



CMAQ APPLICATION: Roundabout

Columbus Street (Loma Linda Dr. - La Cresta Dr.)

Project Limits: Intersection of Columbus
Street (Loma Linda Drive and La Cresta Drive)



KERN COUNCIL OF GOVERNMENTS
Congestion Mitigation and Air Quality (CMAQ) Program
PROJECT APPLICATION – Due Thursday, July 17, 2025

*Please note this is a PDF fillable form so responses may be typed. Items 1, 2, 7, and 22 are drop downs. Totals in item 6 will automatically calculate.

- (1) Is the project included in a local agency-adopted resolution supporting the project? YES NO
- (2) Does the proposed project meet basic eligibility requirements? YES NO
- (3) Project background and justification: Explain the project in terms of the existing infrastructure, its impact for service, safety or any other issue that is relevant to the project (attach to application). If the project scope relates to fueling infrastructure please provide a 3-year fleet conversion plan.
- (4) Lead Agency: _____
- (5) Project description [(Location:) + (Limits) + (;) + (Improvement/Activity)]

(6)	Funding Type	PE	R/W	Const.	Total
	Local	\$ _____	\$ _____	\$ _____	\$ _____
	Local	\$ _____	\$ _____	\$ _____	\$ _____
	State	\$ _____	\$ _____	\$ _____	\$ _____
	Federal	\$ _____	\$ _____	\$ _____	\$ _____
	Total	\$ _____	\$ _____	\$ _____	\$ _____

- (7) Programming Year by Phase: PE: _____ R/W: _____ Const: _____
- (8) VMT Reduction (annual miles): _____
- (9) VOC Reduction (kg/day): _____ Additional documentation required. See instructions.
- (10) NOx Reduction (kg/day): _____ Additional documentation required. See instructions.
- (11) PM₁₀ Reduction (kg/day): _____ Additional documentation required. See instructions.
- (12) PM_{2.5} Reduction (Kg/day): _____ Additional documentation required. See instructions.
- (13) CO Reduction (kg/day): _____ Additional documentation required. See instructions.
- (14) Cost-Effectiveness (\$/lb): _____ Additional documentation required. See instructions.
- (15) Livability and Safety: Describe how project provides the six benefits; limit to half page per benefit.
- (16) Hwy Peak Period LOS Before Project (AM/PM average): _____
- (17) Hwy Peak period LOS After Project (AM/PM average): _____
- (18) Bikeway Peak Period LOS Before Project (AM/PM average): _____
- (19) Bikeway Peak period LOS After Project (AM/PM average): _____
- (20) Pedestrian Peak period LOS Before Project (AM/PM average): _____
- (21) Pedestrian Peak period LOS After Project (AM/PM average): _____
- (22) Is the project identified as a RACM/BACM? YES NO

Application completed by: _____	Date Completed: _____
E-mail: _____	Phone Number: _____
Agency: _____	
Address: _____	

Send completed application electronically on a flash drive with transmittal letter on agency letterhead to:

Attn: Ceasar Valle ❖ Kern Council of Governments, 1401 19th Street, Suite 300, Bakersfield, CA 93301

OR send Digitally via [Dropbox, click here.](#)

