final

Roundabouts

The California State Highway System Roundabouts Inventory

July 2014

California Department of Transportation
Division of Transportation Planning
Office of System & Freight Planning

Caltrans

Caltrans Mission Statement

Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

Summary

The California State Highway System (SHS) Roundabouts Inventory has been compiled by Caltrans to provide an inventory of existing, programmed, and planned roundabouts located on the SHS. Roundabouts can often improve safety, decrease traffic congestion, improve air quality, and reduce environmental impacts, as compared to all-way stop signs or signalized intersections.

The Inventory includes examples of where roundabouts have been successfully implemented on the SHS and includes a historical context of why the roundabout was installed. This document is a reflection of Caltrans' leadership role in developing project alternatives that reduce vehicles emissions while enhancing California's economy and livability.

The purpose of the roundabout is to maximize safety and improve highway operations while being sensitive to the environment and community needs. Roundabouts help to maximize safety for drivers, pedestrians, and bicyclists while improving mobility. For further information on this topic and other Caltrans System Planning products, please visit the Caltrans System Planning website at:

http://www.dot.ca.gov/hq/tpp/offices/oasp/

Disclaimer

The information and data contained in this document are for planning purposes only and should not be relied upon for final design of any project. Any information in this document is subject to modification as conditions change and new information is obtained. Although planning information is dynamic and continually changing, Caltrans makes every effort to ensure the accuracy and timeliness of the information contained in the document. The information in this document does not constitute a standard, specification, or regulation, nor is it intended to address design policies and procedures.

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Introduction

This document provides basic roundabout information and an inventory of existing, programmed, and planned roundabouts on the State Highway System (SHS), including those located at freeway ramp intersections.

The term ***roundabout*** is a British word[1] for a road junction in which vehicles move in one direction around a central island with priority given to vehicles already in the circulating flow of the roundabout. The roundabout is a circular intersection that creates a circular traffic flow pattern using yield controls on each approach and signage to inform the driver about slowing down and recognizing who has the right of way. Vehicles enter the roundabout and navigate counter-clockwise with the option to make an immediate right-turn, go straight, or continue around the roundabout.

Roundabouts and traffic circles have similar geometric characteristics; however traffic circles are different in several ways[2]. Specifically, roundabouts use a yield control on all entries. Traffic circles use stop signs, signals or a combination[3]. Roundabout intersections give the right-of-way to those already in the roundabout, while traffic circles require circulating traffic to yield to entering traffic. Furthermore, roundabouts provide pedestrian access only across the legs of the roundabout, behind the yield line. Traffic circles allow pedestrians access to the central island. Finally, in a roundabout, all vehicles circulate counter-clockwise and pass to the right of the central island. Traffic circles allow left-turning vehicles to pass to the left of the central island.

Figure 1: Example of a Roundabout Sign

The circular intersection roundabout symbol (Figure 1) in the 2012 ***California Manual on Uniform Traffic Control Devices*** (2012 CA MUTCD) is one example of signage located prior to reaching the roundabout. The 2012 Highway Design Manual (HDM), provides design guidance and should be utilized when planning and developing roundabouts on the SHS. The HDM emphasizes that the yield-controlled roundabout is now considered to be a viable alternative for a broad range of intersection treatments, highway facility types and operation improvement conditions, such as high speeds and peak hour traffic volumes[4].

Benefits

Roundabouts can improve safety, decrease traffic congestion, improve air quality, and reduce environmental impacts, as compared to side-street stops or signalized intersections.

Safety Benefits

In comparison to roundabouts, signalized intersection accidents have higher rates of vehicle damage, injuries, and fatalities. The **Federal Highway Administration (FHWA)** compiled the following nationwide traditional intersection statistics for the year 2004[5]:

- ✓ 2.7 million intersection-related collisions
- ✓ 900,000 intersection-related injury collisions
- ✓ 9,117 intersection-related fatalities
- ✓ $96 billion nationally in financial losses from intersection-related collisions

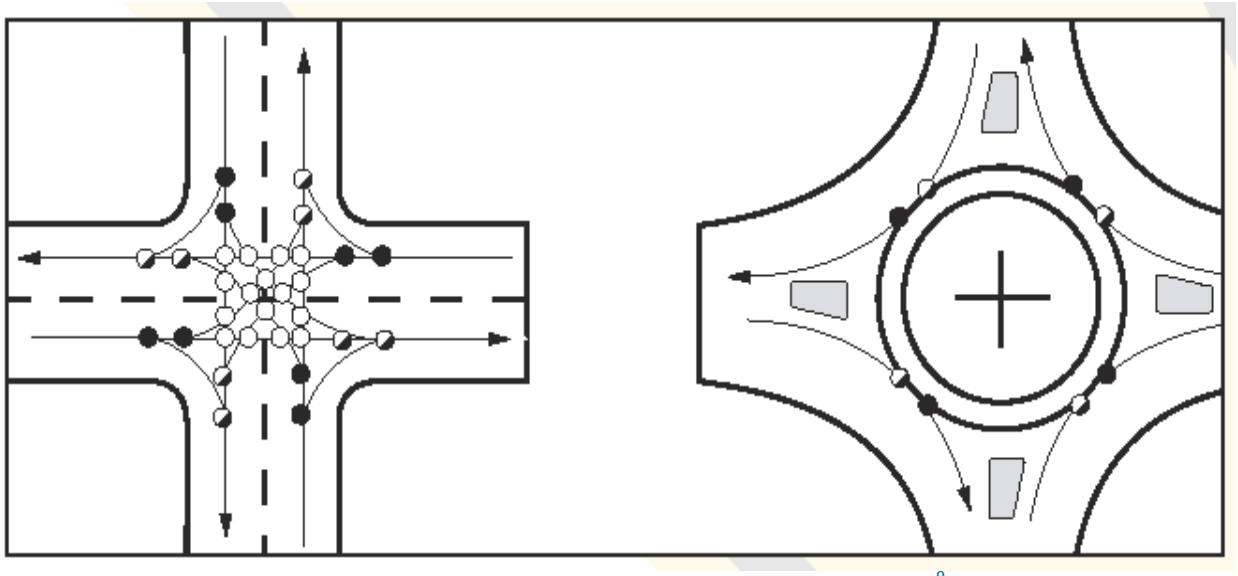
The **Insurance Institute of Highway Safety (IIHS)**, in partnership with the FHWA[6] has shown that roundabouts typically achieve the following improved safety benefits as compared to signalized or side-street stop intersections:

- ✓ 37 percent reduction in overall collisions
- ✓ 75 percent reduction in injury collisions
- ✓ 40 percent reduction in pedestrian collisions
- ✓ 75 percent fewer “conflict points” than a traditional intersection
- ✓ 90 percent reduction in overall fatalities

Design features of roundabouts limit the diameter of the circular roadway, which decreases vehicle speed, and reduces the risk of collisions as compared to signalized or side-street stop intersections. Roundabout design features are more effective at guiding vehicles safely through intersections than reliance on driver obedience to traffic control devices such as signals and side-street stop signs.[7] Single-lane roundabouts are particularly effective at improving safety.

Multi-lane roundabouts have many of the same safety performance characteristics as their simpler single-lane counterparts. However, due to the presence of additional entry lanes and the accompanying need to provide wider circulatory and exit roadways, multi-lane roundabouts introduce additional conflict points not present in single-lane roundabouts. Overall, there is an observed reduction of 35 percent for single-lane and 76 percent for multi-lane roundabouts in total and injury crashes, respectively, following conversion to a single or multi-lane roundabout from a traditional intersection[8].

Figure 2: Conflict Points - 32 Versus 8



Source: FHWA, Roundabout Informational Brochure & Guide[9]

Roundabouts have only eight conflict points versus a traditional intersection, which has 32 conflict points. In roundabout intersections, none of these conflict points are at right angles, thus decreasing injuries, fatalities, and property damage when collisions do occur.

Transportation Benefits

Roundabouts can improve traffic flow and significantly reduce traffic delays. Roundabouts promote a continuous, circular flow of traffic, which allows more vehicles to travel through an

intersection at a time. FHWA found that roundabouts increased traffic capacity by 30 percent to 50 percent[10], compared to signalized intersections. Roundabouts reduce delay by allowing vehicles to continuously move through all legs of the intersection without any of the legs having stop signs or red lights.

The Highway Capacity Manual (HCM) includes a new section on roundabout Level of Service (LOS) tables for performance measures[11]. The HCM states that for signalized or stop sign intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching or passing through a signalized or stop sign intersection, compared with a free-flow vehicle if it were not required to stop at the intersection, such as roundabouts[12].

In 2006, the IIHS studied intersections in three states (New Hampshire, New York, and Washington)[13] where roundabouts replaced traditional signalized intersections and found:

- ✓ 89 percent average reduction in vehicle delays
- ✓ 56 percent reduction in vehicle stops

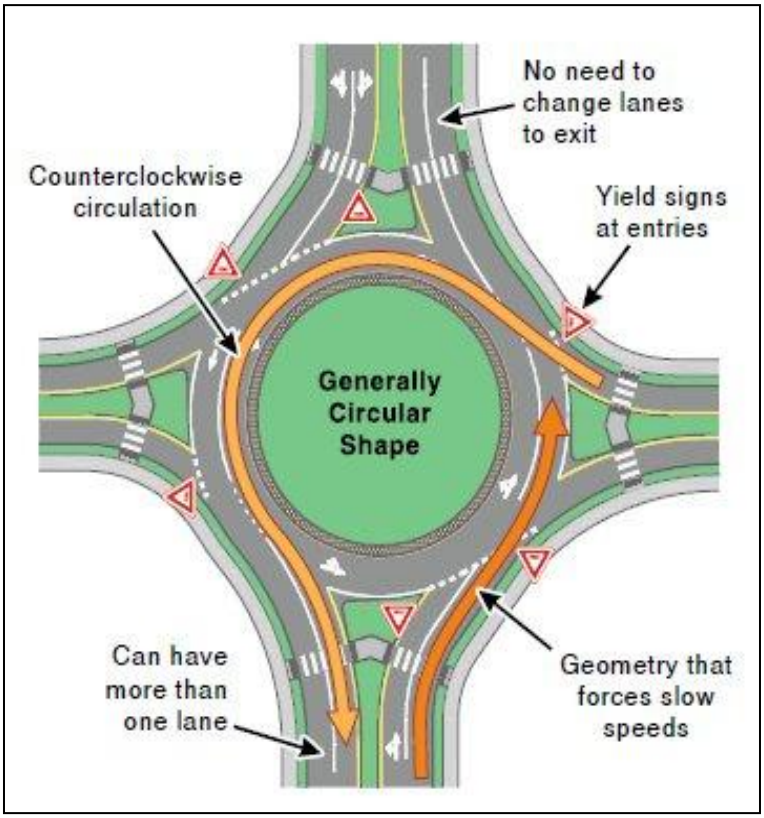
The design characteristics for single-lane and multi-lane roundabouts are similar for desirable maximum entry speeds of up to 20-25 mph for a single-lane roundabout and 25 to 30 mph for a multi-lane roundabout. Both roundabout types allow for a raised central island, which may have traversable aprons for large or long vehicles such as buses and trucks. Multi-lane roundabouts allow for 2 entry points per direction into the roundabout, compared with only 1 entry point for single-lane roundabouts. Single-lane roundabouts have the capacity to handle up to 25,000 vehicles per day and multi-lane roundabouts have the capacity to handle up to 45,000 vehicles per day[14].

The capacity of a roundabout depends on the number of vehicles present at each roundabout entry. The capacity of the entries is computed as a function of the other conflicting approaches. The maximum flow rate that can be accommodated mainly depends on two factors: the circulating flow and the geometric elements of the roundabout.

