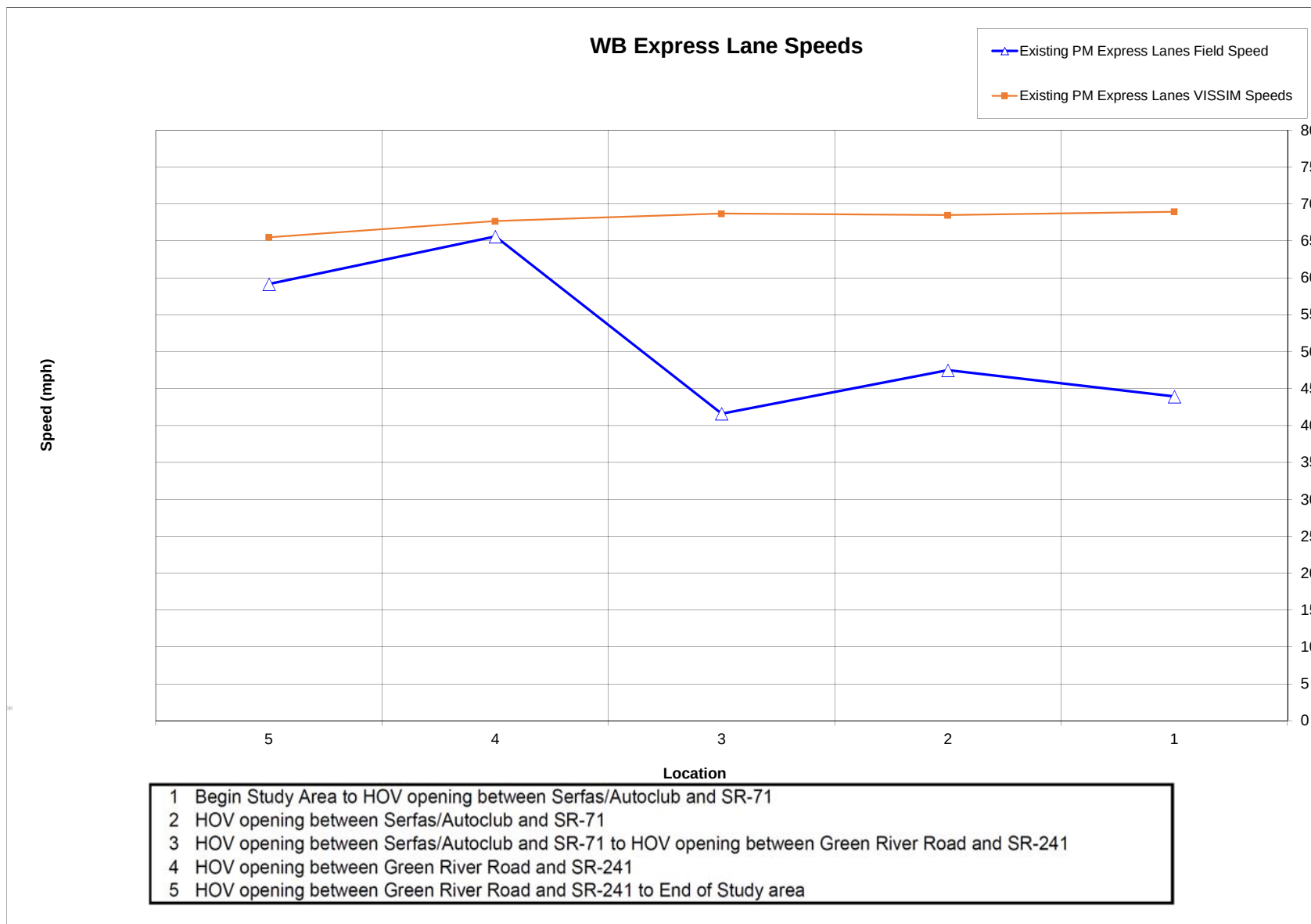


Charts 6-7 PM-Calibration

WB Mainline Speeds







Appendix C

VISSIM Summary of Results 2017 No Build Conditions

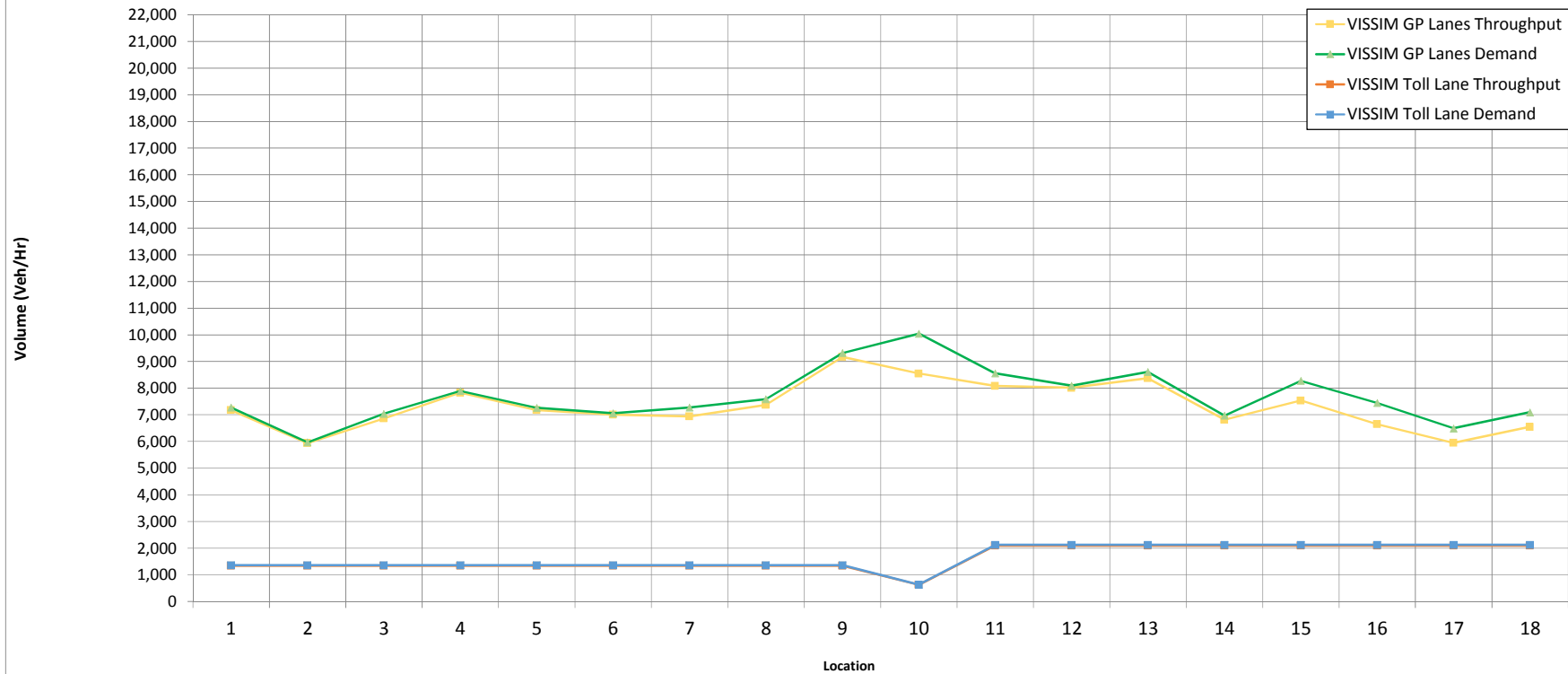
SR-91/241**Vissim Model Summary - 2017 No Build - AM Peak Period****Network Summary Statistics**

Parameter			2017 No Project	Difference	
Total Vehicle Demand (4 Hr)			100,741		
Total number of vehicles that did not reach their destination			9,016		
Total number of vehicles that have reached their destination			91,725		
Total vehicle-miles traveled (VMT)			796,551		
Total travel time, All Vehicle Types (VHT)			23,068		
Average speed [mph], All Vehicle Types			34.5		
Average delay time per vehicle [mins], All Vehicle Types			6.83		

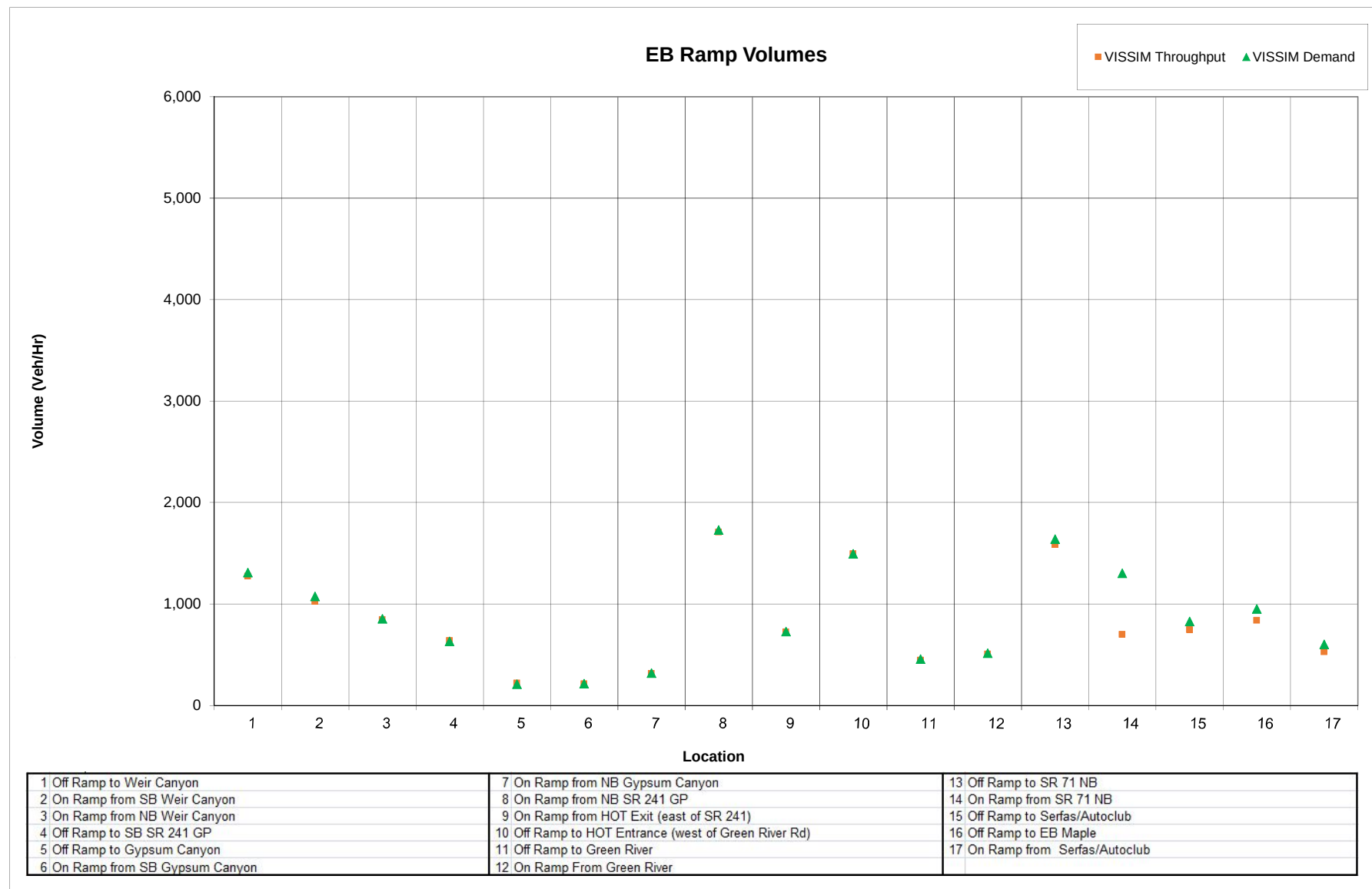
SR-91/241
Vissim Model Summary - 2017 No Build - AM Peak Period
Travel Time Results

#	Origin	#	Destination	p Key	Hide Travel Time			2017 AM No Build VISSIM Travel Time		
					Seg 1	Seg 2	Seg 3	6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	8.6	8.7	8.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	8.6	8.6	8.6
		5	SR 241 SB south of SR 91	3	1001			7.1	7.2	7.2
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	11.1	11.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.5	8.5	8.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.9	10.9	10.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	23.1	24.8	24.1
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	23.0	24.7	24.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	25.4	27.1	26.5
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			12.4	13.3	12.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	12.0	12.4	12.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	14.4	14.8	15.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.0	11.0	11.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9
		7	SR 71 NB north of SR 91	20	1007	1003	1004	13.4	13.4	13.4
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	43.0	54.1	55.9
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	42.9	54.0	55.8
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			28.7	37.2	38.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	45.3	56.4	58.3
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a

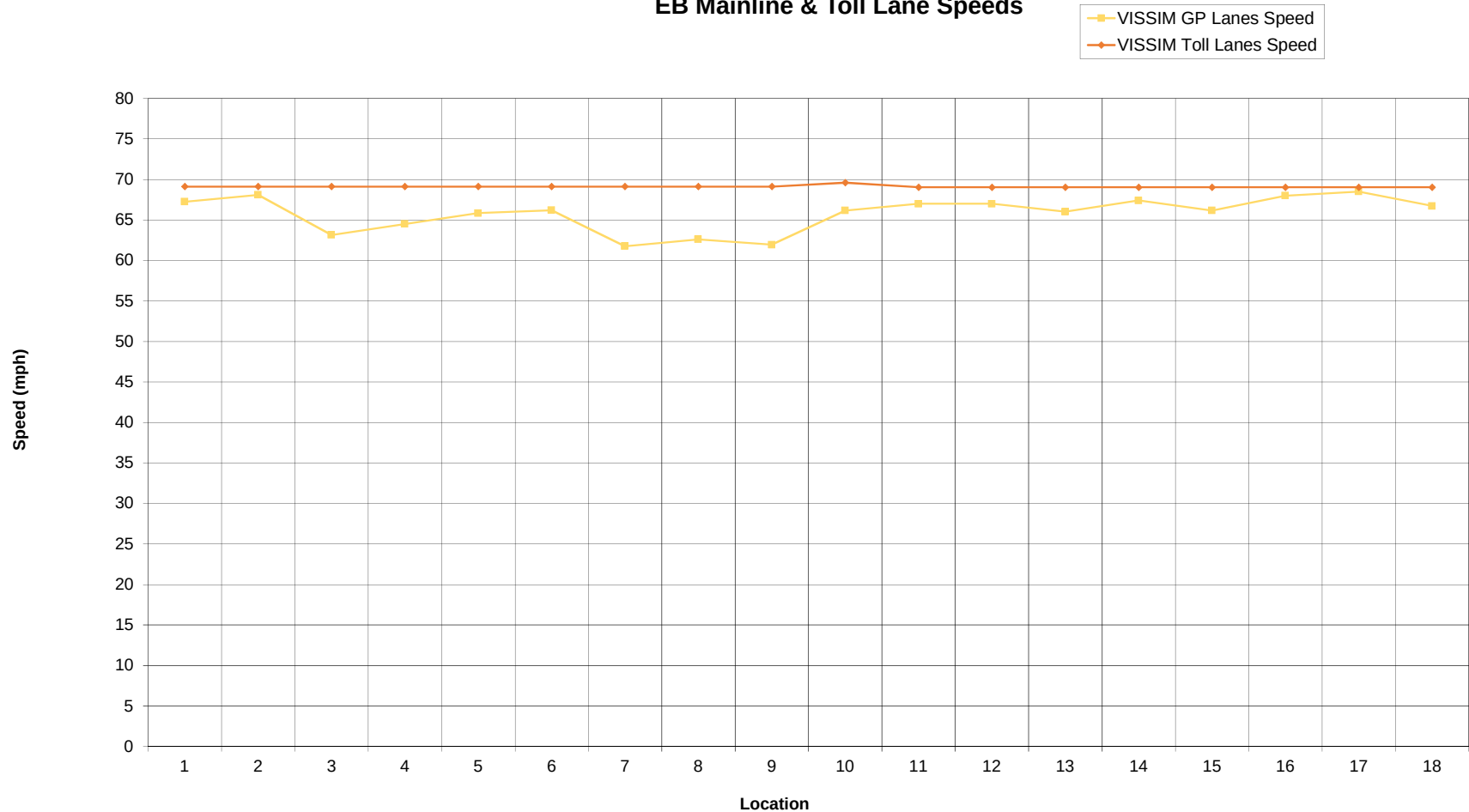
EB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

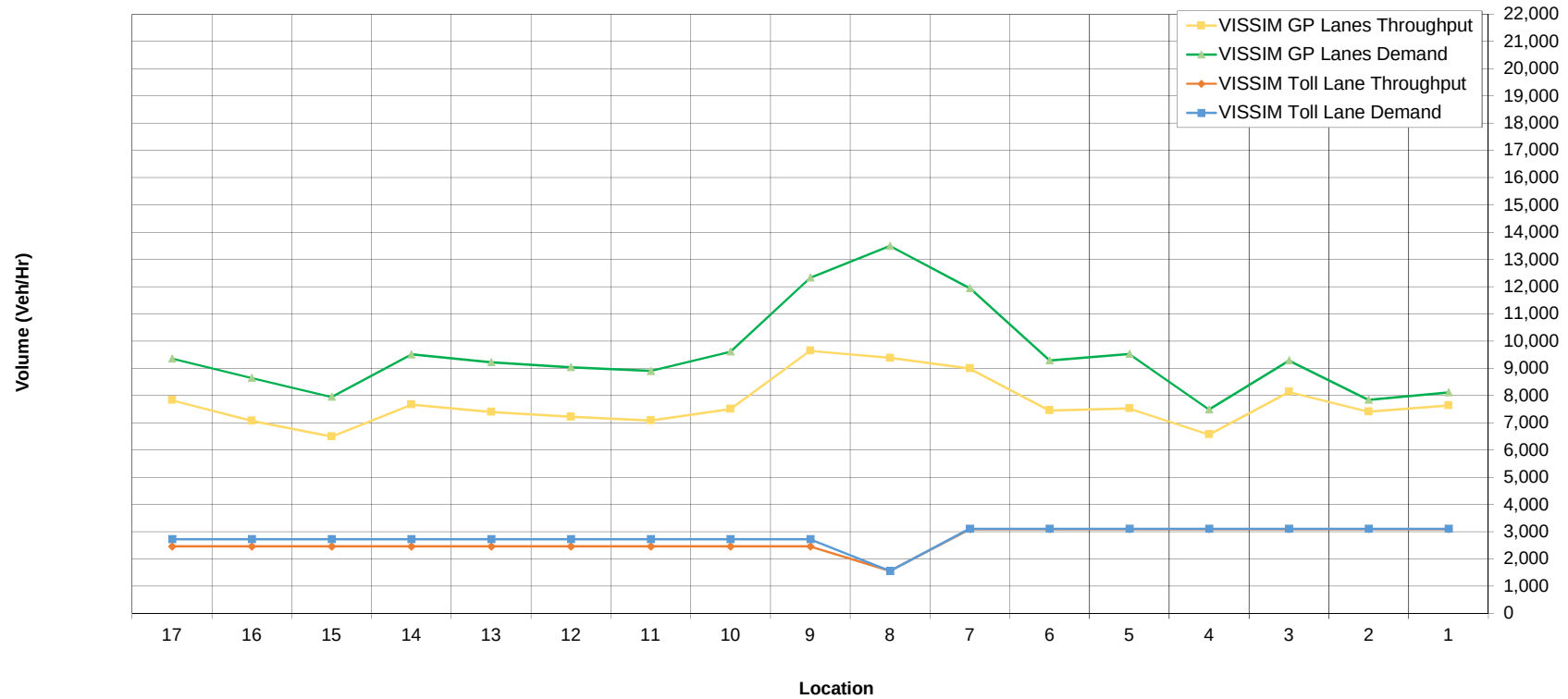


EB Mainline & Toll Lane Speeds

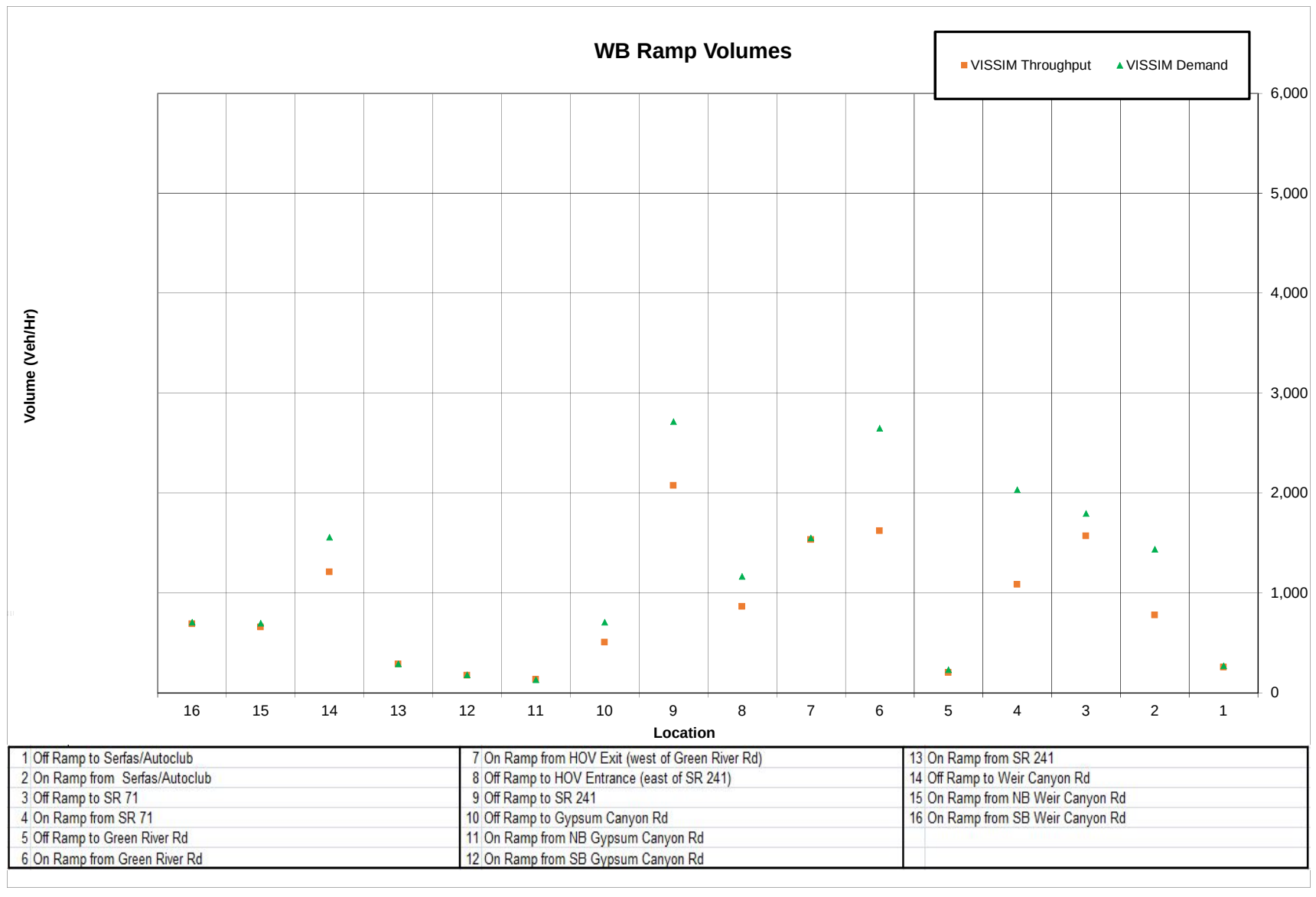


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

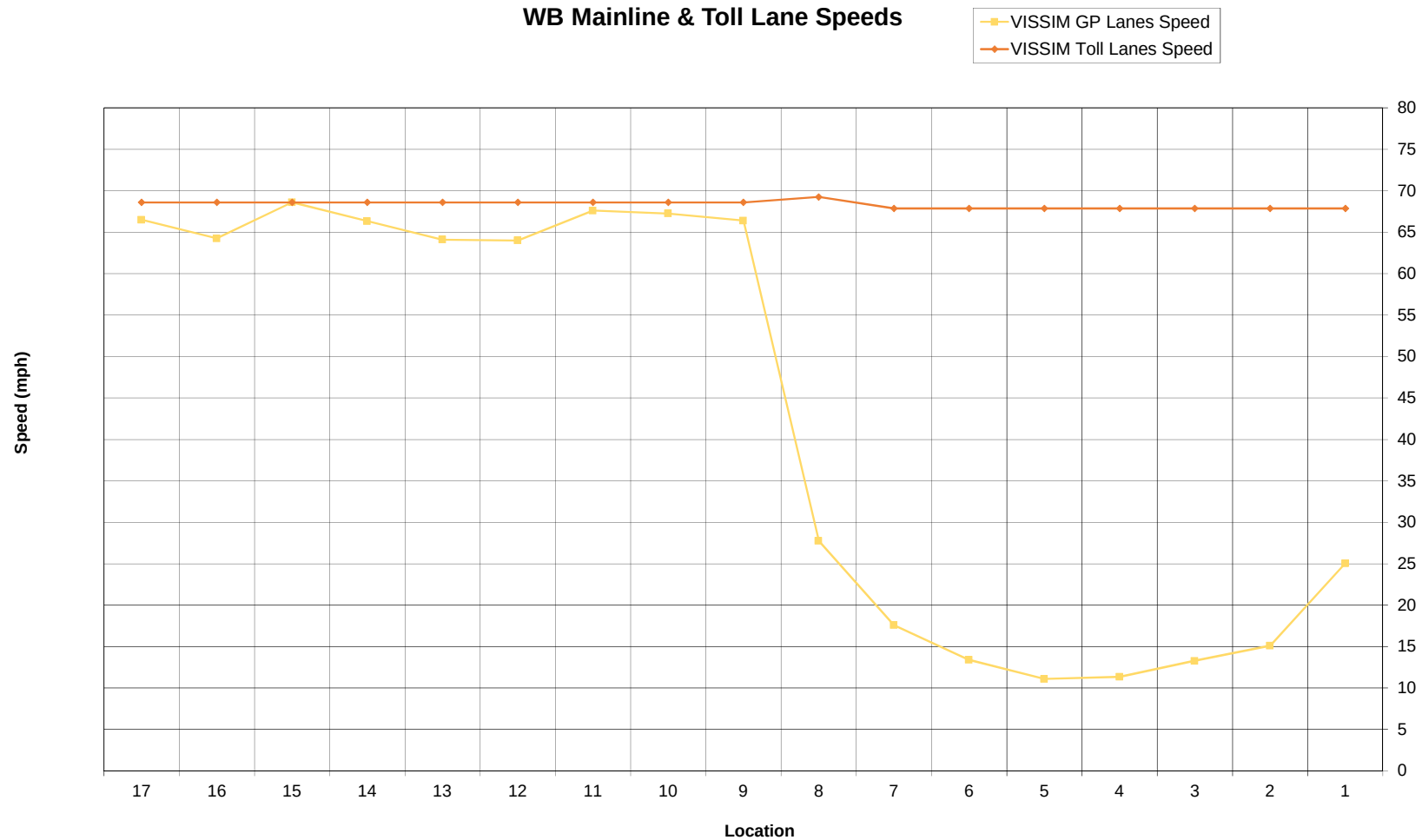


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



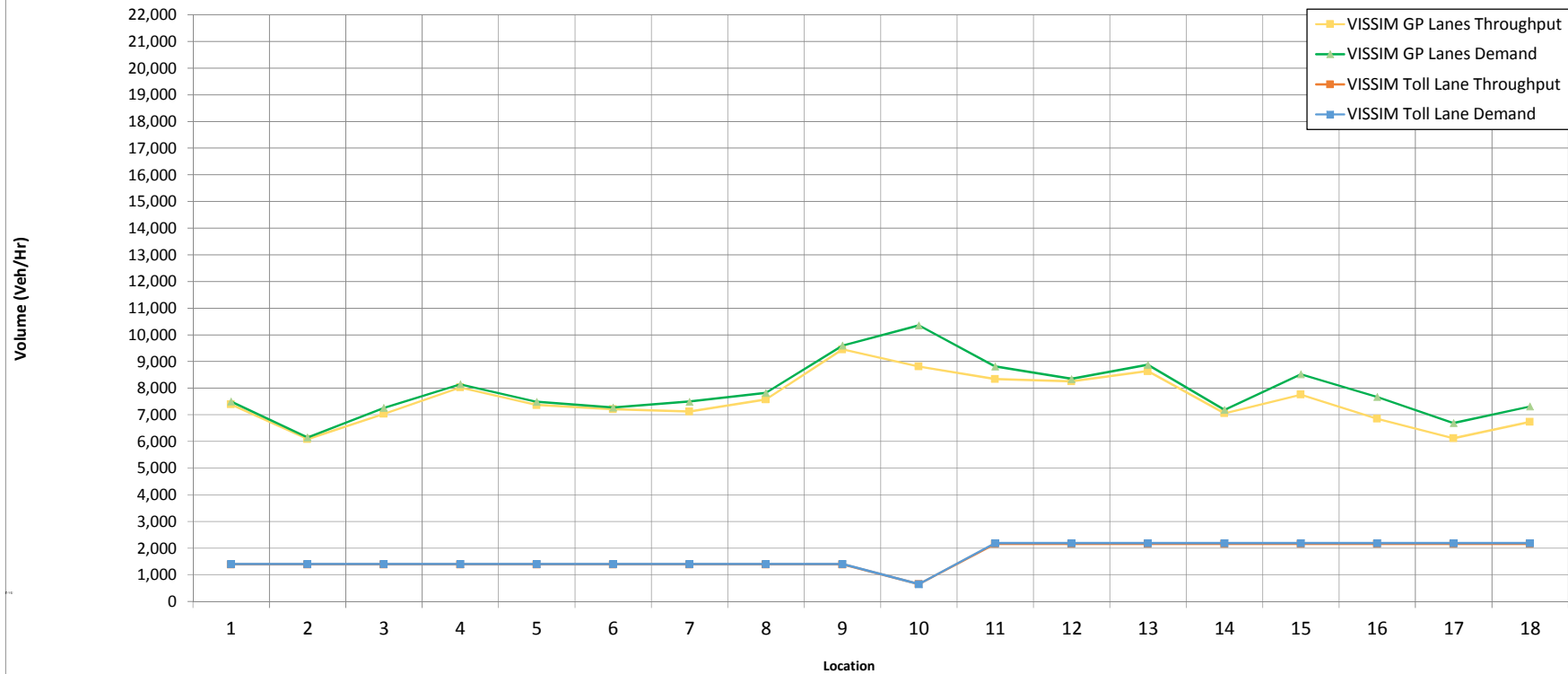
Charts 6-7 AM

WB Mainline & Toll Lane Speeds

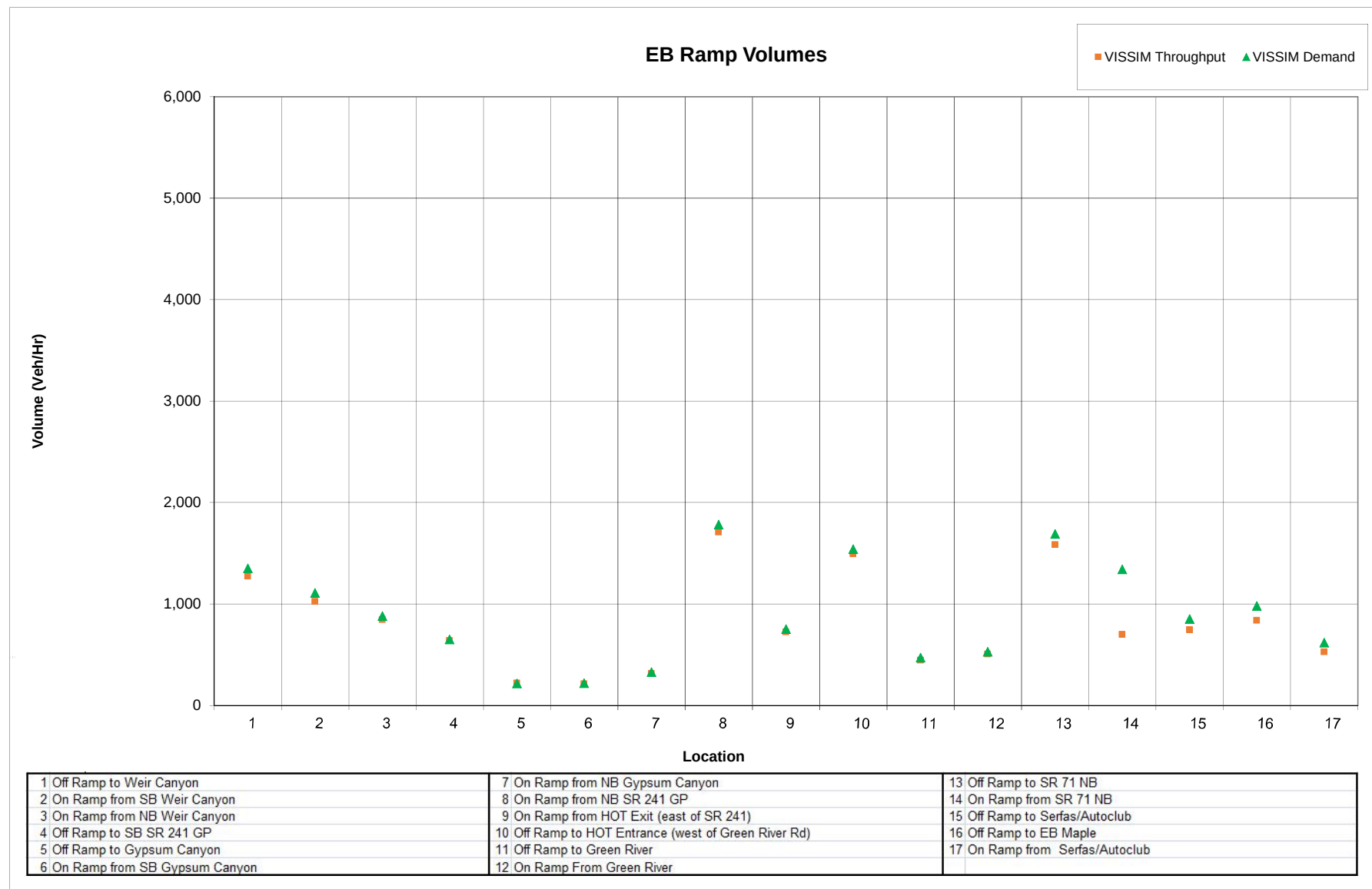


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

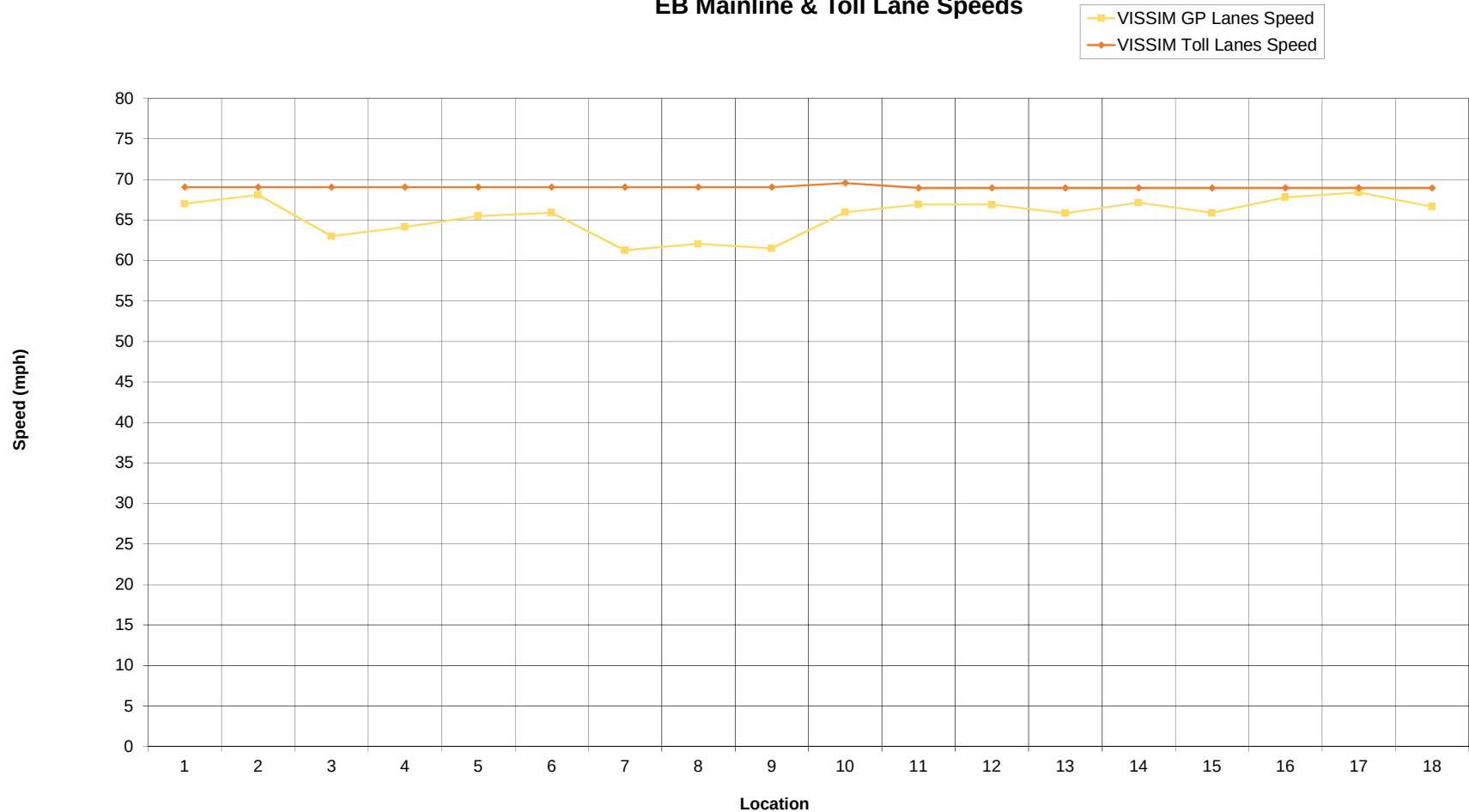
EB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

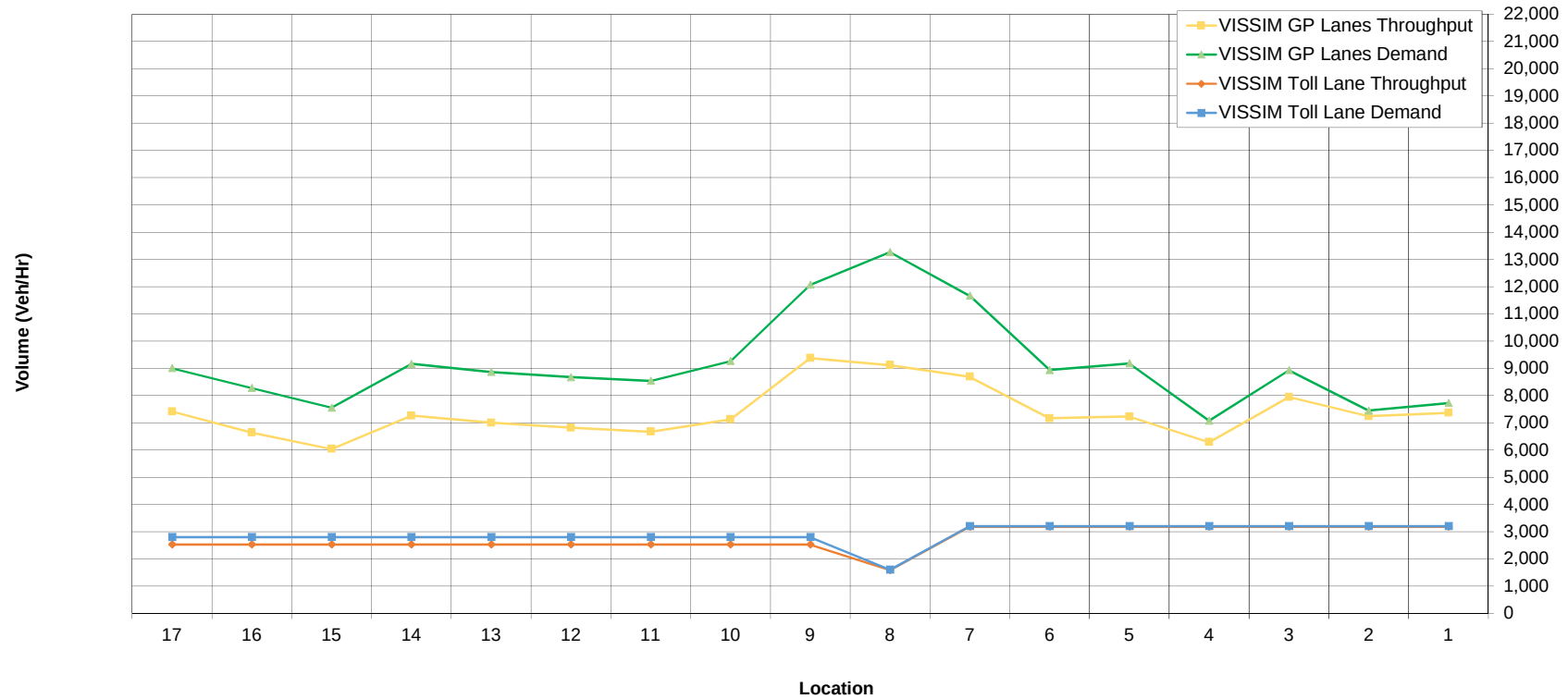


EB Mainline & Toll Lane Speeds

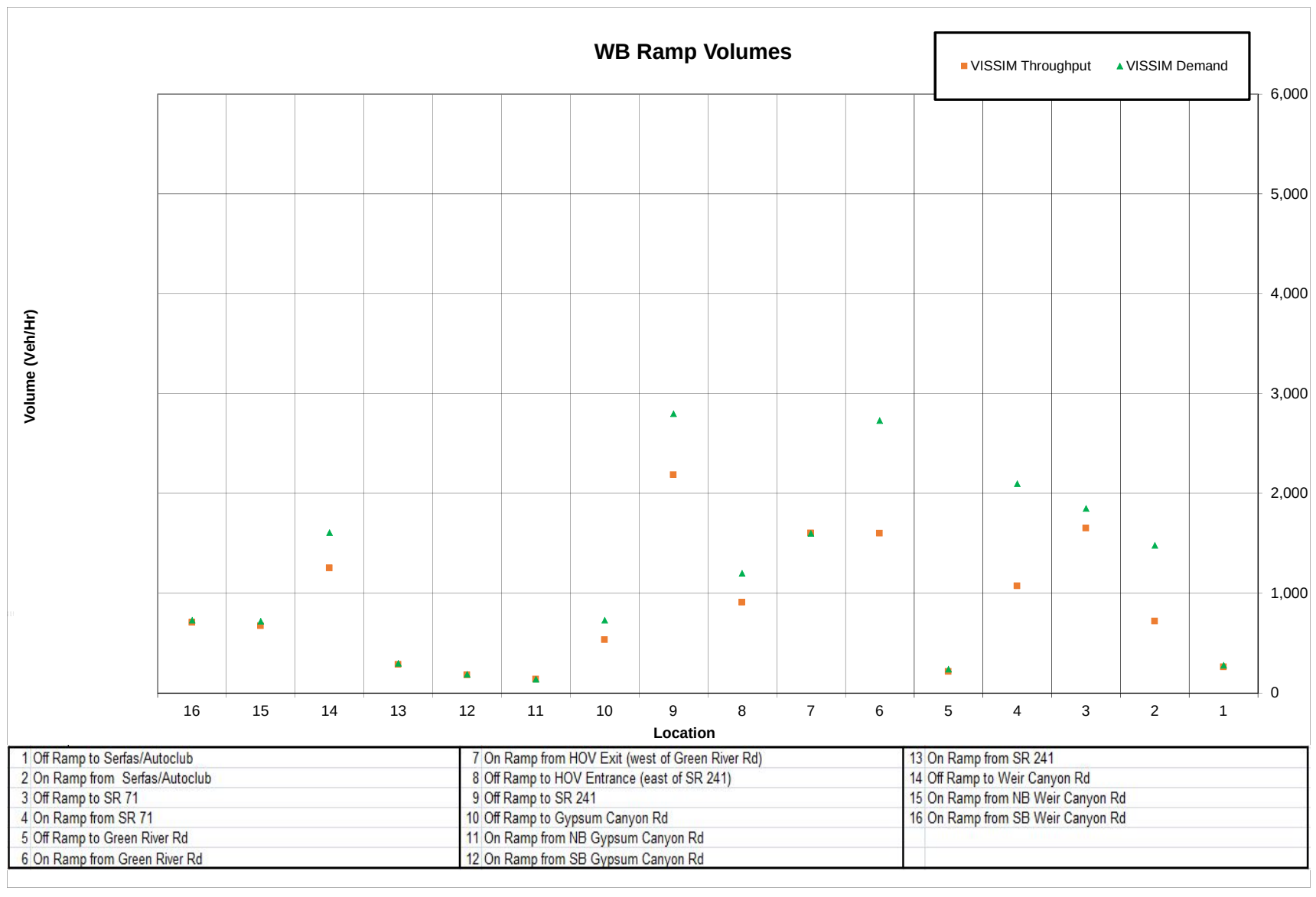


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

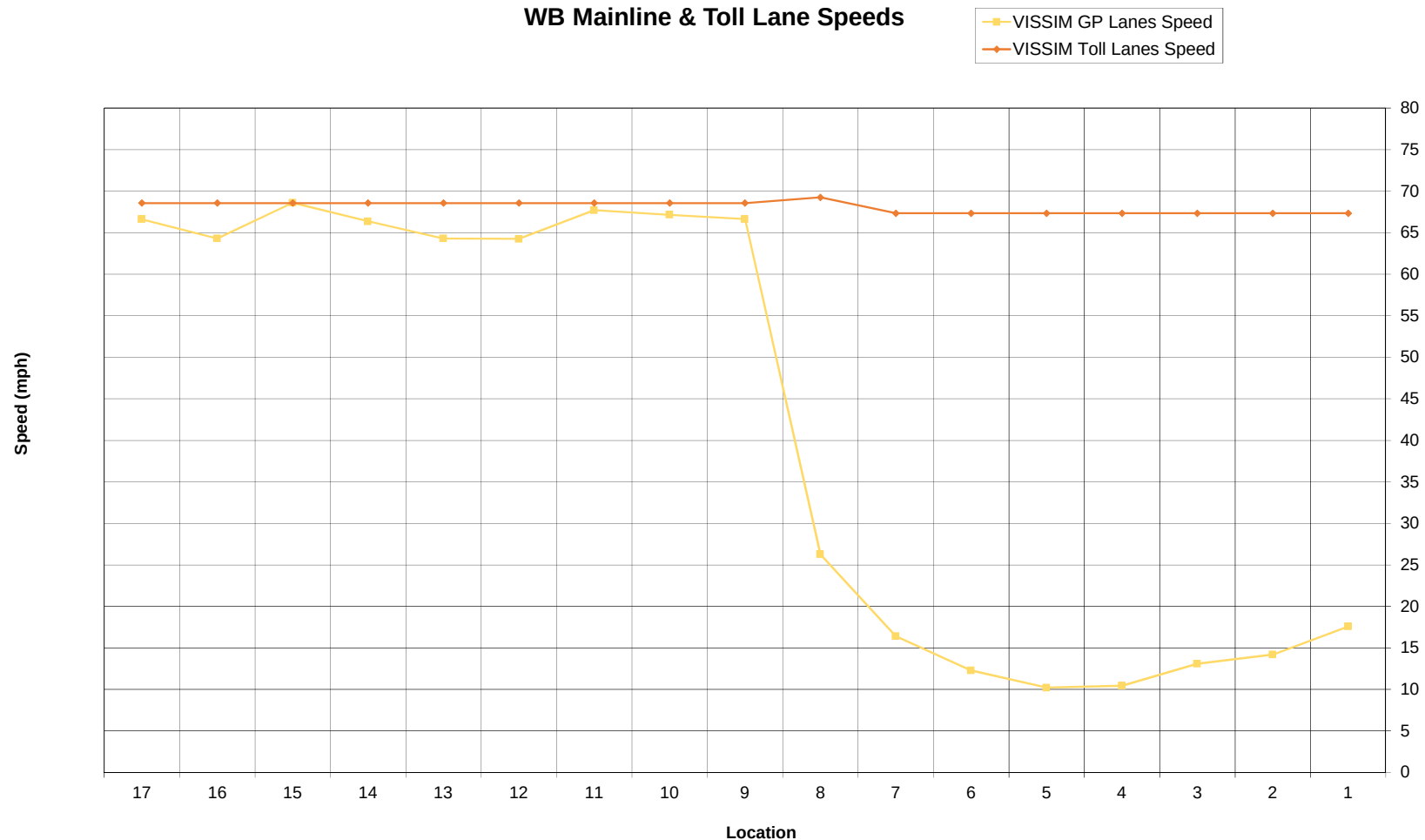


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



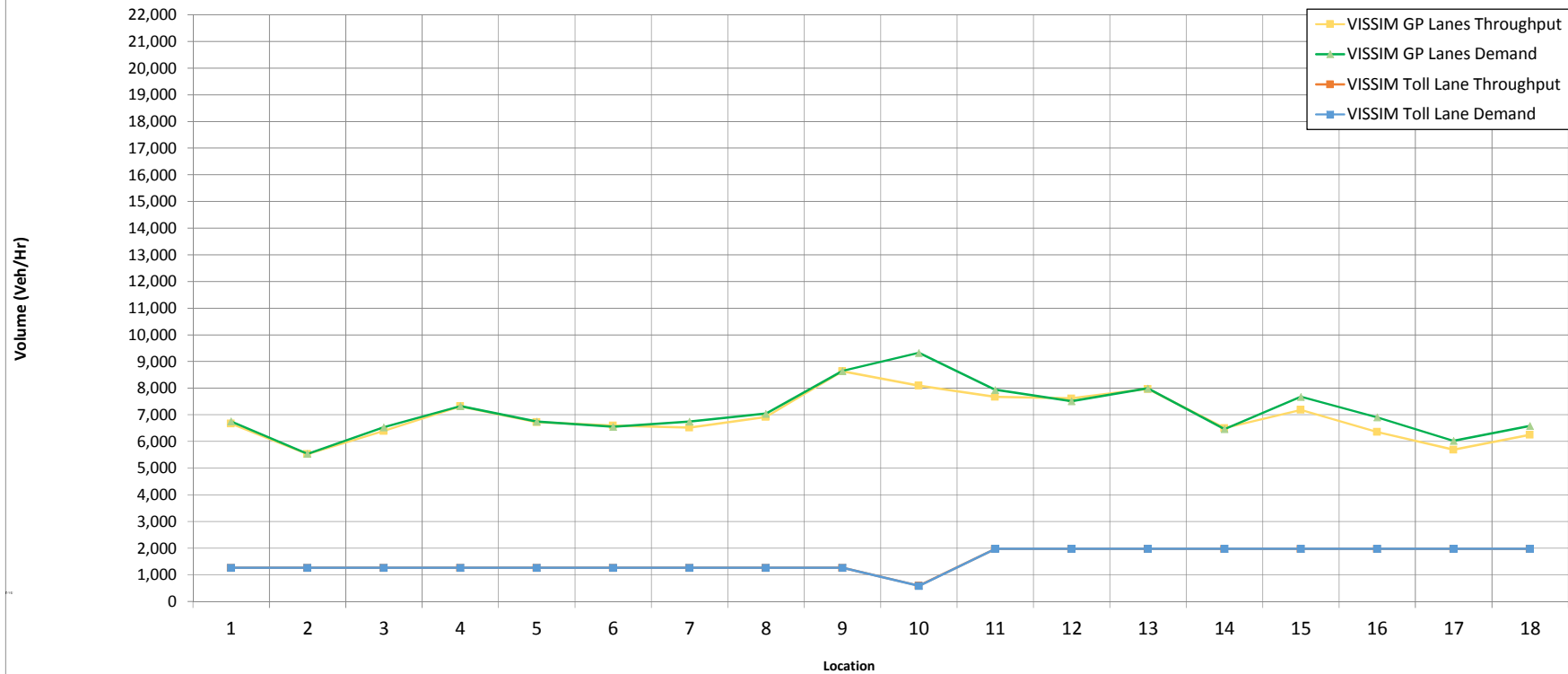
Charts 7-8 AM

WB Mainline & Toll Lane Speeds

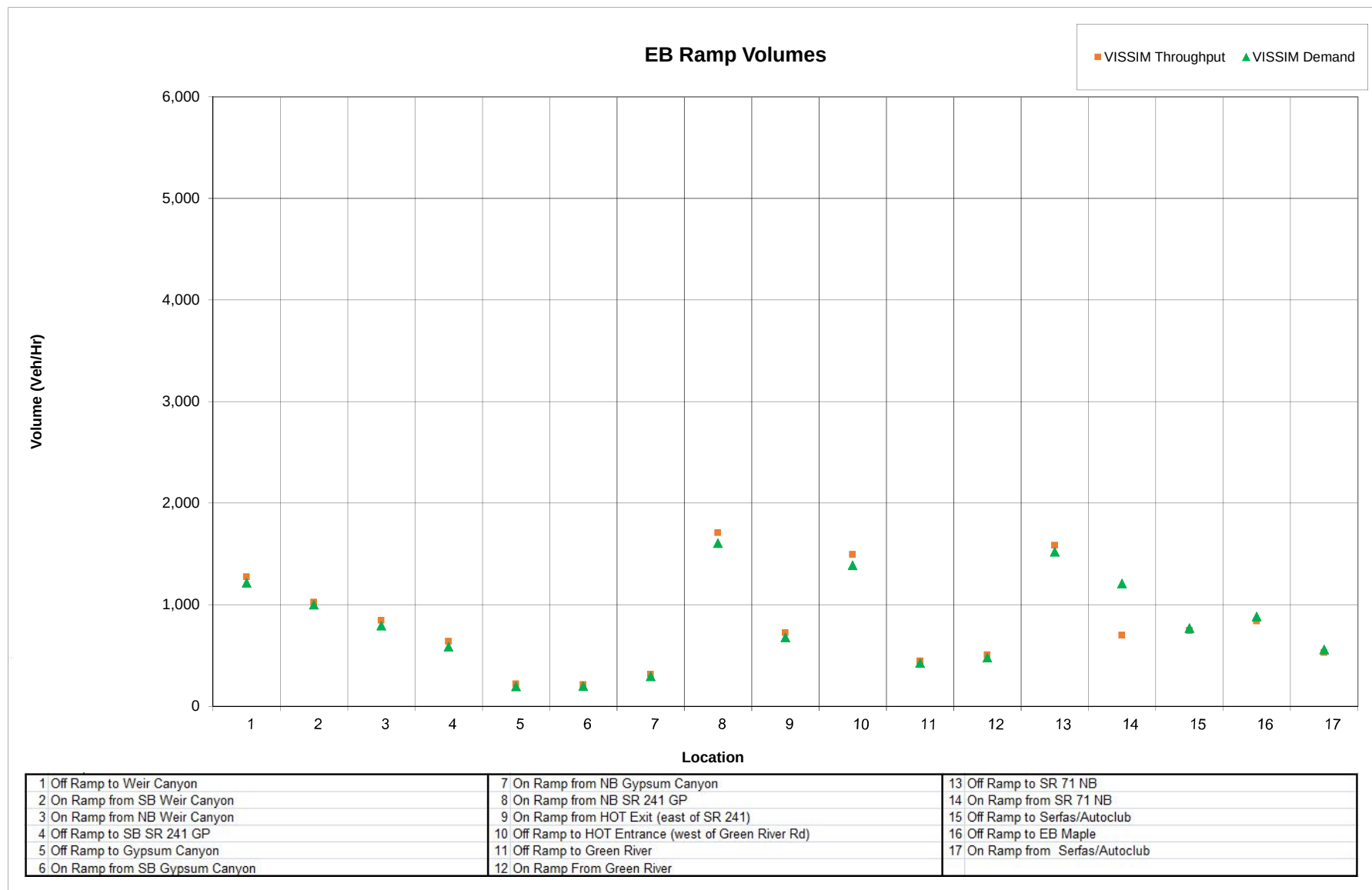


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

EB Mainline & Toll Lane Vehicle Volume by Location

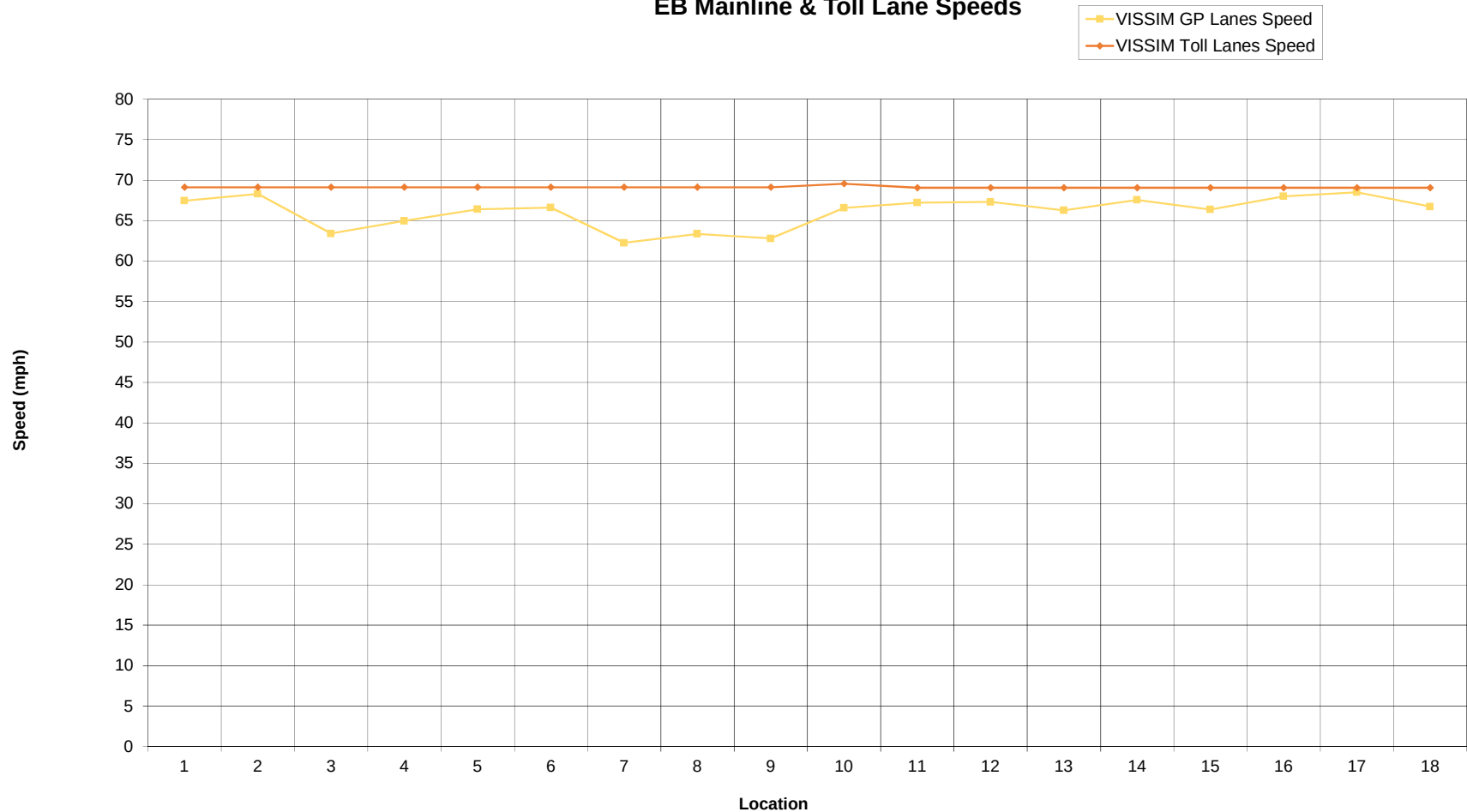


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



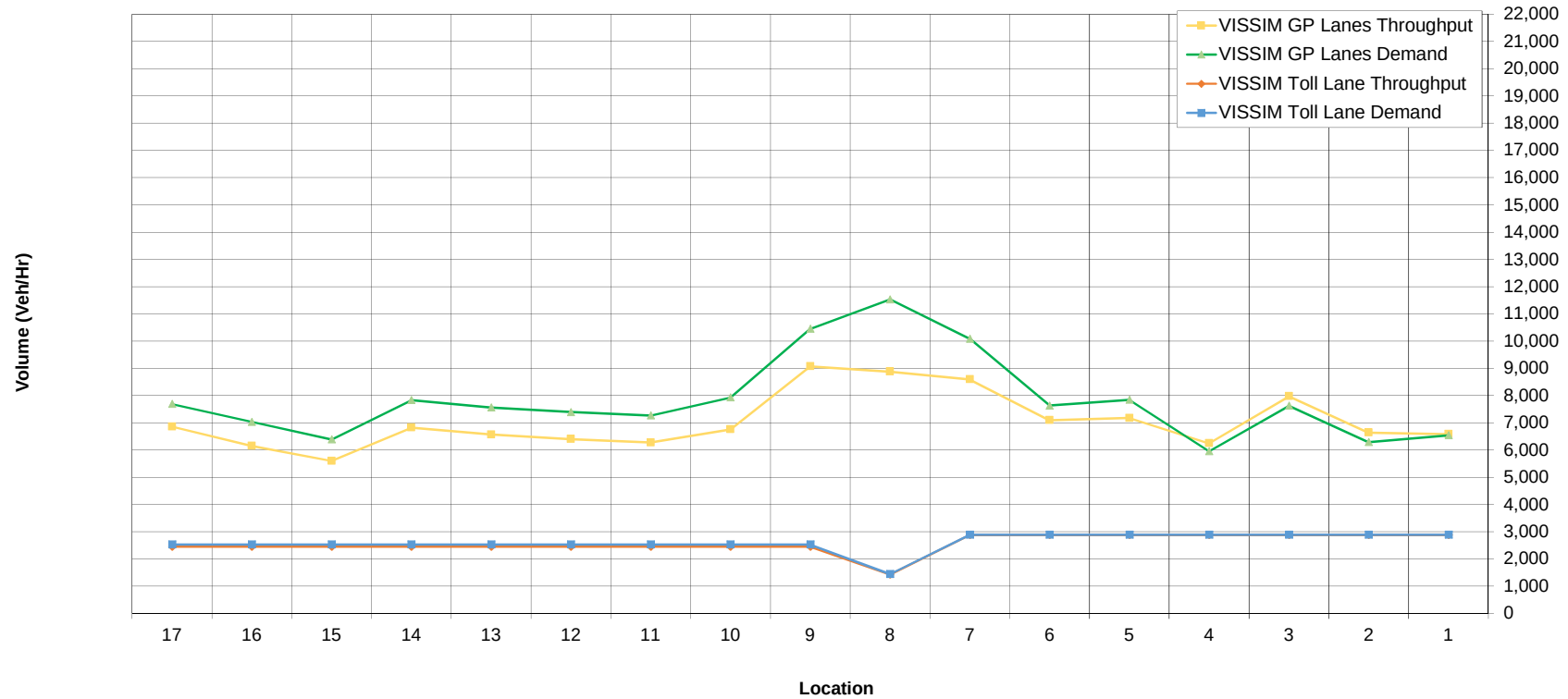
Charts 8-9 AM

EB Mainline & Toll Lane Speeds

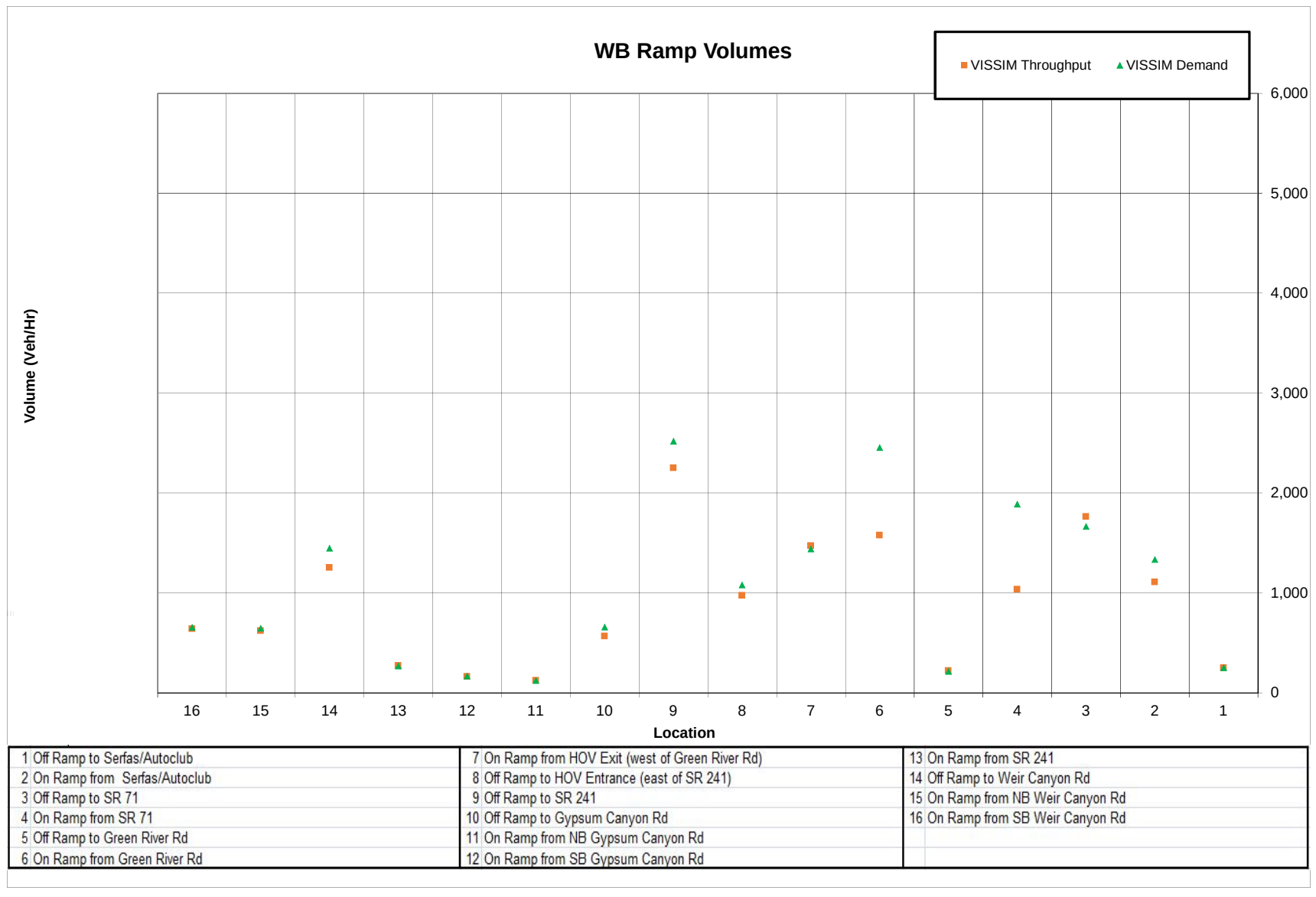


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

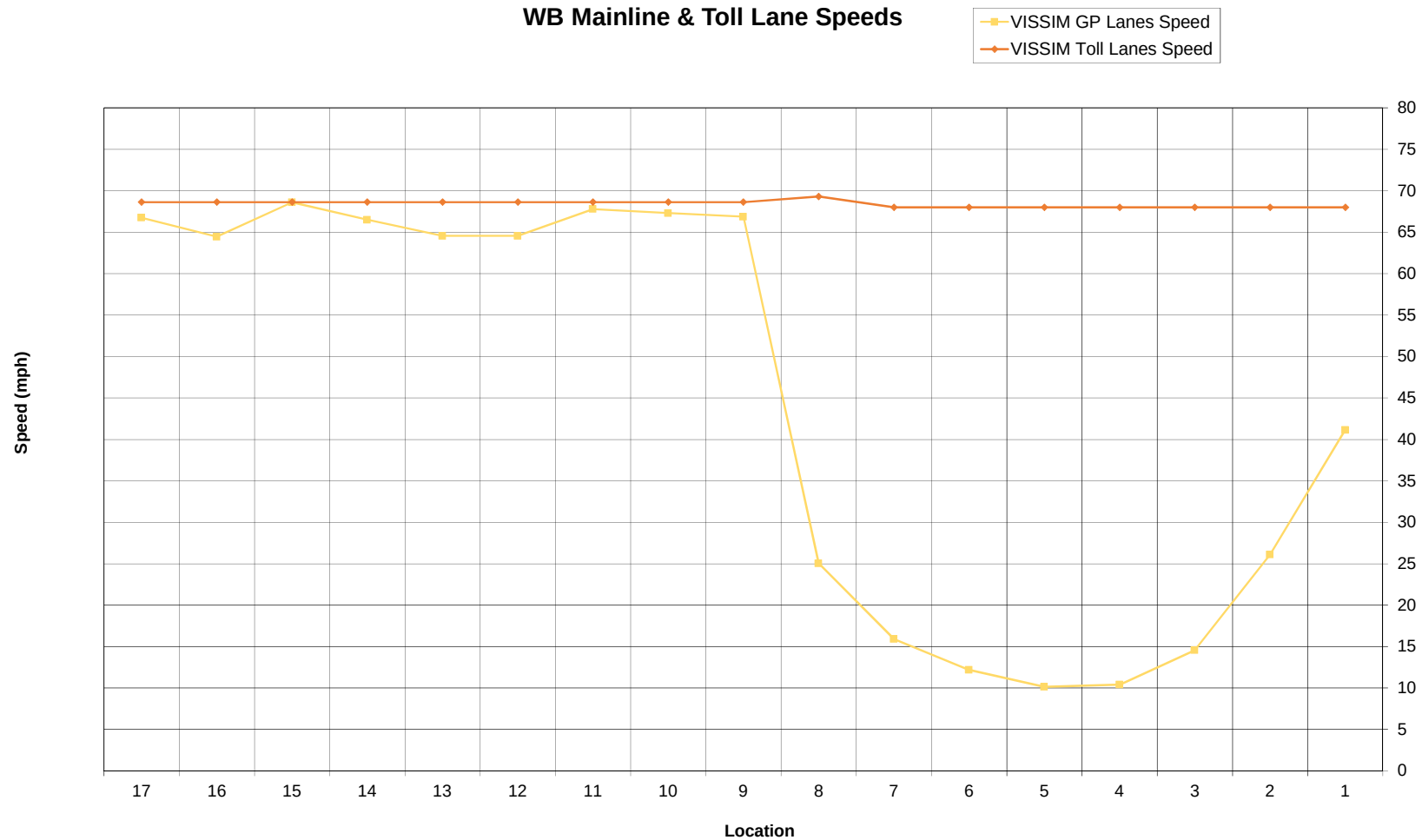


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



Charts 8-9 AM

WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

VISSIM Model Summary - 2017 No Build - PM Peak Period

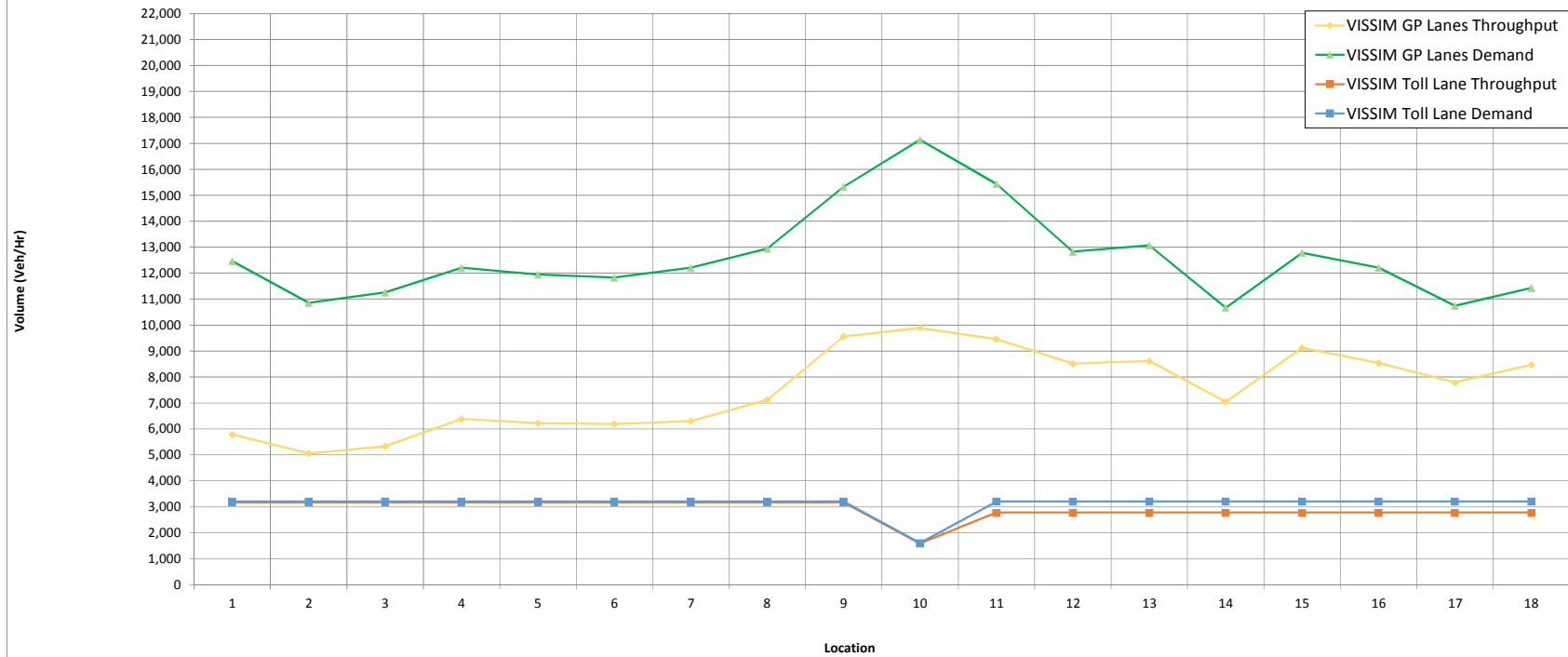
Network Summary Statistics

Parameter			2017 No Project		Difference
Total Vehicle Demand (4 Hr)			141,937		
Total number of vehicles that did not reach their destination			20,812		
Total number of vehicles that have reached their destination			121,125		
Total vehicle-miles traveled (VMT)			1,014,001		
Total travel time, All Vehicle Types (VHT)			26,278		
Average speed [mph], All Vehicle Types			38.6		
Average delay time per vehicle [mins], All Vehicle Types			5.27		

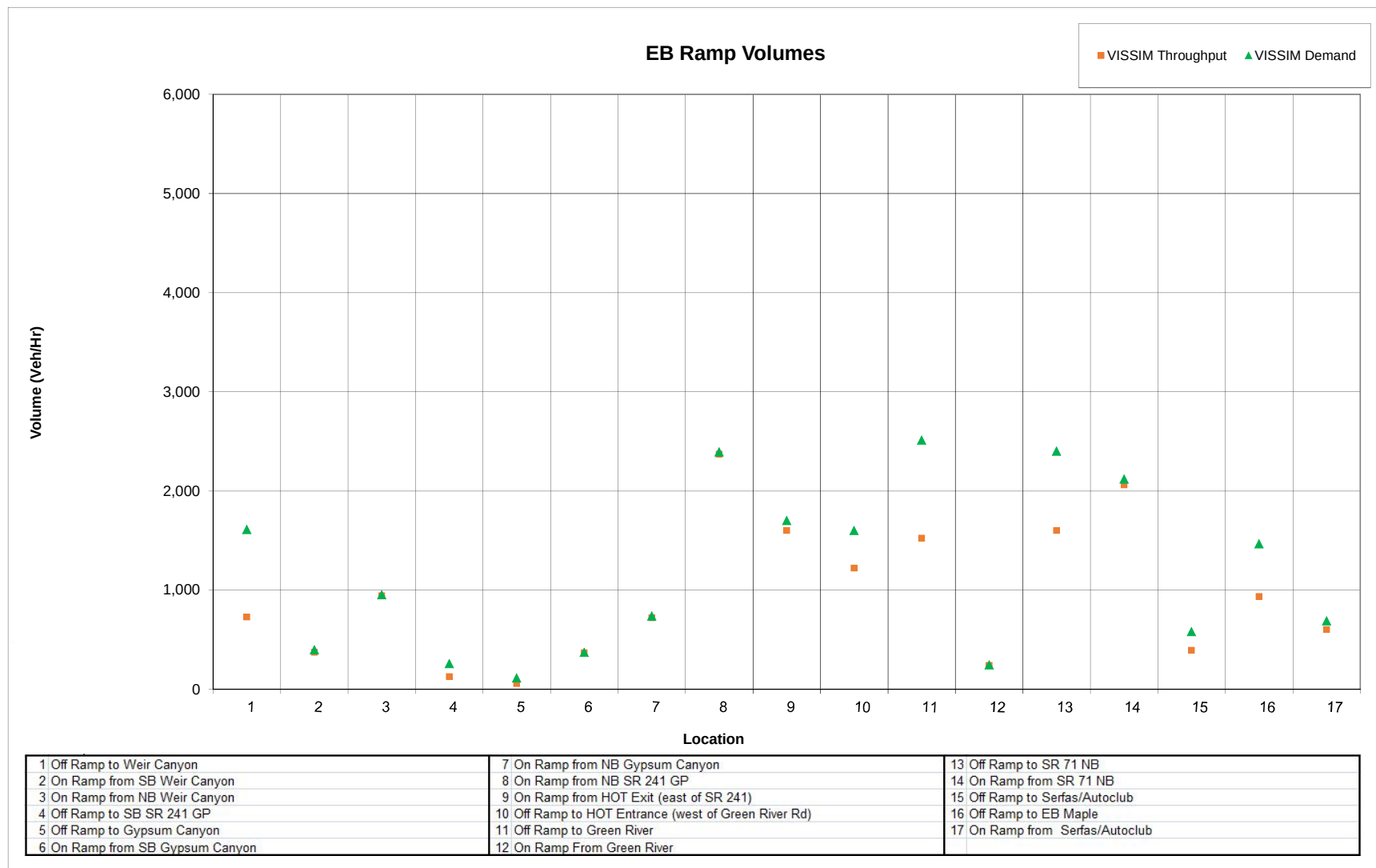
VISSIM Model Summary - 2017 No Build - PM Peak Period
Network Summary Statistics

					Hide			2017 PM No Build				
					Travel Time Segments			VISSIM Travel Time (Minutes)				
#	Origin	#	Destination	p	Ke	Seg 1	Seg 2	Seg 3	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005		28.3	29.6	29.4	27.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005		28.3	29.5	29.4	27.6
		5	SR 241 SB south of SR 91	3	1001				18.4	19.1	19.0	17.7
		7	SR 71 NB north of SR 91	4	1002	1003	1004		30.6	31.9	31.8	30.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005		10.4	10.5	10.5	10.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005		8.4	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004		12.7	12.8	12.9	12.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014		8.5	8.5	8.5	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014		8.5	8.5	8.5	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013		10.9	11.0	10.9	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013		n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010				5.0	5.0	5.0	5.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014		8.5	8.5	8.5	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014		8.4	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013		10.9	10.9	10.9	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013		n/a	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006				7.2	7.2	7.2	7.2
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005		13.4	13.5	13.6	13.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005		13.4	13.4	13.5	13.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004		15.7	15.8	15.9	15.9
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005		n/a	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005		n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004		n/a	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014		10.2	10.2	10.1	9.9
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014		10.2	10.2	10.0	9.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008				6.4	6.7	6.2	5.8
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013		12.6	12.7	12.5	12.3
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013		n/a	n/a	n/a	n/a

EB Mainline & Toll Lane Vehicle Volume by Location

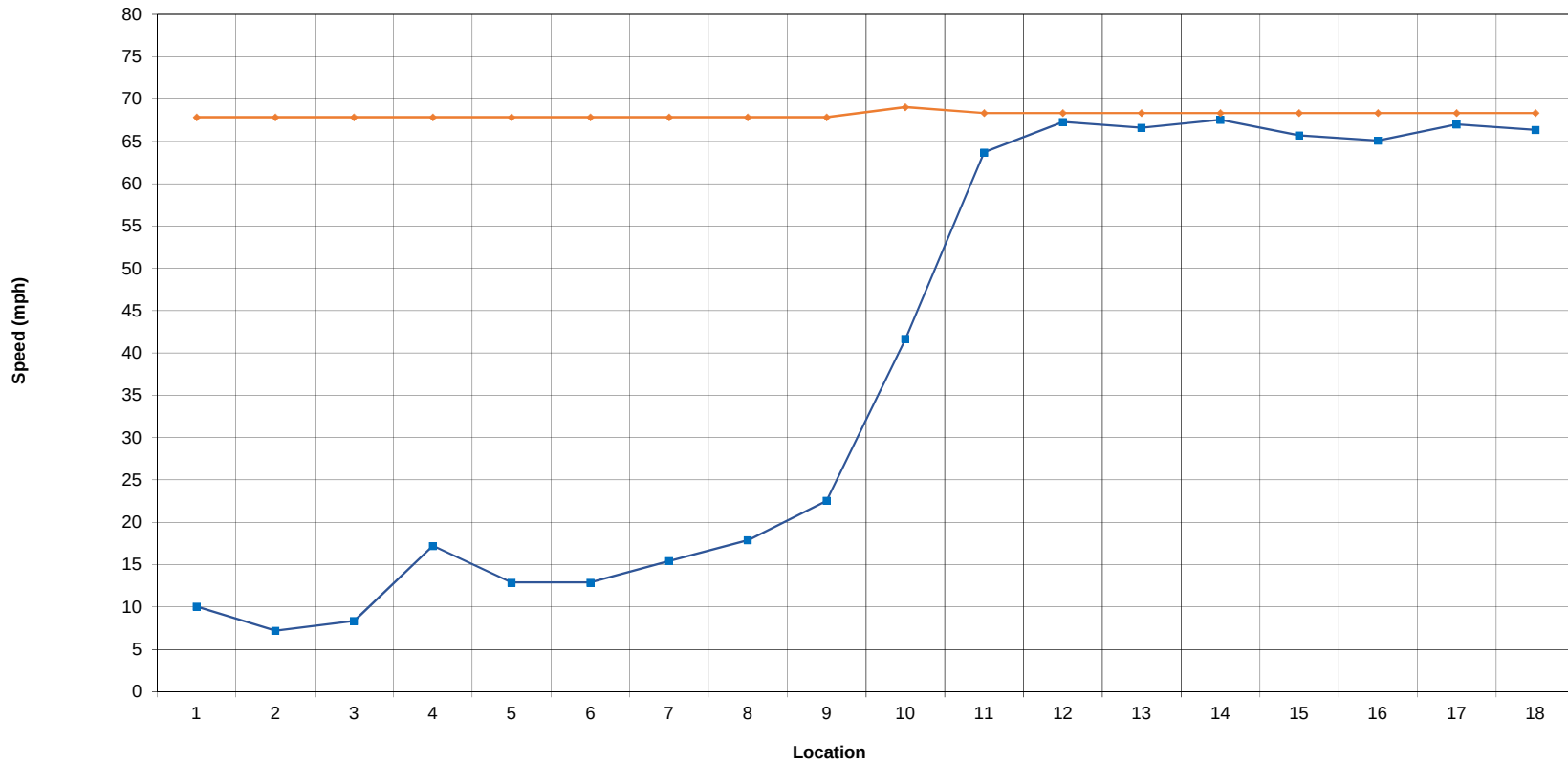


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



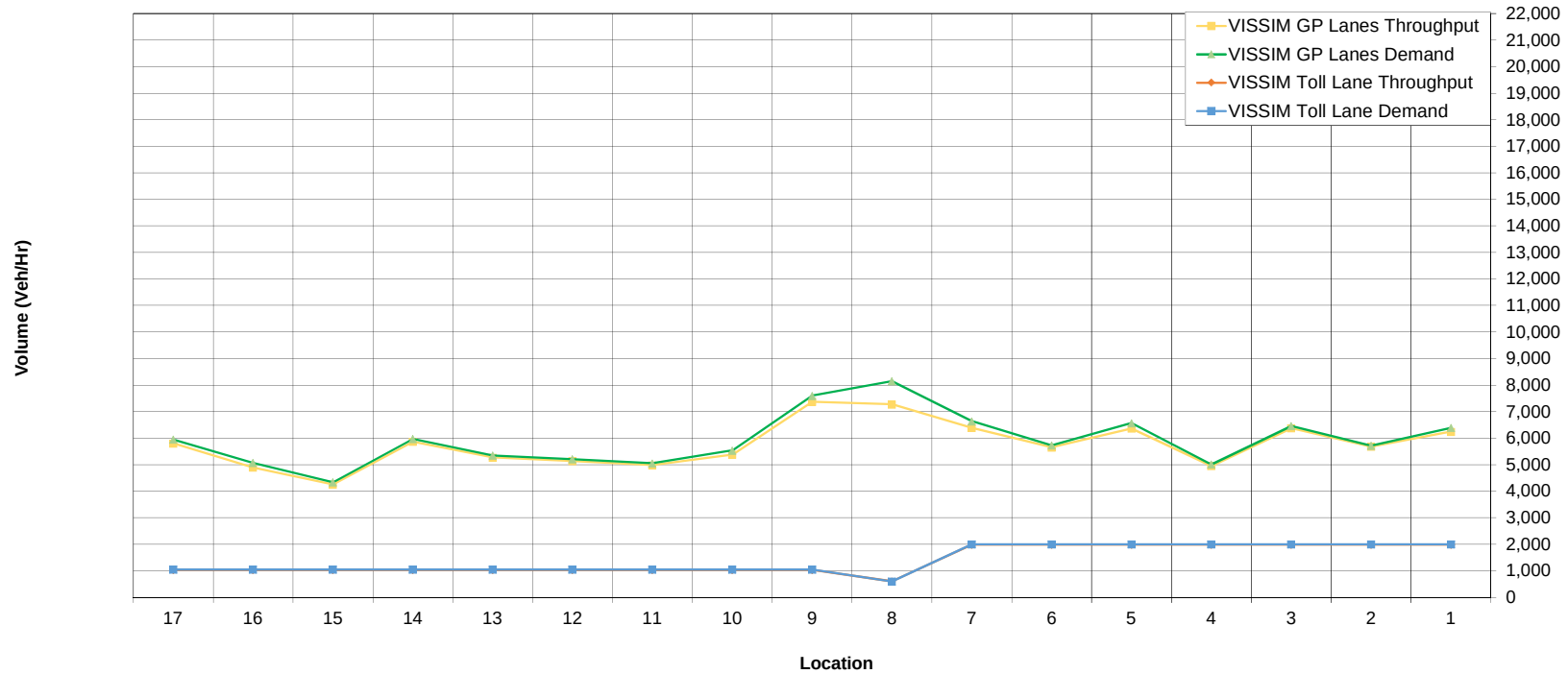
EB Mainline & Toll Lane Speeds

■ VISSIM GP Lanes Speed
◆ VISSIM Toll Lane Speed

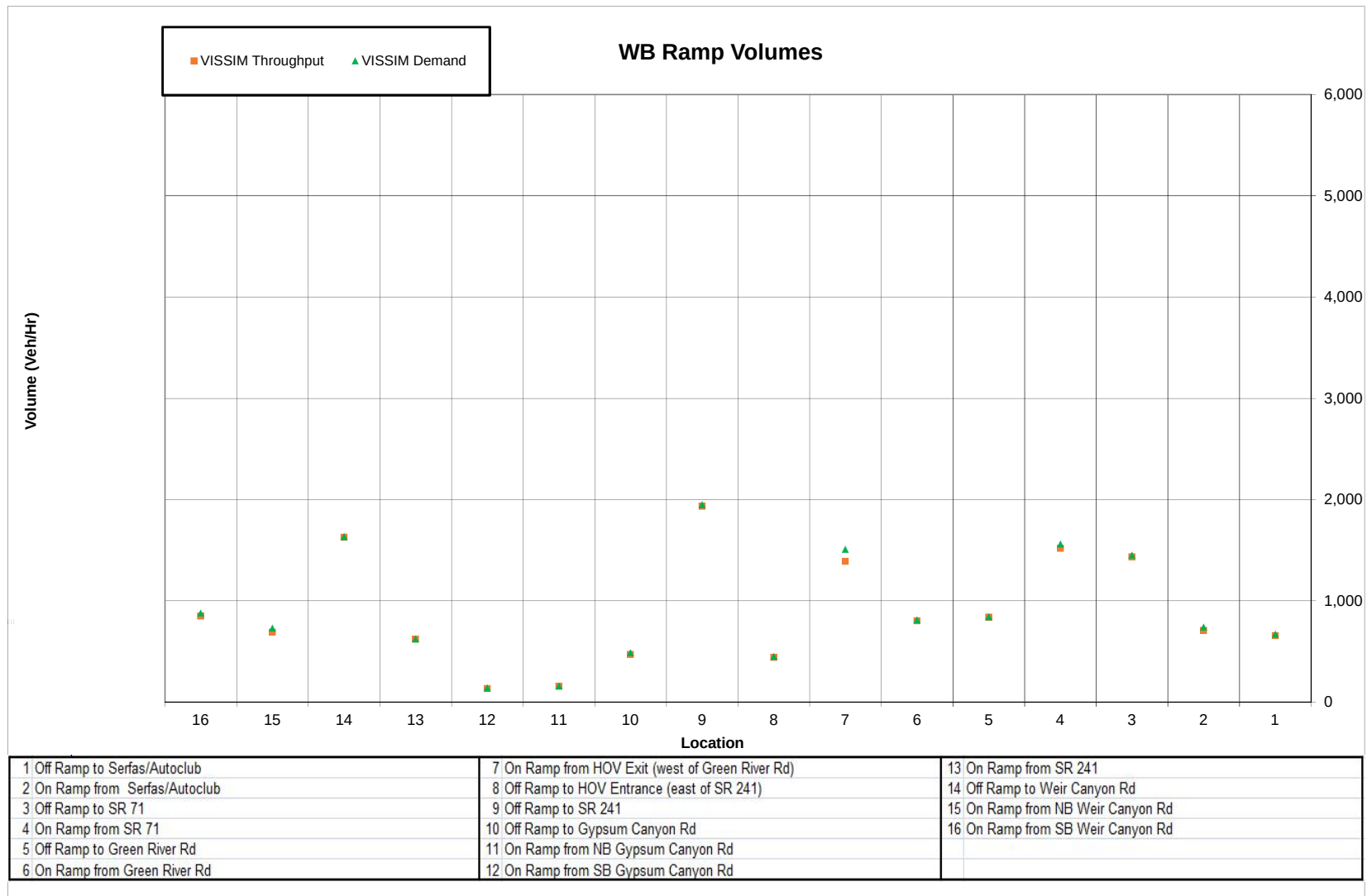


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

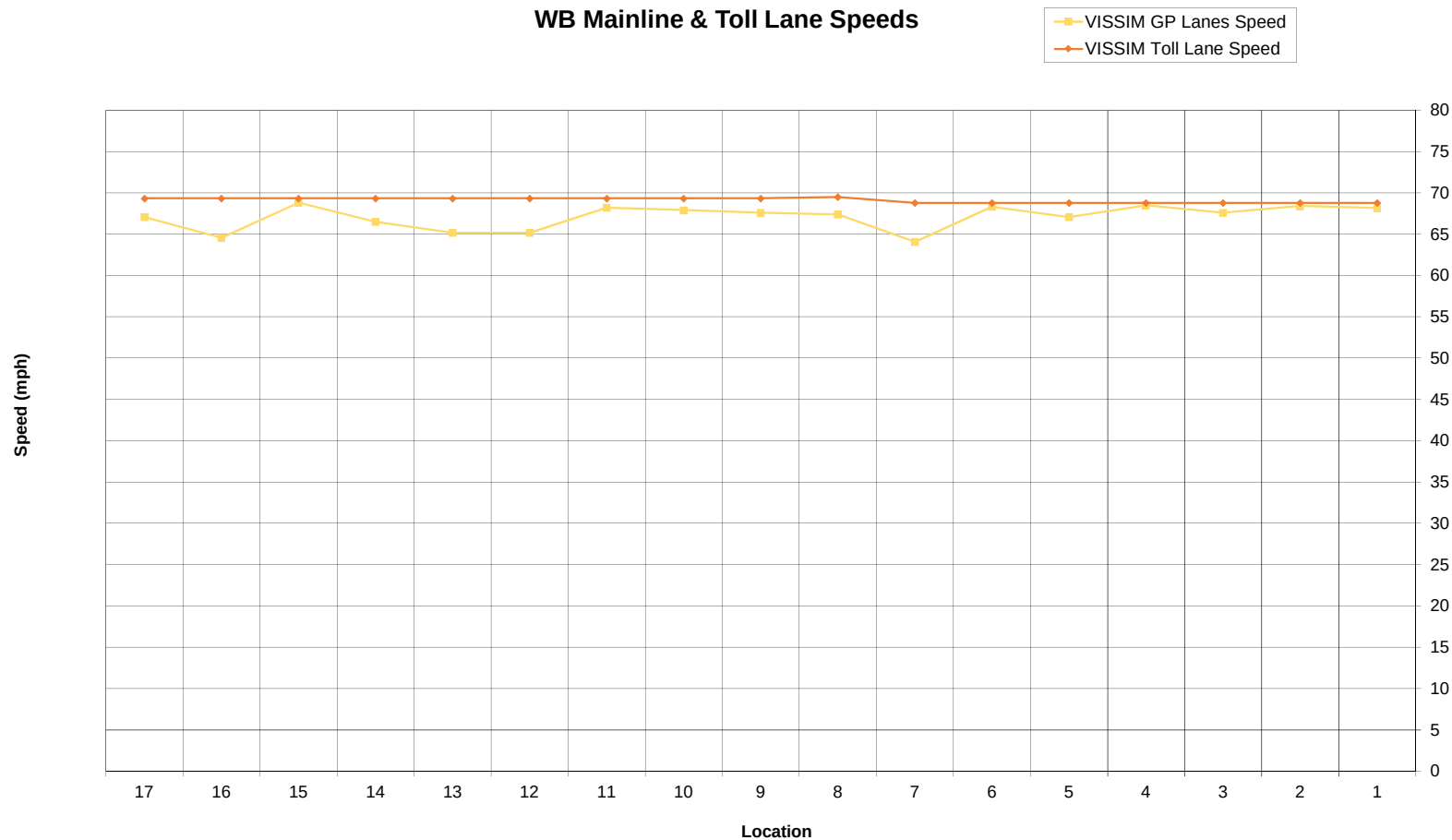


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



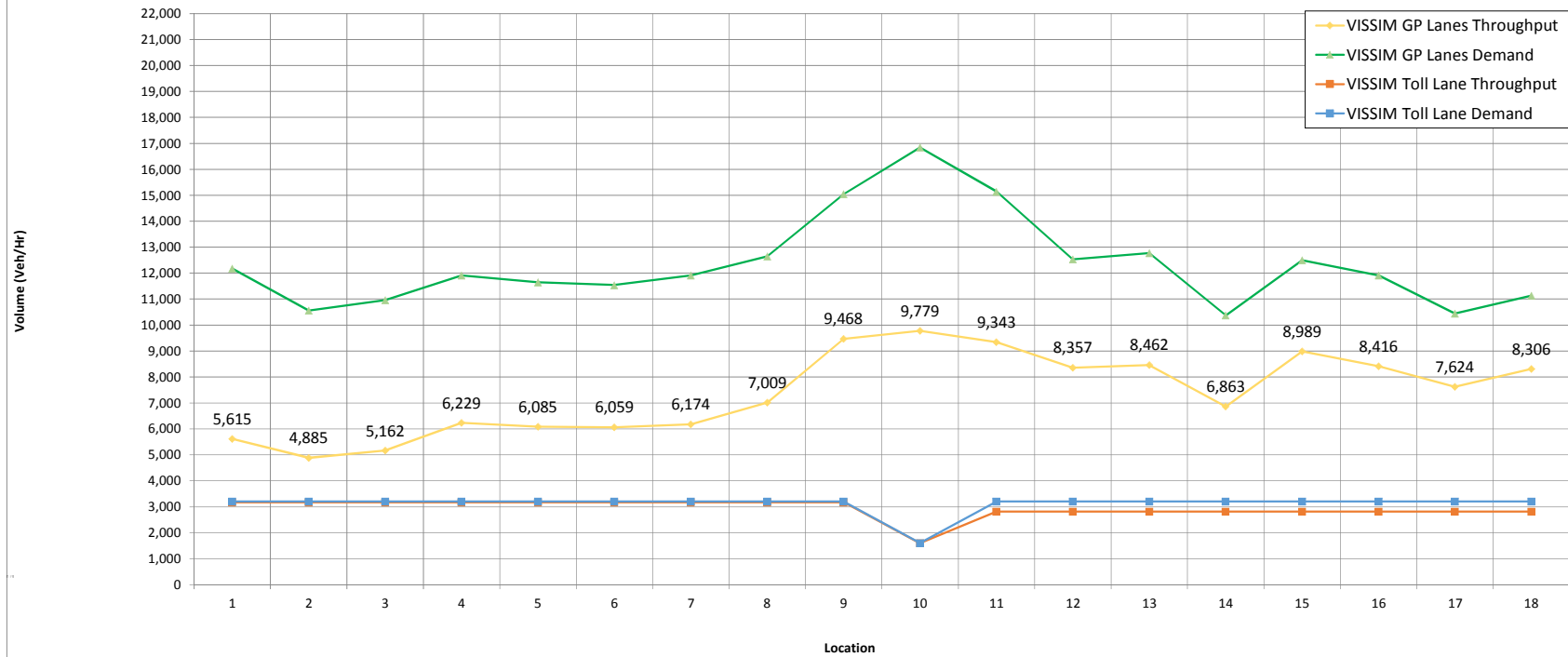
Charts 3-4 PM

WB Mainline & Toll Lane Speeds

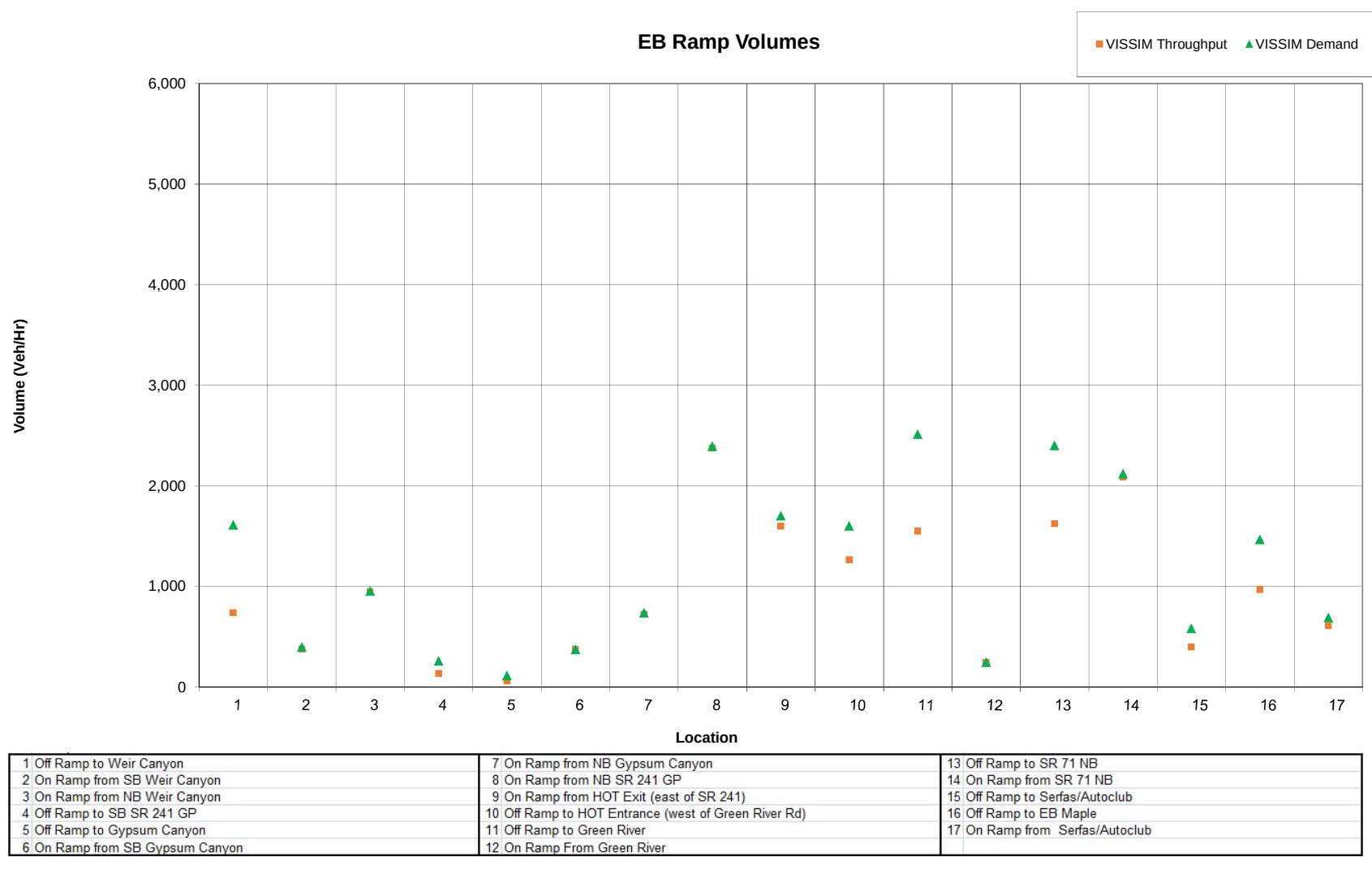


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

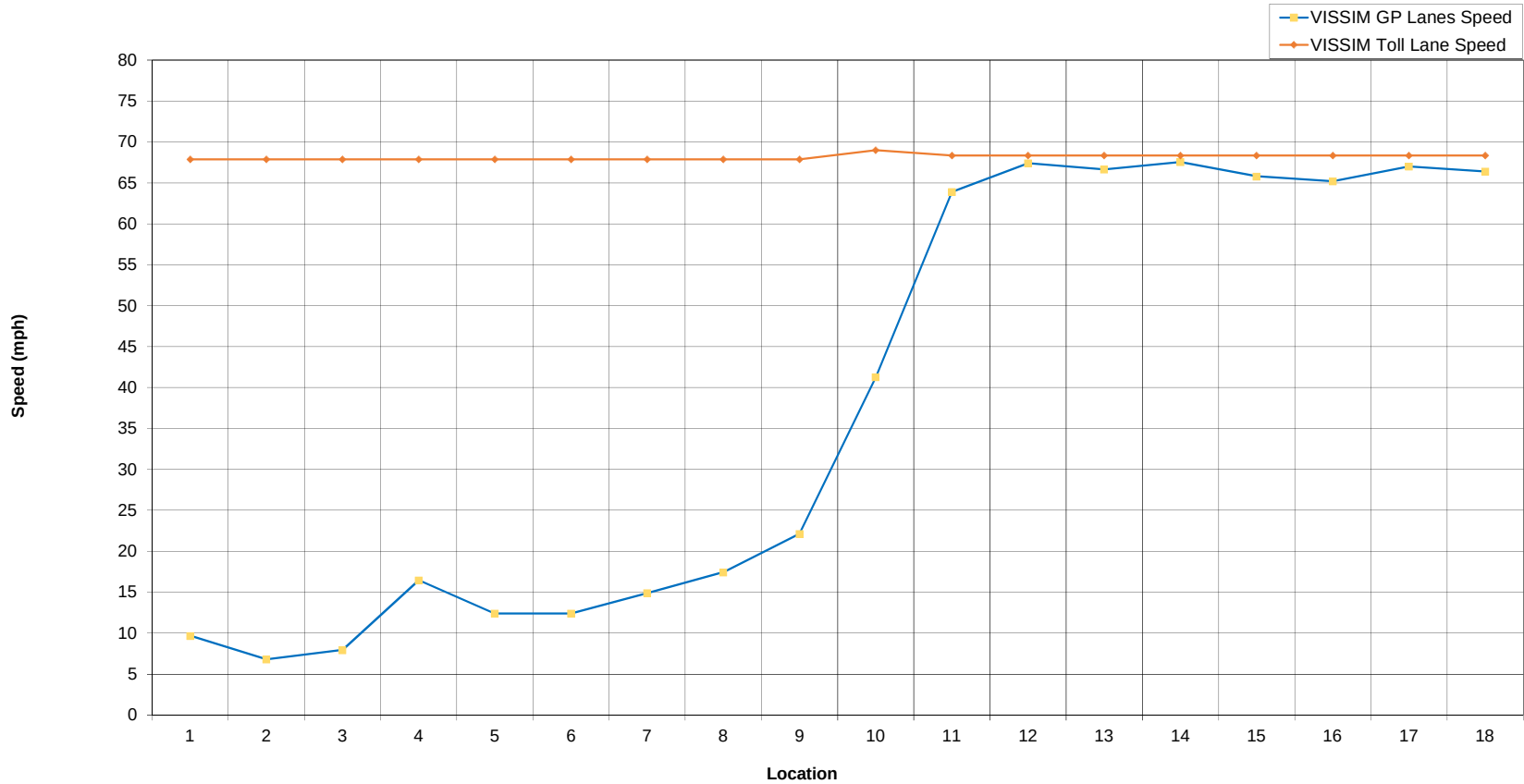
EB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