N

0

0.03

0.06 Miles

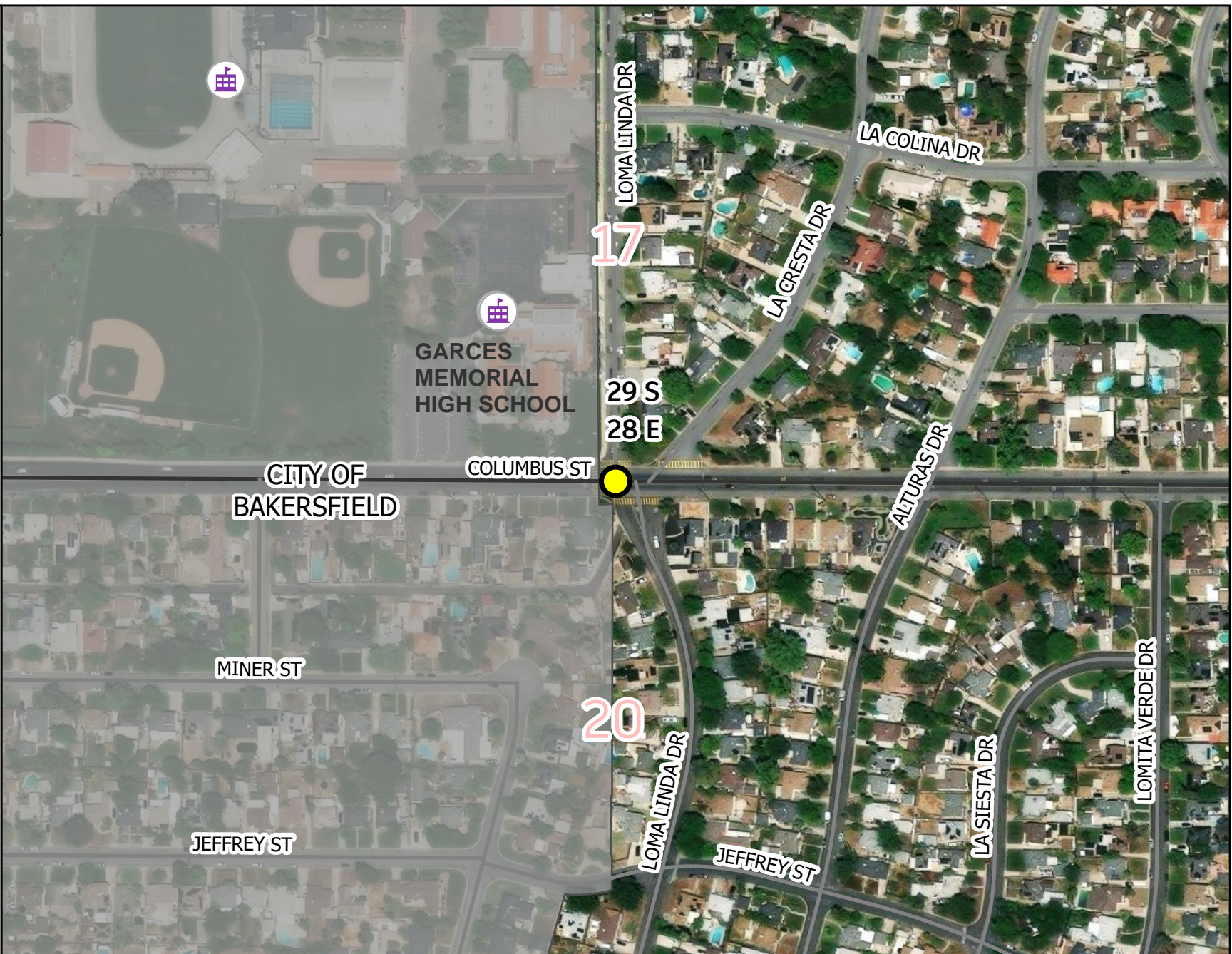
Secs: 17, 20

29 S 28 E

ROUNDAABOUT

CITY LIMITS

SCHOOL



DRAWN BY: WRK

CHECKED BY: YA



COUNTY OF KERN

PUBLIC WORKS DEPARTMENT

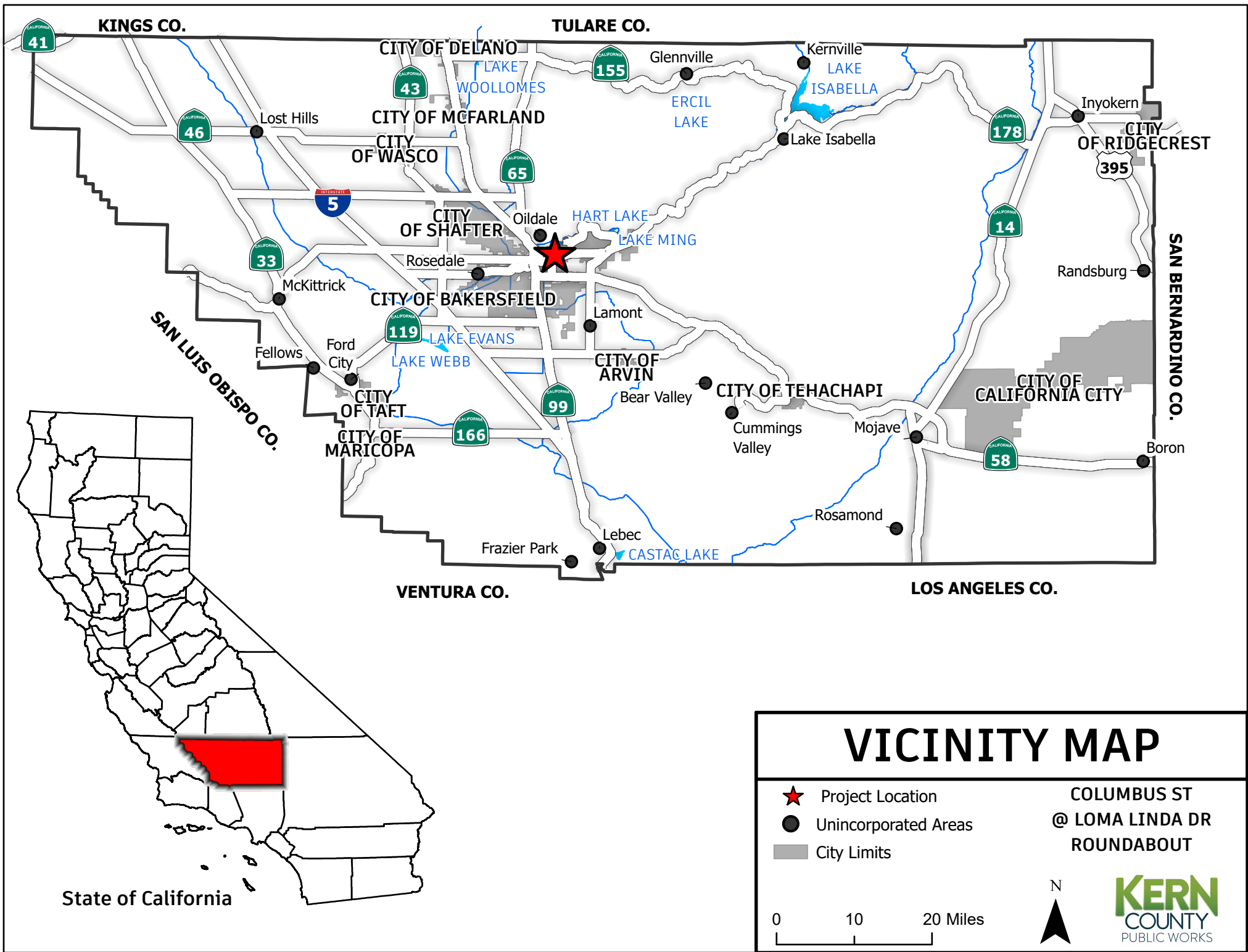
METRO BAKERSFIELD, CA

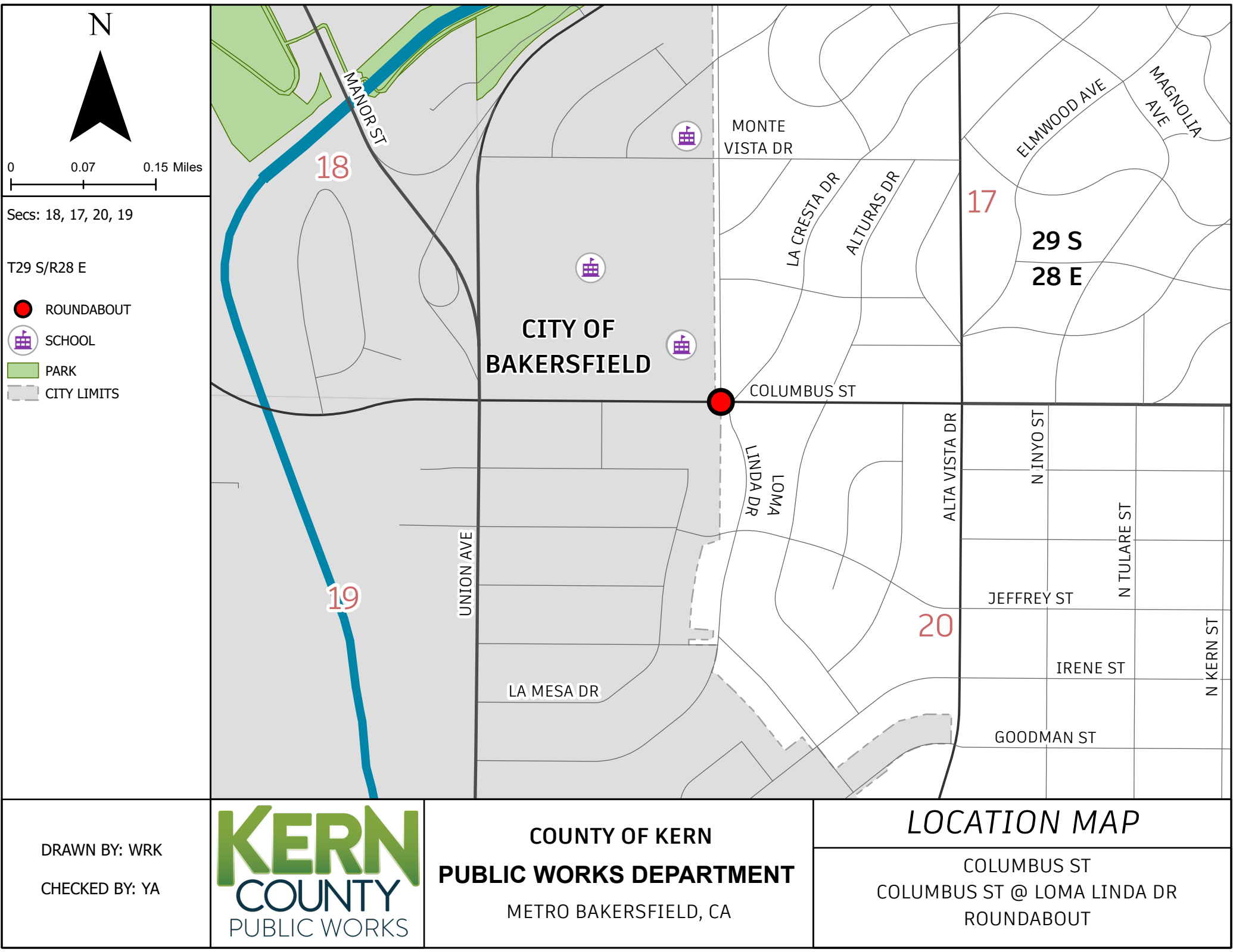
AERIAL MAP

COLUMBUS ST

COLUMBUS ST @ LOMA LINDA DR

ROUNDAABOUT





DRAWN BY: WRK
CHECKED BY: YA

KERN
COUNTY
PUBLIC WORKS

COUNTY OF KERN
PUBLIC WORKS DEPARTMENT
METRO BAKERSFIELD, CA



PROJECT BACKGROUND

1. Justitification
2. Livability
3. Safety
 - A. Collision Maps
 - B. Collision Rates

CMAQ Roundabout Project:
Columbus Street (Loma Linda Drive and La Cresta Drive)

Project Limits: Intersection of Columbus Street, Loma Linda Drive and La Cresta Drive

Project Description & Justification

Project Description

The proposed project would construct a roundabout, high visibility crosswalks, and ancillary facilities necessary for the proper construction and operation of these facilities according to Kern County and Caltrans, and the Americans with