2025 California High Occupancy Vehicle Facilities Degradation Action Plans

Prepared by

California Department of Transportation
Division of Traffic Operations
Office of Mobility Programs

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1. OVERVIEW

The California Department of Transportation (Caltrans) has prepared the *2025 California High Occupancy Vehicle Facilities Degradation Action Plans.* This document details the actions Caltrans will take, through 2025, to make significant progress towards bringing degraded high occupancy vehicle (HOV) facilities on California highways into compliance with the federal performance standard under Title 23 of the United States Code, Section 166 (23 U.S.C. § 166). The actions detailed in this document are intended to address HOV facility degradation identified in the *2023 California HOV Facilities Degradation Report* calculated using data from 2023.

2. STATEWIDE PLANS FOR ADDRESSING DEGRADATION

Subsection (d) of 23 U.S.C. § 166 requires Caltrans to develop a remediation plan to address degradation. For each degraded HOV facility, Caltrans districts perform an investigation analyzing local traffic data and specific field conditions to identify the potential causes of degradation. The districts then implement projects to remediate HOV degradation and bring the HOV facility into compliance with the federal performance standard.

2.1. Common Causes for Degradation on HOV Facilities

The analysis conducted by the districts identified some common causes for HOV facility degradation. These are listed below.

Demand Exceeding Capacity

Heavy vehicle volumes on HOV lanes produce congestion and slow traffic conditions. HOV facilities with high volumes tend to be located on commuter routes which lead toward job centers in the morning peak hour period and away from job centers in the return afternoon peak hour period. In addition, heavy use of the HOV lanes can occur at some locations as a result of special events, or because of recreational travel, such as the traffic on routes leaving urban areas just before the weekends. To ensure that HOV lanes continue to offer a time-savings incentive to carpool, Caltrans has traditionally set 1,650 vehicles per hour as the maximum capacity of HOV lanes. The most heavily used HOV lanes on the State Highway System are exceeding this threshold.

Friction Factor

The term "friction factor" refers to the slowing of vehicles in the HOV lane because of the presence of slow vehicles in the adjacent general purpose (GP) lanes. The speed differential between the HOV lane and the GP lanes can cause travelers in the HOV lane to decelerate in anticipation of slow-moving vehicles suddenly

merging into the HOV lane. It can also cause vehicles in the HOV lane to slow as they prepare to change lanes into the slow-moving adjacent traffic to access exit ramps on the right side of the freeway. Caltrans completed a study on the effects of Friction on HOV Degradation in July 2024. The results of this study show that frictional effects can be reduced where there is less expectation that vehicles will merge into the HOV lane, through the use of buffers or physical barriers, or the shoulder width provides a comfortable area for drivers to recover. Due to space constraints, many HOV segments do not have the space to increase the buffer or shoulder width.

Roadway Geometry

The geometry of the GP lanes or the HOV lanes affects traffic by introducing a disruption in the smooth flow of vehicles. Lane drops and bottlenecks in the GP lanes can cause congestion, which increases friction for the HOV lane. Unless otherwise noted, the bottlenecks referred to in these action plans are located in the GP lanes. When an HOV facility ends at the edges of the HOV network or where there is a gap in the HOV network, vehicles must exit the HOV lane and merge into (potentially) slower general traffic.

For HOVs traveling on more than one facility, the lack of direct connectors between intersecting freeways also requires HOVs to merge back into general traffic temporarily, potentially causing slowing and congestion in the HOV lanes.

Violations

Violations occur when vehicles in the HOV lane do not meet the occupancy requirements or avoid paying the toll when using the high occupancy/toll (HOT) facility. When GP lanes are congested, there is a greater incentive to take advantage of the time savings the HOV facility may provide, so vehicles violate the occupancy requirements to bypass the congestion. The California Highway Patrol (CHP) enforces the occupancy requirements, but large numbers of violations still occur. Some toll operators have tested Automated Vehicle Occupancy Detector (AVOD) systems to deter violators, but challenges regarding visibility, tints, and varying car lengths have affected the accuracy of these systems and has prevented their use for enforcements.

2.2. HOV Degradation Remediation Strategies

A list of potential actions has been developed for all districts to consider as they develop their action plans to address degradation. This list can be found in Table 1. This is not a comprehensive list of all potential actions that districts have identified to address degradation. In addition to the strategies Caltrans implements to address degradation, other agency projects, specifically transit

and rail expansion and improvement projects, have been identified to remediate degradation by lowering demand. Actions in Table 1 are listed in order of their potential ability to address degradation, as well as whether they can be implemented in the near- term or may require some time to implement.

Table 1. Statewide HOV Degradation Remediation Strategies

HOV Degradation Remediation Strategy	Type of Project	Purpose	Potential to Address Degradation	Time to Implementation
Increase Occupancy Requirements	Operational	Operational Improvement	High	Near-Term
Increase Occupancy Requirements and Convert to HOT Lane	Operational Capital	Operational Improvement	High	Near to Mid-Term
Addition of HOV auxiliary (weave) lanes.	Capital	Operational Improvement	High	Mid- to Long-Term
Addition of a second HOV lane.	Capital	Add Capacity	High	Mid- to Long-Term
Enhanced, dedicated, and targeted HOV enforcement including the establishment of enforcement zones.	Operational Capital	Enforcement	Medium to High	Near- to Mid-Term
Revise pricing strategy on HOT lanes to address degradation.	Operational	Operational Improvement	Medium to High	Near to Mid-Term
Toll exempted clean air vehicles on HOT lanes using tiered/reduced rates	Operational	Operational Improvement	Medium to High	Near to Mid-Term

HOV Degradation Remediation Strategy	Type of Project	Purpose	Potential to Address Degradation	Time to Implementation
Implement access strategies, including access restrictions, increasing the length of access openings or modification/elimination of bottlenecks such as ingress/egress locations.	Operational Capital	Operational Improvement	Medium to High	Near- to Mid-Term
Implementation of Integrated Corridor Management, or other traffic management techniques such as speed harmonization and lane control signals to optimize system performance.	Capital	Operational Improvement	Medium to High	Mid- to Long-Term
Close gaps in the HOV lane network	Capital	Operational Improvement	Medium to High	Long-Term
Interchange improvements including, but not limited to, construction of direct HOV connectors, ramp widenings, or truck climbing lanes.	Capital	Add Capacity	Medium to High for direct HOV connectors, Low to Medium for other improvements	Long-Term

HOV Degradation Remediation Strategy	Type of Project	Purpose	Potential to Address Degradation	Time to Implementation
Increase public awareness. Update HOV violation fine amount on the existing signs to the current value.	Operational	Education	Low to Medium	Near-Term
Improvement in Traffic Incident Management including the deployment or expansion of Freeway Service Patrol.	Operational	Operational Improvement	Low to Medium	Near- to Mid-Term
Expand the use of ramp metering, through the addition of new meters, metering HOV preferential lanes, or corridor wide adaptive ramp metering	Capital	Operational Improvement	Low to Medium	Near- to Mid-Term
Addition of general-purpose auxiliary lanes.	Capital	Operational Improvement	Low	Mid- to Long-Term

2.3. FUNDING FOR ADDRESSING DEGRADATION

Caltrans has set aside a one-time allocation of approximately $30 million from the Operational Improvement (OI) program in the State Highway Operations and Protection Program (SHOPP) for the purpose of addressing HOV degradation. Six Caltrans districts were provided the opportunity to identify projects to address degradation. Funds were required to be used specifically for projects intended to address degradation and any remaining funds were redirected back to the OI program. As a result, the districts and headquarters staff identified five projects to be included in the 2024 SHOPP.

Apart from the one-time allocation of $30 million, there is no specific recurring funding source to address HOV degradation. HOV degradation funding from the SHOPP comes from the same pool of OI funding that supports a variety of operational improvement projects such as adding GP auxiliary lanes, intersection improvements, ramp improvements, Transportation Systems Management and Operations (TSMO), truck climbing lanes, and Traffic Management System upgrades.

2.4. RESTRICTIONS ON EXEMPT VEHICLES

Currently, California has no plans to prohibit clean air vehicles (CAVs) from HOV facilities since it is state policy to encourage the purchase and use of CAVs, and access to HOV facilities is a primary incentive. There are also no plans at this time to convert high occupancy/toll (HOT) facilities back to HOV lanes. Caltrans coordinates regularly with the regional transportation agencies who operate the HOT facilities to ensure that provisions are in place to keep the facilities in compliance with the federal performance standard. Provisions that have been implemented already or are being evaluated include raising tolls, operating the facilities in an "HOV Only" mode, and automated occupancy monitoring.

The expiration dates of the decals are set in state law. Starting January 1, 2019, the decals are only valid until January 1 of the fourth year after the year of issuance. Decals issued after January 1, 2022, cannot be renewed. Changes to the expiration dates would require legislative action and Caltrans is not looking to make any changes to the program. The program that allows CAVs to access HOV lanes is governed by federal law and the enabling federal statute is currently set to expire on September 30, 2025.

On September 22, 2024, California Assembly Bill 2678 was signed, which permits the use of CAVs on HOV facilities to January 1, 2027, if the federal authorization is extended past September 30, 2025.

2.5. COORDINATION WITH THE CALIFORNIA HIGHWAY PATROL

The California Highway Patrol (CHP) is responsible for law enforcement on California highway facilities including the enforcement of vehicle occupancy requirements on all HOV facilities. Caltrans is committed to regular coordination with the CHP, both at the headquarters and the district level, to address the high number of violations on HOV lanes. Each district coordinates with and provides their regional CHP offices with annual reports that identify the number of violations on district HOV facilities. The purpose of these annual reports is to inform the CHP where additional enforcement may be needed. Districts are also encouraged to coordinate with the CHP to obtain historical HOV lane enforcement data to identify the effects of past enforcement. HOT lane operators typically have agreements in place with the CHP to provide additional enforcement on those facilities above and beyond what the CHP normally provides; this is funded by toll revenues. Caltrans and some HOT lane operators are testing AVOD systems to improve the accuracy of the violation rates to help identify occupancy trends, improve enforcement, and reduce violations through continuous coordination with the CHP.

2.6. COORDINATION WITH TOLL OPERATORS

Caltrans Traffic Operations received a letter on September 29, 2023, regarding collaboration with the California Toll Operators Committee (CTOC) on the degradation of Express Lanes. CTOC is a collaborative organization composed of fourteen California toll facility operators/owners and Caltrans. The committee serves as the primary resource for interoperability, education, and advocacy among facilities in operation throughout California. The existing Express Lane operators agreed to take the following actions to ensure that Express Lanes facilities meet the requirements of 23 U.S.C § 166:

1. Partner with Caltrans in reviewing locations on Express Lanes facilities where degradation was observed. If, after such review, it is mutually determined that the facility is degraded pursuant to 23 U.S.C § 166, the Express Lanes operator will agree to collaborate with Caltrans on solutions to identify actions to address the degradation for inclusion in the Action Plan, and work with Caltrans to support the implementation of such actions for which the Express Lanes operator is responsible.
2. Work with Caltrans to determine if the Express Lanes operators can provide speed and volume data to either supplement or replace the data that Caltrans uses to develop the Degradation Report.

Caltrans has collaborated with toll operators to establish action plans for the maintenance of express lanes. Ongoing coordination, both at the headquarters

and district levels, will persist to identify and address any degradation in the Express Lanes.

2.7. TH TRAFFIC INVESTIGATION ON DEGRADED HOV FACILITIES

On February 15, 2022, Caltrans Headquarters issued TOPD 22-04, mandating that districts conduct a type "TH" traffic investigation for each degraded HOV facility listed in the annual California High Occupancy Vehicle (HOV) Facilities Degradation Report. Traffic investigations were initiated by Caltrans HQ in June 2022, after to the completion of the 2021 HOV facility degradation report. The traffic investigations for the 2021 HOV degraded facilities has been concluded and the findings along with the analysis performed will be the basis to support the actions districts are taking to improve degradation. When available, recommendations will be incorporated.

For this 2025 California HOV Facilities Degradation Action Plan, six HOV facilities were identified as degraded that were not degraded in the 2021 or 2022 California HOV Facilities Degradation Report. The districts will conduct a 'TH' traffic investigation for each of the newly degraded HOV facilities listed in Table 2.

Table 2. Newly Degraded HOV Facilities in 2023

District	Route	Facility Type	Direction	Limits	Facility Length	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
04	80	HOV	WB	Air Base Pkwy to SR-12	7.59	PM	6.15	5.77	0	0	0.38
04	237	HOT	WB	I-880 to Lawrence Expwy	6.09	AM	3.97	2.96	1.01	0	0
04	580	HOT	WB	Greenville Rd to I-680	11.95	AM	6.70	6.35	0.34	0	0
04	880	HOV	NB	Old Bayshore Hwy to Dixon Landing Rd	5.84	PM	2.38	1.84	0	0.54	0
07	134	HOV	WB	I-5 to Cahuenga Blvd	4.17	PM	3.78	0.65	2.39	0.74	0
12	605	HOV	SB	Los Angeles County Line to I-405	2.53	AM	2.10	1.00	1.10	0	0

2.8. WAIVERS

Per 23 U.S.C. § 166, sanctions may be imposed if Caltrans fails to bring degraded HOV facilities into compliance with the federal performance standard. Sanctions may include withholding of Federal transportation funds or approval of projects.

A waiver from sanctions may be requested for degraded facilities where good faith efforts have been attempted and found still ineffective, and where it is determined that such a waiver may be in the best interest of the traveling public. However, it's essential to note that Caltrans has chosen not to request any waivers at this time. All waiver requests require review and approval by the U.S. Secretary of Transportation's office before the action plan can be accepted. Instead of facing the potential risks and delays associated with submitting waiver requests, the FHWA has recommended that the most effective approach is to define a set of actions so that all degraded segments can be classified as "likely to make significant progress." Upon review of the action plans, the FHWA may modify the conditional of approval items for the 2021 HOV degradation action plans for the conditional of approval items for the 2025 HOV degradation action plans or identify a set of actions for all degraded segments to achieve the desired outcomes. These actions will be performed by either Caltrans HQ or districts. All the HOV facilities will continue to be monitored for compliance with the federal performance standards and under the conditions of the waiver, certain actions may still be required on those facilities.

2.9. FRICTION FACTOR IMPACT STUDY AND ACCESS POINT WEAVING IMPACT STUDY

Caltrans is working with a consultant, Parsons Transportation Group Inc., to conduct two studies of the effects that friction factor and weaving have on HOV lane degradation.

Friction factor has been cited as a cause of degradation at locations where the performance of the adjacent congested general purpose (GP) lane is assumed to negatively affect the performance of the HOV lane. This has been witnessed in HOV segments where the demand in the HOV lanes is below its capacity, however speeds are below free-flow speeds. HOV lanes have shown evidence of not operating at their expected operating speeds relative to the measured traffic volumes. In many instances, the speeds of an HOV lane that is adjacent to a congested general purpose (GP) lane is often less than expected even though the traffic demand is well below capacity. The purpose of this study is to (1) verify the existence of a friction factor by showing that adjacent GP lane congested speeds negatively affect the operating speeds of the HOV lanes, (2) quantify the friction factor in which the sympathy speed phenomenon impacts the travel speed of the HOV lane, and (3) identify factors the impact the magnitude of friction.

Parsons provided the Friction Factor Impact Study Final Report in July 2024. The study was successful in identifying friction as a cause of degradation and

quantifying the factors that impact friction. The study provides operationalized guidance on improvements to the HOV facility that can reduce the impact of friction, including increased shoulder widths and buffer widths.

Access point weaving has been cited as a cause of degradation for HOV facilities. The access points at these facilities have increased ingress and egress between the HOV lanes and adjacent lanes. Excess weaving is assumed to negatively affect the performance of the HOV lane. Weaving has typically been cited as a cause of degradation when there are nearby onramps, nearby offramps, excess congestion in the general purpose (GP) lanes, closely spaced interchanges, platoon leader's speed, and an end to the HOV lane. The purpose of this study is to verify if weaving is a cause of degradation on HOV facilities.

Parsons provided the Weaving Impact Study Final Report in September 2024. The study identified that weaving has a substantial negative influence on both HOV and general-purpose lane speeds for this specific study corridor. The study analyzes the effects of replacing entrance into HOV facility with direct access ramps through a microsimulation model. The study shows that the complete elimination of HOV weaving is not necessary to provide substantial reductions in delay, rather it is important to identify where weaving is most impactful to the overall traffic conditions.

The FHWA has received the final reports of both of these studies and has been involved in reviewing and guiding the direction of these studies.

3. DISTRICT-SPECIFIC ACTION PLANS

Each district has developed an action plan for each route with a degraded HOV facility as identified in the 2023 California HOV Facilities Degradation Report. No summary is provided for District 10 because no HOV facilities in that district were degraded. A list of HOV facilities that were identified as degraded in 2023 is provided in Appendix A. Caltrans classifies degradation into three (3) categories based on how frequently degradation, as defined in 23 U.S.C. § 166, occurs. The criteria for each category of degradation status are as follows:

- Slightly Degraded—degradation occurs from 10 to 49 percent of the time.
- Very Degraded—degradation occurs from 50 to 74 percent of the time.
- Extremely Degraded—degradation occurs 75 percent or more of the time.

The action plans may include general information related to district-wide studies or plans developed to address degradation. These include plans developed by the districts as well as those developed by regional partners.

Each HOV facility was analyzed for degradation. The peak period average speed was calculated for each detection station on the facility and a count was taken of the number of times the average speed went below 45 mph. This count was then divided by the number of days for which data was available from that detection station in order to determine the percentage of time the speed was below 45 mph. The average speed and this percentage data were then plotted. The districts review this data and the plots (hereafter referred to as "profiles") to identify the locations and causes of degradation, such as roadway geometrics, traffic and travel patterns on the route, or other freeway performance issues. If necessary, the districts may conduct additional operational analyses of the facilities if the cause is unclear. The speed and degradation profiles for each degraded facility in the district are provided at the beginning of each district's section. These plots should be read from left to right. The outcomes of these reviews and analyses are reported in the "Analysis" section of each action plan. This section also includes statistics such as violation rates or percentages of CAVs if those are causes.

If a facility experienced severe, pervasive degradation, the "Analysis" section of the action plans may also include the "spot time" plots or the plots showing the HOV and adjacent GP lane speeds along the length of the HOV facility. The purpose of providing these plots is to provide additional information related to bottlenecks and the length and duration of congestion on HOV facilities and to provide a snapshot of GP lane performance alongside the HOV facilities.

The "Remediation Strategies" section describes the specific actions for the route based on the analyses. The actions are tied back to the causes identified in the "Analysis" section. These actions may include strategies for individual spots on a facility, for portions of a facility, for a facility as a whole, or for the entire route. Information is provided regarding the scope and schedule of the proposed actions and expected outcomes.

3.1. DISTRICT 3 2025 DEGRADATION ACTION PLANS

3.1.1 DISTRICT-WIDE ACTIONS RELATED TO DEGRADATION

District 3 is currently developing a Managed Lanes System Plan to identify and prioritize future managed lanes projects and strategies over the next 20 years. This effort is being led by District 3 Division of Planning, with support from District 3 Traffic Operations and in consultation with regional transportation agencies and other stakeholders. One of the major factors being considered is how to address existing and future HOV degradation.

The District 3 MLSP will divide construction of the 20-year managed lanes network into phases. These phases indicate the priority of managed lanes projects; that is, projects in Phase 1 are considered "high priority" while projects in Phase 2 or 3 are "medium" or "lower priority." The evaluation to include a project in a certain phase is based on a set of metrics that includes HOV degradation remediation. The study was started in March 2022 and will be completed in late 2024.

3.1.2 ACTION PLAN FOR HOV FACILITIES ON INTERSTATE 80

A. Analysis

Interstate 80 (I-80) in Sacramento experiences heavy congestion during the AM peak period in the westbound direction and during the PM peak period in the eastbound and westbound directions. This heavy congestion is the result of jobs/housing imbalance where the residents of large housing developments in Placer County and the surrounding cities commute to employment centers to the west, such as Downtown Sacramento and the San Francisco Bay Area, using I-80 as the connection.

The HOV lanes on I-80 initially provided a reliable commute option for carpoolers and transit users traveling between Roseville and downtown Sacramento. However, as travel demand has increased along this corridor, the HOV lanes have become a less reliable option in some segments for commuters during the peak periods.

Eastbound AM:

Eastbound I-80 does not experience HOV degradation during the AM peak period.

Eastbound PM:

The eastbound I-80 HOV lane experiences slight degradation during the afternoon commute period in a 2.65-mile segment from SAC PM M2.94 to M5.089 (2.23 of these miles are slightly degraded). The degradation occurs at the Northgate Boulevard interchange and extends west to the San Juan Road overcrossing, with some non-degraded segments in between. The primary causes of the degradation are heavy weaving movements from the I-5 connector on-ramp and Truxel Road off-ramp, the horizontal and vertical alignment between Truxel Road and Northgate Boulevard impacting the sight distance, large amounts of HOV violators in the HOV lane, and demand exceeding capacity for the HOV lane.

The eastbound I-80 HOV lane experiences slight degradation during the afternoon commute period in a 0.94-mile segment from SAC PM 12.401 to 14.574.

The degradation occurs at the Greenback Lane interchange and extends west through the Madison Avenue interchange. The primary causes of the degradation at this location include HOV lane violations, recreational traffic, and unmetered HOV preferential lanes for nearby on-ramps.

In addition, the eastbound I-80 HOV lane is slightly to very degraded during the afternoon commute period from PLA PM 2.539 to 3.006. The degradation occurs at the Atlantic Street interchange and extends back to Lead Hill Boulevard. The degradation at this location is caused by heavy weaving between Douglas Boulevard and State Route 65 (SR 65), friction between the HOV lane and adjacent GP (general-purpose) lanes, HOV lane violations, and unmetered HOV preferential lanes for nearby on-ramps.

Heavy Weaving

Between I-5 and Truxel Road

Degradation is partially caused by heavy weaving into the HOV lane on I-80 eastbound from I-5 northbound. Table 3.1 shows the average volumes in the HOV lane at the San Juan Road overcrossing and Truxel Road interchange. Between the two locations (about 0.6 miles apart), the volume in the HOV lane increases by up to 64 percent. The large amount of vehicles entering the HOV lane in a short distance affect operations in the HOV lane.

Table 3.1: EB I-80 PM Peak Period Average HOV Lane Volumes

Hour	HOV Lane Volume (vph)		Volume Increase (vph) % Change
	San Juan Road Overcrossing	Truxel Road Interchange	
3:00 – 4:00 PM	858	1,271	414 48.3%
4:00 – 5:00 PM	969	1,321	352 36.3%
5:00 – 6:00 PM	867	1,201	334 38.5%
6:00 – 7:00 PM	491	806	315 64.2%

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between July 1 and December 31, 2023).

Moreover, the weave segment of eastbound I-80 between the I-5 connector on-ramp and Truxel Road off-ramp experiences a heavy off-ramp movement during the PM peak period. The average off-ramp volumes are shown in Table 3.2. For reference, the AM peak hour volume of the off-ramp is 925 vehicles per hour (vph). The heavy weave movement between I-5 and Truxel Road contributes to degradation in the HOV lane, as vehicles enter the lane from the I-5 connector on-ramp and exit the lane to access the Truxel Road off-ramp.

Table 3.2: EB I-80/Truxel Road Average Off-Ramp Volumes

Hour	Off-Ramp Volume (vph)		
	Lane 1	Lane 2	Total
3:00 – 4:00 PM	306	783	1,089
4:00 – 5:00 PM	310	828	1,138
5:00 – 6:00 PM	357	889	1,246
6:00 – 7:00 PM	350	790	1,140

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between July 1 and December 31, 2023).

Between Douglas Boulevard and SR 65

The degradation observed in the HOV lane on I-80 eastbound by the Atlantic Street interchange and Lead Hill overcrossing is partially attributed to heavy weaving activity between the Douglas Boulevard interchange and the SR 65 connectors. This two-mile weaving segment, which includes four on-ramps and three off-ramps (including the eastbound I-80 connector to northbound SR 65), facilitates frequent lane changes that disrupt traffic flow and increase friction between the HOV lane and the adjacent GP lanes, thereby impacting the overall operations of the HOV lane.

As shown in Table 3.3 and Table 3.4, substantial traffic volumes use the on- and off-ramps within this segment during the PM peak period. These values represent averages collected in 2023. There is high demand for the Atlantic Street off-ramp during the PM peak period, which indicates that vehicles weave across lanes to exit at the Atlantic Street off-ramp, while nearby, traffic from Douglas Boulevard on-ramp merges onto the mainline. Additionally, the high demand for the eastbound I-80 to northbound SR 65 connector off-ramp and southbound SR 65 to eastbound I-80 connector on-ramp creates a bottleneck, which further leads to degradation. Furthermore, many vehicles slow their speed on the I-80 mainline to maneuver through the curve of the eastbound I-80 to northbound SR 65 connector.

Table 3.3: EB I-80 Average On-Ramps Volumes

Hour	On-Ramp Volume (vph)				
	Douglas Boulevard	Atlantic Street (loop)	Eureka Road (slip)	SB SR 65 to EB I-80 Connector	Total
3:00 - 4:00 PM	442	234	1,045	1,199	2,920
4:00 – 5:00 PM	390	214	1,051	1,119	2,774
5:00 – 6:00 PM	373	184	1,011	1,103	2,671
6:00 – 7:00 PM	352	150	7,45	1,067	1,569

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between July 1 and December 31, 2023).

Table 3.4: EB I-80 Average Off-Ramp Volumes

Hour	Off-Ramp Volume (vph)			
	Atlantic Street	Taylor Road	EB I-80 to NB SR 65 Connector	Total
3:00 - 4:00 PM	1125	450	3,395	4,970
4:00 – 5:00 PM	1,163	492	3,472	5,127
5:00 – 6:00 PM	1,118	445	3,375	4,938
6:00 – 7:00 PM	1,002	351	3,034	4,387

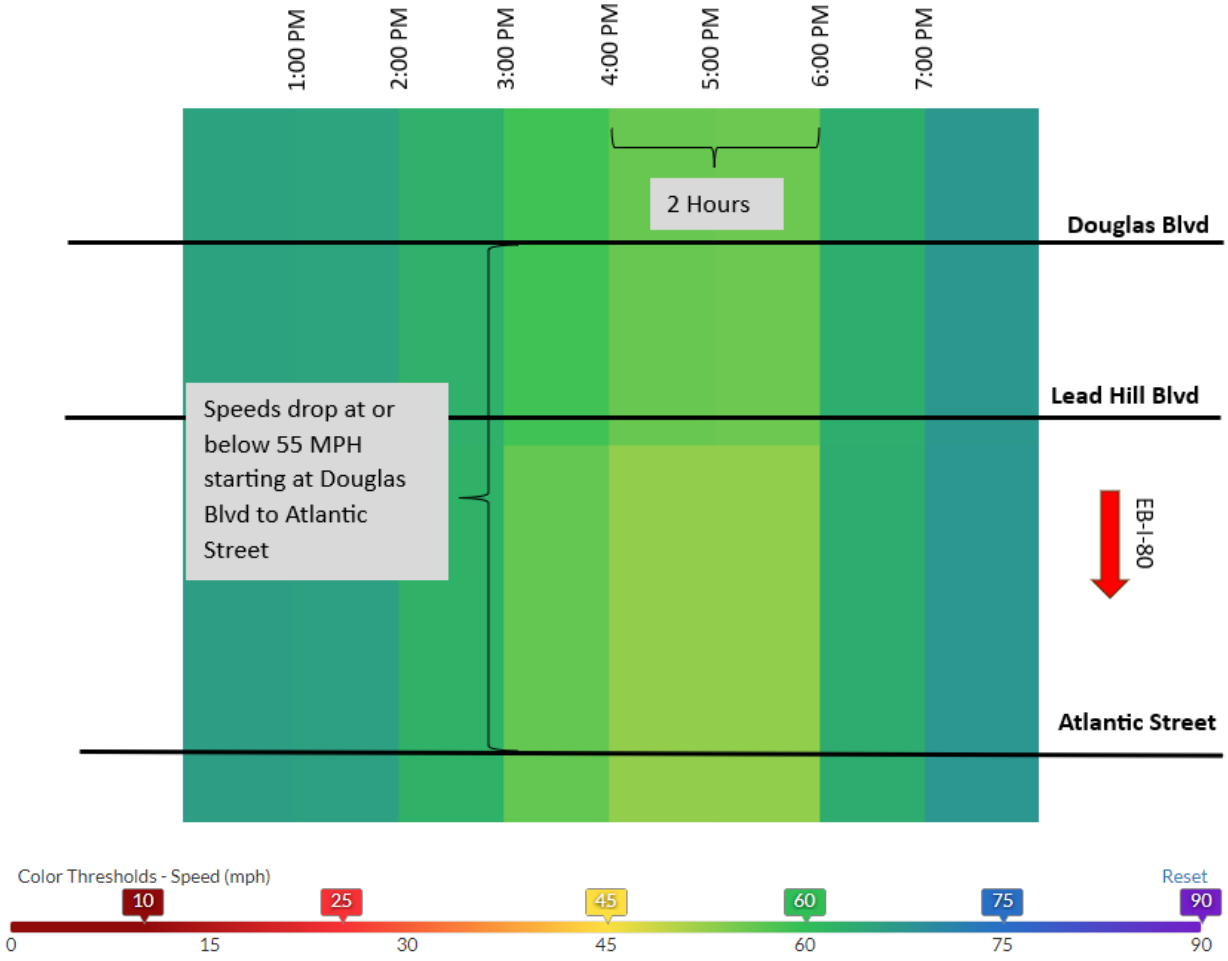
Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between July 1 and December 31, 2023).

Friction Factor

The HOV lane degradation during the afternoon commute period on I-80 eastbound by the Atlantic Street interchange and Lead Hill overcrossing is a result of friction between the HOV lane and adjacent GP lanes. There is a large amount of vehicles entering I-80 eastbound from Douglas Boulevard that weave to access the HOV lane. This, in turn, slows down the traffic on the mainline, including in the HOV lane.

Figure 3.1 is an average speed heat map for eastbound I-80 across all lanes during the PM peak period. The figure shows a segment where speeds decline between 4:00 PM and 6:00 PM between Atlantic Street and east of Douglas Boulevard, which includes the limits of HOV degradation.

Figure 3.1: EB I-80 PM Peak Period Average Speed Heat Map from Douglas Boulevard to Atlantic Street



Source: INRIX (weekdays between July 1, 2023, to December 31, 2023).

Table 3.5 shows the average volume and average speeds of the HOV lane, #2 GP lane, and all GP lanes for the east of Douglas Boulevard location on eastbound I-80 during the PM peak hour and period. The speeds are lower in the #2 GP lane and across all GP lanes compared to the HOV lane, which indicates that GP lane speeds impact HOV lane speeds.

Table 3.5: EB I-80 Average Lane Speeds and Average Volumes

Location		PM Peak Period		PM Peak Hour	
		Speed (mph)	Volume (vph)	Speed (mph)	Volume (vph)
West of Lead Hill Boulevard	HOV Lane	58	856	56	963
	#2 GP Lane	55	1,456	54	1,608
	All GP Lanes	52	4,777	50	5,046

Source: Caltrans Performance Measurement System (PeMS) (weekdays between July 1 and December 31, 2023).

Ramp Metering

Unmetered HOV preferential lanes at on-ramps within congested segments limit District 3's ability to control freeway volume. This leads to the freeway reaching capacity, resulting in an increasing friction factor.

On-ramps that include unmetered HOV preferential lanes within the degradation limits are:

- Greenback Lane loop on-ramp to eastbound I-80
- Madison Avenue loop on-ramp to eastbound I-80
- Atlantic Street slip on-ramp to eastbound I-80

HOV Violations

HOV violators also cause degradation by using up available capacity and increasing the density of vehicles in the lane. During the PM peak period, the HOV lane violation rate on eastbound I-80 is 42 percent near the Pinell Street overcrossing and 27 percent near the Foothill Farms pedestrian overcrossing (measured October 2023), adding more vehicles to the lane and impairing performance.

Recreational Traffic

Eastbound I-80 experiences heavy recreational traffic because the corridor connects the Bay Area/Sacramento area with Reno, NV and Lake Tahoe, CA. Average PM peak period travel speeds on Fridays going towards Reno/Lake Tahoe (in the eastbound direction between east of Madison Avenue and Atlantic Street) are 6 to 11 miles per hour (mph) lower than typical weekday travel speeds, likely due to the increase in demand associated with recreational travel. Analysis of PeMS data on I-80 eastbound near Madison Avenue shows that of the 33 degraded weekdays measured between July 2023 and December 2023, 10 (or

30 percent) were Fridays. This large percentage indicates that many trips on I-80 eastbound are recreation trips, as drivers travel on this corridor to access recreational or tourist destinations.

Westbound I-80 AM:

During the AM peak period, HOV lane degradation occurs on westbound I-80 between the Foothill Farms pedestrian overcrossing (just east of Madison Avenue) and Elkhorn Boulevard, which equates to SAC PM 13.703 to 14.937, or 1.57 miles. There are two causes of degradation in this direction: friction between the GP lanes and HOV lane and a high percentage of HOV lane violators.

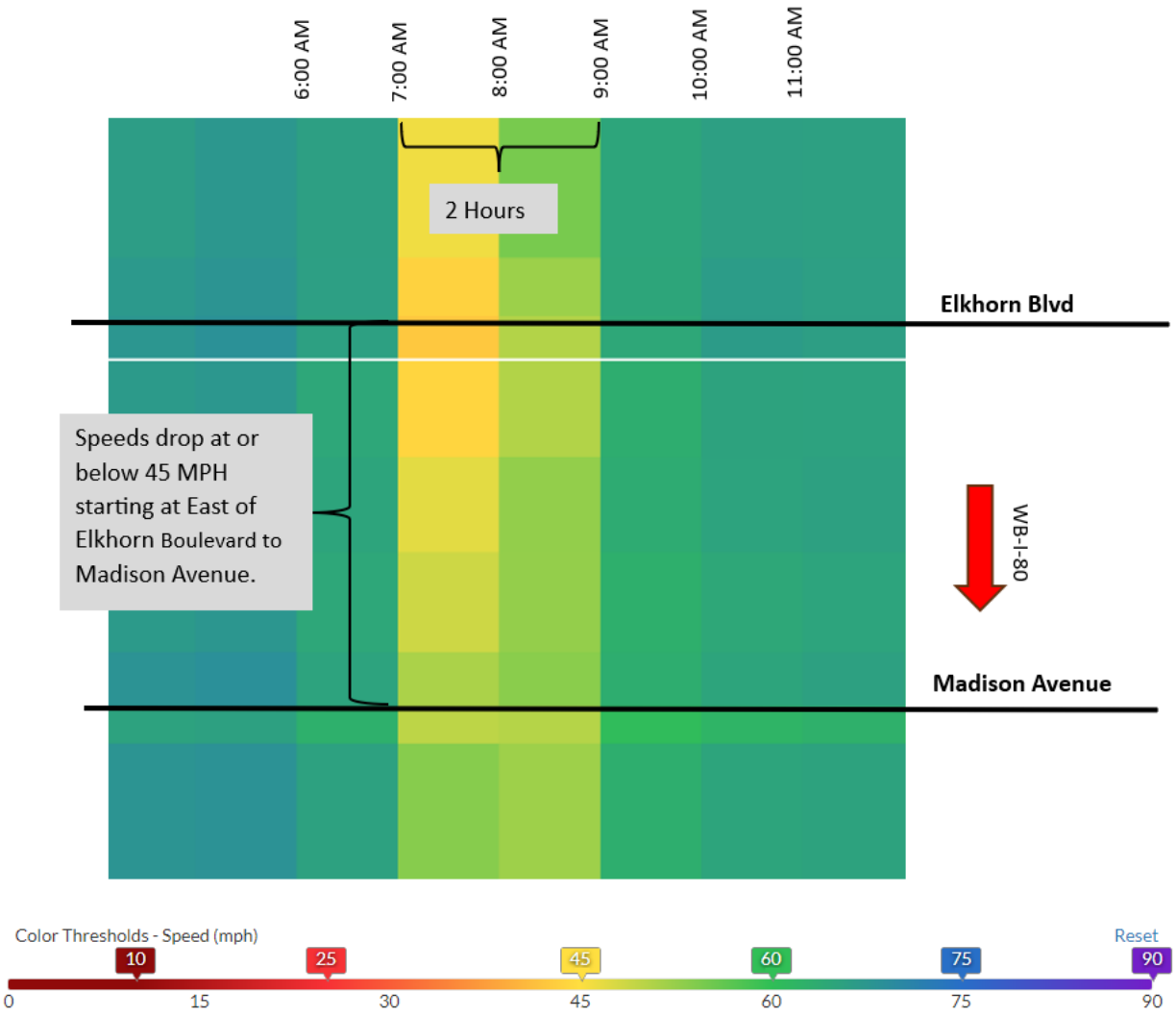
Additionally, there is slight degradation measured east of Rio Linda Boulevard at SAC PM M6.891, or about 0.76 miles, during the PM peak period. However, closer review of the data indicates that detector issues are present at this location. District 3 will address the malfunctions with the MVDS detectors in 2024.

Friction Factor

The friction between the HOV lane and GP lanes is a major reason why there is slight degradation on westbound I-80 during the morning commute, occurring between the Foothill Farms pedestrian overcrossing and Elkhorn Boulevard. The primary cause of the friction is due to congestion and slow-moving vehicles in the GP lanes caused by high demand. Analysis of INRIX and PeMS lane-by-lane speed data indicates that the primary cause of this degradation is the friction between the HOV lane and the GP lanes.

Figure 3.2 is an average speed heat map for westbound I-80 across all lanes during the AM peak period. The figure shows a segment where speeds decline between 7:00 AM and 9:00 AM between Elkhorn Boulevard and Madison Avenue, which include the limits of HOV degradation.

Figure 3.2: WB I-80 AM Peak Period Average Speed Heat Map from Elkhorn Boulevard to Madison Avenue



Source: INRIX (weekdays between July 1, 2023, to December 31, 2023).

Analysis of PeMS lane-by-lane average speed data, as shown in Table 3.6, confirms speeds in the #2 GP lane during the AM peak hour and peak period are slower than that of the HOV lane. This is also the case for speeds across all GP lanes in comparison to the speed of the HOV lane. This suggests that friction between the HOV lane and GP lanes results in HOV lane degradation.

Table 3.6: WB I-80 Average Lane Speeds and Average Volumes

Location		AM Peak Period		AM Peak Hour	
		Speed (mph)	Volume (vph)	Speed (mph)	Volume (vph)
Elkhorn Boulevard	HOV Lane	62	947	52	1,207
	#2 GP Lane	57	1,646	46	1,723
	All GP Lanes	51	5,498	42	5,947

Source: Caltrans Performance Measurement System (PeMS) (weekdays between July 1 and December 31, 2023).

HOV Violations

HOV violators also cause degradation by using up available capacity and increasing the density of vehicles in the lane. During the AM peak period, the violation rate measured on I-80 westbound is 53 percent measured at the Foothill Farms pedestrian overcrossing (measured October 2023), adding more vehicles to the lane and impairing performance.

Westbound I-80 PM:

During the PM peak period, the HOV lane on westbound I-80 experiences degradation ranging from slight to extreme. Extreme degradation occurs at Douglas Boulevard interchange from PLA PM 1.876 to 2.008. There are two main causes of degradation in this direction: friction between the GP lanes and HOV lane and a high percentage of HOV lane violators. An additional reason for the degradation is the construction project EA 03-3F23U, which started on June 16, 2023. The construction, which involved the addition of a K-rail, an additional lane drop, and the elimination of the right-side shoulder, has resulted in more congestion and an increased reduction of the capacity of the GP lanes leading to a higher friction factor between the HOV lane. Additionally, the construction has added a short merge taper at the Douglas Boulevard on-ramps, affecting the merge into the mainline, and has realigned the Douglas Boulevard off-ramp.

Additionally, there is slight degradation measured east of Rio Linda Boulevard at SAC PM M6.891, or about 0.76 miles, during the PM peak period. However, closer review of the data indicates that detector issues are present at this location. District 3 will address the malfunctions with the MVDS detectors this year.

Friction Factor

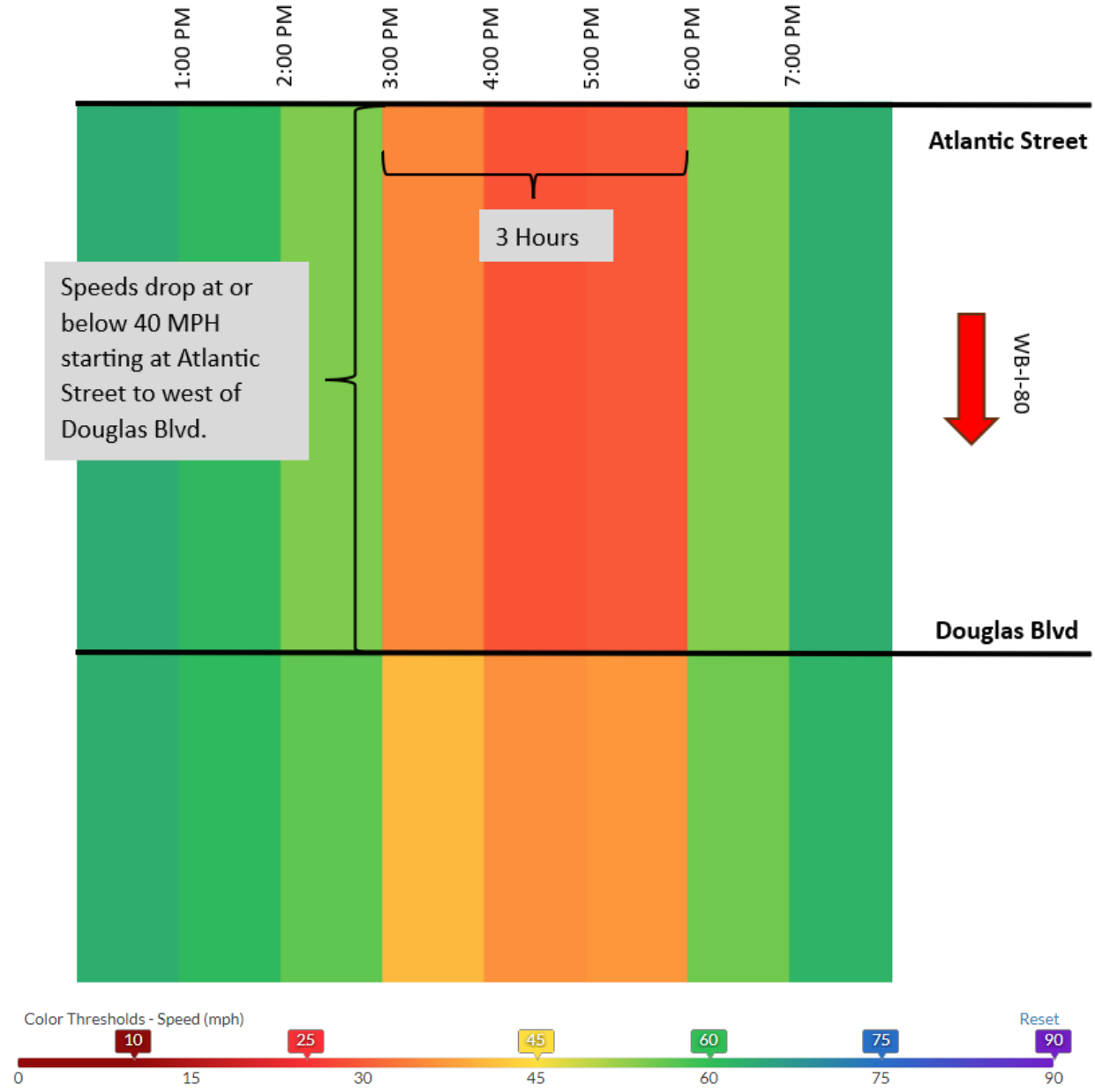
The friction between the HOV lane and GP lanes is a major reason why there is slight to extreme degradation on westbound I-80 during the afternoon commute.

In fact, this location was studied in the *Friction Factor Impact Study (Final Study Report)* (July 2024). The findings for this location state verified that friction is present and clearly observed between the HOV lane and adjacent GP lane at this location.

The primary cause of the friction is the lane drop (with construction there are two lane drops within a short distance) at the Douglas Boulevard off-ramp, which causes congestion and queueing. This lowers the capacity on westbound I-80 by reducing the number of available lanes from 5 to 4, which ultimately leads to the formation of a bottleneck and an increased friction factor between the GP lanes and the HOV lane.

Figure 3.3 is an average speed heat map for westbound I-80 across all lanes in the afternoon commute. The figure shows significant congestion between 3:00 PM and 6:00 PM from Atlantic Street to west of Douglas Boulevard, which includes the limits of HOV degradation.

Figure 3.3: WB I-80 PM Peak Period Average Speed Heat Map from Atlantic Street to Douglas Boulevard



Source: INRIX (weekdays between July 1, 2023, to December 31, 2023).

Analysis of PeMS lane-by-lane average speed data confirms that speeds in the #2 GP lane and across all GP lanes are significantly lower than that in the HOV lane during the PM peak hour and peak period. Table 3.7 shows the average lane speeds and volumes on westbound I-80 at Douglas Boulevard during the PM peak hour and PM peak period.

Table 3.7: WB I-80 Average Lane Speeds and Average Volumes

Location		PM Peak Period		PM Peak Hour	
		Speed (mph)	Volume (vph)	Speed (mph)	Volume (vph)
Douglas Boulevard	HOV Lane	44	1,305	37	1,314
	#2 GP Lane	39	2,062	31	2,074
	All GP Lanes	36	5,011	28	5,072

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between July 1 and December 31, 2023).

HOV Violations

HOV violators also cause degradation by using up available capacity and increasing the density of vehicles in the lane. During the PM peak period, the violation rate measured on I-80 westbound is 37 percent near the Foothill Farms pedestrian overcrossing (measured October 2023). These violators increase the number of vehicles in the HOV lane and impair its performance.

B. Remediation Strategies

Both Directions

Long Term Solutions

District 3 has completed the K-Phase for the project (03-2J180) to address degradation by evaluating other managed lanes strategies by modifying the existing HOV lanes along the I-80 corridor between West El Camino Avenue in West Sacramento and SR 65 in Roseville. Changes in managed lane type, minimum occupancy requirements, and operational improvements, such as reducing weaving and friction from the GP lanes through limited access striping, will be studied and part of the project alternatives. The Project Initiation Document was completed December 2022. PA&ED of this project is scheduled to be complete in 2028. However, this project is "on-hold," as it is awaiting funding.

Another project that will improve HOV lane degradation is 03-2C990, which will improve operations at the I-5/I-80 interchange in Sacramento. The improvements will include direct connectors for the HOV lane, which will reduce the lane changes need to enter and exit the HOV lanes on both I-5 (when managed lanes are constructed) and I-80. This will allow vehicles to maintain a consistent speed as they travel through the interchange. This was demonstrated in the Final Study

Report of the *Access Point Weaving Impact Study* (August 2024), where direct connectors at the I-5/State Route 55 interchange in Orange County yielded improved speeds in the HOV lane on I-5 northbound. This study is still in draft form. District 3 anticipates the PID for 03-2C990 is scheduled to be approved in 2025 and construction will begin in 2029.

The degradation that occurs on eastbound I-80 by Douglas Boulevard during the PM peak period will be addressed by 03-4E320, which would upgrade the I-80/SR 65 interchange by adding a bi-directional HOV direct flyover connector ramp which would include a connection from the HOV lanes on I-80 eastbound to future HOV lanes on SR 65 northbound. This would allow vehicles using these HOV lanes to remain on the left-side of the freeway instead of changing lanes to access the connector ramps. As mentioned previously, direct connectors may yield improved speeds in HOV lane, as demonstrated in the Final Study Report of the *Access Point Weaving Impact Study* (August 2024). This study is still in draft form. PA&ED for this project was completed in 2016, but the construction year is unknown at this time.

HOV Violations

In coordination with CHP, District 3 performed a Pilot Special Enforcement Study on State Route 99 (SR 99) from September 19, 2022, to October 14, 2022. This study evaluated the effects of special enforcement (two CHP units dedicated to pulling over violators in the HOV lane to issue citations and verbal warnings) during the weekday peak period to study its effects on travel speeds, lane volumes, HOV lane degradation, and HOV violation rates. Because of limited resources, CHP only conducted this special enforcement three days a week in the northbound direction during the AM peak period, but the whole week was studied along with the PM peak period in the southbound direction to determine its full impact. District 3 studied conditions Before, During, and After the special enforcement period.

The results showed that increased CHP presence during the AM peak period correlated with lower violation rates in the HOV lane. However, the degradation in the HOV lane increased and speeds in the HOV and GP lanes decreased. This is believed to be the result of increased friction between the #2 GP lane and HOV lane, as drivers who would violate the occupancy requirements of HOV lane stayed in the GP lane, and drivers slowing down to observe CHP activity along the corridor. The changes observed in the PM peak period metrics were nominal and likely represent daily variation in the data.

While these results are not in line with expectations, further study of increased enforcement of HOV lane violations is necessary to address HOV lane

degradation. District 3 recommends that future iterations of this study include automated vehicle occupancy detection (AVOD) and larger sample sizes (e.g., longer time periods) of data collection for Before, During, and After the enhanced enforcement period.

Occupancy Detection

To continue the efforts of the SR 99 Pilot Special Enforcement Study, District 3 met with FHWA California Division on December 6, 2022, to discuss potential effects of special enforcement of the minimum occupancy requirements of HOV lanes on I-80 and committed to installing Automated Vehicle Occupancy Detection (AVOD) systems to further enhance the accuracy of future studies and set baseline occupancy for the HOV lanes on SR 99 and I-80 (degraded routes in our 2022 HOV Action Plan). District 3 is partnering with DRISI and UC Davis to test this technology, with work beginning in 2025.

Eastbound I-80:

Ramp Metering

District 3 has identified ramp metering issues along the eastbound I-80 corridor associated with unmetered HOV preferential lanes, which greatly impact the effectiveness of the ramp meters along this corridor. This degraded segment has four unmetered HOV preferential lanes (two at Madison Avenue and two at Greenback Lane) that contribute to congestion and increased friction factor along the corridor in specifically in the degraded segment. Project 03-3J210 will meter the two unmetered HOV preferential lanes at Greenback Lane within the degraded segment of eastbound I-80. Due to bids coming back much higher than the engineer's estimate, this project has been delayed and will begin construction when costs come down. Project 03-4J530, which is anticipated to begin construction in December 2026, will meter the two unmetered HOV preferential lanes at Madison Avenue within the degraded segment of eastbound I-80.

Westbound I-80:

Friction Factor

District 3 received Cycle 2 Trade Corridor Enhancement Program funding for a project (EA 03-3723U) that eliminates the lane drop at Douglas Boulevard, which is the cause of extreme degradation in the afternoon. The project is scheduled to complete construction in July 2024. This project will construct an auxiliary lane which will extend the fourth GP Lane (i.e., the fifth mainline lane) from Douglas Boulevard to Riverside Avenue and upgrade existing on-ramps to help limit congestion and increase throughput at Douglas Boulevard.

Ramp Metering

The westbound I-80 Atlantic Street on-ramp had limited storage which limits District 3's ability to meter this location effectively. Vehicles must be released at a faster rate to limit queue spillback onto local streets. Project 03-0H460 was completed in July 2022 and widened the previous single lane on-ramp to a three-lane on-ramp, which allows for greater storage and gives District 3 the ability to better manage traffic entering the freeway on this degraded section of westbound I-80. Field observations have shown qualitative benefits, but more time is needed to demonstrate the quantitative benefits of adding additional storage. Following the completion of the 03-0H460 project, District 3 performed a before/after study to quantify the effects of widening the ramp, but construction from the 03-3F23U project affected the results. Therefore, District 3 will perform a before/after study once construction is complete to quantify the effects of both 03-0H460 *and* 03-3F23U combined.

3.1.3 ACTION PLAN FOR HOV FACILITIES ON STATE ROUTE 99

A. Analysis

State Route 99 (SR 99) in Sacramento experiences heavy directional congestion during the AM peak period in the northbound direction and during PM peak period in the southbound direction. This heavy directional congestion is the result of the jobs/housing imbalance where the residents of large housing developments in Sacramento County and the surrounding cities commute to employment centers to the north, such as downtown Sacramento, and the City of Elk Grove, using SR 99 as a connection.

The HOV lanes on SR 99 initially provided a reliable commute option for carpoolers and transit users traveling between Elk Grove and downtown Sacramento. However, as travel demand has increased along this corridor, the HOV lanes have become a less reliable option in some segments for commuters during peak periods.

Northbound SR 99 AM:

Northbound SR 99 experiences degradation during the AM commute period from SAC PM 18.576 to 20.753. The degradation occurs at the Mack Road interchange and extends north through 47th Avenue with non-degraded segments at various locations in between. The degradation segment length is about 2.2 miles for the AM peak period. The primary causes of the degradation on northbound SR 99 are friction between the GP lanes and HOV lane, demand exceeding capacity, HOV lane violators, and unmetered on-ramps.

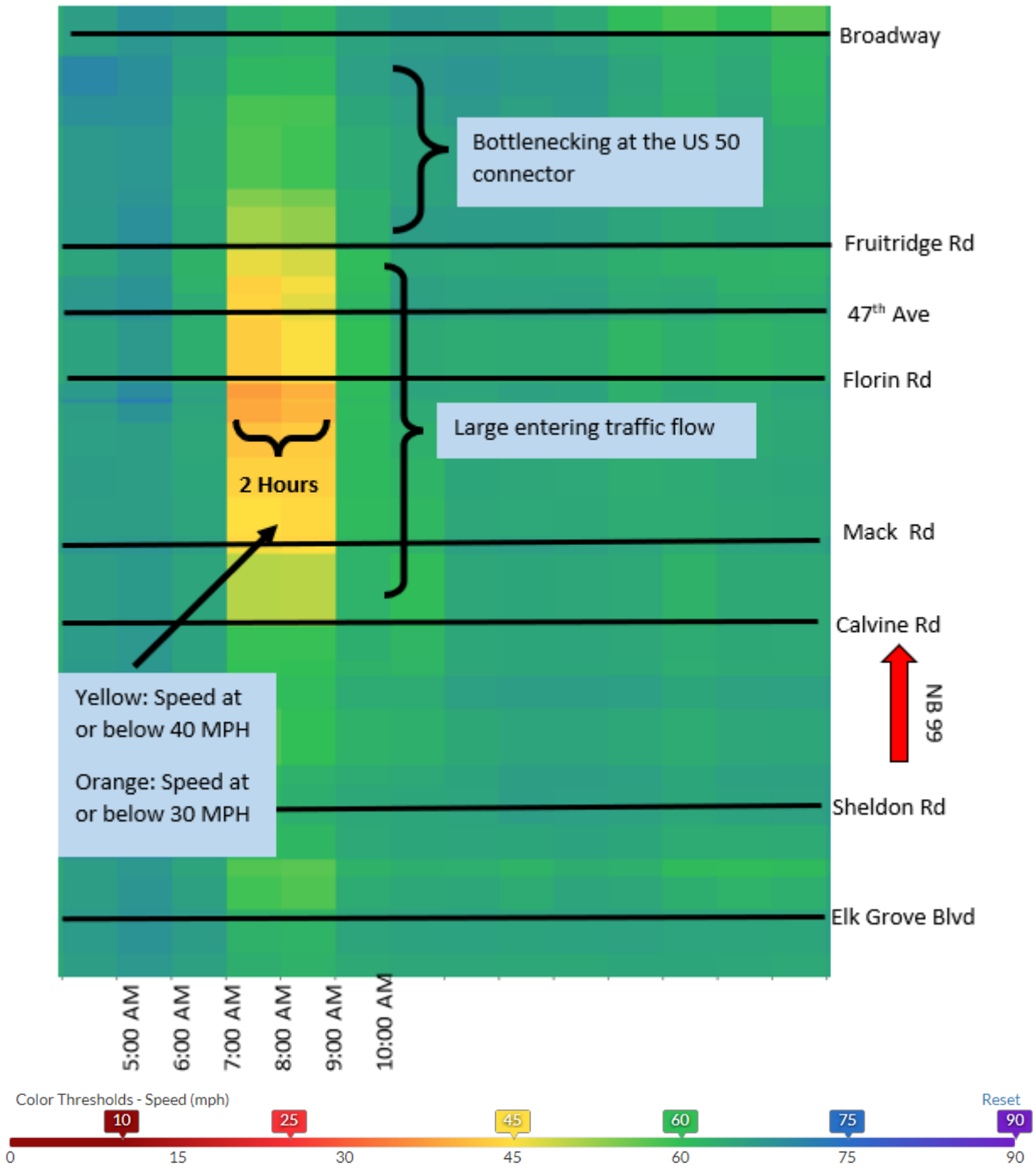
Friction Factor

Friction between HOV lane and GP lanes is a major factor in degradation. The primary cause is the heavy demand for the HOV lane from Elk Grove to the US 50 connector, which requires vehicles to cross all GP lanes, causing a weaving movement. Additionally, the heavy directional demand leads to mainline SR 99 operating above capacity across all lanes. This results in the formation of bottlenecks and an increased friction between the GP lanes and the HOV lane.

The friction is also present due to lack of standard inside shoulders. Most of the 2.2 miles of the degraded segment features non-standard inside shoulder widths that increase friction. This means that drivers experience friction on both sides of their vehicles, lowering speeds and increasing the extent of degradation. This effect is highlighted in "Element C" of the *Friction Factor Impact Study (Final Study Report)* (July 2024).

Figure 3.4 displays average speeds for northbound SR 99 across all lanes during the AM peak period via INRIX Analytics. The figure shows a segment where speeds decline between 7:00 to 9:00 AM, from Elk Grove Boulevard to S Street (on State Route 51 (SR 51)), which coincides with the limits of the HOV degradation. Furthermore, as shown in Table , the speed in the #2 GP lane is slower than the speed in the HOV lane at 47th Avenue and Florin Road.

Figure 3.4: NB SR 99 AM Peak Period Average Speed Heat Map from Elk Grove Boulevard to Broadway



Source: INRIX (weekdays between July 1, 2023, to December 31, 2023).

Demand Exceeding Capacity

Another factor that leads to degradation is the volume-to-capacity (V/C) ratio. According to PeMS, at the 47th Avenue interchange, the V/C ratio (based on a theoretical capacity of 1600 vph[1] due to friction between the GP and HOV lanes and limited shoulder widths) for the #2 GP lane is 1.02 and HOV is 0.76. Table 3.8 provides average volume and average speed information for the HOV lane, #2 GP lane, and all GP lanes combined at 47th Avenue, Fruitridge Road, and 12th Avenue interchanges. The Fruitridge Road and 12th Avenue interchange locations represent sites closer to the start of the bottleneck and have V/C ratios closer to or above 1.0, indicating that the facility is operating over capacity. This constrains some of the volume getting through the 47th Avenue location.

Table 3.8: NB SR 99 Average Lane Speed and Average Volumes

Location		AM Peak Period		AM Peak Hour		
		Speed (mph)	Volume (vph)	Speed (mph)	Volume (vph)	V/C Ratio
12th Avenue	HOV Lane	55	1,179	53	1,281	0.80
	#2 GP Lane	60	1,625	59	1,722	1.08
	All GP Lanes	52	3,888	51	4,096	0.85
Fruitridge Road	HOV Lane	65	1,028	64	1,167	0.73
	#2 GP Lane	55	1,904	51	1,980	1.24
	All GP Lanes	52	5,109	49	5,404	1.13
47th Avenue	HOV Lane	46	1,137	39	1,222	0.76
	#2 GP Lane	44	1,673	36	1,635	1.02
	All GP Lanes	45	4,290	38	4,370	0.91

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between October 1 and December 31, 2023).

[1] Use of 1600 vph as the default capacity for managed lanes is based on FHWA guidance for default capacity of an HOV lane. (https://ops.fhwa.dot.gov/publications/fhwahop13042/appg.htm)

Ramp Metering

Unmetered HOV preferential lanes at the on-ramps within congested segments limits District 3's ability to control freeway volume and leads to the freeway reaching capacity, resulting in increased friction and an increase in V/C ratio.

Within the limits of HOV lane degradation on SR 99 northbound, there are unmetered HOV preferential lanes at the following on-ramps:

- Mack Road loop on-ramp to SR 99 northbound
- Florin Road slip on-ramp to SR 99 northbound

Additionally, on SR 99 northbound, there are unmetered HOV preferential lanes at the following on-ramps outside of the degradation limits:

- Elk Grove Boulevard on-ramp to SR 99 northbound
- Sheldon Road loop on-ramp to SR 99 northbound
- Sheldon Road slip on-ramp to SR 99 northbound
- Calvine Road loop on-ramp to SR 99 northbound
- Calvine Road slip on-ramp to SR 99 northbound

HOV Violations

HOV violators also cause degradation by using up available capacity and increasing the density of vehicles in the HOV lane. Violation rates during the peak traffic period on northbound SR 99 reach 25 percent (measured at the 44th Avenue pedestrian overcrossing in October 2023), adding more vehicles to the lane and impairing performance. This value decreased from the 36 percent violation rate measured in 2022 at this location.

Northbound SR 99 PM:

Northbound SR 99 does not experience HOV degradation during the PM peak period.

Southbound SR 99 AM:

Southbound SR 99 does not experience HOV degradation during the AM peak period.

Southbound SR 99 PM:

The southbound SR 99 HOV lane experiences degradation during the afternoon commute period from SAC PM 16.23 to R24.332. The degradation occurs at N Street (on SR 51) and extends south through the Calvine Road interchange on SR 99, with non-degraded segments at various locations in between. The degraded segment length is about 8.9 miles during the afternoon peak period. The primary

causes of the degradation on southbound SR 99 are friction between the GP lanes and HOV lane, HOV violators, and unmetered on-ramps.

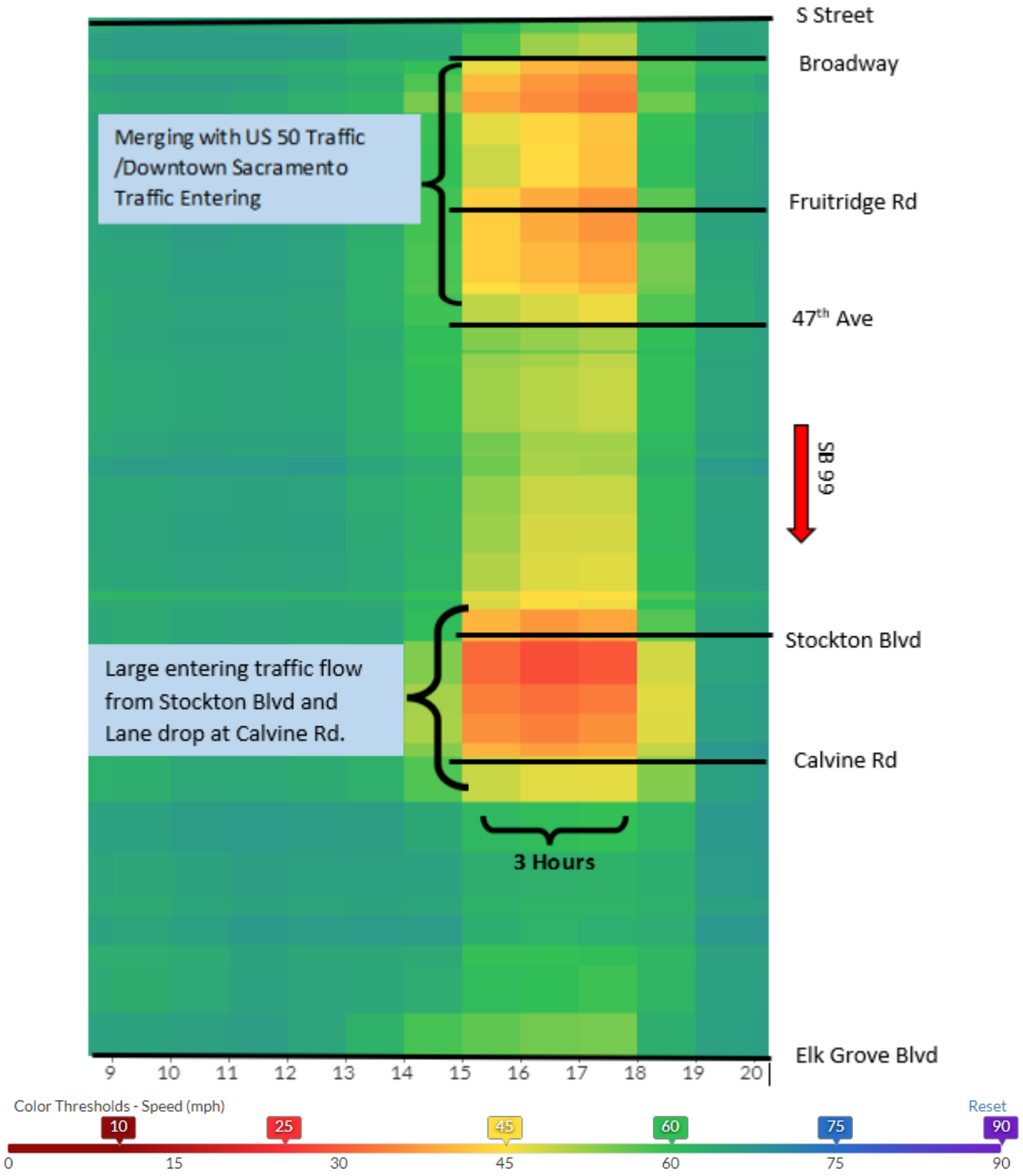
Friction Factor

Friction between HOV lane and GP lanes is a major factor in degradation. At the northern portion, the merging operation of US 50 traffic onto southbound SR 99 traffic has reduced the capacity of the freeway, which in turn reduces speed across all lanes, leading to friction. At the southern portion of the degraded segments, there are GP lane drops at the Fruitridge Road and Calvine Road off-ramps, which lower capacity and increase the V/C ratio in the GP lanes. This leads to the formation of an extremely intense bottleneck, resulting in reduced speed and increased friction between the GP lanes and the HOV lane.

Friction is also present due to the lack of standard inside shoulders. Most of the almost 8.9-mile degraded segment includes non-standard inside shoulder widths that increase friction. This means that drivers experience friction on both sides of their vehicles, lowering speeds and increasing the extent of degradation. This effect is highlighted in "Element C" of the *Friction Factor Impact Study (Final Study Report)* (July 2024).

Figure 3.5 displays an average speed heat map for southbound SR 99 across all lanes during the PM peak period via INRIX Analytics. The figure shows a segment where speeds decline between 3:00 and 6:00 PM from N Street (on SR 51) to Elk Grove Boulevard, which coincides with the limits of the degraded HOV segment.

Figure 3.5: SB SR 99 Average Speed Heat Map from N Street to Elk Grove Boulevard



Source: INRIX (weekdays between July 1, 2023, to December 31, 2023).

The friction at this location results in a substantial drop in the theoretical capacity of the facility. The high demand for the lane leads to slower speeds in the HOV

lane. Table 3.9 shows the HOV lane, the #2 GP lane, and overall GP average lane speeds and average volumes at Calvine Road on southbound SR 99 during the PM peak hour and period.

Table 3.9: SB SR 99 Average Lane Speeds and Average Volumes

Location		PM Peak Period		PM Peak Hour	
		Speed (mph)	Volume (vph)	Speed (mph)	Volume (vph)
Calvine Road	HOV Lane	40	1,345	41	1,299
	#2 GP Lane	28	1,249	31	1,252
	All GP Lanes	31	2,792	33	2,781

Source: *Caltrans Performance Measurement System (PeMS)* (weekdays between October 1 and December 31, 2023).

Ramp Metering

There is one unmetered on-ramp on southbound SR 99 at Elk Grove Boulevard, which limits District 3's ability to control freeway volume and leads to the freeway reaching its capacity, resulting in increasing friction.

HOV Violations

HOV violators also cause degradation by using up available capacity and increasing the density of vehicles in the lane. The HOV lane violation rate during the peak traffic period on southbound SR 99 is 18 percent (measured at the 44th Avenue pedestrian overcrossing in October 2023), adding more vehicles to the lane and impairing performance. This value decreased from the 25 percent violation rate measured in 2022 at this location.

B. Remediation Strategies

Both Directions:

Long Term Solutions

In July 2021, District 3 completed a preliminary Managed Lanes Study on SR 99. This study contained seven (7) alternatives that analyzed conversion of the current HOV 2+ lane to another type of managed lane (see Table 3.10 below for reference). The analysis was conducted to address the short and long term HOV degradation in both directions of SR 99.

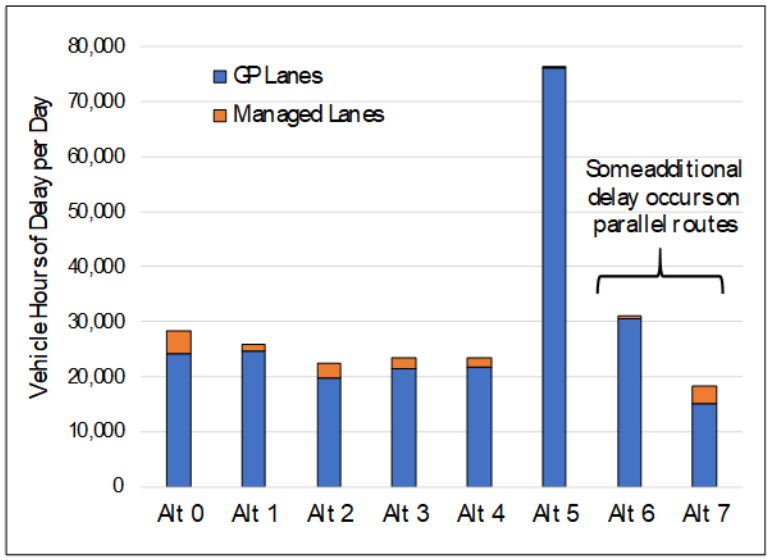
Table 3.10: Managed Lanes Study Alternatives

Alt.	Managed Lane Alternative Description
1	No Build
2	Convert HOV 2+ to HOT 2+ (HOV 2+ free, SOV Pay Full)
3	Convert HOV 2+ to HOT 3+ (HOV 3+ Free, HOV 2 Pay Half, SOV Pay Full)
4	Convert HOV 2+ to HOT 3+ (HOV 3+ free, HOV2/SOV Pay Full)
5	Change Minimum Occupancy from HOV 2+ to HOV 3+
6	Convert Inside GP lane to HOV 2+ (two HOV 2+ lanes)
7	Convert HOV2+ and inside GP lane HOT 2+ (two HOT 2+ lanes, HOV 2+ free, SOV Pay Full)

As a result of the study, limited access striping was also evaluated on northbound and southbound SR 99. Limited access on northbound SR 99 proved to be an equity concern and consideration for limited access on northbound SR 99 was dropped, however on southbound SR 99 limited access is being considered on two segments: from the SR 99/US 50 Interchange to Fruitridge Road, and upstream of Mack Road to Calvine Road. This limited access striping project has been added to the 2026 SHOPP.

The performance of each alternative, in term of vehicle hours of delay (VHD) in the year 2050, is presented in Figure 3.6 below.

Figure 3.6[2]: Forecast of Vehicle Hours of Delay in the Corridor in 2050



District 3 considered an incremental approach to fixing HOV degradation by converting the HOV 2+ lane to an HOV 3+ lane. As identified by Figure 3.6, the conversion from HOV2+ to a HOV3+ lane in Alternative 5 performs very well in the managed lane due to the low number of users. Conversely, the GP lanes perform very poorly due to limiting access to HOV2 vehicles from using the managed lane.

District 3 is in the planning stage for project 03-2J210 (Sacramento 99-51 Managed Lanes) to address degradation by evaluating other managed lanes strategies for the existing HOV lanes along the SR 99 corridor between the City of Elk Grove and downtown Sacramento. Changes in managed lane type, minimum occupancy requirements, access control (e.g., limited access striping), and operational improvements will be studied and part of the project alternatives. Capacity will not be able to be added on SR 99 due to geometric constraints, however, a goal of this project is to help redistribute demand across the GP lanes to better control demand in the managed lane. District 3 is in the process of applying for grants to move the project forward, the Project Initiation Document (PID) was approved on December 30th, 2022.

HOV Violations

In coordination with CHP, District 3 performed a Pilot Special Enforcement Study on SR 99 from September 19, 2022, to October 14, 2022. This study evaluated the effects of special enforcement (two CHP units dedicated to pulling over violators in the HOV lane to issue citations and verbal warnings) during the weekday peak

[2] Alternative 0 of this study is the No Build alternative with increased CHP enforcement.

period to study its effects on travel speeds, lane volumes, HOV lane degradation, and HOV violation rates. Because of limited resources, CHP only conducted this special enforcement three days a week in the northbound direction during the AM peak period, but the whole week was studied along with the PM peak period in the southbound direction to determine its full impact. District 3 studied conditions Before, During, and After the special enforcement period.

The results showed that increased CHP presence during the AM peak period correlated with lower violation rates in the HOV lane. However, the degradation in the HOV lane increased and speeds in the HOV and GP lanes decreased. This is believed to be the result of increased friction between the #2 GP lane and HOV lane, as drivers who would violate the occupancy requirements of HOV lane stayed in the GP lane, and drivers slowing down to observe CHP activity along the corridor. The changes observed in the PM peak period metrics were nominal and likely represent daily variation in the data.

While these results are not in line with expectations, further study of increased enforcement of HOV lane violations is necessary to address HOV lane degradation. District 3 recommends that future iterations of this study include automated vehicle occupancy detection (AVOD) and larger sample sizes (e.g., longer time periods) of data collection for both Before, During, and After the enhanced enforcement period.

Occupancy Detection

To continue the efforts of the SR 99 Pilot Special Enforcement Study, District 3 met with FHWA California Division on December 6, 2022, to discuss potential effects of special enforcement of the minimum occupancy requirements of HOV lanes on I-80 and committed to installing Automated Vehicle Occupancy Detection (AVOD) systems to further enhance the accuracy of future studies and set baseline occupancy for the HOV lanes on SR 99 and I-80 (degraded routes in our 2022 HOV Action Plan). District 3 is partnering with DRISI and UC Davis to test this technology, with work beginning in 2025.

Northbound SR 99:

Friction Factor

As mentioned previously, District 3 completed a study in 2023 that proposes the potential conversion of the HOV lane to an HOT lane (EA 03-2J210). Currently, this study is in PID phase and District 3 is working on grant applications for funding. The Ready-to-List (RTL) date is projected for 2029.

Ramp Metering

District 3 has identified several ramp metering deficiencies along the northbound SR 99 corridor associated with unmetered HOV preferential lanes.

District 3 has initiated projects to meter seven unmetered HOV preferential lanes along the degraded portion of this corridor. Project 03-3J220 will meter HOV preferential lane at the northbound SR 99/eastbound Mack Road loop on-ramp. This project is planned for construction in summer 2024. Project 03-4J730 will meter the HOV preferential lane at northbound SR 99/westbound Florin Road slip on-ramp. Its construction date is summer 2024. Project 03-1H630 is currently in Construction phase and will meter five HOV preferential lanes at Calvine Road (slip and loop), Sheldon Road (slip and loop), and Elk Grove Boulevard (slip). The project is currently scheduled to complete construction in October 2025.

Once these projects are completed, District 3 will have no unmetered on-ramps in the northbound direction of SR 99 within the HOV lane limits.

Southbound SR 99:

Friction Factor

District 3 will implement Limited Access Control on southbound SR 99 from the US 50/SR 99 interchange to Fruitridge Road (EA 03-0J420), and from Mack Road to Calvine Road (EA 03-4J970) to mitigate the friction factor between the HOV lane and GP lanes. These projects will be (RTL) in December 2025 and June 2028, respectively.

Ramp Metering

Currently, there is only one unmetered on-ramp on southbound SR 99 within the HOV lane limits, located at the Elk Grove Boulevard interchange. District 3 is planning to meter this location with a SHOPP 2026 program.

3.2. DISTRICT 4 2025 DEGRADATION ACTION PLANS

3.2.1 DISTRICT-WIDE ACTIONS RELATED TO DEGRADATION

In 2023, overall traffic volumes increased due to changing travel patterns, with more employees returning to the office as the pandemic subsides and many companies implementing hybrid work models. District 4 has seen degradation in managed lanes increase by 19 lane-miles in AM peak periods and 7 lane-miles in PM peak periods compared to 2022. The following routes that were not degraded in 2022 have become degraded in 2022: Solano (SOL) County Interstate (I) 80 (westbound, PM peak period), Santa Clara (SCL) County State Route (SR) 237

(westbound, AM peak period), Alameda (ALA) County I-580 (westbound, AM peak period), and Santa Clara County I-880 (northbound, PM peak period).

3.2.2 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 4

In 2022, as pandemic restrictions eased, the eastbound SR 4 HOV lane experienced approximately 1.4 miles of degradation during the PM peak period. By 2023, this figure increased to around 1.6 miles, reflecting a gradual return of commuters and the adoption of hybrid work models.

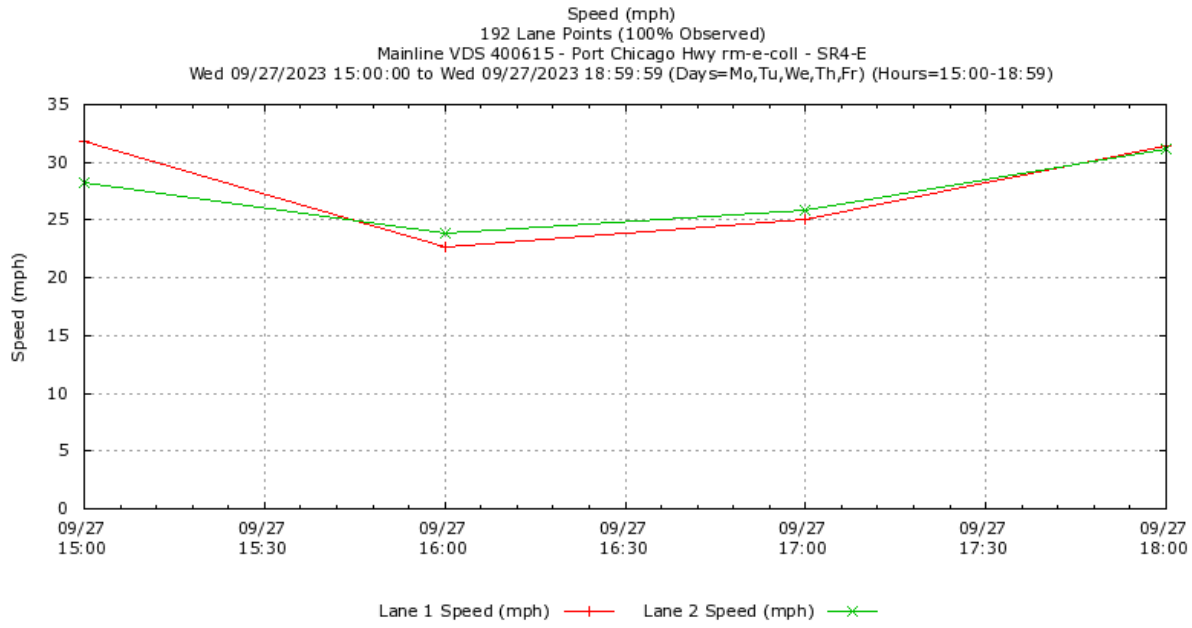
On the westbound side, the situation was more pronounced. In 2022, there were 5.3 lane-miles of degraded HOV lane in the AM peak period, which rose to 6.3 lane-miles in 2023. This increase was attributed to changing commuting patterns as more people returned to in-office work post-pandemic. Overall, the data indicates a trend of rising congestion in HOV lanes as commuting behaviors evolved.

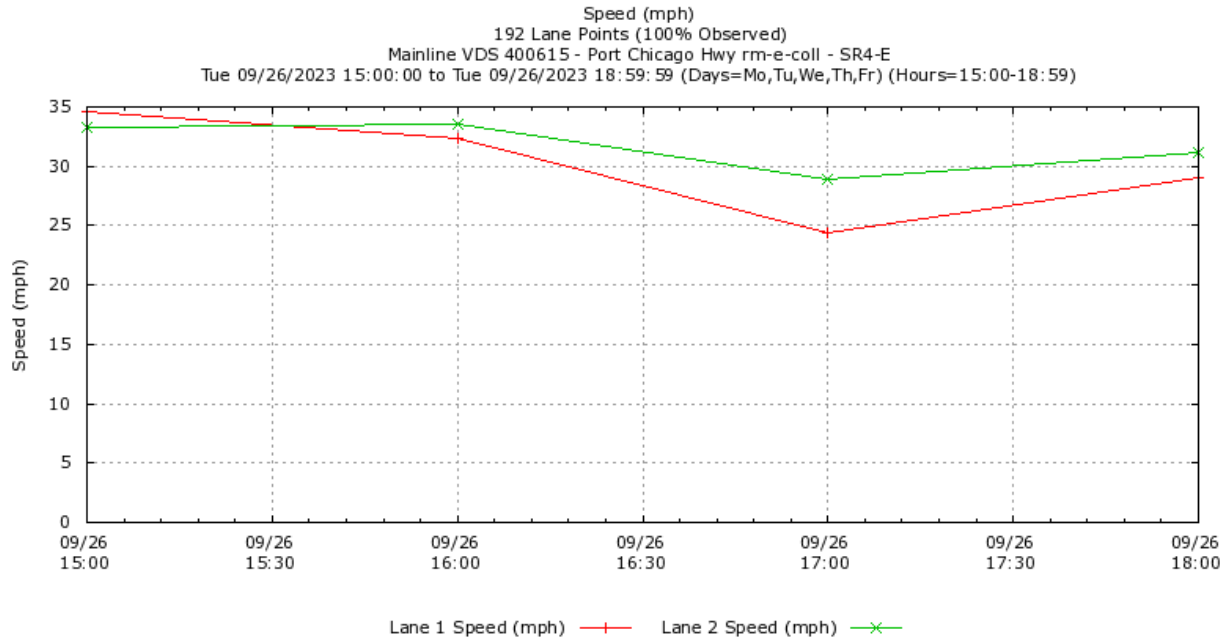
A. Analysis

SR 4 Eastbound: I-680 to Hillcrest Avenue:

The eastbound HOV lane on SR 4 between Port Chicago Highway and Willow Pass Road (Concord) is experiencing degradation due to recurrent congestion in the general-purpose lanes during the PM peak period. This congestion is impacting the performance and speed of the HOV lane. Additionally, demand exceeding the capacity of the HOV lane is contributing to congestion at Port Chicago Highway. A "spot time" plot illustrating the speeds of both the HOV and general-purpose (GP) lanes during a typical morning peak period is shown in the figure below. Lane 1 represents the HOV lane, while Lane 2 represents the adjacent GP lane. This data demonstrates how congestion in the GP lanes affects the speeds in the HOV lane.

Figure 4.1: EB SR-4 PM "Spot Time" Plots at Port Chicago Highway





The HOV 2+ demand on this route is relatively high which can also influence the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane demand is greater than the effective capacity of the lane to maintain a speed at 45 mph or greater.

Table 4.1: EB SR-4 PM HOV & GP1 Flow and Speed at Port Chicago Highway

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
9/25/2023 15:00	1,710	34	1,566	34
9/25/2023 16:00	1,560	28	1,483	32
9/25/2023 17:00	1,557	27	1,503	35
9/25/2023 18:00	1,473	29	1,407	31
9/26/2023 15:00	1,650	35	1,451	33
9/26/2023 16:00	1,537	32	1,397	34
9/26/2023 17:00	1,491	24	1,545	29
9/26/2023 18:00	1,530	29	1,497	31
9/27/2023 15:00	1,637	32	1,545	28
9/27/2023 16:00	1,494	23	1,464	24
9/27/2023 17:00	1,514	25	1,463	26
9/27/2023 18:00	1,552	31	1,469	31
9/28/2023 15:00	1,533	28	1,515	29
9/28/2023 16:00	1,515	25	1,483	26
9/28/2023 17:00	1,491	23	1,552	26
9/28/2023 18:00	1,448	24	1,429	28.2
9/29/2023 15:00	1,600	34	1,516	33
9/29/2023 16:00	1,593	27	1,570	29
9/29/2023 17:00	1,556	28	1,599	30
9/29/2023 18:00	1,609	36	1,502	36

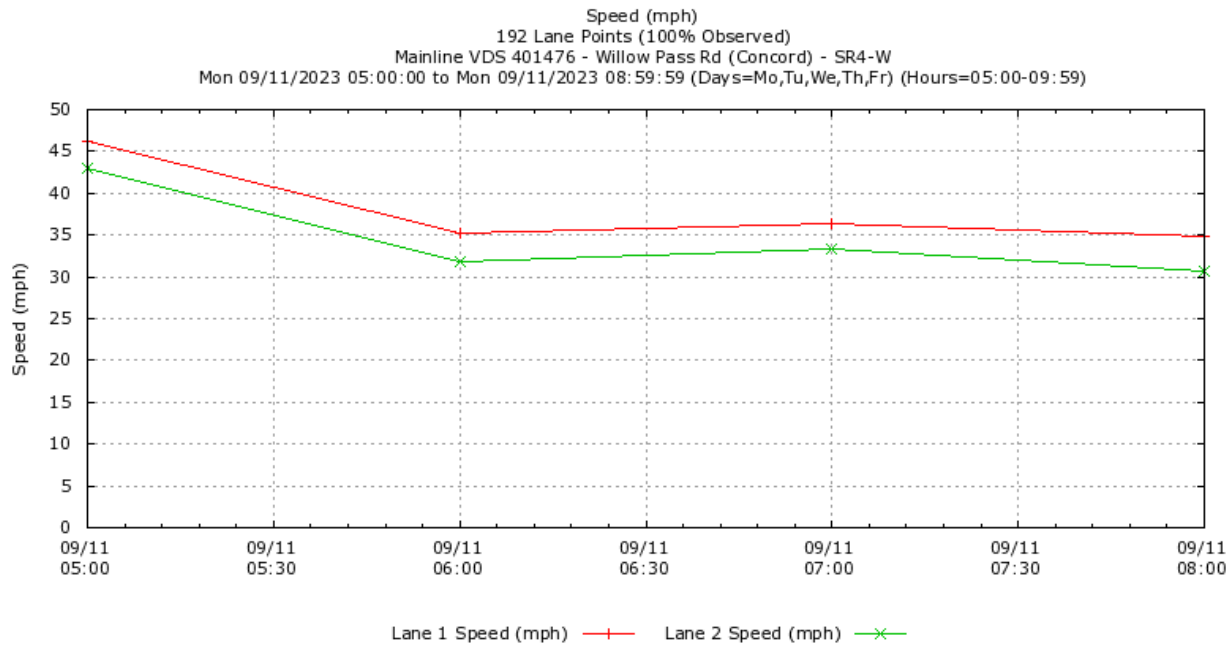
Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes, demand exceeds capacity.

SR 4 Westbound: Hillcrest Avenue to East of Port Chicago Highway:

Westbound SR 4 experiences recurrent AM peak period congestion in all lanes, including the HOV lane, approaching a bottleneck between the Willow Pass Road (Concord) on-ramp and the Port Chicago Highway off-ramp. Queues typically extend upstream for over 8 miles to east of the Loveridge Road

interchange. The primary factors resulting in reduced HOV lane speed are friction between the HOV lane and the general-purpose lanes within the area of congestion and weaving at the end of the HOV lane within the bottleneck section. A "spot time" plot of the HOV and GP lane speeds on westbound SR 4 for a typical morning peak period are shown in the figure below. Lane 1 represents the HOV lane and lane 2 represents the adjacent GP lane. This illustrates how the congested speeds of the GP lanes influence the speeds in the HOV lane.

Figure 4.2: WB SR-4 AM "Spot Time" Plot at Willow Pass Rd.



B. Remediation Strategies:

SR 4 Eastbound: I-680 to Hillcrest Avenue:

The eastbound SR 4 HOV lane was extended to I-680 in 2021, however with the return of evening commute traffic, the high-volume SR 242 on-ramp and lane drop at the Port Chicago Highway interchange add to the reoccurring congestion on this route impacting the HOV lane at this location. There are no current projects to address the eastbound bottleneck. However, Caltrans Headquarters in currently working on Managed Lane weaving and friction factor studies scheduled to be completed in June 2024. Conclusions from these studies could lead to future Managed Lane improvement projects. In addition, the Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025, the removal of CAVs from the Managed Lane would improve the Managed Lane operations.

SR 4 Westbound: Hillcrest Avenue to East of Port Chicago Highway:

An Operation Improvements Project (OIP) includes several phases to add sections of GP lane or auxiliary lanes in the westbound direction and widen off-ramps on SR 4 between SR 242 and Bailey Road. This project includes future phases for westbound improvements of new auxiliary lanes, conversion of auxiliary lanes to GP lanes, or new GP lanes. First Phase of project is currently in PA&ED, with construction completion schedule in 2025 (project currently on hold). PSR-PDS completed in 2016 estimated entire OIP project cost estimate is $220M. Caltrans Headquarters in currently working on Managed Lane weaving and friction factor studies scheduled to be completed in June 2024. Conclusions from these studies could lead to future Managed Lane improvement projects. In addition, the Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025, the removal of CAVs from the Managed Lane would improve the Managed Lane operations.

3.2.3 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 80

There are HOV facilities on two segments of I-80 in District 4. The first segment is in Alameda and Contra Costa Counties between the San Francisco-Oakland Bay Bridge and Route 29. The second segment is in Solano County between Red Top Road and Airbase Parkway. An on-going construction project will extend the HOV lane in both directions of Route 80 from Air Base Parkway to Leisure Town Road.

In 2022, eastbound I-80 between the I-880 and Cummings Skyway had 0.8 degraded HOV lane-miles in the AM peak period and 11.3 degraded HOV lane-miles in the PM peak period. In 2023, there was no HOV degradation in the AM peak period and it experienced 10.37 degraded HOV lane-miles in the PM peak period.

In 2022, the westbound I-80 between SR 29 and San Francisco-Oakland Bay Bridge Toll Plaza had 9.0 degraded HOV lane-miles in the AM peak period and 2.2 degraded HOV lane-miles in the PM peak period. In 2023, the segment had 7.27 degraded HOV lane-miles in the AM peak period and 2.0 degraded HOV lane-miles in the PM peak period.

Eastbound I-80 between Red Top Road and Airbase Parkway has no degraded HOV lane-miles in the AM peak period in 2023 which was the same conditions as in 2022. In 2023, eastbound I-80 within this segment there was 4.2 degraded HOV lane-miles and in 2022, there was 2.6 degraded HOV lane-miles in the PM peak period.

Westbound I-80 between Airbase Parkway and westbound SR 12 there was no degraded HOV lane-miles in 2022 in either the AM or PM peak period. This was the same conditions as in 2023.

