WILLITS BEFORE AND AFTER STUDY

AUGUST 2017

INTRODUCTION

The purpose of this study is to document current conditions on the Willits Bypass and on Old Route 101 through the City of Willits, and to compare various current metrics with prior conditions. The study employed a variety of methods and data sources to compare before and after conditions (described in detail in the body of the report). Focus areas of the study include: safety, travel time, and traffic volumes/congestion.

SUMMARY OF FINDINGS

- **Collision Reduction:** Average collision rates for through traffic on the Willits Bypass are projected to be reduced by approximately 400%, compared with average collision rates on Old Route 101 through Willits.

- **Reduction in Vehicle Miles Traveled :** The Willits Bypass has reduced total Vehicle Miles Traveled by an estimated 725 miles per day, or over 265,000 miles per year compared with driving on Old Route 101 through Willits.

- **Reduction in Travel Time:** The Willits Bypass has reduced average travel time for through traffic by approximately 5-6 minutes, with 10-15 minutes of travel time saved during Peak Summer Hour, and as much as 80 minutes of travel time saved during Special Event Periods.

- **Reduction in Delay:** The Bypass has reduced delay by approximately 750 vehicle hours of delay per day, or over 275,000 vehicle hours of delay reduced per year.

- **Reduced Traffic Volume on Old Route 101:** After completion of the Bypass, through volumes on Old Route 101 were reduced by approximately 35% during days that approximate AADT; and approximately 50% during Peak Summer Days.

- **Reduced Fuel Consumption/Less Greenhouse Gas Emissions:** The Willits Bypass reduces vehicle idling, speed variance, travel time, and Vehicle Miles Traveled, therefore reducing fuel consumption and CO_2 emissions, while boosting economic productivity.

- **Reduced Revenue in the City of Willits:** Willits businesses, especially gas stations and motels, have experienced a drop in revenue since the opening of the Willits Bypass.

BACKGROUND

Routing interregional traffic through downtown Willits has been a historic concern, first for the Division of Highways, then for Caltrans. A freeway bypass route was adopted in 1962, and the first stage (which included the Haehl overhead bridge over the railroad) was constructed in 1968/69. Concurrently, the District designed and produced plans for subsequent stages, which would have used borrow material from Oil Well Hill to construct embankment on the adopted alignment, which traversed Little Lake. Funding for new facility projects in District 1 was in limited supply in the 1970's, due to both increased construction costs and a greater portion of highway funding going to more populated areas in the State. While the Willits Freeway project was the District's highest priority for most of the 1980's through the early 2000's, environmental and financial constraints delayed its construction. Cost estimates increased dramatically as the Willits Bypass project was being developed, due to alignment revisions, extensive viaducts and mitigation measures that

were planned to meet environmental requirements. As a result, the Willits Bypass project was constructed as a 2-lane freeway bypass, with plans to expand it to a 4-lane freeway in the future.