Disabilities Act (ADA) design standards. ADA compliant facilities including curbs, gutters, curb-ramps, and sidewalks necessary to ensure the accessibility of the intersection by disabled pedestrians.

Project Justification

The intersection of Columbus Street and Loma Linda Drive is located in an unincorporated area of east Bakersfield. This is a non-traditional 4-way intersection where 2 two-lane collector roads are reduced down to one lane at this skewed intersection. It is complicated by an adjacent residential road which will result in a 5-legged roundabout to make this an efficient facility. The intersection has a Level of Service (LOS) of "C" that once improved will have a LOS of "A." Per the last traffic study conducted, drivers at this intersection experience 20 seconds of delay from congestion. After the project, the average delay would decrease by 60% to 8 seconds, saving 12 seconds each time motorists cross the intersection. The congestion is a result of 16,500 vehicle trips each day (per the last study.) After the project, drivers could expect to save a total of more than 20,075 vehicle hours a year and over \$280,000 annually from reduced delay costs.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is currently in non-attainment for the 8-hour Ozone Standard (cause by volatile organic compounds (VOC) and nitrogen oxide (NO_x)), particulate matter smaller than 2.5 microns ($\text{PM}_{2.5}$) emissions, and PM_{10} emissions under state and federal clean air guidelines. Additionally, the Bakersfield metropolitan area is also under a Carbon Monoxide maintenance plan. these pollutants have been linked to premature death, respiratory and cardiovascular diseases, lost work days, school absences, and reduced activity, all of which translates into increased health costs. the anticipated reduction in emissions will help SJVAPCD meet its air qualify goals by reducing 1,600 pounds per year of these pollutants, the most significant. Attainment of California's emissions standards would prevent up to around 9,000 premature deaths annually statewide, per California Air Resources Board, 2010 study.