A. Analysis

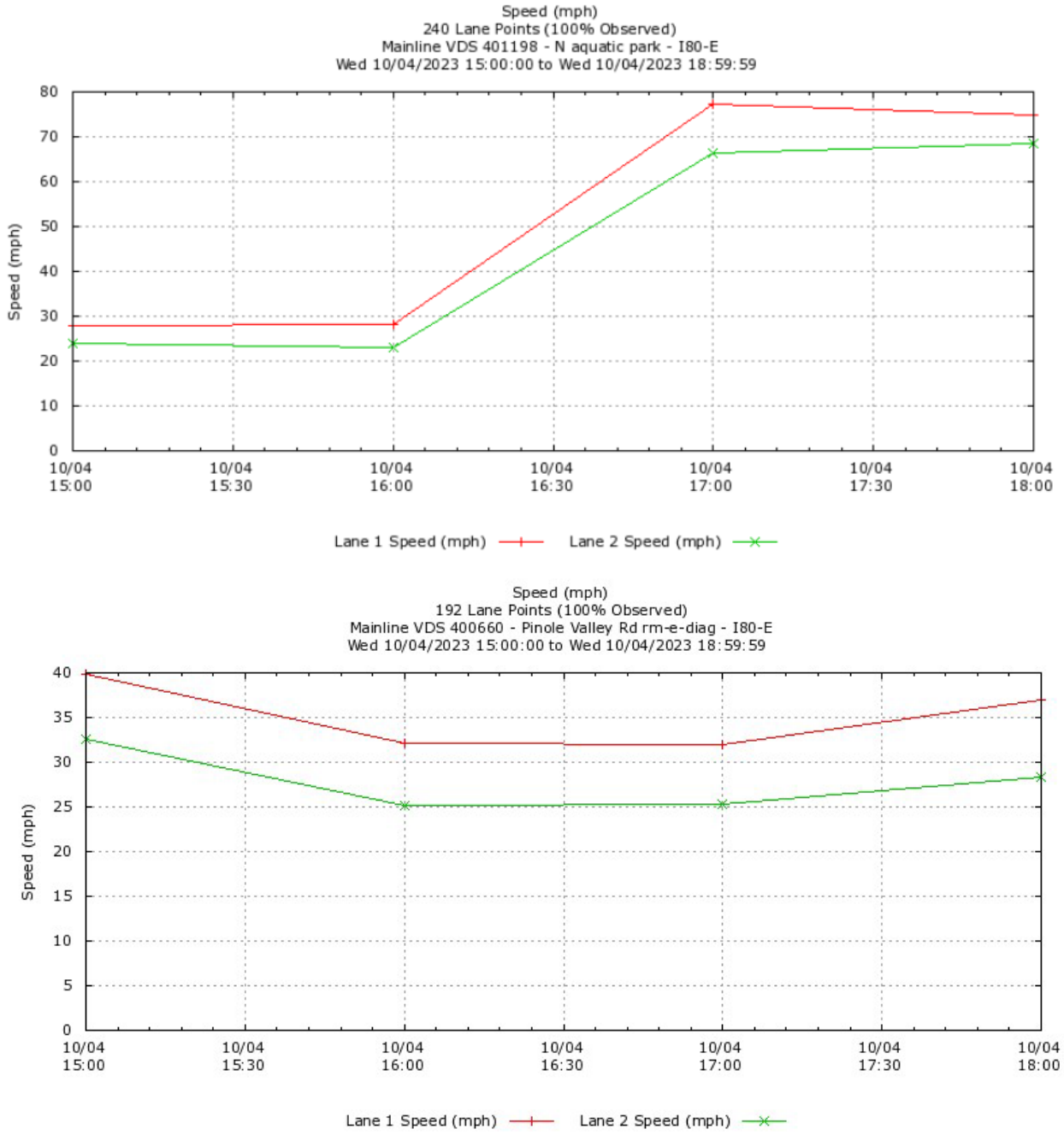
ALA/CC-80 Eastbound (AM): Route 80/Route 580 Split to Cummings Skyway:

There are no controlling bottlenecks during the AM peak period.

ALA/CC-80 Eastbound (PM): Route 80/Route 580 Split to Cummings Skyway:

There are two controlling bottlenecks on eastbound I-80 in the PM peak period. One bottleneck is between east of University Avenue on-ramp and the Ashby Avenue off-ramp. The queue from this bottleneck extends back to about the Route 80/Route 580 on eastbound I-80 approximately 2.6 miles. The other bottleneck is downstream between Pinole Valley Road on-ramp and the Route 4 off-ramp. The queue from this bottleneck extends back to Solano Avenue, approximately 5.2 miles. Peak period recurrent congestion in the GP lanes due to these conditions reduces HOV lane performance and speed due to the friction factor between these lanes. Even though the HOV lanes are degraded, HOVs in the eastbound direction experiences a travel time savings over the general-purpose traffic during the afternoon peak hour. A "spot time" plot of the HOV and GP lane speeds on eastbound I-80 for a typical afternoon peak period is shown in the figures below. Lane 1 represents the HOV lane and lane 2 represents the adjacent GP lane. This illustrates how the congested speeds of the GP lanes influence the speeds in the HOV lane.

Figure 4.3: EB I-80 PM "Spot Time" Plots at N. Aquatic Park and Pinole Valley Rd.



The HOV 3+ demand on this route is relatively high which can also influence the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is near or at the effective capacity of the lane to maintain a speed at 45 mph or greater.

Table 4.2: EB I-80 PM HOV and GP1 Flow and Speed at N. Aquatic Park

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 15:00	1831	39.1	1884	40
10/2/2023 16:00	1446	35.4	1622	38
10/2/2023 17:00	1672	37.5	1614	39
10/2/2023 18:00	1384	44	1556	43
10/3/2023 15:00	1778	43.3	1748	42
10/3/2023 16:00	1805	37.8	1617	39
10/3/2023 17:00	1634	35.5	1600	39
10/3/2023 18:00	1684	37.6	1537	40
10/4/2023 15:00	1797	39.9	1698	42
10/4/2023 16:00	1735	32.1	1590	38
10/5/2022 17:00	1757	32	1575	38
10/5/2022 18:00	1725	36.9	1589	40
10/6/2022 15:00	1782	31.8	1682	37
10/6/2022 16:00	1756	32.2	1569	37
10/6/2022 17:00	1698	32.5	1574	37
10/6/2022 18:00	1713	34.9	1616	37
10/7/2022 15:00	1746	32	1611	38
10/7/2022 16:00	1716	31.1	1569	36
10/7/2022 17:00	1707	31.4	1568	38
10/7/2022 18:00	1662	33.1	1351	39

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes, demand exceeds capacity.

ALA/CC-80 Westbound (AM): SR 29 to Route 80/Route 580 Split:

On westbound Route 80 in the AM peak period, there is a bottleneck between the Gilman Street on-ramp and the University Avenue off-ramp. The queue from this bottleneck extends back to the Appian Way interchange, approximately 8.4 miles. Peak period recurrent congestion in GP lanes reduces HOV lane performance and speed due to the friction factor. Even though the HOV lanes are degraded, HOVs in the westbound direction experiences a travel time savings over the general-purpose traffic during the morning peak period. Figures below shows a "spot time" plot of the HOV and GP lane speeds on westbound I-80

during a typical morning peak period. Lane 1 represents the HOV lane and lane 2 represents the adjacent GP lane.

The HOV 3+ demand on this route is relatively high which can also influence the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is near the effective capacity of the lane to maintain a speed at 45 mph or greater.

Figure 4.4: WB I-80 AM "Spot Time" Plot at Gilman St.

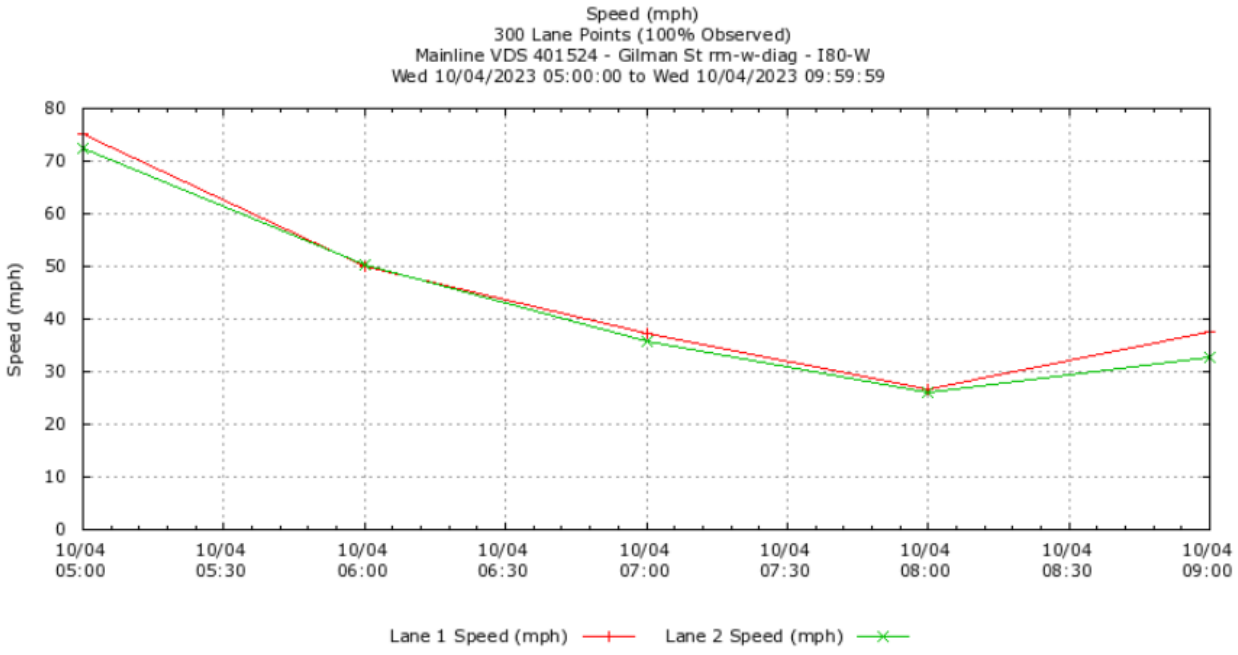


Table 4.3: WB I-80 AM HOV and GP1 Flow and Speed just East of Gilman I/C

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 5:00	1438	82	1377	74
10/2/2023 6:00	1601	54	1617	51
10/2/2023 7:00	1599	34	1551	32
10/2/2023 8:00	1485	33	1394	28
10/2/2023 9:00	1395	36	1323	25
10/3/2023 5:00	1579	77	1408	70
10/3/2023 6:00	1666	54	1606	51
10/3/2023 7:00	1449	28	1423	28
10/3/2023 8:00	1427	26	1338	23
10/3/2023 9:00	1465	29	1324	25
10/4/2023 5:00	1841	75	1549	70
10/4/2023 6:00	1697	50	1653	46
10/4/2023 7:00	1553	37	1487	34
10/4/2023 8:00	1410	27	1298	24
10/4/2023 9:00	1456	38	1401	29
10/5/2023 5:00	1604	79	1508	72
10/5/2023 6:00	1726	51	1653	47
10/5/2023 7:00	1590	36	1513	33
10/5/2023 8:00	1220	48	1355	41
10/5/2023 9:00	1271	26	1145	20
10/6/2023 5:00	1604	75	1408	69
10/6/2023 6:00	1664	52	1615	47
10/6/2023 7:00	1566	42	1550	36
10/6/2023 8:00	1494	39	1472	32
10/6/2023 9:00	1307	47	1366	30

ALA/CC-80 Westbound (PM): SR 29 to Route 80/Route 580 Split:

On westbound I-80 in the PM peak period, there is a bottleneck that develops between the Powell Street loop on-ramp and the I-80/I-580/I-880 junction. A queue from this bottleneck extends back to the Buchanan Street interchange, approximately 3.4 miles. Peak period recurrent congestion in GP lanes reduces HOV lane performance and speed due to the friction factor. Even though the HOV lanes are degraded, HOVs in the westbound direction experiences a travel time savings over the general-purpose traffic during evening peak period. Figures below shows a "spot time" plot of the HOV and GP lane speeds on westbound I-80 during a typical evening peak period. Lane 1 represents the HOV lane and lane 2 represents the adjacent GP lane.

Figure 4.5: WB I-80 PM "Spot Time" Plot at Aquatic Park

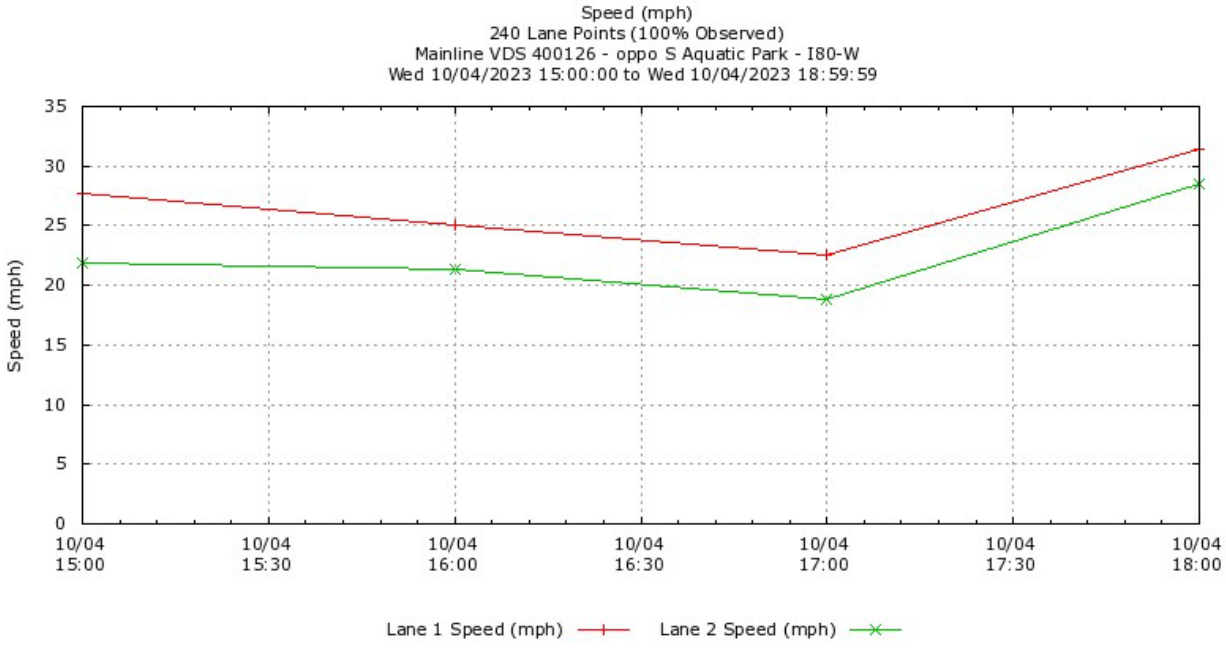


Table 4.4: WB I-80 PM HOV and GP1 Flow and Speed at Aquatic Park

Hour	HOT Lane Flow (Veh/Hour)	HOT Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 15:00	1527	32	1467	27
10/2/2023 16:00	1508	29	1465	26
10/2/2023 17:00	1458	28	1423	25
10/2/2023 18:00	1293	47	1547	44
10/3/2023 15:00	1287	19	1054	14
10/3/2023 16:00	1414	22	1324	22
10/3/2023 17:00	1384	21	1324	22
10/3/2023 18:00	1475	27	1436	27
10/4/2023 15:00	1487	28	1399	25
10/4/2023 16:00	1469	25	1421	25
10/4/2023 17:00	1408	23	1351	22
10/4/2023 18:00	1532	31	1516	31
10/5/2023 15:00	1573	32	1533	31
10/5/2023 16:00	1422	26	1376	25
10/5/2023 17:00	1241	24	1214	24
10/5/2023 18:00	1504	30	1462	33
10/6/2023 15:00	1351	22	1313	23
10/6/2023 16:00	1296	19	1237	20
10/6/2023 17:00	1317	21	1265	20
10/6/2023 18:00	1448	24	1415	25

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes, demand exceeds capacity

SOL-80 Eastbound (AM): Red Top Road to Airbase Parkway:

There are no controlling bottlenecks during the AM peak period.

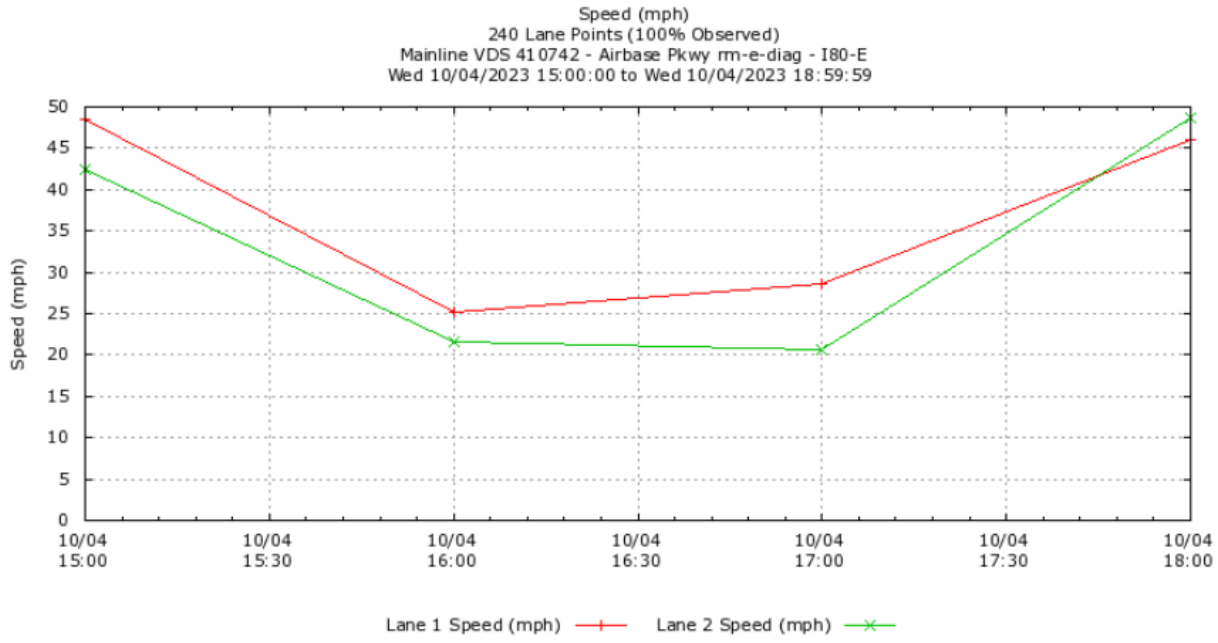
SOL-80 Eastbound (PM): Red Top Road to Airbase Parkway:

During the afternoon peak period the HOV lane is degraded, congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor. This is due to several geometric factors on the GP lanes. In the eastbound direction there are two consecutive general-purpose lane drops – first is a mandatory off to eastbound SR 12 (7 lanes to 6 lanes), second is a lane drop after the connector to SR 12 (from 6 to 5 lanes). There is also a lane drop downstream after HOV lane ends causing traffic to back up prior to the end of the HOV lane.

In addition, this route is a getaway route for drivers heading to the Tahoe/Reno area, congestion on the mainline occurs around the major holidays (Independence Day, Labor Day, Thanksgiving, and week before Christmas) and weekends.

Speed profiles showing friction between HOV lane #1 and GP lane #2 is shown on the graphs below, along with the congestion in the HOV lane due to the lane drop downstream of the end of the HOV lane.

Figure 4.6: EB I-80 PM "Spot Time" Plot at Airbase Pkwy.



B. Remediation Strategies

San Francisco-Oakland Bay Bridge to Carquinez Bridge:

- Caltrans has updated the HOV violation fine amount on existing signs along this corridor to the current dollar amount to support the enhanced HOV

enforcement effort, completed end of 2018. However, this did not have a significant impact on addressing the degradation on this corridor.

- Caltrans is utilizing the westbound I-80 electronic overhead lane use control sign to display HOV diamond symbol over lane #1 during the HOV lane hours of operation (5-10 AM and 3-7 PM). Results did not show a significant impact on the degradation on this corridor.
- A future project will convert the HOV lanes to HOT lanes. Preliminary engineering and environmental studies are pending. Scheduled to open 2030/31 with preliminary project cost is estimated at $190 million and would be funded by MTC. With HOT lane projects there is dedicated funding provided by the HOT lane operators for CHP enforcement of the HOT lanes. This will insure a more consistent approach to enforcing and deterring violations of the HOT lanes.
- In addition, MTC is embarking on a design alternative assessment (DAA) on I-80. The DAA will identify and evaluate a range of near-term and mid-term operational improvements and demand management strategies to address congestion in the corridor focusing on improving high occupancy modes of travel such as express buses and carpools, Managed lanes, and associated operational policies. The outcome of the DAA will be a set of near-and mid-term project concepts, started in November 2020 and completed by end of 2022. Potential implementation of DAA alternatives would be within 4 years.

I-80 Eastbound Red Top Road to Airbase Parkway:

A project in construction will convert the existing HOV lanes to HOT lanes and will extend them from Airbase Parkway eastward to I-505 in Vacaville in both directions of I-80. The project cost is $179 M, completion scheduled for July 2025. With HOT lane projects there is dedicated funding provided by the HOT lane operators for CHP enforcement of the HOT lanes. This will insure a more consistent approach to enforcing and deterring violations of the HOT lanes. In addition, Solano County Transportation Authority and MTC are conducting a study to increase the occupancy for the HOT to 3+ no toll, with HOV 2 and CAV charged a 50% discounted toll prior to opening the lane to tolling.

3.2.4 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 85

In 2022, NB I-85 in the AM peak period exhibited an increase over 2021 degraded segments to from 4.6 to 5.3 miles. In 2023 the NB direction has 9.41 lane-miles of degraded lane miles exhibiting an increase over the 2022 observations.

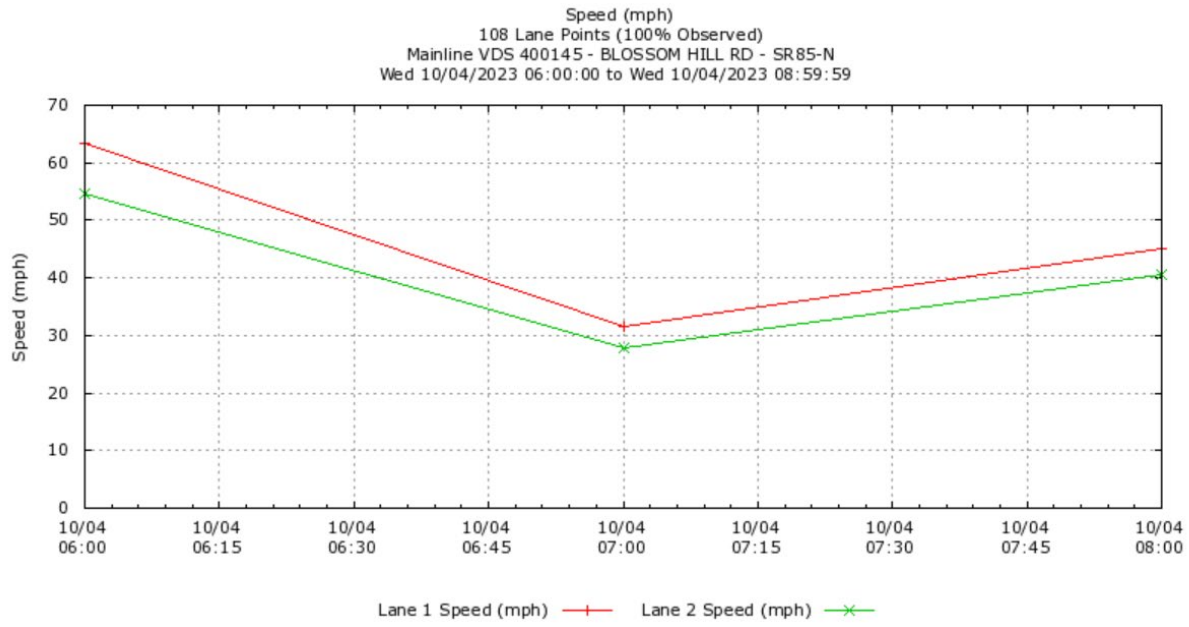
In 2022, SB I-85 in the PM peak period degraded HOV lane-miles reduced from 8.3 to 7.6 over the 2021 behavior. In 2023 the SB direction has 11.1 lane-miles of degraded HOV facility, an increase over the 2022 observations.

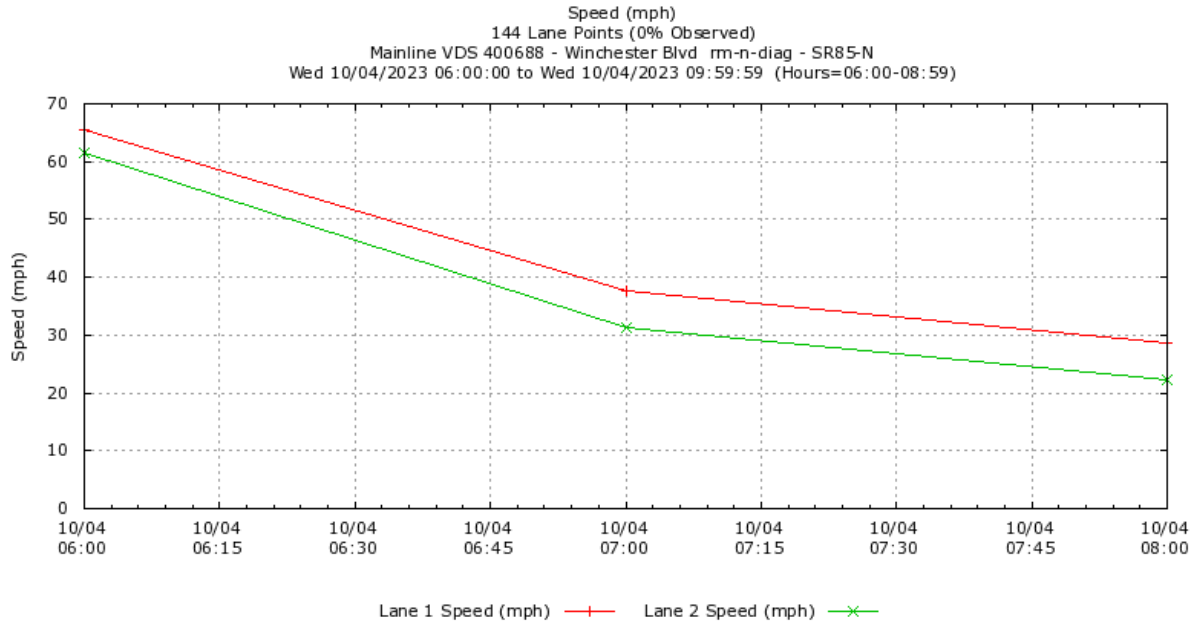
A. Analysis

SR 85 Northbound: US 101 (S. San Jose) to US 101 (Mountain View):

In the northbound direction during the AM peak period traffic conditions started to return to pre-pandemic conditions. There is a bottleneck between the Winchester Boulevard on-ramp and the Saratoga Avenue off-ramp. The queue from this bottleneck currently extends upstream beyond the Blossom Hill Road interchange. There is a bottleneck that develops downstream between the Fremont Avenue on-ramp and the El Camino Real (SR 82) diagonal off-ramp. Queues from this bottleneck extend upstream to the Stevens Creek Boulevard interchange. Peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.7: NB I-85 AM "Spot Time" Plots at Blossom Hill Rd. & Winchester Blvd.





The HOV 2+ demand on this route is relatively high which can also have an effect on the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is near the effective capacity of the lane in order to maintain a speed at 45 mph or greater.

Table 4.5: NB I-85 HOV and GP1 Flow and Speed at Union Avenue

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 6:00	876	70	1395	61
10/2/2023 7:00	1475	45	1755	39
10/2/2023 8:00	1339	45	1691	37
10/3/2023 6:00	1096	62	1784	58
10/3/2023 7:00	1511	44	1728	37
10/3/2023 8:00	1352	35	1457	28
10/4/2023 6:00	970	61	1576	57
10/4/2023 7:00	1481	43	1719	38
10/4/2023 8:00	1318	37	1505	29
10/5/2023 6:00	1155	61	1770	57
10/5/2023 7:00	1483	43	1706	37

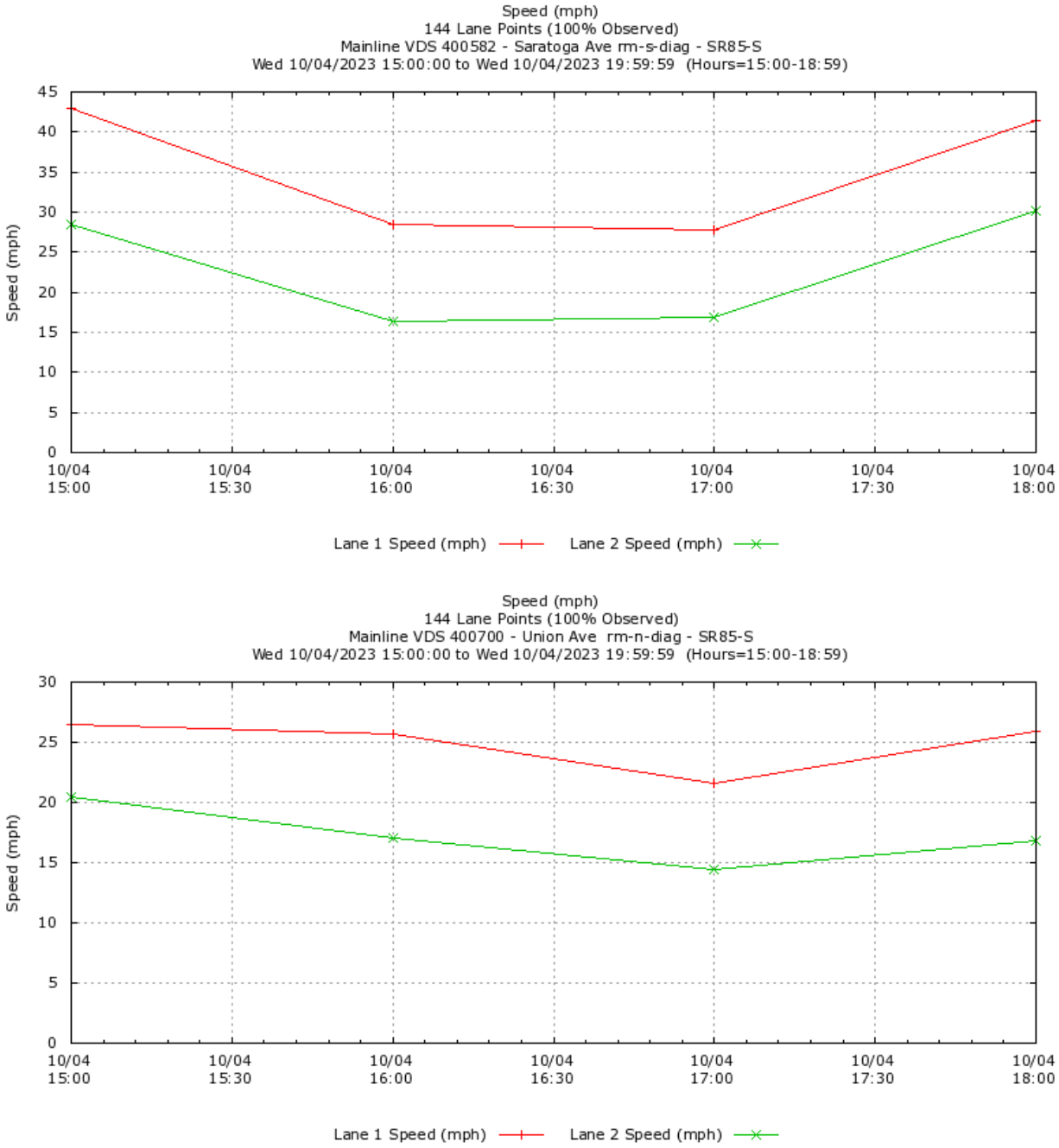
Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/5/2023 8:00	1410	42	1587	35
10/6/2023 6:00	935	69	1569	61
10/6/2023 7:00	1465	47	1747	41
10/6/2023 8:00	1092	48	1617	39

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes.

SR 85 Southbound: US 101 US 101 (Mountain View to (S. San Jose):

In the southbound direction during the PM peak period traffic conditions are starting to return to pre-pandemic conditions. However, as the severity of the congestion has been reduced this has uncovered multiply bottlenecks along this route. The multiple bottlenecks along this route are as follows, between the SR 237 and the El Camino Real interchanges, between the Fremont Avenue on-ramp and the Homestead Road off-ramp, from the Saratoga Avenue on-ramp to the Winchester Boulevard off-ramp, between the Union Avenue on-ramp and the Camden Avenue off-ramp and between SR 87 and Blossom Hill Road off-ramp. PM peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.8: SB I-85 PM "Spot Time" Plots at Saratoga Ave. & Union Ave.



The HOV 2+ demand on this route is relatively high which can also have an effect on the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is near the effective capacity of the lane in order to maintain a speed at 45 mph or greater.

Table 4.6: SB I-85 PM HOV and GP1 Flow and Speed at Union Avenue

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 15:00	1536	27	1485	22
10/2/2023 16:00	1274	21	1108	14
10/2/2023 17:00	1263	19	831	6
10/2/2023 18:00	1097	52	1493	26
10/3/2023 15:00	1513	24	1418	20
10/3/2023 16:00	1446	22	1312	17
10/3/2023 17:00	1461	20	1281	15
10/3/2023 18:00	1531	25	1357	17
10/4/2023 15:00	1524	27	1437	21
10/4/2023 16:00	1492	26	1355	17
10/4/2023 17:00	1457	22	1257	14
10/4/2023 18:00	1479	26	1352	17
10/5/2023 15:00	1172	23	1123	21
10/5/2023 16:00	1458	23	1385	19
10/5/2023 17:00	1413	21	1342	17
10/5/2023 18:00	1517	23	1410	19
10/6/2023 15:00	1482	23	1401	20
10/6/2023 16:00	1524	24	1359	19
10/6/2023 17:00	1451	26	1317	17
10/6/2023 18:00	1160	45	1728	43

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes.

B. Remediation Strategies

There is a project to convert existing HOV lanes to HOT lanes and add a second HOT lane to provide a dual lane facility. The project limits are from the US 101 interchange in south San Jose to the US 101 interchange in Mountain View. Preliminary project cost is estimated at $185 million and would be funded by the

Santa Clara Valley Transportation Authority (VTA) through the design stage of the project. There is also a proposal to raise occupancy to HOV 3+ with HOT lane conversion. In addition, HOV 2 and Clean Air Vehicles would be tolled at a discounted rate. VTA plans to build this project and the US 101 HOT lane project in phases. The first segment on SR 85 opened in February 2022 between Central Expressway and US 101 (Mountain View). The segment from US 101 (south San Jose) to SR 87 is currently in the design phase with construction to start in 2024, and completed in 2027, with a project cost of $64M. The middle section of the SR 85 HOT lane conversion and lane addition will follow this project.

A project to widen the metered on-ramps at Camden Avenue, Union Avenue, Bascom Avenue, and SR 17 to SR 85 connector on southbound SR 85 is at the PID stage. An addition lane at these on-ramps will provide more vehicle storage. This additional storage would allow the ramp meters to restrict more of the on-ramp demand to southbound SR 85 and improve traffic flow along this route. The project is planned to be programmed in the 2026 SHOPP.

3.2.5 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 87

In 2022, there was 1.9 lane-miles of degraded HOV lanes in the AM peak period. In 2023, the NB direction had 1.7 lane-miles of degraded HOV lane-miles in the AM peak period. In 2022, northbound SR 87 had 0.4 miles of degraded HOV lane-miles in the PM peak period. In 2023, no HOV degradation was observed in the PM peak period, exhibiting a decrease over the previous two years.

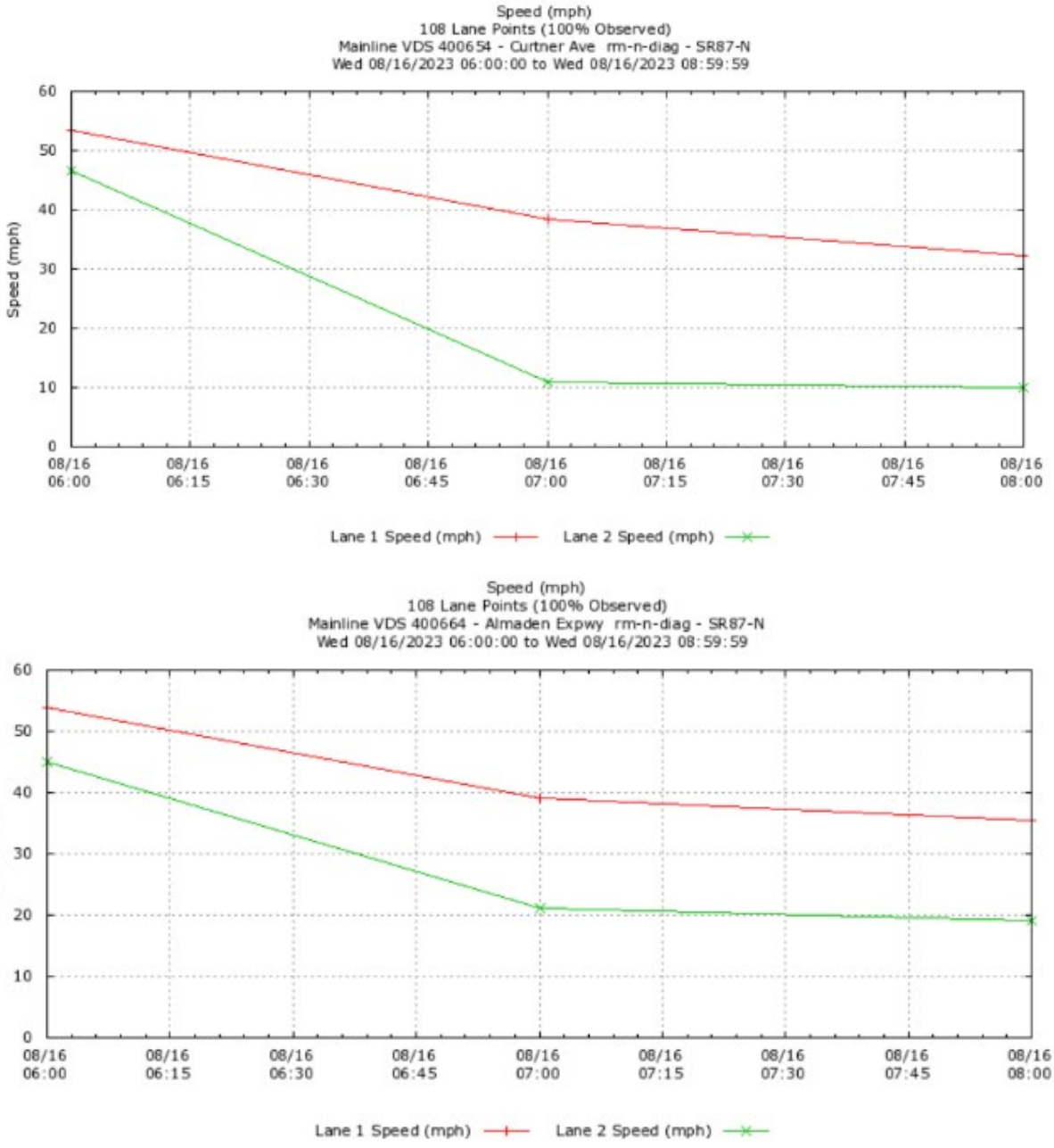
In 2022, southbound SR 87 in the PM peak period had 3.9 miles of degraded HOV lane-miles in the PM peak period. In 2023, the SB direction had 3.5 lane-miles of degraded HOV lane-miles in the PM peak period.

A. Analysis

SR 87 Northbound: SR 85 to US 101:

On northbound SR 87 during the AM peak period there is currently a bottleneck at the Almaden Expressway on-ramp with queues extending upstream to the Chynoweth Avenue. Peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.9: NB SR-87 AM "Spot Time" Plots at Curtner Ave. & Almaden Expwy.



The HOV 2+ demand on this route is relatively high which can also have an effect on the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is at the effective capacity of the lane in order to maintain a speed at 45 mph or greater.

Table 4.7: NB I-87 AM HOV and GP1 Flow and Speed at Almaden Expressway

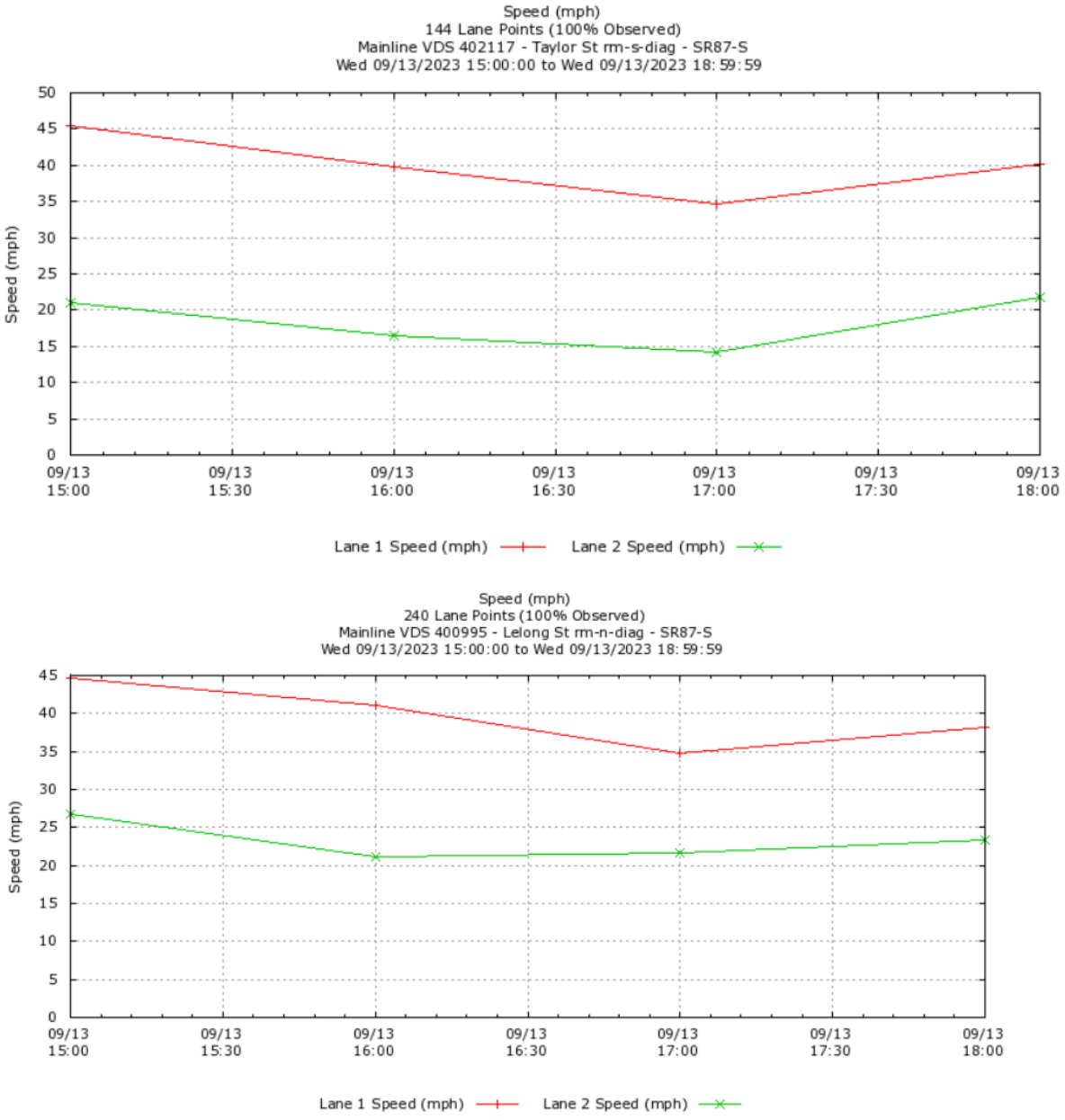
Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
8/14/2023 6:00	1228	59	1829	48
8/14/2023 7:00	1612	46	1651	29
8/14/2023 8:00	1584	40	1486	22
8/15/2023 6:00	1370	55	1816	46
8/15/2023 7:00	1678	41	1487	22
8/15/2023 8:00	1665	33	1406	20
8/16/2023 6:00	1368	54	1791	45
8/16/2023 7:00	1747	39	1489	21
8/16/2023 8:00	1599	36	1370	19
8/17/2023 6:00	1389	59	1783	45
8/17/2023 7:00	1677	40	1487	21
8/17/2023 8:00	1528	32	1361	20
8/18/2023 6:00	1141	71	1786	57
8/18/2023 7:00	1609	45	1678	34
8/18/2023 8:00	1607	38	1453	22

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes, at capacity.

SR 87 Southbound: US 101 to SR 85:

On southbound SR 87 there is one controlling bottleneck in the afternoon peak period between the I-280 on-ramp and the Almaden Expressway off-ramp. The queue from this bottleneck extends back to US 101. Peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.10: SB SR-87 PM "Spot Time" Plots at Taylor St. & Lelong St.



B. Remediation Strategies

VTA conducted a corridor study and is planning a future project to convert the HOV lane to a HOT lane. At the time of conversion, occupancy may be increased to HOV 3+ no toll. In addition, HOV 2 and Clean Air Vehicles could be tolled at a discounted rate. The corridor study was completed in August 2018 however the HOT lane conversion does not currently have a schedule completion date.

A Technology-Based Corridor improvement project ($3 Million), part-time lane (Bus), which would convert the right shoulder to a part-time lane for transit, was scheduled to start construction in the Summer of 2023 with completion in fall 2024. VTA however has put this project on hold for the time being.

A project headed by VTA and partnered with Caltrans, City of San Jose and Santa Clara County Roads and Airports, would modify the on and off-ramps between SR 87/Capitol Expressway interchange and Narvaez Avenue to improve traffic operations and provide multimodal transportation. Different alternatives for HOV bypass at the ramp locations are being evaluated with consideration of the future Transit-Oriented Development (TOD) planned at the southeast side of the project site (Further discussed below). This $50 Million project is at the PA&ED stage with construction scheduled to start in the fall of 2029 for completion by fall 2030.

A mixed-use TOD is planned at the Capitol station at Capitol Expressway/Narvaez Avenue in San Jose. The development, which provides affordable housing near public transportation, would encourage transit use and relieve traffic congestion. Construction is scheduled to start in 2026 for completion by 2029.

Caltrans Headquarters in currently working on Managed Lane weaving and friction factor studies scheduled to be completed in June 2024. Conclusions from these studies could lead to future Managed Lane improvement projects. In addition, the Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025, the removal of CAVs from the Managed Lane would improve the Managed Lane operations.

Caltrans has discussed with CHP the Managed Lane high violation locations throughout the San Francisco Bay Area in early 2023. This will allow CHP to concentrate their enforcement efforts in these areas.

3.2.6 ACTION PLAN FOR DEGRADED MANAGED LANE ON ROUTE 92

In 2022, the westbound SR 92 HOV lane had 0.2 lane-miles of degraded HOV lane in the a.m. peak period. In 2023, there was 0.79 lane-miles of slightly degraded HOV lane in the a.m. peak period. There was no degradation in p.m. peak period.

A. Analysis

The controlling bottleneck in the a.m. peak period along this corridor is the westbound 3-lane San Mateo-Hayward Bridge. Traffic congestion extends from this bottleneck to near the I-880 interchange during the a.m. peak period. The HOV lane is approximately 3.3 miles long from Hesperian Blvd to the San Mateo-Hayward Bridge toll plaza of which 1.1 miles is monitored. The monitored HOV lane segment is near the upstream end of the HOV lane. The average speed for this

segment ranged from 5 mph at the downstream end to 30 mph at the upstream end. The % of days less than 45 mph ranged from 35% at the downstream end to 6% at the upstream end.

B. Remediation Strategies

The Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025. The removal of CAVs from the HOV lane would improve the degraded HOV lane operations.

3.2.7 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 101

There are multiple HOV/HOT facilities on US 101 in District 4. There are HOV lanes located in Santa Clara County between Cochrane Road and Mathilda Avenue and HOT lanes between Mathilda Avenue and I-380 in Santa Clara and San Mateo Counties. The tolling of the HOT lane in both directions from Scl/SM county line to I-380 began in March 2023. A second set of HOV facilities are located in Marin County between Richardson Bay Bridge and Atherton Avenue. There are also HOV facilities in Sonoma County between the Marin County line and Windsor River Road.

In 2022, northbound US 101 in the AM peak period had 4.9 degraded HOV lane-miles and no degraded HOV/HOT lane-miles in the PM peak period between Cochrane Road and Whipple Avenue. In 2023, northbound US 101 in the AM peak period had 8.0 degraded HOV lane-miles and 0.4 degraded HOT lane-miles between Cochrane and I-380. The PM peak period had 0.3 degraded HOV lane-miles and 1.9 degraded HOT lane-miles.

In 2022, southbound US 101 between Whipple Avenue and Cochrane Road had no degraded HOV/HOT lane-miles in the AM peak period and 9.8 degraded HOV/HOT lane-miles in the PM peak period. In 2023, southbound US 101 had 0.4 degraded HOV lane miles and 2.5 degraded HOT lane-miles between I-380 and Cochrane Road in the AM period. The PM peak period had 9.0 degraded HOV lane miles and 3.9 degraded HOT lane miles.

In 2022, northbound US 101 in the PM peak period had 3.0 degraded HOV lane-miles between Richardson Bay Bridge and Atherton Avenue. In 2023, this segment had 4.5 degraded HOV lane-miles.

In 2022, southbound US 101 in AM peak period 3.1 degraded HOV lane-miles between De Long Avenue and Richardson Bay Bridge in the AM peak period. In 2023, this segment had 3.4 degraded HOV lane-miles.

In 2022, northbound US 101 between Marin/Sonoma County line and Windsor River Road had 2.4 degraded HOV lane-miles in the PM peak period. In 2023, this

segment had 0.6 degraded HOV lane-miles in the PM peak period and 3.7 degraded HOV lane-miles in the AM peak period.

In 2022, southbound US 101 between Windsor River Road and north of the Marin/Sonoma County line had 3.1 degraded HOV lane-miles in the PM peak period. In 2023, this segment had no degraded lane-miles in the southbound in the PM peak period but had 5.1 lane-miles in the AM peak period.

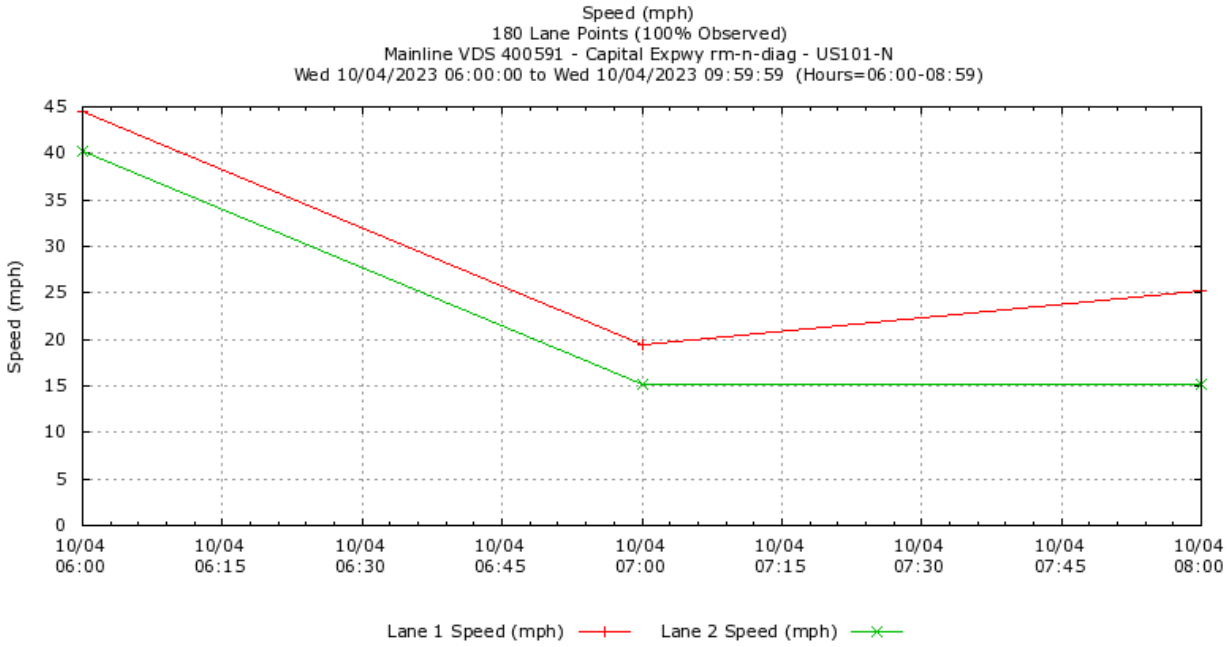
A. Analysis

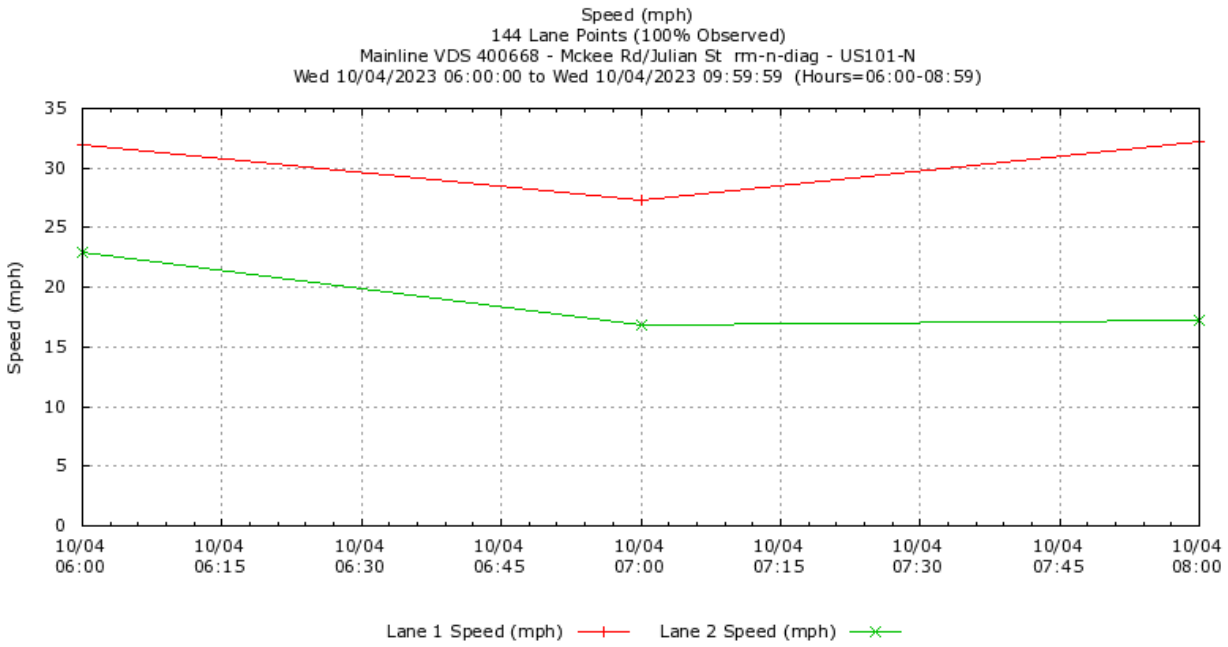
US 101 Northbound Cochrane Road to I-380:

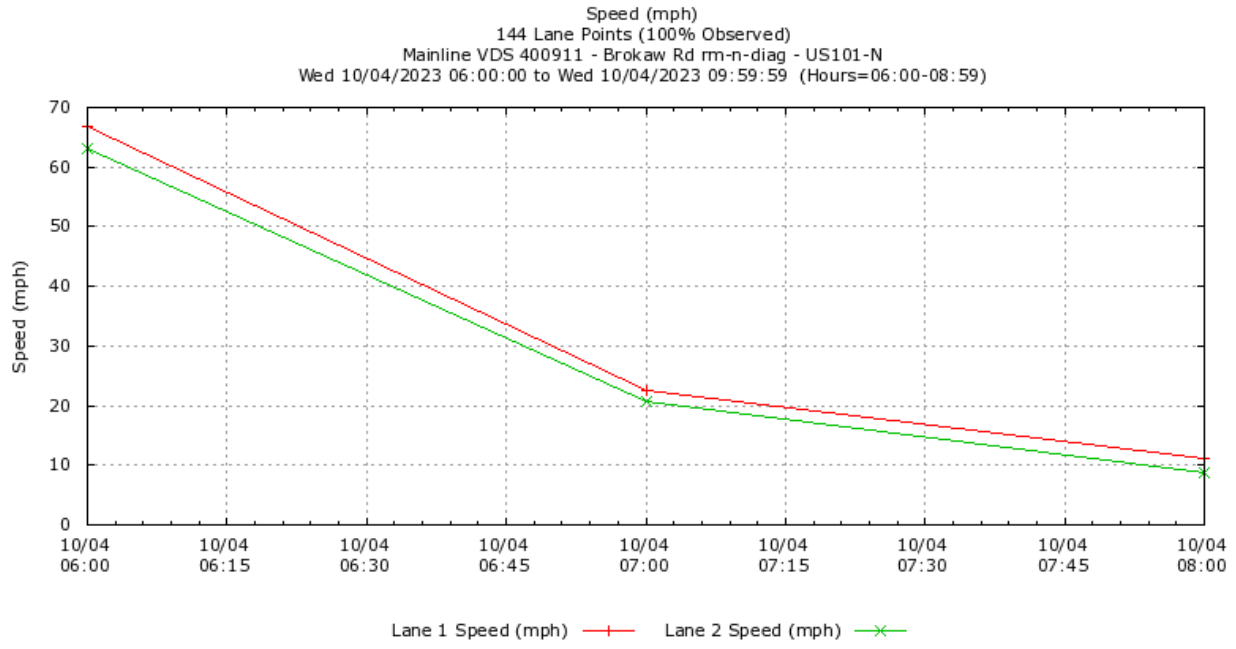
In the morning peak period, there are multiply bottlenecks along northbound US 101. The bottlenecks between the McKee Road on-ramp and the Old Oakland Road off-ramp and Tully Road on-ramp and I-280/I-680 off-ramp cause a queue to extend to the Blossom Hill Road interchange. Another bottleneck develops downstream between Trimble Road and Montague Expressway with queues extending upstream to the Old Bayshore Highway on-ramp. A third bottleneck develops between the Shoreline Boulevard on-ramp and the Rengstorff Avenue off-ramp with queues extending upstream to the Ellis Street interchange. These bottlenecks cause recurrent congestion in the GP lanes that reduces HOV lane performance and speed due to the friction factor between these lanes.

No degradation is observed for the HOT segment from SCL/SM county line to I-380 in the AM peak period. The slight degradation is observed at East Hillsdale Blvd interchange.

Figure 4.11: NB US-101 AM "Spot Time" Plots at Capital Expwy., McKee Rd/Julian St. & Brokaw Rd.







The HOV 2+ demand on this route is relatively high which can also have an effect on the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is at the effective capacity of the lane in order to maintain a speed at 45 mph or greater.

Table 4.8: NB US-101 AM HOV and GP1 Flow and Speed at McKee Road

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
10/2/2023 6:00	1255	45	3,183	29
10/2/2023 7:00	1532	32	3,207	13
10/2/2023 8:00	1417	34	3,319	14
10/3/2032 6:00	1591	41	3,985	28
10/3/2023 7:00	1544	31	3,415	15
10/3/2023 8:00	1455	28	3,052	12
10/4/2023 6:00	1579	32	3,666	19
10/4/2023 7:00	1543	27	3,361	14
10/4/2023 8:00	1468	32	3,251	14
10/5/2023 6:00	1592	37	3,788	24
10/5/2023 7:00	1555	31	3,420	14
10/5/2023 8:00	1471	31	3,130	13
10/6/2023 6:00	1572	46	3,918	32
10/6/2023 7:00	1536	33	3,448	15
10/6/2023 8:00	1259	47	3,856	29

Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes. HOV lane bottleneck output volumes, demand exceeds capacity.

US 101 Southbound I-380 to Cochrane Road:

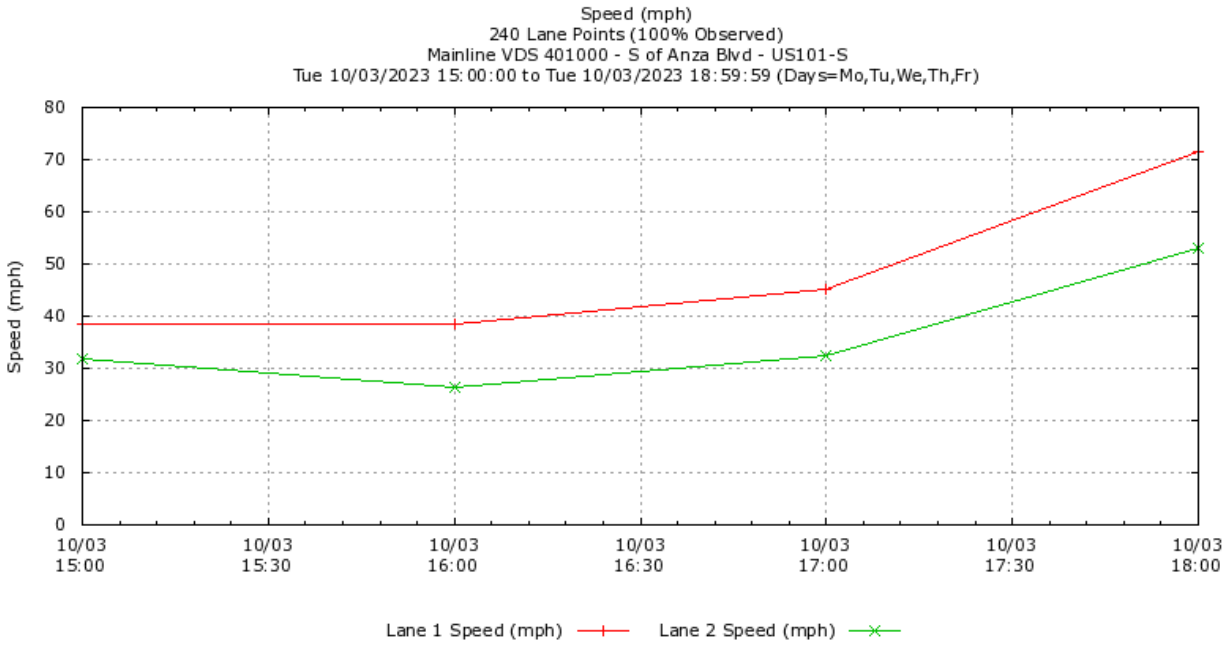
The southern end of US101 HOT segment south of US101/SR84 interchange experiences slight degradation in the AM period.

There are multiple bottlenecks on southbound US 101 in the afternoon peak period. A bottleneck between the Rengstorff Avenue on-ramp and southbound SR 85 off-ramp causes a queue to extend back to towards the University Avenue interchange. Further downstream there is a bottleneck between the De La Cruz Boulevard diagonal on-ramp and the southbound SR 87 off-ramp. Queue from this bottleneck extends upstream of the Shoreline Boulevard interchange. Downstream of this bottleneck there is another bottleneck between the Old Oakland Road on-ramp and the Julian Street off-ramp. Queue from this

bottleneck extends upstream to the SR 87 interchange. The recurrent congestion in the GP lanes associated with these bottlenecks reduces HOV lane performance and speed due to the friction factor between these lanes.

In addition, there is a bottleneck south of the end of the HOV lane between the Cochrane Road on-ramp and the Dunne Avenue off-ramp. This causes a queue to extend back into the end of the HOV lane towards the Bailey Road interchange. This results in reduced speeds in all lanes with the HOV lane operating at similar speeds as the GP lanes.

Figure 4.12: SB US-101 PM "Spot Time" Plot South of Anza Blvd. – Very Degraded



*Lane 1 is HOV, Lane 2 is GP Lane

Figure 4.13: SB US-101 PM "Spot Time" Plot Opposite Peninsula Ave. in Menlo Park – Slightly Degraded

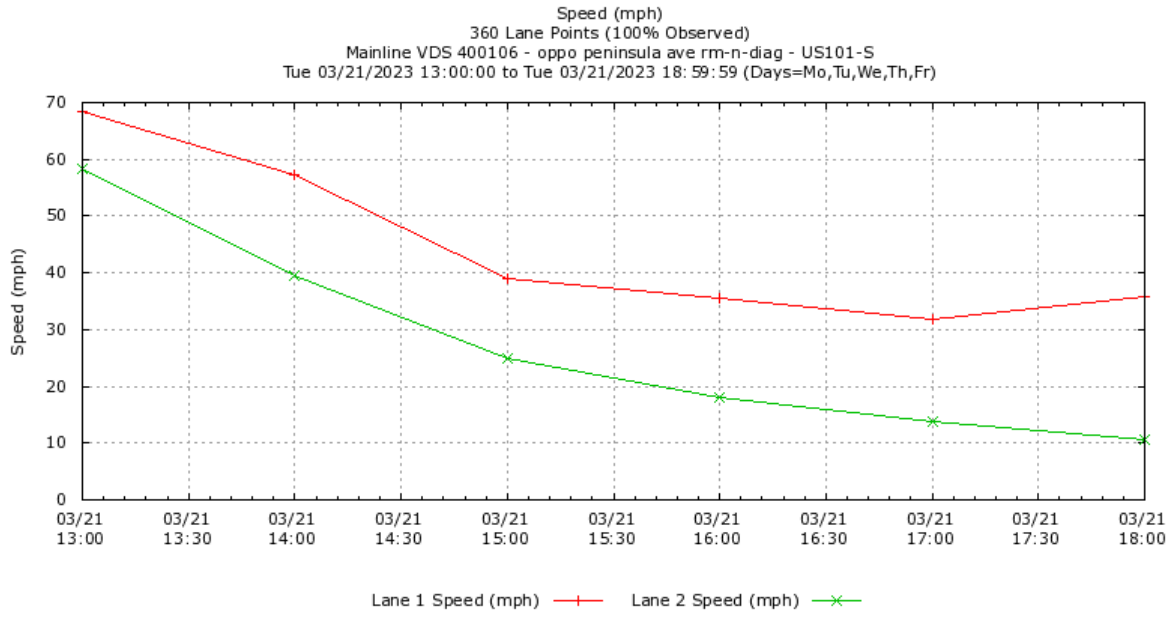


Figure 4.14: SB US-101 PM "Spot Time" Plot Opposite North of Henderson Ave. in Menlo Park – Slightly Degraded

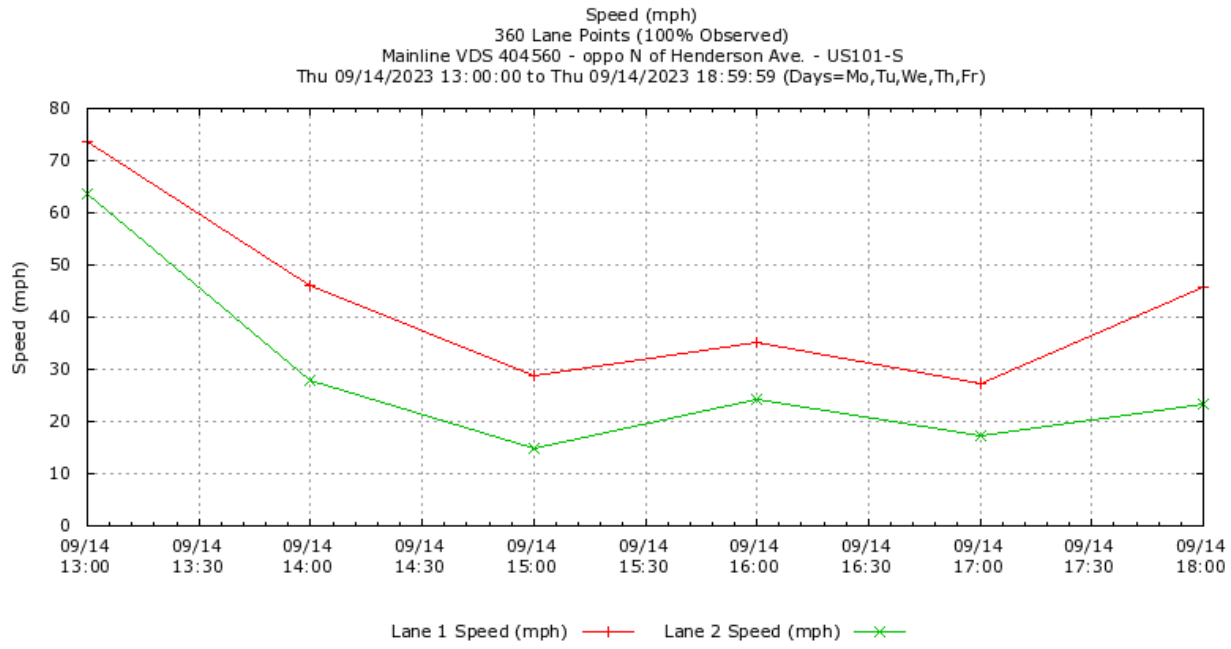


Figure 4.15: SB US-101 AM "Spot Time" Plot Whipple Ave. in Redwood City – Slightly Degraded

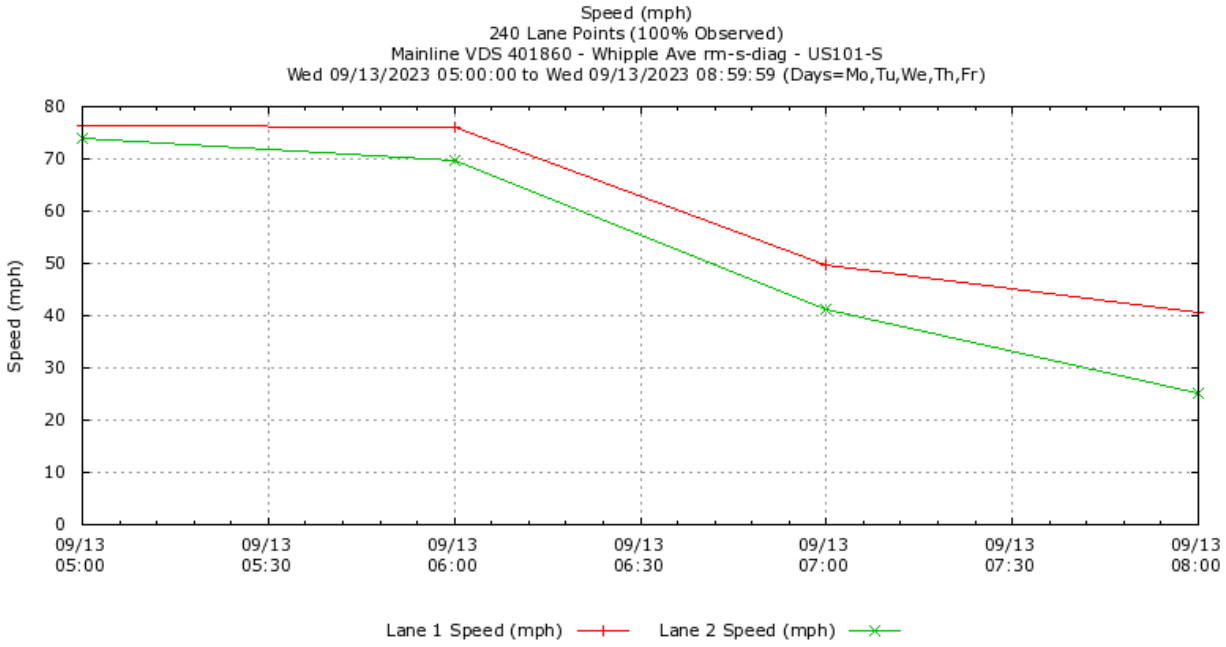


Figure 4.16: SB US-101 AM "Spot Time" Plot Woodside Rd./Seaport Blvd. – Slightly Degraded

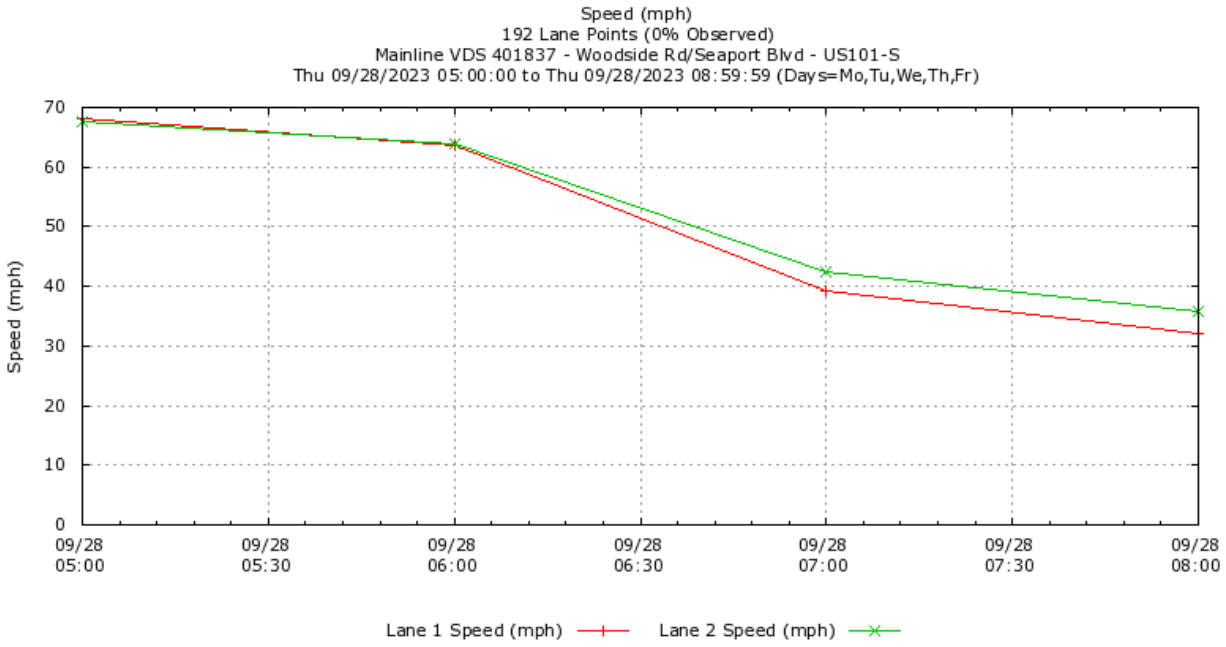


Figure 4.17: SB US-101 AM "Spot Time" Plot Opposite North of Union Pacific RROC in Menlo Park – Slightly Degraded

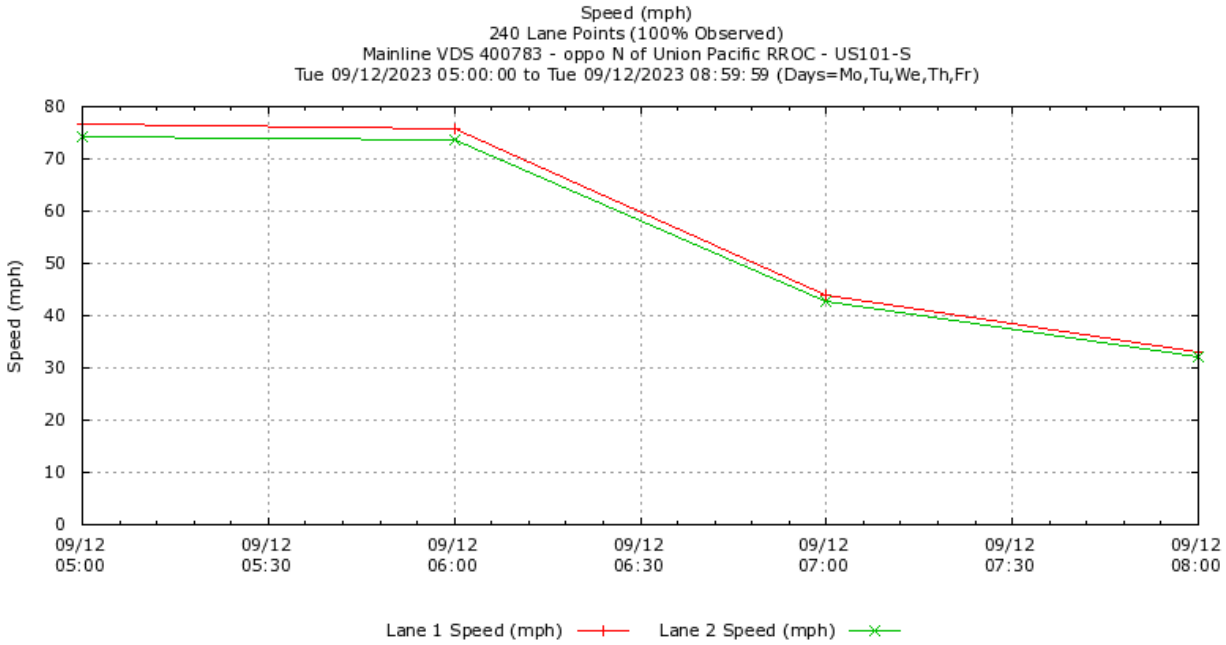


Figure 4.18: SB US-101 AM "Spot Time" Plot Opposite North of Henderson in Menlo Park – Slightly Degraded

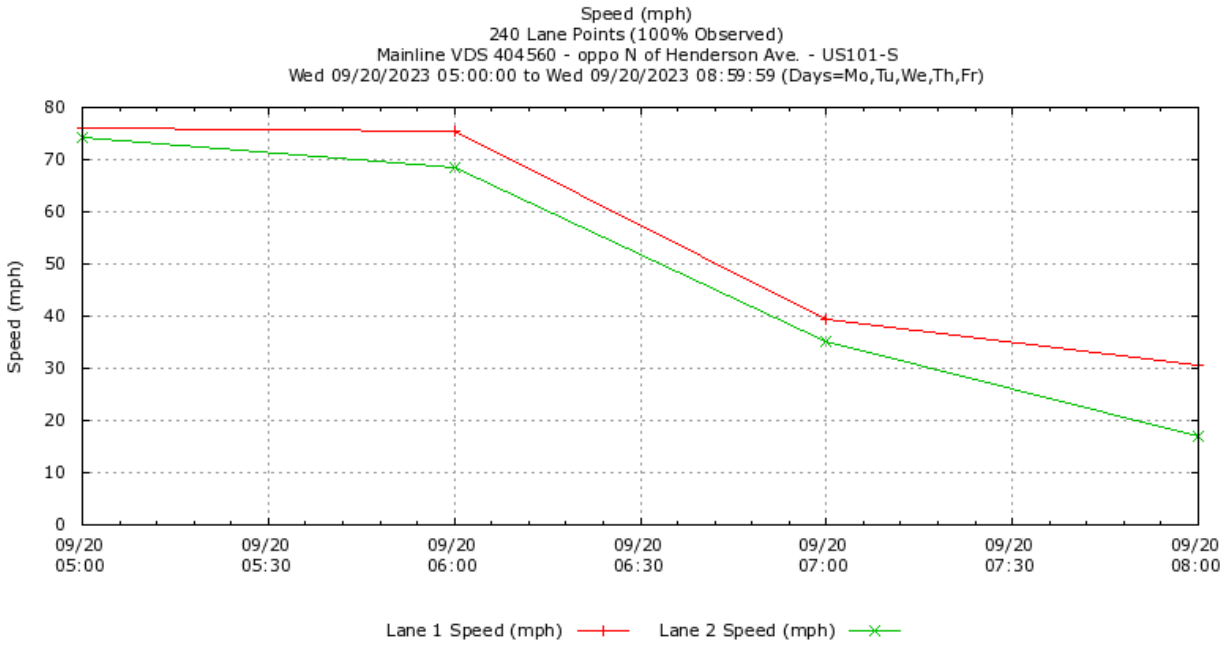


Figure 4.19: SB US-101 AM "Spot Time" Plot at Willow Road rm- South Loop in East Palo Alto – Slightly Degraded

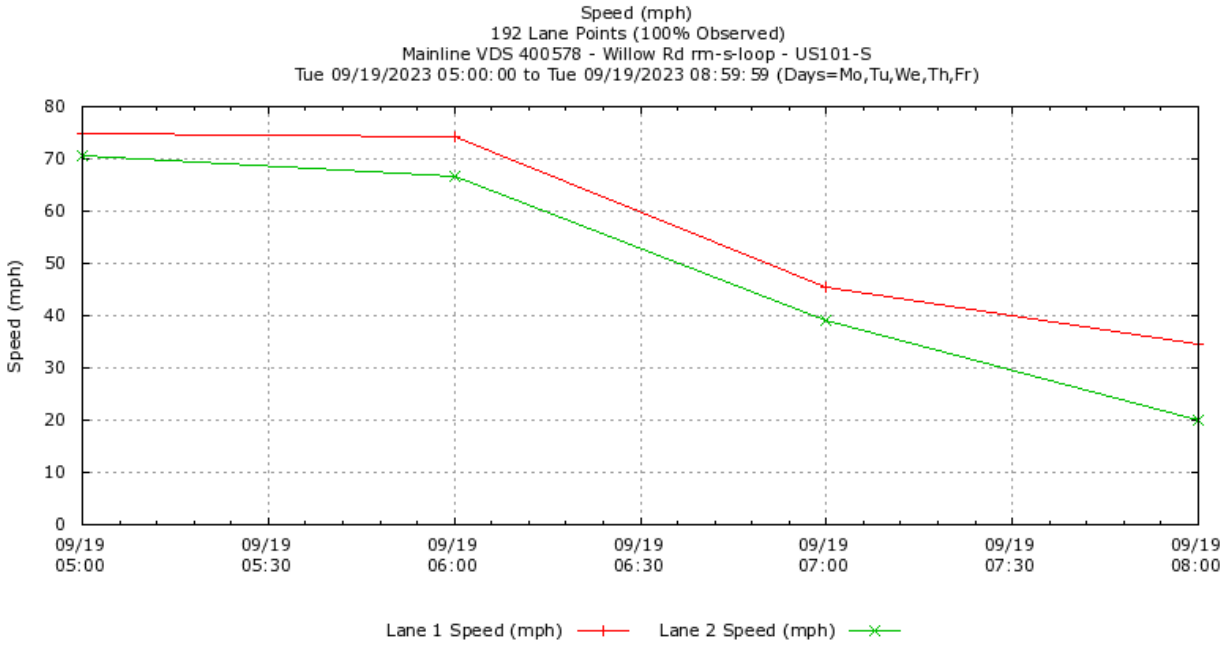


Figure 4.20: SB US-101 AM "Spot Time" Plot at Willow Road rm- South Diagonal in East Palo Alto – Slightly Degraded

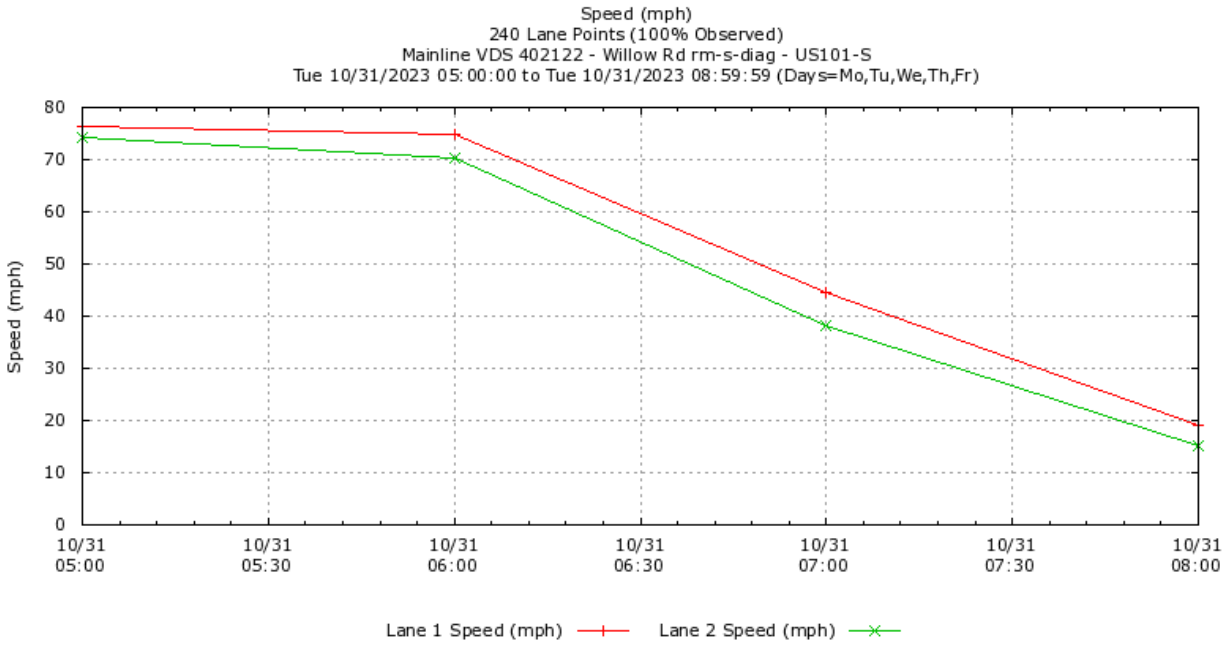


Figure 4.21: SB US-101 PM "Spot Time" Plot South of Clarke Ave.

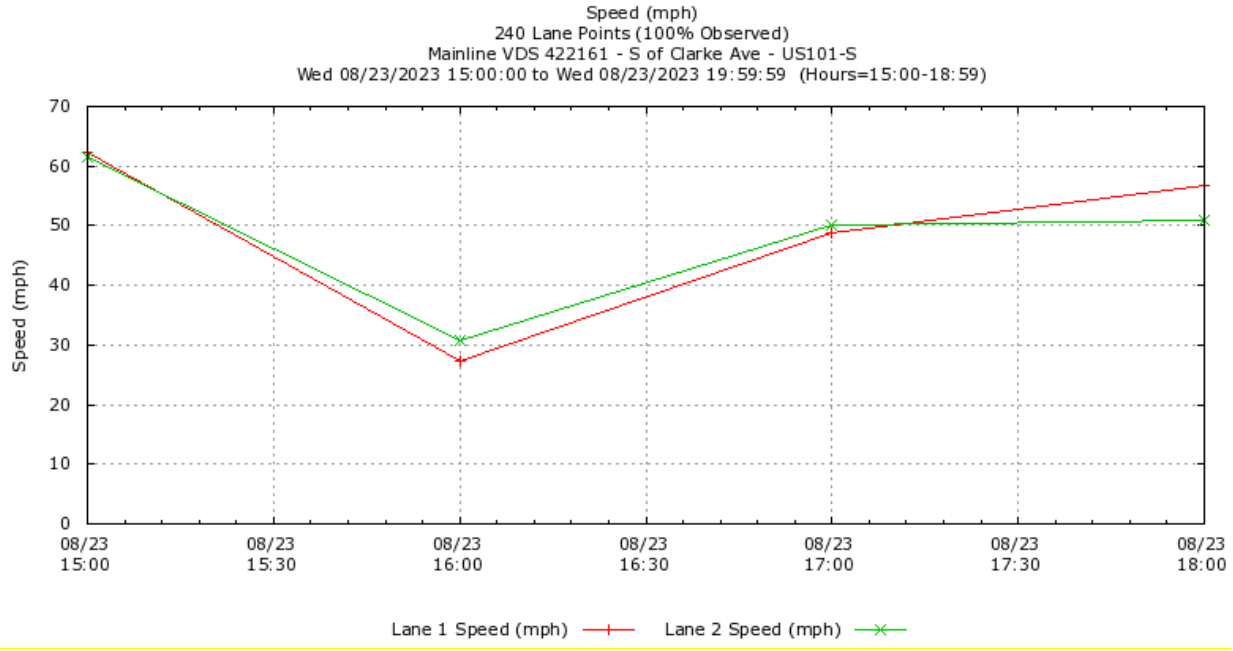
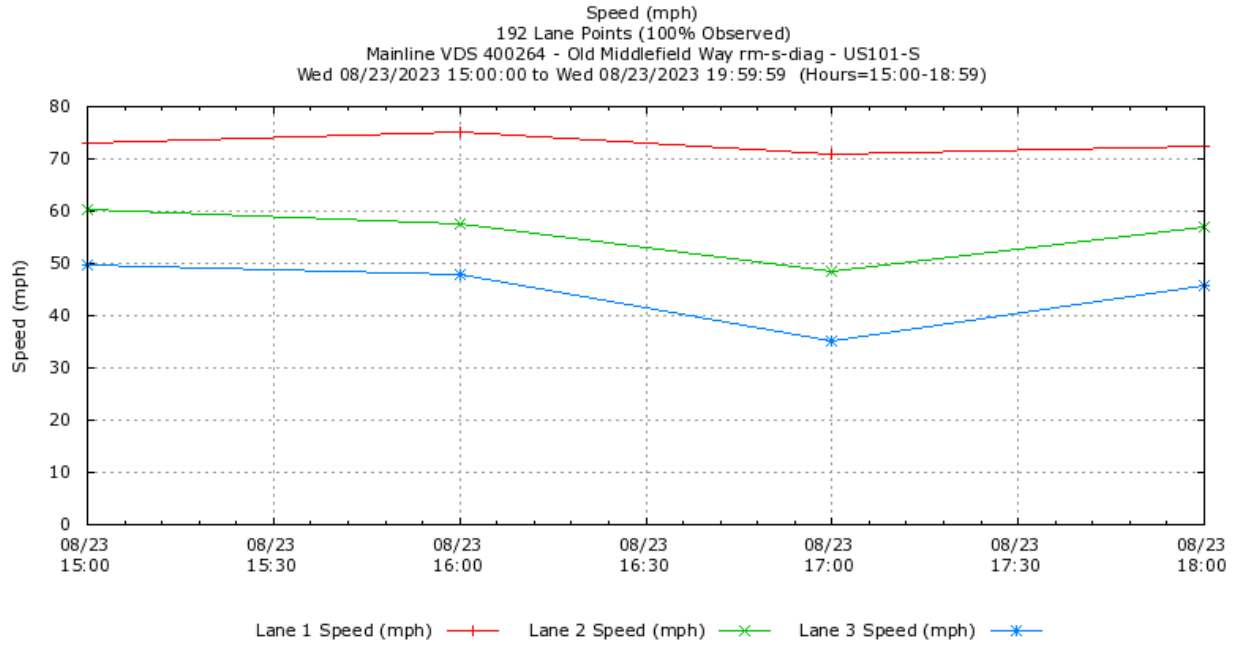


Figure 4.22: SB US-101 PM "Spot Time" Plot at Old Middlefield Way



* Two lane Express lane (lanes 1 and 2), GP lane (lane 3)

Figure 4.23: SB US-101 PM "Spot Time" Plot at Moffet Blvd.