For planning purposes, the number of roundabout lanes selected would require a detailed operational analysis. Single-lane Roundabouts can be expected to handle a peak hourly flow of between 2,000 to 2,500 vehicles per hour (VPH) while double-lane roundabouts can be expected

to handle from 2,500 to 4,300 VPH. Estimating future turning movements and a reasonable annual growth rate provides a sufficient level of accuracy for planning purposes[15].

Figure 3: Typical Roundabout Design



Source: NCHRP/FHWA Publication[16]

Environmental Benefits

Roundabouts benefit the environment by decreasing vehicle emissions when compared to traditional signed or signalized intersections. Both human and environmental health benefit from vehicles spending less time idling and not starting from a complete stop, which also reduces fuel consumption.

Studies in 2002[17] and 2004[18] by the IIHS demonstrated that roundabout intersections can reduce fuel consumption, when traversing roundabouts, rather than traditional intersections by approximately 30 percent per vehicle on a roundabout intersection for the year. The 2002 and 2004 studies measured vehicle emissions and concluded:

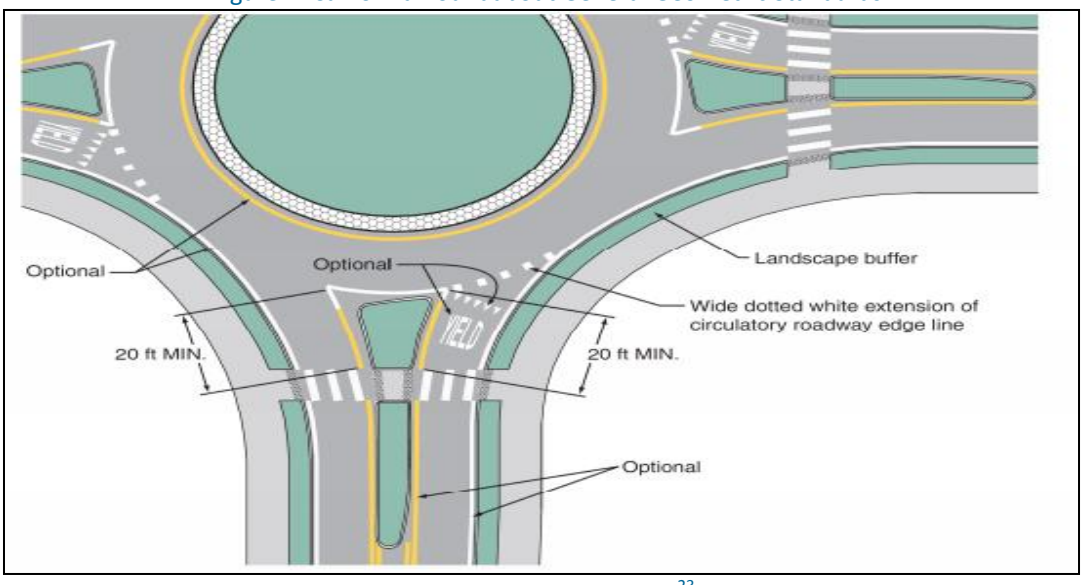
- ✓ 29 percent reduction in carbon monoxide emissions (2002)[19]
- ✓ 37 percent reduction in carbon dioxide emissions (2004)[20]

Design Features for Pedestrians and Bicyclists

Caltrans' Highway Design Manual (HDM) on roundabouts states, "At single-lane approaches and departures, the pedestrian crossing should be located one car length (approximately 24 feet) away from the inscribed circle. At multi-lane approaches and departures, the pedestrian crossing should be located two car lengths (approximately 49 feet) away from the inscribed circle. In all cases, the pedestrian crossing shall be no closer than 19 feet from the inscribed circle."[21]

Pedestrian benefits include a much safer roundabout intersection to cross, compared to signalized intersections. Pedestrians cross only one direction of traffic at a time, with a pedestrian refuge area in the middle of the crossing. The pedestrian refuge area allows for pedestrians to wait for a safe crossing opportunity for traffic coming from the opposite direction. FHWA's, ***Roundabouts: An Informational Guide***"[22] recommends terminating bicycle lanes well before the entrances to allow bicyclists time to merge into the stream of motorized traffic.

Figure 4: California Roundabout General Geometric Standards



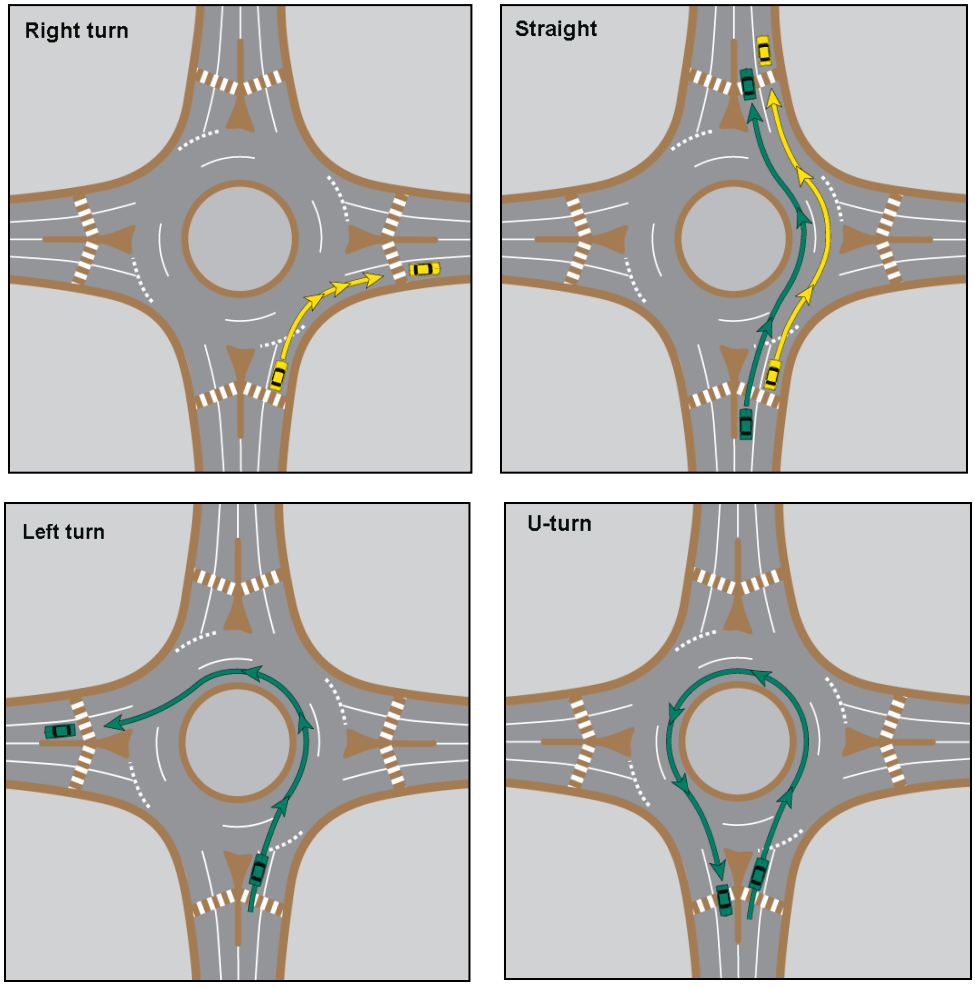
Source: Caltrans 2012 MUTCD[23]

Trucks, Buses, and Oversize Vehicles

Roundabout designs should consider, when applicable, all vehicle sizes from small economy cars to buses, large farm equipment, and semi-trucks with trailers. Roundabouts are commonly designed with a truck apron, a raised section of pavement around the central island that acts as

additional lane width for larger vehicles. The back wheels of oversized vehicles can ride up on the truck apron to navigate the turn; but the apron height deters use by smaller vehicles. In multi-lane roundabouts, oversize vehicles and vehicles with trailers may straddle both lanes or make use of the apron while navigating through a roundabout.

Figure 5: Roundabout Maneuvering



Source: Washington State Department of Transportation (WADOT)[24]

The following table and map identifies the Existing, Programmed, and Planned roundabouts on the California State Highway System:

Roundabout Inventory List
(As of June 2014)

CA State Highway System Roundabout Inventory							
ID	District	CO	RTE	PM	Phase	Location	Page #
Existing							
1	D01	HUM	101	88.803	Complete	U.S. 101 Northbound/Giuntoli Lane	13
2	D01	HUM	101	88.803	Complete	U.S. 101 Southbound/Giuntoli Lane	13
3	D01	MEN	1	59.25	Complete	SR 1/Simpson Lane	16
4	D01	MEN	175	1.14	Complete	SR 175/Main Street/East Side Road	19
5	D01	LAK	20	12.199	Complete	SR 20/Nice-Lucerne Cutoff/Pyle Road	22
6	D02	SHA	5	R004.289	Complete	I-5 Northbound/Deschutes Drive	25
7	D03	NEV	20	R13.614	Complete	SR 20 Westbound/E. Main Street/Idaho Maryland I	28
8	D03	NEV	89	0.494	Complete	SR 89 Eastbound/I-80	31
9	D03	NEV	89	0.54	Complete	SR 89 Westbound/I-80	31
10	D03	NEV	89	R000.826	Complete	SR 89 / Donner Pass Rd	34
11	D03	NEV	89	1.15	Complete	SR 89N/Alder Drive/Prosser Dam Road	37
12	D05	SB	101	12.969	Complete	U.S. 101/Milpas Street	39
13	D05	SB	144	0.87	Complete	SR 144/Five Points	42
14	D05	SB	246	12.27	Complete	SR 246/La Purisima Road	45
15	D06	KER	204	4.779	Complete	SR 204/Chester Avenue	48
16	D07	LA	1	3.613	Complete	SR 1/Lakewood Blvd	51
17	D07	LA	5	R56.749	Complete	I-5 Northbound/Hasley Canyon Road	54
18	D07	LA	5	R56.763	Complete	I-5 Southbound/Hasley Canyon Road	54
19	D07	LA	138	48.461	Complete	SR 138/E. Palmdale Blvd	57
20	D08	RIV	10	R17.501	Complete	I-10 Eastbound/Seminole Drive	60
21	D08	RIV	10	R17.501	Complete	I-10 Westbound/Seminole Drive	60
Programmed							
1	D01	MEN	101	48.750	CON	U.S. 101 Southbound/Main Street	
2	D01	LAK	20	8.337	CON	SR 20/SR 29	
3	D02	SHA	5	R004.289	PS&E	I-5 Southbound/Deschutes Drive	
4	D03	ED	50	18.559	PA/ED	U.S. 50 Westbound/Placerville Drive	
5	D03	ED	50	18.559	PA/ED	U.S. 50 Eastbound/Forni Road	
6	D03	PLA	28	9.72	PS&E	SR 28/Bear Street	
7	D03	PLA	28	9.9	PS&E	SR 28/Coon Street	
8	D03	SAC	99	3.525	PA/ED	SR 99 SB/SR 104/Twin Cities Road	
9	D03	SAC	99	3.525	PA/ED	SR 99 NB/SR 104/Twin Cities Road	
10	D03	YOL	128	9.014	PS&E	SR 128/Walnut Lane	
11	D04	SOL	12	19.163	PA/ED	SR 12/SR 113	
12	D04	SON	116	46.721	PA/ED	SR 116/SR 121	
13	D04	ALA	880	28.687	CON	I-880/29th Street	
14	D05	SB	101	3.06	PS&E	U.S. 101/Ogan Road	
15	D05	SB	217	2.3	PS&E	SR 217/Hollister Avenue	
16	D05	SB	246	R34.601	CON	SR 246/SR 154	
17	D05	SLO	1	10.9	PA/ED	SR 1/Halcyon Road	
18	D05	SLO	46	R21.940	ROW	SR 46/West U.S. 101	