Figure 1: Aerial Image of Old Route 101 & the Willits Bypass

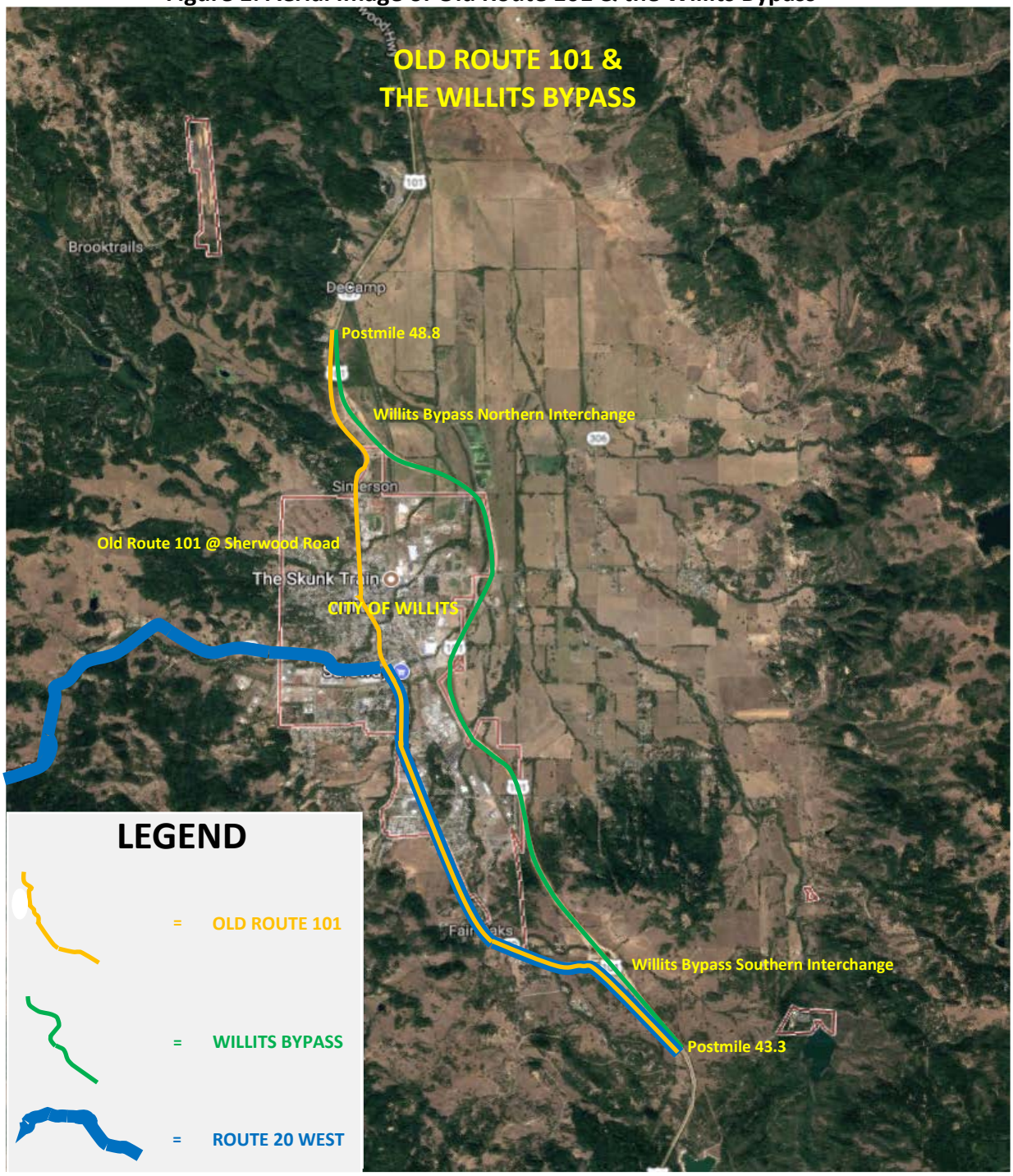


Figure 1 shows a bird's eye view of the Willits Bypass (ie. New Route 101) freeway alignment alongside the Old Route 101 conventional highway alignment in Willits. The 2-lane bypass was completed and opened for traffic on November 3, 2016. This segment is 5.53 miles long, traversing around the East side of Willits, from

postmile 43.30/48.80 in Mendocino County. The Willits Bypass is 0.09 miles shorter than the Old Route 101 alignment, which is 5.62 miles long.

Old Route 101 is a 2-4 lane highway segment from PM 43.30/48.80, and traverses through Main St. in the City of Willits. It includes approximately 1.5 miles of a two-way left turn lane (TWLTL). Old Route 101 contains the following speed zones and lane configurations:

- PM 43.30/44.74: 2-lanes, 55 mph
- PM 44.74/45.14: 2-lanes, 45 mph
- PM 45.14/45.62: 4-lanes with TWLTL, 40 mph
- PM 45.62/46.15: 4-lanes with TWLTL, 35 mph
- PM 46.15/47.10: 2-lanes with TWLTL, 25 mph
- PM 47.07/47.43: 2-lanes with TWLTL, 25 mph when children are present
- PM 47.10/47.57: 2-lanes with TWLTL, 35 mph
- PM 47.57/48.80: 2-lanes, 55 mph

The Willits Bypass contains the following speed zones and lane configurations:

- PM 43.30/44.50: 4-lanes, 65 mph
- PM 44.50/48.80: 2-lanes, 55 mph

PURPOSE

This study has been undertaken by District 1 to:

- Examine the safety benefits of the Willits Bypass.
- Develop estimates of reduction in travel time, vehicle hours of delay and Vehicle Miles Traveled for vehicles utilizing the Willits Bypass.
- Document traffic volumes, travel times, and travel distances for both the Old Route 101 in Willits and the Willits Bypass, for both Peak Summer Hour[1] and Average AADT Day[2] volumes.

LOCATIONS STUDIED

- Old Route 101 (Study Area 1): From 0.4 miles South of the Haehl Creek Undercrossing in southern Willits (PM 43.3) to 0.6 miles North of the Upp Creek Undercrossing in northern Willits (PM 48.8). PM 43.3 and 48.4 are the locations where the Bypass ties in with Old Route 101.

- Willits Bypass (Study Area 2): From southern Willits (43.3) to northern Willits (PM 48.8).

