

4 | Level of Service Results: HOV and Express Lanes



Considering the importance of managed lanes (such as HOV and express lanes) in improving the overall performance of a corridor, Alameda CTC started monitoring these facilities in 2014. Results are presented in Appendix B, Tables B-10 and B-11. The new I-580 Express Lanes in East County opened in February 2016, but were not included in the 2016 monitoring because they were still in the express lane ramp up period. In 2018, it is recommended that the eastbound managed lanes be considered as express lanes and the corresponding updates to the CMP network be performed. New segment definitions for the westbound express lanes will be required as well.

Since the last monitoring cycle, a new section of HOV facility opened on I-880 (southbound) from south of Hegenberger Road to Marina Boulevard, where it joins the existing I-880 (southbound) HOV facility. Two new CMP segments have been introduced to represent this new HOV section:

- I-880 (southbound) HOV from the HOV facility start south of Hegenberger Road to State Route 112 (Davis Street); and
- I-880 (southbound) HOV from State Route 112 (Davis Street) to Marina Boulevard.

4.1 | Congested Segments

Travel time data for HOV and express lanes from 2016 revealed that 11 segments were congested in the afternoon peak (See Table 4-1) and none in the morning peak. These occurred mostly on the major regional and interregional corridors I-80 and I-880. For the identified congested HOV segments, all the corresponding general purpose lanes were also congested (LOS F), with the exception of I-80 (westbound) from the Toll Plaza to the End of HOV which was slightly better at LOS E.

Table 4-1: Congested Segments on HOV Lanes - PM

CMP Route	Segment Limits	Jurisdiction
I-80 – EB	Begin of HOV to I-80 HOV/GP Gore	Oakland
I-80 – EB	I-80 HOV/GP Gore to Powell St.	Emeryville – Berkeley
I-80 – EB	Powell to Ashby Ave.	Emeryville – Berkeley
I-80 – EB	Ashby Ave. to University Ave.	Emeryville – Berkeley
I-80 – WB	Toll Plaza to End of HOV	Oakland
I-880 – NB	SCL County Line to SR 262/Mission Blvd. (450 ft s/o Warren Ave. Overhead Bridge)	Fremont
I-880 – NB *	Stevenson Blvd. to Decoto Rd.	Fremont
I-880 – NB *	Decoto Rd. to Alvarado Blvd.	Fremont
I-880 – NB *	Alvarado Blvd. to Alvarado-Niles Rd.	Fremont – Union City
I-880 – NB *	Alvarado-Niles Rd. to Tennyson Rd.	Union City – Hayward
I-880 – NB *	Tennyson Rd. to SR 92	Hayward

* Construction

Congested segments are assigned differently on express lanes than HOV lanes. Alameda CTC determined that express lanes are considered congested if they are assigned LOS D, E, or F which is equivalent to speeds less than 49 mph. Review of the 2016 results for express lanes (other than I-580 which was not analyzed due to express lane ramp up period) revealed no congested segments in either peak period.

4.2 | Average Speeds

Appendix A contains the maps showing the HOV and express lanes' performance. Managed lane overall system average speeds for 2016 are presented in Table 4-2 and Figure 4-1, along with a comparison to results from the previous monitoring cycle. Compared to 2014, the morning peak speed slightly increased and the afternoon peak speed decreased for the HOV lanes, and the morning peak speed slightly increased and the afternoon peak speed increased for the express lanes. All changes were less than two miles per hour.

Table 4-2: 2014 - 2016 Average Speed of Managed Lanes (mph)

Monitoring Year	Period	HOV	Express Lane
2014	PM	49.3	67.4
	AM	56.3	64.9
2016	PM	48.3	68.4
	AM	58.1	65.2
Change 2014 - 2016	PM	-1.0	+1.0
	AM	+1.8	+0.3

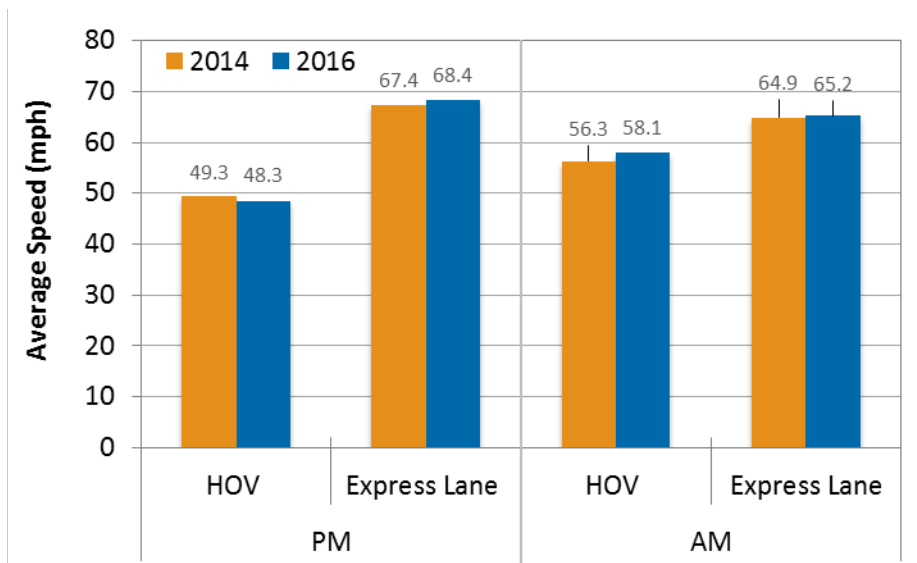


Figure 4-1: Average Speeds on the Managed Lane Network (2014 to 2016)

4.3 | Comparison to Freeway Performance across All Lanes

Through the implementation of managed lanes, Alameda CTC and associated agencies are not only encouraging commuters to carpool (HOV lanes), but are also maximizing efficiency by enabling single occupancy vehicles to access managed lanes by paying a toll (express lanes). By meeting these occupancy or payment requirements, HOV/express lane users gain access to managed lanes that are unavailable to general purpose lane users. This section reviews the effect of these managed lanes by comparing freeway general purpose lane performance to managed lane performance. Appendix B presents detailed data of managed lane performance.