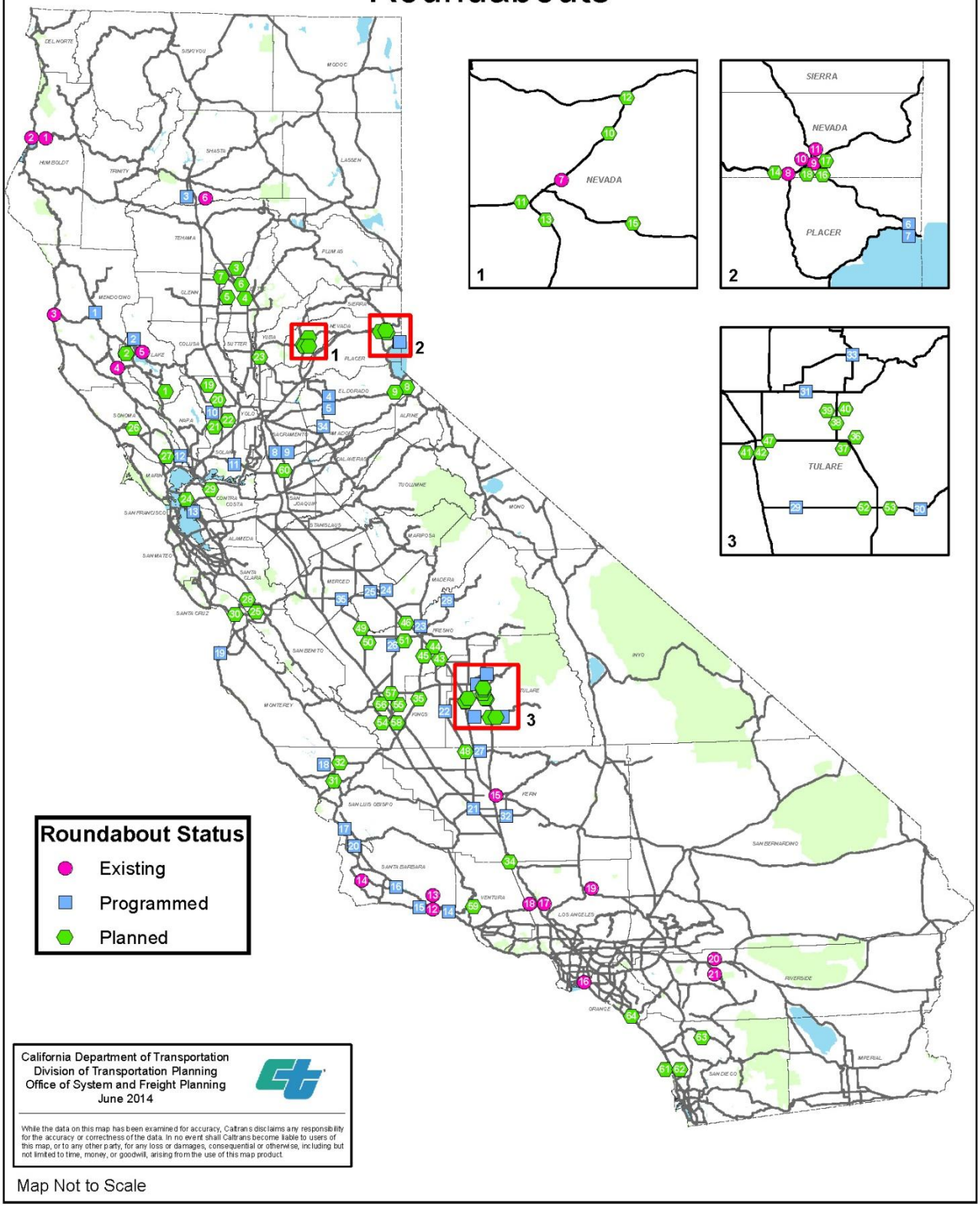
Roundabout Inventory List
(As of June 2014)

19	D05	MON	68	L4.22	PS&E	SR 68/17 Mile Drive
20	D05	SB	166	4.82	PA/ED	SR 166/Black Road
21	D06	KER	43	0.111	PA/ED	SR 43/SR 119/Enos Lane
22	D06	KIN	43	1.456	PA/ED	SR 43/SR 137/Whitley Avenue
23	D06	FRE	99	23.652	PA/ED	SR 99 Northbound/McKinley Avenue
24	D06	MAD	99	26.323	PA/ED	SR 99 Northbound/SR 233
25	D06	MAD	99	26.728	PA/ED	SR 99 Southbound/SR 233
26	D06	FRE	145	33.129	CON	SR 145/Jensen Avenue
27	D06	KER	155	1.46	PA/ED	SR 155/Browning Avenue
28	D06	FRE	168	T30.201	PA/ED	SR 168/Auberry Road
29	D06	TUL	190	4.44	PA/ED	SR 190/Bliss Lane/Road 152
30	D06	TUL	190	21.1	PS&E	SR 190/Road 284
31	D06	TUL	198	R14.6	PS&E	SR 198 Eastbound/Farmersville Road
32	D06	KER	223	R16.014	PA/ED	SR 223/SR 184/Wheeler Ridge Road
33	D06	TUL	245	7.066	PS&E	SR 245/SR 216
34	D10	AMA	49	19.412	PS&E	SR 49/Main Street
35	D10	MER	33	5.6	PA/ED	SR 33/SR 140
Planned						
1	D01	LAK	29	9.87	PID	SR 29/Hartmann Road
2	D01	LA	20	7.444	PID	SR 20/SR 53
3	D03	BUT	99	R36.250	Conceptual	SR 99/Eaton Road
4	D03	BUT	32	R8.367	Conceptual	SR 32 (Nord Avenue)/West 1st Avenue
5	D03	BUT	32	7.71	Conceptual	SR 32 (Nord Avenue)/West Sacramento Avenue
6	D03	BUT	32	7.092	Conceptual	SR 32 (Nord Avenue)/West 8th Avenue
7	D03	BUT	32	6.436	Conceptual	SR 32 (Nord Avenue)/West Lindo/Glenwood Avenue
8	D03	ED	50	70.62	Conceptual	U.S. 50/SR 89
9	D03	ED	50	71	Conceptual	U.S. 50/Apache
10	D03	NEV	20	R15.947	Conceptual	SR 20/Gold Flat Road/Ridge Road
11	D03	NEV	20	R11.960	Conceptual	SR 20/McCourtney Road
12	D03	NEV	20	R17.398	Conceptual	SR 20/Uren Street
13	D03	NEV	49	13.664	Conceptual	SR 49/McKnight Way
14	D03	NEV	80	13.127	Conceptual	I-80 Eastbound/Cold Stream Road
15	D03	NEV	174	6.83	Conceptual	SR 174/Brunswick Road
16	D03	NEV	267	M01.419	Conceptual	SR 267/Brockway Road/Soaring Way
17	D03	NEV	267	M0.066	Conceptual	SR 267/I-80 Eastbound
18	D03	NEV	267	M0.000	Conceptual	SR 267/I-80 Westbound
19	D03	YOL	16	28.266	Conceptual	SR 16/S. County Road 21A
20	D03	YOL	16	29.76	Conceptual	SR 16/N. Woodland Ave
21	D03	YOL	128	8.906	Conceptual	SR 128/Dutton Street
22	D03	YOL	128	9.149	Conceptual	SR 128/Morgan Street
23	D03	YUB	70	R9.092	Conceptual	SR 70/Powerline Road
24	D04	ALA	80	6.648	Conceptual	I-80/Gilman Street
25	D04	SCL	101	2.466	Conceptual	US 101/SR 237

Roundabout Inventory List
(As of June 2014)

26	D04	SON	116	19.399	Conceptual	SR 116/Mirabel Road
27	D04	SON	116	46.755	Conceptual	SR 116/SR 121/Fremont
28	D04	SCL	152	6.998	Conceptual	SR 152/SR 237
29	D04	CC	242	R0.766	Conceptual	SR 242/Clayton Road
30	D05	SCR	152	T002.503	PID	SR 152/Freedom Blvd
31	D05	SLO	101	48.331	Conceptual	U.S. 101/Del Rio Road
32	D05	SLO	46	31.8	Conceptual	SR 46/Union Road
33	D06	KER	5	R0.109	Conceptual	I-5 Northbound/Frazier Mountain Park
34	D06	KER	5	R0.119	Conceptual	I-5 Southbound/Frazier Mountain Park
35	D06	KIN	41	34.69	Conceptual	SR 41/Kansas Avenue
36	D06	TUL	65	29.489	Conceptual	SR 65/Hermosa Street
37	D06	TUL	65	30.34	Conceptual	SR 65/Avenue 232
38	D06	TUL	65	34.56	Conceptual	SR 65/Avenue 256
39	D06	TUL	65	36.8	Conceptual	SR 65/Avenue 268
40	D06	TUL	65	37.58	Conceptual	SR 65/Avenue 280/Rocky Hill Drive
41	D06	TUL	99	27.53	Conceptual	SR 99 Northbound/Paige Avenue
42	D06	TUL	99	27.718	Conceptual	SR 99 Southbound/Paige Avenue
43	D06	FRE	99	R3.742	Conceptual	SR 99/Mountain View Avenue
44	D06	FRE	99	10.891	Conceptual	SR 99 Northbound/Merced Street
45	D06	FRE	99	11.376	Conceptual	SR 99 Southbound/Merced Street
46	D06	MAD	99	R0.989	Conceptual	SR 99/Avenue 7
47	D06	TUL	137	18.46	Conceptual	SR 137/Oakmore Street
48	D06	KER	155	R0.470	Conceptual	SR 155/Lexington Street
49	D06	FRE	180	23.5	Conceptual	SR 180/SR 33
50	D06	FRE	180	24.2	Conceptual	SR 190/9th Street
51	D06	FRE	180	47.65	Conceptual	SR 180/Dickenson Avenue
52	D06	TUL	190	13.45	PID	SR 190/Westwood Road
53	D06	TUL	190	16.97	PID	SR 190/Plano Street
54	D06	KIN	269	0.911	Conceptual	SR 198 Westbound/Hanford Armona Road
55	D06	FRE	269	8.644	Conceptual	SR 269/Tornado Avenue
56	D06	FRE	269	8.924	Conceptual	SR 269/Myrtle Avenue/4th Street
57	D06	FRE	269	9.647	Conceptual	SR 269/Palmer Avenue
58	D06	KIN	269	0.911	Conceptual	SR 269/San Joaquin Street
59	D07	VEN	150	16.577	Conceptual	SR 33/SR 150
60	D10	SJ	99	31.3	PID	SR 99 Southbound/Turner Road/Cherokee Lane
61	D11	SD	5	R39.83	Conceptual	I-5 Northbound/Birmingham Drive
62	D11	11	5	R39.83	Conceptual	I-5 Southbound/Birmingham Drive
63	D11	SD	76	32.87	Conceptual	SR 76/Valley Center Road
64	D12	ORA	5	8.44	Conceptual	I-5 Northbound/Valle Road