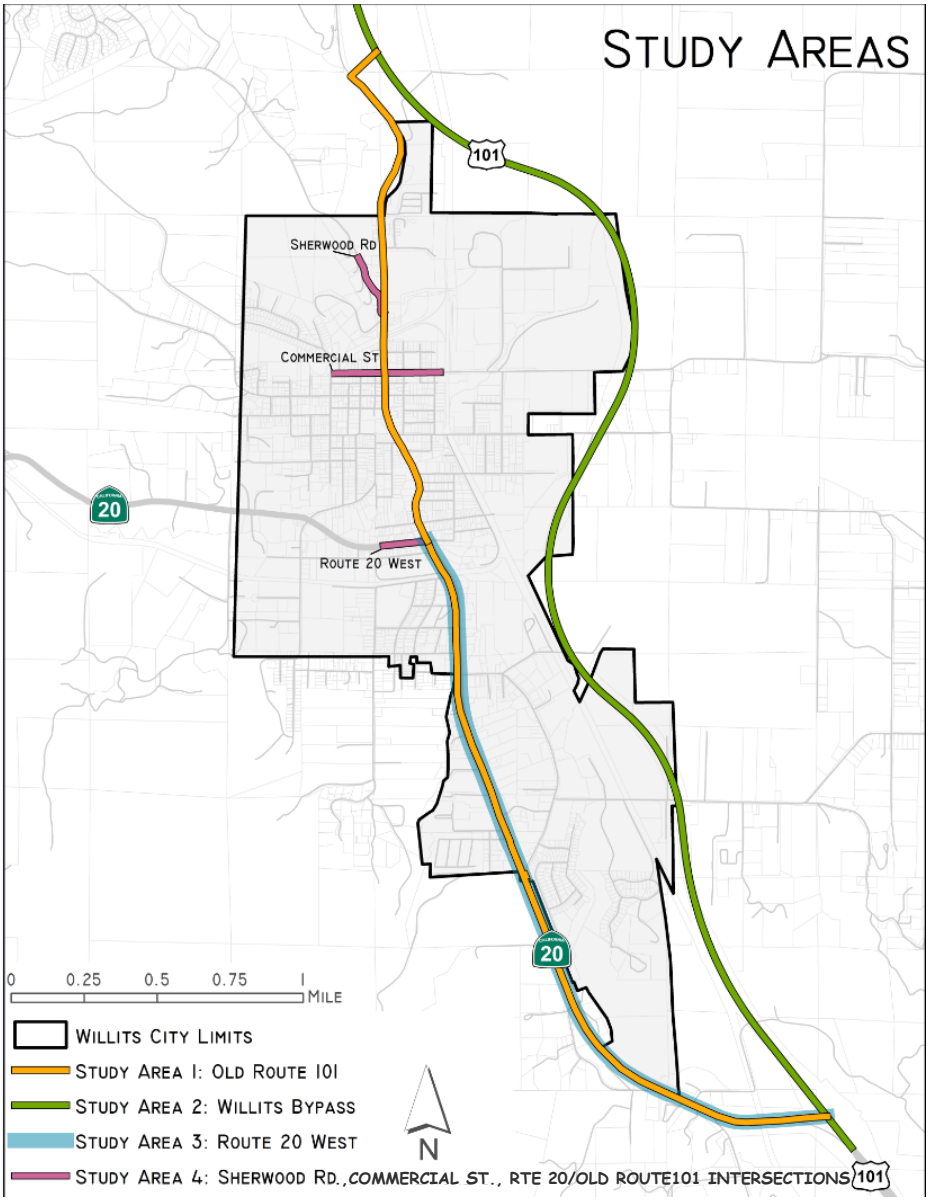
- Route 20 West (Study Area 3): From southern connection with the Willits Bypass (PM 43.3), north through the City of Willits, to the Old Route 101/Route 20 intersection (46.363).

- Willits Intersections (Study Area 4): Route 101 traffic volumes were studied for both the "Before Bypass" and "After Bypass" conditions on Route 101 @ Sherwood Rd. (PM 47.24). Similar volume reductions on Route 101 @ Sherwood Road. are assumed to have occurred on Route 101 throughout Willits, including Route 101 @ Commercial St., and Route 101 @ Route 20 West.

[1]Peak Summer Hour represents an estimate of the largest hourly 2-way volume of traffic flow, which usually occurs on a Friday during July & August (ie. Peak Summer Day) from 4:00-6:00 P.M., and is expressed in units of Vehicles Per Hour. On Route 101 in the Willits area, due to large seasonal fluctuations in traffic, the Peak Summer Hour is the hour near the maximum for the year, excluding the highest 30-50 hours of the year with exceedingly high volumes that are not typical of the Peak Summer Hour defined above.

