

Updated Traffic Data Confirm US 50 Road Diet Violates Federal Guidelines

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Abstract

This paper updates our earlier paper with daily and hourly visitation data taken on August 30, 2021, from Placer.ai at two points along the East Shore corridor of US 50. In all cases, average daily traffic in 2021 was substantially higher than the 2002 estimate, far exceeding maximum thresholds established by several government agencies for road-diet consideration. Peak hourly traffic data over the same periods also far exceed the government agency thresholds, providing further confirmation that US 50 is not a "good candidate" for a road diet, using FHWA language.

Visitor Overpopulation and Traffic Congestion

Since the original Placer.ai visitation data were collected in 2002, the Lake Tahoe Basin has undergone a significant increase in visitor population, leading Fodor's Travel to rank Lake Tahoe among the "10 regions to reconsider in 2023." According to Fodor's¹:

Lake Tahoe has a people problem. Amid the pandemic and the great migration, there was an influx of people moving to the mountains, as well as people with second homes in the area coming to live in Tahoe permanently. And it's caused traffic along the lake to crawl, as well as kept trails and beaches packed.

According to the Tahoe Prosperity Center², the number of year-round residents in the Basin [in 2021 was] 53,699 according to U.S. Census figures," and "more than 15 million people visit [Lake Tahoe] every year." According to the Tahoe Fund³, total population can reach 300,000 on peak days.

One might expect this increase in visitor population to have a serious impact on traffic congestion, as Fodor's Travel surmised! But what does it mean relative to the established thresholds for consideration of a so-called "road diet" along the East Shore Corridor of US Highway 50? That is what this paper seeks to address by comparing daily and peak hourly traffic data during the peak summer season to these government thresholds.

Traffic Thresholds

According to Spact⁴ and supported by the Highway Capacity Manual⁵: "2-Lane (one in each direction with left turn lanes at busy intersections and coordinated signals), undivided streets are considered almost congested with a volume of 8,900 to 18,300 vehicles per day." By "volume," Spact is referring to the average daily traffic (ADT) metric used throughout the industry. Gates⁶ recommended an ADT range threshold for applying a road diet to urban streets of between 15,000 and 17,000 vehicles per day, which is reported in the USDOT Road Diet Information Guide⁷. "The FHWA [Federal Highway Administration] advises that roadways with

an ADT of 20,000 vpd or less may be good candidates for a Road Diet and should be evaluated for feasibility".

Road Diet thresholds are also reported for peak hour and peak direction traffic, which is a more meaningful metric for this thoroughfare. The USDOT Road Diet Information Guide⁷ suggests that road diets (again in urban settings) may be feasible "at or below 750 vehicles per hour per direction during the peak hour." Therefore, planners should "Consider cautiously between 750 – 875 vphpd during the peak hour." Finally, "feasibility [is] less likely above 875 vphpd during the peak hour and [one can] expect reduced arterial LOS [level of service] during the peak period."

Peak Season Traffic Data

Tahoe East Shore Alliance (TESA) has requested peak traffic volume data along the US 50 East Shore corridor from TRPA and NDOT with no success. As a result, TESA placed a request from Placer.ai for daily and hourly visitation data within the corridor, which strongly correlates with vehicle traffic volume. The first tranche of visitation data showed daily visitations from October 2001 through September 2002, and these were reported in our first paper on this topic⁸. However, that information was dated, and a request was submitted for more recent data showing hourly visitation data at two key locations over the 24-hour period on Oct 31, 2021⁹.

The August 30 date, while it lies within Lake Tahoe's Summer peak season, it is outside Independence Day and Labor Day vacation periods and is considered unextraordinary relative to normal summer traffic volume. The 2021 year is also unextraordinary as summarized below:

- Tahoe Blue Event Center broke ground in July 2020, but major construction did not ramp up until 2022.
- Barton Memorial Hospital did not break ground until October 2022.
- Round Hill Pines Beach Resort and Marina new entry on US 50 did not break ground until May 2022.
- Zephyr Cove Resort new entry on US 50 (Warrior Way traffic light) did not break ground until July 2022.
- Washoe Sawmill did not begin transporting Caldor Fire lumber over US 50 until August 2022.
- Vacation traffic largely resumed following Covid-19 pandemic despite Nevada mask mandate.