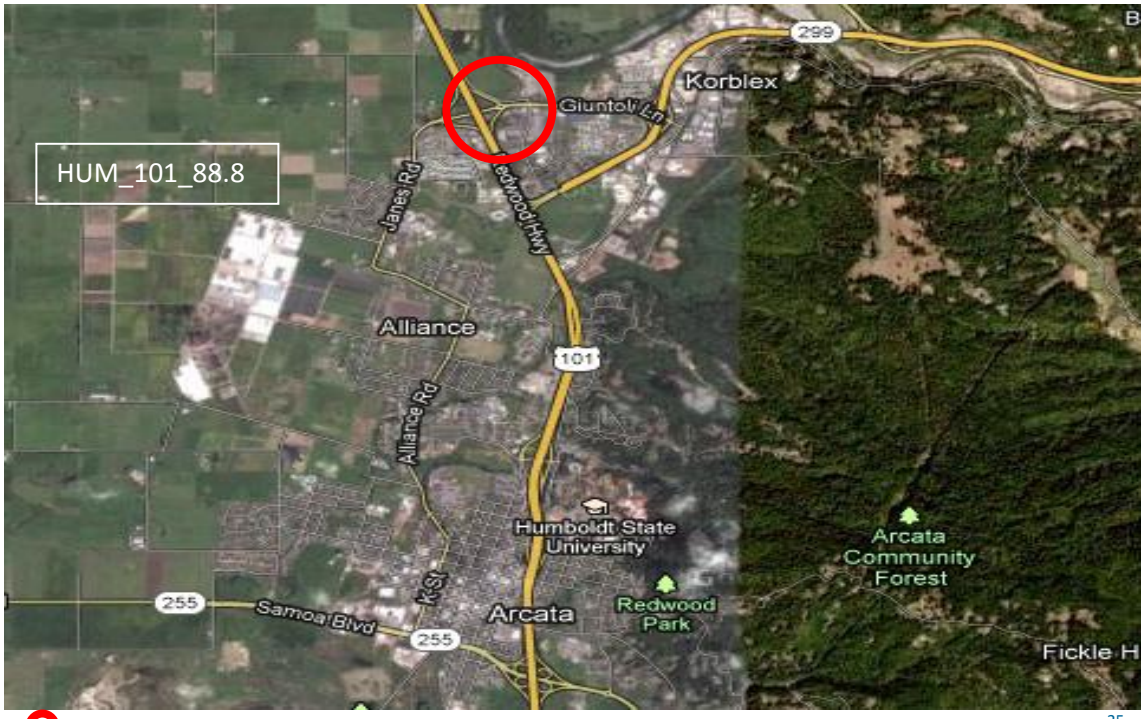
California State Highway System Roundabouts



District 1

US 101 and Guintoli Lane

Humboldt County
Arcata, CA



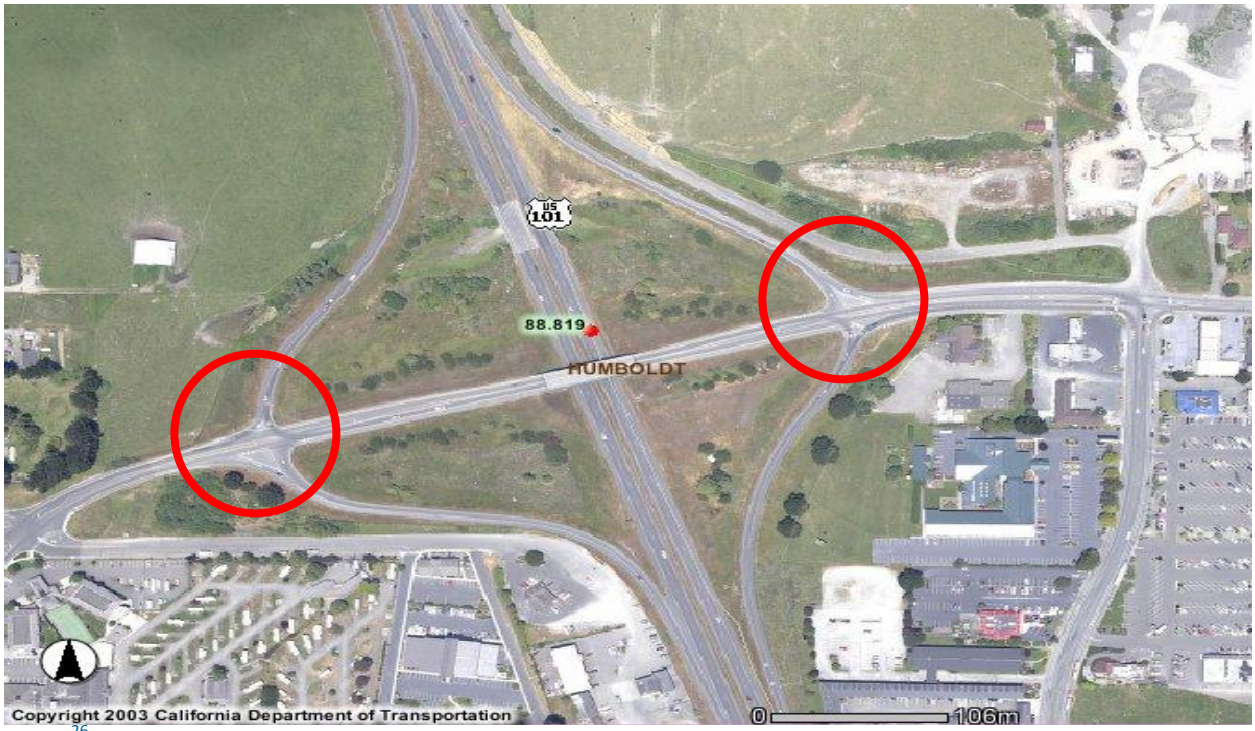
= Project Area

Regional View/HUM_101_88.803 [25]

History

In 2001, Caltrans evaluated building roundabouts at the intersections for both eastbound and westbound on- and off-ramps at Guintoli Lane where there were two, four-way stop sign intersections. Caltrans evaluated the traffic volumes for signalization, and determined that the intersections did not meet signal warrants; however, a roundabout would be permissible.

In 2002, the **City of Arcata** asked Caltrans to coordinate with the local agency and the local community on the development of dual roundabouts on eastbound and westbound Guintoli Lane at U.S. Route 101. Construction was completed in 2004 for the dual roundabouts. Caltrans monitors and maintains the roundabouts.



Before [26] District 1, Humboldt County, Arcata, CA - U.S. Route 101 and Guintoli Lane

After [27] District 1, Humboldt County, Arcata, CA - U.S. Route 101 and Guintoli Lane

Ground View [28] District 1, Humboldt County, Arcata, CA - U.S. Route 101 and Guintoli Lane

District 1

State Route 1 and Simpson Lane

Mendocino County
Fort Bragg, CA

= Project Area

Region View/MEN_1_59.250[29]

History

The purpose of the **Simpson Lane Intersection Project** was to enhance safety and reduce travel delays at the intersection of State Route (SR) 1 and Simpson Lane in Mendocino county. The project was initiated due to lengthy delays and safety concerns associated with persistent congestion at the intersection. Caltrans coordinated with local agency staff and the community to select a multi-lane roundabout as the preferred project alternative. Construction of the Simpson Lane roundabout was completed in November 2011.

Before [30] District 1, Mendocino County, Fort Bragg, CA – SR 1 and Simpson Lane

After [31] District 1, Mendocino County, Fort Bragg, CA – SR 1 and Simpson Lane

Ground View [32] District 1, Mendocino County, Fort Bragg, CA - SR 1 and Simpson Lane

District 1

State Route 175 and Main Street

Mendocino County
Hopland, CA

= Project Area

Regional View/MEN_175_1.140[33]

History

In 2006, the **City of Hopland** coordinated with Caltrans on the development of a roundabout at the intersection of Main Street and SR 175 to replace a three-way stop controlled intersection. The need was to improve safety. Caltrans evaluated the intersection and concluded that improved access to SR 175 was needed but did not warrant a signalized intersection, but a roundabout was permissible and deemed viable. Construction was completed in 2008.

Before [34] District 1, Mendocino County, Hopland, CA - SR 175 and Main Street

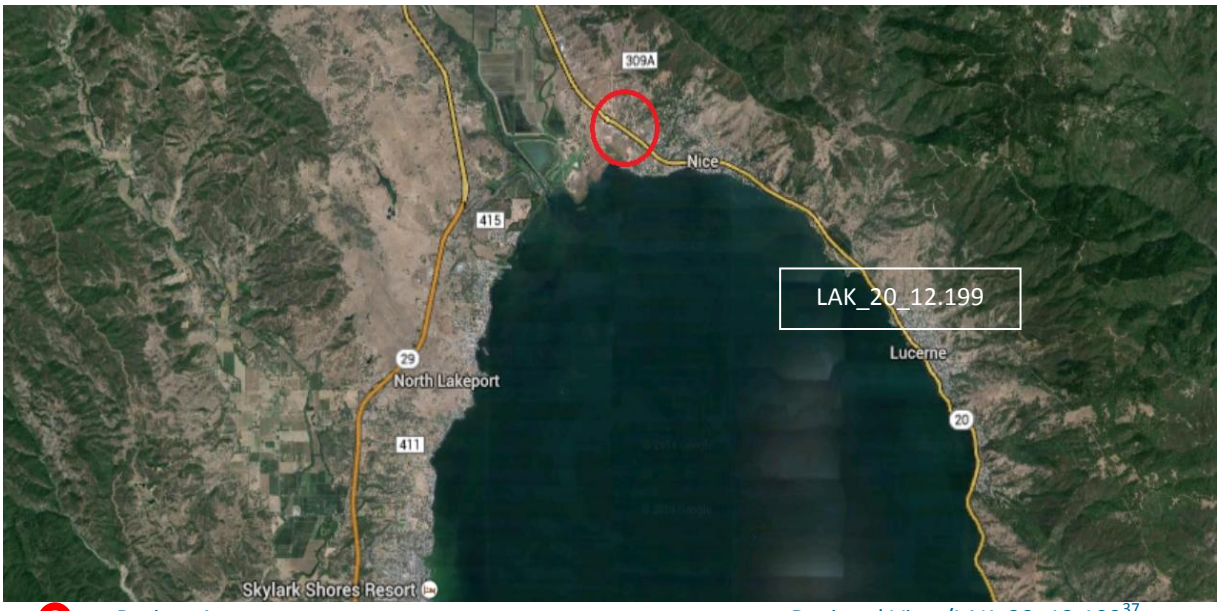
After [35] District 1, Mendocino County, Hopland, CA - SR 175 and Main Street

Ground View [36] District 1, Mendocino County, Hopland, CA - SR 175 and Main Street

District 1

State Route 20 and Nice-Lucerne Cutoff

Lake County
Nice, CA



= Project Area

Regional View/LAK_20_12.199[37]

History

In 2007 the State Route 20/Lucerne Cutoff Intersection Project was initiated to improve safety. Caltrans evaluated both a signalized intersection and a single lane roundabout. Caltrans held an open house informational meeting in May of 2008 to engage local stakeholders and gauge community support for the roundabout alternative. Many residents who originally opposed the installation of a roundabout became supporters of the project after learning of the safety benefits. Installation of the roundabout also helped The Lake County Regional Development Agency achieve a safety goal outlined in the 2005 North Shore Traffic Calming and Beautification Plan.