[2]Average Annual Daily Traffic (AADT) Day: AADT represents an estimated sum of the 2-way daily traffic volumes for a 1-year period, divided by 365, and is expressed in units of Vehicles. From Caltrans 2015 continuous daily traffic counts for Route 101, postmile (PM) 42.2 in Mendocino County, it was determined that: AADT volumes typically occur on a Tuesday or Wednesday, in the months of March-May, as well as the month of October; data collected from any of these time periods is considered an Average AADT Day.

Figure 2: Study Areas on Old Route 101 and the Willits Bypass



SAFETY INFORMATION

Actual collision data on Old Route 101 during the three-year time period before the start of construction of the Willits Bypass (2/25/2010 through 2/24/2013) shows the following:

Old Route 101 Collision information:

- 154 total collisions were reported (4 fatal, 27 injury, 123 property damage only (PDO)).
- This segment has an actual "Fatal" collision rate which is 3.7 times greater than the statewide average for similar highway facilities.
- Four fatal collisions occurred within this segment during this time period. Two of four collisions resulted in a vehicle fatally striking a pedestrian.

Since there is currently a lag of one year or more between when collisions occur, and when Traffic Collision Reports are entered into TASAS (the State's safety database), actual collision information is not yet available for the Willits Bypass. Therefore, projected collision reductions were based on average collision rates, rather than actual historic collision data. Average collision rates for both Old Route 101 and the Willits Bypass are shown in Table 1.

Table 1: Average Collision Rates on Old Route 101 and the Willits Bypass

Average Rates on Old Route 101 (Collisions Per Million Vehicle Miles Traveled)			**Average Rates on Willits Bypass (Collisions Per Million Vehicle Miles Traveled)**		
Fatality	Fatality + Injury (F + I)	Total	Fatality	F + I	Total
0.015	0.65	1.60	0.014	0.17	0.36

From Table 1, it was determined that vehicles traveling on the Bypass instead of Old Route 101 are expected to experience the following average collision rate reductions:

- A 380% reduction in "F+I" collision rate
- A 440% reduction in "Total" collision rate
- A 7% reduction in "Fatal" collision rate
- Old Route 101 in Willits is expected to experience lower collision rates due to reduced traffic volumes.
- Auto-pedestrian collisions are projected to be substantially reduced on the Bypass.