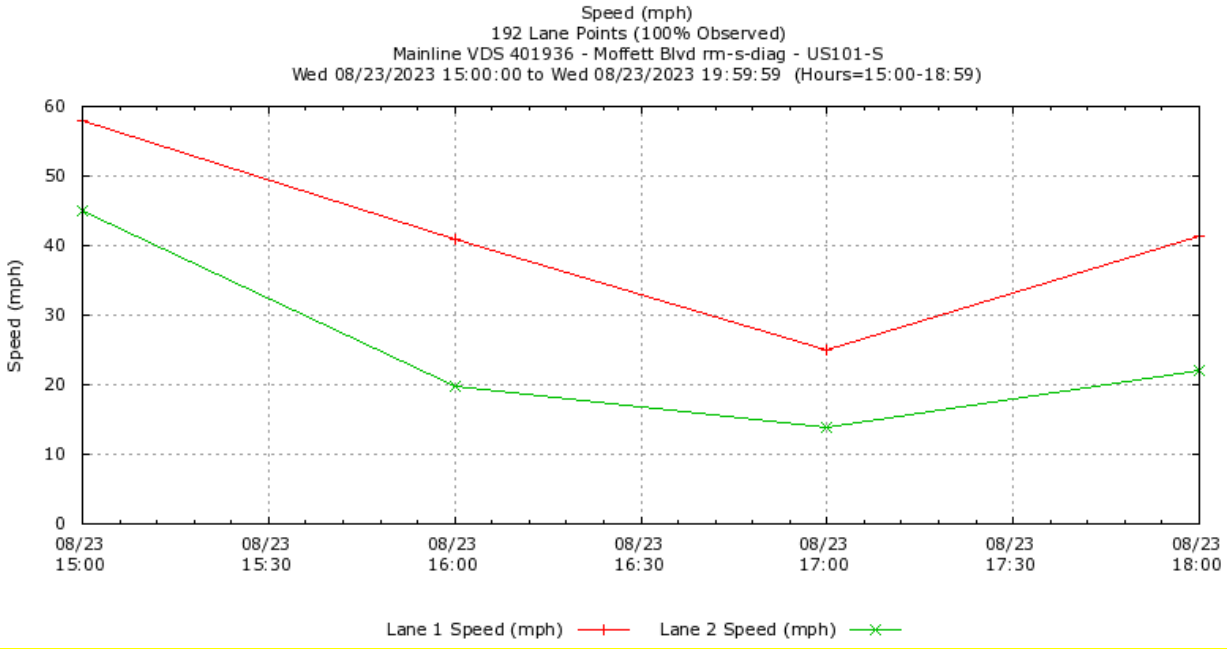


Figure 4.24: SB US-101 PM "Spot Time" Plot at 4A5324 Loc. 66

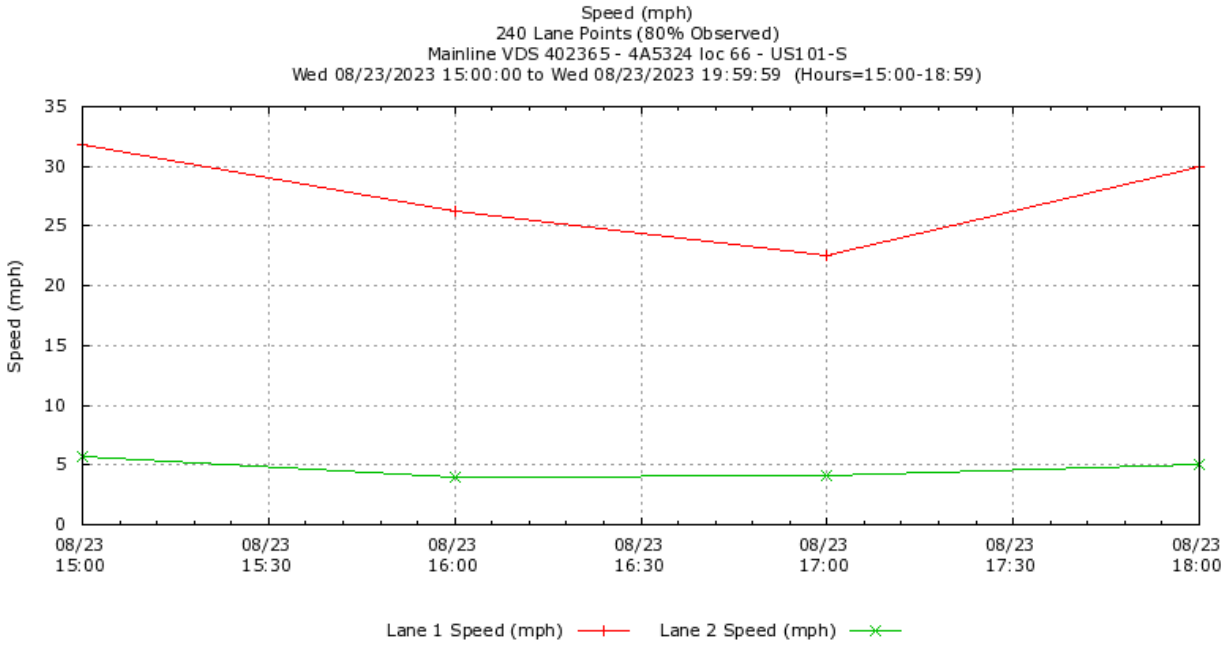
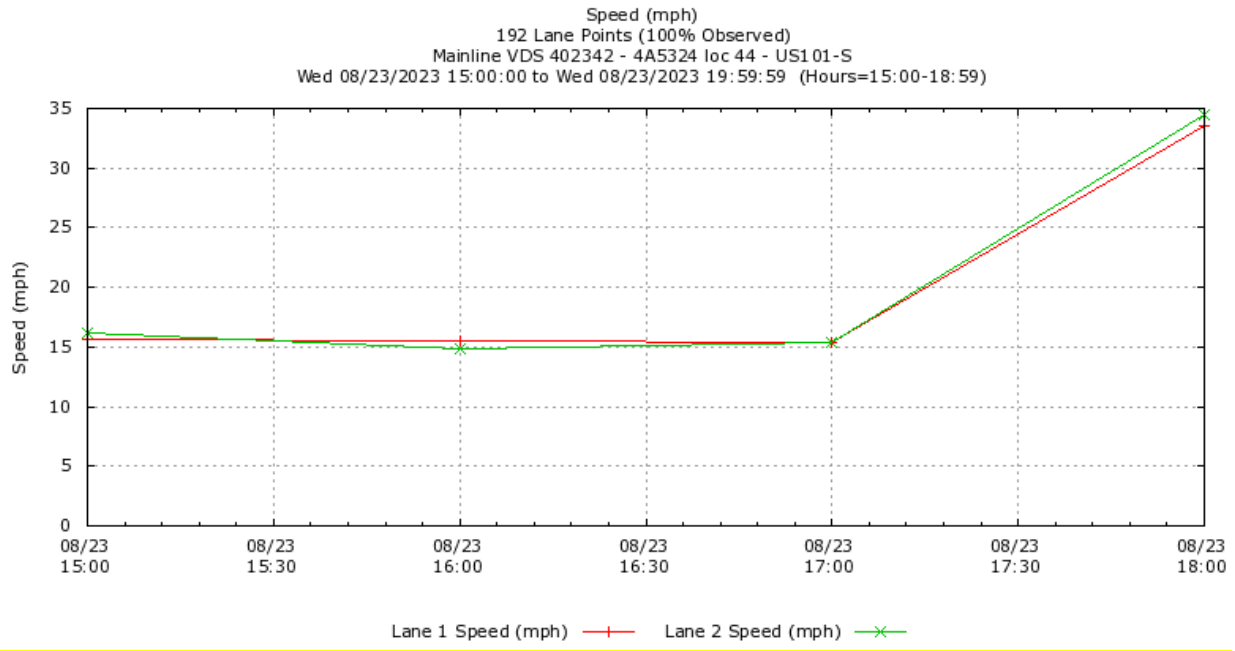


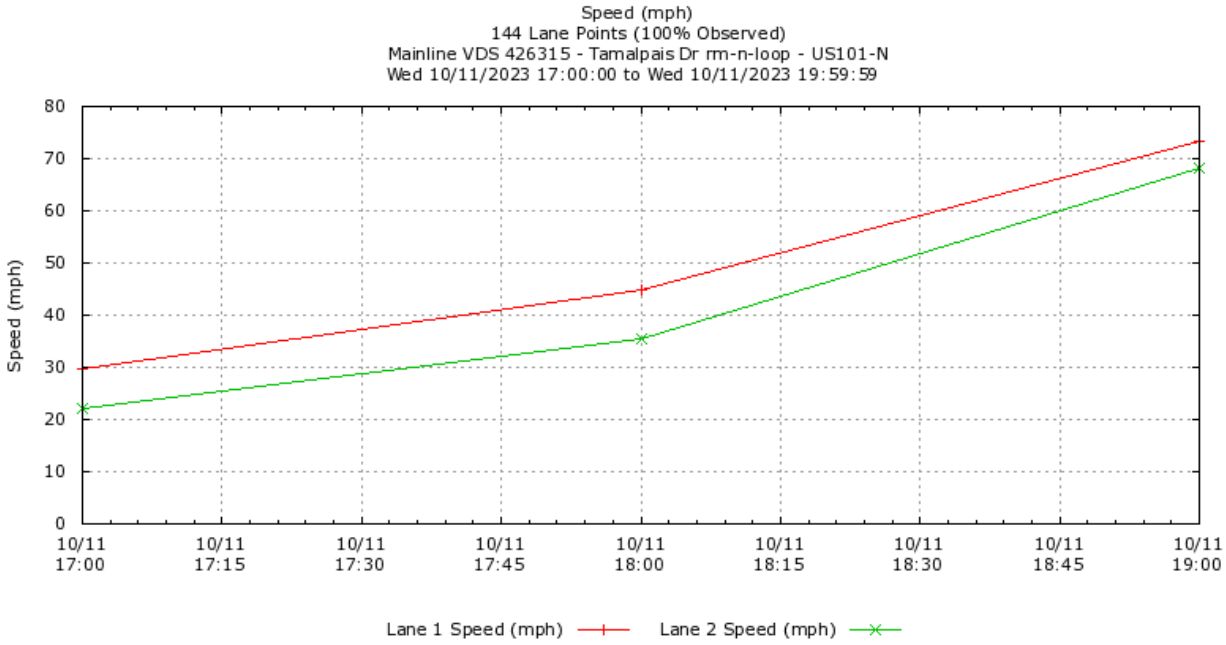
Figure 4.25: SB US-101 PM "Spot Time" Plot at 4A5324 Loc. 44



US 101 Northbound: Richardson Bay Bridge to Atherton Avenue:

There are two controlling bottlenecks on northbound US 101 in Marin County. The first bottleneck is between the Tamalpais Drive diagonal on-ramp and the Lucky Drive off-ramp. The queue from this bottleneck extends upstream south of the N. Bridge Boulevard interchange. The second bottleneck is typically downstream at the end of the HOV lane caused by a general-purpose lane drop north of the Atherton Avenue on-ramp. Queue from this bottleneck extends beyond the Atherton Avenue interchange. The bottleneck between the Tamalpais Drive diagonal on-ramp and the Lucky Drive off-ramp causes recurrent congestion in the general-purpose lanes that reduces HOV lane performance and speed due to the friction factor between these lanes.

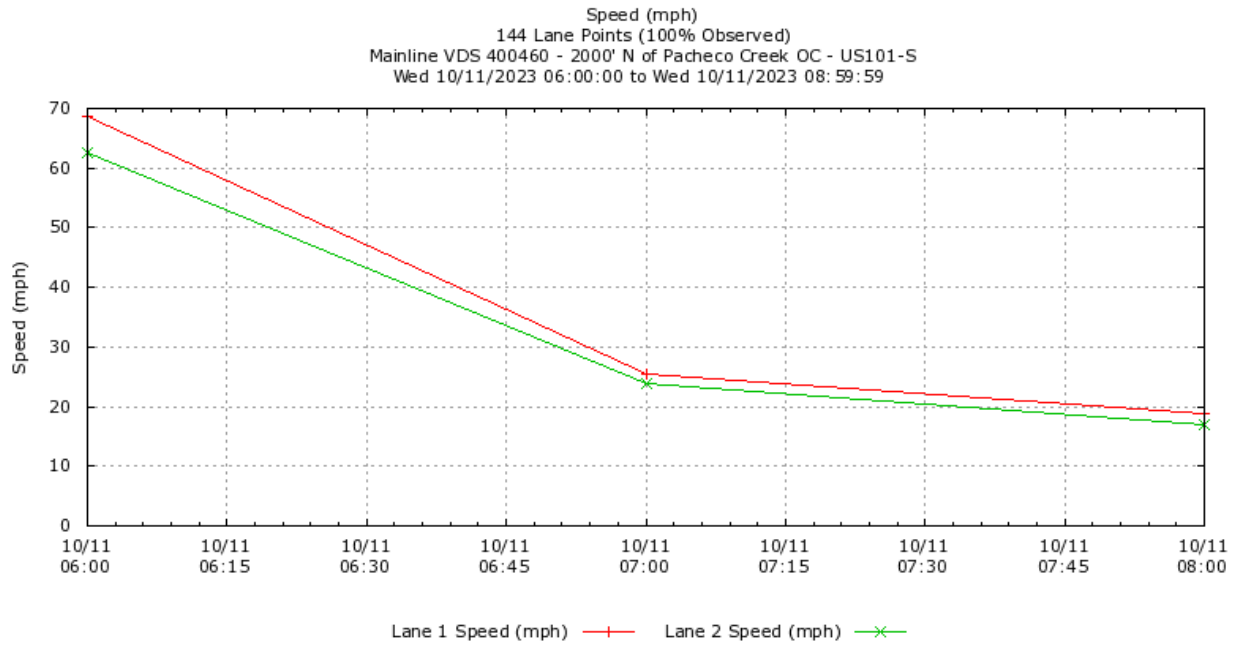
Figure 4.26: NB US-101 PM "Spot Time" Plot at Tamalpais Dr.



US 101 Southbound De Long Avenue to Richardson Bay Bridge

In the AM peak period there is bottleneck at the Lucas Valley Road on-ramp to the Manuel Freitas Parkway off-ramp. The queue from this bottleneck extends upstream to the Rowlands Boulevard interchange. The recurrent congestion in the GP lanes caused by this bottleneck reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.27: SB US-101 AM "Spot Time" Plot 2000' North of Pacheco Creek OC



Note: HOV lane is only in operation between 6:30 – 8:30 am, only the 7 am on this table is actually speed when HOV lane is in operations.

US 101 Northbound: South of Marin/Sonoma County Line to Windsor River Road

In the AM peak period initial PeMS data indicated a degraded segment at College Avenue however it was determined that the PeMS speed data for the HOV lane was the GP lane speed. Lane #1 and Lane #3 were miscoded and there is no degradation in the HOV lane at this location.

In the PM peak period, there is minor bottleneck between the Hearn Avenue on-ramp and the SR 12 off-ramp due to weaving between these ramps. Slow speeds extend upstream to Rohnert Park Expressway interchange. The recurrent congestion in the GP lanes caused by this bottleneck reduces HOV lane performance and speed due to the friction factor between these lanes.

Note: HOV lane is only in operation between 3:00 – 6:30 pm, only the speeds up to 6:30 pm on this table are actually speed when HOV lane is in operations.

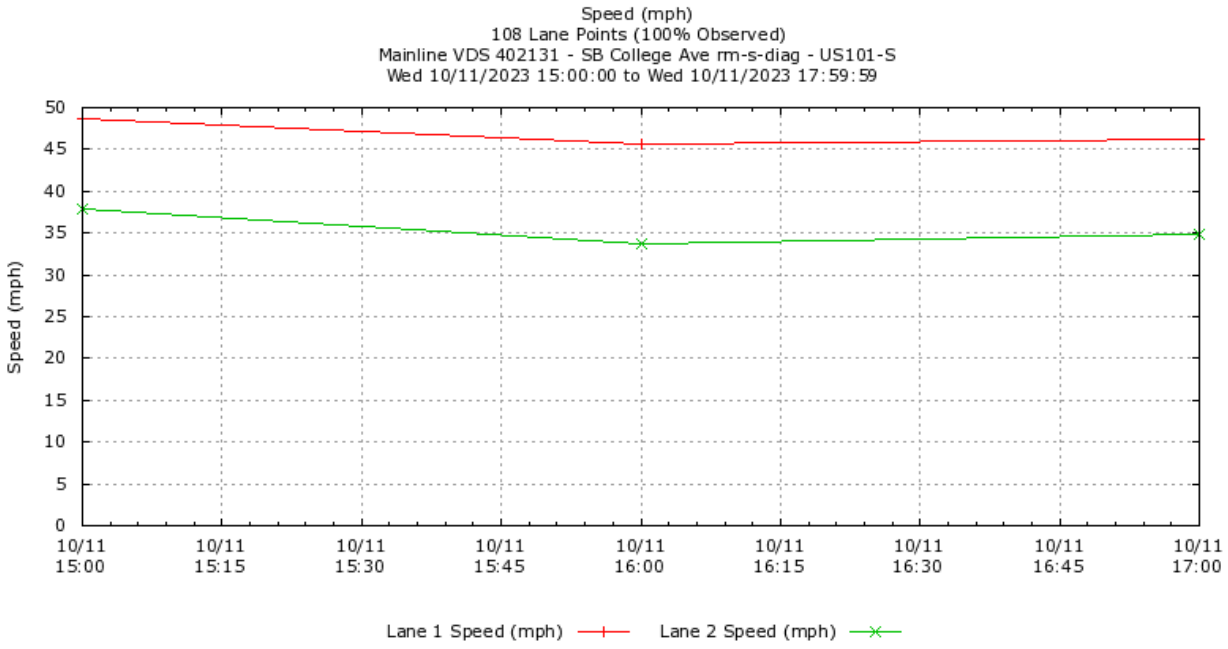
US 101 Southbound: Windsor River Road to North of Marin/Sonoma County Line

In the AM peak period, PeMS data indicated at the eastbound SR 12 on-ramp the HOV lane was degraded. However, it was determined that this was a bad detector and should have been removed from the analysis. There are no degraded segments on southbound US 101 in the AM peak period in 2022.

On southbound US 101 there is a bottleneck between the SR 12 on-ramp and the Baker Avenue off-ramp in the PM peak period. The queue from this bottleneck extends upstream to the Hopper Avenue interchange. The recurrent congestion in the GP lanes caused by this bottleneck reduces HOV lane performance and speed due to the friction factor between these lanes.

Note: HOV lane is only in operation between 3:00 – 6:30 pm, only the speeds up to 6:30 pm on this table are actually speed when HOV lane is in operations.

Figure 4.28: SB US-101 PM "Spot Time" Plot SB College Ave.



B. Remediation Strategies

Northbound and Southbound US 101 Cochrane Road (SCL County) to I-380 (SM County):

There are plans to convert the existing HOV lanes to HOT lanes and add a second HOT lane to create a dual lane facility. The project limits are from East Dunne Avenue to the SCL/SM County line in Santa Clara County. Preliminary project cost is estimated at $416M and would be funded by VTA. VTA plans to build this project and the SR 85 HOT lane project in segments. The first segment on US 101 is between SR 237 and the San Mateo County line. Construction began March 8, 2019, and was completed in February 2022. Occupancy requirement for toll free travel on this segment was increased to HOV 3+ with this HOT lane conversion. HOV 2 and Clean Air Vehicles are tolled at a discounted rate. With HOT lane projects there is dedicated funding provided by the HOT lane operators for

increased CHP enforcement of the HOT lanes. This will insure a more consistent approach to enforcing and deterring violations of the HOT lanes. The second phase, between SR 237 and Old Oakland Road, is now in the PS&E phase, with a start construction date of March 2026, opening to traffic in January 2029 as a dual HOT lane.

San Mateo County Transportation Agency, City/County Association of Governments, and Caltrans developed a project to add HOT lanes between the SCL/SM County line and I-380. This lane is a HOT 3+ lane and began construction in February 2020. Estimated cost of the project is $514M and the project was completed in March 2023. This project converted the existing HOV lane between the Santa Clara County line and Whipple Avenue into a HOT lane; this conversion was completed in February 2022. Between Whipple Avenue and I-380, the project added a HOT lane in both directions. The lane was opened in "HOV 3+ Only" in the fall 2022 and began tolling in March 2023. Occupancy requirements were increased to HOV 3+ no toll with HOT lane conversion. In addition, HOV 2 and Clean Air Vehicles are tolled at a discounted rate. With HOT lane projects there is dedicated funding provided by the HOT lane operators for increased CHP enforcement of the HOT lanes. This will insure a more consistent approach to enforcing and deterring violations of the HOT lanes.

A project to widen the connector from southbound US 101 to southbound SR 87 to two lanes was undertaken due to the demand for this off-ramp exceeding the capacity of a one lane ramp. This caused congestion to queue back onto southbound US 101. Construction started in February 2022 and was completed in October 2022, with a cost of $4.2M.

A project to fill in the ramp metering gaps and extend ramp metering on northbound US 101 from Fair Oaks Avenue to Embarcadero Road was completed in June 2021, project cost $8.3M.

A new interchange at Zanker Road to improve access to and across US 101, to the Mineta San Jose international Airport and to connect portions of north and central San Jose that are separated by US 101 is in the PA&ED stage. Estimated project cost is $350M with start of construction at the end of 2028.

A project to modify the interchanges at Rengstorff Avenue and San Antonio Road will provide HOV lanes at all on-ramps. Estimated project cost is $192M with construction to start at the end of 2028 and completed by 2030.

A project to improve access efficiency onto northbound US 101 on-ramp from Camino Arroyo and the Pacheco Pass Highway in Gilroy is currently in the PA&ED phase. As a major point of connection for the local, regional, and inter-regional travelers providing access to downtown Gilroy, the US 101/SR 152/10th Street

interchange is often congested, and the congestion extends to the upstream of the US 101 northbound onramp. The turn movements at nearby intersections exceed the available storage capacity currently and produce excessive queue lengths during weekday peak periods. Congested commercial traffic during Saturday peak hour traffic conditions east of the interchange ramps is also projected to worsen with forecast traffic from future adjacent land development. Modification of the existing geometry for efficient interchange to accommodate high traffic volumes will help to reduce existing bottleneck, enhance traffic flow, and improve operations of local and through traffic. With the project, all on-ramps will include an HOV preferential lane. The project cost is $77M, with construction to start at 2027 and completed by 2028.

Northbound and Southbound US 101 Richardson Bay Bridge to Atherton Avenue:

Part Time Transit Bus Only Lane (Bus on Shoulder) pilot project from Novato Boulevard to Mission Boulevard is currently being studied by the Transportation Authority of Marin (TAM). Currently TAM is seeking funding to begin a Project Initiation Document (PID) for this project.

TAM also has US 101 Highway Interchanges and Approaching Roadways Project Initiation Document (PID) for the following interchanges 1) E. Blithedale Ave./Tiburon Blvd. (Highway 131) – PM 5.69, 2) Freitas Parkway/Civic Center Dr. – PM 13.71, and 3) Alameda del Prado/Nave Dr. – PM 16.64. There may be an opportunity to reduce the friction factor by selecting roadway geometry and ITS components that could improve the flow of the general-purpose lanes. This project does not currently have funding past the PID phase.

The Marin/Sonoma County narrows HOV lane gap closure project between De Long Avenue and north of the Marin/Sonoma County line started construction in July 2022. This project is scheduled to be completed January 2026 with a cost of $180M. This project will close the gap in the HOV lane between the two counties. Current HOV hours of operation in Marin County are 6:30 AM – 8:30 AM in the southbound direction and 4:30 PM – 7:00 PM in the northbound direction. The HOV lane hours of operation in Sonoma County are 7:00 AM – 9:00 AM and 3:00 PM – 6:30 PM in both directions. Once the gap closure project is completed the hours of operation in both counties will need to match. TAM has hired a consultant to study the existing operation and proposed operation on the corridor and planning to produce a study to suggest new operating hours on the corridor. The study is anticipated to be released July 2025.

Caltrans Headquarters in currently working on Managed lane weaving and friction factor studies scheduled to be completed in June 2024. Conclusions from these studies could lead to future Managed lane improvement projects. In

addition, the Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025, the removal of CAVs from the Managed lane would improve the Managed lane operations.

Caltrans has discussed with CHP the Managed lane high violation locations throughout the San Francisco Bay Area in early 2023. This will allow CHP to concentrate their enforcement efforts in these areas.

Northbound and Southbound US 101 South of the Marin/Sonoma County line to Windsor River Road:

The HOV lane projects were completed in 2021/2022 to close gaps in the HOV lane for a continuous HOV lane between the Marin/Sonoma County line and Windsor River Road.

There are no current projects to address the bottlenecks near SR 12 which is causing degradation in the northbound and southbound US 101 HOV lanes in Sonoma County. Heavy traffic to and from SR 12 is causing bottlenecks on northbound and southbound US 101.

Caltrans Headquarters in currently working on Managed lane weaving and friction factor studies scheduled to be completed in June 2024. Conclusions from these studies could lead to future Managed lane improvement projects. In addition, the Clean Air Vehicle (CAV) exemption is currently scheduled to sunset at the end of September 2025, the removal of CAVs from the Managed lane would improve the Managed lane operations.

Caltrans has discussed with CHP the Managed lane high violation locations throughout the San Francisco Bay Area in early 2023. This will allow CHP to concentrate their enforcement efforts in these areas.

3.2.8 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 237

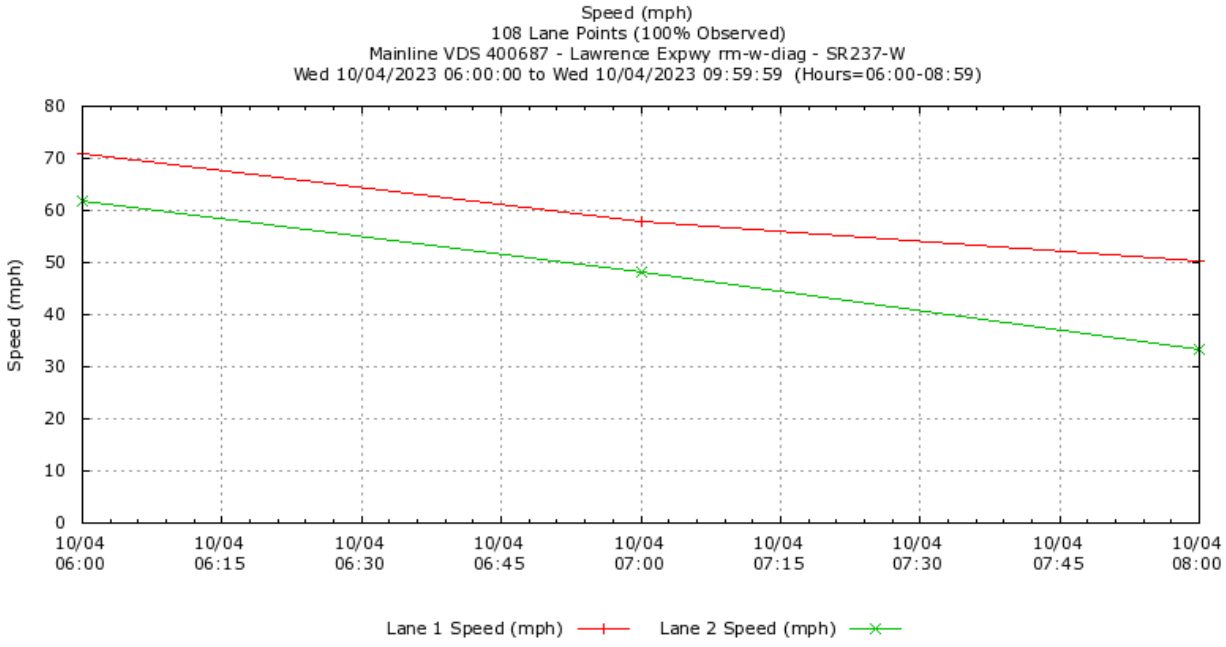
In 2022, there was no degraded HOT lane-miles on westbound SR 237 in either the AM or PM peak periods. In 2023, there was no degraded HOT lane-miles on westbound SR 237 in PM but there was slight degradation of 1.0 miles in the AM peak periods. On eastbound SR 237 there was 0.9 degraded HOT lane-miles in the AM peak period, an increase from 0.4 degraded HOT lane-mile in 2022. Degraded HOT Lane was at a spot location near Fair Oaks Avenue off-ramp. Eastbound SR 237 in the PM peak period had 2.8 degraded HOT lane-miles in 2023, an increase from 2.1 degraded HOT lane-miles in 2022.

A. Analysis

SR 237 Westbound: Lawrence Expressway:

There is no recurring bottleneck on westbound SR 237 in the AM peak period. As the HOT lane comes to an end at this spot location, vehicles entering the lane from the GP lanes at the downstream may be impacting the performance of the HOT lane.

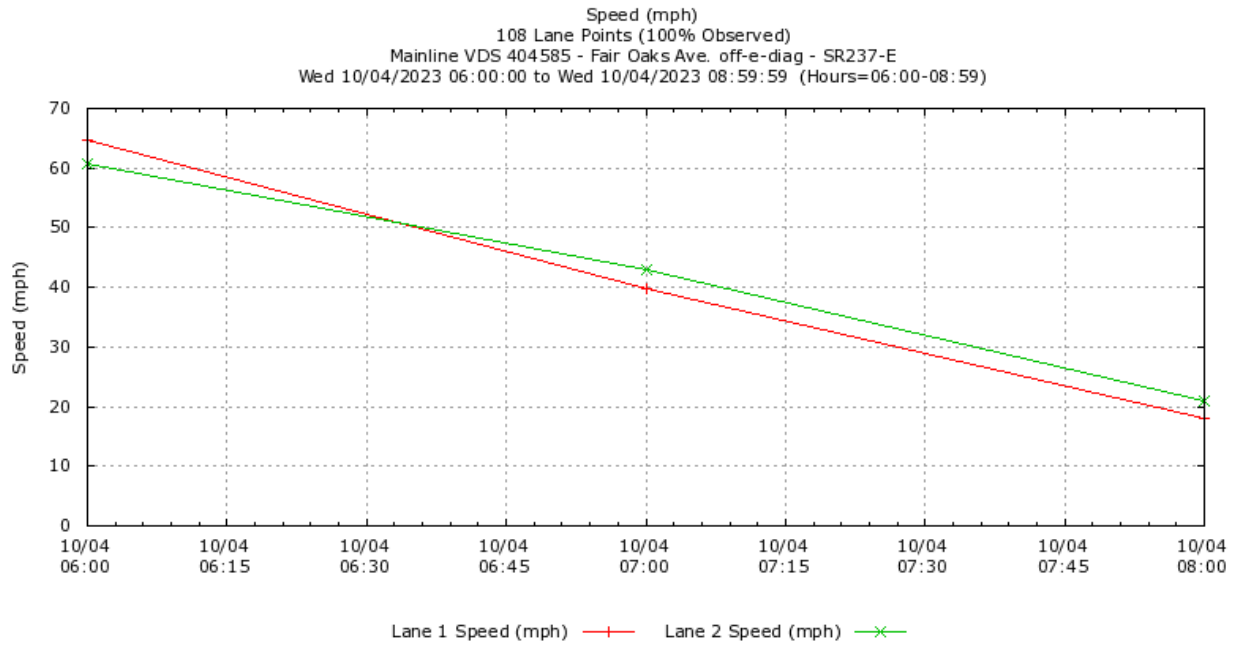
Figure 4.29: WB SR-237 AM "Spot Time" Plot at Lawrence Expwy.



SR 237 Eastbound: Mathilda Avenue to I-880:

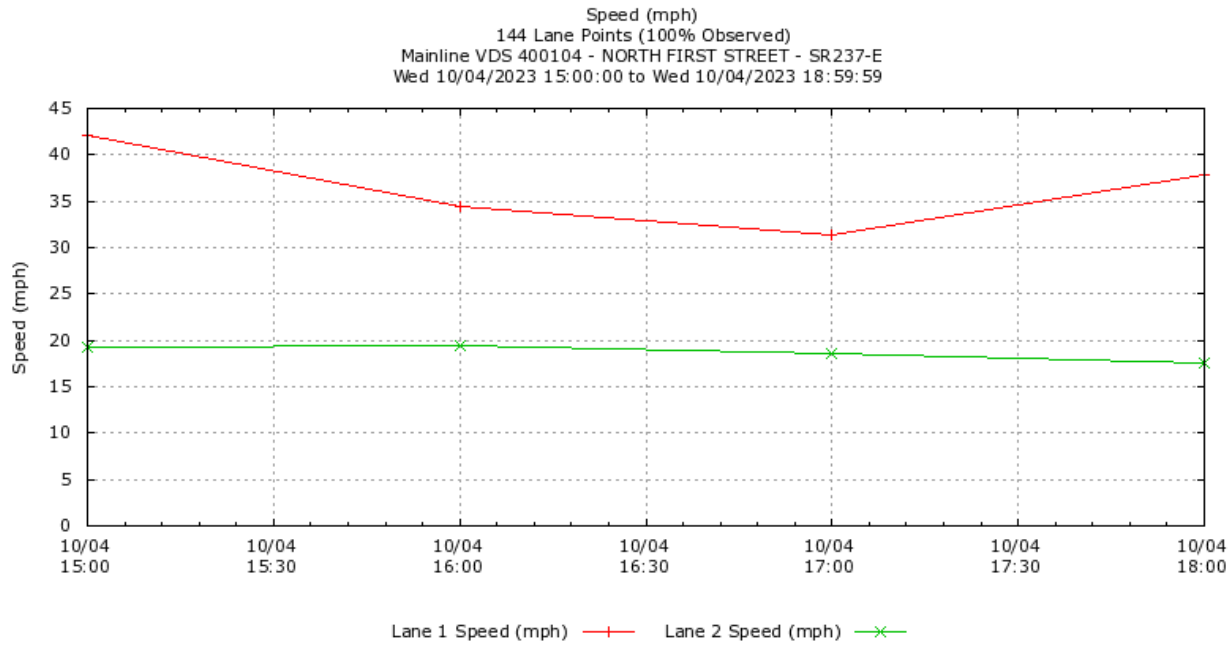
There is no recurring bottleneck on eastbound SR 237 in the AM peak period. Occasional slowdown in the GP lanes at this spot location may be impacting the HOT lane speeds as vehicles exit the HOT lane to access the off-ramps downstream of Fair Oaks Avenue.

Figure 4.30: EB SR-237 AM "Spot Time" Plot at Fair Oaks Ave.



On eastbound SR 237 in the PM peak period a bottleneck develops between North First Street on-ramp and Zanker Road off-ramp. The queue from this bottleneck extends upstream to the West Maude Avenue interchange. This bottleneck causes recurrent congestion in the GP lanes that reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.31: EB SR-237 PM "Spot Time" Plot at North First St.



B. Remediation Strategies

SR 237 Eastbound: Mathilda Avenue to I-880:

A future project will add an auxiliary lane in the eastbound direction by widening the freeway between North 1st Street and Zanker Road. The Project Approval and Environmental Document (PA&ED) phase was completed August 2020. Construction started in 2022, with an estimated cost of $15.2M, is expected to be completed by 2024, .

A project to add auxiliary lanes to SR 237 in both directions between Middlefield Road and SR 85 is in the PA&ED stage. A HOV direct connector may be added to the project if funding is available. Estimated project cost is $55M with construction to start in mid-2026 and completed by early 2028.

A road widening project between I-880 and Milpitas Blvd is at the PA&ED stage. The project will improve general-purpose speeds within the limits and enhance access to the HOV lanes at the McCarthy Blvd interchange. Estimated project cost is $143M with construction to start in 2027 and completed by 2029.

3.2.9 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 280

In 2022, northbound I-280 in the AM peak period had 1.9 degraded HOV lane-miles. In 2023, the number decreased to 1.1 degraded HOV lane-miles in the AM peak period.

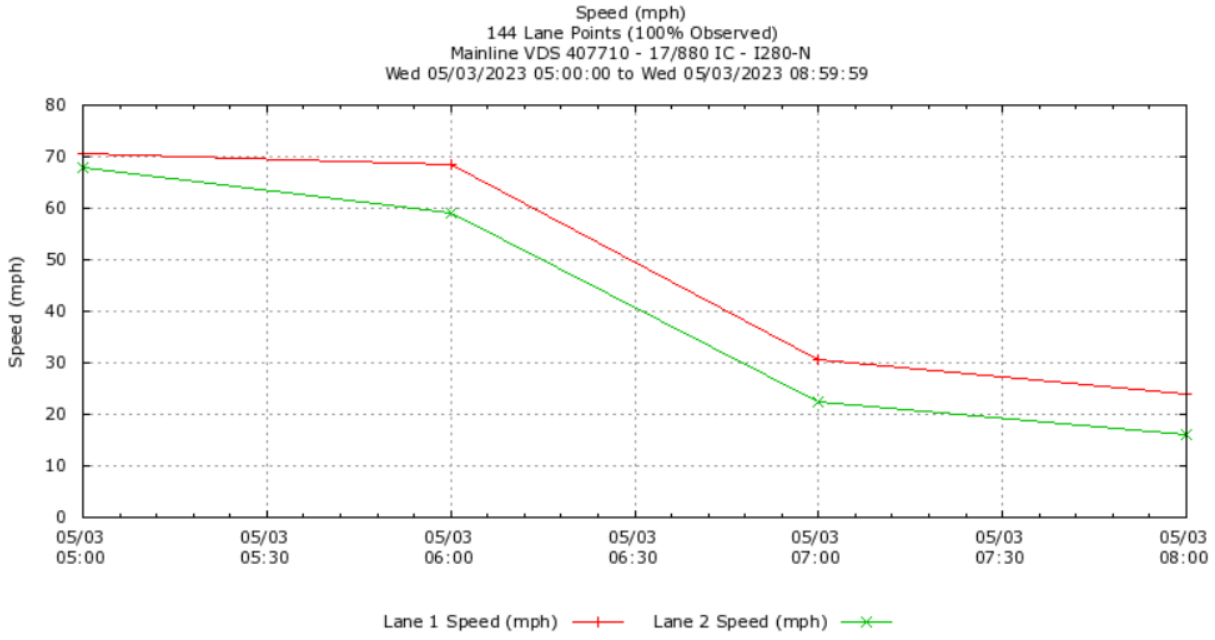
In 2022, southbound I-280 in the PM peak period had 7.2 degraded HOV lane-miles. In 2023, the number decreased to 4.1 HOV lane-miles in the PM peak period.

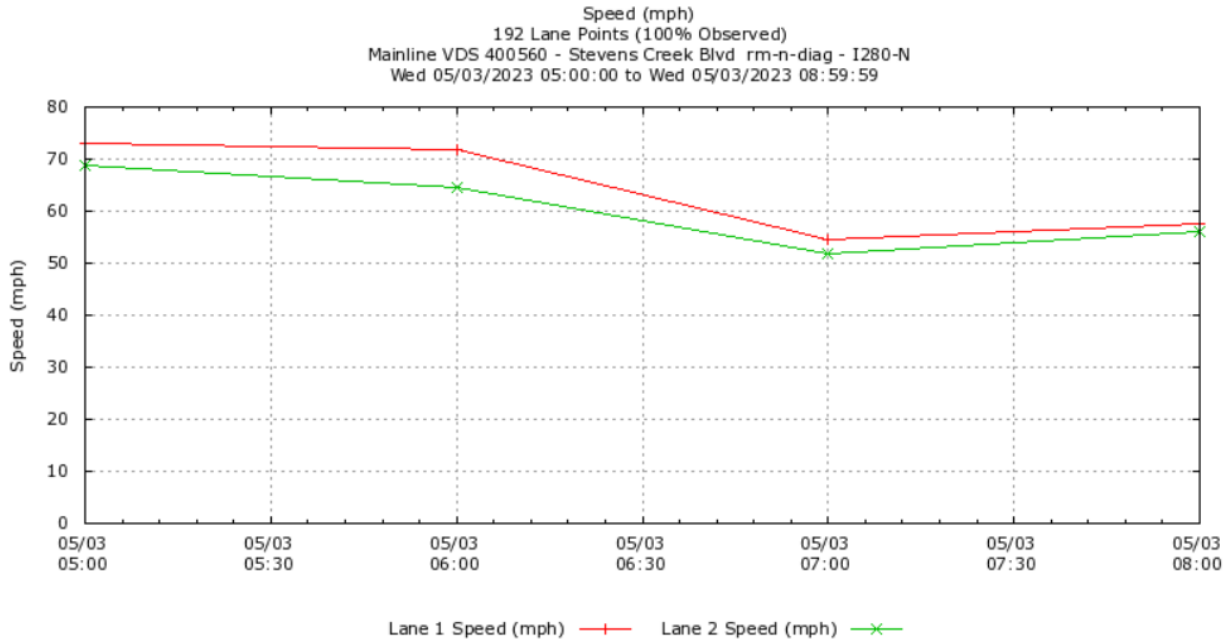
A. Analysis

I-280 northbound: South of Leland Avenue to Magdalena Avenue:

In the AM peak period the controlling bottleneck is between the SR 17/I-880 I/C and the Saratoga Avenue off-ramp. A queue from this bottleneck extends upstream to beyond the US 101 interchange. The peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

Figure 4.32: NB I-280 AM "Spot Time" Plots at the 17/880 IC & Stevens Creek Blvd





The HOV 2+ demand on this route is relatively high which can also have an effect on the speed in the HOV lane when the adjacent GP lanes are congested due to this friction factor. The HOV lane is at the effective capacity of the lane in order to maintain a speed at 45 mph or greater.

Table 4.9: NB I-280 AM HOV and GP1 Flow and Speed at SR-17/I-880 I/C

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
5/1/2023 5:00	195	72	1562	66
5/1/2023 6:00	547	70	3255	59
5/1/2023 7:00	1582	39	3316	23
5/1/2023 8:00	1344	32	2894	18
5/2/2023 5:00	209	70	1602	65
5/2/2023 6:00	619	70	3281	57
5/2/2023 7:00	1498	32	2953	17
5/2/2023 8:00	1442	17	2349	11
5/3/2023 5:00	214	71	1622	65
5/3/2023 6:00	651	69	3329	56
5/3/2023 7:00	1541	31	3110	20
5/3/2023 8:00	1502	24	2723	14
5/4/2023 5:00	247	72	1641	65
5/4/2023 6:00	687	72	3452	58
5/4/2023 7:00	1646	35	3181	20
5/4/2023 8:00	1544	27	2800	15
5/5/2023 5:00	234	71	1539	64
5/5/2023 6:00	582	71	3287	60
5/5/2023 7:00	1492	40	3526	27
5/5/2023 8:00	757	66	3442	51

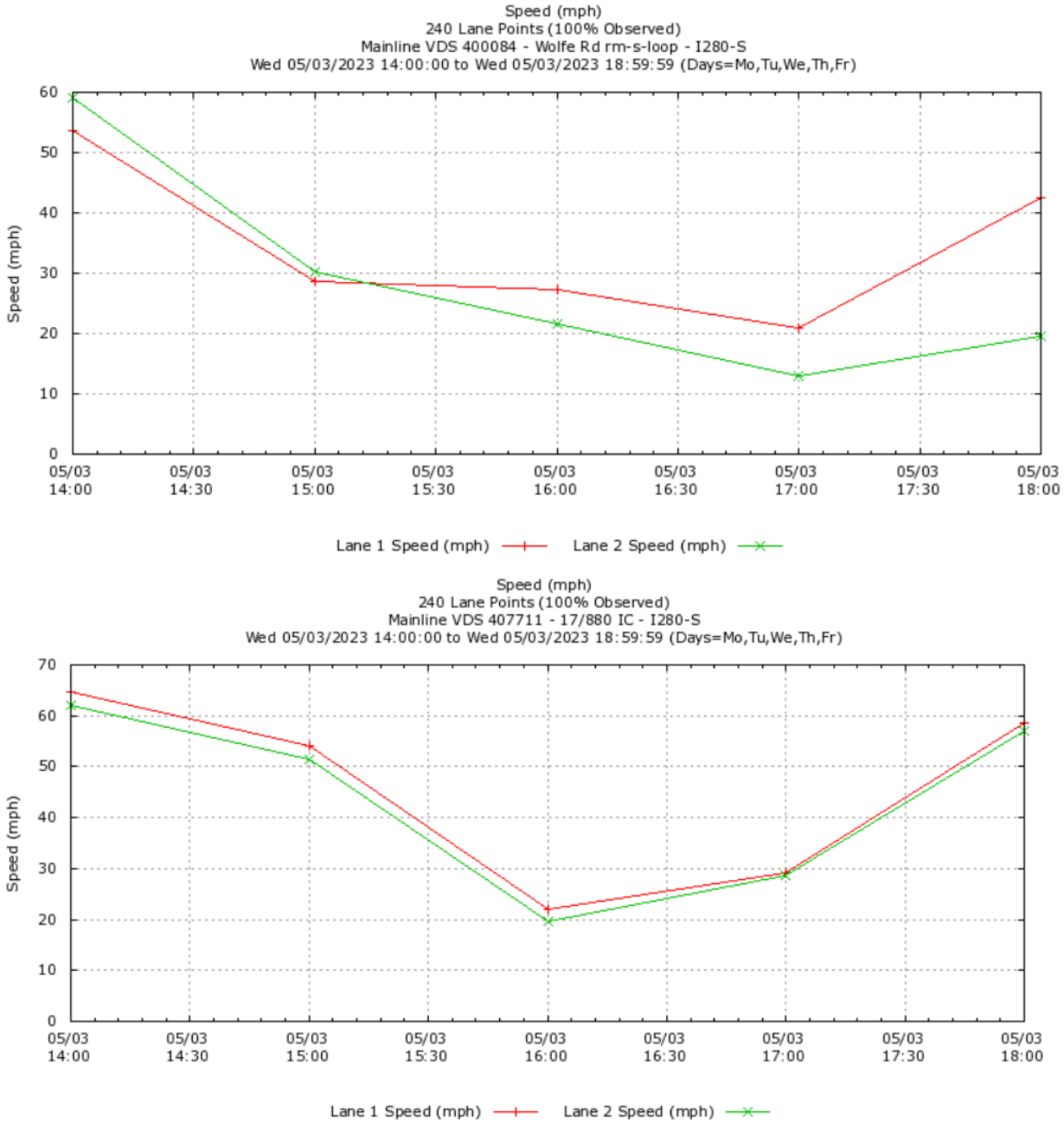
Note: Speeds below 35 mph would be locations in congestion and corresponding volumes would be constrained volumes. HOV lane bottleneck output volumes, demand exceeds capacity

I-280 Southbound, North of Magdalena Avenue to Leland Avenue

In the PM peak period the controlling bottleneck develops between the 7th Street on-ramp and the Mclaughlin Avenue off-ramp with a queue extending to the SR 85 interchange. The peak period recurrent congestion in the GP lanes reduces HOV lane performance and speed due to the friction factor between these lanes.

In addition, as the bottleneck is downstream of the end of the HOV lane limits, speeds are similar in all lanes as the queue from this bottleneck spills back into the end of the HOV lane.

Figure 4.33: SB I-280 PM "Spot Time" Plots at Wolfe Rd. & the 17/880 I/C



B. Remediation Strategies

A project at the I-280/Winchester Boulevard interchange will construct a new direct northbound SR 17 to northbound I-280 flyover metered connector ramp and add ramp metering to the southbound I-880 to northbound I-280 connector. This will improve GP lane speeds within the limits and reduce friction between HOV lane and GP lane traffic. Estimated project cost is $229M with construction to start in 2027 and completed by 2030.

A project at the I-280/Wolfe Road interchange will widen the existing diagonal on-ramps to accommodate HOV lanes. Estimated project cost is $120M with construction to start in 2025 and completed by 2028.

3.2.10 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 580

In 2022, there was no degraded HOT lane-miles on either eastbound or westbound I-580. In 2023, the westbound I-580 HOT lane had 0.36 lane-miles of slight degraded the a.m. peak period. There was no degradation in the p.m. peak period of in the eastbound direction.

A. Analysis

I-580 Westbound Greenville Road to I-680:

Westbound I 580 experiences recurrent AM peak period slowing in the general purpose lanes between the Isabel Avenue interchange, just west of the degraded segment at Portola Ave, and the Hacienda Drive interchange. Vehicles approaching the slow general purpose lane traffic frequently enter the express in the area of Portola Avenue overcrossing to avoid the slowing in the general purpose lanes. Express lane volumes frequently approach the lane's capacity in the area and, combined with friction between the general purpose and express lanes , results in occasional degradation of the express lane. See express lane and general purpose lane volumes and speeds in the graph and table below.

Figure 4.34: WB I-580 AM "Spot Time" Plot Opposite West of Portola Ave. OC

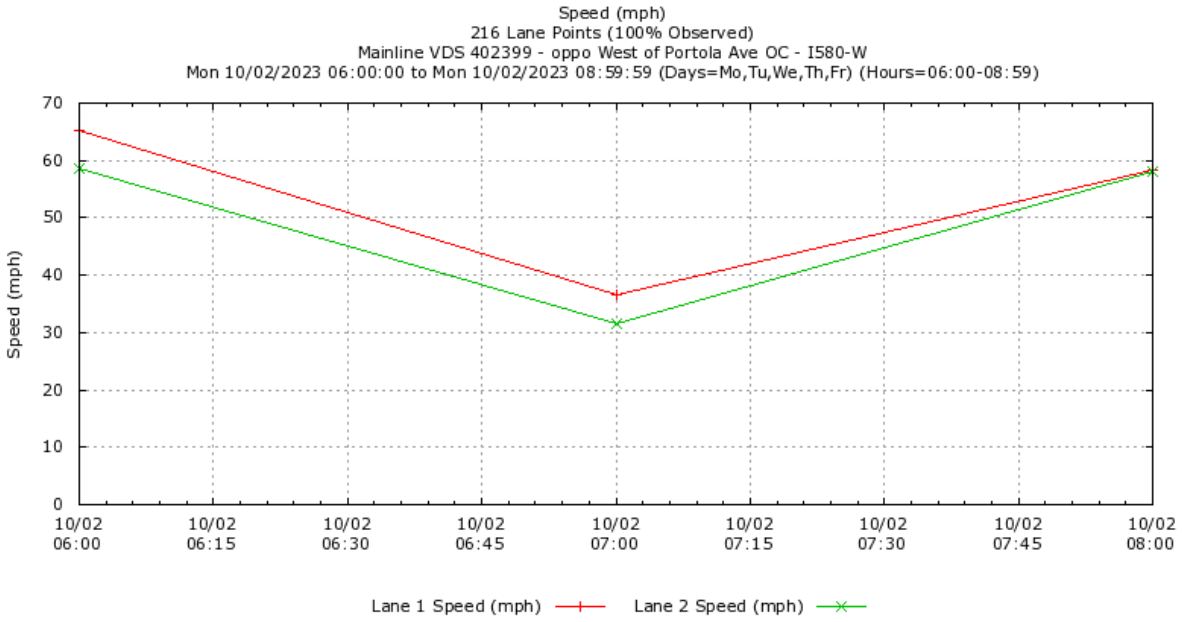


Table 4.10: NB I-580 PM EL and GP1 Flow and Speed at Portola Ave OC

Date	Hour	EL Flow	EL Speed	Avg GP Flow	Avg GP Speed
10/2/2023	15:00	1335	65.1	1362	57.0
10/2/2023	16:00	1526	36.7	1282	41.4
10/2/2023	17:00	1359	58.3	1364	53.4
10/3/2023	15:00	1334	66.8	1355	59.5
10/3/2023	16:00	1497	42.6	1400	50.7
10/3/2023	17:00	1268	54.8	1260	53.5
10/4/2023	15:00	1342	65.2	1389	58.4
10/4/2024	16:00	1556	42.3	1372	48.9
10/4/2024	17:00	1302	56.8	1404	51.9
10/5/2024	15:00	1326	67.0	1361	58.5
10/5/2023	16:00	1528	50.2	1361	50.4
10/5/2023	17:00	1359	53.9	1304	44.5
10/6/2023	15:00	1111	68.6	1328	59.2
10/6/2023	16:00	1084	68.7	1367	58.9
10/6/2023	17:00	871	48.9	1073	43.4

B. Remediation Strategies

In the short term, additional enforcement should be considered to discourage violators from using the lane and exacerbating the degradation of the facility. Additionally, the district should work with Alameda CTC to increase pricing of the lane to better manage demand for the facility.

Longer term Caltrans District 4, Caltrans District 10 and other regional partners have initiated a 580/205 Altamont Pass Corridor Executive Working Group. The purpose of the group and subsequent working teams is to focus on multimodal transportation challenges, improvements along the corridor on commuter and goods movement trips over the Altamont Pass. Additionally, the Valley Link project, which will provide rail service between Dublin and Tracy over the Altamont Pass, is currently in the PA&ED phase and should help reduce demand for the corridor. Construction is scheduled to begin in late 2026 and the estimated project construction cost is currently $772.5 M.

3.2.11 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 680

There are multiple HOV facilities on I-680 in District 4. HOT lanes operate in Santa Clara and Alameda Counties between SR 237/Calaveras Boulevard and SR 84. HOT and HOV lanes operate in Contra Costa County between Alcosta Boulevard and Marina Vista Avenue.

In 2022, northbound I-680 between Alcosta Boulevard and Livorna Road had 3.4 lane-miles of degraded HOT lane during the PM peak period. In 2023, this segment improved to approximately 3.1 lane-miles of degraded HOT lane during the PM peak period.

In 2022, southbound I-680 between Marina Vista Avenue and Alcosta Boulevard had 0.5 lane-miles of degraded HOT lanes during the AM peak period. In 2023, this segment remained unchanged, with approximately 0.5 degraded HOT lane during the AM peak period.

In 2022, southbound I-680 between Marina Vista Avenue and Alcosta Boulevard HOT lane was not degraded during the PM peak period. In 2023, Southbound I-680 between Marina Vista Avenue and Alcosta Boulevard had an approximately 0.5 lane-miles of degraded HOT lanes during PM peak period.

In 2023, northbound from South Grimmer Boulevard to Livorna Road on-ramp in the PM peak period had 4.7 degraded HOT lane-miles. And southbound from SR 84 to Alcosta Boulevard on-ramp in the AM peak period had 0.5 degraded HOT lane-miles and 1.0 degraded HOT lane-miles in the PM peak period.

A. Analysis

Route 680 Northbound South Grimmer Boulevard to State Route 84:

The HOV facilities on I-680 underwent significant operational changes in 2020 as mentioned in the 2020 California High Occupancy Vehicle Facilities Degradation Report. In 2020, a gap in the southbound direction between Treat Boulevard and Rudgear Road was closed by adding a HOT lane. Additionally, the HOV lane between Marina Vista Avenue and Treat Boulevard was converted to HOT operations to provide one continuous HOT lane facility in the southbound direction between Marina Vista Avenue and Alcosta Boulevard. The HOT Lane on southbound I-680 between Marina Vista Avenue and Rudgear Road originally was opened in "HOV Only" mode and started collecting tolls on August 20, 2021. The southbound HOT lane between SR 84 and SR 237 was converted from a limited access facility to a continuous access facility and operated in "HOV only" mode until tolling began in March 2023.

A recurrent northbound PM peak period bottlenecks typically develops north of the SR-84 interchange, downstream of the end of the managed lane, with queues extending nearly the entire length of the facility at the height of peak period. The primary factors resulting in reduced managed lane speeds are friction between HOV lane and general purpose lanes within the area of congestion and weaving at the end of the HOV lane within the bottleneck section at the end of the facility. See the graph and table below for express and general purpose speeds and flow in the degraded section at Vargas Road.

Figure 4.35: NB I-680 PM "Spot Time" Plot at Vargas Rd.

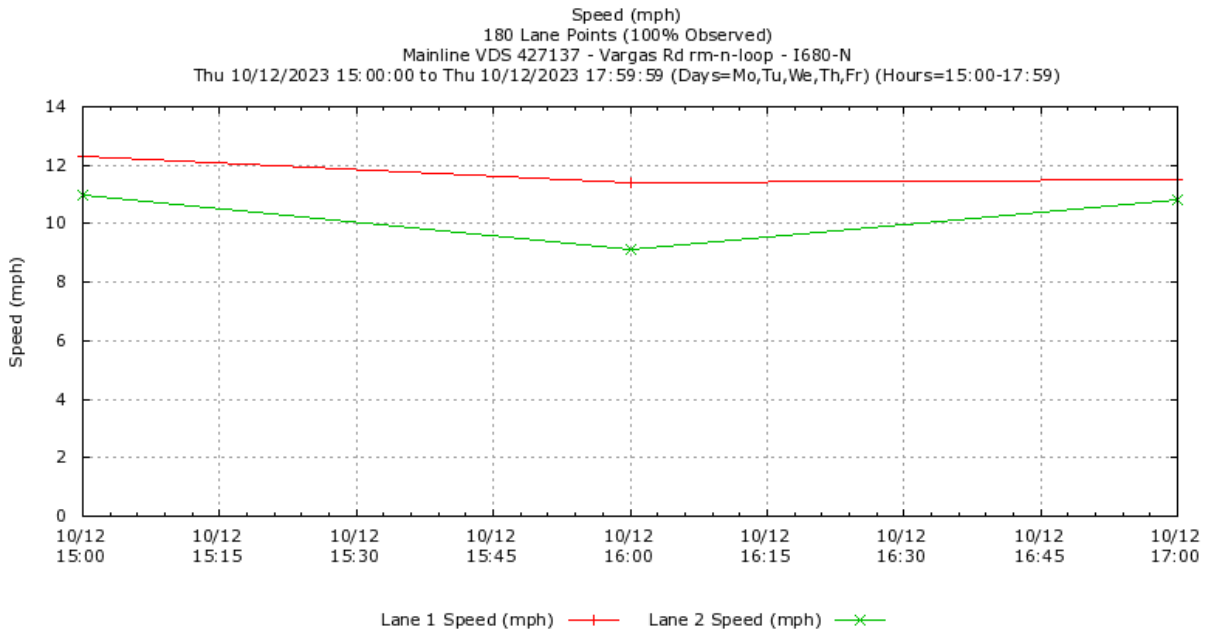


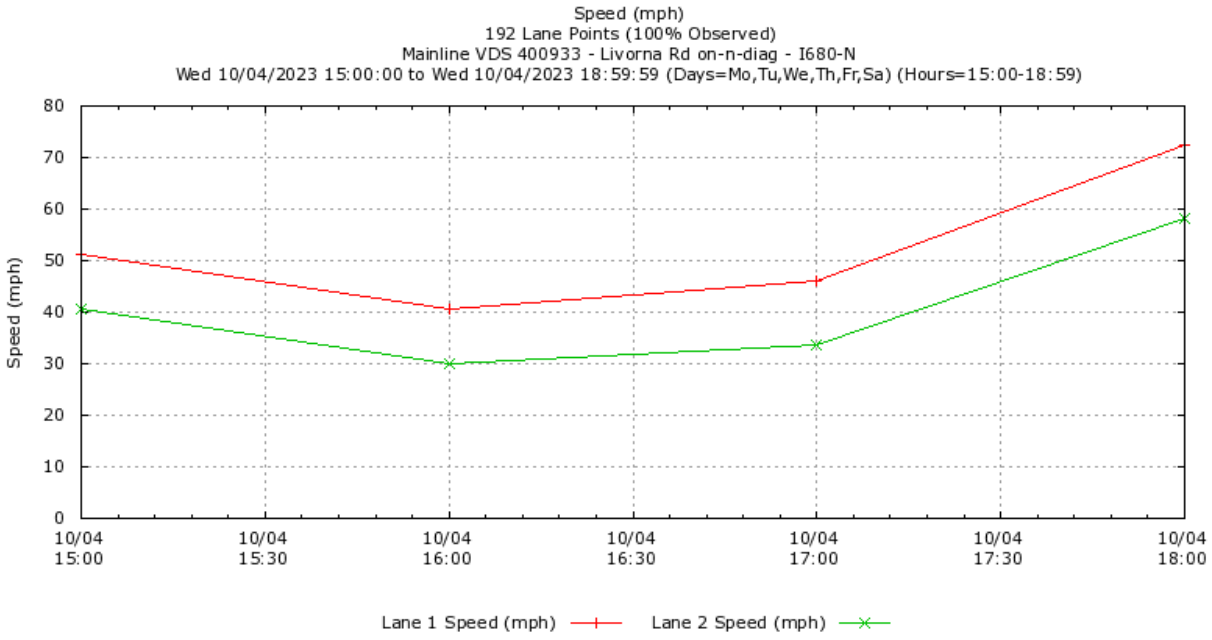
Table 4.11: NB I-680 PM EL and GP1 Flow and Speed at Vargas Rd.

Date	Hour	EL Flow	EL Speed	Avg GP Flow	Avg GP Speed
10/9/2023	15:00	1183	31.7	1185	35.3
10/9/2023	16:00	1050	14.6	1059	17.5
10/9/2023	17:00	978	46,1	1018	56.2
10/10/2023	15:00	969	13.0	1003	15.6
10/10/2023	16:00	998	12.4	1050	15.3
10/10/2023	17:00	992	11.9	1022	15.1
10/11/2023	15:00	1021	14.8	1030	17.5
10/11/2023	16:00	973	12.2	1017	15.0
10/11/2023	17:00	977	12.4	1001	15.2
10/12/2023	15:00	977	12.3	949	12.7
10/12/2023	16:00	929	11.4	890	11.6
10/12/2023	17:00	947	11.5	954	12.8
10/13/2023	15:00	1003	12.7	1004	13.9
10/13/2023	16:00	964	11.6	1011	14.6
10/13/2023	17:00	1035	13.7	1011	17.2

I-680 Northbound, Alcosta Boulevard to Marina Vista Avenue

There are two managed lane facilities on northbound I-680 in Contra Costa County, a HOT lane facility between Alcosta Boulevard and Livorna Road and an HOV lane facility between SR 242 and Marina Vista Avenue, leaving to a gap in the managed lanes between Livorna Road and SR 242. A significant northbound PM peak period bottleneck develops within the manage lane gap between the Lawrence Way on-ramp and the Treat Boulevard off-ramp. Queues and slow speeds approaching this bottleneck regularly extend south nearly 10 miles to south of the Sycamore Valley Road interchange. Friction between traffic in the continuous access HOT lane and traffic in the slower moving GP lanes results in reduced HOT lane speeds and performance. A second contributing factor to degradation is the in-queue weaving that takes place between HOT lane traffic and general-purpose lane traffic near the northern end of the HOT lane at Livorna Road.

Figure 4.36: NB I-680 PM "Spot Time" Plot at Livorna Rd.



I-680 Southbound, Marina Vista Avenue to Alcosta Boulevard:

In the southbound direction, a recurrent AM peak period bottleneck develops between the Main Street on-ramp and the SR 24 off-ramp. Queues approaching this bottleneck extend north about 5 miles to the area of the Willow Pass Road

interchange and extending back onto SR 242 to the Concord Avenue interchange. In addition, a HOT lane degradation occurs north of Livorna Road near the end of the buffer separation and north of Monument Boulevard on-ramp due to queue weaving between HOT lane and general-purpose lane traffic during the AM peak period.

A slight HOT lane degradation occurs north of Livorna Road near the end of the buffer separation during the PM peak period.

Figure 4.37: SB I-680 AM "Spot Time" Plot Opposite 3300' N. of Livorna Rd.

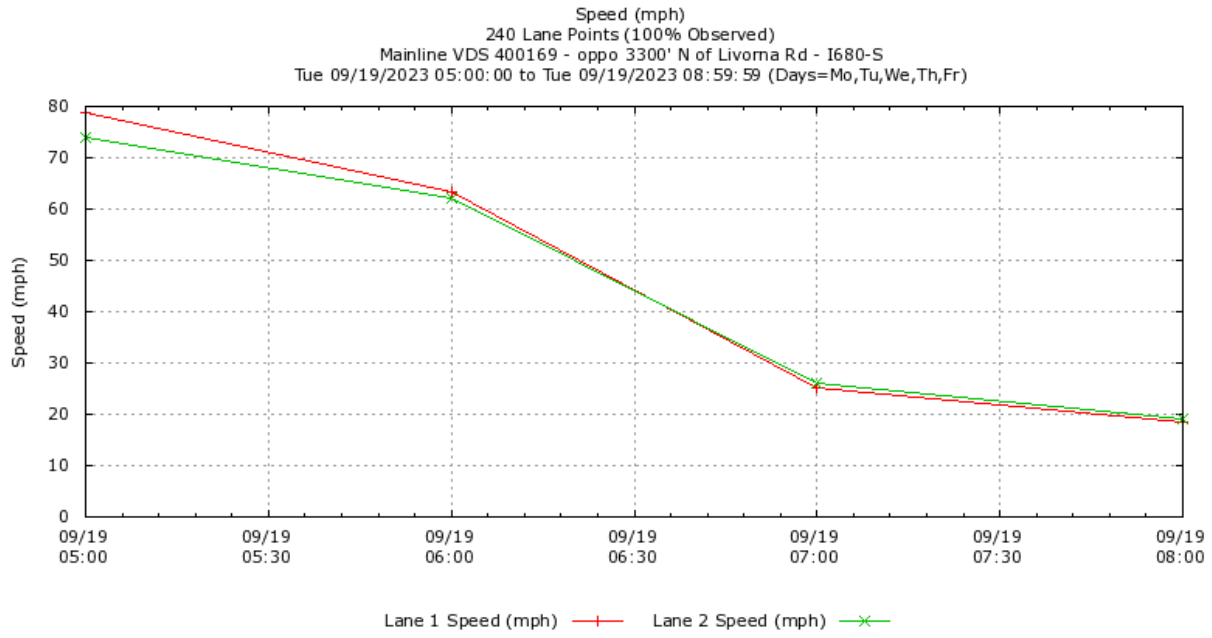
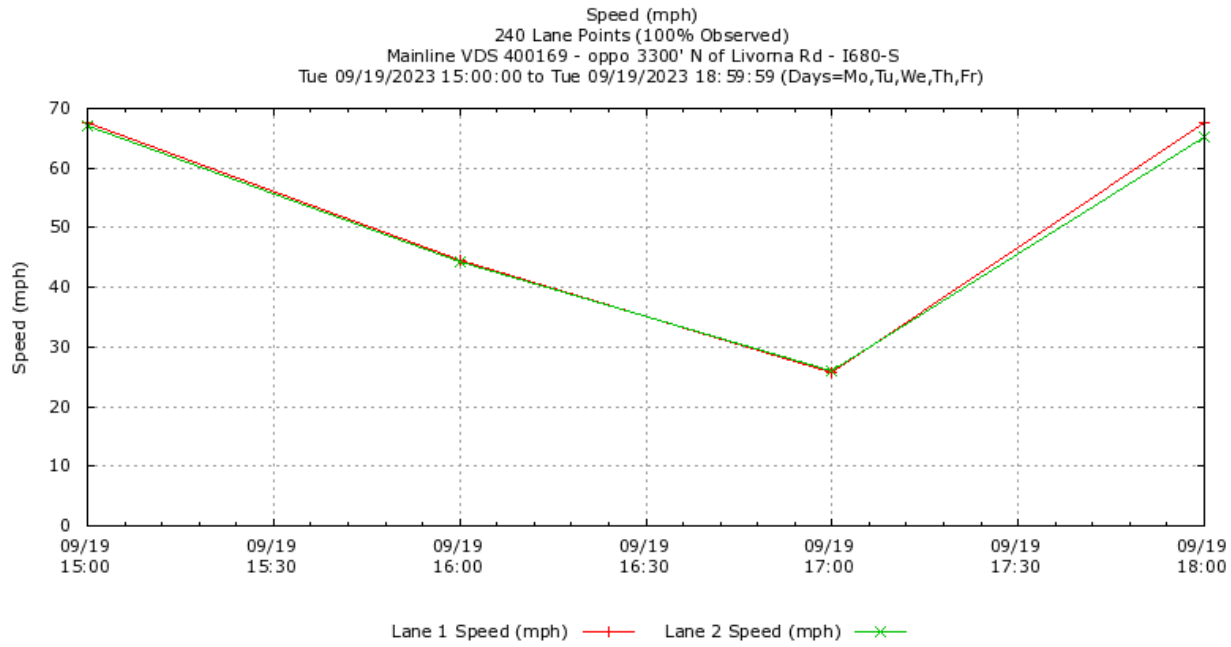


Figure 4.38: SB I-680 PM "Spot Time" Plot Opposite 3300' N. of Livorna Rd.



B. Remediation Strategies

Tolling of the express lane resumed in March 2023 after previously operating as an HOV lane. It is recommended that additional enforcement be considered to discourage violators and the district work with Alameda CTC to increase pricing of the lane to better manage demand for the facility. Longer term, the PA&ED phase for a section of express lane between SR-84 and Alcosta Boulevard has been completed. However, funding and construction are still pending and no date to begin construction has yet been identified This project would increase bottleneck capacity and reduce GP lane congestion and friction between the GP lanes and managed lane approaching it.

I-680 Northbound and Southbound: Alcosta Boulevard to Marina Vista Avenue:

Innovate 680, sponsored by the Contra Costa Transportation Authority, is a comprehensive initiative plan that includes completion of the northbound HOT lane network as well as other northbound improvements including part time transit lanes, shared mobility hubs and a corridor adaptive ramp metering project between the Bollinger Canyon Road and Ygnacio Valley Road interchanges. The HOT lanes completion and adaptive ramp metering projects are currently in PA&ED phases with estimated costs of $389 million and $25 million, respectively. Both projects are expected to be implemented in 2027. The part time transit lane on northbound I-680 is currently in the planning phase with an estimated cost of about $20 million with an implementation date of 2025. Smart mobility hubs

project is in the earlier stages of planning. A concept plan was completed in January 2023 and implementation and phasing plans are still to be developed.

3.2.12 ACTION PLAN FOR DEGRADED MANAGED LANES ON ROUTE 880

There are multiple managed lane facilities on I-880 in District 4. HOT lanes operate in Santa Clara and Alameda Counties between Hegenberger Road and SR 237 in the southbound direction and between south of SR 262 and south of SR 238 in the northbound direction. HOV lanes also operate in Alameda and Santa Clara Counites at the north end of the route and between Old Bayshore Highway and south of SR 262 in the northbound direction and between SR 237 and US 101 in the southbound direction.

In 2022, northbound I-880 between Santa Clara County line to south of SR 238 had 2.7 degraded HOT lane-miles in the PM peak period. In 2023, northbound I-880 between south of SR 262 and south of SR 238 had 5.3 degraded HOT lane-miles in the PM peak period.

In 2022, southbound I-880 between Hegenberger Rd and SR 237 had 5.7 degraded HOT lane-miles in the AM peak period and 0.7 degraded HOT lane-miles in the PM peak period. In 2023, within this segment there was 6.6 degraded HOT lane-miles in the AM peak period and 0.2 degraded HOT lane-miles in the PM peak period.

In 2022, southbound I-880 between SR 237 and US 101 had 0.5 degraded HOV lane-miles in the AM peak period and 1.7 degraded HOV lane-miles in the PM peak period. In 2023, southbound I-880 within this segment had 0.5 degraded HOV lane-miles in the AM peak period and 1.5 degraded HOV lane-miles in the PM peak period.

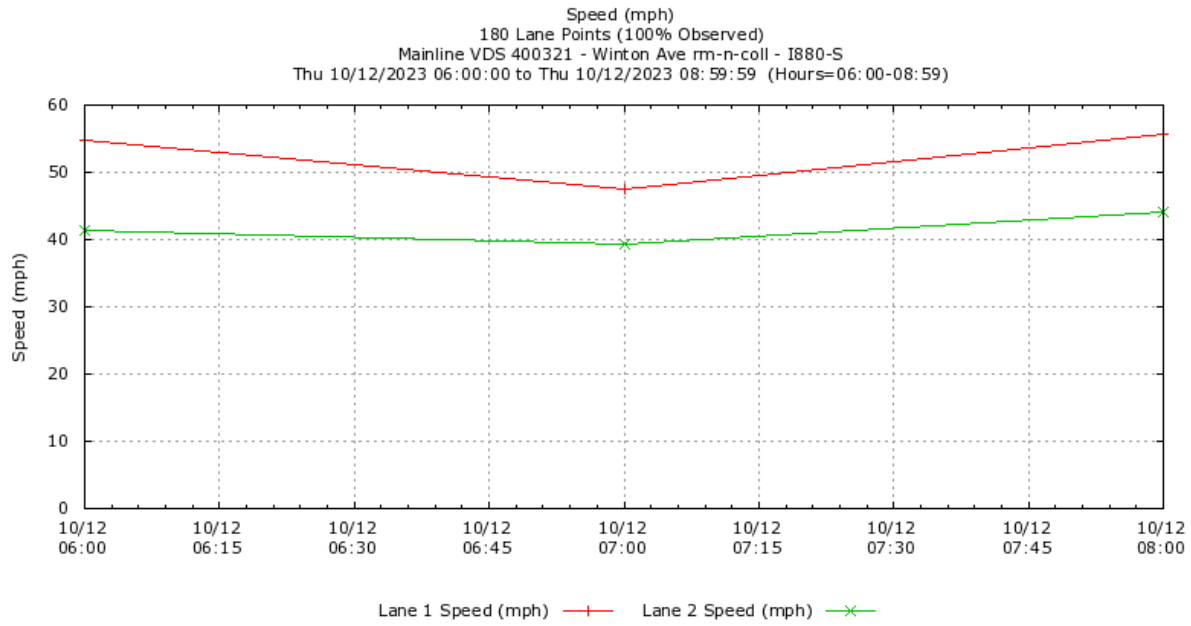
A. Analysis

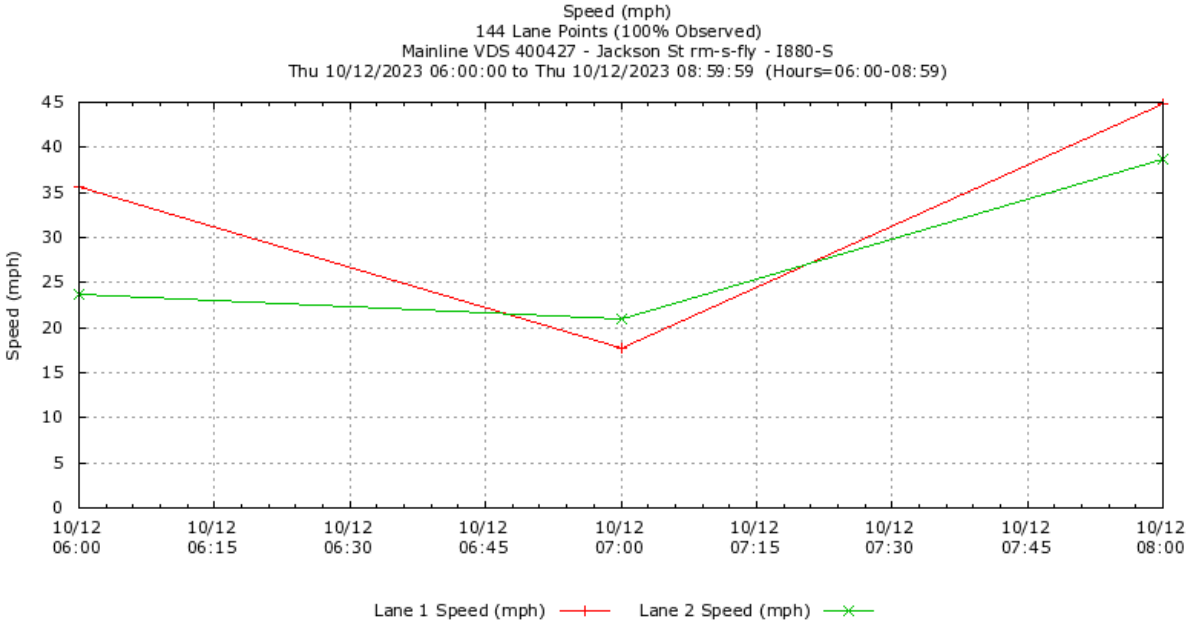
I-880 SB Hegenberger Road to US 101:

Multiple bottlenecks develop on southbound Route 880 in Alameda County during the AM peak period; however, two primary bottlenecks generally control traffic operations for the majority of the peak. A northern bottleneck between the A Street on-ramp and the Winton Avenue off-ramp and a southern bottleneck between the Stevenson Boulevard on-ramp and the Auto Mall Parkway off-ramp. Queues associated with the northern bottleneck typically extend north for about 2 miles to the State Route 238 interchange and queues from the southern bottleneck extend as far north as the State Route 92 interchange, a distance of about 12 miles. Friction between express lane and general purpose lane vehicles as well as high express lane demand results in degraded express lane operations

in both the buffered and open access portions of the facility from the State Route 238 interchange to south of the Alvarado-Niles Road interchange and from the Decoto Road interchange to the Stevenson Boulevard interchange. See the tables below graphs and tables for express lane and general purpose lane volumes and speeds in the areas of the Jackson Street, Winton Avenue and Alvarado-Niles Road interchanges.

Figure 4.38: SB I-880 AM "Spot Time" Plots at Winton Ave, Jackson St & Alvarado-Niles Rd





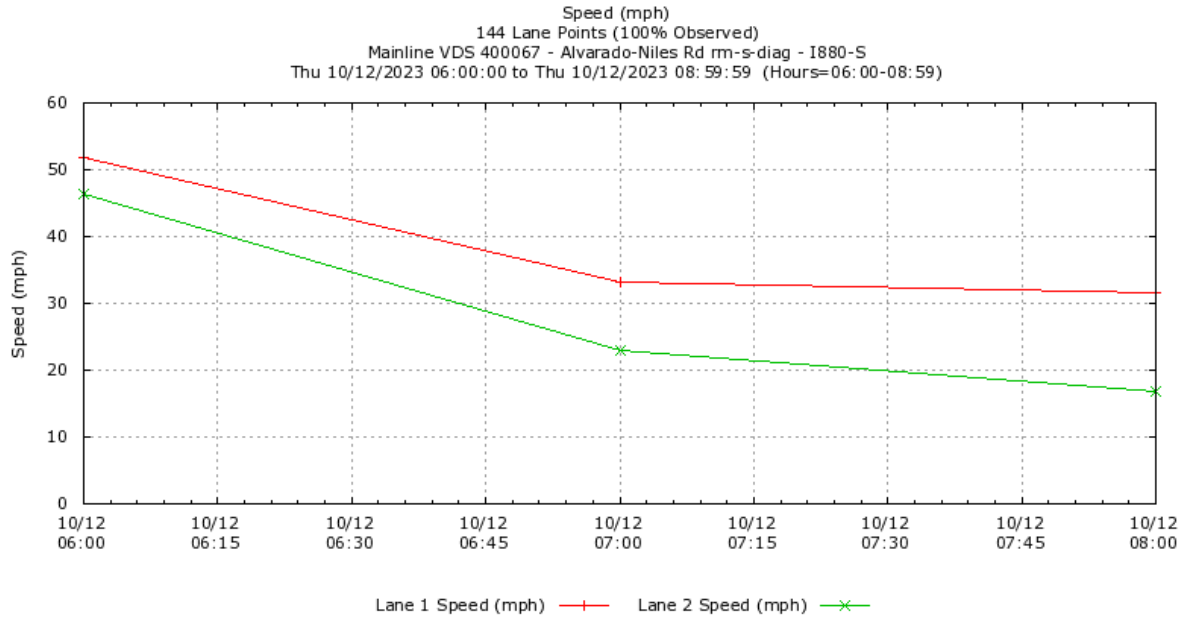


Table 4.12: SB I-880 AM EL and GP1 Flow and Speed at Winton Ave.

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Speed
10/9/23	0600	1295	61.7	1492	48.1
10/9/23	0700	1123	58.8	1431	44.6
10/9/23	0800	986	62.8	1352	50.6
10/10/23	0600	1462	45.7	1371	29.0
10/10/23	0700	1170	20.1	758	9.4
10/10/23	0800	1012	11.6	779	8.9
10/11/23	0600	1523	53.9	1481	32.4
10/11/23	0700	1329	27.0	1275	22.1
10/11/23	0800	1182	49.7	1288	26.8
10/12/23	0600	1477	54.7	1498	32.2
10/12/23	0700	1352	47.5	1354	28.7
10/12/23	0800	1199	55.6	1352	29.6
10/13/23	0600	1304	61.1	1496	43.6
10/13/23	0700	1116	57.8	1393	40.7
10/13/23	0800	956	62.9	1400	46.6

Table 4.13: SB I-880 AM EL and GP1 Flow and Speed at Jackson St.

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Speed
10/9/23	0600	1152	64.0	1445	56.0
10/9/23	0700	101	54.8	1346	48.1
10/9/23	0800	799	64.9	1332	56.3
10/10/23	0600	1417	35.2	1364	17.5
10/10/23	0700	962	9.8	1057	12.3
10/10/23	0800	912	8.4	967	8.8
10/11/23	0600	1392	41.9	1432	26.8
10/11/23	0700	1160	15.5	1202	13.0
10/11/23	0800	1018	25.5	1195	29.1
10/12/23	0600	1330	35.6	1411	27.0
10/12/23	0700	1169	17.7	1253	23.3
10/12/23	0800	1003	44.8	1148	35.1
10/13/23	0600	1197	65.7	1460	51.8
10/13/23	0700	1005	61.1	1335	52.4
10/13/23	0800	803	63.7	1340	55.6

Table 4.14: SB I-880 AM EL and GP1 Flow and Speed at Alvarado – Niles Rd.

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Speed
10/9/23	0600	1354	58.4	1483	45.2
10/9/23	0700	1476	42.1	1371	27.4
10/9/23	0800	769	51.2	935	30.1
10/10/23	0600	1564	50.7	1497	40.5
10/10/23	0700	1451	33.1	1043	21.6
10/10/23	0800	1430	31.9	1164	22.1
10/11/23	0600	1543	52.4	1544	43.4
10/11/23	0700	1539	30.9	1300	25.6
10/11/23	0800	1345	29.3	1008	19.4
10/12/23	0600	1181	51.9	1184	43.0

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Speed
10/12/23	0700	1104	33.2	912	23.3
10/12/23	0800	1000	31.6	715	20.4
10/13/23	0600	1402	59.2	1513	47.1
10/13/23	0700	1412	52.9	1430	41.9
10/13/23	0800	1030	30.4	1069	34.5

During the PM peak, southbound I-880 experiences intermittent congestion at various locations along most of the corridor, including the area of express lane degradation north of the Decoto Road interchange near the end of the southern buffer section. Friction between express lane and general purpose lane vehicles and entering the express lane south of the buffer results in degraded express lane operations at this location. The graph and table below shows express and general purpose lane speeds ad volumes at the Decoto interchange

Figure 4.39: SB I-880 PM "Spot Time" Plot at Decoto Rd.

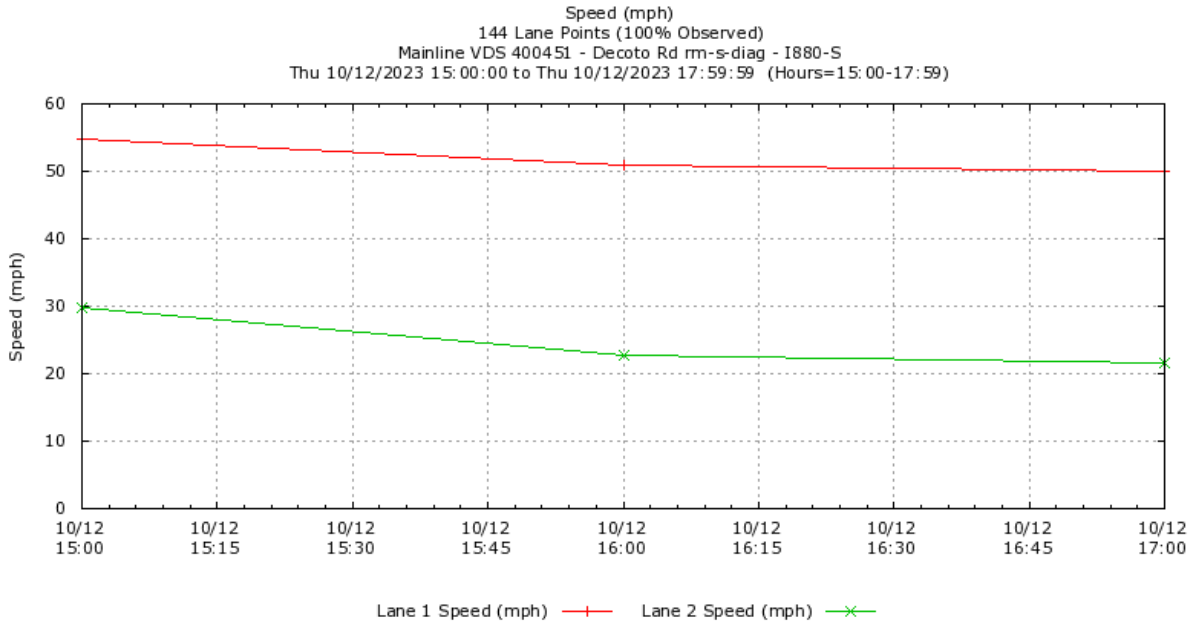


Table 4.15: SB I-880 AM EL and GP1 Flow and Speed at Decoto Rd.

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Speed
10/9/23	0600	1041	58.2	1410	30.9
10/9/23	0700	1134	57.1	1424	32.1
10/9/23	0800	912	60.8	1406	42.3
10/10/23	0600	1210	52.6	1227	17.5
10/10/23	0700	1266	46.8	1159	17.2
10/10/23	0800	1264	48.9	1197	16.5
10/11/23	0600	1045	64.3	1399	49.9
10/11/23	0700	1194	55.4	1306	25.6
10/11/23	0800	1164	51.9	1297	22.8
10/12/23	0600	1168	54.8	1386	26.8
10/12/23	0700	1344	50.9	1265	18.8
10/12/23	0800	1314	50.0	1240	18.2
10/13/23	0600	1267	37.2	1067	19.3
10/13/23	0700	1393	39.3	1251	17.7
10/13/23	0800	1377	46.9	1292	20.6

Figure 4.40: SB I-880 AM "Spot Time" Plot at Old Bayshore Highway I/C

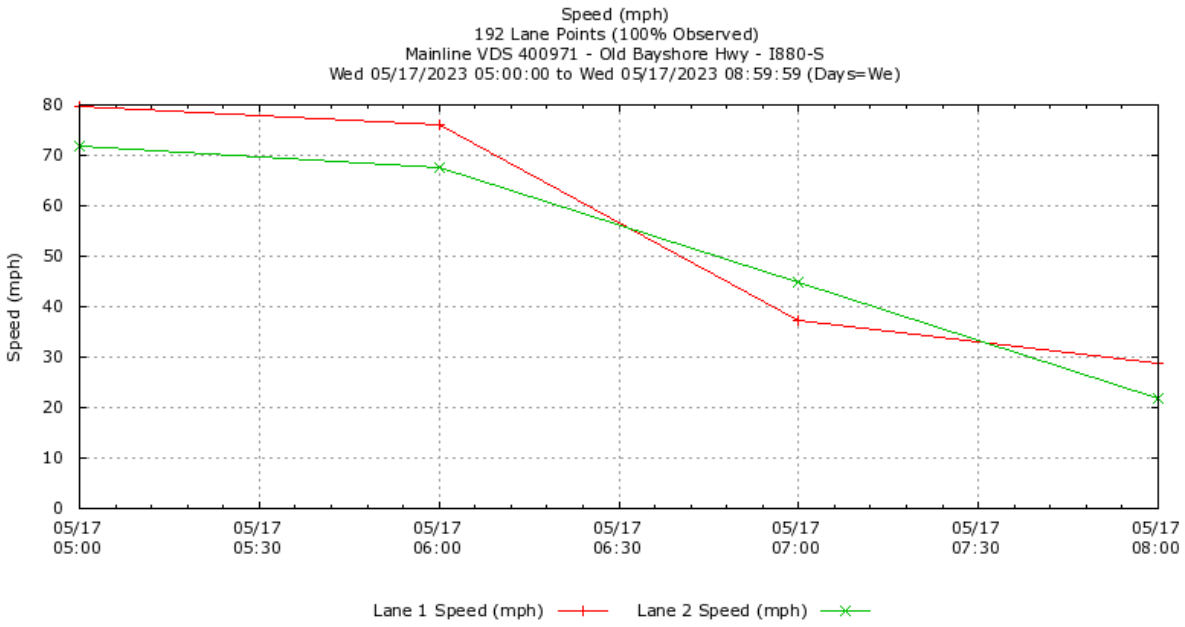


Table 4.16: SB I-880 PM EL and GP1 Flow and Speed at Old Bayshore Highway I/C.

Hour	HOV Lane Flow (Veh/Hour)	HOV Lane Speed (mph)	GP Lane Flow (Veh/Hour)	GP Lane Speed (mph)
05/15/2023 15:00	1574	30	1574	30
05/15/2023 16:00	1561	30	3440	29
05/15/2023 17:00	1525	27	3587	31
05/15/2023 18:00	1043	63	4009	54
05/16/2023 15:00	1742	45	3583	25
05/16/2023 16:00	1703	38	3548	24
05/16/2023 17:00	1649	47	3929	31
05/16/2023 18:00	1385	53	3915	41
05/17/2023 15:00	1834	40	3638	24
05/17/2023 16:00	1834	38	3713	25
05/17/2023 17:00	1694	37	3649	26
05/17/2023 18:00	1466	46	3937	38
05/18/2023 15:00	1639	49	3547	25
05/18/2023 16:00	1765	42	3612	23
05/18/2023 17:00	1327	21	3100	20
05/18/2023 18:00	1505	47	3707	36
05/19/2023 15:00	1726	43	3580	25
05/19/2023 16:00	1722	43	3678	26
05/19/2023 17:00	1650	46	3746	30
05/19/2023 18:00	1694	37	3649	26

I-880 Northbound Santa Clara County line to South of State Route 238

Several bottlenecks develop along northbound I-880 in Alameda County during the PM peak period, with primary controlling bottlenecks developing between the Auto Mall Parkway on-ramp and the Stevenson Boulevard off-ramp in the southern portion of the express lane corridor and between the Winton Avenue on-ramp and the A Street off-ramp in the northern portion. Queues approaching

the southerly bottleneck typically extend about 5.5 miles south through the Dixon Landing Road interchange in Santa Clara County. Express lane degradation within this freeway section occurs only intermittently in the buffered section at the Auto Mall Parkway I/C, generally due to friction between general purpose lane and express lane traffic. See the graph and table below comparing general purpose and express lane speeds and flows at Auto Mall Parkway.

Figure 4.41: NB I-880 PM "Spot Time" Plot at Auto Mall Pkwy.

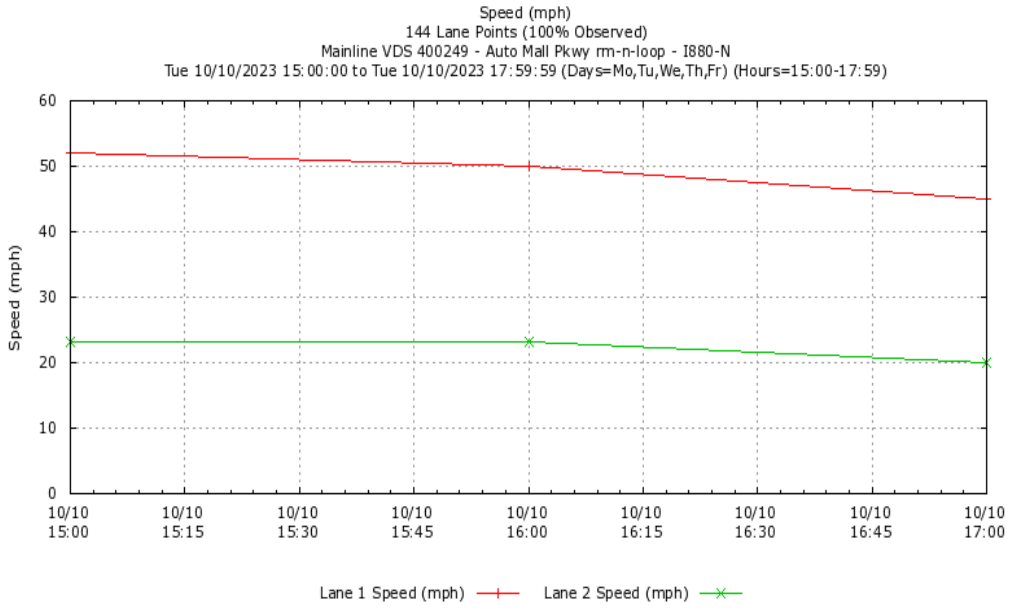


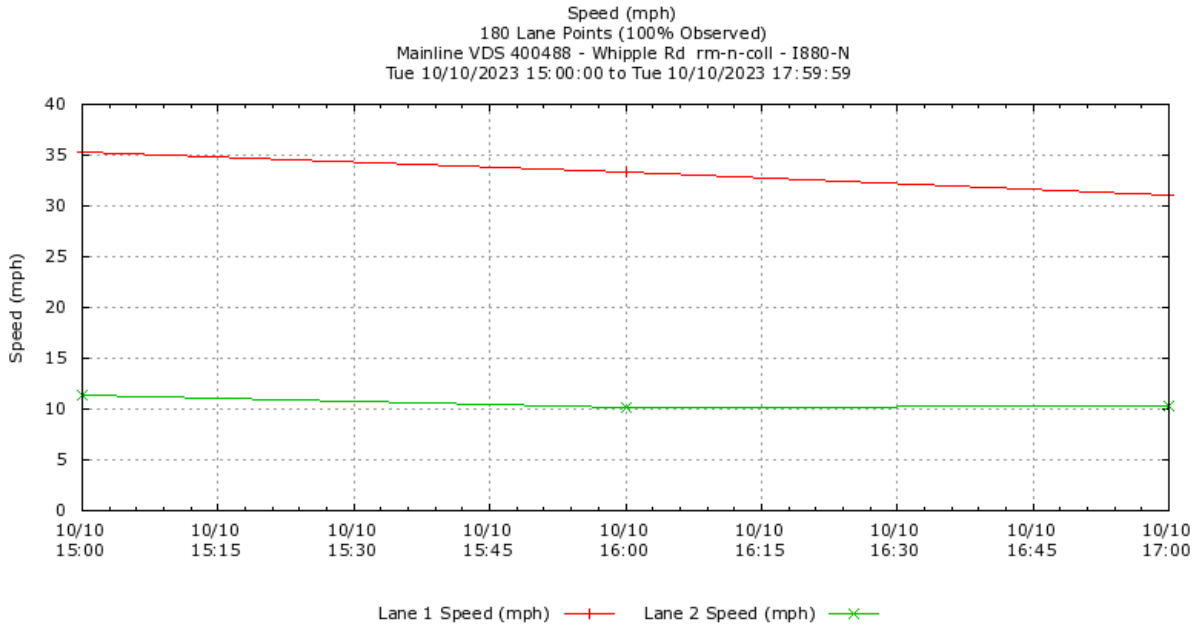
Table 4.17: SB I-880 PM EL and GP1 Flow and Speed at Auto Mall Pkwy.