Before[38] District 1, Lake County, Nice, CA - SR 20/Nice-Lucerne Cutoff

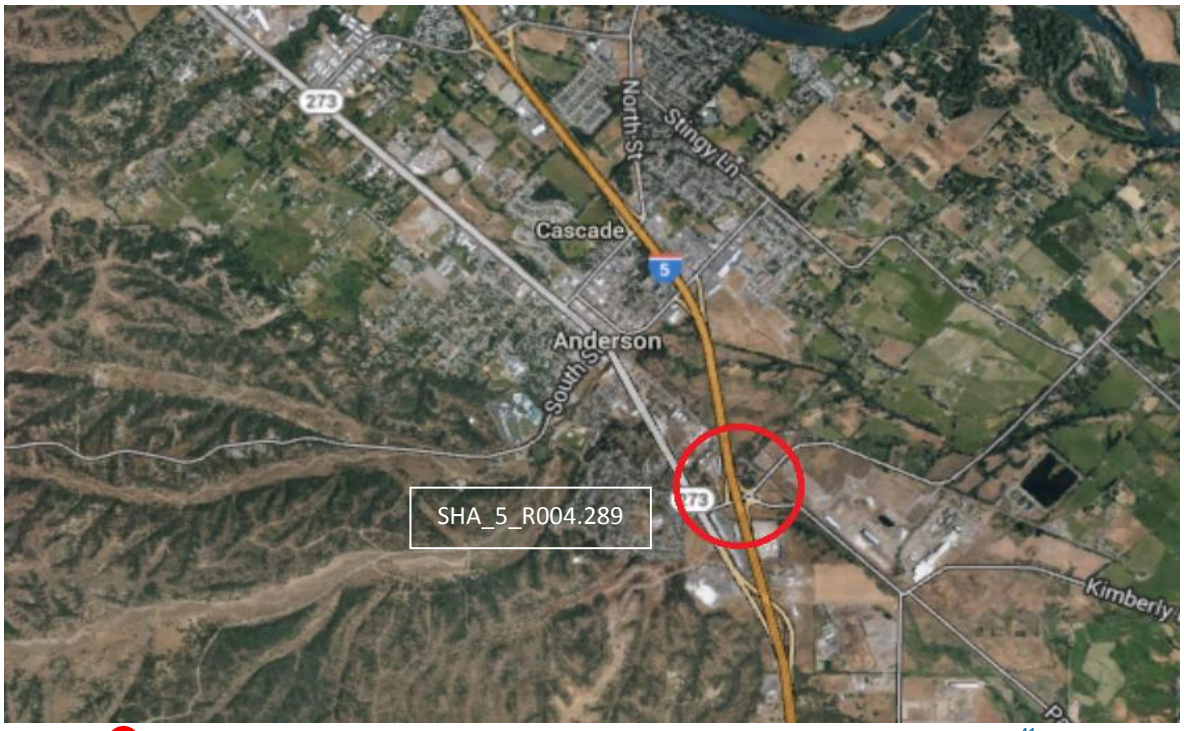
After[39] District 1, Lake County, Nice, CA - SR 20/Nice-Lucerne Cutoff

Ground View[40] District 1, Lake County, Nice, CA - SR 20/Nice-Lucerne Cutoff

District 2

I-5 NB and Deschutes Drive

Shasta County
City of Anderson



= Project Area

Regional View/SHA_5_R004.289[41]

History

As originally constructed, the I-5/Deschutes Road interchange did not provide a northbound off-ramp or a southbound on-ramp (these moves were accommodated at the I-5/SR 273 interchange approximately one-half mile to the south). During development of the Anderson Market Place in the **City of Anderson** between 2002 and 2005, traffic analysis showed that improvements would be necessary to the existing interchange at I-5/Deschutes Road.

The Anderson City Council unanimously determined that a new northbound off-ramp and roundabout at the I-5/Deschutes Road interchange would best accommodate commercial and industrial development in the southern portion of the city (approximately 85 percent of the City's growth is expected in this area). In 2005, the City of Anderson enacted a development impact fee program for the needed improvements. Initial project development work was funded with developer impact fees while construction of the northbound ramp and roundabout was funded by the Corridor Mobility Improvement Account (Proposition 1B). The project ribbon-cutting was in October 2013.

Before[42] District 2, Shasta County, City of Anderson/I-5 and Deschutes Drive

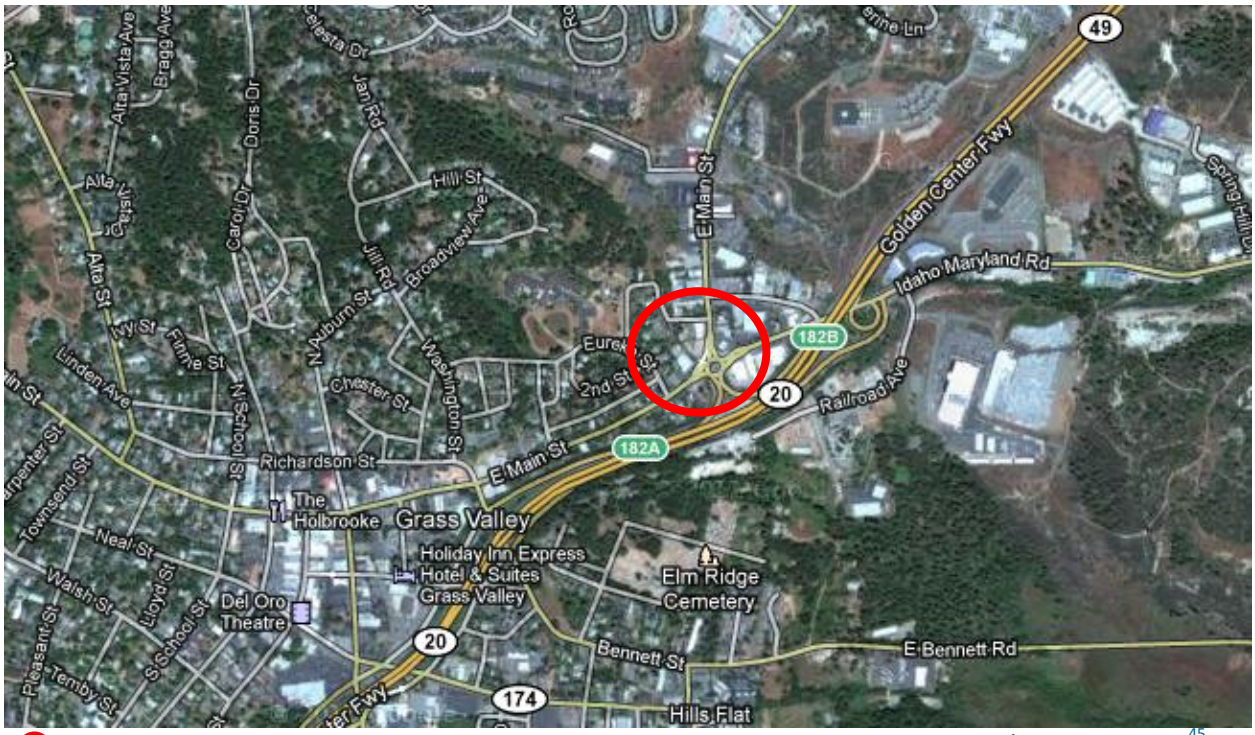
After[43] District 2, Shasta County, City of Anderson/I-5 and Deschutes Drive

Ground View[44] District 2, Shasta County, City of Anderson/I-5 and Deschutes Drive

District 3

State Route 20 and E. Main Street

Nevada County
Grass Valley, CA State



= Project Area

Regional View/NEV_20_13.631[45]

History

In 2007 an initial study was prepared by the **City of Grass Valley** to improve the intersection of East Main Street and Idaho-Maryland Road. A project was needed to improve operations of the intersection and freeway which were operating at an unacceptable Level of Service (LOS).

Caltrans and the City of Grass Valley worked in coordination to develop a roundabout, including a southbound-to-westbound bypass lane and dual entry lanes for the Idaho-Maryland approach. This concept was determined by Caltrans and the city to be the only viable improvement that met the goals of providing acceptable operation of both the intersection and the freeway. Construction of the partial dual-lane roundabout was completed in 2008 and is maintained by the City of Grass Valley.

Before [46] District 3, Nevada County, Grass Valley, CA - SR 20 and Main Street

After [47] District 3, Nevada County, Grass Valley, CA - SR 20 and Main Street

Ground View [48] District 3, Nevada County, Grass Valley, CA - SR 20 and Main Street

District 3

State Route 89 EB/WB and I-80

Nevada County
Town of Truckee, CA

= Project Area

Regional View/NEV_80_R000.826 and R000.751[49]

History

In 2001, Caltrans proposed the installation of traffic signals at the ramp intersection of I-80 and SR 89 in 2001, but the **Town of Truckee** officials opposed the idea.

As an alternative, the Town of Truckee proposed the preparation of a study to determine the feasibility of constructing roundabouts in lieu of signals, which was consistent with the Town of Truckee General Plan. This plan promotes the use of roundabouts rather than signals at major intersections when feasible. Caltrans and the Town of Truckee agreed to use the money initially dedicated to traffic signals toward the dual roundabouts project. Traffic studies indicated the need for dual left turn lanes to the WB on-ramp, for future recreational peaks, but local concerns eliminated this feature. In 2005, the SR 89/ I-80 Diamond Interchange Dual Roundabouts project was completed in Truckee and opened to the public. Caltrans monitors and maintains both roundabouts, which at the time of completion were the first of their kind in Northern California.

Before [50] District 3, Nevada County, Town of Truckee, CA – I-80 SB and NB

After [51] District 3, Nevada County, Town of Truckee, CA – I-80 SB and NB

Ground View [52] District 3, Nevada County, Town of Truckee, CA – I-80 SB and NB

District 3

State Route 89 and Donner Pass Road

Nevada County
Town of Truckee, CA

= Project Area

Regional View/NEV_89_.826[53]

History

In 2006, the **Town of Truckee** proposed the construction of a partial two-lane roundabout at the intersection of SR 89 North at Donner Pass Road in the Town of Truckee. This roundabout, along with a second proposed roundabout approximately three-tenths of a mile north on SR 89, were to be constructed simultaneously to improve operations as a result of increased development along this stretch of highway. These roundabouts were constructed in 2007.

Before [54] District 3, Nevada County, Town of Truckee, CA - SR 89N/Donner Pass Road

After [55] District 3, Nevada County, Town of Truckee, CA - SR 89N/Donner Pass Road

Ground View [56] District 3, Nevada County, Town of Truckee, CA - SR 89N/Donner Pass Road

District 3

Nevada County
Town of Truckee

State Route 89 and Alder Drive

= Project Area

Regional View/NEV_89_1.150[57]

History

In 2006, the **Town of Truckee** proposed the construction of a single-lane roundabout at the intersection of SR 89 North at Alder Drive-Prosser Dam Road in the Town of Truckee. Caltrans and the Town of Truckee agreed to develop the roundabout in conjunction with other developed roundabouts on SR 89. The three roundabouts would be approximately three-tenths of a mile apart on SR 89 and were originally submitted to Caltrans as one major project to be constructed simultaneously. Construction on the third roundabout was completed in October 2011.