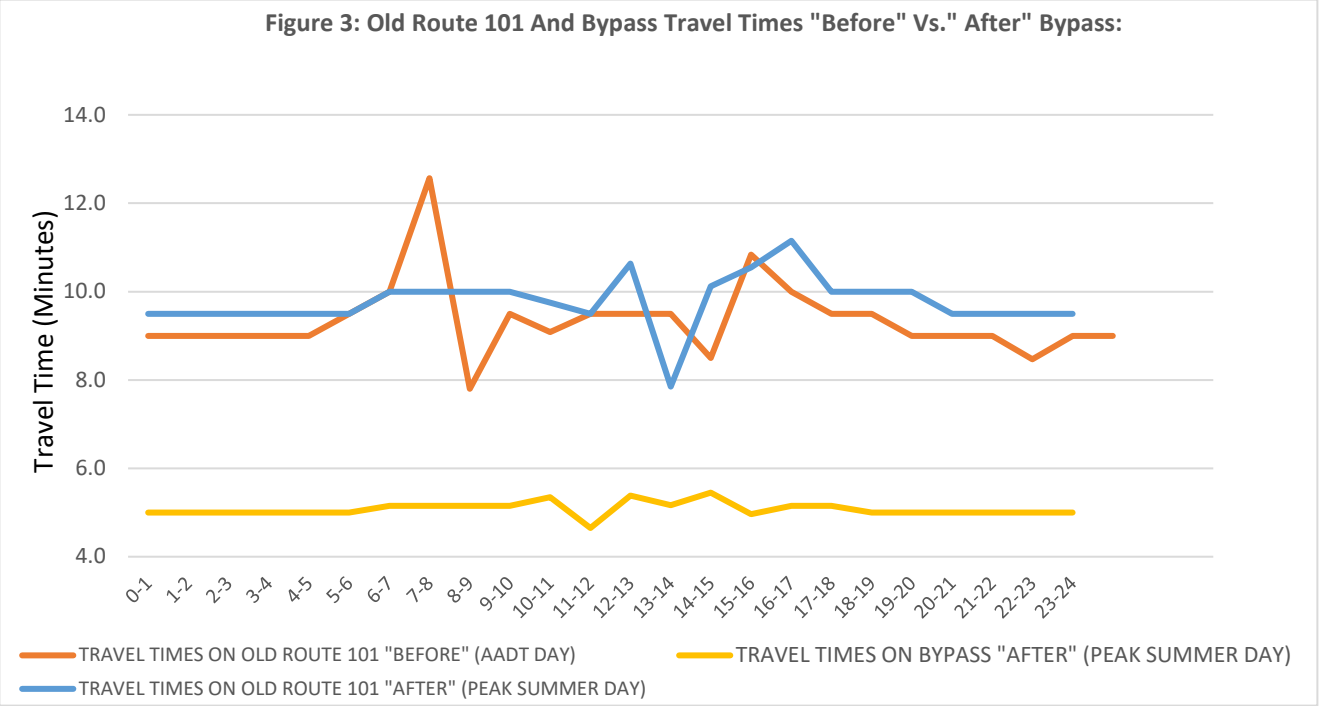
Vehicle Miles Traveled

The "Speedometer" app was utilized to drive Old Route 101 and the Willits Bypass and determine travel distances throughout peak hours on a Peak Summer Day in Willits. It was determined that the length of the Willits Bypass is 5.53 miles and the length of Old Route 101 is 5.62 miles (ie. the Bypass is 0.09 miles shorter than Old Route 101). With an average AADT of approximately 8,100 vehicles per day, the Willits Bypass has reduced total VMT by an estimated 725 miles per day, or over 265,000 miles per year compared with driving on Old Route 101 in Willits.

Travel Time (i.e. Floating Car Runs)

Floating car runs utilize a driver and a recorder, traveling over a set route, and recording times at the beginning, mid-points (if applicable), and end of a segment. The driver should pass as many cars as pass him or her (although this is not always practical, depending on traffic volumes and speed).
Seven floating car run data points were collected from March 3rd, 2015 through March 22, 2015; these data points represent "Travel Times on Old Route 101 "Before" (AADT Day)". Additionally, 14 floating car run data points were collected on Friday, August 11th, 2017, from 11:00 A.M. through 5:30 P.M., these data points represent "Travel Times on Old Route 101 "After" (Peak Summer Day)". These floating car runs were made on both Old Route 101 and the Willits Bypass on dates and times that approximated Peak Hour Day conditions, on dates and times that approximated AADT, to show a variety of operating conditions. The results of these floating car runs is displayed in Figure 3.

Old Route 101: Average travel times on Old Route 101 range from 7-12 minutes and fluctuate by 4-5 minutes during peak hours. From Figure 3, Peak Summer Day travel times on Old Route 101 through Willits in the "After" condition are similar to AADT Day travel times on Old Route 101 in the "Before" condition. Travel times "Before" completion of the Bypass ranged from 7-12 minutes during Average AADT Day conditions, and 10-25 minutes during peak Summer conditions when signalized intersections would exceed capacity. During special events, travel times varied substantially, from 10 minutes to as much as 90 minutes during peak hours.



*0-1=12:00 AM-1:00 AM; 1-2 = 1:00 A.M.-2:00 AM; 11-12 = 11:00 A.M.-12:00 P.M. etc.

Willits Bypass**:** The average travel time on the Willits Bypass is 5.0 minutes (times range from 4.5-5.5 minutes) during Peak Summer Day volumes, with insignificant change in travel time during peak flows, as seen in Figure 3. The Bypass has reduced average travel time by 5-6 minutes compared with driving on Old Route 101 in Willits; travel time has been reduced by 10-15 minutes during Peak Summer Hour, with as much as 80 minutes of travel time saved during Special Event periods.

Traffic Volumes: Figures 4 and 5 show 12 to 24-hour traffic volume counts that were collected by Caltrans at the Route 101/Sherwood Road intersection in Willits, both "Before" and "After" the Bypass was constructed, for both Peak Summer Hour and Average AADT Day periods[3].

In Summer months prior to the completion of the Bypass, traffic volumes would often peak mid-day and plateau until the early evening hours (Figure 4). From an August 11th, 2017 field review, it was observed that Old Route 101 (Main Street) traffic volumes have significantly decreased since the opening of the Willits Bypass. Compared to the "Before" condition, green time at signalized intersections has increased, and delay has been significantly reduced for both Old Route 101 through traffic and local cross street traffic. The historical Signalized Unstable Flow[4] that occurred on Old Route 101 during peak hours at the intersections of Route 20 West, Commercial St., and Sherwood Road has been significantly improved to Signalized Stable Flow[5] conditions.

[3] "Before" AADT volume data was collected from October 4th-November 2nd, 2016 and averaged to determine average October 2016 AADT daily volume. The "After" data was collected from November 4th-December 2nd, 2016 and averaged to determine an average November 2016 daily volume. To normalize November 2016 data to October 2016 (an Average AADT month), November 2016 volumes were multiplied using L,R,I adjustment factors. "Before" Peak Hour volume data was collected on July 17th, 2015 and projected to a Friday in August 2016 (Peak Summer Day and Month) daily volume using L,R,I adjustment factors.