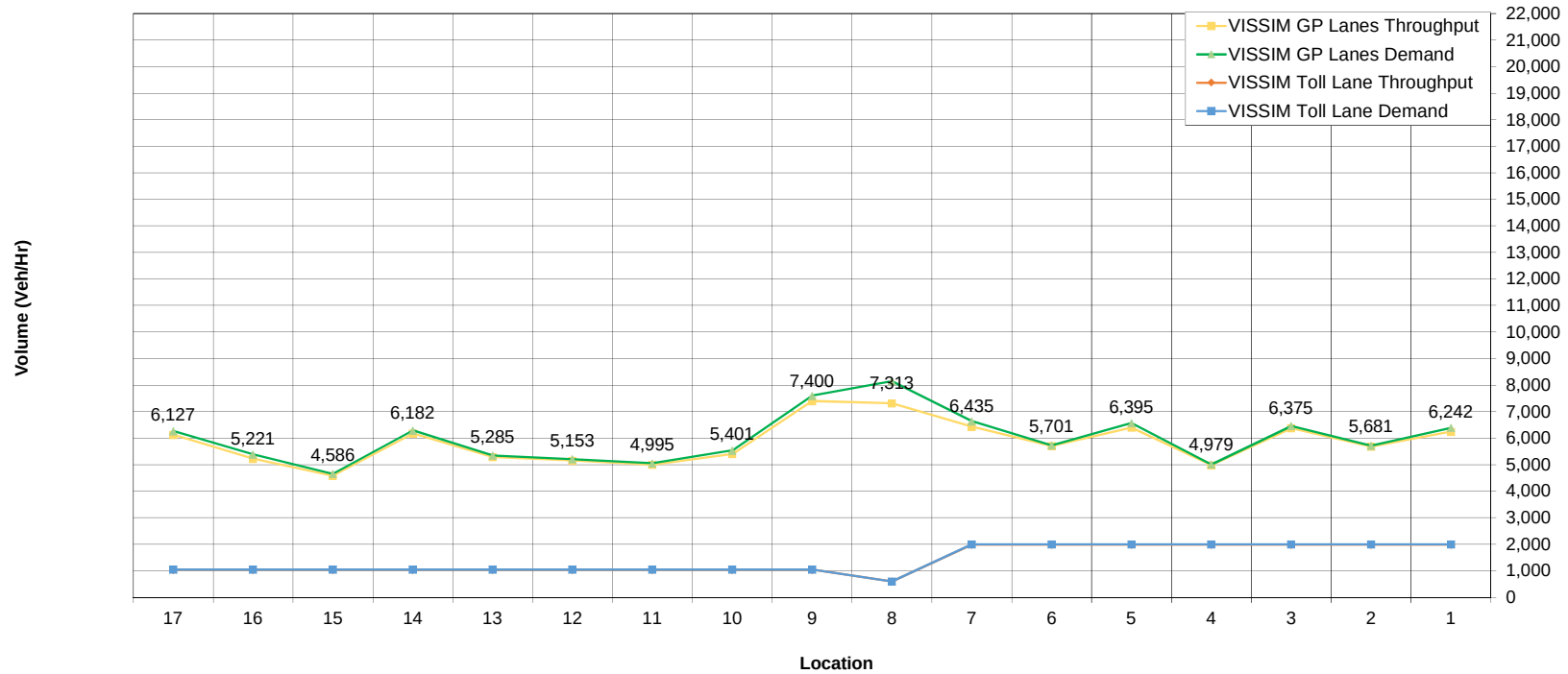


EB Mainline & Toll Lane Speeds

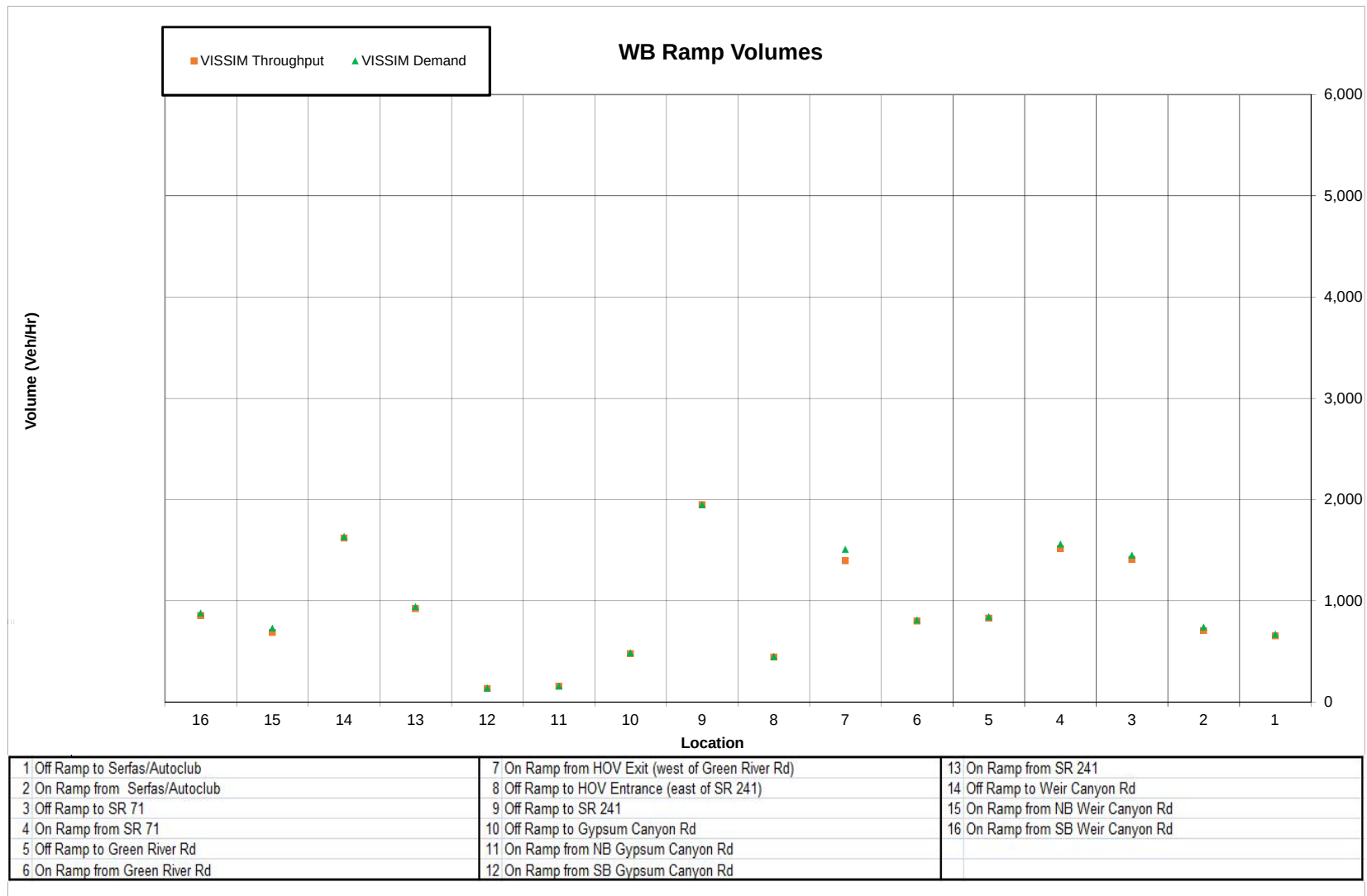


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

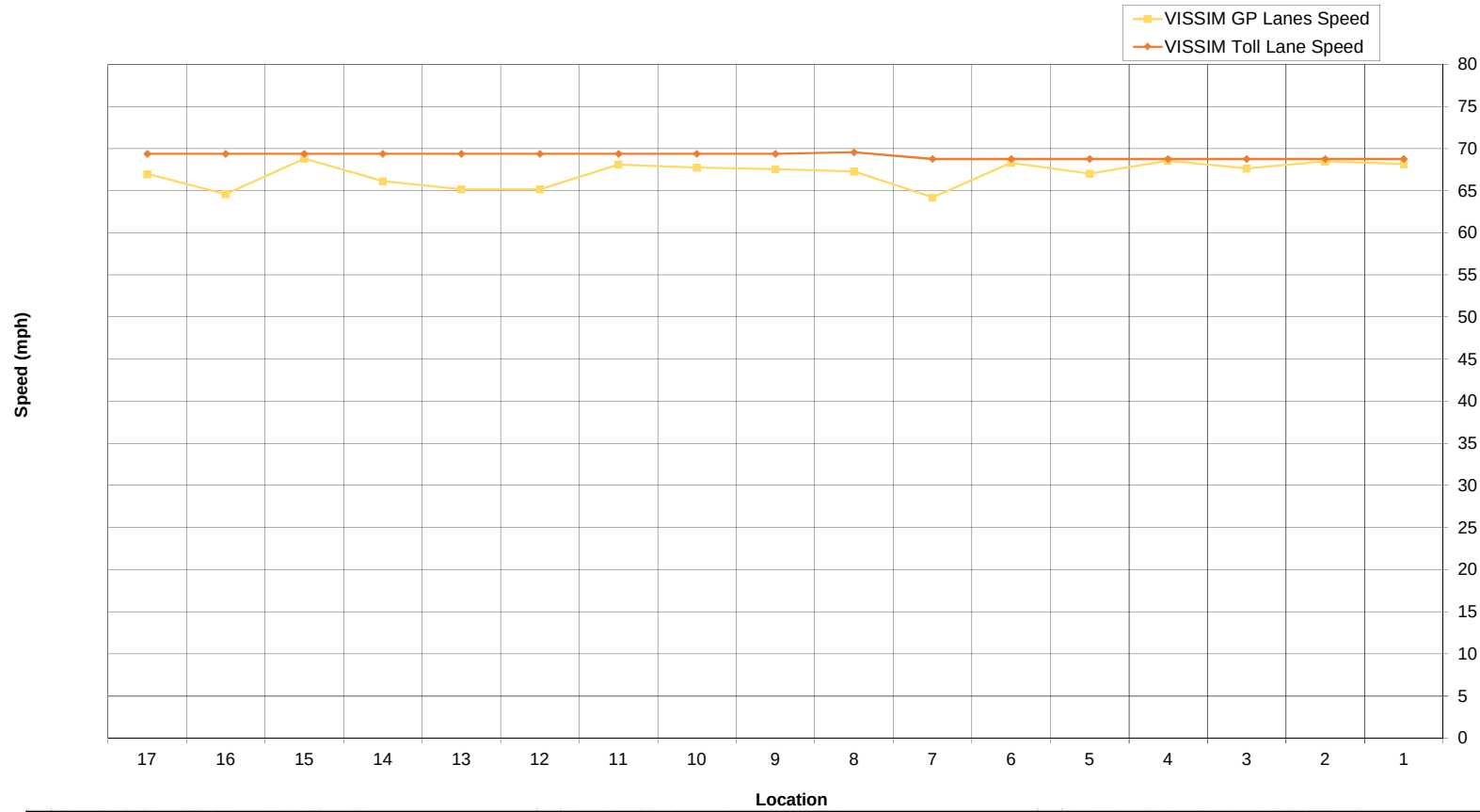
WB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

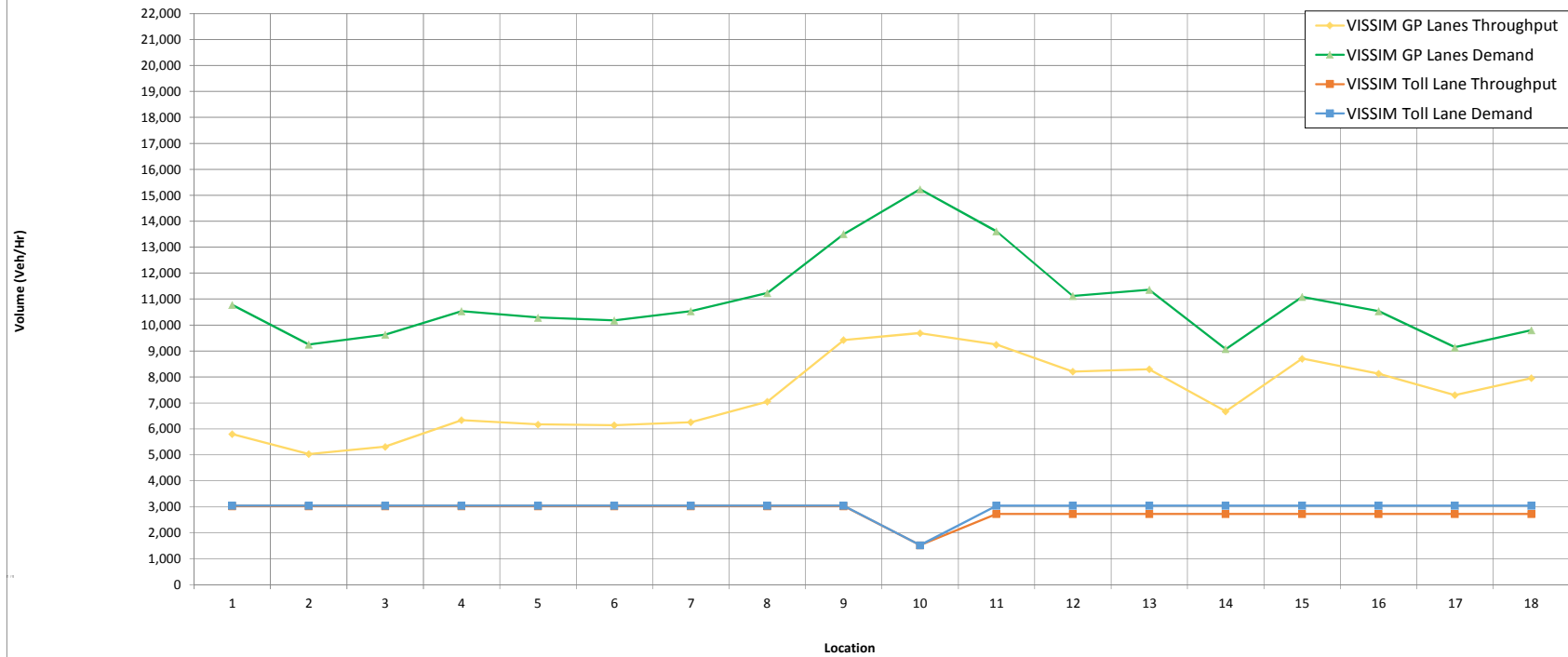


WB Mainline & Toll Lane Speeds

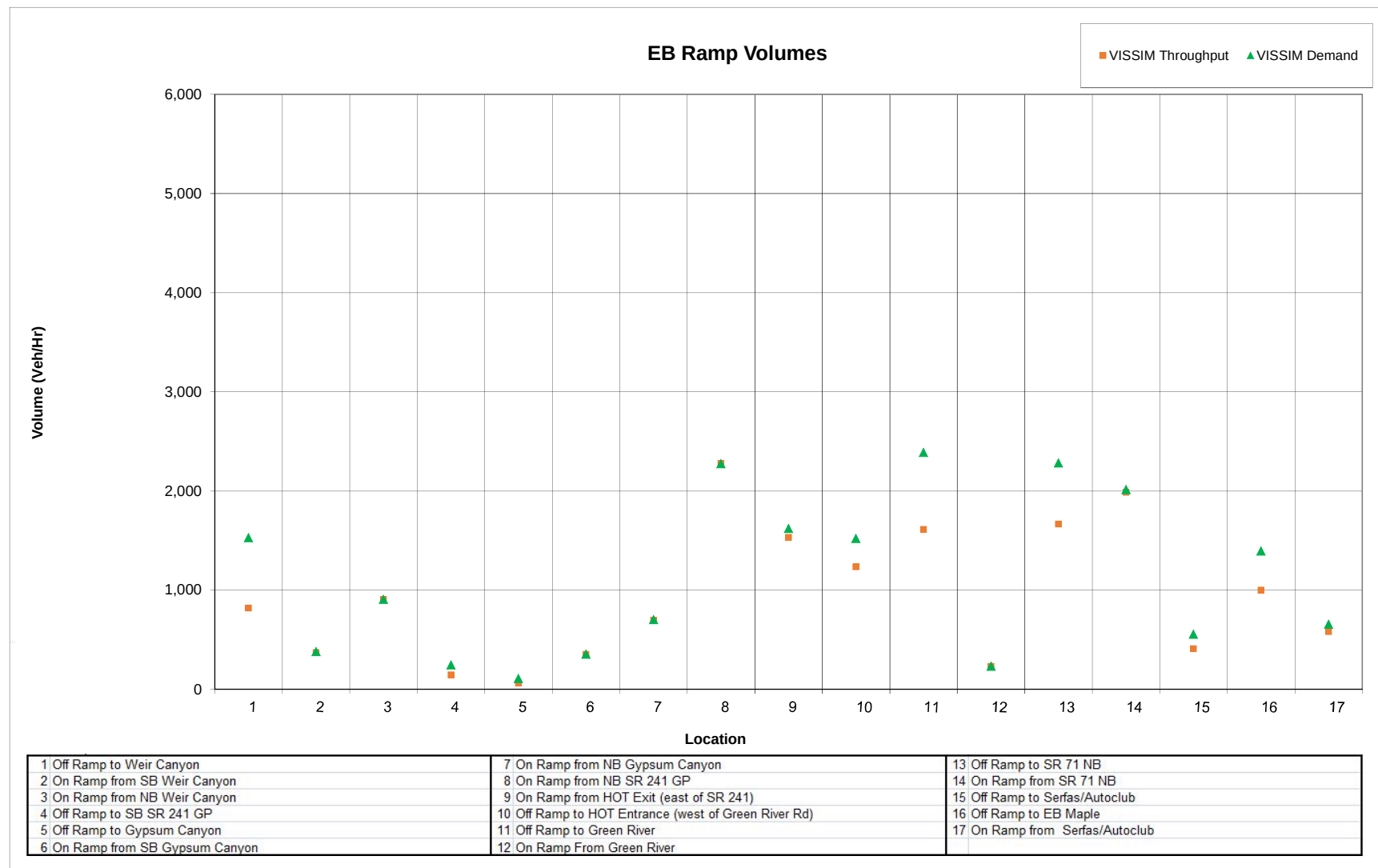


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

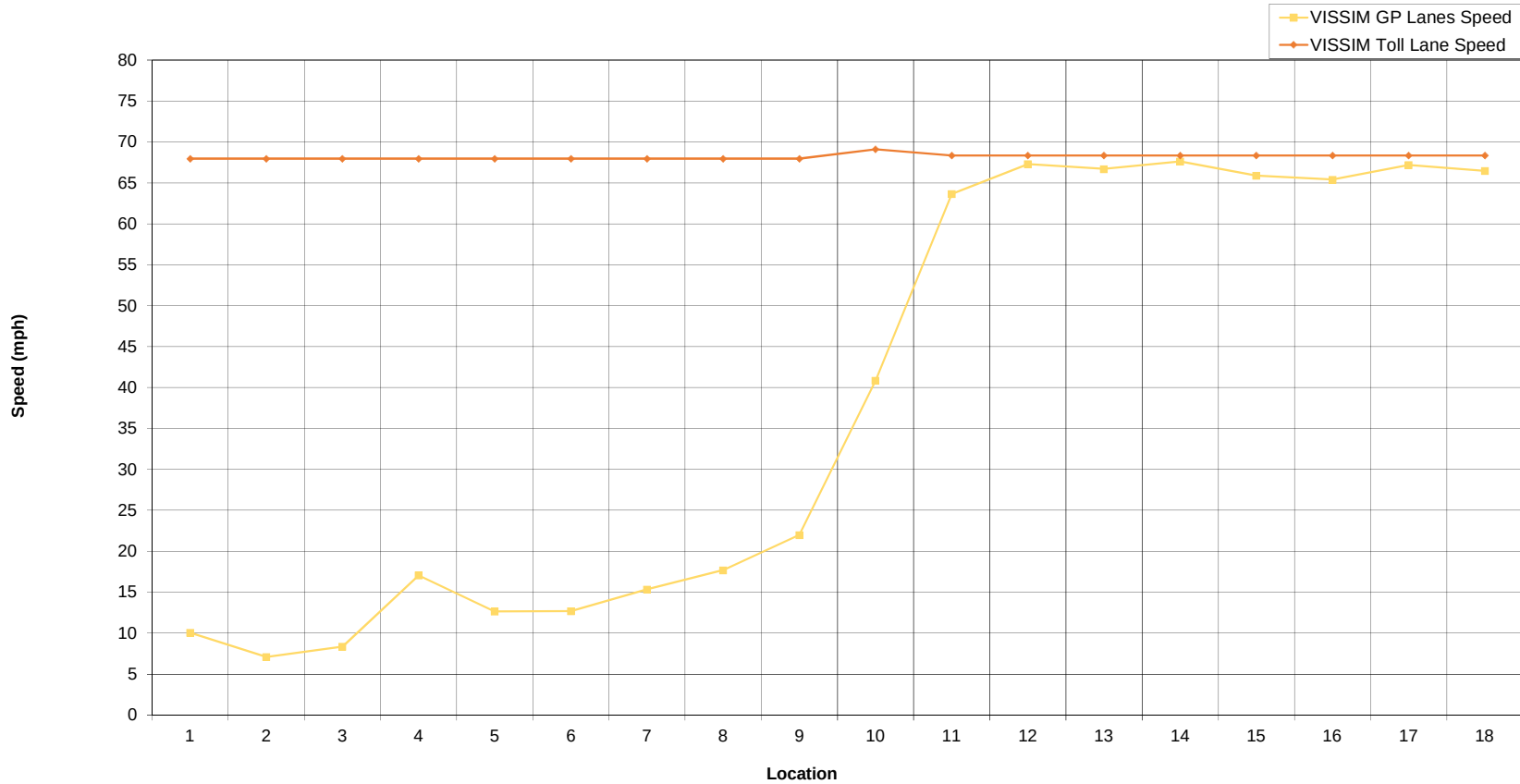
EB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

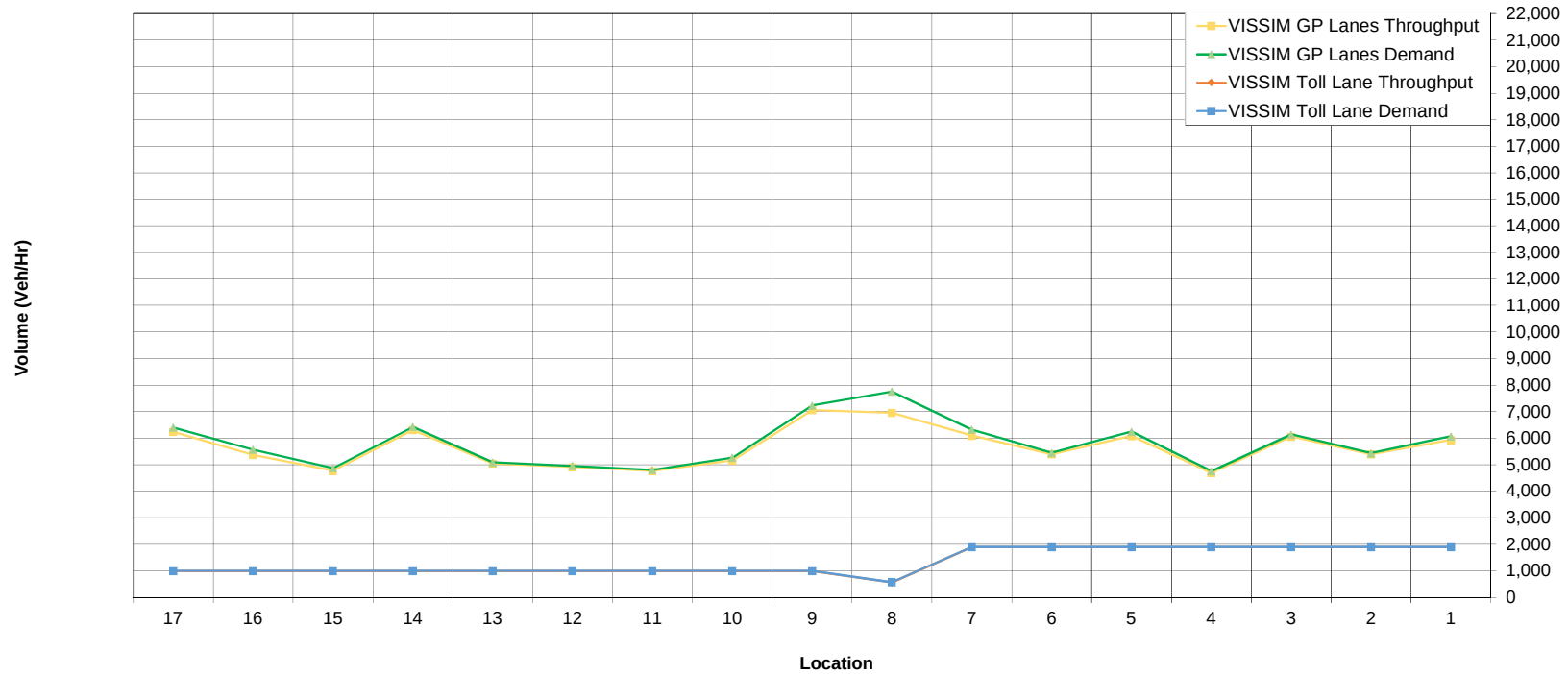


EB Mainline & Toll Lane Speeds

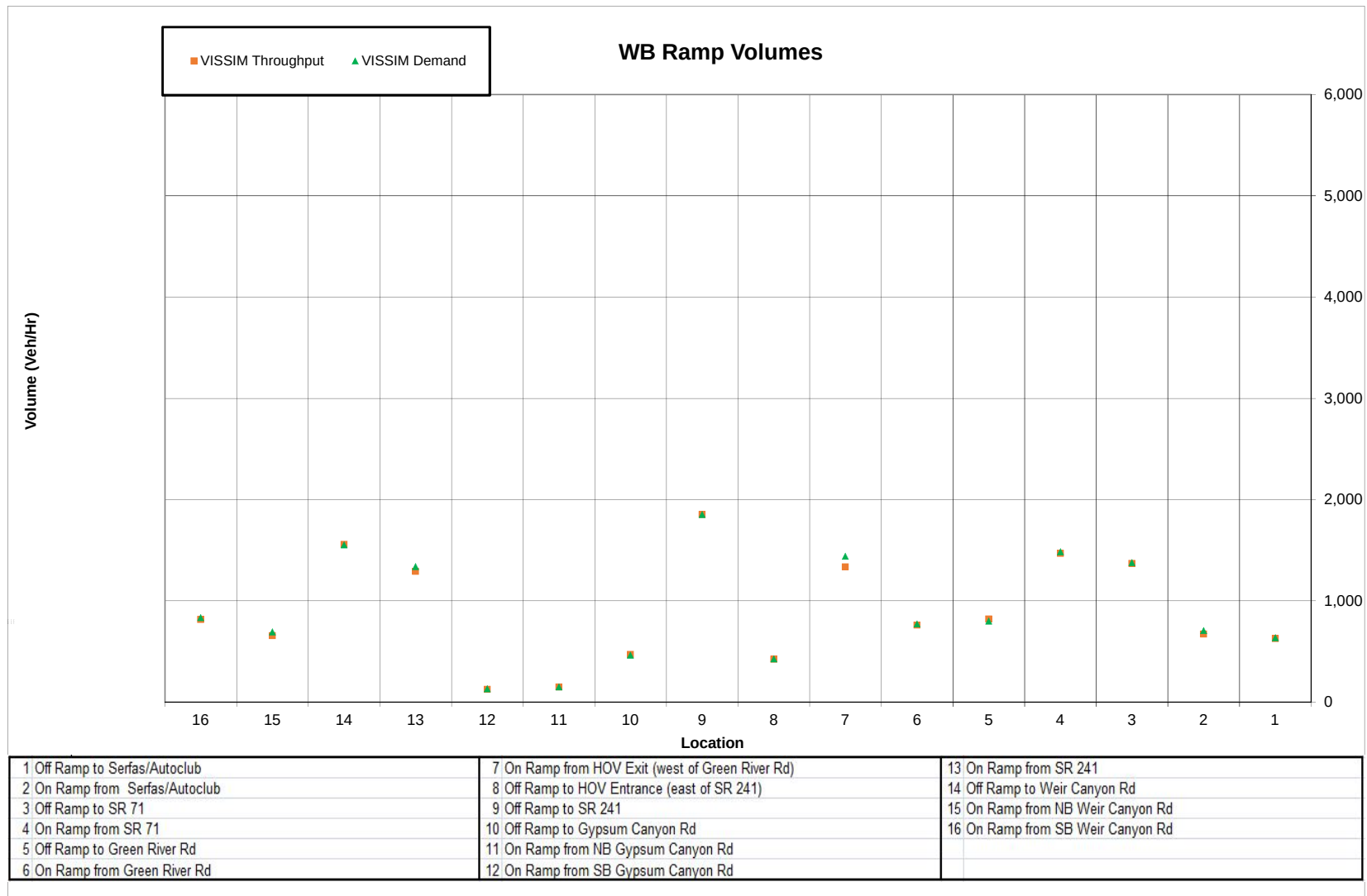


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

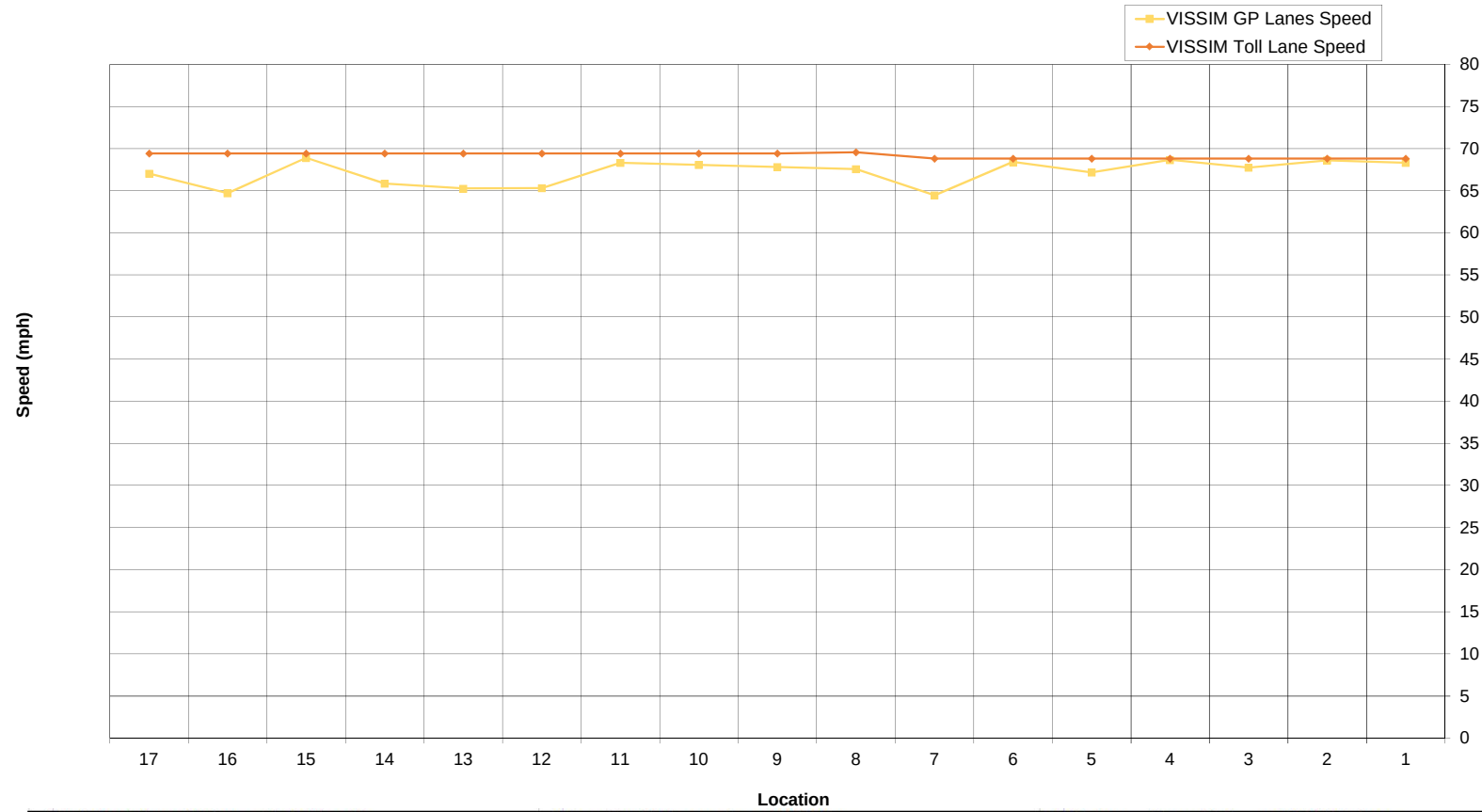


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



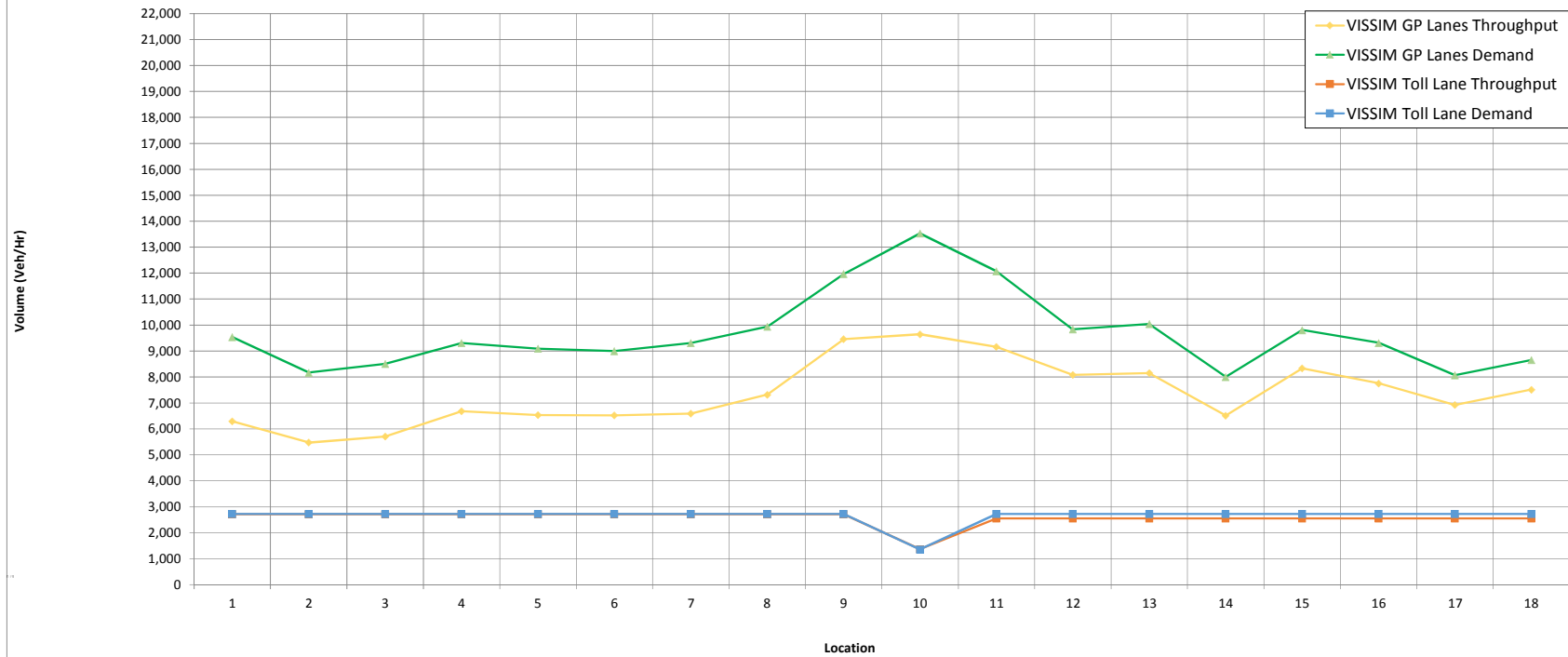
Charts 5-6 PM

WB Mainline & Toll Lane Speeds

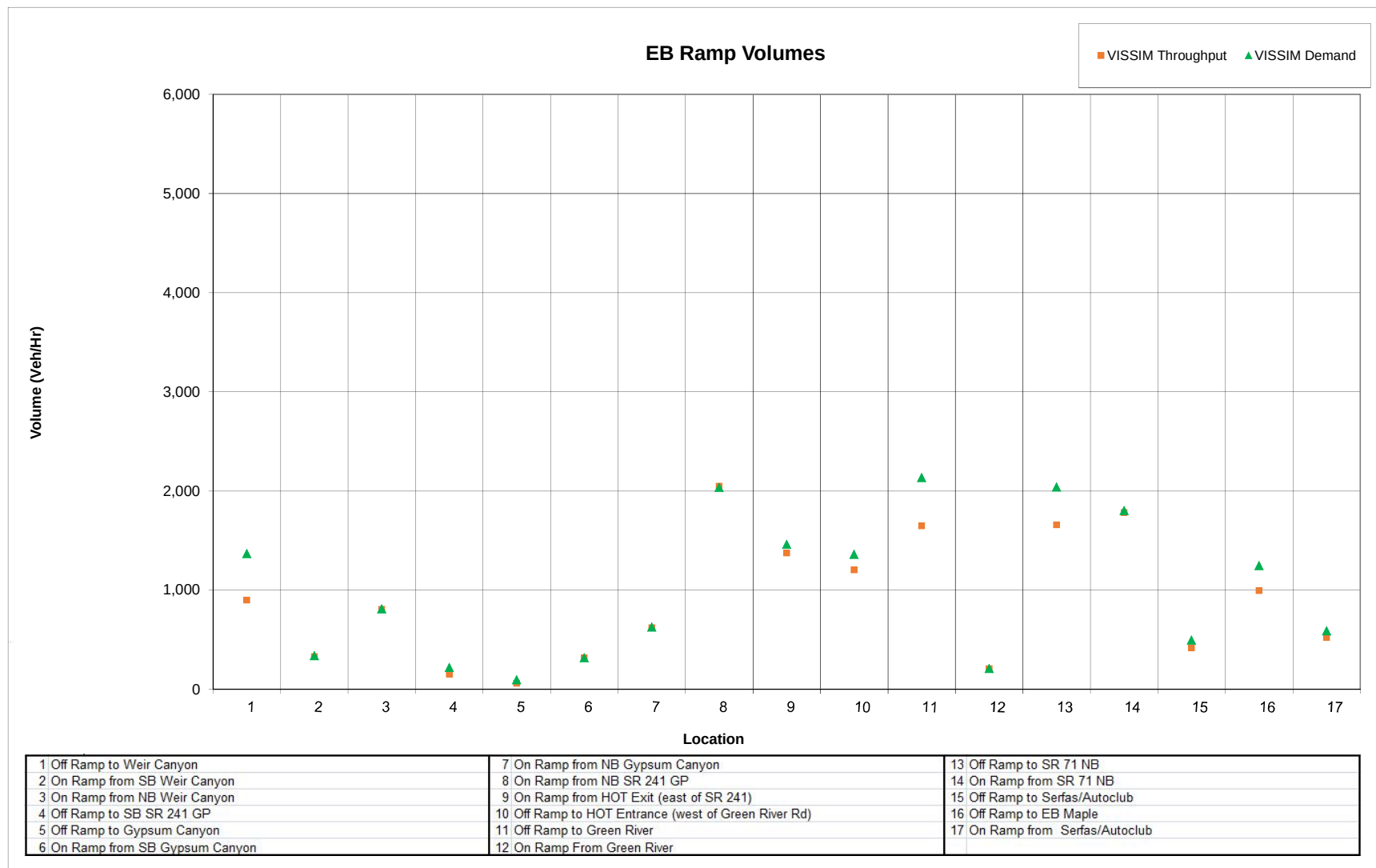


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

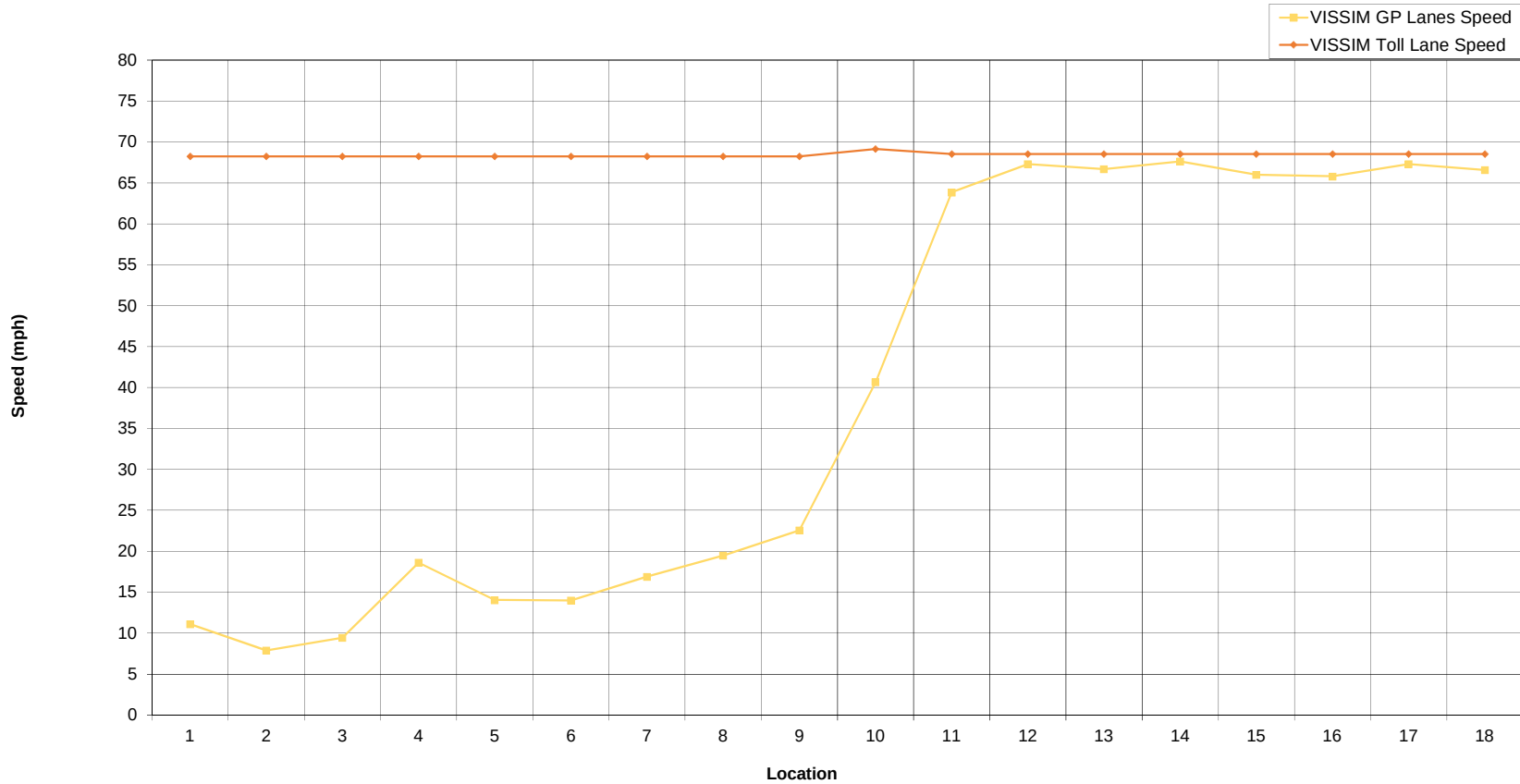
EB Mainline & Toll Lane Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

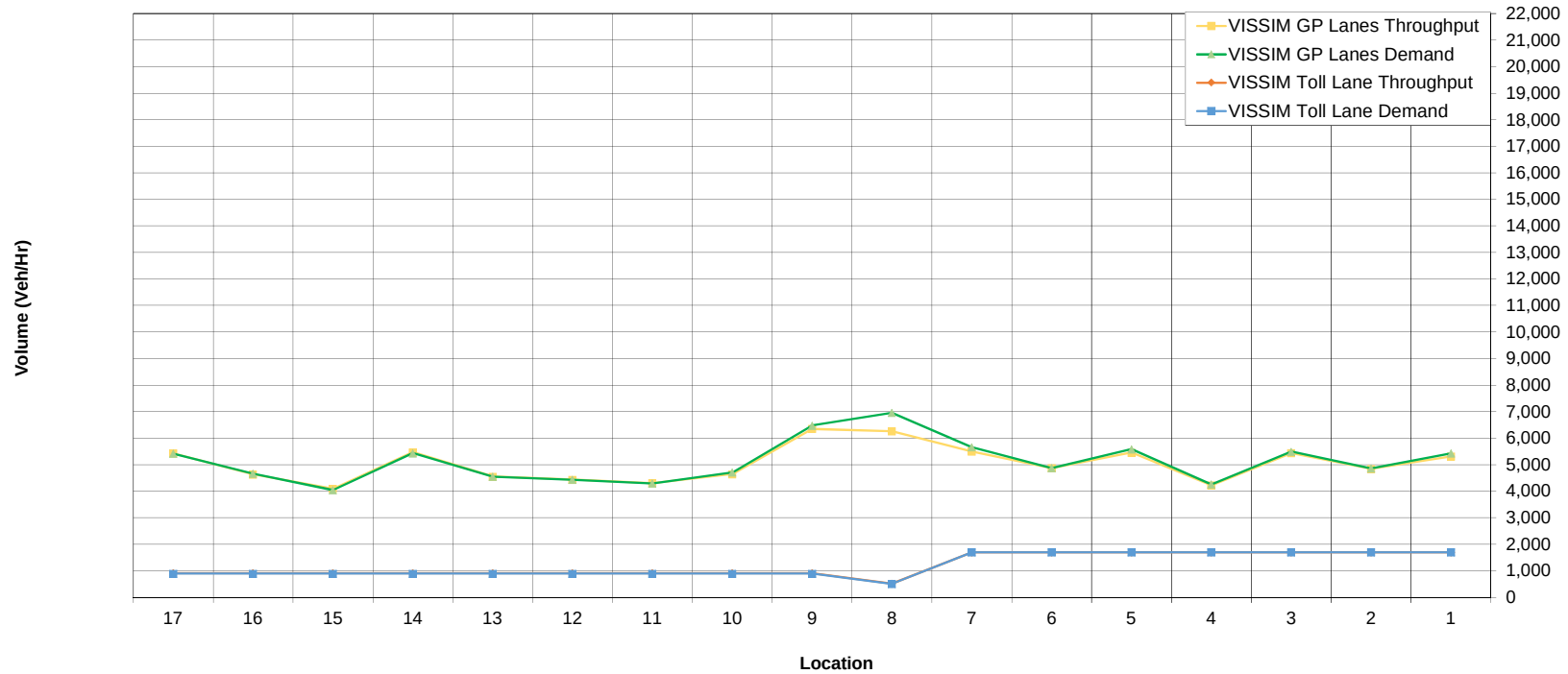


EB Mainline & Toll Lane Speeds

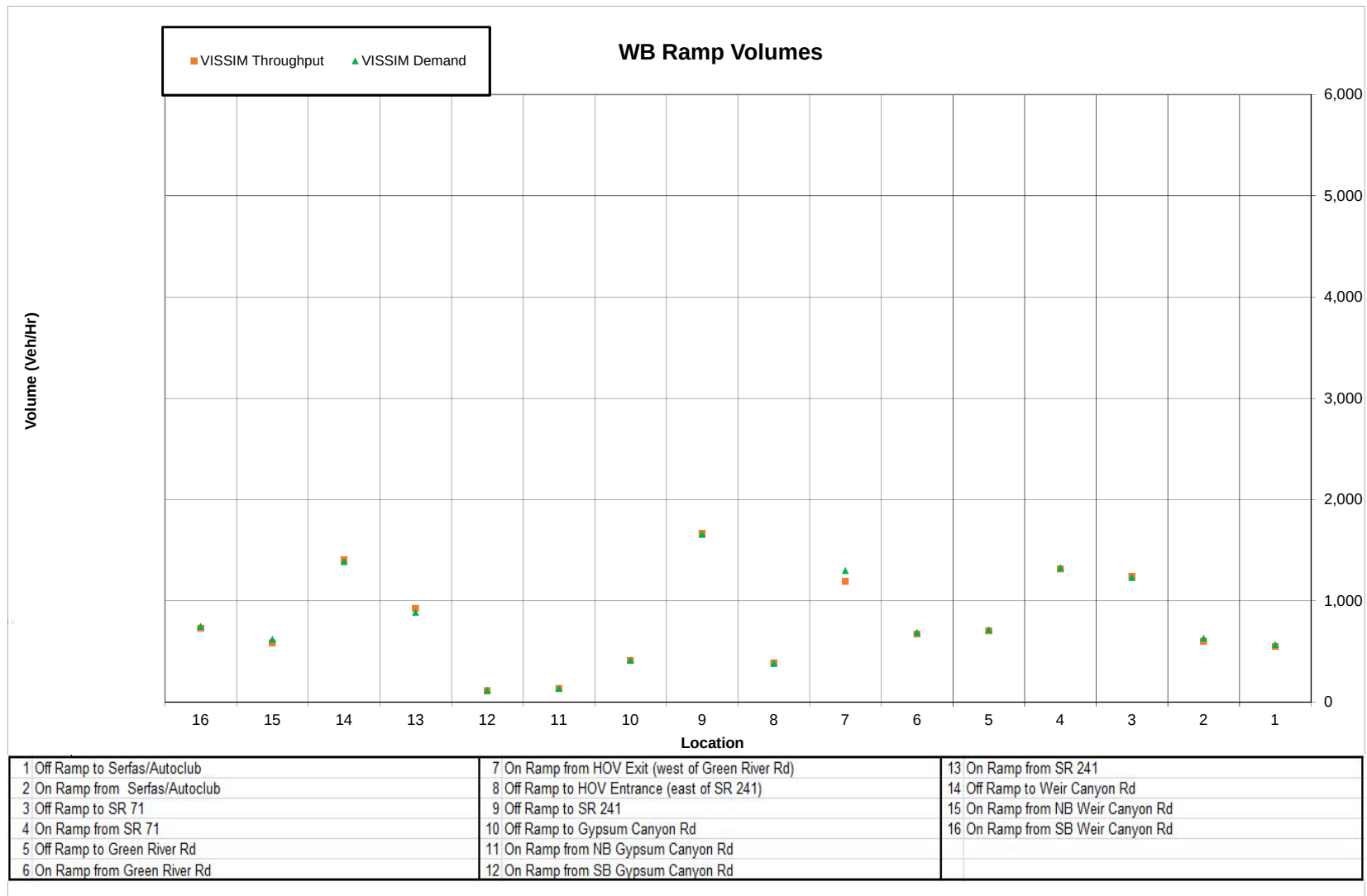


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

WB Mainline & Toll Lane Vehicle Volume by Location

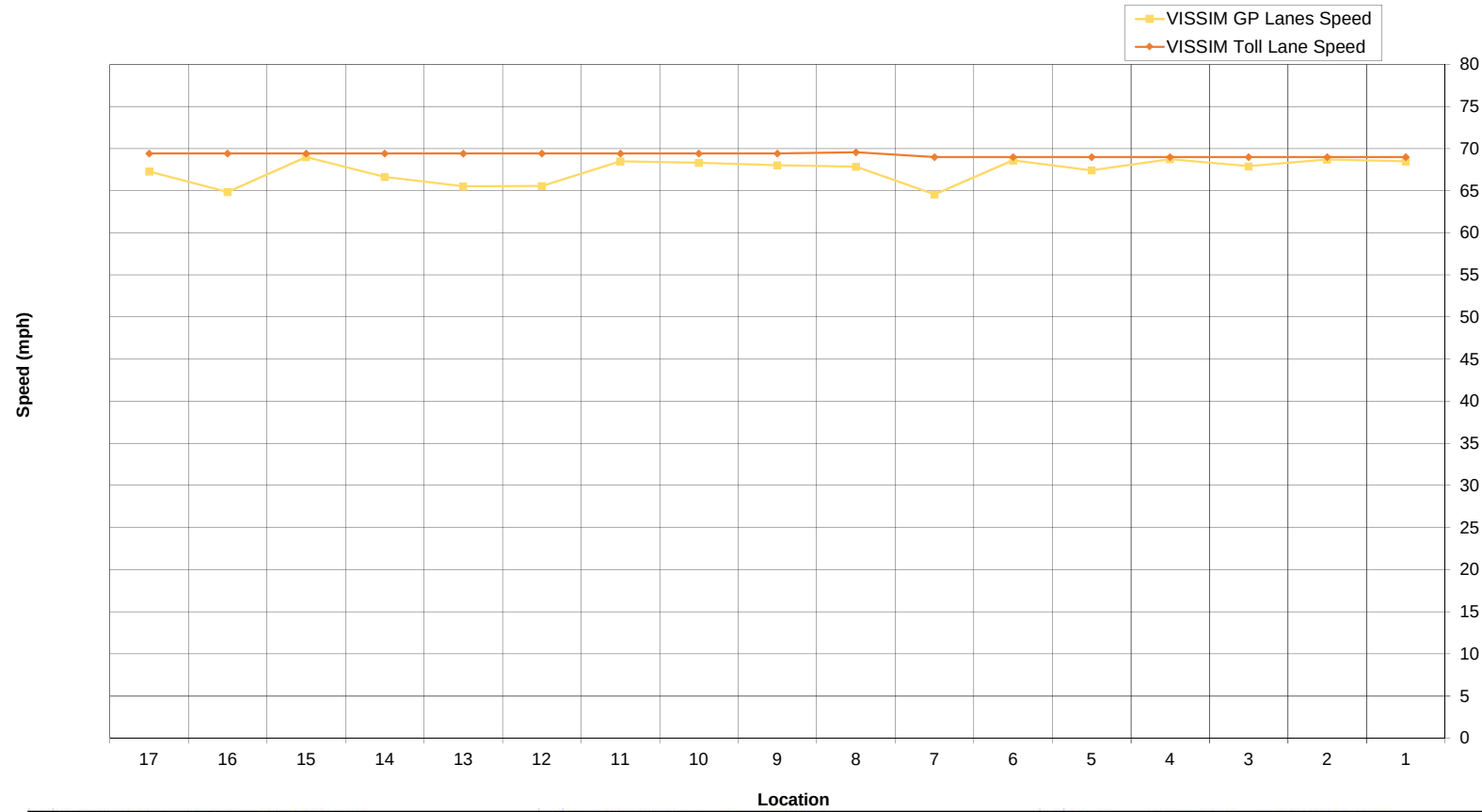


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



Charts 6-7 PM

WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

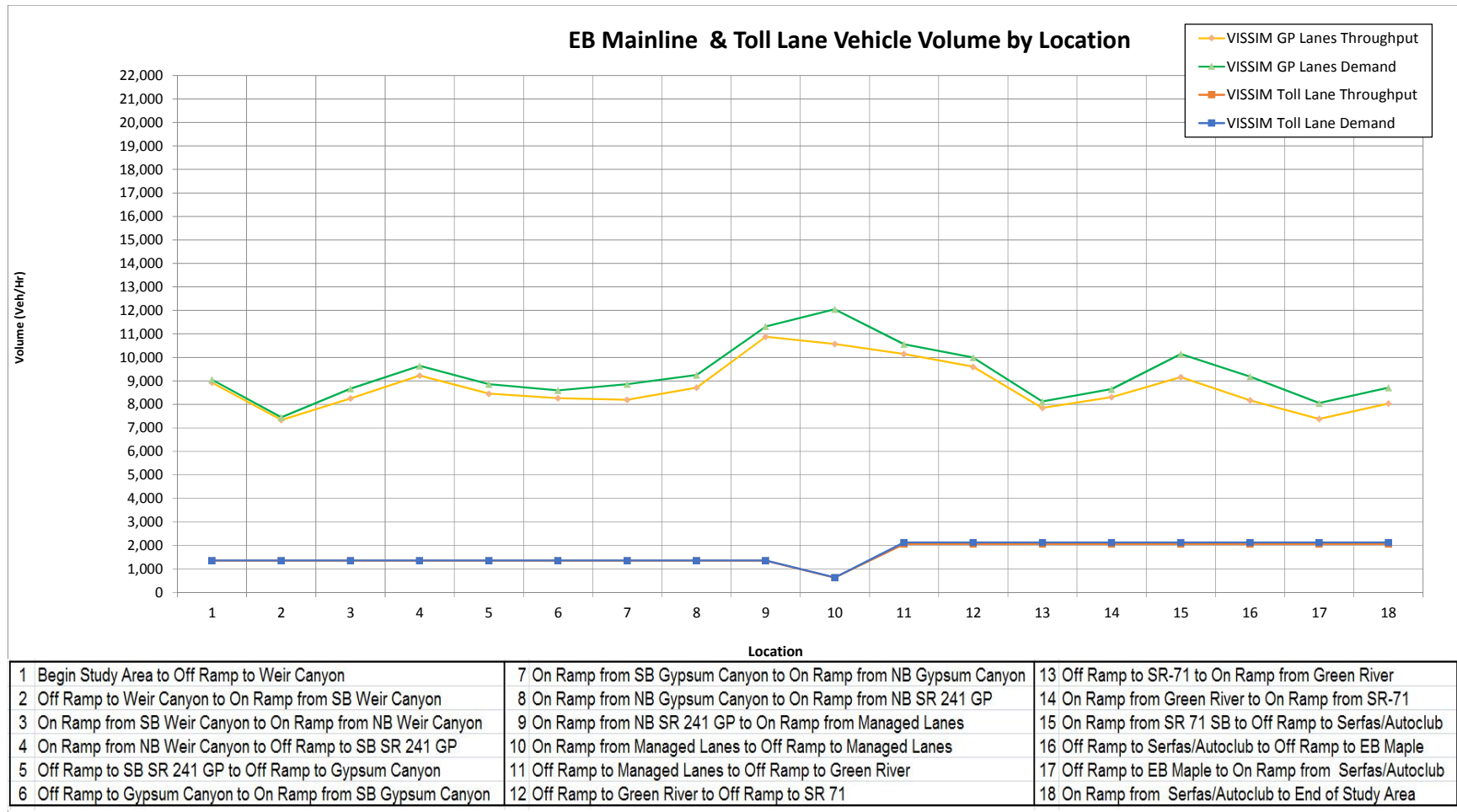
Appendix D
VISSIM Summary of Results
2040 No Build Conditions

VISSIM Model Summary - 2040 No Build - AM Network Summary Statistics

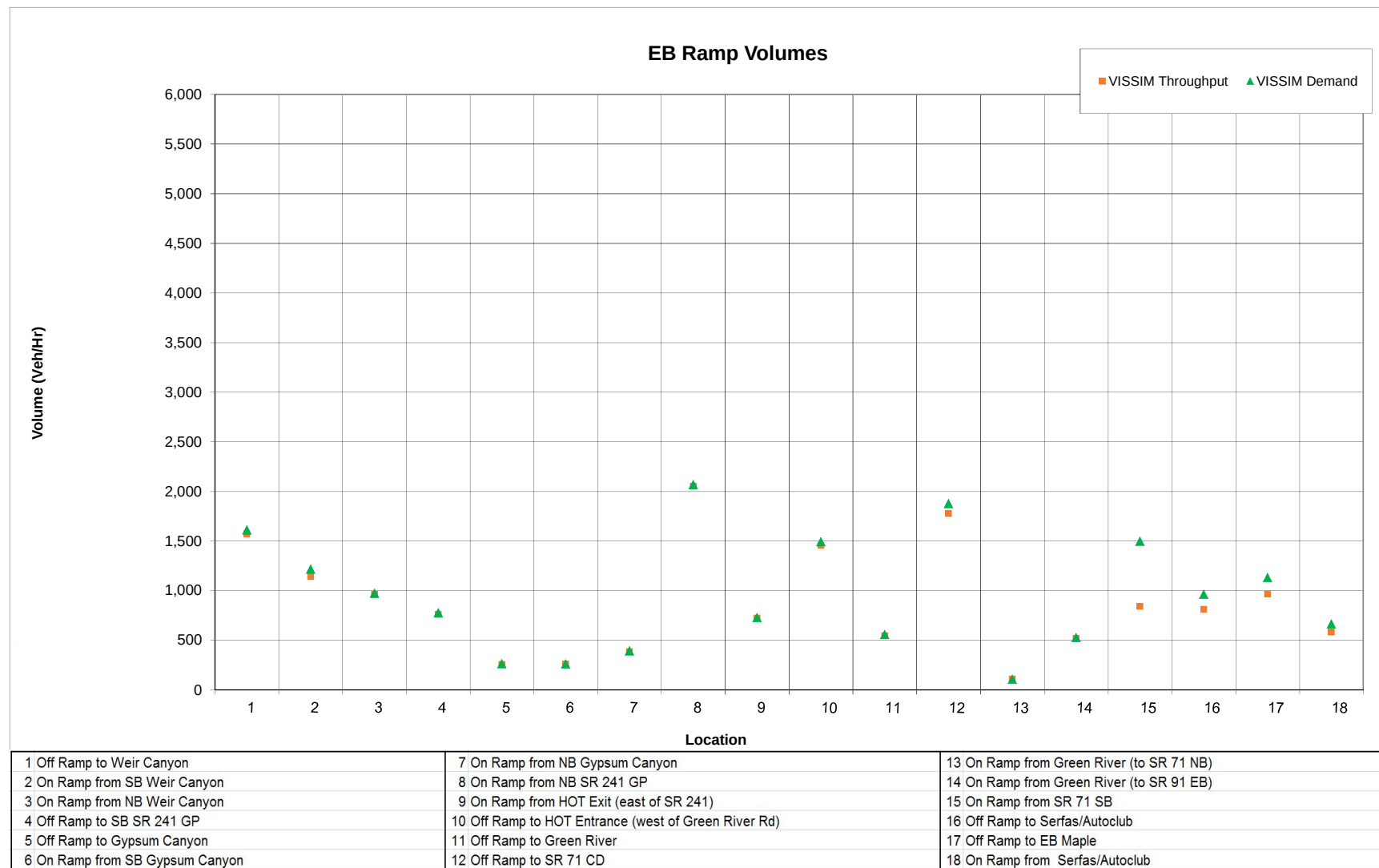
Parameter			2040 No Project	2017 No Project	Difference
Total Vehicle Demand (3 Hr)			119,605	100,741	18,864
Total number of vehicles that did not reach their destination			10,264	9,016	1,247
Total number of vehicles that have reached their destination			109,342	91,725	17,617
Total vehicle-miles traveled (VMT)			939,671	796,551	143,120
Total travel time, All Vehicle Types (VHT)			27,641	23,068	4,572
Average speed [mph], All Vehicle Types			34.0	34.5	-0.5
Average delay time per vehicle [mins], All Vehicle Types			7.00	6.83	0.17

VISSIM Model Summary - 2040 No Build - AM
Travel Time Results

#	Origin	#	Destination	p Ke	Hide Travel Time Segments			2017 AM No Build VISSIM Travel Time (Minutes)		
					Seg 1	Seg 2	Seg 3	6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	9.7	12.6	13.7
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	9.5	12.4	13.5
		5	SR 241 SB south of SR 91	3	1001			7.9	10.7	12.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	13.9	15.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.7	8.7	8.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.3	8.3	8.3
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.0	10.0	9.9
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	22.8	21.2	16.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	20.8	19.3	15.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	23.2	21.8	17.8
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			8.5	8.0	5.7
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	15.0	14.5	13.2
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	15.5	15.0	14.7
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.3	7.3	7.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.1	11.1	11.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.4	12.4	12.4
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	39.6	56.0	59.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	37.6	54.2	58.4
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			23.5	38.6	44.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	40.1	56.6	60.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a

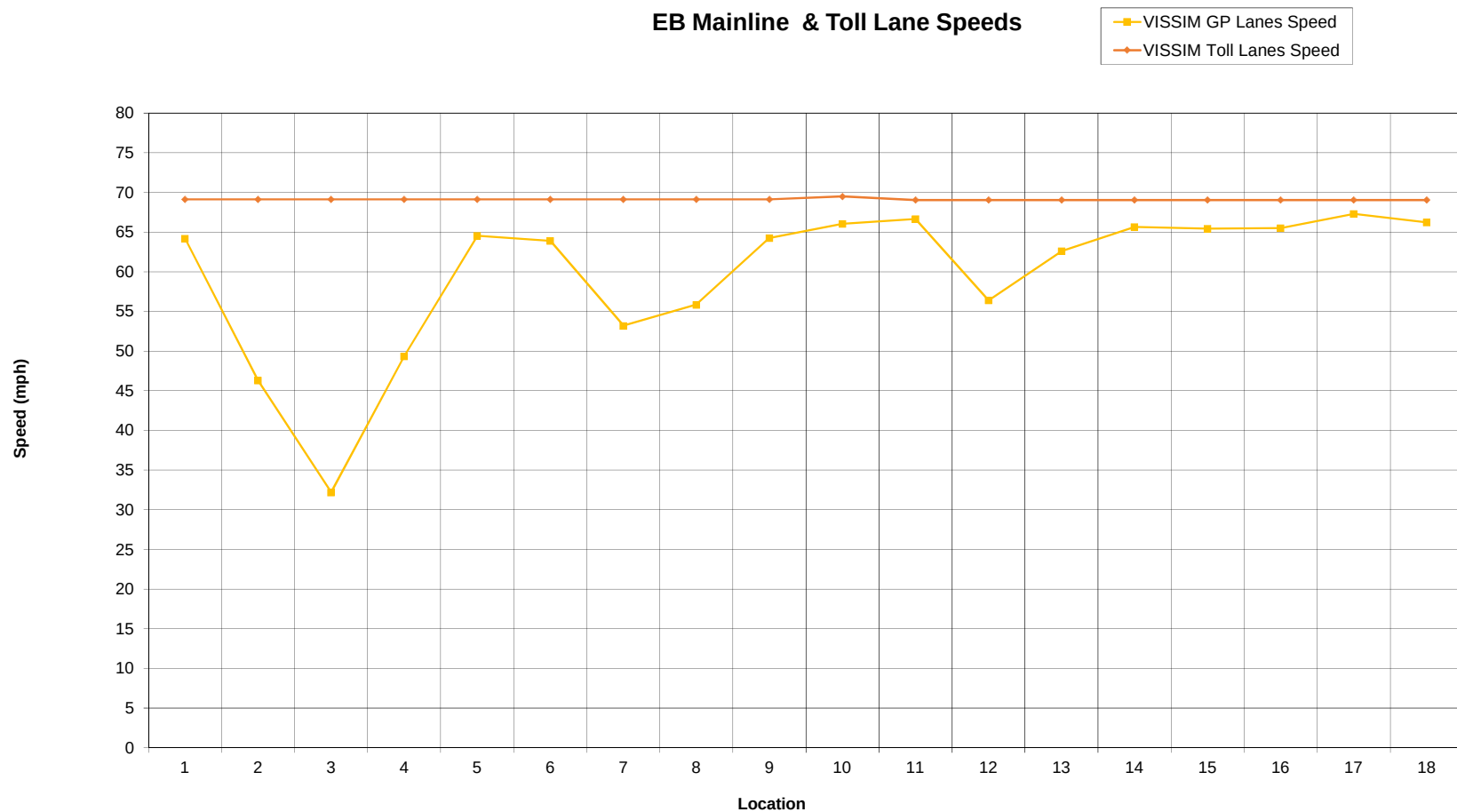


Charts 6-7 AM

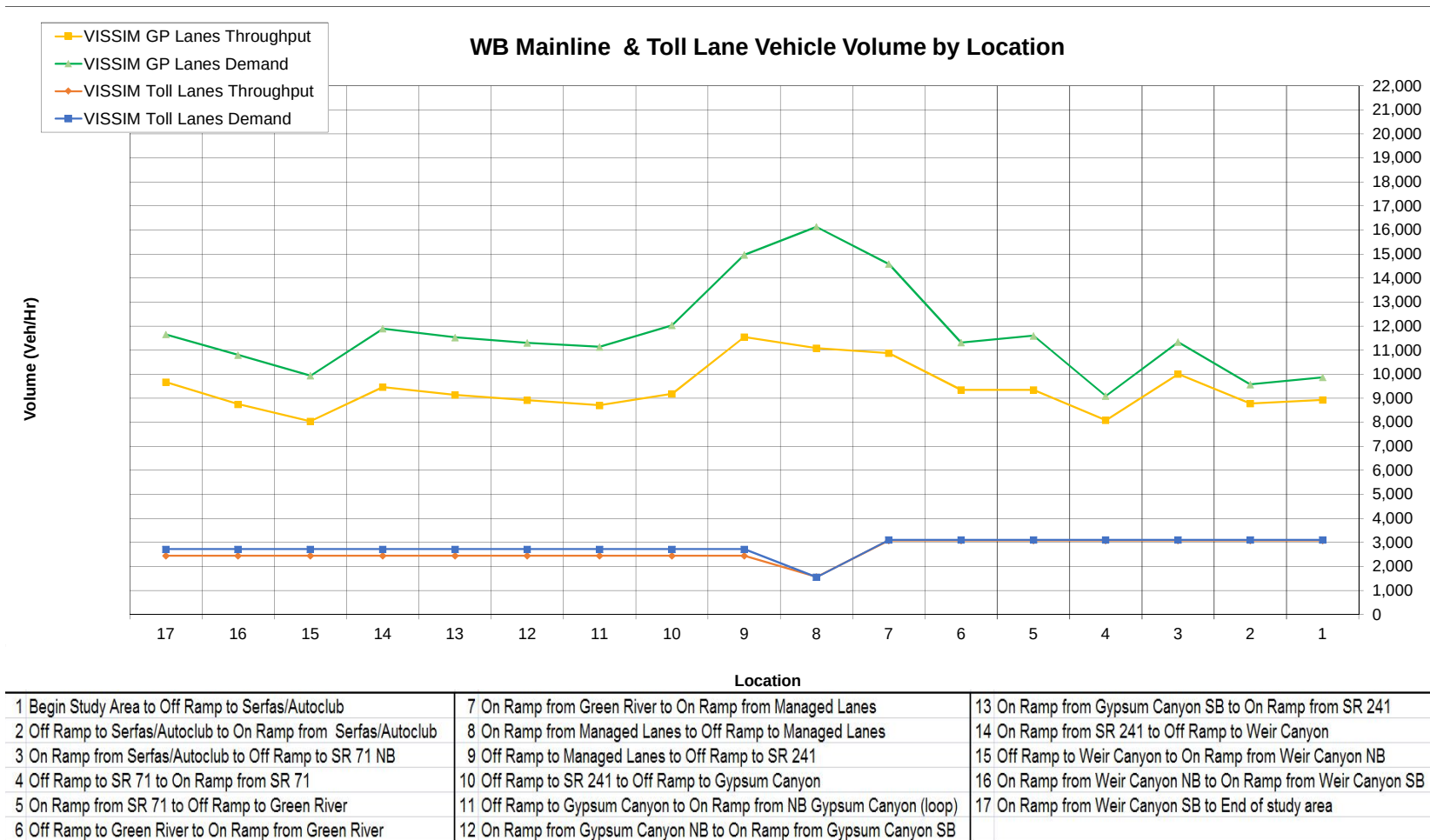


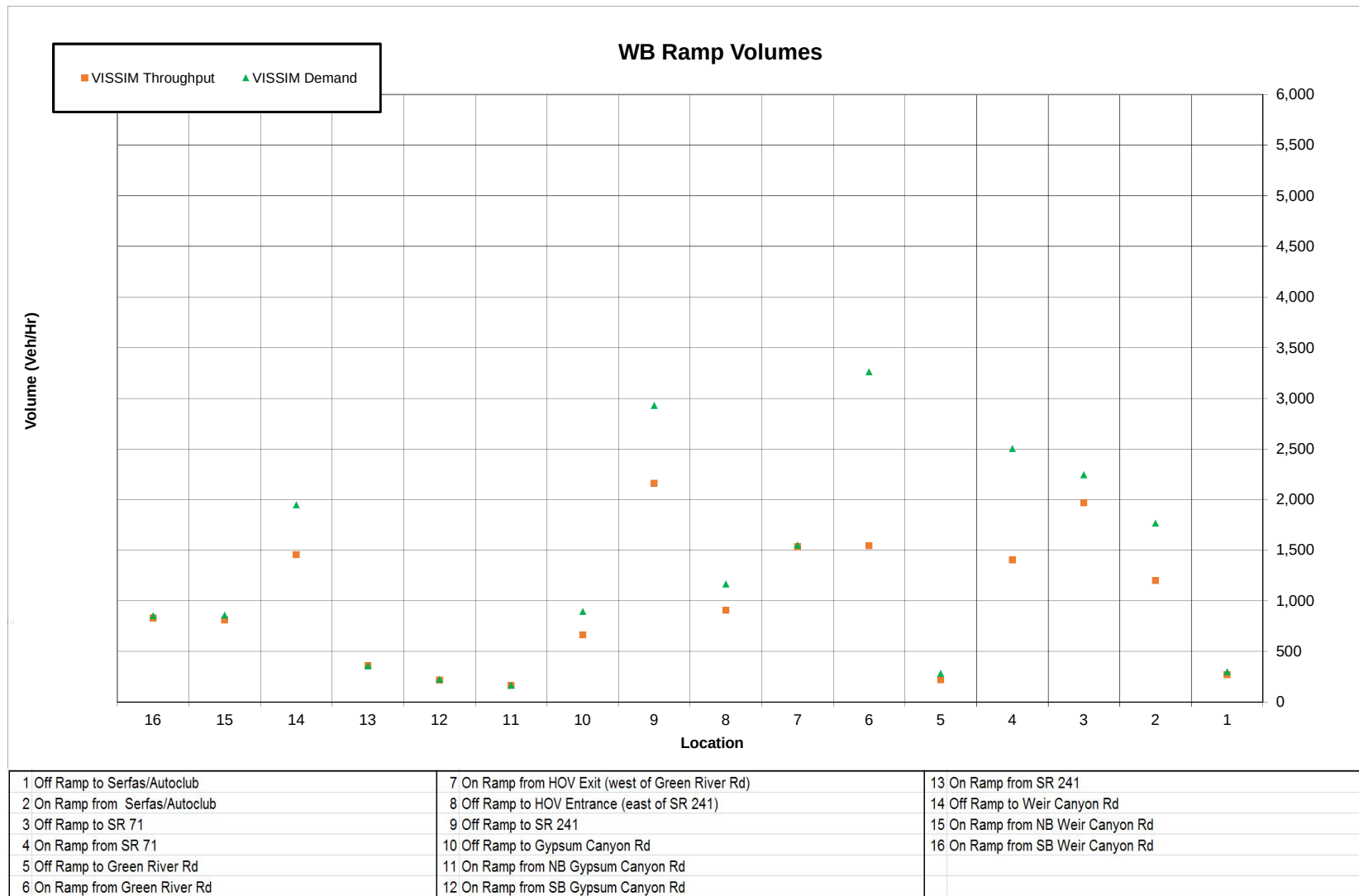
Charts 6-7 AM

EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



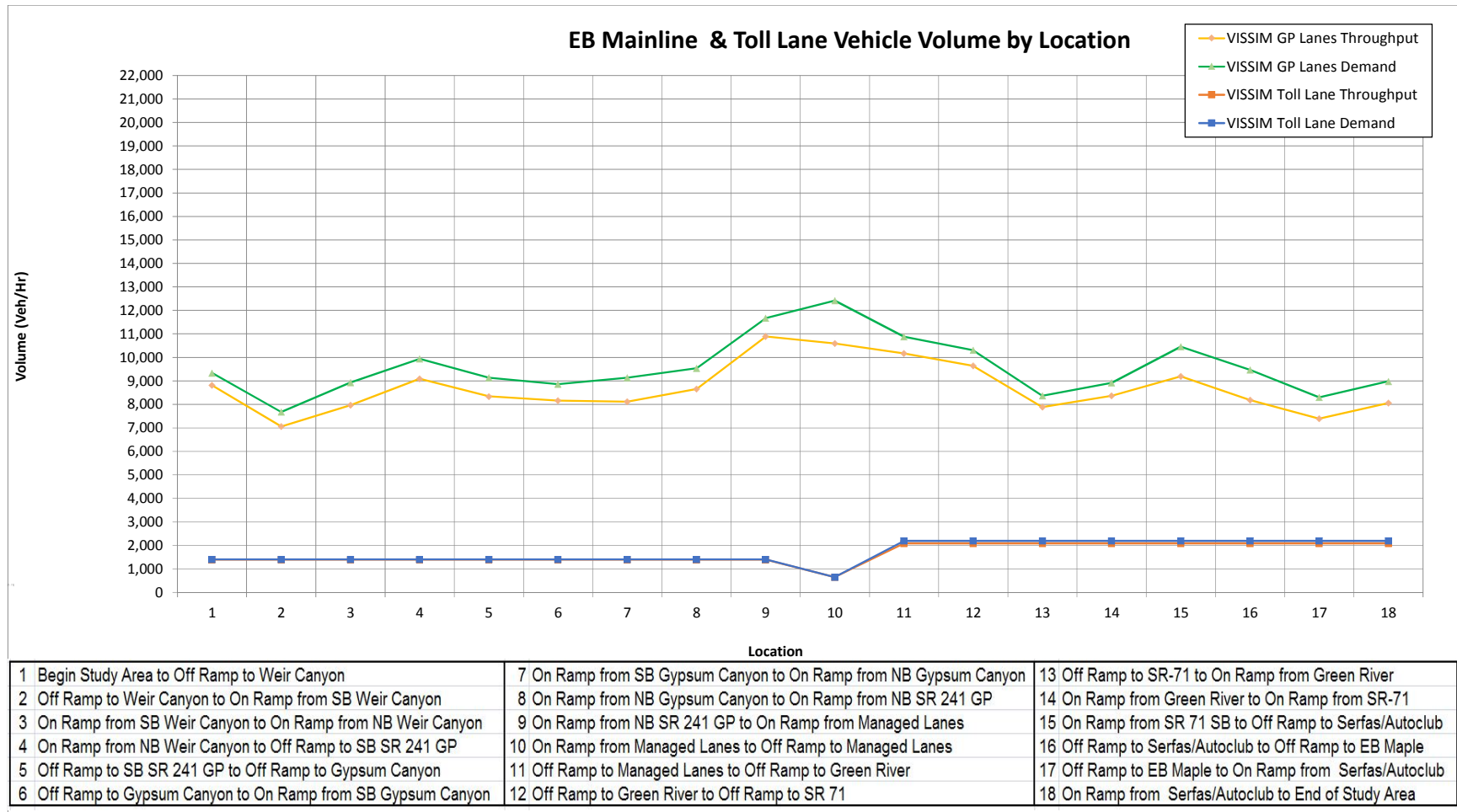


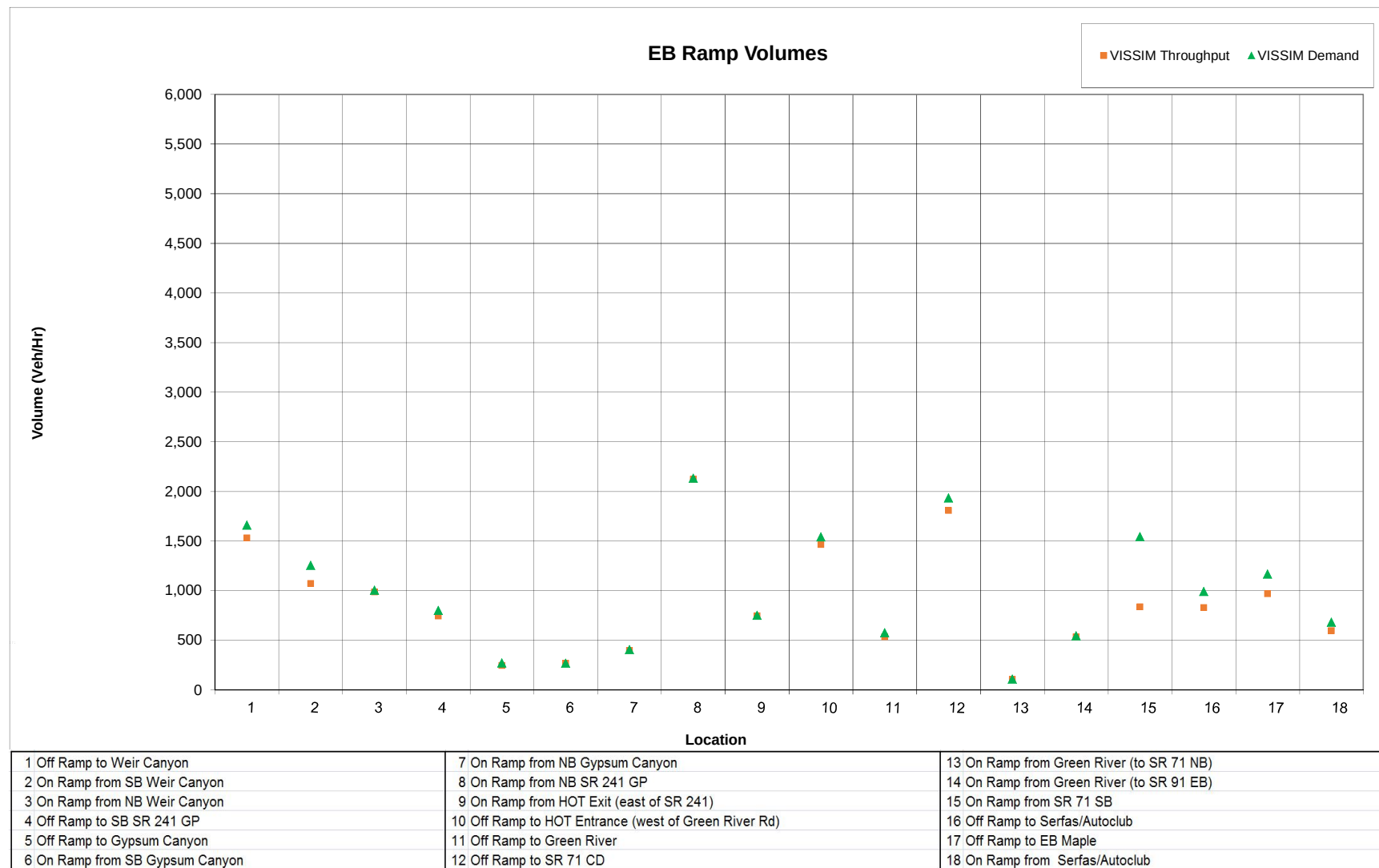
Charts 6-7 AM

WB Mainline & Toll Lane Speeds



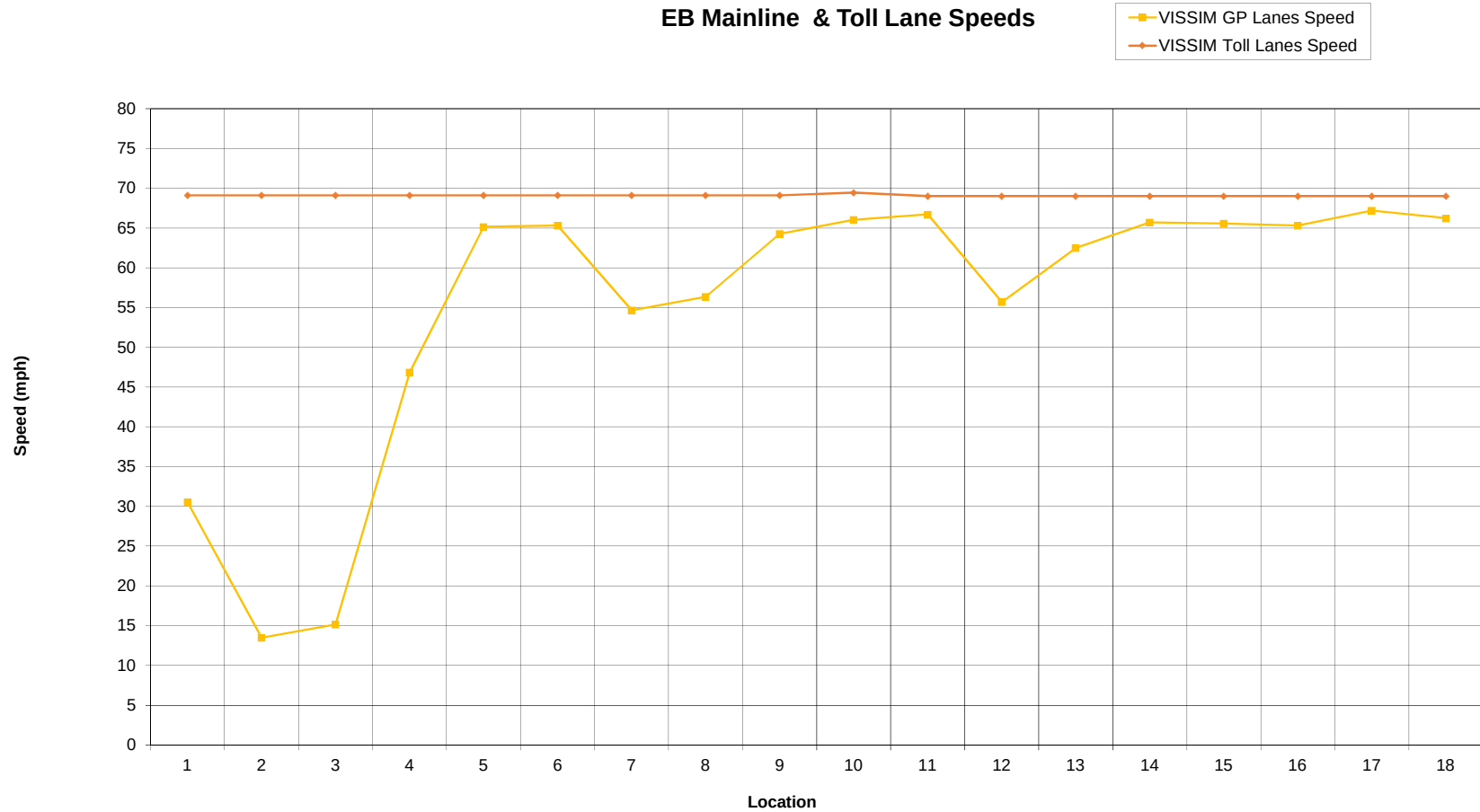
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



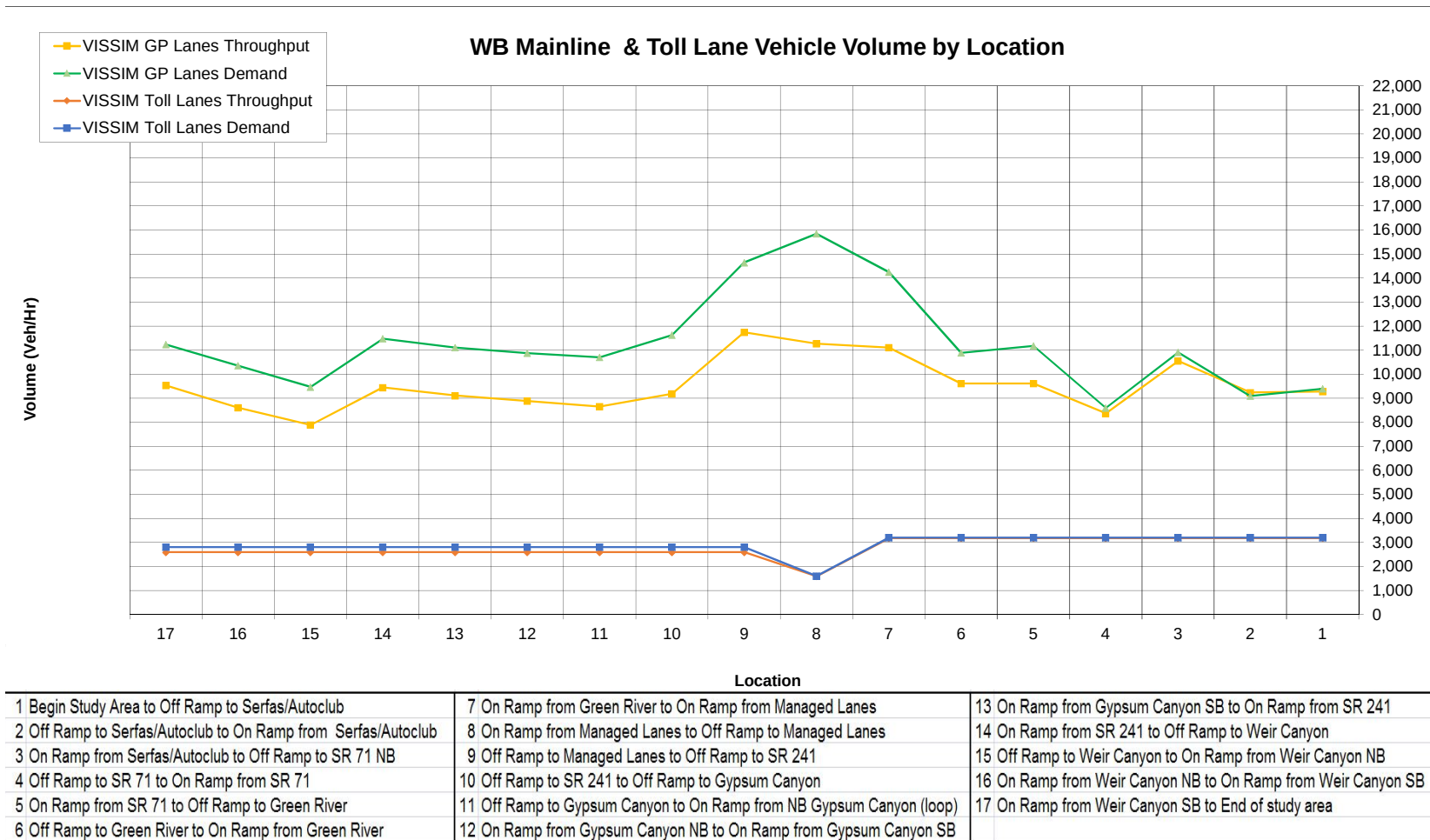


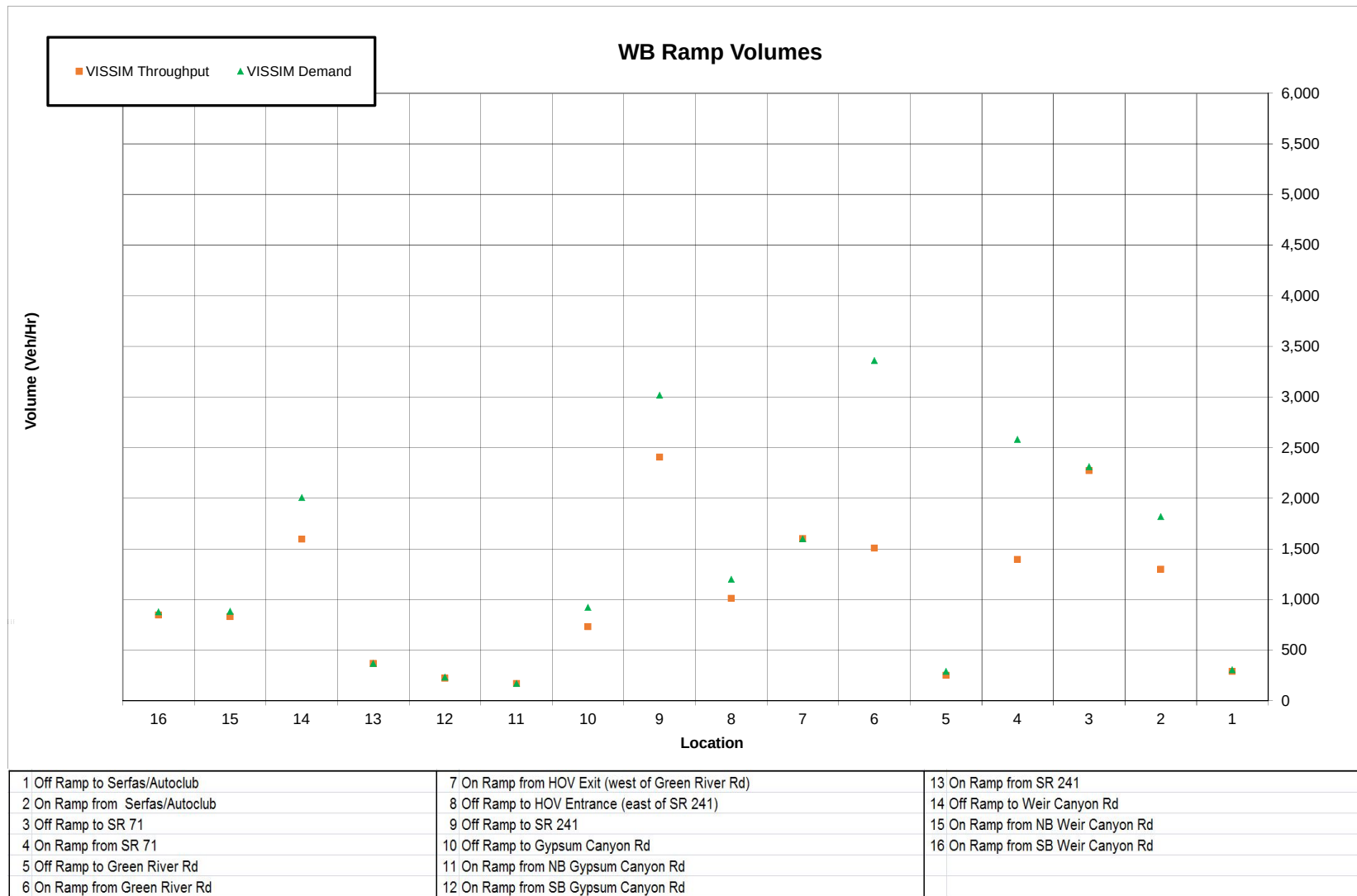
Charts 7-8 AM

EB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



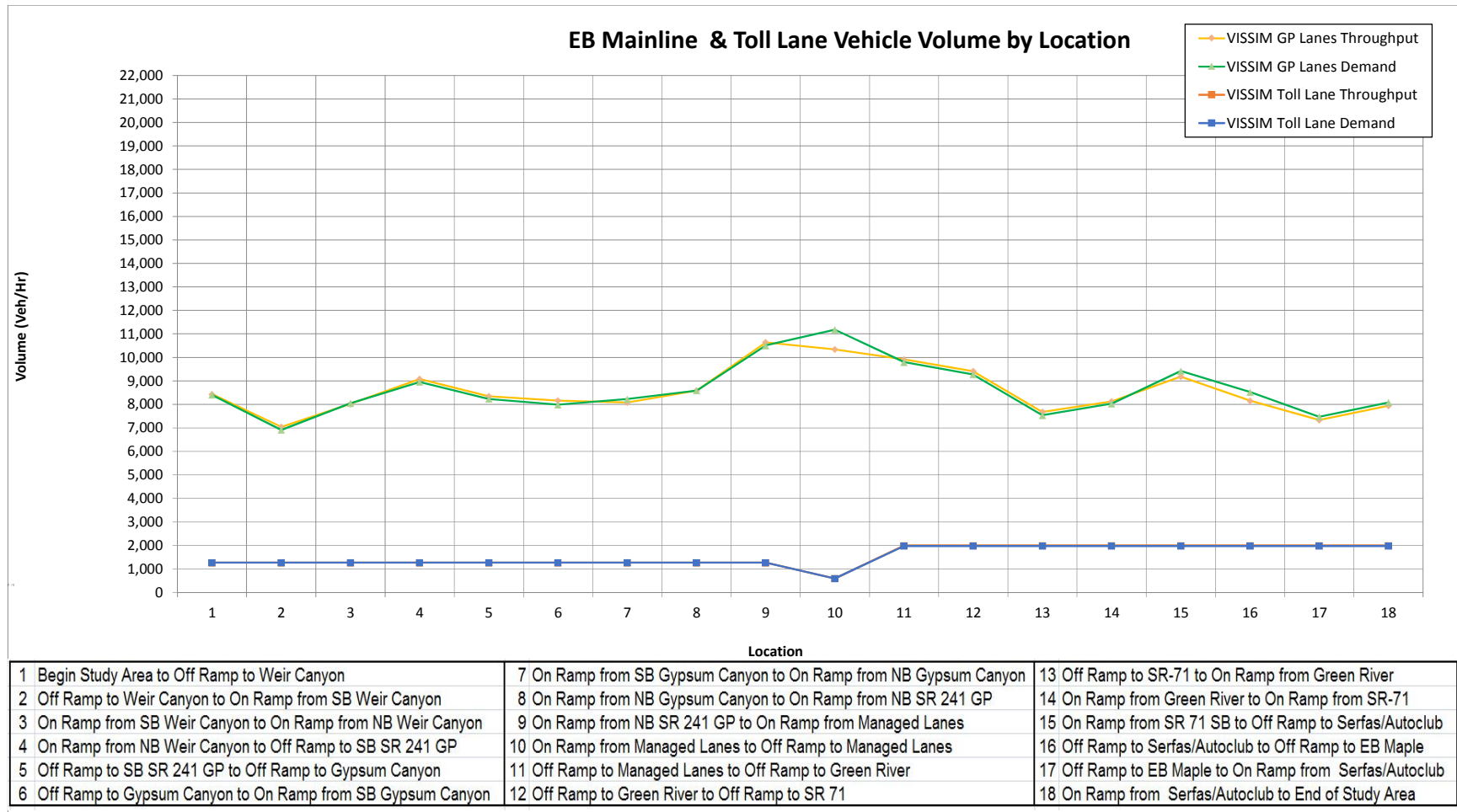


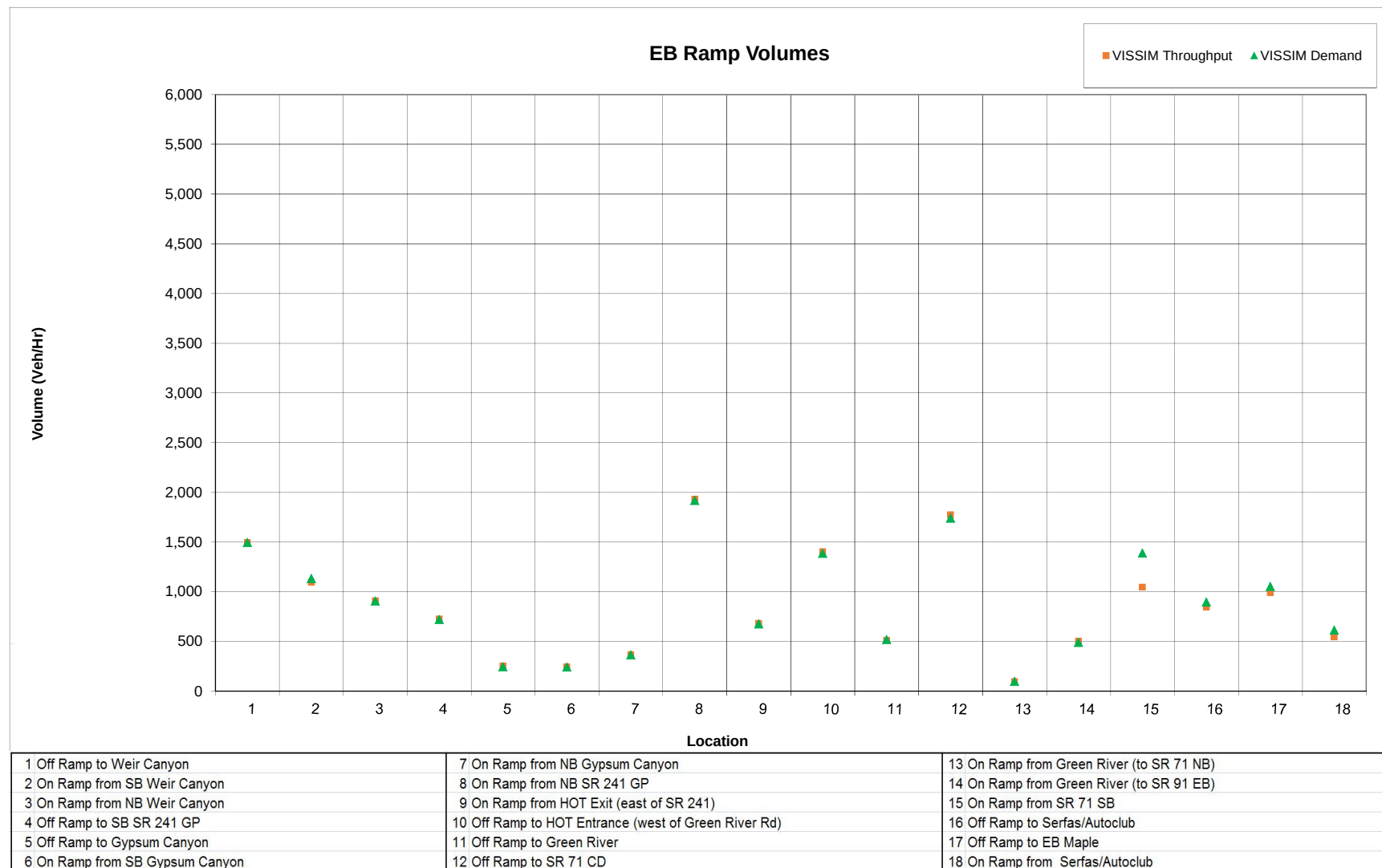
Charts 7-8 AM

WB Mainline & Toll Lane Speeds



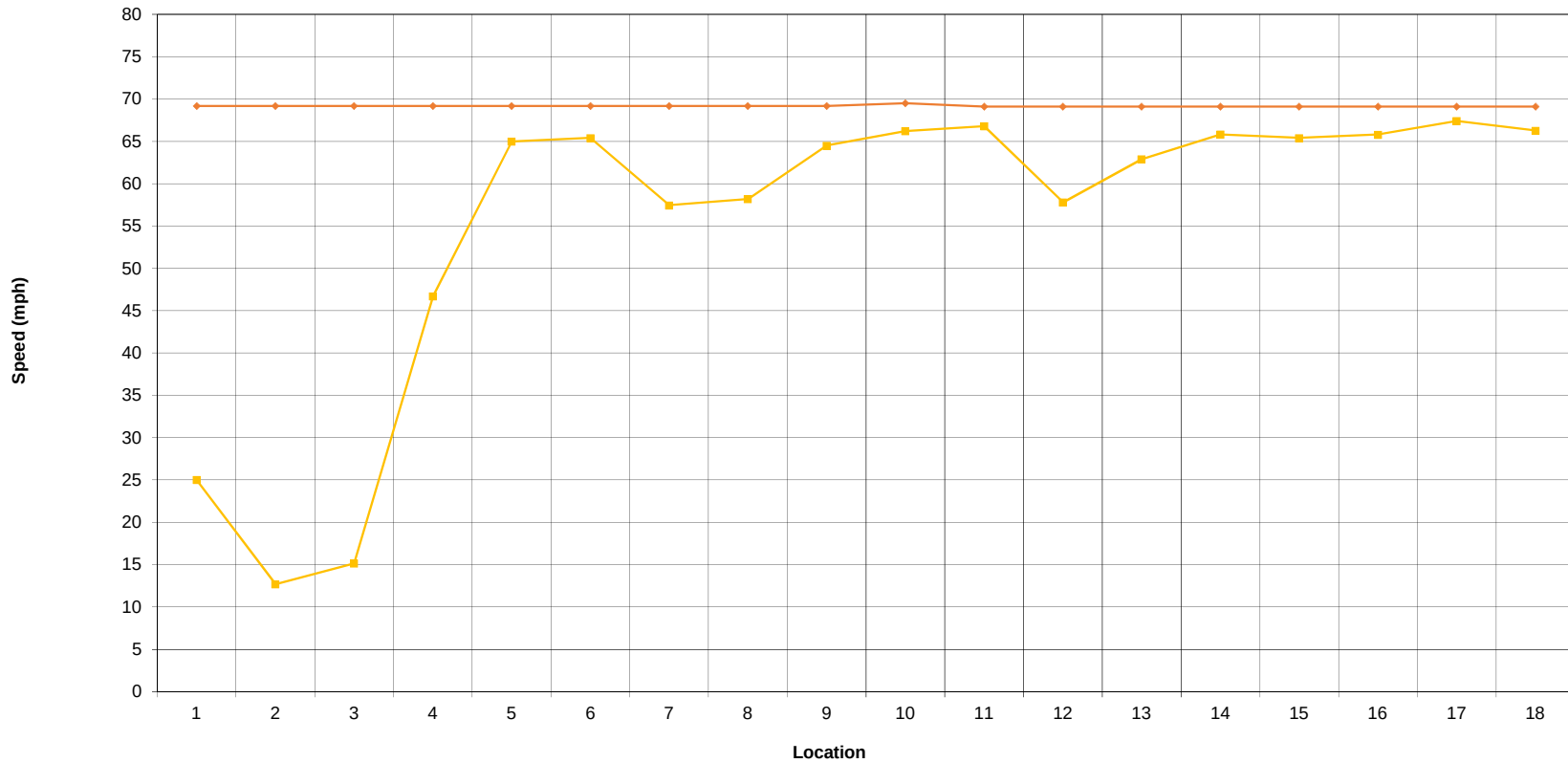
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