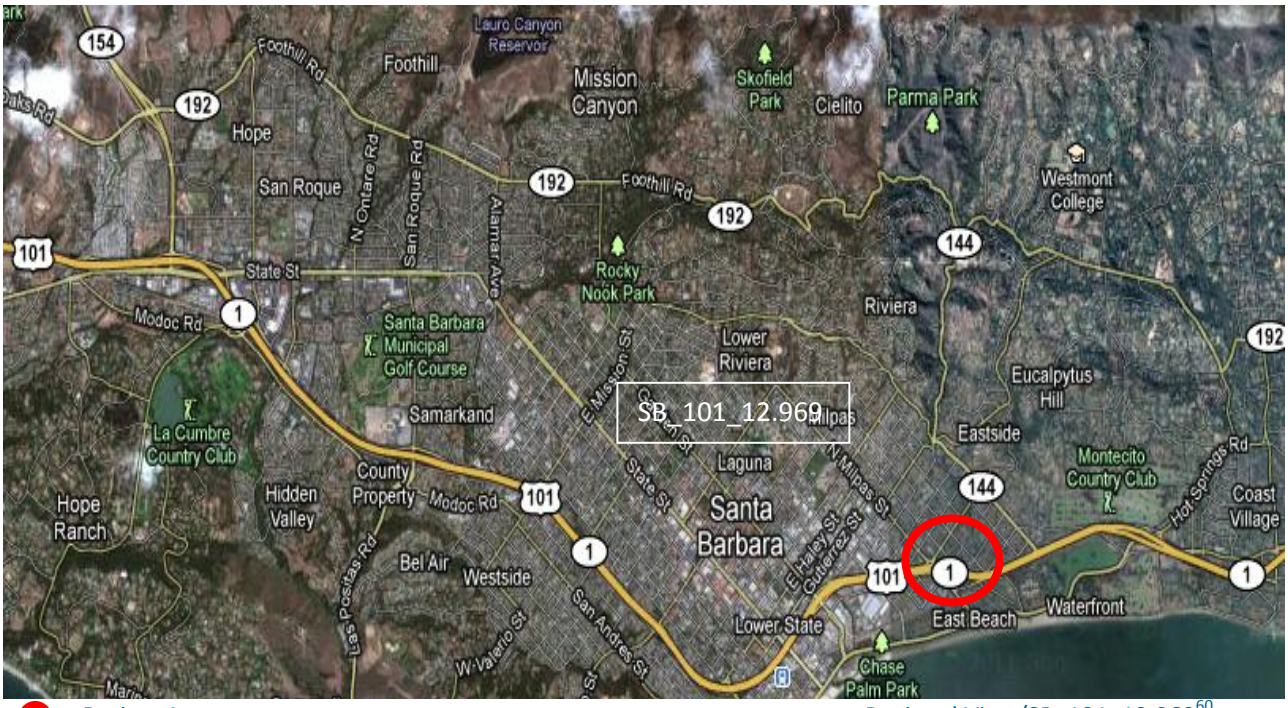
Before [58] District 3, Nevada County, Town of Truckee – SR 89N/Alder Drive/Prosser Dam

Ground View [59] District 3, Nevada County, Town of Truckee – SR 89N/Alder Drive/Prosser Dam

District 5

US 101 and Milpas Street

Santa Barbara County
City of Santa Barbara



= Project Area

Regional View/SB_101_12.969[60]

History

Caltrans transferred ownership from the State to the City, a portion of SR 144 (Milpas Street/U.S. 101 to Salinas Street) to the **City of Santa Barbara** in 1999. In 2000, the City of Santa Barbara constructed a roundabout at a formerly five-leg signalized intersection. The oblong roundabout on Milpas Street/U.S. 101 interchange consists of a yield-controlled five-legged roundabout that connects Milpas Street with Carpinteria Street and U.S. 101 northbound ramps.

Before [61] District 5, Santa Barbara County, City of Santa Barbara – US 101SB/Milpas Street

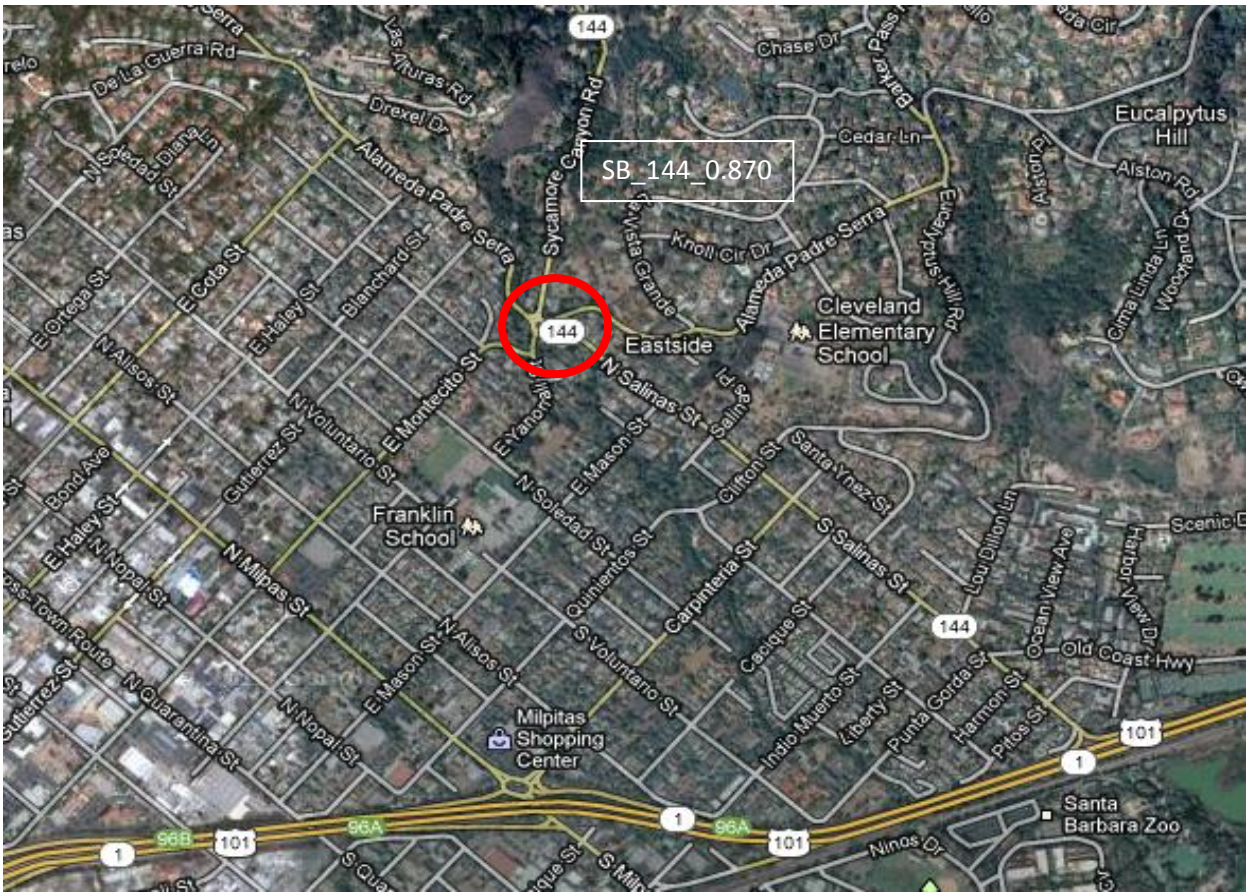
After [62] District 5, Santa Barbara County, City of Santa Barbara – US 101SB/Milpas Street

Ground View [63] District 5, Santa Barbara County, City of Santa Barbara – US 101SB/Milpas Street

District 5

Santa Barbara County
Santa Barbara, CA

State Route 144 and Five Points

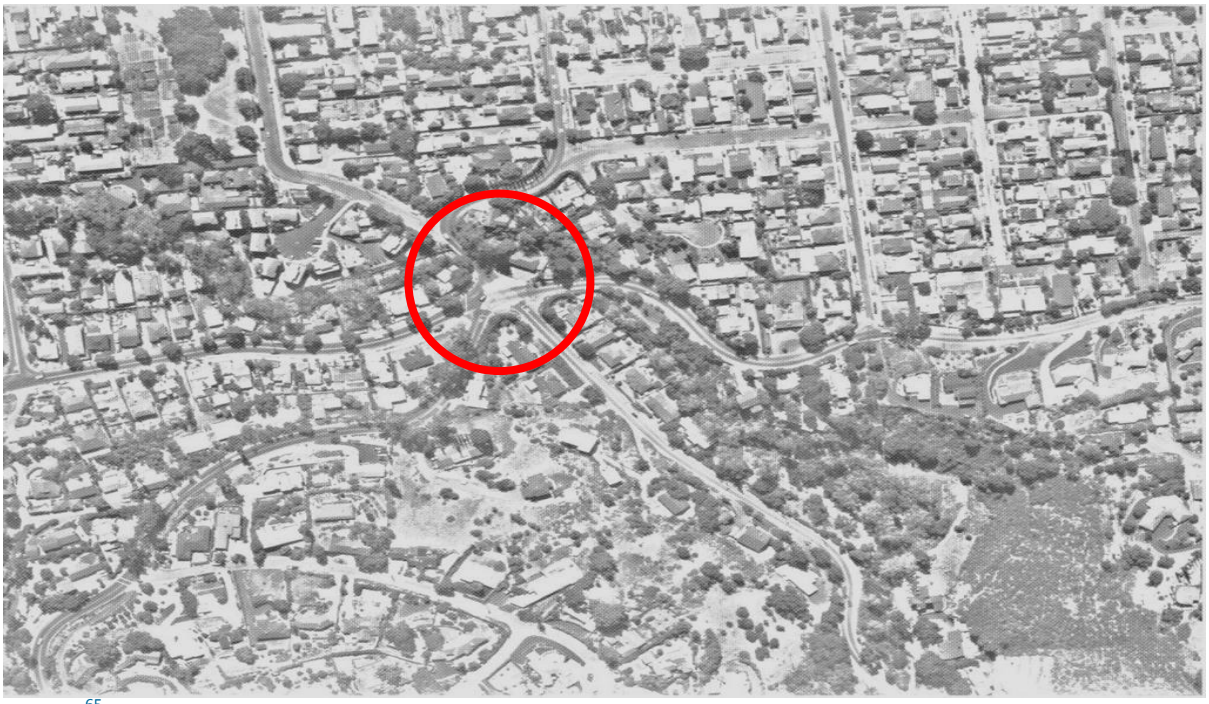


= Project Area

Region View/SB_144_0.870[64]

History

The **City of Santa Barbara** constructed a roundabout in 1992 at the intersection of Alameda Padre Serra, Route 144 (Salinas Street), Montecito Street, and Route 144 (Sycamore Canyon Road). Caltrans transferred ownership from the State to the City, a portion of SR 144 (Salinas Street) to the City of Santa Barbara. Currently, SR 144 (Sycamore Canyon Road) begins at the edge of the roundabout. The intersection experienced operational problems due to delay and confusion over who had the right of way. By placing a roundabout at the intersection it provided operational improvements for vehicles, pedestrians, and bicyclists.