[4] From the 2010 Highway Capacity Manual: For signalized intersections, *Signalized Unstable Flow* is defined as average control delay greater than 55 seconds. *Approaching Signalized Unstable Flow* is defined as: Average Control Delay is greater than 35 seconds and less than or equal to 55 seconds. *Average Control Delay* is defined as: the total elapsed time from when a vehicle stops at the end of a queue until the Page 4 vehicle departs from the stop line.

[5] From the 2010 Highway Capacity Manual: For signalized intersections, *Signalized Stable Flow* is defined as: average control delay is less than 35 seconds.

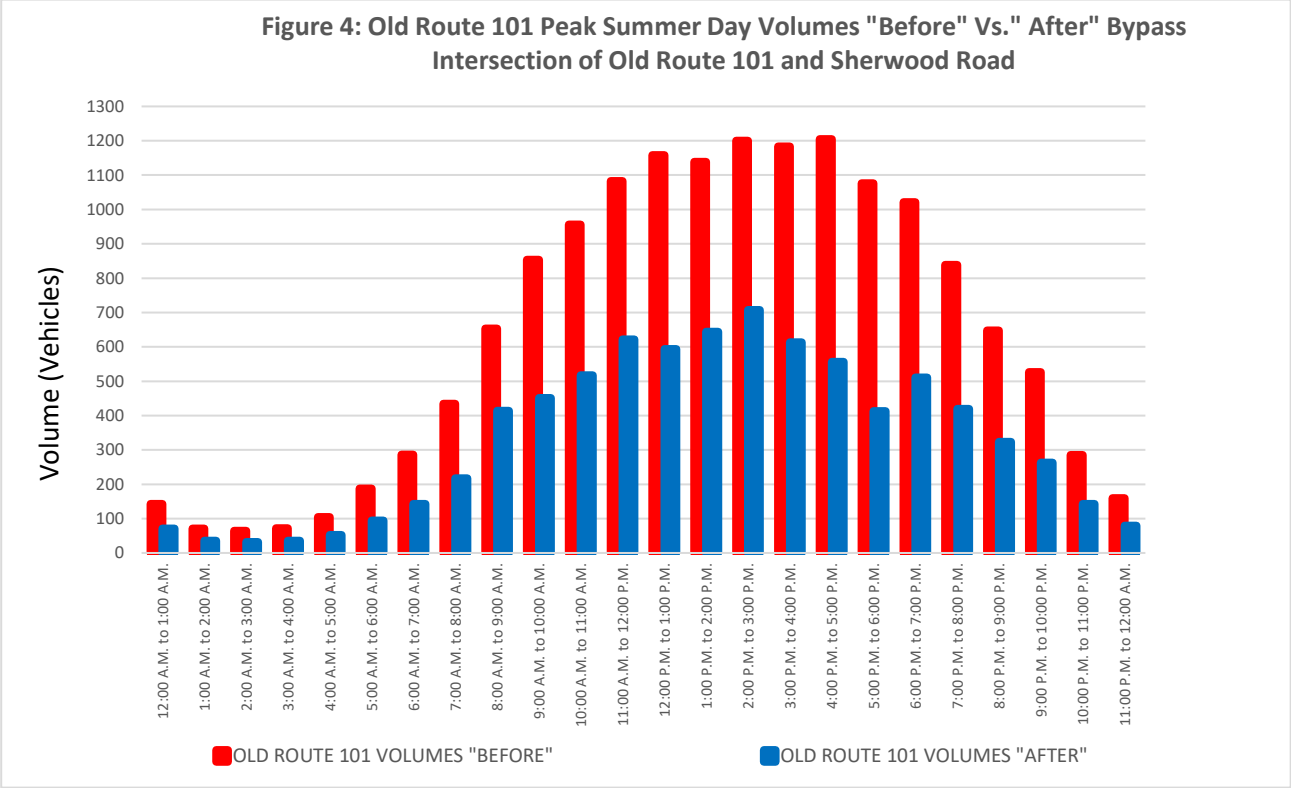


Figure 4 shows an overall average 50% reduction of Route 101 through volumes on a Peak Summer Day in the "After" condition, from 15,300 vehicles per day to 8,000 vehicles per day. Figure 5 shows an overall average 35% reduction of Route 101 through volumes on an Average AADT Day in the "After" condition, from 11,900 vehicles per day to 8,000 vehicles per day.