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Lane Speed
10/9/23	1500	1239	49.1	1306	24.9
10/9/23	1600	1260	49.3	1272	22.9
10/9/23	1700	1146	51.3	1221	19.9
10/10/23	1500	1201	52.0	1315	25.0
10/10/23	1600	1318	49.9	1303	22.9
10/10/23	1700	1361	44.9	1295	21.4
10/11/23	1500	1137	55.3	1312	26.7
10/11/23	1600	1252	49.8	1315	24.5
10/11/23	1700	1319	47.3	1287	22.9
10/12/23	1500	1324	50.4	1323	24.8

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Lane Speed
10/12/23	1600	1339	47.2	1313	23.6
10/12/23	1700	1259	48.2	1320	23.9
10/13/23	1500	1210	52.9	1321	24.4
10/13/23	1600	1030	52.5	1340	30.3
10/13/23	1700	1158	50.5	1293	26.0

Queues approaching the northerly bottleneck typically extend upstream about 9 miles through the Thornton Avenue interchange. Friction between express lane and general purpose lane vehicles results in degraded express lane operations in the open access portions of the facility between the Thornton and Whipple Road interchanges. Additional express lane degradation develops near the end of the express lane south of State Route 238, where general purpose lane vehicles merge into the left freeway lane. See graphs below for a comparison of express lane and left general purpose lane speeds at the Whipple and SR-92 interchanges.

Figure 4.42: NB I-880 PM "Spot Time" Plots at Whipple Rd. & SR-92 I/Cs



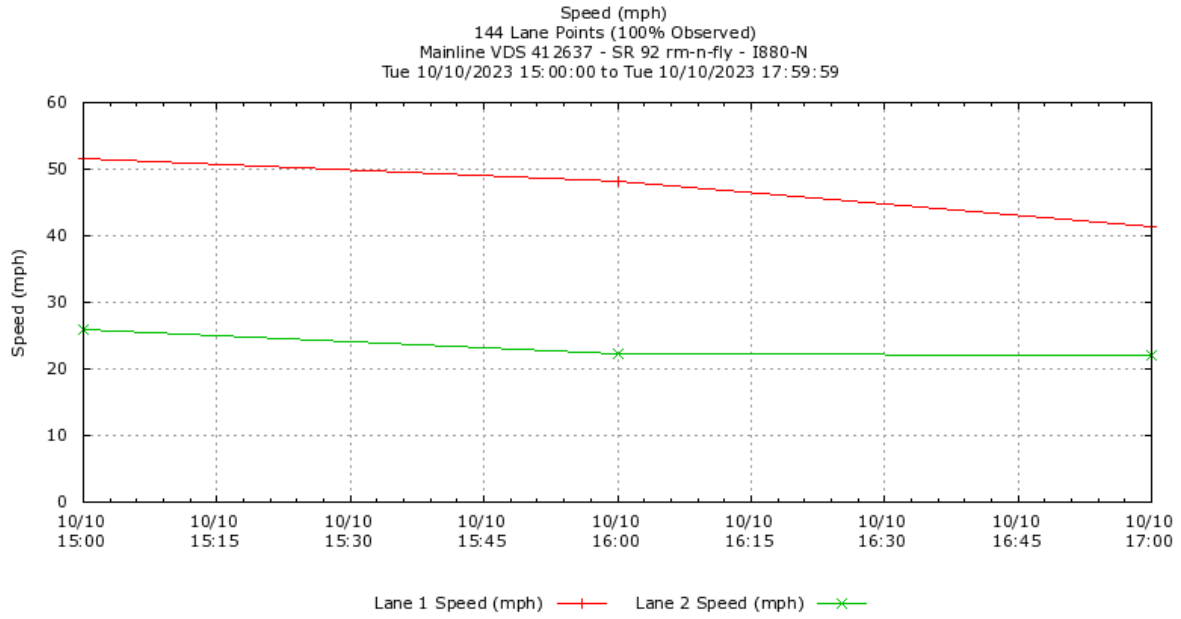


Table 4.18: NB I-880 PM EL and GP1 Flow and Speed at Whipple I/C

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Lane Speed
10/9/23	1500	1354	30.5	1799	11.0
10/9/23	1600	1296	33.6	1681	10.3
10/9/23	1700	1275	32.1	1674	9.7
10/10/23	1500	1346	35.3	1830	11.8
10/10/23	1600	1327	33.3	1685	10.2
10/10/23	1700	1306	31.1	1705	10.2
10/11/23	1500	1367	33.9	1706	10.3
10/11/23	1600	1298	34.9	1587	9.7
10/11/23	1700	1331	32.1	1724	10.4
10/12/23	1500	1352	33.6	1631	10.6
10/12/23	1600	1356	35.6	1687	10.7
10/12/23	1700	1312	28.3	1688	10.2
10/13/23	1500	1308	29.4	1605	9.8
10/13/23	1600	1320	28.4	1601	9.5
10/13/23	1700	1335	30.5	1711	10.4

Table 4.19: NB I-880 PM EL and GP1 Flow and Speed at SR-92 I/C

Date	Time	EL Flow	EL Speed	Avg GP Lane Flow	Avg GP Lane Speed
10/9/23	1500	1319	48.6	1288	21.2
10/9/23	1600	1334	45.3	1250	21.0
10/9/23	1700	1295	43.8	1218	20.2
10/10/23	1500	1289	51.7	1316	23.9
10/10/23	1600	1314	48.2	1261	20.9
10/10/23	1700	1354	41.3	1269	21.4
10/11/23	1500	1328	47.8	1239	21.4
10/11/23	1600	1310	46.5	1217	21.8
10/11/23	1700	1333	44.3	1227	21.1
10/12/23	1500	1397	43.5	1186	18.8
10/12/23	1600	1403	45.6	1268	22.6
10/12/23	1700	1373	40.8	1210	21.2
10/13/23	1500	1350	44.6	1221	20.5
10/13/23	1600	1352	42.0	1241	21.7
10/13/23	1700	1335	44.0	1237	21.5

B. Remediation Strategies

In the short term, it is recommended that Caltrans work with CHP to provide additional enforcement and discourage violators from using the lane and exacerbating the degradation of the facility. Additionally, the Caltrans District 4 should work with MTC/BAIFA to alter tolling rates to better manage demand for the facility. Longer term, the I-880/Winton Avenue and I-880/A Street Interchange Improvements project will provide an auxiliary lane between the Winton Avenue and A Street interchanges in both directions, reducing the congestion associated with the primary corridor bottleneck between the interchanges and further reducing friction between express and general purpose lane traffic.

3.3. DISTRICT 5 2025 DEGRADATION ACTION PLAN

3.3.1 ACTION PLAN FOR HOV FACILITIES ON U.S. ROUTE 101

A. Analysis:

Northbound and southbound U.S. Route 101 in Santa Barbara County were identified as having slightly degraded HOV facility between Linden Ave and Santa Monica Road in 2023. The analysis conducted by District 5 identified a common cause resulting in the slight and very degraded segments of the northbound U.S. Route 101 HOV Facility in Santa Barbara County in the Year 2023. The slight degradation attributed to the southbound U.S. Route 101 HOV Facility in Santa Barbara County in the Year 2023 was found to be due to a categorization error stemming from District 5's unique naming convention for count stations within the PeMS system.

The degradation of the NB U.S. Route 101 HOV Facility in 2023 was due to construction activities coupled with a three to two lane drop bottleneck which produced congestion and slow traffic conditions. Our analysis concluded that the average vehicle demand during the analysis period of 2,748 vehicles per hour during the AM peak hour commute period exceeded the capacity of the downstream three to two lane drop bottleneck and construction zone of 2,660 vehicles per hour (1,330 VPHPL) resulting in a 0.631-mile length of vehicle queue. To ensure that HOV lanes continue to offer a time-savings incentive to carpool, Caltrans has traditionally set 1,650 vehicles per hour as the maximum capacity of HOV lanes. Within the existing three lane facility, the U.S. Route 101 Northbound HOV Facility with the highest volumes was carrying an average of 870 vehicles per hour during the AM peak hour commute period which is under the established threshold of 1,650 vehicles per hour. It is suspected that the bottleneck caused by ongoing construction activities discourages commuters whose destination is north of the construction area from carpooling and thus leaves the existing northbound HOV lane underutilized.

The degradation of the SB U.S. Route 101 HOV Facility in 2023 was found to be due to the naming convention that District 5 decided upon for count stations within PeMS. This naming convention specifies the direction of travel that the count station records in the name of the count station instead of the direction field that is able to be queried within PeMS. This resulted in count stations that gather data for the northbound direction being categorized as gathering data for the southbound direction and vice versa. Table 5.1 below shows the PeMS count stations that were categorized as gathering data for the northbound direction but actually gather data for the southbound direction. The text "MLNB" in the

count station name signifies that the count station gathers data for the northbound direction of the mainline. Table 5.2 below shows the PeMS count stations that were categorized as gathering data for the southbound direction but actually gather data for the northbound direction. The text "MLSB" in the count station name signifies that the count station gathers data for the southbound direction of the mainline. When the count stations are sorted by their correct direction, it is found that the southbound U.S. Route 101 HOV Facility did not experience degradation in 2023.

Table 5.1. Northbound Count Stations Categorized as Southbound

Station #	County	Postmile	Name
501010032	Santa Barbara	2.486	CASSITAS PASS RD 101 SB VDS MLNB
501010043	Santa Barbara	3.057	LINDEN AVE 101 SB VDS MLNB NB

Table 5.2. Southbound Count Station Categorized as Northbound

Station #	County	Postmile	Name
501010052	Santa Barbara	3.633	REYNOLDS AVE 101 SB VDS MLSB

B. Remediation Strategies

In 2022, District 5 had active construction work for Phase 4C (05-0N703) which built an additional 4.6 bi-directional lane-miles of HOV lanes on U.S. Route 101 in Santa Barbara County between Padaro Lane (PM R7.3) and Posilipo Lane (PM 9.6). Of the 4.6 additional lane-miles, 2.3 lane-miles were added in the northbound direction of travel. Due to funding issues, Phase 4C went to construction before Phase 4B. This means that although Phase C completed construction work in 2022, the HOV lane will be intermittent until construction work for Phase 4B is completed in December of 2024. It should also be noted that District 5 currently has two additional phases (4D & 4E) encompassing 6.6 additional HOV lane-miles (3.3 NB & 3.3 SB) in the late stages of Plans, Specifications, and Estimates (PS&E) within this U.S. Route 101 corridor. The anticipated completion date of these additional 6.6 bi-directional lane-miles of HOV lanes is slated for April 2032, so the full usage of the HOV lane will not materialize until after construction work for Phases 4D and 4E are completed.

Future HOV degradation analysis and action plans will account for how the naming convention used by District 5 for count stations within the PeMS system can lead to count stations being attributed to the opposite travel direction and correct the station data accordingly.

3.4. DISTRICT 7 2025 DEGRADATION ACTION PLAN

3.4.1 DISTRICT-WIDE APPROACH TO HOV/HOT LANE DEGRADATION

The Los Angeles and Ventura County region has experienced a rapid expansion of public transportation systems in preparation for the Los Angeles 2028 Olympics. Significant improvements have been made to The Los Angeles County Metropolitan Transportation Authority's (LA Metro or Metro) rail and bus services, including the introduction of new light rail lines and the enhancement of bus rapid transit (BRT) routes. These developments aim to create a more efficient and accessible transit network, reducing reliance on personal vehicles and alleviating congestion on managed lanes. By diverting a substantial number of commuters to public transit and thereby easing the demand on freeways, the average traffic speed in high-occupancy vehicle (HOV) and high-occupancy toll (HOT) lanes is expected to improve, addressing the issue of degradation as defined by federal standards. This strategic expansion of public transportation is anticipated to transform the regional transportation landscape, promoting sustainable mobility and improving overall traffic flow.

District 7's HOV/HOT lane operations remain substantially affected by recurring issues previously identified in degradation action plans. The following are some of the commonly cited causes:

- High occupancy violation rates were observed on HOV lanes district-wide in 2023. Average occupancy violation rates in District 7's HOV lanes have doubled since 2022 (2022: 14.9 percent, 2023: 33 percent). The highest violations observed were listed as follows: 43.5% on Route 5, 48.6 % on Route 10, 43.3% on Route 14, 40.4% on Route 57, 32.7% on Route 60, 38.7% on Route 91, 57.5% on Route 101, 37.5% on Route 105, 35.9% on Route 118, 28.5% on Route134, 35.9% on Route 210, 42.4% on Route 405, and 44.4% on Route 605.
- Single occupant vehicles (SOV) utilize the Clean Air Vehicle (CAV) Decal program. The CAV decal rate (CAV volume/total HOV volume) in HOV lanes accounts for approximately 10 percent of traffic volume during peak hours.
- Recurrent congestion on general-purpose (GP) lanes at geometrically constrained locations, particularly at freeway interchanges, generates "friction" between GP and HOV lanes, which is a primary factor contributing to the degradation of HOV lane performance.
- District-wide issues with data coverage and quality are prevalent. District 7's PeMS data indicates that only 26% of the detection sensors were "healthy" overall in 2023. The Degradation and Action Plan Reports rely exclusively on PeMS data, which may not accurately reflect the extent of degradation.

However, the latest PeMS detection health in District 7 has improved to around 50 to 60%. The newly formed Office of Transportation Management Systems in District 7 is tasked with bringing the detection health to 90%. Caltrans is currently updating the PeMS system.

- Degradation increased after the I-10 and I-110 HOV lanes were converted to ExpressLanes. Approximately 75 to 86 percent of vehicles in the I-10 and I-110 ExpressLanes are single-occupant vehicles. The person throughput number, 5957 passengers per lane per hour in 2011 (before conversion), went down to 2949 in 2018, 1,885 in 2022, and 1964 in 2023. Approximately 30 to 60 percent of users (occupancy violators) are not setting the transponder correctly, to the correct number of people in the vehicle. Pursuant to California Senate Bill 1298 (SB 1298) approved on September 21, 2014, LA Metro has the authority to operate ExpressLanes on the I-10 (Alameda Street to Route 605) and I-110 (Adams Boulevard to Harbor Gateway Transit Center). The I-110 ExpressLane is not included in the 2023 degradation report due to the lack of data from detection sensors.

3.4.2 ACTION PLAN FOR HOV FACILITIES ON ROUTE 5

Project Updates

Route 5 did not appear as a degraded facility in the 2023 degradation report due to insufficient data for analysis. However, as the HOV facility on Route 5 experienced degradation in 2022, this report includes project updates for Route 5.

- The East San Fernando Valley Transit Corridor Project (ESFV, Los Angeles Metro) consists of a Light Rail Transit (LRT) system that will travel north of the Van Nuys Orange Line Station to the Sylmar/San Fernando Metrolink Station, a total of 9.2 miles and will operate in the median of Van Nuys Boulevard for 6.7 miles to San Fernando Road. Construction began in 2022 and is expected to be completed in time for the 2028 Summer Olympic and Paralympic Games. $1.3 billion has been identified for the project, most coming from local Measures M and R, as well as State gas tax funds. This project is expected to reduce traffic demand on Routes 5 and 405, especially relieving congestion on Route 5 between Van Nuys Blvd and Polk St (approx. PM 154-157, Fig. 3, 4). All post miles in this report from District 7 are presented as absolute post miles.
- Project 07-2332E will extend the HOV and truck lanes between Antelope Valley Freeway (Route 14) and Parker Rd. on Route 5, which will ease traffic delays and absorb traffic growth due to increased population and

surrounding communities – both residential and commercial. This project is expected to reduce the congestion on the northbound HOV lane during PM peak hours. Construction began in 2021, and completion is expected in February 2026. The estimated construction cost is $527 million.

- Project 07-35030 will upgrade the existing Changeable Message Signs (CMS) to the new full-color LED CMS to provide clearer real-time traffic information on State's highways. This project will also upgrade aging Traffic Census Stations (TCS) and Vehicle Detection Stations (VDS) systems. It aims to improve travel reliability, reduce congestion impacts, minimize the duration and effects of non-recurring congestion, and enhance the overall operational efficiency of the state highway system. The performance measures for this project include 240 Field Elements, comprising 159 TCS, 75 CMS, and 6 VDS. Construction is expected to begin in 2025, with completion anticipated by May 2027.
- Metrolink developed the Southern California Optimized Rail Expansion (SCORE) plan in partnership with freight and intercity rail operators as a roadmap to increased rail service to accommodate expected population and job growth in advance of 2028 when Los Angeles will host the Olympics. SCORE will fund the Antelope Valley Line (AVL) Capacity and Service improvements. This project aims to improve service frequency and reliability along the 76.6-mile-long AVL commuter rail corridor between Lancaster and downtown Los Angeles and is expected to reduce traffic demand on Routes 5 and 14. SCORE projects will be completed starting in 2023, with the program complete by 2028.
- California High-Speed Rail service between Bakersfield to Los Angeles Union Station is expected to be completed before the 2028 Olympics. In April 2020, the California High-Speed Rail Authority (Authority) Board of Directors approved a preliminary funding plan with Los Angeles County Metropolitan Transportation Authority (LA Metro) to move the Link Union Station project External Link (Link US) forward in Southern California. The funding plan details the release of $423 million in Prop 1A funds for the first phase of the Link US project featuring "run through" tracks crossing over the US-101 freeway. The HSR would provide benefits to the regional transportation system by reducing the number of vehicles operating on the regional roadway network through the diversion of intercity road trips to HSR. In 2040, implementation of the HSR would result in a net reduction in vehicle miles traveled ranging from about 931 million to 1.28 billion (an approximately 1.1 percent to 1.5 percent reduction) for the medium and high ridership scenarios, respectively, compared to the No Project Alternative. This is a net benefit to transportation

and traffic operations because a reduction in vehicle miles traveled helps maintain or potentially improve the operating conditions of regional roadways. This reduction in future vehicle trips would improve the level-of-service (LOS) (i.e. operating quality) of the regional roadway system.

- District 7 shared vehicle occupancy counts and violation data with the CHP, so they can prioritize their enforcement efforts

3.4.3 ACTION PLAN FOR EXPRESSLANE/HOV FACILITIES ON ROUTE 10

HOV facilities on Route 10 are split into two segments: Alameda Street to Route 605 as ExpressLane facilities and Route 605 to San Bernardino County Line as HOV facilities. These action plans cover the entire route.

A. Analysis

Alameda Street to Route 605 (ExpressLane)

- On eastbound during the PM peak period, recurrent congestion, between Rosemead Blvd. and Durfee Ave. (Abs PM 25.4-29.2), near interchange 605 (Fig. 1), in all lanes reduces eastbound ExpressLane performance. The Express lanes are degraded ranging from slight to extreme.
- On westbound during the AM peak period, ExpressLanes are very degraded at Durfee Rd (PM 29.2) near interchange 605 and are slightly degraded between Hellman and Eastern (PM 20.8-19.3) due to lane drop (from two lanes to one lane).
- The existing HOV lane in each direction was converted to two HOT lanes in each direction by LA Metro on February 23, 2013. Vehicle volume has increased because of the addition of toll-paying vehicles and an increase in violation rates. LA Metro's Pricing Algorithm cannot control demand, even under "HOV Only" mode due to high occupancy violations. The occupancy violation rate with the self-declaring FasTrak flex transponder has increased over time, as SOVs set the transponder to HOV to avoid paying tolls. Approximately 30 to 60 percent of users are not setting the transponder correctly. D7 annual manual counts in 2023 show over 86 percent of vehicles in the HOT lane are SOVs and only 9 percent carpool during the peak hour.

Figures 7.1 and 7.2 provide plots of eastbound ExpressLane and GP lane speeds during the fourth quarter of 2023. Figures 7.3 and 7.4 provide plots of westbound ExpressLane and GP lane speeds during the same quarter.

Figure 7.1. Average Express Lane Speed – Eastbound Route 10 (Alameda St to Route 605), Q4 2023

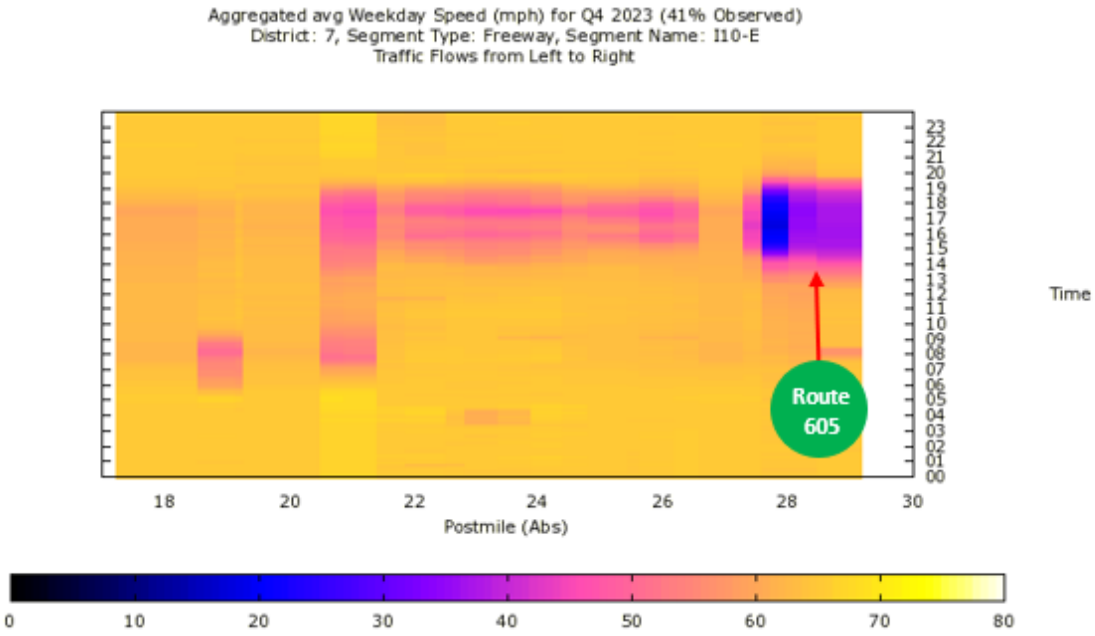


Figure 7.2. Average GP Lane Speed – Eastbound Route 10 (Alameda St to Route 605), Q4 2023

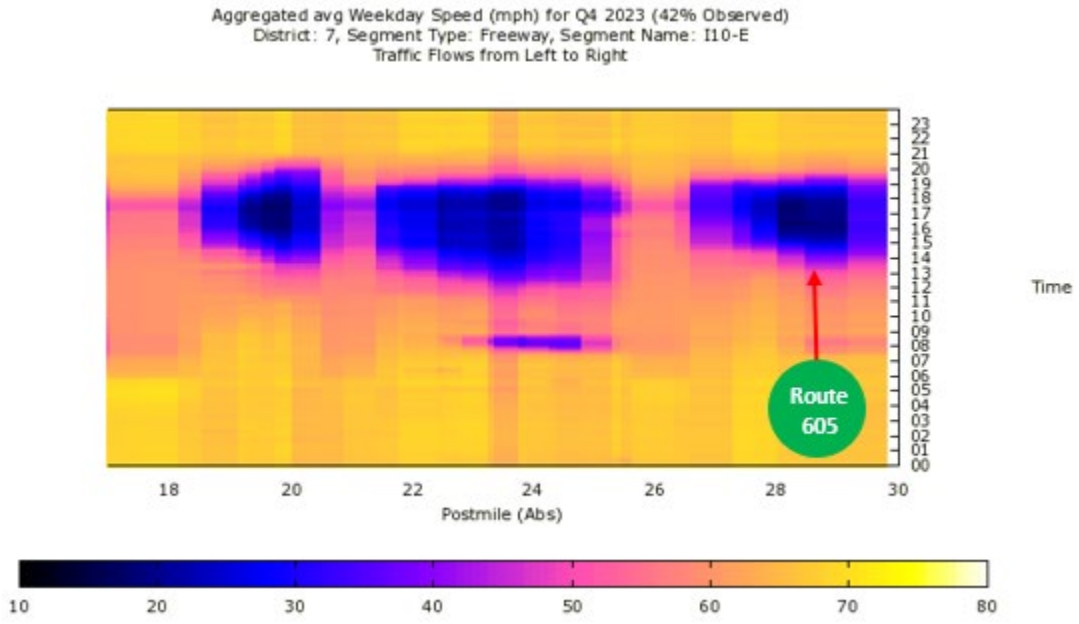


Figure 7.3. Average ExpressLane Speed – Westbound Route 10 (Route 605 to Alameda St.), Q4 2023

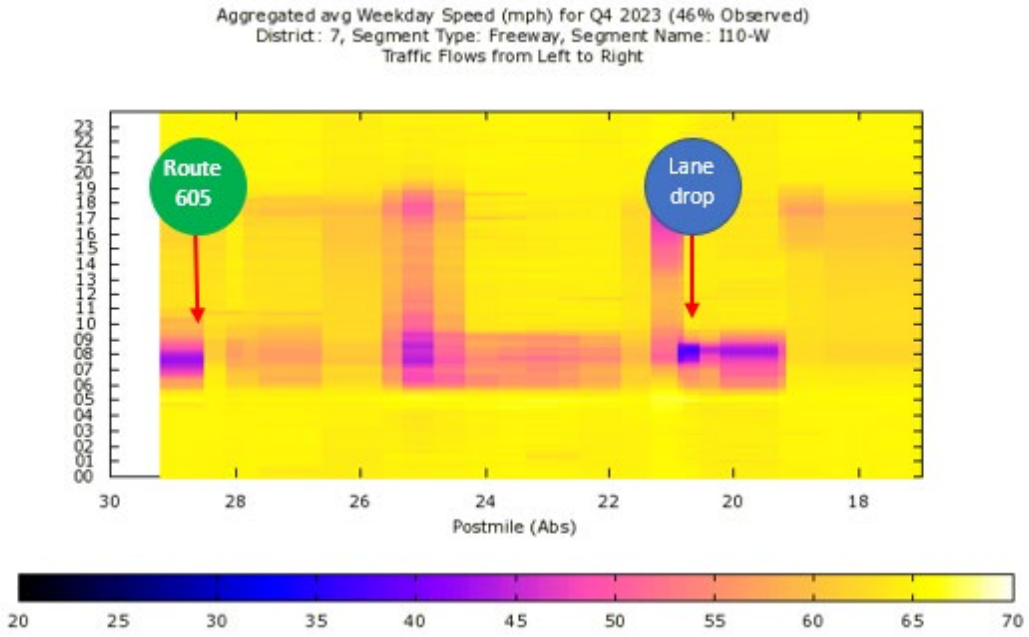
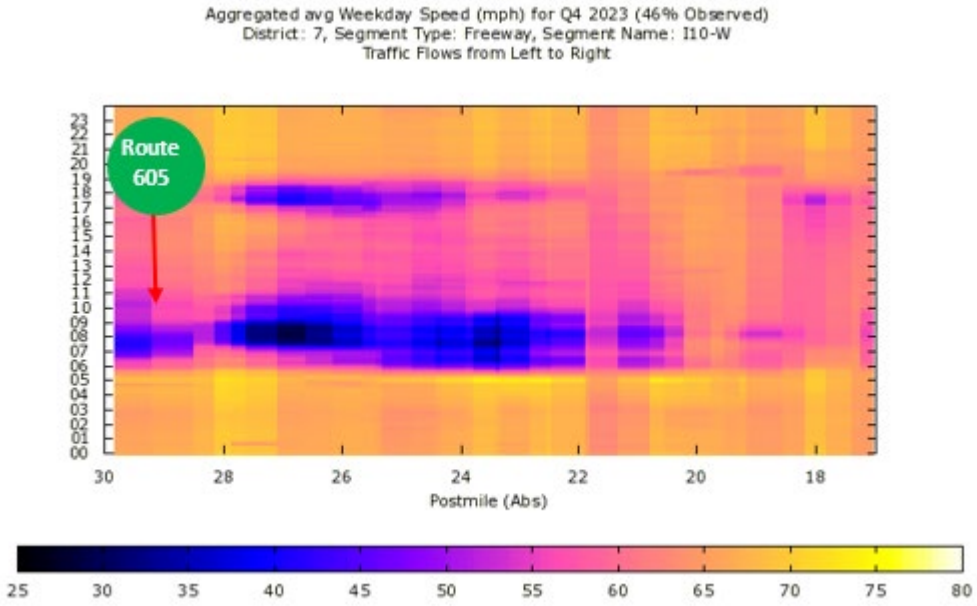


Figure 7.4. Average GP Lane Speed – Westbound Route 10 (Route 605 to Alameda St.), Q4 2023



San Gabriel River Fwy (Rte 605) to San Bernardino County Line

- On eastbound, peak period recurrent extreme congestion in all lanes reduces eastbound HOV lane performance between I-605 to Baldwin Park Blvd (PM

31) due to the weaving from I-10 to I-605, and between Fairplex Dr. to N. San Antonio Ave (PM 42.3-45.7) due to the construction of widening ExpressLanes (EA 08-0C2514) from Pomona to Ontario in District 8.

- On westbound, during morning and afternoon peak periods HOV lane is slightly degraded at Baldwin Park Blvd due to vehicles weaving in/out at the end of ExpressLane.
- Extremely high violation rates during peak 1-hour periods are observed on Route 10 HOV lanes during field counts. The violation rate is 48.6% at Barranca St. (PM 36.5).
- District 7 conducted manual counts showing that the CAV decal rate is up to 6.6 percent during peak hours.
- High truck traffic volumes (6.5 to 7.8 percent) reduce the capacity of the freeway, especially along the right two lanes; other vehicles tend to maneuver into the leftmost lanes, increasing weaving and the friction factor with the HOV lanes.

Figures 7.5 and 7.6 provide plots of eastbound HOV and GP lane speeds during the fourth quarter of 2023. Figures 7.7 and 7.8 provide plots of westbound HOV and GP lane speeds during the same time.

Figure 7.5. Average HOV Lane Speed – Eastbound Route 10 (Route 605 to San Bernardino County Line), Q4 2023

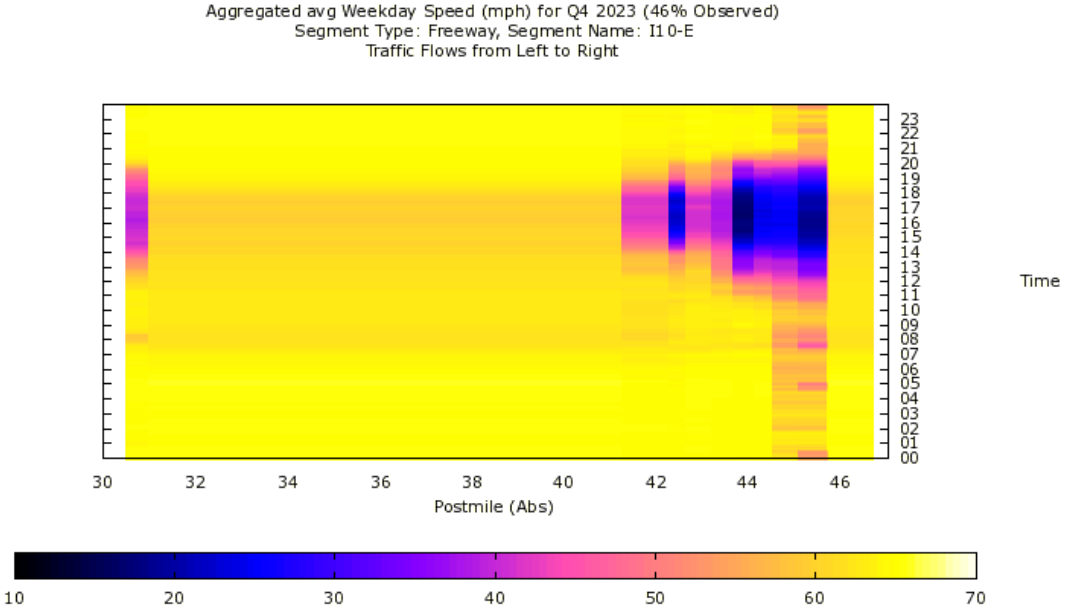


Figure 7.6. Average GP Lane Speed – Eastbound Route 10 (Route 605 to San Bernardino County Line), Q4 2023

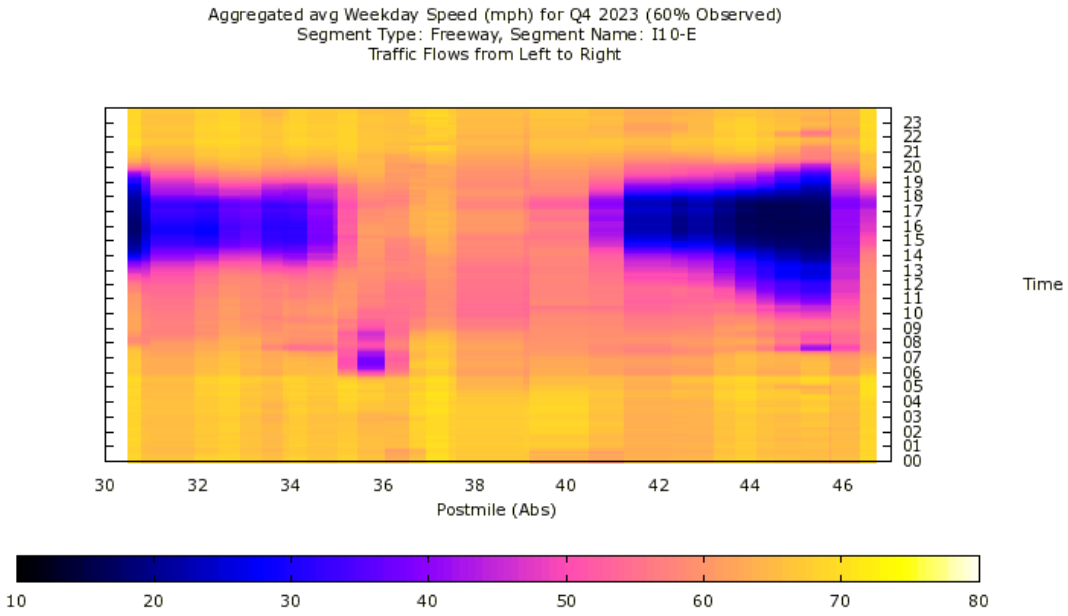


Figure 7.7. Average HOV Lane Speed – Westbound Route 10 (San Bernardino County Line to Route 605), Q4 2023

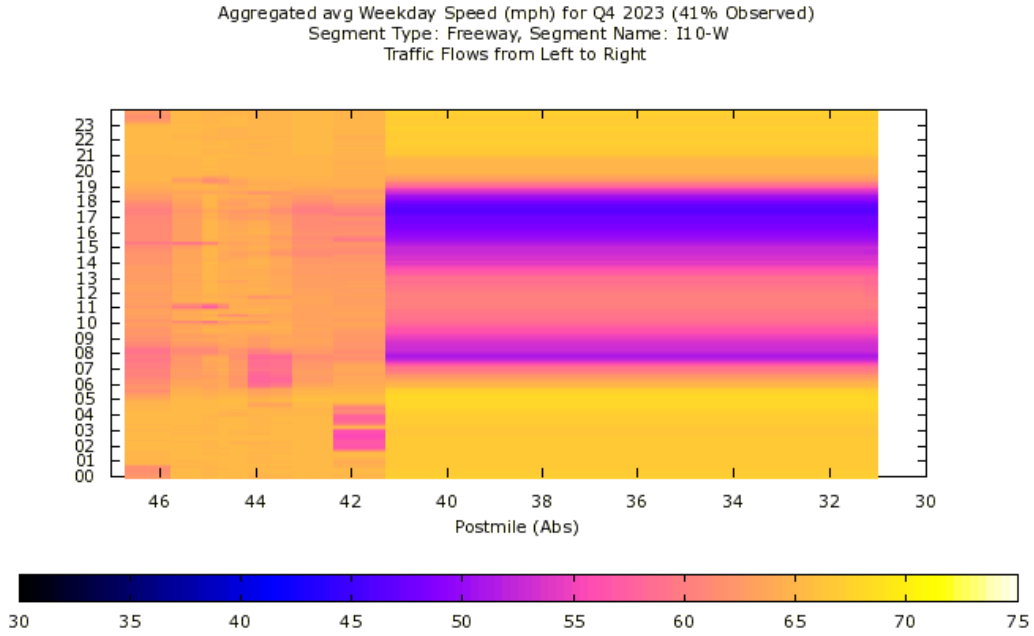
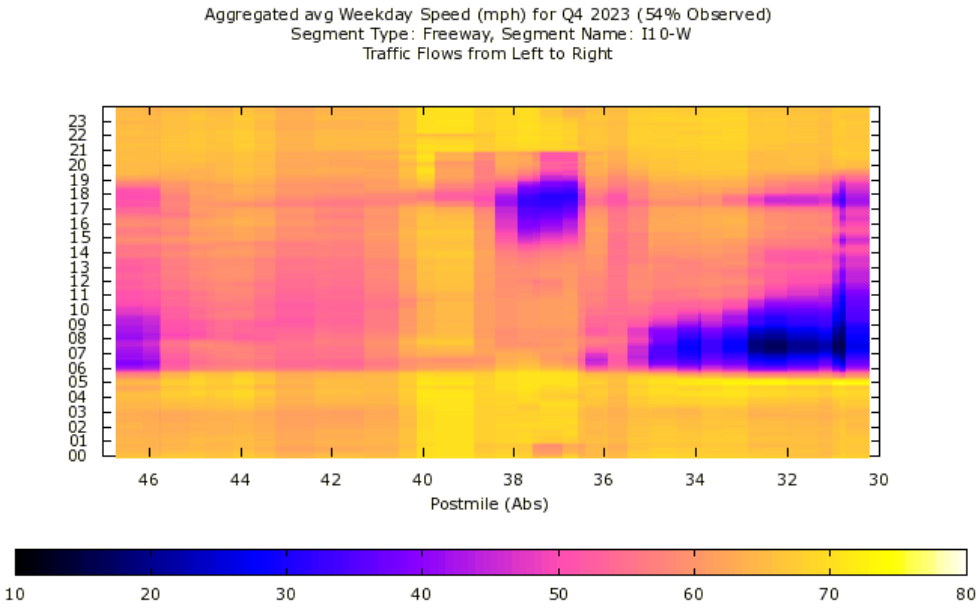


Figure 7.8. Average GP Lane Speed – Westbound Route 10 (San Bernardino County Line to Route 605), Q4 2023



B. Remediation Strategies

Alameda Street to Route 605 (ExpressLane)(Pepared by Metro)

Project updates for ExpressLane below are provided by Metro.

- The "Pay As You Go" program was made permanent in June 2023. This program is designed to lower the costs of using the ExpressLanes for non-accountholders. Industry experience has shown that offering drivers additional legal avenues to access managed lanes can have the effect of reducing violations, which subsequently enhances the ability of the toll system to manage congestion. The Pay-As-You-Go program makes it easier for people to pay to use the ExpressLanes, which reduces the amount of toll evasion (i.e., non-payment) that Metro experiences.
- Caltrans has recently completed its ExpressLanes Corridor Incident Management project using funding provided by Metro ExpressLanes. This project is designed to integrate ExpressLanes traffic and CCTV data into the Caltrans TMC for enhanced incident management to reduce non-recurrent delay.
- Metro is preparing to deploy a camera-based roadside Occupancy Detection System on I-10 and I-110 to deter occupancy mis-representation—a leading cause of toll evasion violations on the corridor and contributor to increased congestion in the managed lanes on the corridor. Metro

anticipates this system to be operational prior to the end of the financial year (June 2025).

- Metro continues to implement additional toll rate increases as warranted based on trends in traffic demand on the corridor, to facilitate ongoing effective management of congestion as demand continues to rise.
- Metro and Caltrans anticipate increased price sensitivity and enhanced ability of the toll system to manage congestion on the corridor after the clean air vehicle decal program ends statewide in September 2025.
- Consistent with actions previously identified in earlier degradation action plans for this corridor, Metro is exploring options for increasing the minimum occupancy requirements for toll-free travel to more effectively manage demand on the corridor through congestion pricing. Metro is in the process of renewing its Toll Policy for ExpressLanes which identifies operational characteristics of the lanes. Areas under consideration for change are primarily two-fold: 1) Increasing the occupancy for free travel from HOV2+ to HOV3+, and 2) eliminating the clean air vehicle discount. The Toll Policy will be reviewed by Caltrans District 7 before the end of 2024, and will be presented to the Metro Board for adoption in the first quarter of 2025.
- At the recommendation of California Highway Patrol, Metro and Caltrans are coordinating to install channelizers in the buffer between the managed lanes and the general-purpose lanes, to improve safety and reduce delays associated with traffic incidents caused by unsafe maneuvers. Funding for this has been identified and design is underway with installation expected to be completed within 12-months. Caltrans District 7 has requested a short-term field test of the proposed channelizers in a small-scale installation area before Metro pursues a broader installation corridor-wide. The short-term field test is targeted for completion by the end of 2024. Pending a successful test, full installation across the corridor is targeted for completion by the end of 2025.
- Metro consistently allocates significant funding to targeted enforcement services provided by the CHP on the ExpressLanes corridors. The aim is to mitigate instances of occupancy misrepresentation, illegal buffer crossings, and other driver behaviors that exacerbate congestion.
- Metro continues to invest in advanced transponder switch setting indicators at each toll collection point on the corridor, to facilitate CHP enforcement by displaying the real-time occupancy switch setting of each vehicle's transponder on an easy-to-read double-sided overhead numeric display. CHP partners indicated that these numeric displays are easier for them to use than the traditional flashing beacons that Metro and other agencies have

historically used.

- In October 2023, Metro committed more than $120 million to corridor improvements from net toll revenues to provide active transportation, transit, and arterial improvements along the corridors. This also included transit subsidies, and funding to Caltrans for projects that did not otherwise have full funding. These strategies help encourage mode shift away from private auto travel on the freeway, by making other alternatives like transit and active transportation more attractive.
- Metro is extending the existing Gold Line service to Claremont, which is expected to alleviate congestion on this stretch of I-10.

Route 605 to San Bernardino County Line

- District 8's project (EA 08-0C2514) involves widening the ExpressLanes in each direction on Route 10, from Pomona to Ontario in San Bernardino County, spanning from the LA/SBD county line to 0.2 miles west of Cherry Ave, and in LA County from 0.4 miles west of White Ave to the LA/SBD county line. Construction began in March 2020 and the lanes opened on August 29, 2024. Speed in the eastbound HOV lane (Figs. 9 and 10) will be improved between Fairplex Dr. and College Ave (PM 42.2-46.7).
- The HOV facility between Route 605 and the San Bernardino County Line will be converted to HOT lanes by December 2026 (EA 354310). If properly enforced for occupancy and toll violations, the new HOT lanes should operate at free-flow conditions using the pricing algorithm.
- The Alameda Corridor-East (ACE) Project founded by The San Gabriel Valley Council of Governments (SGVCOG) will mitigate the impacts of significant increases in freight rail traffic on over 70 miles of mainline railroad in the San Gabriel Valley. The ACE Project consists of a comprehensive program of safety improvements and mobility upgrades at an estimated cost of $1.9 billion. It is anticipated to be completed by the summer of 2025. The project will mitigate the impacts of growth in trade transported by train along the Alameda Corridor-East Trade Corridor transcontinental rail network in Southern California, which carries about 16% of all oceangoing containers in the United States. This project will also relieve truck traffic from Long Beach and San Pedro to the Inland Empire region, thereby reducing truck traffic and congestion on the GP lanes; hence, reducing HOV lane degradation due to friction factors by GP lanes. For more details on the updates of construction completion, please visit the website at https://www.theaceproject.org/.
- District 7 shared vehicle occupancy counts and violation data with the

California Highway Patrol (CHP), so they can prioritize their enforcement efforts.

- Brightline West High-speed Rail project between Las Vegas and southern California plans to break ground by the end of 2023. That would set the rail line up to be operational at the beginning of 2027. The diversion of people from auto and air travel to Brightline West's high-speed rail system reduces vehicle miles traveled by more than 700 million each year and the equivalent of 16,000 short haul flights annually.

3.4.4 ACTION PLAN FOR HOV FACILITIES ON ROUTE 14

A. Analysis

- Afternoon peak period recurrent congestion in the GP lanes reduces HOV lane performance northbound from Newhall Ave. (PM 2.1) to Soledad Canyon Rd. (PM11.2) (Fig. 9, and 10). Demand exceeds capacity when GP lanes drop, causing friction between HOV and GP lanes. During the 1-hour peak hour, volumes on the two GP lanes and one HOV lane are 3,100 and 1,821 vehicles/hour, respectively. The HOV lane is extremely degraded at the two locations.
- Vehicle volumes from I-5 northbound merge to northbound Route 14 in the PM and Lane drops in the GP lanes (from 5 to 3) at Newhall Avenue create a bottleneck in the northbound direction.
- Lane drops in the GP lanes (from 3 to 2) at Sand Canyon Rd create a bottleneck in the northbound direction.
- Morning peak period recurrent congestion in the southbound GP lanes reduces HOV lane performance between Agua Dulce Canyon Rd and Placerita Canyon Rd (PM 14.8-3.2). The HOV lane is extremely degraded between Via Princessa (PM 6.3) and Placerita Canyon Rd. The degradation is due to the close proximity of two on-ramps (Non-metered on-ramps, 405 feet apart) around Via Princessa, which add two auxiliary lanes approximately 3,800 feet long, and a sudden lane drop from five GP lanes to three at Golden Valley Rd. Demand exceeds capacity when GP lanes drop, causing friction between HOV and GP lanes (Fig. 11 and 12). During the 1-hour peak hour, volumes on the GP lanes and one HOV lane are up to 3,680 and 1,896 vehicles/hour, respectively.
- In 2019, the HOV lane buffer striping was replaced with continuous access striping for approximately 29 miles beginning 1.2 miles north of Via Princessa to Palmdale Blvd/Avenue P-8 (Technology Dr) (PM 7.3-35.9). This change increased solo violators using the continuous access portion of the HOV lane.

The violation rate was 5.6 percent in 2018. After converting, it went to 8.6 percent in 2019, 8.8 percent in 2021, and 9.1 percent in 2022.

- Non-metered on-ramps allow platoons of vehicles to enter the freeway. When the opportunity occurs (local projects and/or dedicated funding), ramp metering equipment is installed.
- Route 14 merging to the southbound Route 5 HOV lane causes delays in the southbound direction during morning peak traffic hours.
- District 7 conducted manual counts showing that the CAV decal rate is up to 3.2 percent during peak hours; the solo violation rate is up to 13.6 percent; the truck rate is up to 6.1 percent.

Figures 7.9 and 7.10 provide plots of Northbound HOV and GP lane speeds during the fourth quarter of 2023. Figures 7.11 and 7.12 provide plots of southbound HOV and GP lane speeds during the same time.

Figure 7.9. Average HOV Lane Speed – Northbound Route 14, Q4 2023

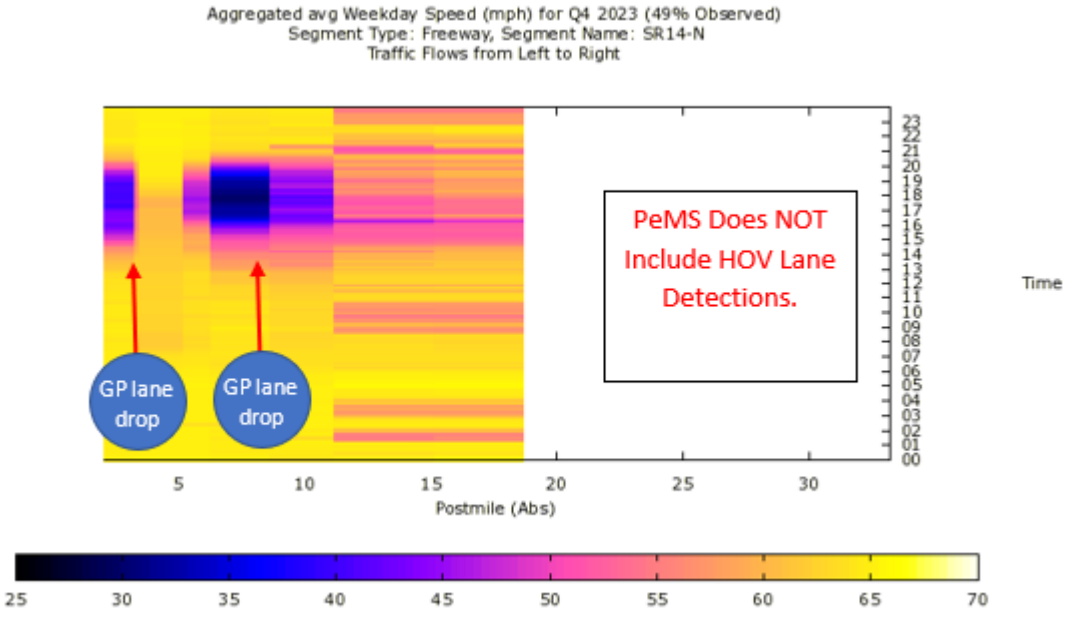


Figure 7.10. Average GP Lane Speed – Northbound Route 14, Q4 2023

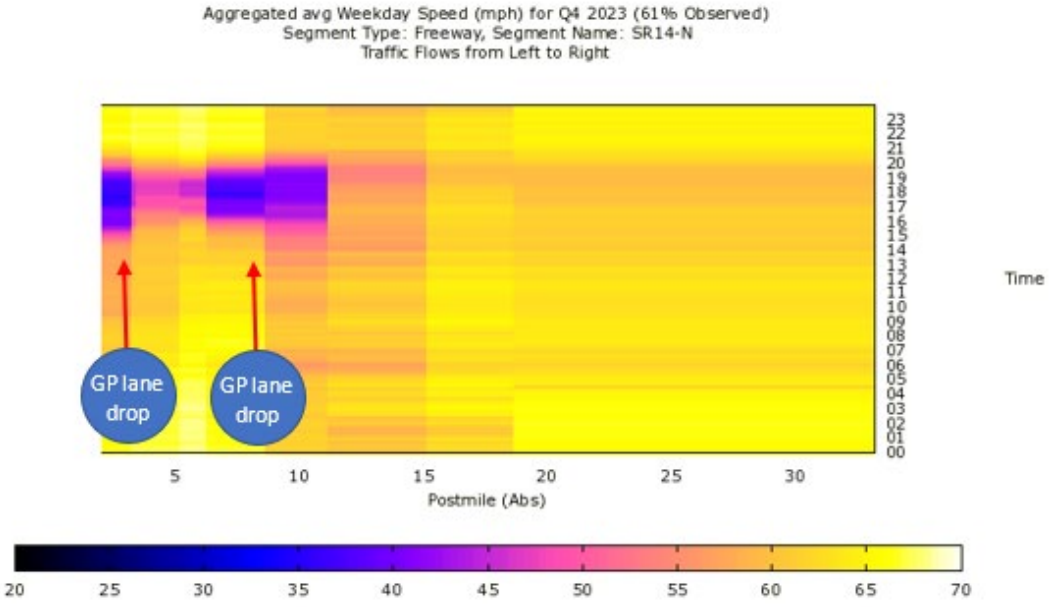


Figure 7.11. Average HOV Lane Speed – Southbound Route 14, Q3 2023

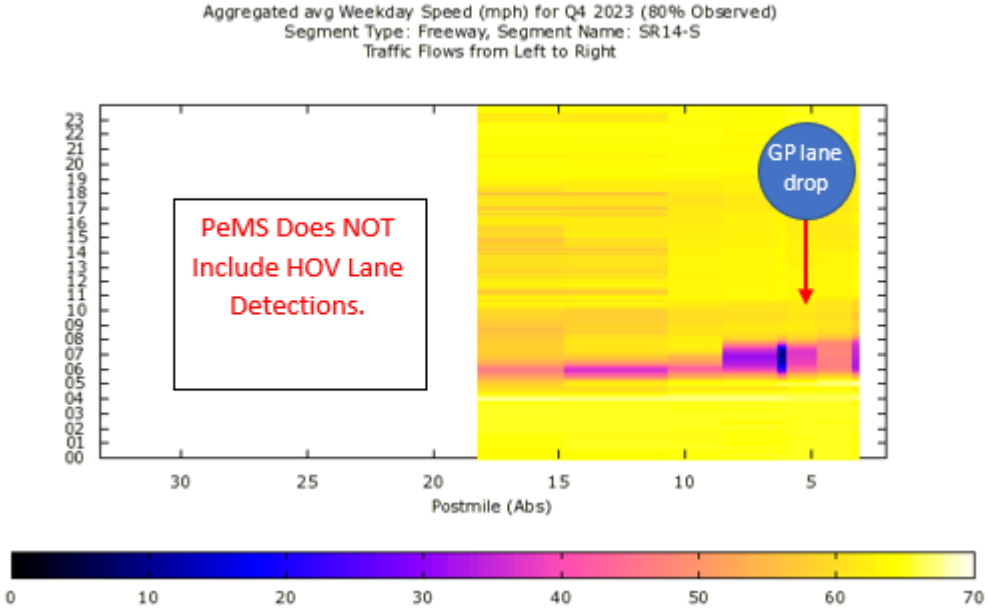
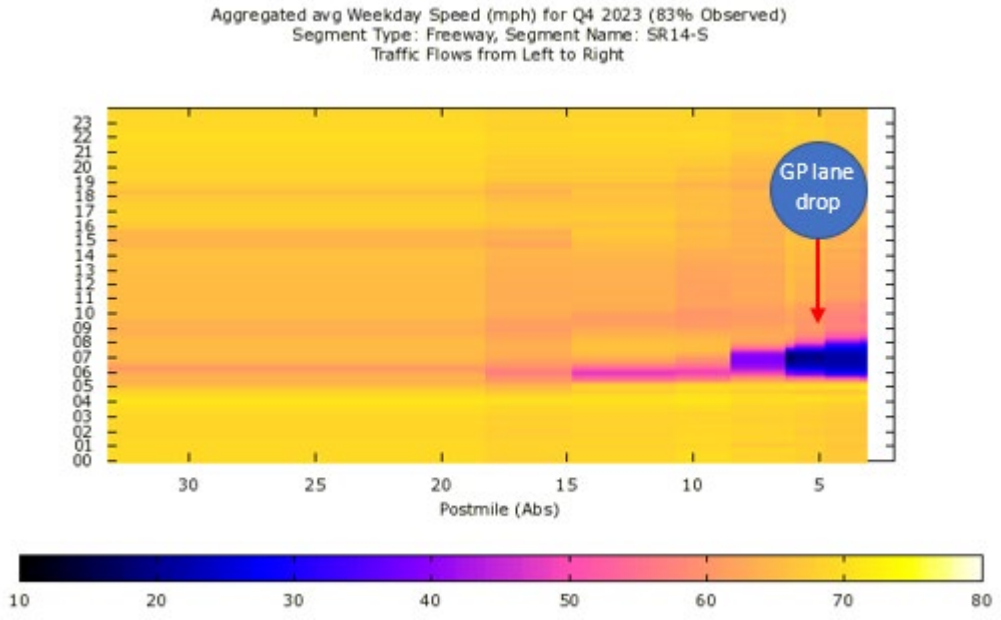


Figure 7.12. Average GP Lane Speed – Southbound Route 14, Q3 2023



B. Remediation Strategies

- Revert HOV striping to a limited access buffer, which existed before July 2019. Before being converted to continuous access, the limited access facility generated free-flow "green" speeds throughout the northern segment. The SR-14 HOV lane operations before (with a limited access buffer) and after (with continuous access/no buffer) traffic analysis indicates that if the HOV limited access buffer is restored onto SR-14, it will result in at least 94 DVHD savings (14%) in the NB HOV lane, and 209 DVHD savings (37%) in the southbound HOV lane. The SR-14 Buffer reinstatement project has been entered into the Asset Management Tool for the 2024 SHOPP, and the DVHD calculations have been approved by Caltrans HQ. Project 07-39060 was initiated in June 2022 and it will convert continuous HOV access buffers to limited access buffers, between I-5 and Rancho Vista Blvd. The project PA&ED will be completed by October 2024 with an anticipated completion date of June 2027.
- Increase public awareness and update HOV violation fine amount on the existing signs to the current amount. Improve HOV signage (regulatory and enforcement signs) and pavement marking on SR-14. Additional or enhanced signing and markings at the beginning and along the HOV lanes need to be installed, if the HOV buffer is not re-instated. This enhancement will be integrated into Project 07-39060, with an anticipated completion date of June 2027.

- Project 07-29890 includes widening the Route 14 mainline from Technology Drive to Palmdale Boulevard and widening northbound Rancho Vista Boulevard off-ramp after the deceleration segment. The project plans also include realigning the off-ramp terminus, replacing signals at the ramp terminus, and synchronizing signal timing. The project is in the construction phase and is led by the City of Palmdale. Construction completion is expected in April 2026. This should reduce congestion in the GP lanes, thereby reducing HOV degradation caused by the friction factor between HOV and GP lanes.
- Metrolink developed the Southern California Optimized Rail Expansion (SCORE) plan in partnership with freight and intercity rail operators as a roadmap to increase rail service to accommodate expected population and job growth in advance of 2028, when Los Angeles will host the Olympics. SCORE will fund the construction of a new station in Santa Clarita. This should reduce demand for the SR-14 freeway, thereby reducing congestion in the GP lanes, and hence reducing HOV degradation.
- Construction of HOV and truck lanes on Route 5 (07-2332E4) will ease traffic delays and absorb the growth of traffic due to increased population and surrounding communities – both residential and commercial. Construction began in 2021; construction completion is expected in early 2026. The estimated construction cost is $525 million.
- California High Speed Rail service between Bakersfield/Palmdale to Los Angeles Union Station is expect to complete prior to the 2028 Olympics. In April 2020, the California High-Speed Rail Authority (Authority) Board of Directors approved a preliminary funding plan with Los Angeles County Metropolitan Transportation Authority (LA Metro) to move the Link Union Station projectExternal Link (Link US) forward in Southern California. The funding plan details the release of $423 million in Prop 1A funds for the first phase of the Link US project featuring "run through" tracks crossing over the US-101 freeway. The HSR would provide benefits to the regional transportation system by reducing the number of vehicles operating on the regional roadway network through diversion of intercity road trips to HSR. In 2040, implementation of the HSR would result in a net reduction in vehicle miles traveled ranging from about 931 million to 1.28 billion (an approximately 1.1 percent to 1.5 percent reduction) for the medium and high ridership scenarios, respectively, compared to the No Project Alternative. This is a net benefit to transportation and traffic operations because a reduction in vehicle miles traveled helps maintain or potentially improve the operating conditions of regional roadways. This reduction in future vehicle trips would

improve the level-of-service (LOS) (i.e. operating quality) of the regional roadway system.

- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.

3.4.5 ACTION PLAN FOR HOV FACILITIES ON ROUTE 57

Project Updates

- Route 57 did not appear as a degraded facility in the 2023 degradation report due to insufficient data for analysis. However, as the HOV facility on Route 57 experienced degradation in 2021, this report includes project updates for Route 57.
- No data was available for Route 57 due to an ongoing major construction project (EA 07-30450). HOV lanes on Route 57 were temporary decommissioned during construction to accommodate lane reduction and lateral shift. EA 07-30450 will rehabilitate Route 57 pavement from Orange County Line to Route 60/57 Separation. This Capital Preventive Maintenance Project will replace distressed individual slabs along all lanes for both Northbound (NB) and Southbound (SB) directions. The project will also apply Lane Replacement Strategy (lanes 3 and 4) for SB, and NB from Cold Spring Lane to Pathfinder Road (approximately 3,400 feet) with Jointed Plain Concrete Pavement-Rapid Set Concrete. Construction started in October 2022 and is expected to be completed by March 2025. This project will replace all loop detectors and install ramp meters for the on-ramp HOV lanes. Repairing the vehicle detector systems will improve data collection and traffic monitoring.

3.4.6 ACTION PLAN FOR HOV FACILITIES ON ROUTE 60

A. Analysis

- Afternoon peak period recurrent congestion in all lanes reduces both eastbound and westbound HOV lane performance and speed (Fig. 13-16).
    - On eastbound, The HOV lane is slightly degraded between Seventh Ave (PM 14.6) and Azusa Ave (18.1), and extremely or moderately degraded between Fairway Dr. (PM 21.14) and Reservoir St (PM 30.5
    - On westbound, the HOV lane is degraded at Garey Ave. (PM 29.7) and Brea Canyon Rd. (PM 22.9). The HOV lanes at a few other locations are slightly degraded.

- Morning peak period recurrent congestion in all lanes reduces both direction HOV lanes' performance and operating speeds (Fig. 13-16).
    - On the westbound, the HOV lane is degraded between Reservoir St (PM 30.34) and Philips Ranch Rd (PM28.1).
    - On eastbound, the HOV lane is slightly or moderately degraded at a few locations.
- Recurrent congestion near the freeway interchange on GP lanes creates friction, which in turn slows down the HOV lane speed.
- Heavy truck traffic (up to 13.8%) reduces speed on general-purpose lanes and introduces a friction factor to HOV lanes, causing congestion in both directions, especially on eastbound uphill grades.
- High volume due to the merging of Route 57 and Route 60 together. Field occupancy counts provide visual observations of traffic patterns, whereby the right two lanes are congested with two continuous lanes of trucks, leaving other vehicles with only the two left lanes to use. This results in increased violation rates in the HOV lane.
- Demand exceeds capacity. During a one-hour peak period, the average flow is 1,776 vehicles per hour on the westbound HOV lane at Phillips Ranch Rd, and 1,489 vehicles per hour on the eastbound HOV lane at Fairway Dr.
- The CAV decal rate is up to 14.9 percent during peak hours and the solo violation rate is up to 32.7 percent.

Figures 7.13 and 7.14 provide plots of eastbound HOV and GP lane speeds on Route 60 during the fourth quarter of 2022. Figures 7.15 and 7.16 provide plots of westbound HOV and GP lane speeds on Route 60 during the third quarter of 2023.

Figure 7.13. Average HOV Lane Speed – Eastbound Route 60, Q3 2023

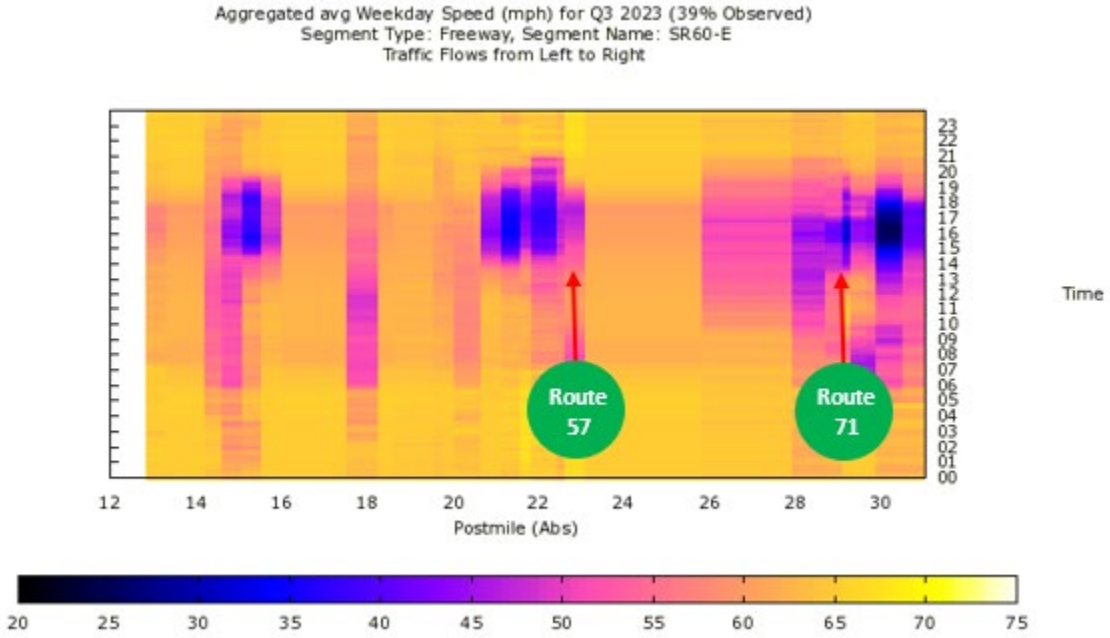


Figure 7.14. Average GP Lane Speed – Eastbound Route 60, Q3 2023

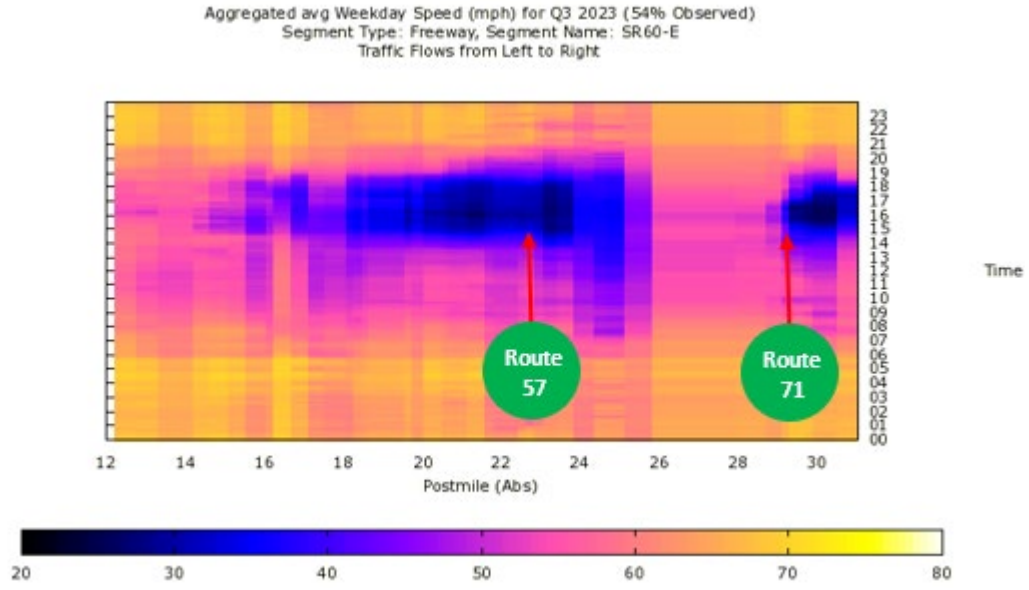


Figure 7.15. Average HOV Lane Speed – Westbound Route 60, Q3 2023

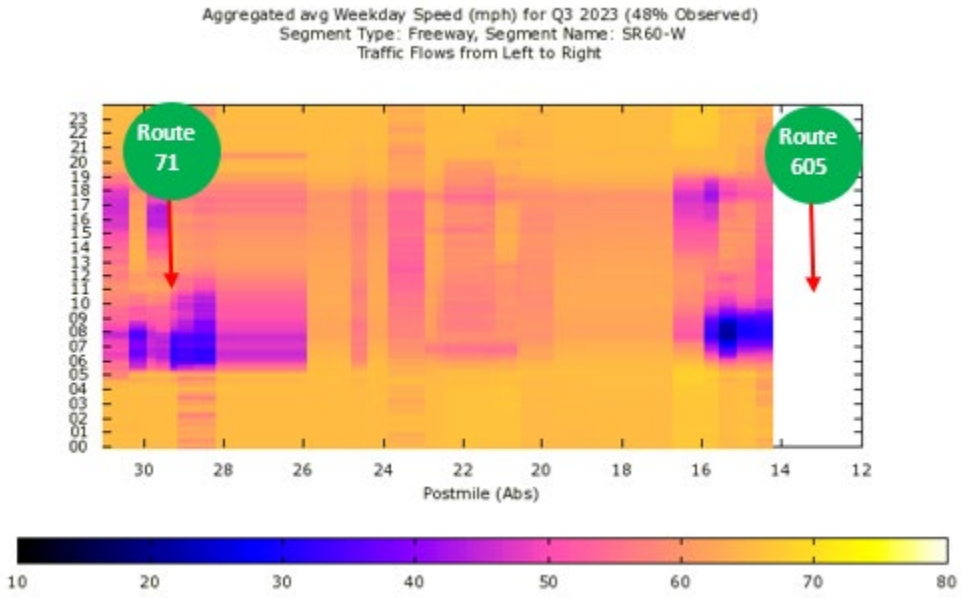
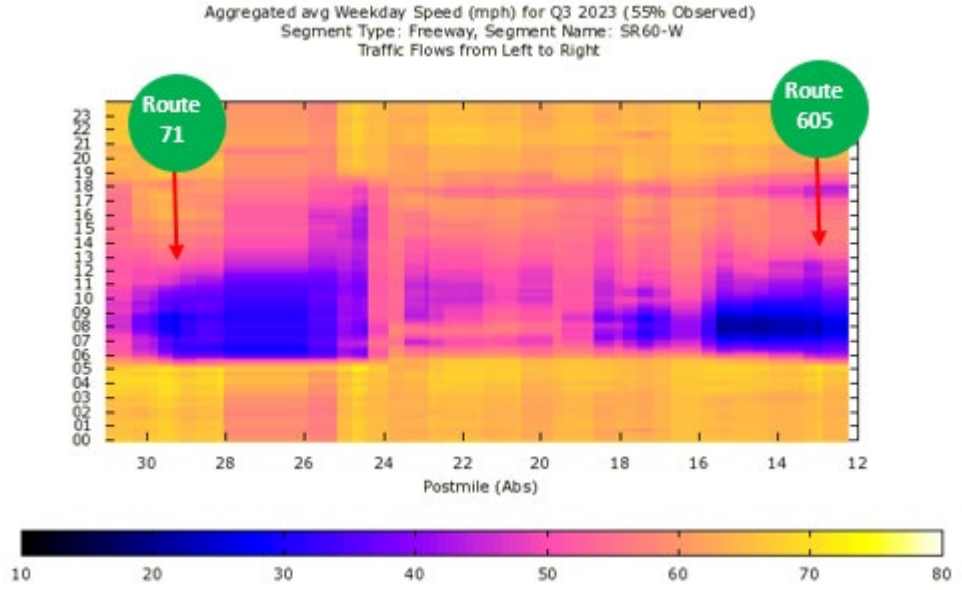


Figure 7.16. Average GP Lane Speed – Westbound Route 60, Q3 2023



B. Remediation Strategies

- Project 07-3101U, Route 605/Route 60 Corridor Improvement Project (CIP), will make the following improvements:
    - Add through-lane at Route 605/Route 60 interchange on Route 60, add through-lane within the Route 605/Route 60 system interchange on Route 60 in the westbound direction.

- Add eastbound Route 60 auxiliary for Route 605 northbound and southbound connectors.
- Add eastbound Route 60 auxiliary lane from northbound Route 605 connector to the Crossroads Parkway off-ramp.
- The existing eastbound Route 60 auxiliary lane from northbound Route 605 connector will be extended through the Crossroads Parkway interchange to 7th Avenue off-ramp.
- An additional westbound Route 60 auxiliary lane is proposed from Hacienda Boulevard to 7th Avenue interchange where it joins an existing auxiliary lane (previously from 7th Avenue to Crossroads Parkway).
- An additional westbound Route 60 auxiliary lane is proposed through Crossroads Parkway interchange until it reaches the northbound and southbound Route 605 connectors.

Dates for this project: RTL 2025, construction to begin 2029, and completion 2032. The estimated construction cost is $2.8 billion. This project will reduce congestion on GP lanes, and increase connectivity with the 605 freeway, thereby reducing HOV degradation.

- Project 07-27912 proposes freeway improvements to the Route 57/60 confluence at the Grand Avenue interchange in Los Angeles County. During peak periods, demand exceeds the capacity for both routes in the vicinity of the interchange, resulting in delays with the Level of Service (LOS) at 'F' for many hours. This project is led by LA Metro and began construction in January 2023. The estimated construction cost is $274 million. Construction completion is expected in 2028. The project plans to significantly modify the GP lanes for Northbound SR-57 and Eastbound SR-60 to ease congestion and delays on the mainline, reduce weaving at the Grand Avenue interchange, and improve HOV speed due to reduced GP freeway operating speeds and friction factors.
- Project 07-32780 proposes two dedicated truck lanes along the median of Route 60, freeway widening, interchange re-configurations, intersection re-configurations, ramp realignments, structure widening and replacement, retaining wall construction, and Right of Way acquisition. Anticipated completion in 2031. This project should reduce truck traffic and congestion on the GP lanes, and hence reduce HOV degradation.
- The Alameda Corridor-East (ACE) Project founded by The San Gabriel Valley Council of Governments (SGVCOG) will mitigate the impacts of significant

increases in freight rail traffic on over 70 miles of mainline railroad in the San Gabriel Valley. The ACE Project consists of a comprehensive program of safety improvements and mobility upgrades at an estimated cost of $1.9 billion. It is anticipated to be completed by the summer of 2025. The project will mitigate the impacts of growth in trade transported by train along the Alameda Corridor-East Trade Corridor transcontinental rail network in Southern California, which carries about 16% of all oceangoing containers in the United States. This project will also relieve truck traffic from Long Beach and San Pedro to the Inland Empire region, thereby reducing truck traffic and congestion on the GP lanes; hence, reducing HOV lane degradation due to friction factors by GP lanes. For more details on the updates of construction completion, please visit the website at https://www.theaceproject.org/.

- Brightline West High-speed Rail project between Las Vegas and southern California plans to break ground by the end of 2023. That would set the rail line up to be operational at the beginning of 2027. The diversion of people from auto and air travel to Brightline West's high-speed rail system reduces vehicle miles traveled by more than 700 million each year and the equivalent of 16,000 short haul flights annually.
- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.
- District 7 plans to initiate a pilot program to study real-time occupancy at high-violation-rate locations. Occupancy detector cameras and special signs (remind drivers about cameras) will be installed. The pilot program needs funding support from Caltrans HQ.

3.4.7 ACTION PLAN FOR HOV FACILITIES ON ROUTE 91

A. ANALYSIS

- Afternoon period recurrent congestion in all lanes reduces HOV lane performance and speed on eastbound (Fig. 7.17 and 7.18). The HOV lane is extremely degraded at Long Beach Blvd (PM 5.0)and Pioneer Blvd (PM 12.0) due to traffic volume from Route 710 and 605 merge into Route 91. The rest of the eastbound HOV facilities are slightly/very degraded during PM peak hours. During morning peak hours, the HOV lane at Norwalk Blvd (PM 12.8) experiences extreme degradation.
- Morning and afternoon peak period recurrent congestion in all lanes reduces HOV lane performance and speed on westbound (Fig. 7.19 and 7.20). During AM and PM peak hours, most of the westbound HOV lane is slightly/very

degraded. During PM peak hours, the segment between Norwalk Blvd. and Carmenita Rd. (PM 12.7-14.5) experiences extreme degradation.

- Demand exceeds capacity with an average volume of 2,100 vehicles/hour during the 1-hour peak period in the HOV lane at Norwalk Blvd.
- The average truck rate is 6.8 percent
- GP lane drops at the Route 710 interchange and Route 605 interchange reduce capacity resulting in a bottleneck. Congestion on GP lanes creates friction, which in turn slows down the HOV lane speed.
- Vehicle weaving conflicts at ingress/egress locations due to congestion in the GP lanes.
- High solo violation rates in the westbound direction, at Bloomfield Ave (PM 19.17), are up to 38.7 percent. The CAV decal rate is up to 12.6 percent.

Figures 7.17 and 7.18 provide plots of eastbound HOV and GP lane speeds on Route 91 during the fourth quarter of 2023. Figures 7.19 and 7.20 provide plots of westbound HOV and GP lane speeds on Route 91 during the fourth quarter of 2023.

Figure 7.17. Average HOV Lane Speed – Eastbound Route 91, Q4 2023

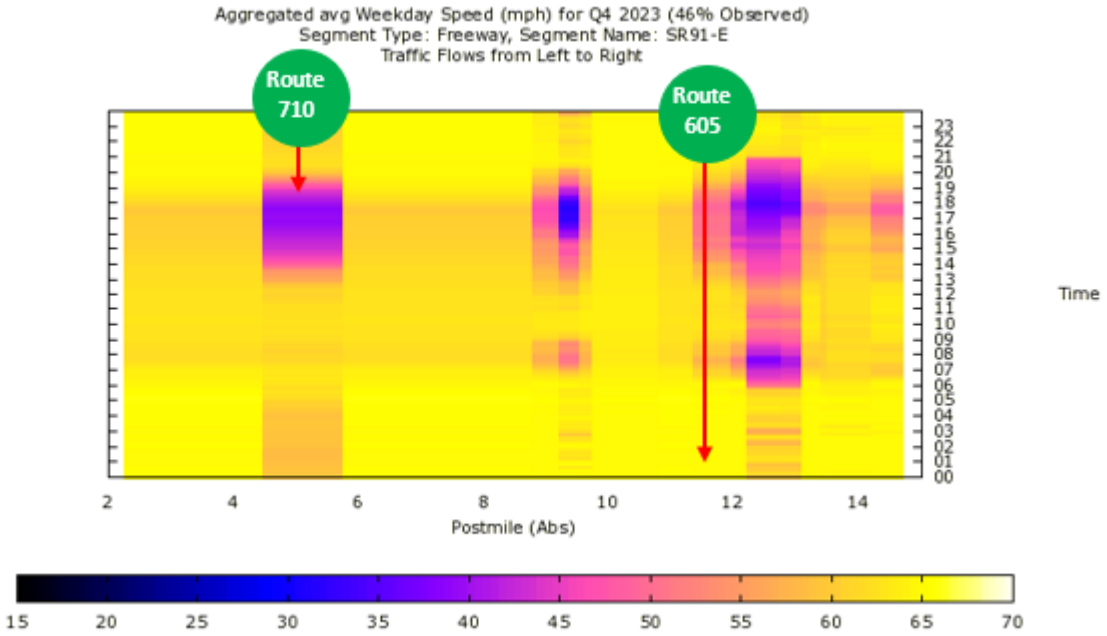


Figure 7.18. Average GP Lane Speed – Eastbound Route 91, Q4 2023

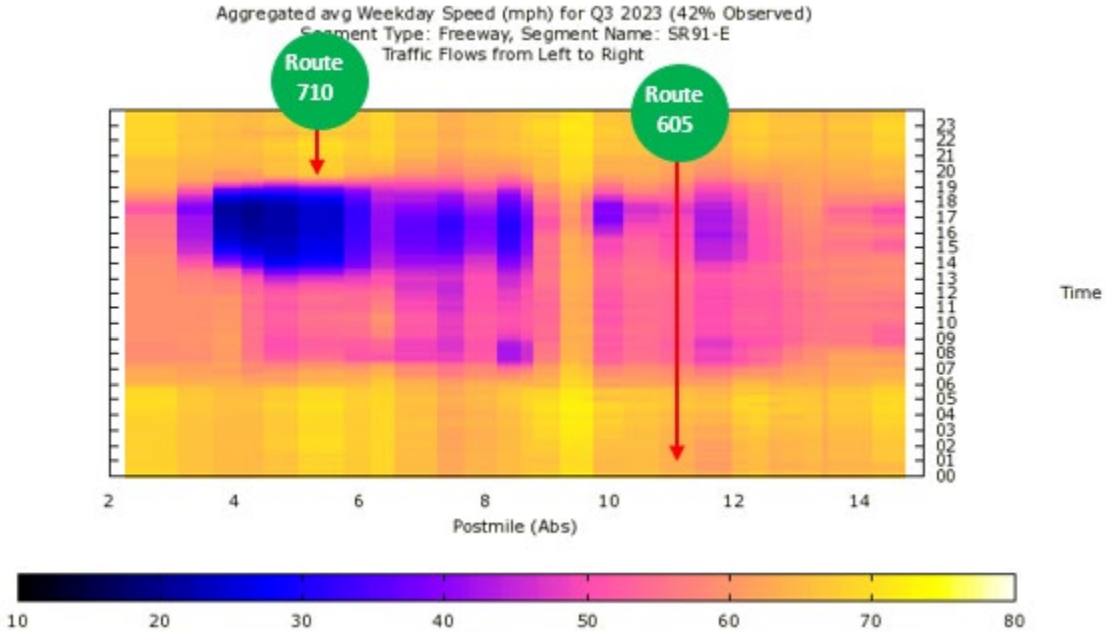


Figure 7.19. Average HOV Lane Speed – Westbound Route 91, Q4 2023

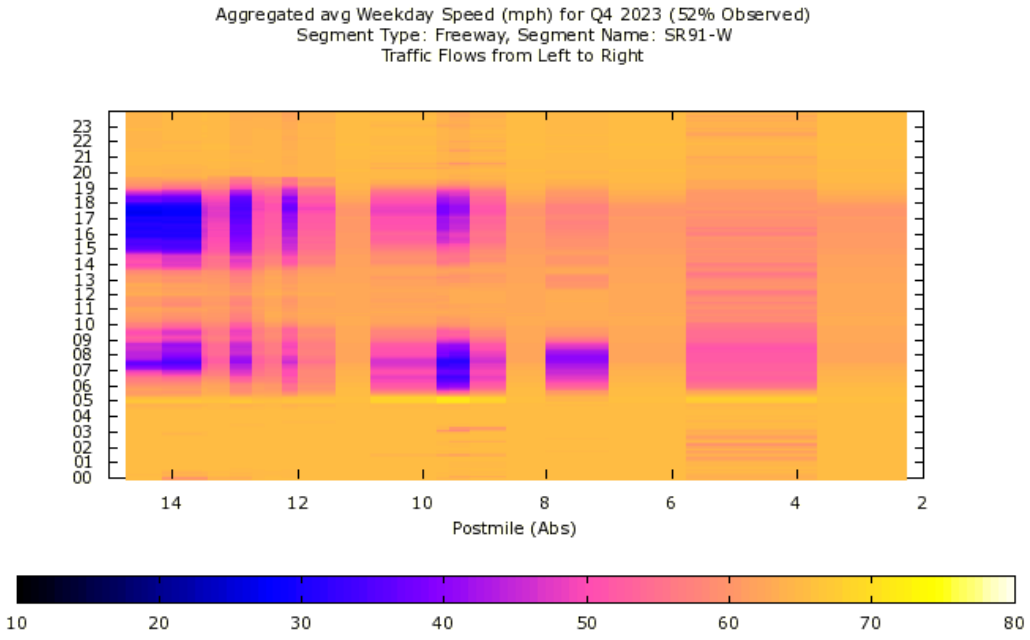
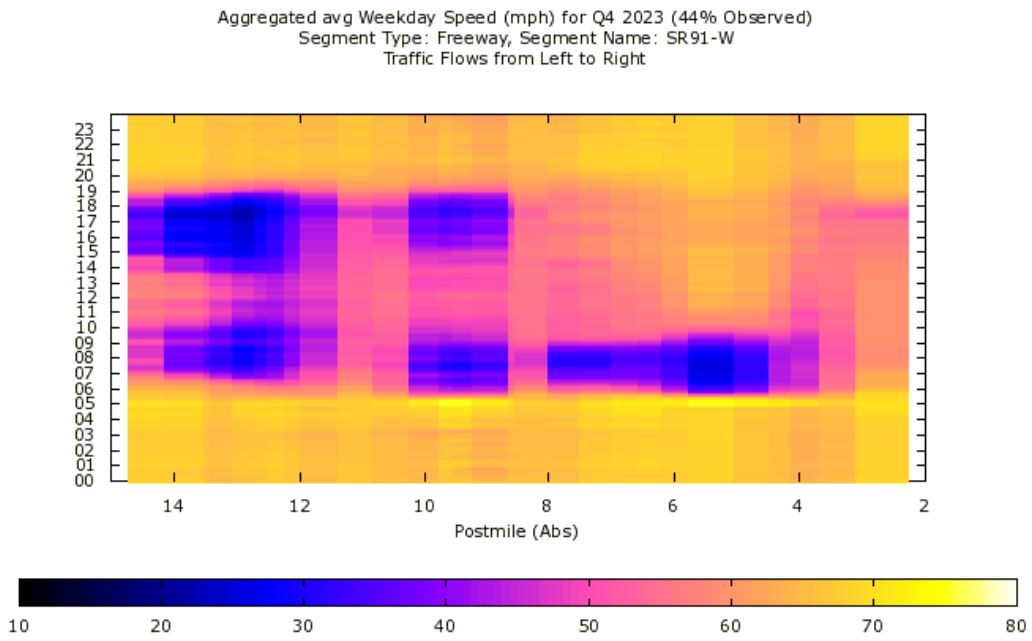


Figure 7.20. Average GP Lane Speed – Westbound Route 91, Q4 2023



B. Remediation Strategies

- The LA Metro West Santa Ana Branch Transit Corridor (WSAB) light rail transit (LRT) line will connect southeast LA County to downtown Los Angeles, serving the cities and communities along Route 5. The WSAB Project is a 19-mile corridor. Undergoing an Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) process is expected for Metro Board certification in 2024. The current project cost is estimated to be $6.5-$6.6B (in 2018 dollars). Opening is expected in 2035. This project should reduce demand and congestion on the GP lanes, and hence reduce HOV degradation.
- The future GP lane projects (, 07-35460, and 07-35920) create collector road arterials, eliminating multiple on/off ramps within close proximity of one another, which will reduce the weaving maneuvers between the HOV and GP lanes and reduce HOV degradation caused by the friction factor.
    - Project 07-35460 will add one auxiliary lane in the eastbound direction, extending the outside #5 lane beyond the Atlantic Avenue eastbound off-ramp to Cherry Avenue then dropping it before the Cherry Avenue undercrossing, and widening the Orange Avenue and Walnut Avenue The estimated project cost is $6.7 million. Construction began in March, 2024, with anticipated completion in 2028. This project should reduce congestion on the GP lanes, and hence reduce HOV degradation

caused by the friction factor.

  - Project 07-35920 proposes to add two frontage road lanes mainly for trucks. This project will address the weaving issues caused by a closely spaced on/off-ramp near the system interchange. Closely spaced ramps have created vehicle weaving conflict at ingress/egress locations due to congestion on the GP lanes and frontage road. The estimated project cost is $120 million. Construction will begin in 2026, with anticipated completion in 2029. This project should reduce truck traffic and congestion on the GP lanes, and hence reduce HOV degradation caused by the friction factor.

- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.
- District 7 plans to initiate a pilot program to study real-time occupancy at high-violation-rate locations. Occupancy detector cameras and special signs (remind drivers about cameras) will be installed. The pilot program needs funding support from Caltrans HQ.
- Brightline West High-speed Rail project between Las Vegas and southern California plans to break ground by the end of 2023. That would set the rail line up to be operational at the beginning of 2027. The diversion of people from auto and air travel to Brightline West's high-speed rail system reduces vehicle miles traveled by more than 700 million each year and the equivalent of 16,000 short-haul flights annually.

3.4.8 ACTION PLAN FOR HOV FACILITIES ON ROUTE 105

Project Updates

- Route 105 did not appear as a degraded facility in the 2022, 2023 degradation report due to insufficient data for analysis. However, as the HOV facility on Route 105 experienced degradation in 2021, this report includes project updates for Route 105.
- Project 07-31450 will convert the existing HOV lanes to HOT lanes and add a second HOT lane in each direction. The project improvement limits include Route 105 from Imperial Highway/Sepulveda Boulevard Intersection (west of Route 405) in the City of Los Angeles, to Studebaker Road (east of Route 605) in the City of Norwalk, in Los Angeles County. The scope of work includes converting the existing HOV lane to one ExpressLane and add a second ExpressLane in each direction (total of two Tolled ExpressLanes in each direction with discounts for HOV). The scope of project will also include HOV

bypass lanes ramp metering to all on-ramps not currently metered and replace all loop detectors. This project will enhance operations and improve trip reliability, travel times, traffic flow, and manage mobility within the Route 105 corridor. Construction is expected to begin in 2025, with anticipated completion in 2028. The estimated construction cost is $741 million.

- Project 07-35030 will upgrade to the new full-color LED CMSs and provide clearer real-time traffic information on State's highways, as well as upgrade ageing TCS and TMDS systems, travel reliability can be improved, impacts of the congestion can be reduced, duration and effects of non-recurring congestion can be minimized, and overall efficiency operations can be maximized. The performance measures for this project are 240 Field Element(s), which includes 159 Census Station, 75 Changeable Message Sign (CMS), and 6 Vehicle Detection. Construction is expected to begin in 2025, with anticipated completion in December 2027.

3.4.9 ACTION PLAN FOR EXPRESSLANE/HOV FACILITIES ON ROUTE 110

Project Updates

Route 110 did not appear as a degraded facility in the 2022, and 2023 degradation reports due to insufficient data for analysis. However, as the HOV facility on Route 110 experienced degradation in 2021, this report includes project updates for Route 110. The Updates below are provided by Metro.

- The "Pay As You Go" program was made permanent in June 2023. This program is designed to lower the costs of using the ExpressLanes for non-accountholders. Industry experience has shown that offering drivers additional legal avenues to access managed lanes can have the effect of reducing violations, which subsequently enhances the ability of the toll system to manage congestion.
- Caltrans has recently completed its ExpressLanes Corridor Incident Management project using funding provided by Metro ExpressLanes. This project is designed to integrate ExpressLanes traffic and CCTV data into the Caltrans TMC for enhanced incident management to reduce non-recurrent delay.
- Metro is preparing to deploy a camera-based roadside Occupancy Detection System on I-10 and I-110 to deter occupancy mis-representation—a leading cause of toll evasion violations on the corridor and contributor to increased congestion in the managed lanes on the corridor. Metro anticipates this system to be operational prior to the end of the financial year (June 2025).