Roundabouts are a common form of intersection control used throughout the world and are increasingly being used now in the U.S. Roundabouts are safer than signalized intersections due to traffic calming which requires drivers to slow down to a safer speed when approaching. This reduces crash severity and limits crash types to side impacts only. The largest benefit is that the configuration of roundabouts eliminate head-on crashes and t-collisions that are more likely to cause fatalities. In addition, they are the largest contributor to the reduction of greenhouse gases by reducing vehicle idling time. This project will reduce 0.108 kg/day of VOC which translates to over 20,000 lbs (788 kg) over the next 20 years for ozone reduction.



Intersection of Columbus Street and Loma Linda Drive, Kern County



Livability and Safety

1. Will enhance or reduce the average cost of user mobility through the creation of more convenient transportation options for travelers?

Yes, the project will reduce the average cost of user mobility by creating a more convenient and cost-effective option for residents in this area to travel within and outside of their neighborhood. Constructing sidewalks will more easily connect pedestrians from numerous residences along these streets to the major streets, such as Union Avenue. Annually, the project will result in an estimated reduction of 1,816 Vehicle Miles Traveled (VMT), which also adds to the cost of savings of vehicle operations (see emission calculations attachment). The project improvements will provide an improved walking experience that will enable users to more easily and safely travel in, out, and around their neighborhood.

2. Will improve existing transportation choices by enhancing points of modal connectivity, increasing the number of modes accommodated on existing assets, or reducing congestion on existing modal assets?

Yes, the project will increase the number of modes accommodated on the roadways and will enhance modal connectivity by improving roadway access. The project area roadways currently have no sidewalks in most locations, deterring many travelers from walking. As such, residents and pedestrians in the area must travel within the roadway or along uneven and unpaved surfaces. Additionally, a local high school and religious place of worship is located adjacent to the project site and as stated above, pedestrians are forced to walk within the roadway to access these facilities. The project will increase pedestrian access and connectivity by ensuring the improvements are designed according to ADA accessibility standards. This will allow for increased usage and a broader scope of pedestrians to use the improved facilities.

3. Will improve travel between residential areas and commercial centers and jobs?

Yes, the project will improve user mobility between neighborhoods and commercial centers in the surrounding community. Residents will have improved multi-modal access to major streets and roadways, making it easier to reach main commercial centers, jobs, and bus stops located along those routes.

4. Will improve accessibility and transportation services for economically disadvantaged populations, non-drivers, senior citizens, and persons with disabilities, or make goods, commodities, and services more readily available to these groups.

Yes, the project will improve accessibility and transportation services for the economically disadvantaged, non-drivers, senior citizens, and persons with disabilities. The proposed project is located within and predominantly serves Census Tract 7.01, 7.02, and 14.01, which is within the 55th – 60th percentile of most environmentally burdened and economically disadvantaged communities per CalEnviroScreen 4.0 (see DAC Map). The proposed project will directly increase accessibility to non-motorized drivers, senior citizens, students, and persons with disabilities.

Livability and Safety



5. **Is the existing Accident Rate higher than the average rate for a similar facility, and does the project reduce the Accident Rate to the average rate or lower? Yes or No and if yes, provide rates and supporting documentation.**