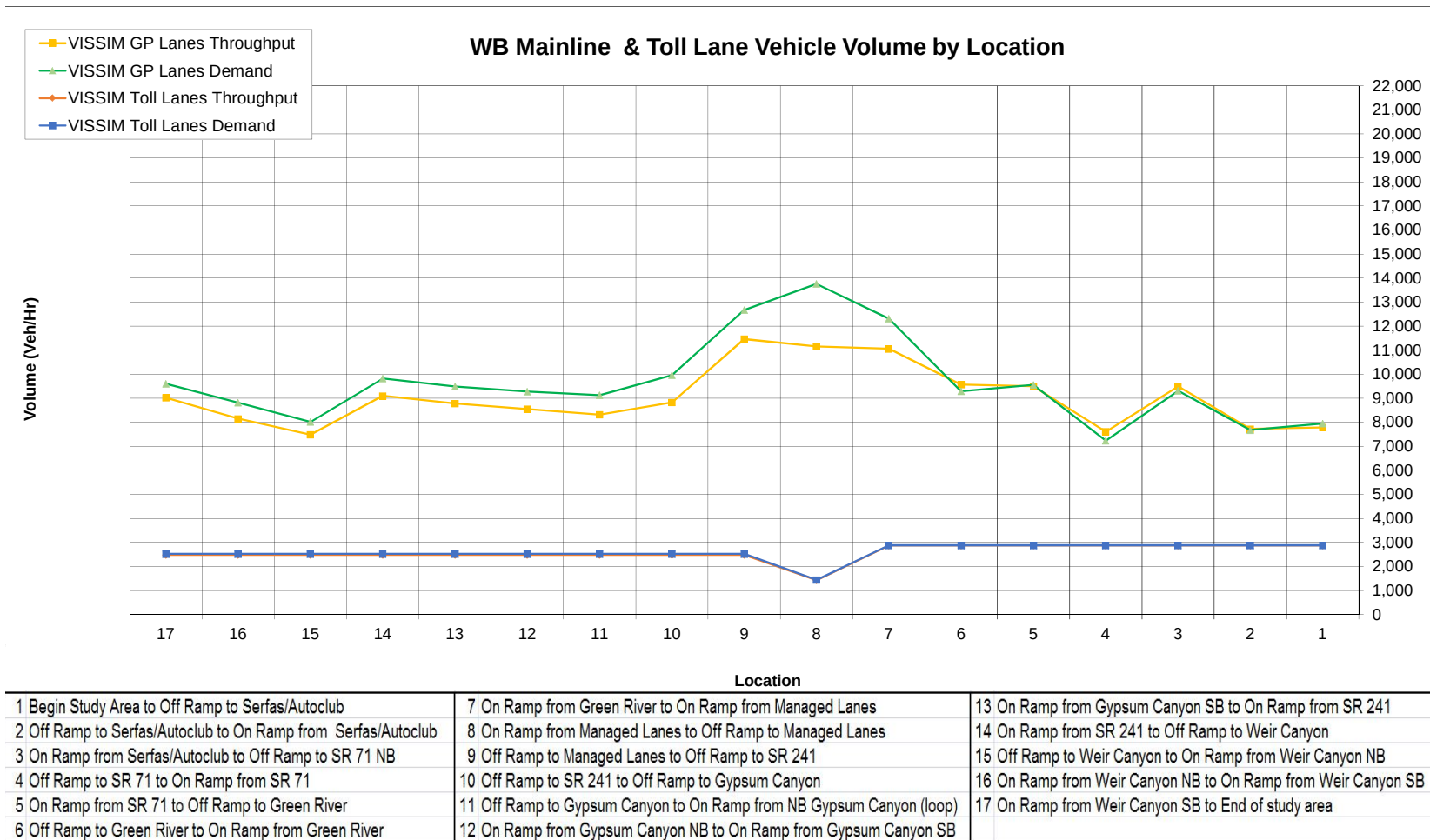


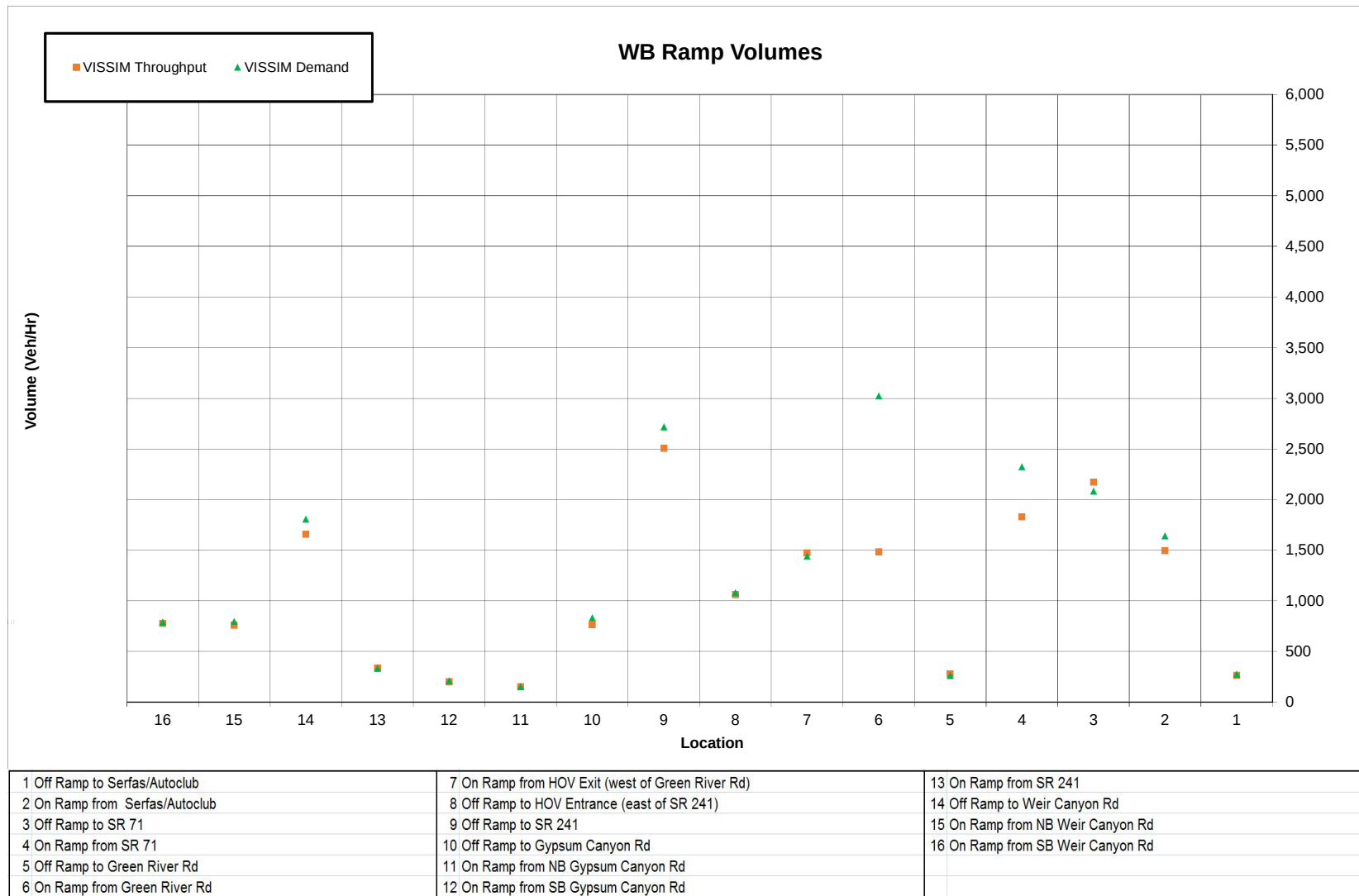
EB Mainline & Toll Lane Speeds

■ VISSIM GP Lanes Speed
◆ VISSIM Toll Lanes Speed

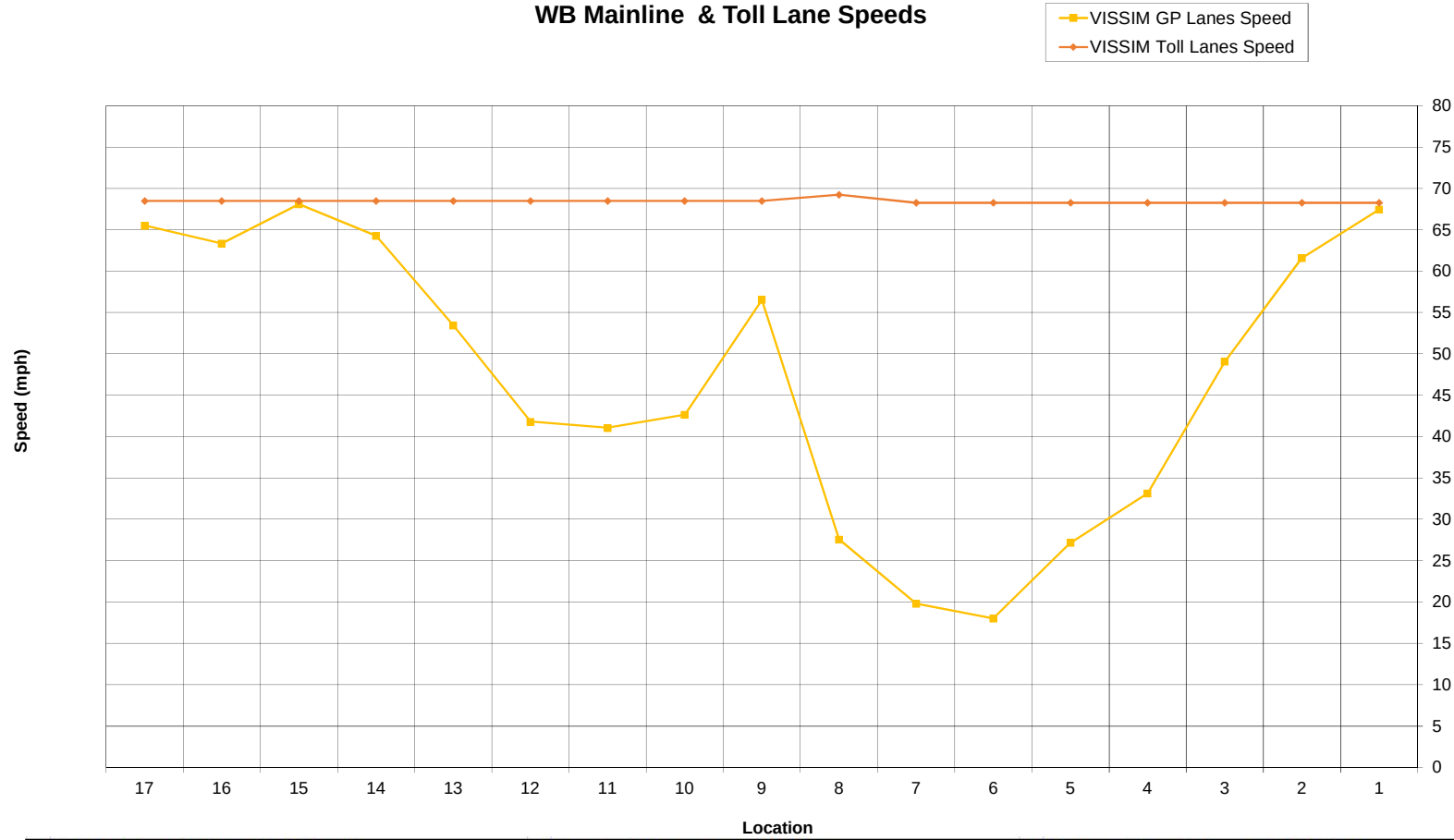


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area





WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

VISSIM Model Summary - 2040 No Build - PM Peak Period

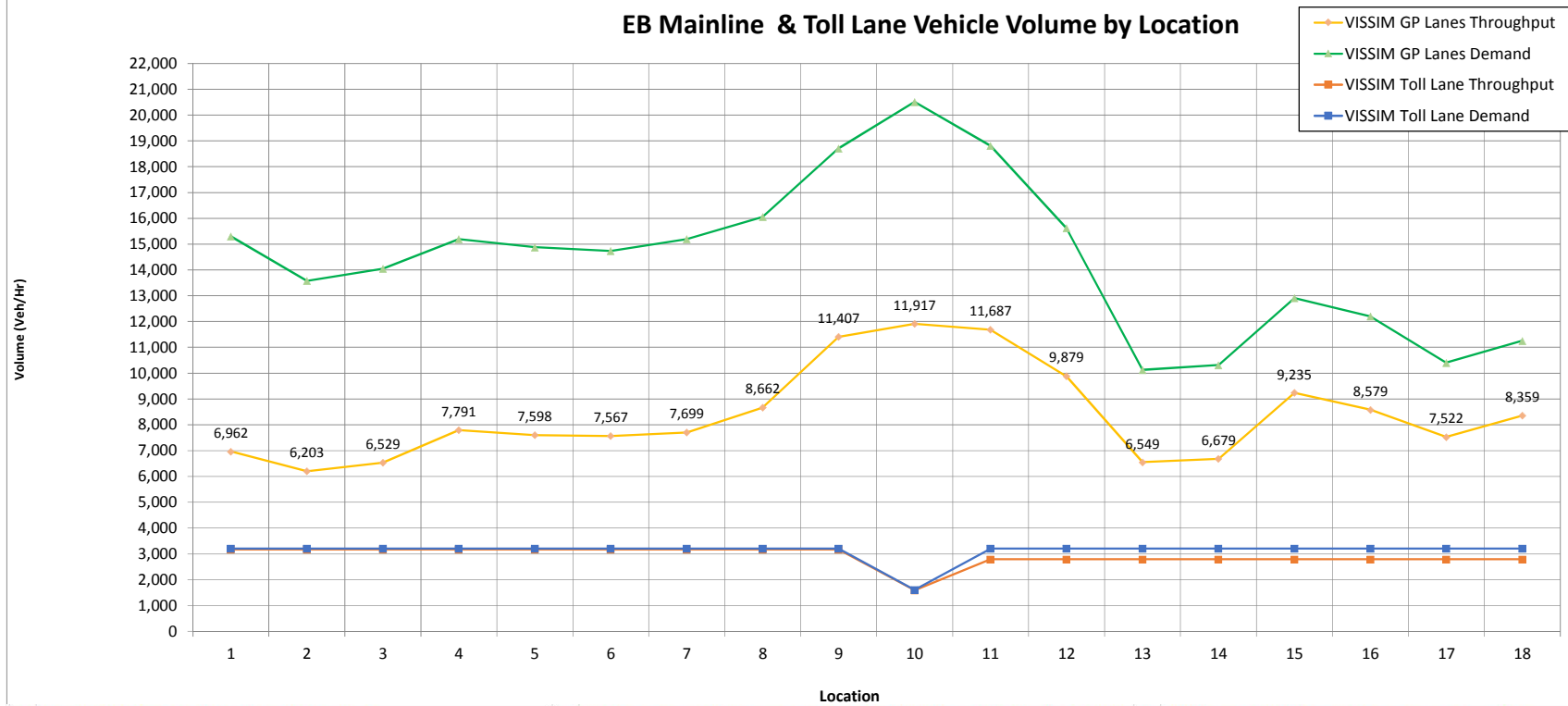
Network Summary Statistics

Parameter			2040 No Project	2017 No Project	Difference
Total Vehicle Demand (4 Hr)			168,494	141,937	26,557
Total number of vehicles that did not reach their destination			26,918	20,812	6,106
Total number of vehicles that have reached their destination			141,576	121,125	20,451
Total vehicle-miles traveled (VMT)			1,173,727	1,014,001	159,725
Total travel time, All Vehicle Types (VHT)			26,063	26,278	-215
Average speed [mph], All Vehicle Types			45.1	38.6	6.5
Average delay time per vehicle [mins], All Vehicle Types			3.45	5.27	-1.82

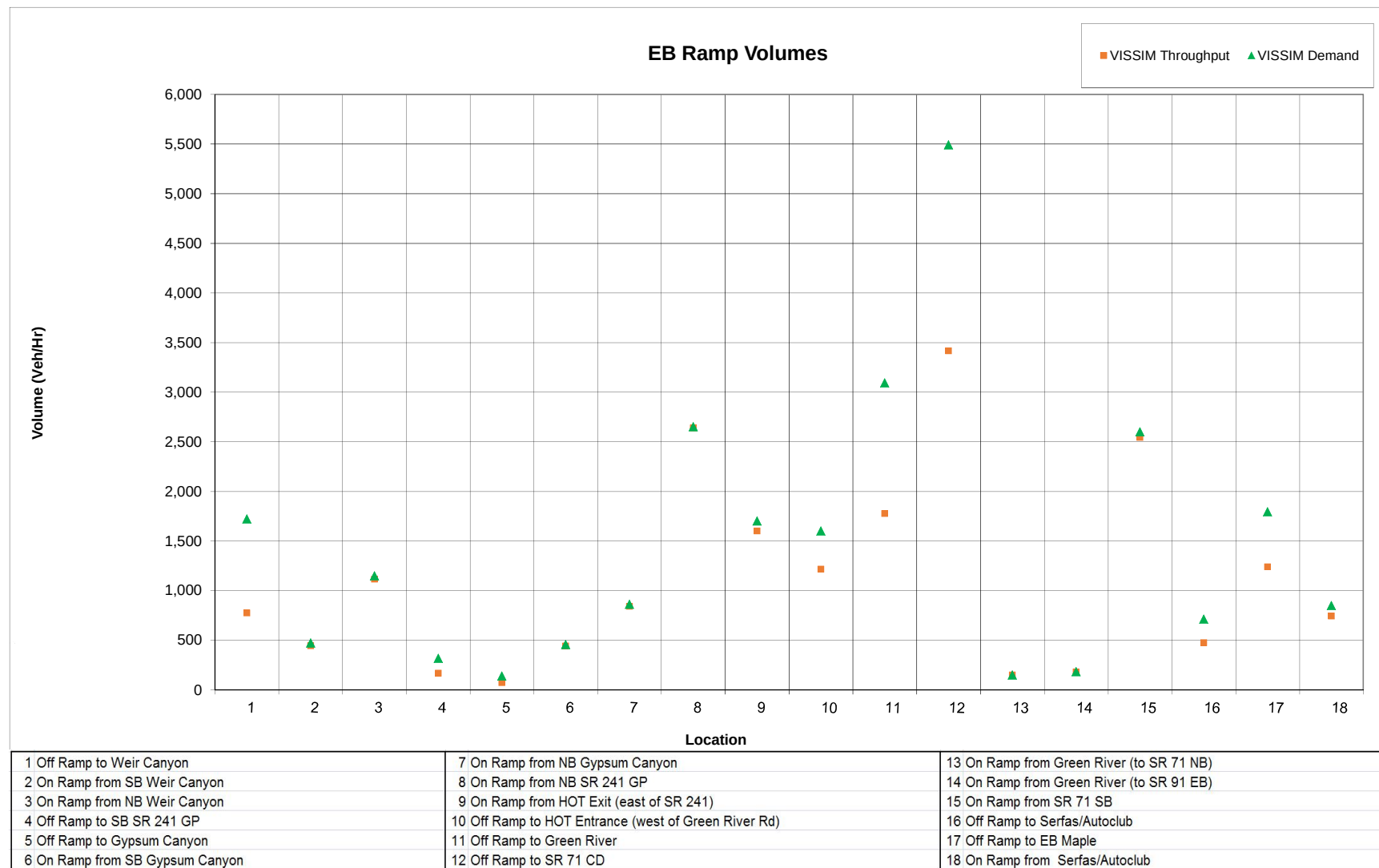
VISSIM Model Summary - 2040 No Build - PM Peak Period
Network Summary Statistics

#	Origin	#	Destination	Key	Hide Travel Time			2040 PM No Build VISSIM Travel Time (Minutes)			
					Seg 1	Seg 2	Seg 3	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	19.8	20.3	20.9	20.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	19.7	20.3	20.8	20.5
		5	SR 241 SB south of SR 91	3	1001			14.7	14.7	14.6	14.3
		7	SR 71 NB north of SR 91	4	1002	1003	1004	21.2	21.8	22.3	22.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.8	9.2	9.7	9.9
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.2	10.6	11.2	11.4
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	8.7	8.7	8.7	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	8.6	8.6	8.6	8.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	11.0	11.1	11.0	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	12	1010			5.0	5.0	5.0	5.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	8.6	8.7	8.6	8.5
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	11.0	11.0	11.0	10.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	n/a
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.5	7.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.2	11.6	12.7	12.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	11.2	11.6	12.7	12.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004	12.6	13.1	14.2	14.0
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	n/a
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	n/a
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	n/a
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	10.0	10.1	10.0	9.8
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	9.9	10.0	9.9	9.8
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			5.7	5.7	5.6	5.4
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	12.4	12.5	12.4	12.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	n/a

EB Mainline & Toll Lane Vehicle Volume by Location

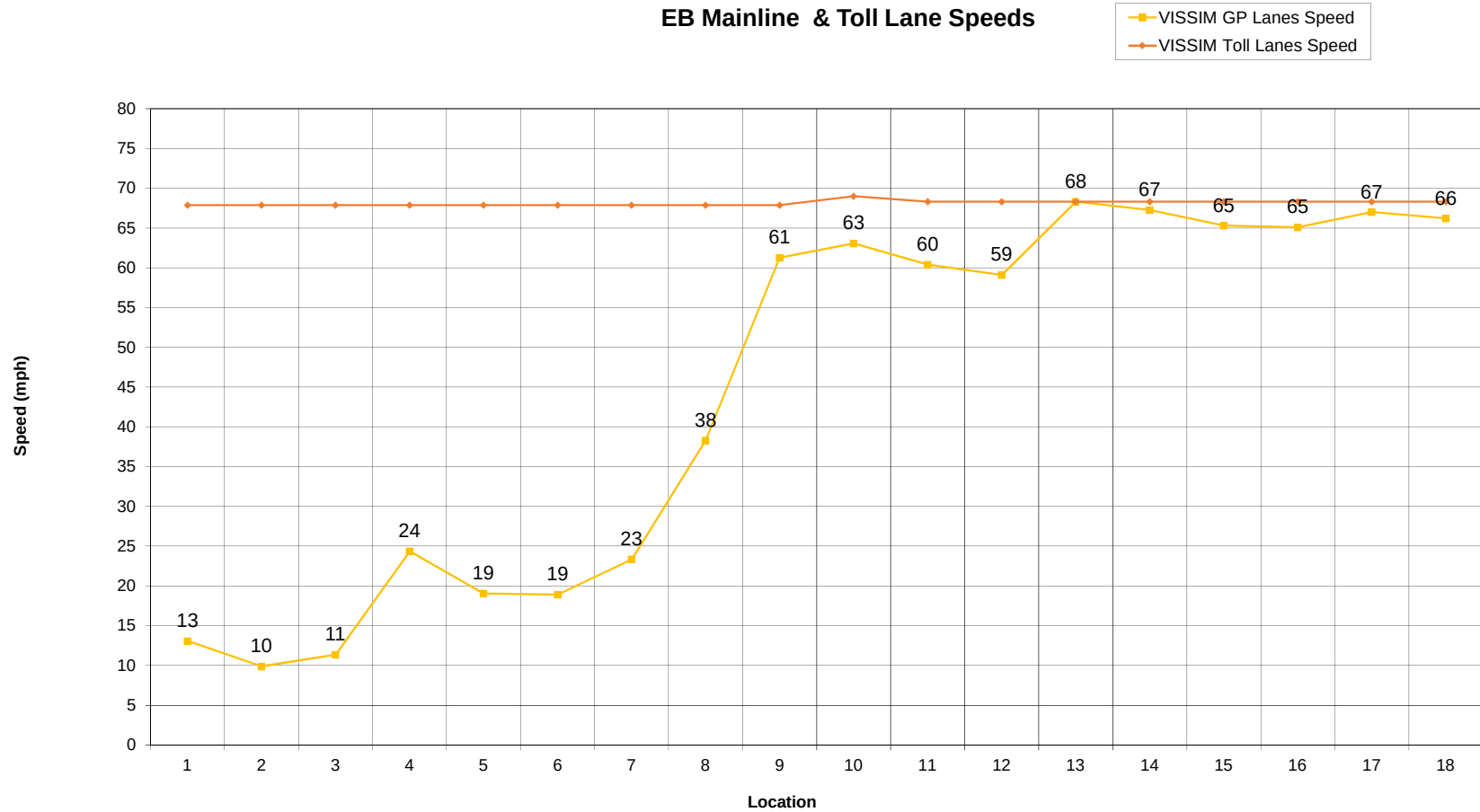


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR-71 to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 On Ramp from Green River to On Ramp from SR-71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to On Ramp from Managed Lanes	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 On Ramp from Managed Lanes to Off Ramp to Managed Lanes	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 Off Ramp to Managed Lanes to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71	18 On Ramp from Serfas/Autoclub to End of Study Area

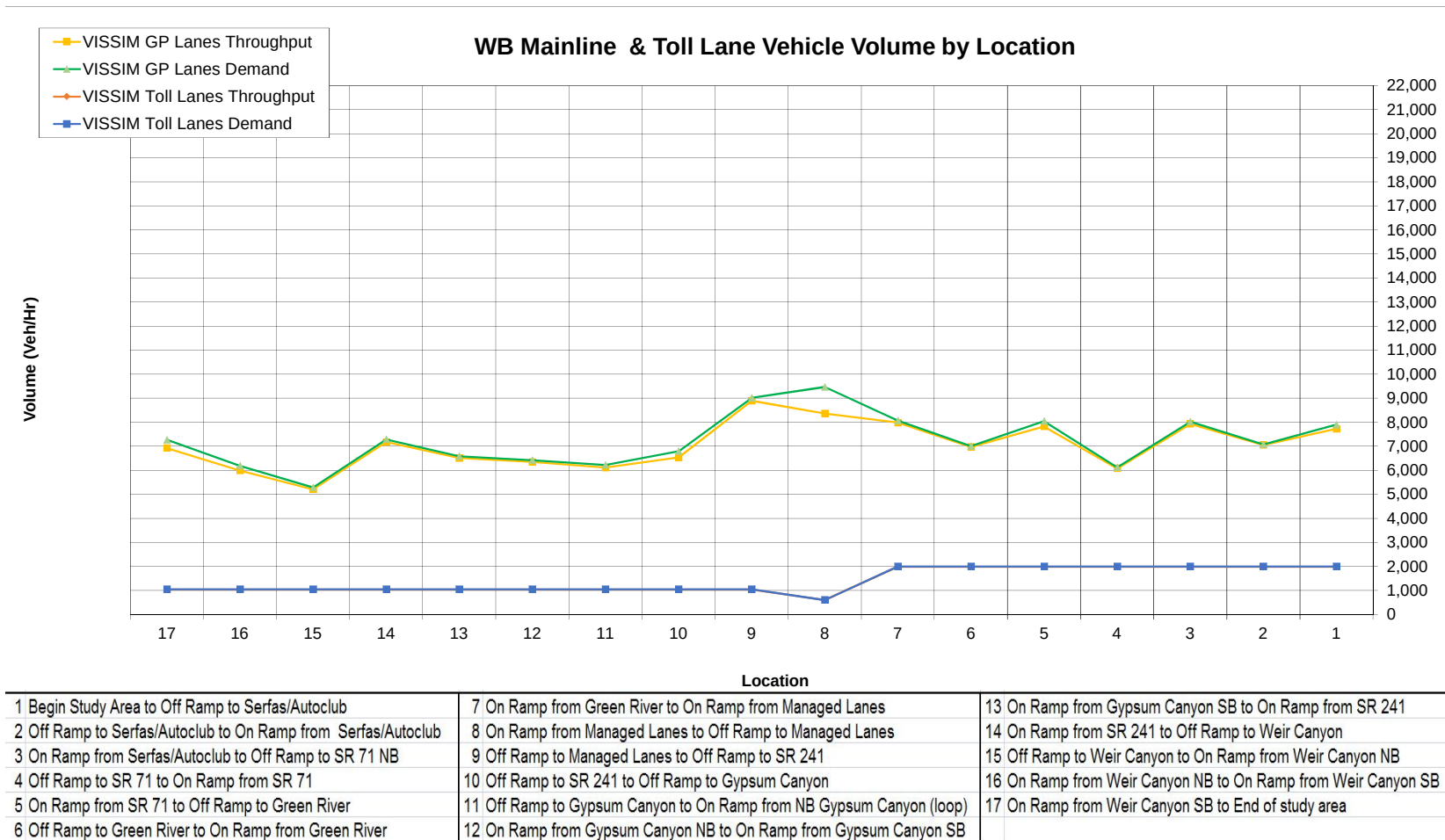


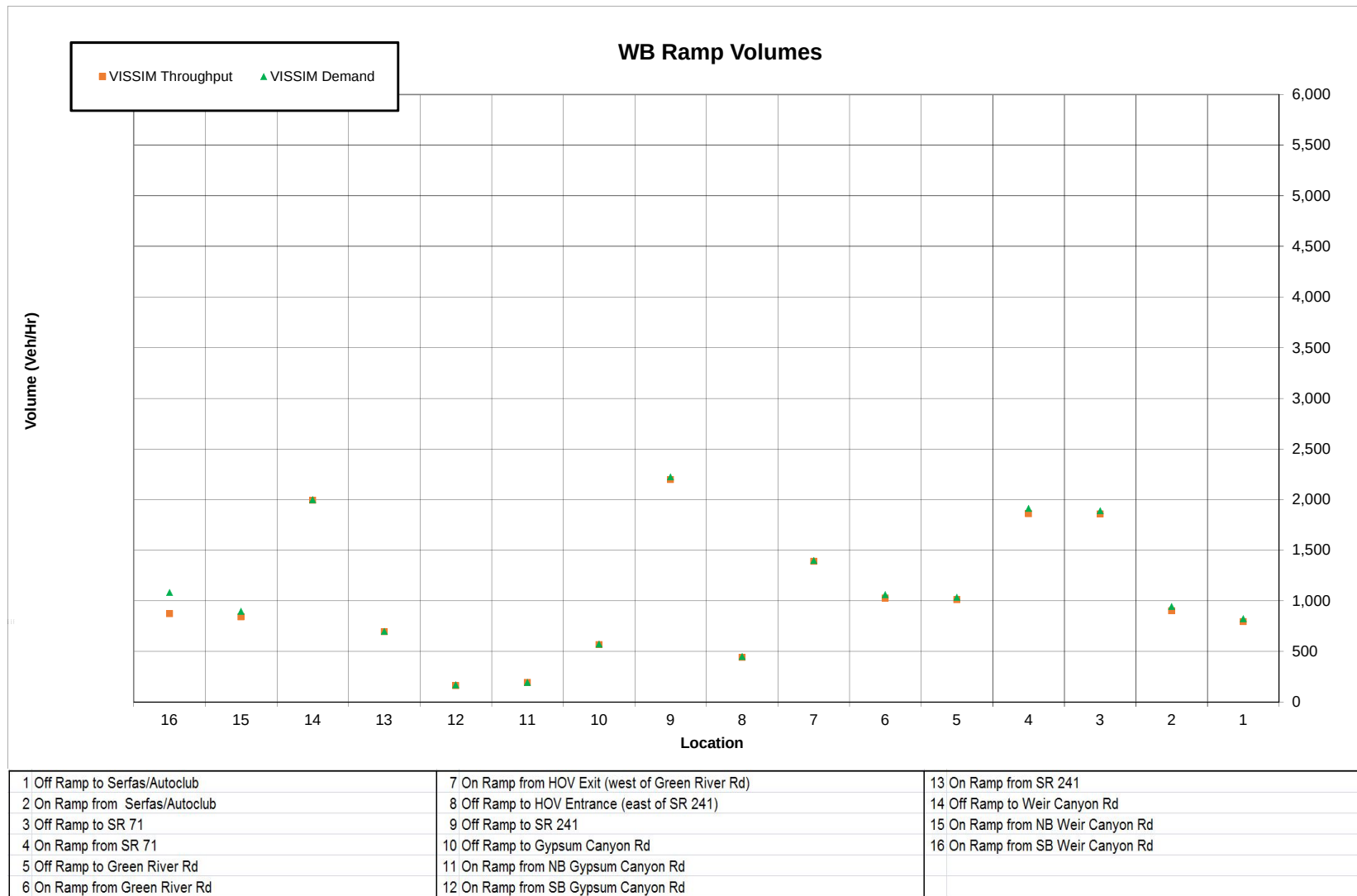
Charts 3-4 PM

EB Mainline & Toll Lane Speeds

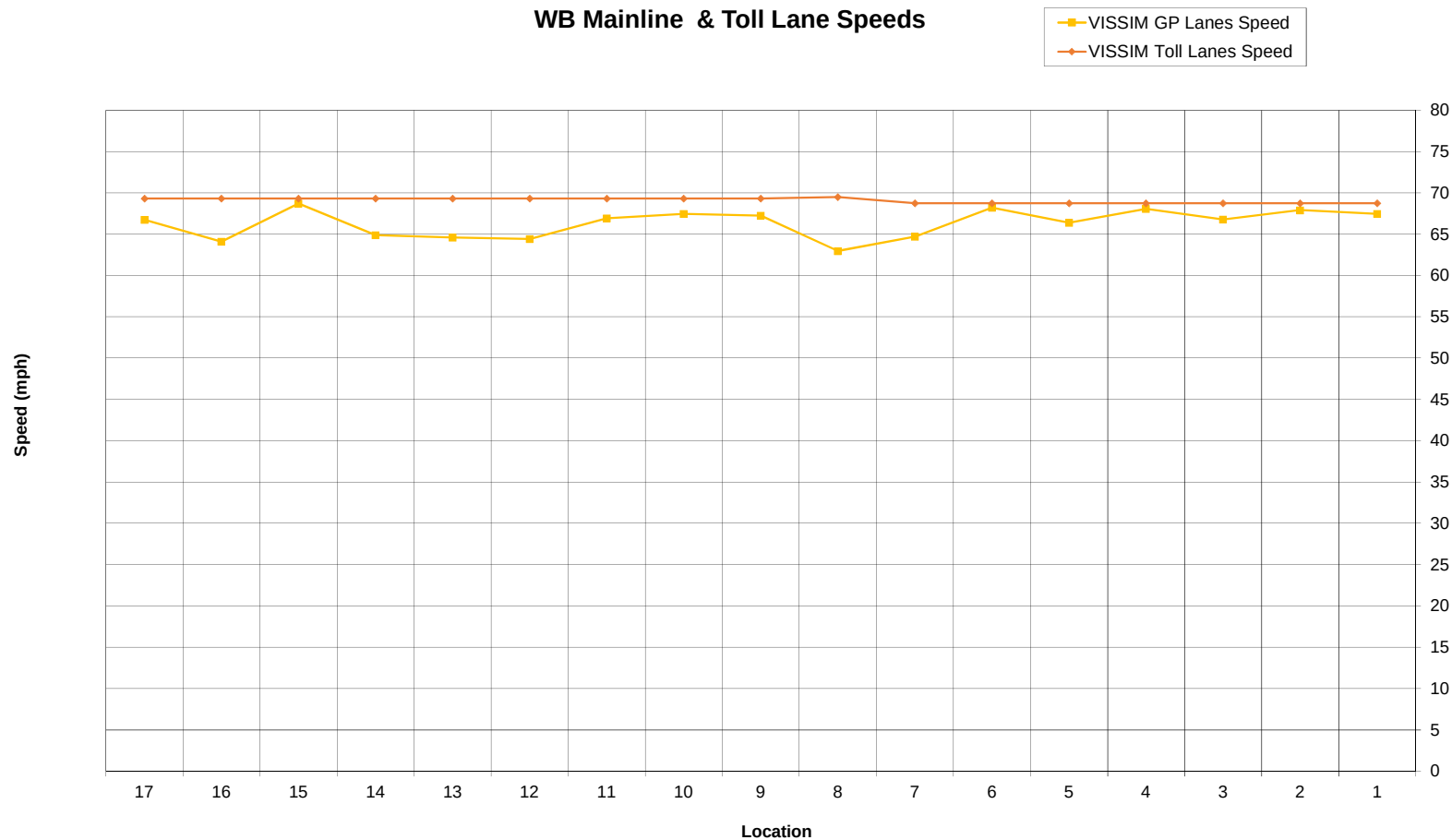


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

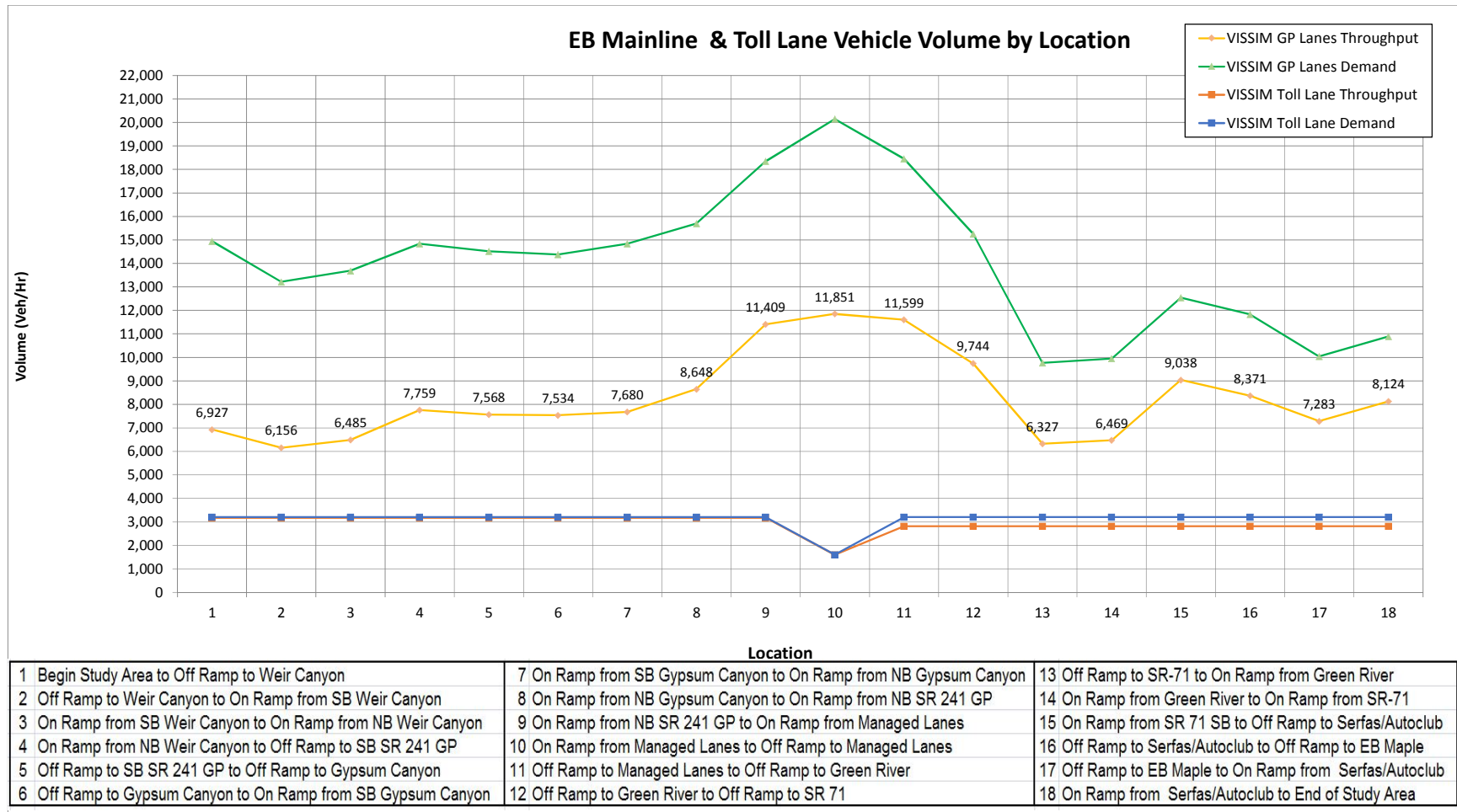




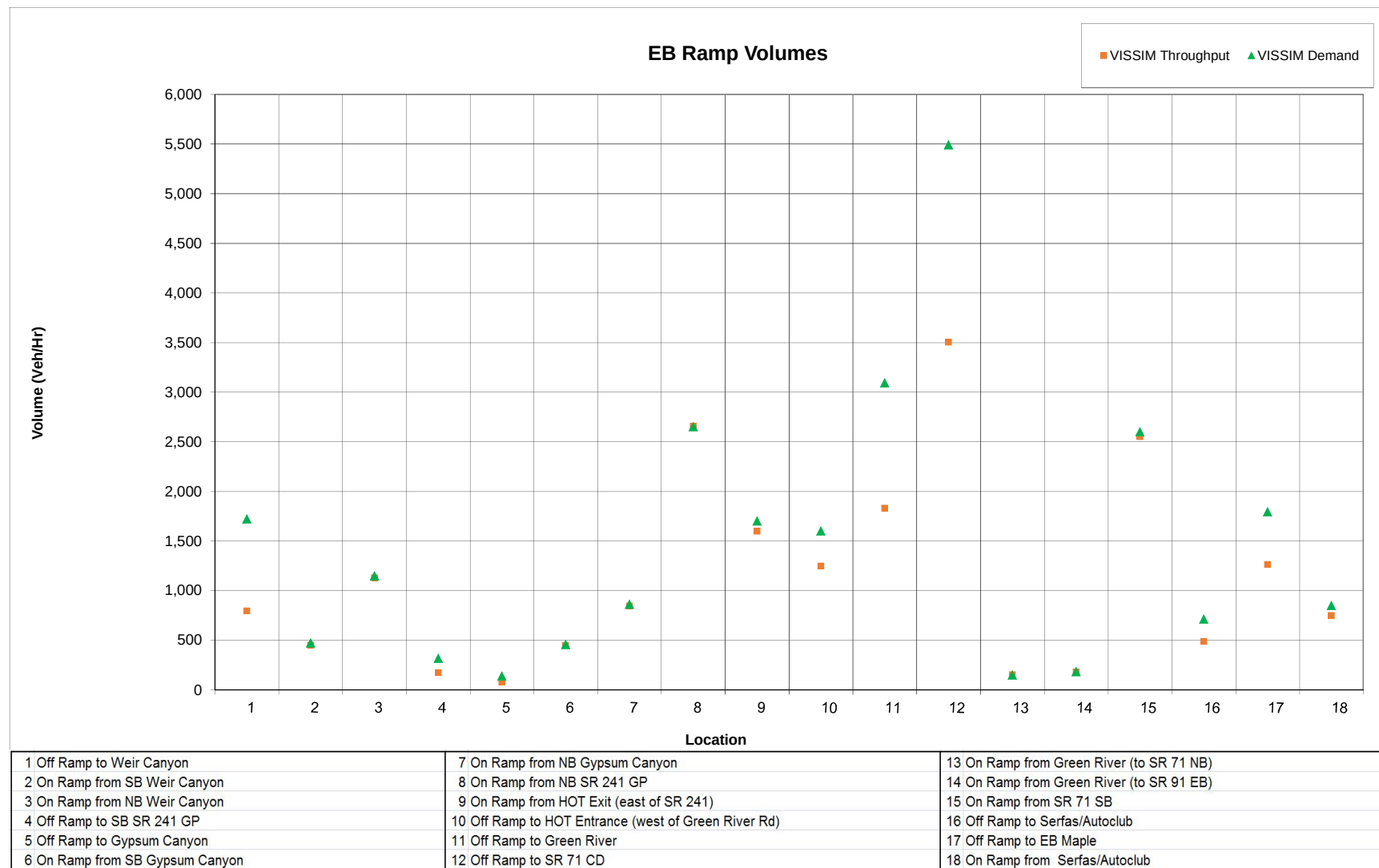
WB Mainline & Toll Lane Speeds



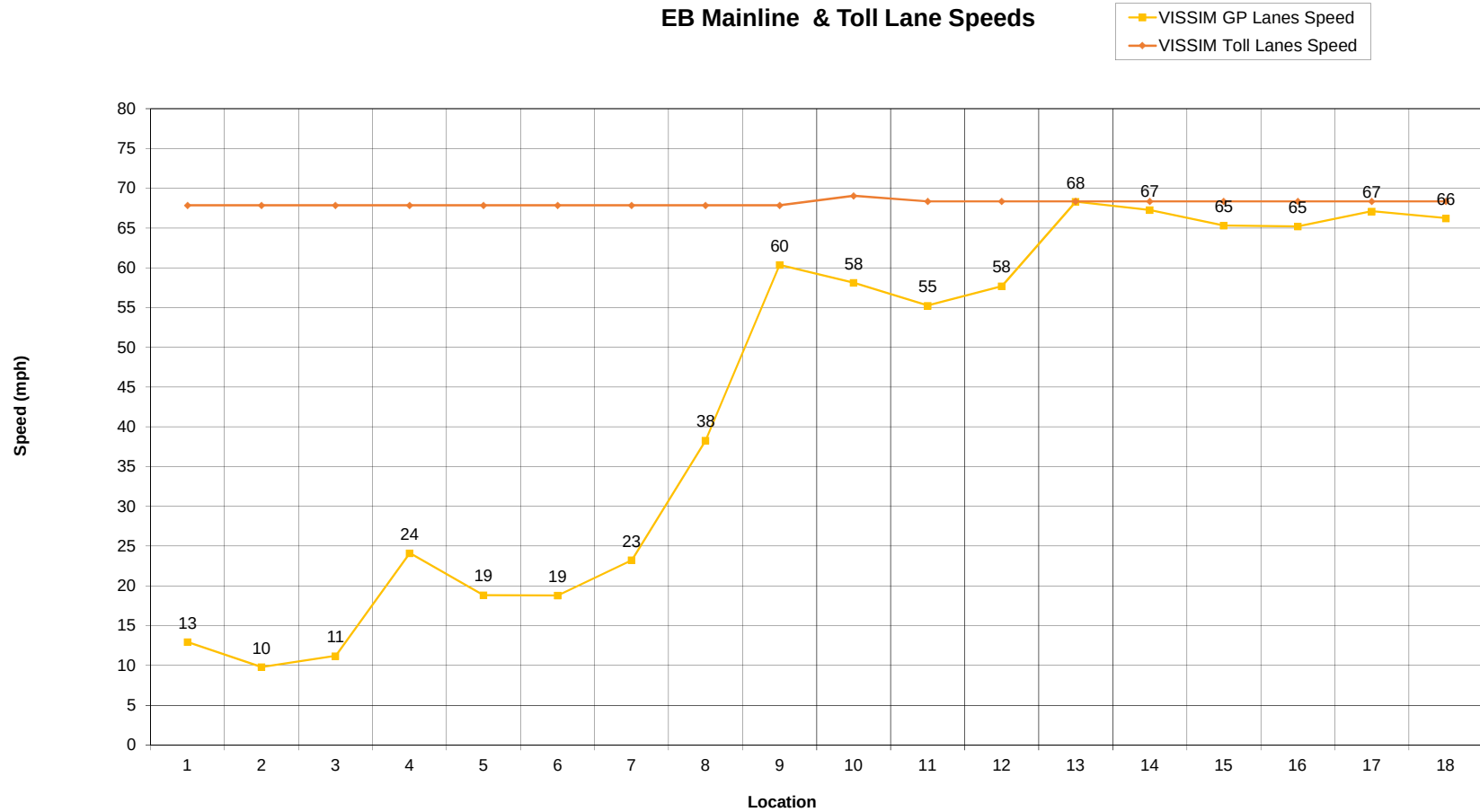
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



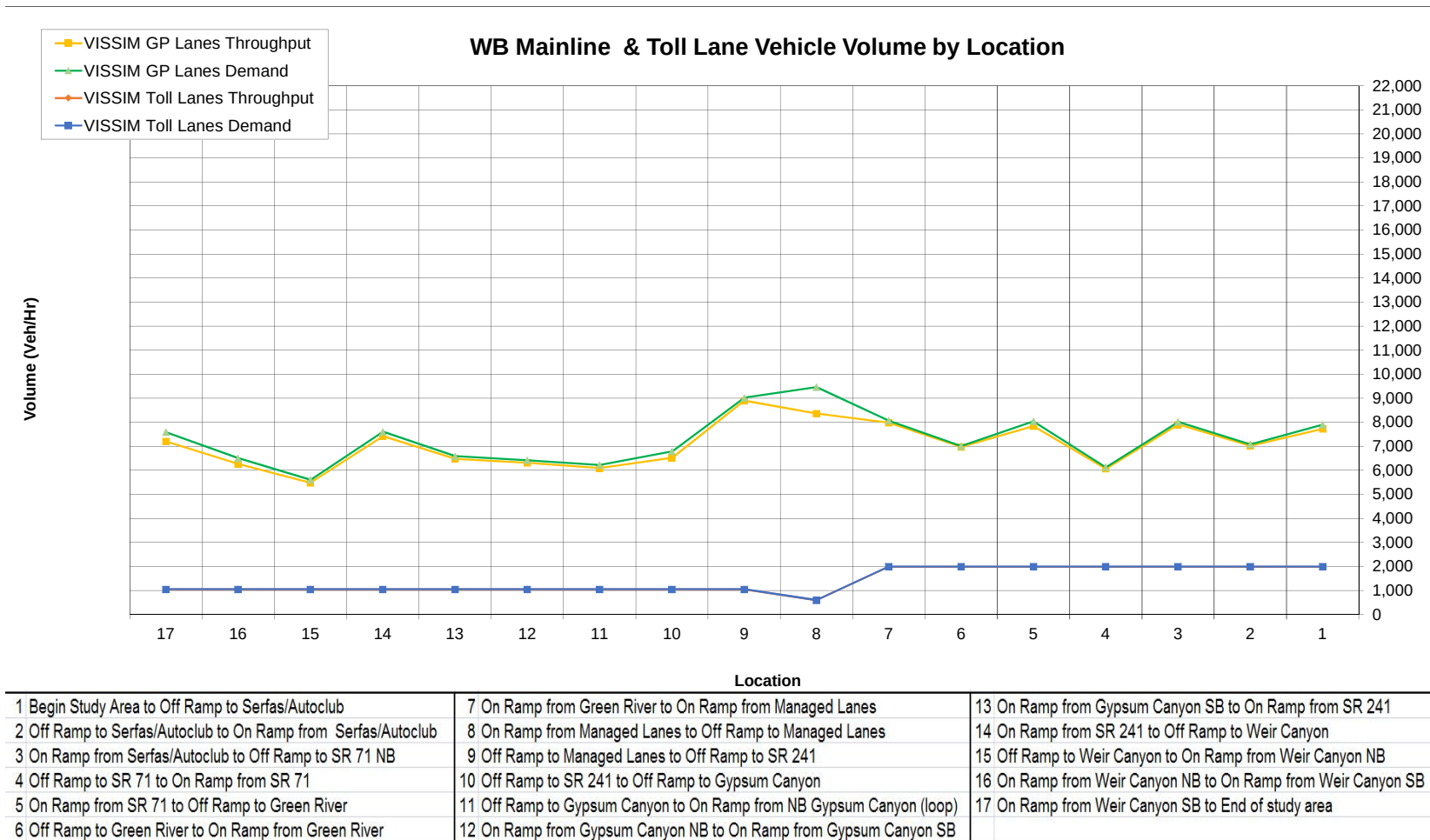
Charts 4-5 PM

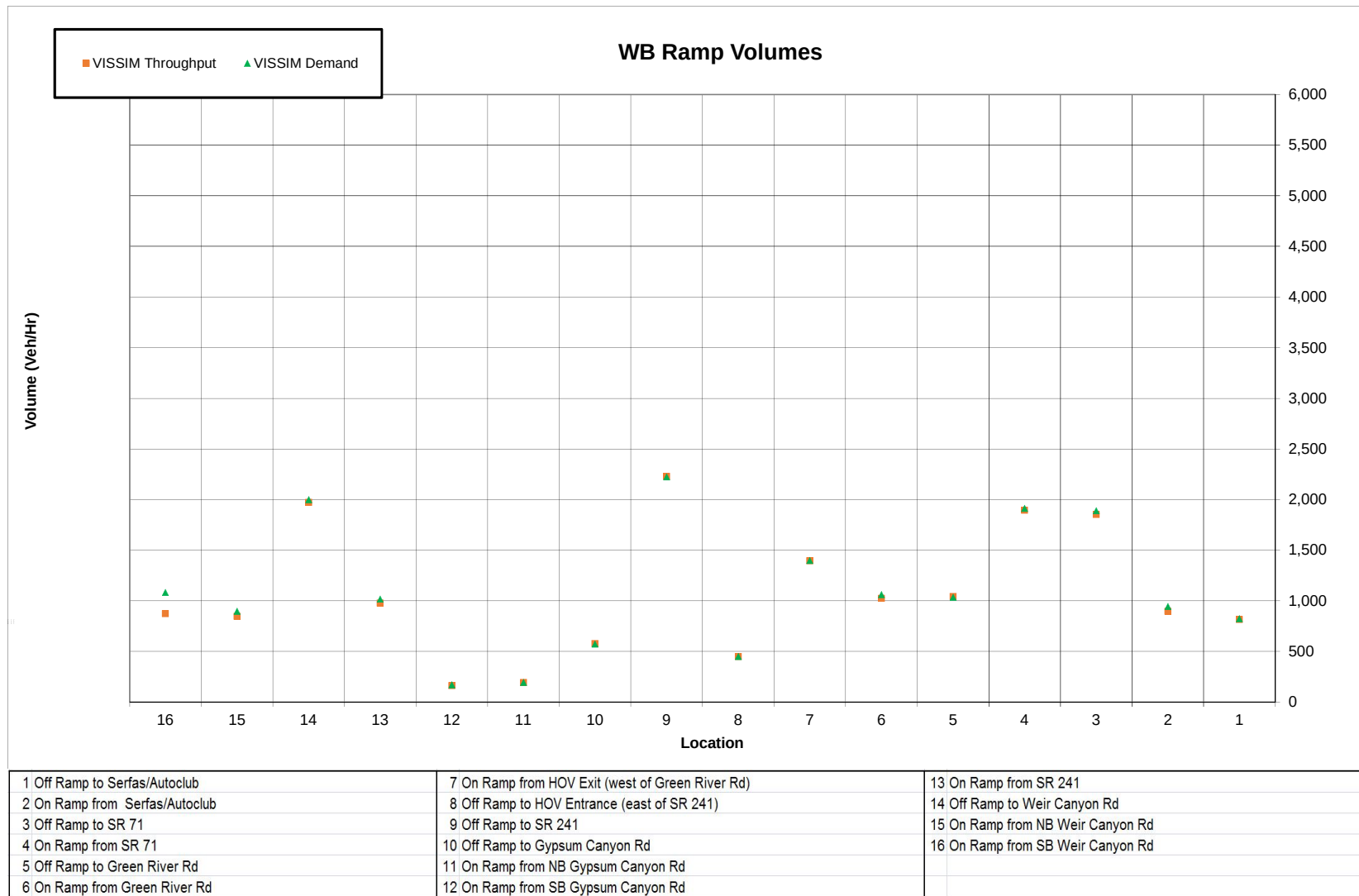


EB Mainline & Toll Lane Speeds



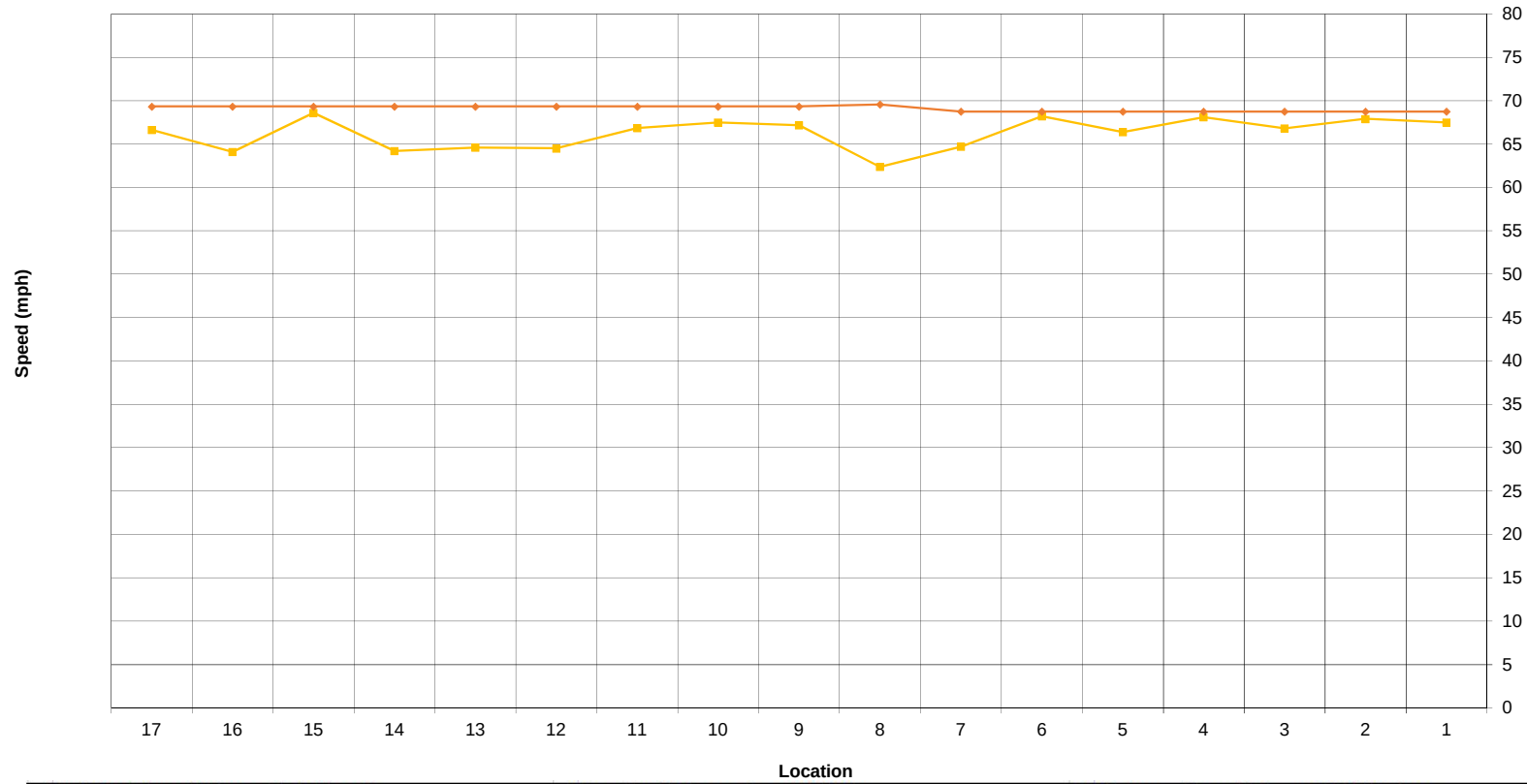
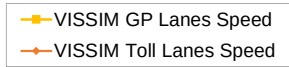
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



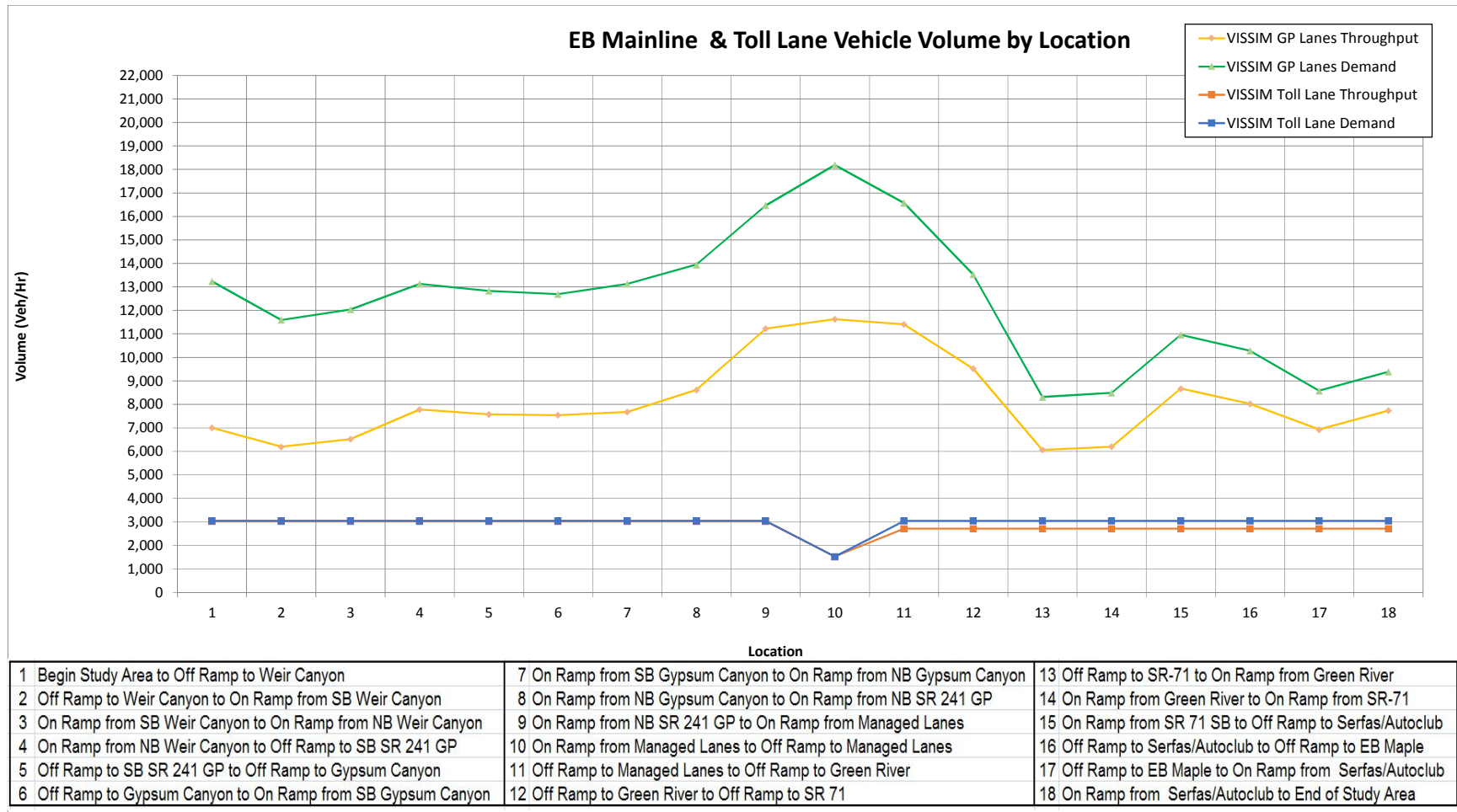


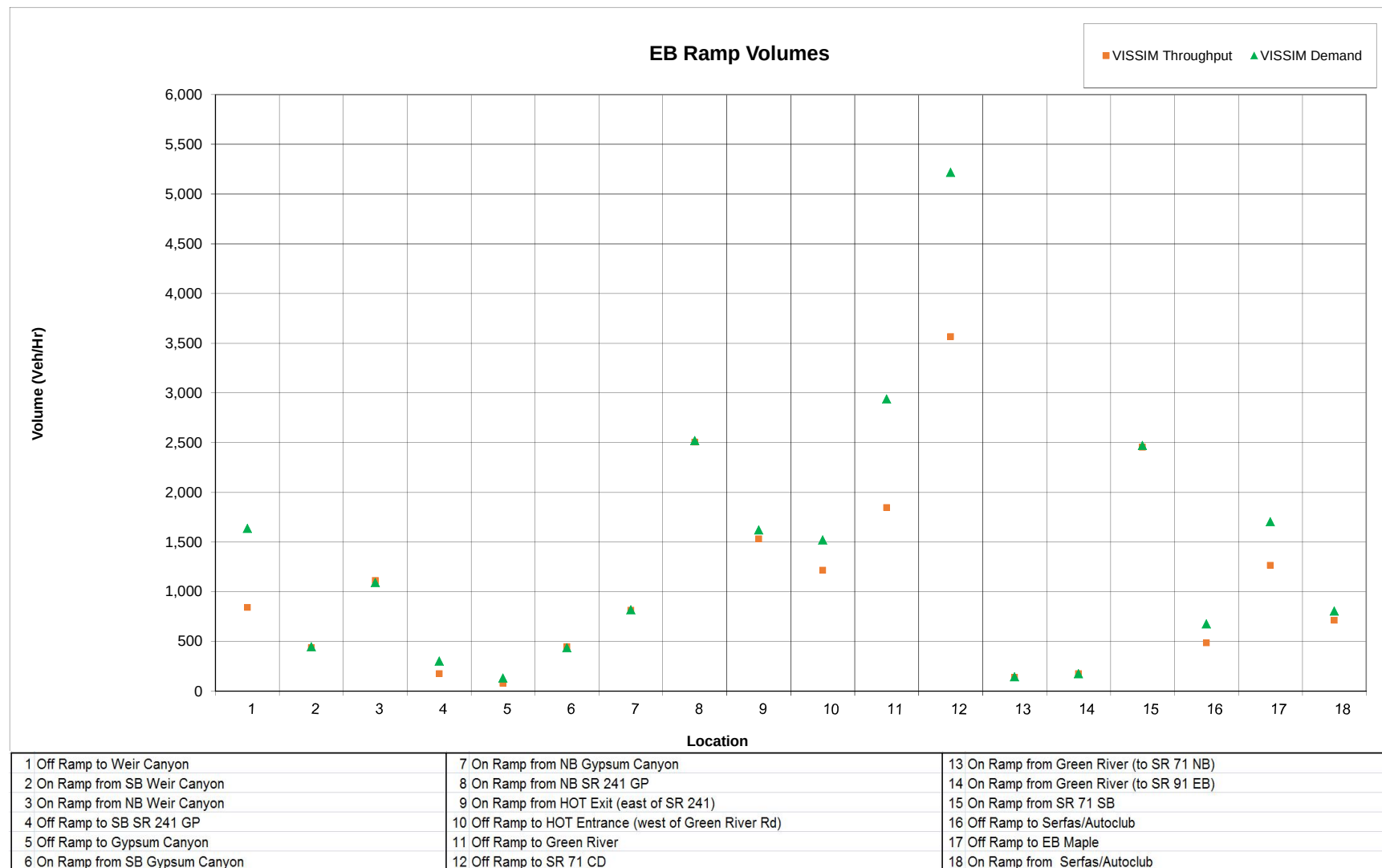
Charts 4-5 PM

WB Mainline & Toll Lane Speeds



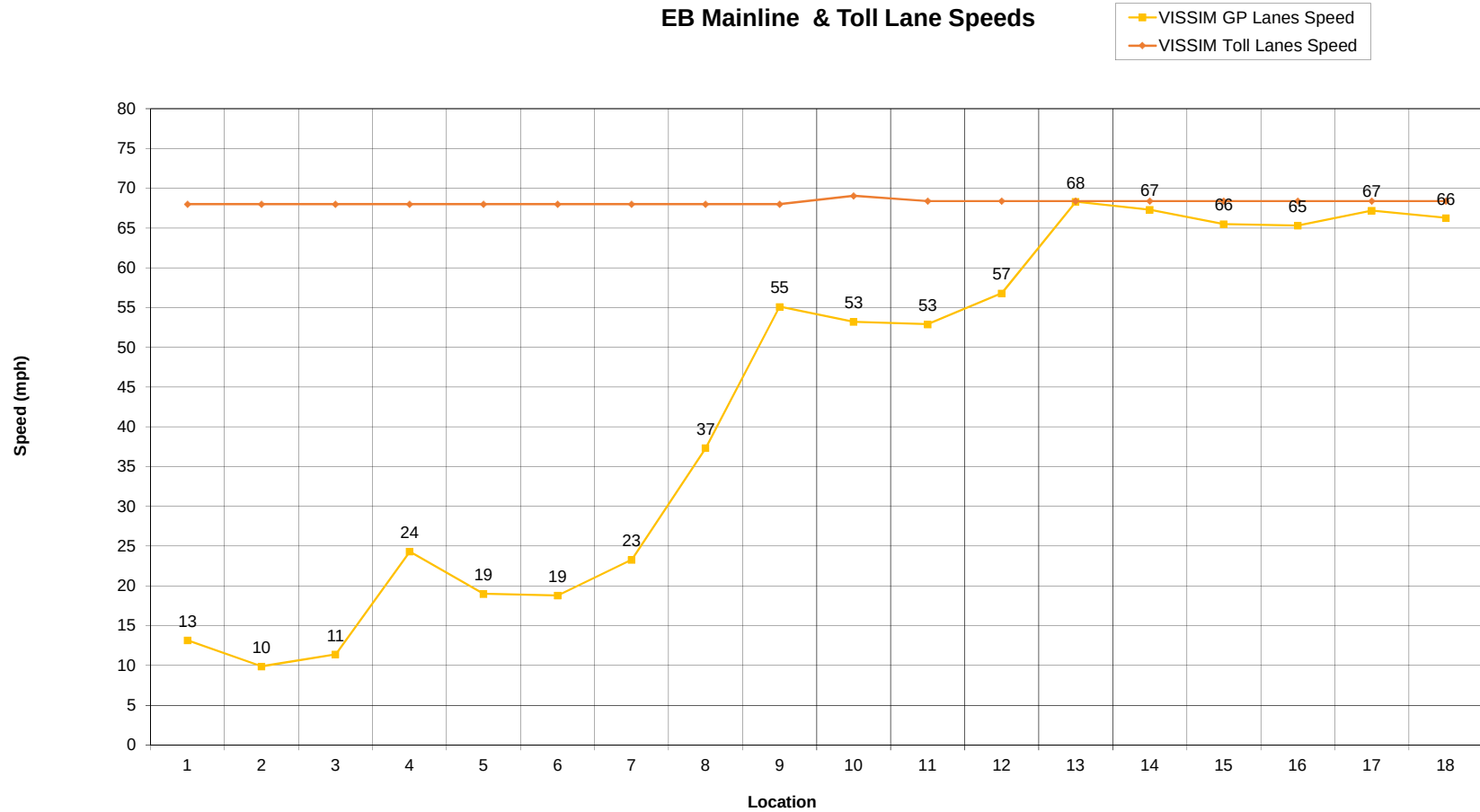
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	



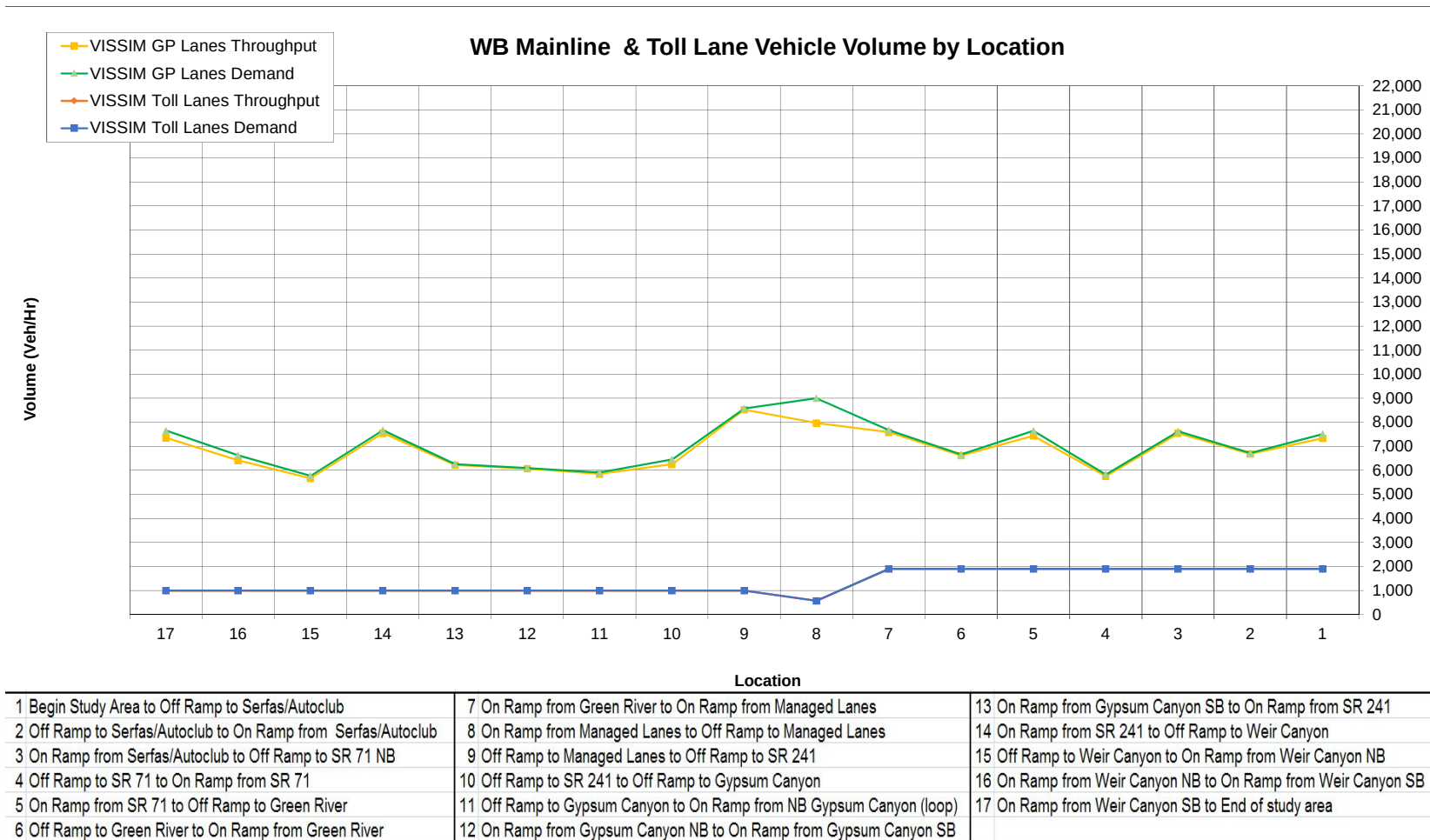


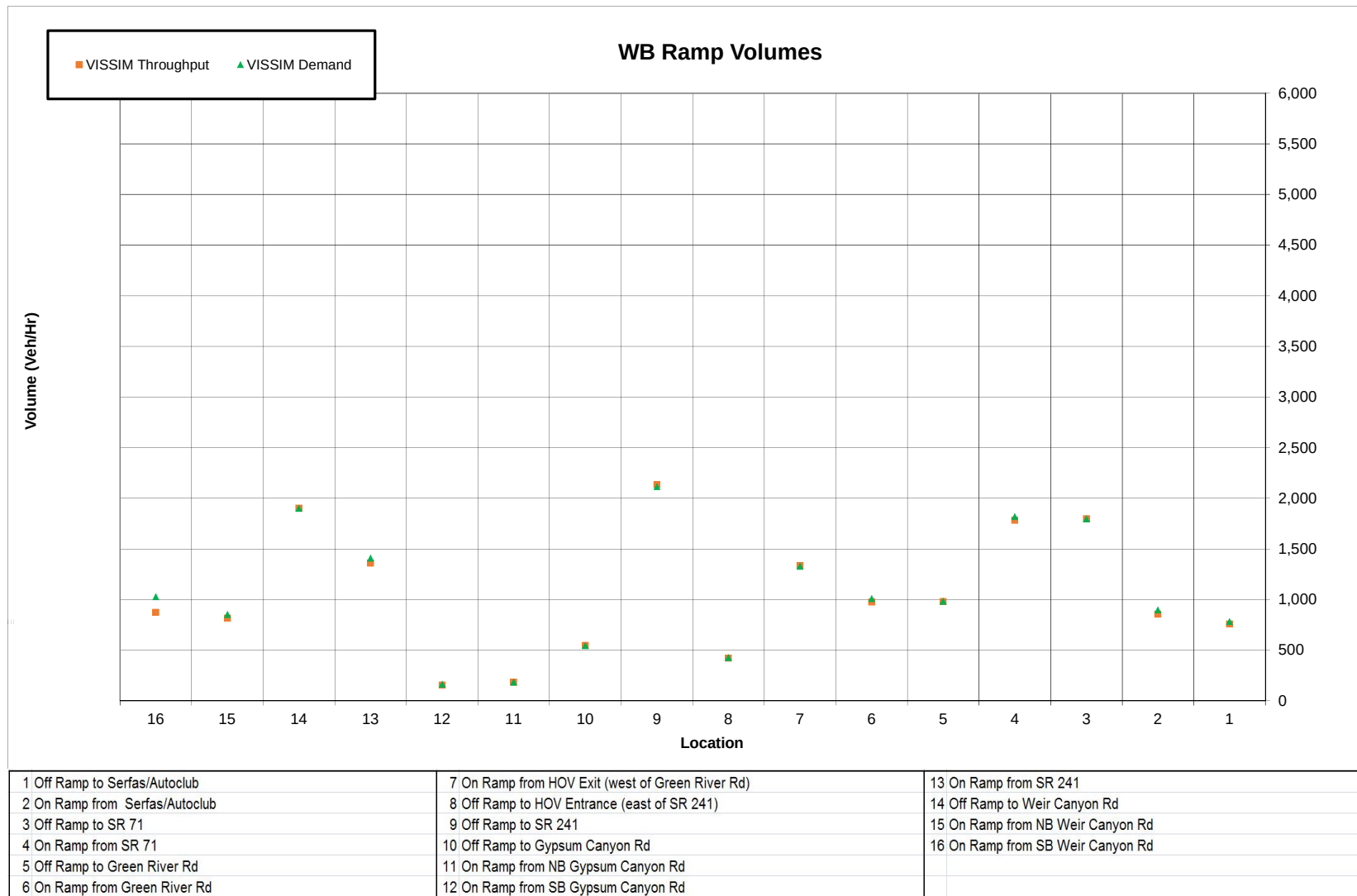
Charts 5-6 PM

EB Mainline & Toll Lane Speeds



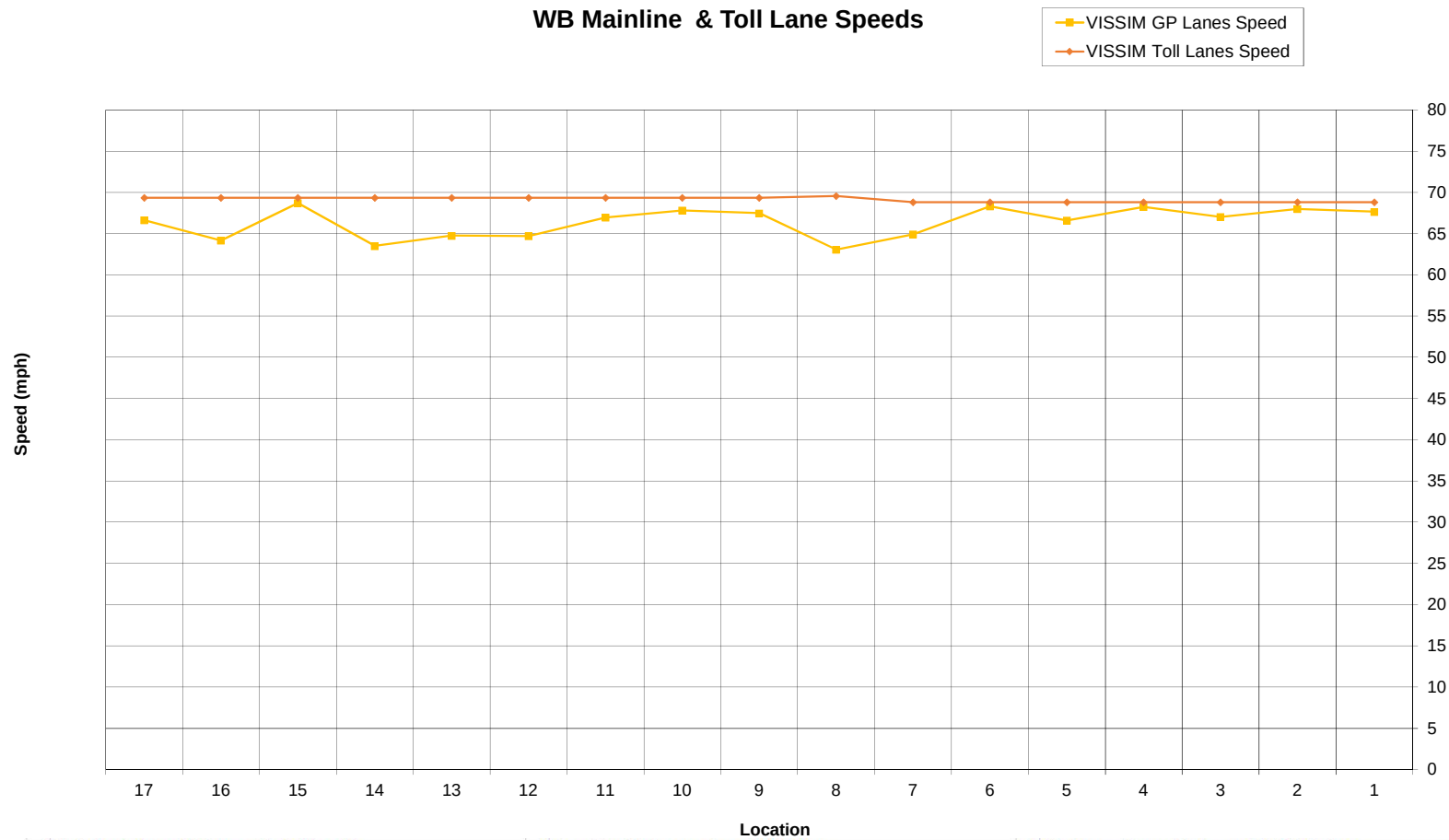
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



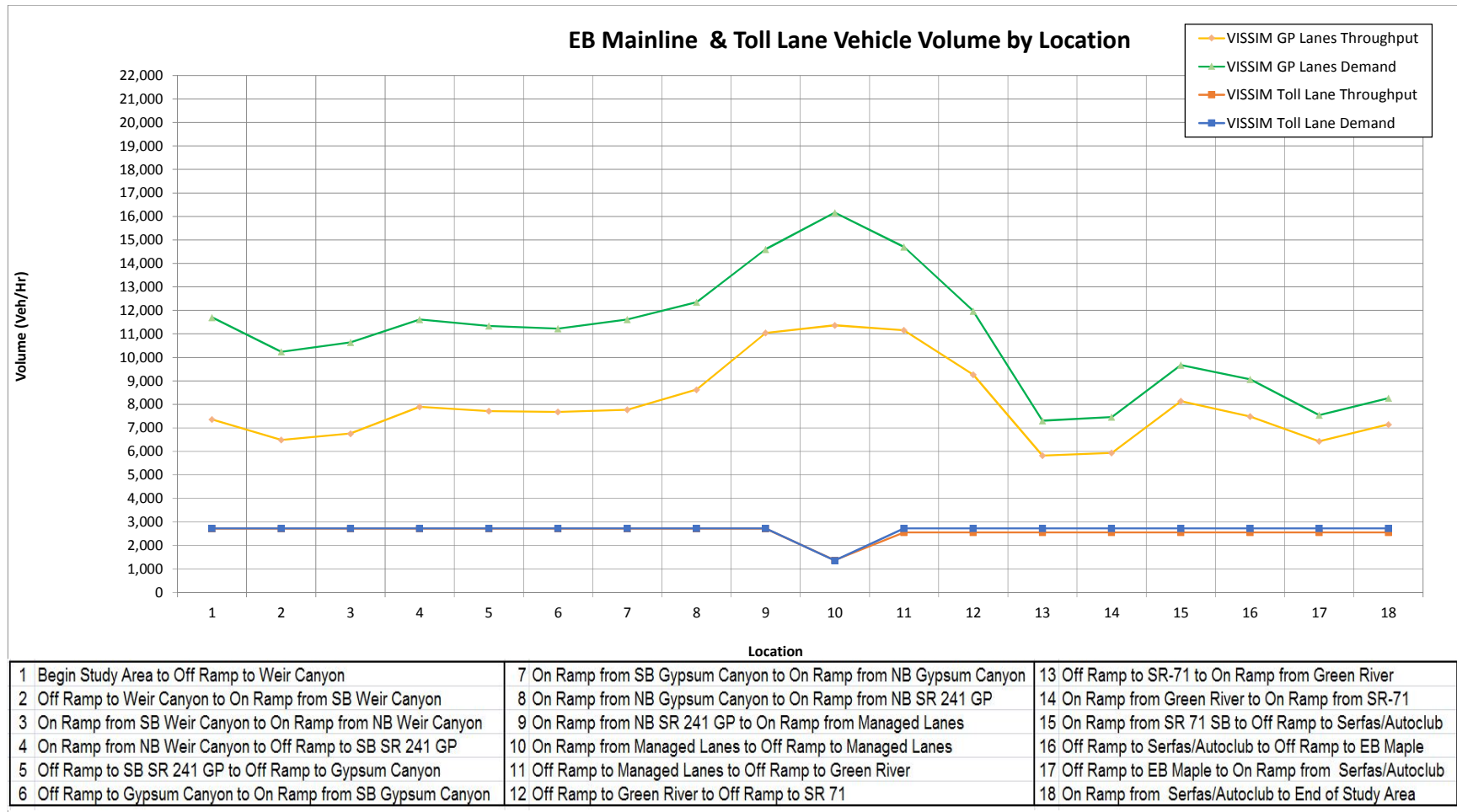


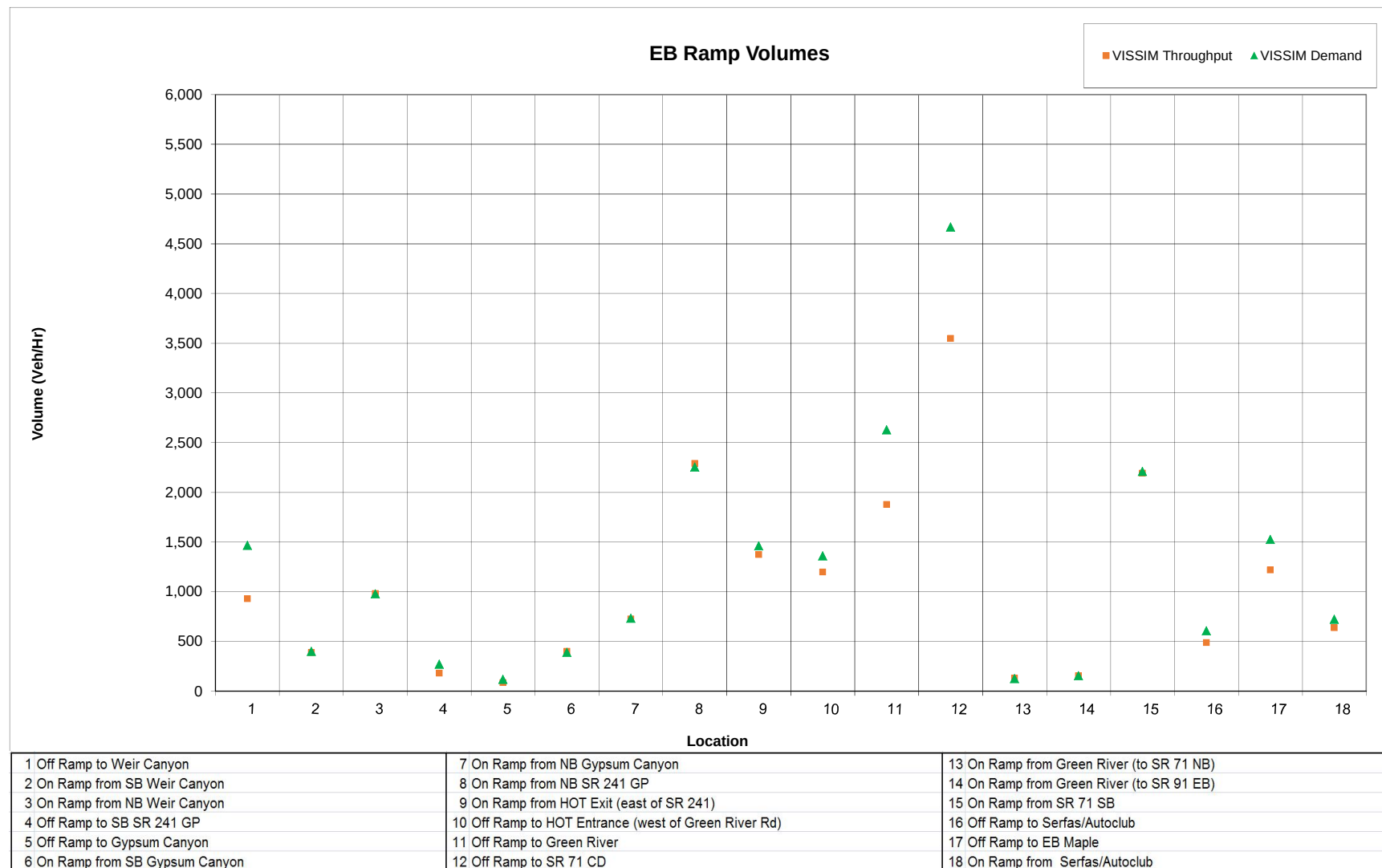
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WB Mainline & Toll Lane Speeds