The plots shown in Figure 4-2 provide a comparison of the speed along the freeway (all lanes) and managed lanes for the afternoon and morning peak periods. Each graph contains a diagonal line which represents parity between the average speeds along freeways and HOV/express lanes. Data points above the line indicate that average speeds on the managed lanes were faster than the freeway speeds. This was the case with the majority of the data points during both the peak periods, indicating that managed lanes were less congested than overall freeway lanes, as expected. However, a minority of data points are below the diagonal line, indicating exceptions, likely due to different sampling rates.

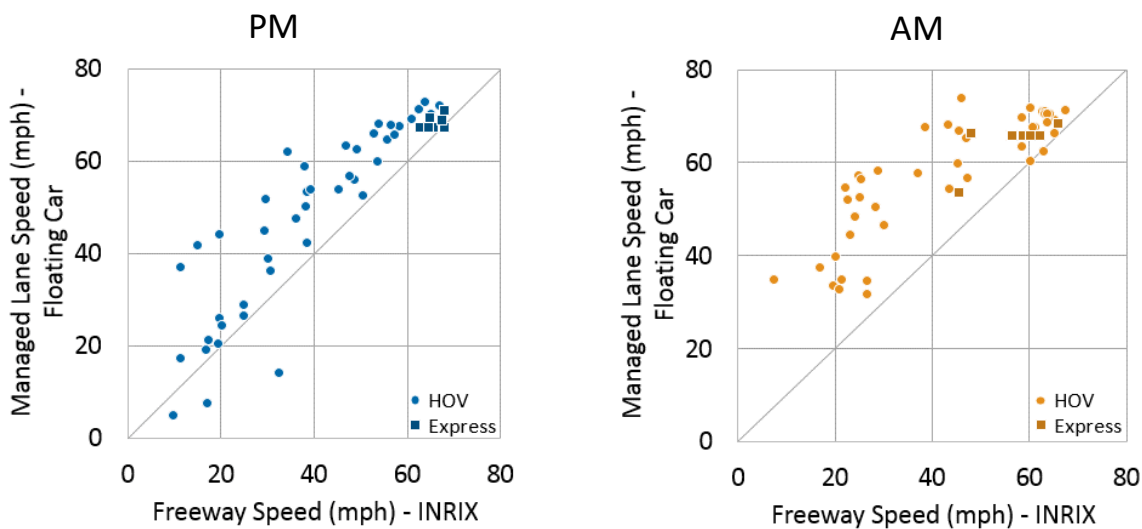


Figure 4-2: Freeway (Tier 1) to HOV Speed Comparison (2016)

While these graphs are useful to compare the performance across different types of freeway lanes, it is important to understand the two limitations of performing the comparison using the current data collection technologies and methodologies (i.e. floating car surveys for managed lanes and commercial speed data for all freeway lanes).

First, the floating car surveys have a limited sample size (six) compared to the commercial data (in thousands). By using an increased sample size, the data obtained is more representative of the average conditions throughout the entire monitoring period and is less prone to influence from individual events.

Second, the commercial data includes data for both general purpose and managed lanes due to the current inability of commercial speed data to report on speeds lane by lane. However, freeway speeds captured by commercial data will be more representative of general purpose lanes as there are more of these lanes than managed lanes. Hence, it is reasonable to expect that the speed along the general purpose lanes is slightly slower than reported under the freeway category and that the benefit of using managed lanes is higher than reported.

Even though freeways and HOV/express lanes were monitored using different data collection methodologies, the comparison is still possible, and generally showed the anticipated difference in performance. Continued undertaking of this effort provides Alameda CTC with a quantitative comparison of the performance of managed lanes within congested freeway corridors. For the next cycle, Alameda CTC may consider using lane-by-lane commercial speed data that has been made available recently.

In the 2016 monitoring cycle, the results indicate that speeds along HOV lanes were generally faster than the freeway performance across all lanes by an average of 8.6 mph in the afternoon peak period and 15.1 mph in the morning peak period. These values were weighted by distance consistent with methods used in freeway monitoring from previous cycles. While HOV performance was generally faster, these managed lanes still experienced congestion at similar locations and time periods as their corresponding general purpose lanes. For example, it was not common to observe free flowing HOV lanes when the performance of the freeway as a whole was notably slower.

The express lane monitoring in 2016 included a single express lane on the I-680 in the southbound direction. It offered travel speeds averaging 2 mph and a maximum of 5 mph faster compared to the overall freeway during the afternoon peak period. In the morning peak period, the express lane offered a larger improvement averaging 7 mph and a maximum of 18 mph faster on one segment (I-680 southbound from the Washington



Boulevard Entry Point to the Auto Mall Parkway Exit Point). There is a larger difference in speed between the lanes in the morning peak period since this is the peak direction towards Santa Clara County and as expected, the express lane provides its greatest benefit during this time. Since I-680 southbound travels largely at free flow speeds in the afternoon peak period, the speeds across all lanes are more similar. As more express lanes are opened in Alameda County in future years, the express lane monitoring will broaden from a single road to a network and therefore, network trends will be more observable instead of the patterns of a single express lane.