- Metro continues to implement additional toll rate increases as warranted based on trends in traffic demand on the corridor, to facilitate ongoing effective management of congestion as demand continues to rise.
- Metro and Caltrans anticipate increased price sensitivity and enhanced ability of the toll system to manage congestion on the corridor after the clean air vehicle decal program ends statewide in September 2025.
- Consistent with actions previously identified in earlier degradation action plans for this corridor, Metro is exploring options for increasing the minimum occupancy requirements for toll-free travel to more effectively manage demand on the corridor through congestion pricing.
- At the recommendation of California Highway Patrol, Metro and Caltrans are coordinating to install channelizers in the buffer between the managed lanes and the general-purpose lanes, to improve safety and reduce delays associated with traffic incidents caused by unsafe maneuvers. Funding for this has been identified and design is underway with installation expected to be completed within 12-months. Caltrans District 7 has requested a short-term field test of the proposed channelizers in a small-scale installation area before Metro pursues a broader installation corridor-wide. The short-term field test is targeted for completion by the end of 2024. Pending a successful test, full installation across the corridor is targeted for completion by the end of 2025.
- Metro continues to contribute millions of dollars toward targeted enforcement services from CHP on the ExpressLanes corridors every year, to reduce instances of occupancy misrepresentation, illegal buffer crossings, and other driver behaviors that contribute to congestion.
- Metro continues to invest in advanced transponder switch setting indicators at each toll collection point on the corridor, to facilitate CHP enforcement by displaying the real-time occupancy switch setting of each vehicle's transponder on an easy-to-read double-sided overhead numeric display.
- In October 2023, Metro committed more than $120 million to corridor improvements from net toll revenues to provide active transportation, transit, and arterial improvements along the corridors. This also included transit subsidies, and funding to Caltrans for projects that did not otherwise have full funding.
- Caltrans is updating the ramp metering system on I-110 as part of Project 07-31200, to help minimize flow disruptions by platoons of vehicles entering the freeway when operating at or near capacity. The construction began in February 2020 and is expected to end in June 2027

3.4.10 ACTION PLAN FOR HOV FACILITIES ON ROUTE 118

A. Analysis

- Afternoon peak period recurrent congestion in all lanes reduces HOV lane performance and speed on two eastbound segments (Fig. 7.21 and 7.22).
    - The segment between De Soto Ave. (PM 36.3) and Chimineas Ave. (PM 39.9) has only four GP lanes. The congestion on GP lanes (Fig. 7.22) causes the friction factor between an HOV lane and GP lanes (Fig. 7.21 and 7.22), hence the HOV lane is degraded.
    - The segment between Sepulveda Blvd. (PM 43.5) and Columbus Ave (PM 43.8) is slightly degraded because the HOV lane ends, the added demand from Route 405, and the motorists transitioning to Route 5 and/or continuing to Route 210 causes multiple weaving maneuvers across the freeway.
- Morning peak period slight degradation at Route 118 merging to Route 5 (PM 42.5) is observed on the eastbound HOV lane.
- The peak period recurrent congestion on eastbound HOV lane is due to:
    - Two lane drops on GP lanes (on southbound Route 5) contribute to congestion on GP lanes and then cause the friction factor for the eastbound HOV lane.
    - Route 118 HOV lane ends and merges into the GP lane before Route 5.
    - High weaving volumes from Route 405.
- The high solo violation rate is observed at Porter Ranch Dr. (PM 35.8). District 7's 2023 Manual Occupancy Data indicates that the HOV violation rate is up to 35.9 percent in both directions during peak hours.

Figures 7.21 and 7.22 provide plots of eastbound HOV and GP lane speeds along the length of the HOV facility on Route 118 during the fourth quarter of 2023.

Figure 7.21. Average HOV Lane Speed – Eastbound Route 118, Q4 2023

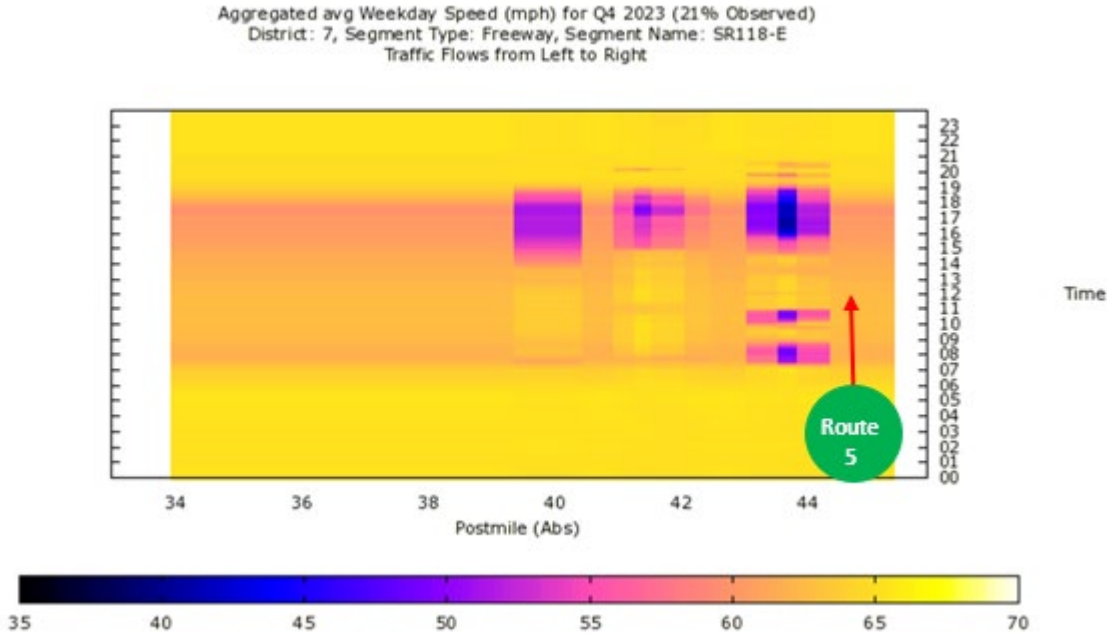
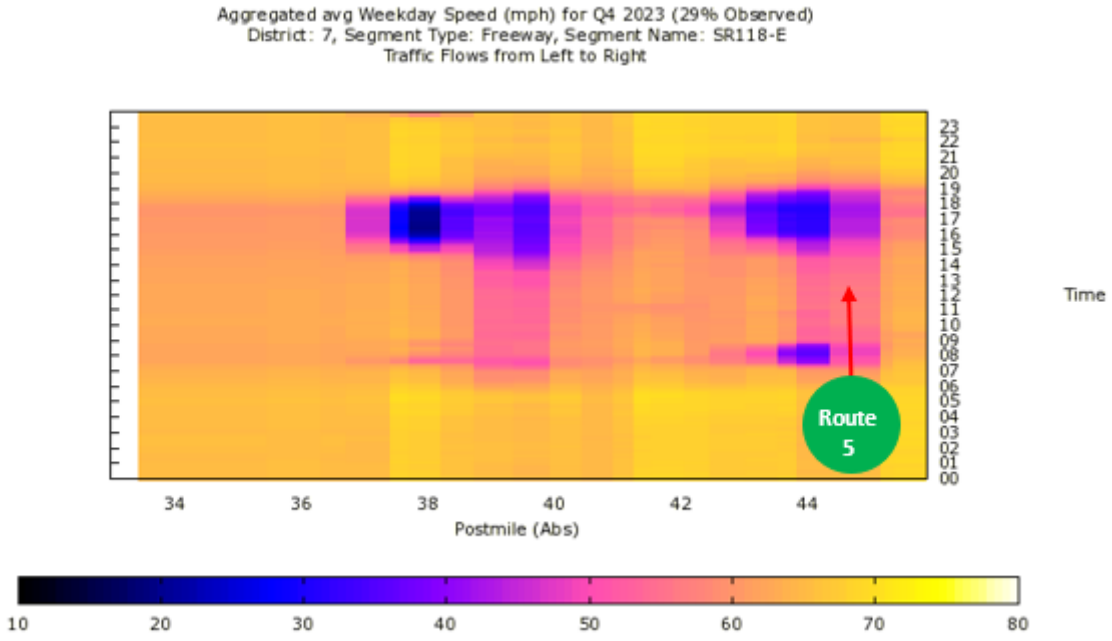


Figure 7.22. Average GP Lane Speed – Eastbound Route 118, Q4 2023



B. Remediation Strategies

- LA Metro is implementing the North Hollywood to Pasadena Bus Rapid Transit (BRT) Corridor, an 18-mile-long BRT project which will be a key regional connection between the San Fernando and San Gabriel Valleys with connections to the Metro Red, Orange, and Gold Lines, as well as Metrolink and other municipal bus lines. LA Metro has added a Route 134 route option in the Eagle Rock portion of the study area. This project is funded by Measure M and Senate Bill 1, which provide $267 million in funding. The Project has an anticipated opening date in summer 2025. This project is expected to relieve traffic congestion on Route 118, hence reducing HOV degradation.
- Route Shield Pavement Markers (RSPM) will be installed between Sepulveda Blvd and Route 5 on eastbound Route 118, where the HOV lane ends and merges into the GP lane before Route 5. The RSPM will improve driving decisions, reduce driver stress, and supplement overhead signs, which help drivers change lanes to the correct route and reduce sudden weaving maneuvers across the freeway near the split. This project has not yet been initiated.
- Meter HOV preferential lanes at on-ramps between De Soto Ave. (PM 36.3 and Chimineas Ave. (PM 39.9), if the number of vehicles meets the criteria of the Ramp Metering Design Manual during peak hours. This project has not yet been initiated.
- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.
- District 7 will review the existing lane configuration of the Route 118 eastbound to Route 5 southbound connector ramp to possibly eliminate the lane drops on the connector through re-striping the pavement delineation.

3.4.11 ACTION PLAN FOR HOV FACILITIES ON ROUTE 134

HOV facilities on Route 134 are split in two at the interchange with Route 5. These action plans cover the entire route. In 2022 no data was collected and in 2023 data was collected at a few locations westbound due to the Rehab project (EA 07-31170) replacing 222 traffic loop detectors.

A. Analysis

- Afternoon peak period recurrent congestion in all lanes reduces HOV lane performance and speed on westbound directions.
- A pavement rehabilitation project (EA 31170) on Route 134 (from Route 101

to 210) is rehabilitating the 112 lane miles to extend the service life of the existing pavement by 5-15 years and improve ride quality. The project is also upgrading the Transportation Management System field elements including 36 traffic signals, 883 delineators, 231,622 linear feet of striping, installing 44,295 pavement markers, and 222 traffic loop detectors. The construction began in 2020 and complete in May 2024.

- High solo violation rates. District 7's 2023 Manual Occupancy Data indicates that the HOV violation rate is up to 41.8 percent during peak hours at Pass Avenue (PM 1.82).
- High CAV decal rates. District 7's 2023 Manual Occupancy Data shows the rate is up to 11.9 percent during peak hours.
- Vehicle weaving conflict at Route 5 interchange.
- The westbound 134 HOV lane ends as the #1 general purpose lane near Route 101; motorists from the GP lane jump in front of the carpoolers while the number of GP lanes reduces from five lanes down to two causing traffic congestion, which then impedes the carpoolers in the HOV lane. This decrease in capacity is due to the westbound 134 to westbound 101 connector structure that has already been restriped to utilize full capacity; any further improvements would require extensive construction and funding.

B. Remediation Strategies

- LA Metro is implementing the North Hollywood to Pasadena Bus Rapid Transit (BRT) Corridor, a 19-mile-long BRT project which will be a key regional connection between the San Fernando and San Gabriel Valleys with connections to the Metro Red, Orange, and Gold Lines, as well as Metrolink and other municipal bus lines. LA Metro has added a Route 134 route option in the Eagle Rock portion of the study area. This project is funded by Measure M and Senate Bill 1, which provide $267 million in funding. The Project has an anticipated opening date in Summer 2025. This project is expected to relieve traffic congestion on Route 134. No traffic analysis was done on Route 134 from the Final Environmental Impact Report (FEIR) published on April 28, 2022.
- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP) to prioritize enforcement efforts.

3.4.12 ACTION PLAN FOR HOV FACILITIES ON ROUTE 210

A. Analysis

- Morning and afternoon peak period recurrent congestion in all lanes reduces HOV lane performance and speed in both directions (Fig. 7.23-7.26). The

eastbound HOV lane is extremely degraded during PM peak hours and the westbound HOV lane is extremely degraded during AM peak hours.

- Demand exceeds capacity. During the peak period, the average volume of the HOV lane is 1,630 vehicles/hour in congested locations.
- Eastbound GP lane drops at El Molino Avenue, Rosemead Boulevard, and San Dimas Avenue cause bottlenecks.
- Vehicle weaving conflicts at ingress/egress locations due to congestion in the GP lanes.
- High CAV decal rates. District 7's 2023 Manual Occupancy Data shows the decal rate is up to 10.9 percent in both directions during peak hours. The solo violation rate is up to 35.9 percent at Wilson (PM 26.6) westbound during PM peak hours.
- Route 210 also has a very high truck volume (approximately 7.9 percent) that connects the Port of Los Angeles to northern Los Angeles County.

Figures 7.23 and 7.24 provide plots of eastbound HOV and GP lane speeds on Route 210 during the fourth quarter of 2023. Figures 7.25 and 7.26 provide plots of westbound HOV and GP lane speeds on Route 210 during the fourth quarter of 2023.

Figure 7.23. Average HOV Lane Speed – Eastbound Route 210, Q4 2023

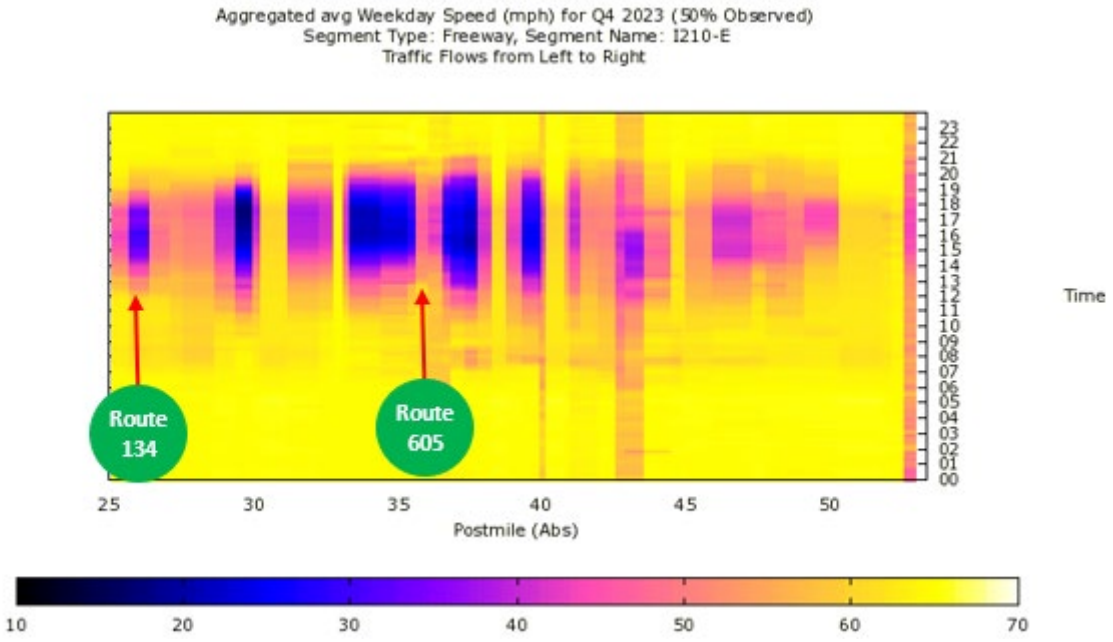


Figure 7.24. Average GP Lane Speed – Eastbound Route 210, Q4 2023

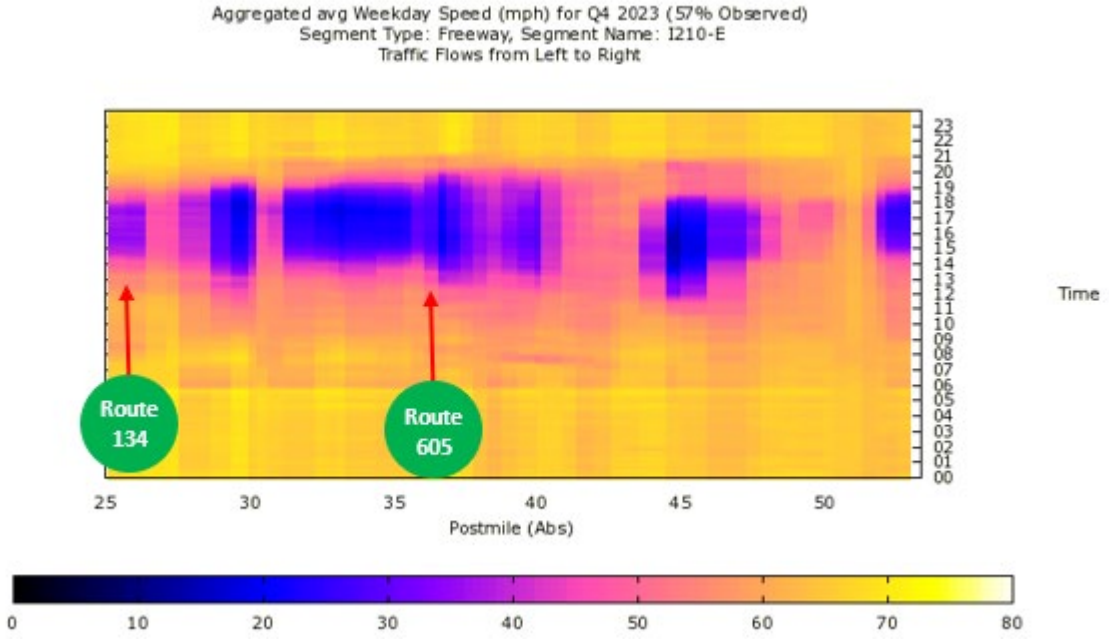


Figure 7.25. Average HOV Lane Speed – Westbound Route 210, Q4 2023

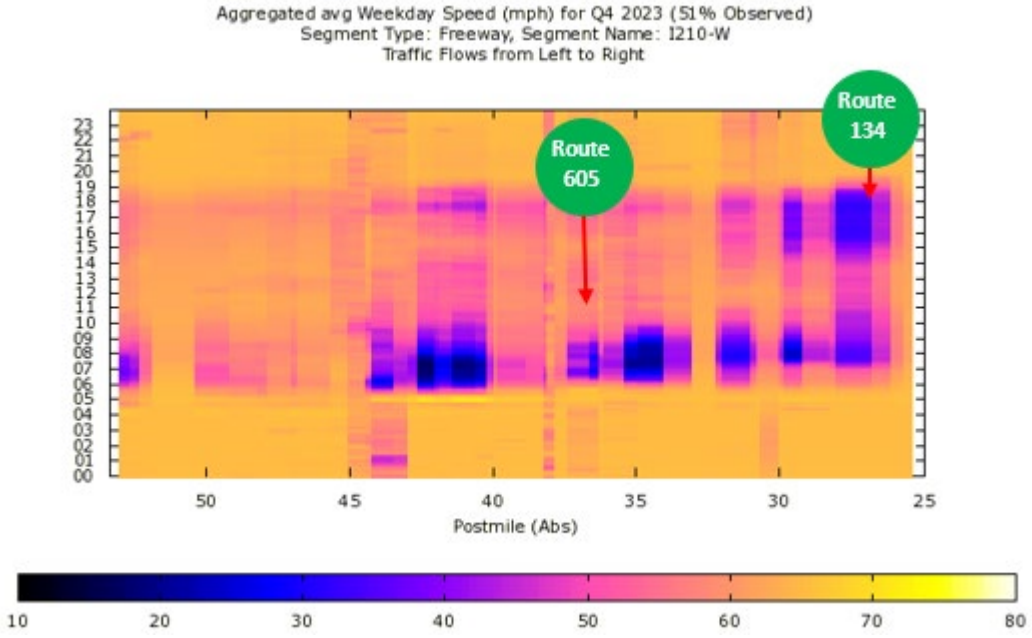
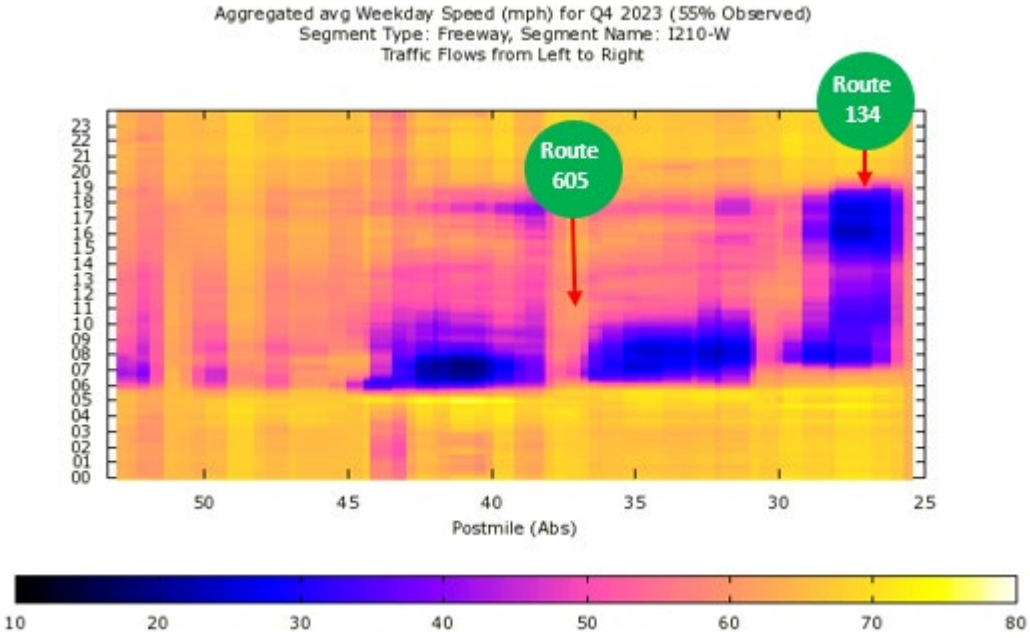


Figure 7.26. Average GP Lane Speed – Westbound Route 210, Q4 2023



B. Remediation Strategies

- The Foothill Gold Line project from Glendora to Montclair will extend the Metro Gold Line by 12.3 miles and add stations in the cities along LA-210. Major construction began in mid-July 2020 and is expected to be completed to Pomona in 2025 (and to Montclair in 2028, if funding is secured in time to move forward with the contract option). The major construction of the Glendora to Pomona project is now approximately 90% complete and remains on time and on budget. Completion of the Glendora to Montclair segment is now estimated to cost $2.1 billion. The Gold Line Foothill Extension's (LA-210-36/53 (EA 07-33120)) expanded transit service along the Interstate 210 corridor will address transportation problems and deficiencies and help relieve traffic congestion.
- Implement access strategies, including increasing the length of access area or frequency of access, continuous access, or modification/elimination of bottlenecks such as ingress/egress locations. These improvements have been incorporated into LA Metro's design plans for the Route 210 Median Barrier Replacement Project (EA 07-33560 and EA 07-33561). Project PS&E are expected in 2026. The completions are expected in September 2027 and April 2028.
- Increase public awareness. Update the HOV violation fine amount on the existing signs to the current amount. The improvement will be incorporated

into LA Metro's design plans for the Route 210 Median Barrier Replacement Project (EA 07-33560 and EA 07-33561).

- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.
- The Alameda Corridor-East (ACE) Project founded by The San Gabriel Valley Council of Governments (SGVCOG) will mitigate the impacts of significant increases in freight rail traffic on over 70 miles of mainline railroad in the San Gabriel Valley. The ACE Project consists of a comprehensive program of safety improvements and mobility upgrades at an estimated cost of $1.9 billion. It is anticipated to be completed by the summer of 2025. The project will mitigate the impacts of growth in trade transported by train along the Alameda Corridor-East Trade Corridor transcontinental rail network in Southern California, which carries about 16% of all oceangoing containers in the United States. This project will also relieve truck traffic from Long Beach and San Pedro to the Inland Empire region, thereby reducing truck traffic and congestion on the GP lanes; hence, reducing HOV lane degradation due to friction factors by GP lanes. For more details on the updates of construction completion, please visit the website at https://www.theaceproject.org/.
- Perform continuous analysis, keeping a record of sensors repeatedly detected as erroneous. Perform ongoing monitoring to detect misconfigurations before they are used in performance reporting. Explore a second data source to determine HOV speeds/degradation. In addition, District 7 will evaluate defective sensors, and begin initiating projects to repair defective sensors.
- Brightline West High-speed Rail project between Las Vegas and southern California plans to break ground by the end of 2023. That would set the rail line up to be operational at the beginning of 2027. The diversion of people from auto and air travel to Brightline West's high-speed rail system reduces vehicle miles traveled by more than 700 million each year and the equivalent of 16,000 short haul flights annually.

3.4.13 ACTION PLAN FOR HOV FACILITIES ON ROUTE 405

HOV facilities on Route 405 are split into four segments: Route 605 to Route 110, Route 110 to Route 10, Route 10 to Route 101, and Route 101 to Route 5. The action plans cover the entire route.

A. Analysis

Route 605 to Route 110 (PM23.8-36.7)

- The southbound HOV facilities on a whole segment are extremely degraded during PM peak hours. The northbound HOV facilities are slightly degraded at both AM and PM peak hours.
- The CAV decal rate is up to 11.5 percent and the violation rate is up to 26.2 percent at Del Amo Blvd (PM 35.6).
- Demand exceeds capacity. During the 1-hour peak period, the average HOV lane volume is 1,500 vehicles/hour in congested locations. In some locations, the maximum HOV lane volume is 1,800-2,000 vehicles/hour.

Route 110 to Route 10 (PM36.7-53.3)

- The northbound HOV lane is extremely degraded during the AM peak hours between La Cienega Blvd (PM 47.4) and Route 10 (PM 53.0)
    - There are only four GP lanes at the Route 90 interchange and the segment between W Century Ave and La Cienega Blvd, causing a bottleneck.
    - Due to the vehicle volume from Route 105, Route 90, and Route 10.
- The southbound HOV lane is extremely degraded during PM peak hours. The maximum HOV lane volume is 1574 vehicles/hour.
    - GP lane drops when approaching (from 4 to 3) the Route 110 interchange, causing a bottleneck southbound.

Route 10 to Route101(PM 53.3-63.2)

- Peak period recurrent congestion in all lanes reduces HOV lane performance and speed (Fig. 7.27-7.30). The northbound HOV lane is extremely degraded during PM peak hours and the southbound HOV lane is extremely degraded during AM peak hours.
- Route 405 northbound and southbound through the Sepulveda Pass is uphill with a 5% grade affecting vehicle speeds in all lanes, especially trucks.
- With narrow buffers between HOV and GP lanes, congestion or slow-down in GP lanes causes friction on HOV lanes.
- Non-metered on-ramps allow platoons of vehicles to enter the freeway. When the opportunity occurs (local projects and/or dedicated funding), ramp metering equipment is installed.

Route 101 to Route 5 (63.2-72.2)

In 2023, no data was collected in this segment. The analysis below is from the 2022 report.

- Peak period recurrent congestion in all lanes reduces HOV lane performance and speed (Fig. 7.33-7.36). The northbound HOV lane is extremely degraded between Burbank Blvd (PM 64.1) and Roscoe Blvd (PM 67.6) during the PM peak period. The southbound HOV lane is extremely degraded between Victory Blvd (PM 65.1) and Sherman Way (PM 66.2) during the AM peak period.
- Route 405 NB (at the northern termini) experiences degraded conditions due to the following factors: 1. A lane drop at San Fernando Mission Blvd. (freeway capacity decreases to 3+1); 2. The end of the HOV lane which becomes the #1 general purpose lane before entering the tunnel; 3. Another lane drop occurs after the freeway exits the tunnel at the joining of I-405 and I-5 freeway merge. The current pavement delineation utilizes full width through the tunnel; therefore, reconstruction would need to occur for the possibility of added capacity.
- Demand exceeds capacity. During the 1-hour peak period, the average HOV lane volume is 1,500 vehicles/hour in congested locations in both directions. In some locations, the maximum HOV lane volume is 1,800-2,000 vehicles/hour.
- Vehicle weaving conflicts at ingress/egress locations due to congestion in the GP lanes southbound.
- Non-metered on-ramps allow platoons of vehicles to enter the freeway. When the opportunity occurs (local projects and/or dedicated funding), ramp metering equipment is installed.

Figures 7.27 and 7.28 provide plots of northbound HOV and GP lane speeds on Route 405 during the fourth quarter of 2023. Figures 7.29 and 7.30 provide plots of southbound HOV and GP lane speeds on Route 405 during the fourth quarter of 2023.

Figure 7.27. Average HOV Lane Speed – Northbound Route 405, Q3 2023

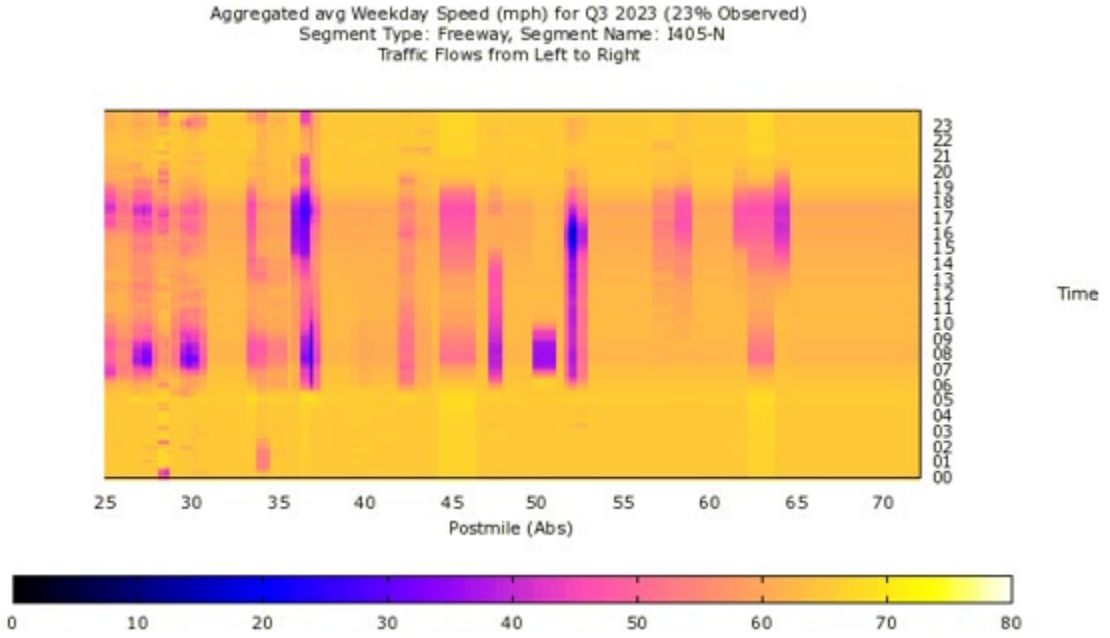


Figure 7.28. Average GP Lane Speed – Northbound Route 405, Q3 2023

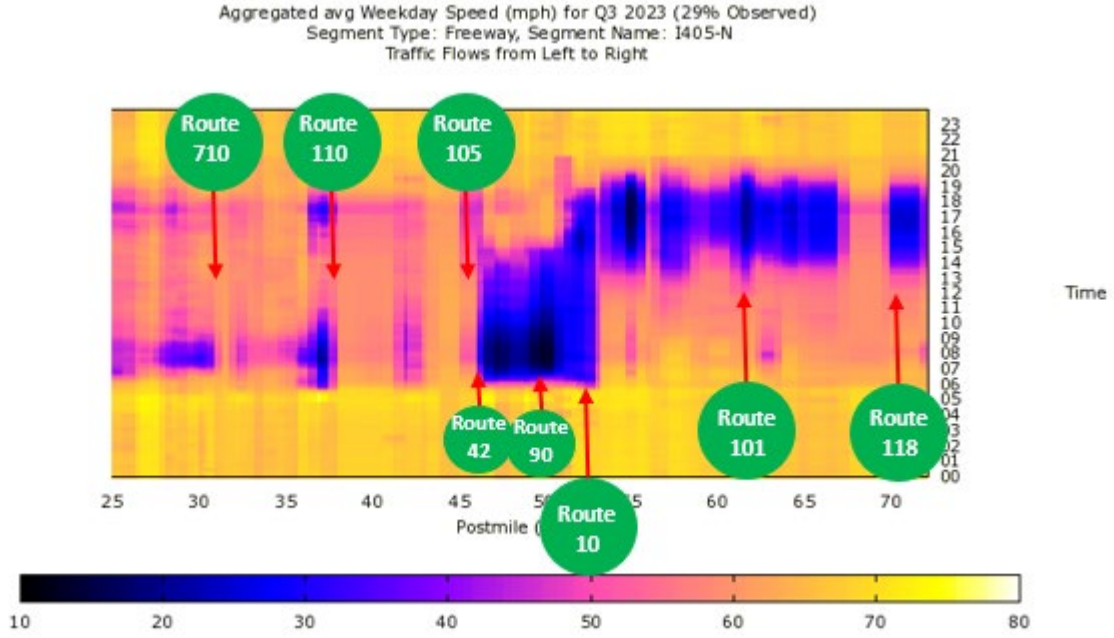


Figure 7.29. Average HOV Lane Speed – Southbound Route 405, Q4 2021

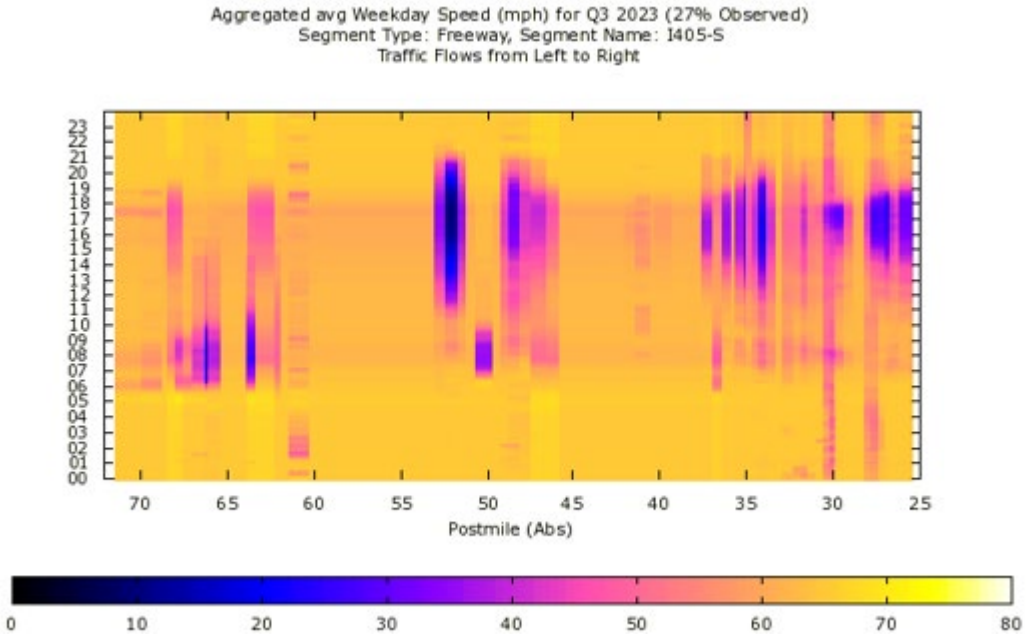
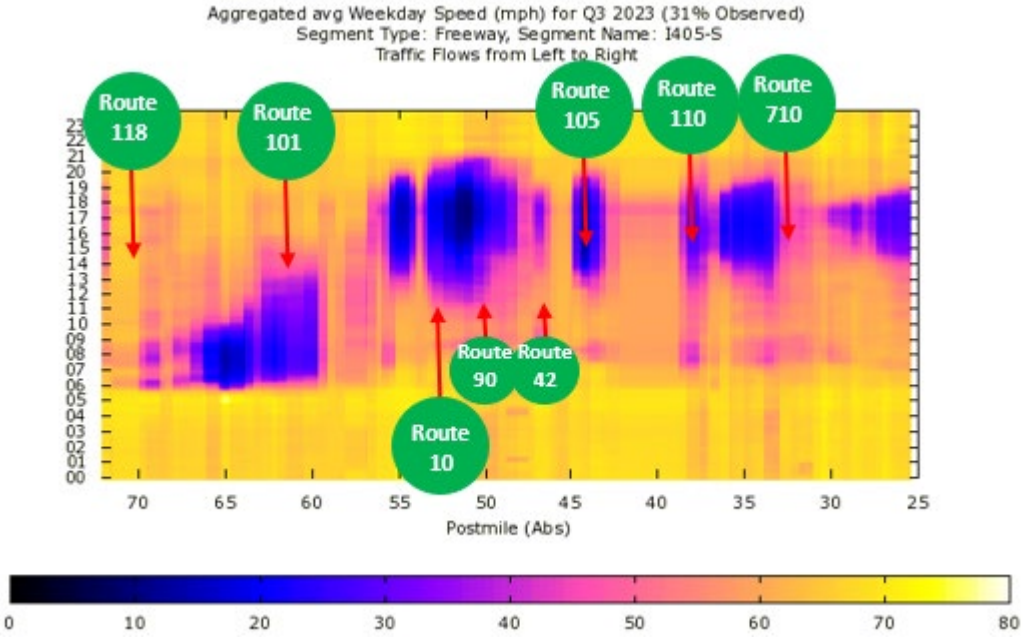


Figure 7.30. Average GP Lane Speed – Southbound Route 405, Q3 2023



B. Remediation Strategies

- Project 07-35310 adds auxiliary lanes in both directions of Route 405 between the interchanges of Redondo Beach and Hawthorne Boulevard, Hawthorne Boulevard, and Inglewood Avenue, and Inglewood Avenue and Rosecrans

Avenue to improve traffic operations and enhance safety through the corridor. The project will be developed by LA Metro. Construction is expected to begin in December 2025; expected to end in March 2027. The estimated construction cost is $120 million. This project will reduce congestion on the GP lanes, and hence reduce HOV degradation caused by the friction factor.

- Project 07-29360 will improve the Route 405/Crenshaw interchange. The northbound off-ramp backs up onto the mainline. The project will include improvements to on/off ramps plus widening and adding an auxiliary lane. Construction began in 2021; expected to end in May 2025. The estimated construction cost is $70 million. This project will reduce congestion on the GP lanes, and hence reduce HOV degradation caused by the friction factor.
- Project 07-23400 will widen Route 405 at the Dominguez Channel (addition of auxiliary lane), including the new addition of northbound Route 405 on-ramp at Wilmington Avenue, ramp modifications and widening of Wilmington Avenue from East 223rd Street to East 220th Street, a bridge retrofit over Dominguez Channel and traffic signal synchronization. Begin construction 2014; end construction in October 2024. The estimated construction cost is $20 million.
- Project 07-20490 will widen the Ventura Boulevard on-ramp to two lanes plus a HOV lane at the westbound Ventura Boulevard entrance. The increased ramp storage will alleviate congestion on Ventura Boulevard. The construction began in December 2022 and is expected to end in April 2025.
- Project 07-35070 provides active traffic management and related traffic management system upgrades along Route 405 near LAX/Route 105. The construction is projected for May 2025, and contract completion is anticipated by August 2026.
- Improvements along Route 405 South Bay Curve: LA Metro plans new auxiliary lanes to improve traffic flow at on- and off-ramps. Completion would be accelerated from 2028 to 2027.
- LA Metro plans to extend service on the Green and Crenshaw/LAX Lines 4.6 miles southward to a new transit center in Torrance. This South Bay Light Rail Extension project is part of the "28 by 28" initiative. A forecasted opening is between 2030-2033. This project will relieve the congestion on Route 405.
- Project 07-35432 will convert the HOV lanes on Route 405 between the LA/Orange County Line and Route 10 to HOT lanes. Target completion 2035. If properly enforced for occupancy and toll violations, the new HOT lanes

should operate at free-flow conditions using the pricing algorithm.

- Project 07-35433 will convert the one HOV lane on Route 405 between Route 10 and Route 101 to two HOT lanes. Target completion 2029. If properly enforced for occupancy and toll violations, the new HOT lanes should operate at free-flow conditions using the pricing algorithm.
- District 7 is monitoring the impact that the decal program has on the level of degradation.
- District 7 completed the study of possible pavement delineation re-striping to eliminate lane-drop configurations. The study concluded that this is not recommended, due to on-ramp to mainline merging concerns.
- Perform continuous analysis, keeping a record of sensors repeatedly detected as erroneous. Perform ongoing monitoring to detect misconfigurations before they are used in performance reporting. Explore a second data source to determine HOV speeds/degradation. In addition, District 7 will evaluate defective sensors, and begin initiating projects to repair defective sensors.

3.4.14 ACTION PLAN FOR HOV FACILITIES ON ROUTE 605

A. Analysis

- Morning and afternoon peak period recurrent congestion in all lanes reduces northbound and southbound HOV lane performance and speed between Rosecrans Avenue and Valley Blvd (PM 9.0-20.0). Both direction HOV lanes in this segment (approximately PM 14.0-17.0) are extremely degraded during the PM peak period.
- Demand exceeds capacity. During the peak period, the average HOV lane volume is above 1,450 vehicles/hour in congested locations.
- GP lane drops northbound (PM 11.1) and southbound (PM 11.9) (from 4 lanes to 3 lanes) around the Route 5 interchange causing a bottleneck (Fig. 36 and 38).
- High vehicle volumes from Route 5 cause congestion in the northbound GP lanes.
- Vehicle weaving conflicts at ingress/egress locations due to congestion in the GP lanes.
- When there is a narrow buffer between the HOV and GP lanes, congestion or slow-down in GP lanes causes friction in HOV lanes. During the morning peak period, between Rosecrans Avenue and Valley Boulevard (PM 9.0-20.8), the

average GP and HOV speeds southbound are 37.9 and 40.0 mph respectively. During the afternoon peak period for the same location and direction, the average GP and HOV speeds southbound are 23.8 and 27.6 mph respectively.

- High solo violation rates. District 7's 2023 Manual Occupancy Data indicates that the HOV violation rate is between 22.6 and 44.4 percent during AM/PM peak hours at Beverly Blvd. (PM 16.5) and Gridley Rd. (PM 4.6) in both directions.
- The high CAV decal rate and high truck rate contribute to congestion on
- I-605. District 7's 2023 Manual Occupancy Data shows the truck rate is up to 13.2 percent and the CAV decal rate is up to 9.8 percent during peak hours in both directions.

Figures 7.31 and 7.32 provide plots of northbound HOV and GP lane speeds on Route 605 during the fourth quarter of 2023. Figures 7.33 and 7.34 provide plots of southbound HOV and GP lane speeds on Route 605 during the fourth quarter of 2023.

Figure 7.31. Average HOV Lane Speed – Northbound Route 605, Q3 2023

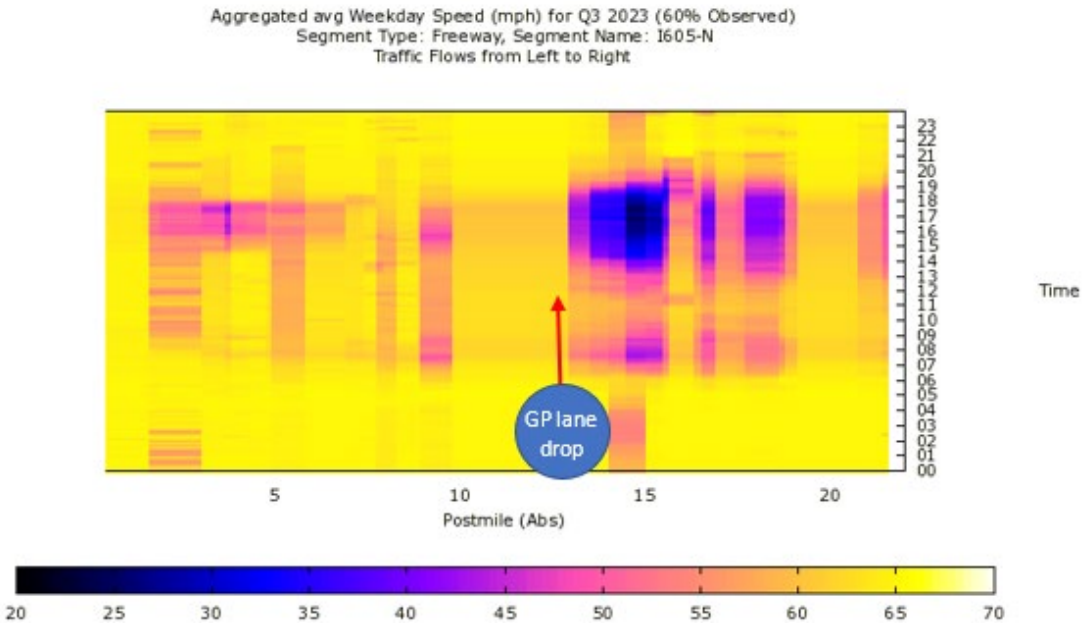


Figure 7.32. Average GP Lane Speed – Northbound Route 605, Q3 2023

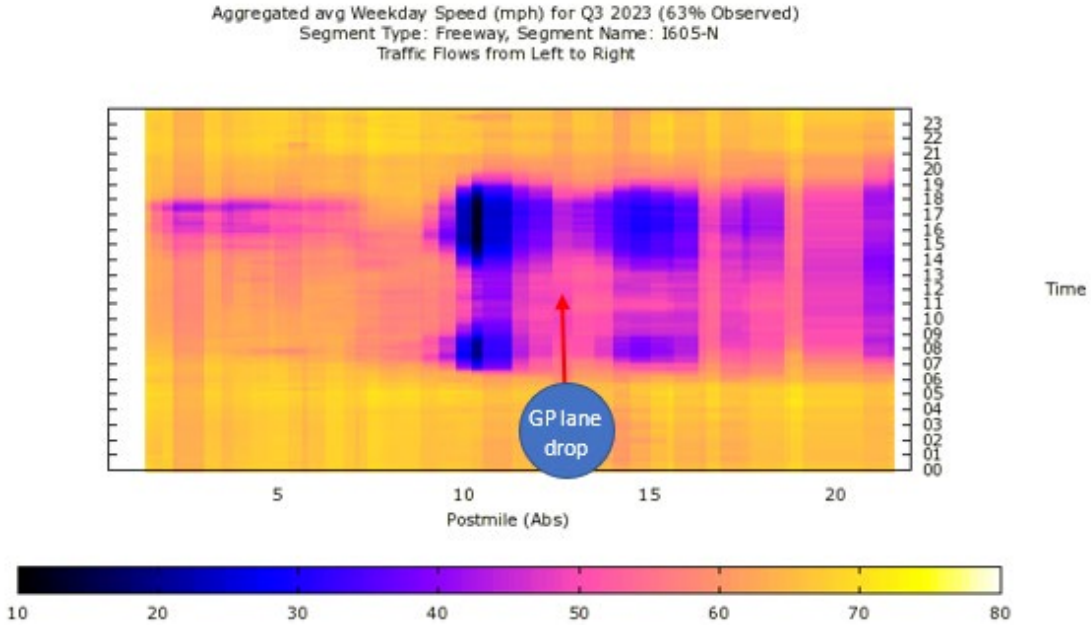


Figure 7.33. Average HOV Lane Speed – Southbound Route 605, Q3 2023

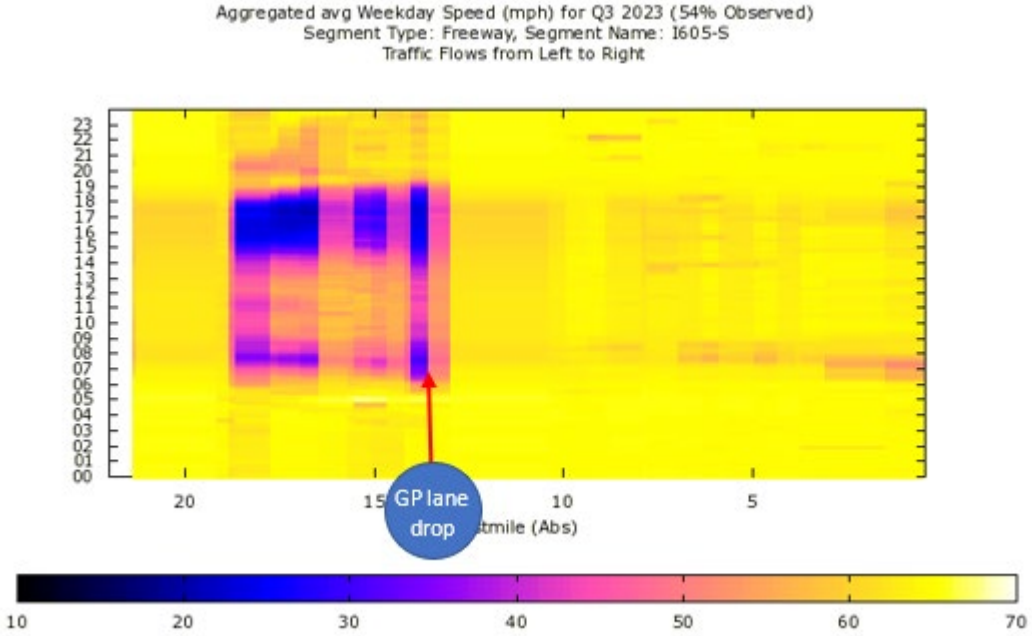
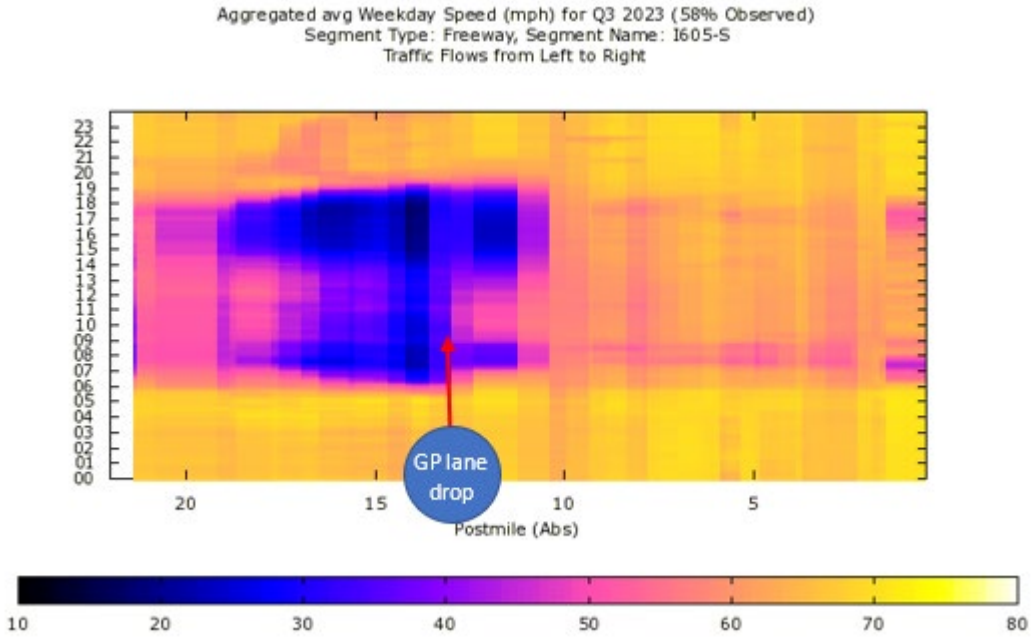


Figure 7.34. Average GP Lane Speed – Southbound Route 605, Q3 2023



B. Remediation Strategies

- District 7 shared vehicle occupancy counts and violation data with the California Highway Patrol (CHP), so they can prioritize their enforcement efforts.
- HOT lanes are proposed for Route 605 between the Orange County line and Route 10. Construction will be funded by Measure R funds and the forthcoming Transportation Strategic Plan-Phase II. The project would also be eligible for federal-aid funding. This project would be implemented in several stages:
    - Project 07-29821 will add one or two HOV or HOT lanes in each direction on Route 605 from Rosecrans Avenue to Slauson Avenue in the cities of Downey, Norwalk, and Santa Fe Springs. This project also includes the construction of new HOV or HOT direct connectors between the HOV/HOT lanes on Route 605 and Route 105. Begin construction in February 2028; end construction January 2031. Construction cost estimate is $ 2.1billion. If properly enforced for occupancy and toll violations, the new HOT lanes should operate at free-flow conditions using the pricing algorithm.
    - Project 07-3101U will widen Route 605 to add one GP lane and one HOV or HOT lane in each direction between Slauson Avenue and Route 10. Begin construction in February 2028; end construction in January

2031. The construction cost estimate is $ 2.8 billion. If properly enforced for occupancy and toll violations, the new HOT lanes should operate at free-flow conditions using the pricing algorithm.

- Implement access strategies, including increasing the length of access area or frequency of access, continuous access, or modification/elimination of bottlenecks such as ingress/egress locations. These improvements have already been incorporated into the pavement rehabilitation project in the design stage at this time. The pavement rehabilitation project (EA 07-35660) will implement access strategies on Route 605, between Telegraph Road Undercrossing and I-605/I-10 Separation including increasing the length of access area or frequency of access and modification/elimination of bottlenecks such as ingress/egress locations. Construction is expected to begin in 2024 and end in 2029.
- The Alameda Corridor-East (ACE) Project founded by The San Gabriel Valley Council of Governments (SGVCOG) will mitigate the impacts of significant increases in freight rail traffic on over 70 miles of mainline railroad in the San Gabriel Valley. The ACE Project consists of a comprehensive program of safety improvements and mobility upgrades at an estimated cost of $1.9 billion. It is anticipated to be completed by the summer of 2025. The project will mitigate the impacts of growth in trade transported by train along the Alameda Corridor-East Trade Corridor transcontinental rail network in Southern California, which carries about 16% of all oceangoing containers in the United States. This project will also relieve truck traffic from Long Beach and San Pedro to the Inland Empire region, thereby reducing truck traffic and congestion on the GP lanes; hence, reducing HOV lane degradation due to friction factors by GP lanes. For more details on the updates of construction completion, please visit the website at https://www.theaceproject.org/.
- District 7 has completed the study on the possible pavement delineation re-striping to eliminate lane-drop configurations on Route 605. There are two proposed projects (EAs 29821 and 3101U) that will include the construction of some auxiliary lanes at locations where the roadway will be widened. These proposed improvements would eliminate some of the lane-drop configurations. The completion is expected in June 2032.
- Perform continuous analysis, keeping a record of sensors repeatedly detected as erroneous. Perform ongoing monitoring to detect misconfigurations before they are used in performance reporting. Explore a second data source to determine HOV speeds/degradation. In addition, district 7 will evaluate defective sensors, and begin initiating projects to repair

defective sensors.

3.5. DISTRICT 8 2025 DEGRADATION ACTION PLANS

3.5.1 ACTION PLAN FOR HOV FACILITIES ON ROUTE 10

This 8.5-mile corridor which begins in the City of Montclair at the LA county line and ends in the City of Ontario west of I-15, is an arterial multilane urban freeway with one continuous access HOV lane in each direction. The HOV-lane is bordered by various width of treated shoulder adjacent to median concrete barrier on the left and General-Purpose Lanes separated with Detail 42 on the right.

A. Analysis

D8 – Route 10 Eastbound and Westbound (AM & PM)

No analysis was performed on this section of I-10 because of the current ongoing SBCTA sponsored project (08-0C251) to convert the existing the one lane HOV 2+ per direction to two toll lanes with HOV 3+ per direction.

The AM and PM peak hour volume on WB: 1598 and 1507 (2018-Counting).

The AM and PM peak hour volume on EB: 1417 and 1678 (2018-Counting).

The 2019 violation rate on I-10 HOV was 23.3%.

B. Remediation Strategies

- 08-0C251 (phase 1), LA PM 44.9-48.3 & SBD PM 0.00-13.20 to convert from a single HOV-2+ lane in each direction to two HOT-3+ lanes in each direction from East of Dudley Street in Los Angeles County to Route 15 in San Bernardino County will increase the existing capacity of the HOV facility. This project will improve the minimum operating speed as mandated by FHWA. Project cost estimate is $901.8 million. Construction began in September 2018 and scheduled to end in October 2025.
- 08-0J400, SBD 3.8-5.6 to construct partial cloverleaf Inter Change (IC) at Grove Ave., remove Fourth St IC, replace Under Crossing (UC) at Grove Ave. & Fourth St. and widen Fourth St. This project will improve the capacity of the Fourth St. IC and thereby improving the minimum operating traffic speed as mandated by FHWA on I-10 in the vicinity. Project cost estimate is $199.4 million. The construction is scheduled to begin in March 2028 and end in May 2029.
    - Desired Outcome: This project is anticipated to increase the freeway capacity in the vicinity and thereby eliminating recurrent congestion both in HOV and GP lanes.

- 08-1F550, SBD 1F550, SBD 5.0-10.0 from 0.2 miles west of Fourth St. UC to 0.2 miles east of I-15 to install double-luminaire lighting, replace sign panels and install high mast lighting. This project will improve traffic safety and increase speed in the dark hours; thereby improving the traffic speed on the pertaining segment. Project cost estimate is $8.2 million. The construction began in September 2018 and scheduled to end in October 2025.
    - Desired Outcome: This project is anticipated to increase the freeway speed in the pertaining segment and thereby improving the congestion both in HOV and GP lanes.
- 08-0C253, SBD 10.0-21.0 from east of I-15 to Pepper Ave. in Colton to add a single HOT-3+ lane in each direction as a continuation of the I-10 managed lane corridor EA 08-0C251. This project will improve the minimum operating speed as mandated by FHWA. Project cost estimate is $778 million. The construction is scheduled to begin in November 2025 and end in August 2027.
    - Desired Outcome: This project is anticipated to increase the freeway capacity and thereby eliminating recurrent congestion both in HOV and GP lanes.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.

3.5.2 ACTION PLAN FOR HOT FACILITIES ON ROUTE 15

A. Analysis

The interregional traffic between the State of Nevada through the county of San Bernardino and Riverside to the county of Orange and Los Angeles, and the accelerated growth and development of cities and communities along I-15 is contributing to congestion along the I-15 corridor. Re-authorization of measure "A" calls for the widening of I-15 to reduce congestion and improve regional mobility. SBCTA (formerly SANBAG) contacted Caltrans District 8, by a letter

dated September 9, 2011, to study feasibility of implementing High Occupancy Toll (HOT) lanes along I-15 from Riverside County Line to US-395. (Ref.: EA 0J080G]

Currently, we have several projects for the purpose. Among others are the following:

- 08-0F540: Improve 15-91 Junction (JCT) and traffic flow on SR-91 by adding HOT lane in each direction along SR-91 from SR-241 to I-15, Mixed Flow (MF) lane and constructing Collector Distributor (CD) from Main St to I-15. Construction schedule: 05/08/2013 –10/02/2023.
- 08-0J080: Construct (2) HOT lanes in each direction along I-15 between Cajalco Rd and SR-60. Construction schedule: 04/13/2017 – 08/01/2024.
- 08-0F543: Construct direct HOT lane connectors within 15-91 JCT between SR-91 (west leg) to I-15 (north leg) and I-15 (south leg). Construction schedule: 04/10/2020 – 04/30/2027.

There are degraded locations on Route 15 HOT lane facilities per Caltrans HQ data. RCTC, the operator of Route 15 HOT lane facilities, disagreed with Caltrans HQ data and claimed that degraded locations have VDS issues. RCTC collects data through RCTC managed gantry. Caltrans D8 Electrical Operations is working to verify the VDS functionality to resolve the data discrepancy.

Northbound traffic (AM & PM):

Please refer to Figures 8.1(A) and 8.1(B)

Northbound I-15 HOT lane were not degraded except slightly degraded (between 10% and 49%) at two locations in the AM and PM peak at about 0.4 mile north of Ontario Ave undercrossing (UC) before SR-91JCT and Parkridge Ave UC after SR-91JCT respectively. Due to proximity to the 15-91 freeway-to-freeway (F2F) Junction (JCT), these slightly degradations were most likely due to propagation of typical traffic turbulences that occur within a F2F JCT.

Data for the graphs on Figures 8.2, 8.3, and 8.4 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

There were 141 collisions reported on this segment during the 6 months period from 07/01/2023 to 12/31/2023. Of these 141 collisions, there were 8 collisions that occurred on HOT and left lanes. Of these 8 collisions, 1 collision happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 133 collisions on right lanes and interior lanes might be not directly impact to the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOT lane and left lanes on the opposite direction did not directly impact the degradation on the HOT lane in discussion. However, due to close proximity to the HOT lane in discussion, drivers on the HOT lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOT lane in discussion.

Southbound traffic (AM & PM):

Please refer to Figure 8.1(C) and Figure 8.1(D)

The outliers in the data between Absolute Postmiles 100.500 and 98.000 are most likely due to questionable condition of Caltrans Vehicle Detection System (VDS) equipment on site that requires verification for the next year Action Plan Report.

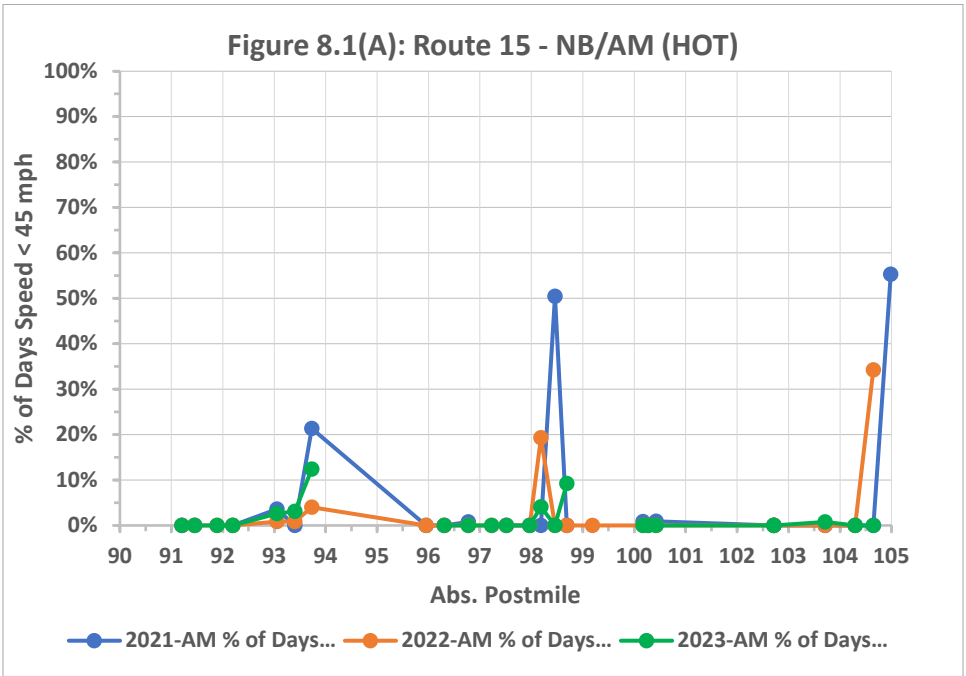
Data for the graphs on Figures 8.2, 8.3, and 8.4 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

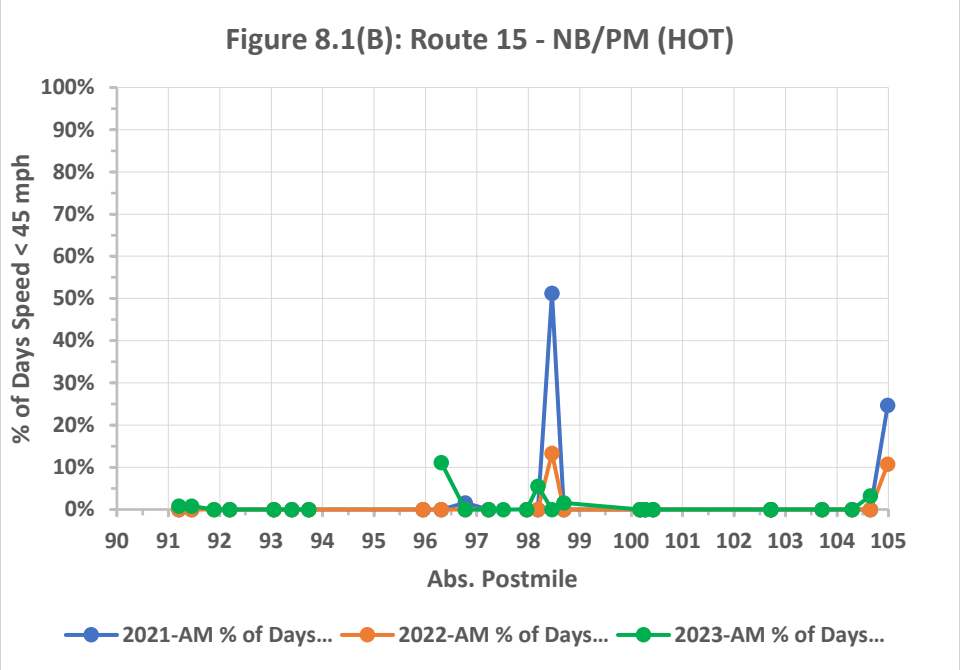
There were 144 collisions reported on this segment during the 6 months period from 07/01/2023 to 12/31/2023. Of these 144, there were 6 collisions that happened on HOT and left lanes. Of these 6, 4 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 138 collisions on right lanes and interior lanes might be not directly impact to the degradation. However, it may distract drivers causing them to slow down.

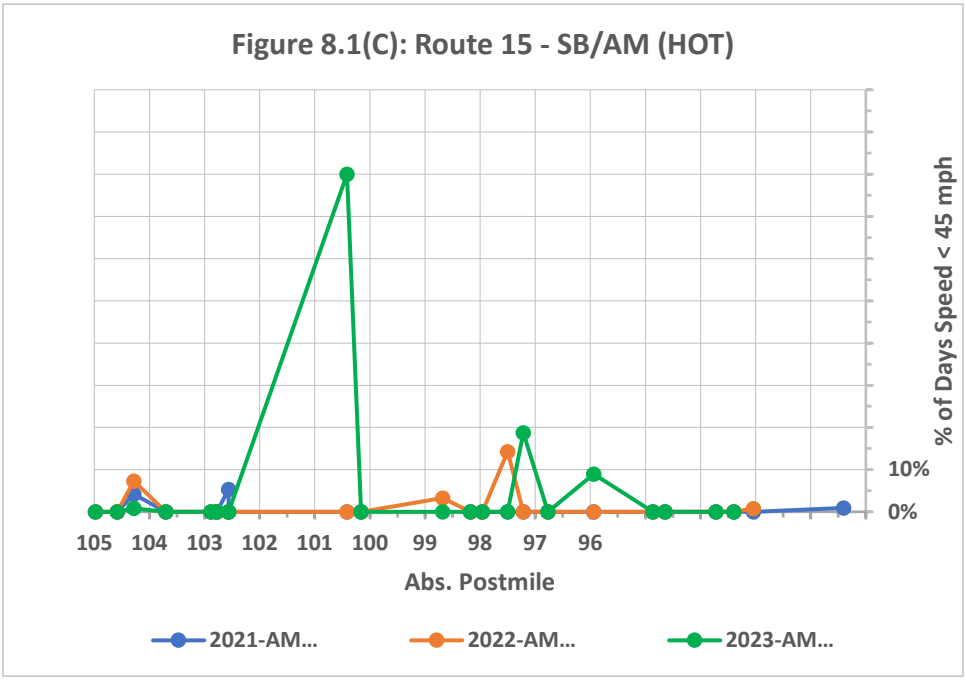
Collisions on HOT lane and left lanes on the opposite direction did not directly impact the degradation on the HOT lane in discussion. However, due to close proximity to the HOT lane in discussion, drivers on the HOT lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOT lane in discussion.

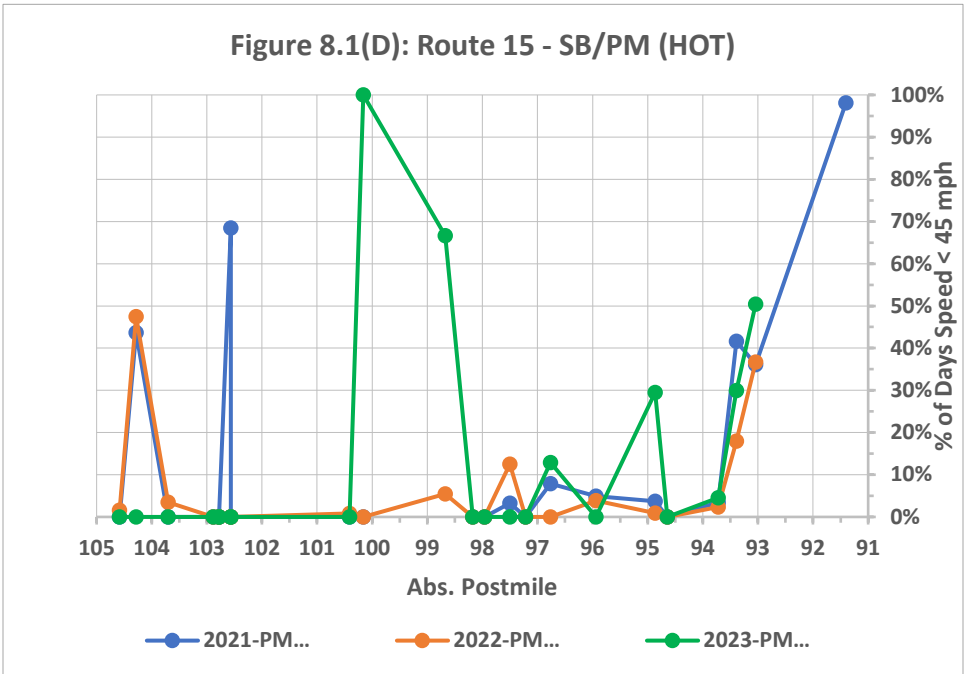
Figure 8.1. Combined Degradation Charts: 2021 v. 2022 v. 2023 - Route 15 HOT





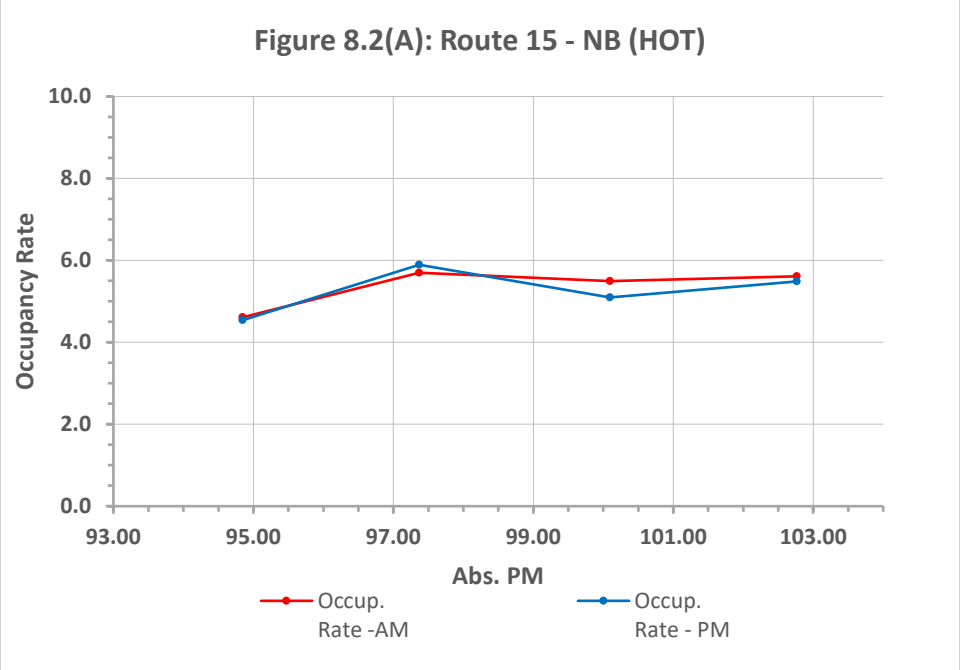
NAME	Abs Postmile
Cajalco Road	91.205
Cajalco Road(T)	91.454
EL CERRITO RD	91.887
El Cerito Rd(T)	92.195
Ontario Ave(T)	93.052
ONTARIO N/B ON	93.403
ONTARIO AVE. 0.4 N/O	93.732
15/91 JCT 1000 S/O	95.951
PARKRIDGE 500 FT S/O	96.306
CORONA OC 100 FT S/O	96.776
HIDDEN VALLEY	97.227
HIDDEN VALLEY	97.513
SECOND ST	97.970
SECOND ST	98.185
SECOND ST OC .3 N/O	98.460
THIRD ST 400 FT N/O	98.687
FOURTH ST OC 100 FTN/O	99.187
SIXTH ST SB	100.168
SIXTH ST	100.268
SIXTH ST. .25 N/O	100.423
Limonite Ave(L)	102.716
Limonite Ave(L)	102.716
LIMEONITE .25 N/O	103.713
CANTU GALLEANO SB ON	104.293
CANTU GALLEANO NB LP	104.648
15/60 IC 1 MILE S/O	104.987



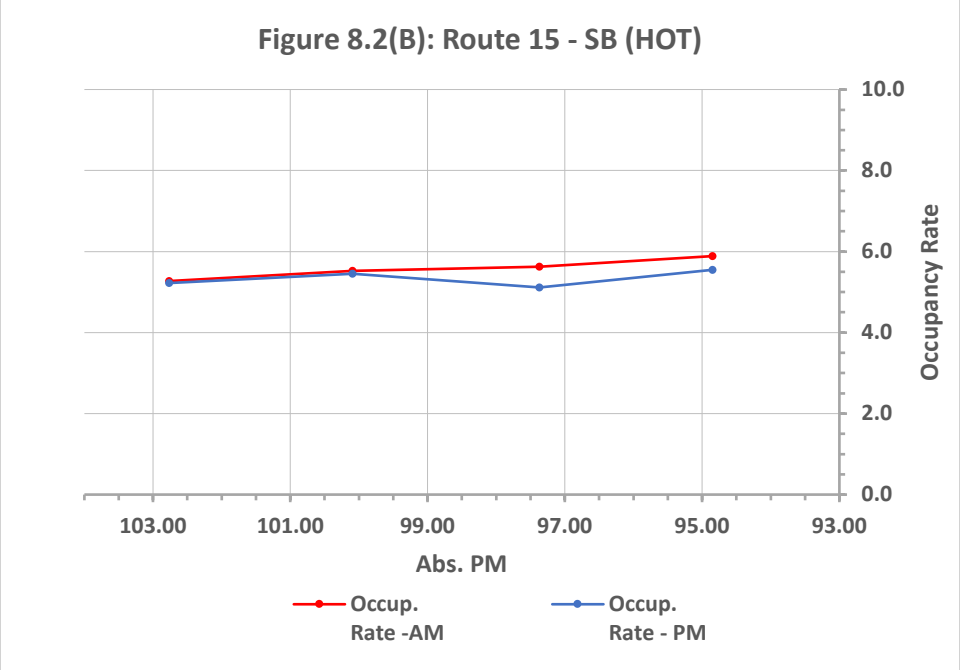


NAME	Abs Postmile
15/60 IC 1 MILE S/O	104.977
CANTU GALLEANO SB LP	104.583
CANTU GALLEANO SB ON	104.283
LIMEONITE .25 N/O	103.703
LIMEONITE NB ON	102.883
LIMONITE AVE (L)	102.779
LIMONITE AVE (L)	102.779
LIMEONITE SB ON	102.563
LIMEONITE SB ON	102.563
SIXTH ST. .25 N/O	100.413
SIXTH ST SB	100.158
THIRD ST 400 FT N/O	98.677
SECOND ST	98.175
SECOND ST	97.960
HIDDEN VALLEY	97.503
HIDDEN VALLEY	97.217
CORONA OC 100 FT S/O	96.766
15/91 JCT 1000 S/O	95.941
MAGNOLIA N/B ON	94.863
Magnolia Ave(T)	94.644
ONTARIO AVE. 0.4 N/O	93.722
ONTARIO N/B ON	93.393
Ontario Ave(T)	93.042
Cajalco Road	91.404

Figure 8.2. Occupancy Rate: Spring 2024 – Route 15 NB & SB HOT

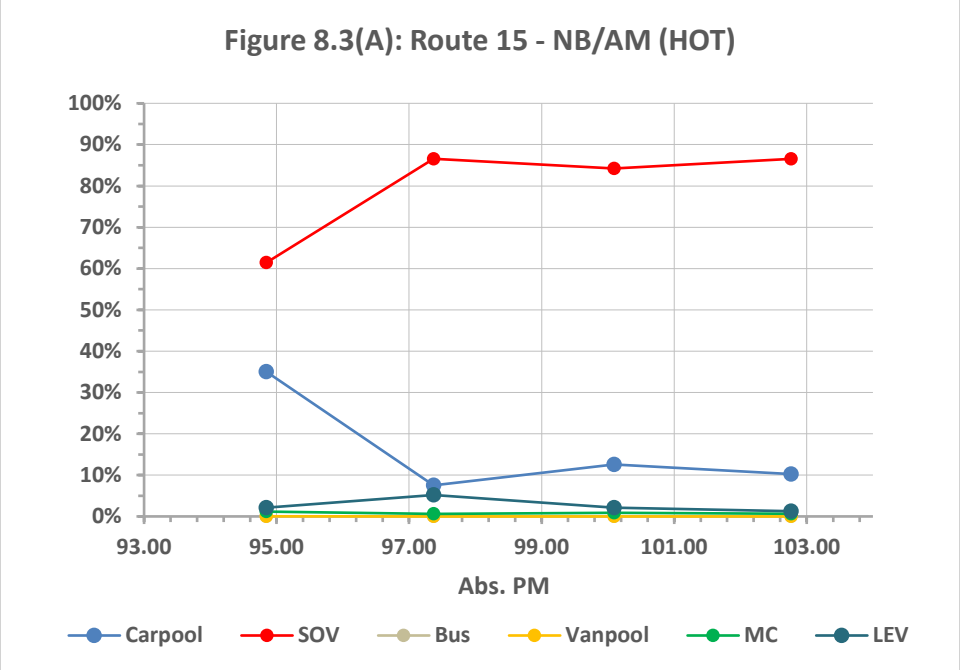


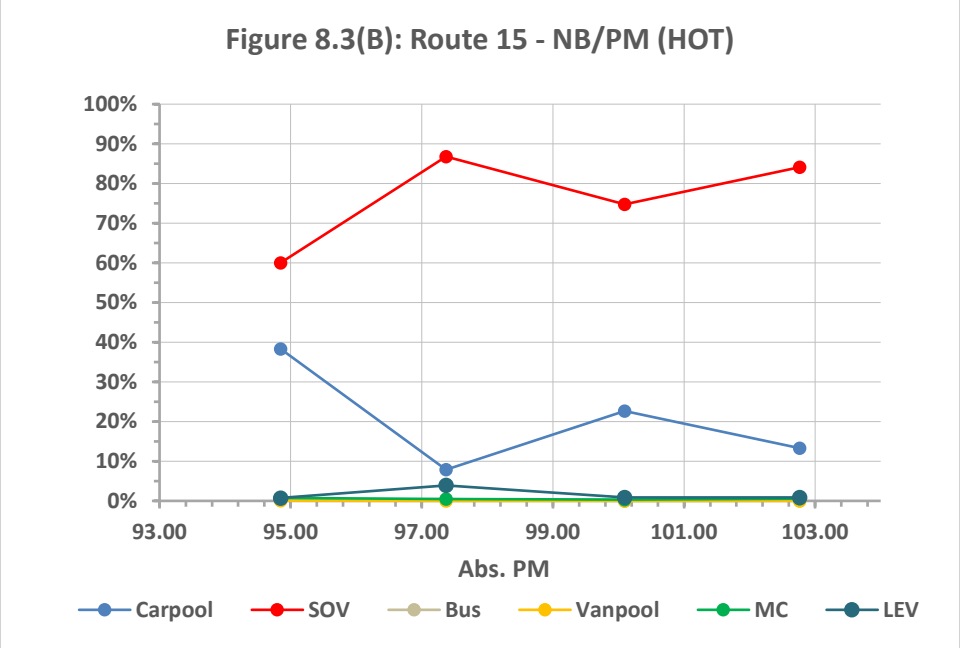
Counting Location	Abs. Postmile	
Magnolia Av.	94.845	HOT
Hidden Valley Pkwy	97.370	HOT
6th St.	100.094	HOT
Limonite Av.	102.764	HOT



Counting Location	Abs. Postmile	
Limonite Av.	102.764	HOT
6th St.	100.094	HOT
Hidden Valley Pkwy	97.370	HOT
Magnolia Av.	94.845	HOT

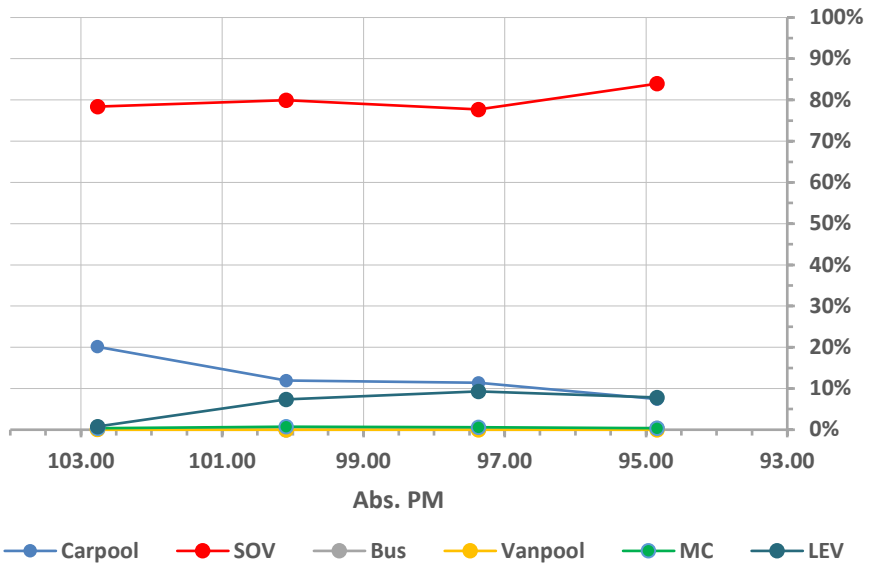
Figure 8.3. Type of Vehicles: Spring 2024 – Route 15 (HOT)





Counting Location	Abs. Postmile	
Magnolia Av.	94.845	HOT
Hidden Valley Pkwy	97.370	HOT
6th St.	100.094	HOT
Limonite Av.	102.764	HOT

Figure 8.3(C): Route 15 - SB/AM (HOT)



Counting Location	Abs. Postmile	
Limonite Av.	102.764	HOT
6th St.	100.094	HOT
Hidden Valley Pkwy	97.370	HOT
Magnolia Av.	94.845	HOT

Figure 8.3(D): Route 15 - SB/PM (HOT)

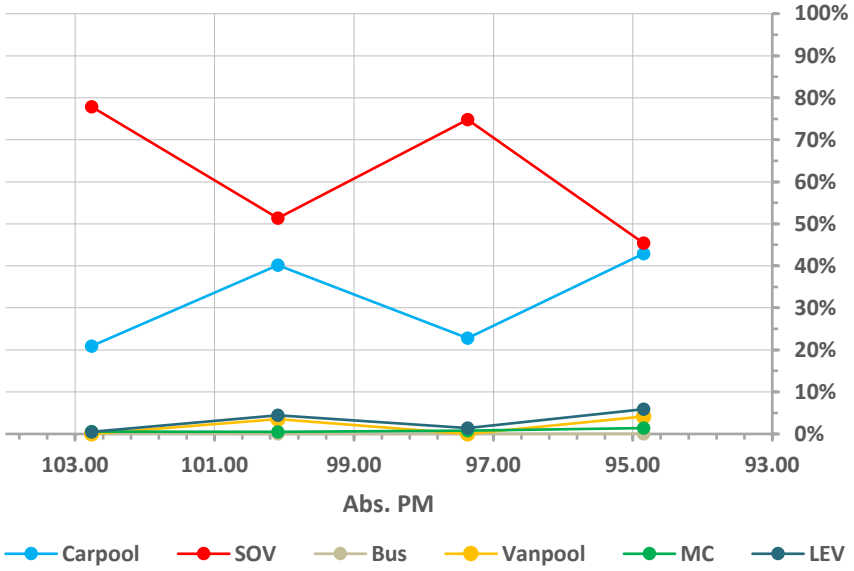
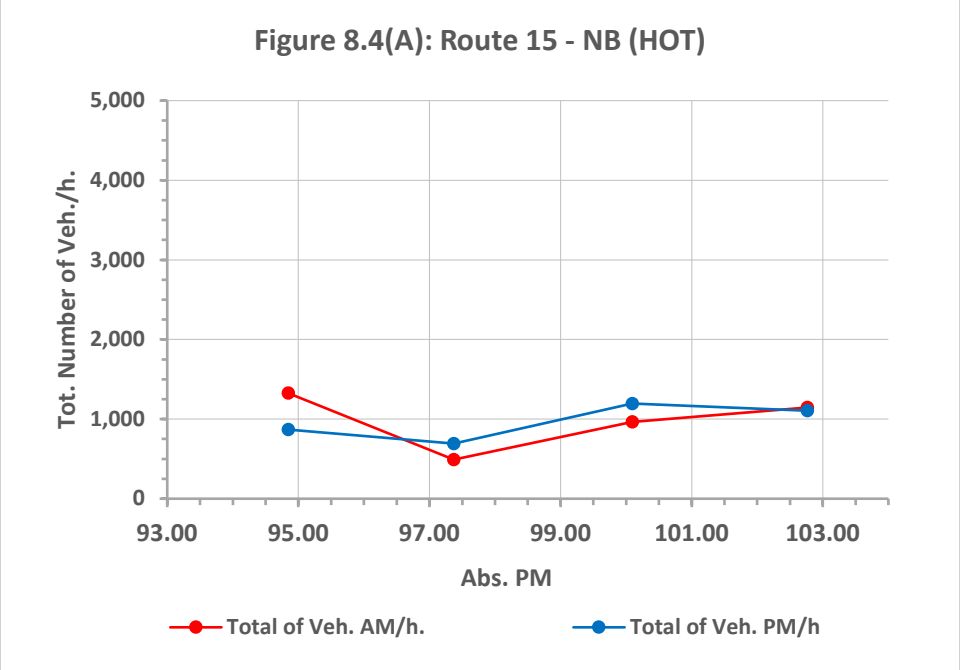
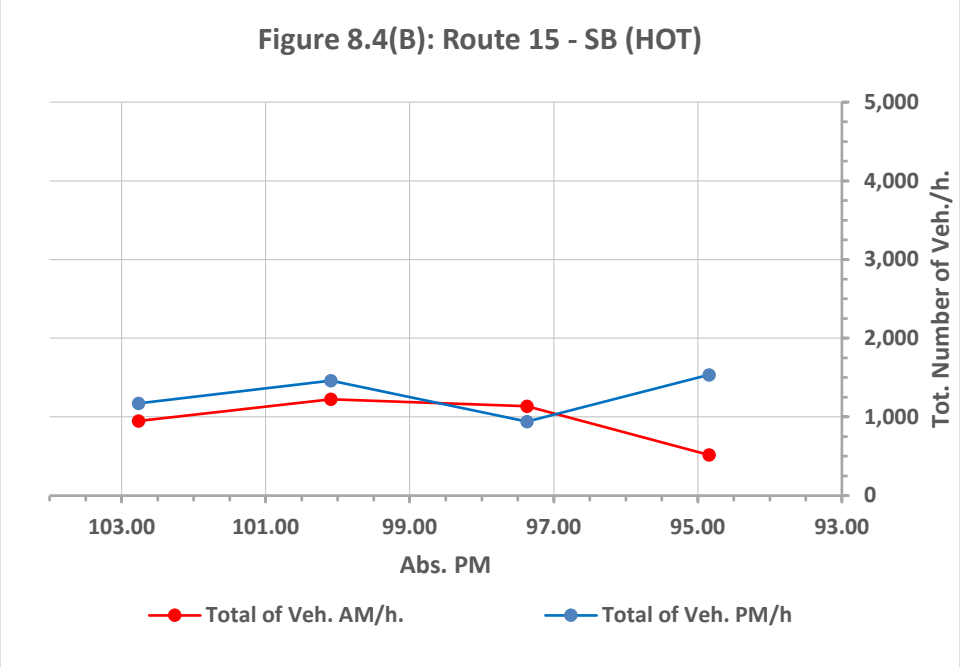


Figure 8.4. Total Number of Vehicles/Hour: Spring 2024 - Route 15 (HOT)



Counting Location	Abs. Postmile	
Magnolia Av.	94.845	HOT
Hidden Valley Pkwy	97.370	HOT
6th St.	100.094	HOT
Limonite Av.	102.764	HOT



Counting Location	Abs. Postmile	
Limonite Av.	102.764	HOT
6th St.	100.094	HOT
Hidden Valley Pkwy	97.370	HOT
Magnolia Av.	94.845	HOT

B. Remediation Strategies

SBCTA & RCTC are sponsoring a project to widen and extend the 15 Express Lanes farther north and south which should resolve this degradation on the I-15 corridor. Project 08-0R801 sponsored by SBCTA for the northerly extension and 08-0J082 sponsored by RCTC for the southerly extension are scheduled to begin construction in December 2024 and March 2027 respectively. The end of the construction for 08-0R801 and 08-0J082 are scheduled in December 2027 and March 2030 respectively.

Northbound traffic

After the completion of the aforementioned projects (08-0F540, 08-0J080 & 08-0F543), the congestion within the I-15 corridor should be reduced and regional mobility should be improved.

Southbound traffic

RCTC has worked with Caltrans on the operation of ramp meters, the paving of shoulders, and toll rate increases.

Caltrans has initiated a project EA 08-1N690 on I-15 SB which is an interim project to extend the southbound MF lane#4 that merges to MF lane #3 before Cajalco Rd UC to connect to the recently constructed I-15 auxiliary lane between Cajalco Rd. on-ramp and Weirick Rd. off-ramp and traps that MF lane#4 into the Weirick off ramp. The project is currently in design with a stated goal to be constructed from November 2024 to February 2025.

RCTC is in the planning phase for an extension of the 15 Express Lanes (EA 08-0J082) between Cajalco Rd, and SR-74. This project will achieve its objectives progressively during construction phase from March 2027 to March 2030 as stated by RCTC.

3.5.3 ACTION PLAN FOR HOV FACILITIES ON ROUTE 60

HOV lanes in Route 60 are covered in two segments. The first segment is from the Los Angeles/San Bernardino County Line to IC 60/91/215 in Riverside County. The second segment is from IC 60/215 to Redlands Blvd in the City of Moreno Valley.

D8 – Route 60 Eastbound from LA County to IC 60/91/215 (AM & PM)

A. Analysis

Please refer to Figure 8.5(A) and Figure 8.5(B). These plots shows the degradation along the corridor in the last three years. Gaps on the graphs show that no data is available along the pertaining gaps either in 2021, 2022 or 2023.

This corridor with the length of about 20 miles, only has a minimal amount of data. We are continuously working with D8 TMS unit to get updated information about the status of detectors. However, in 2021, 2022, and 2023 during AM & PM Peak, a degradation occurred between Vineyard Ave. & Archibald Ave. (about Abs. PM 38.000) due to traffic from/to Ontario International Airport.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 60(5).

Data for the graphs on Figures 8.6 to 8.9 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

There were 335 collisions reported on this segment during the 6 months period from 07/01/2023 to 12/31/2023. Of these 335, there were 38 collisions that happened on HOV and left lanes. Of these 38, 17 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 217 collisions on right lanes and interior lanes might be not directly impact to the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

D8 – Route 60 Westbound from LA County to IC 60/91/215 (AM & PM)

Please refer to Figure 8.5(C) and Figure 8.5(D). These plots shows the degradation along the corridor in the last three years. Gaps on the graphs show that no data is available along the pertaining gaps either in 2021, 2022 or 2023.

This corridor with the length of about 20 miles, only has a minimal amount of data. We are continuously working with D8 TMS unit to get updated information about the status of detectors. However, in 2021, 2022, and 2023 during AM & PM Peak, a degradation occurred between Vineyard Ave. & Archibald Ave. (about Abs. PM 38.000) due to traffic from/to Ontario International Airport.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 60(6).