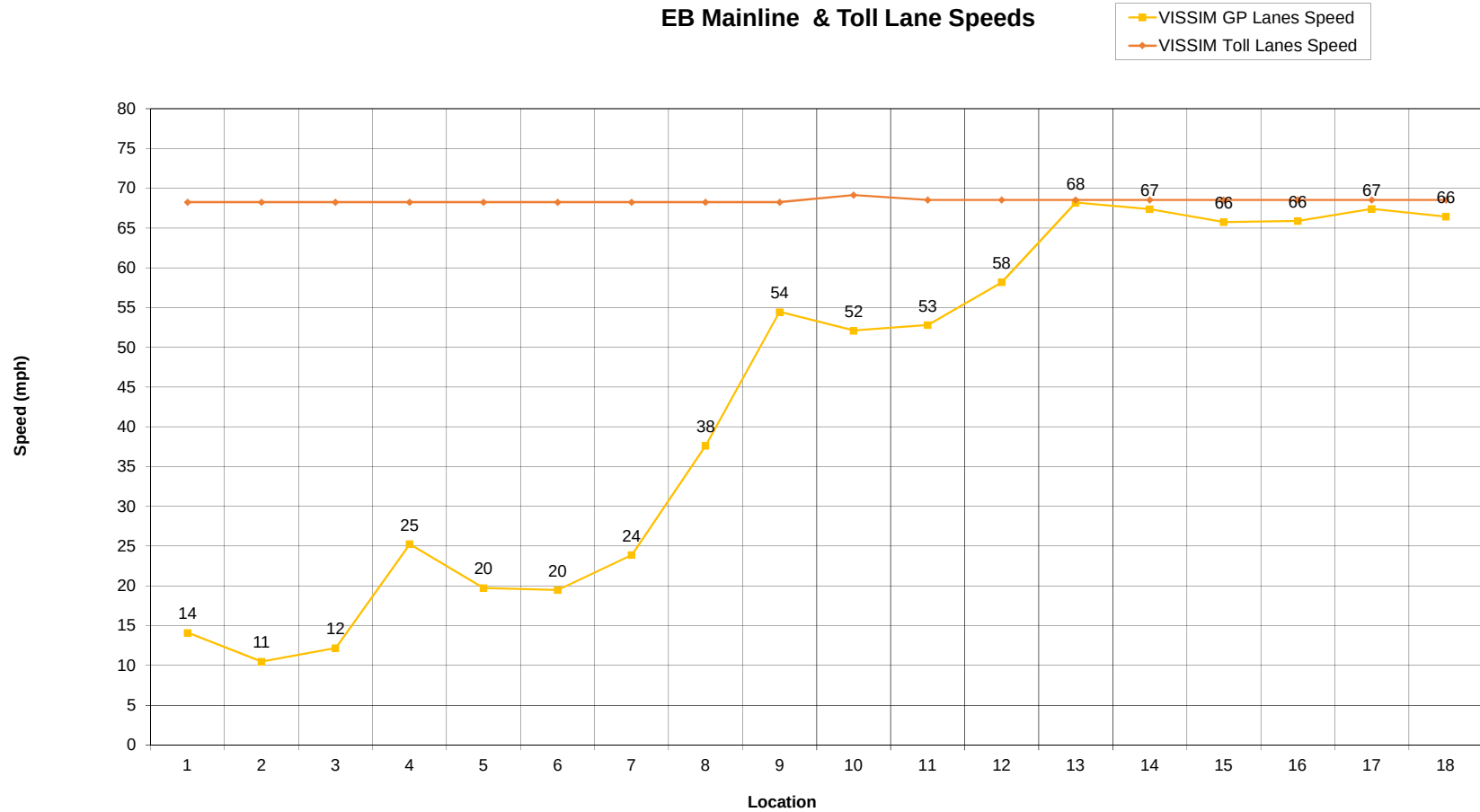


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

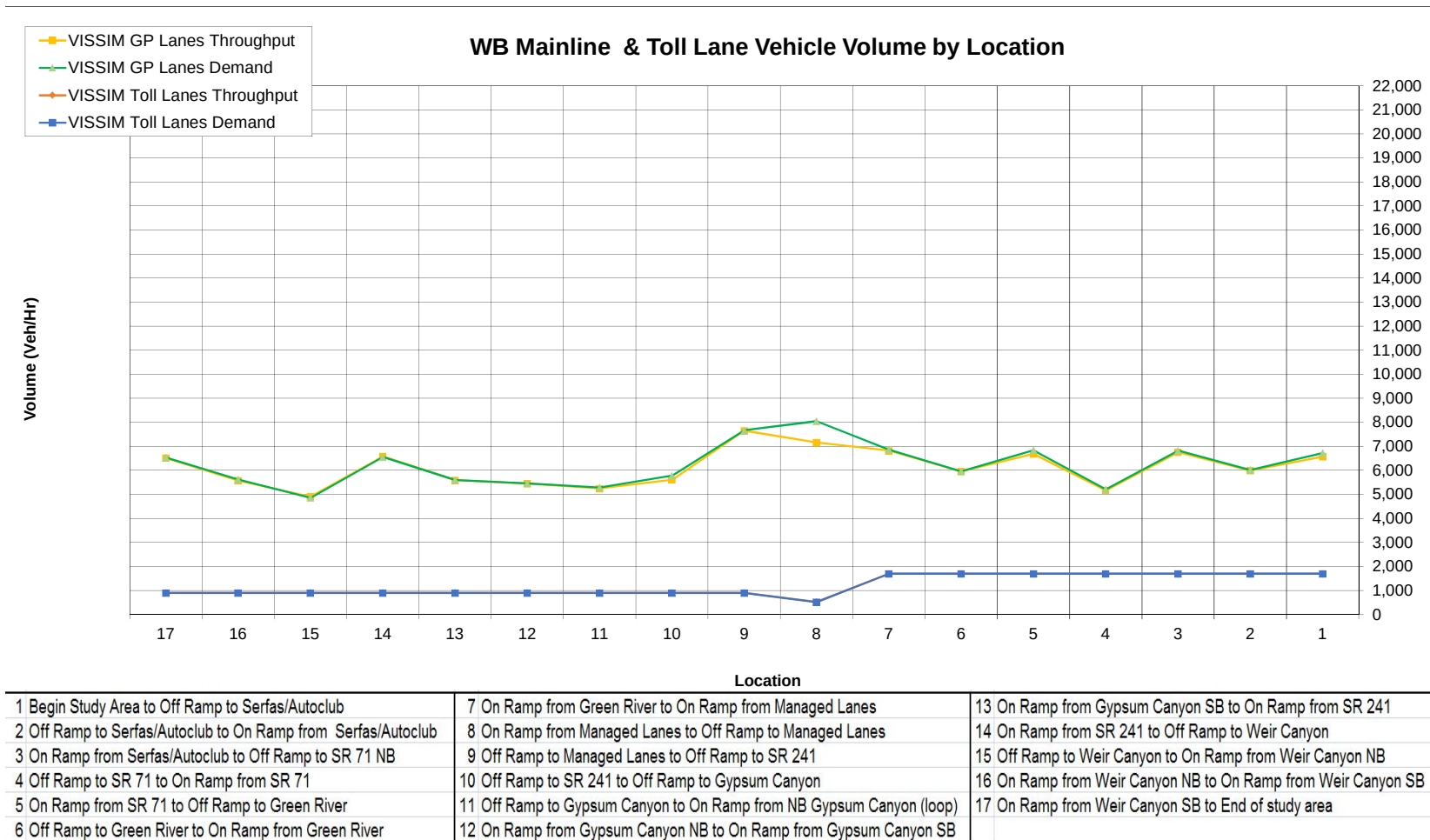


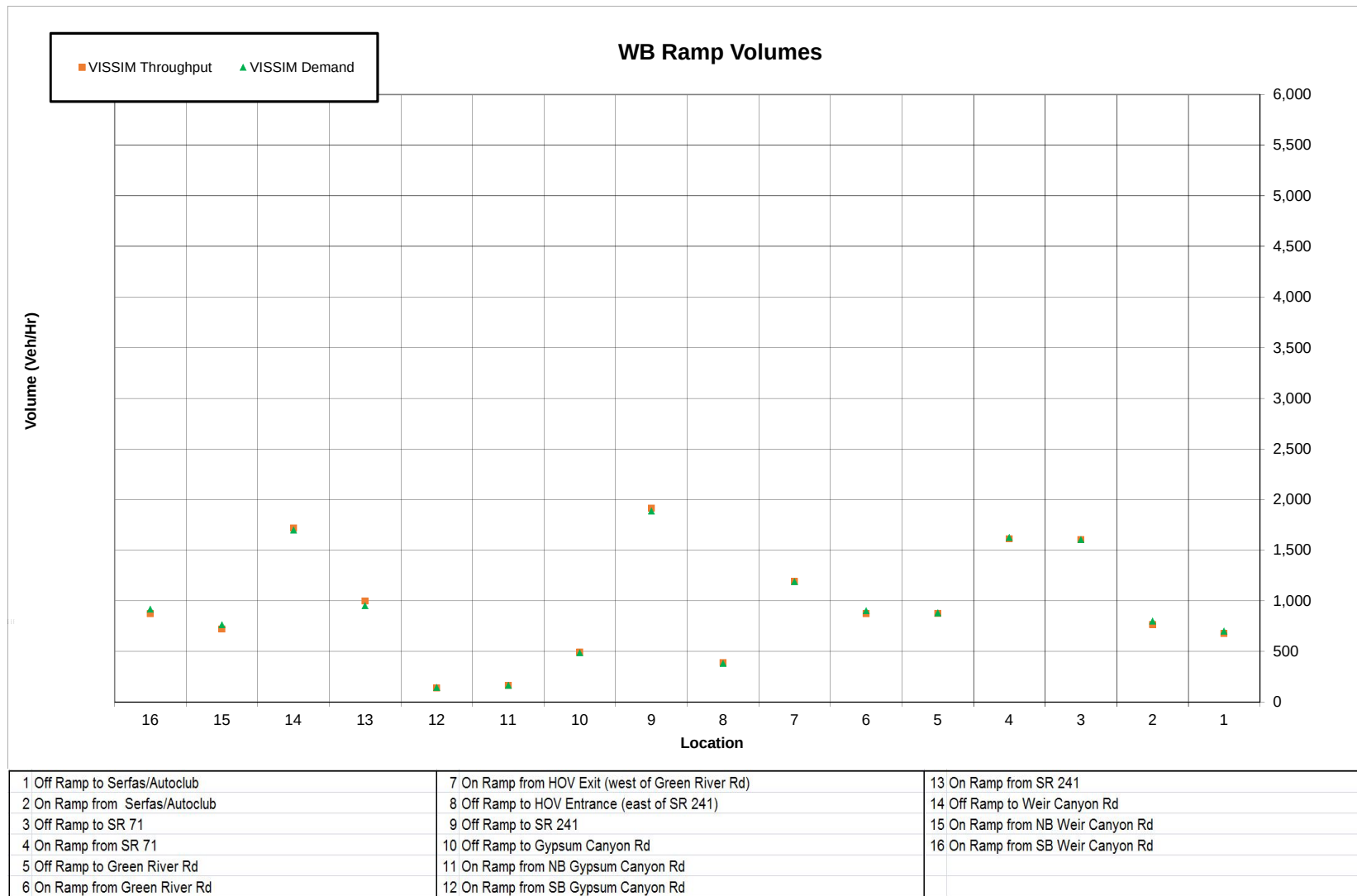


EB Mainline & Toll Lane Speeds

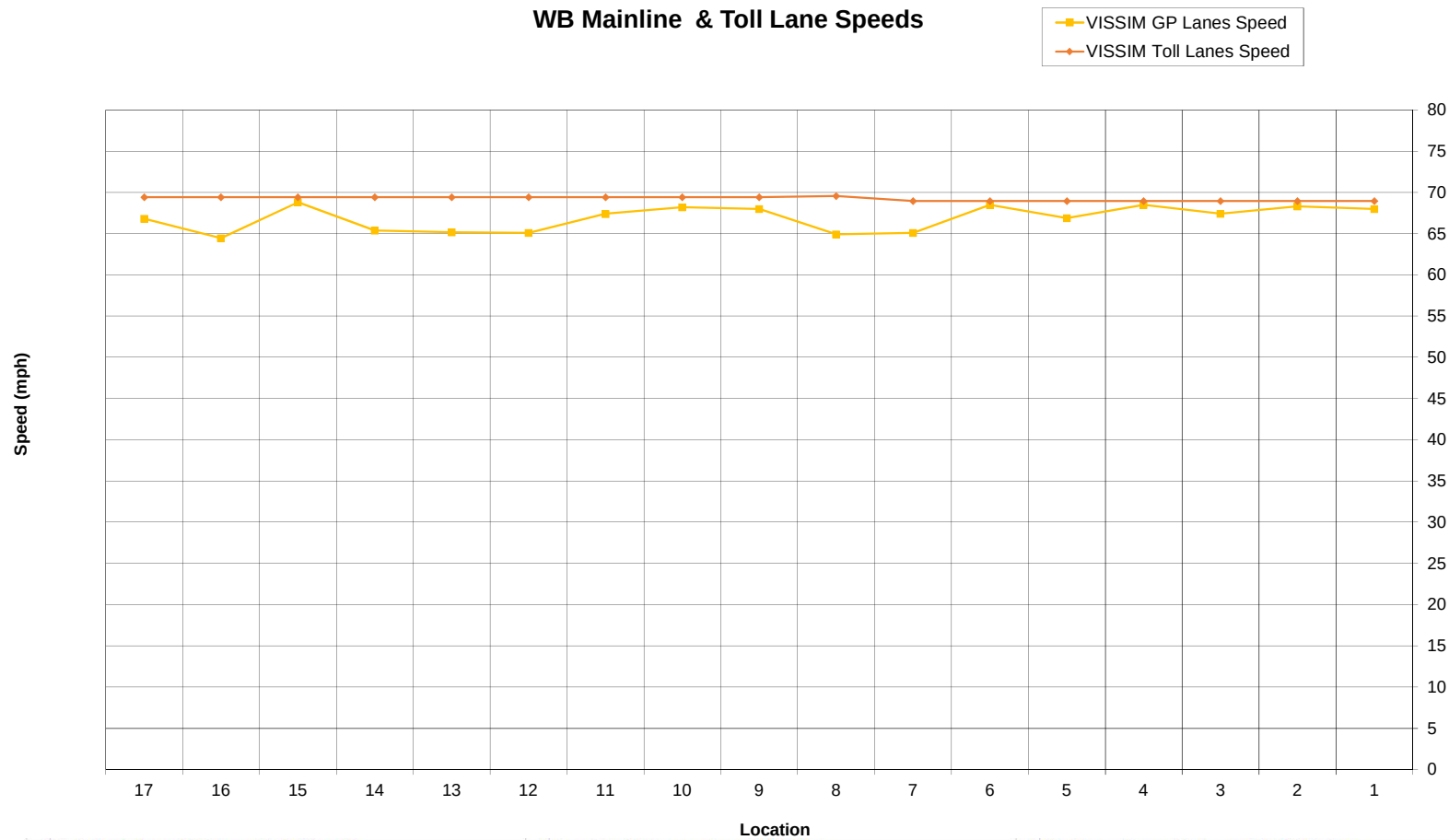


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR-71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from NB SR 241 GP	14 Off Ramp to SR 71 NB to On Ramp from SR 71 SB
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from NB SR 241 GP to Start Managed Lanes Weave	15 On Ramp from SR 71 SB to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SB SR 241 GP	10 Managed Lanes Weave between SR 241 and Green River Rd	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SB SR 241 GP to Off Ramp to Gypsum Canyon	11 End Managed Lanes Weave to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area





WB Mainline & Toll Lane Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 Green River On-Ramp to Start of HOV Weave	13 SB Gypsum Canyon On Ramp to SR 241 On Ramp
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 HOV Weave between Green River Rd and SR 241	14 SR 241 On Ramp to Weir Canyon Off Ramp
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71 NB	9 End of HOV Weave to SR 241 Off-Ramp	15 Weir Canyon Off-Ramp to NB Weir Canyon On-Ramp
4 SR 71 Off-Ramp to SR 71 On-Ramp	10 SR 241 Off Ramp to Gypsum Canyon Off Ramp	16 NB Weir Canyon On-Ramp to SB Weir Canyon On-Ramp
5 SR 71 On-Ramp to Green River Off-Ramp	11 Gypsum Canyon Off Ramp to NB Gypsum Canyon On Ramp	17 SB Weir Canyon On-Ramp to End of study area
6 Green River Off-Ramp to Green River On-Ramp	12 NB Gypsum Canyon On Ramp to SB Gypsum Canyon On Ramp	

Appendix E
VISSIM Summary of Results
2017 Build Conditions

SR-91**Vissim Model Summary - 2017 Build Option 2 - AM
Network Summary Statistics**

Parameter	2017 AM No Build	2017 AM Build Option 2	Difference
Total Vehicle Demand (3 Hr)	100,741	101,682	941
Total number of vehicles that did not reach their destination	9,016	5,420	-3,597
Total number of vehicles that have reached their destination	91,725	96,262	4,538
Total vehicle-miles traveled (VMT)	796,551	845,966	49,415
Total travel time, All Vehicle Types (VHT)	23,068	21,012	-2,056
Average speed [mph], All Vehicle Types	34.5	40.3	5.7
Average delay time per vehicle [mins], All Vehicle Types	6.83	4.93	-1.90

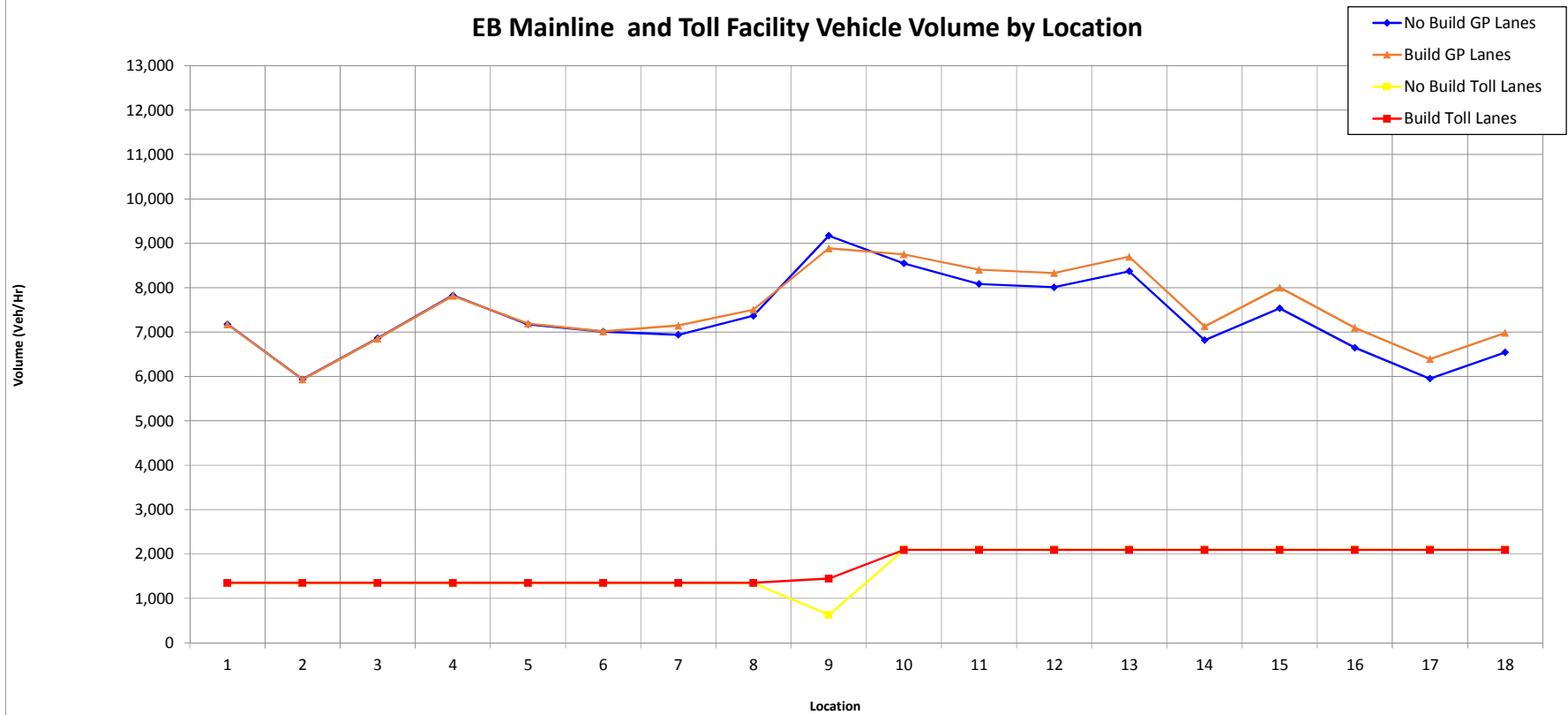
SR-91

Vissim Model Summary - 2017 Build Option 2 - AM

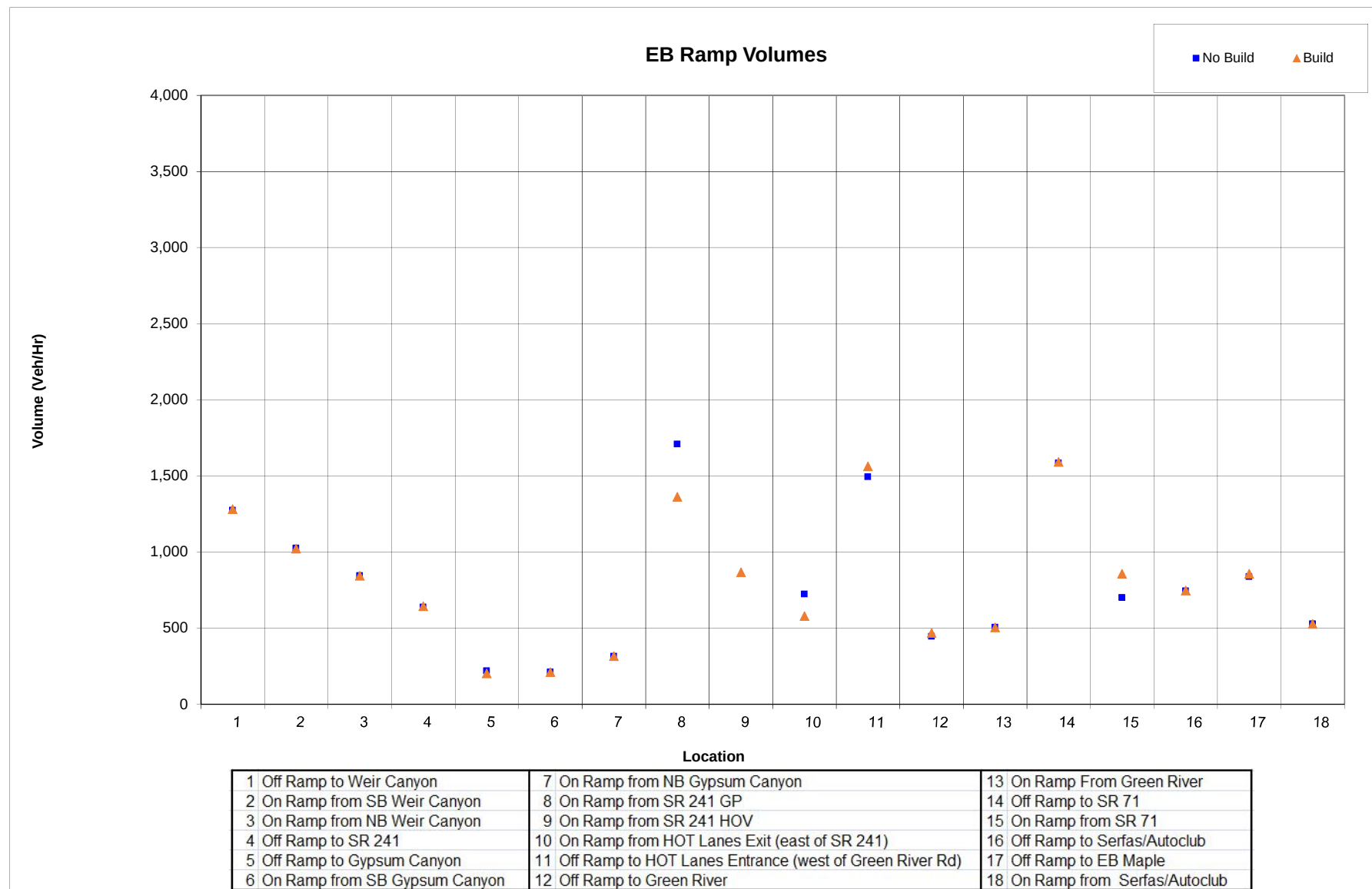
Travel Time Table

#	Origin	#	Destination	p Key	Hide Travel Time Segments			2017 AM No Build VISSIM Travel Time			2017 AM Build Option 2 VISSIM Travel Time			Change VISSIM Travel Time		
					Seg 1	Seg 2	Seg 3	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005	8.6	8.7	8.6	8.7	8.7	8.6	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005	8.6	8.6	8.6	8.6	8.6	8.6	0.0	0.0	0.0
		5	SR 241 SB south of SR 91	3	1001			7.1	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004	11.0	11.1	11.0	11.1	11.1	11.0	0.0	0.0	0.0
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004	10.9	10.9	10.9	10.9	11.0	10.9	0.0	0.0	0.0
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014	23.1	24.8	24.1	18.7	20.4	19.5	-4.4	-4.4	-4.6
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014	23.0	24.7	24.0	18.6	20.3	19.5	-4.4	-4.4	-4.6
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013	25.4	27.1	26.5	21.1	22.8	22.0	-4.3	-4.3	-4.4
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013	n/a	n/a	n/a	21.0	22.7	21.9	-4.4	-4.4	-4.6
		7	SR 71 NB north of SR 91	12	1010			12.4	13.3	12.0	9.0	10.1	7.7	-3.4	-3.2	-4.3
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014	12.0	12.4	12.6	11.1	11.4	11.9	-0.9	-1.0	-0.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014	8.4	8.4	8.4	8.5	8.5	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013	14.4	14.8	15.0	13.6	13.9	14.4	-0.8	-0.9	-0.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013	n/a	n/a	n/a	10.8	10.9	10.8	-3.6	-3.9	-4.1
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006			7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005	11.0	11.0	11.0	11.0	11.0	10.9	0.0	0.0	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	20	1007	1003	1004	13.4	13.4	13.4	13.4	13.4	13.3	0.0	0.0	0.0
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005	n/a	n/a	n/a	10.9	10.9	10.9	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005	n/a	n/a	n/a	10.8	10.8	10.8	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	23	2007	1003	1004	n/a	n/a	n/a	13.3	13.4	13.3	0.0	-0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014	43.0	54.1	55.9	32.0	39.5	40.5	-11.0	-14.6	-15.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014	42.9	54.0	55.8	31.9	39.4	40.5	-11.0	-14.6	-15.3
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008			28.7	37.2	38.3	20.5	26.7	27.0	-8.2	-10.5	-11.3
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013	45.3	56.4	58.3	34.4	42.0	43.1	-10.9	-14.4	-15.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013	n/a	n/a	n/a	34.3	41.8	42.9	-11.0	-14.6	-15.4

EB Mainline and Toll Facility Vehicle Volume by Location

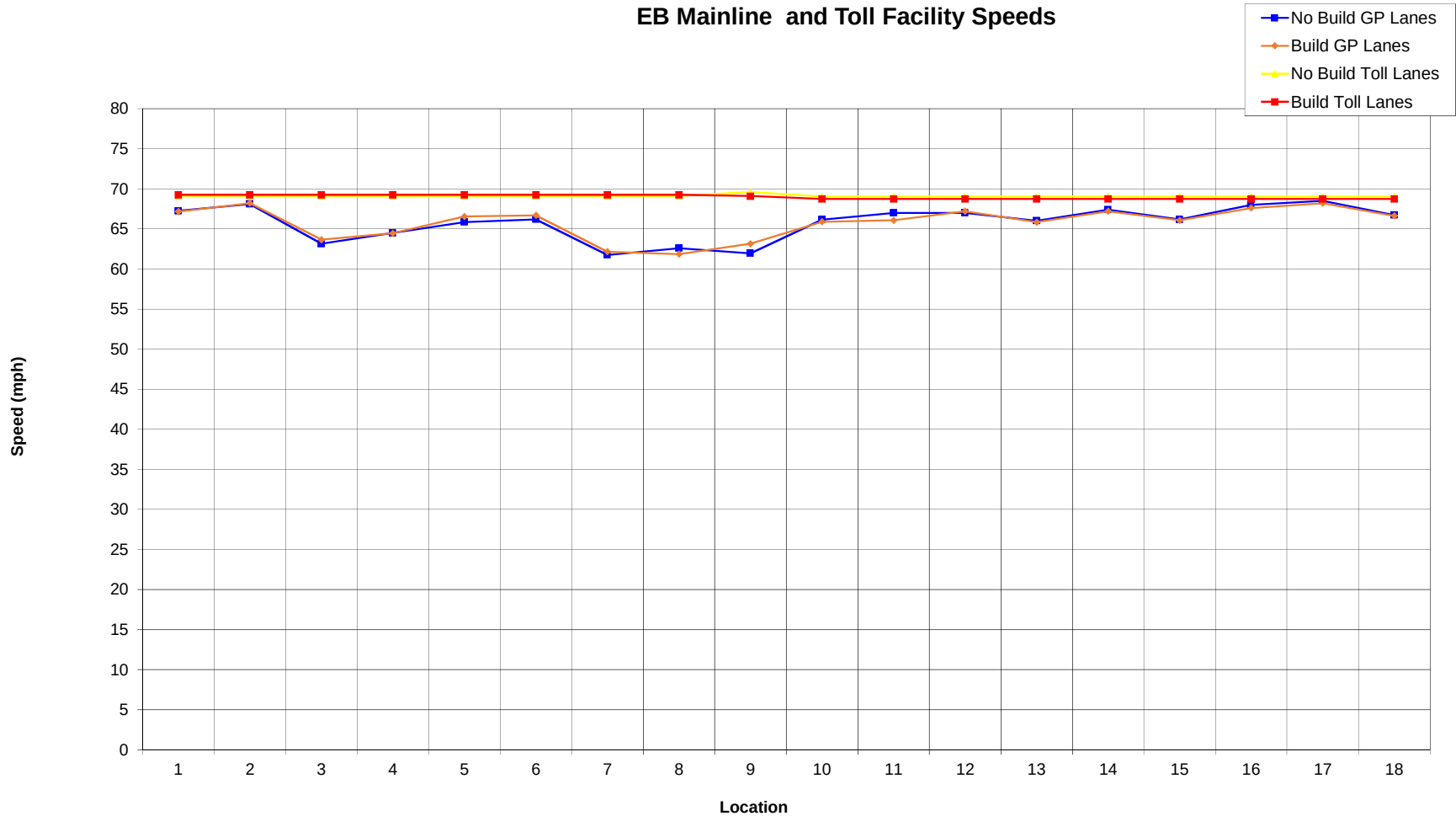


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



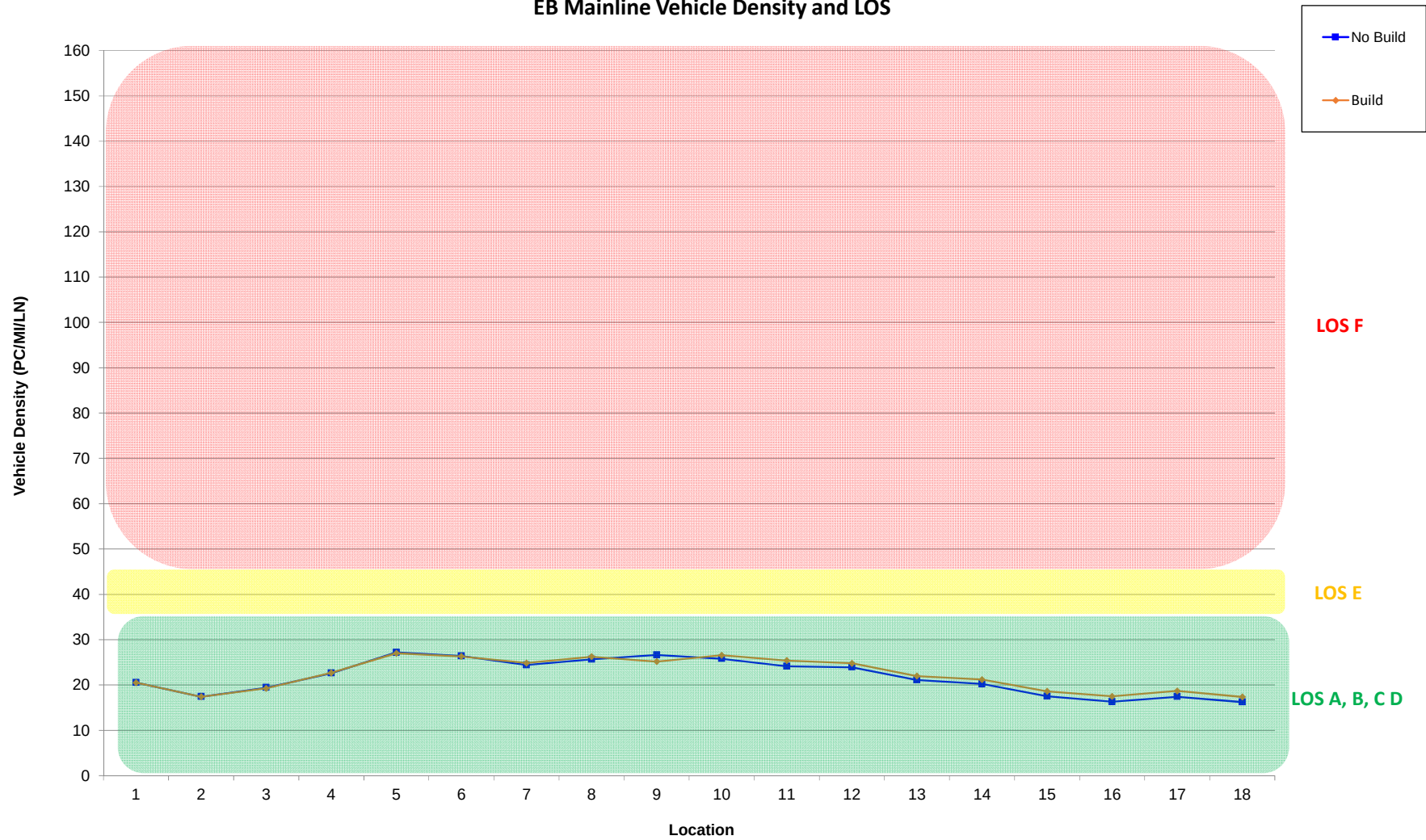
Charts 6-7 AM

EB Mainline and Toll Facility Speeds

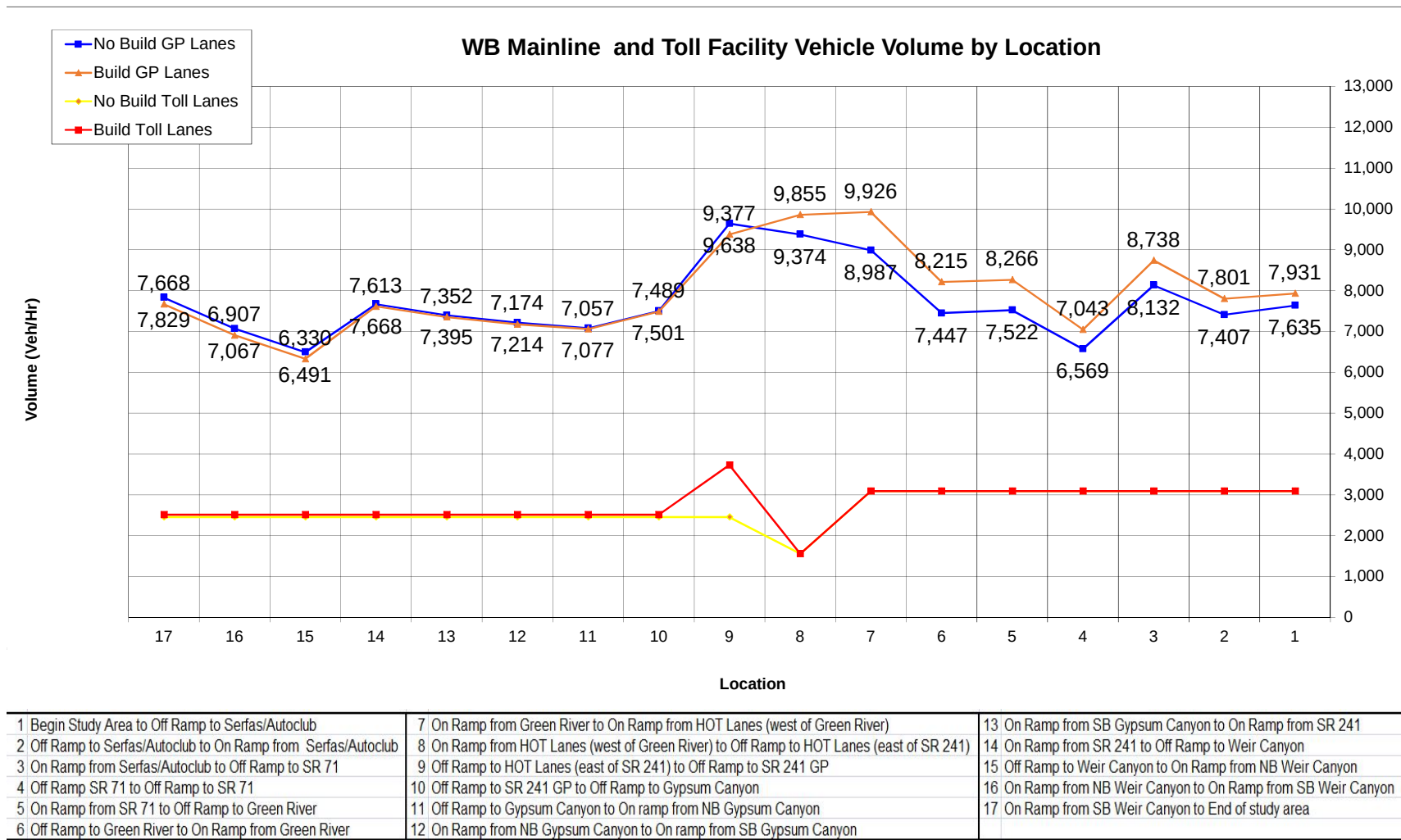


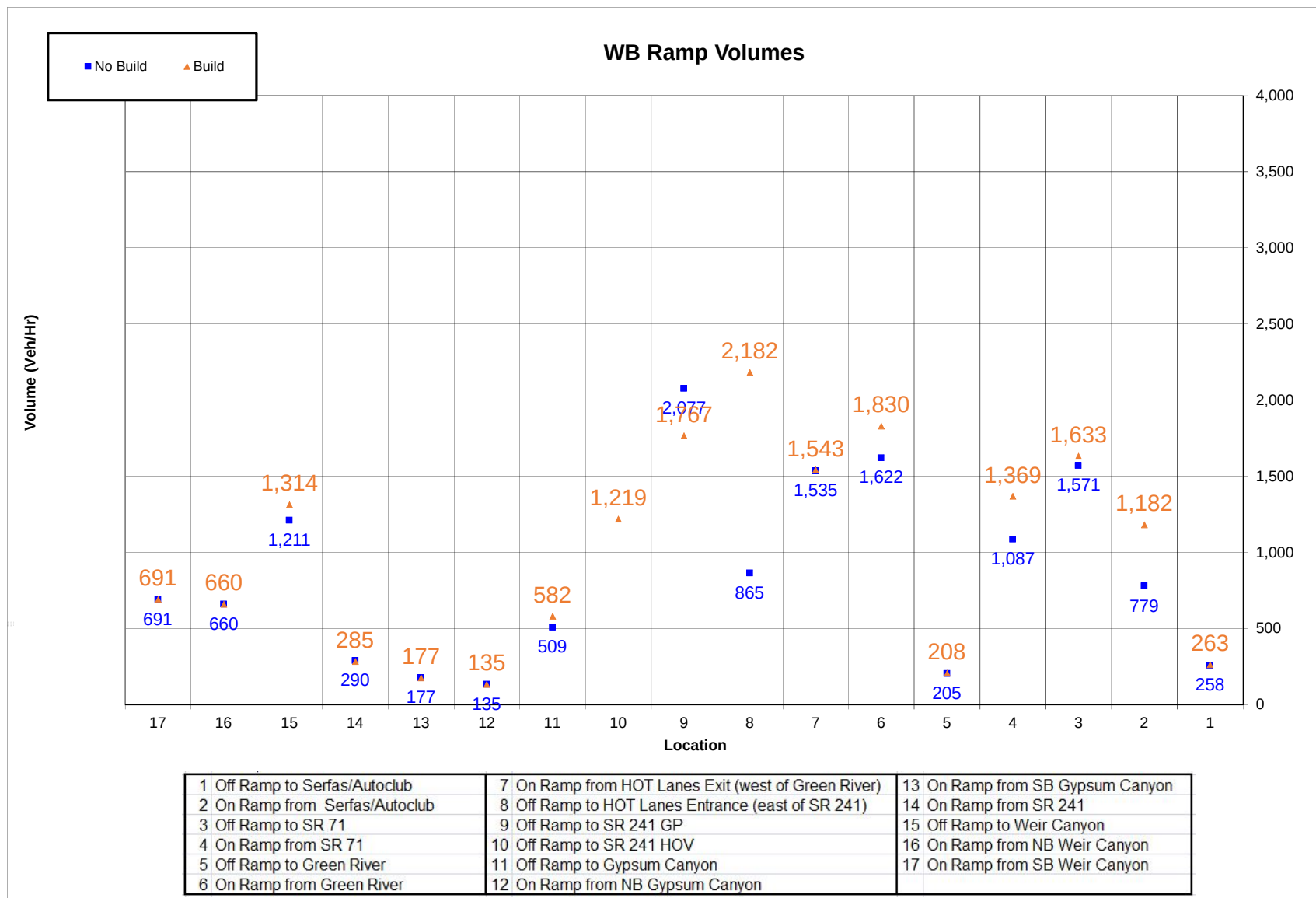
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

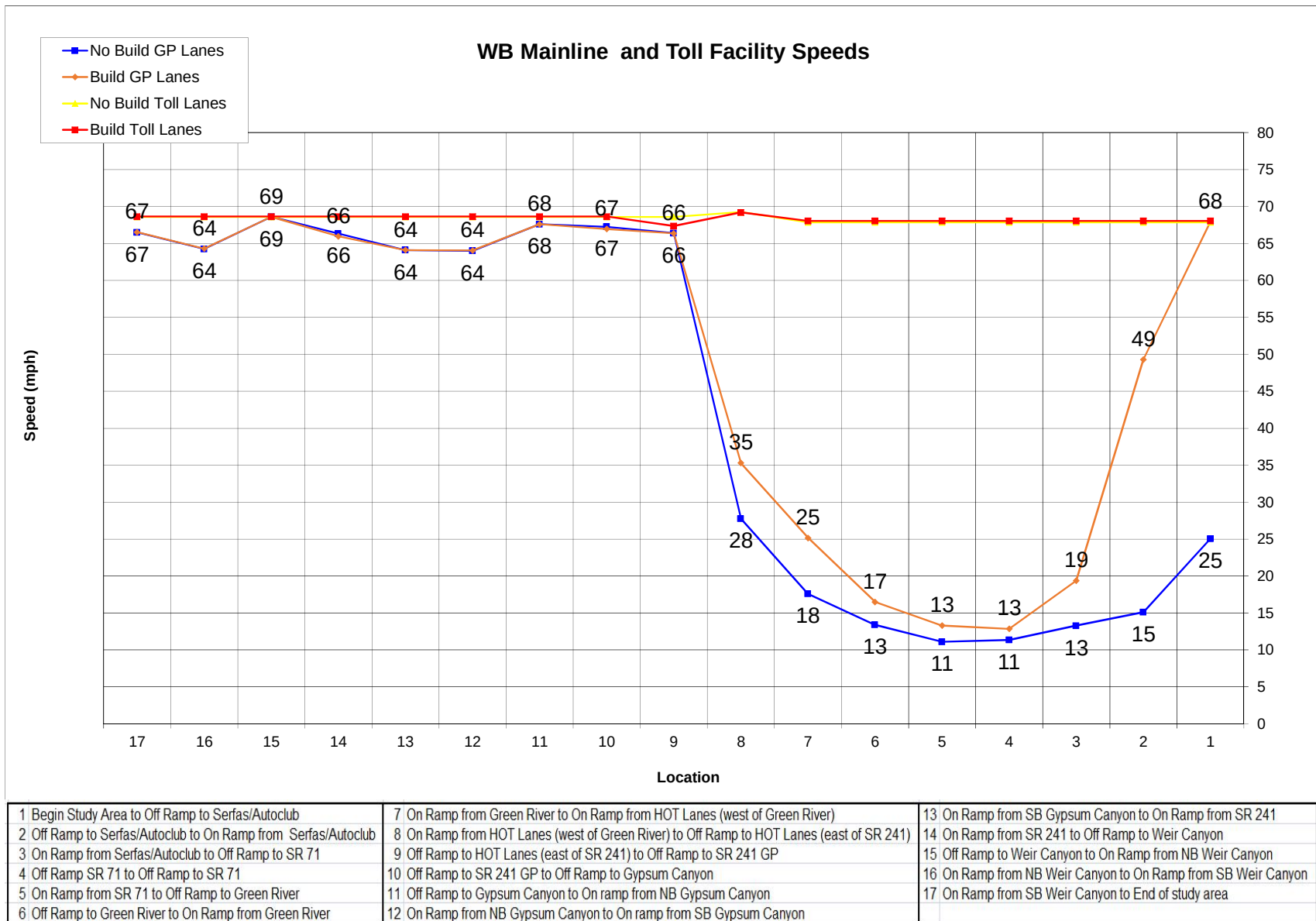


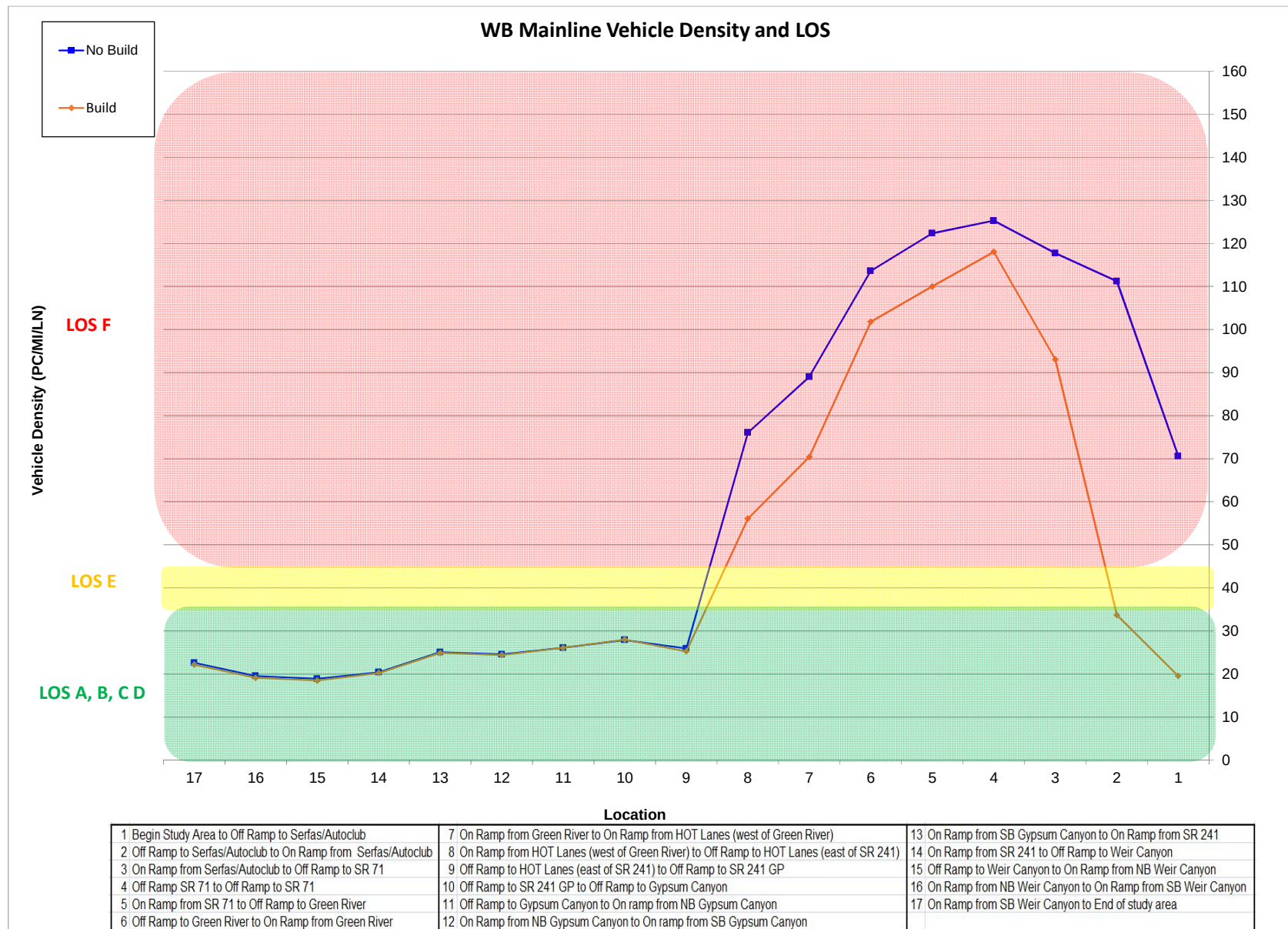
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



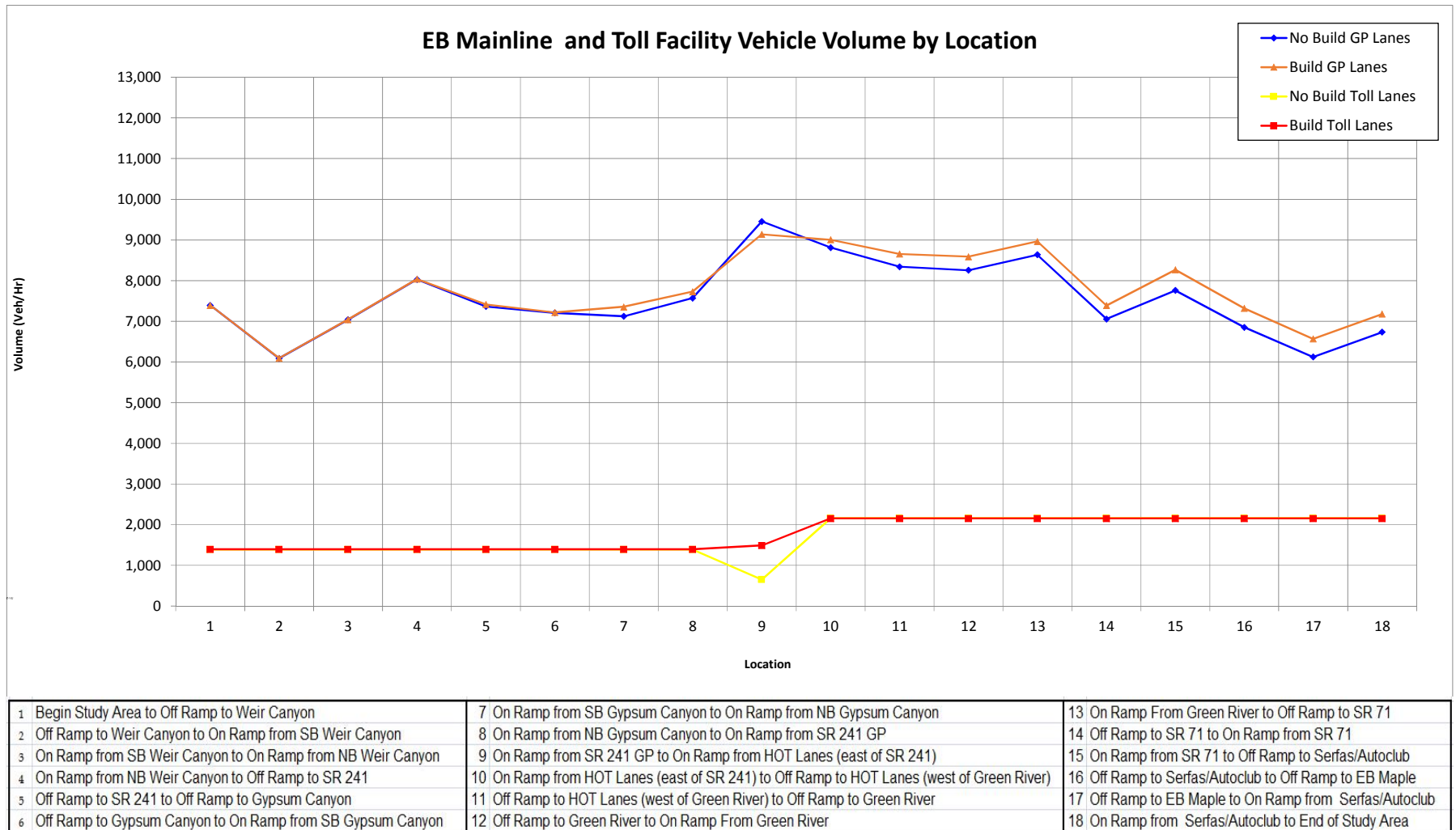


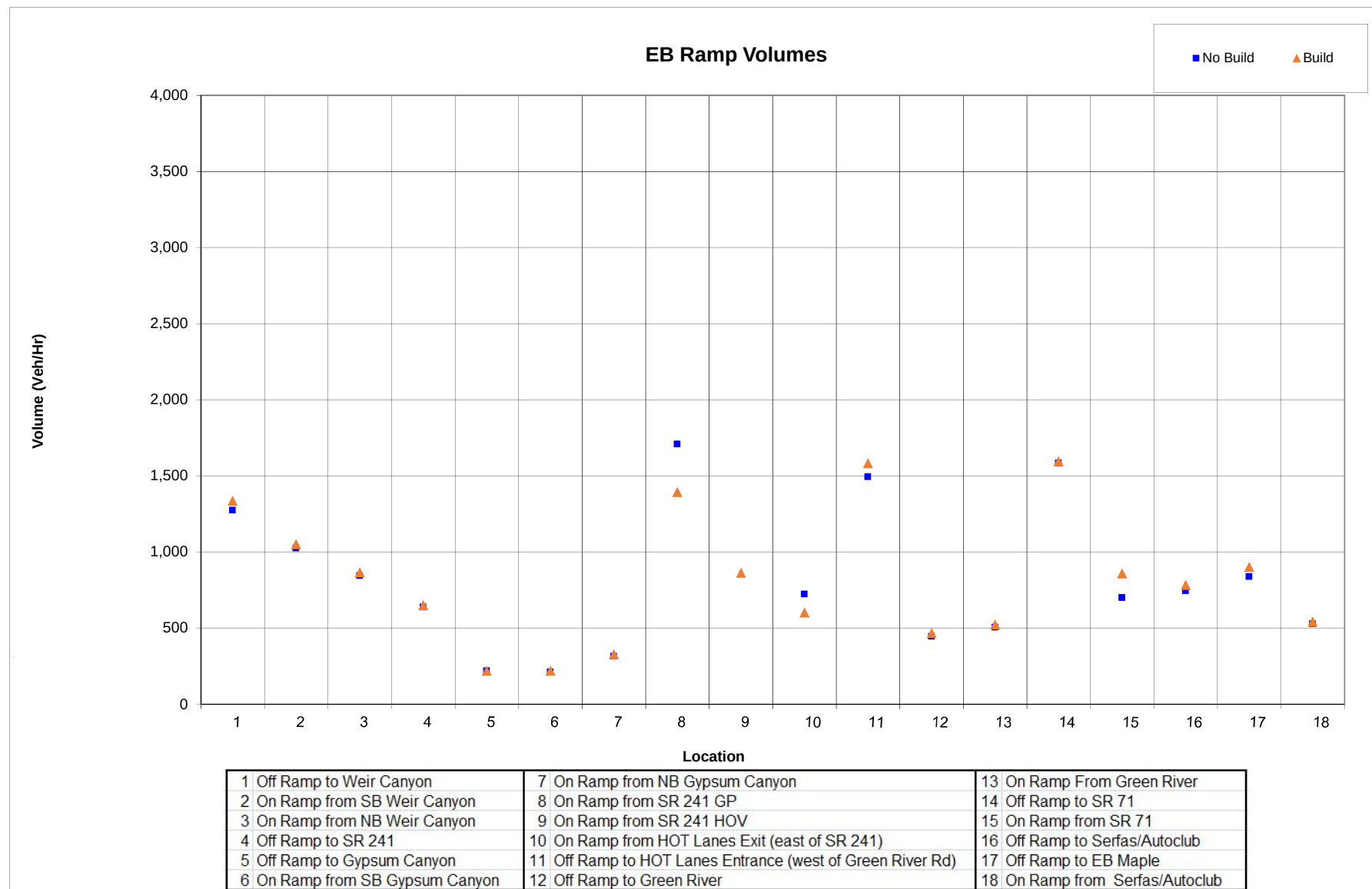
Charts 6-7 AM



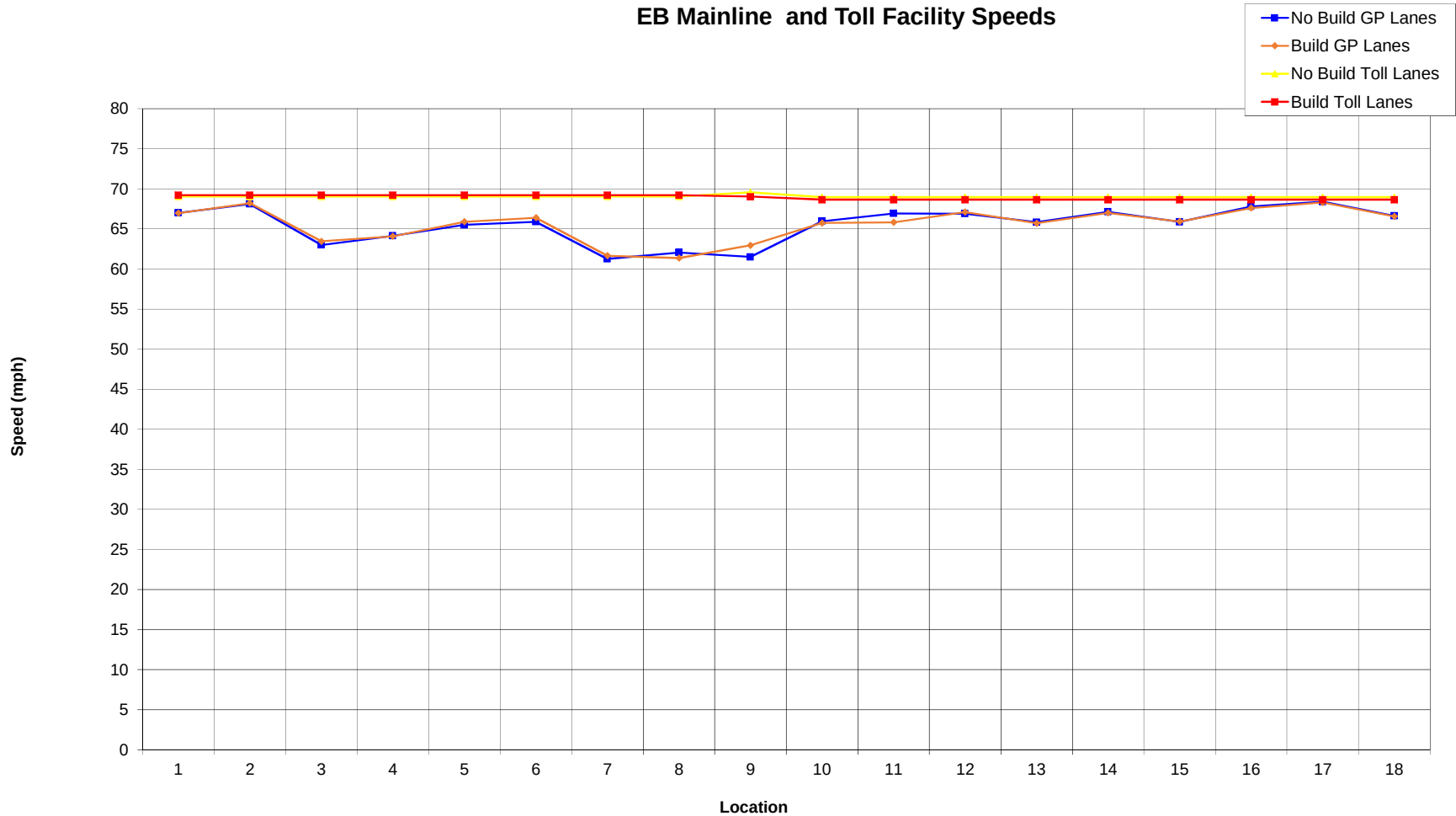


Charts 6-7 AM



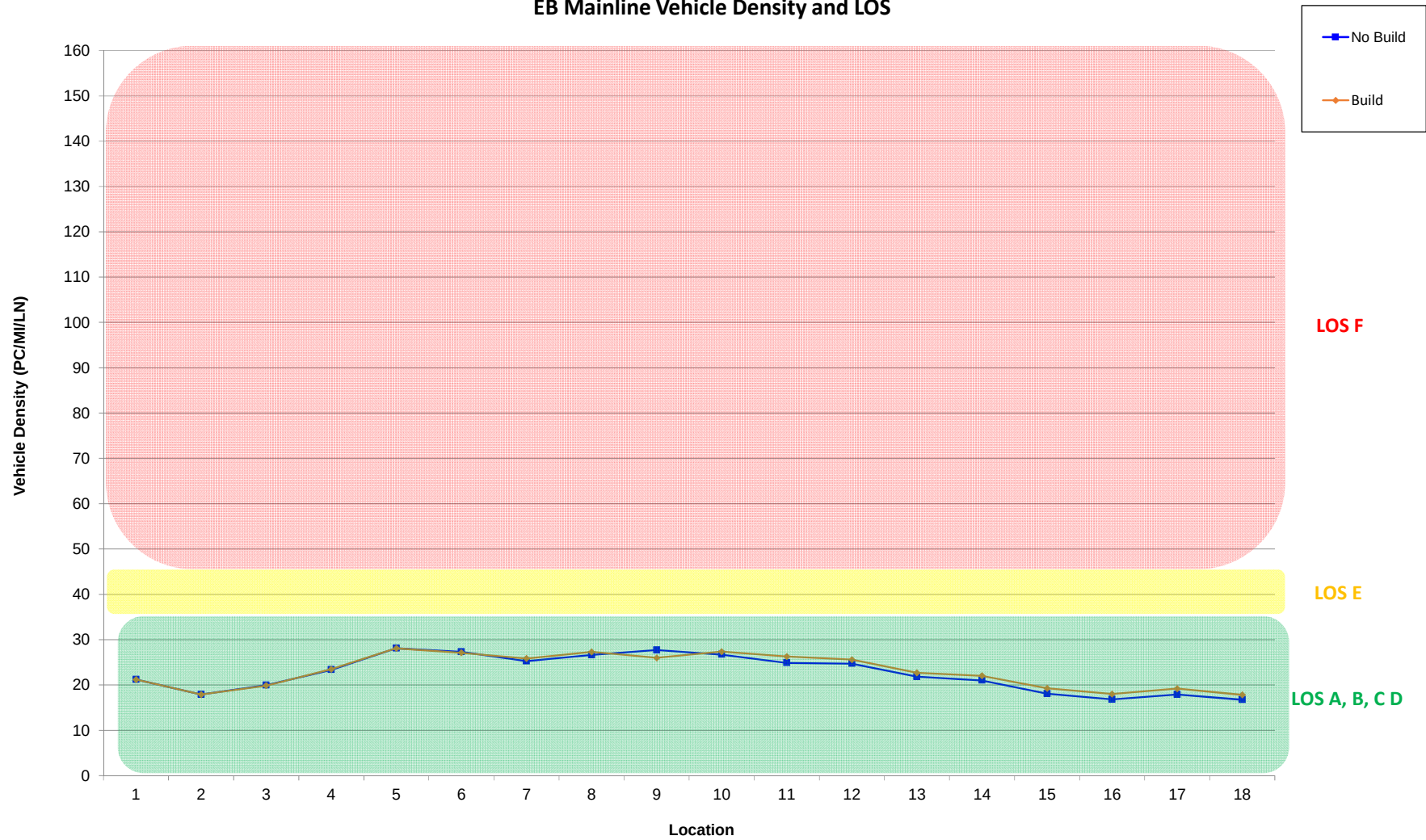


EB Mainline and Toll Facility Speeds



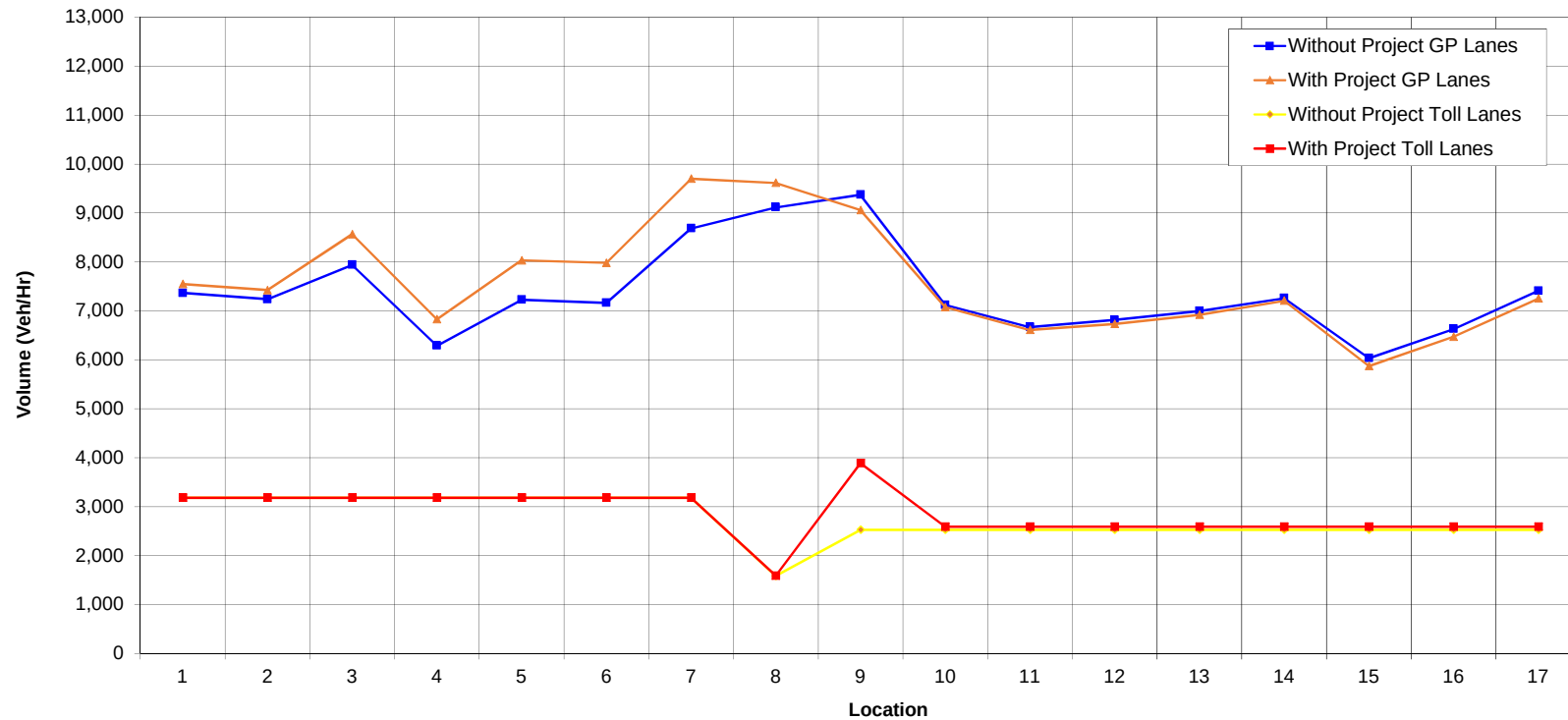
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

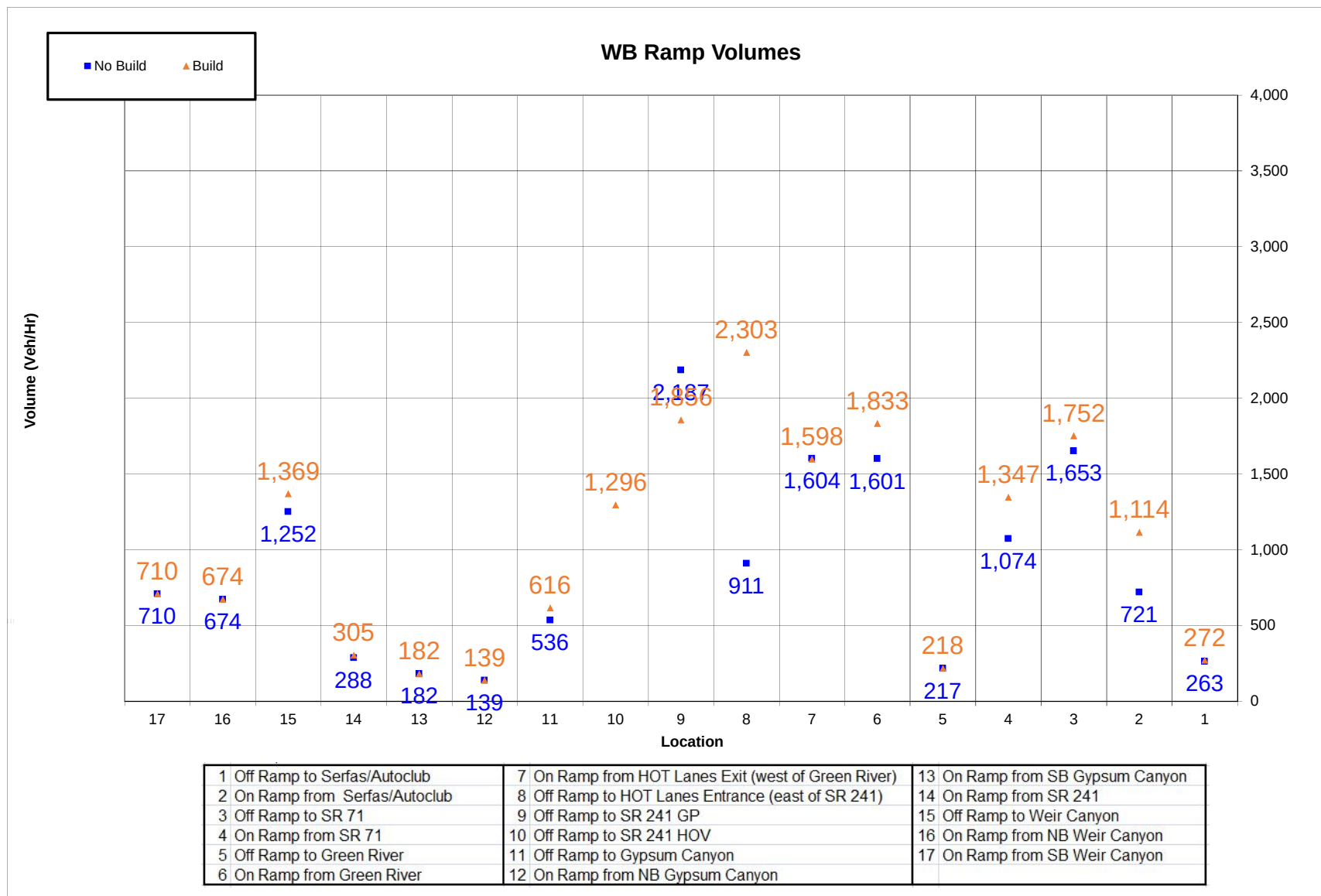


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

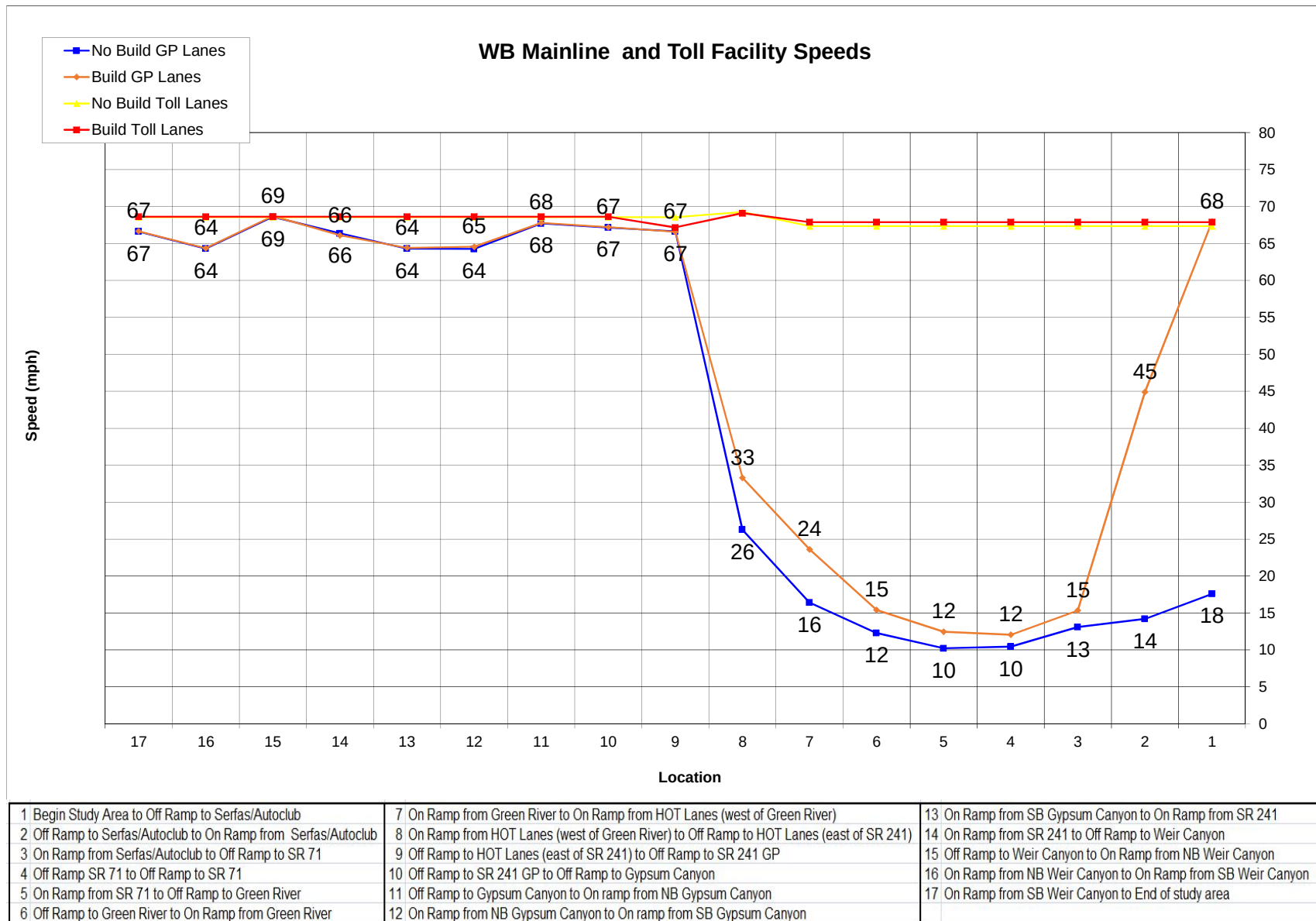
WB Mainline and Toll Facility Vehicle Volume by Location



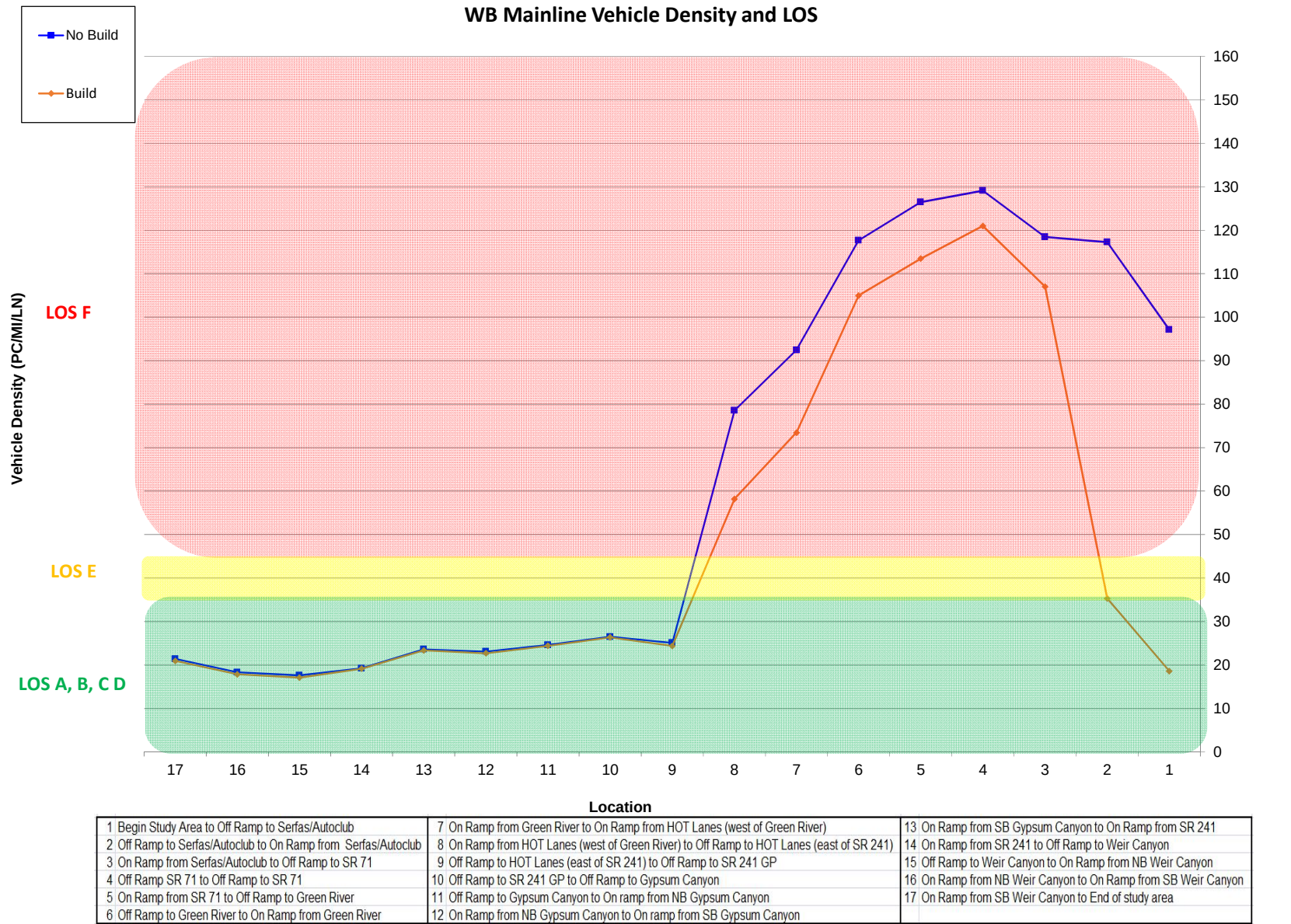
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



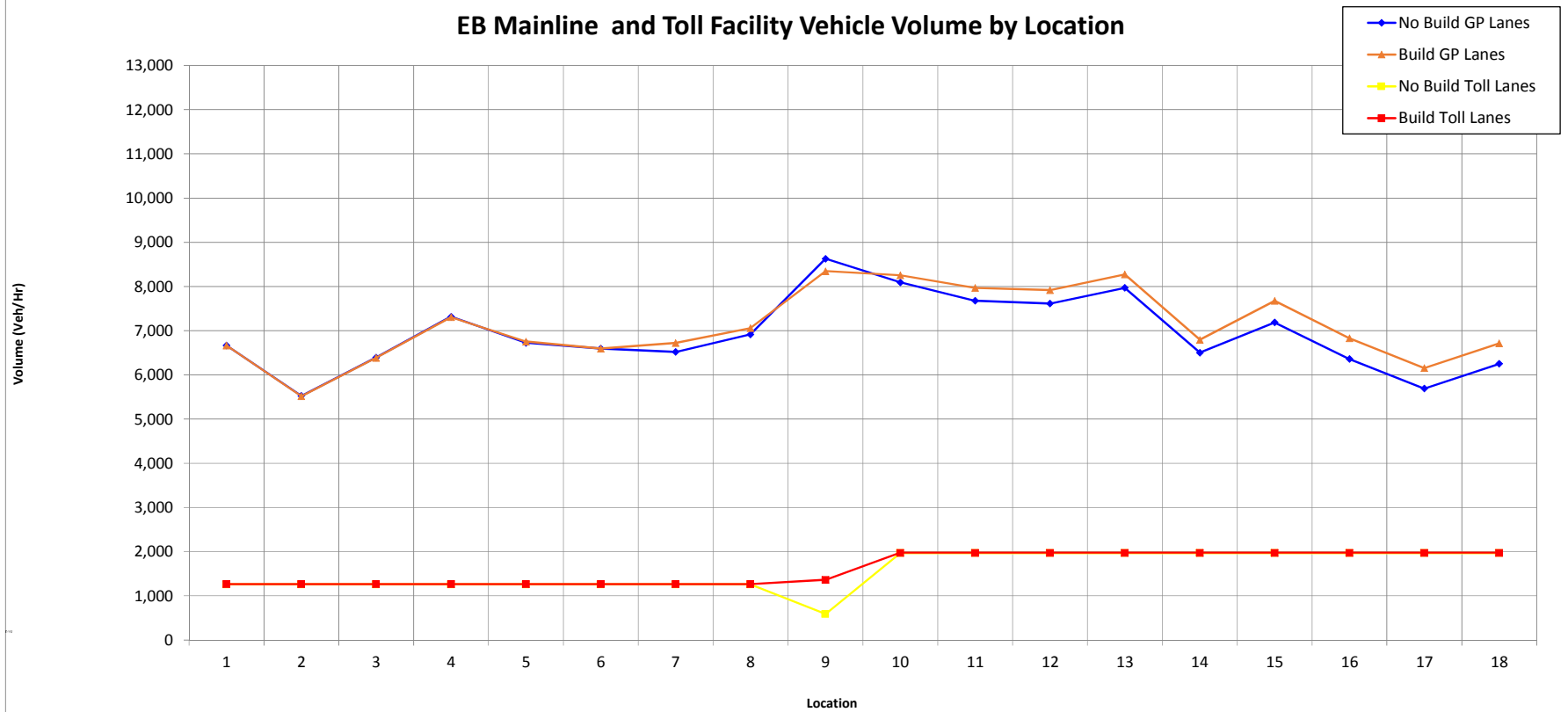
Charts 7-8 AM



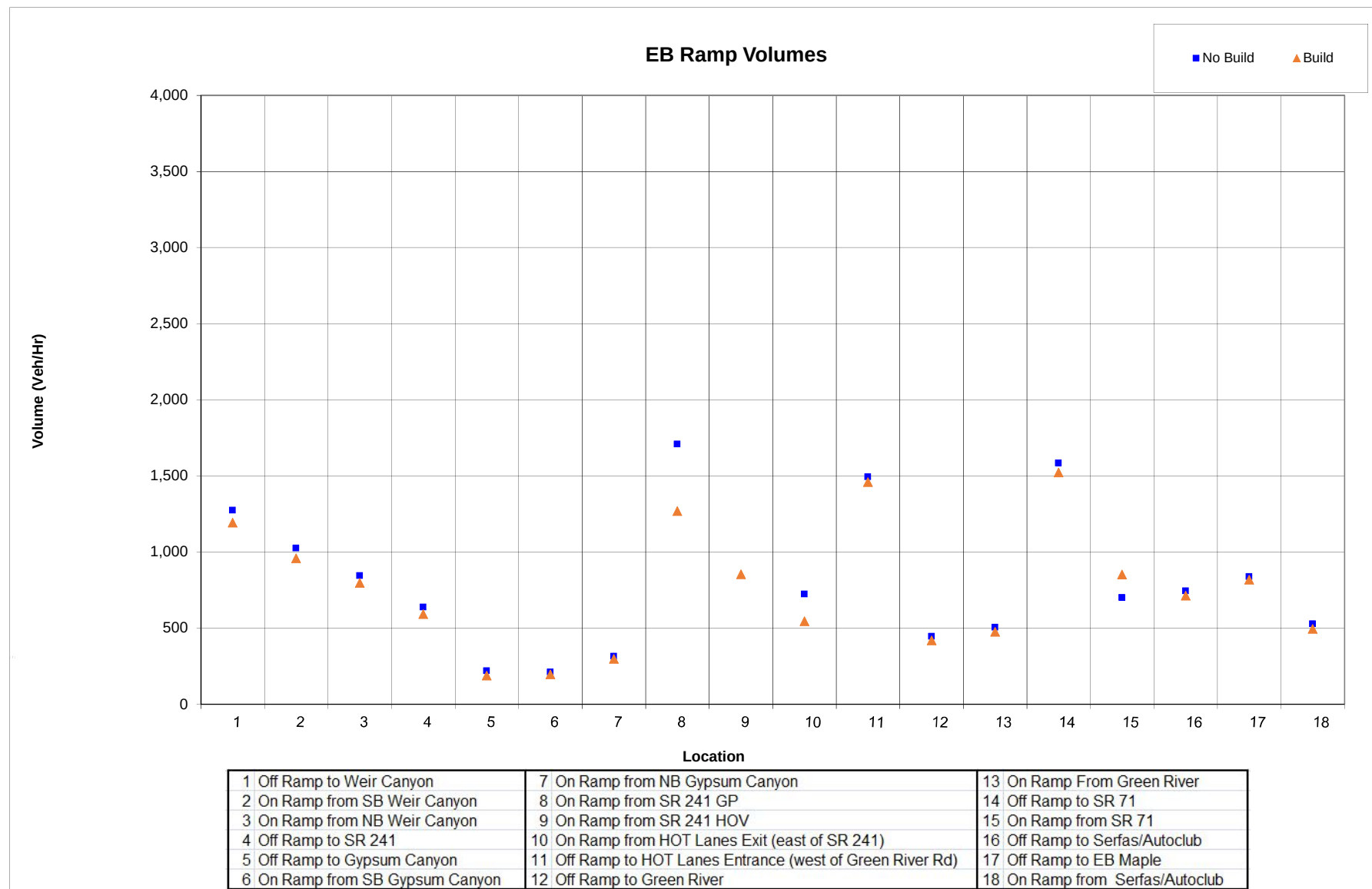
WB Mainline Vehicle Density and LOS



EB Mainline and Toll Facility Vehicle Volume by Location

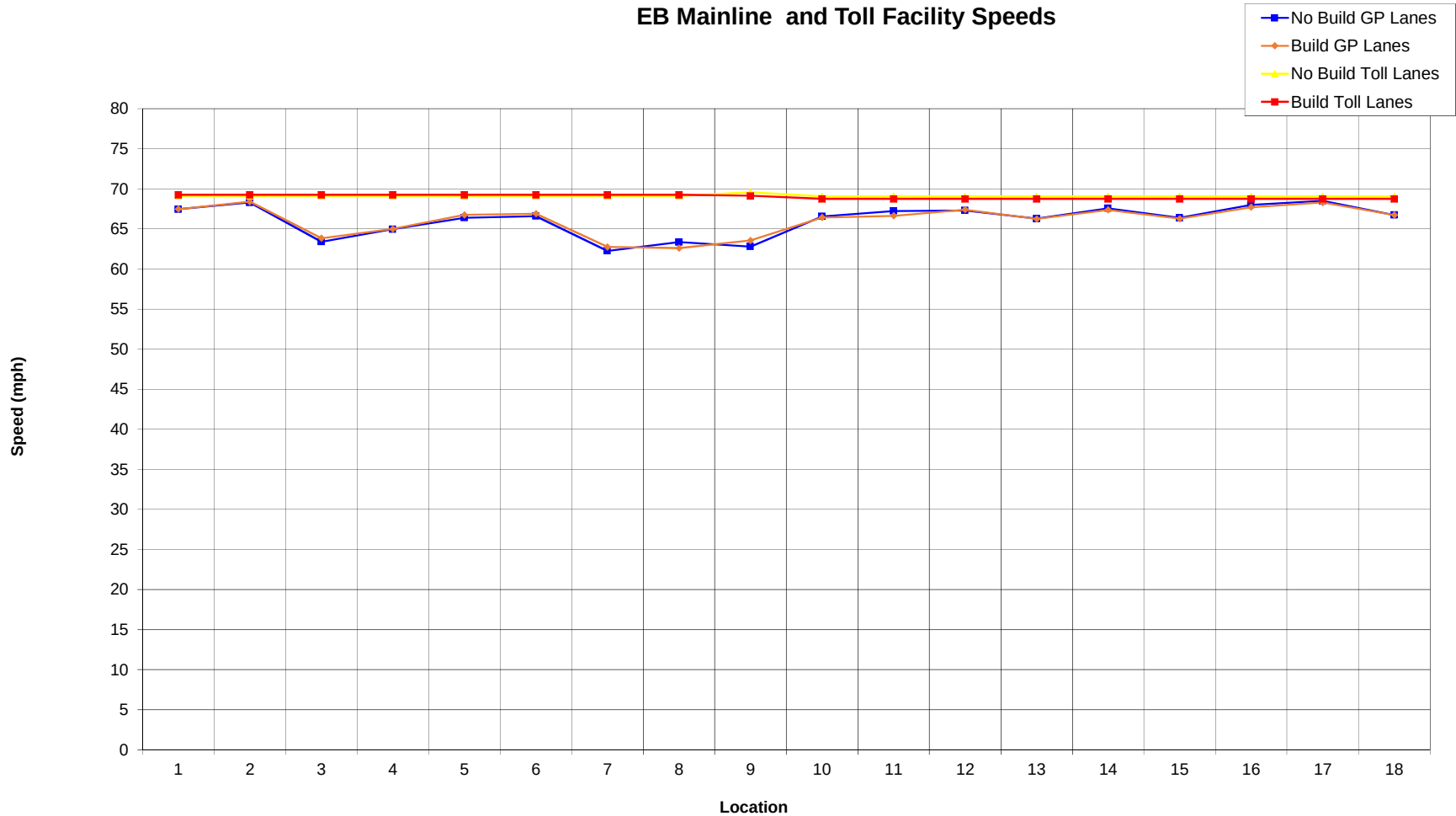


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



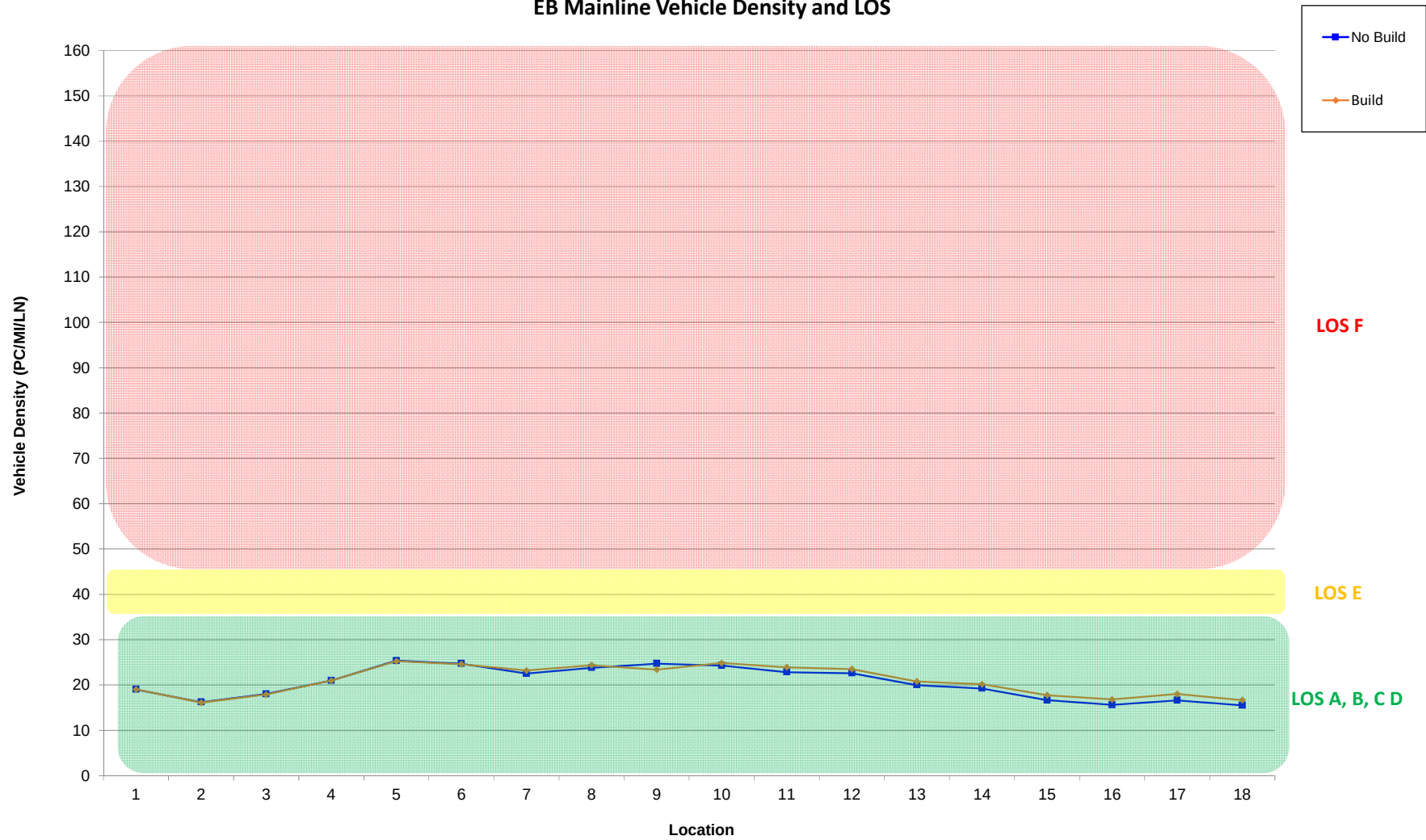
Charts 8-9 AM

EB Mainline and Toll Facility Speeds

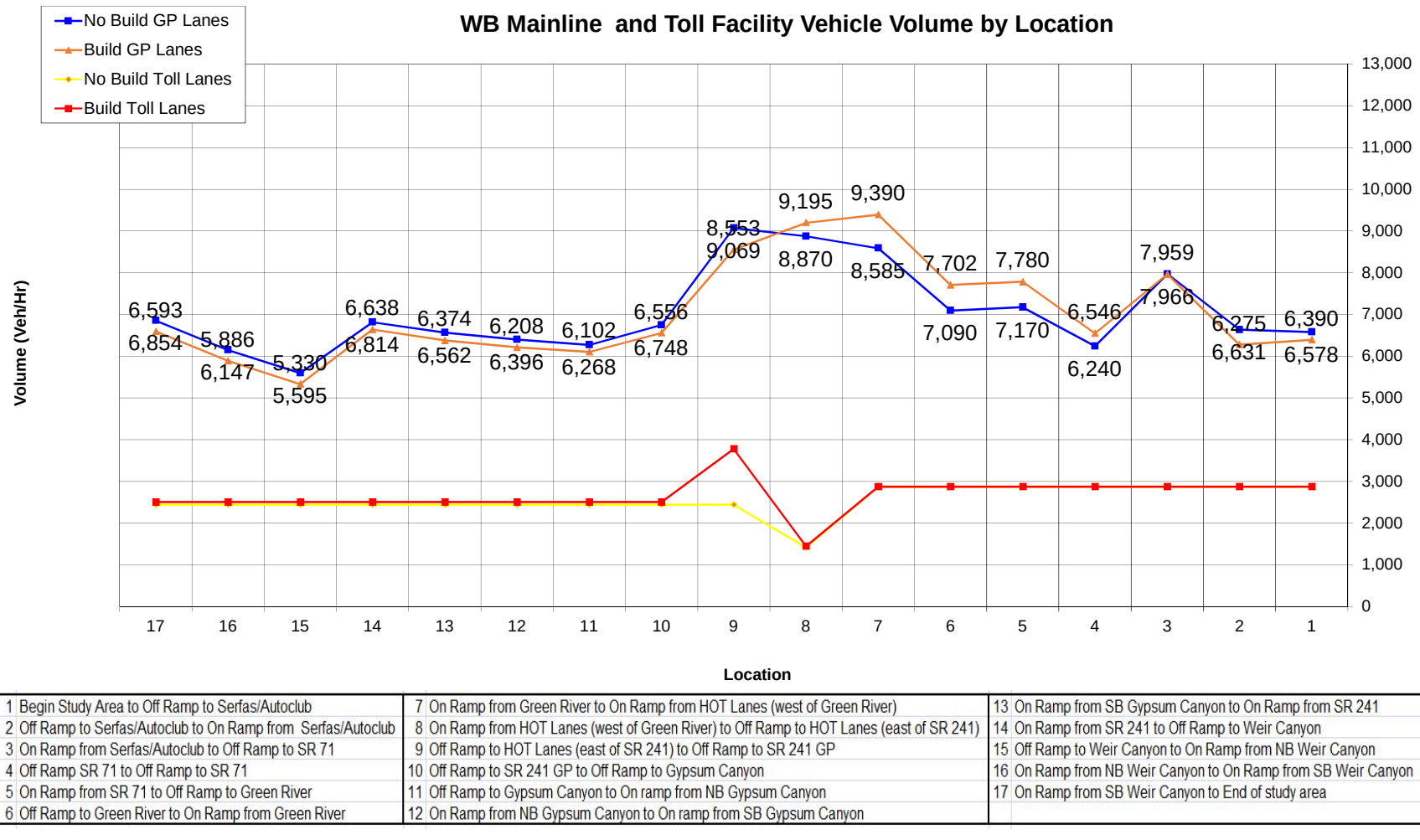


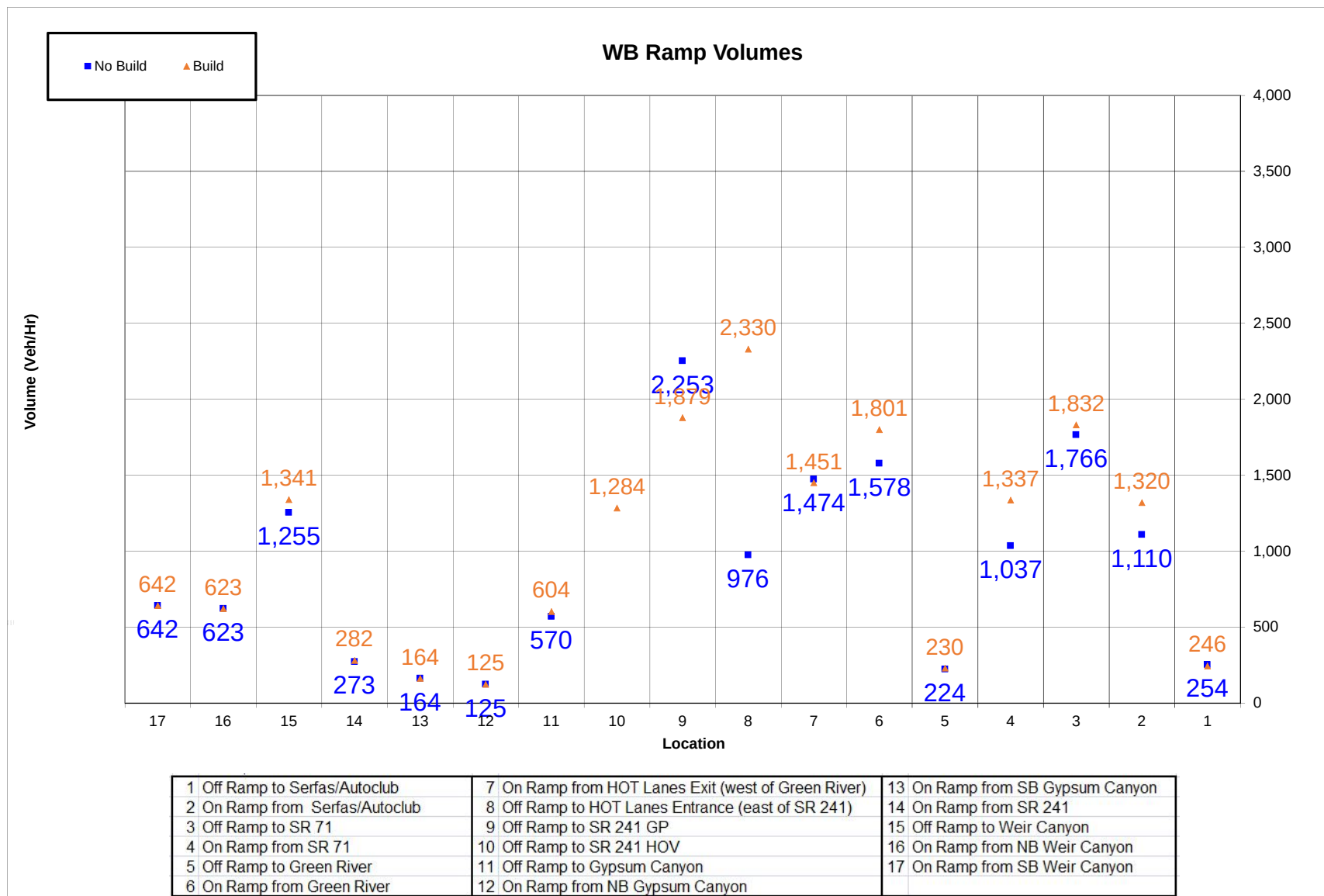
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

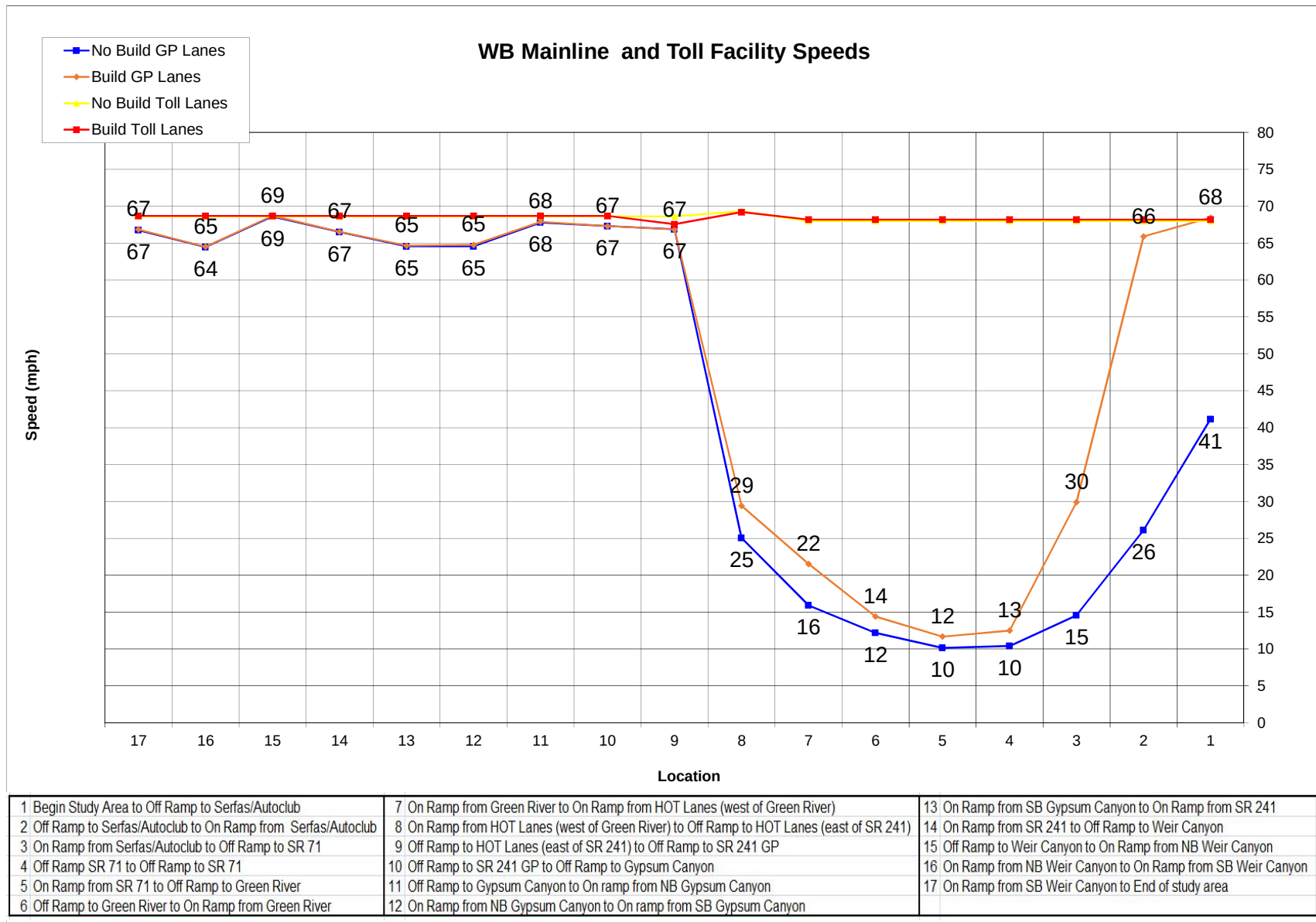


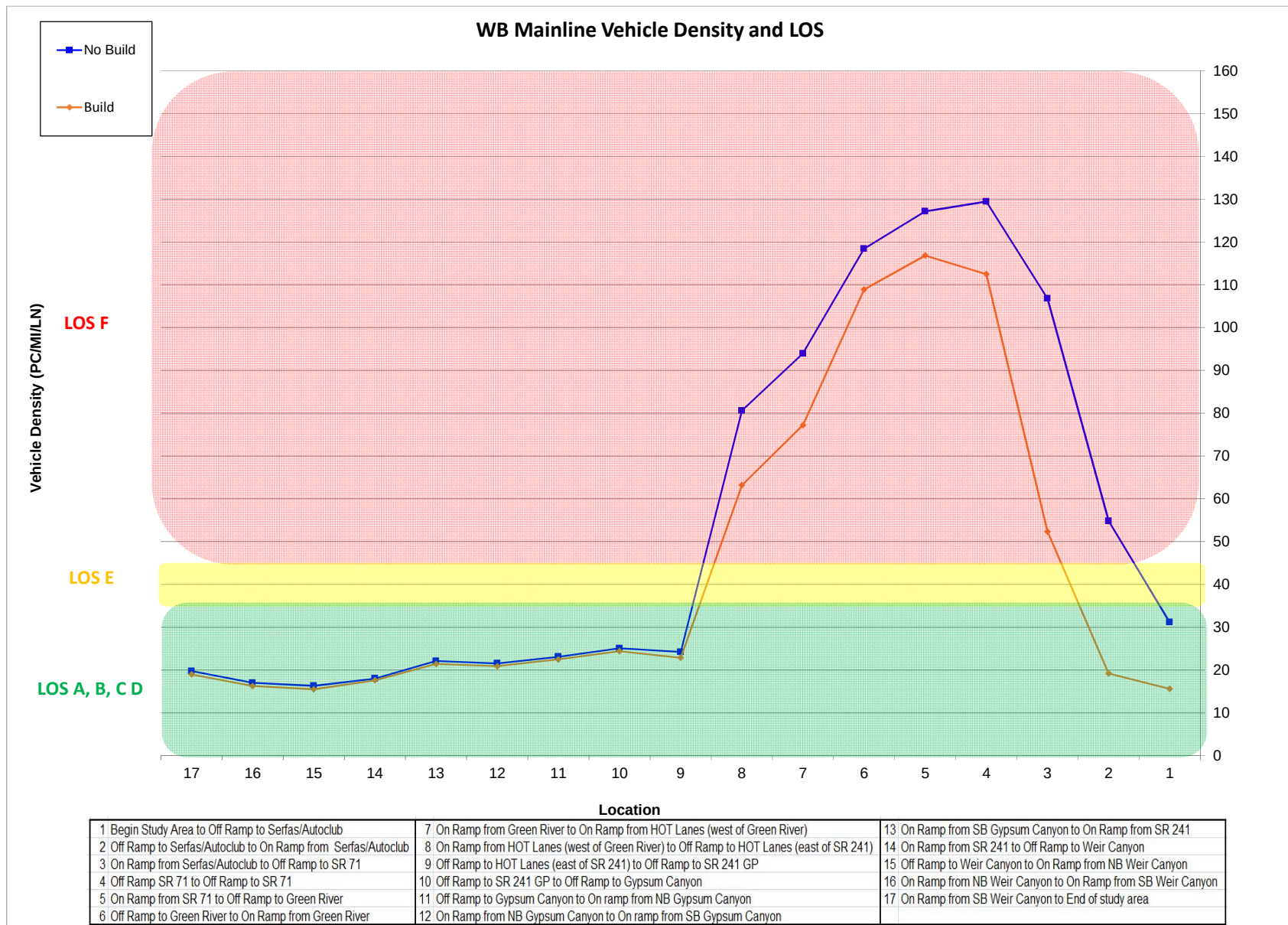
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area