The following two locations were selected for collecting visitation data along the US 50 East Shore Corridor: (1) Lake Parkway intersection is a natural choke point for traffic entering and leaving South Lake Tahoe since there are no parallel routes, (2) Elks Point Road intersection at the Round Hill Shopping Center is north of the Kingsbury Grade turn-off and provides a reasonable measure of traffic along the corridor from Kingsbury Grade to Spooner Summit. Both locations have full cell coverage, an imperative for accurate Placer.ai cellphone ping data, which is not the case further north along the corridor.

Table 1 shows the number of visitations recorded for each hour of the day during Oct 30, 2021, for each location. Peak hourly volume, which equates to design hourly volume (DHV) used by transportation engineers for road design, occurred at 11:00 AM for both locations. Table 1 also shows the daily traffic volume along with the computed means and standard deviations for the hourly data. K-factor is another transportation engineering parameter, which is the ratio of peak hourly volume to daily volume. A K-factor value near 0.10 is considered typical for roads of similar character.

Table 1. Hourly Visitation Data for August 30, 2021.

Time of Day	Hourly Visitations	
	50 Hwy & Lake Pkwy, Stateline / Lincoln Highway, NV 89449, NV	50 Hwy & Elks Point Rd, Zephyr / Elks Point Road, NV 89449, NV
12:00 AM	2646	1734
1:00 AM	2185	1881
2:00 AM	1312	978
3:00 AM	389	318
4:00 AM	651	556
5:00 AM	1076	600
6:00 AM	978	604
7:00 AM	2414	1494
8:00 AM	2599	1844
9:00 AM	3162	2404
10:00 AM	4864	2800
11:00 AM	6794	5854
12:00 PM	6654	5270
1:00 PM	5513	4863
2:00 PM	4999	4853
3:00 PM	4850	4180
4:00 PM	2511	2267
5:00 PM	4059	2764
6:00 PM	3084	2899
7:00 PM	3216	2185
8:00 PM	2073	1150
9:00 PM	1865	1390
10:00 PM	1850	1462
11:00 PM	2518	1758
Survey Date	9/30/21	9/30/21
Design Hourly Vol, K(1)	6794	5854
Hour of Day for DHV	11:00 AM	11:00 AM
Daily Traffic	72262	56108
Mean	3011	2338
Standard Deviation (P)	1760	1553
Apparent K-Factor	0.094	0.104

Table 2 summarizes road diet thresholds described earlier and contrasts these with US 50 East Shore average daily traffic volumes derived from Placer.ai visitations for August 30, 2021. In all cases, ADT during summer high season along US 50 East Shore far exceeds all threshold maxima for even considering a road diet.

Table 2. US 50 East Shore ADT compared to Road Diet Thresholds

ADT Threshold (vehicles per day)	Source		
	Spact & HCM	Gates & USDOT RDGIG	USDOT FHWA
Minimum Threshold Consider Road Diet	< 8,900	< 15,000	N/A
Maximum Threshold Consider Road Diet, subject to additional factors	< 18,300	< 17,000	<20,000
Placer.ai Daily Visitations, 8/30/2021	Equivalent ADT		
US 50 and Lake Parkway (Stateline)	72,262		
US 50 and Elks Point Road (Round Hill)	56,108		

Table 3 summarizes road diet thresholds described earlier and contrasts these with US 50 East Shore DHV derived from hourly Placer.ai visitation data for August 30, 2021. Again, the DHV during summer high season along UD 50 East Shore far exceeds threshold maxima for even considering a road diet.

Table 3. US 50 East Shore DHV compared to Road Diet Thresholds

DHV Threshold (vehicles per hour)	Source
	USDOT FHWA
Minimum Threshold Consider Road Diet	< 750
Maximum Threshold Consider "Cautiously"	< 875
Placer.ai Peak Hourly Visitations, 8/30/2021	Equivalent DHV
US 50 and Lake Parkway (Stateline)	6,794
US 50 and Elks Point Road (Round Hill)	5,854

Conclusion

Using the FHWA language, we must conclude that US 50 is not a "good candidate" for a road diet, even if it were in an urban setting, and further "feasibility evaluations" would not be warranted.

References

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Author Biography

Robert Byren: Mr. Byren is a retired electrical engineer with over 40 years professional experience in military lasers, laser radar, beam control, adaptive optics, thermal imaging, and optical metamaterials. Prior to retirement, he served as Chief Technologist for Raytheon's Space and Airborne Systems business unit with responsibility for the senior technical staff, intellectual property, innovation, and university relations. Post retirement, he led a small consulting firm in the field of high energy laser systems. Mr. Byren holds 43 US Patents and has co-authored 55 books and technical papers. He received his MSEE degree from Stanford University in 1975 and his BSEE degree from Lehigh University in 1974.