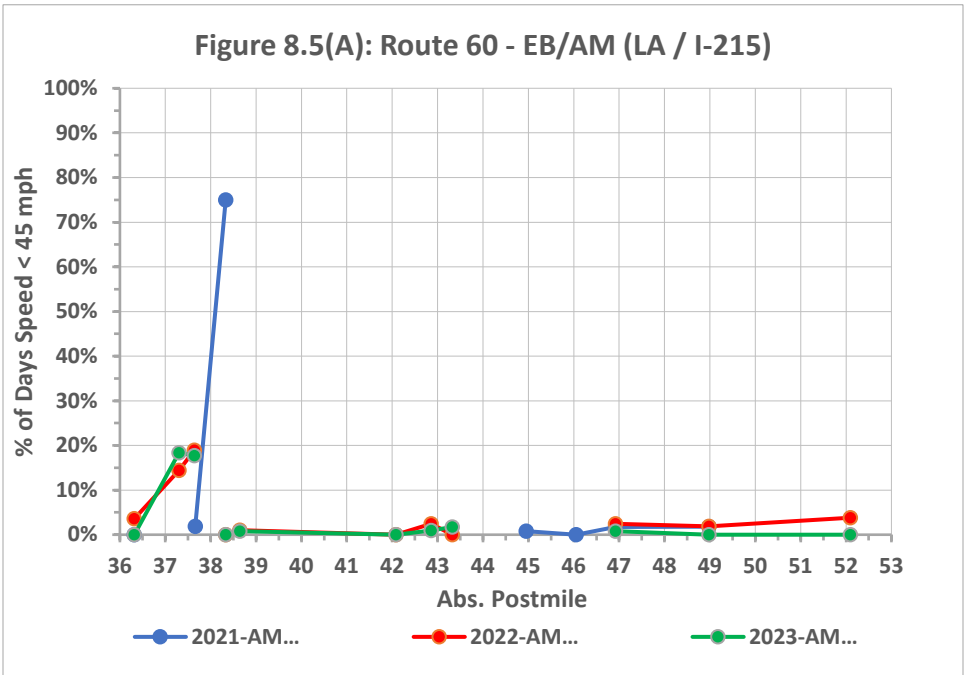
Data for the graphs on Figures 8.6 to 8.9 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

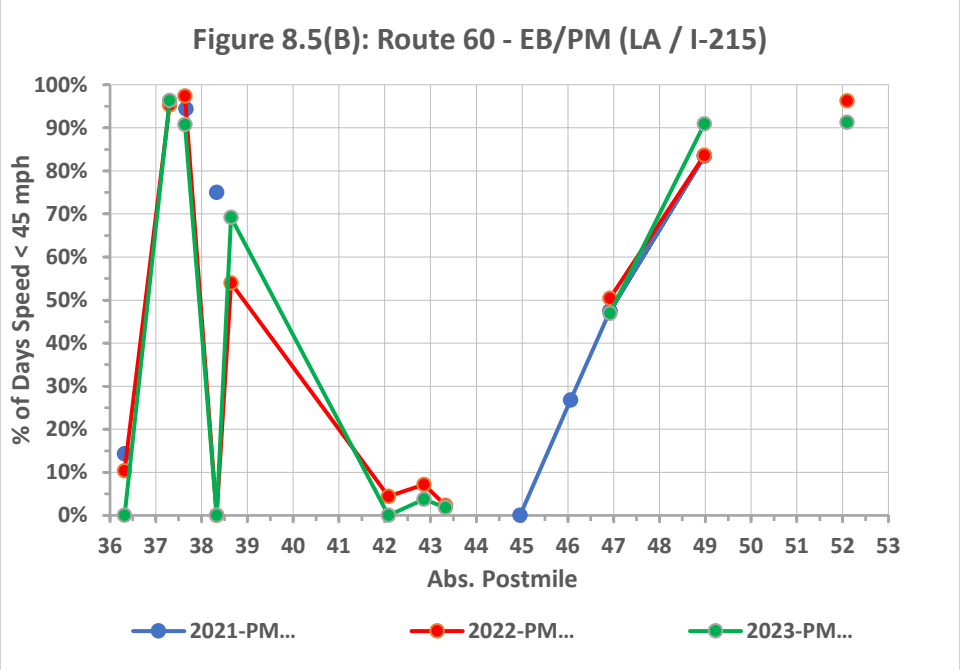
There were 240 collisions reported on this segment during the 6 months period from 07/01/2023 to 12/31/2023. Of these 240, there were 27 collisions that happened on HOV and left lanes. Of these 27, 20 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 74 collisions on right lanes and interior lanes might be not directly impact to the degradation. However, it may distract drivers causing them to slow down.

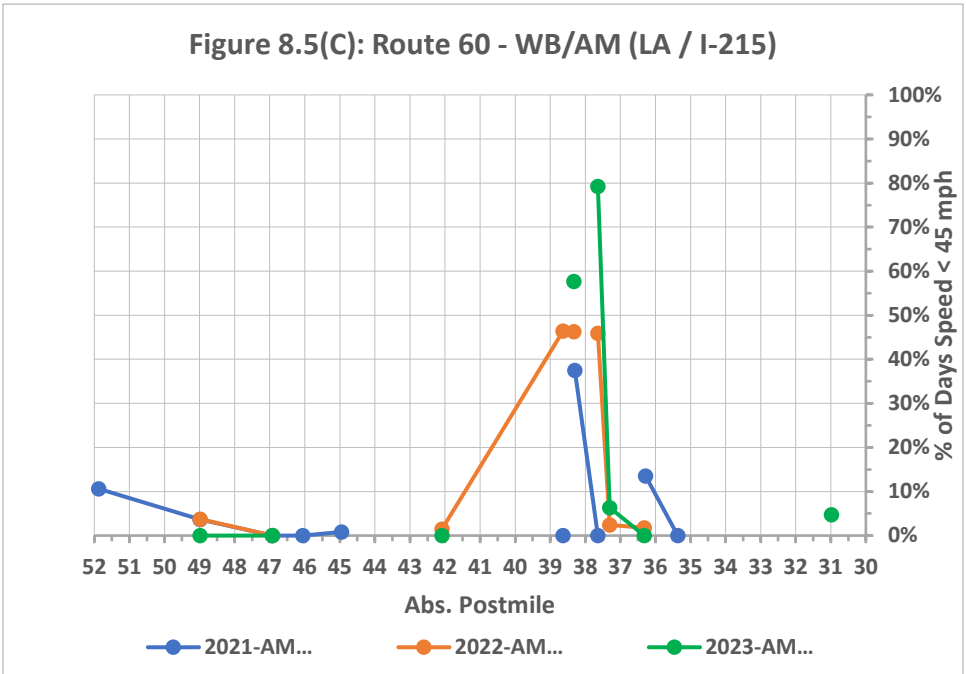
Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

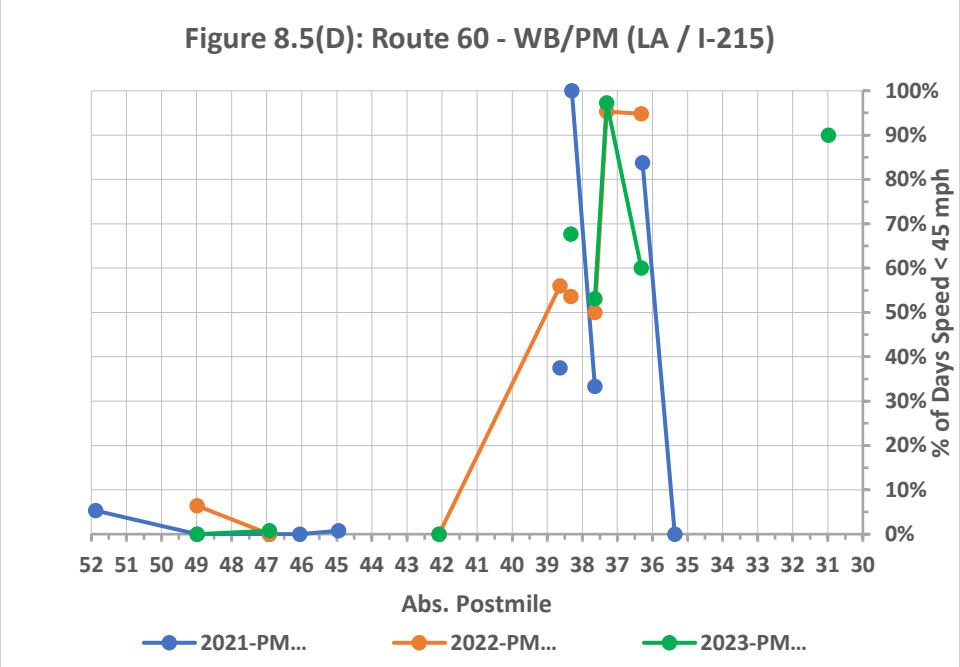
Figure 8.5. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 60 (LA to I-215)





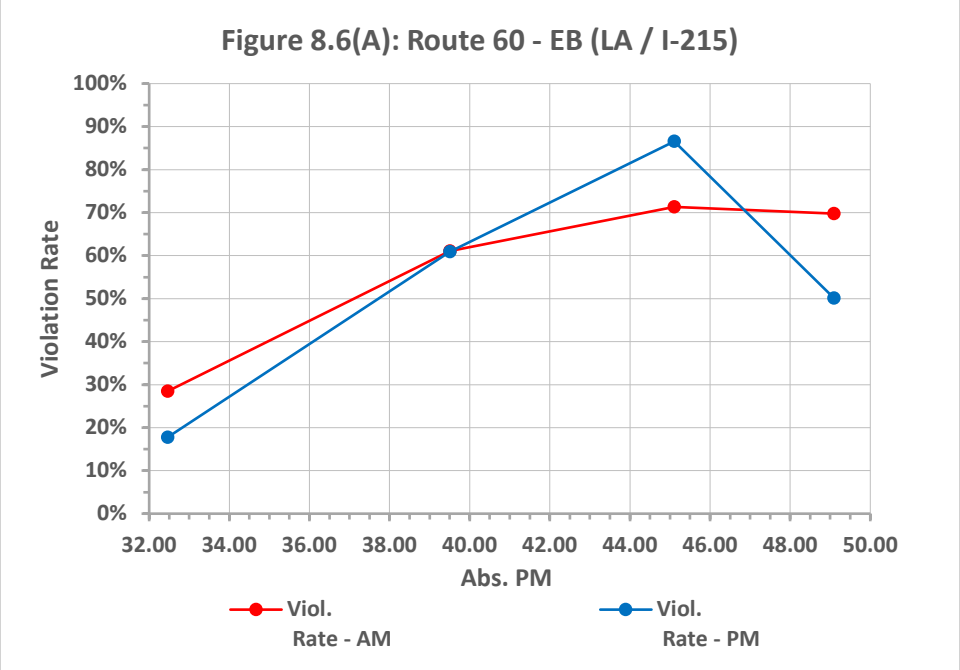
NAME	Abs Postmile
GROVE	36.318
VINEYARD	37.301
VINEYARD	37.639
VINEYARD	37.660
ARCHIBALD	38.330
ARCHIBALD	38.640
Mission Blvd	42.081
Etiwanda Ave	42.857
County Village Rd	43.325
PEDLEY RD	44.955
PYRITE AVE	46.055
0.8 MI E/O Pyrite	46.920
W/O RUBIDOUX	48.980
MAIN ST	52.095



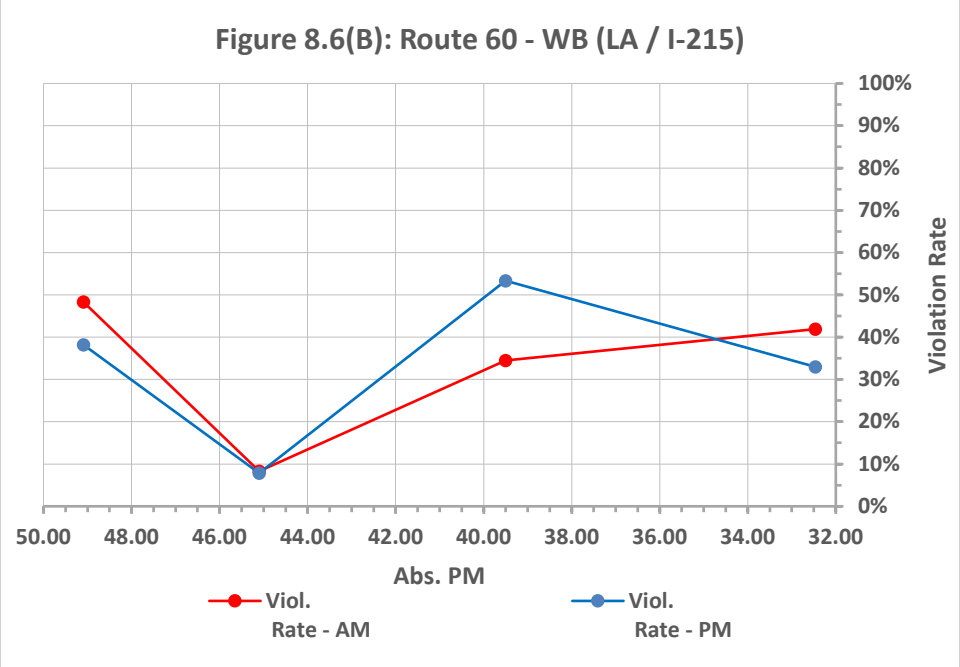


NAME	Abs Postmile
W/O Main Street	51.880
W/O RUBIDOUX	48.980
0.8 MI E/O Pyrite	46.920
PYRITE AVE	46.055
PEDLEY RD	44.955
Mission Blvd	42.081
ARCHIBALD	38.640
ARCHIBALD	38.330
ARCHIBALD	38.299
VINEYARD	37.639
VINEYARD	37.301
GROVE	36.318
GROVE	36.279
EUCLID	35.363
END AVE	30.979

Figure 8.6. Violation Rate: Spring 2024 – Route 60 EB & WB (LA / I-215)

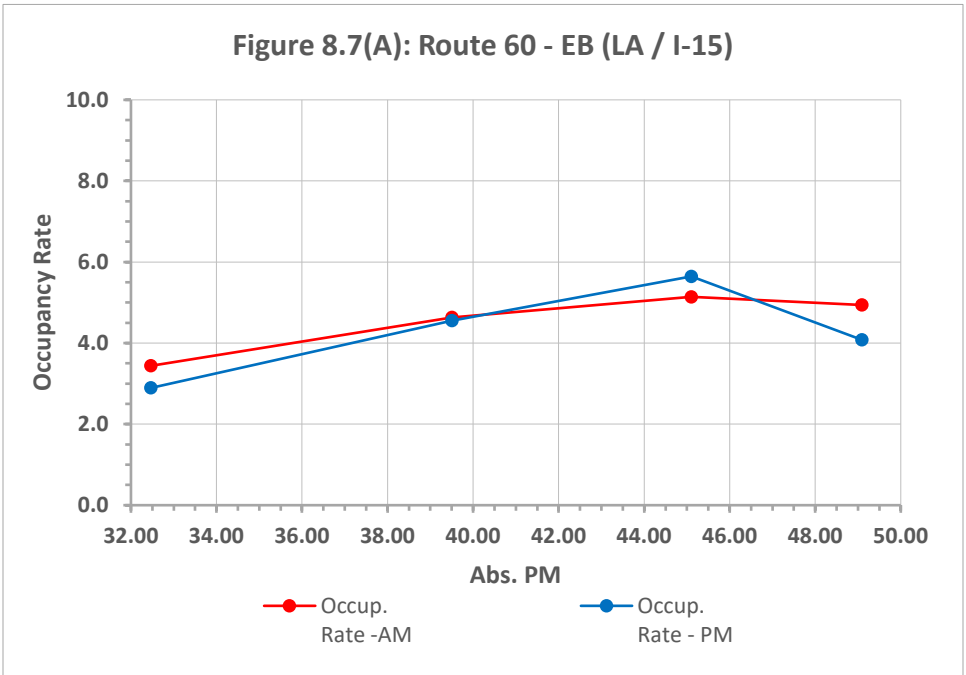


Counting Location	Abs. Postmile
Monte Vista Av.	32.463
Haven Av.	39.503
Pedley Rd.	45.103
La Rue St.	49.093

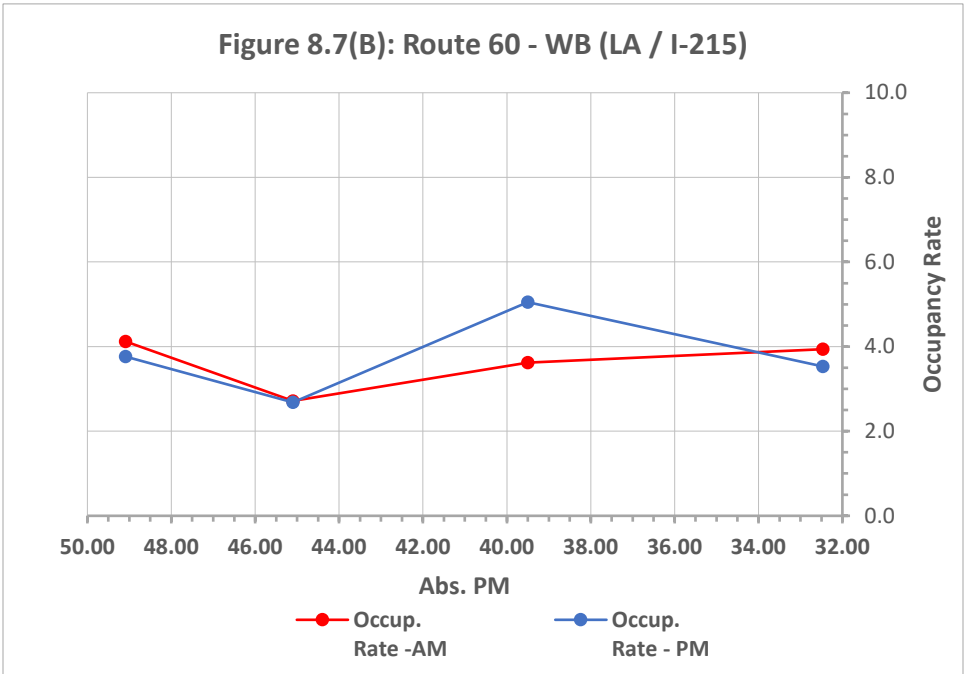


Counting Location	Abs. Postmile
La Rue St.	49.093
Pedley Rd.	45.103
Haven Av.	39.503
Monte Vista Av.	32.463

Figure 8.7. Occupancy Rate: Spring 2024 – Route 60 EB & WB (LA/ I-215)

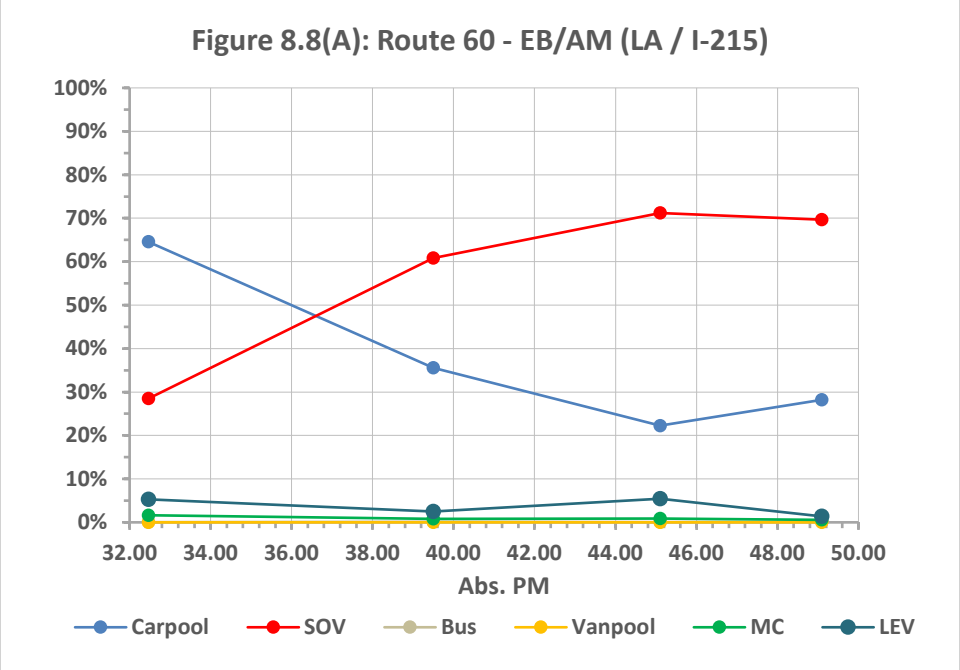


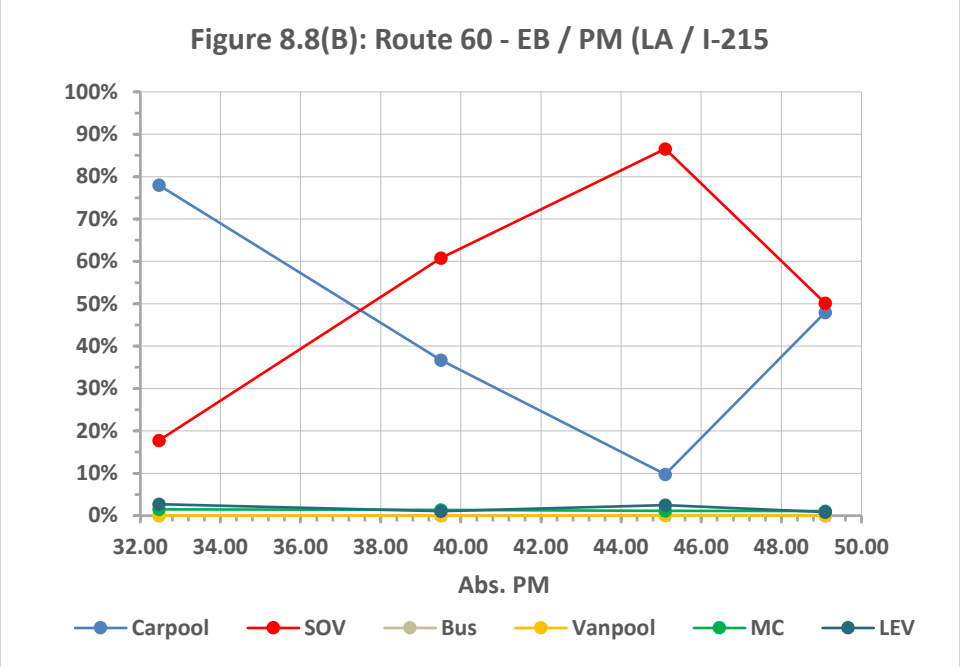
Counting Location	Abs. Postmile
Monte Vista Av.	32.463
Haven Av.	39.503
Pedley Rd.	45.103
La Rue St.	49.093



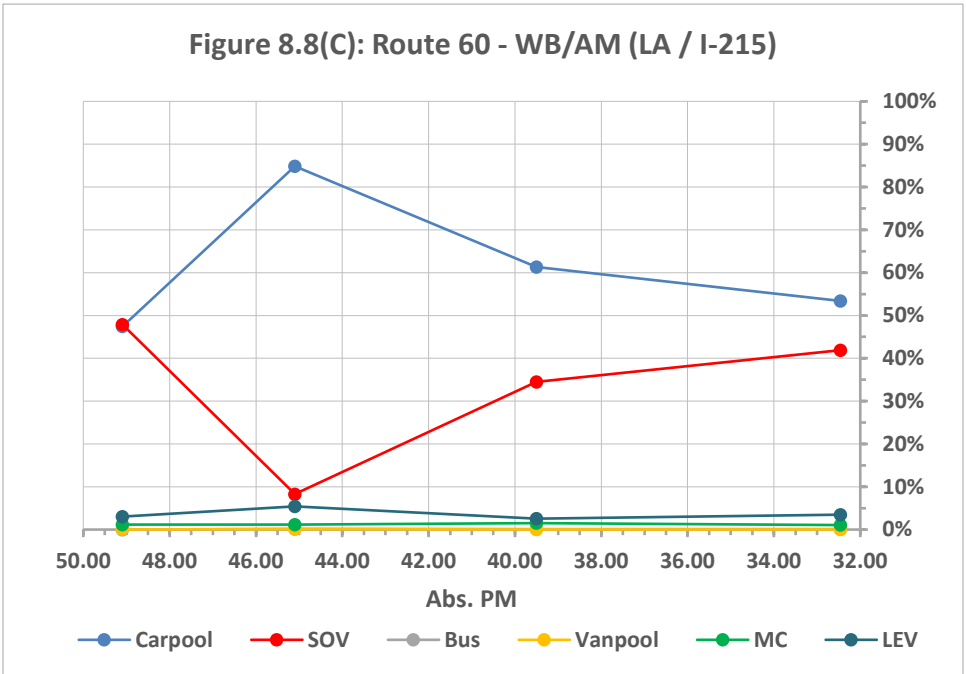
Counting Location	Abs. Postmile
La Rue St.	49.093
Pedley Rd.	45.103
Haven Av.	39.503
Monte Vista Av.	32.463

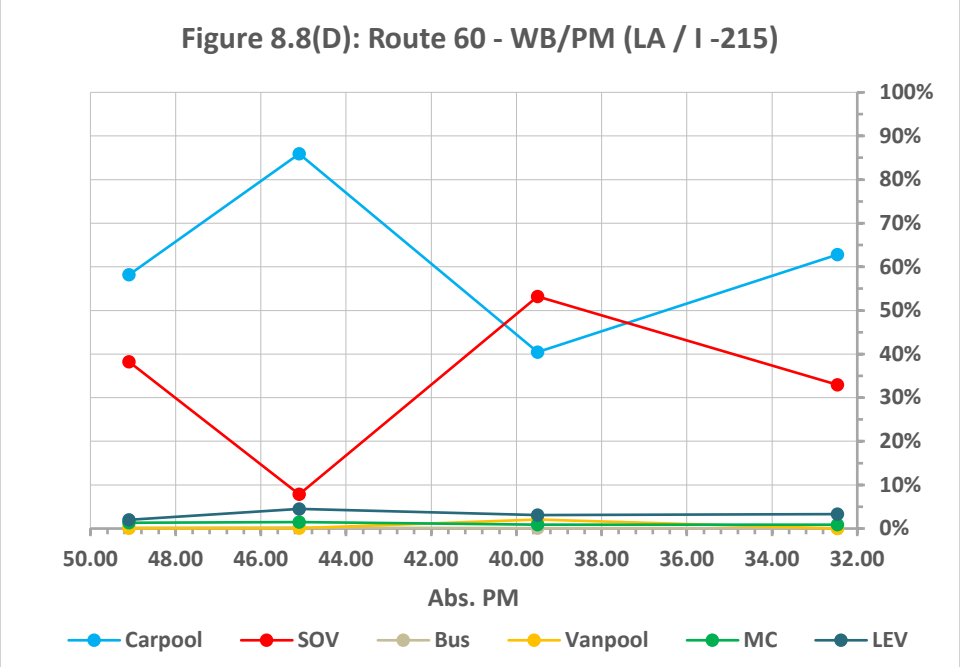
Figure 8.8. Type of Vehicles: Spring 2024 – Route 60 (LA / I-215)





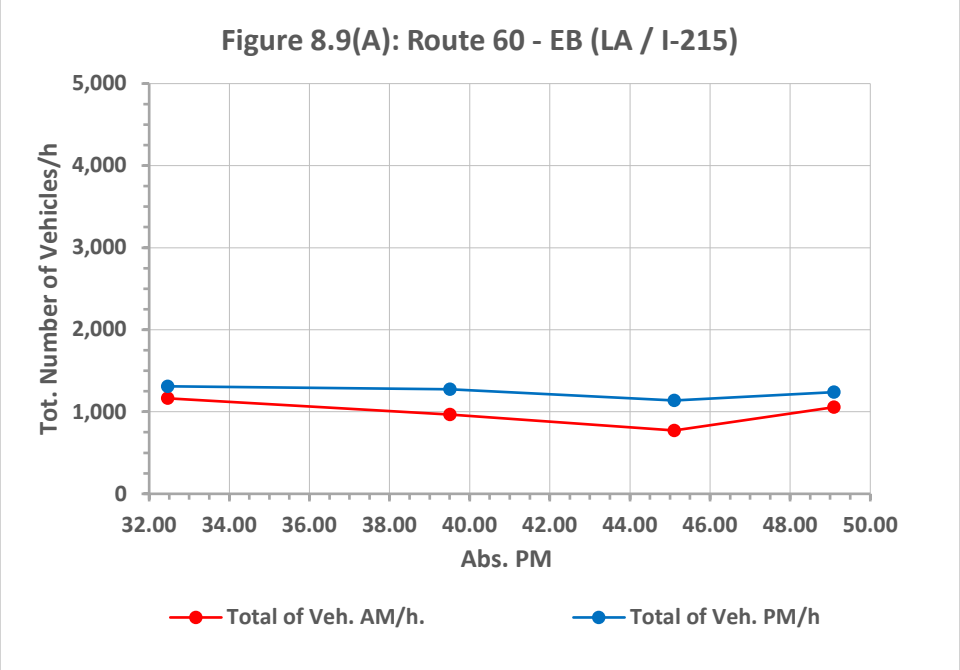
Counting Location	Abs. Postmile
Monte Vista Av.	32.463
Haven Av.	39.503
Pedley Rd.	45.103
La Rue St.	49.093



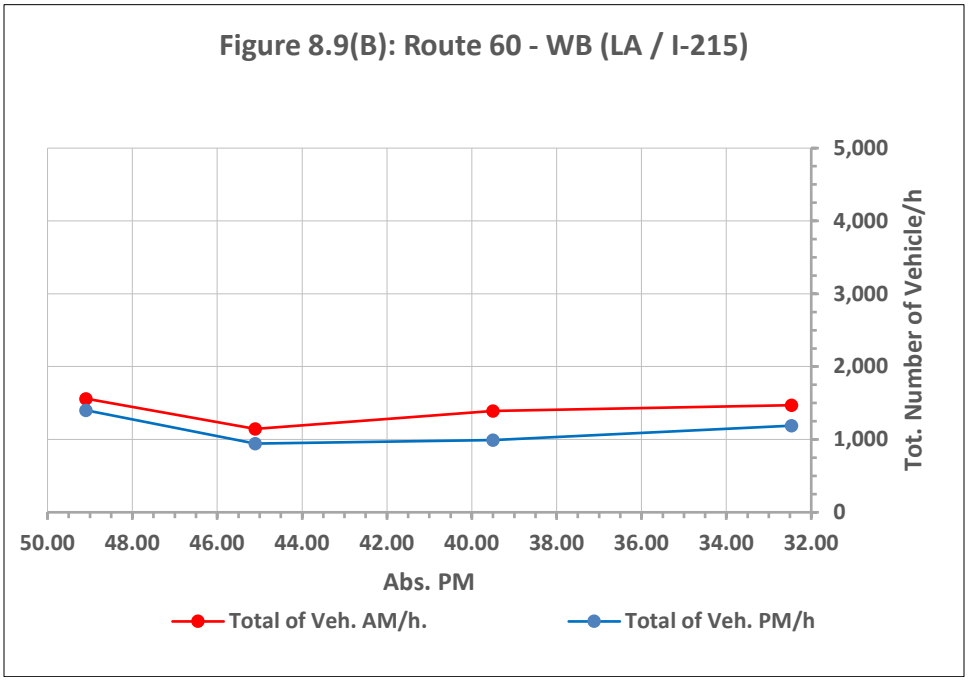


Counting Location	Abs. Postmile
La Rue St.	49.093
Pedley Rd.	45.103
Haven Av.	39.503
Monte Vista Av.	32.463

Figure 8.9. Total Number of Vehicles/Hour: Spring 2024 – Route 60 (LA / I-215)



Counting Location	Abs. Postmile
Monte Vista Av.	32.463
Haven Av.	39.503
Pedley Rd.	45.103
La Rue St.	49.093



Counting Location	Abs. Postmile
La Rue St.	49.093
Pedley Rd.	45.103
Haven Av.	39.503
Monte Vista Av.	32.463

B. Remediation Strategies

- Project 08-1F260, SBD PM R7.8/R7.9 to widen Archibald Avenue interchange. The project was under construction from May 2021 to May 2023. This project should improve the traffic mobility on all lanes in the vicinity of Archibald Avenue Interchange.
- Project 08-0E33U, SBD R7.3/R10.0 to add westbound auxiliary lane and eastbound deceleration lane. Construction began in May 2021 and will end in April 2025. Current estimate is $43 million funded by SHOPP. This project should improve the traffic mobility on all lanes in the vicinity of Archibald, Haven, Milliken, and Vineyard Interchanges.
- Project 08-0C870 SBD PM R2.1/R2.6 to widen eastbound & westbound on-ramps & Central Avenue Construction was started in the April 2021 and will end in October 2025. This project should improve the traffic mobility on all lanes in the vicinity of Central Avenue Interchange.
- 08-1M790 RIV PM R0.00/20.1 to restripe, adding pavement marking, and replacing sign panels on HOV lane. Construction is scheduled to begin in July 2027 and end in January 2028. Signing, pavement markings, and refreshing stripping will help drivers to make decisions on time rather than slowing down and impacting traffic flow.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.

D8 – Route 60 Eastbound in Moreno Valley (AM & PM)

A. Analysis

Please refer to Figure 8.10(A) and Figure 8.10(B). These plots show the degradation along the corridor in the last three years. Gaps on the graphs show that no data is available along the pertaining gaps either in 2021, 2022 or 2023.

In the AM Peak the corridor had no degradation, except as the traffic leaving 60-215 JCT, it was slightly degraded. In the PM Peak, the traffic was also slightly degraded at the same location and extremely degraded at Pigeon Pass due to traffic in/out from Moreno Valley Mall.

The degradation pattern in the AM and PM Peak were consistent throughout these three years related to their locations and intensities. This congestion caused by commercial and commuter traffic eastward from all the counties in the east region including Orange County, Los Angeles County, Riverside County and San Bernardino County. The demand exceeds the capacity.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 60(19).

Data for the graphs on Figures 8.11to 8.14 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

There were 50 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. These was no collision happened in HOV and left lanes during peak hour.

The 48 collisions on right lanes and interior lanes might be not directly impact to the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

D8 – Route 60 Westbound in Moreno Valley (AM & PM)

Please refer to Figure 8.10(C) and Figure 8.10(D). These plots show the degradation along the corridor in the last three years. Gaps on the graphs show that no data is available along the pertaining gaps either in 2021, 2022 or 2023.

In those 3 years, the degradation patterns were consistent in AM and PM Peaks. Traffic slightly degraded from Heacock IC and increased to very degraded when getting closer to IC 60/215. This congestion caused by commercial and commuter traffic westward from Arizona, San Diego and their surroundings as well as cities located along the freeway. Moreno Valley Mall created significant traffic at the Southeast quadrant of Day Street IC that contributed to additional congestion. The demand exceeds the capacity.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 60(20).

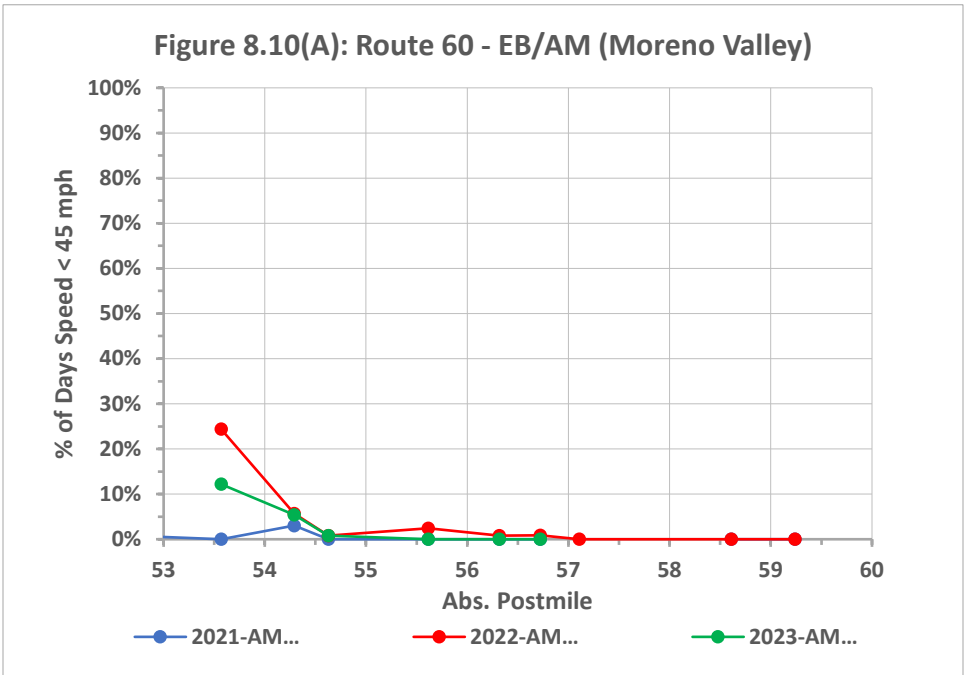
Data for the graphs on Figures 8.11 to 8.14 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

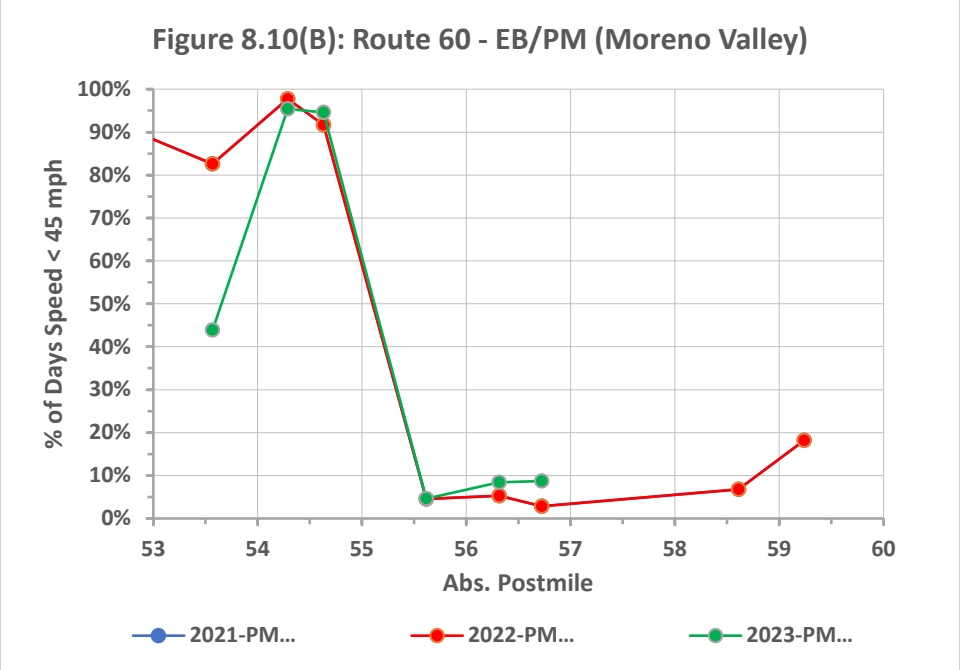
There were 76 collisions reported on this segment during the 6-month period from 07/01/2022 to 12/31/2022. Of these 76, there were 11 collisions that happened on HOV and left lanes. Of these 11, 5 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 65 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

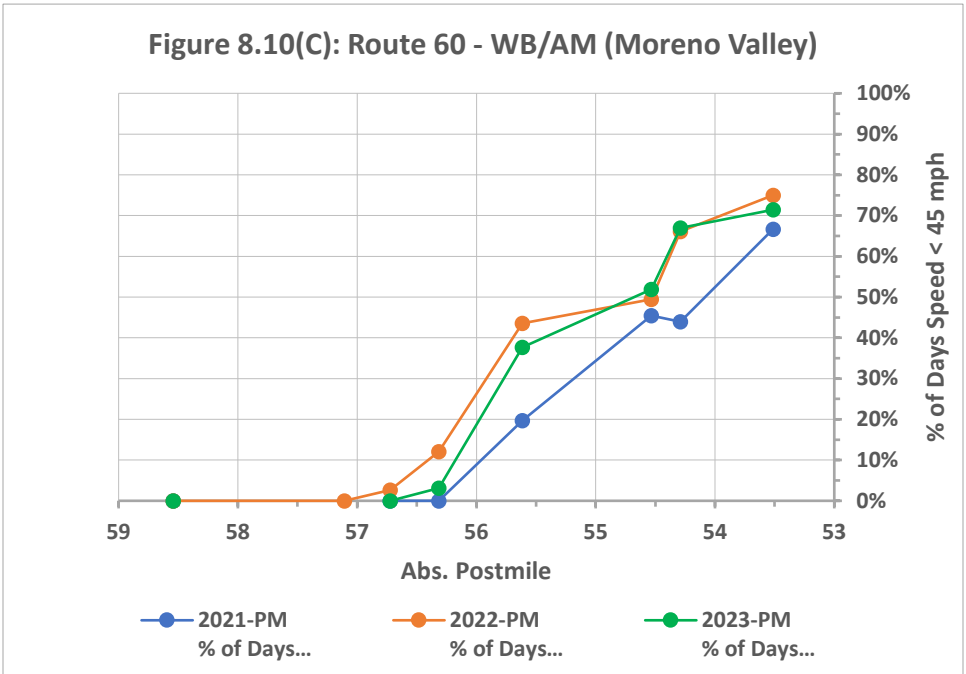
Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

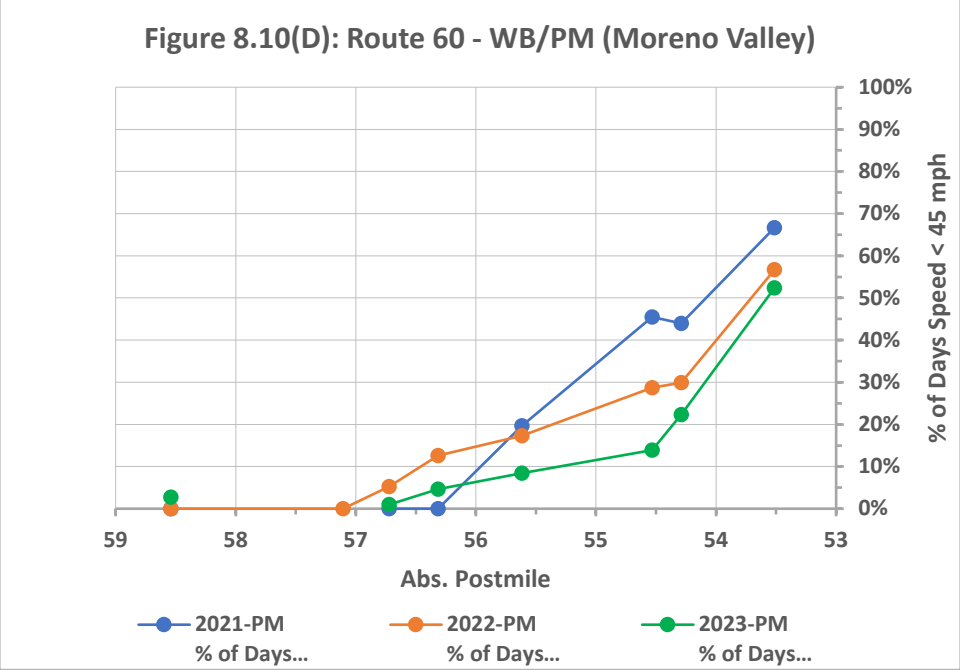
Figure 8.10. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 60 (Moreno Valley)





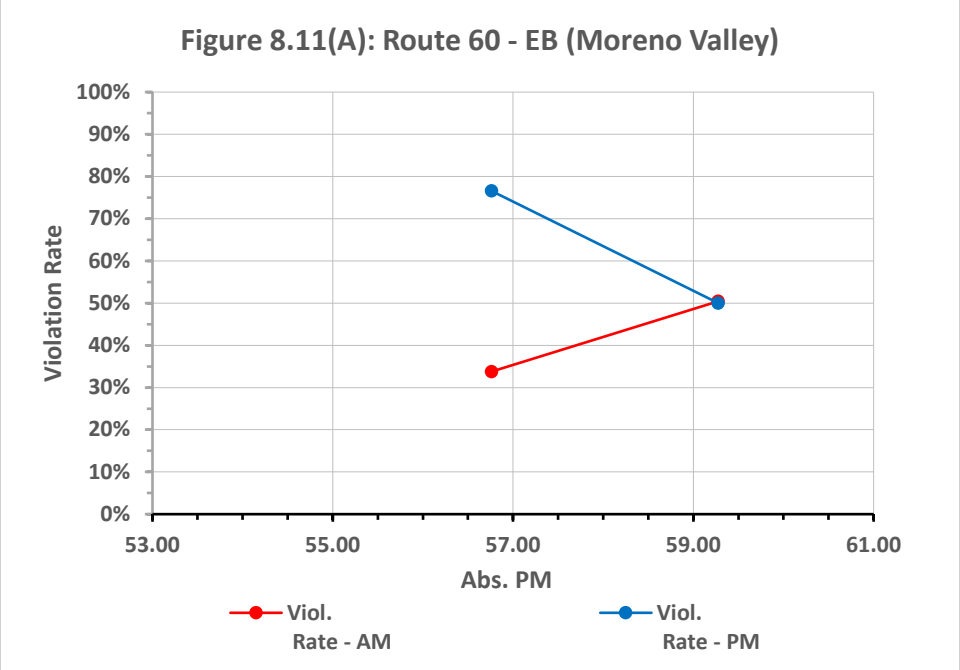
NAME	Abs Postmile
MAIN ST	52.095
DAY ST E/B ON	53.568
PIGEON PASS	54.289
PIGEON PASS	54.630
HEACOCK	55.616
PERRIS WB ON	56.316
PERRIS EB ONR	56.723
Nason St	58.611
Moreno Beach Dr	59.239



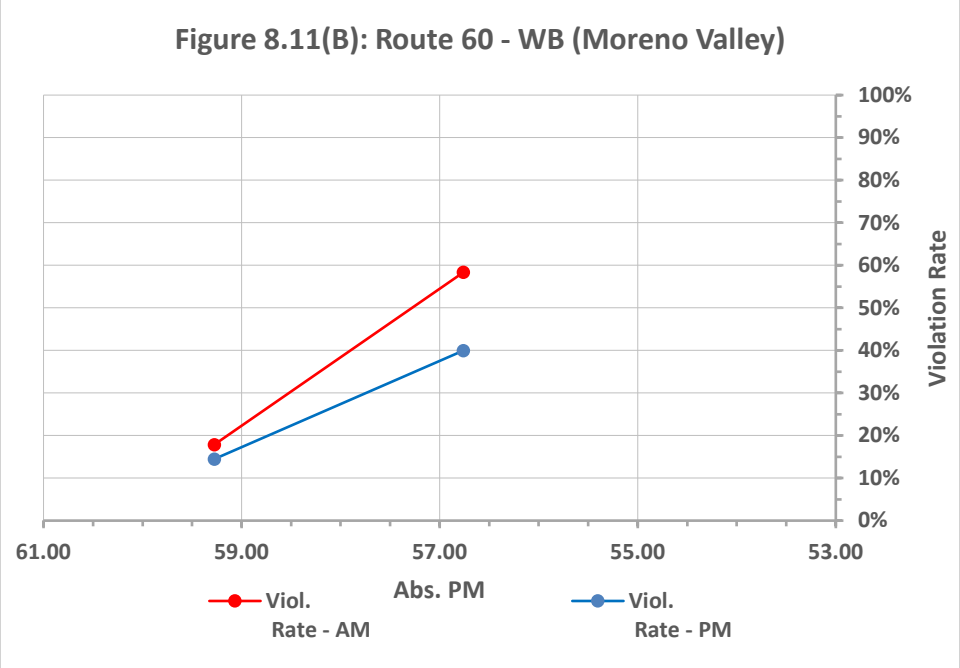


NAME	Abs Postmile
Nason St	58.541
W/O VALLEY WAY	57.106
PERRIS EB ONR	56.723
PERRIS	56.316
HEACOCK	55.616
PIGEON PASS LOOP	54.533
PIGEON PASS	54.289
DAY	53.513

Figure 8.11. Violation Rate: Spring 2024 – Route 60 (Moreno Valley)

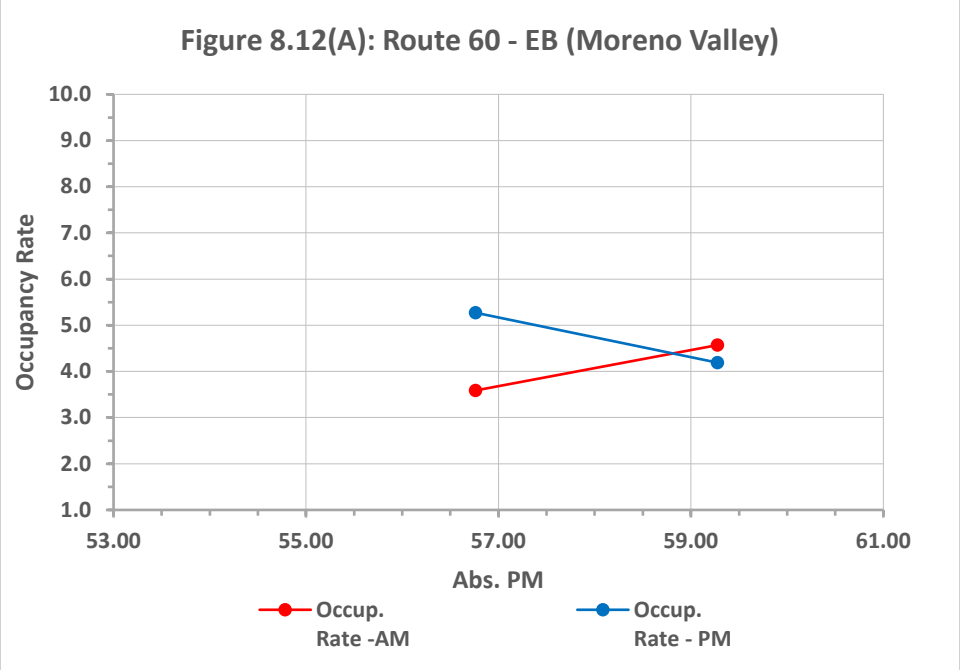


Counting Location	Abs. Postmile
Indian St.	56.760
Nason St.	59.275

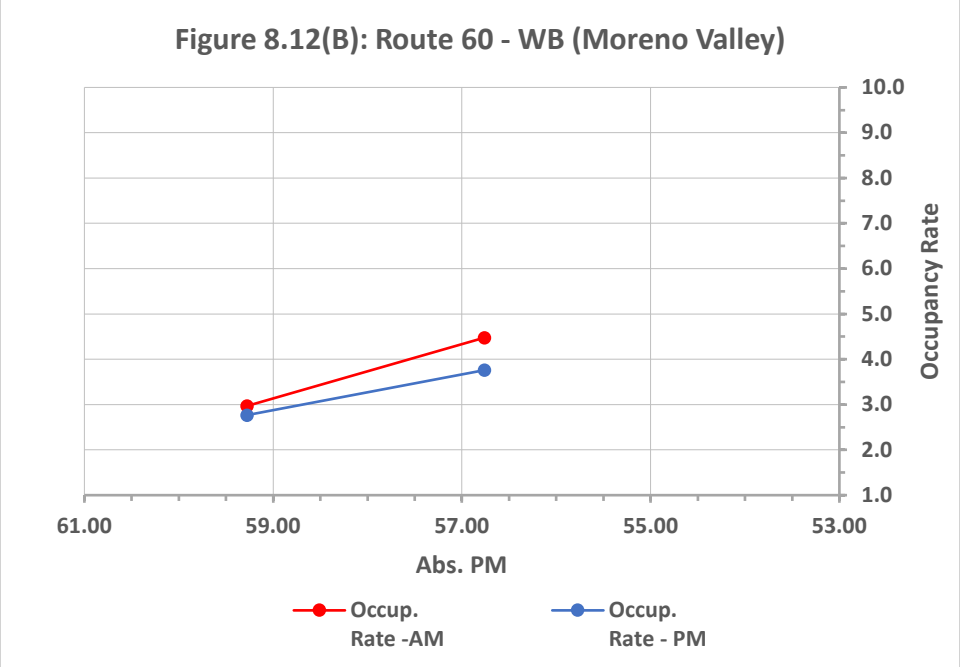


Counting Location	Abs. Postmile
Nason St.	59.275
Indian St.	56.760

Figure 8.12. Occupancy: Spring 2024 – Route 60 (Moreno Valley)

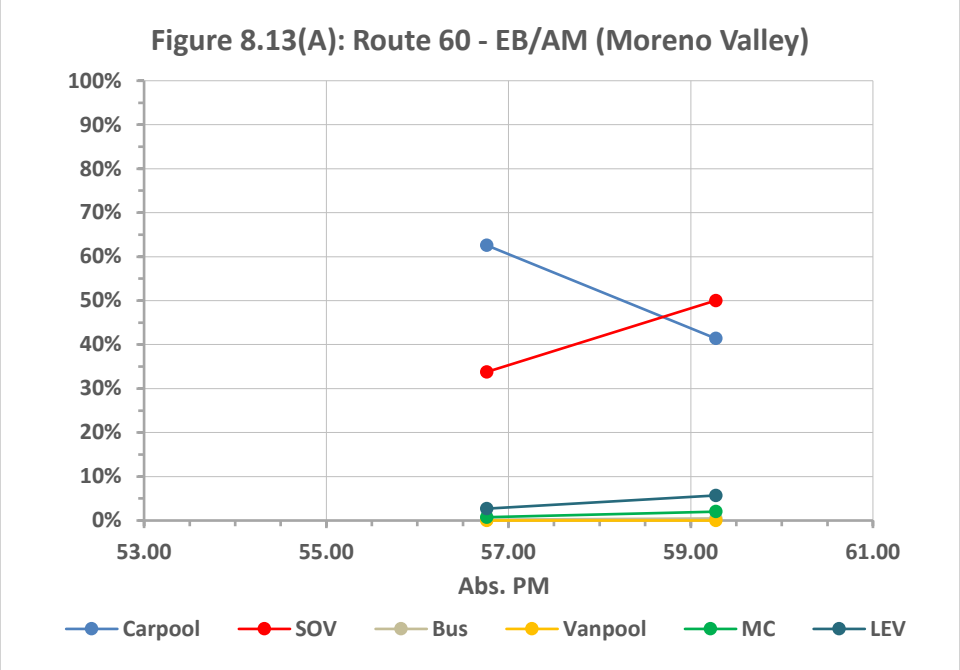


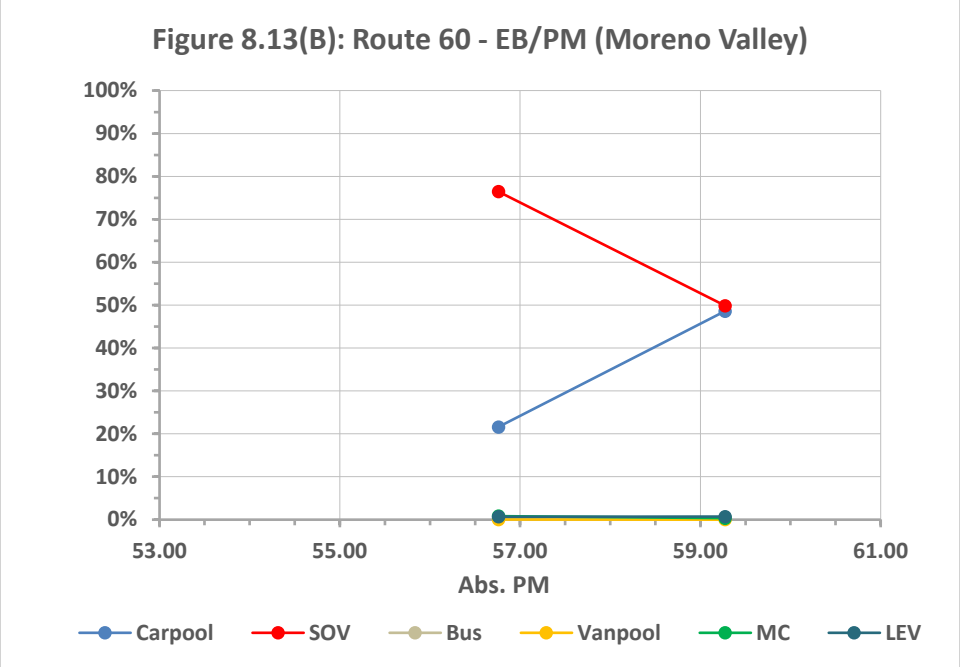
Counting Location	Abs. Postmile
Indian St.	56.760
Nason St.	59.275



Counting Location	Abs. Postmile
Nason St.	59.275
Indian St.	56.760

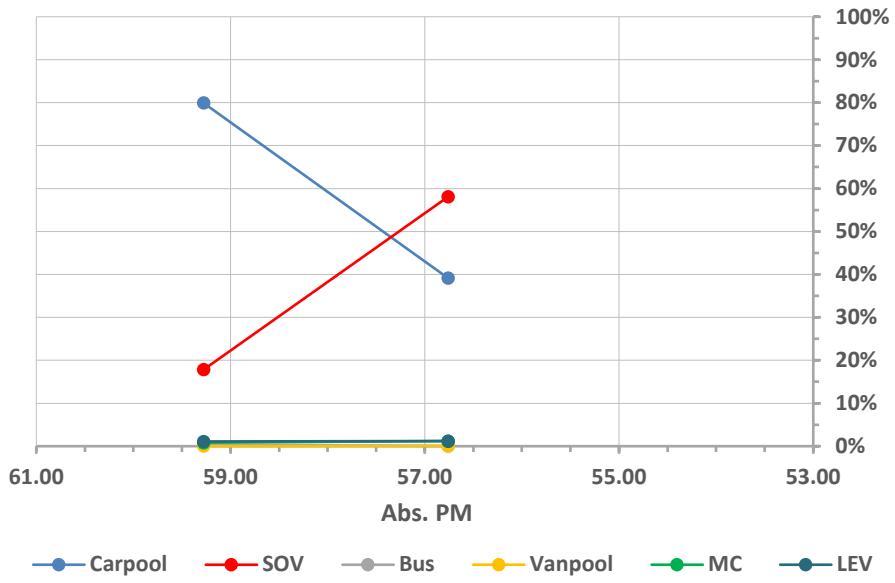
Figure 8.13. Type of Vehicles: Spring 2024 – Route 60 (Moreno Valley)





Counting Location	Abs. Postmile
Indian St.	56.760
Nason St.	59.275

Figure 8.13(C): Route 60 - WB/AM (Moreno Valley)



Counting Location	Abs. Postmile
Nason St.	59.275
Indian St.	56.760

Figure 8.13(D): Route 60 - WB/PM (Moreno Valley)

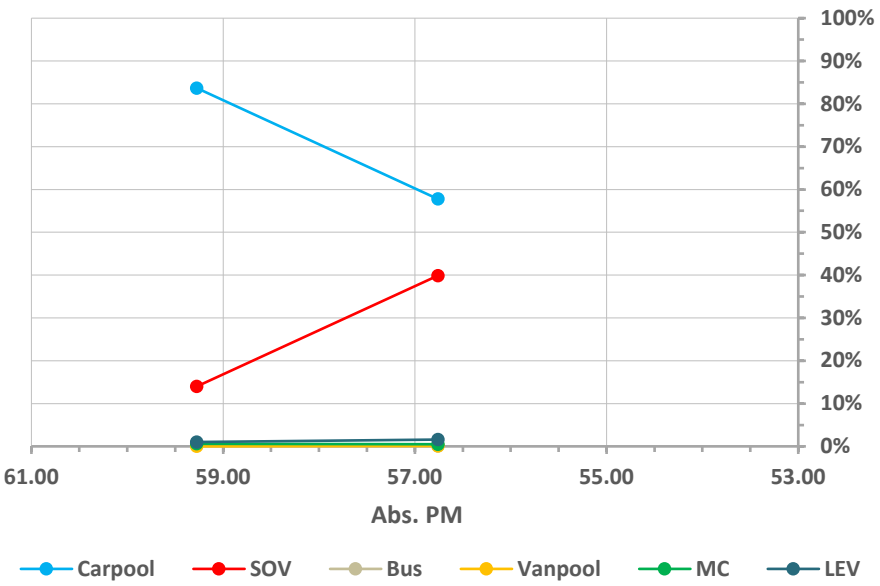
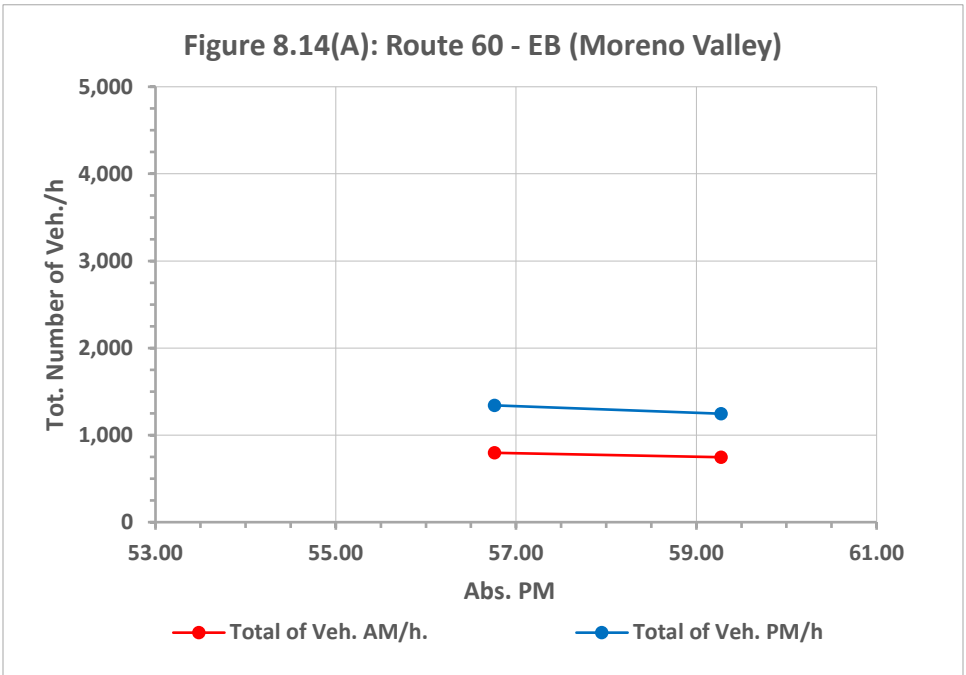
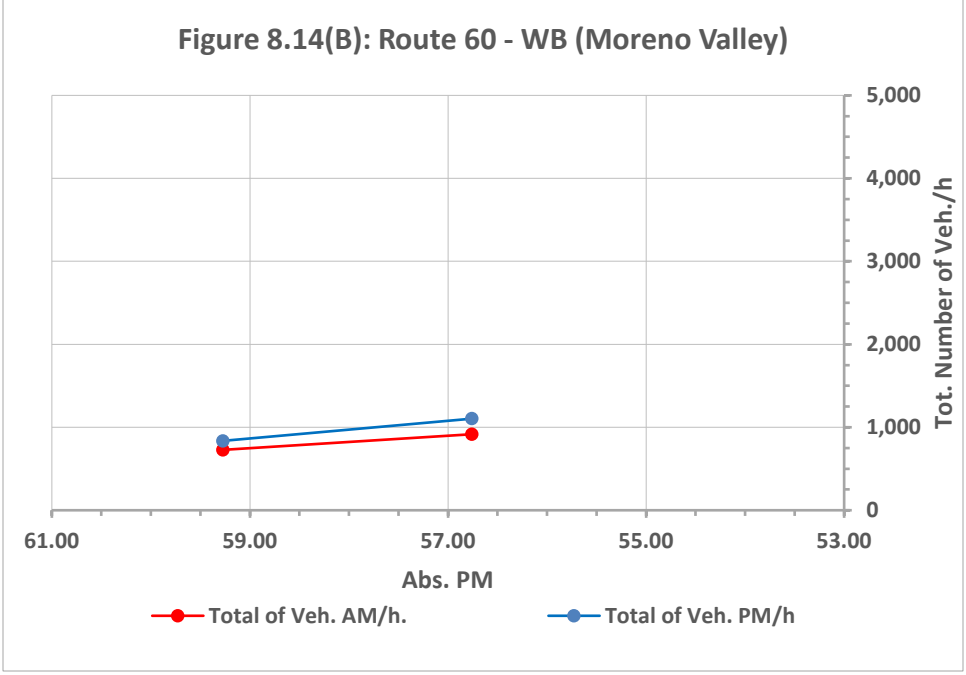


Figure 8.14. Total Number of Vehicles/Hour: Spring 2024 – Route 60 (Moreno Valley)



Counting Location	Abs. Postmile
Indian St.	56.760
Nason St.	59.275



Counting Location	Abs. Postmile
Indian St.	56.760
Nason St.	59.275

B. Remediation Strategies

- 08-1M790 RIV PM R0.00/20.1 to restripe, adding pavement marking, and replacing sign panels on HOV lane. Construction is scheduled to begin in July 2027 and end in January 2028. Signing, pavement markings, and refreshing stripping will help drivers to make decisions on time rather than slowing down and impacting traffic flow.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.

3.5.4 ACTION PLAN FOR HOT FACILITIES ON ROUTE 71

A. Analysis

State Route 71 (SR-71) begins at its junction with Interstate 10 (I-10) in the city of Pomona in Los Angeles County and extends southeasterly through San Bernardino County ending at its junction with State Route 91 (SR-91) in Riverside County. The total route length is 15.9 miles.

In District 8, SR-71 begins at the Los Angeles-San Bernardino County line and ends at its junction with SR-91 in Riverside County, with 8.4 miles in San Bernardino County and 3.0 miles in Riverside County. In the District 8 portion, at the San Bernardino/Riverside County line is where the freeway portion of the route ends, and it transitions to a divided four-lane expressway, terminating at its junction with the SR-91 freeway in the city of Corona.

The HOV lane on Route 71 is within San Bernardino County and spans from south of SR-60 JCT to south of Euclid Ave. undercrossing with the length of approximately 7 (seven) miles. This segment of HOV lane is the last and only Buffer-Separated HOV lane in District 8. This route is one of the 5 Backward Routes in California with the increasing postmiles as it goes southward.

The route serves a high volume of traffic from the cities of Riverside, Corona, Chino, Chino Hills, and Ontario, as well as Orange and Los Angeles Counties. SR-71 is a connecting link for major east-west corridors including I-210, I-10, SR-57, SR-60, SR-91, and SR-210. SR-71 also serves as an intraregional route circulating significant volumes of local traffic.

Northbound & Southbound traffic

Please refer to Figure 8.15.

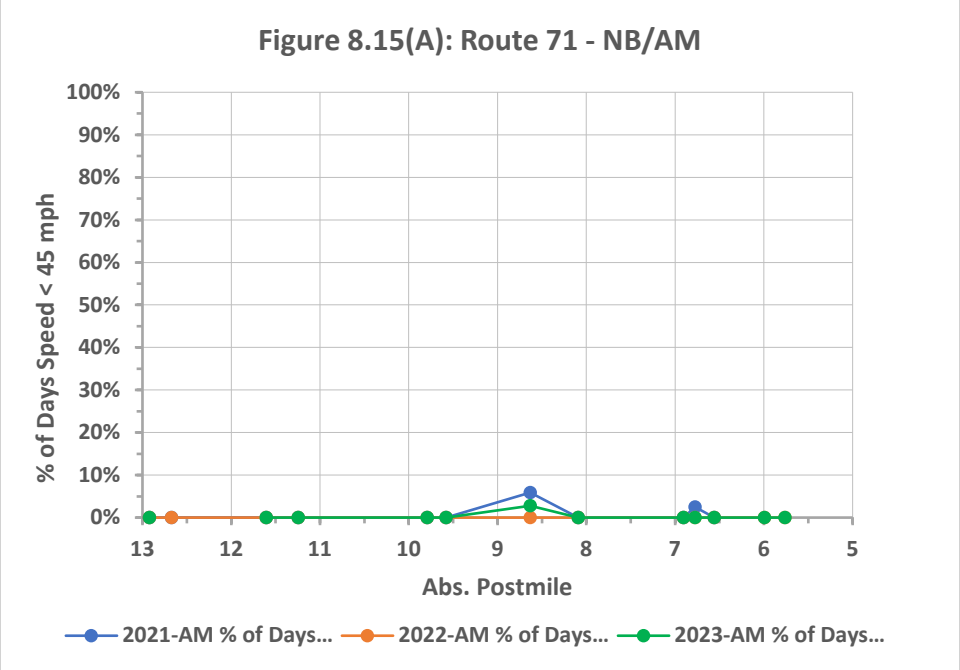
Northbound Route 71 during AM & PM peak were not degraded.

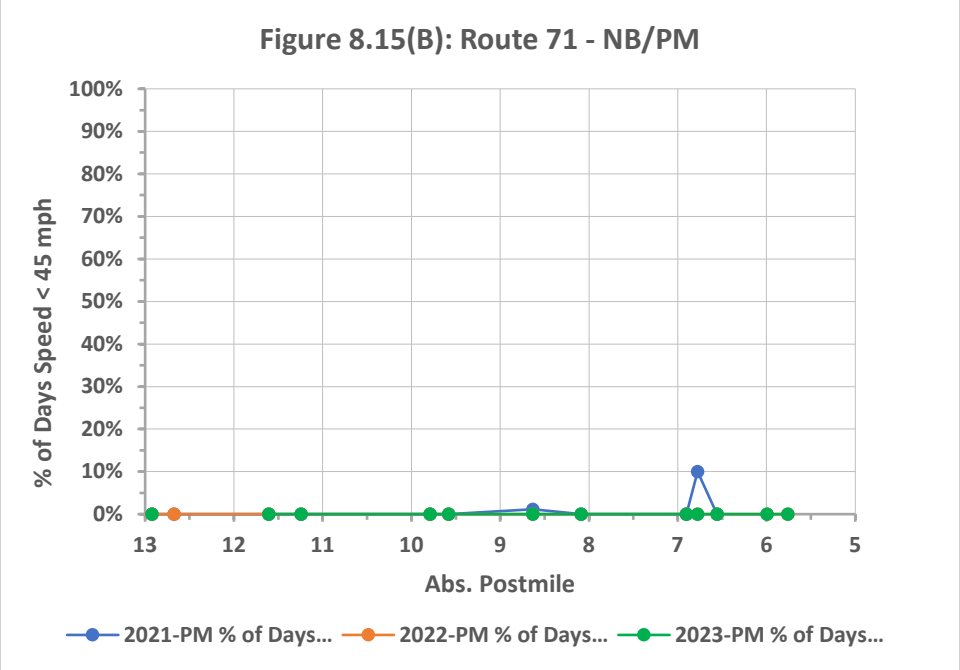
Southbound Route 71 in the proximity to Pine Ave. overcrossing is slightly (@24%) and very degraded (@55%) during AM & PM peak. During AM & PM peak hours recurrent congestion due to commuter traffic at the south end of the HOV lane by Euclid Avenue IC causes by merging the HOV lane to Mixed Flow (MF) lane 2. The end of this lane-drop is less than 1,500 feet up stream from the gore of the westbound Euclid Ave on-ramp. The Euclid Ave. Interchange is a successive freeway entrance type. The eastbound Euclid Ave. on-ramp is located downstream not too far from the westbound on-ramp. The traffic turbulence created by these three successive traffic merging (lane dropped and two on-ramps) cause congestion more than one mile up-stream.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.16.

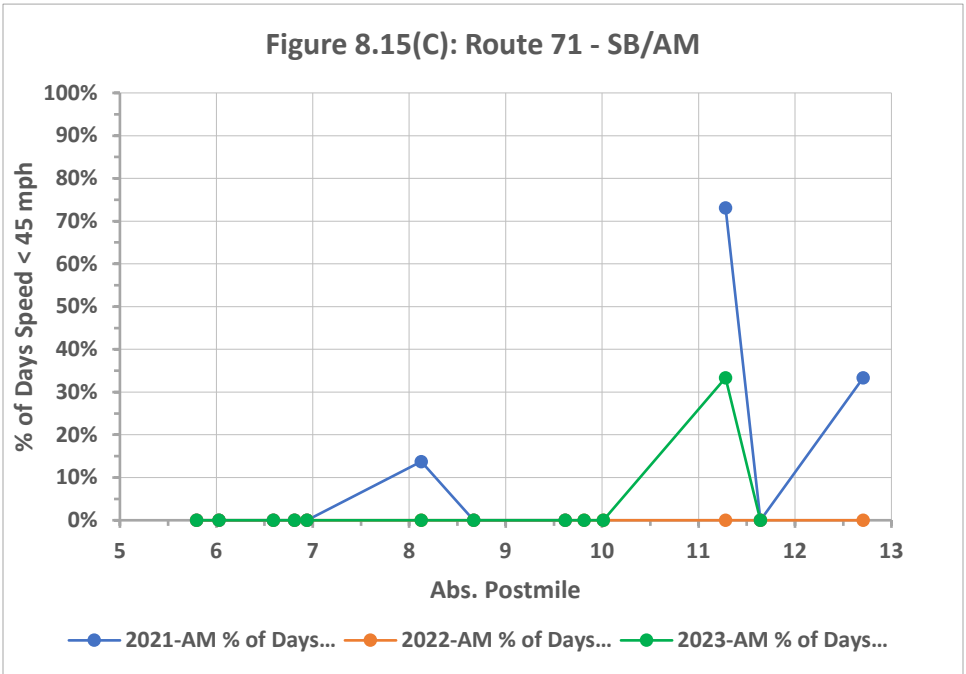
Data for the graphs on Figures 8.17 to 8.19 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024.

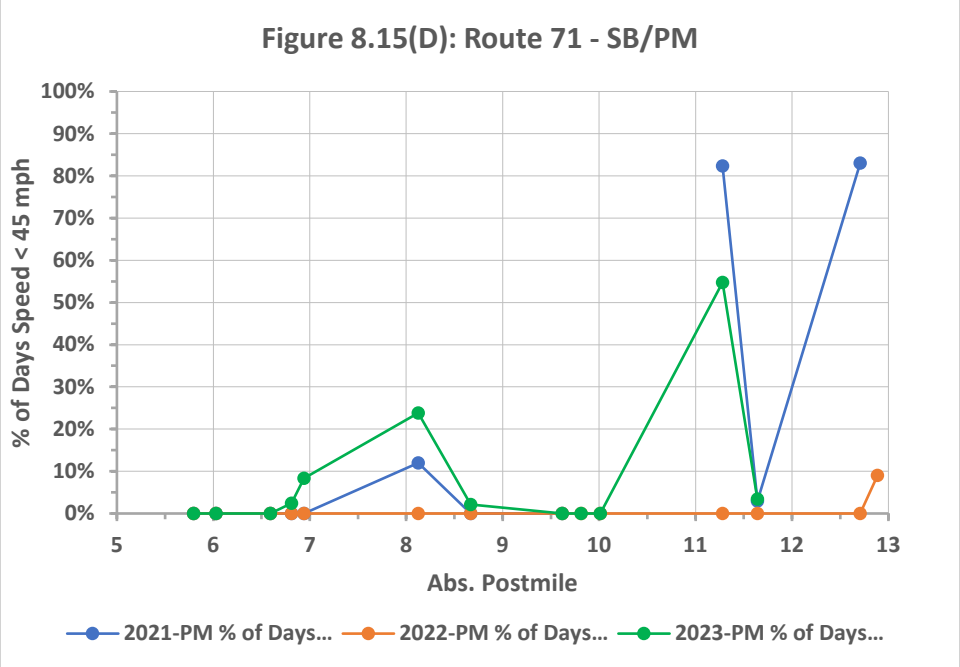
Figure 8.15. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 71





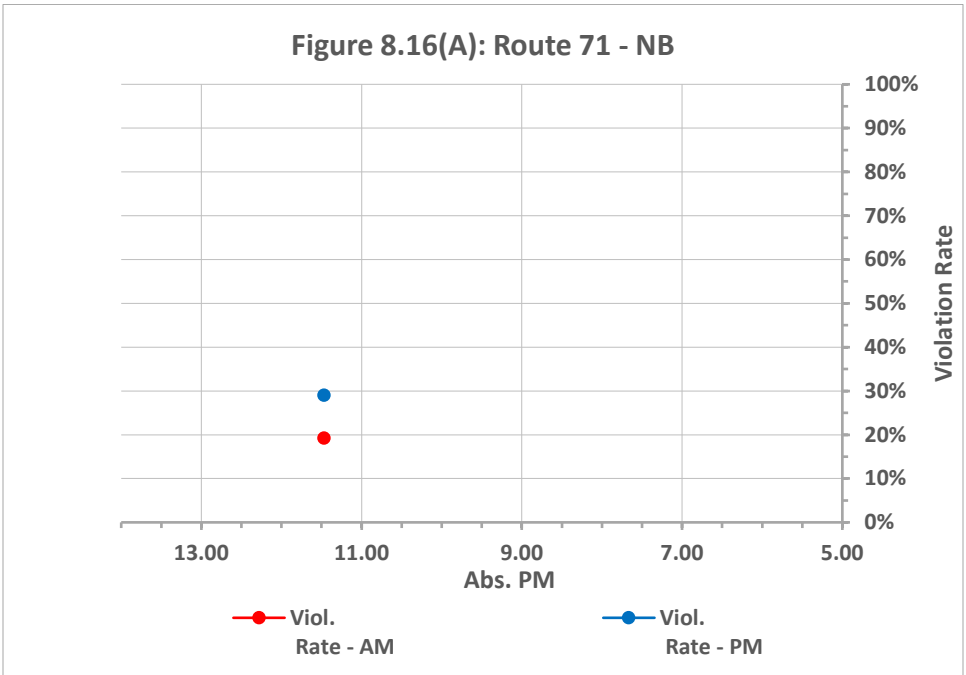
NAME	Abs Postmile
EUCLID AVE NB ON	R12.922
.3 MI N/O EUCLID	R12.673
PINE AVE S/B ON	R11.606
NB ON PINE AVE	R11.244
SOQUEL CYN NB LOOP	R9.792
SOQUEL CYN NB ON	R9.581
Ramona Ave ON	R8.633
Chino Hills Pkwy ON	R8.090
Grand Ave. ON	R6.904
GRAND AVE NB LOOP	R6.775
Grand Ave	R6.558
Chino Ave	R5.993
Chino Ave ON	R5.761





NAME	Abs Postmile
Chino Ave ON	R5.796
Chino Ave	R6.028
Grand Ave	R6.593
GRAND AVE NB LOOP ON	R6.810
Grand Ave. ON	R6.939
Chino Hills Pkwy ON	R8.125
Ramona Ave ON	R8.668
SOQUEL CYN SB OFF	R9.616
SOQUEL CYN	R9.815
SB ON SOQUEL CYN	R10.014
PINE AVE NB ON	R11.279
PINE AVE S/B ON	R11.641
EUCLID AVE .3 MI N/O	R12.708
EUCLID AVE	R12.887

Figure 8.16. Violation Rate: Spring 2024 – Route 71



Counting Location	Abs. Postmile
Pine Av.	11.469

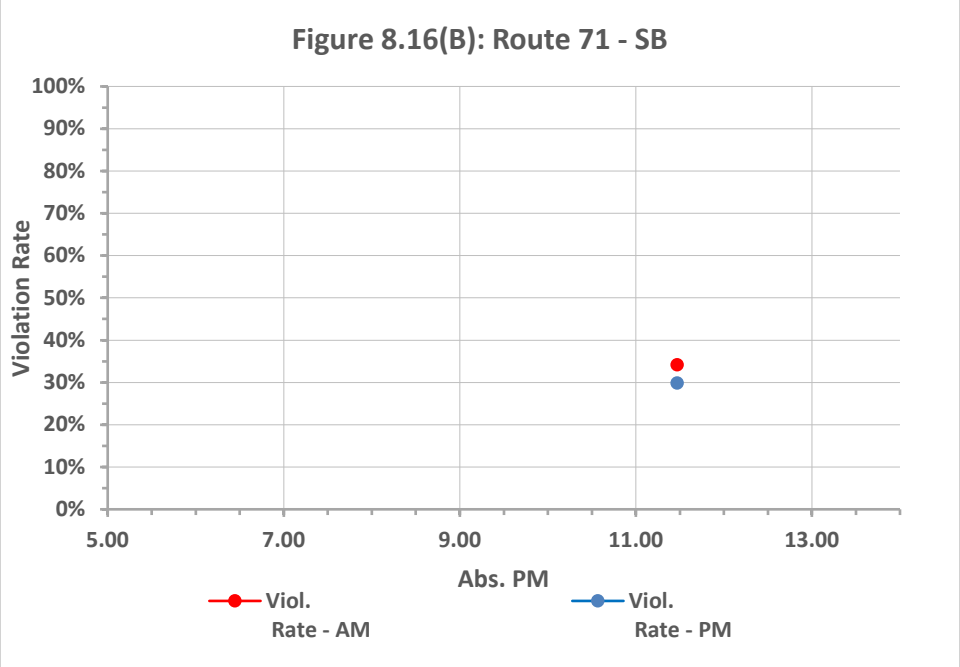
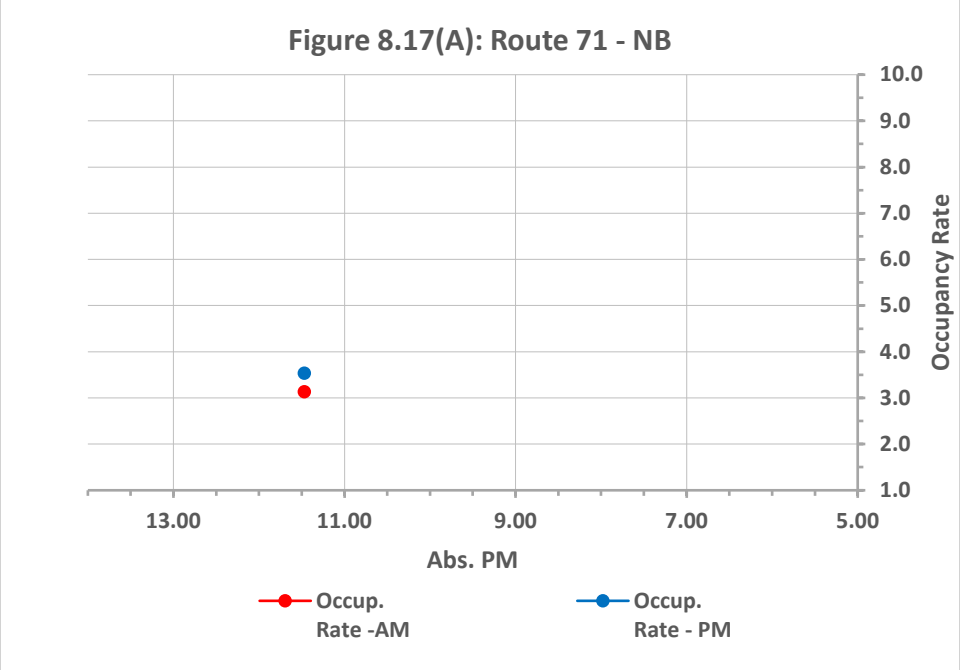


Figure 8.17. Occupancy Rate: Spring 2024 – Route 71



Counting Location	Abs. Postmile
Pine Av.	11.469

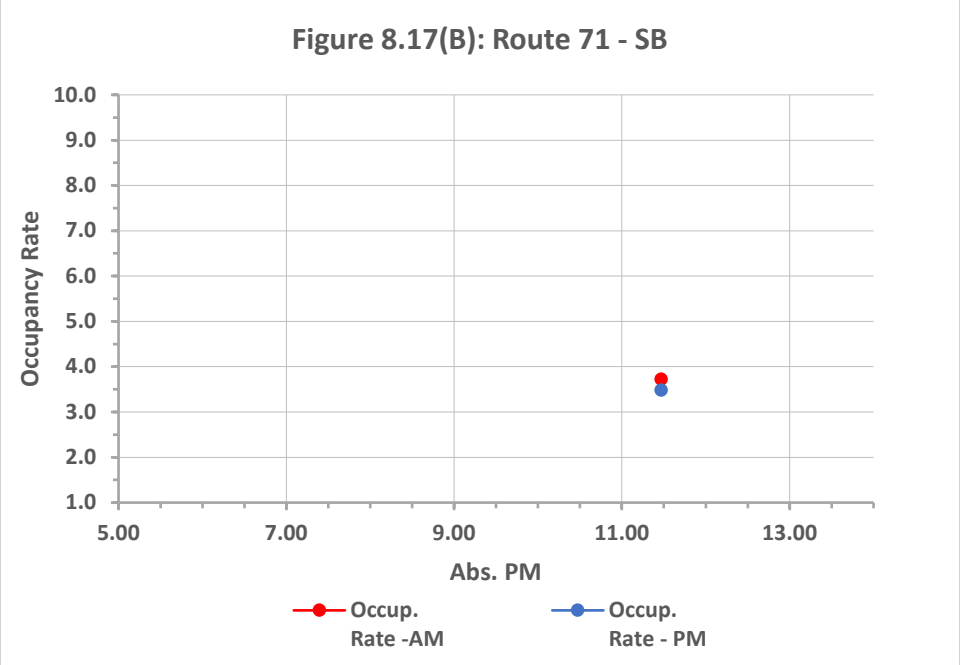
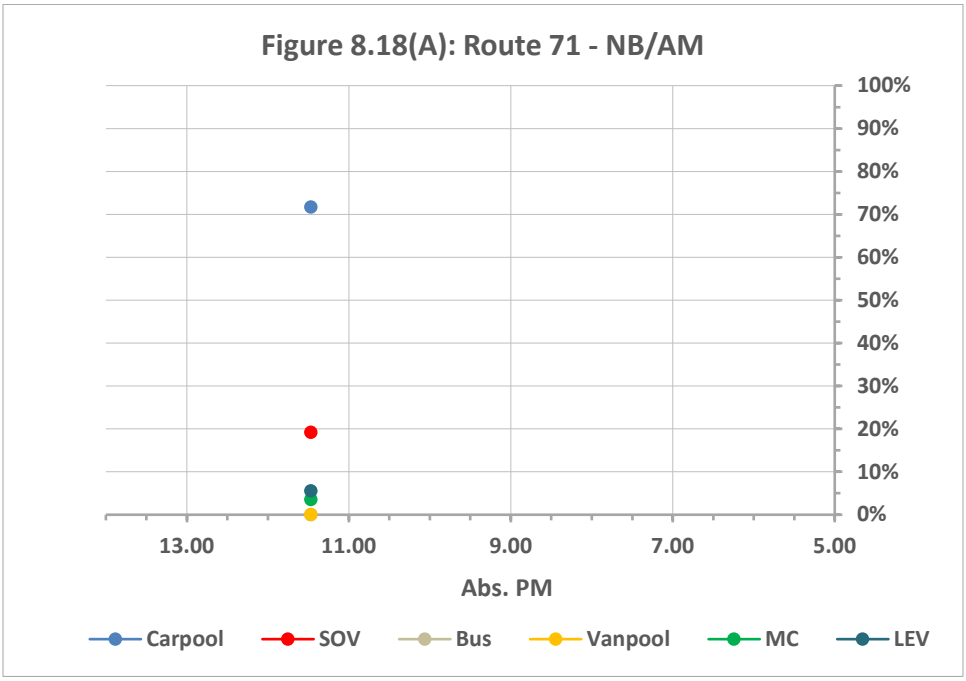
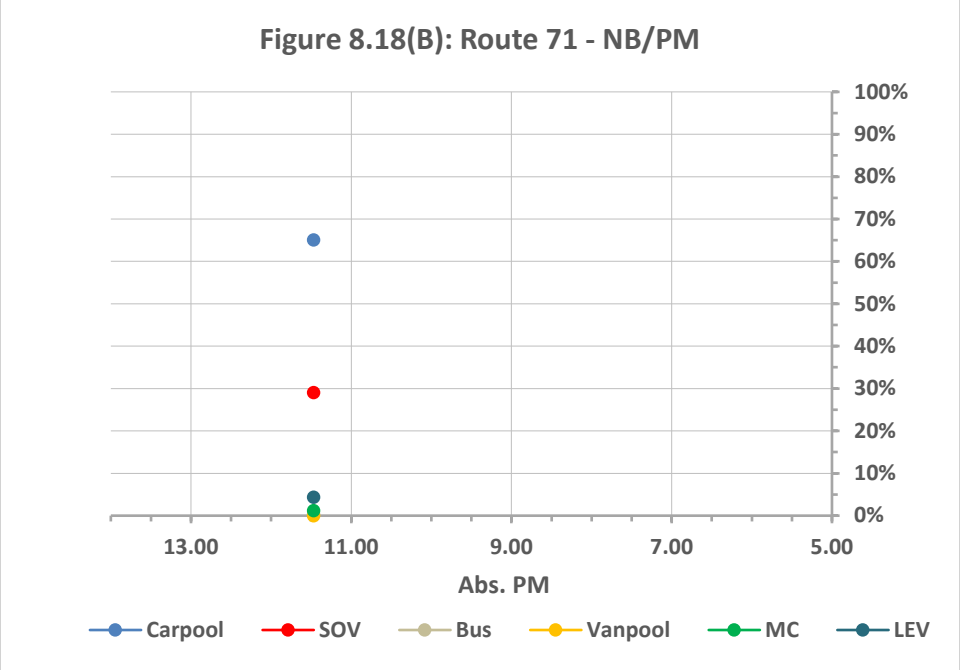
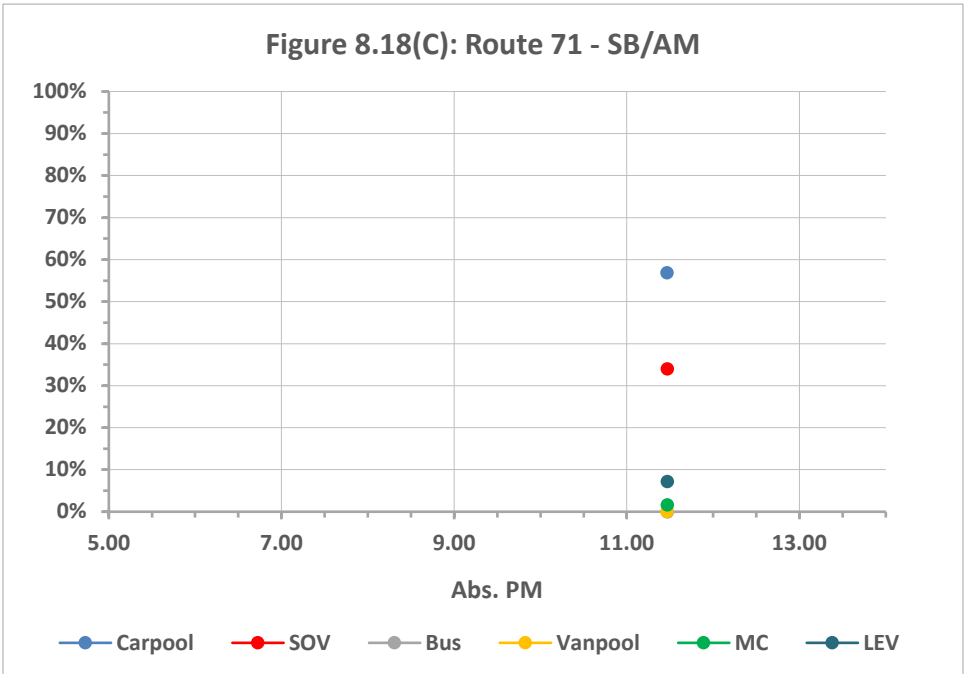


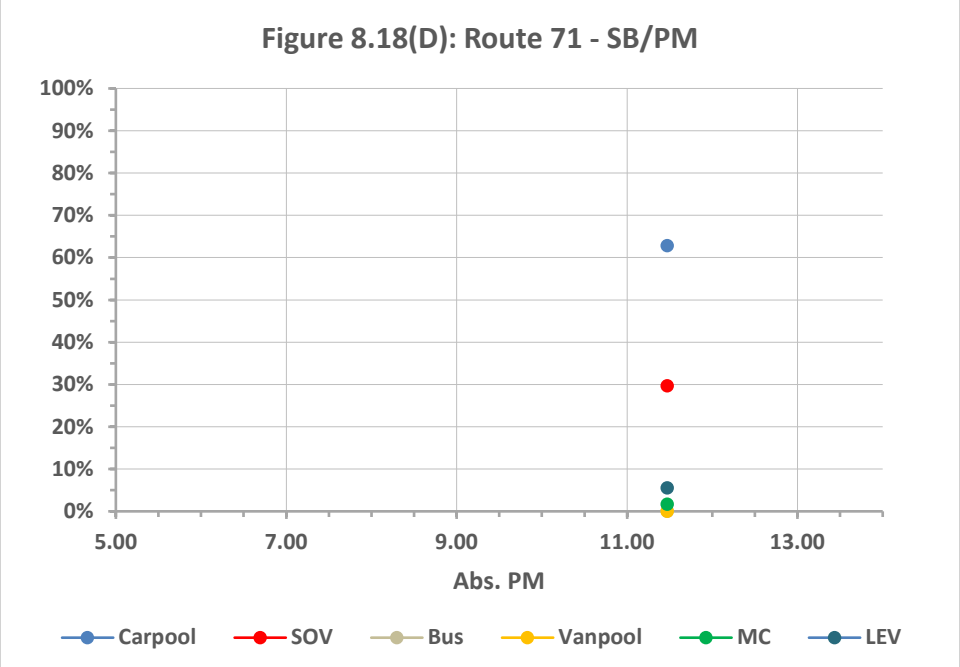
Figure 8.18. Type of Vehicles: Spring 2024 – Route 71



Counting Location	Abs. Postmile
Pine Av.	11.469

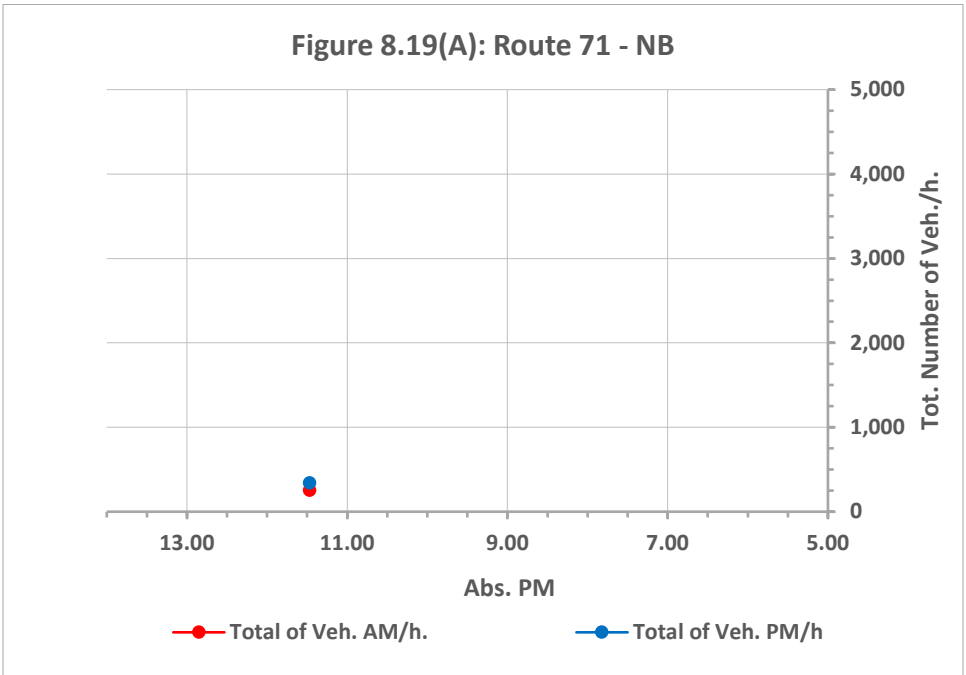




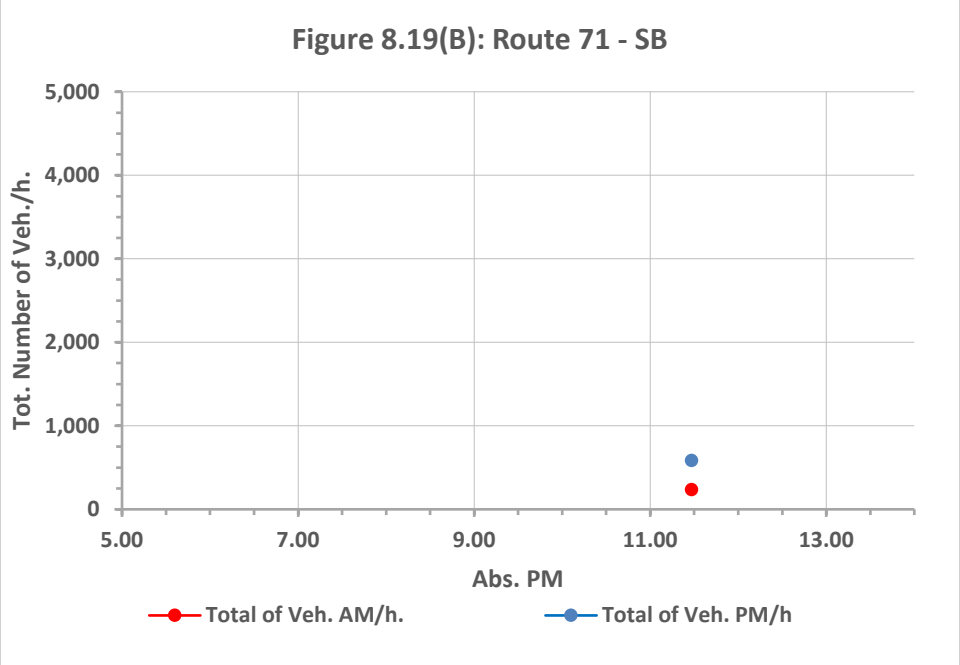


Counting Location	Abs. Postmile
Pine Av.	11.469

Figure 8.19. Total Number of Vehicles/Hour: Spring 2024 – Route 71



Counting Location	Abs. Postmile
Pine Av.	11.469



B. Remediation Strategies

Project EA 0G790 was completed in 8/2023. The scope of the project was to install RMS, CCTV, CMS, VDS, and Fiber Optic Communication System. HQ can collect new data for 2024 and send to D8 for the next 2024 Action Plan.