Charts 8-9 AM





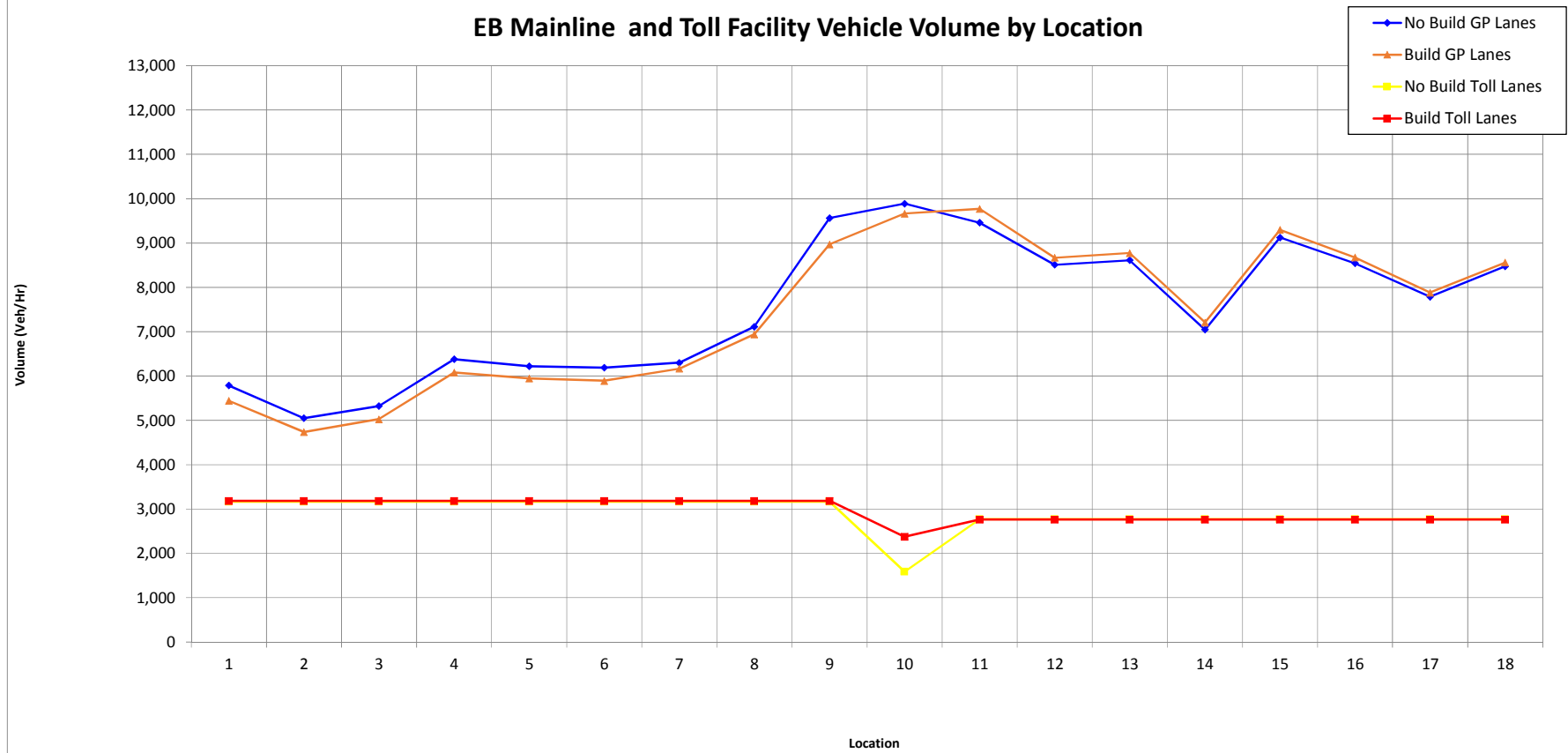
SR-91**Vissim Model Summary - 2017 Build Option 2 - PM Peak Period****Network Summary Statistics**

Parameter	2017 No Build	2017 Option 2	Difference
Total Vehicle Demand (4 Hr)	141,937	144,727	2,790
Total number of vehicles that did not reach their destination	20,812	22,405	1,593
Total number of vehicles that have reached their destination	121,125	122,322	1,197
Total vehicle-miles traveled (VMT)	1,014,001	1,036,967	22,965
Total travel time, All Vehicle Types (VHT)	26,278	27,608	1,331
Average speed [mph], All Vehicle Types	38.6	37.6	-1.0
Average delay time per vehicle [mins], All Vehicle Types	5.27	5.68	0.41

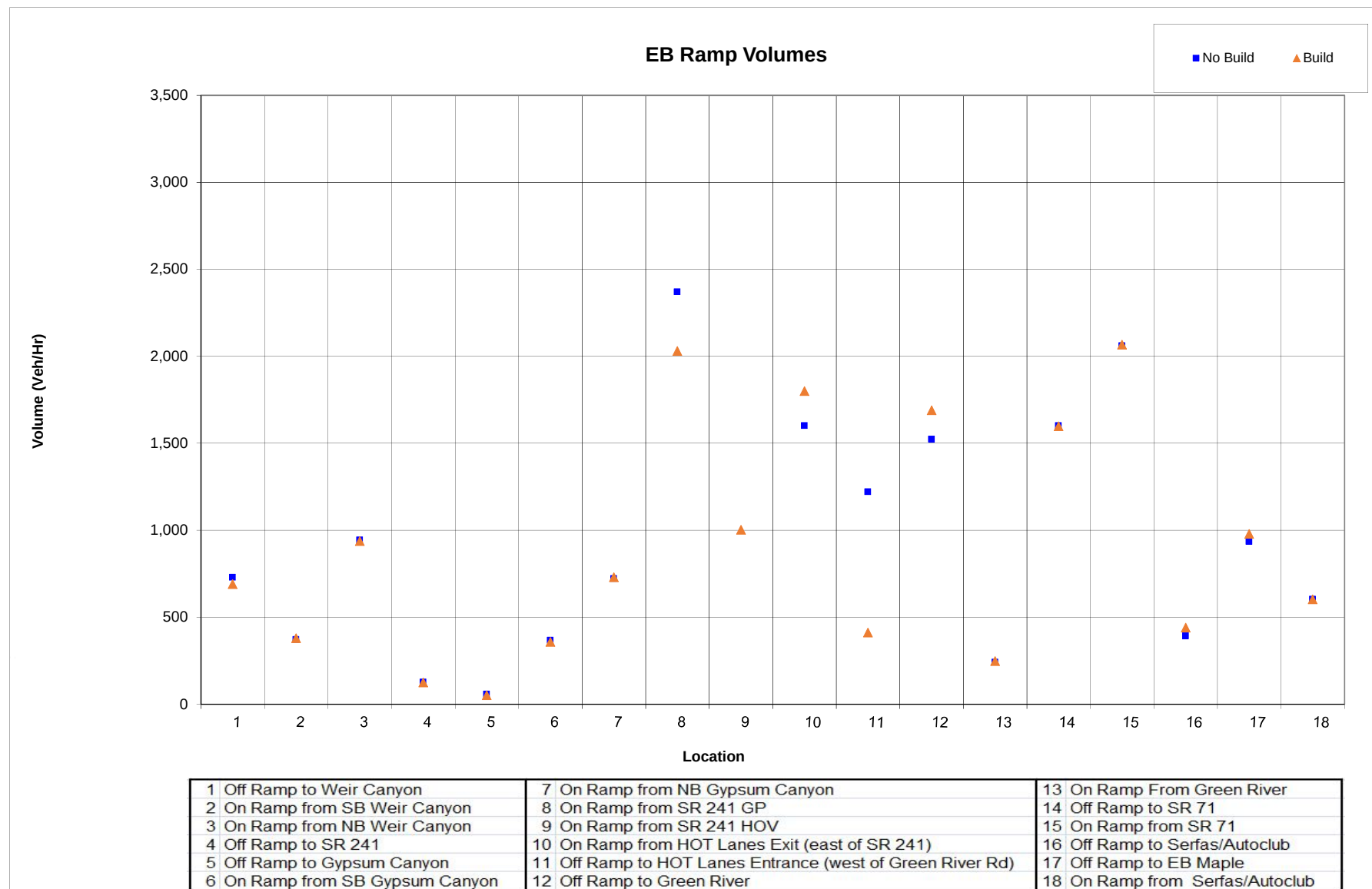
Vissim Model Summary - 2017 Build Option 2 - PM Peak Period Travel Time Results

				Hide				2017 PM No Build				2017 PM Build				Change				
#	Origin	#	Destination	p	Ke	Travel Time			VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)			
						Seg 1	Seg 2	Seg 3	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005		28.3	29.6	29.4	27.6	30.3	31.9	32.0	29.4	2.0	2.4	2.6	1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005		28.3	29.5	29.4	27.6	30.3	31.9	31.9	29.4	2.0	2.4	2.6	1.8
		5	SR 241 SB south of SR 91	3	1001				18.4	19.1	19.0	17.7	19.3	20.8	20.6	18.7	1.0	1.7	1.5	1.0
		7	SR 71 NB north of SR 91	4	1002	1003	1004		30.6	31.9	31.8	30.0	32.7	34.3	34.3	31.7	2.0	2.4	2.6	1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005		10.4	10.5	10.5	10.5	11.2	11.3	11.3	11.2	0.8	0.8	0.8	0.6
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005		8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004		12.7	12.8	12.9	12.9	13.6	13.6	13.7	13.5	0.8	0.8	0.8	0.6
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014		8.5	8.5	8.5	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013		10.9	11.0	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013		n/a	n/a	n/a	n/a	10.9	10.8	10.8	10.8	-0.1	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	12	1010				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014		8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014		8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013		10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013		n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.7	-0.1	-0.2	-0.1	-0.1
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006				7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005		13.4	13.5	13.6	13.6	15.0	15.2	15.1	14.9	1.6	1.7	1.5	1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005		13.4	13.4	13.5	13.5	15.0	15.2	15.1	14.8	1.6	1.8	1.5	1.3
		7	SR 71 NB north of SR 91	20	1007	1003	1004		15.7	15.8	15.9	15.9	17.3	17.5	17.5	17.2	1.6	1.7	1.5	1.3
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005		n/a	n/a	n/a	n/a	13.6	13.7	13.7	13.6	0.2	0.2	0.1	0.0
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005		n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-2.5	-2.6	-2.7	-2.7
		7	SR 71 NB north of SR 91	23	2007	1003	1004		n/a	n/a	n/a	n/a	15.9	16.0	16.0	15.9	0.2	0.2	0.1	0.0
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014		10.2	10.2	10.1	9.9	10.2	10.2	10.1	9.9	0.0	0.0	0.0	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014		10.2	10.2	10.0	9.9	10.2	10.2	10.0	9.8	0.0	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008				6.4	6.7	6.2	5.8	6.5	6.6	6.2	5.8	0.1	-0.1	0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013		12.6	12.7	12.5	12.3	12.7	12.6	12.5	12.3	0.0	0.0	0.0	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013		n/a	n/a	n/a	n/a	12.6	12.6	12.4	12.2	-0.1	-0.1	-0.1	-0.1

EB Mainline and Toll Facility Vehicle Volume by Location

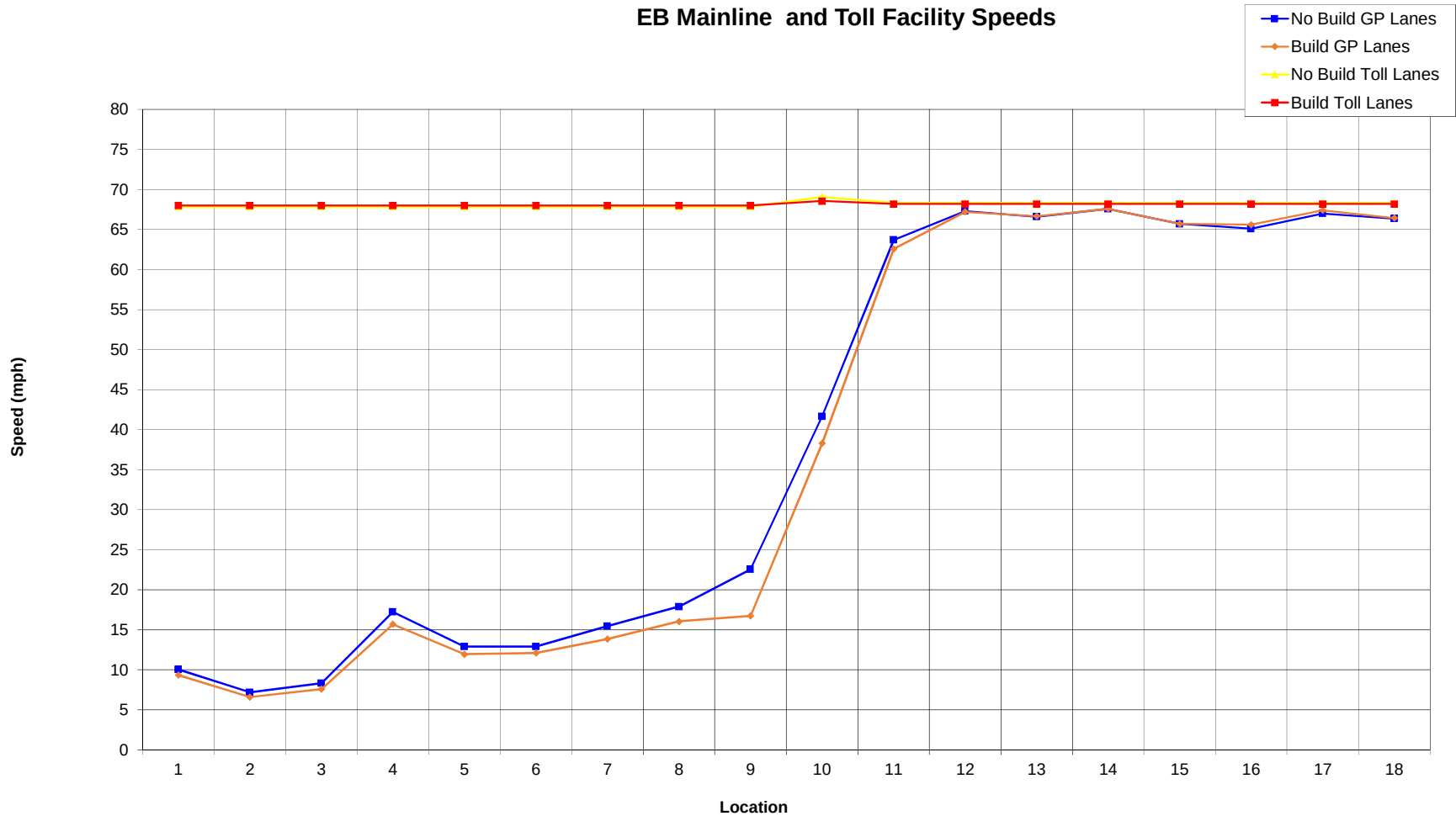


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



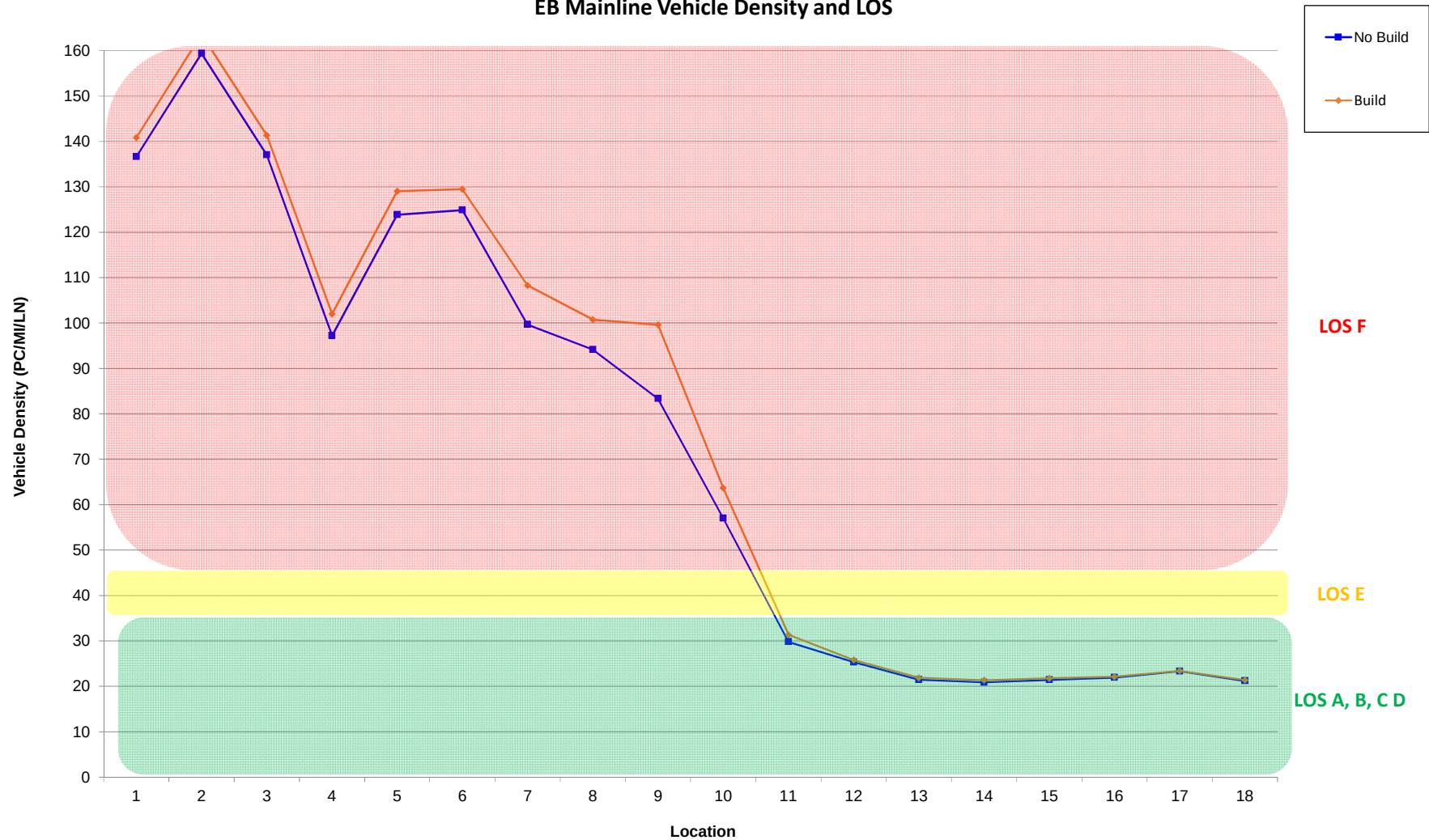
Charts 3-4 PM

EB Mainline and Toll Facility Speeds

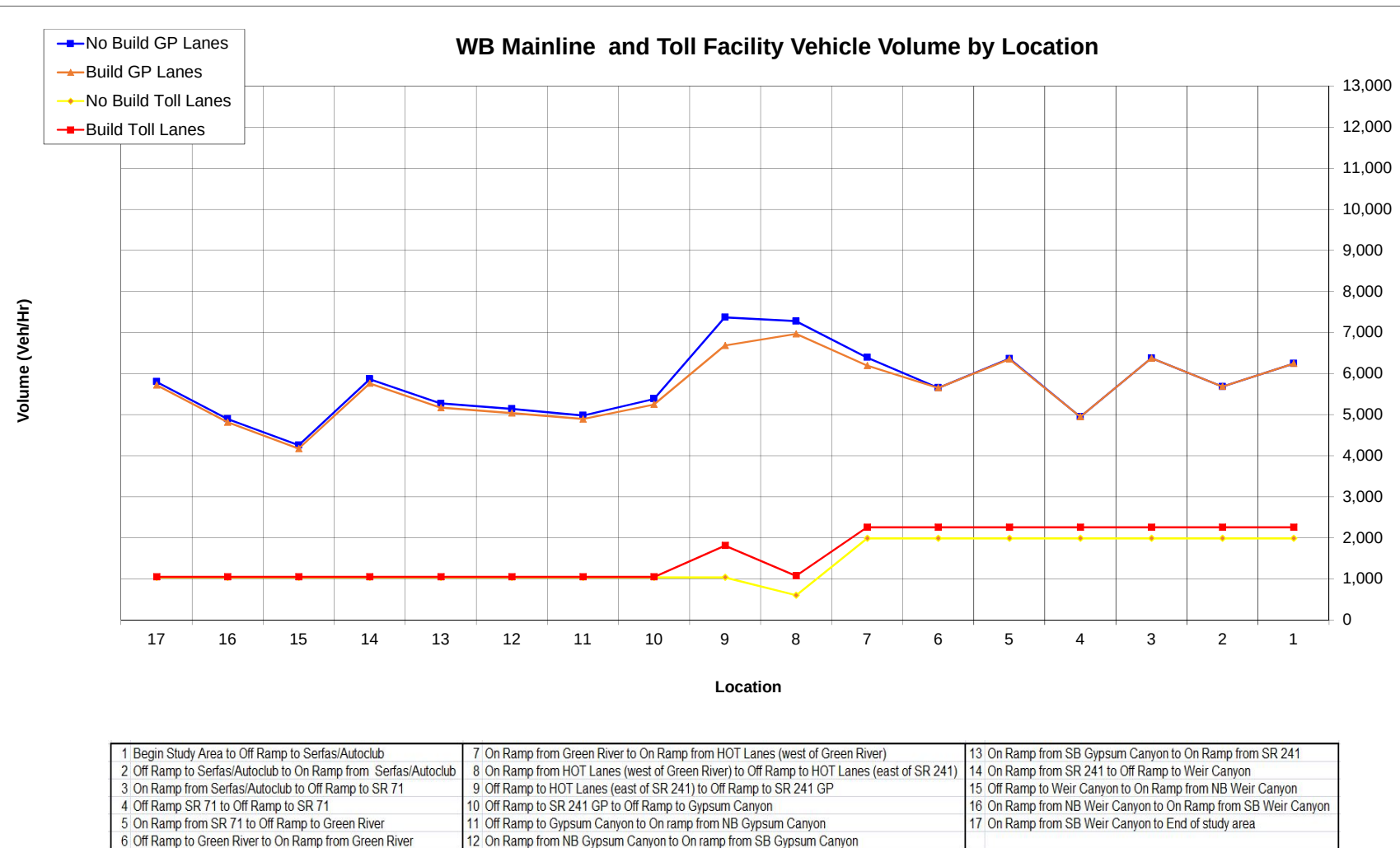


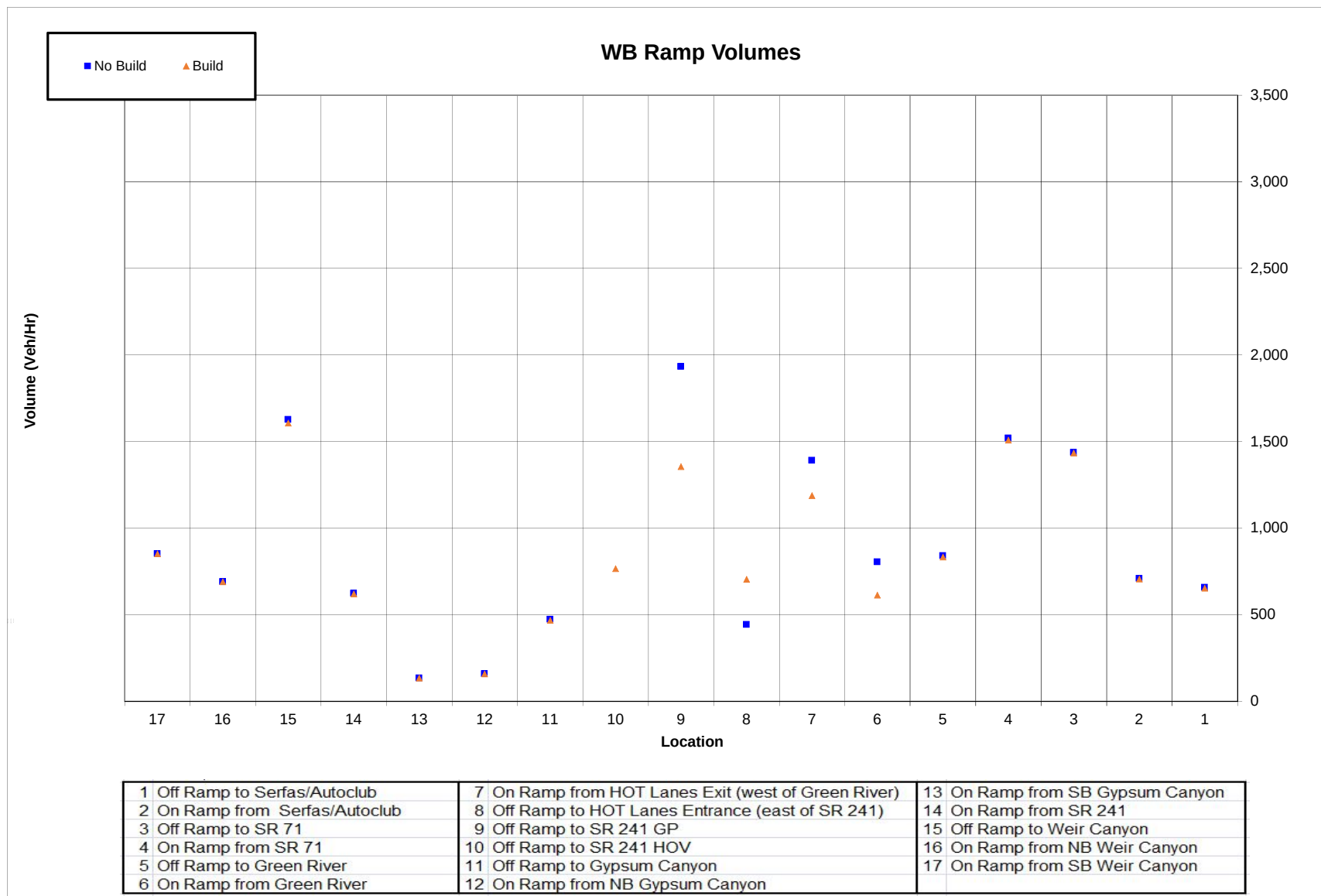
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

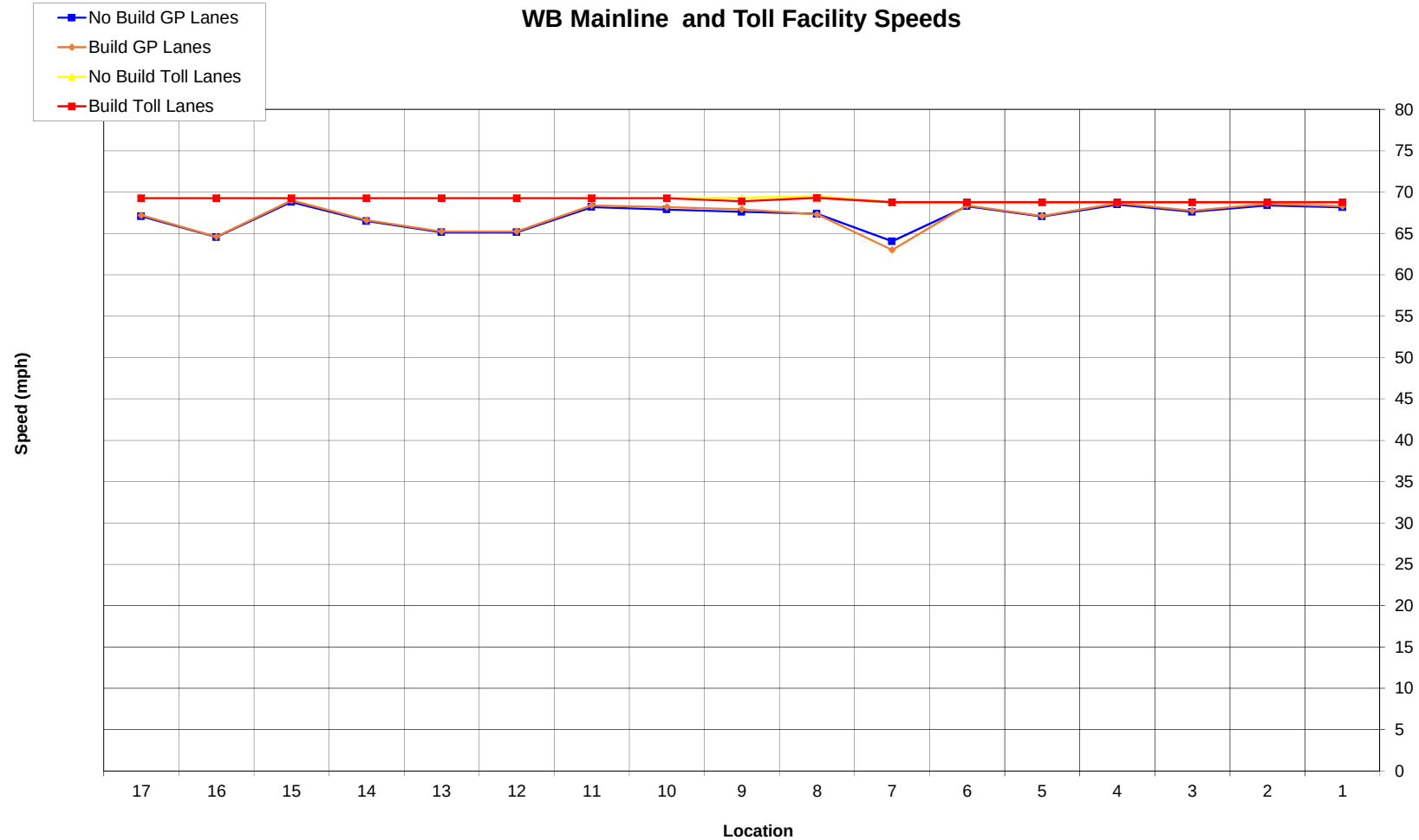


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

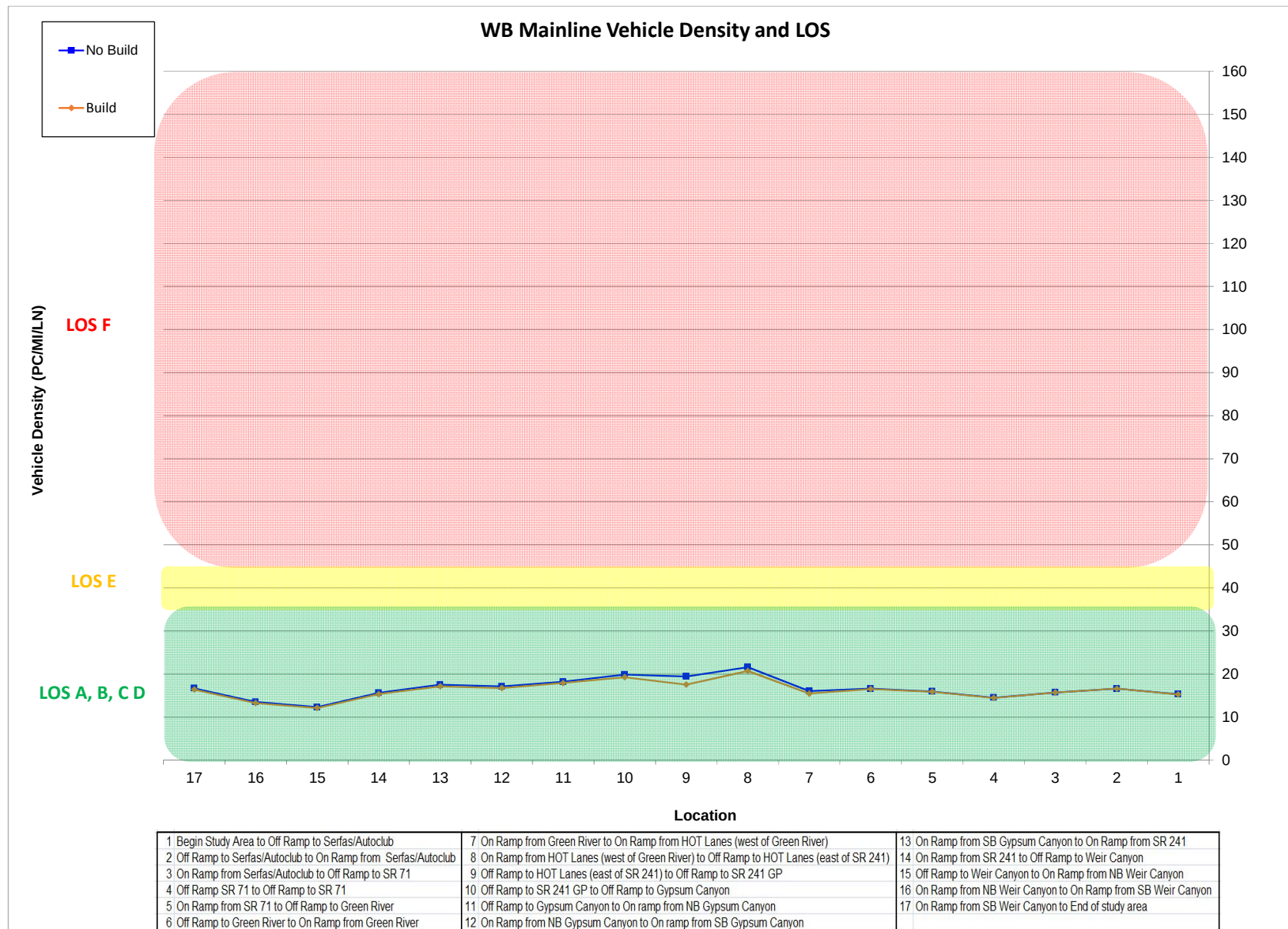




WB Mainline and Toll Facility Speeds

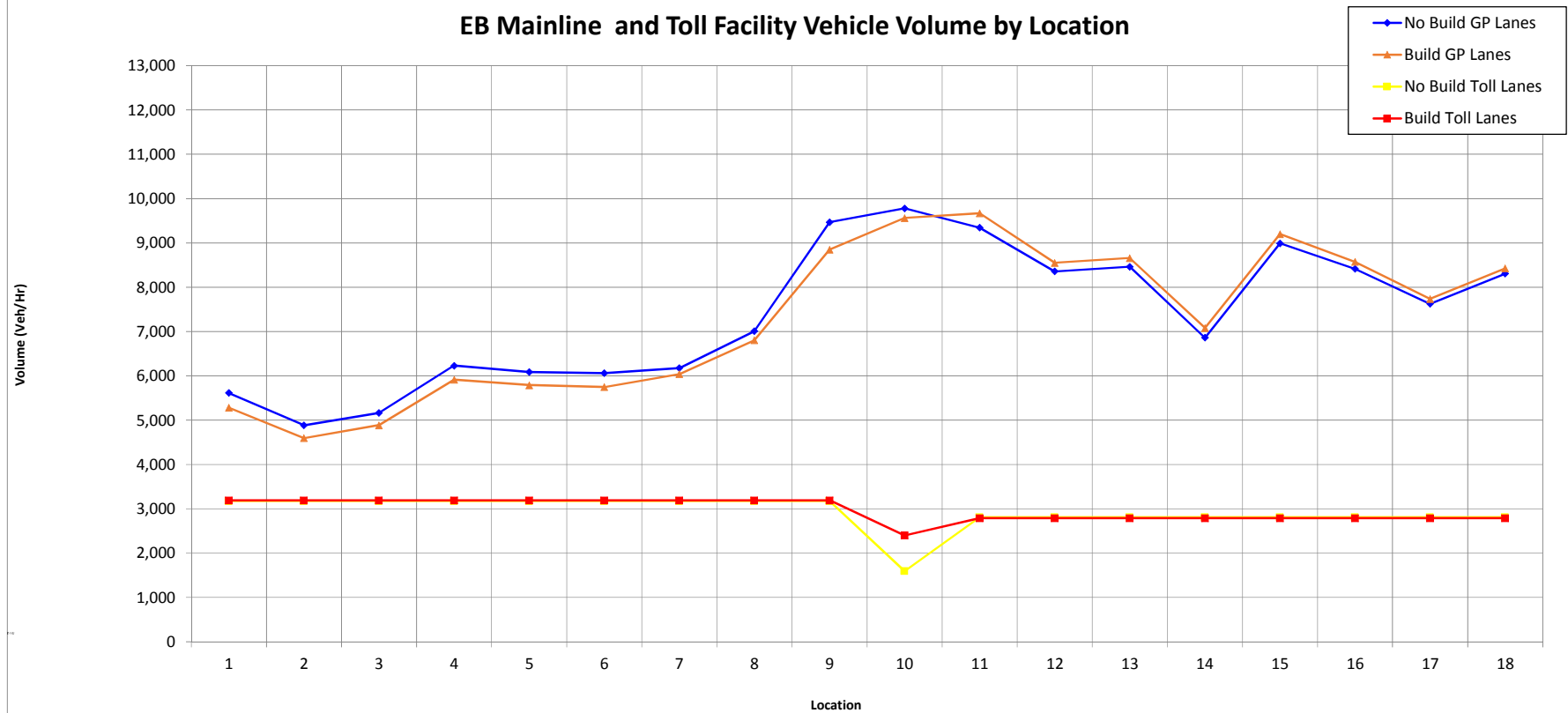


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

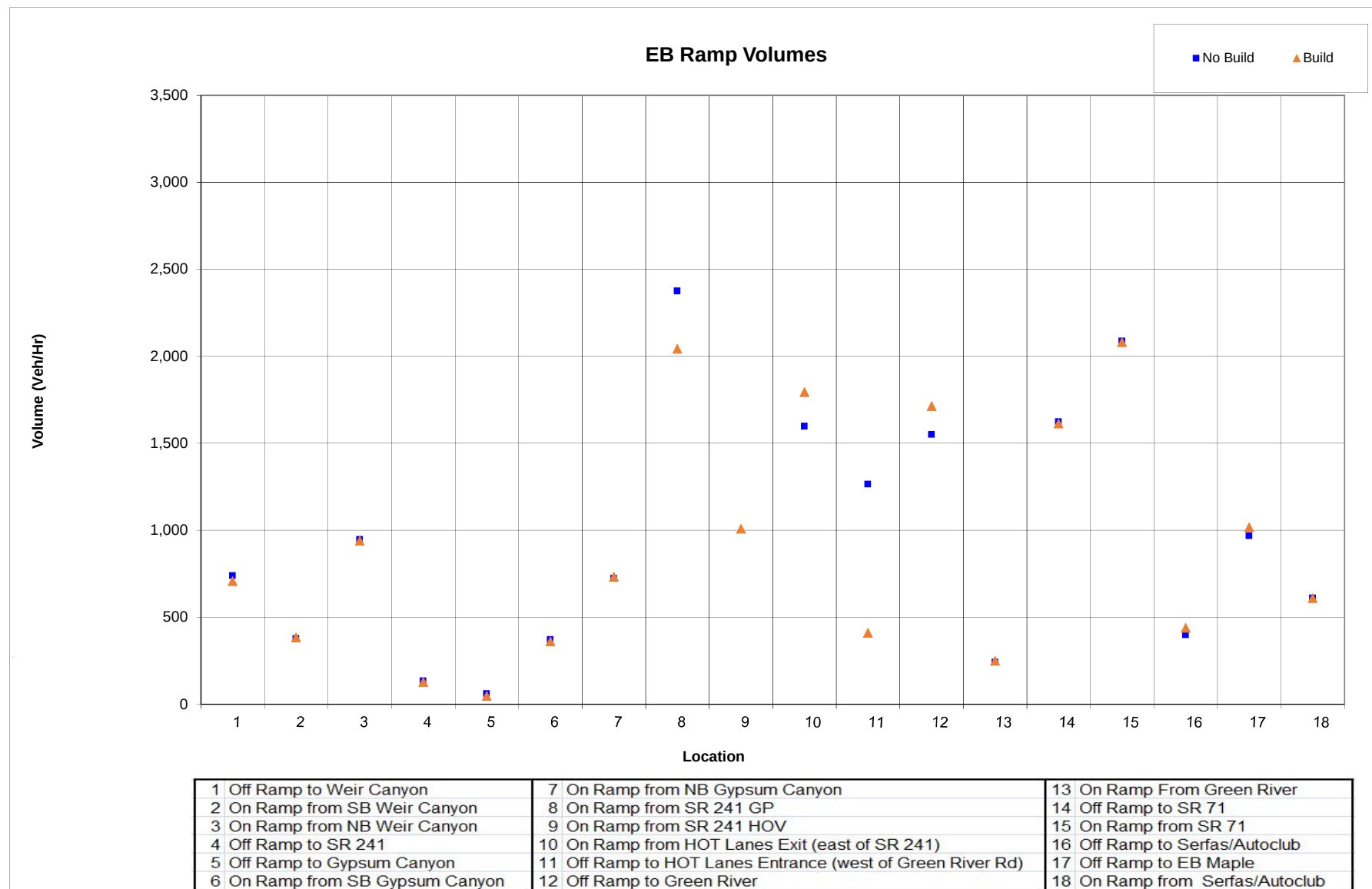


Charts 3-4 PM

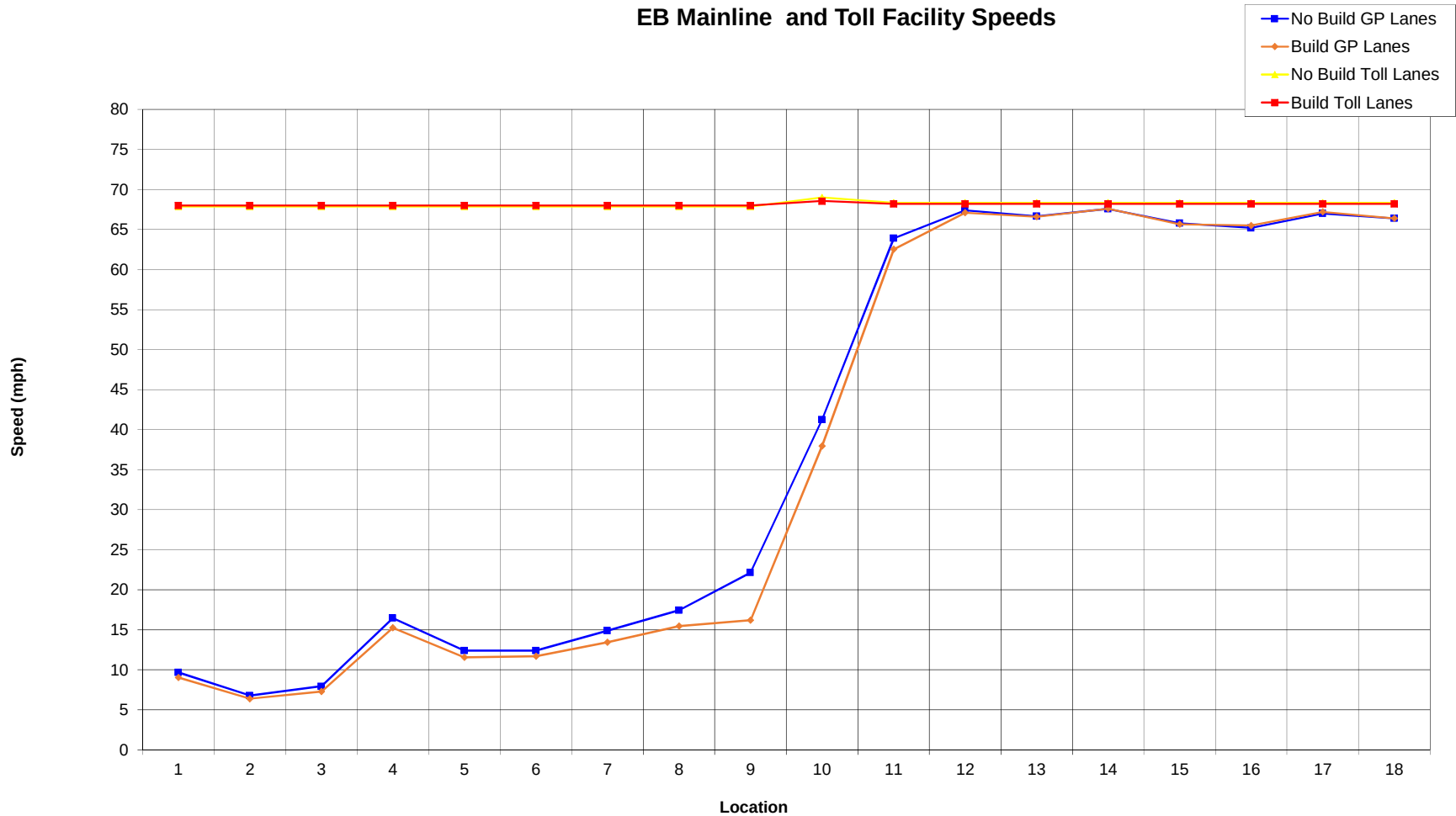
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

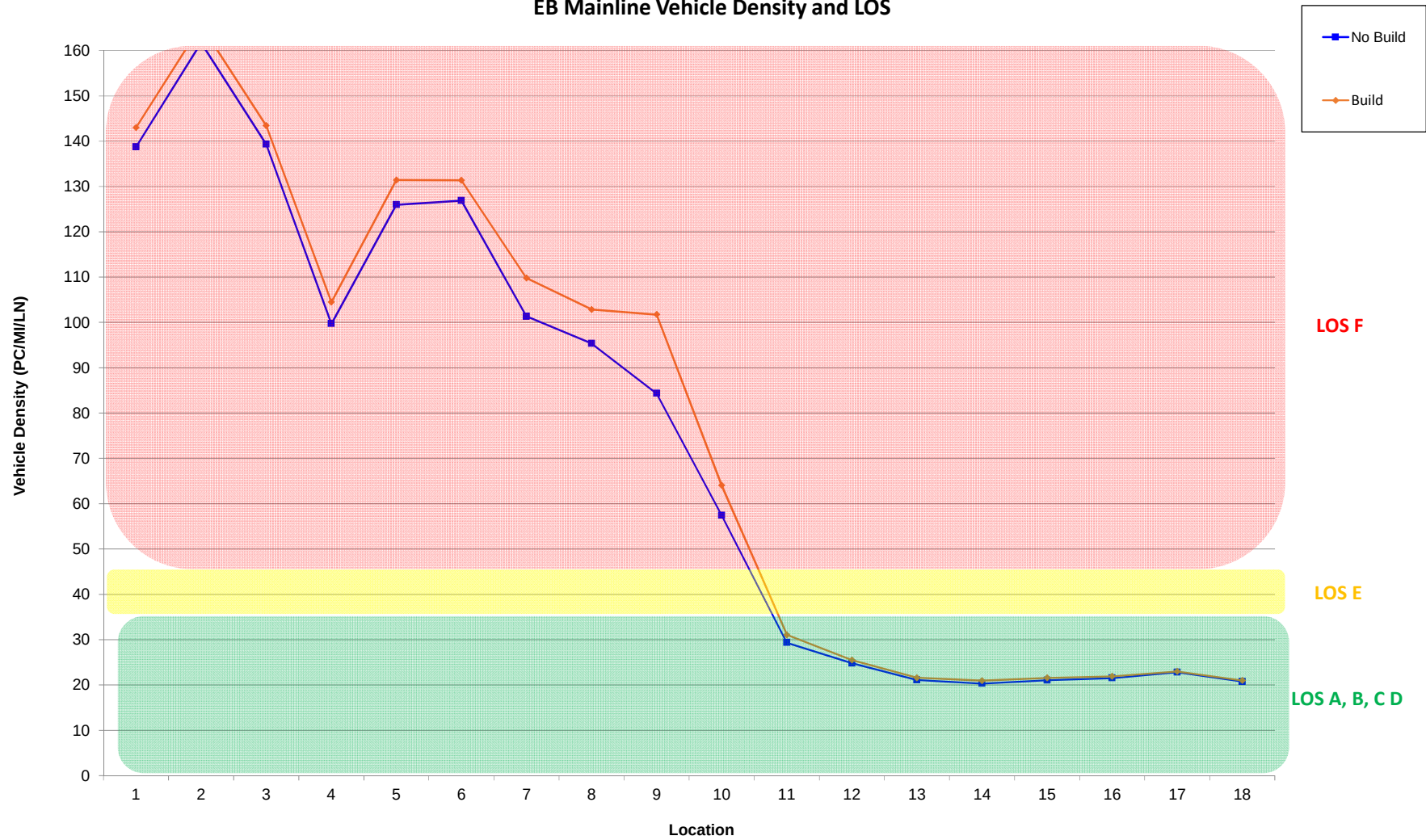


EB Mainline and Toll Facility Speeds

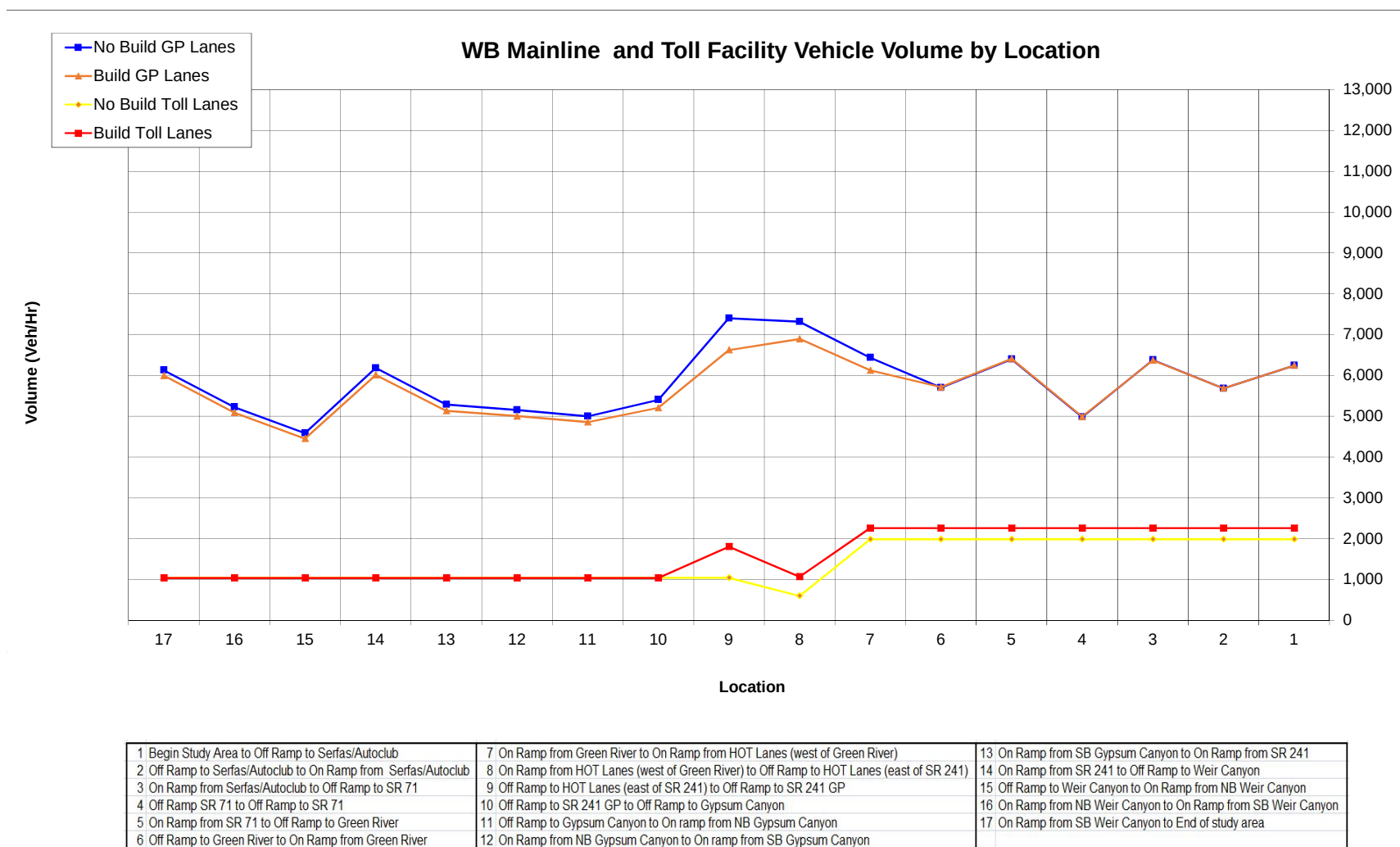


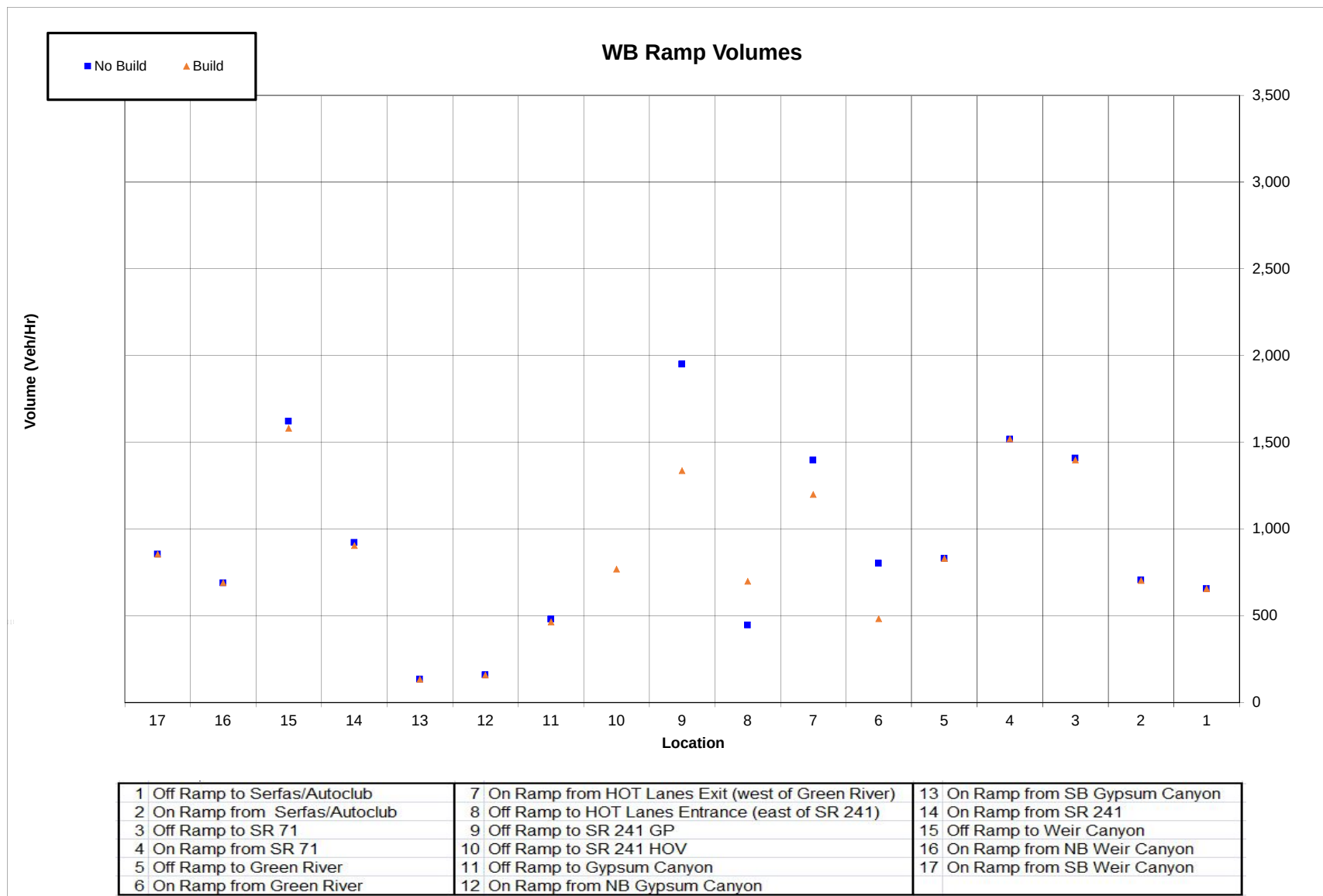
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



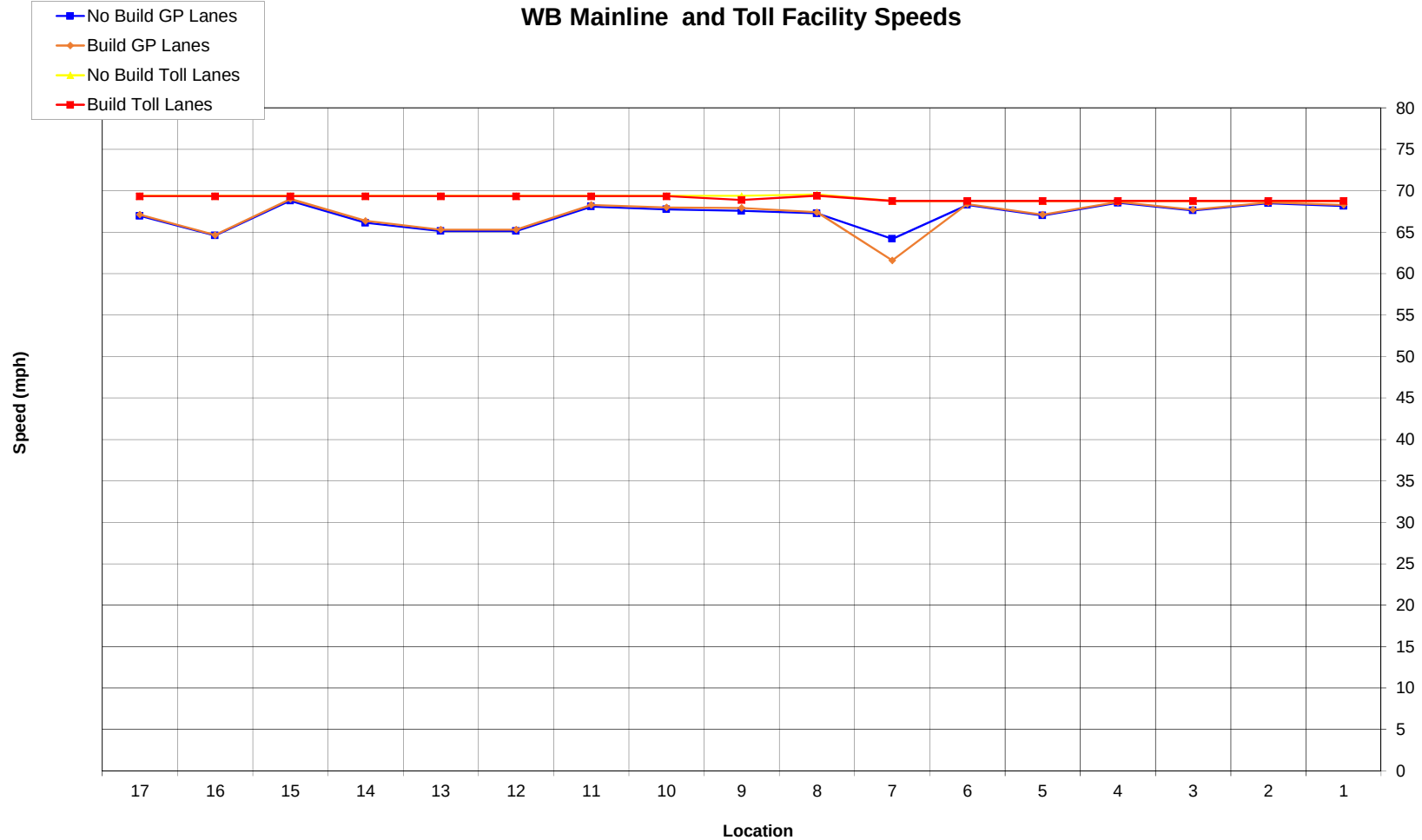
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



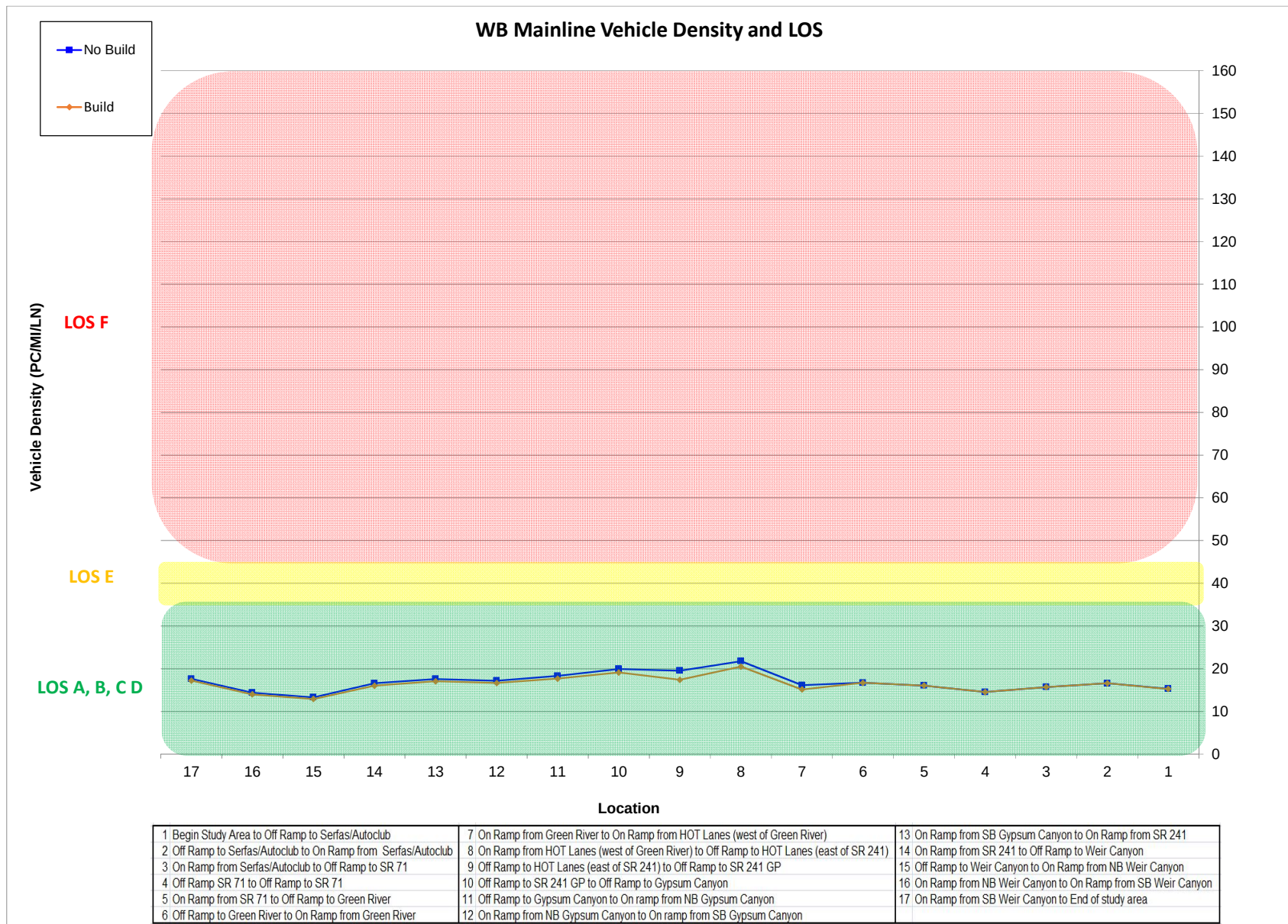


Charts 4-5 PM

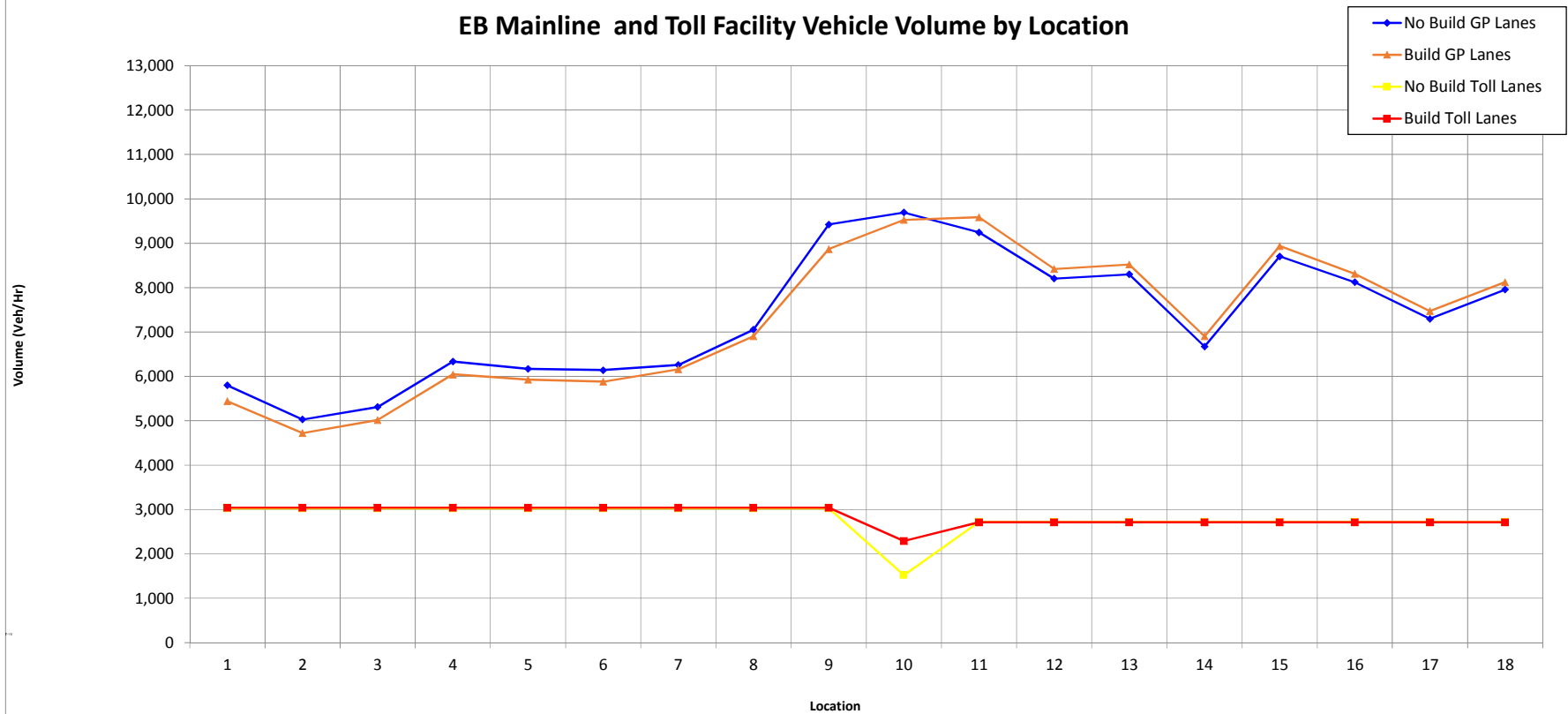
WB Mainline and Toll Facility Speeds



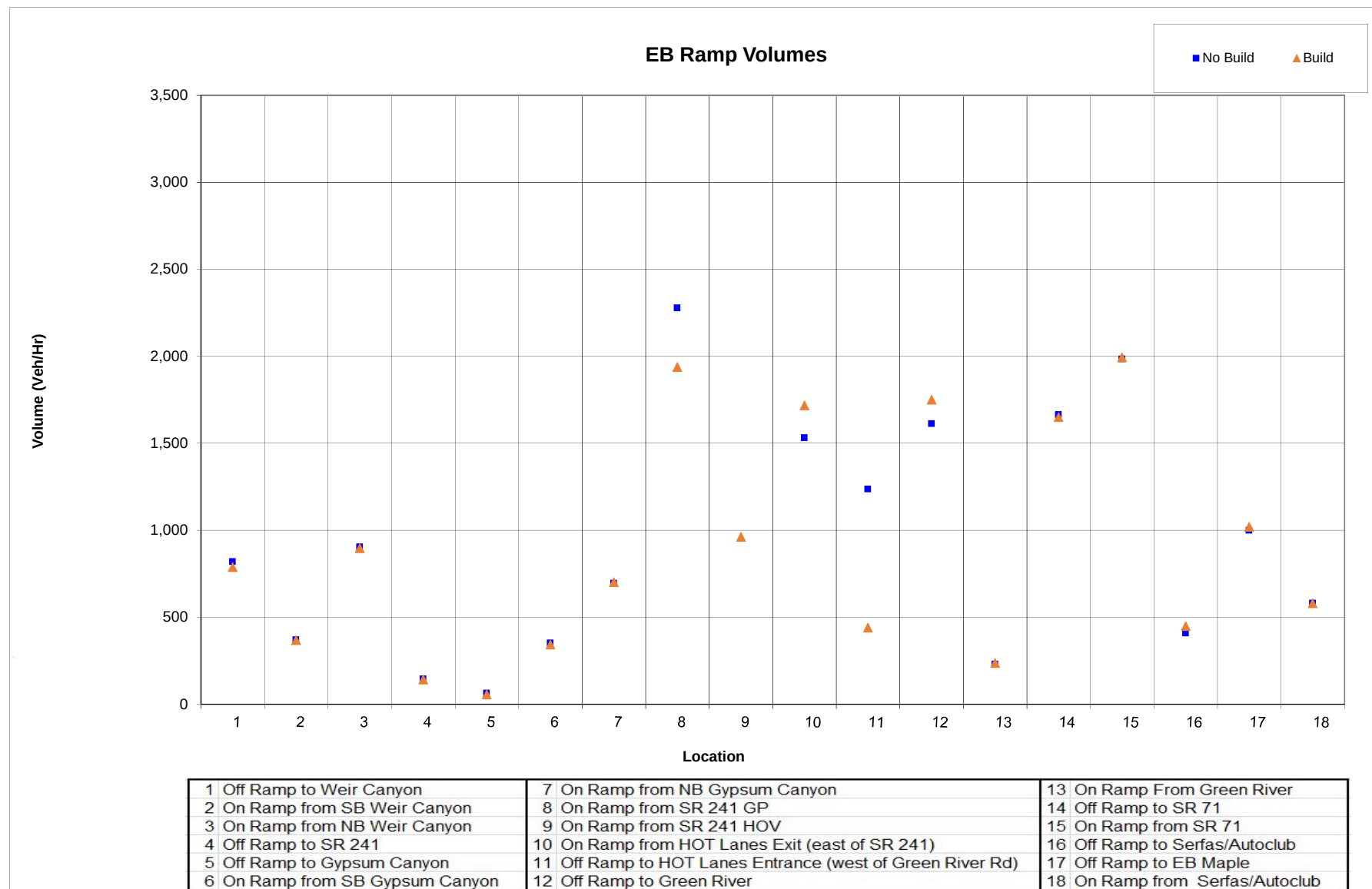
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



EB Mainline and Toll Facility Vehicle Volume by Location

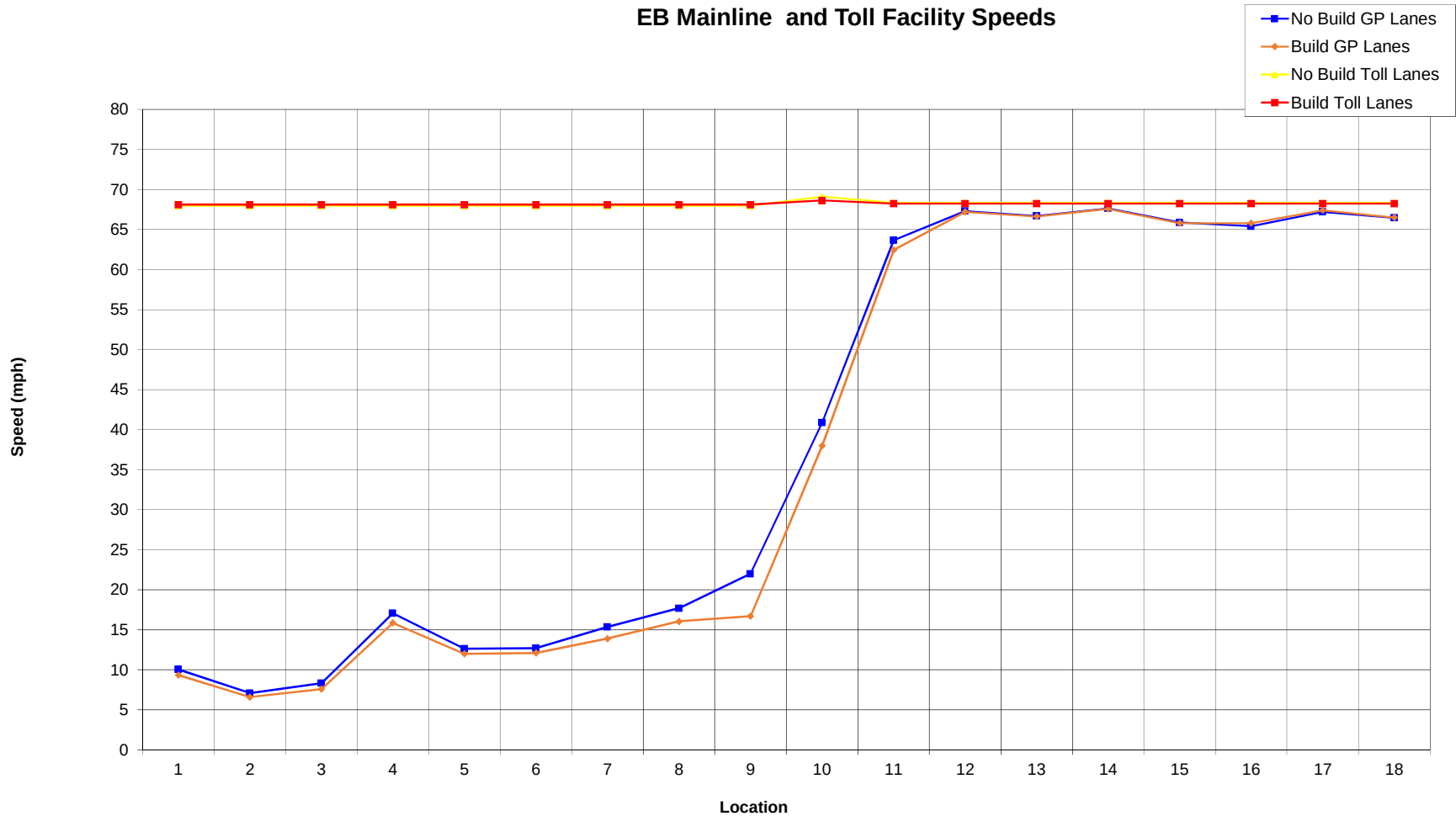


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



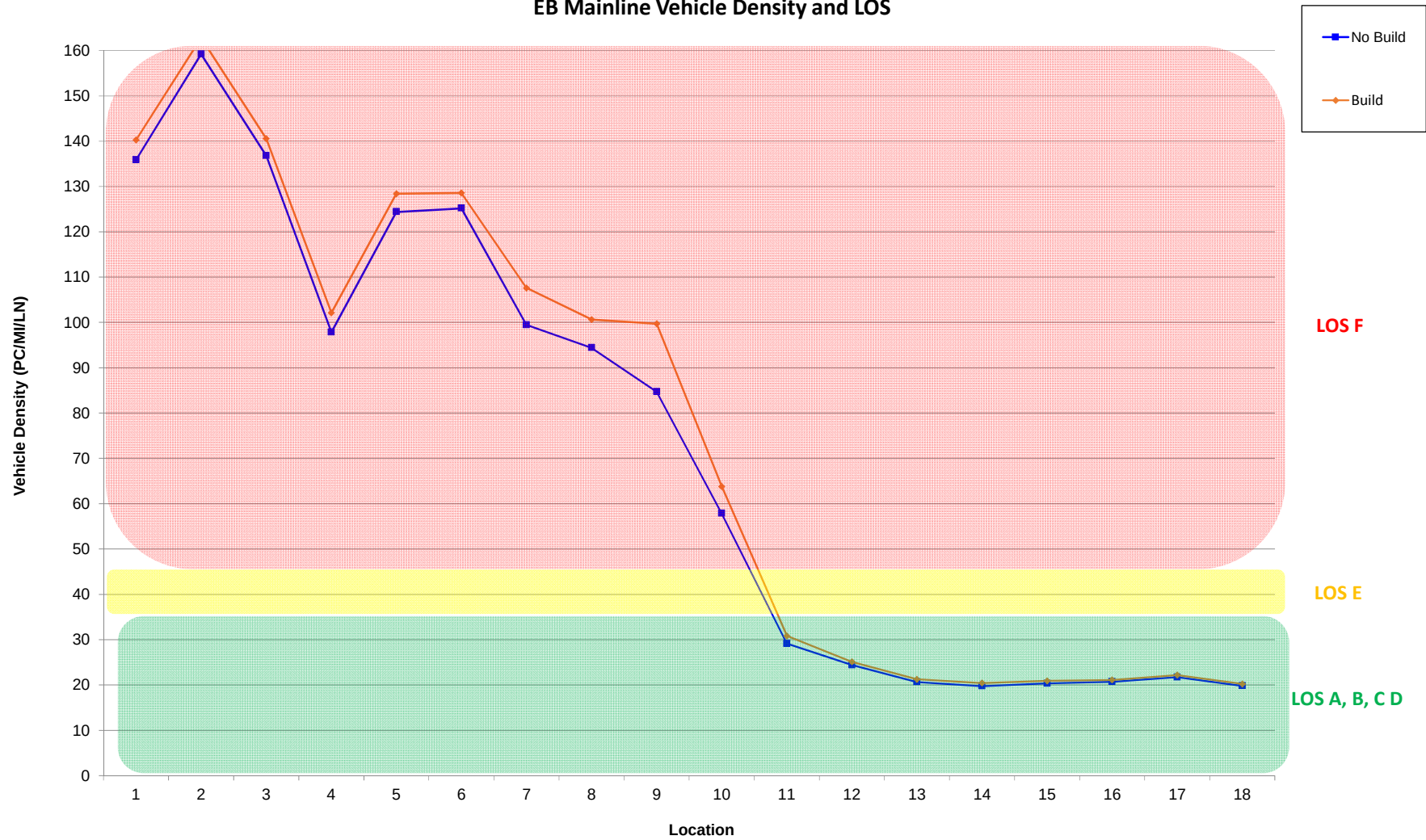
Charts 5-6 PM

EB Mainline and Toll Facility Speeds

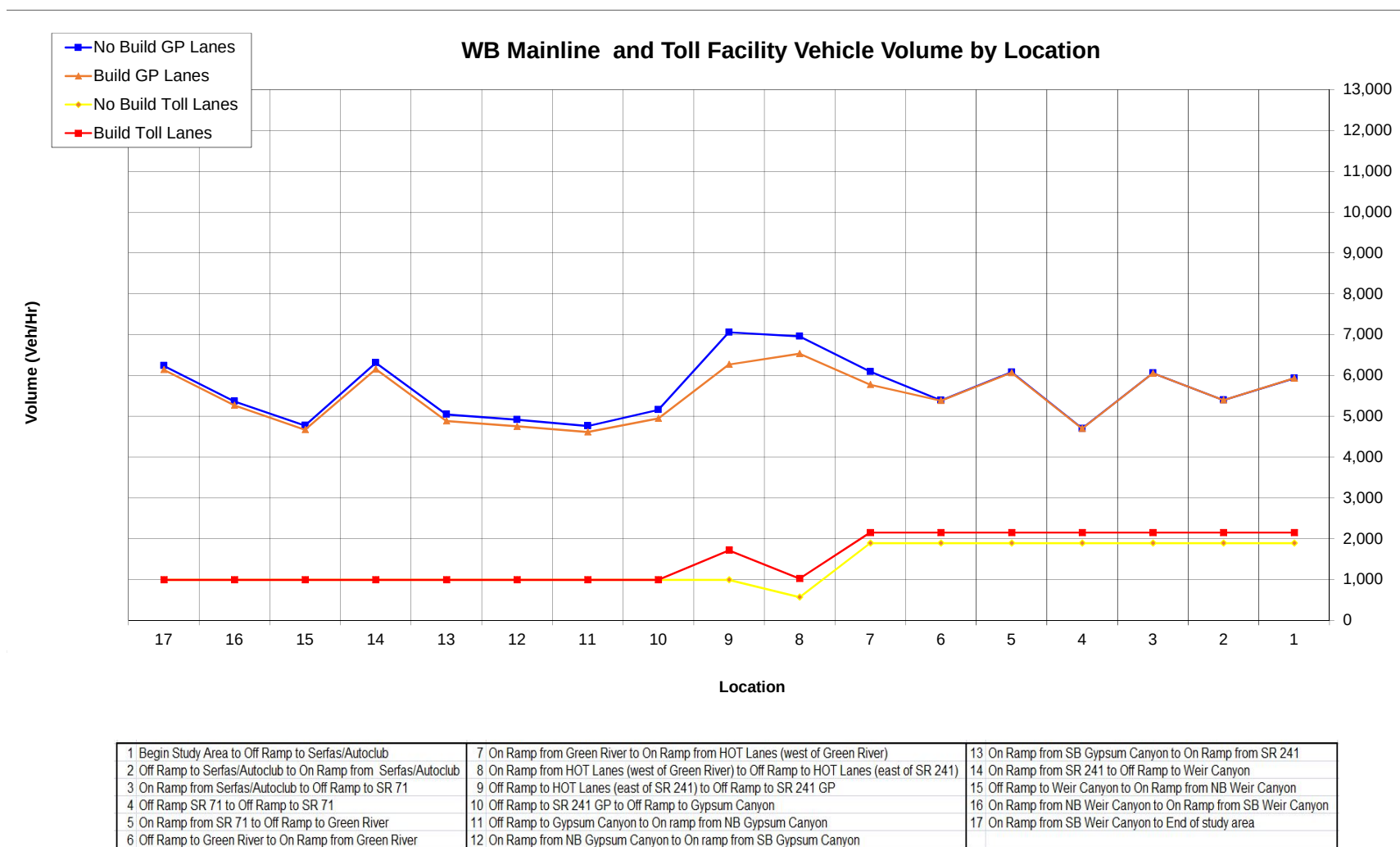


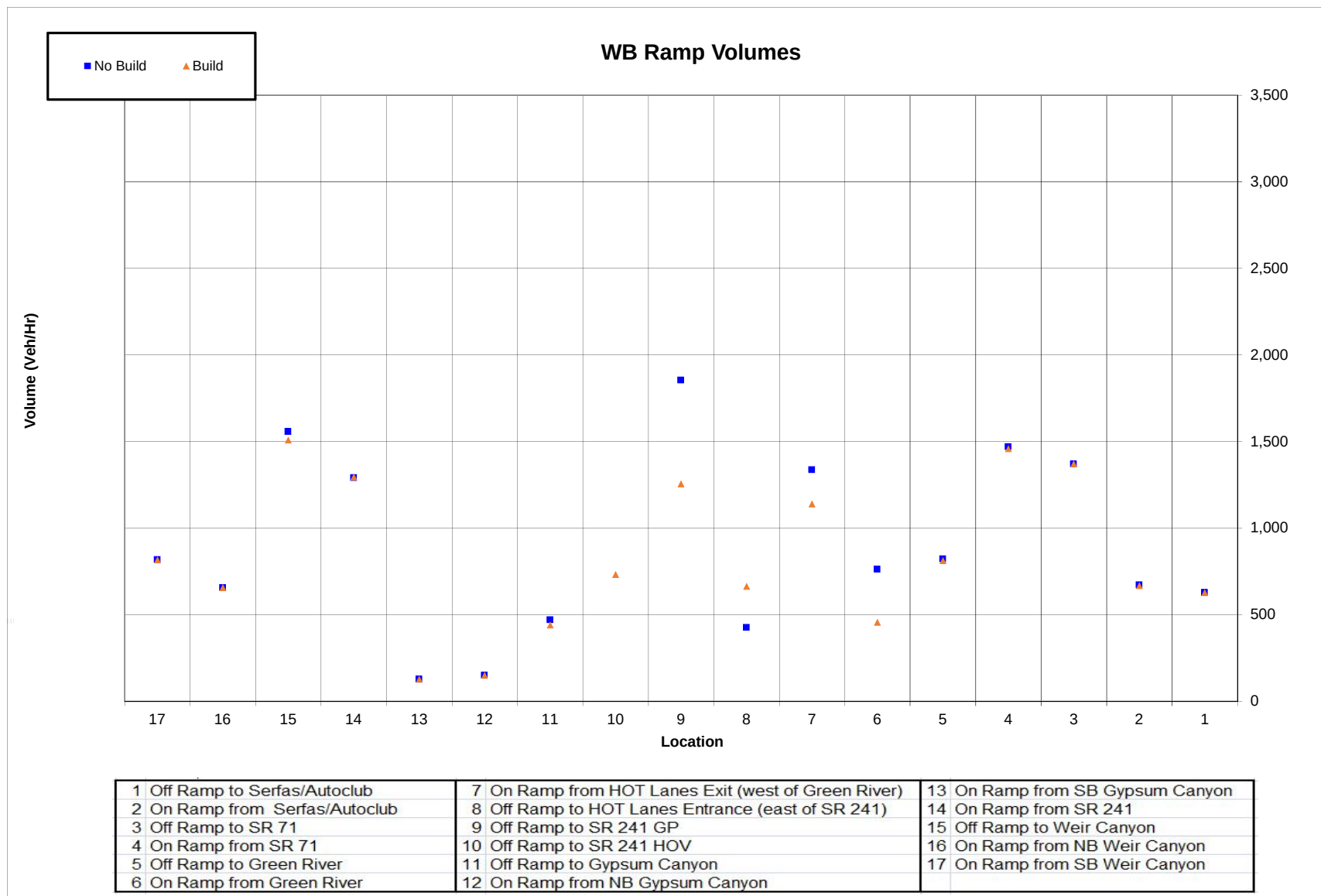
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



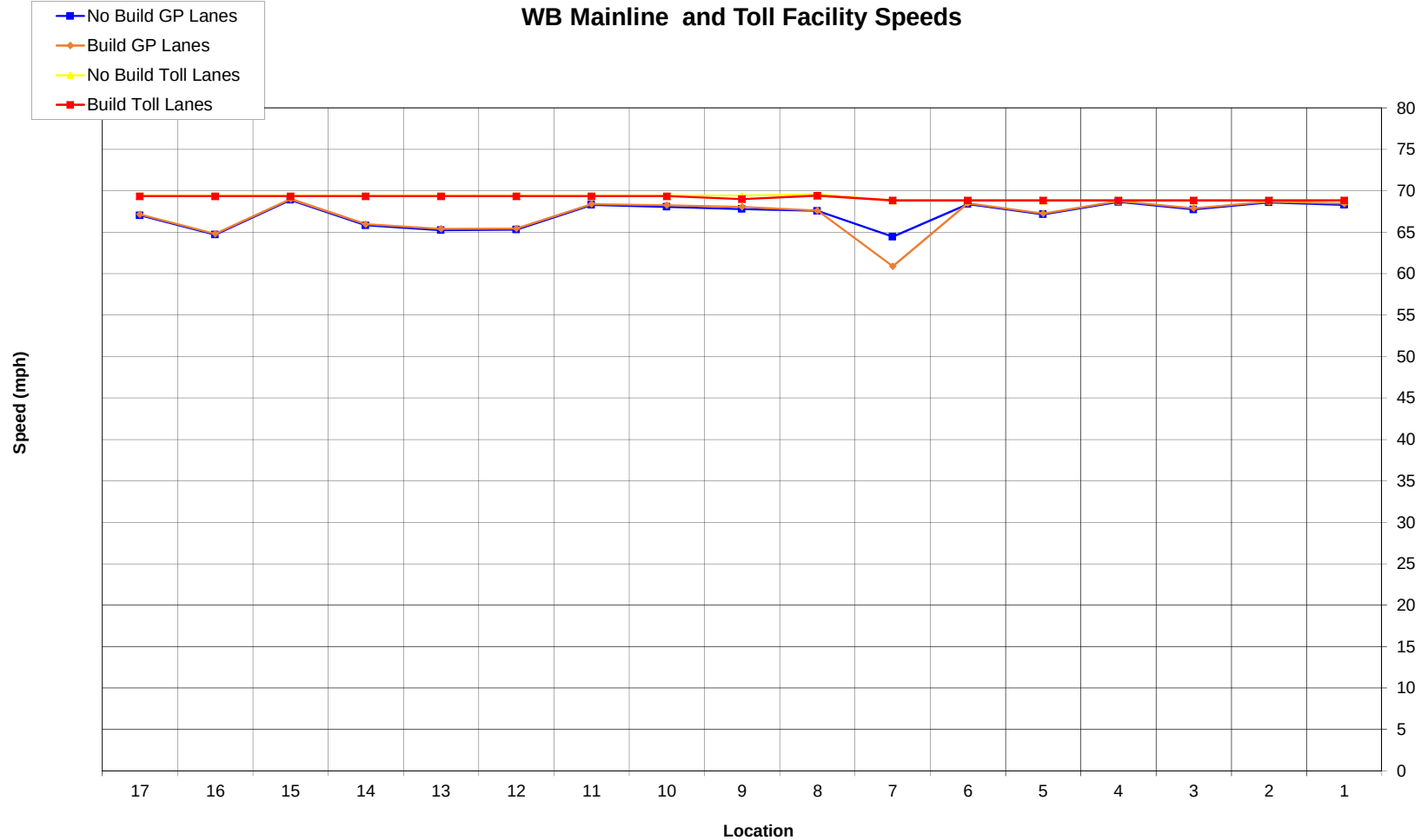
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



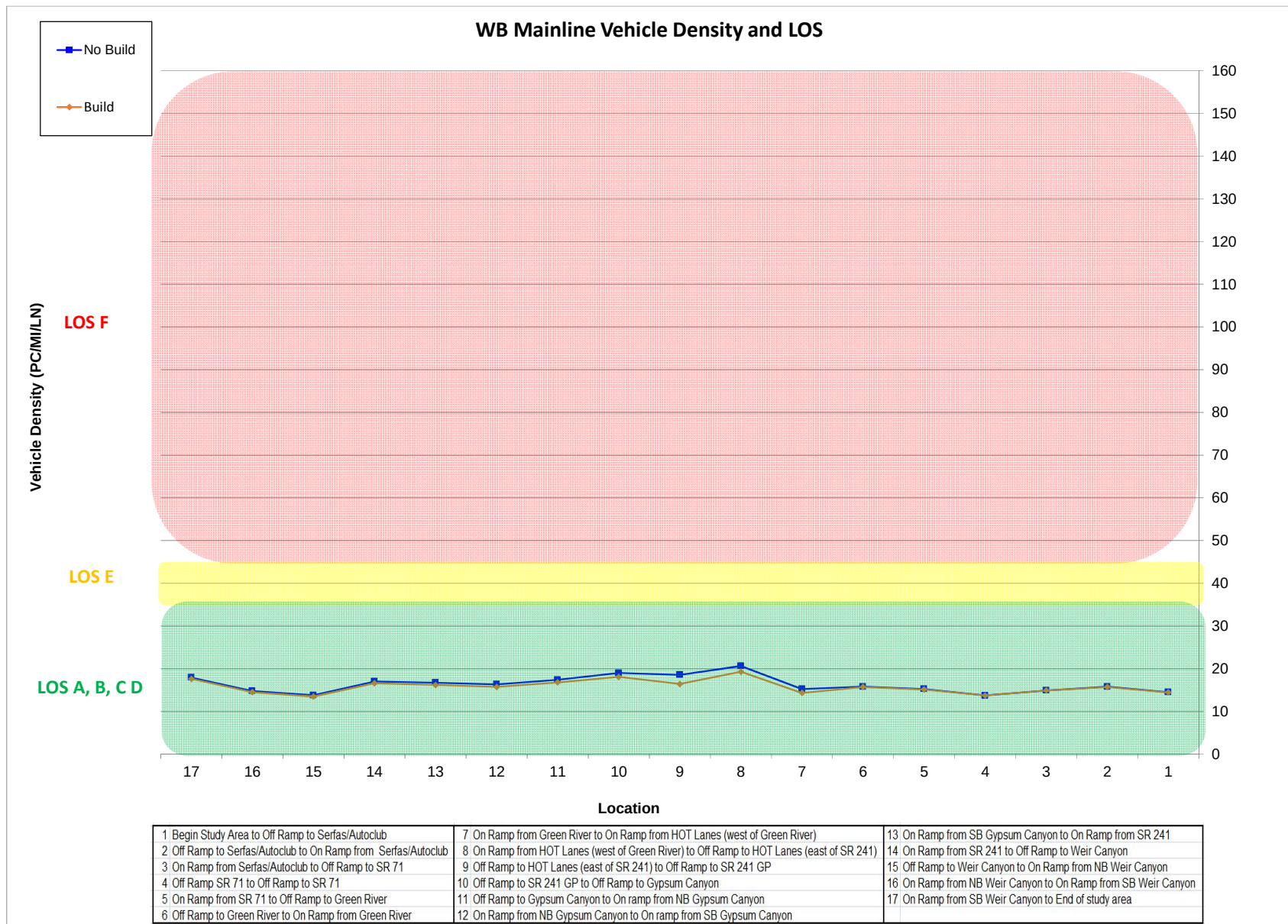


Charts 5-6 PM

WB Mainline and Toll Facility Speeds

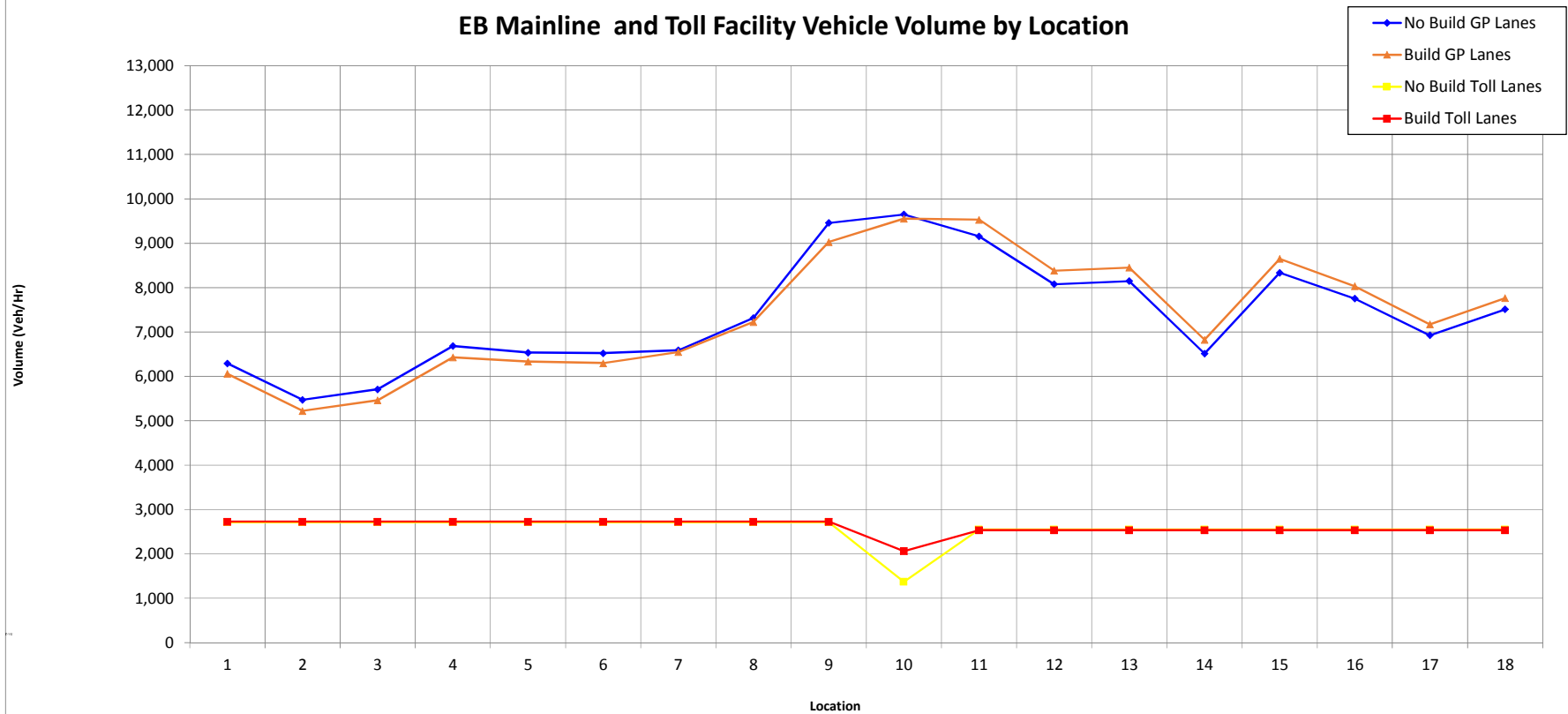


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

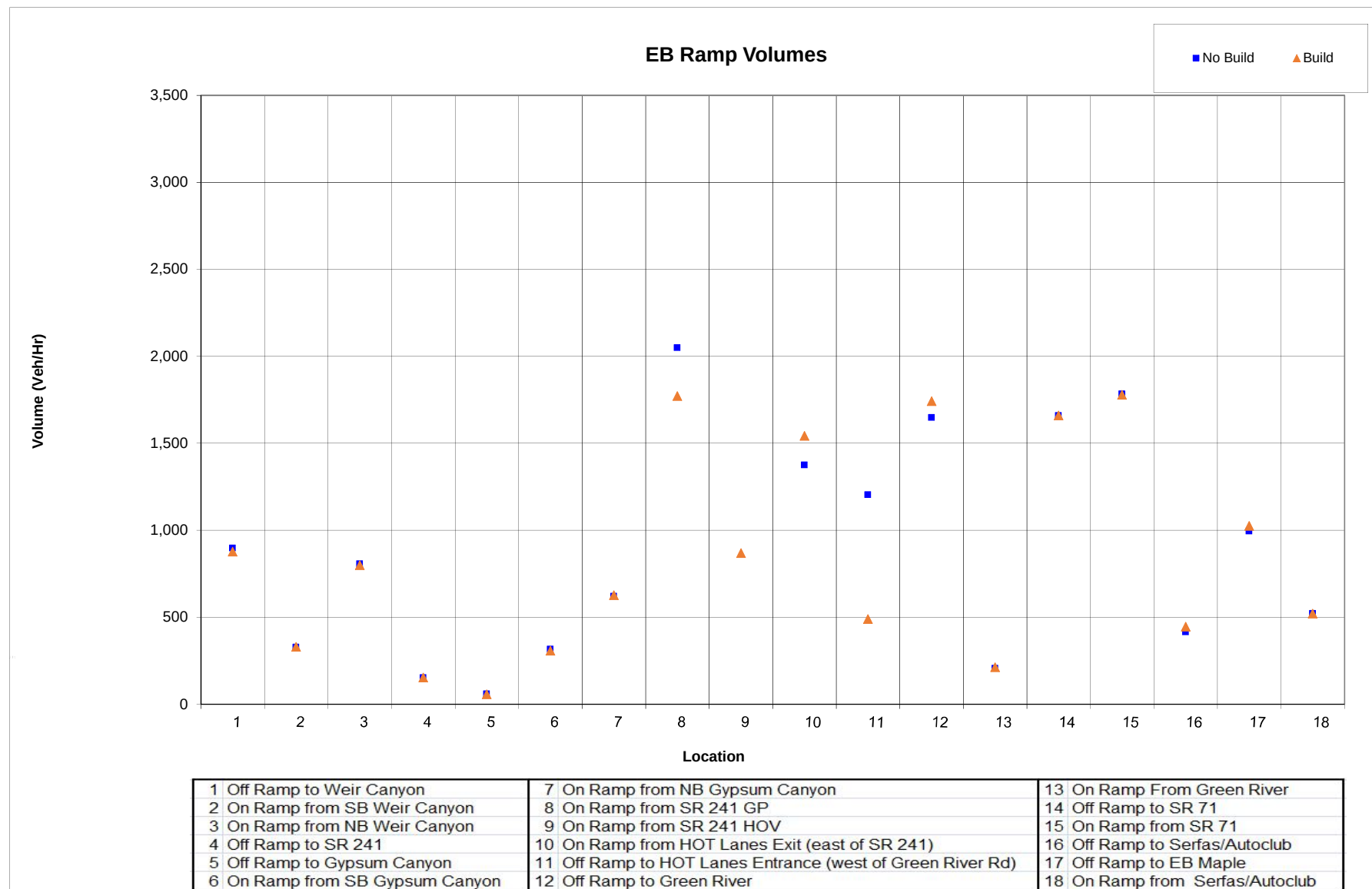


Charts 5-6 PM

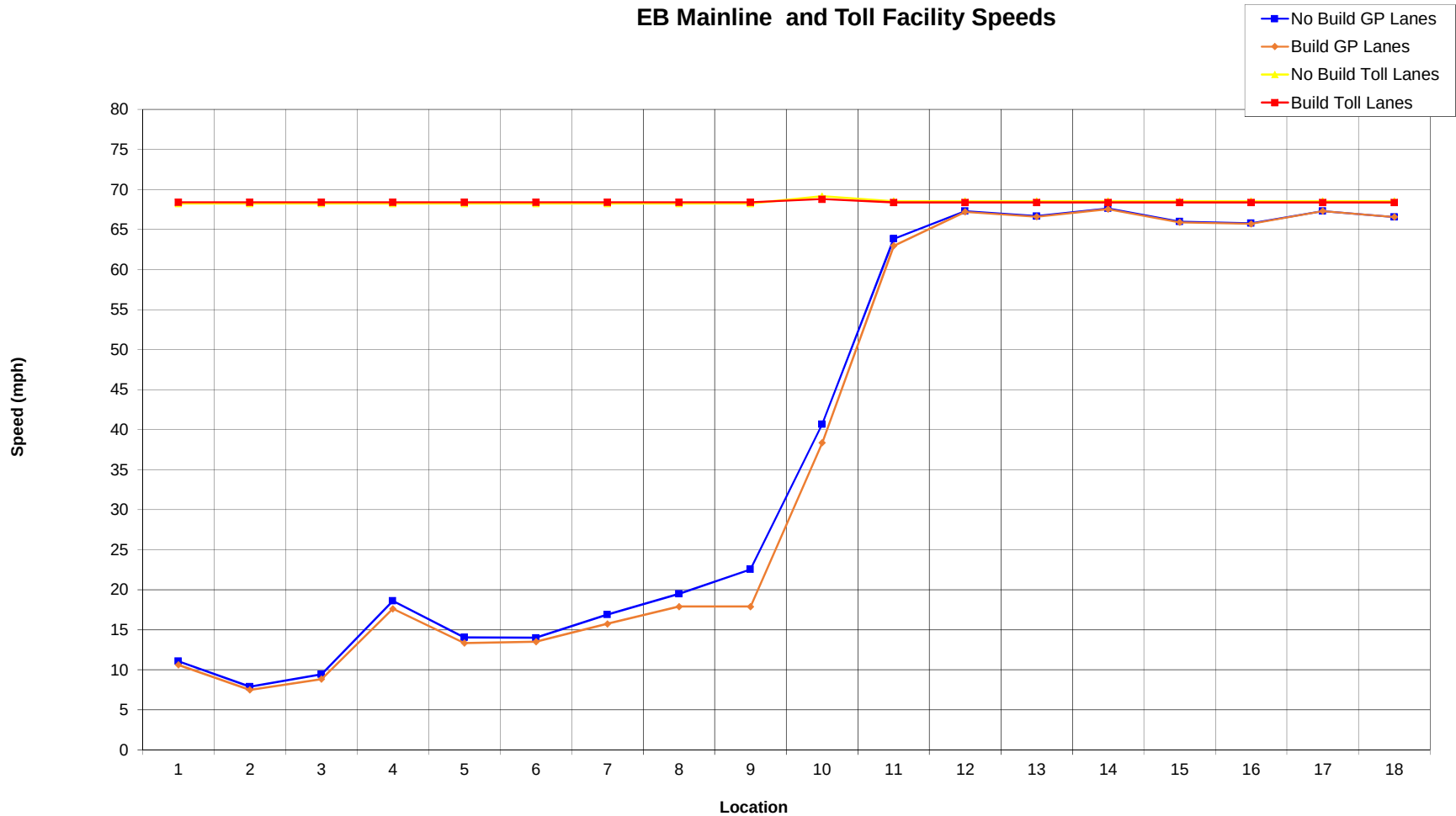
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