Before [65] District 5, Santa Barbara County, Santa Barbara, CA – SR 144 and Five Points

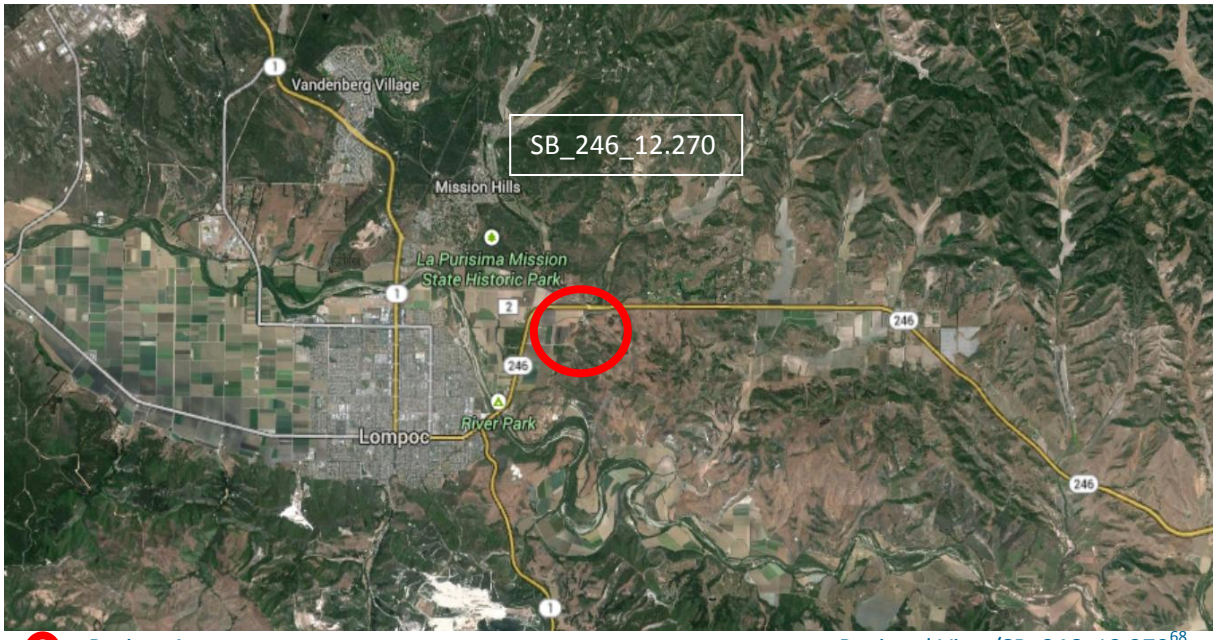
After [66] District 5, Santa Barbara County, Santa Barbara, CA – SR 144 and Five Points

Ground View [67] District 5, Santa Barbara County, Santa Barbara, CA – SR 144 and Five Points

District 5

State Route 246 and La Purisima Road

Santa Barbara County
Lompoc, CA



= Project Area

Regional View/SB_246_12.270[68]

History

The existing intersection was realigned in 1982 from a 10° skew angle to a 75° skew angle prior to the roundabout project. The tee intersection was un-signalized with the Purisima Road approach stop-controll situated in a rural location. Channelization existed on State Route 246 with a left-turn lane on the eastbound approach and a right-turn lane on the westbound approach. There was a short median refuge area in the eastbound direction to accommodate vehicles turning left from the Purisima Road onto eastbound State Route 246.

The roundabout project was initialed in March 2008 as part of the Safety Improvement Program to improve the safety at the intersection by reducing the potential for broadside collisions and severity of the collisions. A striped island was also added on the westbound approach separating the right-turn lane and the westbound through lane.

Before [69] District 5, Santa Barbara County, City of Lompoc – SR 246/La Purisima Road

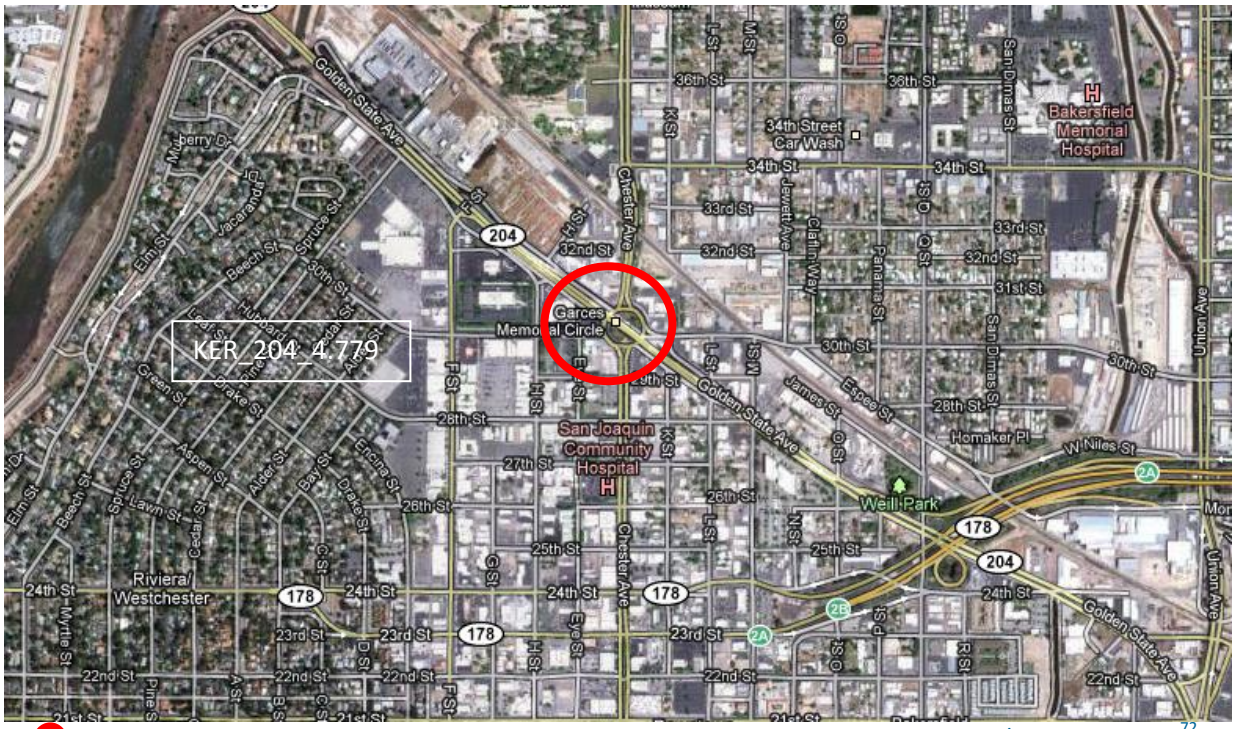
After [70] District 5, Santa Barbara County, City of Lompoc – SR 246/La Purisima Road

Ground View [71] District 5, Santa Barbara County, City of Lompoc – SR 246/La Purisima Road

District 6

State Route 204 and Chester Avenue

Kern County
City of Bakersfield, CA



= Project Area

Regional View/KER_204_4.779[72]

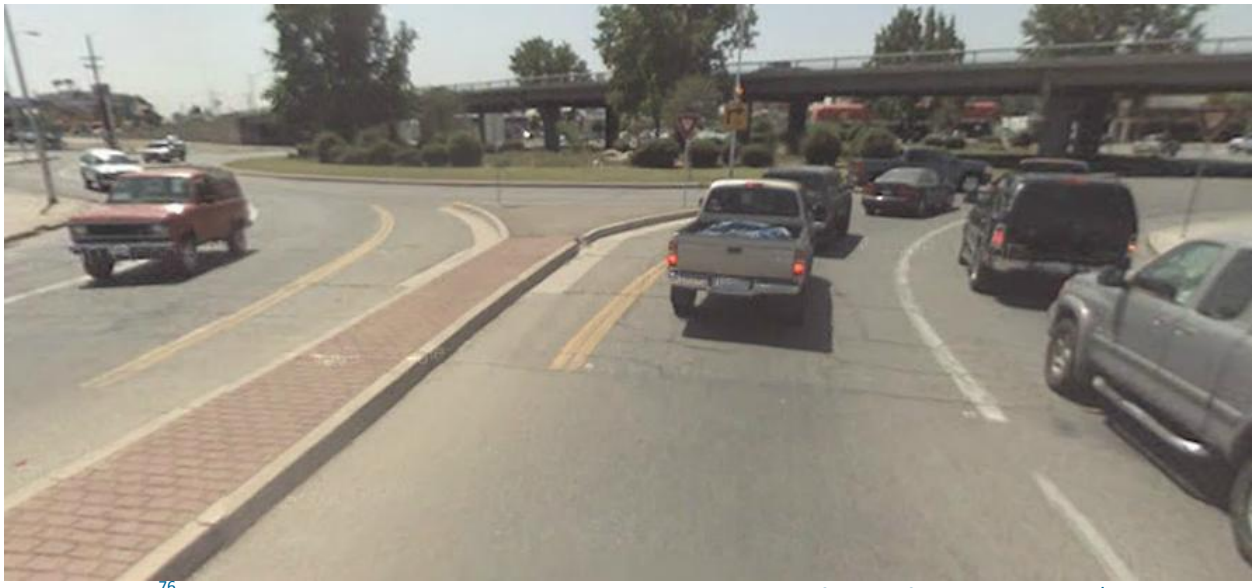
History

In 1935, the **Garces Traffic Circle** was constructed[73], along with the development of SR 99 in Kern County. The traffic circle is located at the intersection of Chester Avenue, Golden State Avenue (now SR 204) and 30th Street.

After its construction, residents of the city saw the circle's promise as a gateway to the city and through the Works Progress Administration, Artist Juan Paulo-Kangas was commissioned to create a statue/memorial to Garces at the center of the circle. The statue and traffic circle are listed as California State Historical Landmark #277. The traffic circle is not considered a roundabout because a stop sign is placed at an entry point.

Before [74] District 6, Kern County, City of Bakersfield, CA – SR 204/Chester Ave

After [75] District 6, Kern County, City of Bakersfield, CA – SR 204/Chester Ave

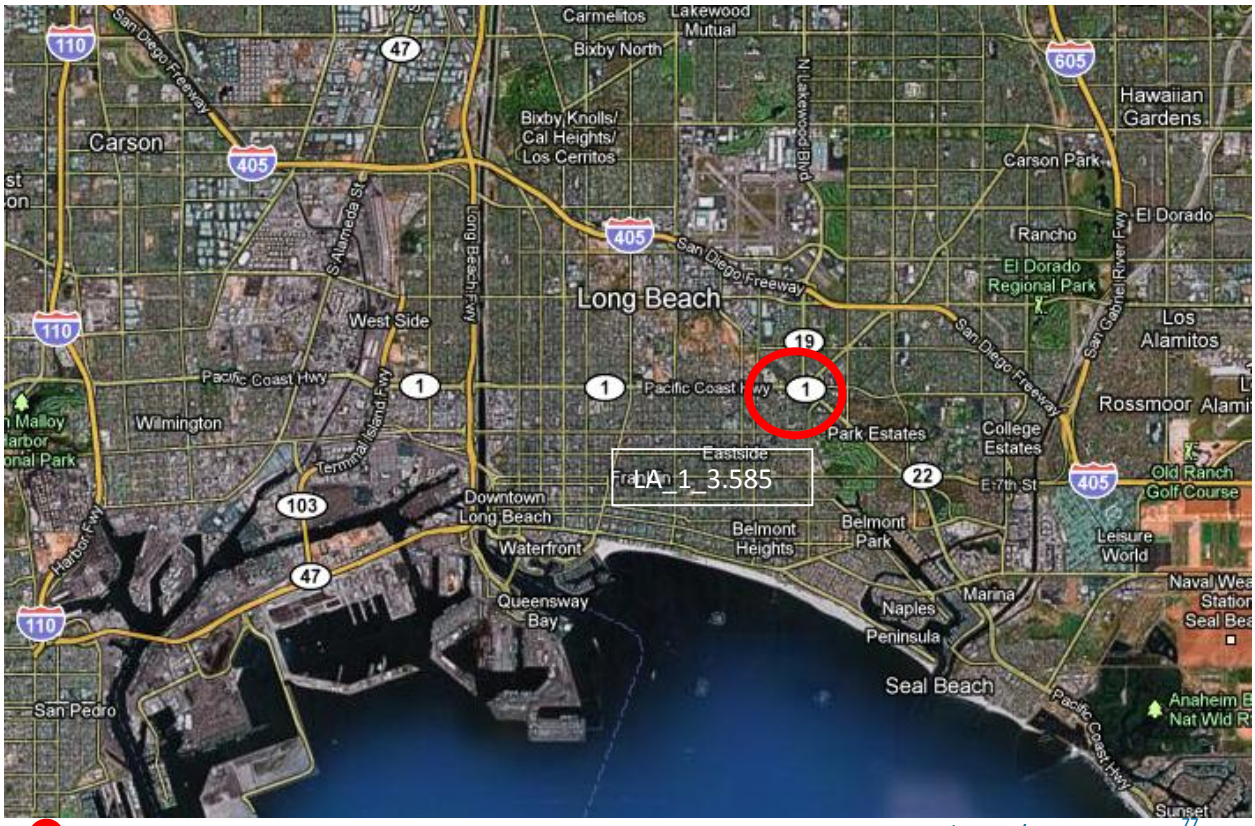


Ground View [76] District 6, Kern County, City of Bakersfield, CA – SR 204/Chester Ave

District 7

Los Angeles County
Long Beach, CA

State Route 1 and Lakewood Blvd.