D8 ML is working with CHP to increase enforcement at high violation locations.

3.5.5 ACTION PLAN FOR HOT FACILITIES ON ROUTE 91

A. Analysis

This Managed Lanes on SR-91 between the Orange County Line and I-15 is a HOT lanes facility.

There are degraded locations on Route 91 HOT lane facilities per Caltrans HQ data. RCTC, the operator of Route 91 HOT lane facilities, disagreed with Caltrans HQ data and claimed that degraded locations have VDS issues. RCTC collects data through RCTC managed gantries. Caltrans D8 Electrical Operations is working to verify the VDS functionality to resolve the data discrepancy.

Eastbound traffic

Please refer to Figure 8.20(A) and Figure 8.20(B).

In the AM, traffic is not degraded except slightly degraded at 91/15 connector. In the PM, traffic is slightly degraded from east of Smith Ave to Lincoln Ave.

Data for the graphs on from Figures 8.21 to 8.23 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

There were 173 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. Of these 173, 29 collisions happened on HOV and left lanes. Of these 29, 15 collisions happened during peak hour (6-9 AM & 3-6 PM). These reported collisions would be the cause adding to the degradation on HOV lane.

The 144 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOT lane and left lanes on the opposite direction did not directly impact the degradation on the HOT lane in discussion. However, due to close proximity to the HOT lane in discussion, drivers on the HOT lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOT lane in discussion.

Westbound traffic

Please refer to Figure 8.20(C) and Figure 8.20(D).

Congestion at about Abs. PM 44.000 occurred before traffic entering and after the entrance of the HOT lanes from general purpose (GP) lanes. Weaving occurs before entering the entrance between HOV traffic upstream to GP lanes and GP lane traffic upstream to HOT lanes. Merging occurs just after the entrance from HOT direct connector lane traffic.

This area was also impacted by construction activities to construct an express lanes connector between the 91 Express Lanes and the 15 Express lanes from the north.

The slight degradation within the City of Corona (about Abs. PM 42.750 to 41.000) was due to typical traffic turbulences within a complex freeway to freeway junction.

The slight degradation west of Green River Rd. overcrossing (about Abs. PM 38.500) was due to weaving traffic at the vicinity of the HOT lanes' ingress/egress.

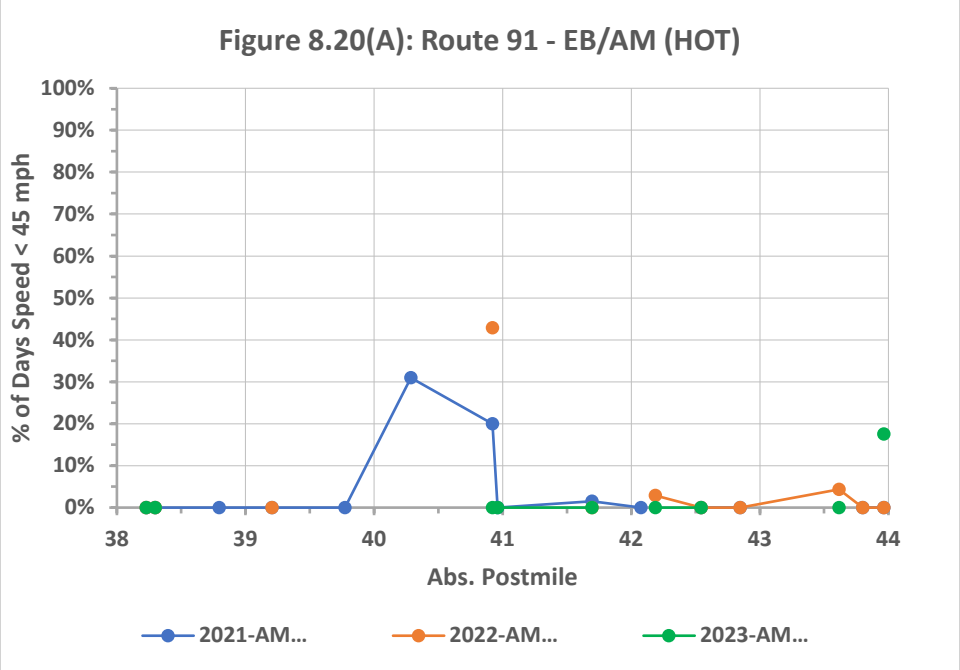
Data for the graphs on Figures 8.21 to 8.23 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

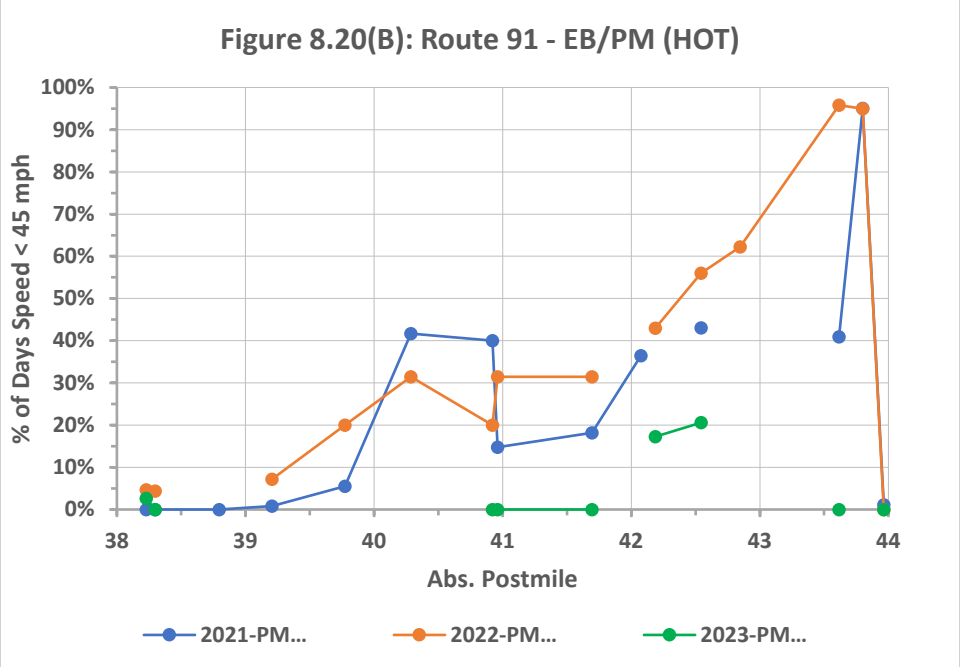
There were 177 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. Of these of 177, 21 collisions happened on HOV and left lanes. Of these 21, 9 collisions happened during peak hour (6-9 AM & 3-6 PM). These reported collisions would be the cause adding to the degradation on HOT lane.

The 156 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers cause them to slow down.

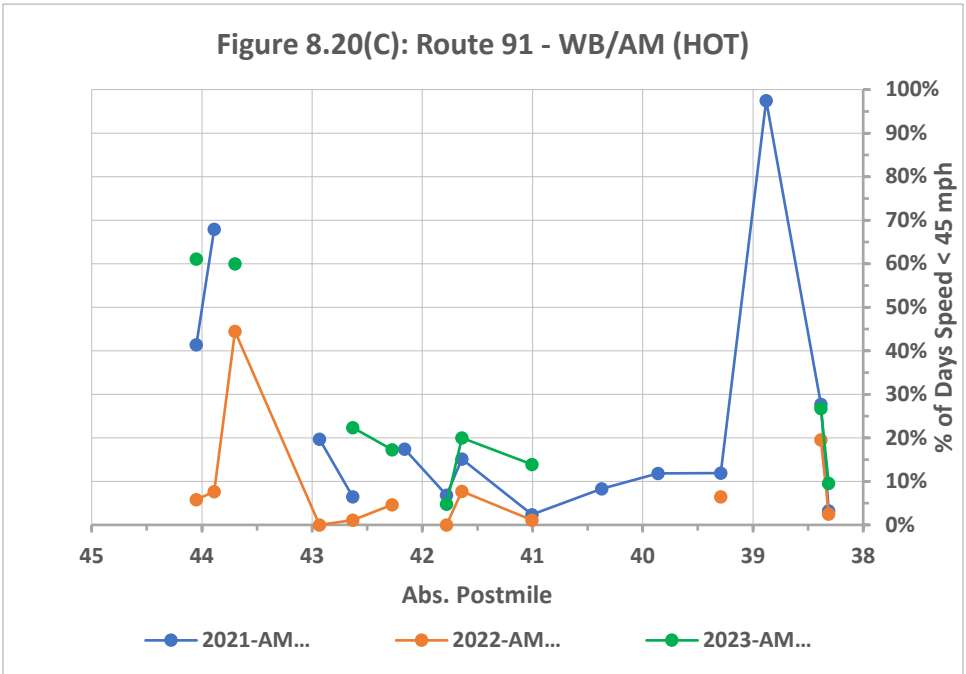
Collisions on HOT lane and left lanes on the opposite direction did not directly impact the degradation on the HOT lane in discussion. However, due to close proximity to the HOT lane in discussion, drivers on the HOT lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOT lane in discussion.

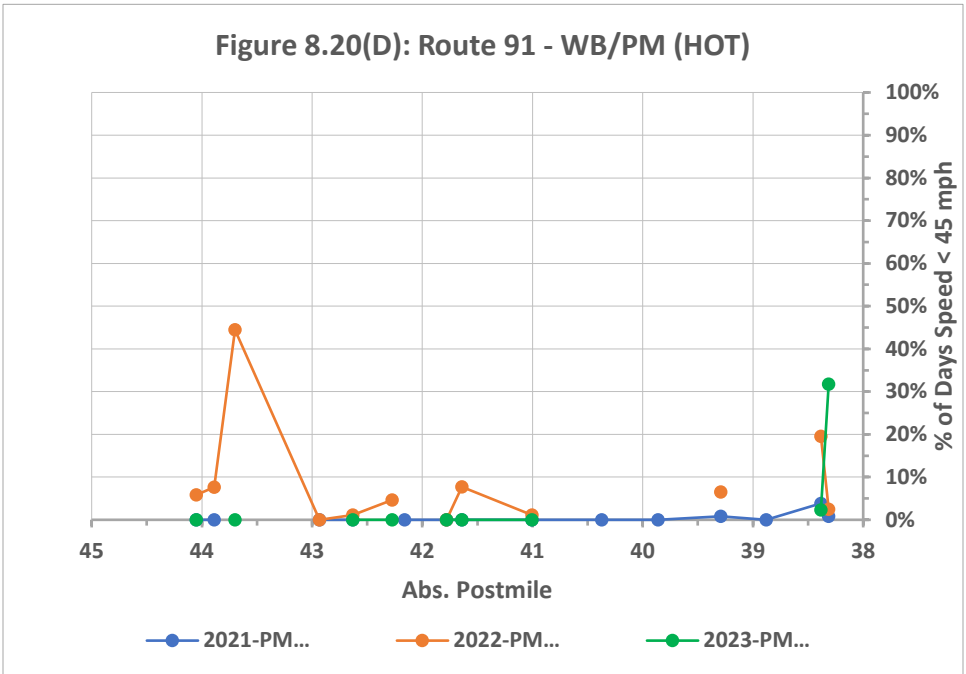
Figure 8.20. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 91 (HOT)





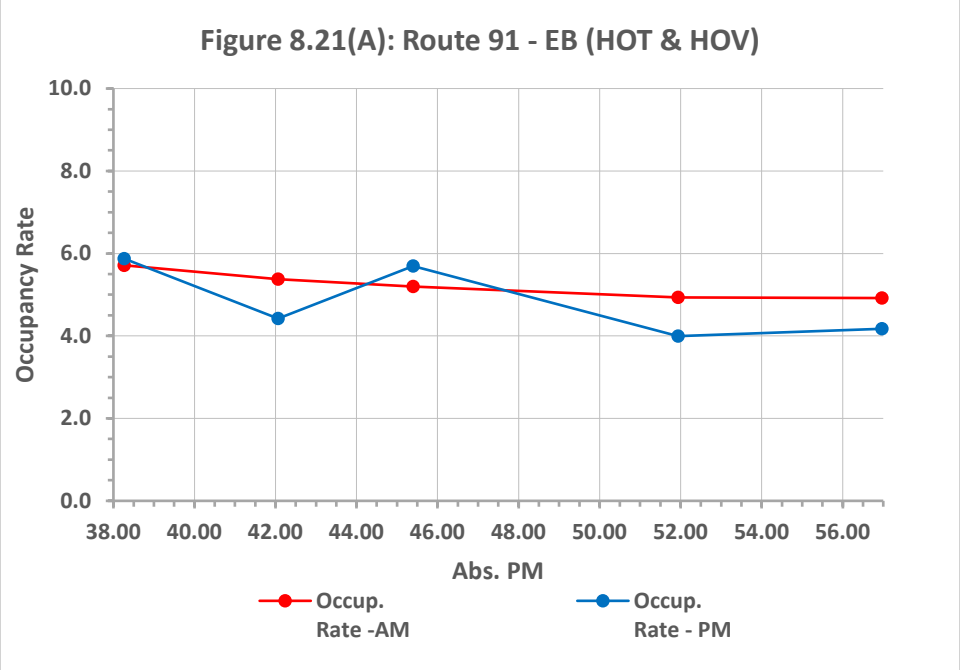
NAME	Abs Postmile
Green River	38.227
Green River	38.297
ROUTE 71	38.795
91 WB @ 71 Connector	39.207
Rte 91 @ Rte 71	39.774
SERFAS CLUB RD	40.286
Serfas Club	40.920
Serface Club	40.961
Paseo Grande	41.694
100 FT E/O SMITH	42.075
100 FT E/O SMITH	42.188
Lincoln Ave	42.544
Lincoln Ave	42.848
Main St	43.615
Main St HOT	43.801
MAIN EB CONNECTOR	43.964



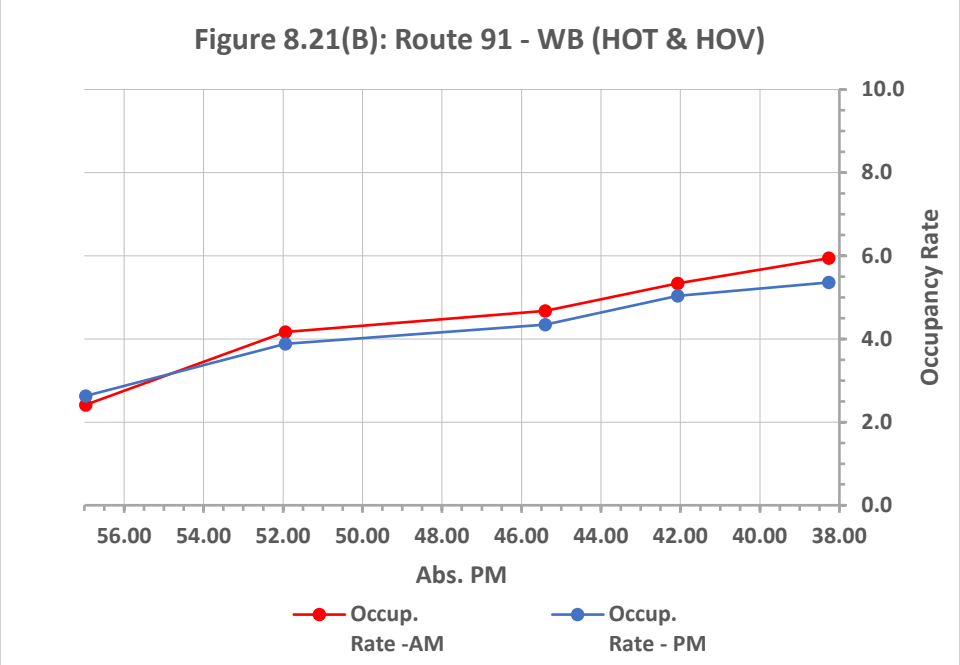


NAME	Abs Postmile
MAIN EB CONNECTOR	44.050
Main St HOT	43.887
Main St	43.701
Lincoln Ave	42.934
Lincoln Ave	42.630
SMITH AVE 100 FT E/O	42.275
SMITH AVE 100 FT E/O	42.161
Paseo Grande	41.780
Mapple Ave	41.640
Serfas Club	41.006
SERFAS CLUB RD	40.372
Rte 91 @ Rte 71	39.860
91 WB @ 71 Connector	39.293
ROUTE 71	38.881
Green River	38.383
Green River	38.313

Figure 8.21. Occupancy Rate: Spring 2024 – Route 91

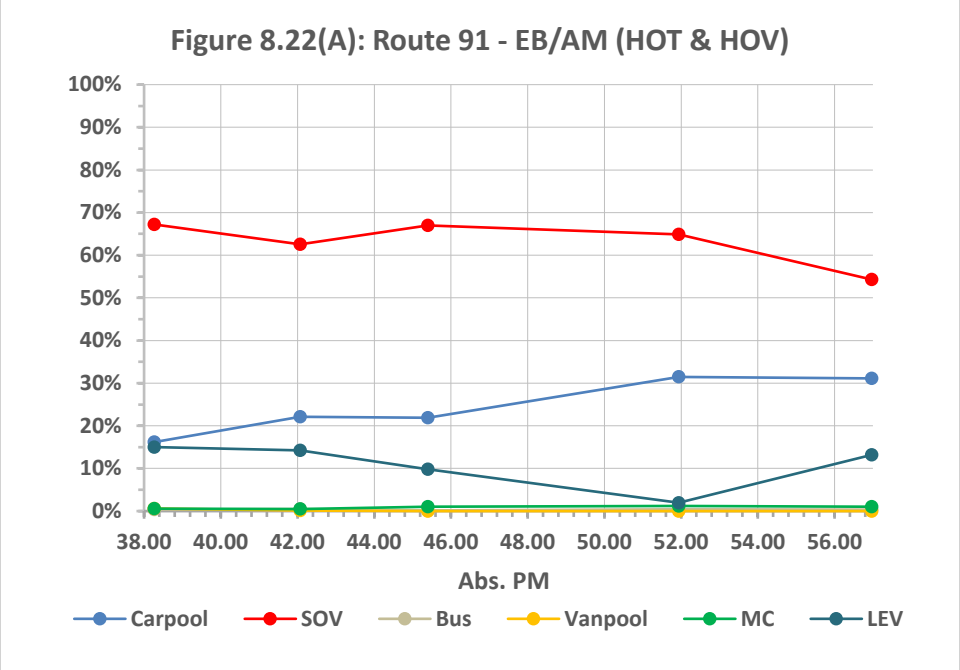


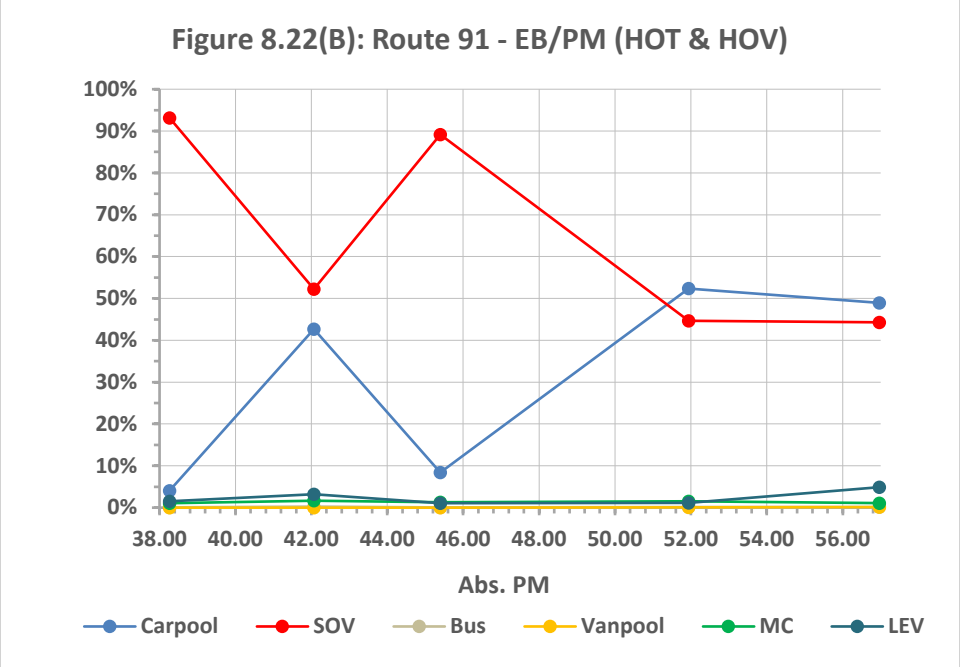
Counting Location	Abs. Postmile	
Green River Rd	38.263	HOT
Smith Av	42.067	HOT
Promenade Av	45.399	HOT
Jackson St	51.939	HOV
Cridge St	56.968	HOV



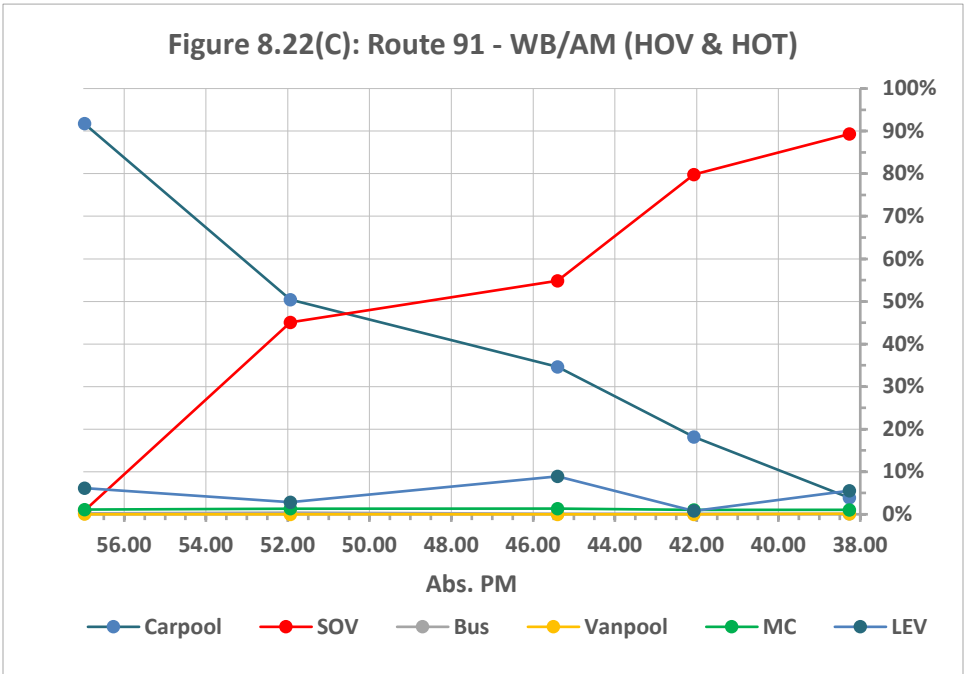
Counting Location	Abs. Postmile	
Cridge St	56.968	HOV
Jackson St	51.939	HOV
Promenade Av	45.399	HOT
Smith Av	42.067	HOT
Green River Rd	38.263	HOT

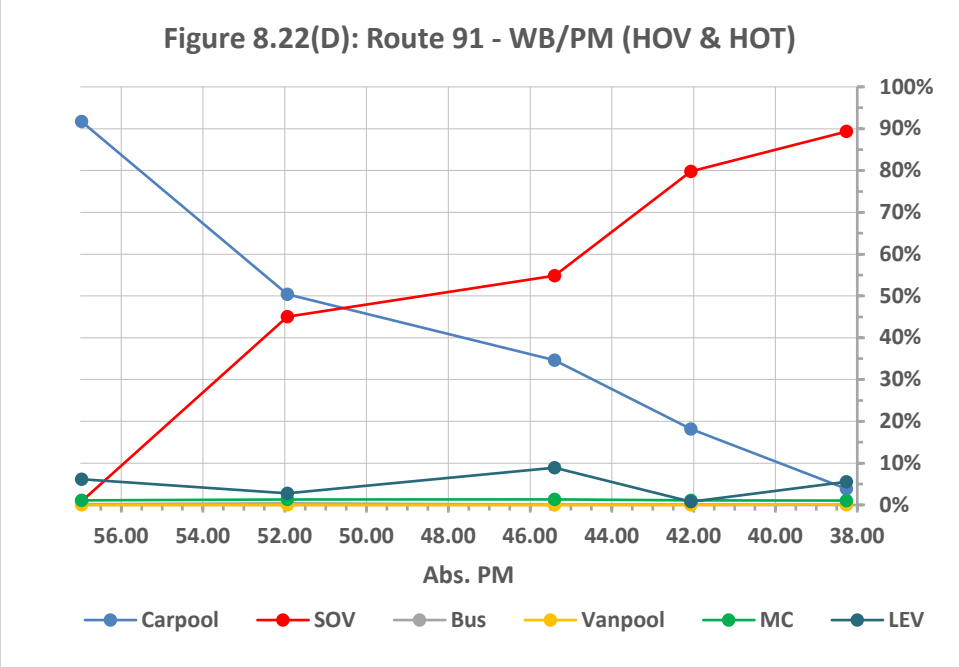
Figure 8.22. Type of Vehicles: Spring 2024 – Route 91





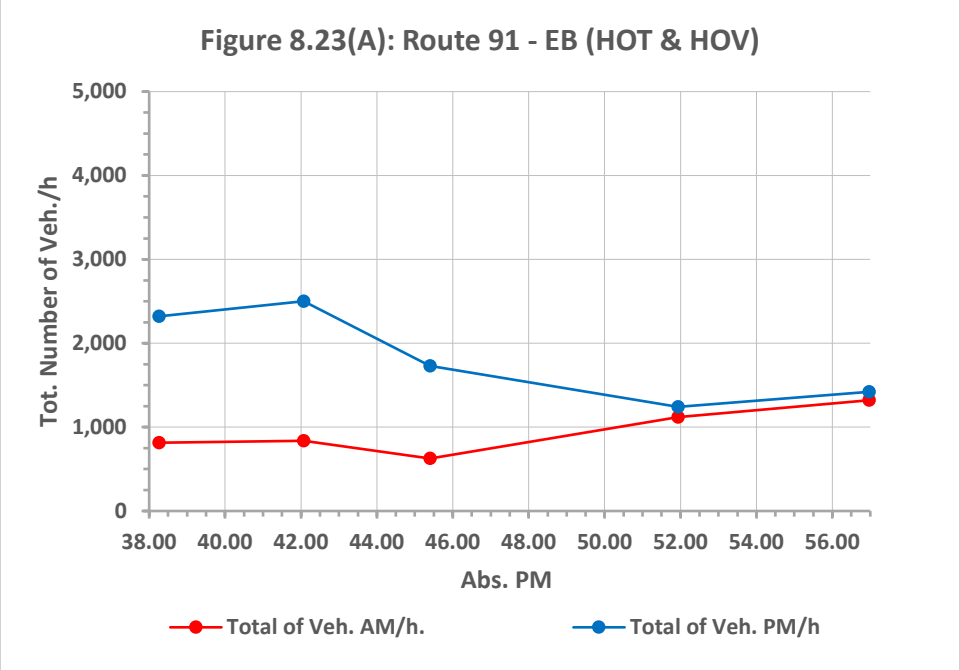
Counting Location	Abs. Postmile	
Green River Rd	38.263	HOT
Smith Av	42.067	HOT
Promenade Av	45.399	HOT
Jackson St	51.939	HOV
Cridge St	56.968	HOV



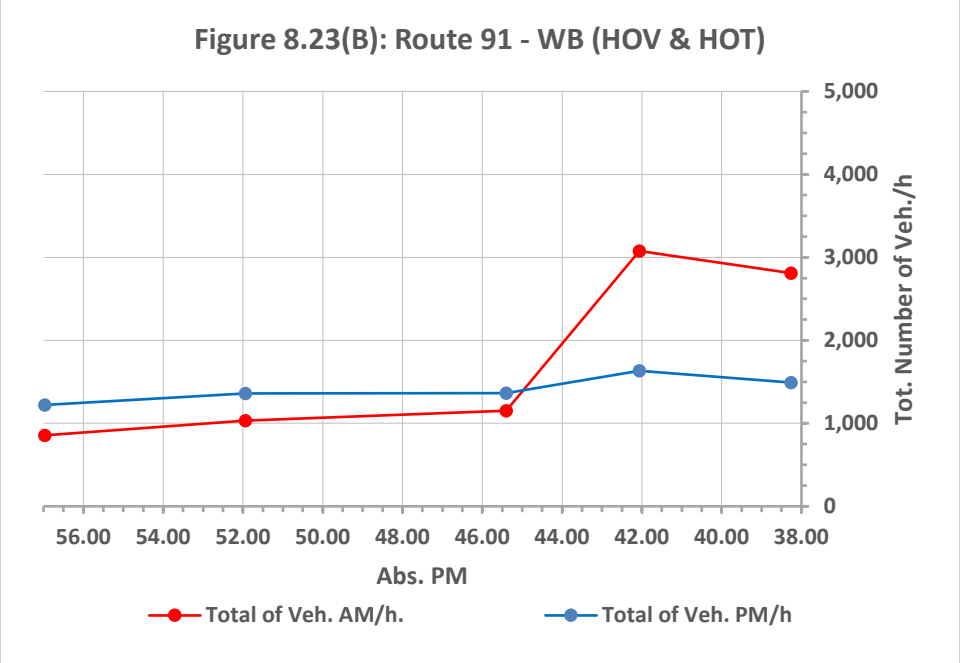


Counting Location	Abs. Postmile	
Cridge St	56.968	HOV
Jackson St	51.939	HOV
Promenade Av	**45.399**	**HOT**
Smith Av	**42.067**	**HOT**
Green River Rd	**38.263**	**HOT**

Figure 8.23. Total Number of Vehicles/Hour: Spring 2024 – Route 91



Counting Location	Abs. Postmile	
Green River Rd	38.263	HOT
Smith Av	42.067	HOT
Promenade Av	45.399	HOT
Jackson St	51.939	HOV
Cridge St	56.968	HOV



Counting Location	Abs. Postmile	
Cridge St	56.968	HOV
Jackson St	51.939	HOV
Promenade Av	45.399	HOT
Smith Av	42.067	HOT
Green River Rd	38.263	HOT

B. Remediation Strategies:

08-0F543, RIV. PM 6.600-8.100 will construct Express Lanes North Direct Connector. The cost estimate is $180 million. Construction began in April 2020 and will be completed in April 2027. Desired Outcome: Improving traffic operation at this segment.

3.5.6 ACTION PLAN FOR HOV FACILITIES ON ROUTE 91

A. Analysis

D8 – Route 91 Eastbound from IC 91/15 to IC 60/91/215 (AM & PM)

Please refer to Figure 8.24(A) and Figure 8.24(B).

In the last three years, within the corridor the congestions occurred on the same segments. The fluctuation of the degradation degree was less than 25% at most of the locations along the corridor.

During AM Peak, traffic was slightly degraded from La Sierra Ave. to Central Ave. eastbound on ramp. In the PM Peak, the traffic was very to extremely degraded starting from McKinley St. to Adams St. due to commuter traffic from Orange County, Los Angeles County, and their surroundings. The demand exceeds the capacity.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.25(A).

There were 258 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. Of these 258, there were 27 collisions that happened on HOV and left lanes. Of these 27, 15 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 231 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers and cause them to slow down.

Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

D8 – Route 91 Westbound from IC 60/91/215 to IC 91/15 (AM & PM)

Please refer to Figure 8.24(C) and Figure 8.24(D).

In the last three years, within the corridor the congestions occurred on the same segments. The fluctuation of the degradation degree was less than 25% at most of the locations along the corridor with the exception along Rte. 91 WB (AM) between Tyler St. (about Abs. PM 50.000) and Pierce St. (Abs. PM 48.000).

During AM Peak, "no" degradation existed from the beginning (the downtown of Riverside) to Van Buren Blvd. (about Abs. PM 51.500). The degradation started from hereon to west of McKinley St. (about Abs.PM 46.500) as the traffic approaching the 15-91 JCT due to commuter traffic from Riverside County, San Bernardino County, and their surroundings to the City of Corona and cities located along Rte. 15.

During PM Peak, "slightly" to "extremely" degradation throughout the corridor. This traffic was commuter traffic from Riverside County, San Bernardino County, and their surroundings to the City of Corona and cities located along Rte. 15.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.25(B).

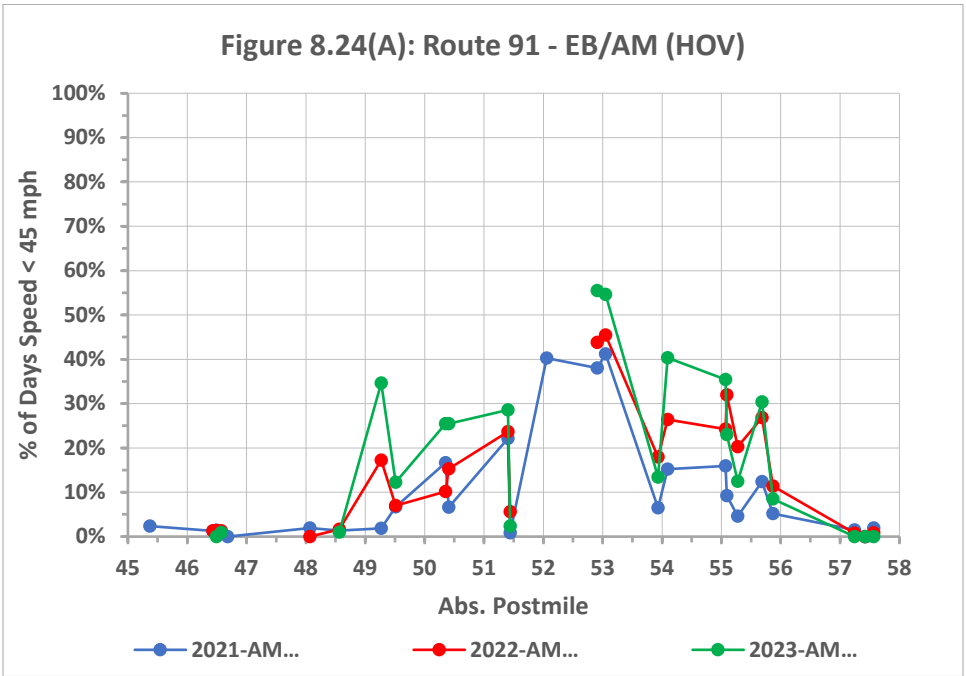
During AM Peak, traffic was slightly degraded from Van Burren Blvd to La Sierra Ave. and extremely degraded at Magnolia Ave. to Pierce St. In the PM Peak, the traffic was degraded the whole corridor due to commuter traffic from Orange County, Los Angeles County, and their surroundings. The demand exceeds the capacity.

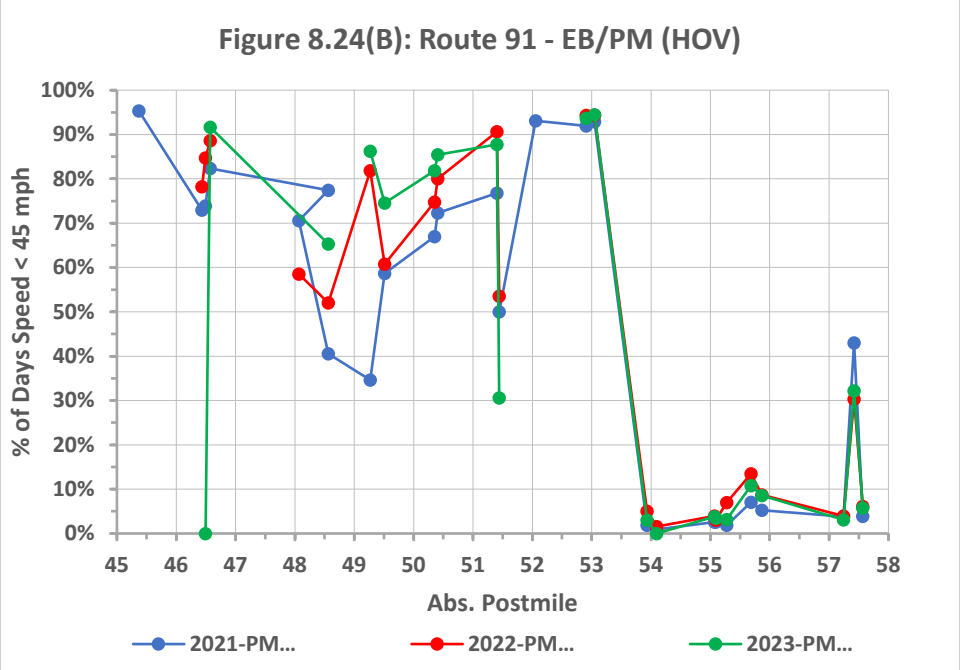
There were 186 collisions reported on this segment during 6-month period from 07/01/2023 to 12/31/2023. Of these 186, there were 27 collisions that happened on HOV and left lanes. Of these 27, 13 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 159 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

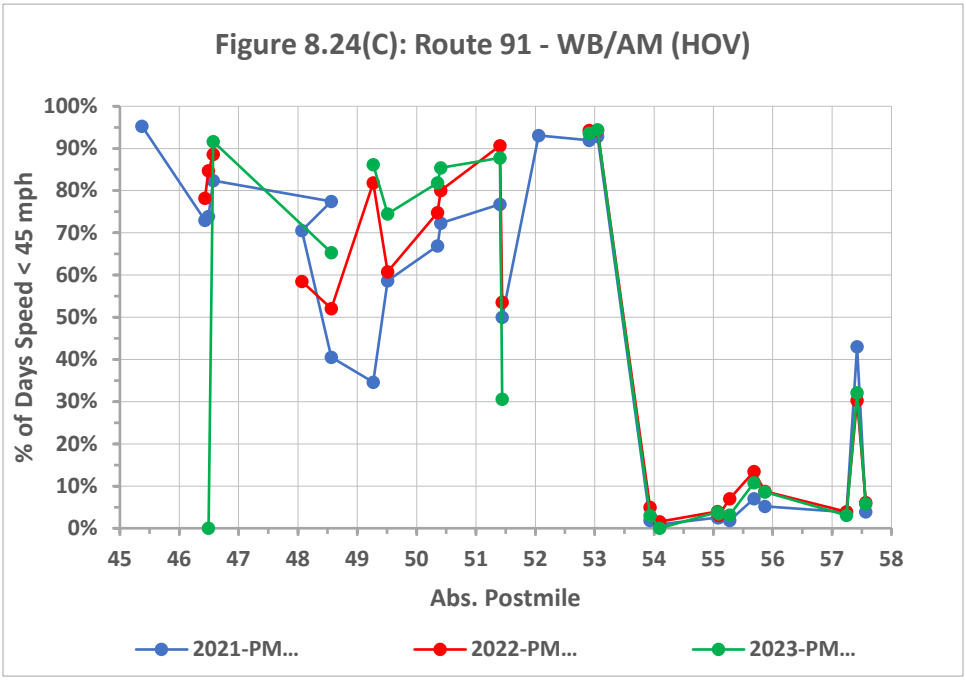
Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

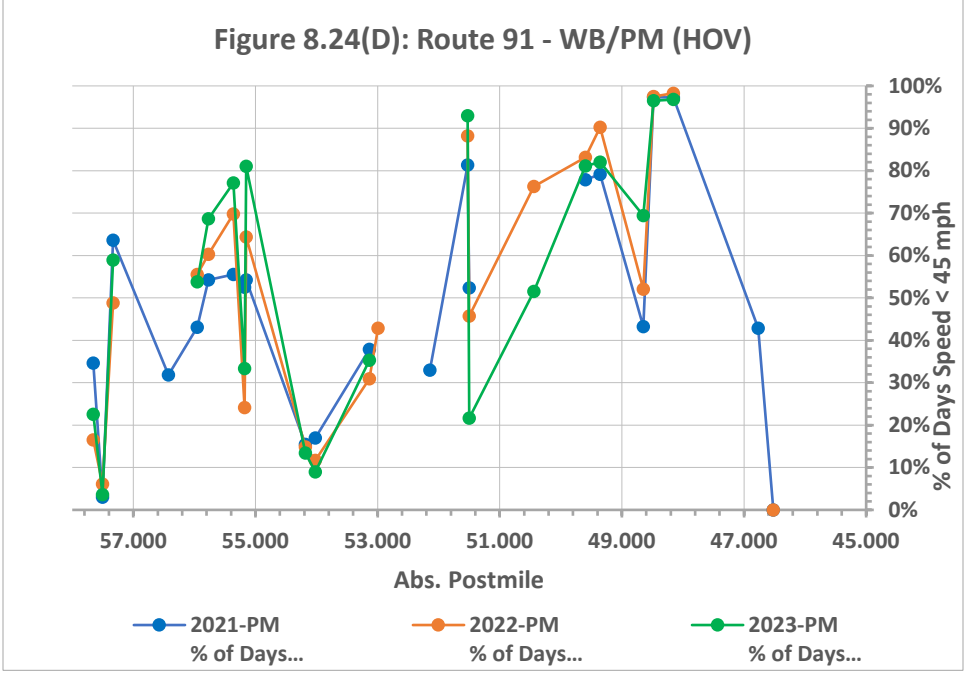
Figure 8.24. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 91 (HOV)





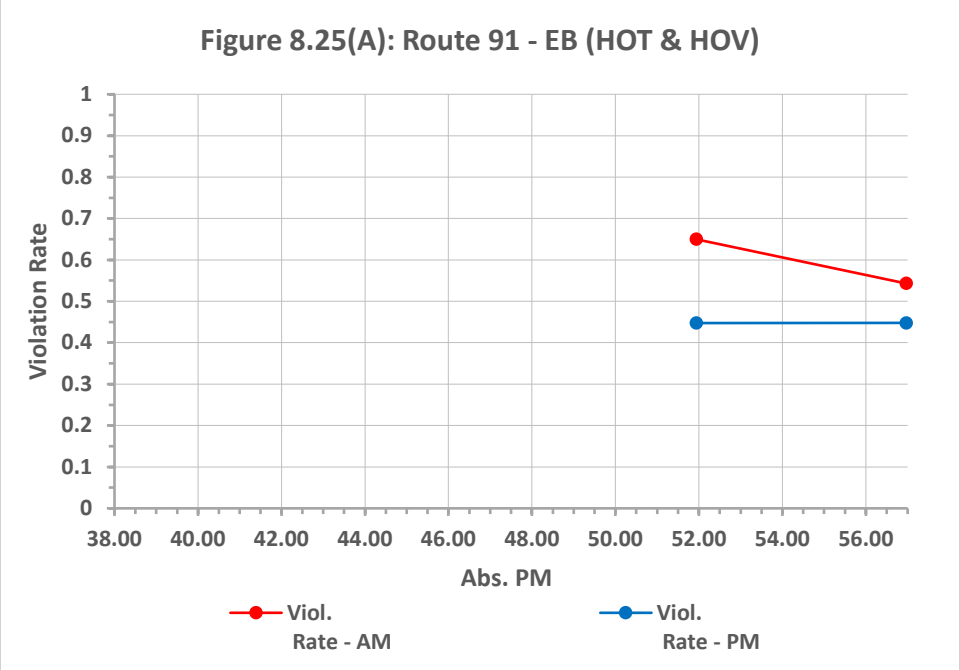
NAME	Abs Postmile
.1 W/O PROMENADE	45.371
MCKINLEY	46.434
MCKINLEY LOOP ON	46.494
MCKINLEY	46.574
E/O MCKINLEY	46.681
PIERCE	48.068
MAGNOLIA	48.563
LA SIERRA	49.271
LA SIERRA	49.509
TYLER	50.355
TYLER	50.408
Van Buren Loop EB on	51.402
VAN BUREN	51.440
600 FT E/O JACKSON	52.058
ADAMS	52.909
ADAMS	53.050
MADISON	53.932
MADISON	54.095
ARLINGTON WB ON	55.068
Jane St	55.094
ARLINGTON AVE	55.273
CENTRAL WB ON	55.686
CENTRAL EB ON	55.866
FOURTEENTH ST	57.243
FOURTEENTH ST	57.420
TENTH ST	57.569



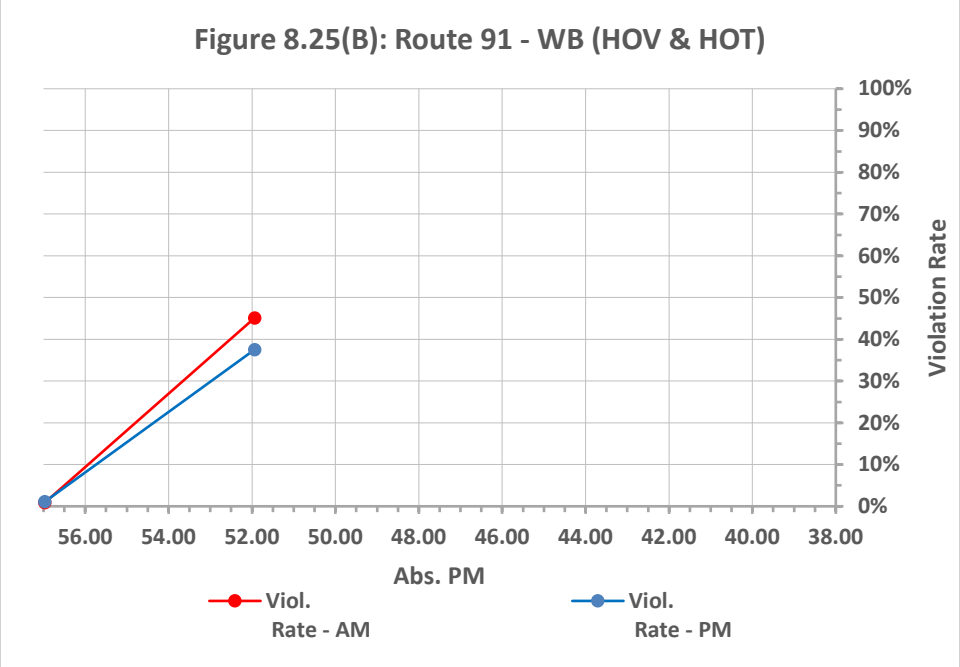


NAME	Abs Postmile
TENTH ST	57.655
FOURTEENTH ST	57.506
FOURTEENTH ST	57.329
IVY OC 100 FT E/O	56.425
CENTRAL EB ON	55.952
CENTRAL WB ON	55.772
ARLINGTON AVE	55.359
Jane St	55.180
ARLINGTON WB ON	55.154
MADISON	54.181
MADISON	54.018
ADAMS	53.136
ADAMS	52.995
JACKSON ST	52.144
VAN BUREN	51.526
VAN BUREN	51.497
TYLER	50.441
LA SIERRA	49.595
LA SIERRA	49.357
MAGNOLIA	48.649
MAGNOLIA	48.482
PIERCE	48.154
E/O MCKINLEY	46.767
MCKINLEY	46.520

Figure 8.25. Violation Rate: Spring 2024 – Route 91 (HOT & HOV)



Counting Location	Abs. Postmile	
Green River Rd	**38.263**	**HOT**
Smith Av	**42.067**	**HOT**
Promenade Av	**45.399**	**HOT**
Jackson St	51.939	HOV
Cridge St	56.968	HOV



Counting Location	Abs. Postmile	
Cridge St	56.968	HOV
Jackson St	51.939	HOV
Promenade Av	**45.399**	**HOT**
Smith Av	**42.067**	**HOT**
Green River Rd	**38.263**	**HOT**

B. Remediation Strategies

- 08-1M790 RIV-91 PM 7.50/21.8 to restripe, adding pavement marking, and replacing sign panels on HOV lane. Construction is scheduled to begin in July 2027 and end in January 2028. Signing, pavement markings, and refreshing stripping will help drivers make decisions on time rather than slowing down and impacting traffic flow.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.
- D8 ML is working with CHP to increase enforcement at high violation locations.

3.5.7 ACTION PLAN FOR HOV FACILITIES ON ROUTE 210

A. Analysis:

D8 – Route 210 Eastbound from LA County to IC 210/215 (AM & PM)

Please refer to Figure 8.26(A) and Figure 8.26(B).

During AM Peak there was no degradation except very degraded at west of 210/15 due to traffic merging.

During PM Peak, in the last three years, within the corridor, the congestion occurred on the same segments. The fluctuation of the degradation degree was less than 25% at most of the locations along the corridor. The traffic was extremely degraded starting from LA County line and diminished farther east as it approached 15-210 JCT. These commercial and commuter traffic came from Los Angeles County going East to San Bernadino County as well as North and South through I-15.

The degradation started right after I-15 JCT and diminished farther east where SR-210 meet I-215. The degradation was caused by traffic coming from I-15 north and I-15 south travelling to San Bernadino County and beyond.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.27(A).

Data for the graphs on Figures 8.28 to 8.30 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

There were 222 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. Of these 222, there were 31 collisions that happened on HOV and left lanes. Of these 31, 19 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 191 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

D8 – Route 210 Westbound from LA County to IC 210/215 (AM & PM)

Please refer to Figure 8.26(C) and Figure 8.26(D).

During AM Peak there was "no" degradation from I-215 all the way to I-15. The degradation started after I-15 and continued to Los Angeles County Line. The commercial and commuter traffic came from north and south through I-15 to Los Angeles County. However, the fluctuation of the degradation degree was less than 25% at most of the locations along the corridor.

During PM Peak in the last three years, there was "no" to "slightly" degradation along the entire corridor.

The violation rates were relatively high. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.27(B).

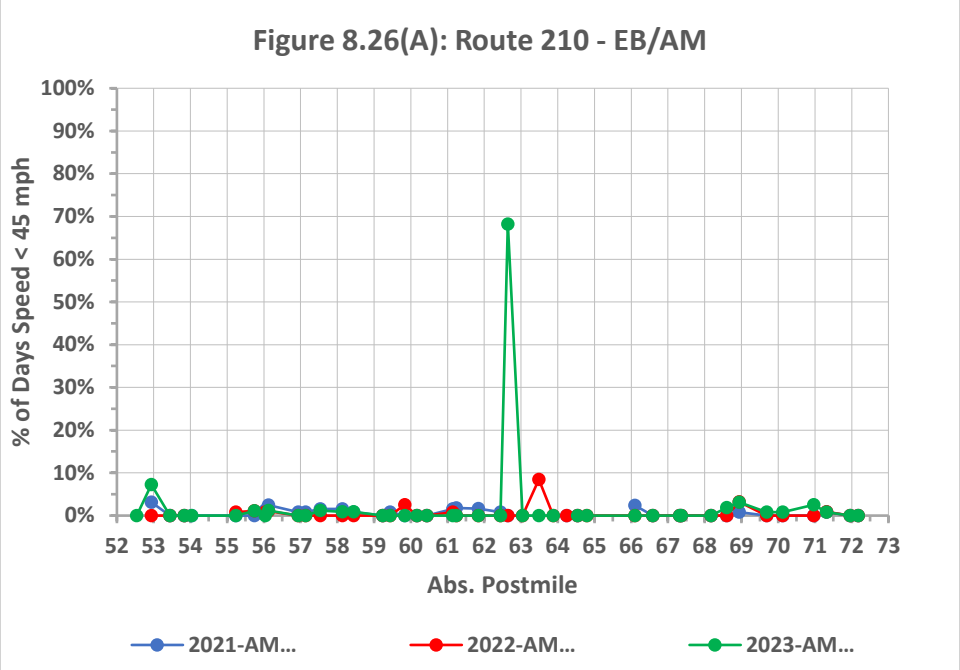
Data for the graphs on Figures 8.28 to 8.30 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024

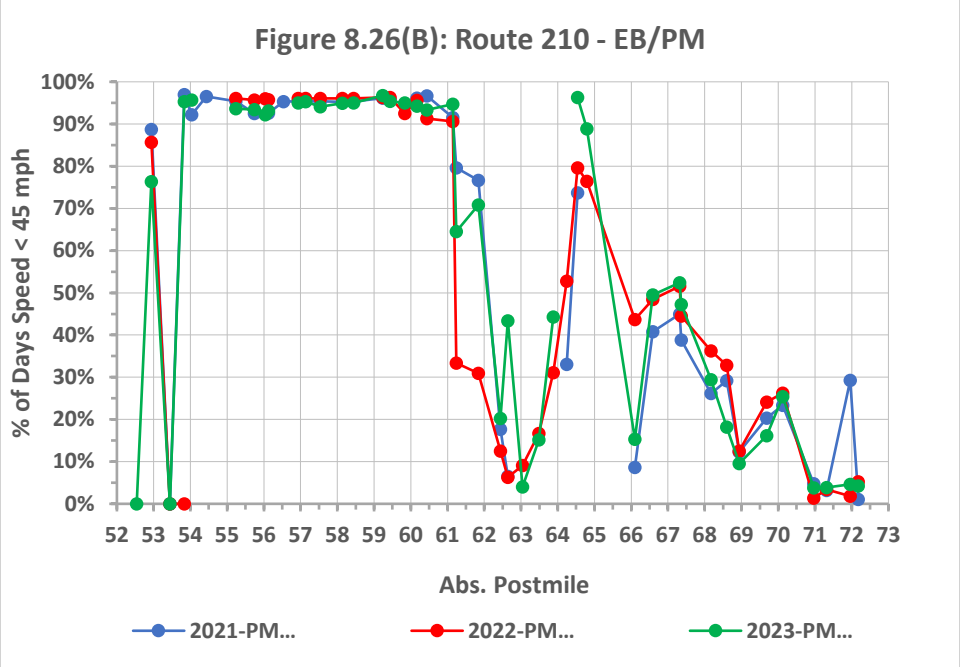
There were 164 collisions reported on this segment during the 6-month period from 07/01/2022 to 12/31/2022. Of these 164, there were 19 collisions that happened on HOV and left lanes. Of these 19, 11 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 145 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

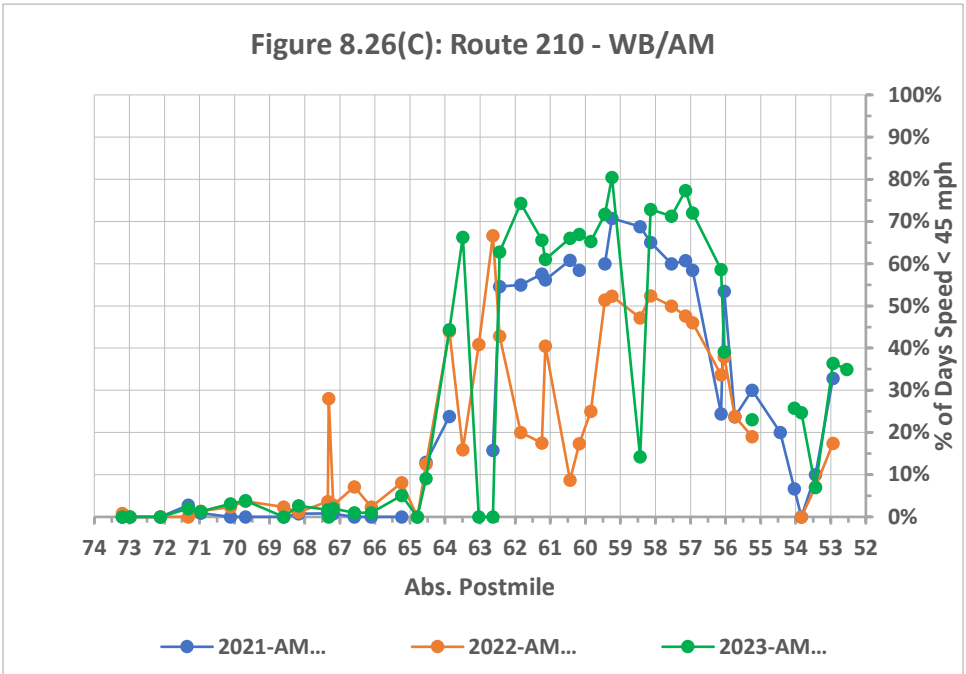
Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

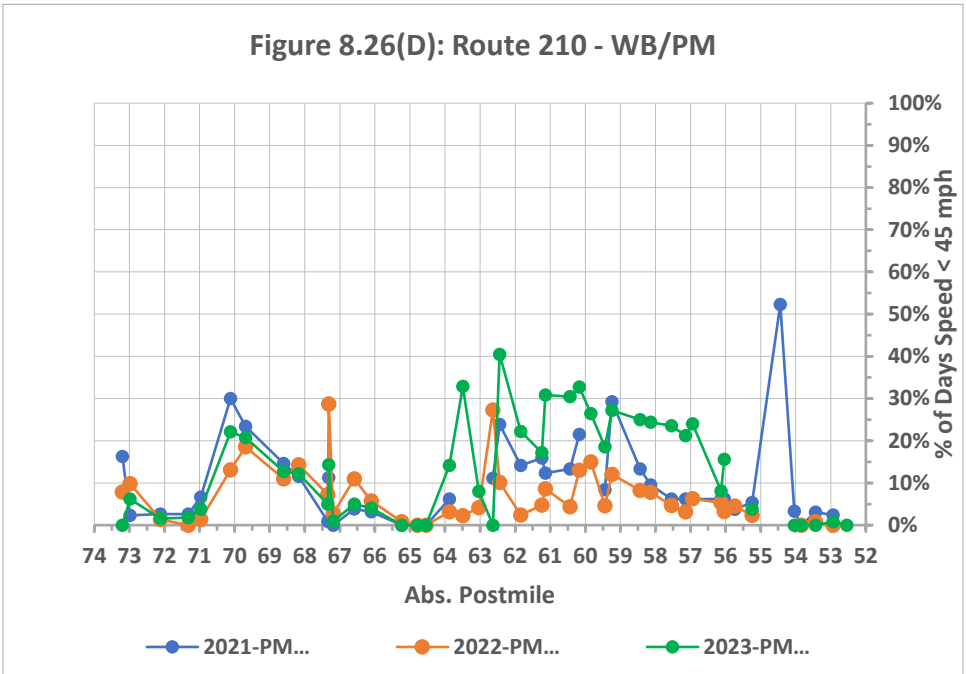
Figure 8.26. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 210





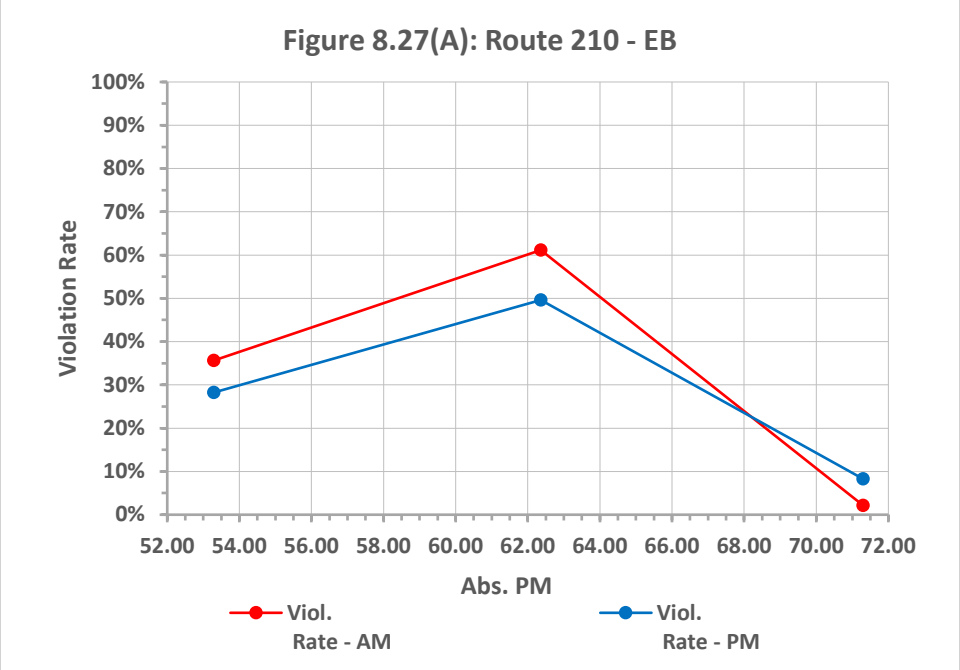
NAME	Abs Postmile
.1 E/O CO LINE	52.539
.5 M E/O COUNTY LINE	52.939
1 M E/O CO LINE	53.439
MOUNTAIN AVE WB ON	53.839
E/B MOUNTAIN AVE	54.039
.4 M E/O MOUNTAIN	54.439
.5 M W/O CAMPUS	55.239
CAMPUS STREET	55.739
.5 M E/O CAMPUS	56.039
CAMPUS EB ON	56.129
.5 M E/O CAMPUS	56.539
CARNELIAN WB ON	56.939
E/B CARNELIAN	57.139
.4M E/O CARNELIAN	57.539
ARCHIBALD	58.139
E/B ARCHIBALD ONR	58.439
HAVEN WB ON	59.239
E/B HAVEN ONR	59.439
.5 M W/O MILLIKEN	59.839
MILLIKEN WB ON	60.169
E/B MILLIKEN ONR	60.439
.75 M E/O MILLIKEN	61.139
DAY CREEK WB ON	61.239
DAY CREEK E/B ON	61.839
.8M E/O DAY CREEK	62.439
1.3MI W/O JCT 210/15	62.639
.9 MI W/O JCT 210/15	63.039
210 WB from 15 SB	63.489
210 WB from 15 NB	63.877
CHERRY AVE	64.239
CHERRY AVE	64.539
210 EB from 15 SB	64.792
CITRUS WB ON	66.099
CITRUS EB ON	66.589
SIERRA EB LOOP	67.319
SIERRA EB ON (T)	67.364
ALDER WB/ON	68.169
ALDER EB/ON @ 210	68.599
.25 W/O LINDEN @ 210	68.939
AYALA WB/ON @ 210	69.689
210 @ AYALA ON	70.119
RIVERSIDE WB/ON@210	70.969
210@RIVERSIDE EB/ON	71.319
STATE WB/ON @ 210	71.962
STATE EB/ON @ 210	72.182



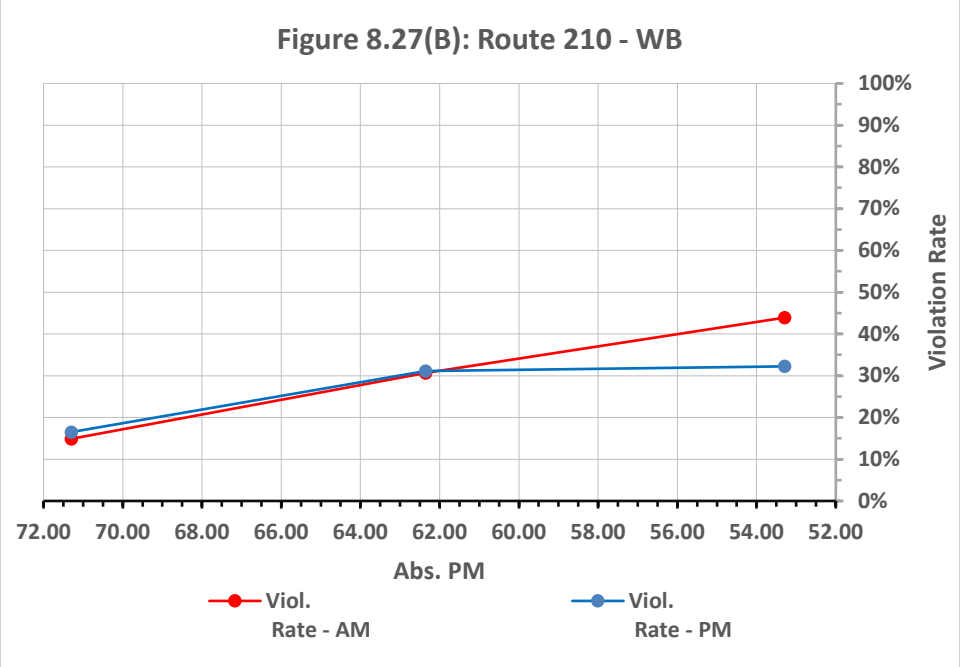


NAME	Abs Postmile
STATE EB/ON @ 210	73.199
STATE WB/ON @ 210	72.979
Pepper Ave	72.111
RIVERSIDE EB/ON@210	71.319
RIVERSIDE WB/ON@210	70.969
AYALA EB ON @ 210	70.119
210 @ AYALA ON	69.689
ALDER EB/ON @ 210	68.599
ALDER WB/ON	68.169
SIERRA WB LOOP	67.339
SIERRA EB LOOP	67.319
SIERRA WB ON	67.189
CITRUS EB ON	66.589
CITRUS WB ON	66.099
1 MI W/O CITRUS AVE	65.239
210 EB from 15 SB	64.792
CHERRY AVE	64.539
210 WB from 15 NB	63.877
210 WB from 15 SB	63.489
.9 MI W/O JCT 210/15	63.039
1.3MI W/O JCT 210/15	62.639
.8M E/O DAY CREEK	62.439
DAY CREEK EB ON (OS)	61.839
DAY CREEK WB ON	61.239
.75 M E/O MILLIKEN	61.139
MILLIKEN EB ON	60.439
W/B MILLIKEN ONR	60.169
MILLIKEN AVE	59.839
HAVEN EB ON	59.439
W/B HAVEN ONR	59.239
E/B ARCHIBALD ONR	58.439
W/B ARCHIBALD ONR	58.139
.4M E/O CARNELIAN	57.539
CARNELIAN EB ON	57.139
W/B CARNELIAN	56.939
CAMPUS EB ON	56.129
CAMPUS AVE .5 M E/O	56.039
CAMPUS W/B ON	55.739
CAMPUS AVE .5 M W/O	55.239
MOUNTAIN AVE .4 E/O	54.439
MOUNTAIN AVE EB ON	54.039
W/B MOUNTAIN AVE	53.839
COUNTY LINE 1 M E/O	53.439
COUNTY LINE .5 M E/O	52.939
COUNTY LINE .1 M E/O	52.539

Figure 8.27. Violation Rate: Spring 2024 – Route 210

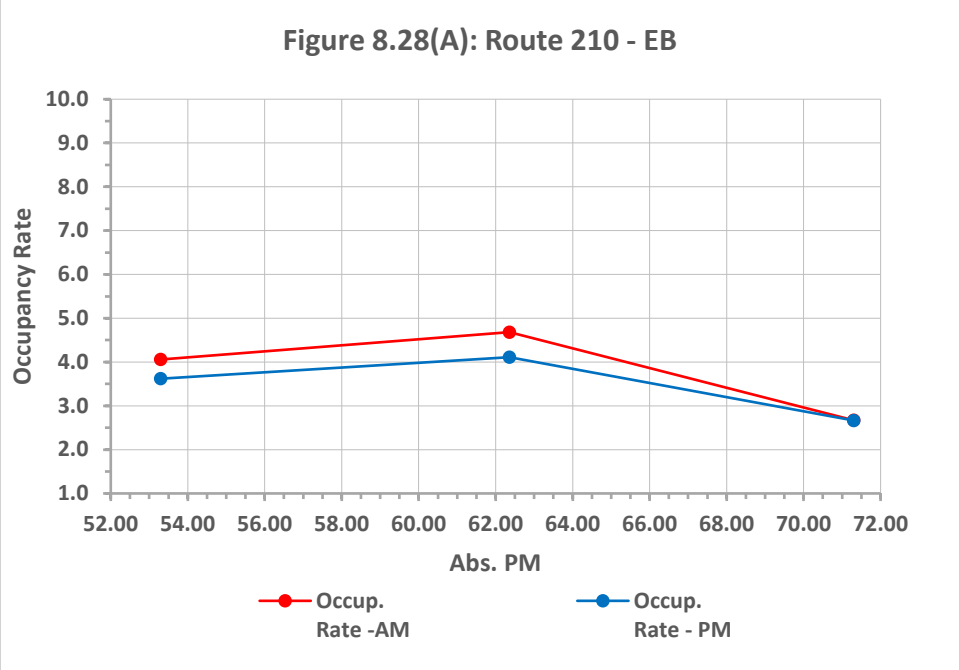


Counting Location	Abs. Postmile
N. Benson Av.	53.293
Etiwanda Av.	62.358
E. Highland Av.	71.299

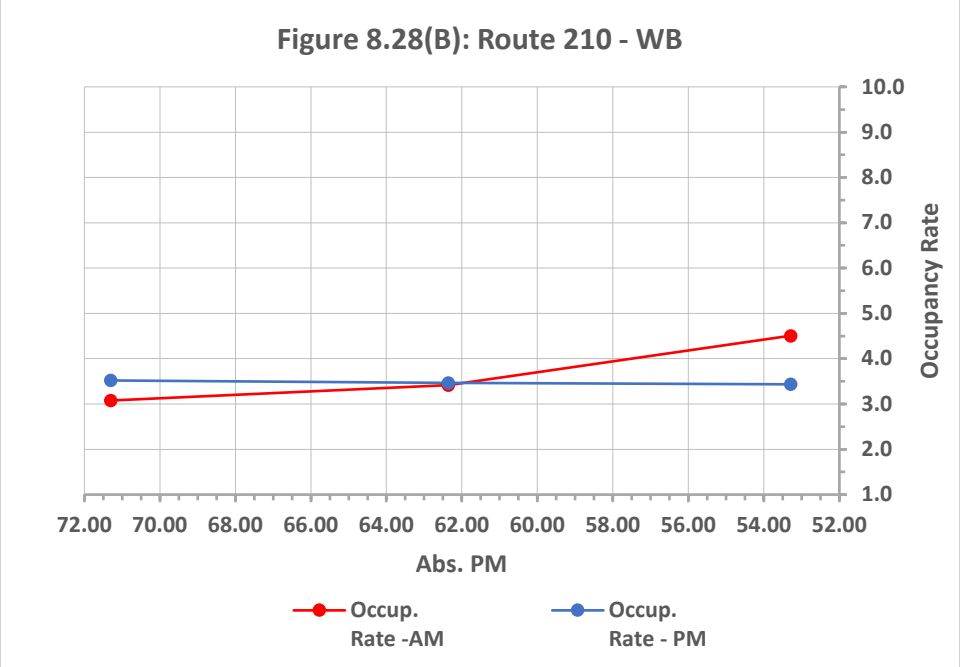


Counting Location	Abs. Postmile
E. Highland Av.	71.299
Etiwanda Av.	62.358
N. Benson Av.	53.293

Figure 8.28. Occupancy Rate: Spring 2024 – Route 210

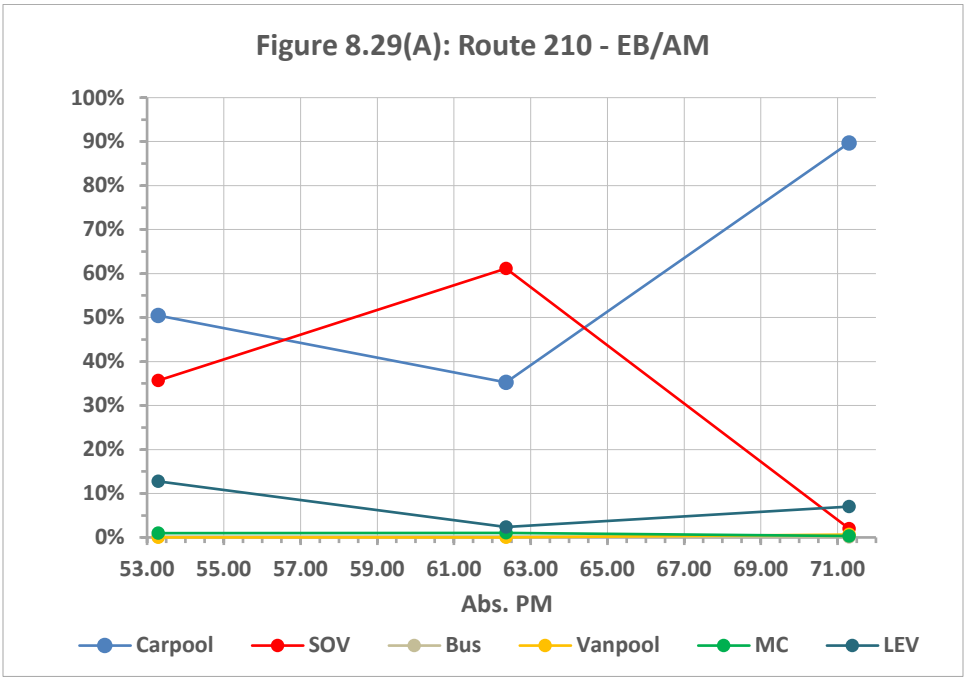


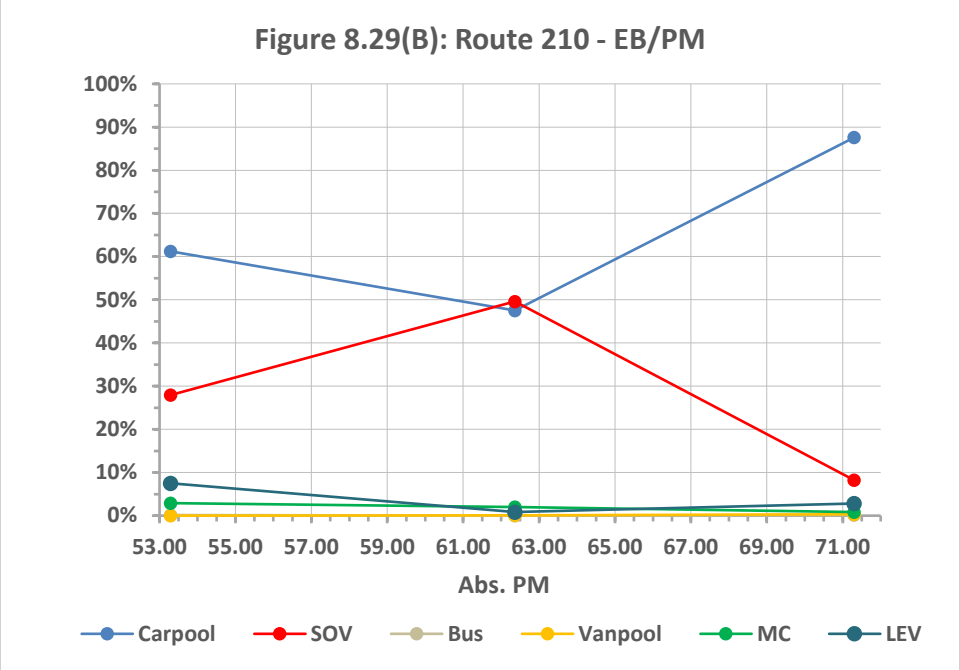
Counting Location	Abs. Postmile
N. Benson Av.	53.293
Etiwanda Av.	62.358
E. Highland Av.	71.299



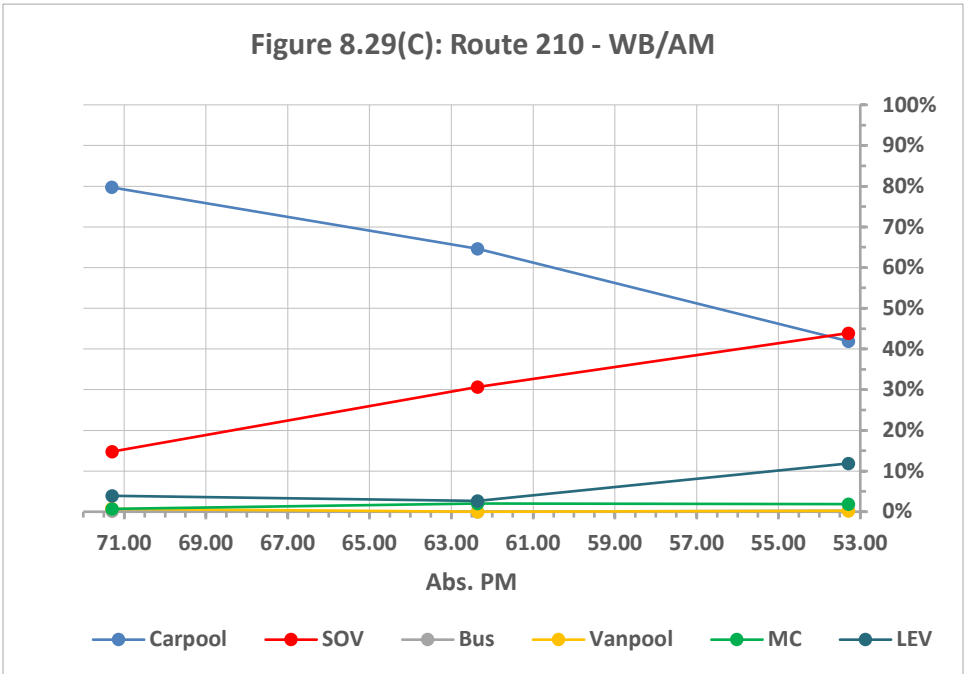
Counting Location	Abs. Postmile
E. Highland Av.	71.299
Etiwanda Av.	62.358
N. Benson Av.	53.293

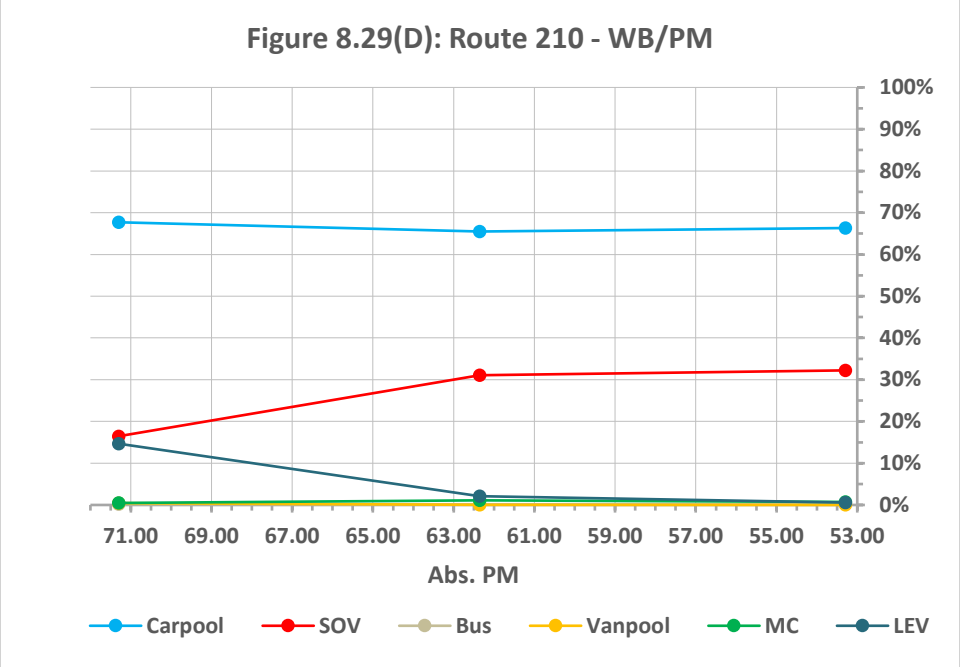
Figure 8.29. Type of Vehicles: Spring 2024 – Route 210





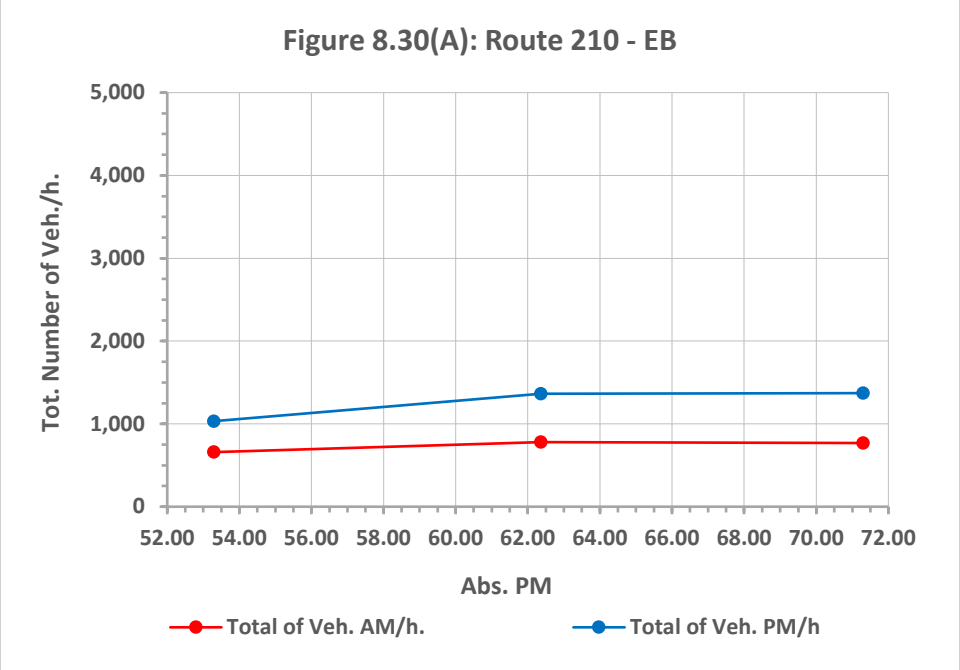
Counting Location	Abs. Postmile
N. Benson Av.	53.293
Etiwanda Av.	62.358
E. Highland Av.	71.299



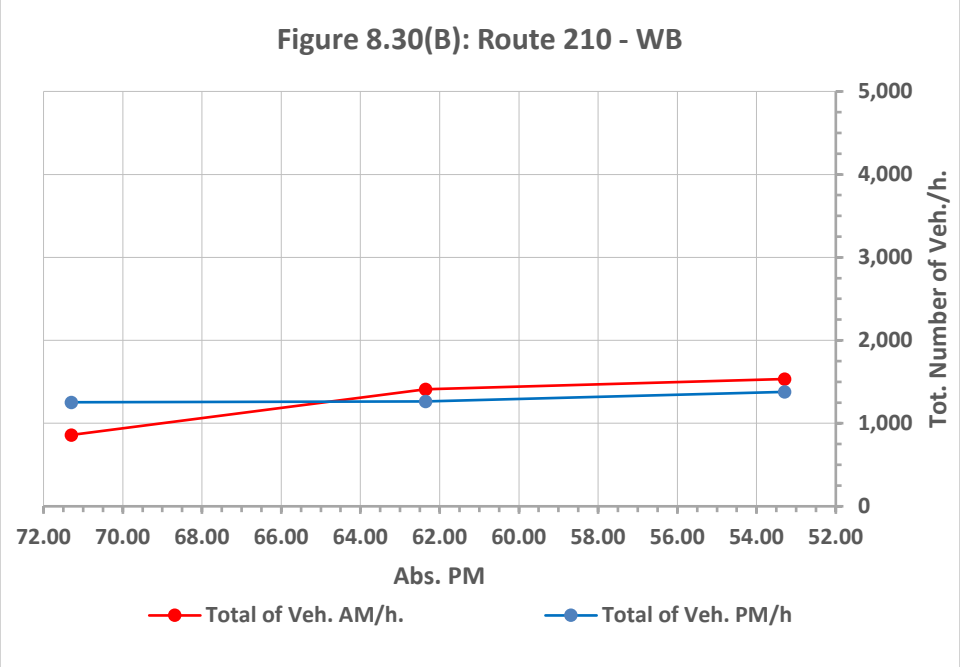


Counting Location	Abs. Postmile
E. Highland Av.	71.299
Etiwanda Av.	62.358
N. Benson Av.	53.293

Figure 8.30. Total Number of Vehicles/Hour: Spring 2024 – Route 210



Counting Location	Abs. Postmile
N. Benson Av.	53.293
Etiwanda Av.	62.358
E. Highland Av.	71.299



Counting Location	Abs. Postmile
E. Highland Av.	71.299
Etiwanda Av.	62.358
N. Benson Av.	53.293

B. Remediation Strategies

- 08-1P530 SBD PM 1.90/3.10 to add EB & WB auxiliary lanes and retaining wall. Construction is scheduled to begin in June 2029 and end in June 2030. This project should improve the traffic mobility on all lanes in the vicinity between Campus Ave and Mountain Ave.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.
- D8 ML is working with CHP to increase enforcement at high violation locations.

3.5.8 ACTION PLAN FOR HOV FACILITIES ON ROUTE 215

I-215 between postmile RIV. 38.78 and SBD. 10.03 (16.5 mile long) is an arterial multilane urban freeway with one-lane continuous access HOV lane in each direction. The I-215 freeway is designated as a North-South Freeway.

The 60-91-215 JCT in the City of Riverside at about Abs. Postmile 58.987 is a four-legged Junction (JCT).

The north and east leg are I-215, the south leg is SR-91, and the west leg is SR-60. SR-60 (designated as East-West freeway) is the west leg of the JCT. SR-91(designated as East-West freeway) is the south leg of the JCT, and its orientation is in the North-South Cardinal direction. I-215 (designated as North-South freeway) is the east and north leg of the JCT. Since there are no direct HOV connectors between the HOV lanes, the HOV traffic must merge to mixed flow (MF) lanes first to enter HOV lane at the other leg of the JCT.

Example: If the northbound HOV lane traffic on northbound I-215 (east leg) plans to continue to stay on northbound I-215 HOV lane, it must exit and merge into MF lanes before the JCT and take the MF connector to northbound I-215 (north leg) first before entering the northbound HOV lane on the north leg. These merging movement creates congestion as the traffic approaching the junction. The

northbound HOV traffic on east leg (I-215) will continue as westbound HOV traffic on west leg (SR-60) if it still wants to stay as a HOV traffic.

The HOV-lane is bordered by a various width of treated shoulder adjacent to median concrete barrier on the left and General Purpose on the right separated by Detail 42. In general, the signing and striping of the HOV-lane is proper and in a good condition. This arterial freeway has closely spaced interchanges and relatively flat terrain throughout, except the first 5-mile segment at the south end between 60-215 JCT in City of Moreno Valley and 60-91-215 JCT in the City of Riverside.

This freeway corridor traverses through the UCR campus area and two downtowns – downtown of the City of Riverside and the City of San Bernardino. SR-60 from the west (Los Angeles County) and SR-91 from the south (Orange County) meet I-215 as 60-91-215 junction in the city of Riverside. SR-60 from the east as far as the State of Arizona and I-215 from the south as far as San Diego County, and Mexico meet I-215 as 60-215 JCT in the City of Moreno Valley. I-10, SR-66 and I-210/I-259 which are E-W direction facilities cut through I-215 at different locations along the northern part of the corridor.