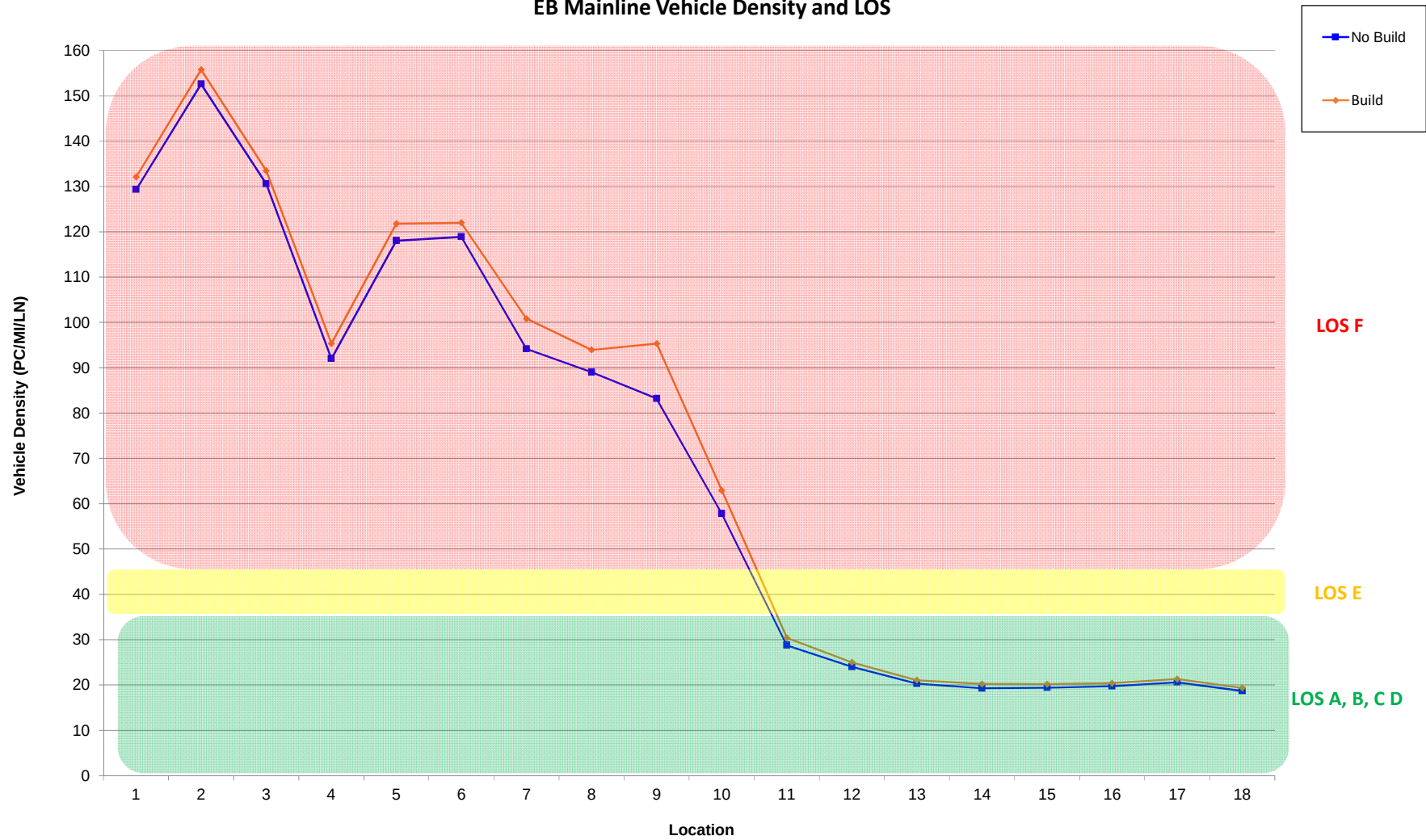


EB Mainline and Toll Facility Speeds

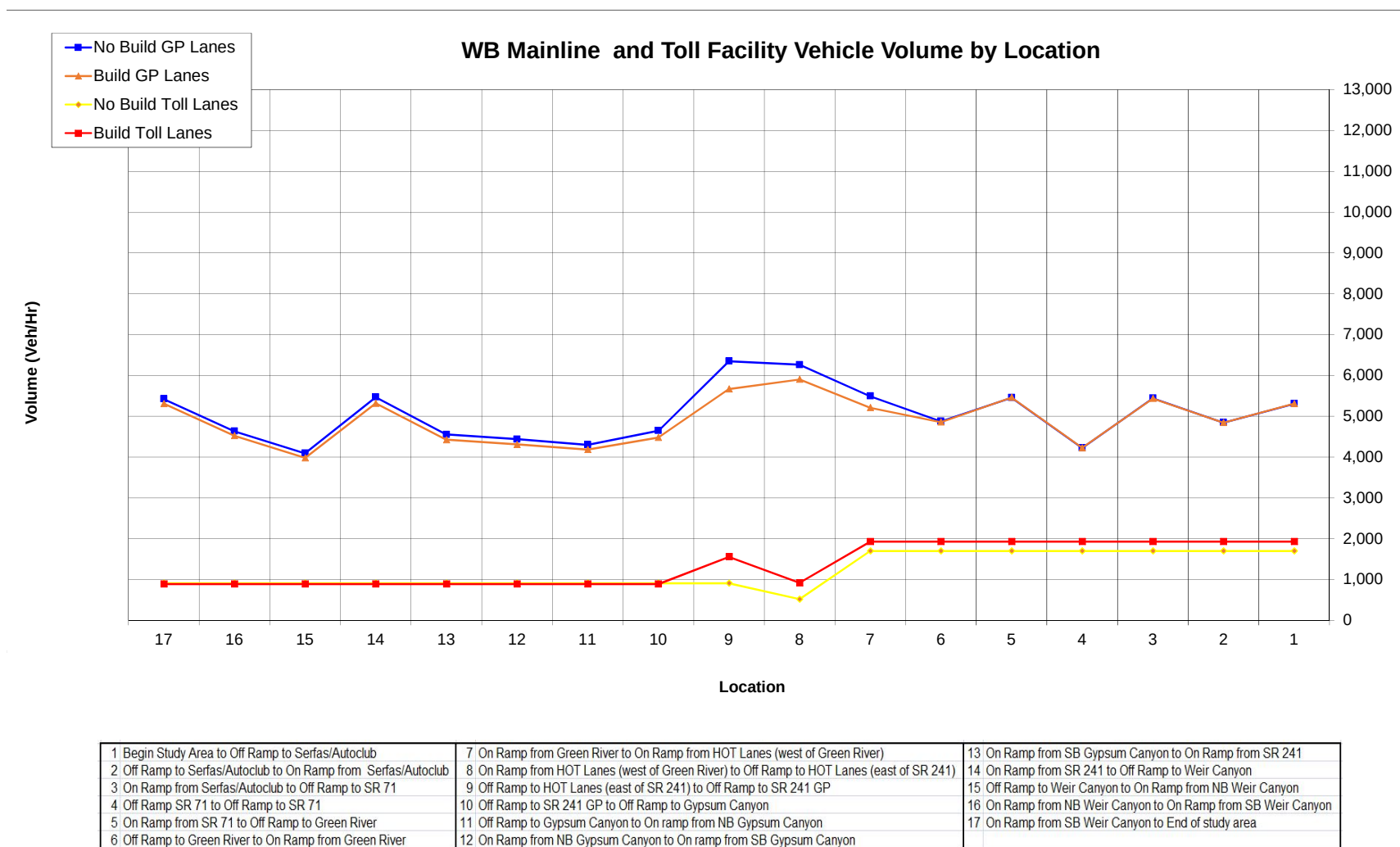


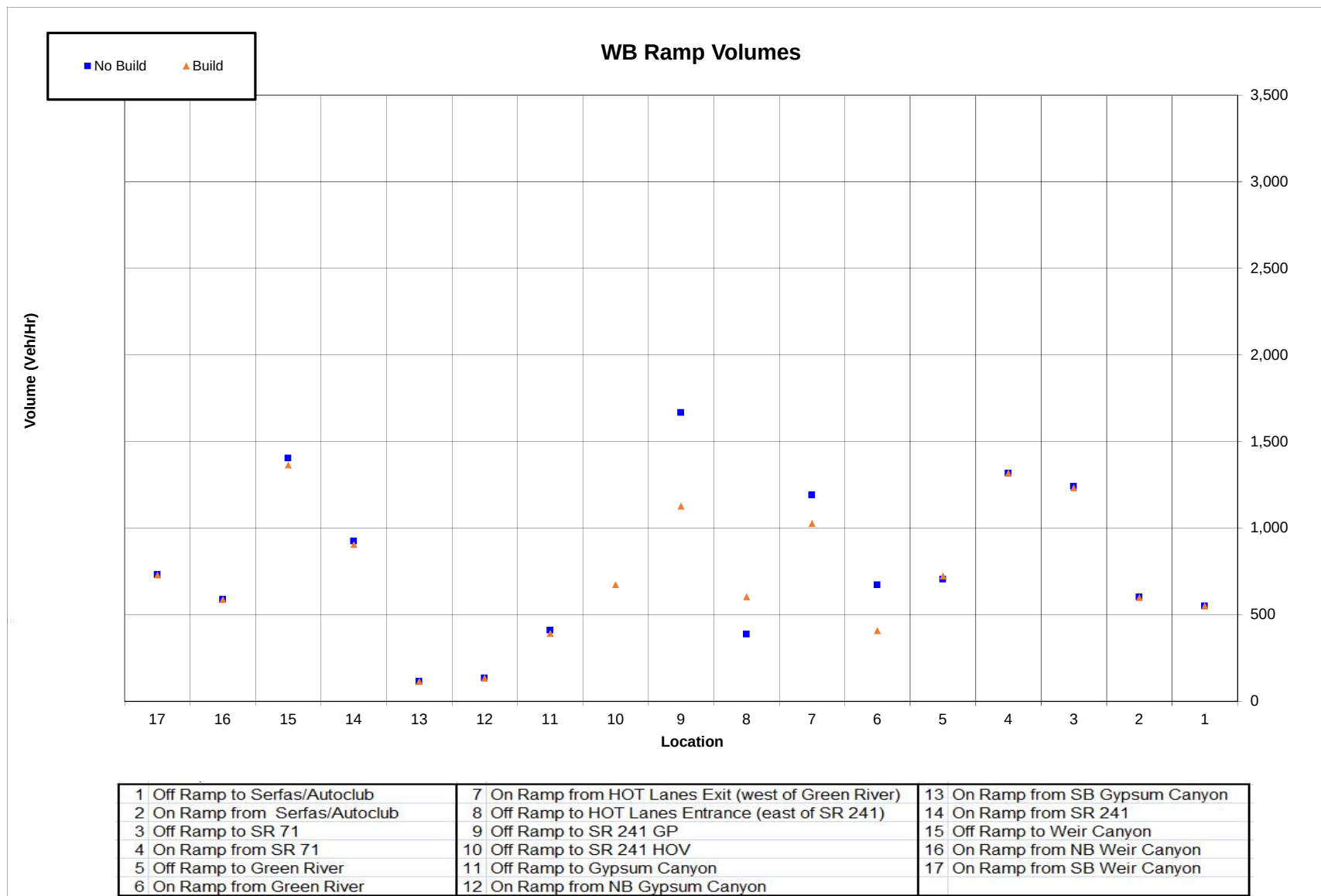
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



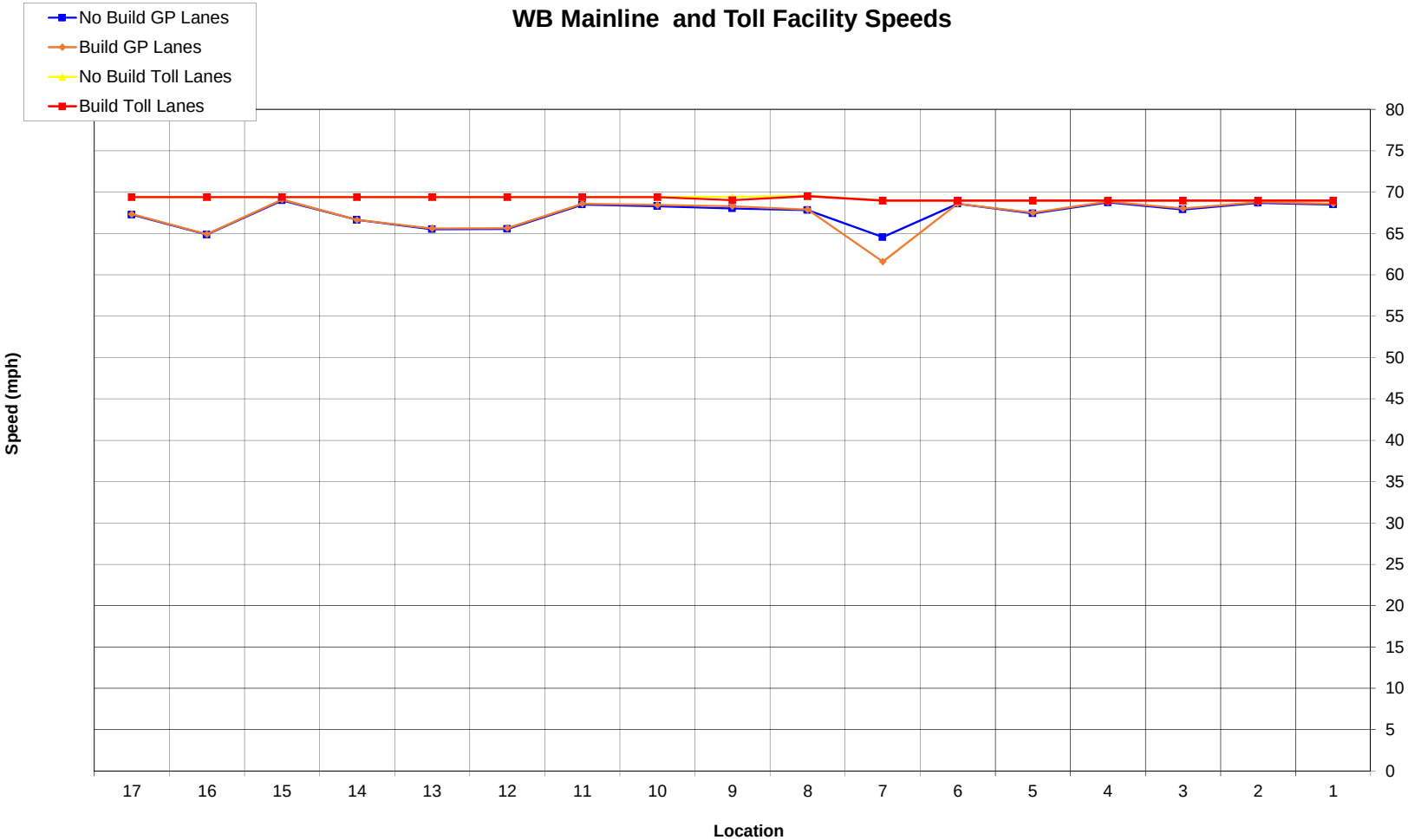
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 On Ramp From Green River to Off Ramp to SR 71
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 Off Ramp to SR 71 to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to On Ramp From Green River	18 On Ramp from Serfas/Autoclub to End of Study Area



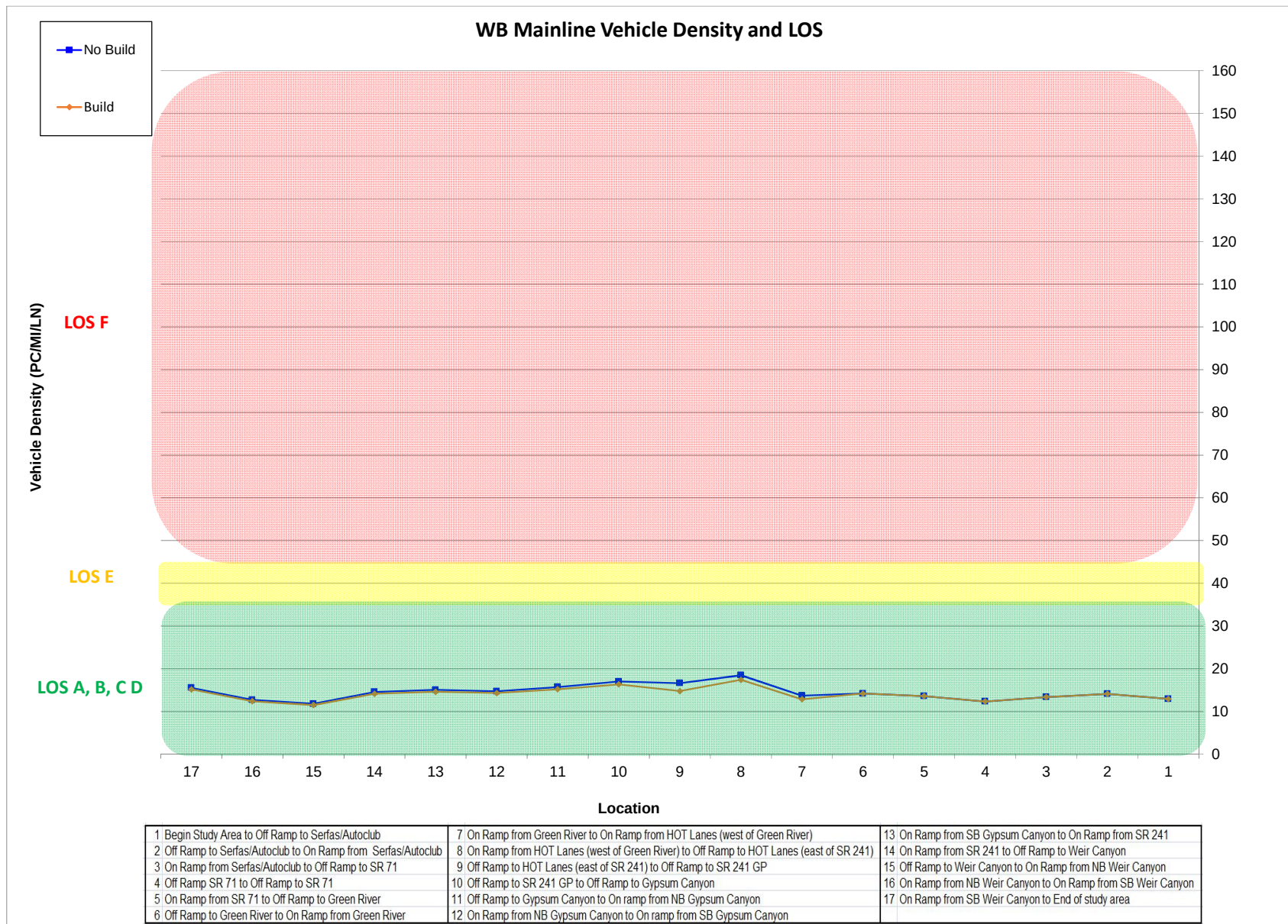


Charts 6-7 PM

WB Mainline and Toll Facility Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



Appendix F
VISSIM Summary of Results
2040 Build Conditions

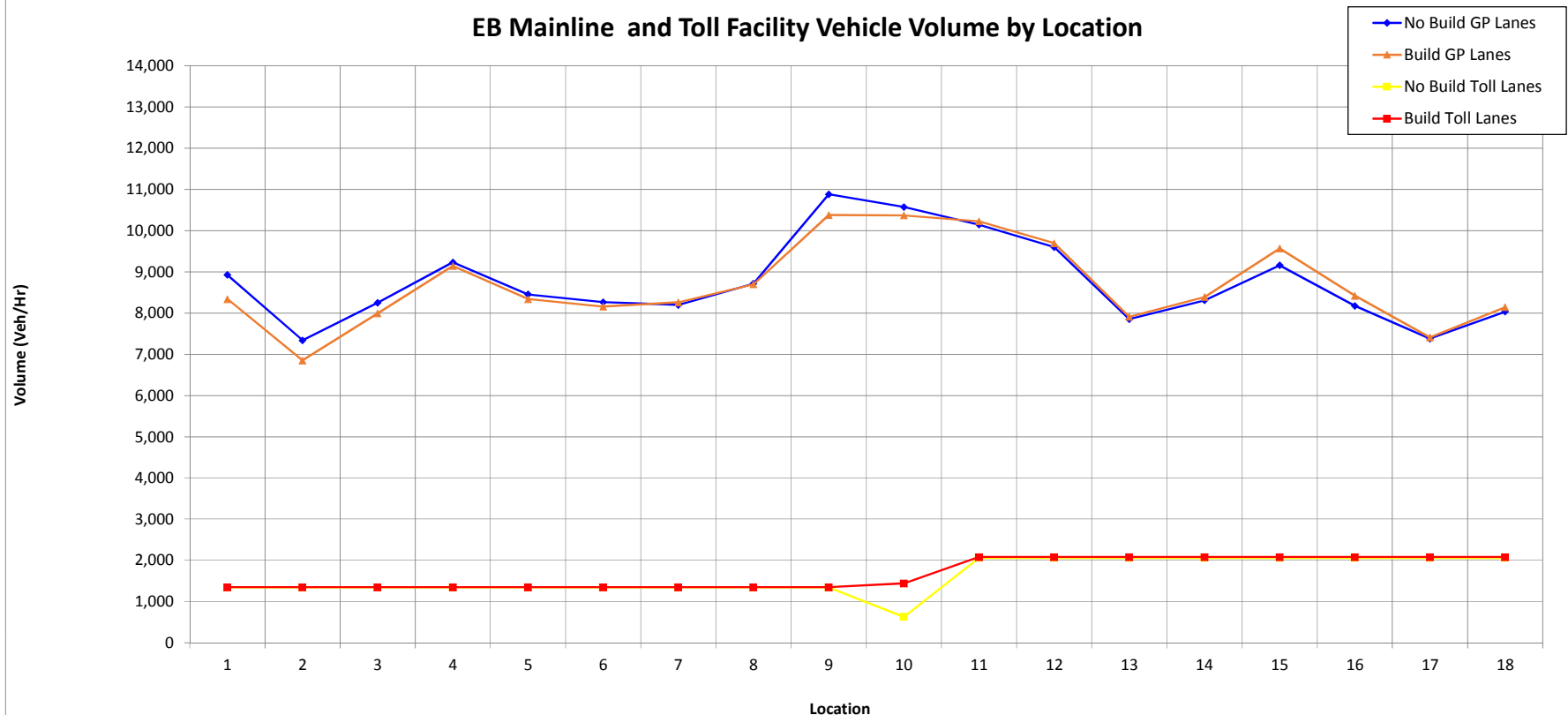
SR-91**Vissim Model Summary - 2040 Build Option 2 - AM
Network Summary Statistics**

Parameter	2040 AM No Build	2040 AM Build Option 2	Difference
Total Vehicle Demand (4 Hr)	119,605	120,167	562
Total number of vehicles that did not reach their destination	10,264	9,895	-369
Total number of vehicles that have reached their destination	109,342	110,273	931
Total vehicle-miles traveled (VMT)	939,671	953,732	14,061
Total travel time, All Vehicle Types (VHT)	27,641	25,219	-2,422
Average speed [mph], All Vehicle Types	34.0	37.8	3.8
Average delay time per vehicle [mins], All Vehicle Types	7.00	5.57	-1.43

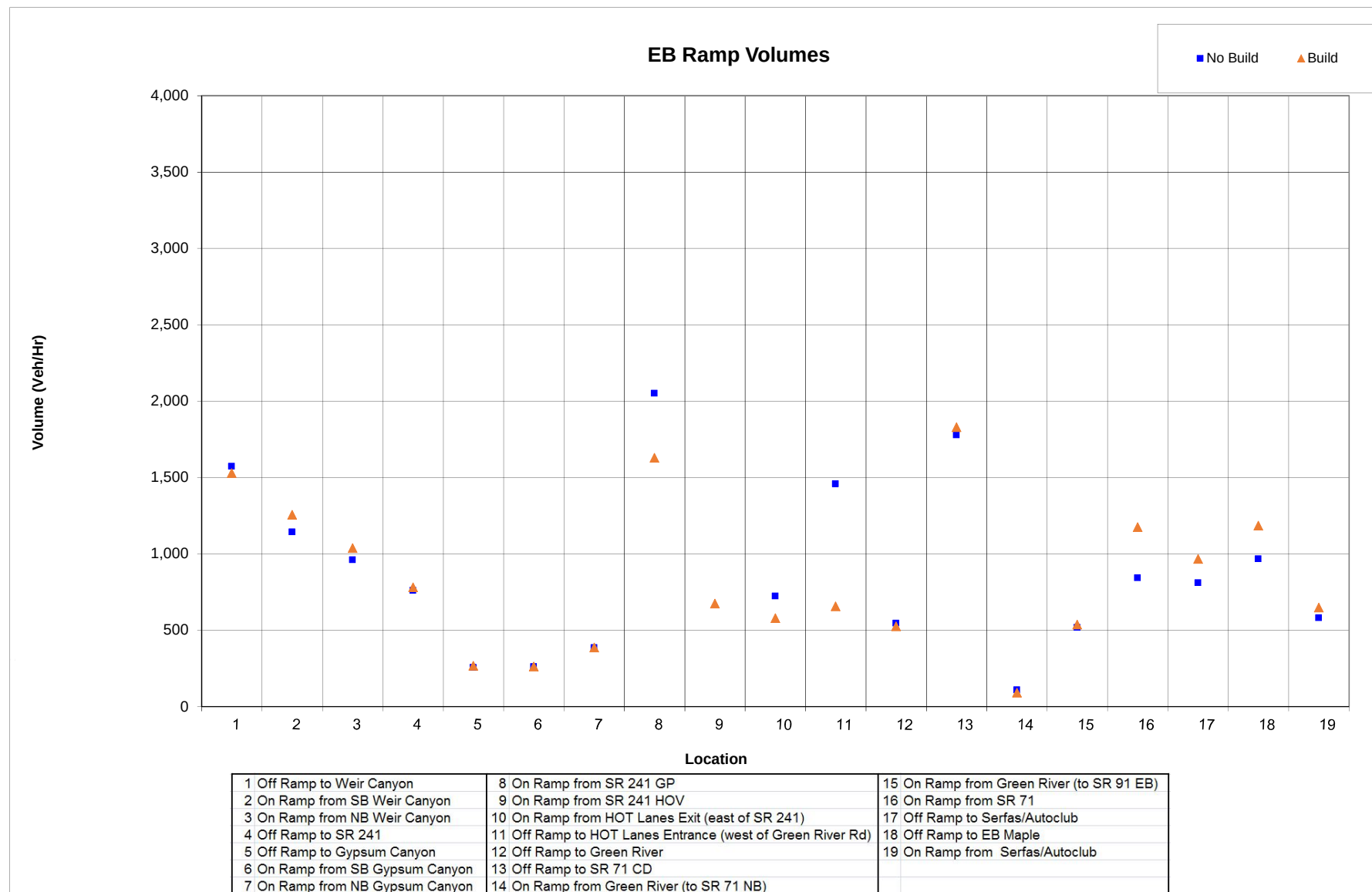
SR-91
Vissim Model Summary - 2040 Build Option 2 - AM
Travel Time Results

#	Origin	#	Destination	p	Ke	Hide Travel Time			2040 AM No Build VISSIM Travel Time			2040 AM Build VISSIM Travel Time			Change VISSIM Travel Time		
						Seg 1	Seg 2	Seg 3	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM	6-7 AM	7-8 AM	7-9 AM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005		9.7	12.6	13.7	8.9	9.5	9.4	-0.8	-3.1	-4.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005		9.5	12.4	13.5	8.8	9.4	9.3	-0.7	-3.0	-4.2
		5	SR 241 SB south of SR 91	3	1001				7.9	10.7	12.0	7.3	7.7	7.9	-0.6	-3.0	-4.2
		7	SR 71 NB north of SR 91	4	1002	1003	1004		11.0	13.9	15.0	10.2	10.8	10.7	-0.8	-3.1	-4.2
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	1003	1005		8.7	8.7	8.6	8.6	8.6	8.5	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005		8.3	8.3	8.3	8.4	8.4	8.4	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	1003	1004		10.0	10.0	9.9	9.9	9.9	9.9	-0.1	-0.1	-0.1
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014		22.8	21.2	16.3	18.1	19.4	20.0	-4.7	-1.8	3.7
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014		20.8	19.3	15.4	16.4	19.2	19.9	-4.4	-0.1	4.5
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013		23.2	21.8	17.8	18.9	21.7	22.4	-4.4	-0.1	4.6
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013		n/a	n/a	n/a	18.8	21.6	22.3	-4.5	-0.2	4.5
		7	SR 71 NB north of SR 91	12	1010				8.5	8.0	5.7	6.2	8.2	7.8	-2.4	0.2	2.1
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	1012	1014		15.0	14.5	13.2	14.1	12.9	13.5	-1.0	-1.5	0.3
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014		8.4	8.4	8.4	8.4	8.4	8.4	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	1012	1013		15.5	15.0	14.7	14.8	15.2	15.9	-0.6	0.2	1.2
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013		n/a	n/a	n/a	10.8	10.8	10.8	-4.6	-4.2	-3.9
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006				7.3	7.3	7.3	7.3	7.3	7.2	0.0	0.0	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005		11.1	11.1	11.1	11.0	11.0	11.0	-0.1	-0.1	-0.1
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005		10.9	10.9	10.9	10.9	10.9	10.9	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	20	1007	1003	1004		12.4	12.4	12.4	12.3	12.3	12.3	-0.1	-0.1	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005		n/a	n/a	n/a	11.0	11.0	11.0	-0.1	-0.1	-0.1
6	SR 241 NB south of SR 91 (via EXP Ramp)	4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005		n/a	n/a	n/a	10.8	10.8	10.8	-0.1	-0.1	-0.1
		7	SR 71 NB north of SR 91	23	2007	1003	1004		n/a	n/a	n/a	12.3	12.3	12.3	-0.1	-0.1	-0.1
		1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014		39.6	56.0	59.3	29.5	44.1	54.6	-10.1	-11.9	-4.7
7	SR 71 SB north of SR 91	2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014		37.6	54.2	58.4	27.8	44.0	54.5	-9.8	-10.2	-3.9
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008				23.5	38.6	44.5	15.2	28.8	35.5	-8.3	-9.8	-9.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013		40.1	56.6	60.9	30.2	46.4	57.0	-9.8	-10.2	-3.9
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013		n/a	n/a	n/a	30.2	46.3	56.9	-9.9	-10.3	-4.0

EB Mainline and Toll Facility Vehicle Volume by Location

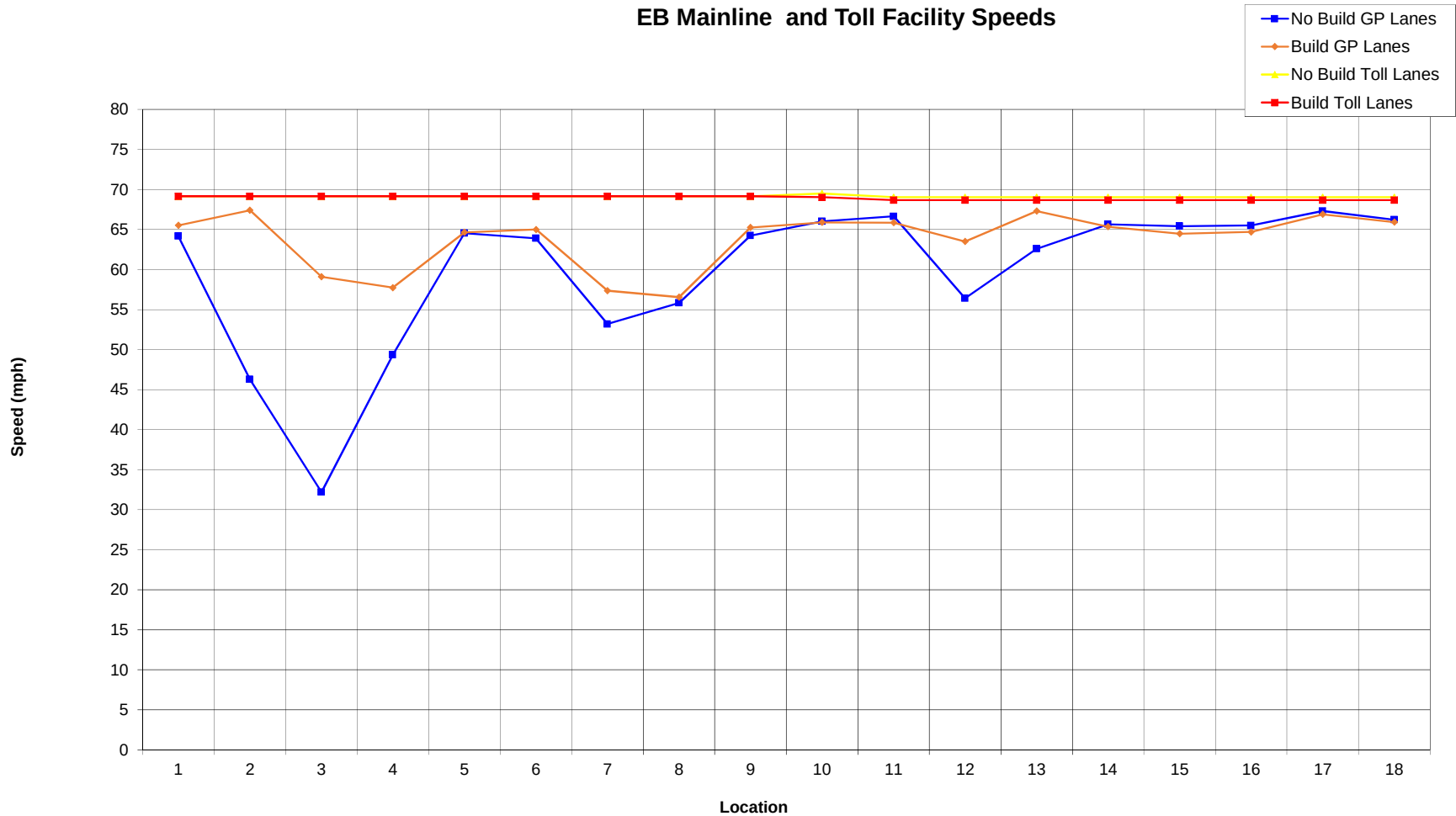


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



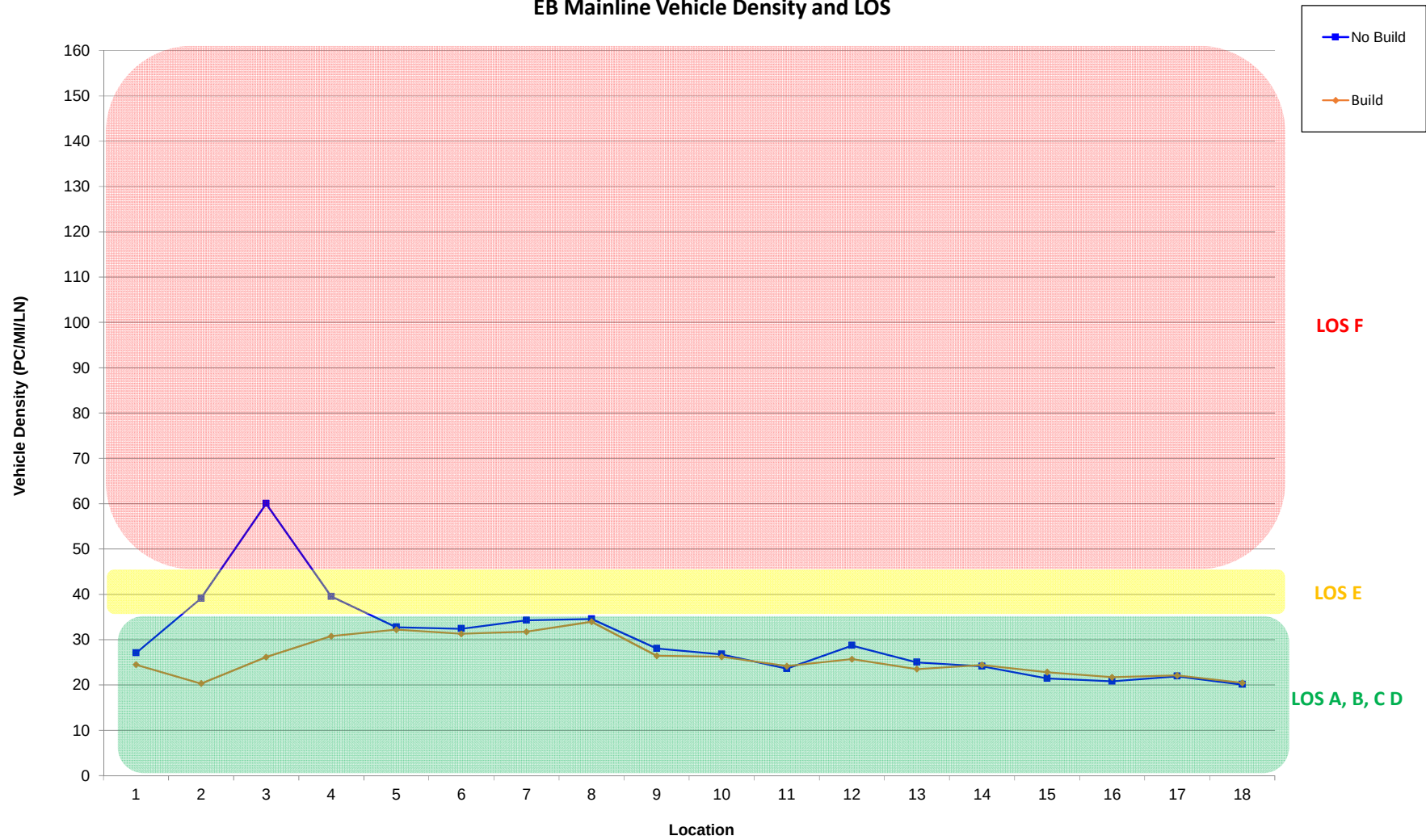
Charts 6-7 AM

EB Mainline and Toll Facility Speeds

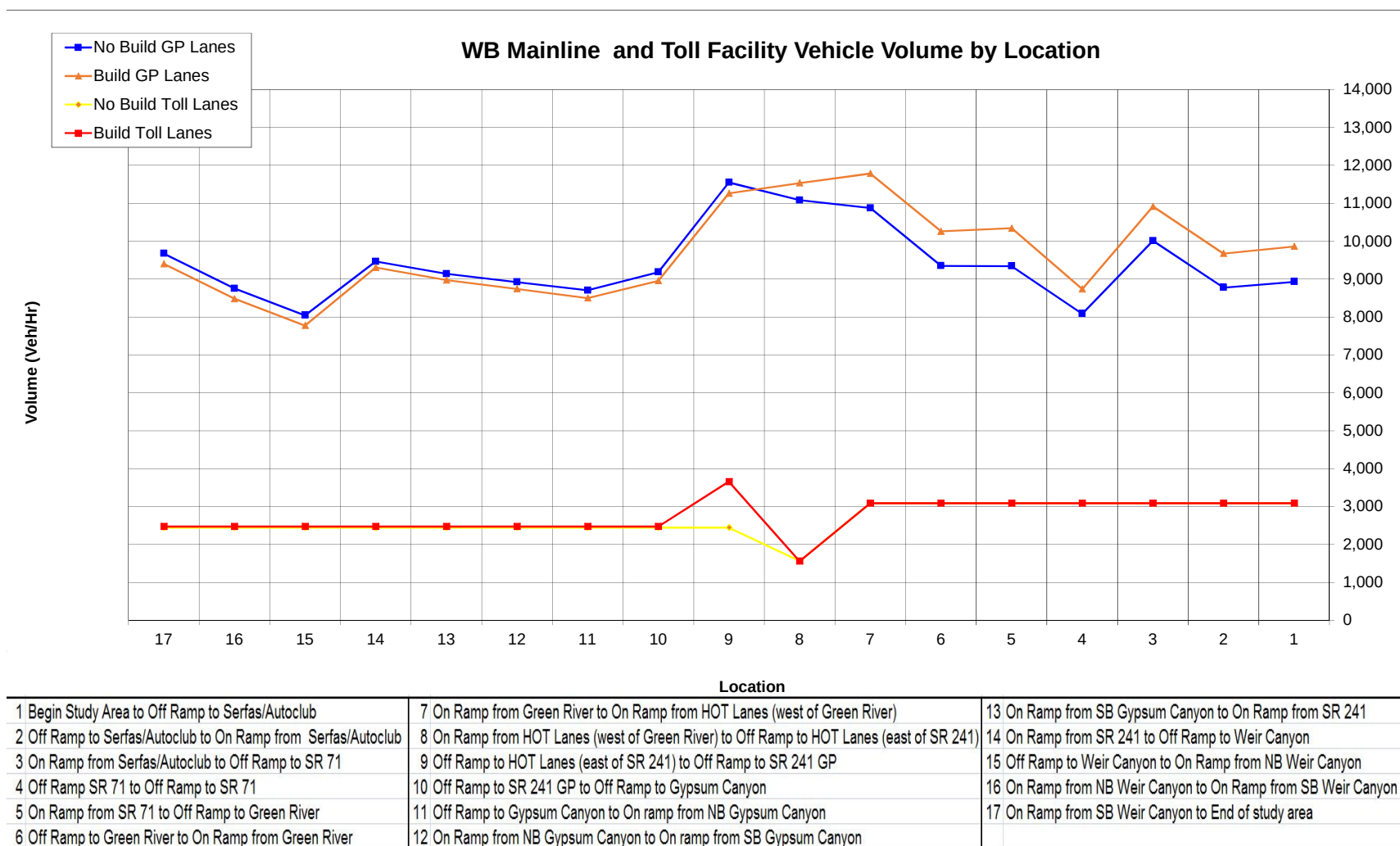


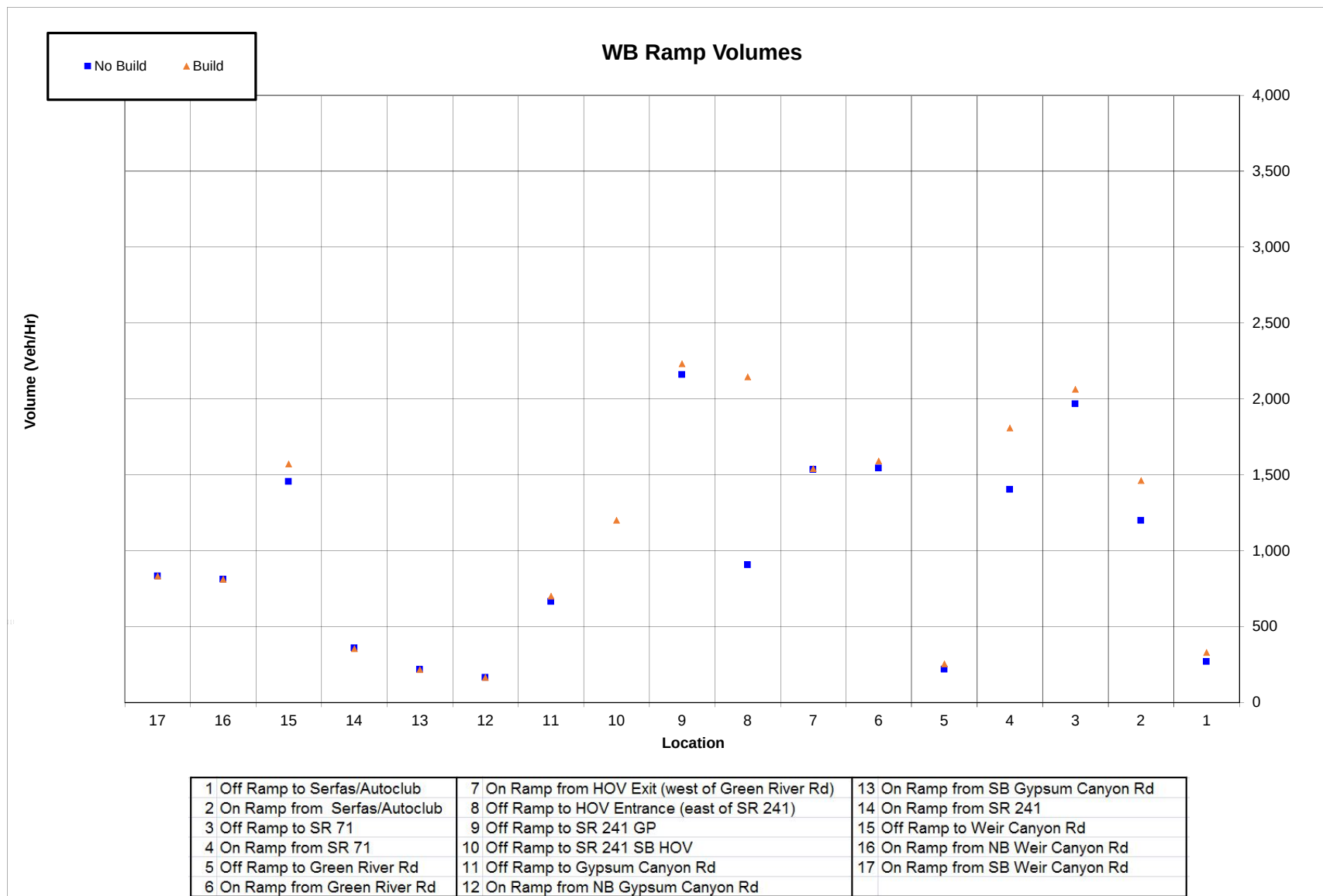
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



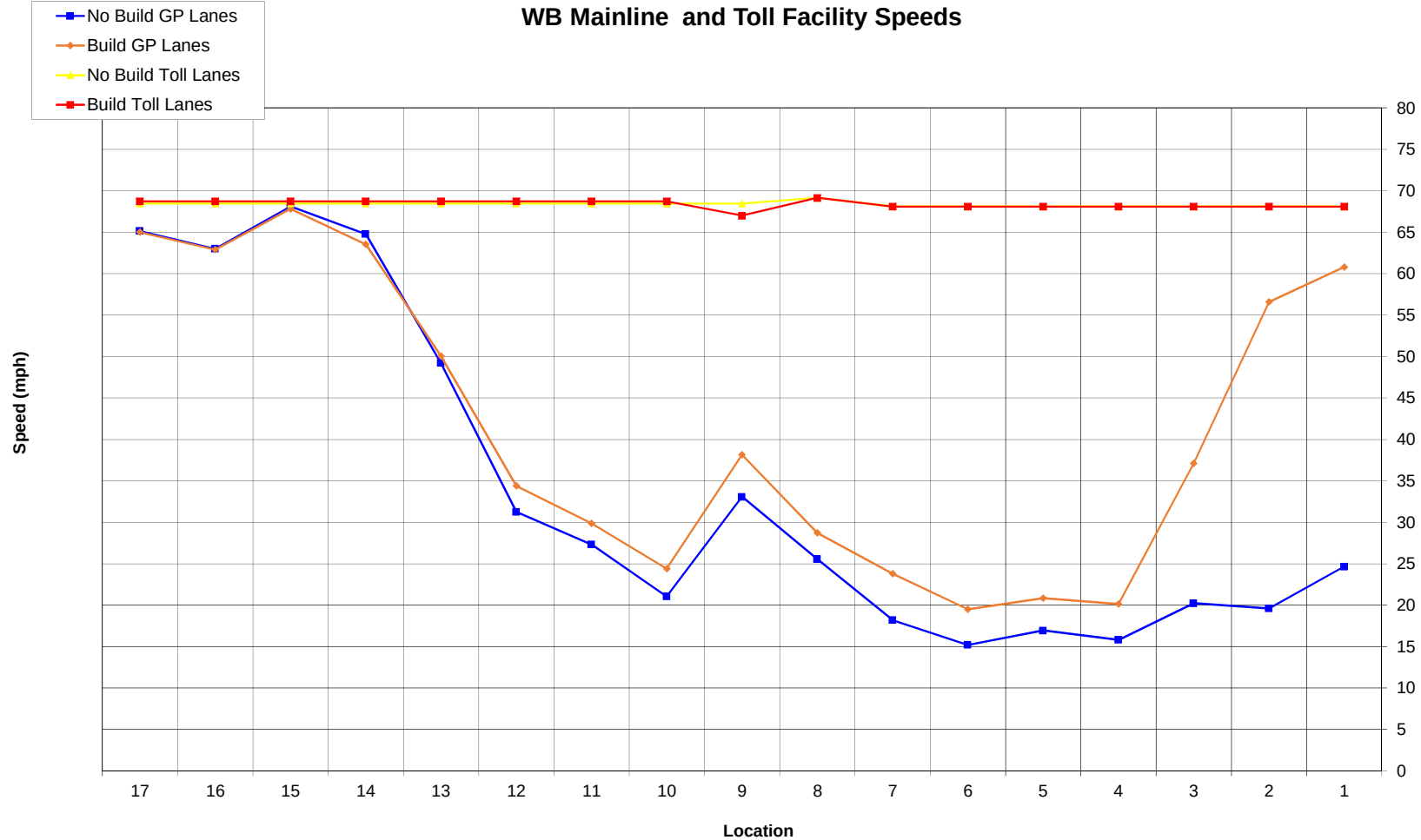
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



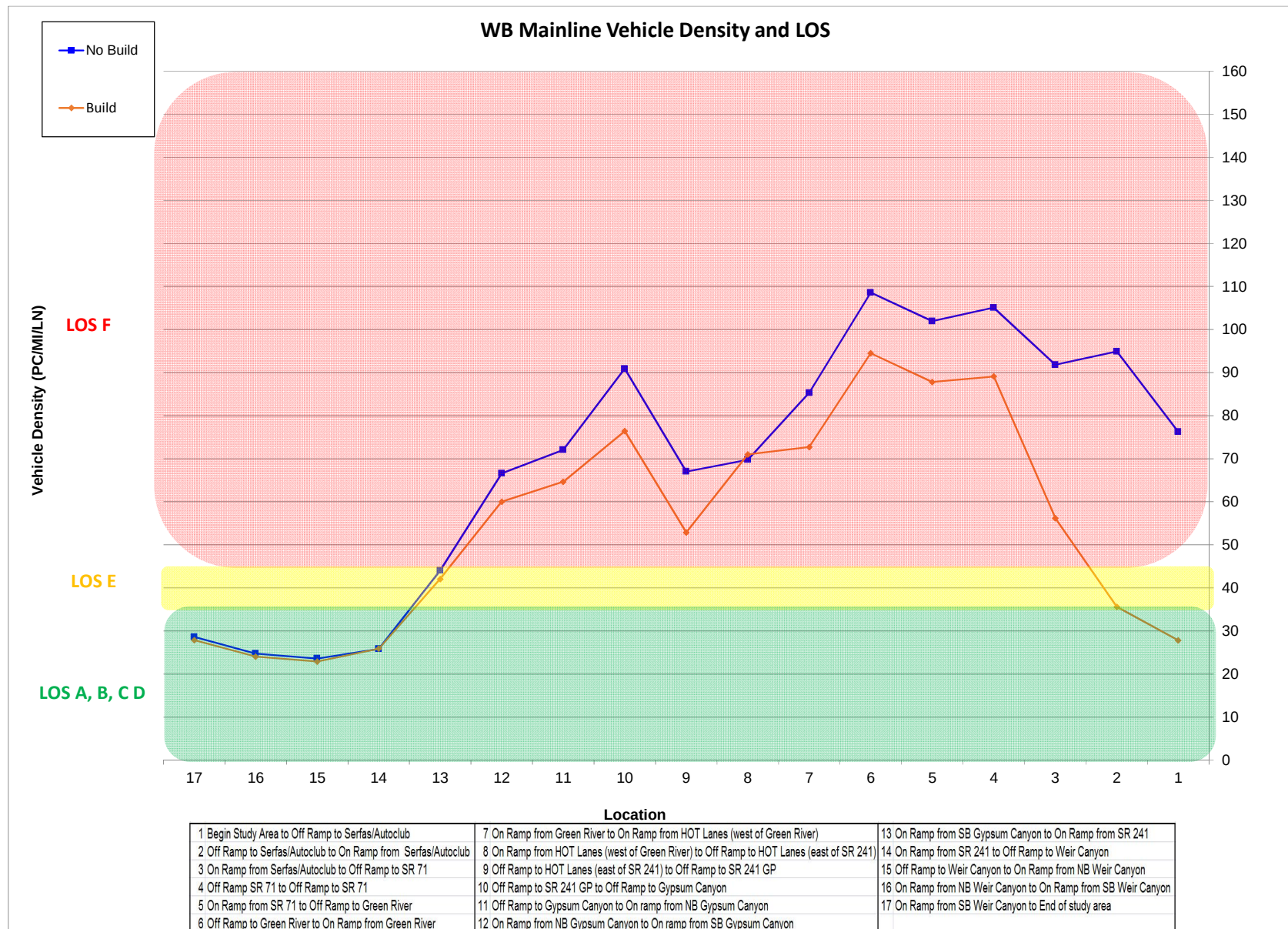


Charts 6-7 AM

WB Mainline and Toll Facility Speeds

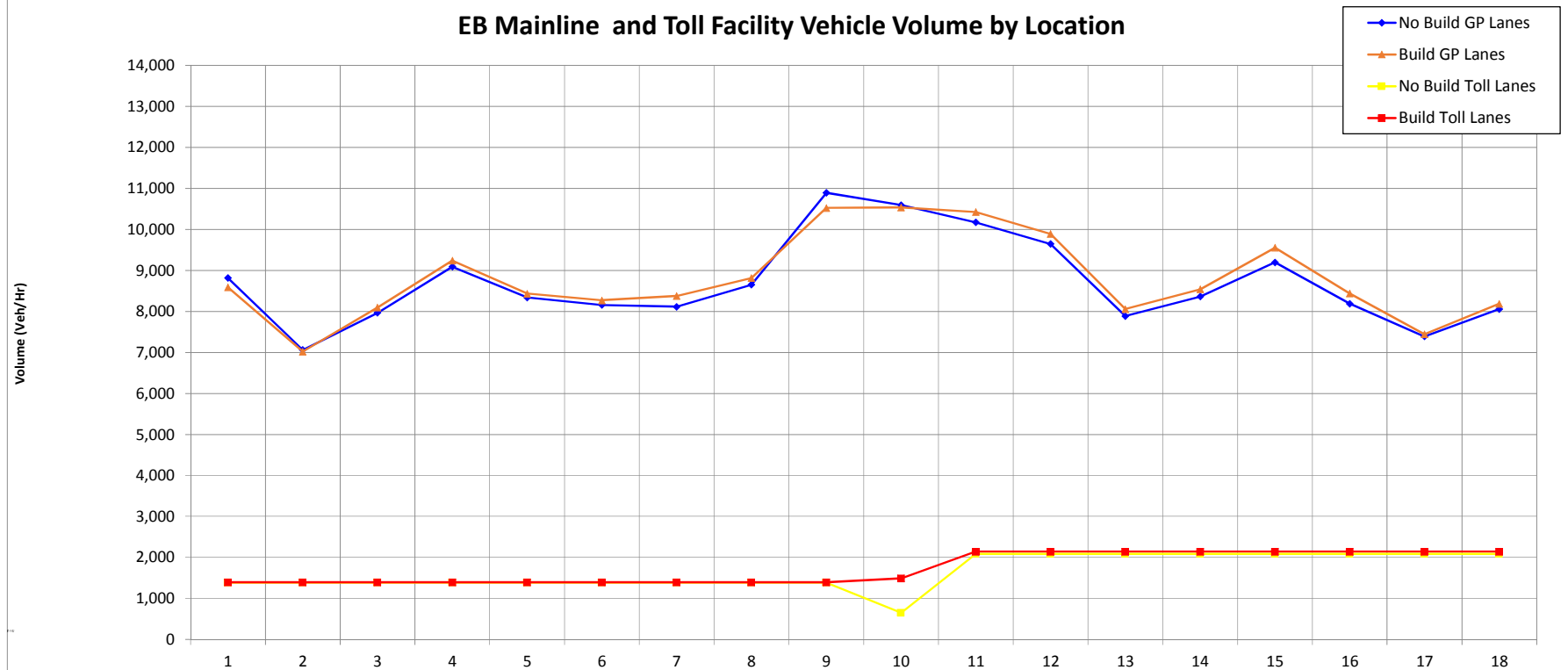


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



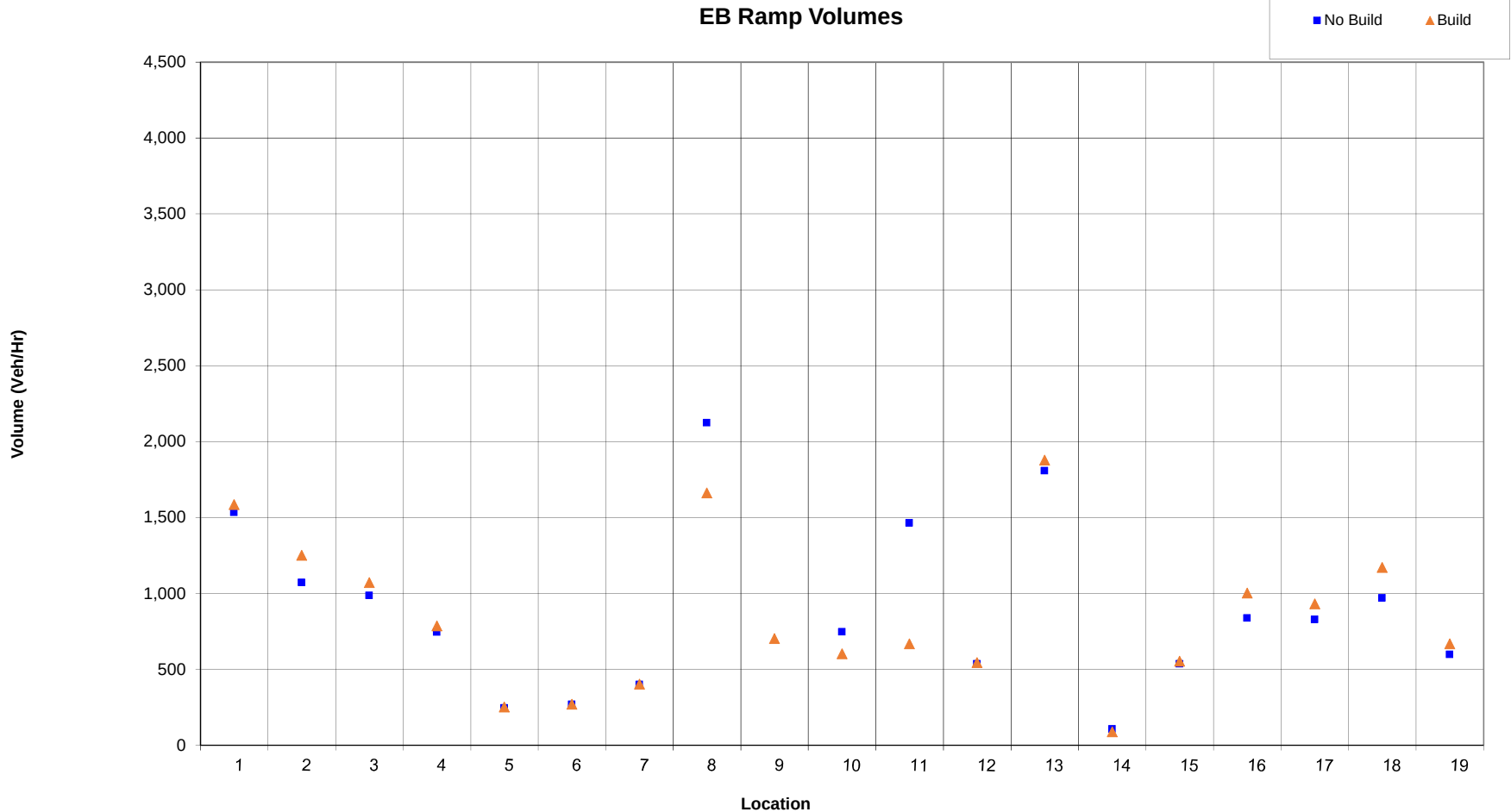
Charts 6-7 AM

EB Mainline and Toll Facility Vehicle Volume by Location



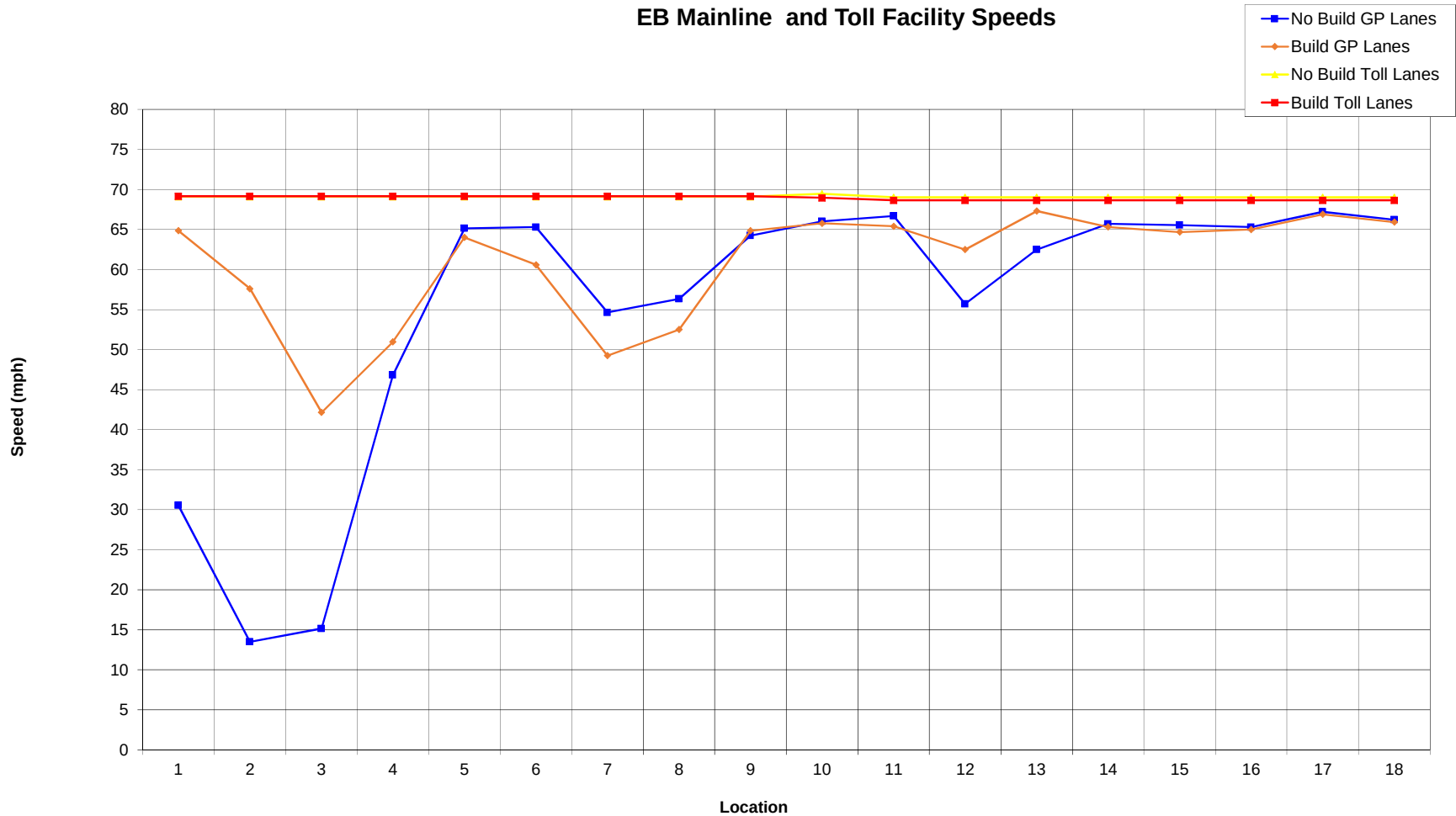
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Ramp Volumes



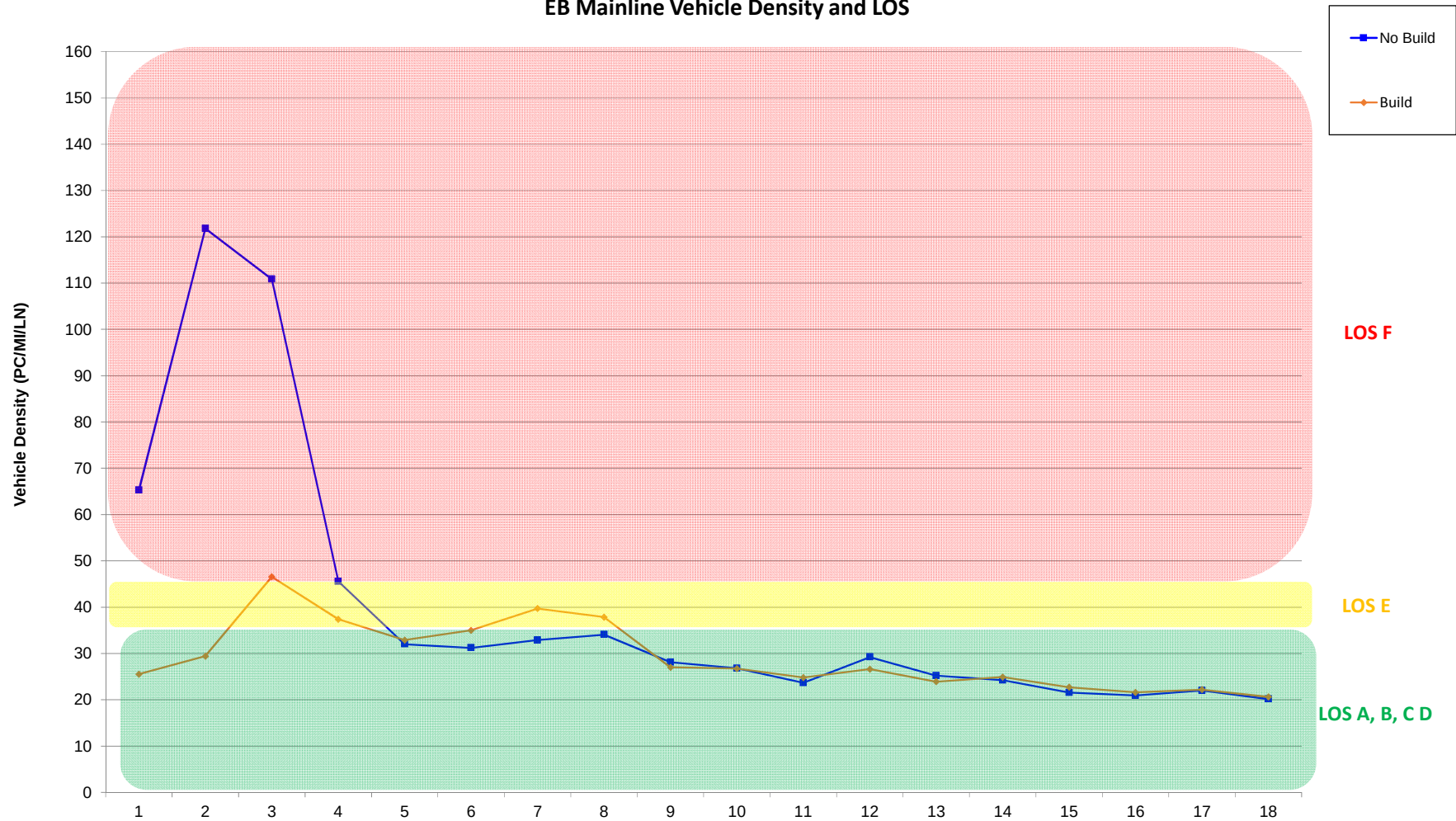
1 Off Ramp to Weir Canyon	8 On Ramp from SR 241 GP	15 On Ramp from Green River (to SR 91 EB)
2 On Ramp from SB Weir Canyon	9 On Ramp from SR 241 HOV	16 On Ramp from SR 71
3 On Ramp from NB Weir Canyon	10 On Ramp from HOT Lanes Exit (east of SR 241)	17 Off Ramp to Serfas/Autoclub
4 Off Ramp to SR 241	11 Off Ramp to HOT Lanes Entrance (west of Green River Rd)	18 Off Ramp to EB Maple
5 Off Ramp to Gypsum Canyon	12 Off Ramp to Green River	19 On Ramp from Serfas/Autoclub
6 On Ramp from SB Gypsum Canyon	13 Off Ramp to SR 71 CD	
7 On Ramp from NB Gypsum Canyon	14 On Ramp from Green River (to SR 71 NB)	

EB Mainline and Toll Facility Speeds

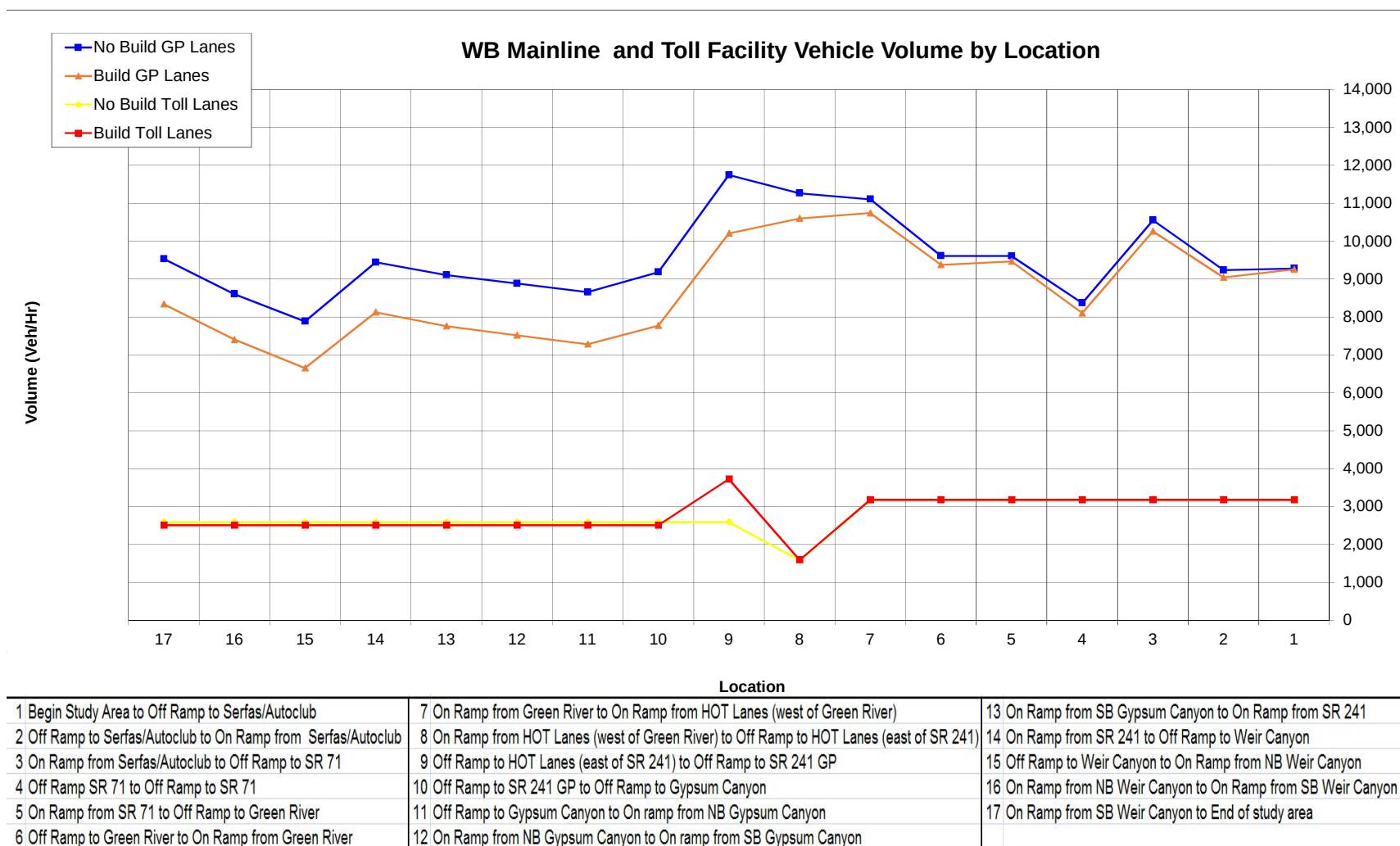


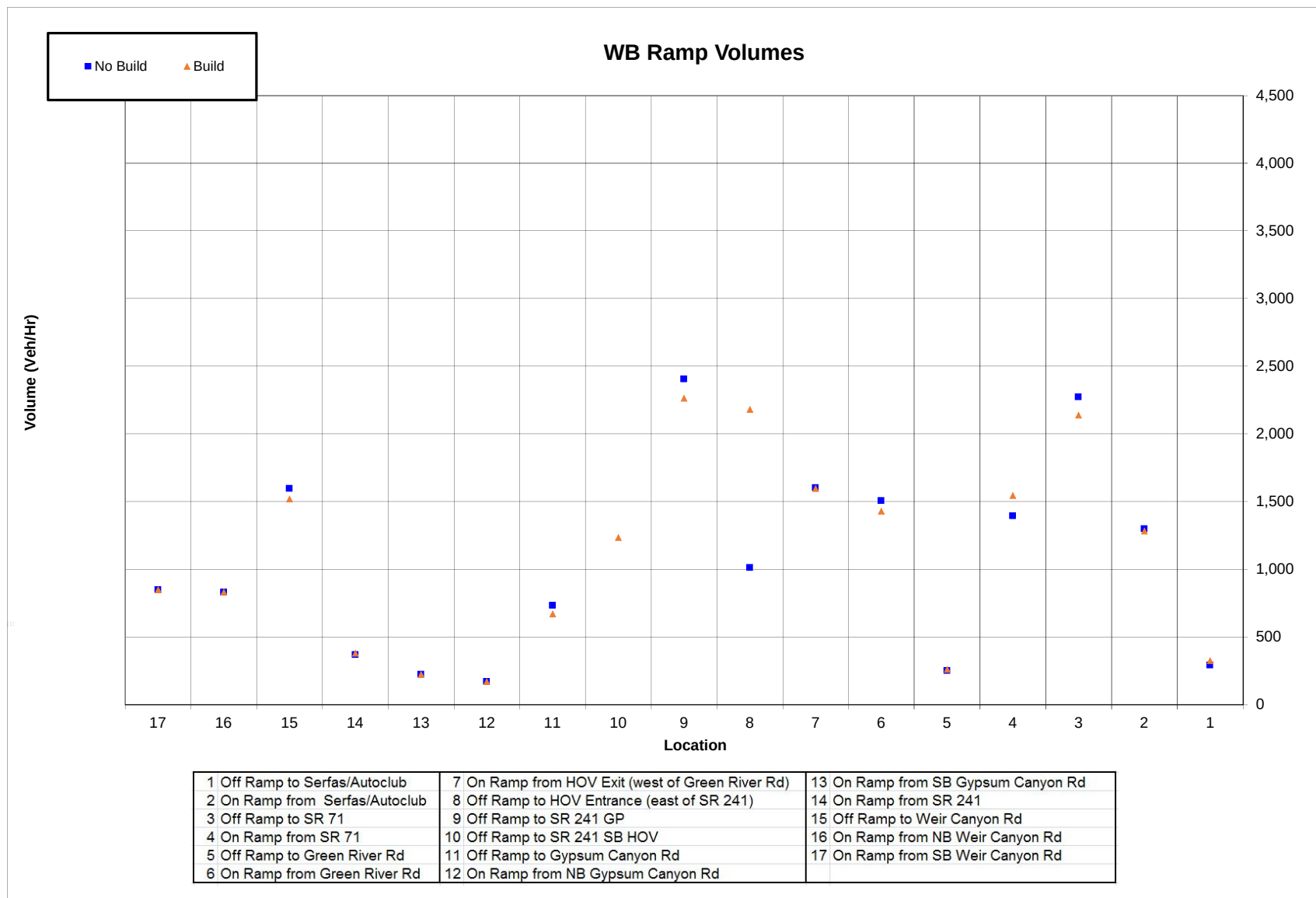
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



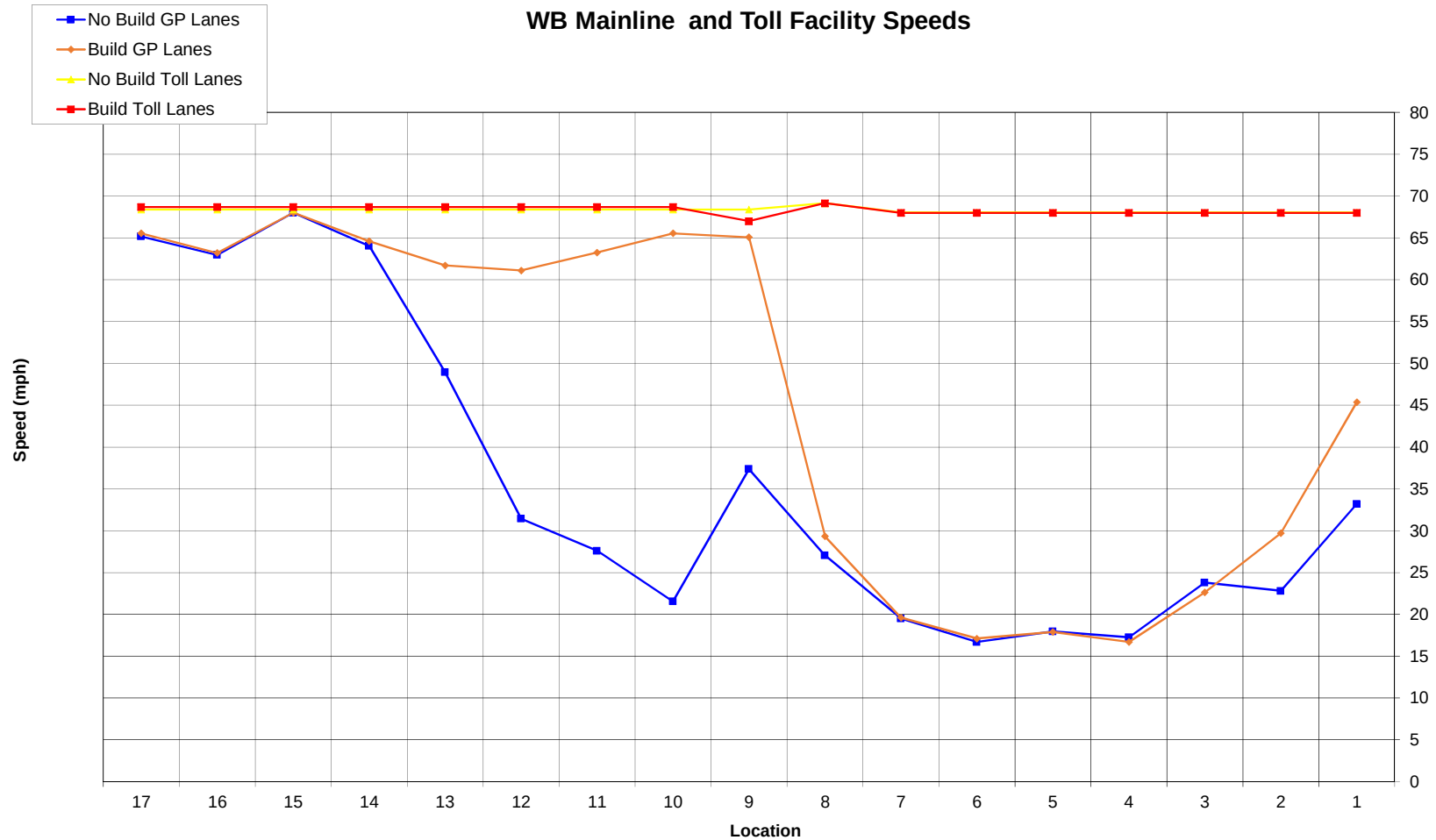
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



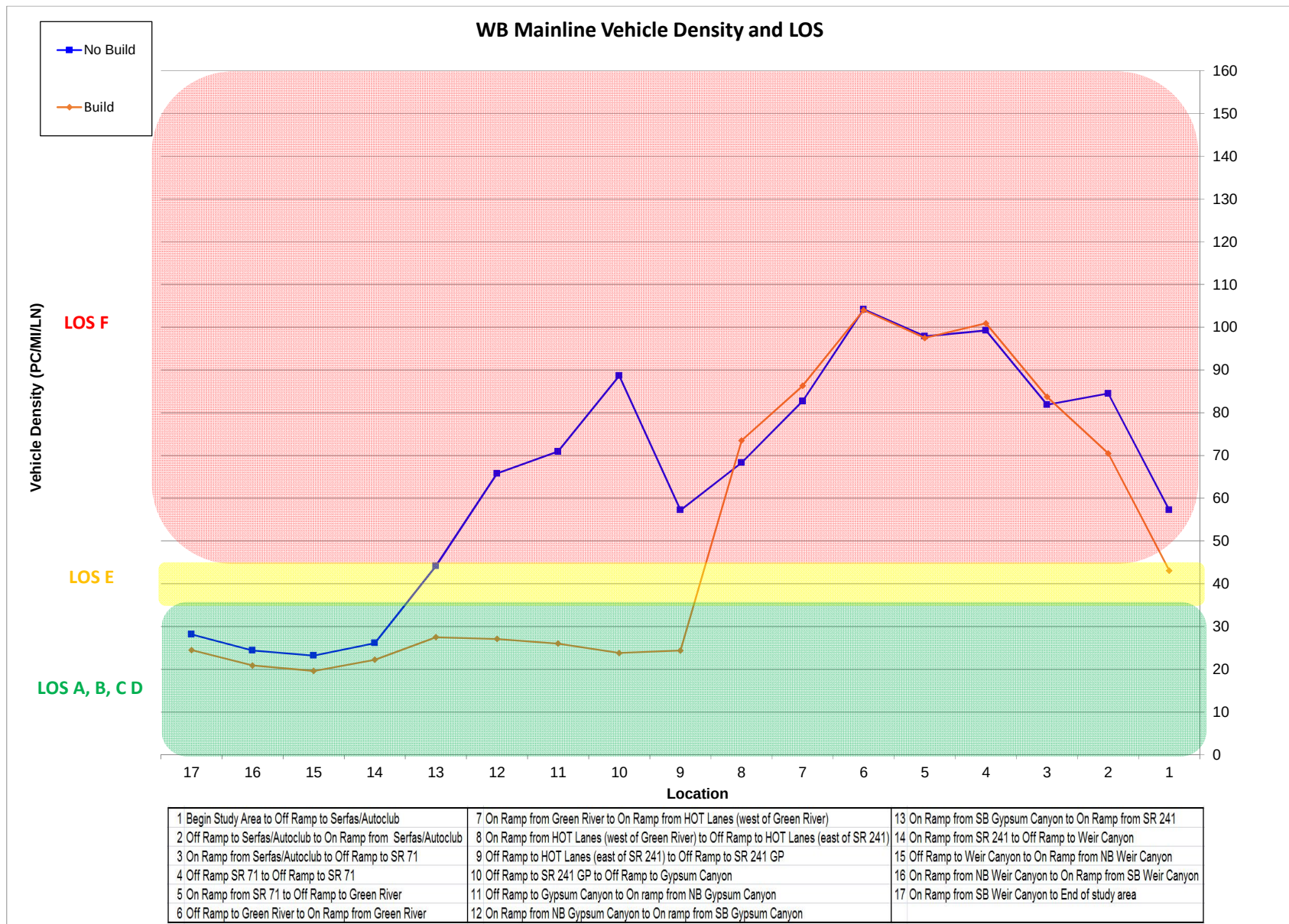


Charts 7-8 AM

WB Mainline and Toll Facility Speeds

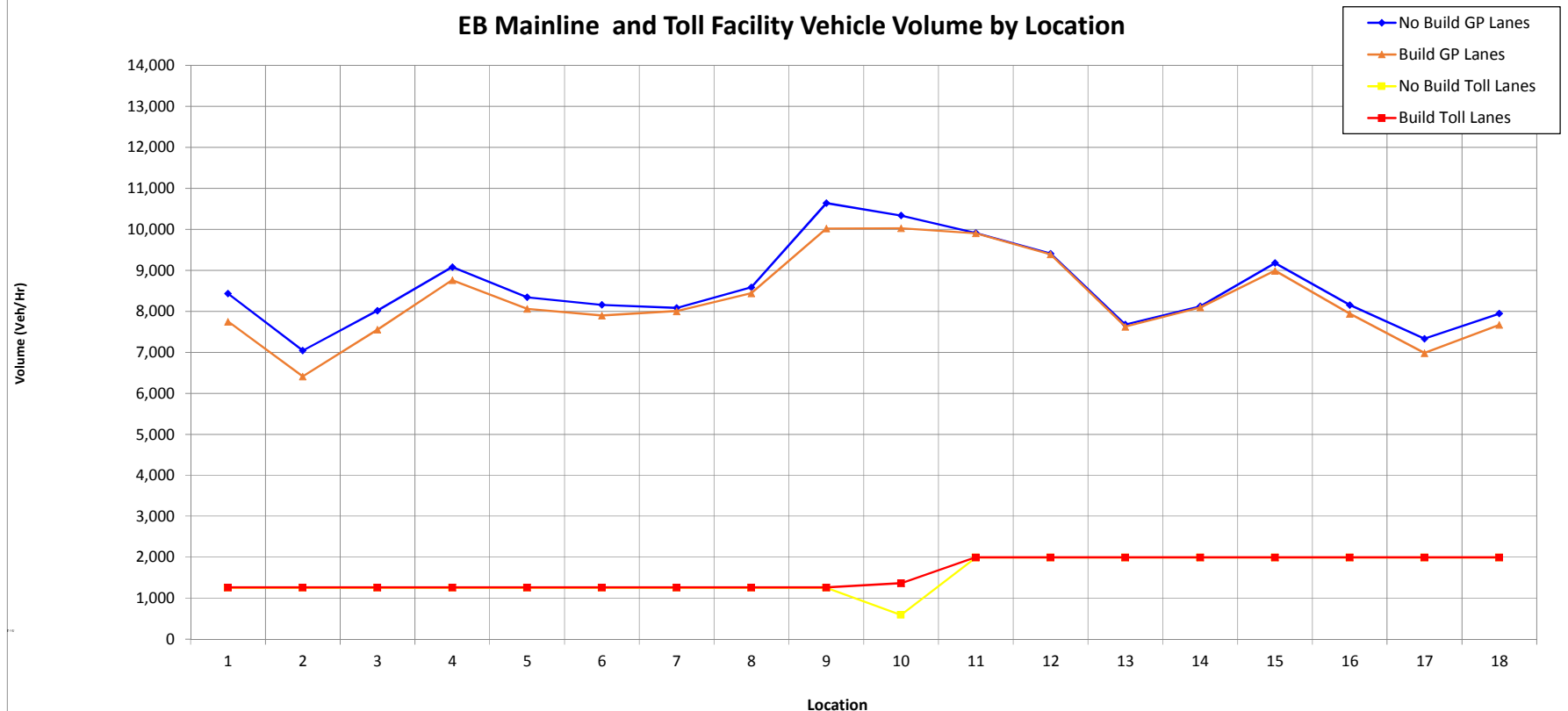


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

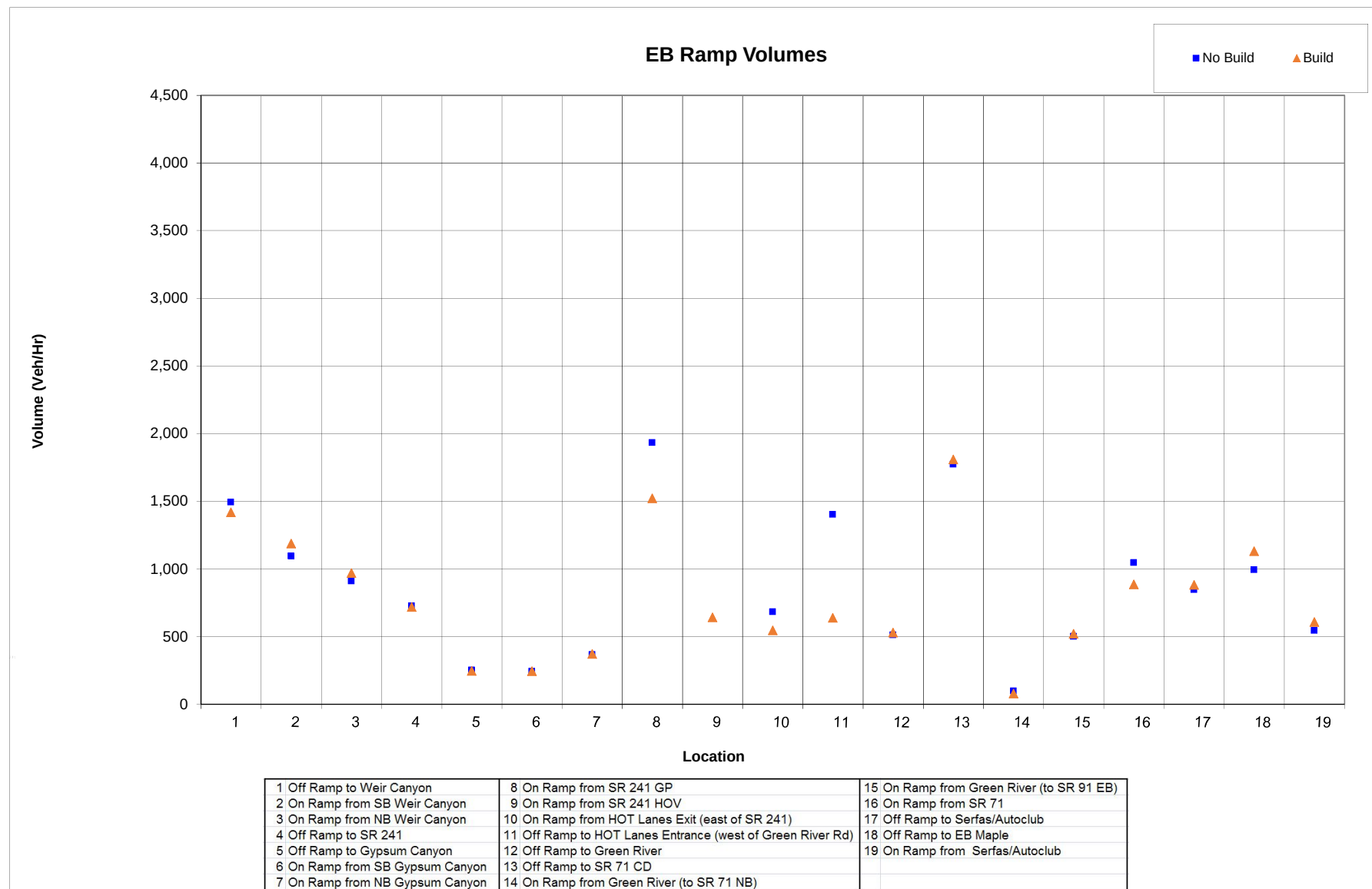


Charts 7-8 AM

EB Mainline and Toll Facility Vehicle Volume by Location

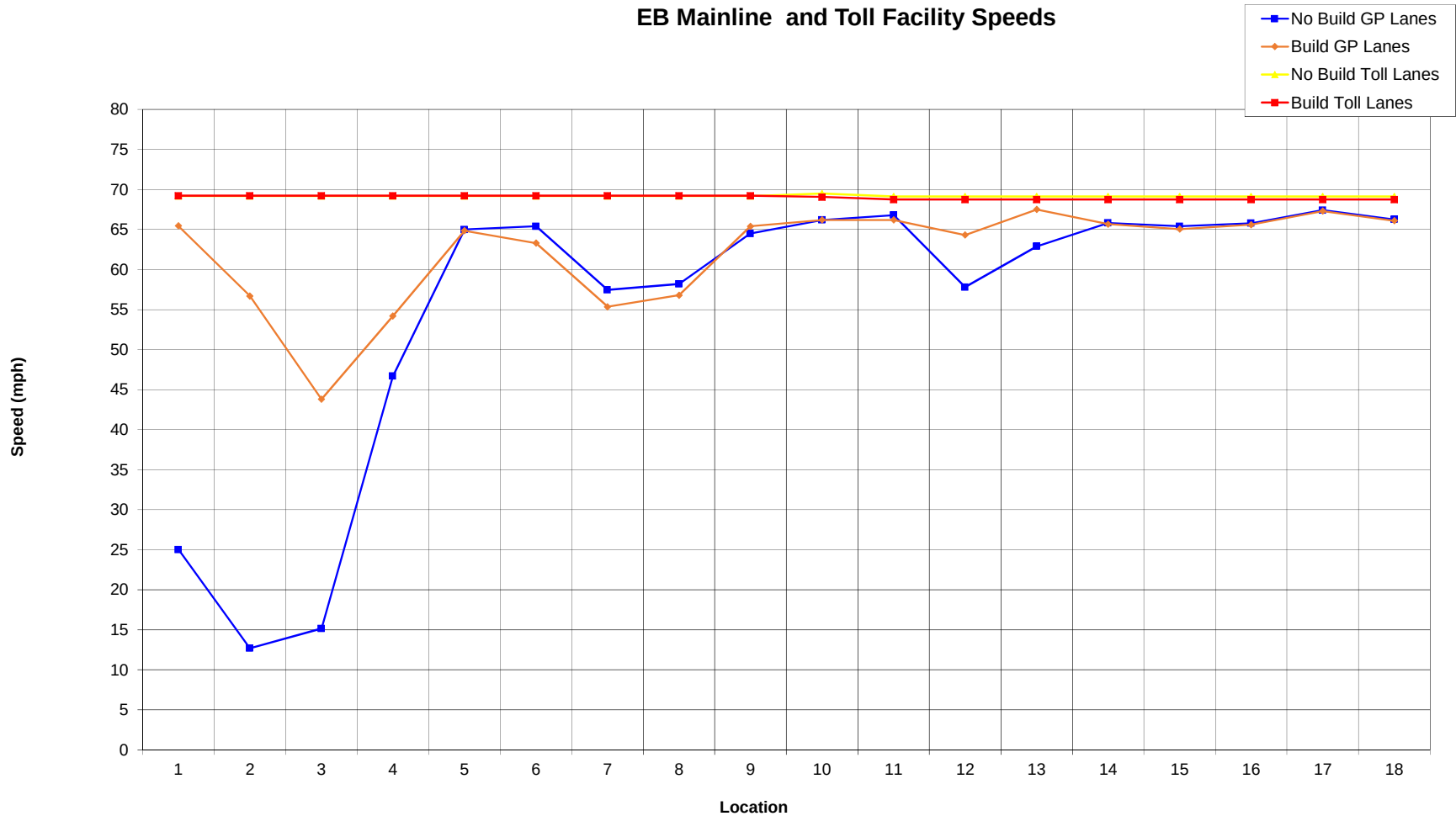


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



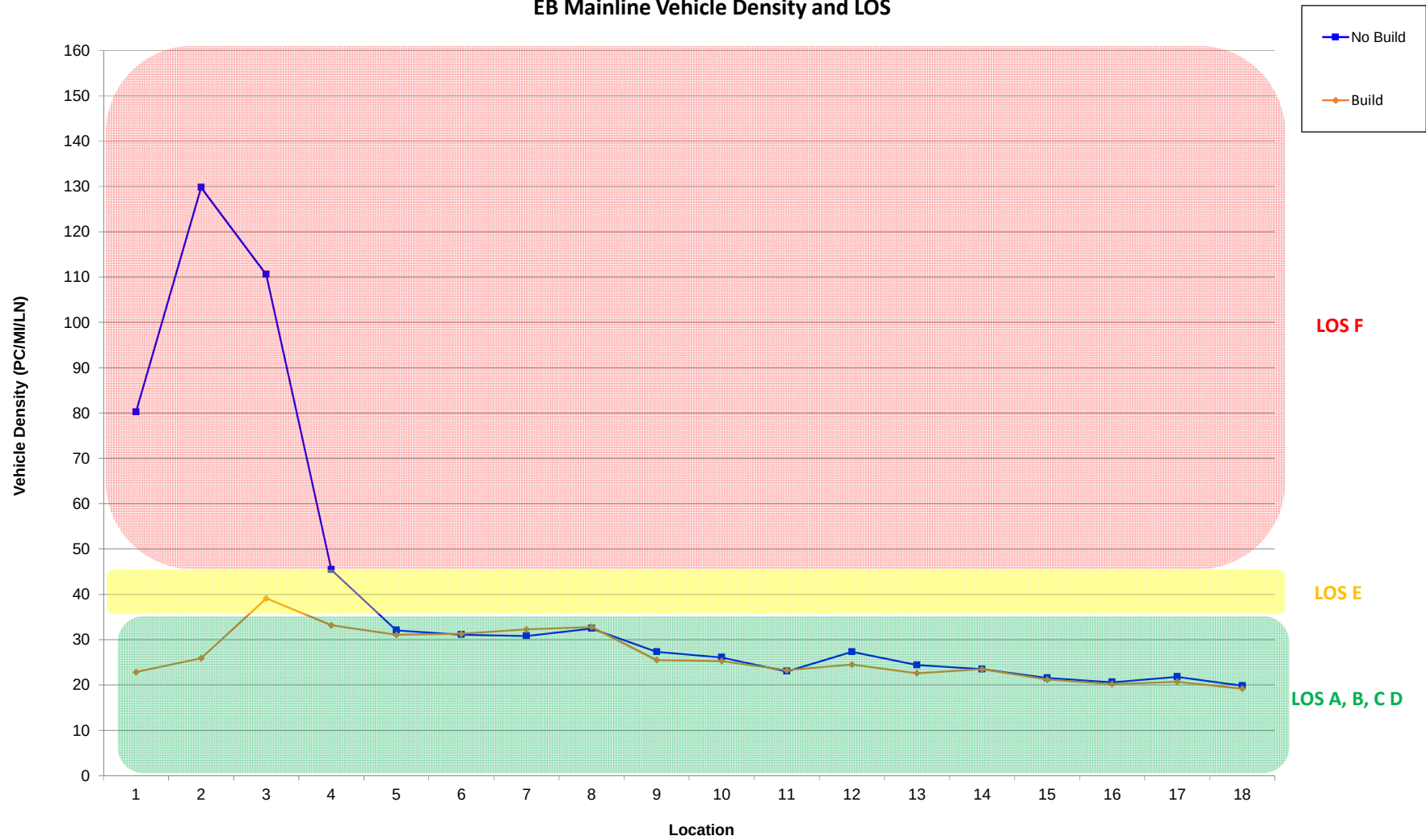
Charts 8-9 AM

EB Mainline and Toll Facility Speeds

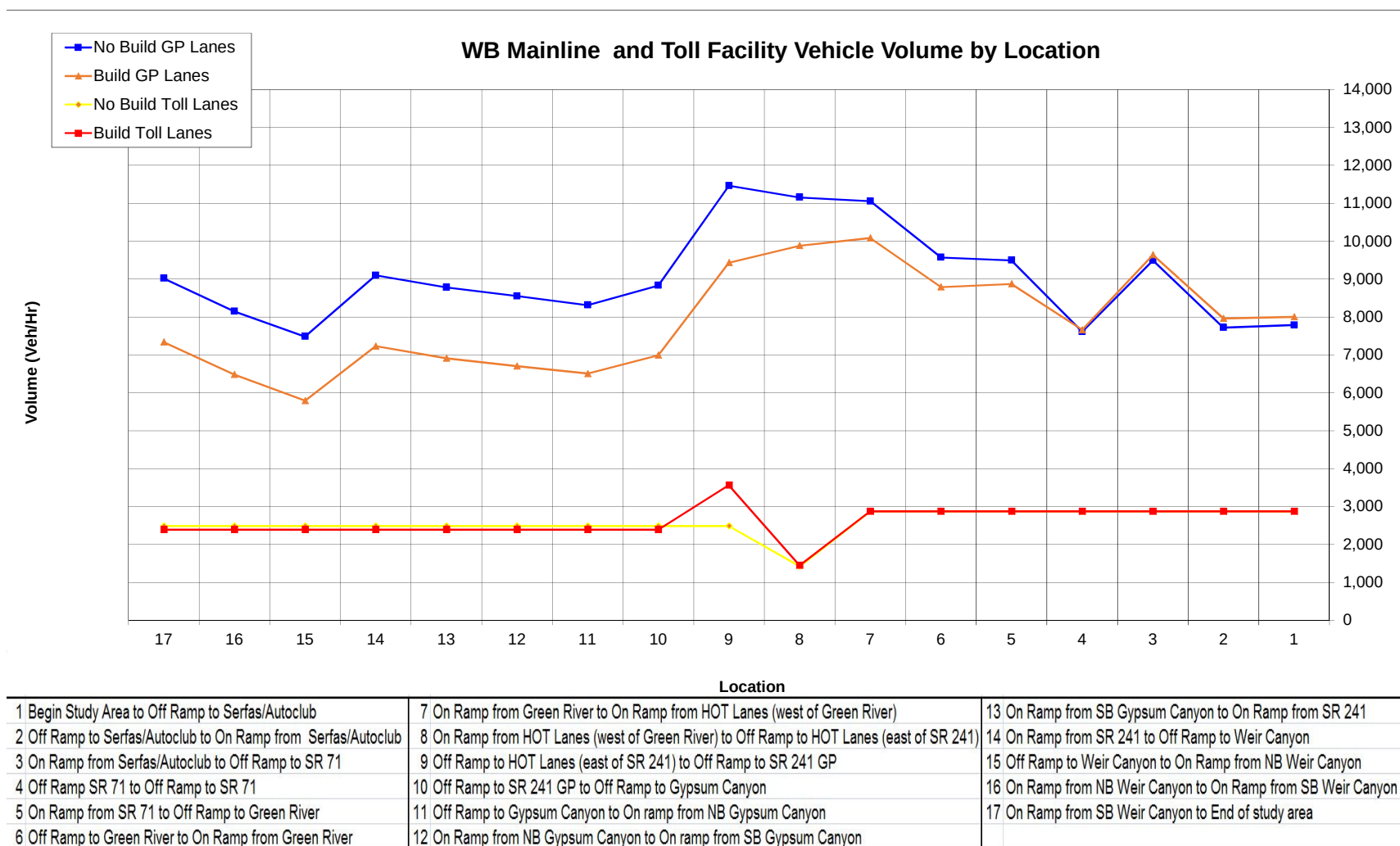


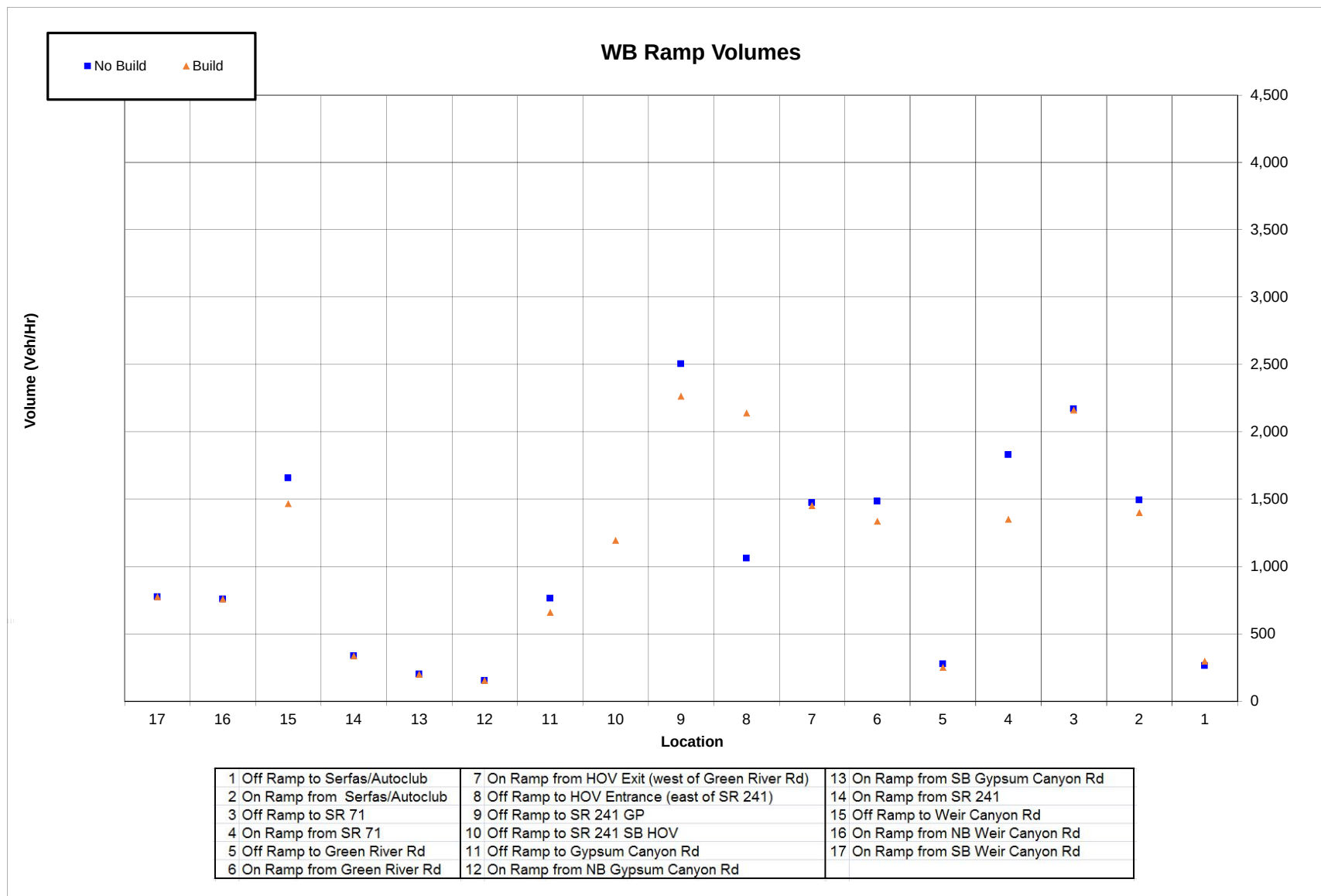
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