= Project Area

Regional View/LA_001_3.585[77]

History

In 1993, the intersection of Lakewood Boulevard (SR 19), Pacific Coast Highway (SR 1), and Los Coyotes Diagonal in **Long Beach**, was converted from a traffic circle to a roundabout. This conversion included modifications to each of its entries and exits, including Yield signs (replacing Stop signs) to increase the speed and ease of traffic entering and exiting the circle and reducing the waiting time to enter. Also added were wider lanes, redundant traffic signs, and devoted lanes for traffic traveling only 90 of the 360 degrees of the circle. After the conversion, both the total auto accident and injury rates dropped significantly. The roundabout handles over 60,000 vehicles a day.

Before [78] District 7, Los Angeles County, Long Beach, CA - SR 1/Lakewood Blvd

After [79] District 7, Los Angeles County, Long Beach, CA - SR 1/Lakewood Blvd

Ground View [80] District 7, Los Angeles County, Long Beach, CA - SR 1/Lakewood Blvd

District 7

I-5 NB/SB and Hasley Canyon Road

Los Angeles County
Santa Clarita, CA

= Project Area

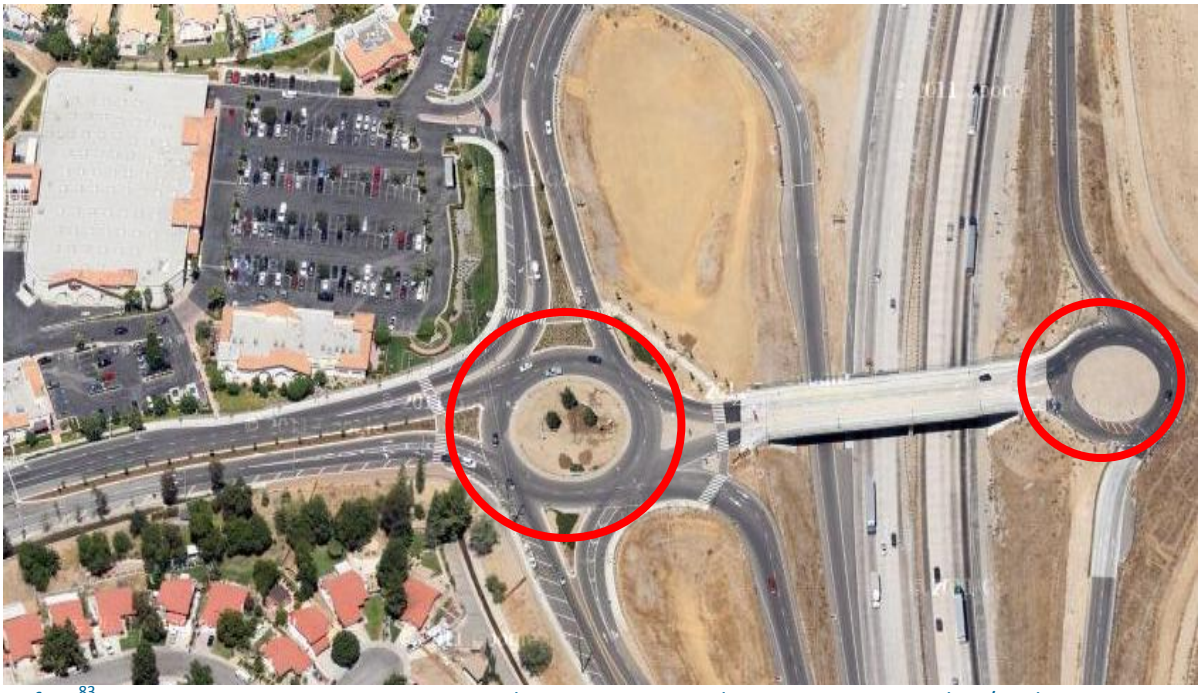
Regional View/LA_005_R56.763[81]

History

In 1968, the **I-5 interchange with Hasley Canyon Road in Castaic** was designed as a tight diamond with a two-lane overcrossing. Growth in the northern Santa Clarita-Castaic area was projected to create high traffic demand exceeding capacity at the Hasley Canyon Road by 2020. A partnership, including the Valencia Company, Los Angeles County, FHWA, and Caltrans recognized that the growing traffic demand could not be accommodated by the existing interchange, and the Valencia Company commissioned a study of various alternatives for increasing the capacity of the interchange. It was determined that a hybrid design, including a dual roundabout combined with southbound I-5 hook on- and off-ramps to The Old Road/Sedona Way would be the preferred alternative.

In 2007, construction of the roundabout commenced. Construction of the project included the multi-lane roundabouts on the east and west sides of the I-5, as this project widened the I-5, the Old Road, and Hasley Canyon Road. When first opened, there were numerous complaints from local residents about the choice of a roundabout. However, the complaints subsided after people became familiar with the roundabout and additional signage provided motorists with clear guidance. The project was completed in 2010.

Before [82] District 7, Los Angeles County, Santa Clarita, CA - I-5 NB and SB/Hasley Canyon Road



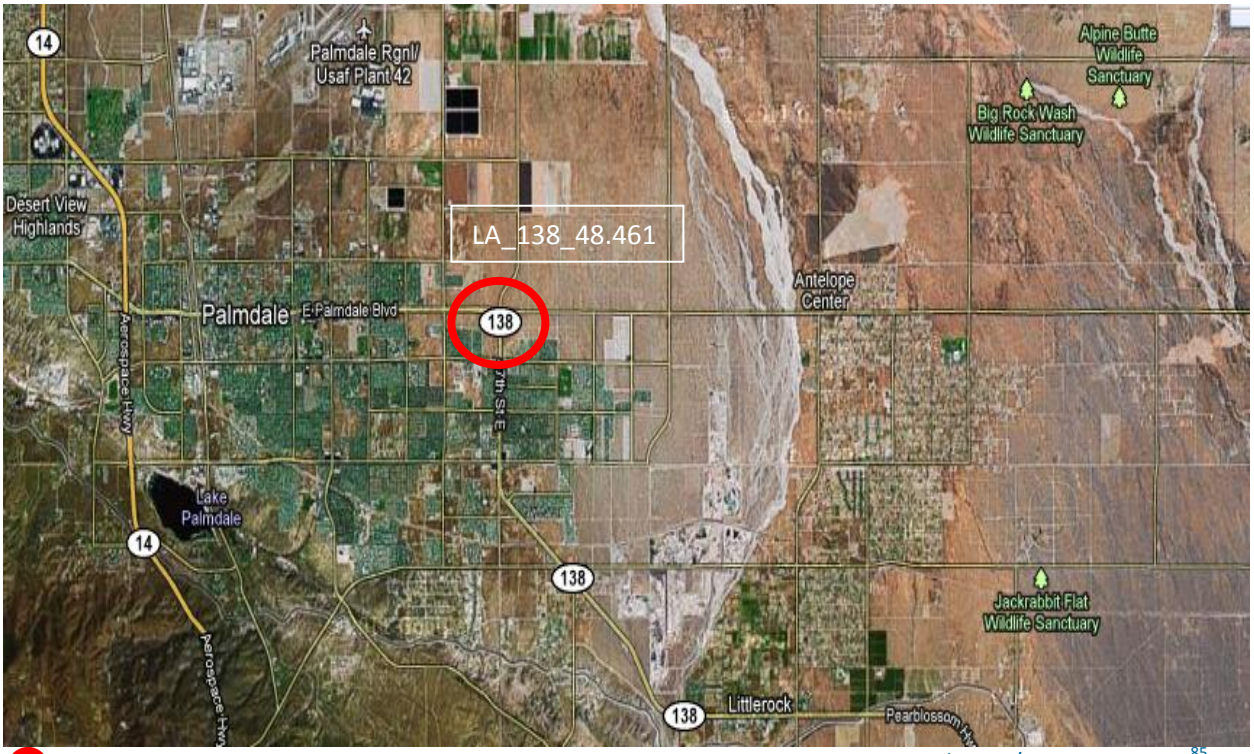
After [83] District 7, Los Angeles County, Santa Clarita, CA - I-5 NB and SB/Hasley Canyon Road

Ground View [84] District 7, Los Angeles County, Santa Clarita, CA - I-5 NB and SB/Hasley Canyon Road

District 7

Los Angeles County
Palmdale, CA

State Route 138 and E. Palmdale Blvd.



= Project Area

Regional View/LA_138_48.461[85]

History

Prior to 1962, SR 138 ran east-west through **Palmdale** and turned south at the four-legged intersection of Palmdale Boulevard/47th Street East/50th Street East. SR 138 is a major truck route between the San Joaquin Valley and the Riverside-San Bernardino Inland Empire region. In 1962, SR 138 was realigned with a 1000-foot radius, 90-degree curve with a design speed of 50 mph. There were two skewed intersections at each end of the curve: SR 138 and Palmdale Boulevard, SR 138 and 47th Street East. The growth of traffic volumes since 1962 resulted in a number of accidents, some of them serious injury and fatal accidents, at both the State and city-owned intersections.

In 2003, due to the continuing potential for high speed approach-turn accidents at the two skewed intersections, and problems caused by the proximity to the intersection of Palmdale Boulevard/47th Street East/50th Street East, it was decided to install a roundabout. Construction was completed in 2009. The project has been successful, with the L.A. County Sheriff's Department and the California Highway Patrol reporting no fatal accidents following completion of the roundabout.

Before [86] District 7, Los Angeles County, Palmdale, CA - SR 138/47th-50th

After [87] District 7, Los Angeles County, Palmdale, CA - SR 138/47th-50th

Ground View [88] District 7, Los Angeles County, Palmdale, CA - SR 138/47th-50th

District 8

Riverside County
Cabazon, CA

I-10 EB/WB and Seminole Drive

= Project Area

Regional View/RIV_010_R017.501[89]

History

In 2003, the Morongo Band of Mission Indians (Tribe) proposed an installation of traffic signals to mitigate traffic impacts to the **Apache Trail Interchange** generated by the Morongo Casino Expansion. In consulting among the Tribe, Caltrans, and the County of Riverside, it was agreed that traffic signals would not work due to the traffic volumes and close proximity of the frontage roads and the railroad. Caltrans and the County of Riverside, suggested that the Tribe look into a dual roundabouts alternative. After doing some traffic simulation studies, it was decided that the roundabouts would be the best option.

In 2004, the Tribe presented the proposed roundabouts to the Tribal Council and obtained approval to fully fund the project. The dual roundabouts at the Apache Trail Interchange were open to traffic in 2008. The roundabouts greatly reduced traffic congestion at the ramp intersections and the backup of traffic onto I-10. Caltrans has retained responsibility for the maintenance of the roundabouts, while the Tribe has committed to do a follow up landscape project that will be maintained by the Tribe in perpetuity.

Before [90] District 8, Riverside County, Cabazon, CA - I-10/Apache Trail

After [91] District 8, Riverside County, Cabazon, CA - I-10/Apache Trail

Ground View [92] District 8, Riverside County, Cabazon, CA - I-10/Apache Trail

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