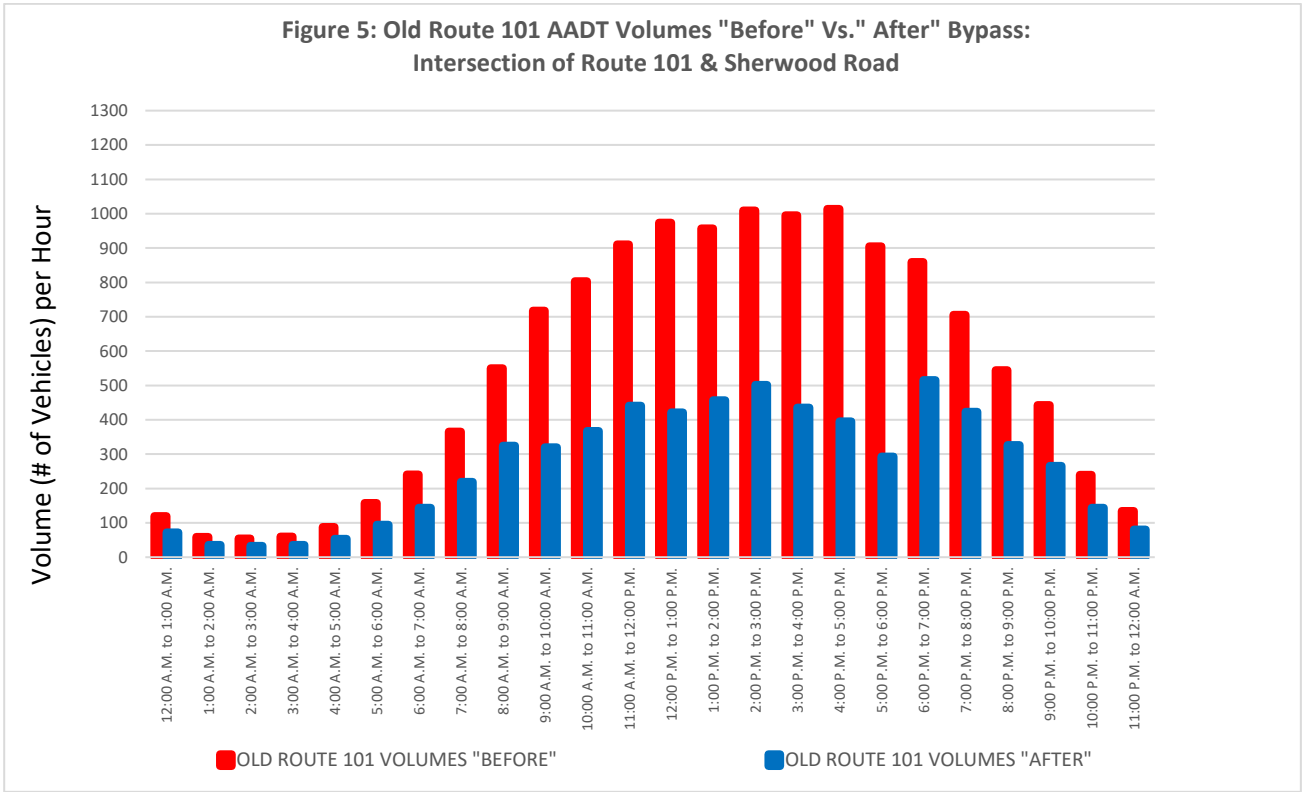
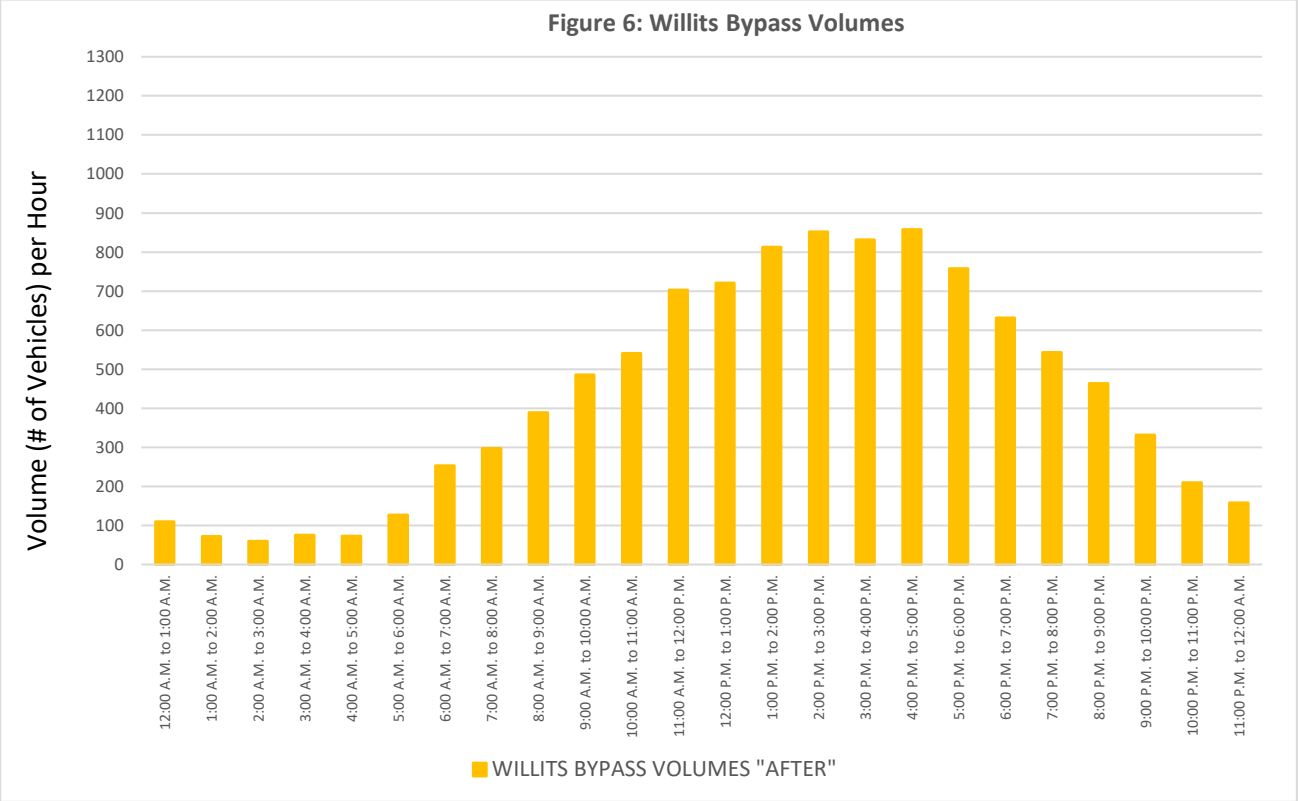