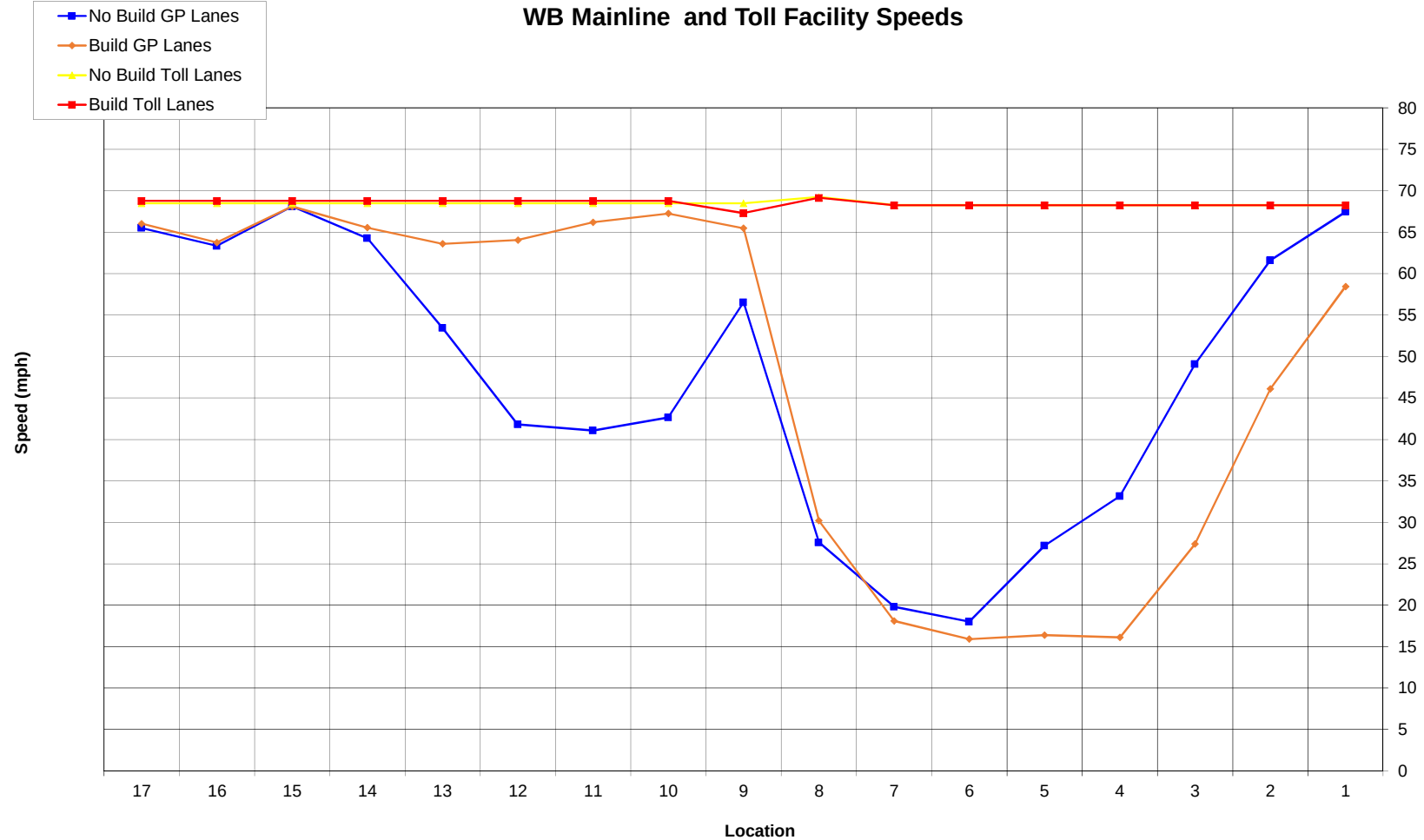
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



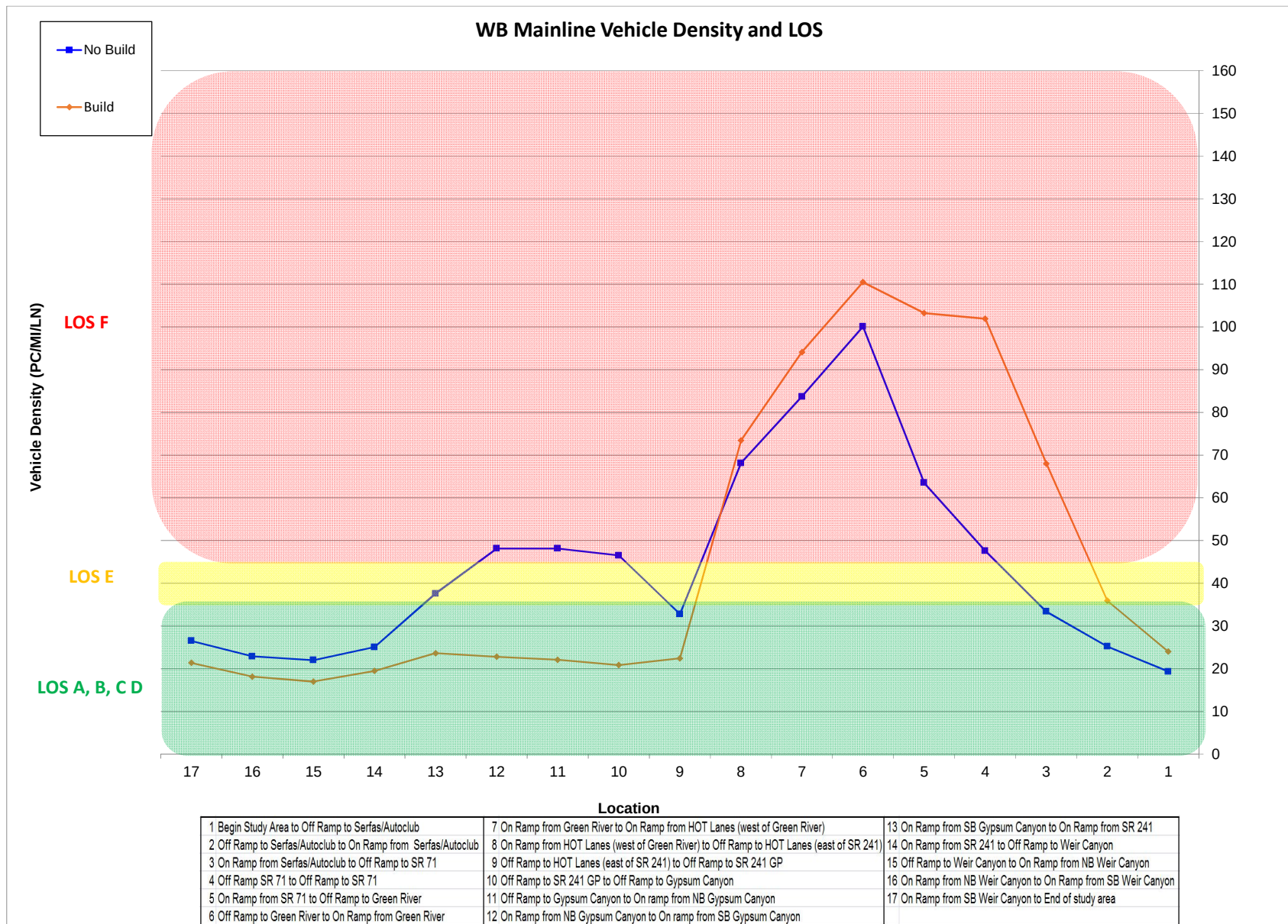


Charts 8-9 AM

WB Mainline and Toll Facility Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



Charts 8-9 AM

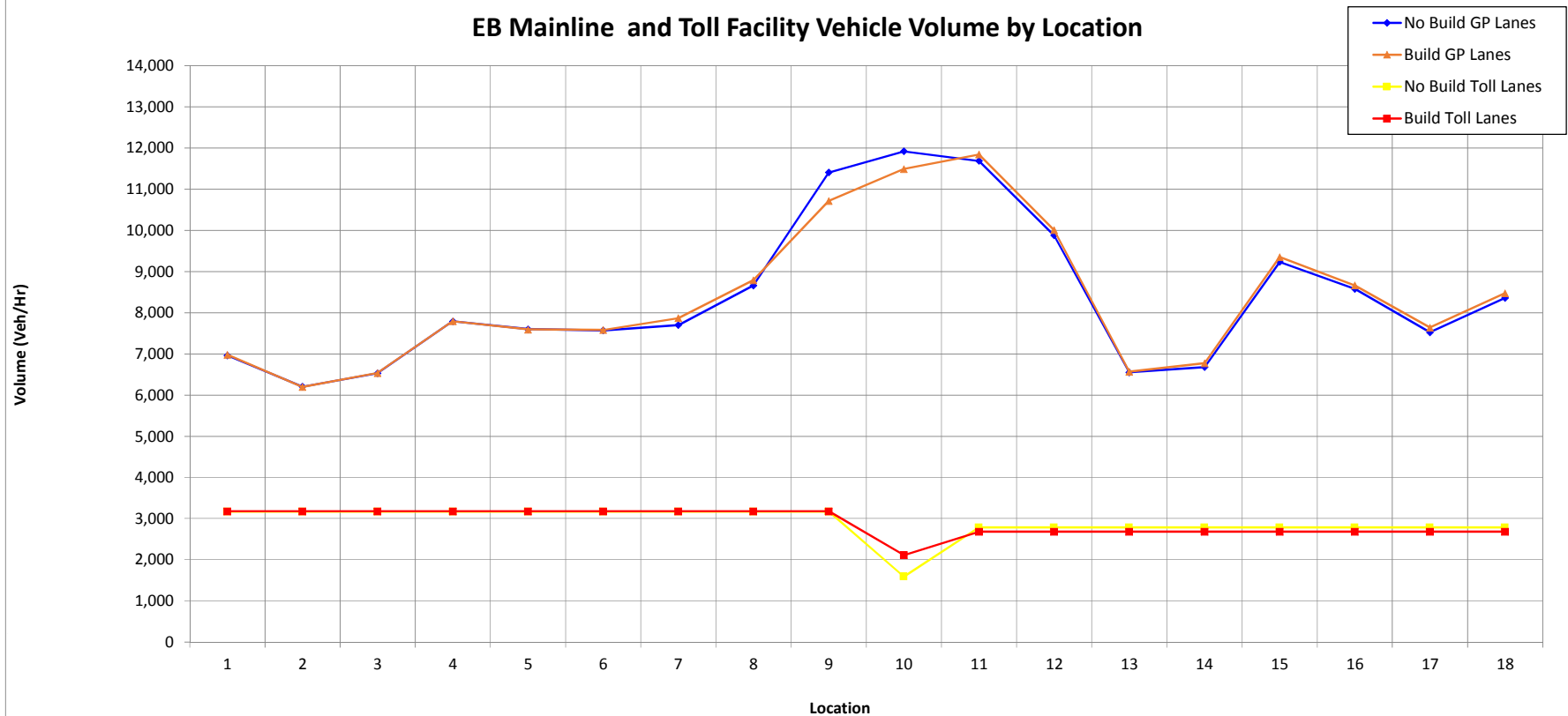
SR-91**Vissim Model Summary - 2040 Build Option 2 - PM Peak Period****Network Summary Statistics**

Parameter	2040 No Build	2040 Build Option 2	Difference
Total Vehicle Demand (4 Hr)	168,494	168,944	450
Total number of vehicles that did not reach their destination	26,918	25,914	-1,004
Total number of vehicles that have reached their destination	141,576	143,030	1,454
Total vehicle-miles traveled (VMT)	1,173,727	1,193,635	19,909
Total travel time, All Vehicle Types (VHT)	26,063	25,477	-586
Average speed [mph], All Vehicle Types	45.1	46.9	1.8
Average delay time per vehicle [mins], All Vehicle Types	3.45	3.08	-0.37

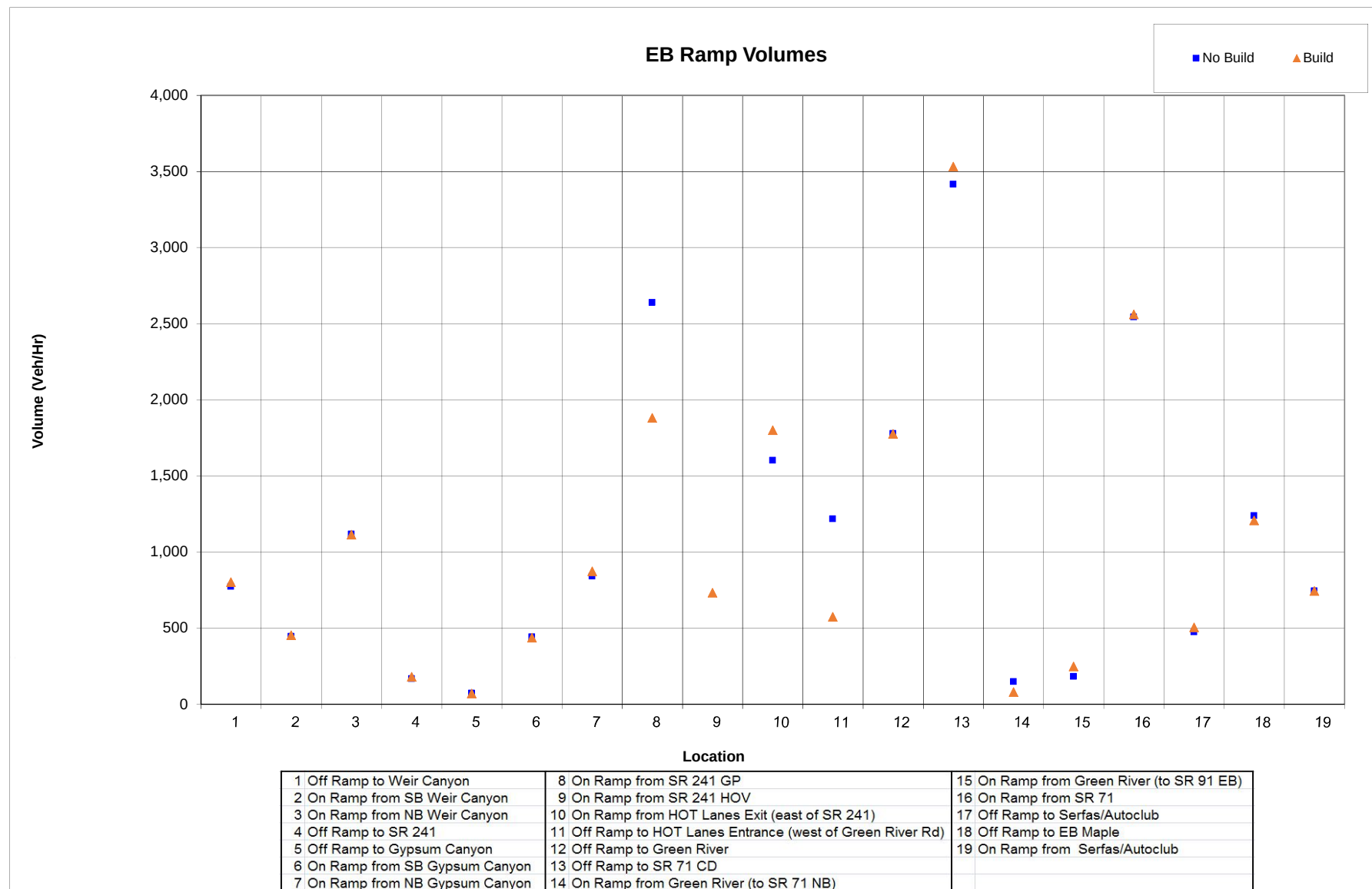
Vissim Model Summary - 2040 Build Option 2 - PM Peak Period Travel Time Results

				Hide				2040 PM No Build				2040 PM Build				Change				
#	Origin	#	Destination	p	Ke	Travel Time			VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)				VISSIM Travel Time (Minutes)			
						Seg 1	Seg 2	Seg 3	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM	3-4 PM	4-5 PM	5-6 PM	6-7 PM
1	SR 91 EB GP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	1	1002	1003	1005		19.8	20.3	20.9	20.5	19.6	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	2	1002	1003	2005		19.7	20.3	20.8	20.5	19.5	19.7	19.6	18.7	-0.2	-0.6	-1.3	-1.8
		5	SR 241 SB south of SR 91	3	1001				14.7	14.7	14.6	14.3	14.5	14.7	14.6	14.0	-0.2	0.0	0.0	-0.3
		7	SR 71 NB north of SR 91	4	1002	1003	1004		21.2	21.8	22.3	22.0	21.0	21.2	21.1	20.2	-0.2	-0.6	-1.3	-1.8
2	SR 91 EB EXP Lanes west of Weir Canyon Rd	3	SR 91 EB GP Lanes east of Serfas Club Rd	5	2002	2003	2005		8.8	9.2	9.7	9.9	8.7	8.7	8.7	8.6	-0.1	-0.5	-1.0	-1.3
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	6	2002	2003	2005		8.4	8.4	8.4	8.4	8.5	8.5	8.5	8.4	0.0	0.0	0.0	0.0
		7	SR 71 NB north of SR 91	7	2002	2003	2004		10.2	10.6	11.2	11.4	10.1	10.2	10.2	10.1	-0.1	-0.5	-1.0	-1.3
3	SR 91 WB GP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	8	1011	1012	1014		8.7	8.7	8.7	8.5	8.5	8.5	8.5	8.5	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	9	1011	1012	2014		8.6	8.6	8.6	8.5	8.5	8.5	8.5	8.4	-0.1	-0.1	-0.1	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	10	1011	1012	1013		11.0	11.1	11.0	10.9	10.9	11.0	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	11	1011	1012	2013		n/a	n/a	n/a	n/a	10.9	10.9	10.8	10.8	-0.2	-0.2	-0.2	-0.1
		7	SR 71 NB north of SR 91	12	1010				5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0
4	SR 91 WB EXP Lanes east of Serfas Club Rd	1	SR 91 WB GP Lanes west of Weir Canyon Rd	13	2011	2012	2014		8.6	8.7	8.6	8.5	8.5	8.5	8.5	8.5	-0.1	-0.1	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	14	2011	2012	2014		8.4	8.4	8.4	8.3	8.4	8.4	8.4	8.4	0.0	0.0	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	15	2011	2012	2013		11.0	11.0	11.0	10.9	10.9	10.9	10.9	10.9	-0.1	-0.1	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	16	2011	2012	2013		n/a	n/a	n/a	n/a	10.8	10.8	10.7	10.7	-0.2	-0.3	-0.3	-0.2
5	SR 241 NB south of SR 91 (via GP Ramp)	1	SR 91 WB GP Lanes west of Weir Canyon Rd	17	1006				7.2	7.2	7.5	7.3	7.2	7.2	7.3	7.2	0.0	0.0	-0.2	-0.1
		3	SR 91 EB GP Lanes east of Serfas Club Rd	18	1007	1003	1005		11.2	11.6	12.7	12.6	11.0	11.1	11.1	11.0	-0.2	-0.6	-1.6	-1.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	19	1007	1003	2005		11.2	11.6	12.7	12.5	11.0	11.0	11.0	11.0	-0.2	-0.5	-1.6	-1.5
		7	SR 71 NB north of SR 91	20	1007	1003	1004		12.6	13.1	14.2	14.0	12.5	12.5	12.5	12.5	-0.2	-0.5	-1.6	-1.5
6	SR 241 NB south of SR 91 (via EXP Ramp)	3	SR 91 EB GP Lanes east of Serfas Club Rd	21	2007	1003	1005		n/a	n/a	n/a	n/a	11.0	11.0	11.1	11.0	-0.2	-0.6	-1.6	-1.5
		4	SR 91 EB EXP Lanes east of Serfas Club Rd	22	2007	2003	2005		n/a	n/a	n/a	n/a	10.8	10.8	10.8	10.8	-0.3	-0.7	-1.8	-1.7
		7	SR 71 NB north of SR 91	23	2007	1003	1004		n/a	n/a	n/a	n/a	12.5	12.5	12.5	12.5	-0.2	-0.6	-1.6	-1.6
7	SR 71 SB north of SR 91	1	SR 91 WB GP Lanes west of Weir Canyon Rd	24	1009	1012	1014		10.0	10.1	10.0	9.8	9.9	9.9	9.9	9.8	-0.1	-0.2	-0.1	0.0
		2	SR 91 WB EXP Lanes west of Weir Canyon Rd	25	1009	1012	2014		9.9	10.0	9.9	9.8	9.8	9.8	9.8	9.7	-0.1	-0.2	-0.1	0.0
		3	SR 91 EB GP Lanes east of Serfas Club Rd	26	1008				5.7	5.7	5.6	5.4	5.8	5.9	5.6	5.4	0.0	0.1	0.0	0.0
		5	SR 241 SB south of SR 91 (Via GP Ramp)	27	1009	1012	1013		12.4	12.5	12.4	12.2	12.3	12.3	12.3	12.2	-0.1	-0.2	-0.1	0.0
		6	SR 241 SB south of SR 91 (Via EXP Ramp)	28	1009	1012	2013		n/a	n/a	n/a	n/a	12.2	12.2	12.2	12.1	-0.2	-0.2	-0.2	-0.1

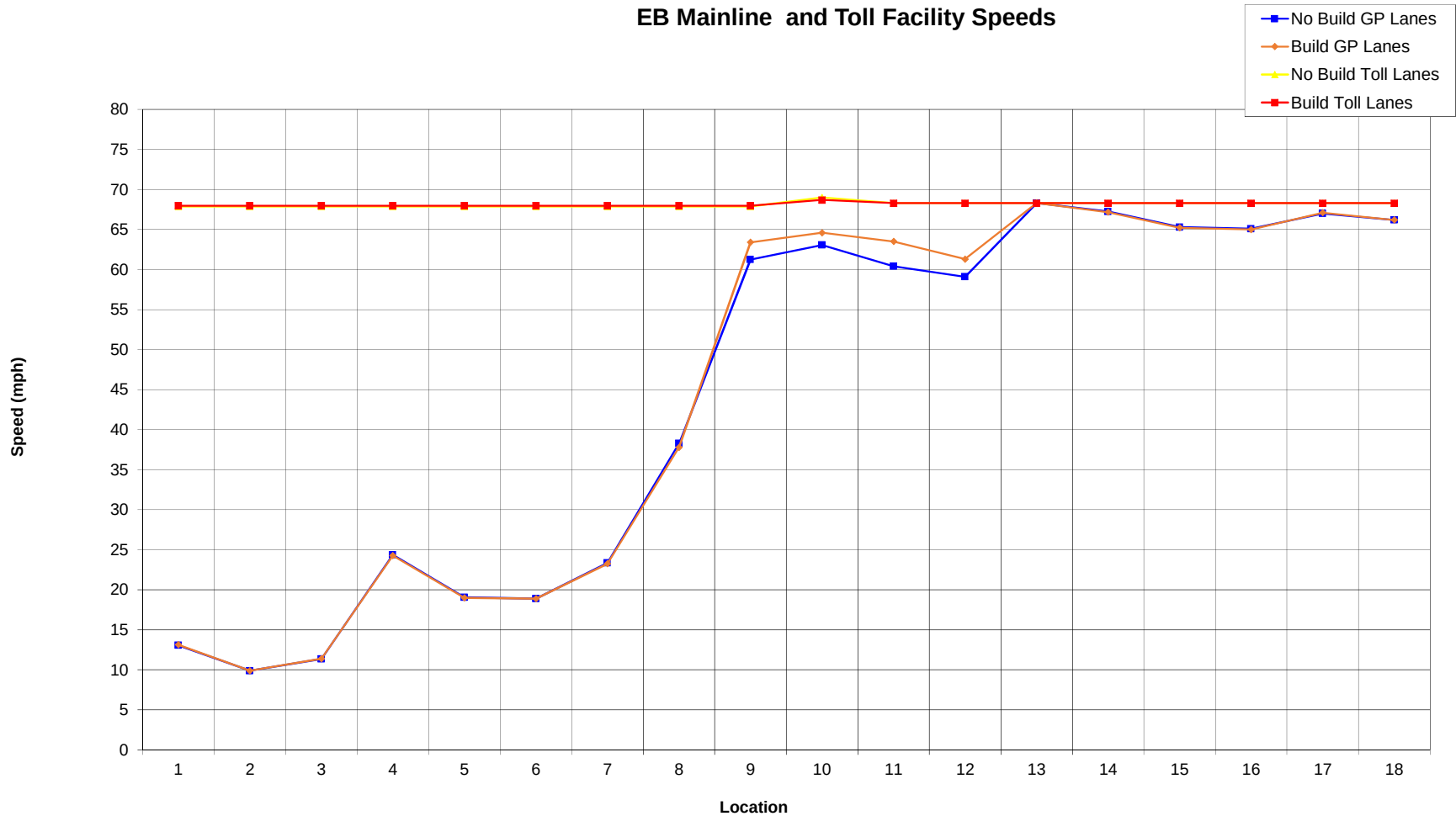
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

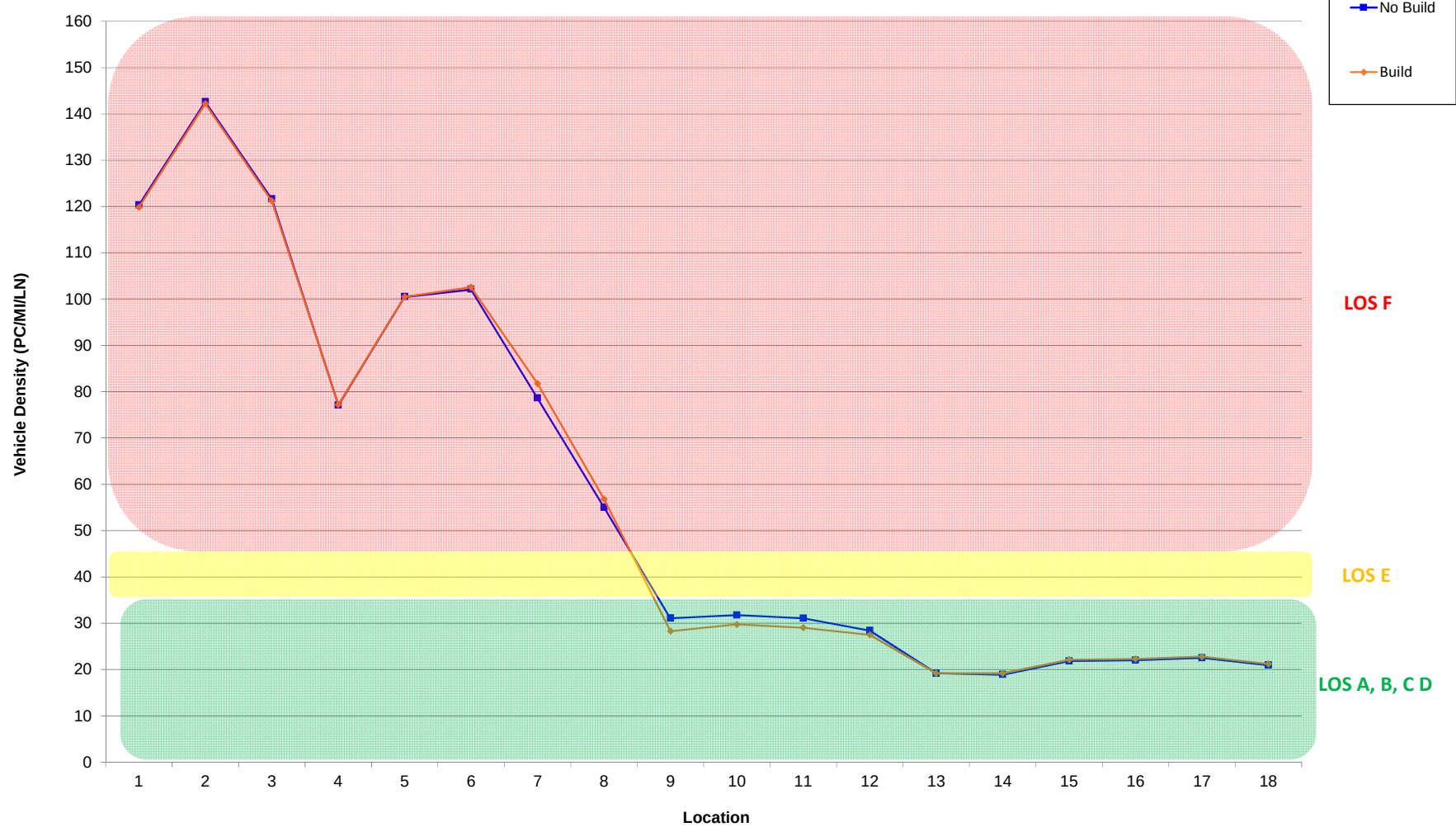


EB Mainline and Toll Facility Speeds

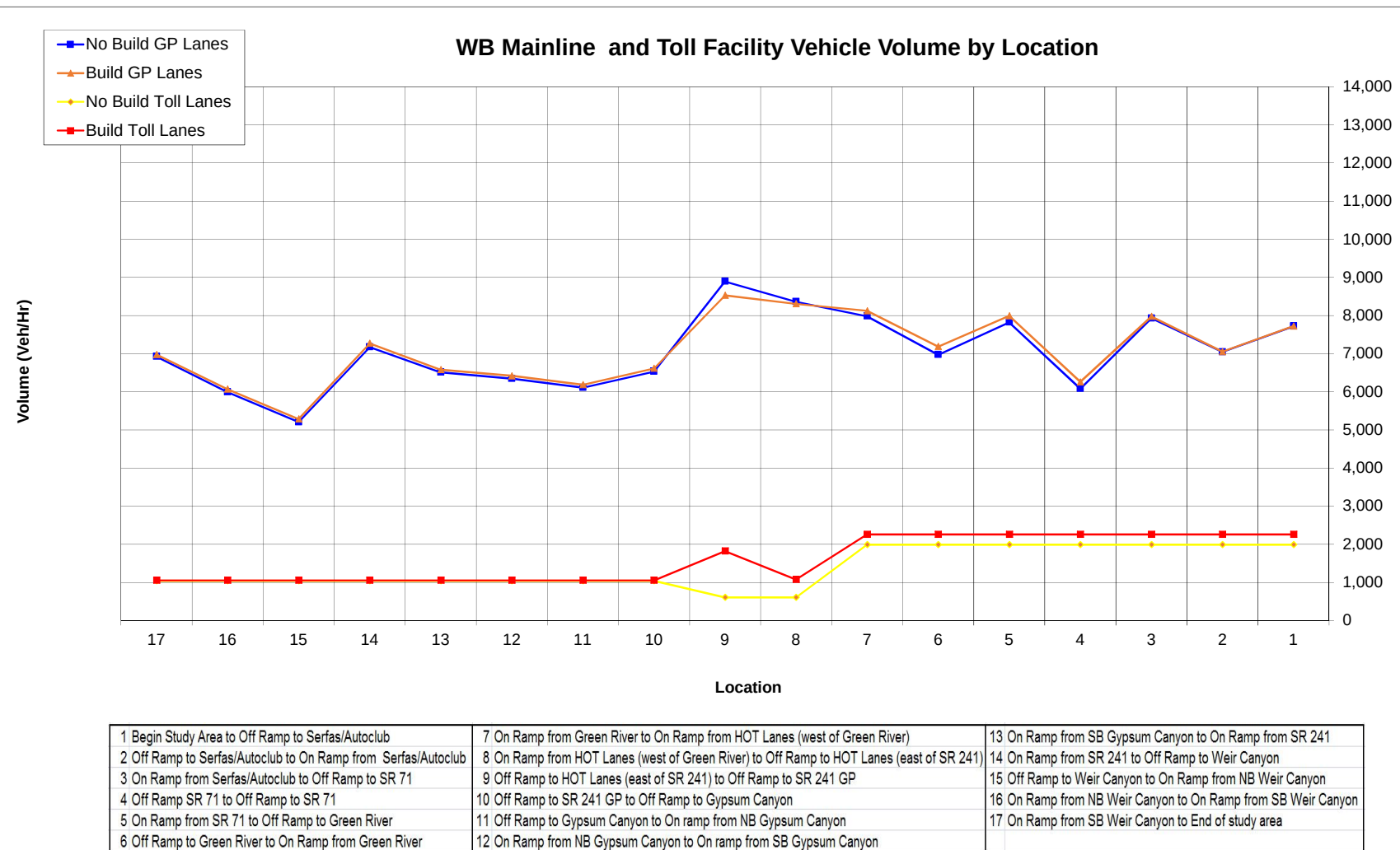


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

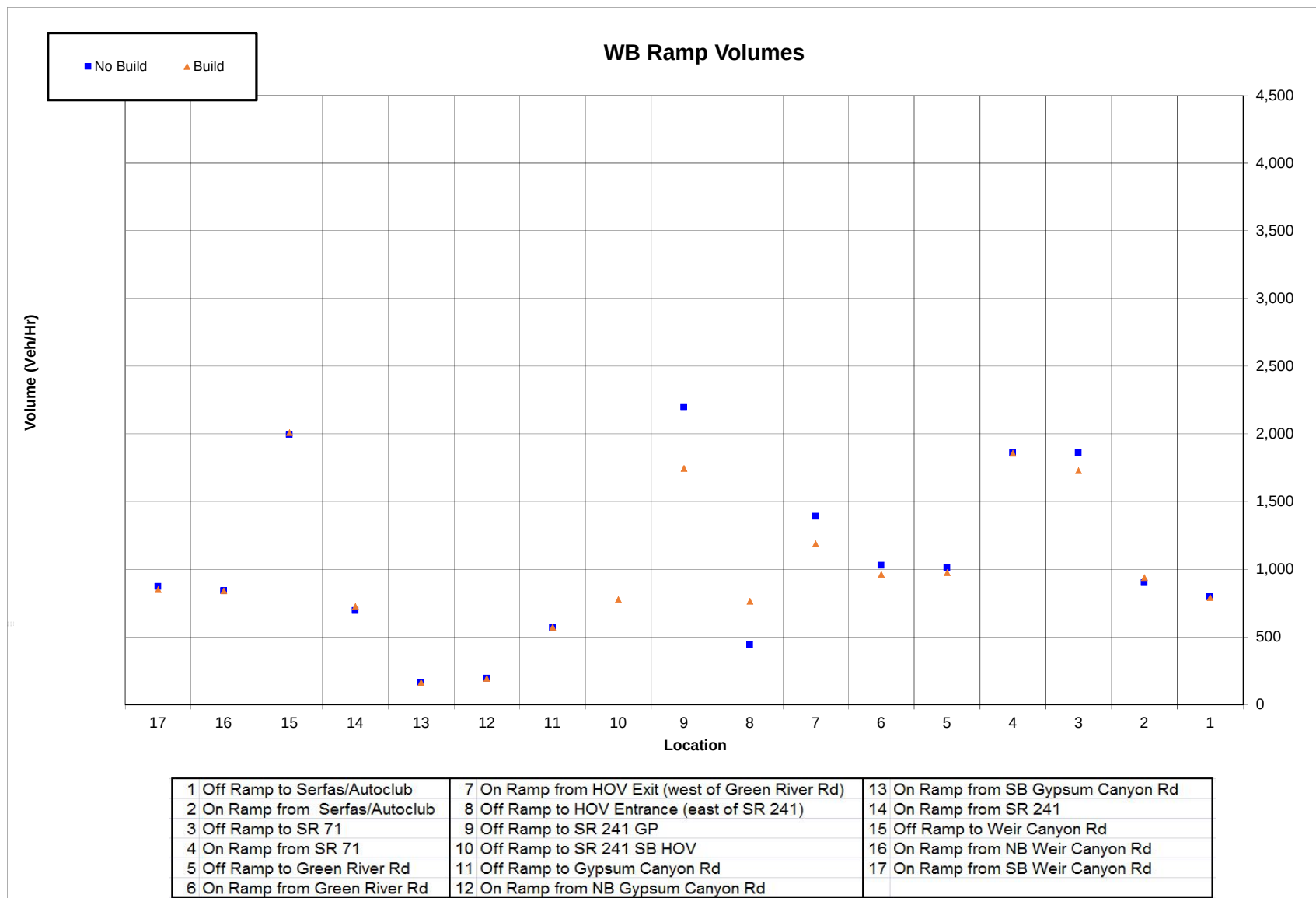
EB Mainline Vehicle Density and LOS



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

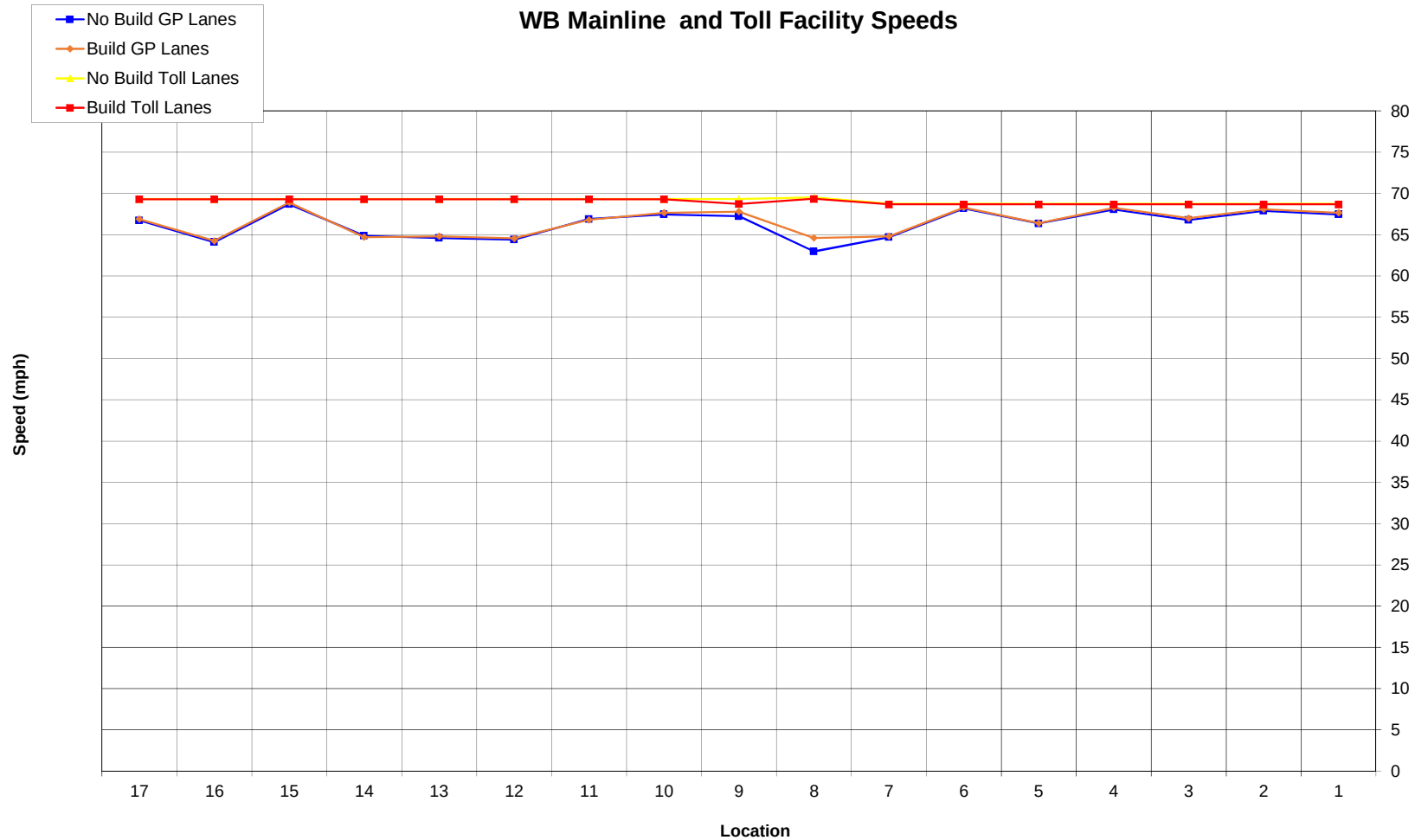


Charts 3-4 PM

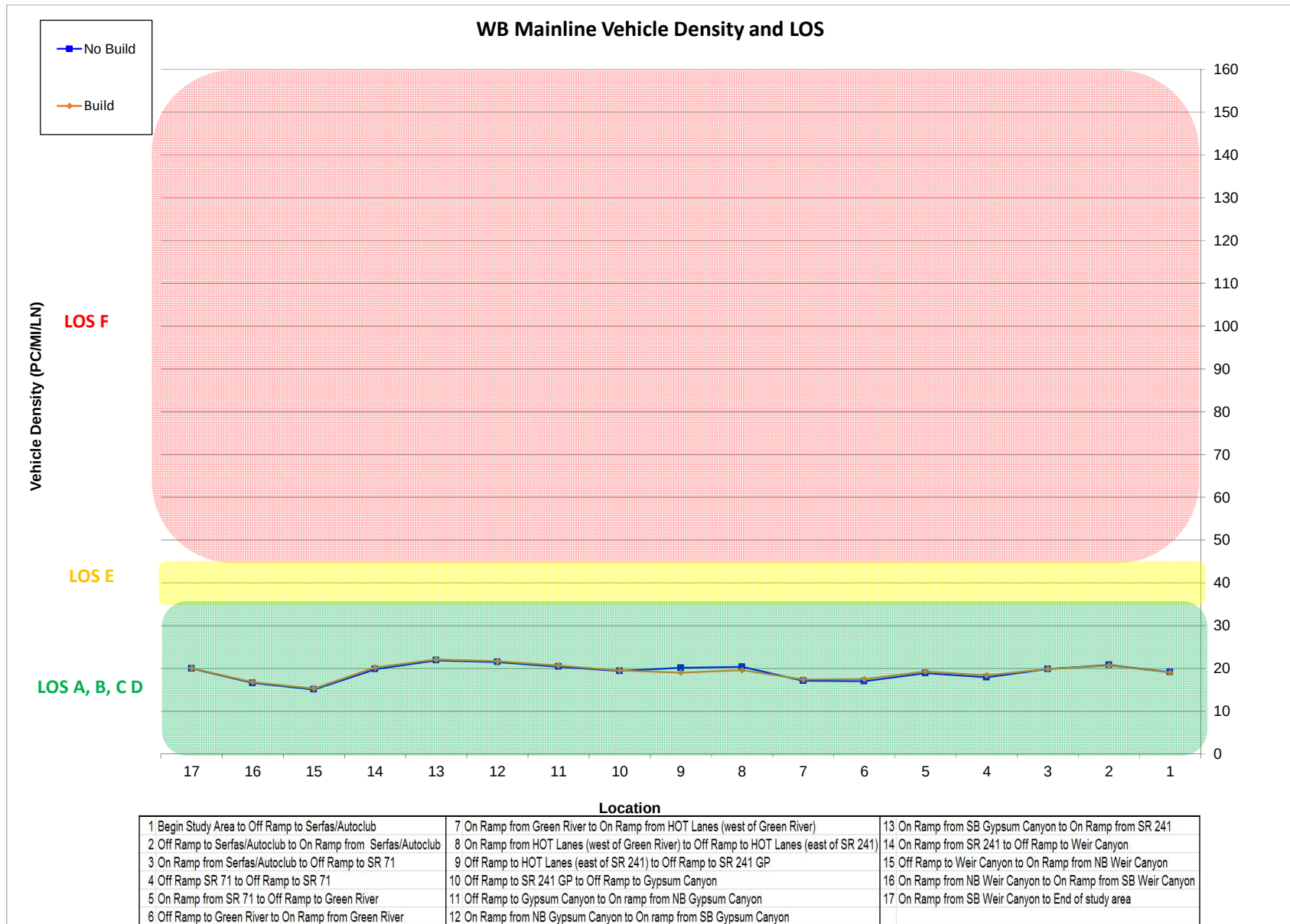


Charts 3-4 PM

WB Mainline and Toll Facility Speeds

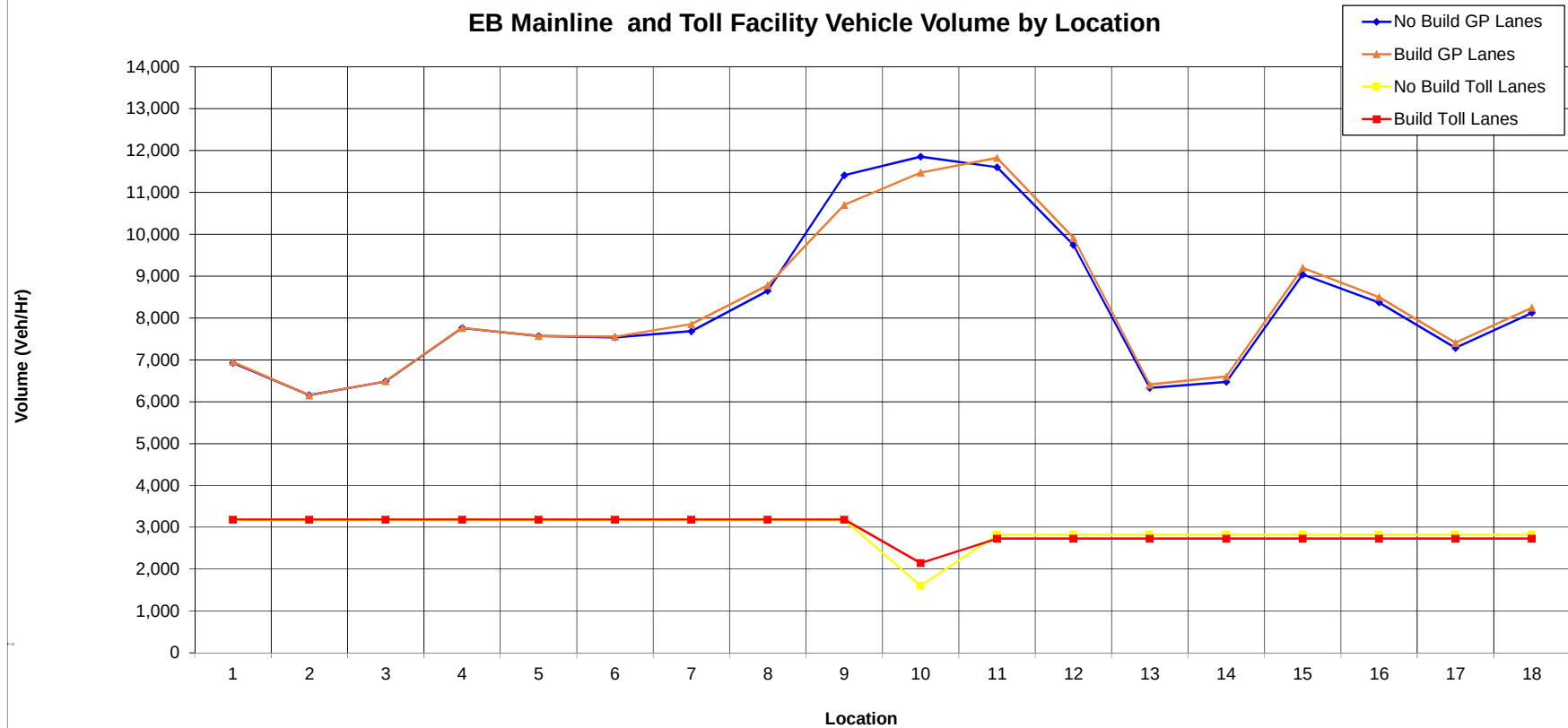


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

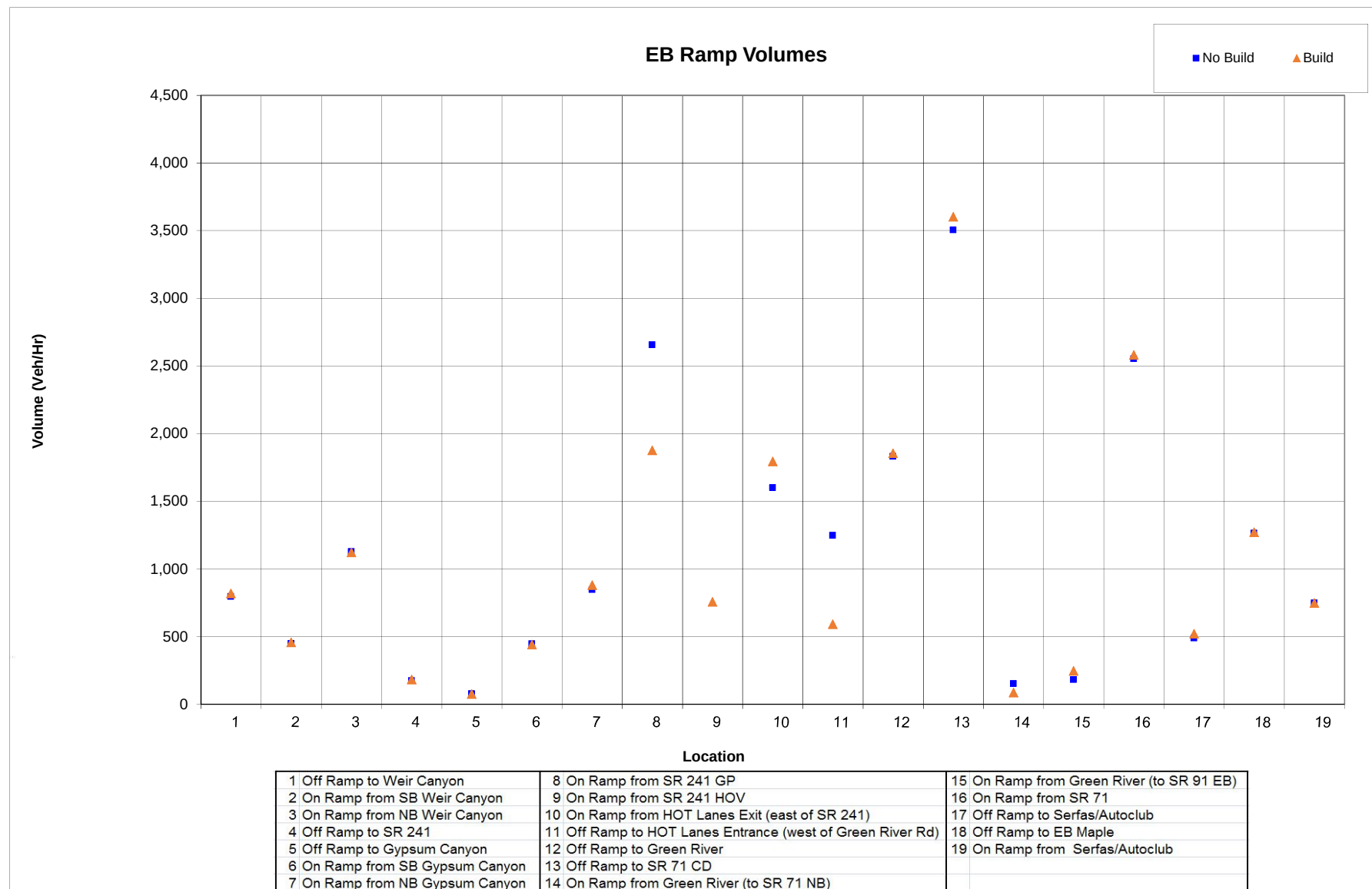


Charts 3-4 PM

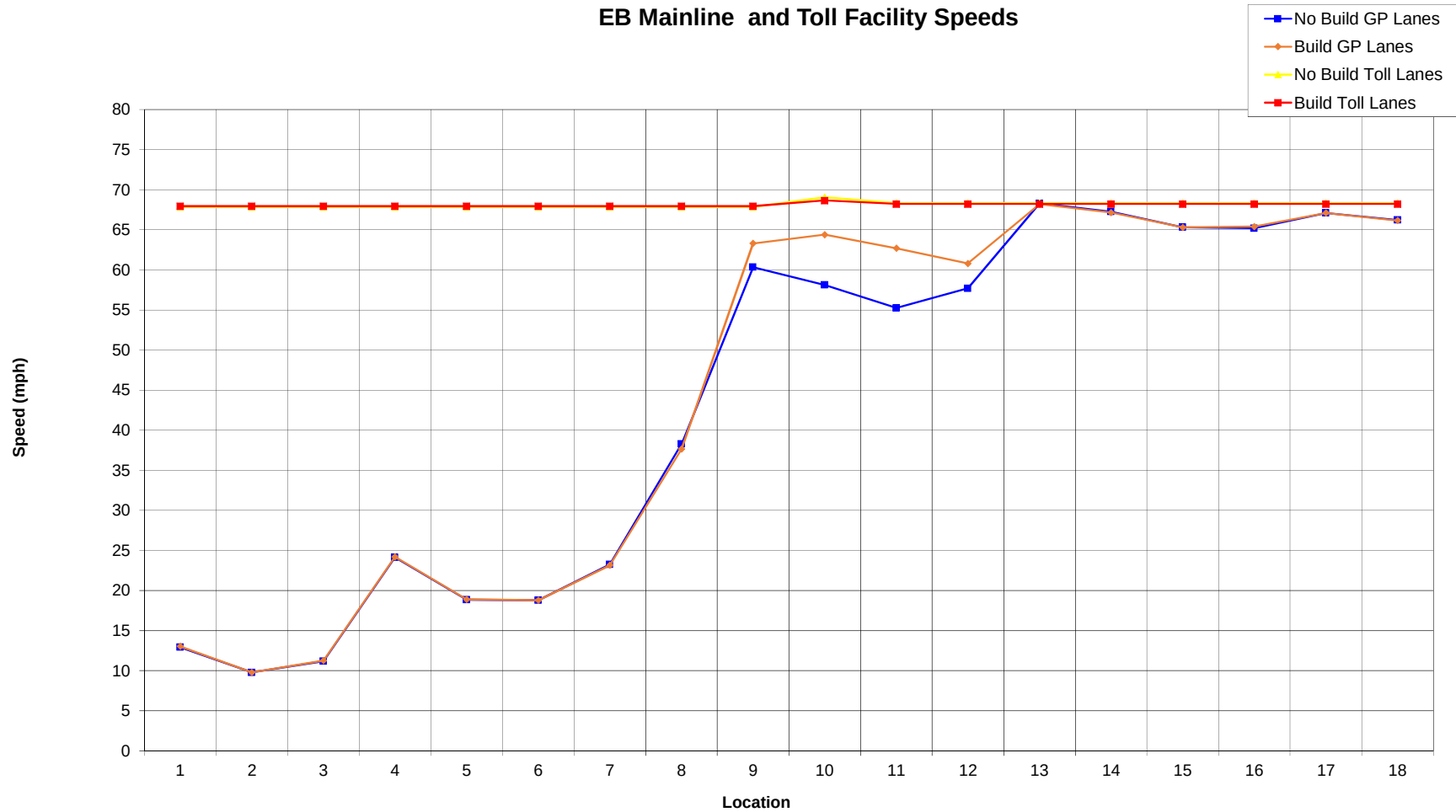
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

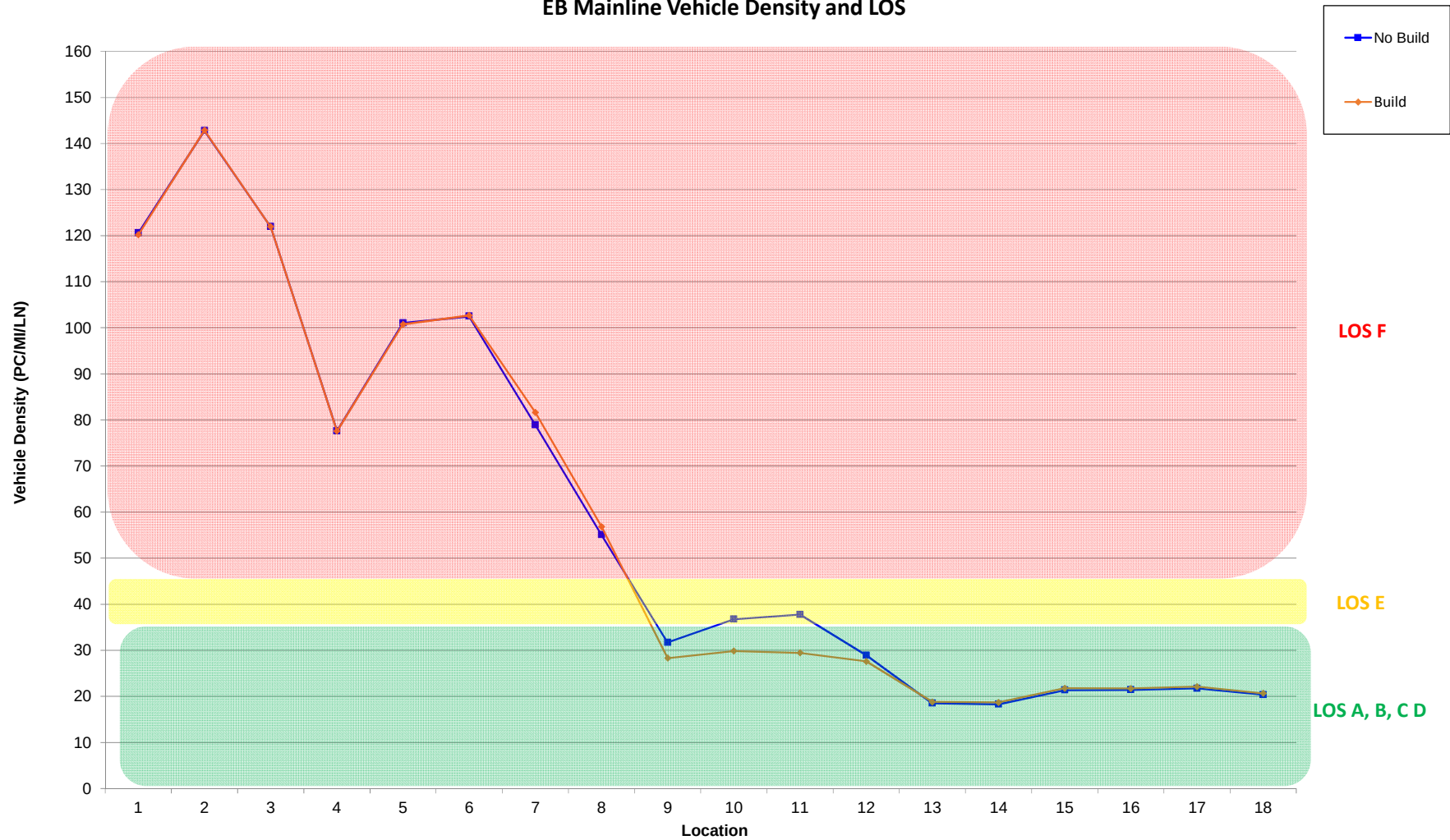


EB Mainline and Toll Facility Speeds

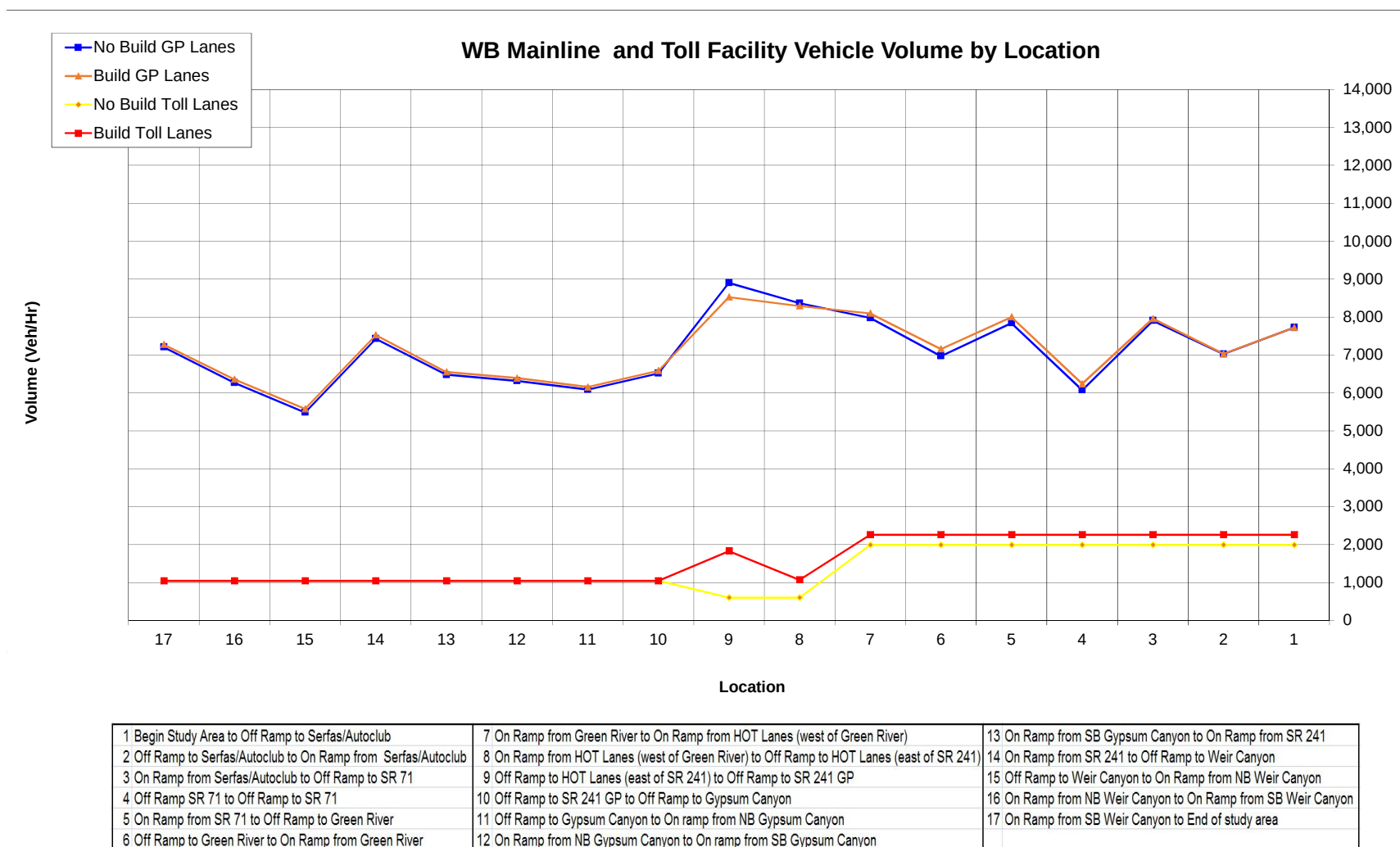


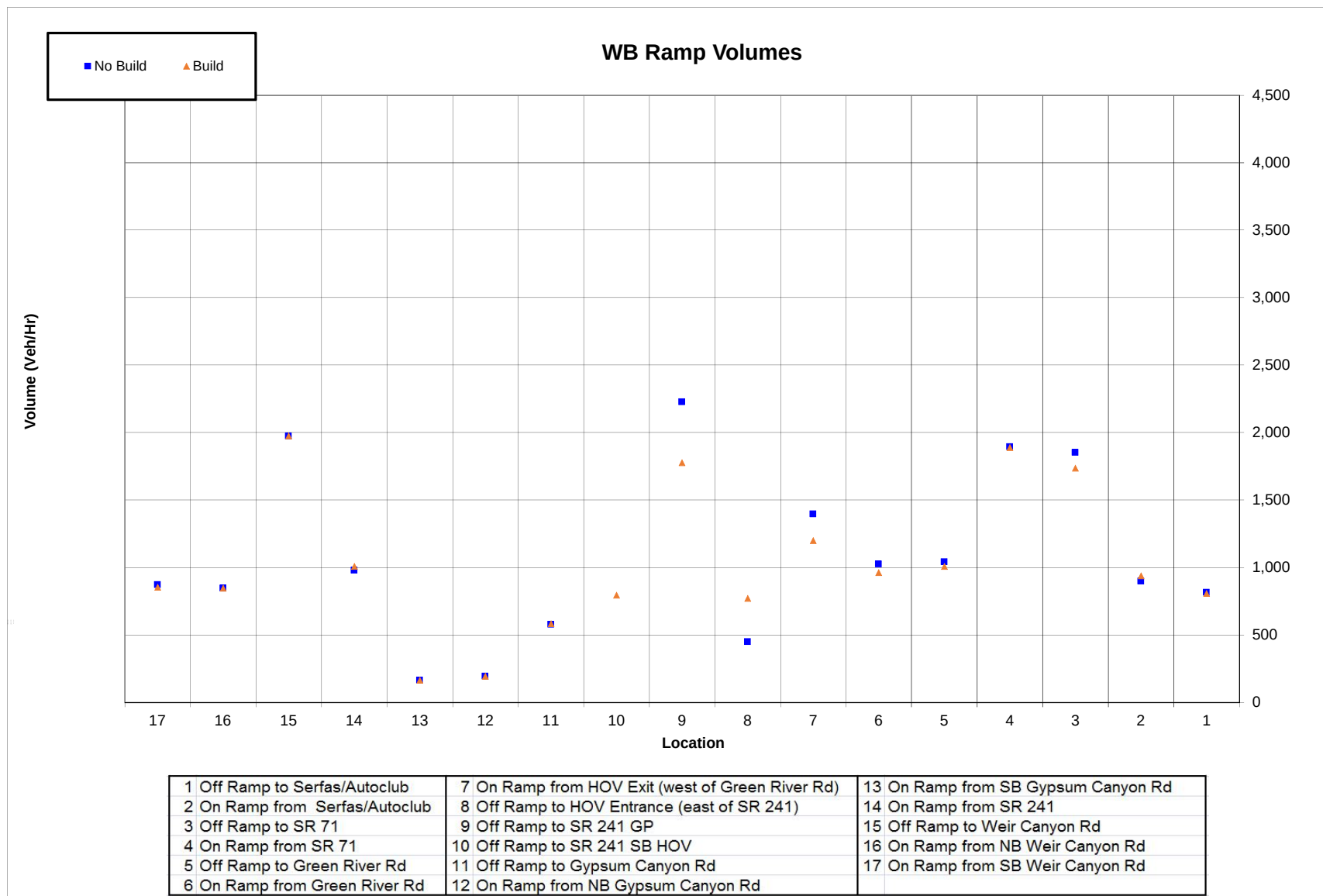
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



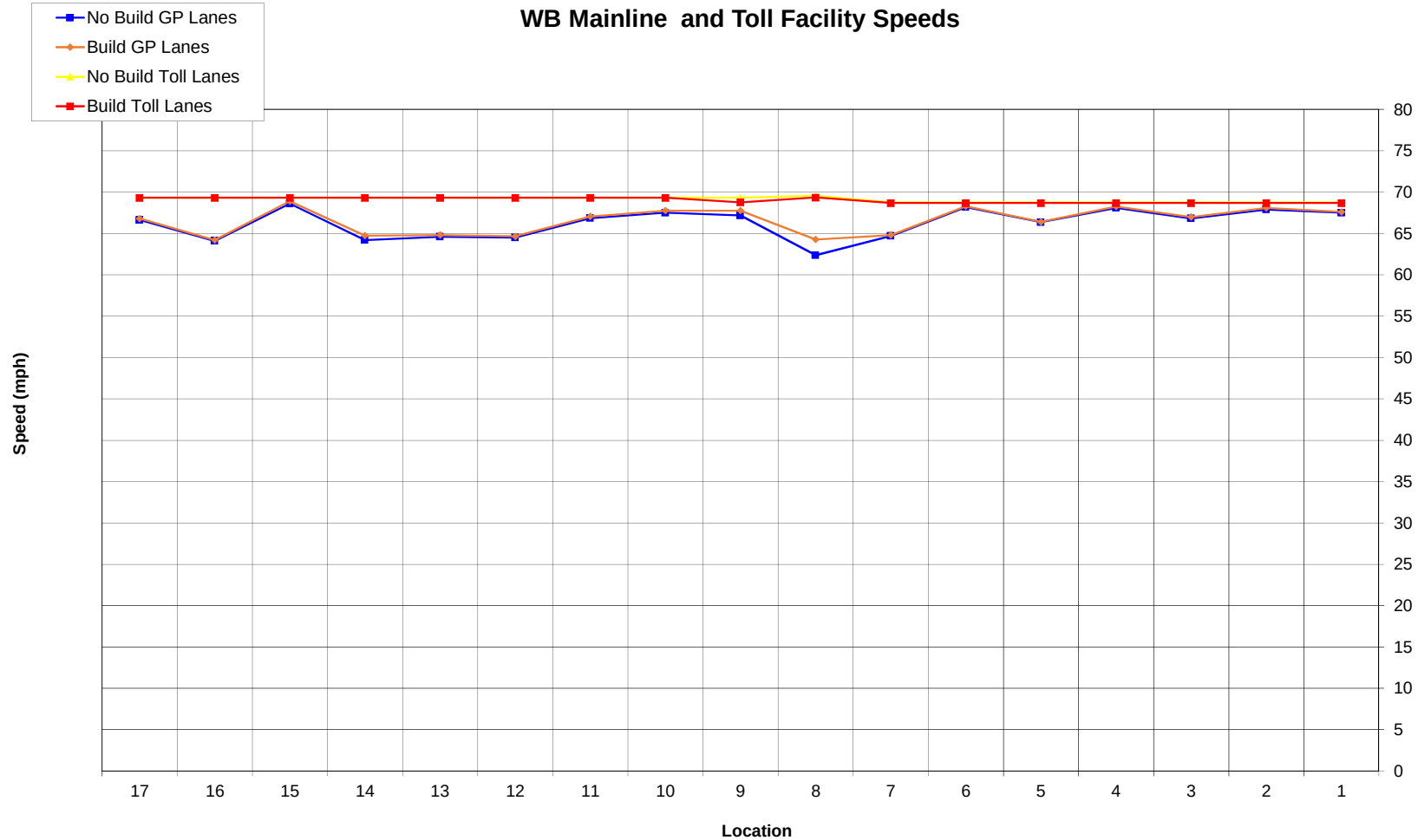
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area





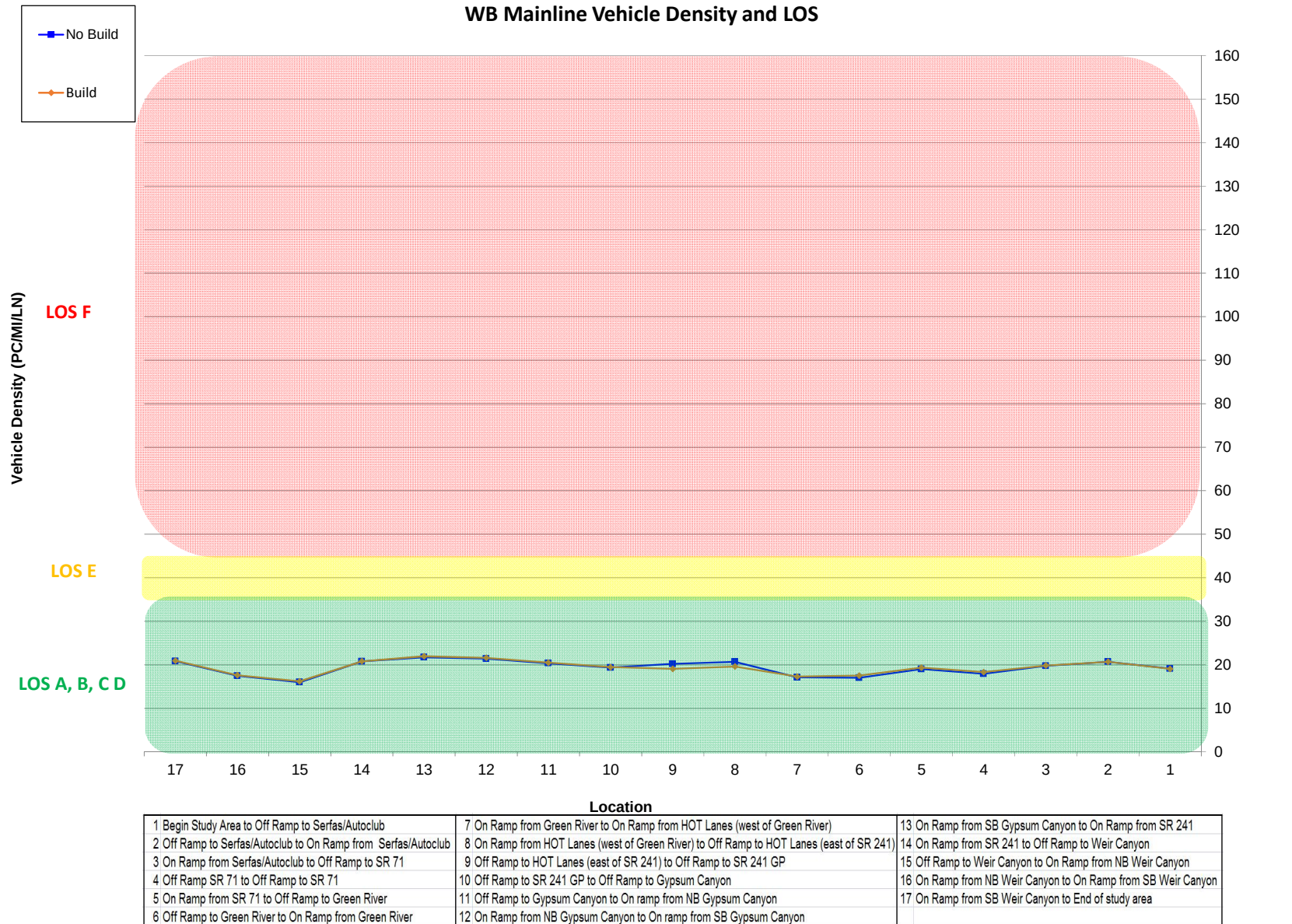
Charts 4-5 PM

WB Mainline and Toll Facility Speeds

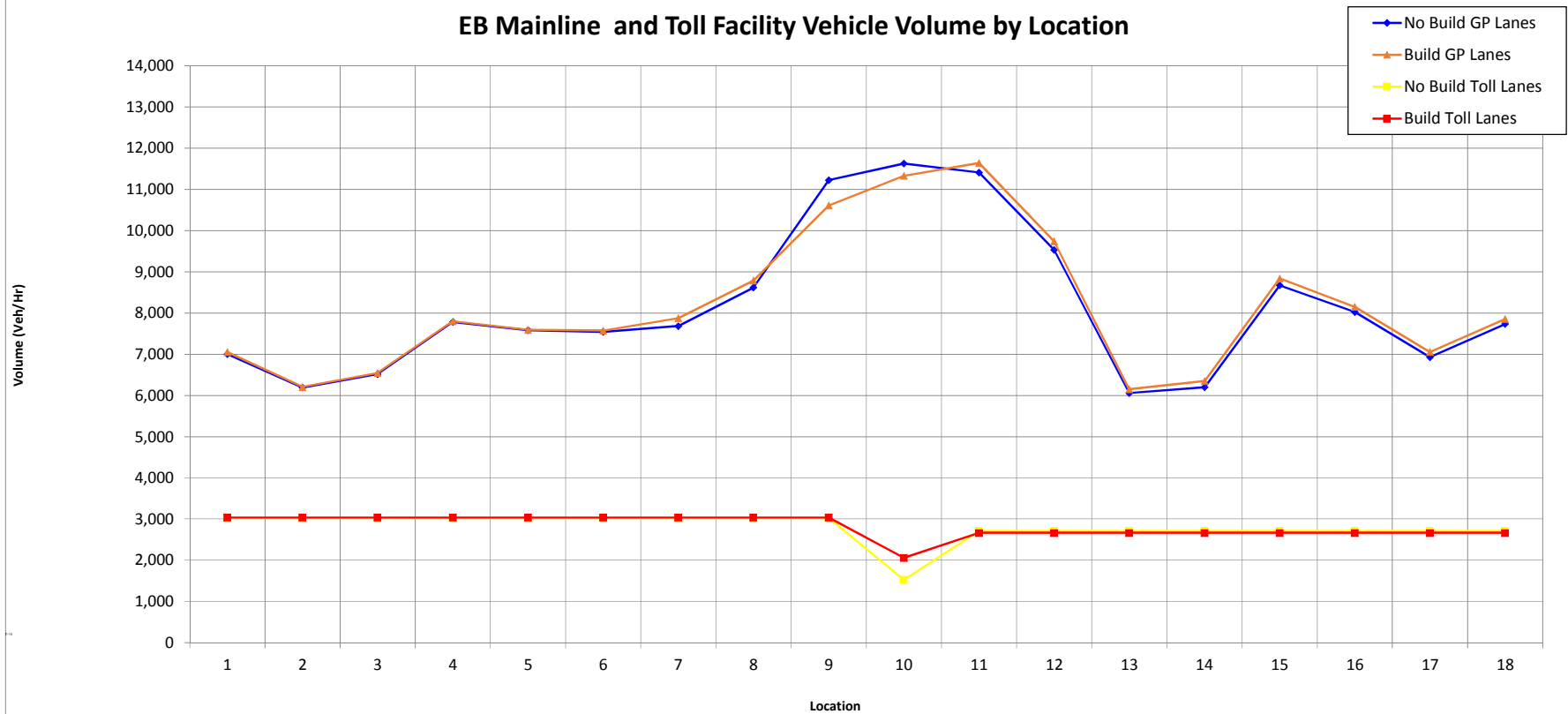


1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	

WB Mainline Vehicle Density and LOS



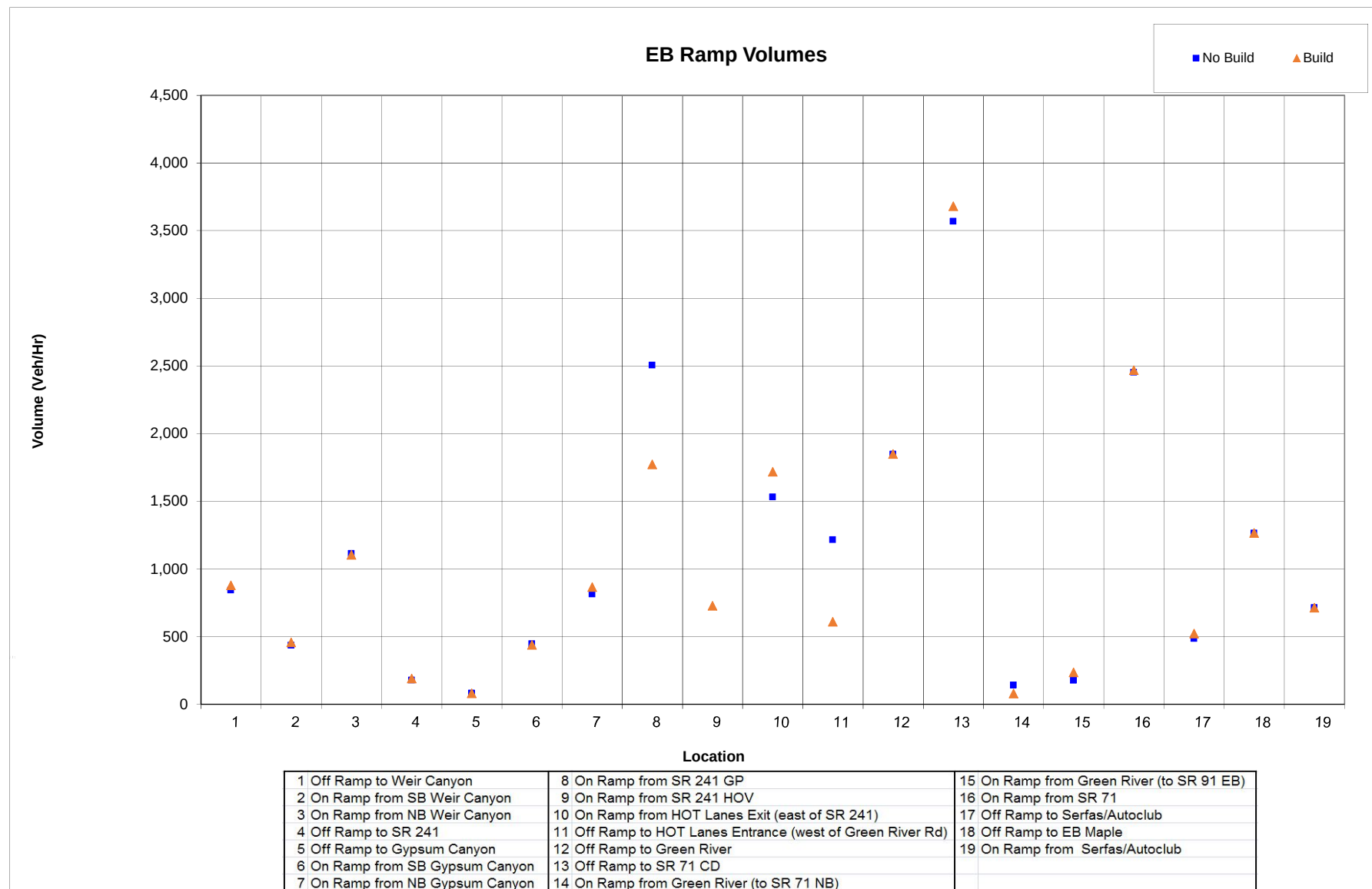
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon
 2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon
 3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon
 4 On Ramp from NB Weir Canyon to Off Ramp to SR 241
 5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon
 6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon

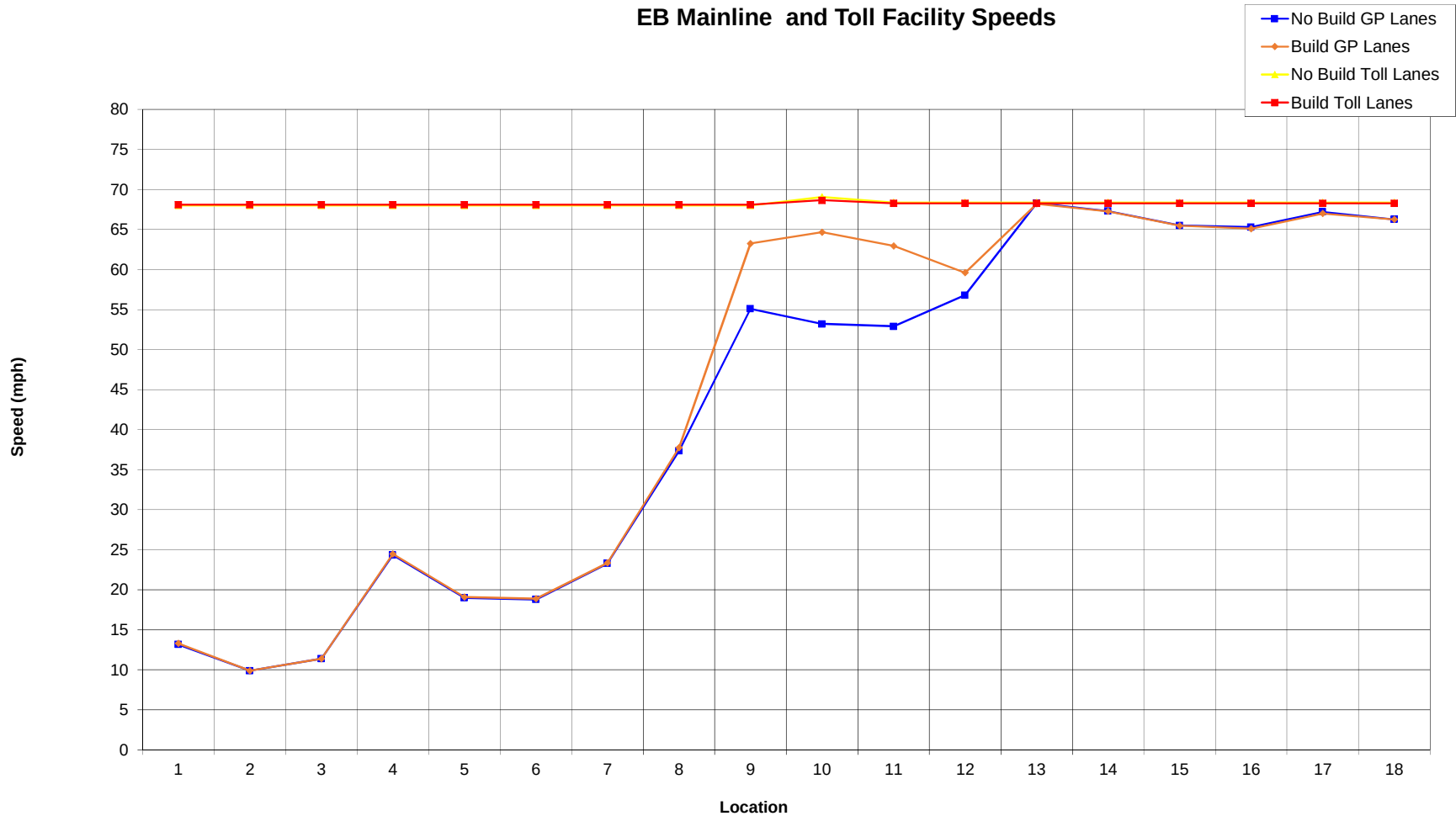
7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon
 8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP
 9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)
 10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)
 11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River
 12 Off Ramp to Green River to Off Ramp to SR 71 CD

13 Off Ramp to SR 71 CD to On Ramp from Green River
 14 On Ramp from Green River to On Ramp from SR 71
 15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
 16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
 17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
 18 On Ramp from Serfas/Autoclub to End of Study Area



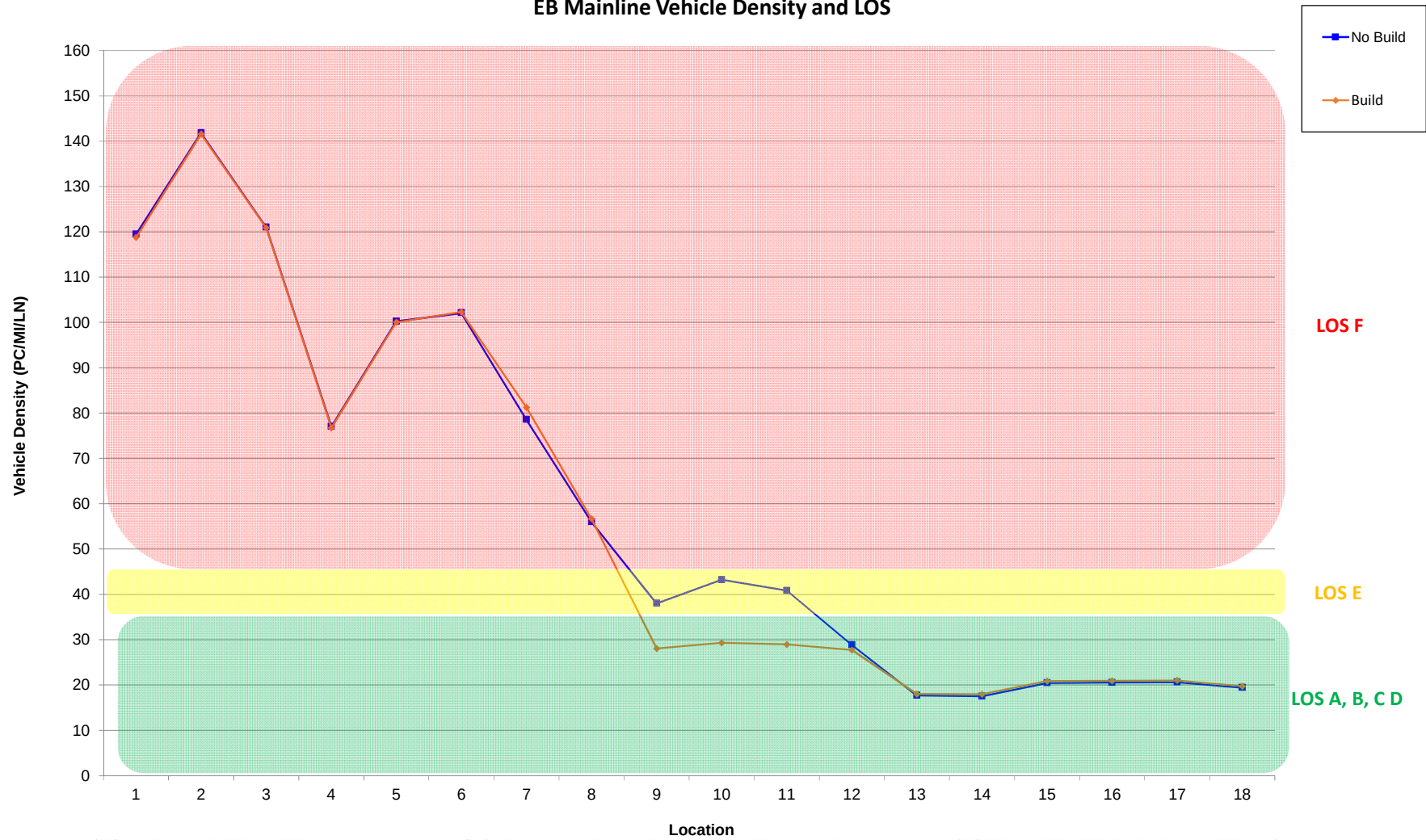
Charts 5-6 PM

EB Mainline and Toll Facility Speeds

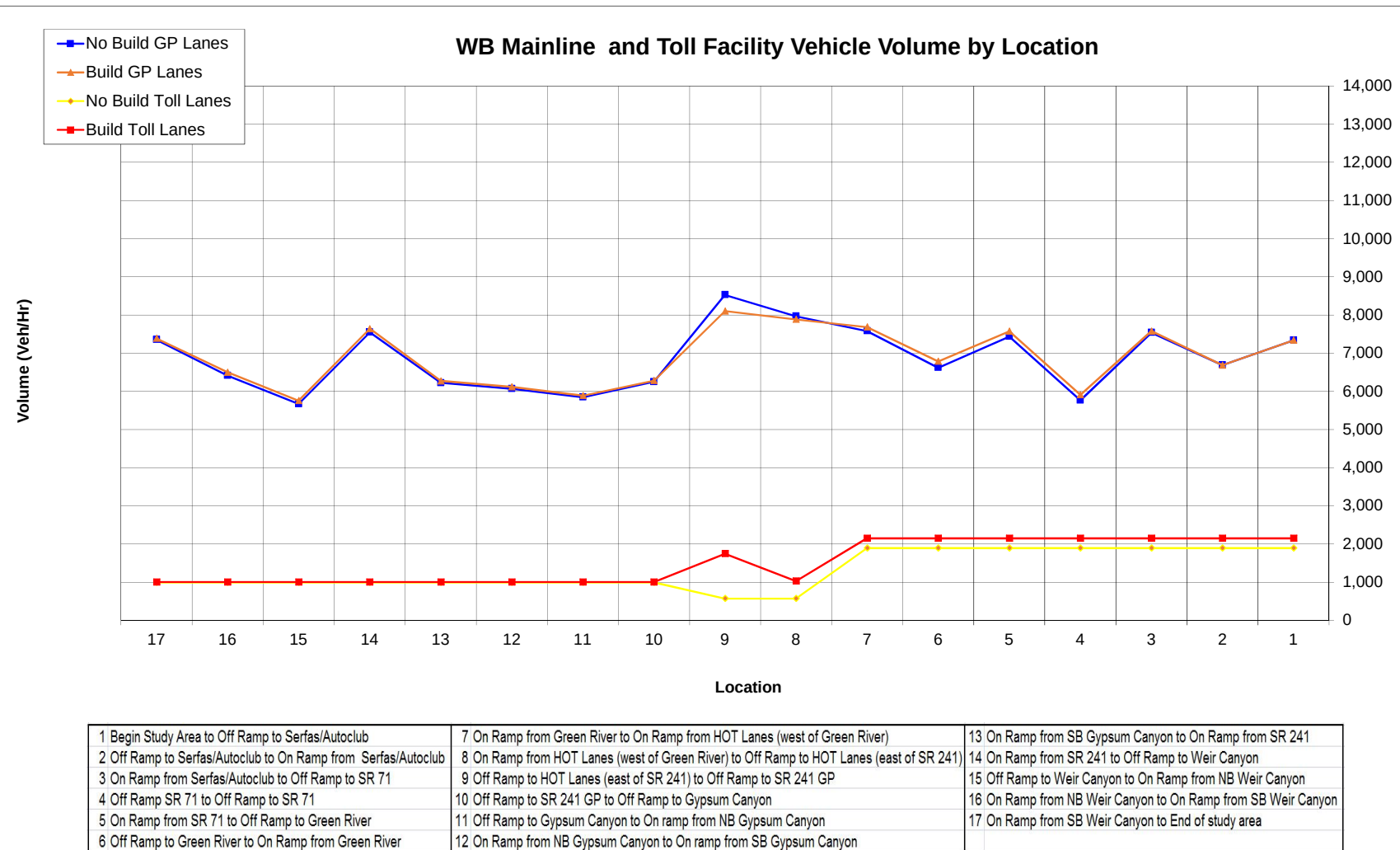


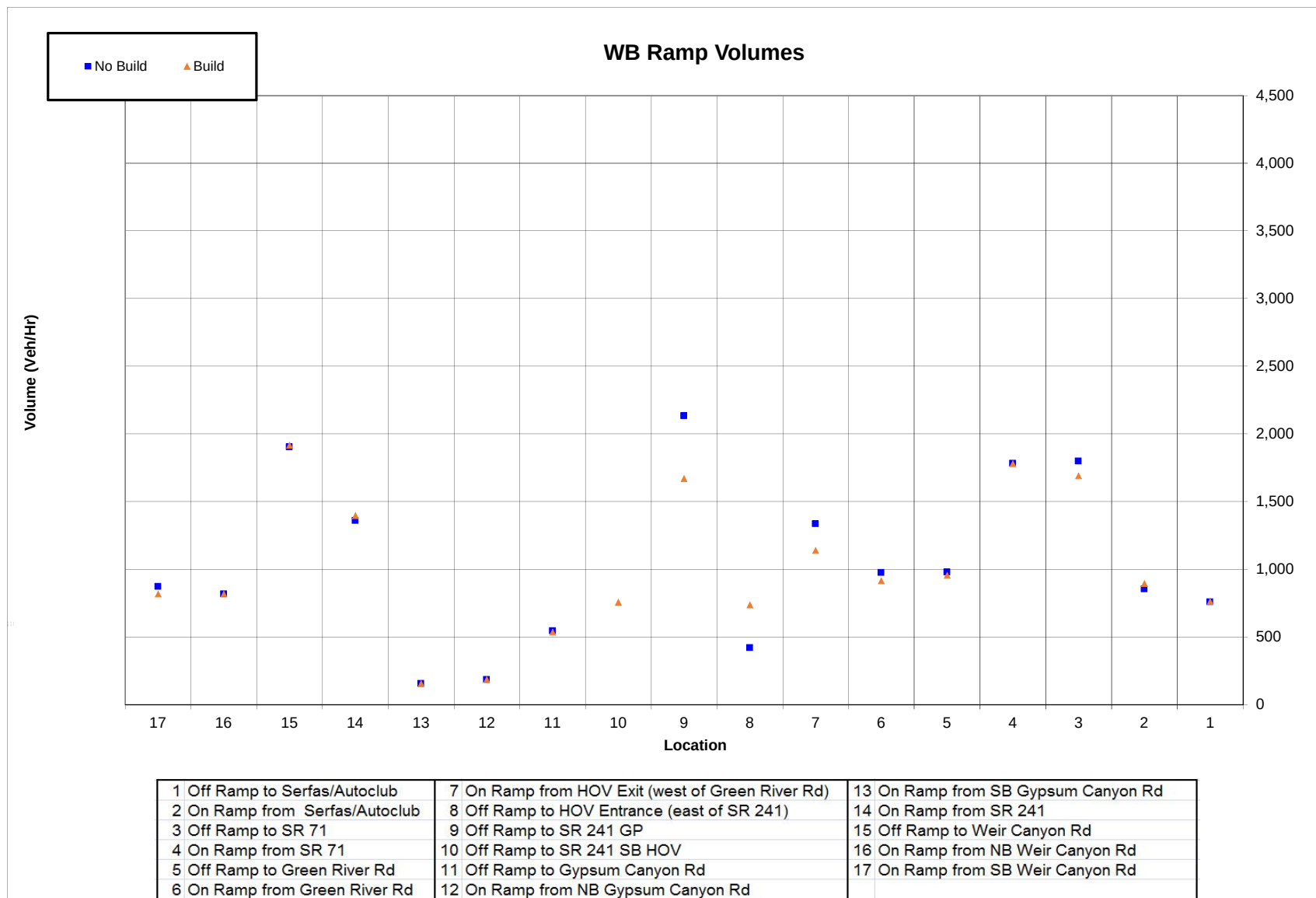
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS



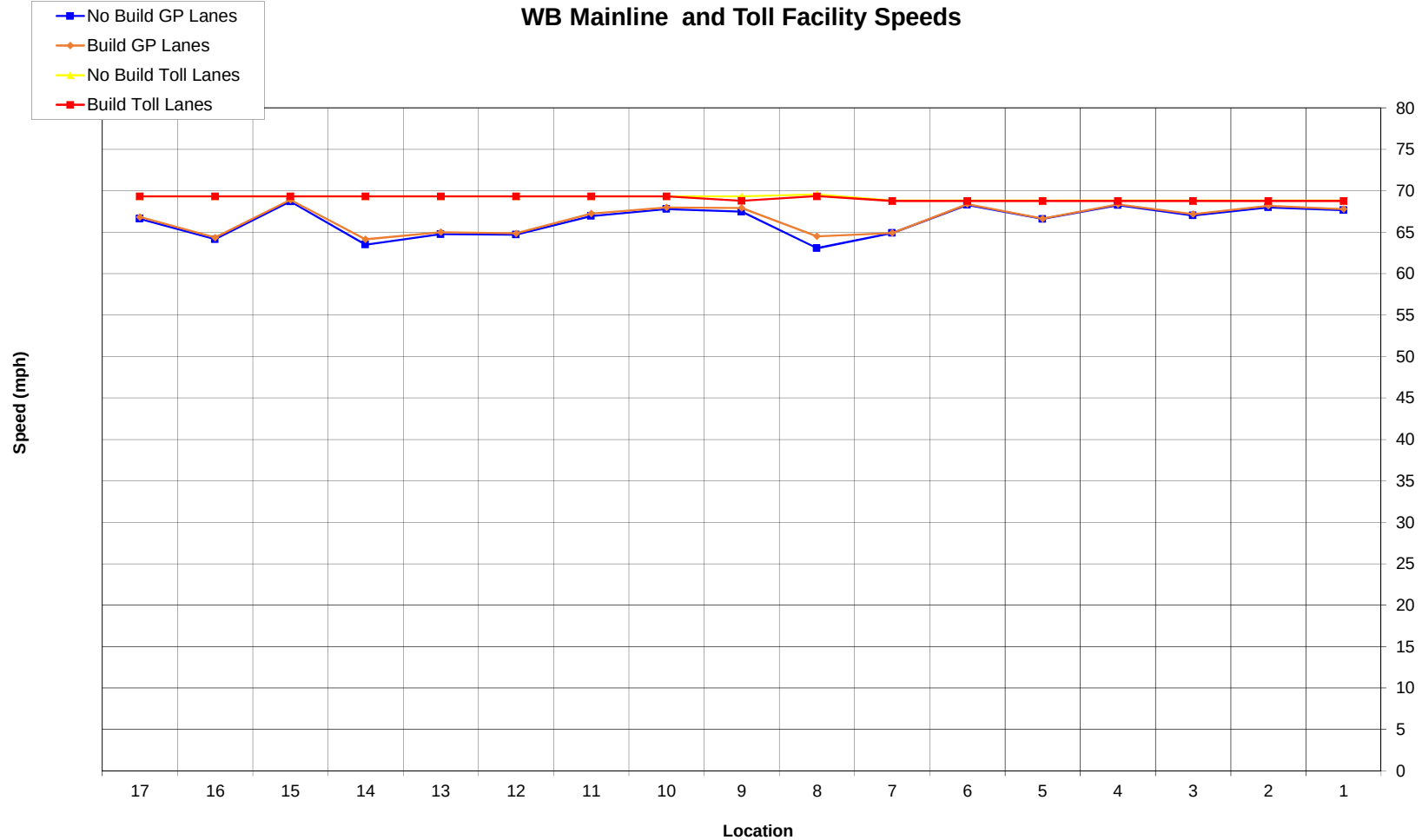
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area



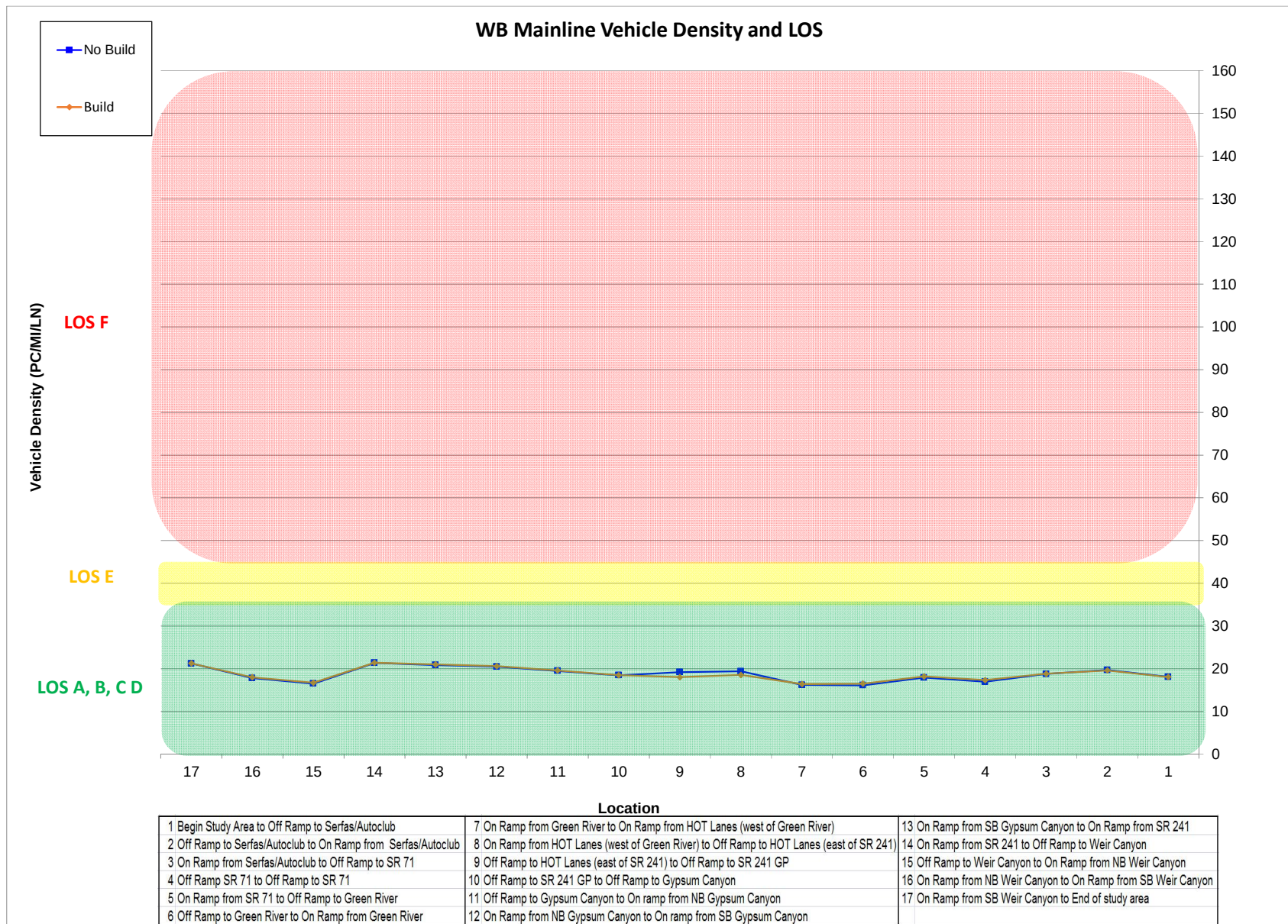


Charts 5-6 PM

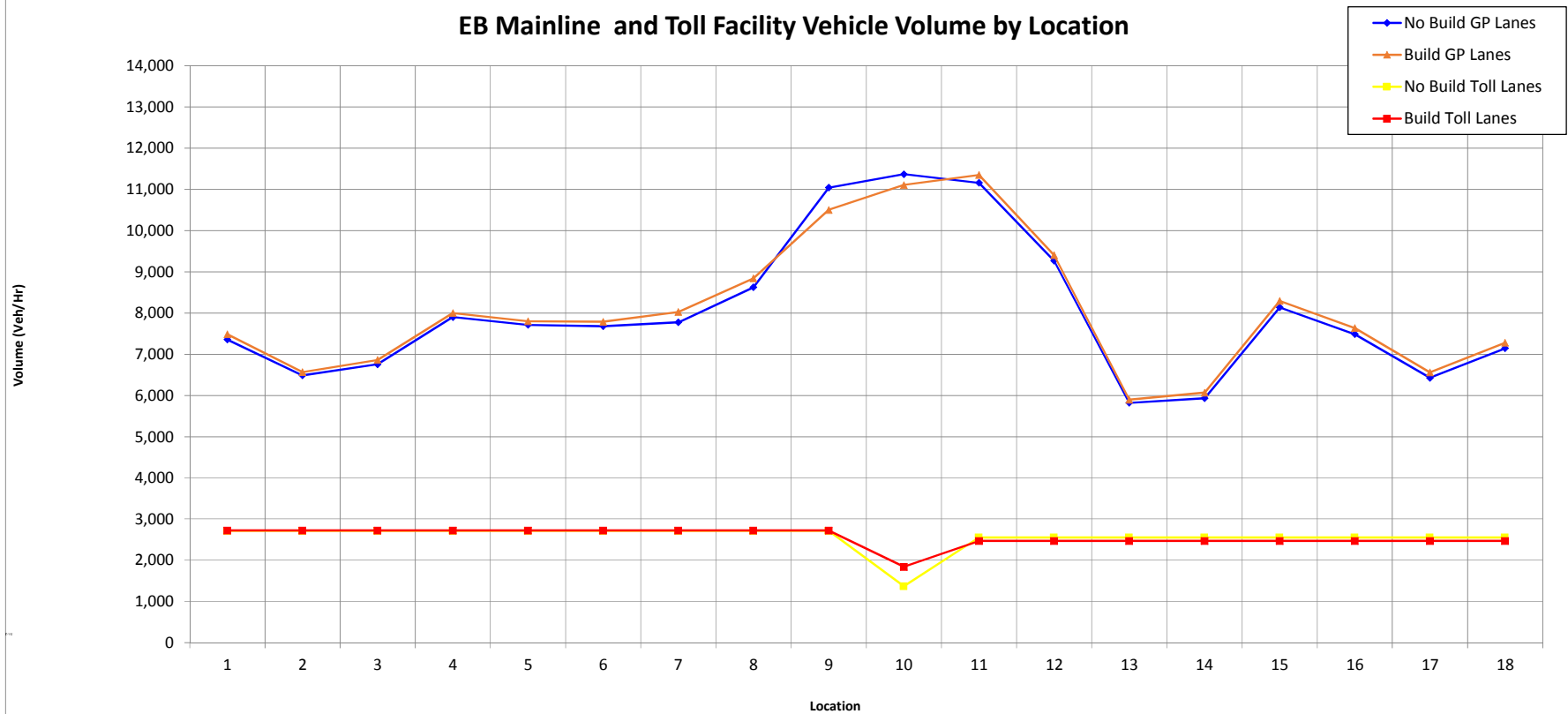
WB Mainline and Toll Facility Speeds



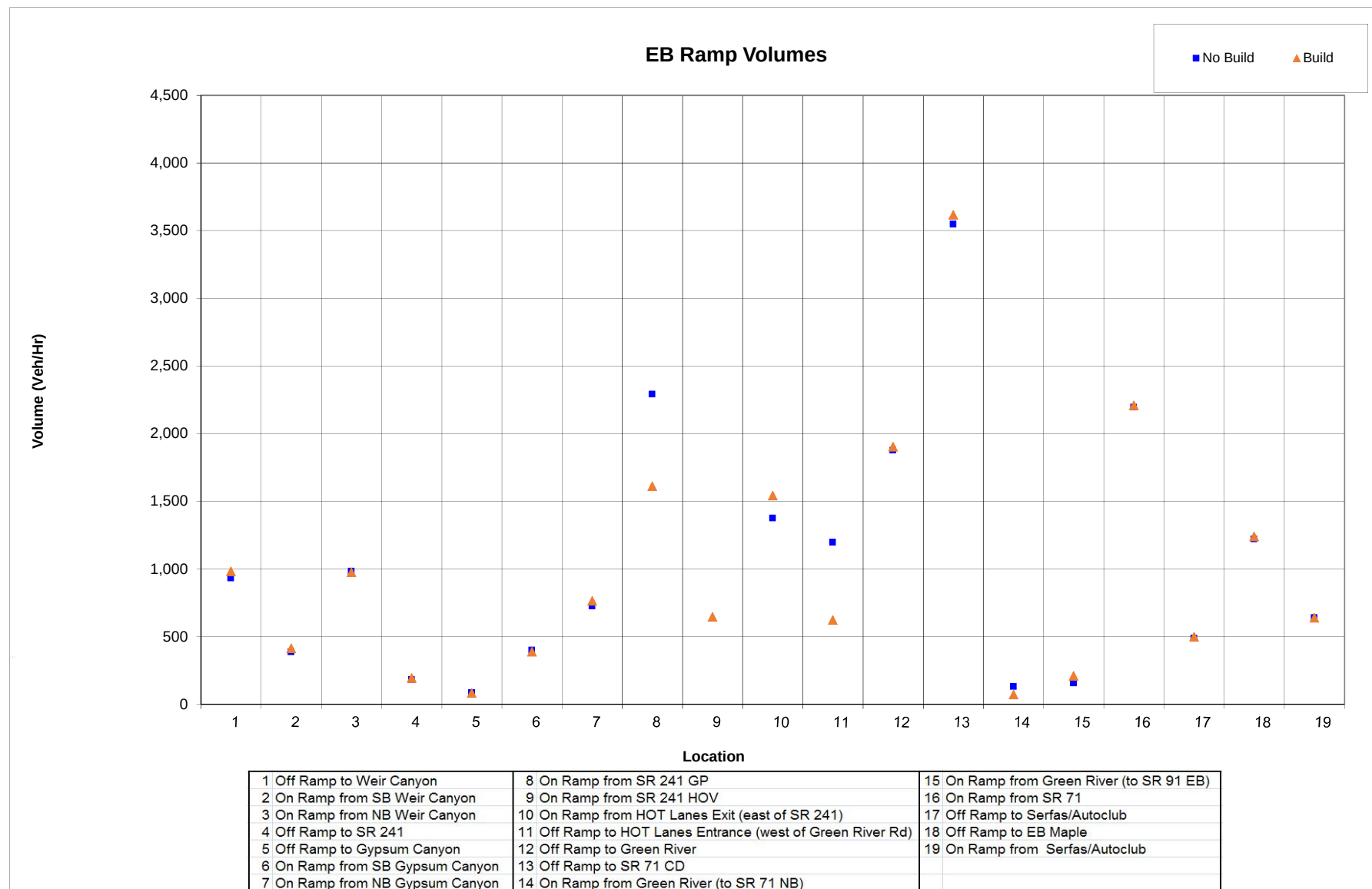
1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



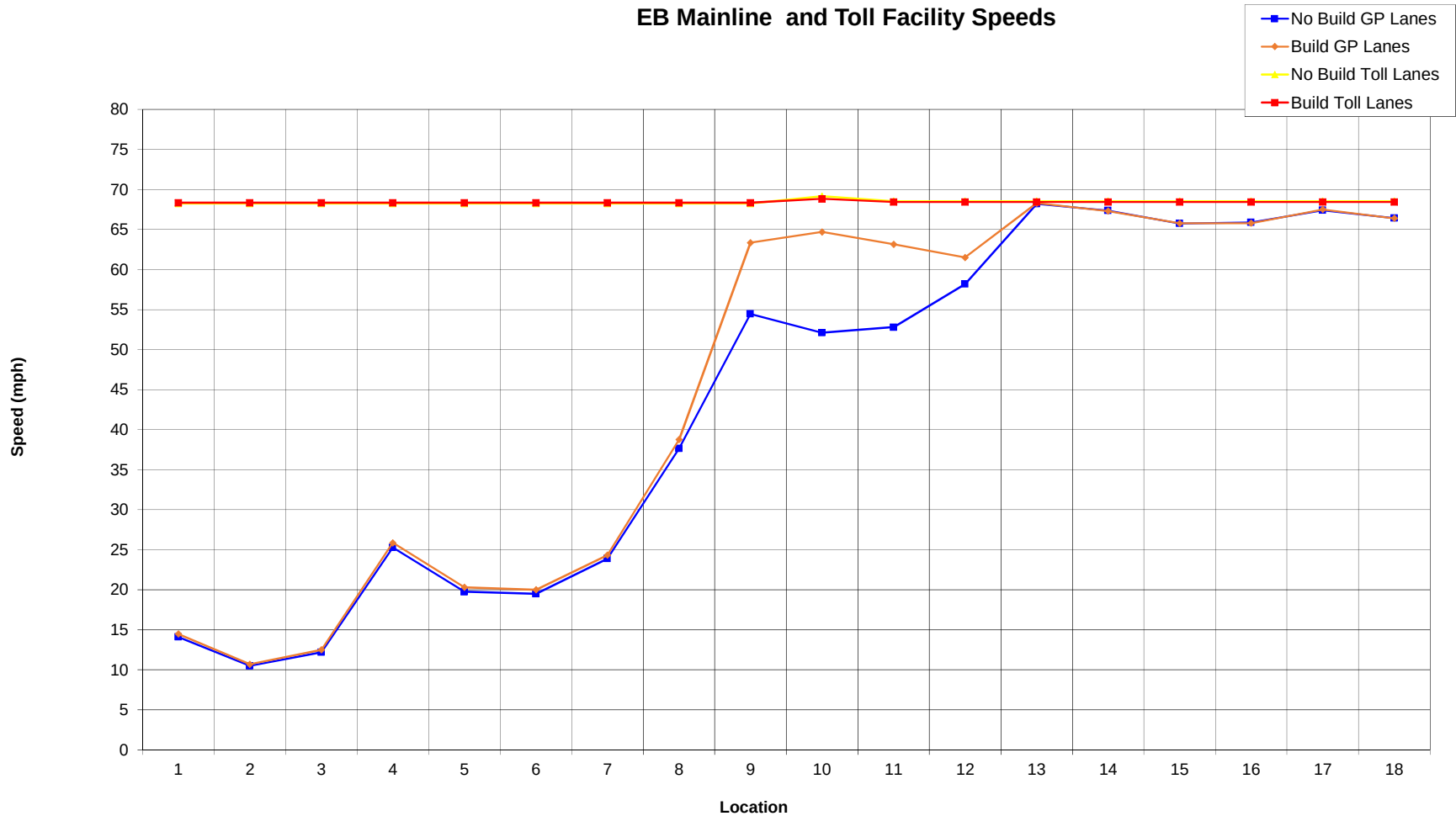
EB Mainline and Toll Facility Vehicle Volume by Location



1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

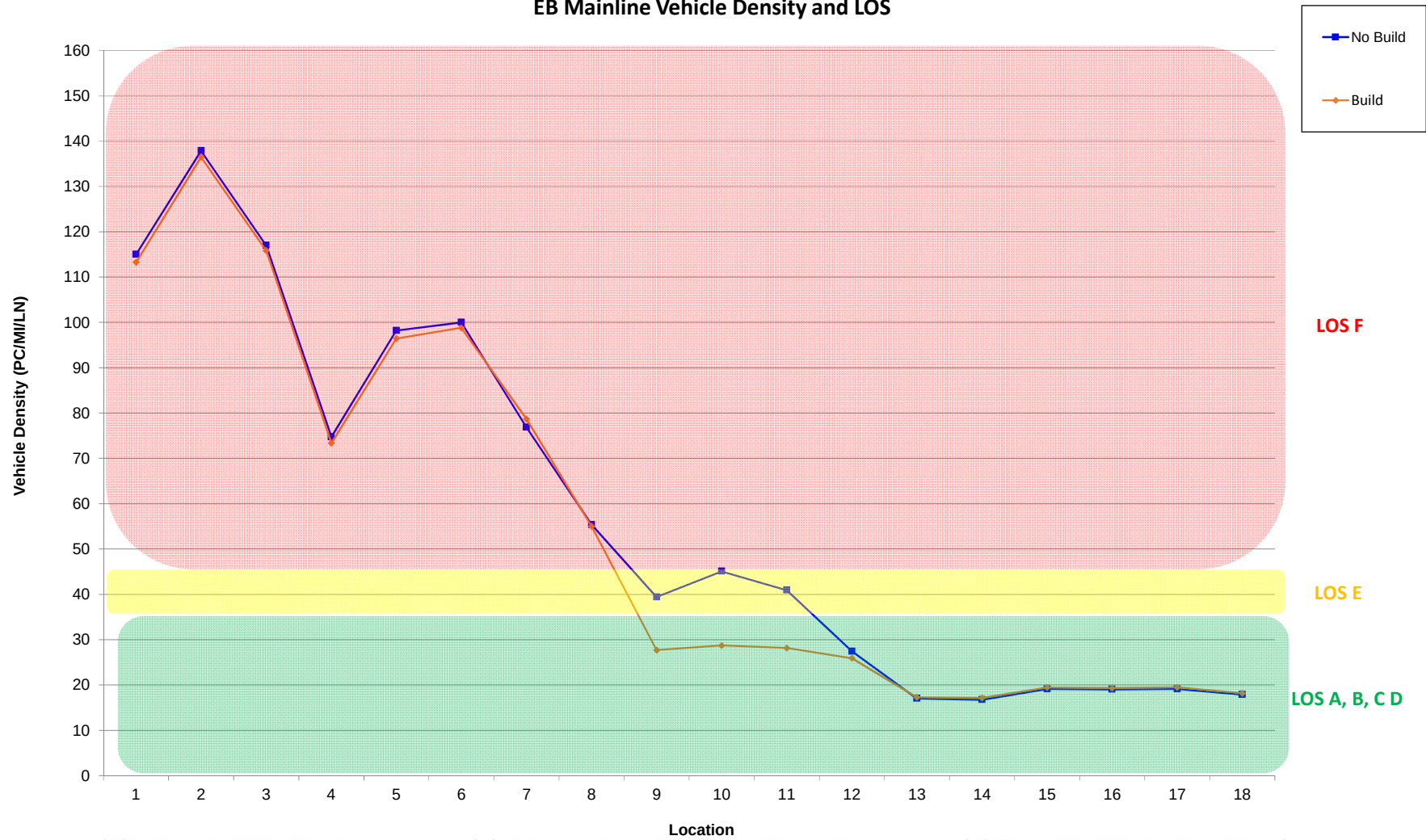


EB Mainline and Toll Facility Speeds

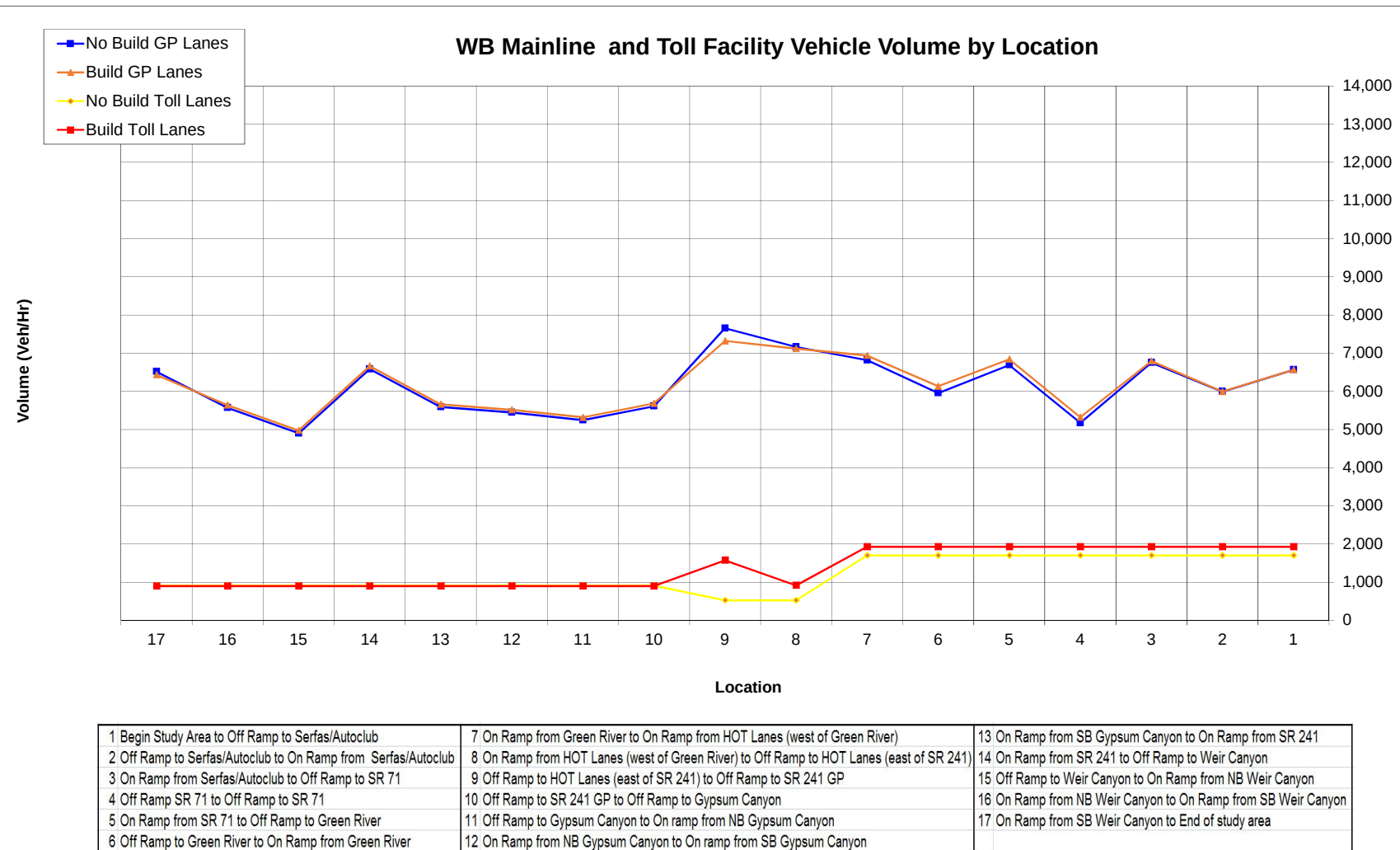


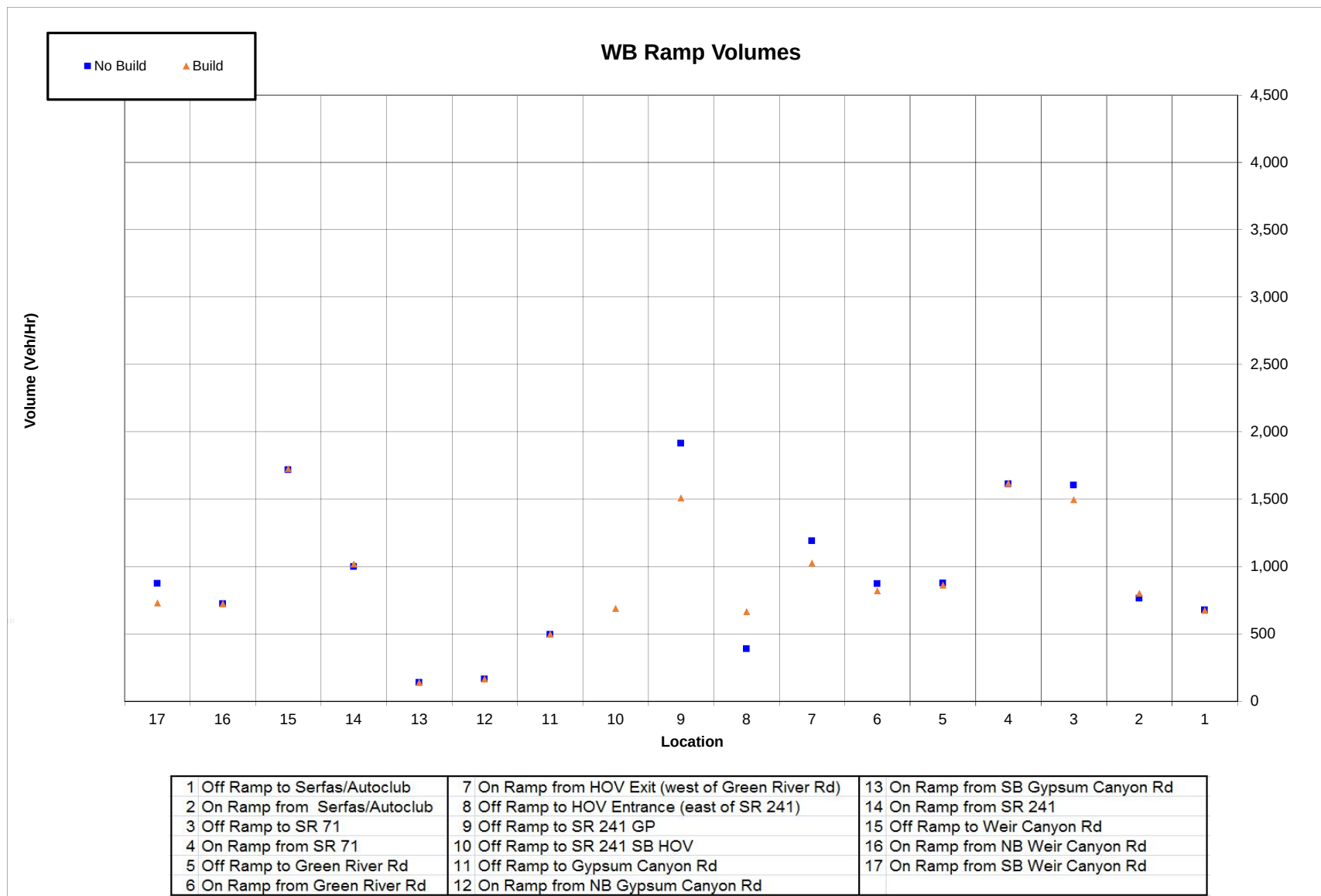
1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

EB Mainline Vehicle Density and LOS

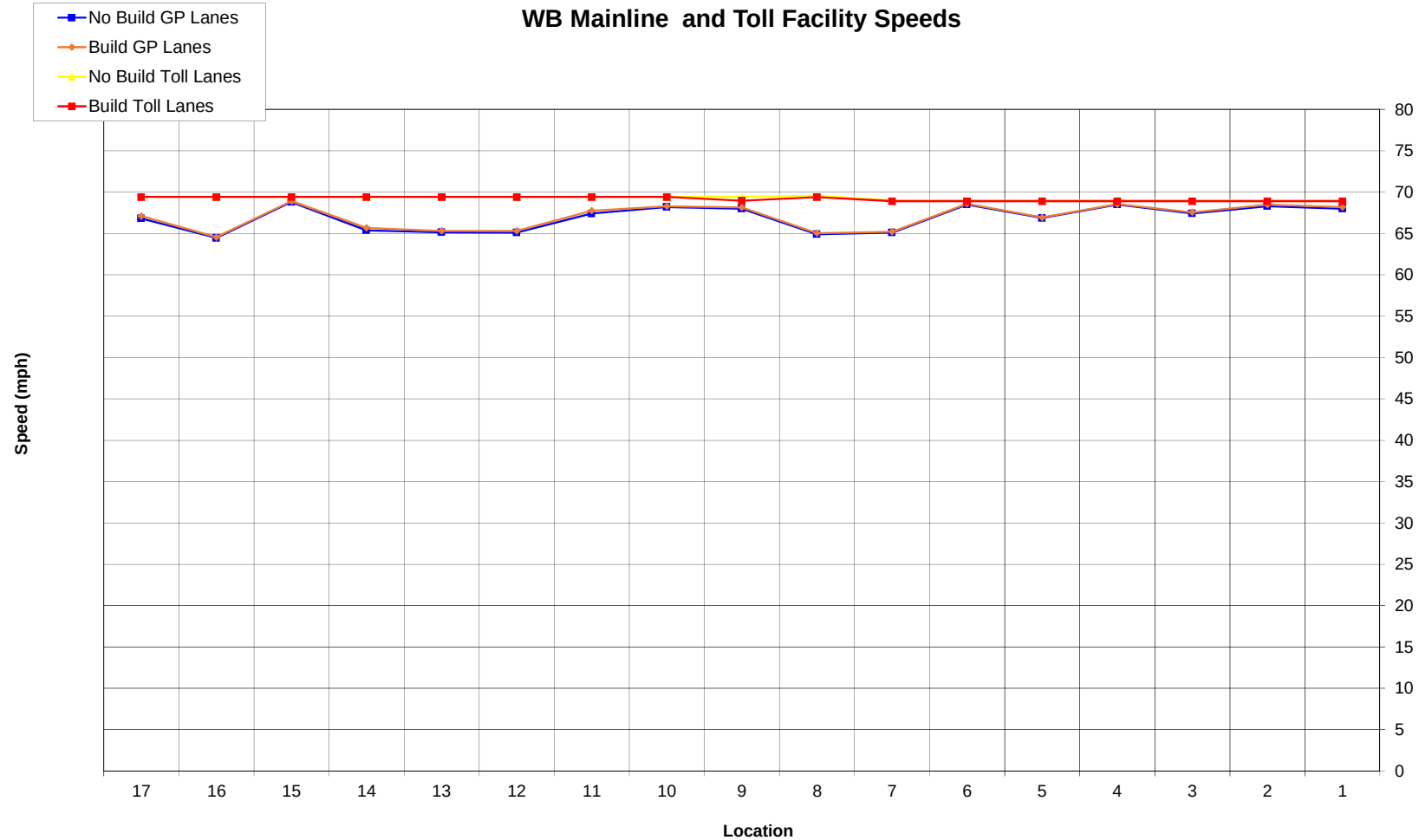


1 Begin Study Area to Off Ramp to Weir Canyon	7 On Ramp from SB Gypsum Canyon to On Ramp from NB Gypsum Canyon	13 Off Ramp to SR 71 CD to On Ramp from Green River
2 Off Ramp to Weir Canyon to On Ramp from SB Weir Canyon	8 On Ramp from NB Gypsum Canyon to On Ramp from SR 241 GP	14 On Ramp from Green River to On Ramp from SR 71
3 On Ramp from SB Weir Canyon to On Ramp from NB Weir Canyon	9 On Ramp from SR 241 GP to On Ramp from HOT Lanes (east of SR 241)	15 On Ramp from SR 71 to Off Ramp to Serfas/Autoclub
4 On Ramp from NB Weir Canyon to Off Ramp to SR 241	10 On Ramp from HOT Lanes (east of SR 241) to Off Ramp to HOT Lanes (west of Green River)	16 Off Ramp to Serfas/Autoclub to Off Ramp to EB Maple
5 Off Ramp to SR 241 to Off Ramp to Gypsum Canyon	11 Off Ramp to HOT Lanes (west of Green River) to Off Ramp to Green River	17 Off Ramp to EB Maple to On Ramp from Serfas/Autoclub
6 Off Ramp to Gypsum Canyon to On Ramp from SB Gypsum Canyon	12 Off Ramp to Green River to Off Ramp to SR 71 CD	18 On Ramp from Serfas/Autoclub to End of Study Area

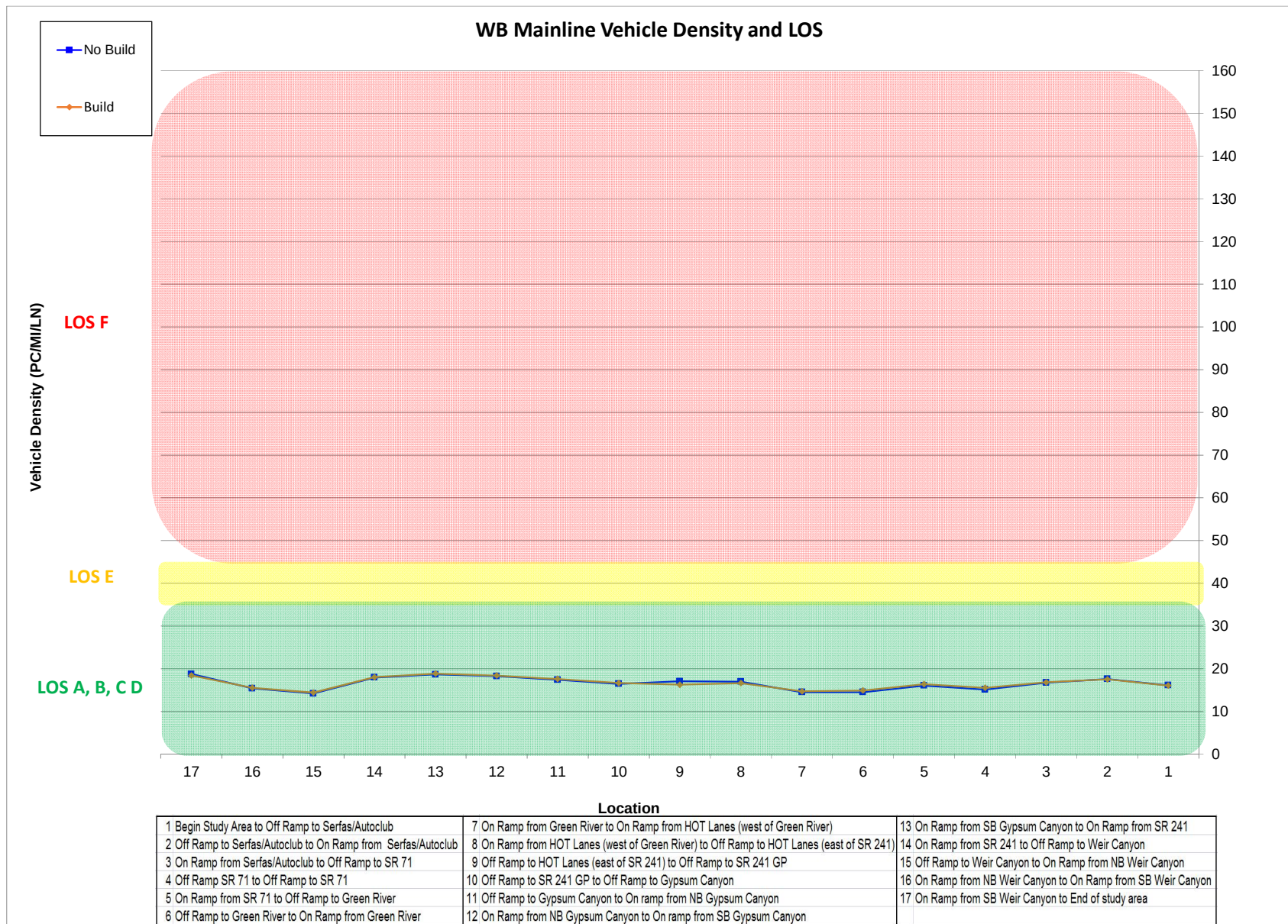




WB Mainline and Toll Facility Speeds



1 Begin Study Area to Off Ramp to Serfas/Autoclub	7 On Ramp from Green River to On Ramp from HOT Lanes (west of Green River)	13 On Ramp from SB Gypsum Canyon to On Ramp from SR 241
2 Off Ramp to Serfas/Autoclub to On Ramp from Serfas/Autoclub	8 On Ramp from HOT Lanes (west of Green River) to Off Ramp to HOT Lanes (east of SR 241)	14 On Ramp from SR 241 to Off Ramp to Weir Canyon
3 On Ramp from Serfas/Autoclub to Off Ramp to SR 71	9 Off Ramp to HOT Lanes (east of SR 241) to Off Ramp to SR 241 GP	15 Off Ramp to Weir Canyon to On Ramp from NB Weir Canyon
4 Off Ramp SR 71 to Off Ramp to SR 71	10 Off Ramp to SR 241 GP to Off Ramp to Gypsum Canyon	16 On Ramp from NB Weir Canyon to On Ramp from SB Weir Canyon
5 On Ramp from SR 71 to Off Ramp to Green River	11 Off Ramp to Gypsum Canyon to On ramp from NB Gypsum Canyon	17 On Ramp from SB Weir Canyon to End of study area
6 Off Ramp to Green River to On Ramp from Green River	12 On Ramp from NB Gypsum Canyon to On ramp from SB Gypsum Canyon	



Charts 6-7 PM

Appendix G

Project Layout Plan

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION CONSULTANT FUNCTIONAL SUPERVISOR

CHECKED BY

REVISD BY

DATE REVISED

MIKE CHESNEY

CHECKED BY

REVISD BY

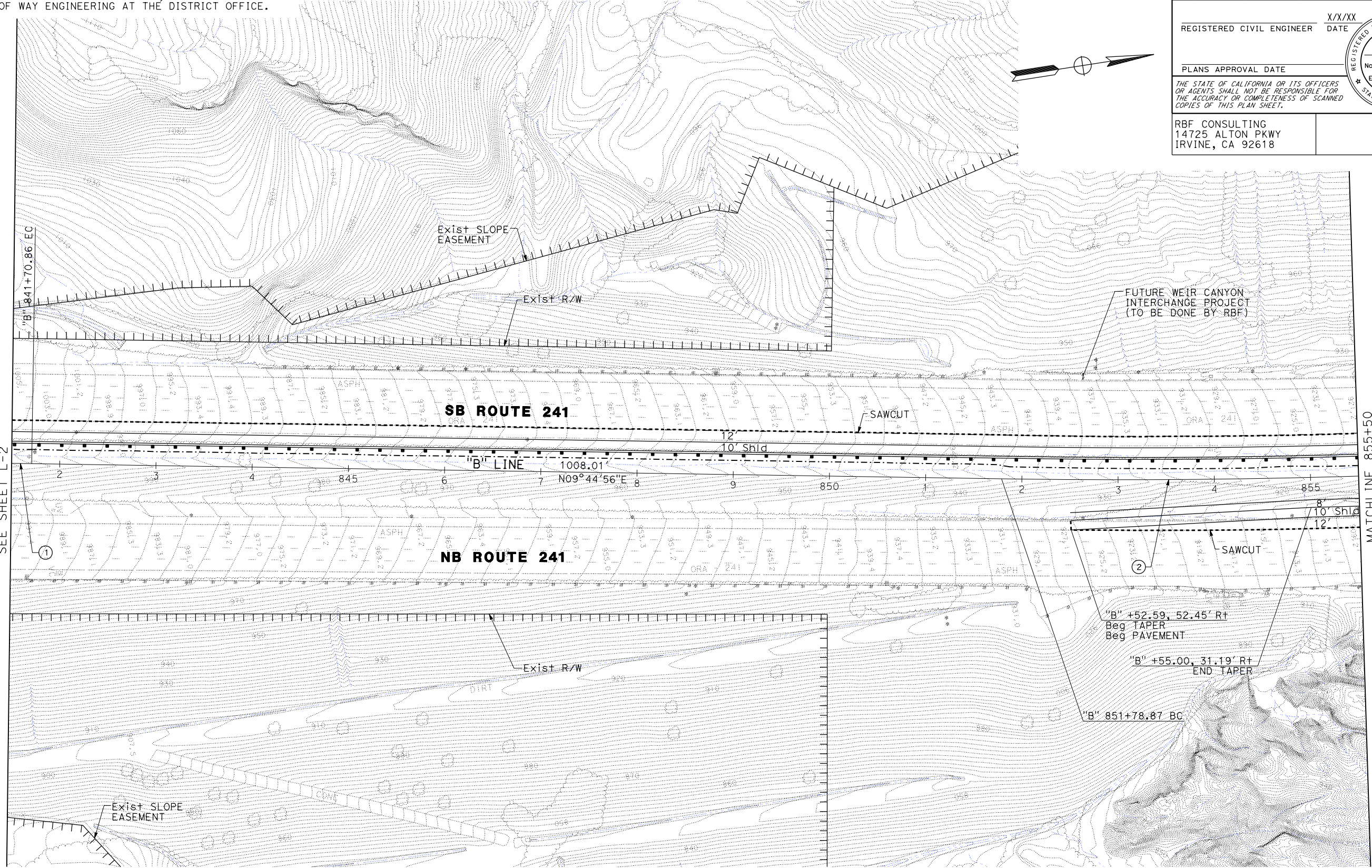
DATE REVISED

Caltrans

NOTE:

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

MATCHLINE 841+50
SEE SHEET L-2



CURVE DATA

No.	R	Δ	T	L
(1)	6000.00	16°15'43"	857.23	1702.94
(2)	8000.00	09°18'59"	651.85	1300.83

LAYOUT
SCALE: 1" = 50'

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		
REGISTERED CIVIL ENGINEER			X/X/XX DATE		
PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.			REGISTERED PROFESSIONAL ENGINEER No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA		
RBF CONSULTING 14725 ALTON PKWY IRVINE, CA 92618					

DRAFT

L-3

BORDER LAST REVISED 7/2/2010

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DGN FILE => 7774-ST-003.dgn

RELATIVE BORDER SCALE
IS IN INCHES



UNIT 0000

PROJECT NUMBER & PHASE

12000000000

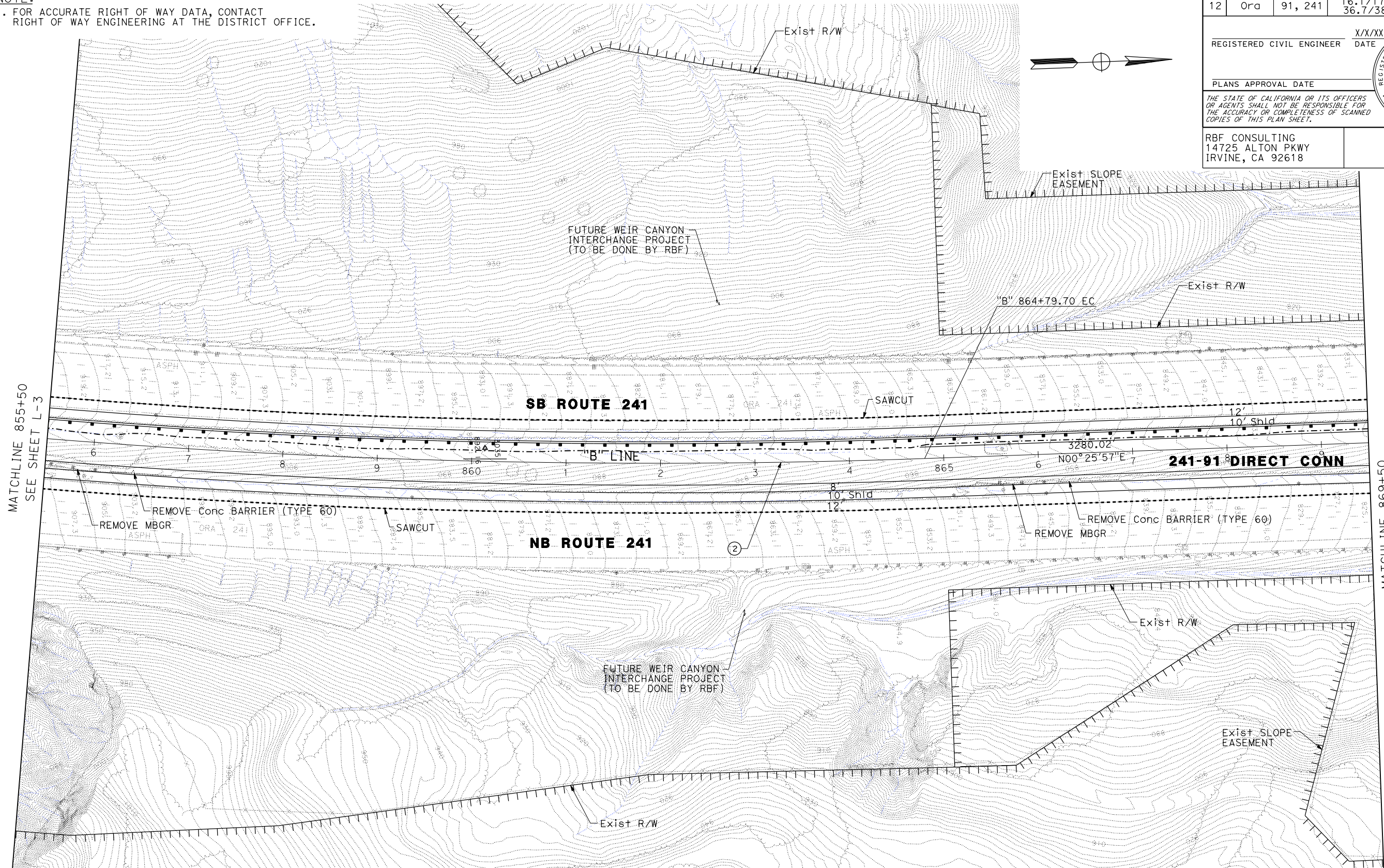
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
x mohamed.ghoniim 05-JUN-2015 18:38
x

DESIGNED BY	CHECKED BY	REVISIONS
MOHAMED GHONIIM	MIKE CHESNEY	
DATE	DATE	REVISION
05-JUN-2015	05-JUN-2015	18:38



NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		
REGISTERED CIVIL ENGINEER			X/X/XX DATE		
PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					
RBF CONSULTING 14725 ALTON PKWY IRVINE, CA 92618					

REGISTERED PROFESSIONAL ENGINEER

No. _____

Exp. _____

CIVIL

STATE OF CALIFORNIA

CURVE DATA				
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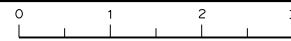
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BORDER LAST REVISED 7/2/2010

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RELATIVE BORDER SCALE
IS IN INCHES



UNIT 0000

PROJECT NUMBER & PHASE

12000000000

LAST REVISION
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TIME PLOTTED => 18:38

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x mohamed.ghoniim 05-JUN-2015 18:38
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CONSULTANT FUNCTIONAL SUPERVISOR

CALCULATED-DESIGNED BY

REVISOR BY

MIKE CHESNEY

CHECKED BY

DATE REVISED

Caltrans

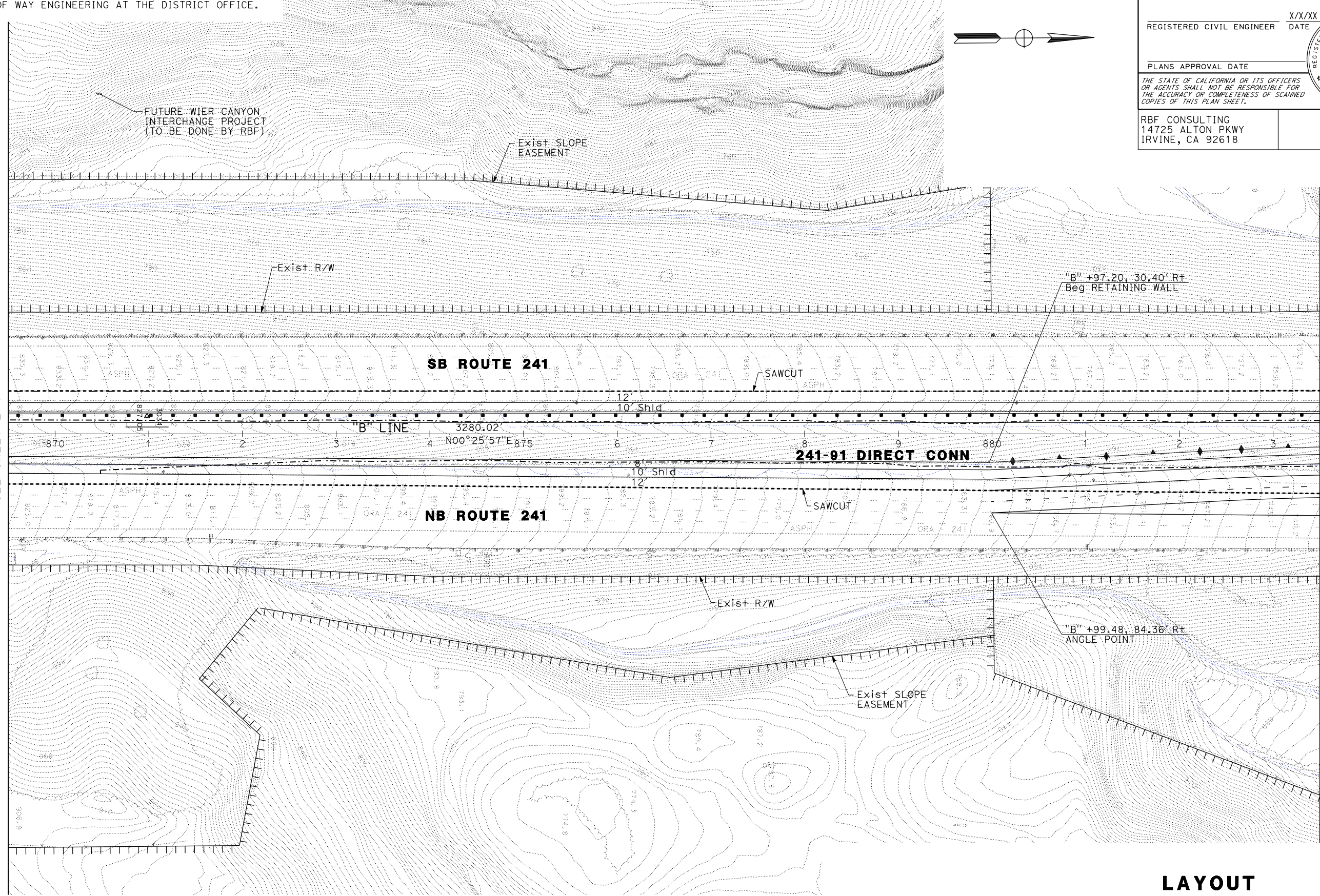
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LAYOUT
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NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

MATCHLINE 869+50
SEE SHEET L-4



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		
REGISTERED CIVIL ENGINEER			X/X/XX DATE		
PLANS APPROVAL DATE					
THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.					
RBF CONSULTING 14725 ALTON PKWY IRVINE, CA 92618					

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

BORDER LAST REVISED 7/2/2010

USERNAME => mohamed.ghoniim
DGN FILE => 7774-ST-005.dgn

RELATIVE BORDER SCALE
IS IN INCHES

0 1 2 3

UNIT 0000

PROJECT NUMBER & PHASE

12000000000

LAST REVISION
00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

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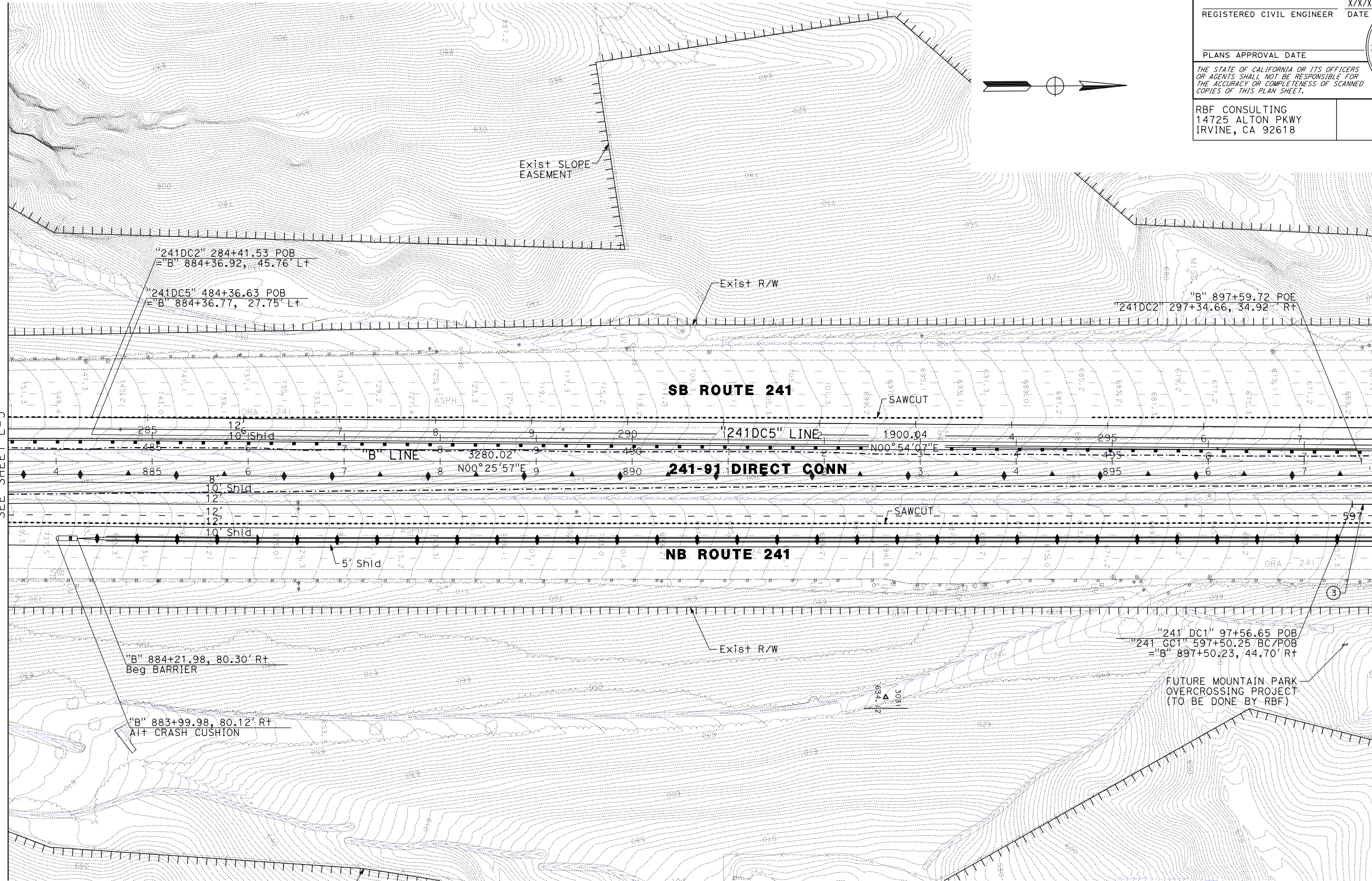
DESIGNED BY	CHECKED BY	REVIEWED BY	DATE
STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION	MIKE CHESNEY		



NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

DRAFT

MATCHLINE 883+50
SEE SHEET L-5



No.	R	Δ	T	L
(3)	5116.00	06°05'50"	272.47	544.42

LAYOUT
SCALE: 1" = 50'

L-6

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		
REGISTERED CIVIL ENGINEER			X/X/XX DATE		
PLANS APPROVAL DATE			No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA		
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RELATIVE BORDER SCALE
IS IN INCHES



UNIT 0000

PROJECT NUMBER & PHASE

12000000000

LAST REVISION
00-00-14
DATE PLOTTED => 05-JUN-2015
TIME PLOTTED => 18:38

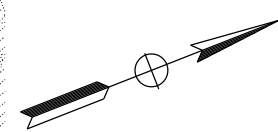
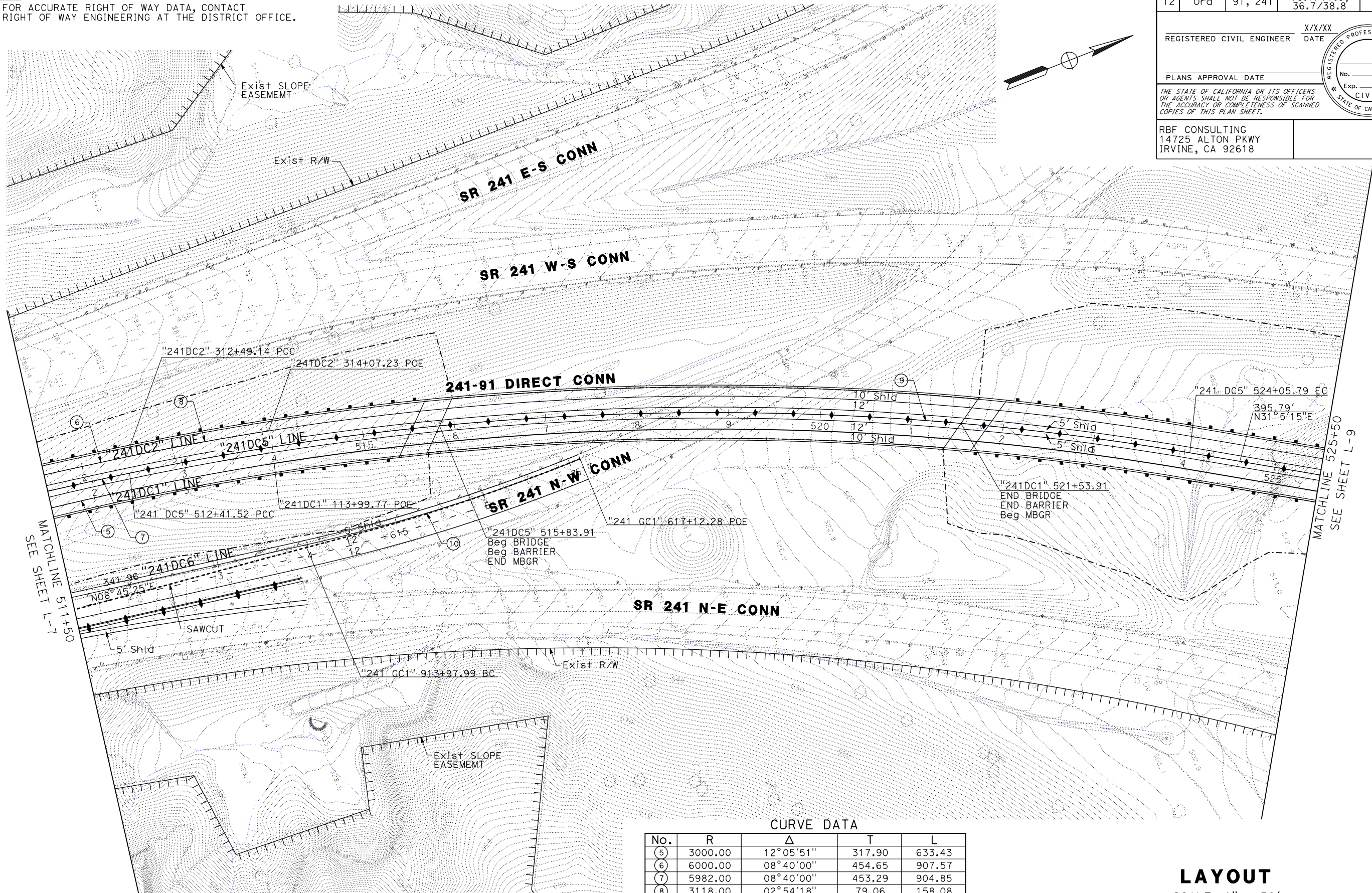
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DESIGNED BY	CHECKED BY	REVIEWED BY	DATE	REVISION
MOHAMED GHONIIM	MIKE CHESNEY			

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION



NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER
DATE X/X/XX

PLANS APPROVAL DATE

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14725 ALTON PKWY
IRVINE, CA 92618

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

CURVE DATA				
No.	R	Δ	T	L
(5)	3000.00	12°05'51"	317.90	633.43
(6)	6000.00	08°40'00"	454.65	907.57
(7)	5982.00	08°40'00"	453.29	904.85
(8)	3118.00	02°54'18"	79.06	158.08
(9)	3100.00	21°31'07"	589.08	1164.28
(10)	1900.00	09°28'39"	157.5	314.29

LAYOUT
SCALE: 1" = 50'

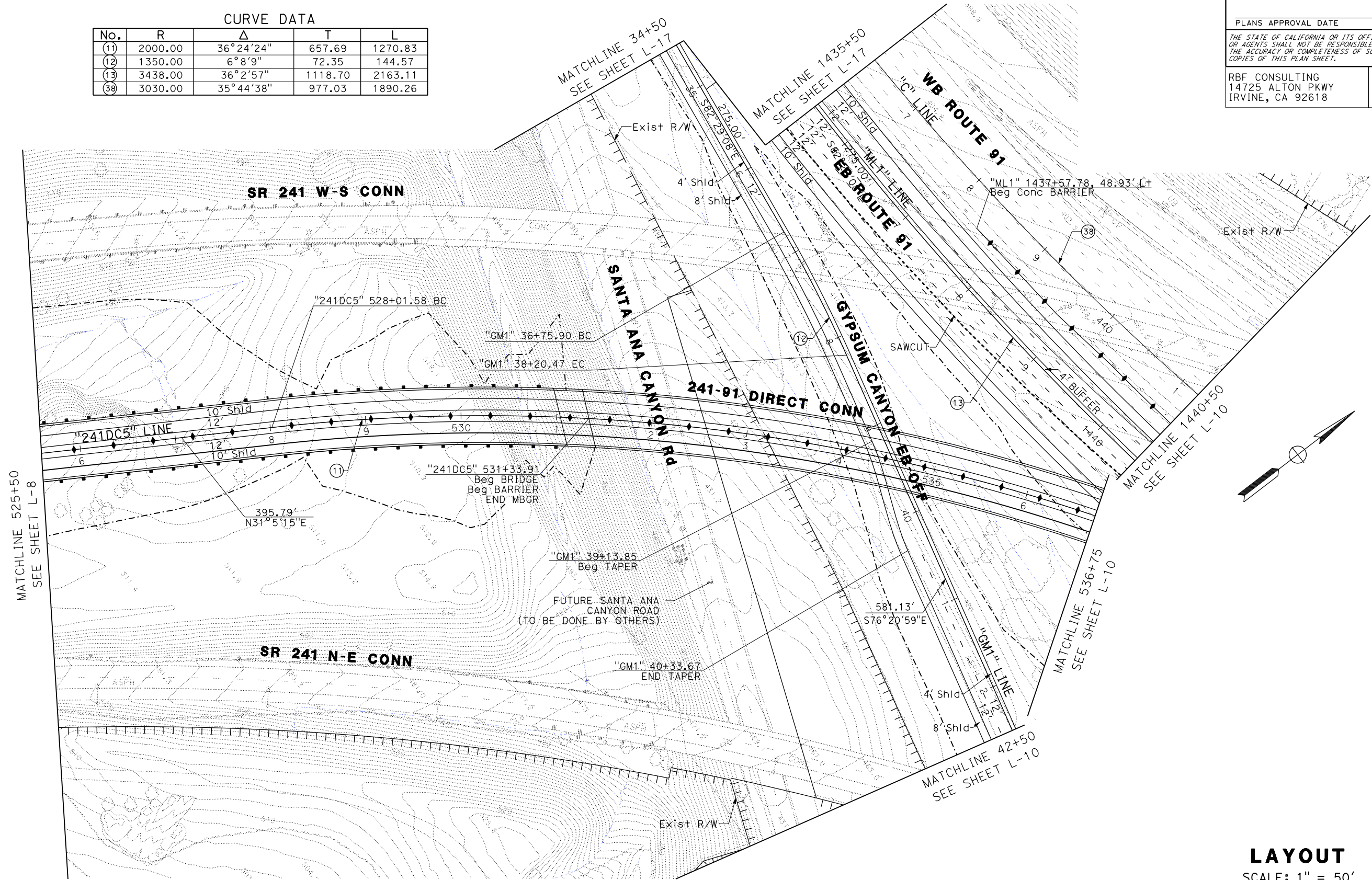
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L-8

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
CONSULTANT FUNCTIONAL SUPERVISOR
MIKE CHESNEY
DESIGNED BY
CHECKED BY
REVISOR
DATE
REVISED BY
DATE REVISED

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA				
No.	R	Δ	T	L
(1)	2000.00	36°24'24"	657.69	1270.83
(12)	1350.00	6°8'9"	72.35	144.57
(13)	3438.00	36°2'57"	1118.70	2163.11
(38)	3030.00	35°44'38"	977.03	1890.26



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER
DATE X/X/XX

PLANS APPROVAL DATE

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14725 ALTON PKWY
IRVINE, CA 92618

REGISTERED PROFESSIONAL ENGINEER
No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

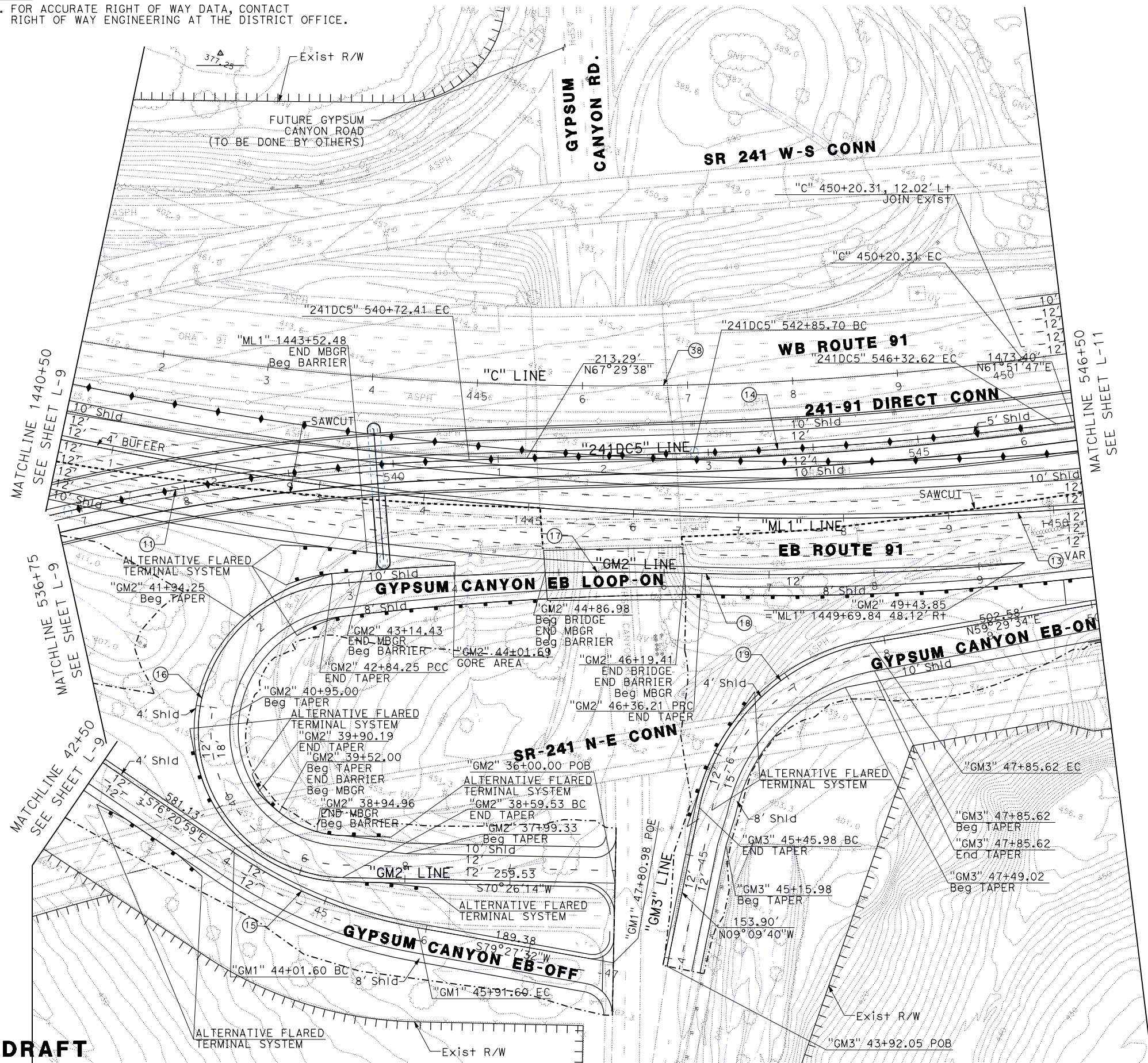
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L-9

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DESIGNED BY	REVISOR	DATE
MOHAMED GHONIM	BY	
CHECKED BY	REVISOR	DATE
MIKE CHESNEY	BY	

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER X/X/XX
DATE

PLANS APPROVAL DATE

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14725 ALTON PKWY
IRVINE, CA 92618

CURVE DATA				
No.	R	Δ	T	L
(1)	2000.00	36°24'24"	657.69	1270.83
(13)	3438.00	36°2'57"	1118.70	2163.11
(14)	3530.00	5°37'51"	173.60	346.92
(15)	450.00	24°11'30"	96.44	190.00
(15)	140.00	173°49'1"	2592.11	424.71
(17)	3000.00	6°43'20"	176.19	351.97
(18)	2420.00	7°17'1"	154.03	307.64
(19)	200.00	68°39'14"	136.57	239.65
(30)	3030.00	35°44'38"	977.03	1890.26

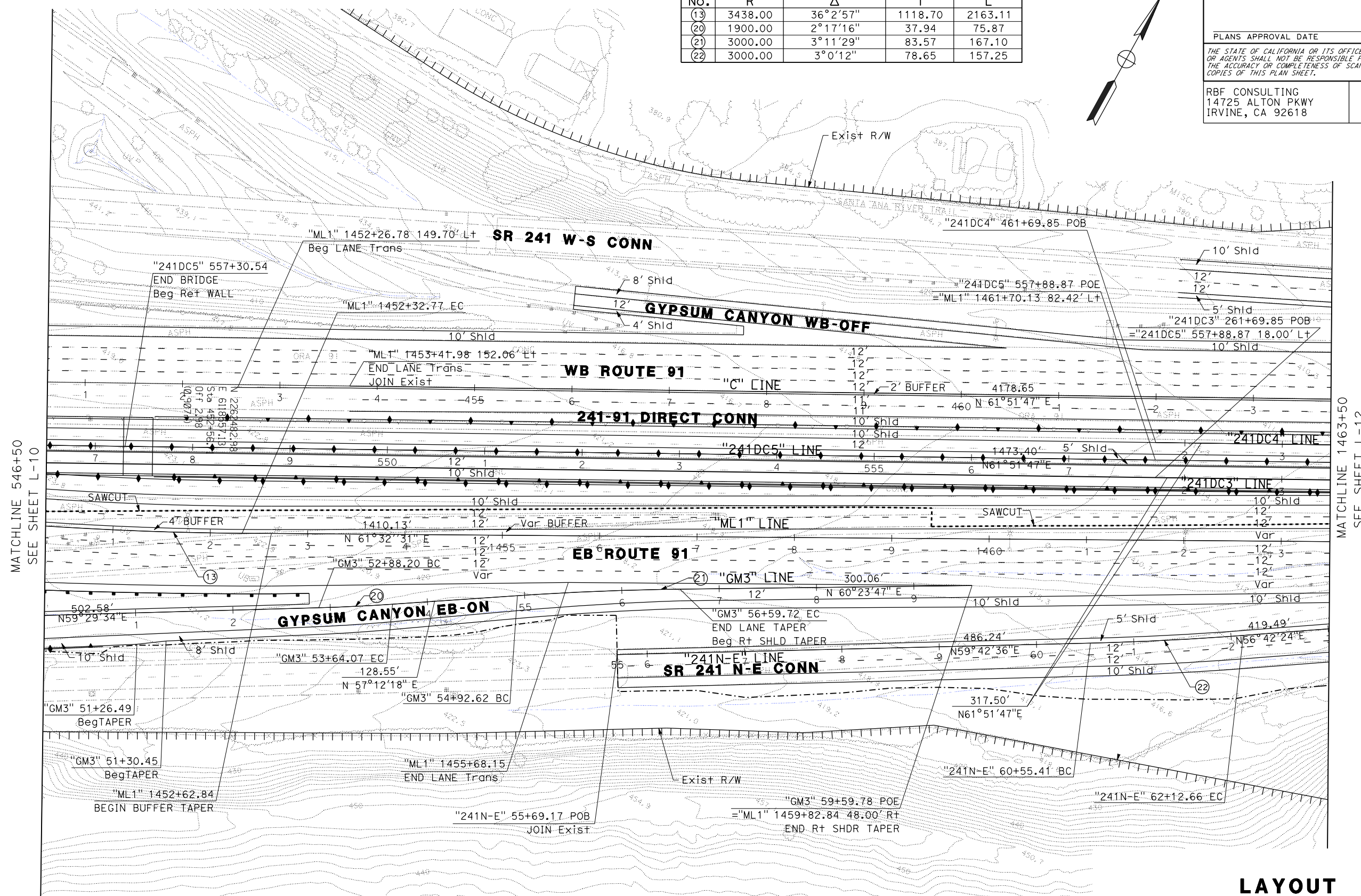
LAYOUT
SCALE: 1" = 50'

L-10

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEET
12	Oran	91, 241	16.1/17.9, 36.7/38.8		
<u>REGISTERED CIVIL ENGINEER</u> <u>DATE</u>			<u>X/X/XX</u> 		
<u>PLANS APPROVAL DATE</u>					
<i>THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.</i>					
RBF CONSULTING 14725 ALTON PKWY IRVINE, CA 92618					

No.	R	Δ	T	L
(13)	3438.00	36°2'57"	1118.70	2163.11
(20)	1900.00	2°17'16"	37.94	75.87
(21)	3000.00	3°11'29"	83.57	167.10
(22)	3000.00	3°0'12"	78.65	157.25



LAYOUT
SCALE: 1" = 50'

DRAFT

L-11

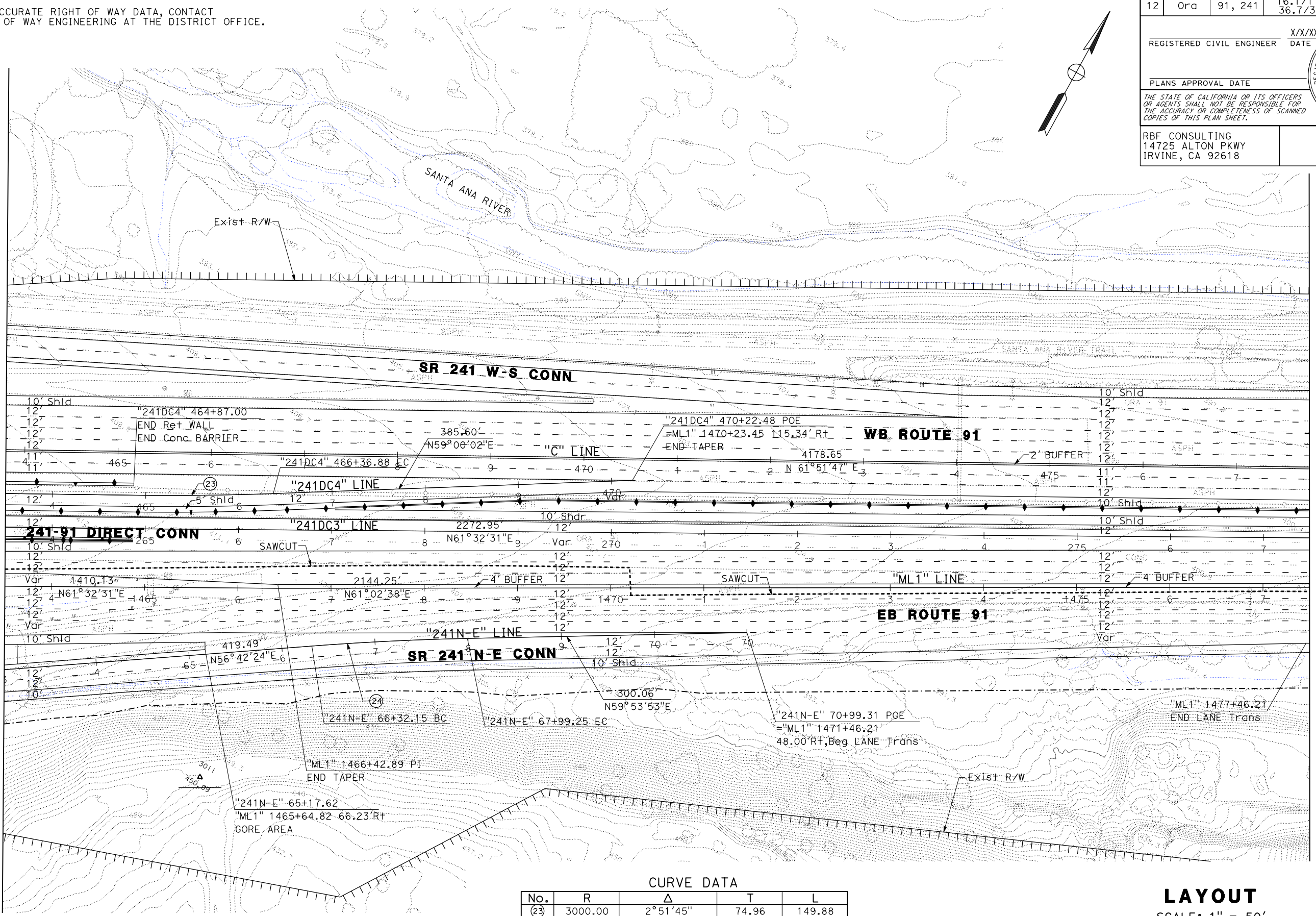
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REVISÉ BY

DATE REVISED

DRAFT



No.	R	Δ	T	L
(23)	3000.00	2° 51' 45"	74.96	149.88
(24)	3000.00	3° 11' 29"	83.57	167.10

LAYOUT
SCALE: 1" = 50'

L-12

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER _____

PLANS APPROVAL DATE _____

X/X/XX

DATE



REGISTERED PROFESSIONAL ENGINEER

No. _____

Exp. _____

CIVIL

STATE OF CALIFORNIA

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14725 ALTON PKWY
IRVINE, CA 92618

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TIME PLOTTED => 18:38	

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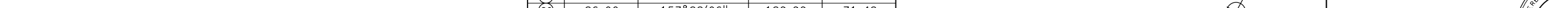
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1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

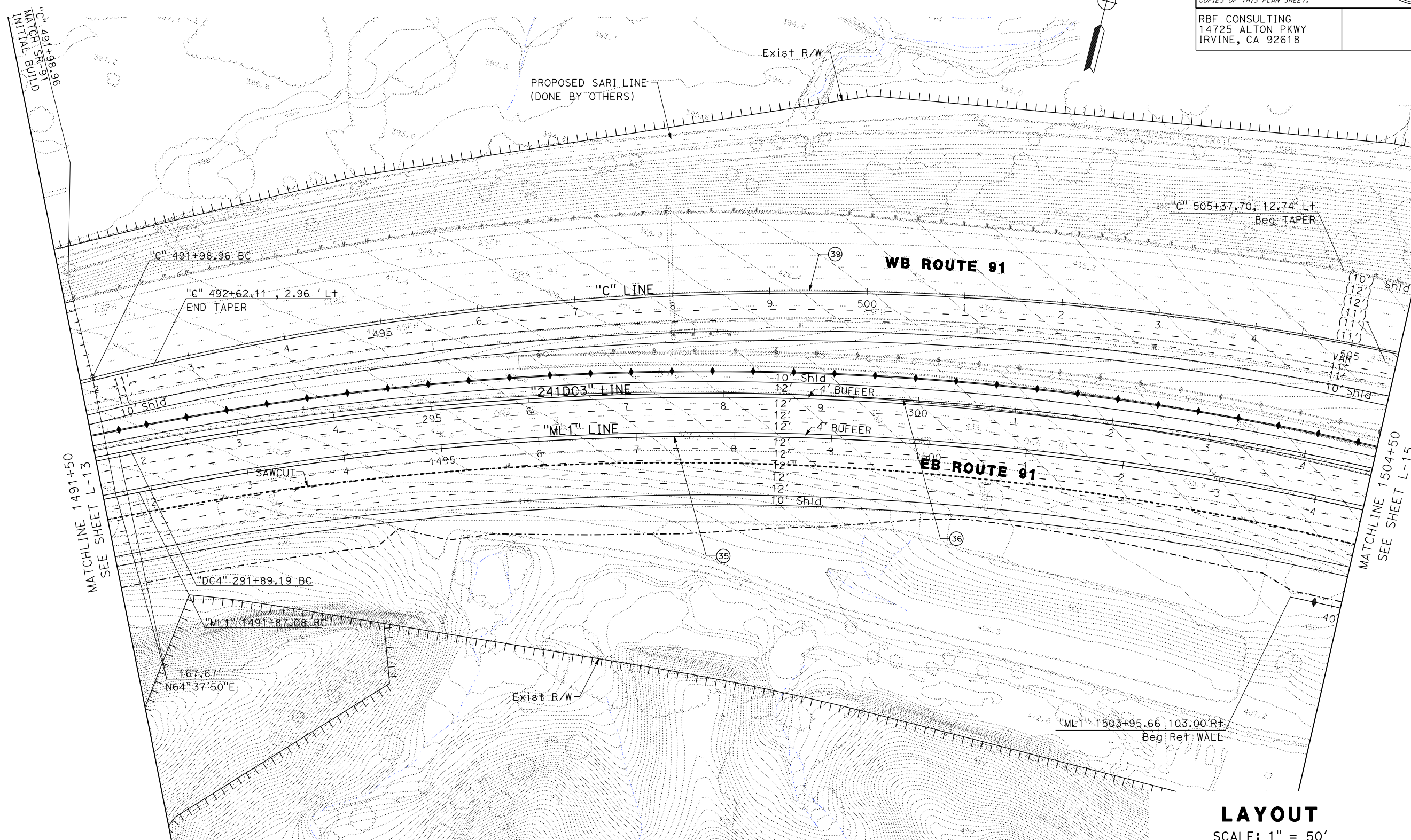
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No.	R	Δ	T	L
(35)	3000.00	$51^{\circ}52'00''$	1458.88	2715.74
(36)	3044.00	$32^{\circ}20'29''$	882.67	1718.22
(39)	3000.00	$57^{\circ}24'04''$	1642.49	3005.52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEET
12	Oran	91, 241	16.1/17.9, 36.7/38.8		

_____ REGISTERED CIVIL ENGINEER	X/X/XX DATE	
_____ PLANS APPROVAL DATE		

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LAYOUT
SCALE: 1" = 50'

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L-14

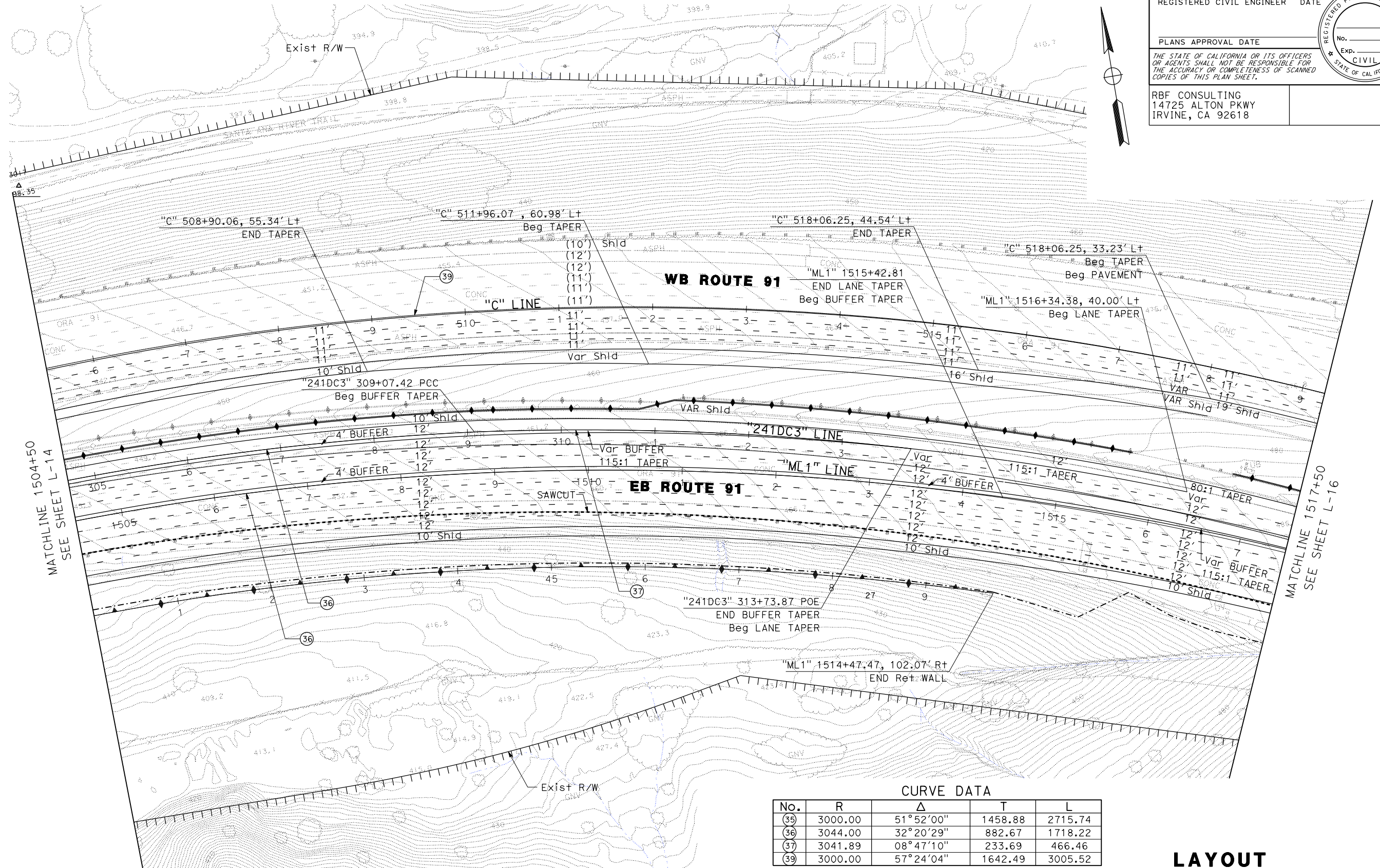
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
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mohamed.ghoniim 05-JUN-2015 18:38

CONSULTANT FUNCTIONAL SUPERVISOR
CHECKED BY
MIKE CHESNEY

REVISOR
DATE

REVISOR
DATE

NOTE:
1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.



CURVE DATA				
No.	R	Δ	T	L
(35)	3000.00	51°52'00"	1458.88	2715.74
(36)	3044.00	32°20'29"	882.67	1718.22
(37)	3041.89	08°47'10"	233.69	466.46
(39)	3000.00	57°24'04"	1642.49	3005.52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
12	Ora	91, 241	16.1/17.9, 36.7/38.8		
REGISTERED CIVIL ENGINEER			X/X/XX DATE		
PLANS APPROVAL DATE			No. _____ Exp. _____ CIVIL STATE OF CALIFORNIA		
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LAYOUT
SCALE: 1" = 50'

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L-15

1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

CURVE DATA				
No.	R	Δ	T	L
(35)	3000.00	51°52'00"	1458.88	2715.74
(39)	3000.00	57°24'04"	1642.49	3005.52

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Oran	91, 241	16.1/17.9, 36.7/38.8		

REGISTERED CIVIL ENGINEER _____

PLANS APPROVAL DATE _____

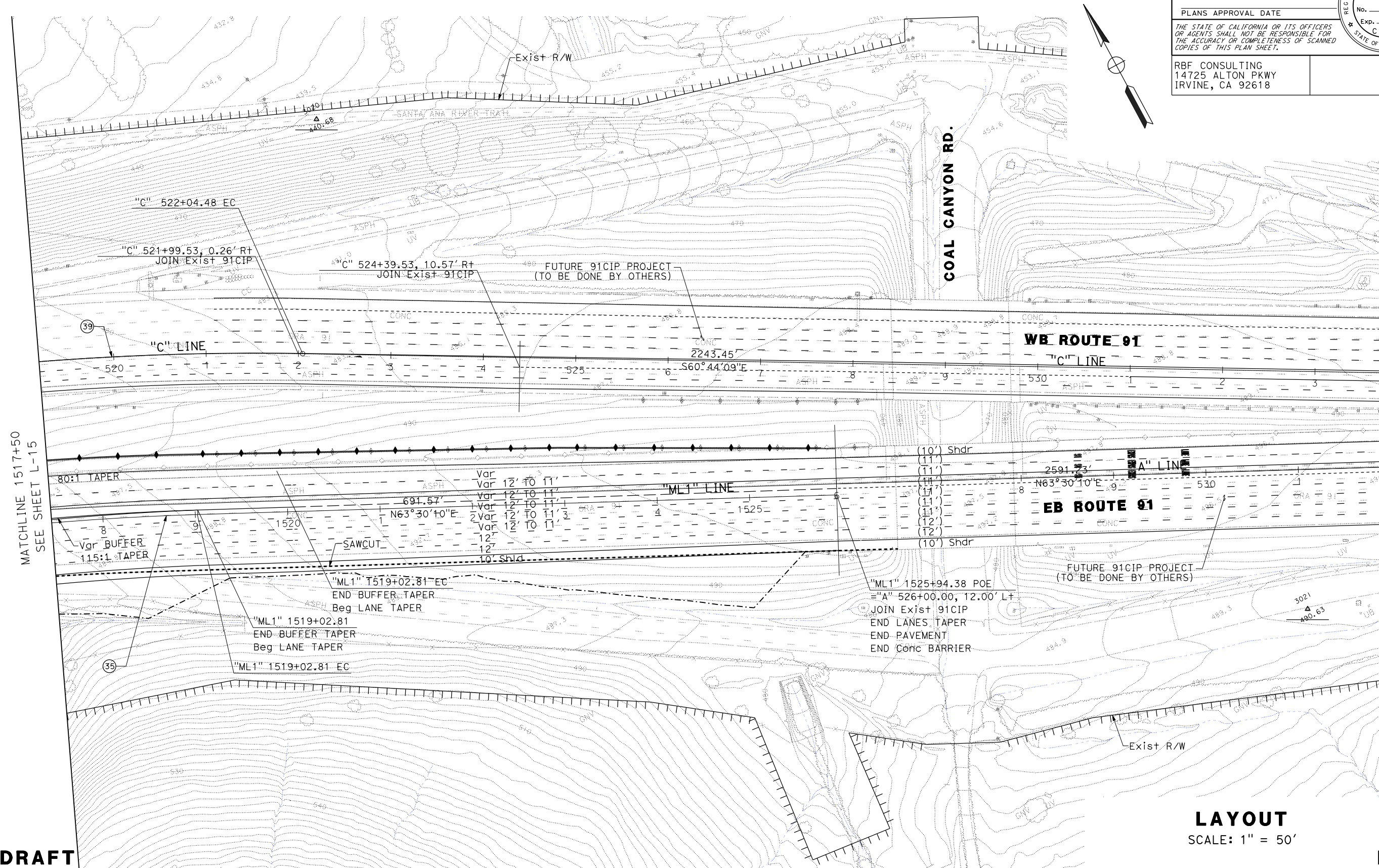
X/X/XX
DATE



No. _____
Exp. _____
CIVIL
STATE OF CALIFORNIA

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14725 ALTON PKWY
IRVINE, CA 92618



LAYOUT
SCALE: 1" = 50'

L-16

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STATE OF CALIFORNIA
et. Caltrans®

BORDER LAST REVISED 7/2/2010

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USERNAME => mohamed.ghonim
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RELATIVE BORDER SCALE
IS IN INCHES



UNIT 0000

PROJECT NUMBER & PHASE

12000000000

DATE PLOTTED => 05-JUN-2015	LAST REVISION
TIME PLOTTED => 18:38	000-00-14

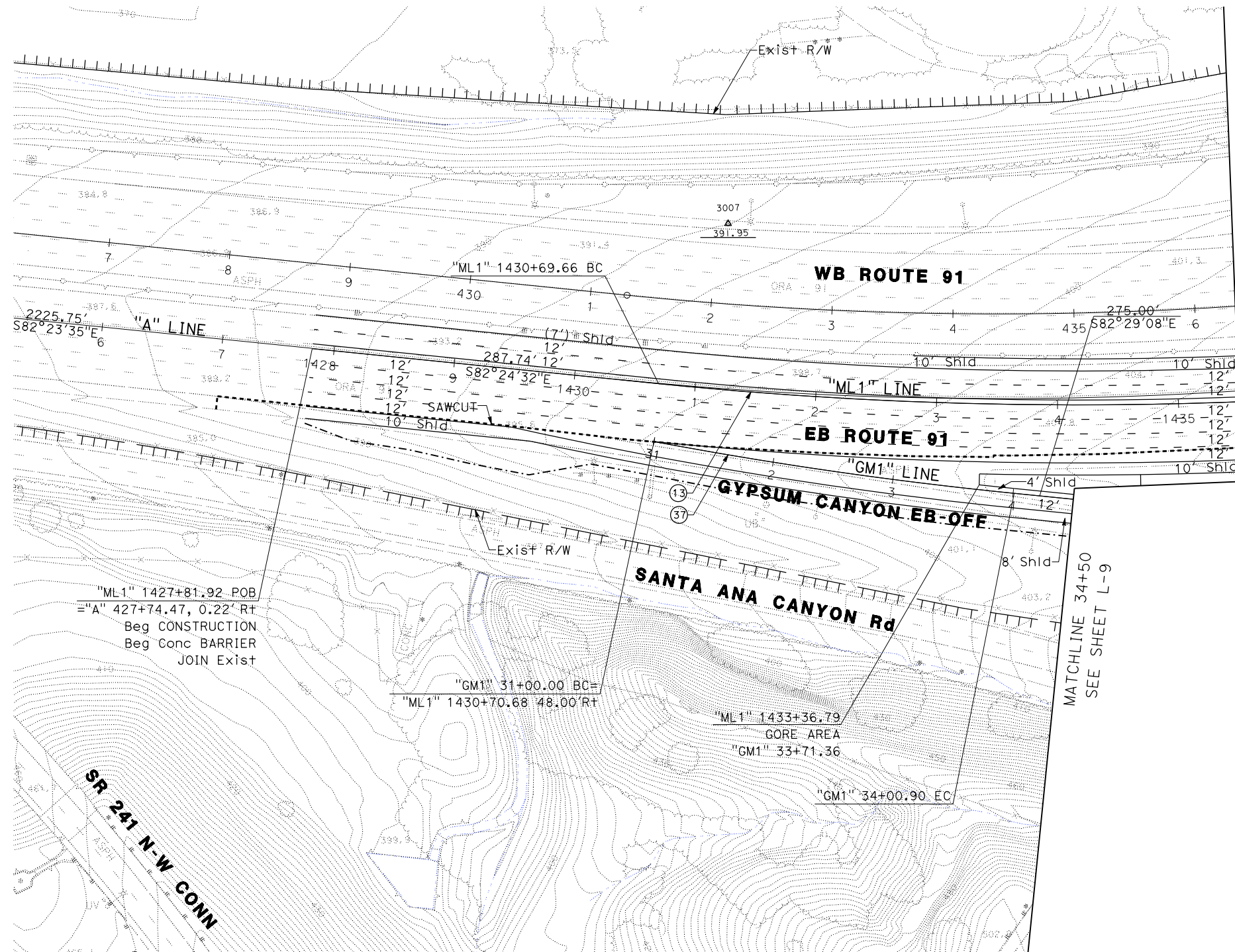
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1. FOR ACCURATE RIGHT OF WAY DATA, CONTACT
RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

No.	R	Δ	T	L
(13)	3438.00	36° 02' 57"	1118.70	2163.11
(37)	3486.00	4° 56' 44"	150.54	300.90



MATCHLINE 1435+50
SEE SHEET L-9

MATCHLINE 34+50
SEE SHEET L-9

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
12	Oran	91, 241	16.1/17.9, 36.7/38.8		

_____ X/X/XX
 REGISTERED CIVIL ENGINEER DATE

 PLANS APPROVAL DATE

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 14725 ALTON PKWY
 IRVINE, CA 92618

LAYOUT
SCALE: 1" = 50'

L-17

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BORDER LAST REVISED 7/2/2010

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USERNAME => mohamed.ghonim
DGN FILE => 7774-ST-017.dgn

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RELATIVE BORDER SCALE
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UNIT 0000

PROJECT NUMBER & PHASE

12000000000

LAST REVISION	DATE PLOTTED => 05-JUN-2015
00-00-14	TIME PLOTTED => 18:38