A 5-mile-long segment (dubbed as the 5-mile-UCR segment) between 60-215 JCT in the City of Moreno valley and 60-91-215 JCT in the City of Riverside is heavily transverse by commercial and commuter traffic especially during AM and PM Peak. At the south end of this segment is 60-215 JCT in City of Moreno Valley where SR-60 and I-215 meet. SR-60 continues easterly and ends at I-10 which continues farther east to the State of Arizona. I-215 continues south to San Diego County and Mexico. The north end of the segment is 60-91-215 JCT in the City of Riverside. I-215 (north leg) continues northerly to join I-15 to northern California towards the State of Nevada. SR-91 (south leg) crosses the Riverside County and Orange County. SR-60 (west leg) crosses the Riverside, San Bernardino, and Los Angeles County. This segment not only has closely spaced interchanges with auxiliary lane but also has an up and down grade with large radius curve alignments.

On September 25, 2023, Caltrans D8 Operations in partnership with Caltrans HQ met with Lindsay Corporation to conduct a study to install Moveable Barrier within this 5-mile-UCR segment of SR-215 HOV Lane near University of California Riverside. The study on this most degraded HOV Lane in D8 is expected to be completed on/or before September 2024.

The traffic demand exceeds the capacity especially during AM and PM Peak.

A. Analysis:

D8 – Route 215 Northbound (AM & PM)

Please refer to Figure 8.31(A) and Figure 8.31(B).

During AM & PM Peak, in the last three years, within the corridor the congestions occurred on the same segments. The fluctuation of the degradation degree was less than 25% at most of the locations along the corridor.

During AM peak, extremely degraded within the 5-mile-UCR segment and diminished as it approached 60-91-215 JCT in the City of Riverside due to commercial & commuter traffic from the State of Nevada and San Diego County and surrounding. At the junction, due to no HOV direct connectors, the HOV traffic lane on northbound I-215 (east leg) would continue as westbound HOV lane on SR-60. The north bound HOV lane on I-215 (north leg) after 60-91-215 JCT is the continuation of eastbound 91 HOV lane (south leg). This commercial & commuter traffic came from Riverside and Orange County travelling north to San Bernardino County and the State of Nevada through I-15.

Due to construction activities of EA 08-1F730 the freeway was degraded between Barton Rd and Washington St/Mount Vernon Ave during AM & PM peak.

During PM Peak, extremely degraded throughout the 5-mile-UCR segment and continue to 210-215 JCT (in the City of San Bernardino). The traffic on the mixed flow lanes were extremely congested due to high truck volume (> 10%) especially within the 5-mile-UCR segment. Due to friction, it effects the adjacent traffic on the HOV lane adversely. The affect was exacerbated by the continuous access HOV lane striping (Detail 42).

The traffic demand within this 5-mile-UCR segment was over the capacity, especially during AM & PM Peak. Refer to Figure 8.35(A) for the number of vehicle/h at Box Springs Rd. and Iowa Av & Linden St.

The violation rates were relatively high, especially within the 5-mile-UCR segment. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.32(A).

Data for the graphs on Figures 8.33 to 8.35 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024.

There were 323 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. Of these 323, there were 26 collisions that happened on HOV and left lanes. Of these 26, 12 collisions happened during peak hour (6-9 AM & 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 297 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

D8 – Route 215 Southbound (AM & PM)

Please refer to Figure 8.31(C) and Figure 8.31(D).

During AM & PM Peak, in the last three years, within the corridor the congestions occurred on the same segments. The fluctuation of the degradation degree was less than 25% at most of the locations along the corridor.

During AM & PM Peak, No degradation up to Iowa Ave. (about Abs. PM 37.500), except around Washington St. (about Abs. PM 40.000) due to construction activities of EA 08-0J070 and 08-1F730. Construction activities required shifting lanes and reducing lane width, thereby creating congestion. The southbound HOV lane on I-215 (east leg) after 60-91-215 JCT is the continuation of eastbound SR-60 HOV lane (west leg). The traffic was extremely degraded within the 5-mile-UCR segment due to closely spaced interchanges and an up and down grade with large radius curve alignments.

The traffic on the mixed flow lanes were extremely congested, especially within the 5-mile-UCR segment due to high truck traffic (>10%). Due to friction effect, it effects the adjacent traffic on the HOV lane adversely. The affect was exacerbated by the continuous access HOV lane striping (Detail 42).

The traffic demand in downtown Riverside and within this 5-mile-UCR segment was over the capacity during AM & PM Peak. Refer to Figure 8.35(B) for the number of vehicle/h at Newport Avenue, Iowa Ave. & Linden St., and Box Springs Rd.

The violation rates were relatively high, especially within the 5-mile-UCR segment. A strategic and well-planned enforcement might improve the traffic flow on HOV lane. Refer to Figure 8.32(B).

Data for the graphs on Figures 8.32 to 8.35 are from 2024-District 8-Spring Traffic Count collected between 03.26.2024 and 05.22.2024.

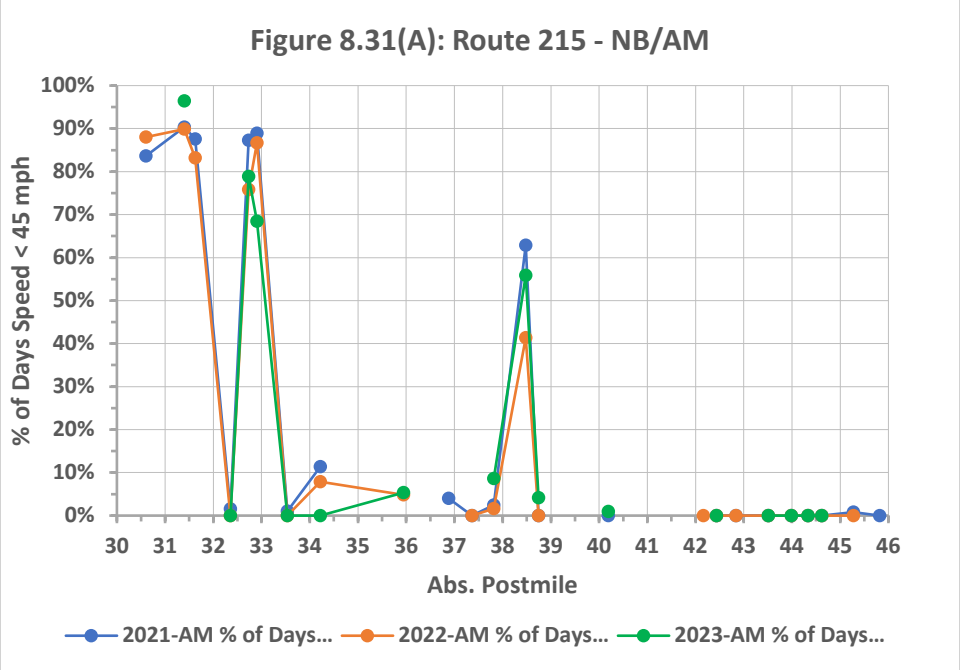
There were 337 collisions reported on this segment during the 6-month period from 07/01/2023 to 12/31/2023. In these 337, there were 36 collisions happened on HOV and left lanes. Of these 36, 15 collisions happened during peak hour (6-9 AM

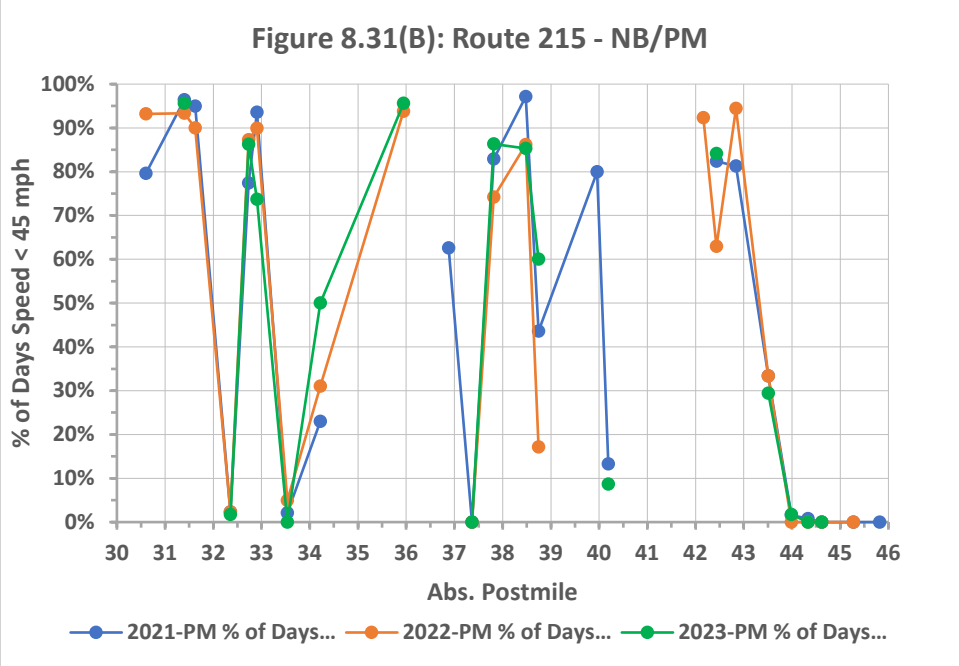
& 3-6 pm). These reported collisions would be the cause adding to the degradation on HOV lane.

The 301 collisions on right lanes and interior lanes might not directly impact the degradation. However, it may distract drivers causing them to slow down.

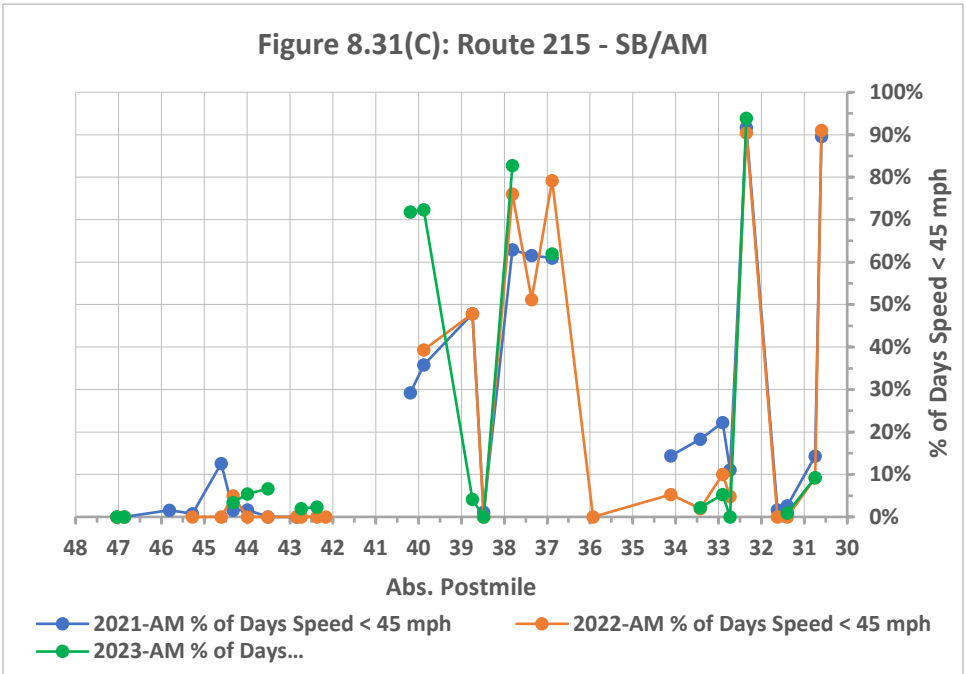
Collisions on HOV lane and left lanes on the opposite direction did not directly impact the degradation on the HOV lane in discussion. However, due to close proximity to the HOV lane in discussion, drivers on the HOV lane in discussion would be distracted and thereby slow down. Therefore, these collisions that happened on the opposite direction would also (not directly) cause congestion on the HOV lane in discussion.

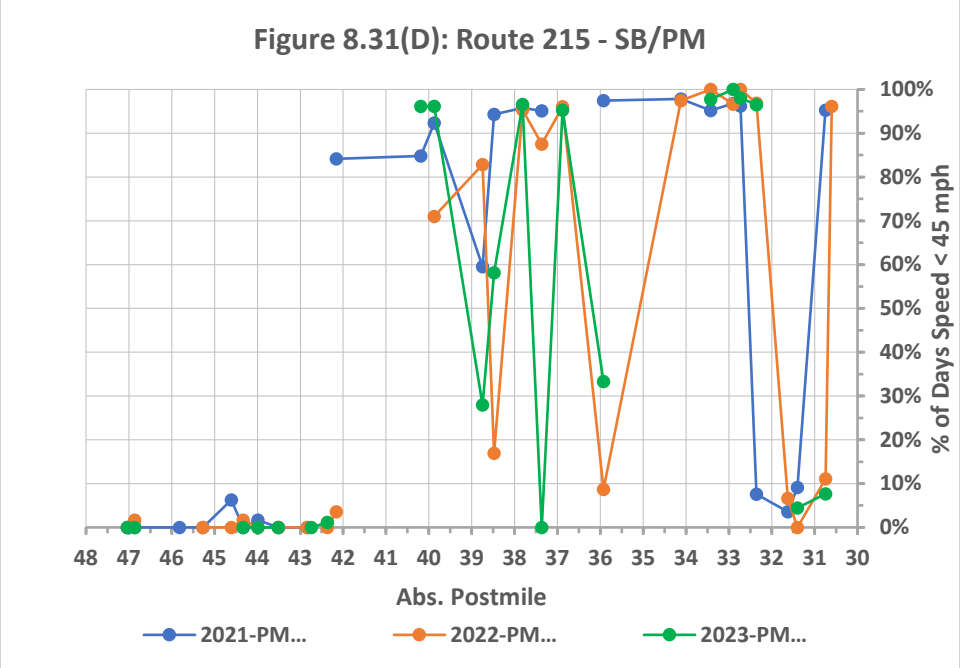
Figure 8.31. Combined Degradation Charts: 2021 v 2022 v 2023 – Route 215





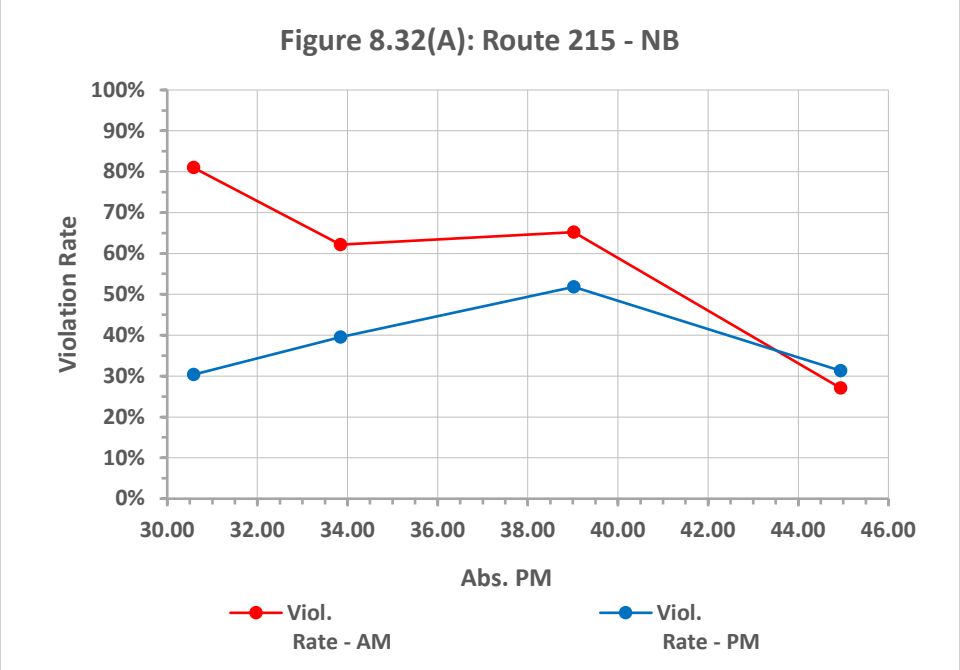
NAME	Abs Postmile
BOX SPRINGS	30.601
CENTRAL AVE SB ON	31.400
CENTRAL/WATKINS	31.626
BOX SPRINGS RD	32.356
MLK SB ON	32.734
MARTIN LUTHER KING	32.903
UNIVERSITY	33.538
BLAINE	34.219
COLUMBIA NB ON	35.944
SO Center St.	36.882
LACADENA DR SB	37.365
IOWA AVE NB ON	37.813
BARTON RD SB ON	38.481
BARTON RD NB ON	38.746
WASHINGTON NB LP ON	39.957
WASHINGTON NB TG ON	40.192
ORANGE SHOW SB T ON	42.162
ORANGE SHOW NB ON	42.435
INLAND CENTER NB ON	42.841
MILL ST NB ON	43.511
2nd St	43.990
Third St	44.331
5th Street	44.619
Baseline Rd	45.276
Mid of Baseline St. & 210-215 JCT	45.817



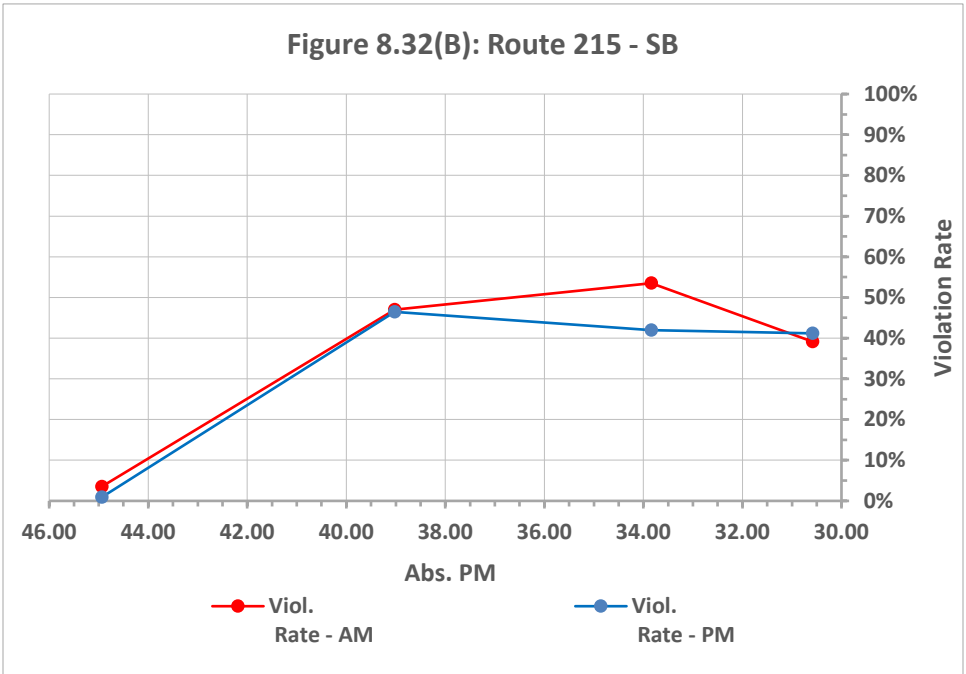


NAME	Abs Postmile
210 EB TO 215 SB	47.035
27th Street	46.865
Mid of 210/215 JCT & Baselaine St.	45.817
Baseline Rd	45.276
5th St	44.607
Third St	44.331
2nd St	43.990
MILL ST NB ON	43.511
INLAND CENTER NB ON	42.841
INLAND CENTER SB ON	42.740
ORANGE SHOW SB L ON	42.368
ORANGE SHOW SB T ON	42.162
WASHINGTON NB TG ON	40.192
MT VERNON/WASH SB ON	39.876
BARTON RD NB ON	38.746
BARTON RD SB ON	38.481
IOWA AVE NB ON	37.813
LACADENA DR SB	37.365
Center St	36.882
Columbia Ave	35.929
BLAINE ST SB ON	34.118
UNIVERSITY AVE SB ON	33.425
MARTIN LUTHER KING	32.903
MLK SB ON	32.734
N/O BOX SPRINGS RD	32.356
CENTRAL/WATKINS	31.626
CENTRAL AVE SB ON	31.400
BOX SPRINGS SB ON	30.748
BOX SPRINGS	30.601

Figure 8.32. Violation Rate: Spring 2024 – Route 215

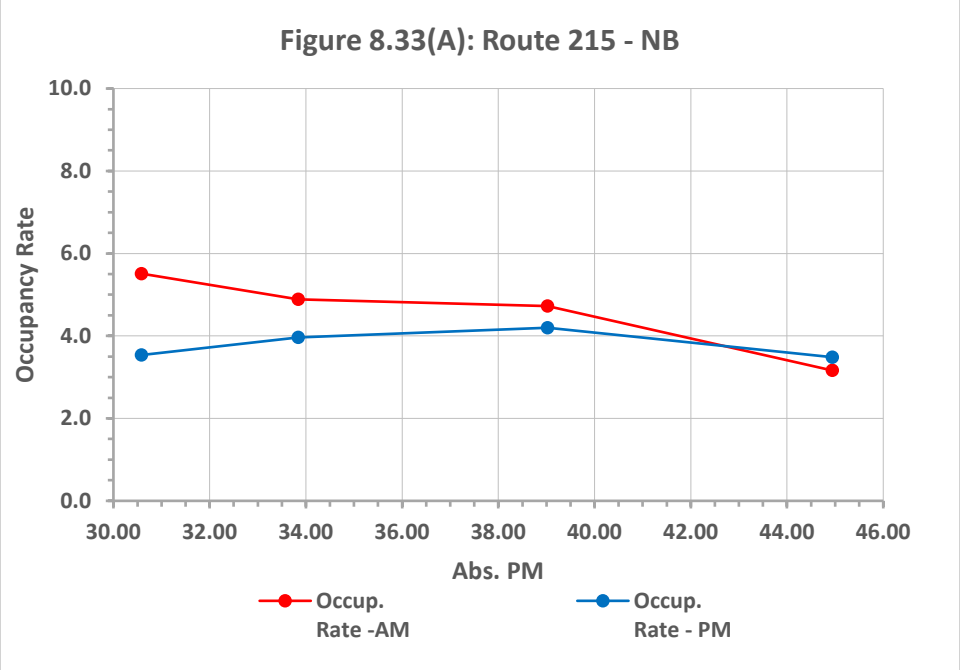


Counting Location	Abs. Postmile
Box Springs Rd.	30.582
Iowa & Linden	33.840
Newport	39.022
9th	44.939

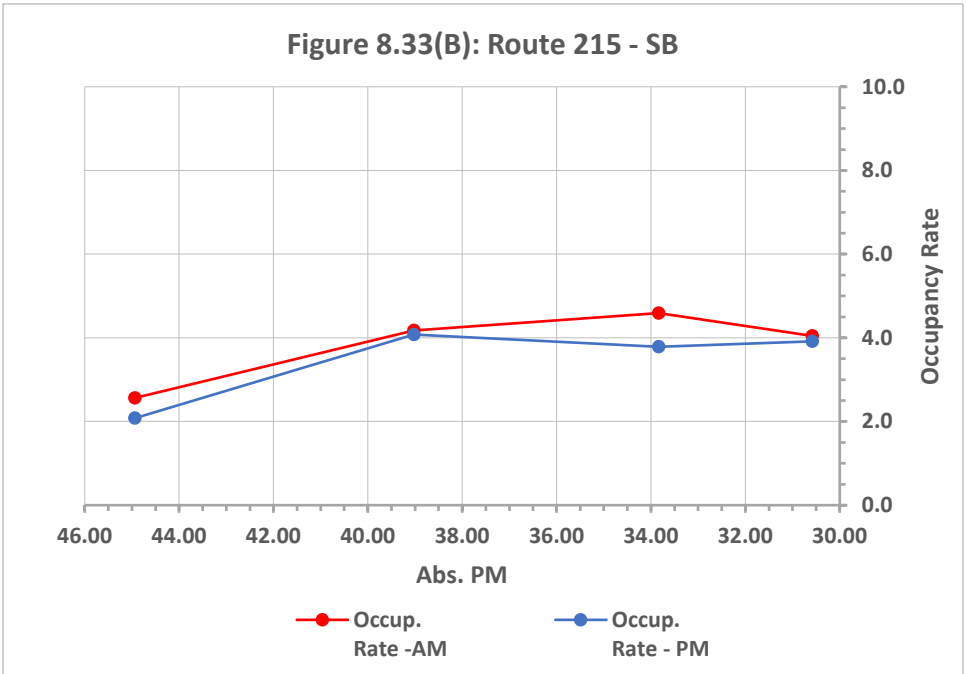


Counting Location	Abs. Postmile
9th	44.939
Newport	39.022
Iowa & Linden	33.840
Box Springs Rd.	30.582

Figure 8.33. Occupancy Rate: Spring 2024 – Route 215

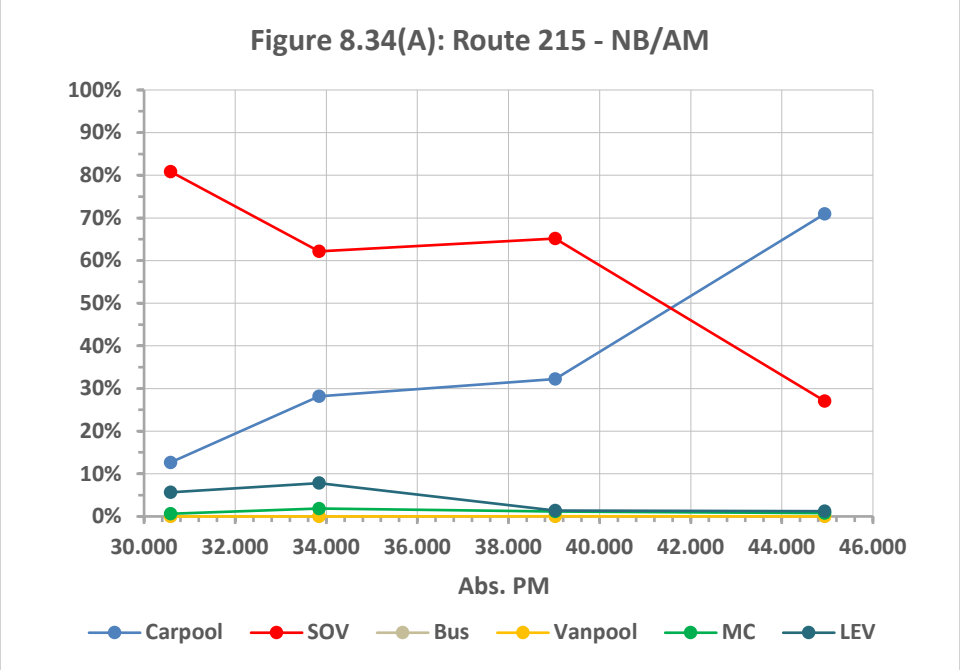


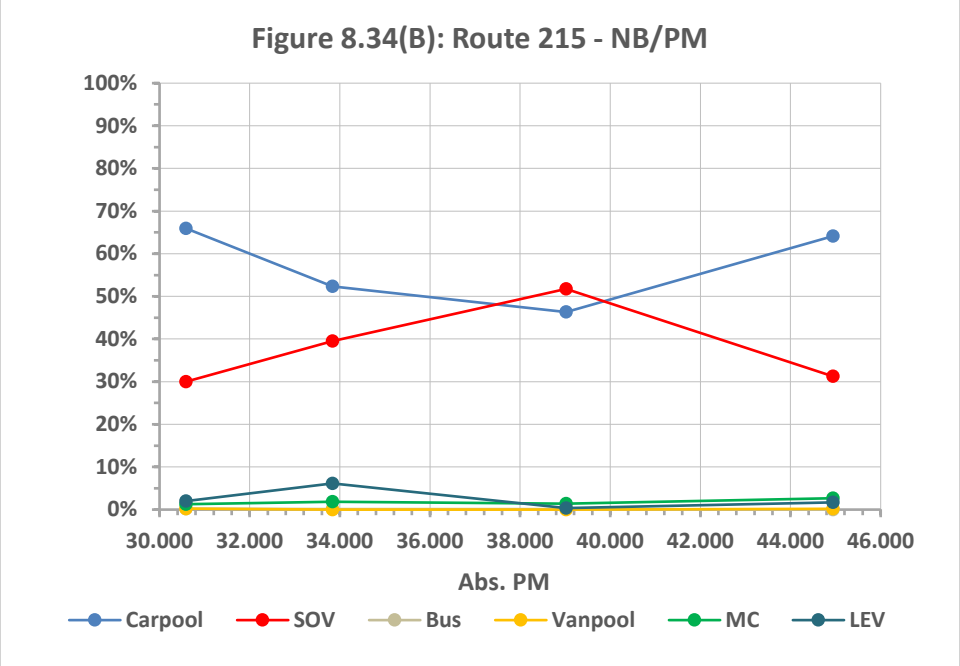
Counting Location	Abs. Postmile
Box Springs Rd.	30.582
Iowa & Linden	33.840
Newport	39.022
9th	44.939



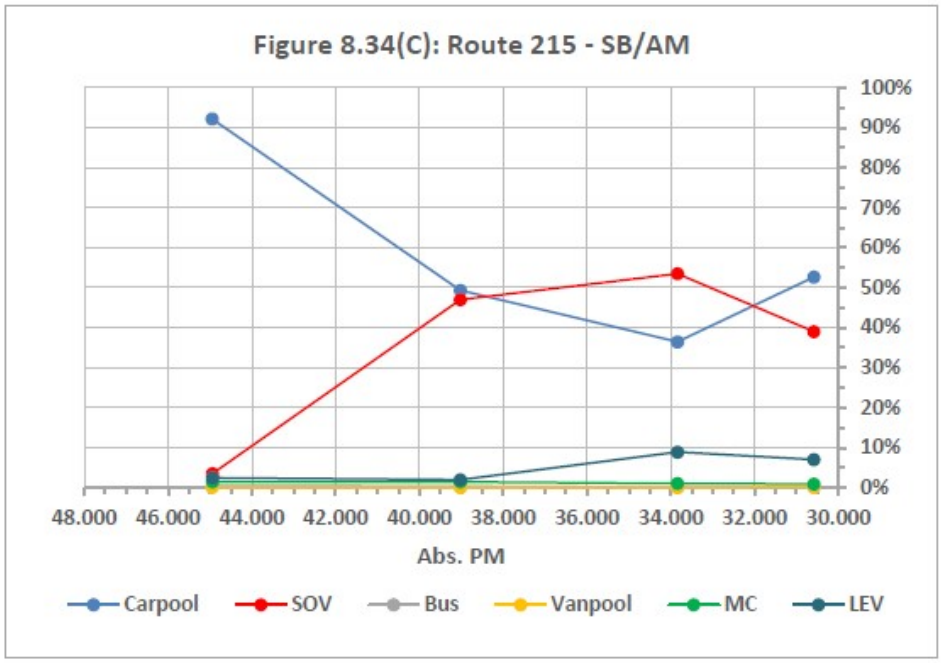
Counting Location	Abs. Postmile
9th	44.939
Newport	39.022
Iowa & Linden	33.840
Box Springs Rd.	30.582

Figure 8.34. Type of Vehicles: Spring 2024 – Route 215





Counting Location	Abs. Postmile
Box Springs Rd.	30.582
Iowa Av & Linden St	33.840
Newport Av	39.022
9th St	44.939



Counting Location	Abs. Postmile
9th St	44.939
Newport Av	39.022
Iowa Av & Linden St	33.840
Box Springs Rd.	30.582

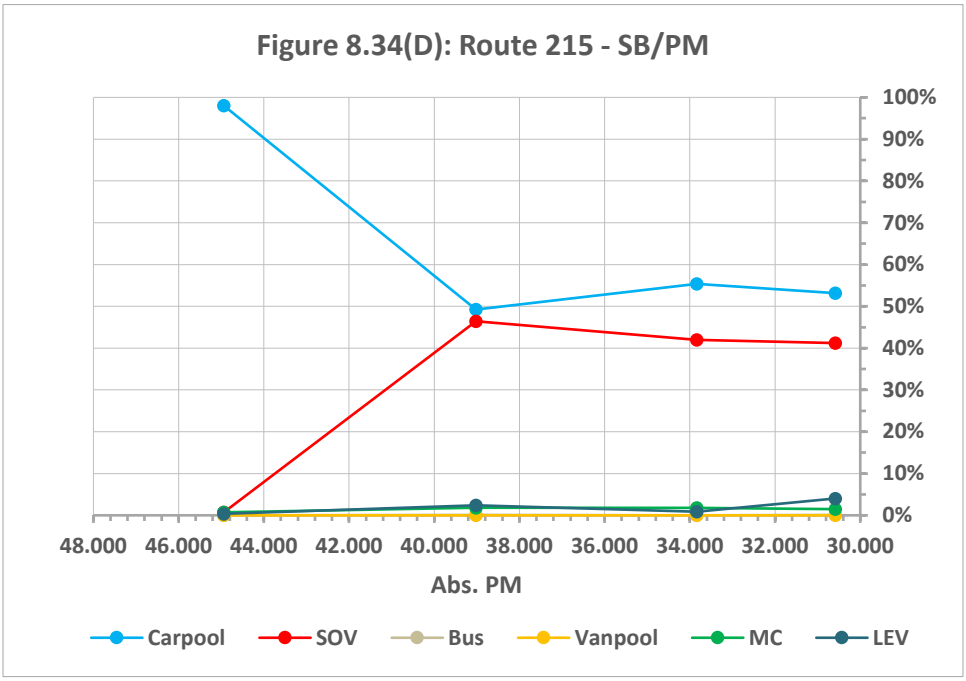
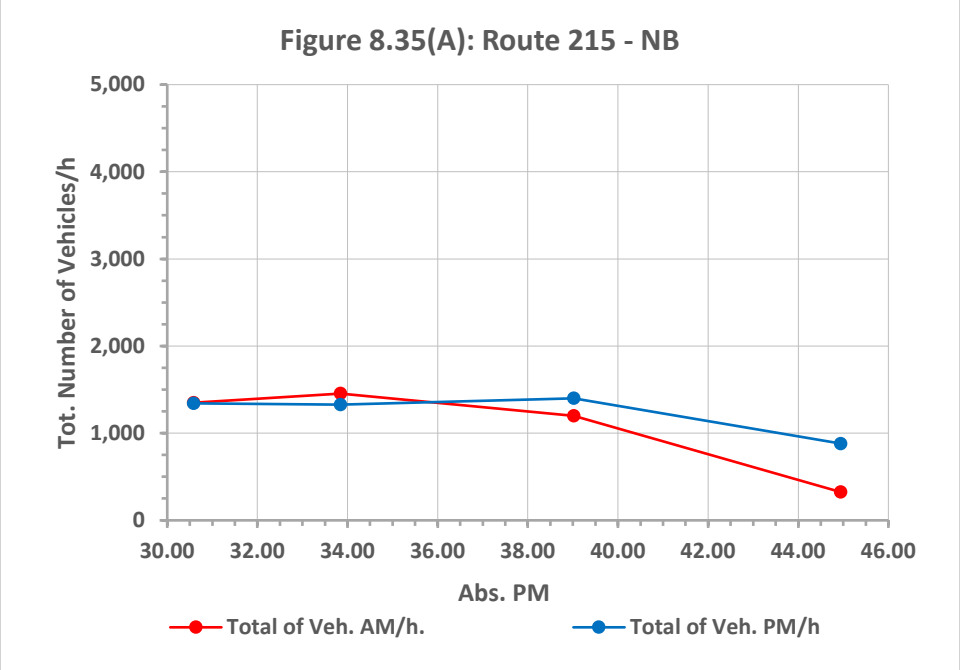
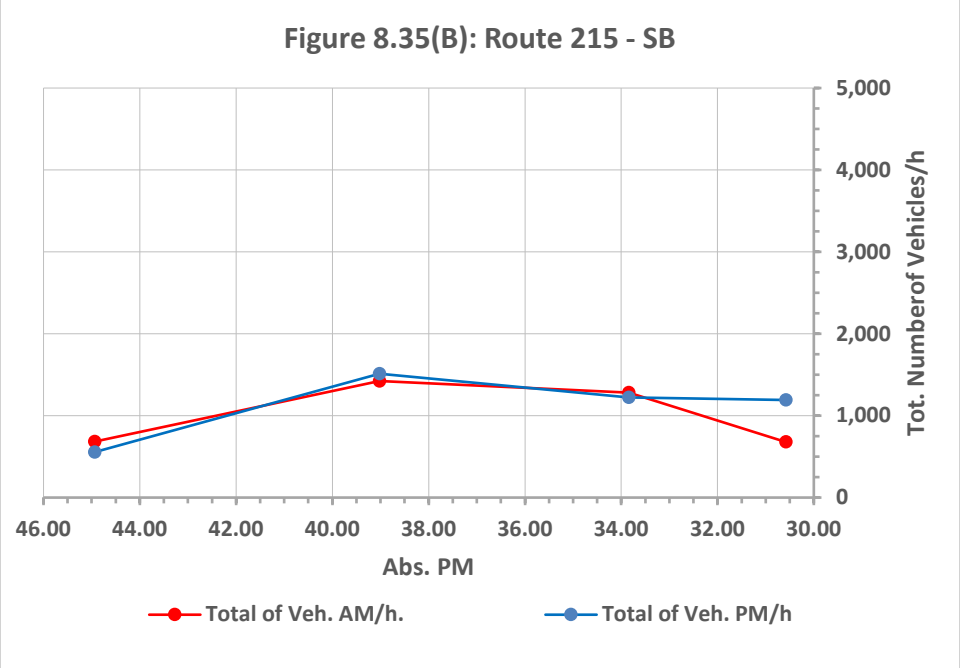


Figure 8.35. Total Number of Vehicles/Hour: Spring 2024 – Route 215



Counting Location	Abs. Postmile
Box Springs Rd.	30.582
Iowa Av & Linden St	33.840
Newport Av	39.022
9th St	44.939



Counting Location	Abs. Postmile
9th St	44.939
Newport Av	39.022
Iowa Av & Linden St	33.840
Box Springs Rd.	30.582

B. Remediation Strategies

- Project 08-1F730 is to reconstruct the overcrossing at Washington St/Mount Vernon Ave on I-215 in city of Colton (Construction Contract Acceptance (CCA) in December 2023). The current vertical clearance of Washington Street OC is 14 ft.-8 in. (non-standard).
    - Desire Outcome: By providing standard vertical clearance, the project will address current and future operational deficiencies, thereby improving the safety of the traveling public.
- 08-1M790 RIV PM R0.00/20.1 to restripe, adding pavement marking, and replacing sign panels on HOV lane. Construction is scheduled to begin in July 2027 and end in January 2028. Signing, pavement markings, and refreshing stripping will help drivers make decisions on time rather than slowing down and impact traffic flow.
- District 8 Traffic Operations installed Route Shield Pavement Markings (RSPMs) near freeway-to freeway interchanges in December 2023. Strategically located RSPMs would supplement the information provided by overhead or roadside signs that depict upcoming freeway interchange approaches. When motorist receive information of interchange approaches early, and in multiple ways, they are likely to make better driving decisions and change lanes farther upstream.
    - Desired Outcome: Improving traffic flow by reducing late lane changes and sudden weaving movement, thereby, improving safety and reducing sudden weaving conflict. District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.
- District 8 will conduct the before and after analysis using data collected during the last six months in 2024. The report will be included in 2024-Degradation Action Plan.
- The 5-mile-long segment is located between 60-215 JCT in the City of Moreno Valley and 60-91-215 JCT in the City of Riverside. District 8 is investigating a possibility to construct a Full or Partial contraflow HOV lane in the median to increase the capacity of the existing HOV lanes in both directions. In addition, on this segment District 8 is also investigating a possibility to stripe an additional northbound HOV lane on the left shoulder.
    - Desired Outcome: Increasing HOV lane capacity.

3.6. DISTRICT 11 2025 DEGRADATION ACTION PLANS

3.6.1 ACTION PLAN FOR HOV FACILITIES ON ROUTE 5

A. Analysis

Route 5 is a major north-south artery serving the San Diego metropolitan area and numerous surrounding cities. In the past, northbound Route 5 would only experience degradation in the afternoon peak period. No degradation was observed on southbound Route 5 during either peak period.

Before February of 2022, the northbound Route 5 HOV lane was an open access HOV lane from Route 56 to Via De La Valle where it converts to a limited access HOV lane ending at Manchester Avenue. Due to the congestion at the end of the northbound HOV lane during the afternoon peak period, the experienced degradation ranged from slightly degraded to extremely degraded. The degradation occurred approximately 9 miles from Carmel Mountain Road to Manchester Avenue.

In February 2022, the North Coast Corridor (NCC) project, a $6.5 billion project which involves numerous rail and highway improvements stretching between the cities of La Jolla and Oceanside was opened to traffic. Construction activities (EA 2T171and 2T35U) for the NCC greatly contributed to congestion in the GP lanes and this congestion would extend into the HOV lane. As a part of the NCC Project, the HOV lanes were extended an additional nine miles to the north to the major interchange at Palomar Airport Road.

B. Remediation Strategies

Even though the HOV lanes opened to traffic if February 2022, construction was still present for the general-purpose lanes involving re-striping, outside shoulder and ramp widening/re-surfacing. Due to this construction, HOV users trying to exit HOV lane at a non-exit location (trying to exit at Loma Santa Fe Drive) and ongoing sensor calibration the northbound 5 HOV lane reports 8.98 miles of slight to extreme degradation. As the NCC construction ends (M600 is expected by 08/18/2025) degradation is expected to be reduced significantly in this segment.

3.6.2 ACTION PLAN FOR HOV FACILITIES ON ROUTE 15

A. Analysis

Route 15 is the primary inland north-south transportation connector serving interregional travelers between Riverside County and downtown San Diego. It also is part of a major interregional goods movement corridor, connecting Mexico with Riverside, San Bernardino counties, and Las Vegas, Nevada. HOT lanes are

operated by the San Diego Association of Governments (SANDAG) on Route 15 between Route 163 and Route 78.

Degradation was observed at the end of the HOT lanes in the northbound direction during the afternoon peak period. The experienced degradation is classified as slightly degraded. This slight degradation is caused by weaving in the HOT lanes by users deciding to exit at the DAR or continue through to merge into GP traffic. There is also a speed reduction caused by the friction between the general-purpose lanes and HOT lanes.

The Route 15 HOT lanes have a regular recurring challenge affecting the facility. Surveys conducted by SANDAG over the past couple of years have indicated that 25-30 percent of users of the HOT lanes are violators, meaning single-occupant vehicles driving through the HOT lanes without a transponder.

B. Remediation Strategies

The slight degradation observed at the north end of the HOT lane is due to the unique circumstances at that terminus.

Currently a new interchange project at I-15 and SR-78 is in the early design phase (EA 11-2T240) and is expected to start construction in 2026-2027 and open to traffic by April 2030. This project along with the new sign and striping package will alleviate weaving issues in the HOT lanes, reduce congestion in the main lanes during peak hours and decrease the friction between the GP and the HOT lane. This new interchange is expected to eliminate degradation in this segment.

For this 2023 report collaboration between Caltrans and SANDAG(Toll Operator) was a priority, all the information collected for this route and proposed remediation strategies were shared and reviewed by our counterparts at SANDAG.

3.6.3 ACTION PLAN FOR HOV FACILITIES ON ROUTE 805

A. Analysis

Route 805 is a heavily traveled route serving the inland communities within the cities of San Diego, National City, and Chula Vista in San Diego County. The commuter freeway connects the Mexico border zone with the light industry of Sorrento Valley. There are two separate segments of Route 805 with HOV facilities; the south segment is from Palomar Street to Route 94 and the north segment is from Route 52 to the Route 5/Route 805 junction.

Palomar Street to Route 94 (South segment)

On the South segment, both the northbound and southbound HOV lanes are open access. The GP lanes in the northbound and southbound direction experience heavy congestion during the morning peak period. The southbound direction does not experience degradation during either peak period. In the northbound direction the heavy congestion spills into the HOV lanes from Route 54 to Imperial Avenue. The degradation in this northbound direction is present only in the morning peak period and is considered as slightly to very degraded, a contributing factor is the presence of the high percentage of HOV lane violators (32% - 35% based on HOV occupancy counts) plus the heavy traffic on the GP lanes (1,773 veh/lane/hr) causing friction to HOV users as vehicles from GP lanes weave in and out of the HOV lane using it as a passing lane.

Route 52 to Route 5 (North segment)

Both the northbound and southbound HOV lanes are open access on this segment. The southbound direction presents degradation ranging from slightly degraded to extremely degraded in the afternoon peak period for approximately 1.8 miles between Nobel Dr and Mira Mesa Blvd. The cause of degradation is due to several factors, occupancy violation rates range from 20% - 25%, heavy traffic (1,813 veh/lane/hr) in the general-purpose lanes causing friction for HOV users, GP traffic weaving in and out of the HOV lane using it as a passing lane, this section of the HOV lane is on an incline grade and the merging of HOV traffic with DAR vehicles coming in form Carroll Canyon Road.

Northbound Route 805 does not experience degradation during either peak period.

B. Remediation Strategies

Palomar Street to Route 94 (South segment)

A Transit Only Lane (MTS bus on shoulder) project is a 3-year pilot project. It began operations in the south segment on June 21, 2022, and will be operational during the commute hours from 6:00 am to 9:00 am. During these hours, the project provides enhanced CHP (2 patrol vehicles) to support the buses when traveling from the HOV lanes to the outside shoulder.

District 11 collected speed data from July 1st, 2023, to December 31st, 2023, along the northbound direction in this segment, from south of Plaza Blvd. to Imperial Ave. to evaluate how the presence of CHP would affect and/or discourage GP vehicles using the HOV lane as a passing lane and violators on the HOV facility.

Table 11.1. Degradation Comparison on Route 805

		2019		2023	
Location	**PM**	**% Days < 45 mph**	**Deg. Level**	**% Days < 45 mph**	**Deg. Level**
805 NB HOV S/O Plaza	9.978	30.6%	Slightly Degraded		No Data
805 NB HOV @ Plaza Blvd	10.362	38.3%	Slightly Degraded	31.9%	Slightly Degraded
805 NB HOV @ Division St	11.096	47.0%	Slightly Degraded		No Data
805 NB HOV @ 47th St	11.444	51.5%	Very Degraded	49.2%	Slightly Degraded
805 NB HOV @ Imperial Ave	12.498	50.8%	Very Degraded	53.1%	Very Degraded

As shown on the Table 11.1, the data collected shows a significant improvement in degradation compared to pre-pandemic volumes, even though degradation is still present especially at the terminus of the HOV lane where speeds are impacted by congestion in the general purpose lanes. The pilot project is expected to conclude by mid-2025. Currently a shoulder modification project (EA 11-42270) in this segment is expected to begin construction by July 2025 and conclude by June 2026.

Route 52 to Route 5 (North segment)

District 11 Traffic Operations Congestion Monitoring and Mobility Performance Branch recommended to pursue reducing degradation in this segment by limiting access with channelizers from the end of the SB Carroll Canyon Road DAR to La Jolla Village Drive exit ramp (approximately 870 feet). The installation of channelizers will also deter HOV violators using the DAR and trying to merge in to congested GP lanes impacting HOV lane speeds. Further coordination is needed for implementation of the channelizers.

Currently two projects are focusing on this segment, project EA 11-2T367 (PID 1122000082) plans to convert the existing HOV lanes to HOT lanes, the project is still in the design phase and M600 is projected for February 2031. The second project is EA-43039 consisting of the construction of Auxiliary lanes at Governor Drive from 0.2 mile north of Route 805/52 separation to 0.3 mile south of Nobel Drive overcrossing. The contract for this project has been approved and M600 is expected by August 2026.

The proposed projects are expected to eliminate or significantly reduce degradation in this segment.

3.7. DISTRICT 12 2025 DEGRADATION ACTION PLANS

3.7.1 DISTRICT-WIDE ACTIONS RELATED TO DEGRADATION

To manage congestion, resolve High Occupancy Vehicle (HOV) speed degradation, improve travel reliability, and offer enhanced mobility options, Caltrans District 12 has increasingly turned to Priced Managed Lanes (PML) as a viable solution. PML maximize system efficiency, increase mobility choices, improve the environment, and contribute financially to freeway corridor maintenance, operations, and improvements.

Caltrans District 12 has conducted two managed lanes studies in 2016 to implement Caltrans' mission, vision, goals, and values. These two studies and their goals are listed as follows:

- Managed Lanes Feasibility Study (MLFS) to replace the HOV lane network with the (High Occupancy Toll) HOT lane network.
- Orange County Managed Lanes Network Study (MLNS) to analyze the operational benefits of PMLs with planning-level traffic analysis.

The 2014 District Systems Management Plan (DSMP) also indicates in Section 3.1D that "congestion pricing is a most powerful policy available to reduce unnecessary driving and finance improvements to our aging infrastructure. This policy has proven effective in cities around the world, allowing local governments to reduce automobiles in highly congested areas while generating revenue for transportation projects."

3.7.2 ACTION PLAN FOR I-5 HOV FACILITIES

A. Analysis

Interstate 5 in District 12 boundary is 44.4 mile long and it is the longest freeway in the district. It is divided into three segments for degradation analysis. Segment 1 is approximately 21 miles long, from San Diego County to El Toro Road interchange at the I-5 and I-405 confluence (PM 93.198). Segment 2 is approximately 13.4 miles long, from El Toro Road interchange (PM 93.198) to I-5/SR-22/SR-57 interchanges (PM 106.651). Segment 3 is approximately 10 miles from I-5/SR-22/SR-57 interchanges (PM 106.651) to Los Angeles County (PM 116.388).

Segment 1

I-5 northbound during AM peak period (6 – 9 AM), HOV degradation occurred at Oso Parkway (PM 87.388) due to construction. This recurrent degradation will expect to be resolved when construction is completed.

I-5 northbound during PM peak period (3 – 6 PM), HOV degradation occurred at South of SR-73 (PM 84.518) to Oso Parkway 2 (PM 87.649) and from Camino de Estrella 1 (PM 77.988) to Avenida Aeropuerto (PM 80.248). Segment from Camino de Estrella 1 to Avenida Aeropuerto is new degraded segment from 2023 traffic data.

There is no degradation for southbound AM peak period for Segment 1.

I-5 southbound during PM peak period (3 – 6 PM), HOV degradation occurred at Oso Parkway Off Ramp (PM 88.075) due to construction. This degradation will expect to be resolved when construction is completed.

Segment 2

I-5 northbound during AM peak period (6 – 9 AM), HOV degradation occurred at Jeffrey Road 1 (PM 97.338) to Tustin Ranch Road (PM 100.351). The degradation in this segment was improved comparing to 2022 traffic data. It was reduced from 11.34 miles to 2.96 miles long.

I-5 northbound during PM peak period (3 – 6 PM), HOV degradation occurred at South of Sand Canyon Avenue (PM 95.785) to North of SR-57 (PM 106.651). The data was similar to 2022 degradation data.

I-5 southbound during AM peak period (6 – 9 AM), HOV degradation occurred at Yale Avenue (PM 97.995) to North of SR-57 (PM 106.588).

I-5 southbound during PM peak period (3 – 6 PM), HOV degradation occurred at 4 locations: North of SR-133 (PM 95.2925), Tustin Ranch Road (PM 100.538), Fourth Street (PM 103.418), and Santiago Street (PM 105.788). The data was similar to 2022 data.

Segment 3

I-5 northbound during AM peak period (6 – 9 AM), HOV degradation occurred at Brookhurst Street1 (PM 112.751).

I-5 northbound during PM peak period (3 – 6 PM), HOV degradation occurred at North of SR-57 (PM 106.651) to Brookhurst Street 1 (PM 112.751).

I-5 southbound during AM peak period (6 – 9 AM), HOV degradation occurred at North of SR-57 (PM 106.588) to Beach Boulevard 1 (PM 115.488).

I-5 southbound during PM peak period (3 – 6 PM), HOV degradation occurred at Crescent Way (PM 112.228) to Orangethorpe Avenue 2 (PM 114.708). This is a new degradation segment according to 2023 traffic data.

After extensive review of traffic data and field investigations, the causes of the degradation on I-5 are as follows:

- Vehicles slowing down at major freeway interchanges at I-405, SR-133, SR-55, SR-57, SR-22, and SR-91.
- High volumes of low or zero emission vehicles in HOV lanes – 15.37% at I-5 NB Broadway (AM), 20.31% at I-5 NB Main Street (AM) during peak periods per 2023 HOV Count data.
- High HOV violation rates – 15.97% at Main Street southbound (AM) and 23.08% at Stanton Avenue northbound (PM) according to Fall of 2023 count.
- There are several construction projects on Segment 1 causing HOV speed reduction.

B. Remediation Strategies

There are several projects either in Construction or in Design phase to add HOV lanes or converting HOV lanes to HOT lanes. Below information is the segments that will be changed in the next several years.

- Three projects (12-0K021, 12-0K022, and 12-0K023) are currently under construction to add one lane in both directions between SR-73 (ORA PM 12.4) and El Toro (ORA PM 18.9). The proposed projects will add GP lanes in each direction on I-5 between Avery Parkway and Alicia Parkway, extend the 2nd HOV lane from Alicia Parkway to El Toro Road, reestablish existing auxiliary lanes/construct new auxiliary lanes, and improve several existing on- and off-ramps. Additionally, the projects propose no HOV buffer, meaning the HOV lane will accommodate continuous access throughout the project limits. Construction began in April 2019 and anticipated to be completed in January 2026. Project costs for the three segments are funded by Measure M2, STBG (Surface Transportation Block Grant), and STIP/SB-1, and are estimated at $468.8 million including Right of Way.
- Project 12-0P550 proposes the addition of an HOV lane to reduce delay along I-5 between the San Diego/Orange County line and the I-5/Avenida Pico interchange. This project would extend the recently completed HOV lane between San Juan Creek Bridge and Avenida Pico to the Orange/San Diego County line. The project limits are from the San Diego/Orange County line interchange (ORA PM 0) to 3.4 miles north at Avenida Pico in the City of San Clemente (ORA PM 3.4). The project is in PA&ED phase now. The Construction

Contract Acceptance will be in July 2033 and the estimated cost is at $189.1 million.

- Project 12-0Q950 (I-5 Managed Lanes) proposes four alternatives from Red Hill Avenue (ORA PM R28.9) to the Orange/Los Angeles County line (LA PM 44.4), essentially converting existing HOV lanes to HOT. The project limit is currently designated as urban with mixed land uses (commercial, industrial, and residential). Preferred Alternative No. 4 proposes the following:
    - Between Red Hill Avenue and SR-55, convert existing HOV lane to HOT lane.
    - Between SR-55 and SR-57, convert two HOV lanes to two HOT lanes.
    - From SR-57 to Orange/ Los Angeles County Line, convert one HOV lane to a HOT lane and add one additional HOT lane.

  The estimated cost for this project will be $360.6 million. This project is now in PA&ED phase and the Construction Contract Acceptance will be in October 2030.
- Project 12-0T950 converts HOV2+ to HOV 3+ from the I-5/I-405 interchange to Red Hill Avenue (ORA PM 21.1 to ORA PM R29.1). The PID was approved in June 2023 and project is now in PA&ED phase. The estimated cost is $8.2 million with Right of Way cost is $8,000. The Construction Contract Acceptance will be in October 2030.
- Project 12-0M980 (ORA PM 17.9 to ORA PM 19.3) is to improve capacity at I-5 on and off ramps at the El Toro Road Interchange, reduce traffic congestion at and through adjacent local street intersections and reduce queuing back up on to the I-5 freeway. The project now is at the PA&ED phase. The estimated cost is funded by OCTA Measure M2 and is estimated $594.9 million including Right of Way (R/W $515.5 million). The Construction Contract Acceptance will be in August 2033.
- Project 12-0P42U, Integrated Corridor Management (ICM) will integrate and upgrade, as necessary, real-time traveler information and intelligent transportation system (ITS) technologies. Cities and Caltrans will manage along the triangle of I-5, SR-91, and SR-57, into an integrated corridor management (ICM) system. The ICM system will actively manage traffic during recurring and non-recurring congestion to benefit both trucks and passenger vehicles. This project will help reduce the HOV degradation on entire triangle and is currently in construction. The Construction Contract Acceptance is anticipated in January 2025.
- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.

3.7.3 ACTION PLAN FOR SR-22 HOV FACILITIES

A. Analysis

According to AM summary and Speed Plot on SR-22 eastbound during AM peak period (6 – 9 AM), HOV degradation occurred from Knott Avenue 2 (PM 4.337) to The City Drive (PM 11.261).

According to PM summary and Speed Plot on SR-22 eastbound during PM peak period (3 – 6 PM), HOV degradation occurred from Magnolia Street 2 (PM 6.447) to Bristol Street (PM 11.691).

According to AM summary and Speed Plot on SR-22 westbound during AM peak period (6 – 9 AM), HOV degradation occurred at one location which was Harbor Boulevard (PM 9.177).

According to PM summary and Speed Plot on SR-22 westbound during PM peak period (3 – 6 PM), HOV degradation occurred from Concord (PM 13.811) to Harbor Boulevard 1 (PM 9.117).

After extensive traffic data review and field investigations, the causes of the degradation on SR-22 are as follows:

- Peak period recurrent congestion in all lanes reducing HOV lane performance and speed.
- High HOV violation rates – based on Peak Period Violation Rate- at 31.46 % Pearce Street POC- westbound (PM) during Fall of 2023. It has been slightly increased comparing to 2019 data which is 30% violation rate at Pearce Street.
- The degradation on westbound direction at PM period from Bristol Street to Harbor Boulevard due to sunlight glare at the curve causing the drivers slowing down. After that curve, the HOV speed was back to normal speed.

B. Remediation Strategies

- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.
- Project 12-0V290 to update Violation Fine to $490 to reduce single occupancy driver using HOV lane on SR-55, SR-22, and SR-91. The Construction Contract Acceptance will be in October 2025.
- According to Orange County Managed Lane Feasibility Study, there is a plan for a second HOV lane and to convert to Dual HOT lanes from I-405 to Grand Avenue. The project will be RTL in 2040/2041.

3.7.4 ACTION PLAN FOR SR-55 HOV FACILITIES

A. Analysis

According to AM summary and Speed Plot on SR-55 northbound during AM peak period (6 – 9 AM), HOV degradation occurred at Dyer Road (PM 6.53) due to construction. The second location is at Collins Avenue (PM 14.582).

According to PM summary and Speed Plot on SR-55 northbound during PM peak period (3 – 6 PM), HOV degradation occurred from Paularino Avenue (PM 5.8) to Taft Avenue (PM 15.782). Within these limits, HOV Degradation occurred on the freeway, and data was similar to 2021 and 2022 data.

According to AM summary and Speed Plot on SR-55 southbound during AM peak period (6 – 9 AM), HOV degradation occurred from Walnut Avenue (PM 14.328) to I-5 Interchange (PM 10.382). Data was similar to 2022 data.

According to PM summary and Speed Plot on SR-55 southbound during PM peak period (3 – 6 PM), HOV degradation occurred from McFadden Avenue (PM 9.785) to Dyer Road (PM 7.672) due to construction.

After extensive traffic data review and field investigations, the causes of the degradation on SR-55 are as follows:

- Demand exceeding capacity – Recurrent peak period congestion reduces HOV lane performance and speed. These are locations that HOV flow reached to more than a 2,400 veh/ln/hr based on August 2023 PeMS data: SR-55 northbound Paularino Street to Taft Avenue; SR-55 southbound from Main Street to Lincoln Street.
- Construction from 0.4 Mile North of Route SR-55/I-405 Separation to 0.2 Mile South of Route I-5/SR-55 Separation (PM 6.2 to 10.3). Project 12-0J340 will widen SR-55 for an additional HOV lane and a GP lane in each direction.
- Bottlenecks at SR-55/I-405 HOV direct connector in the PM period and I-5 HOV direct connector in the AM period.
- Mainline bottlenecks at SR-55/SR-22 interchange and SR-55/SR-91 interchange.
- Northbound HOV lane transitioning to a GP lane prior to joining the SR-91 express lane. At this location, several vehicles exit the HOV lane and merge to GP lanes to avoid the toll charge. This causes slowdowns on both the HOV and GP lanes. The weaving movement creates an extreme backlog at the SR-55/SR-91 interchange, especially during peak period.

B. Remediation Strategies

- Project 12-0J340 adding HOV, GP and auxiliary lanes from ORA PM 6.2 to ORA PM 10.3 (0.4 north of SR-55/I-405 Interchange to 0.2 south of I-5/SR-55 separation). The contract was approved (M500) in June 2022. Construction Contract Acceptance will be in February 2028. The cost of contract is $385.6 million including Right of Way cost $156.6 million.
- Project 12-0K720 from ORA PM 10.5 to ORA PM 17.8 (I-5 interchange to SR-91 interchange) to add additional GP lanes to increase capacity and improve freeway operation funded by OCTA/OCGO. Project is in PS&E phase. The Construction Contract Acceptance will be in January 2028. The estimated cost of project is $135.2 million including Right of Way cost, which is expected to be $5.3 million.
- Project 12-0K970 proposes to add an Express Connector between the SR-241and SR-91 express lanes. It is anticipated this connector will provide some relief to the SR-55 HOV lanes in both directions at the SR-91 interchange. The project is in PS&E phase to acquire R/W. The Construction Contract Acceptance will be in March 2028 . The project cost is estimated at $333 million and entirely funded by TCA.
- Project 12-0V290 to update Violation Fine to $490 to discourage single occupancy vehicles from using HOV lane on SR-55, SR-57, and SR-91. Construction Contract Acceptance will be in October 2025.
- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.

3.7.5 ACTION PLAN FOR SR-57 HOV FACILITIES

A. Analysis

According to AM summary and Speed Plot on SR-57 northbound during AM peak period (6 – 9 AM), HOV degradation did not occur. The data was similar to 2022 data.

According to PM summary and Speed Plot on SR-57 northbound during PM peak period (3 – 6 PM), HOV degradation occurred from Orangewood Avenue (PM 0.946) to Tonner Canyon Road (PM 11.266). The data was similar to 2022 data.

According to AM summary and Speed Plot on SR-57 southbound during AM peak period (6 – 9 AM), HOV degradation occurred from Imperial (PM 9.291) to Ball (PM 2.621).

According to PM summary and Speed Plot on SR-57 southbound during PM peak period (3 – 6 PM), HOV degradation occurred from Bastanchury (PM 8.201) to Placentia (PM 6.351), and from Lincoln Avenue 2 (PM 4.181) to Stadium (PM 1.551).

After extensive traffic data review and field investigations, the causes of the degradation on SR-57 are as follows:

- Major bottlenecks at SR-91 interchange and I-5 interchange.
- SR-57 is a busy truck route that connect Los Angeles County, Orange County and Riverside County to SR-91.
- Termination of SR-57 at the I-5/SR-22 interchange – the HOV lane keeps connecting to I-5, but the number of GP lanes reduces from 4 to 2, resulting in major braking, slowing, and weaving movements.
- Queuing of vehicles from the southbound SR-57 HOV lane onto southbound I-5 at the interchange.
- District completed the TH investigation for SR-57. These investigations revealed additional causes of HOV degradation. SR-57 is one of the freeways that connects Los Angeles County and Orange County, which are housing and job hubs within the SoCal Region. Also, it is the freeway connecting San Bernadino County, Los Angeles County and Orange County through SR-91. The Demand-Over-Capacity is the primary reason for the recurrent congestion on SR-57. District 12 has made the improvement of freeway capacity and converted HOV buffer-separated to continuous striping. There is no action taken at this time until district has fundings to convert HOV to HOT lane or change from HOV 2+ to HOV 3+ to increase HOV traffic throughput.

B. Remediation Strategies

- Project 12-0M970 proposes geometric improvements to increase capacity and improve congestion on northbound from Orangewood Avenue to Katella Avenue in the City of Anaheim. The project is now in PS&E phase. Construction will begin in September 2025. The Construction Contract Acceptance will be in September 2028 and is scheduled to be final project closeout by May 2031. This is an OCTA project with a cost of approximately $50.7 million.
- Project 12-0P42U, Integrated Corridor Management (ICM Triangle) will integrate and upgrade, as necessary, real-time traveler information and intelligent transportation system (ITS) technologies. Cities and Caltrans will manage along the triangle of I-5, SR-91, and SR-57, into an integrated corridor management (ICM) system. The ICM system will actively manage traffic during recurring and non-recurring congestion to benefit both trucks and passenger vehicles. This project will help reduce the HOV degradation on the entire

Triangle and is currently in construction. The Construction Contract Acceptance is anticipated in January 2025.

- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.

3.7.6 ACTION PLAN FOR SR-91 HOV FACILITIES (FROM LOS ANGELES COUNTY LINE TO 91 EXPRESS LANES AT SR-55 CONNECTOR ONLY, PM 15.339 TO PM 26.692)

A. Analysis

According to AM summary and Speed Plot on SR-91 eastbound during AM peak period (6 – 9AM), HOV degradation occurred from Holder Street (PM 16.059) to East Street/Raymond Avenue (PM 22.723).

According to PM summary and Speed Plot on SR-91 eastbound during PM peak period (3 – 6 PM), HOV degradation occurred from Orangethorpe Avenue (PM 15.339) to Acacia Street (PM 23.713) and from La Palma Avenue (PM 25.193) to Grove Street (PM 26.23).

According to AM summary and Speed Plot on SR-91 westbound during AM peak period (6 – 9 AM), pockets of HOV degradation with lengths of less than one mile occurred at Orangethorpe Avenue (PM 15.139), State College Boulevard (PM 23.553) and East of SR-57 (PM 24.713).

According to PM summary and Speed Plot on SR-91westbound during PM peak period (3 – 6 PM), HOV degradation occurred from Orangethorpe Avenue (PM 15.139) to East of Stanton Avenue (before I-5 interchanges) and from Harbor Boulevard (PM 21.534) to Grove Street (PM 26.273) right at Express Lane entrance.

After extensive traffic data reviewing and field investigations, the causes of the degradation on SR-91 are as follows:

- Recurrent peak period congestion in all lanes reducing HOV lane performance and speed.
- Major bottlenecks at the I-5 and SR-57 interchanges contributing to congestion due to lane changing/merging problems when drivers compete for available gaps in the traffic stream.
- Weaving conflicts occurring where the eastbound SR-91 HOV lane transitions to an express lane near Tustin Avenue in the City of Anaheim. A primary cause of the congestion is the existing demand to access the Express Toll Lane facility, which exceeds capacity during afternoon peak periods.

- High HOV violation rate – AM violation was 22.61% on eastbound at Holder Street POC (PM 16.059), and PM violation was 22.94% on eastbound at Harbor Blvd (PM 21.54) according to 2023 Fall count data.

B. Remediation Strategies

Based on the analysis in the previous section, the following remediation strategies for SR-91 in both directions will be implemented for the studied facilities:

- Project 12-0P42U, Integrated Corridor Management (ICM Triangle) will integrate and upgrade, as necessary, real-time traveler information and intelligent transportation system (ITS) technologies. Cities and Caltrans will manage along the triangle of I-5, SR-91, and SR-57, into an integrated corridor management (ICM) system. The ICM system will actively manage traffic during non-recurring congestion to benefit both trucks and passenger vehicles. This project will help reduce the HOV degradation on the entire Triangle and is currently in construction. The contract accept is anticipated in January 2025.
- Project 12-0K970 adding an Express Connector between the SR-241and SR-91 express lanes. It is anticipated this connector will provide some relief to the SR-55 HOV lanes in both directions at the SR-91 interchange. The project is in PS&E phase to acquire R/W. The Construction Contract Acceptance will be in March 2028. The project cost is estimated at $333 million and entirely funded by TCA.
- Project 12-0V290 to update Violation Fine to $490 to reduce single occupancy driver using HOV lane on SR-55, SR-57, and SR-91. The Construction Contract Accept will be in October 2025.
- Looking for future expansion, it is suggested to add a second HOV lane from Los Angeles County line to existing express lanes at SR-91 and SR-57 to ensure traffic flow for all SR-91 express lanes. This will reduce traffic congestion and weaving at the current express lane entrances.
- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.

3.7.7 ACTION PLAN FOR I-405 HOV FACILITIES (FROM PM 0.37 TO PM 8.12)

A. Analysis

According to AM summary and Speed Plot on the I-405 northbound during AM peak period (6 – 9 AM), HOV degradation occurred at SR-133 (PM 1.34).

According to PM summary and Speed Plot on the I-405 northbound during PM peak period (3 – 6 PM), HOV degradation occurred from South of SR-133 (PM. 1.34) to SR-55 HOV Connector (PM 8.12).

According to AM summary and Speed Plot on the I-405 southbound during AM peak period (6 – 9 AM), HOV degradation occurred at Yale (PM 4.78) .

According to PM summary and Speed Plot on the I-405 southbound during PM peak period (3 – 6 PM), HOV degradation occurred from MacArthur Boulevard (PM 7.46) to Sand Canyon Avenue (PM 2.65).

After extensive traffic data review and field investigations, the causes of the degradation on I-405 are as follows:

- Recurrent peak period congestion in all lanes reducing HOV lane performance and speed.
- Vehicle weaving conflicts at ingress/egress locations.
- Congestion in the GP lanes at the SR-55 interchange and at the Express Lane entrance.
- High traffic volume and demand from John Wayne Airport and South Coast Metro Center.
- Bottleneck at I-405/SR-55 HOV direct connector (PM 8.12).
- High volumes of low or zero emission vehicles in HOV lanes- 28.56% during AM Peak Period Hour at Jeffrey Road POC northbound and 14.17% at PM Peak Period Hour at Jeffrey Road POC southbound according to 2023 HOV Count data.
- High HOV violation rate – AM violation was 16.96% at Von Karman Avenue and PM violation was 21.27% on southbound I-405 at Jeffrey Road POC according to 2023 HOV Count data.

B. Remediation Strategies

Based on the analysis in the previous section, the following remediation strategies for I-405 in both directions will be implemented for the studied facilities:

- Design-Build Widening Project 0H100 on I-405 between SR-73 and I-605 converted the existing HOV lane to an express lane and add another HOT lane to create dual HOT lanes in each direction. The project also adds one GP lane in each direction to increase freeway capacity. The project opened for public use in December 2023. This project also created a direct HOT Lanes connector from SR-73 to I-405. CCTV cameras to monitor the express lanes and toll equipment will be installed for I-405 from SR-73 to I-605. The cameras will have

pan, tilt, and zoom (PTZ) capabilities to allow Orange County Transportation Authority and Caltrans to monitor freeway incidents and the toll facilities.

- Project 0Q970 (ORA PM 0.0 to ORA PM 11.4) proposes to extend the life expectancy of pavement, improve safety for all modes of travelers as well as maintenance crews, enhance traffic operation, manage congestion, and provide the ability to collect, analyze, and utilize data for efficient systems performance along I-405 corridor within the project limits. Construction Contract Acceptance will be in March 2026. This is a SHOPP project and SB1 funding with the estimated cost is $22.25 million for roadway and structure. Right of Way will be $629,000.
- Caltrans is working with CHP to increase CHP presence to minimize the HOV violation.

3.7.8 ACTION PLAN FOR I-405 HOT FACILITIES

I-405 HOT facility is new and it was open to public use in December 2023. This new facility will be included in the 2024 Degradation Report and Action Plan.

3.7.9 ACTION PLAN FOR SR-91 EXPRESS LANE FACILTIES

The SR-91 Express Lanes facility does not fall into the category that requires a degradation study.

4. APPENDIX A

LIST OF THE 2023 DEGRADED HOV FACILITIES

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
03	80	HOV	EB	West El Camino Ave to SR-65	21.55	2+	PM	17.50	11.69	4.95	0.86	0.00
03	80	HOV	WB	SR-65 to West El Camino Ave	21.46	2+	AM	20.75	18.72	1.39	0.00	0.65
03	80	HOV	WB	SR-65 to West El Camino Ave	21.46	2+	PM	16.38	14.29	0.76	0.00	1.34
03	99/51	HOV	NB	Elk Grove Blvd to N St	13.10	2+	AM	10.43	8.68	1.02	0.73	0.00
03	99/51	HOV	SB	B St to Elk Grove Blvd	13.63	2+	AM	12.58	12.12	0.46	0.00	0.00
03	99/51	HOV	SB	B St to Elk Grove Blvd	13.63	2+	PM	12.58	4.79	5.14	0.70	1.95
04	4	HOV	EB	Port Chicago Hwy to Hillcrest Ave	15.34	2+	PM	8.99	7.40	1.19	0.00	0.40
04	4	HOV	WB	Hillcrest Ave to Port Chicago Hwy	11.87	2+	AM	8.45	2.13	0.96	2.33	3.04
04	80	HOV	EB	I-880 to Cummings Skyway	18.62	3+	AM	14.31	13.53	0.40	0.39	0.00
04	80	HOV	EB	I-880 to Cummings Skyway	18.62	3+	PM	14.31	4.43	2.48	1.22	6.18
04	80	HOV	WB	SR-29 to Powell St	19.00	3+	AM	14.81	7.12	3.47	2.53	1.69
04	80	HOV	WB	SR-29 to Powell St	19.00	3+	PM	14.81	12.76	1.10	0.00	0.95
04	80	HOV	EB	Red Top Rd to Air Base Pkwy	8.12	2+	PM	6.31	2.41	2.50	0.80	0.61
04	80	HOV	WB	E/O Air Base Pkwy to WB SR 12 Interchange	7.60	2+	PM	6.15	5.77	0.00	0.00	0.38
04	85	HOT	SB	US-101 to Central Expwy.	1.85	*3+	PM	1.18	0.69	0.50	0.00	0.00
04	85	HOV	NB	US-101 (South San Jose) to S/O Moffett Blvd.	24.56	2+	AM	14.65	5.25	7.31	2.10	0.00
04	85	HOV	SB	Central Expwy. to US-101 (South San Jose)	23.92	2+	AM	17.33	16.74	0.60	0.00	0.00
04	85	HOV	SB	Central Expwy. to US-101 (South San Jose)	23.92	2+	PM	17.33	6.24	3.02	4.64	3.44

District	te	lity Type	ction	Limits	lity	upancy	e Period	e Miles	raded	htly raded	y raded	emely
04	87	HOV	NB	SR-85 to US-101	9.70	2+	AM	4.94	3.22	0.82	0.91	0.00
04	87	HOV	SB	US-101 to SR-85	9.12	2+	PM	4.42	0.93	1.05	2.45	0.00
04	92	HOV	WB	Hesperian Blvd to San Mateo Bridge Toll Plaza	3.28	2+	AM	1.11	0.33	0.79	0.00	0.00
04	101	HOT	NB	S/O Ellis St. to Rte 380	29.10	*3+	AM	11.78	11.37	0.41	0.00	0.00
04	101	HOT	NB	S/O Ellis St. to Rte 380	29.10	*3+	PM	12.48	10.50	1.09	0.90	0.00
04	101	HOT	SB	Rte 380 to N/O SR 237	30.25	*3+	AM	11.14	8.64	2.50	0.00	0.00
04	101	HOT	SB	Rte 380 to N/O SR 237	30.25	*3+	PM	11.18	7.28	2.22	1.68	0.00
04	101	HOV	NB	Cochrane Rd to S/O Ellis St.	29.39	2+	AM	19.78	11.77	6.24	1.39	0.38
04	101	HOV	NB	Cochrane Rd to S/O Ellis St.	29.39	2+	PM	19.78	19.49	0.00	0.00	0.29
04	101	HOV	SB	N/O SR 237 to Cochrane Rd	27.53	2+	AM	17.86	17.49	0.38	0.00	0.00
04	101	HOV	SB	N/O SR 237 to Cochrane Rd	27.53	2+	PM	17.86	8.92	2.02	1.22	5.71
04	101	HOV	NB	Richardson Bay Bridge to N of Atherton Ave	18.67	2+	PM	9.92	5.44	2.20	0.47	1.82
04	101	HOV	SB	De Long Ave to Richardson Bay Bridge	16.18	2+	AM	7.85	4.48	1.84	1.54	0.00
04	101	HOV	NB	0.4 mi S/O Marin/Sonoma Co line to Windsor River Rd	31.12	2+	PM	16.53	15.93	0.28	0.00	0.33
04	101	HOV	NB	0.4 mi S/O Marin/Sonoma Co line to Windsor River Rd	31.12	2+	AM	16.53	12.79	2.25	1.22	0.28
04	101	HOV	SB	Windsor River Rd. to 0.3 mi N/O Marin Co Line	31.09	2+	AM	18.88	13.75	2.46	1.07	1.61
04	237	HOT	EB	Mathilda Ave to I-880	7.32	*3+	AM	4.28	3.34	0.00	0.95	0.00
04	237	HOT	EB	Mathilda Ave to I-880	7.32	*3+	PM	4.28	1.51	2.11	0.00	0.67
04	237	HOT	WB	Rte 880 to E. Java Dr.	6.09	*3+	AM	3.97	2.96	1.01	0.00	0.00
04	280	HOV	NB	Leland Ave to Magdalena Ave	10.69	2+	AM	4.84	3.73	0.00	0.70	0.41

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
04	280	HOV	SB	N/O Magdalena Ave. to Leland Ave.	11.03	2+	PM	6.10	2.00	0.00	2.96	1.14
04	580	HOT	WB	Greenville Rd to I-680	11.95	**2+	AM	6.70	6.35	0.36	0.00	0.00
04	680	HOT	NB	South Grimmer to Livorna Rd On-ramp	19.66	^2+	PM	10.96	6.27	2.82	0.32	1.56
04	680	HOT	SB	SR-84 to Alcosta Blvd onramp	37.19	**2+	AM	20.95	20.50	0.22	0.24	0.00
04	680	HOT	SB	SR-84 to Alcosta Blvd onramp	37.19	**2+	PM	20.95	20.00	0.47	0.48	0.00
04	880	HOT	NB	S/O SR 262 to S/O SR-238	17.89	*3+	PM	11.60	6.36	2.08	1.00	2.17
04	880	HOT	SB	Hegenberger Rd to SR-237	27.08	*3+	AM	16.07	9.44	5.27	1.36	0.00
04	880	HOT	SB	Hegenberger Rd to SR-237	27.08	*3+	PM	16.07	15.86	0.21	0.00	0.00
04	880	HOV	NB	Old Bayshore Hwy to Dixon Landing Rd	5.84	2+	PM	2.38	1.84	0.00	0.54	0.00
04	880	HOV	SB	SR 237 to US-101	4.30	2+	AM	2.91	2.37	0.55	0.00	0.00
04	880	HOV	SB	SR 237 to US-101	4.30	2+	PM	2.91	1.44	0.38	0.55	0.56
05	101	HOV	NB	Ventura Co Line to 0.51 mi N/O Santa Monica Creek	4.14	2+	AM	4.09	3.46	0.13	0.50	0.00
05	101	HOV	SB	Bailard Ave to 0.56 mi N/O Santa Monica Creek	4.19	2+	AM	4.06	3.64	0.42	0.00	0.00
07	10	HOT	EB	Baldwin Ave to I-605	22.30	^^3+	AM	16.48	16.11	0.37	0.00	0.00
07	10	HOT	EB	Baldwin Ave to I-605	22.30	^^3+	PM	16.48	11.07	2.79	0.00	2.62
07	10	HOT	WB	Garvey Ave to Temple City Blvd	22.63	^^3+	AM	13.33	8.75	3.71	0.87	0.00
07	10	HOV	EB	I-605 to San Bernardino Co Line	17.27	2+	AM	7.10	6.51	0.60	0.00	0.00
07	10	HOV	EB	I-605 to San Bernardino Co Line	17.27	2+	PM	7.10	0.00	0.00	0.69	6.42
07	10	HOV	WB	San Bernardino Co Line to I-605	16.97	2+	AM	8.63	7.72	0.91	0.00	0.00
07	10	HOV	WB	San Bernardino Co Line to I-605	16.97	2+	PM	8.63	8.46	0.17	0.00	0.00

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
07	14	HOV	NB	I-5 to 0.3 mi N of Palmdale Blvd	35.04	2+	PM	11.72	2.50	5.70	0.00	3.52
07	14	HOV	SB	Ave P-8 to I-5	36.45	2+	AM	14.77	4.37	6.90	0.00	3.50
07	60	HOV	EB	I-605 to San Bernardino Co Line	18.67	2+	AM	10.33	8.82	0.85	0.66	0.00
07	60	HOV	EB	I-605 to San Bernardino Co Line	18.67	2+	PM	10.33	3.55	4.04	0.69	2.05
07	60	HOV	WB	San Bernardino Co Line to 0.4 mi W/O 7th Ave	16.63	2+	AM	10.69	3.10	0.90	2.27	2.60
07	60	HOV	WB	San Bernardino Co Line to 0.4 mi W/O 7th Ave	16.63	2+	PM	10.69	5.55	2.57	0.75	0.00
07	91	HOV	EB	I-110 to Orange Co Line	14.18	2+	AM	4.86	4.41	0.00	0.00	0.45
07	91	HOV	EB	I-110 to Orange Co Line	14.18	2+	PM	4.86	1.95	1.20	0.64	1.07
07	91	HOV	WB	Orange Co Line to Central Ave	12.21	2+	AM	5.81	0.67	1.88	2.21	1.06
07	91	HOV	WB	Orange Co Line to Central Ave	12.21	2+	PM	5.81	1.80	0.87	0.90	2.25
07	118	HOV	EB	0.1 mi E/O Ventura Co Line to I-5	10.40	2+	AM	2.49	2.09	0.40	0.00	0.00
07	118	HOV	EB	0.1 mi E/O Ventura Co Line to I-5	10.40	2+	PM	2.49	1.16	0.40	0.94	0.00
07	134	HOV	WB	I-5 to 0.1 mi W/O Cahuenga Blvd	4.17	2+	PM	3.78	0.65	2.39	0.74	0.00
07	210	HOV	EB	SR-134 to San Bernardino Co Line	27.42	2+	AM	19.47	17.99	1.49	0.00	0.00
07	210	HOV	EB	SR-134 to San Bernardino Co Line	27.42	2+	PM	19.47	2.46	2.36	2.67	11.99
07	210	HOV	WB	San Bernardino Co Line to SR-134	27.22	2+	AM	20.91	5.26	4.20	2.67	8.79
07	210	HOV	WB	San Bernardino Co Line to SR-134	27.22	2+	PM	20.91	12.54	6.11	0.57	1.69
07	405	HOV	NB	Orange Co Line to I-5	48.41	2+	AM	17.29	4.86	7.28	2.87	2.28
07	405	HOV	NB	Orange Co Line to I-5	48.41	2+	PM	17.29	5.39	6.99	0.30	4.61
07	405	HOV	SB	I-5 to Orange Co Line	47.68	2+	AM	20.56	13.60	3.69	0.81	2.46

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
07	405	HOV	SB	I-5 to Orange Co Line	47.68	2+	PM	20.56	4.37	1.77	4.83	9.59
07	605	HOV	NB	Orange Co Line to I-10	19.84	2+	AM	12.37	9.58	2.79	0.00	0.00
07	605	HOV	NB	Orange Co Line to I-10	19.84	2+	PM	12.37	5.45	2.89	0.41	3.62
07	605	HOV	SB	I-10 to Orange Co Line	20.71	2+	AM	13.77	8.03	2.90	1.45	1.38
07	605	HOV	SB	I-10 to Orange Co Line	20.71	2+	PM	13.77	8.03	0.00	0.00	5.73
08	10	HOV	EB	Los Angeles Co Line to Haven Ave	8.27	2+	AM	4.57	3.21	0.00	0.51	0.85
08	10	HOV	EB	Los Angeles Co Line to Haven Ave	8.27	2+	PM	4.57	0.00	1.66	1.61	1.29
08	10	HOV	WB	Haven Ave to Los Angeles Co Line	8.52	2+	AM	5.34	0.00	2.17	2.06	1.12
08	10	HOV	WB	Haven Ave to Los Angeles Co Line	8.52	2+	PM	5.34	0.00	4.78	0.56	0.00
08	15	HOT	NB	Cajalco Rd to Rte 60	29.20	*3+	AM	17.66	17.14	0.52	0.00	0.00
08	15	HOT	NB	Cajalco Rd to Rte 60	29.20	*3+	PM	17.66	16.83	0.82	0.00	0.00
08	15	HOT	SB	Rte 60 to Cajalco Rd	29.20	*3+	AM	18.19	16.19	0.92	0.00	1.08
08	15	HOT	SB	Rte 60 to Cajalco Rd	29.20	*3+	PM	18.19	12.28	2.90	1.93	1.08
08	60	HOV	EB	Los Angeles Co Line to Redlands Blvd	29.60	2+	AM	17.14	15.54	1.60	0.00	0.00
08	60	HOV	EB	Los Angeles Co Line to Redlands Blvd	29.60	2+	PM	17.14	6.34	3.92	0.30	6.58
08	60	HOV	WB	East Jct I-215 to Los Angeles Co Line	30.19	2+	AM	17.77	13.08	0.51	3.66	0.51
08	60	HOV	WB	East Jct I-215 to Los Angeles Co Line	30.19	2+	PM	20.27	14.48	1.01	3.54	1.24
08	71	HOV	SB	Los Angeles Co Line to N/O Butterfield Ranch Rd	7.06	2+	AM	6.52	5.71	0.81	0.00	0.00
08	71	HOV	SB	Los Angeles Co Line to N/O Butterfield Ranch Rd	7.06	2+	PM	6.52	4.84	0.86	0.81	0.00
08	91	HOT	EB	Orange Co Line to I-15	16.52	^*3+	AM	7.56	7.41	0.15	0.00	0.00

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
08	91	HOT	EB	Orange Co Line to I-15	16.52	^*3+	PM	7.56	6.05	1.51	0.00	0.00
08	91	HOT	WB	I-15 to Orange Co Line	16.43	3+	AM	8.59	2.33	3.99	2.27	0.00
08	91	HOT	WB	I-15 to Orange Co Line	16.43	3+	PM	8.59	6.90	1.70	0.00	0.00
08	91	HOV	EB	1 mi E of I-15 to I-215	13.42	2+	AM	10.41	5.10	4.30	1.01	0.00
08	91	HOV	EB	1 mi E of I-15 to I-215	13.42	2+	PM	10.41	4.72	0.79	1.14	3.76
08	91	HOV	WB	I-215 to 0.7 mi E/O I-15	13.97	2+	AM	9.99	6.97	1.32	0.47	1.23
08	91	HOV	WB	I-215 to 0.7 mi E/O I-15	13.97	2+	PM	9.99	0.69	3.21	2.74	3.36
08	210	HOV	EB	Los Angeles Co Line to I-215	21.29	2+	AM	17.74	17.44	0.00	0.30	0.00
08	210	HOV	EB	Los Angeles Co Line to I-215	21.29	2+	PM	17.74	3.50	5.18	1.04	8.03
08	210	HOV	WB	I-215 to Los AngelesCo Line	21.48	2+	AM	19.37	10.19	2.93	5.46	0.80
08	210	HOV	WB	I-215 to Los AngelesCo Line	21.48	2+	PM	19.37	9.71	9.67	0.00	0.00
08	215	HOV	NB	South Jct SR-60 to SR-210	16.32	2+	AM	10.00	8.35	0.00	0.87	0.79
08	215	HOV	NB	South Jct SR-60 to SR-210	16.32	2+	PM	10.26	3.77	0.58	2.34	3.57
08	215	HOV	SB	N Jct SR-60/SR-91 to SR-210	16.30	2+	AM	12.05	7.89	0.00	2.86	1.30
08	215	HOV	SB	N Jct SR-60/SR-91 to SR-210	16.30	2+	PM	12.31	4.38	2.08	0.47	5.39
11	5	HOV	NB	I-805 to SR-78	20.01	2+	AM	17.63	16.36	1.28	0.00	0.00
11	5	HOV	NB	I-805 to SR-78	20.01	2+	PM	17.63	8.66	0.00	3.61	5.37
11	15s	HOT	NB	SR-163 to SR-78	39.68	2+	PM	39.10	31.80	7.30	0.00	0.00
11	805	HOV	NB	Telegraph Canyon Rd to Market St	7.89	2+	AM	7.26	4.04	2.24	0.98	0.00
11	805	HOV	SB	I-5 to SR-52	4.33	2+	PM	4.29	1.99	0.69	0.75	0.85

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
12	5	HOV	NB	Avenue Pico to Beach Blvd	42.04	2+	AM	33.82	29.43	2.56	1.83	0.00
12	5	HOV	NB	Avenue Pico to Beach Blvd	42.04	2+	PM	33.71	16.84	5.17	1.55	10.14
12	5	HOV	SB	Artesia Blvd to Avenue Pico	43.33	2+	AM	34.51	18.51	7.34	3.91	4.75
12	5	HOV	SB	Artesia Blvd to Avenue Pico	43.33	2+	PM	34.12	29.70	3.96	0.47	0.00
12	22	HOV	EB	I-405 to Grand Ave	11.65	2+	AM	11.10	4.84	3.52	2.75	0.00
12	22	HOV	EB	I-405 to Grand Ave	11.65	2+	PM	11.10	5.08	2.16	1.84	2.03
12	22	HOV	WB	0.8 mi W/O SR-55 to I-405	12.39	2+	AM	11.86	11.23	0.32	0.32	0.00
12	22	HOV	WB	0.8 mi W/O SR-55 to I-405	12.39	2+	PM	11.86	8.33	1.81	0.28	1.44
12	55	HOV	NB	I-405 to 0.7 mi S/O Lincoln Ave	10.67	2+	AM	9.85	9.56	0.29	0.00	0.00
12	55	HOV	NB	I-405 to 0.7 mi S/O Lincoln Ave	10.67	2+	PM	9.85	1.77	2.33	1.47	4.29
12	55	HOV	SB	0.4 mi S/O Lincoln Ave to I-405	10.29	2+	AM	6.43	2.84	0.96	0.72	1.92
12	55	HOV	SB	0.4 mi S/O Lincoln Ave to I-405	10.29	2+	PM	8.58	7.02	1.56	0.00	0.00
12	57	HOV	NB	I-5 to Los Angeles Co Line	11.78	2+	PM	10.20	1.93	3.17	2.09	3.00
12	57	HOV	SB	Los Angeles Co Line to I-5	11.85	2+	AM	9.76	3.99	1.41	2.08	2.29
12	57	HOV	SB	Los Angeles Co Line to I-5	11.85	2+	PM	10.59	4.35	2.83	1.53	1.89
12	91	HOV	EB	Los Angeles Co Line to Tustin Ave	11.78	2+	AM	10.63	4.58	3.84	2.21	0.00
12	91	HOV	EB	Los Angeles Co Line to Tustin Ave	11.78	2+	PM	10.63	1.49	2.80	3.27	3.08
12	91	HOV	WB	Tustin Ave to Los Angeles Co Line	11.76	2+	AM	10.57	8.21	2.36	0.00	0.00
12	91	HOV	WB	Tustin Ave to Los Angeles Co Line	11.76	2+	PM	11.00	3.11	2.81	1.95	3.14
12	405	HOV	NB	I-5 to Los Angeles Co Line	26.54	2+	AM	22.15	19.85	0.57	0.80	0.93

District	Route	Facility Type	Direction	Limits	Facility Length	Occupancy Requiremen	Time Period	Lane Miles Monitored	Not Degraded	Slightly Degraded	Very Degraded	Extremely Degraded
12	405	HOV	NB	I-5 to Los Angeles Co Line	26.54	2+	PM	21.55	10.15	4.99	3.93	2.48
12	405	HOV	SB	Los Angeles Co Line to I-5	26.35	2+	AM	20.52	19.17	1.35	0.00	0.00
12	405	HOV	SB	Los Angeles Co Line to I-5	26.35	2+	PM	19.70	14.11	2.47	1.48	1.64
12	605	HOV	NB	I-405 to Los Angeles Co Line	2.36	2+	PM	2.10	1.81	0.00	0.29	0.00
12	605	HOV	SB	Los Angeles Co Line to I-405	2.53	2+	AM	2.10	1.00	1.10	0.00	0.00
12	605	HOV	SB	Los Angeles Co Line to I-405	2.53	2+	PM	2.10	1.00	1.10	0.00	0.00

EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound, E/O = East of, W/O = West of, N/O = North of, S/O = South of

* HOV 2 & CAV pay 50% of posted toll

** CAV pay 50% of posted toll

^ NB 680, South Grimmer to SR 84, CAV pay 50% of posted toll. NB 680, Alcosta Blvd. On-ramp to Livorna Rd., CAV travel free.

^^ 3+ only during peak hours.

^* HOV 2 & CAV pay 50% of posted toll during peak hours