Figure 6 shows hourly volumes on the Willits Bypass. This 24-hour hose count data was collected on Friday, August 11th, 2017 (Peak Summer Day), and totals approximately 10,400 vehicles.



The hose count data in Figure 6 was collected in conjunction with Miovision video, to compare and evaluate the results of volume counts between these two systems. The results from this comparison will be evaluated in a subsequent study.

Continuous count stations are located on existing Route 101 at both ends of the Bypass (PM 43.78 and PM 48.22); these stations are being utilized to compile an AADT for the Willits Bypass.

GREENHOUSE GAS EMISSIONS & FUEL REDUCTION

Vehicle idling and speed variance not only reduce economic productivity, they also reduce fuel consumption[6]. Since the Willits Bypass reduces vehicle idling time, travel time, and speed variance, it provides the positive environmental benefits of reducing fuel consumption and CO_2 emissions, while boosting economic productivity. The reduction in both travel time and Vehicle Miles Traveled on the Bypass further contribute to reductions in fuel consumption and CO_2 emissions.

REDUCED REVENUE IN THE CITY OF WILLITS

Willits businesses, especially gas stations and motels, reported a 5-40% drop in revenue in the weeks immediately following the opening of the Willits Bypass, with at least one food shop owner (Niko's Gyro Shop) attributing a closure due to reduced business as a result of the Willits Bypass[7]. This reduction can be attributed in part to signage concerns, which have since been addressed.

[6] Excessive Idling and Gas Mileage http://www.mpgenhance.com/idling.html

[7] Daily Journal Local News: Willits Business See Drop in Sales Post-Bypass http://www.ukiahdailyjournal.com/article/NP/20161222/NEWS/161229972
Daily Journal Local News: Assembly Bill Aims to Relieve Adverse Willits Bypass Effects http://www.ukiahdailyjournal.com/article/NP/20170406/NEWS/170409927
Willits News: Willits Hotels, Gas Stations, See Decline in Business http://www.willitsnews.com/article/NR/20170803/NEWS/170809985 BJT 8/29/2017

NEXT STEPS

Caltrans will continue to monitor traffic safety (including collision information that is not yet available at the time of this report), traffic volumes at the two new permanent count stations, and roadway conditions on the Willits Bypass, making roadway improvements as warranted.

We anticipate that, as other projects in the area are completed, such as improvements to the Sherwood Rd. intersection and the Old Route 101 streetscape improvements, travel patterns will settle as people become accustomed to the bypass and the new configuration of Route 20 and Old Route 101. We plan to revisit travel patterns in the area, with a similar study to this one, in approximately three years—after completion of most of the major construction associated with bypass mitigation and other improvement projects in the area have been completed.