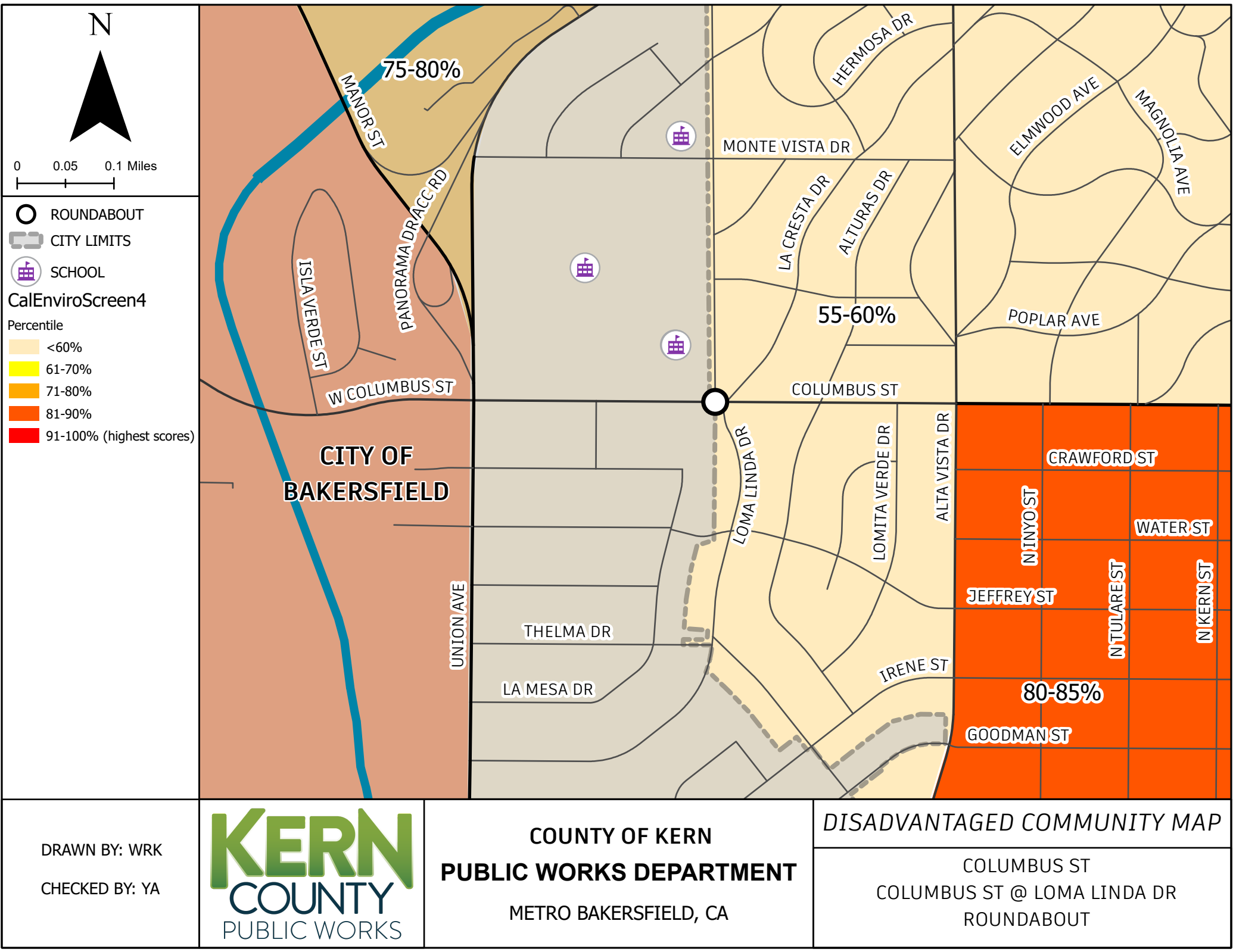
Yes, the existing collision rate is higher than the statewide average.

No, the after project rate will not reduce the collision rate to the statewide average, however, it will significantly reduce the rate to be closer to the statewide average (see attached Collision Map).

6. **Is the existing fatality Rate higher than the average rate for a similar facility, and does the project reduce the fatality rate to the average rate or lower? Yes or No and if yes, provide rates and supporting documentation.**

No, the existing fatality rate is not higher than the statewide average.

No, there have been no reported fatalities within the project limits, however, as stated above, the project will further increase pedestrian safety by allowing pedestrians to safely walk out of the roadway and prevent traffic collisions (see attached Collision Map).



N

0 0.05 0.1 Miles

○ ROUNDABOUT

▬ CITY LIMITS

🏫 SCHOOL

CalEnviroScreen4

Percentile

<60%

61-70%

71-80%

81-90%

91-100% (highest scores)

CITY OF
BAKERSFIELD

UNION AVE

THELMA DR

LA MESA DR



MONTE VISTA DR

HERMOSA DR

LA CRESTA DR

ALTURAS DR

55-60%

COLUMBUS ST

LOMA LINDA DR

LOMITA VERDE DR

ALTA VISTA DR

ELMWOOD AVE

MAGNOLIA AVE

POPLAR AVE

CRAWFORD ST

WATER ST

N INYO ST

N TULARE ST

N KERN ST

JEFFREY ST

80-85%

GOODMAN ST

IRENE ST

DRAWN BY: WRK

CHECKED BY: YA

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METRO BAKERSFIELD, CA

DISADVANTAGED COMMUNITY MAP

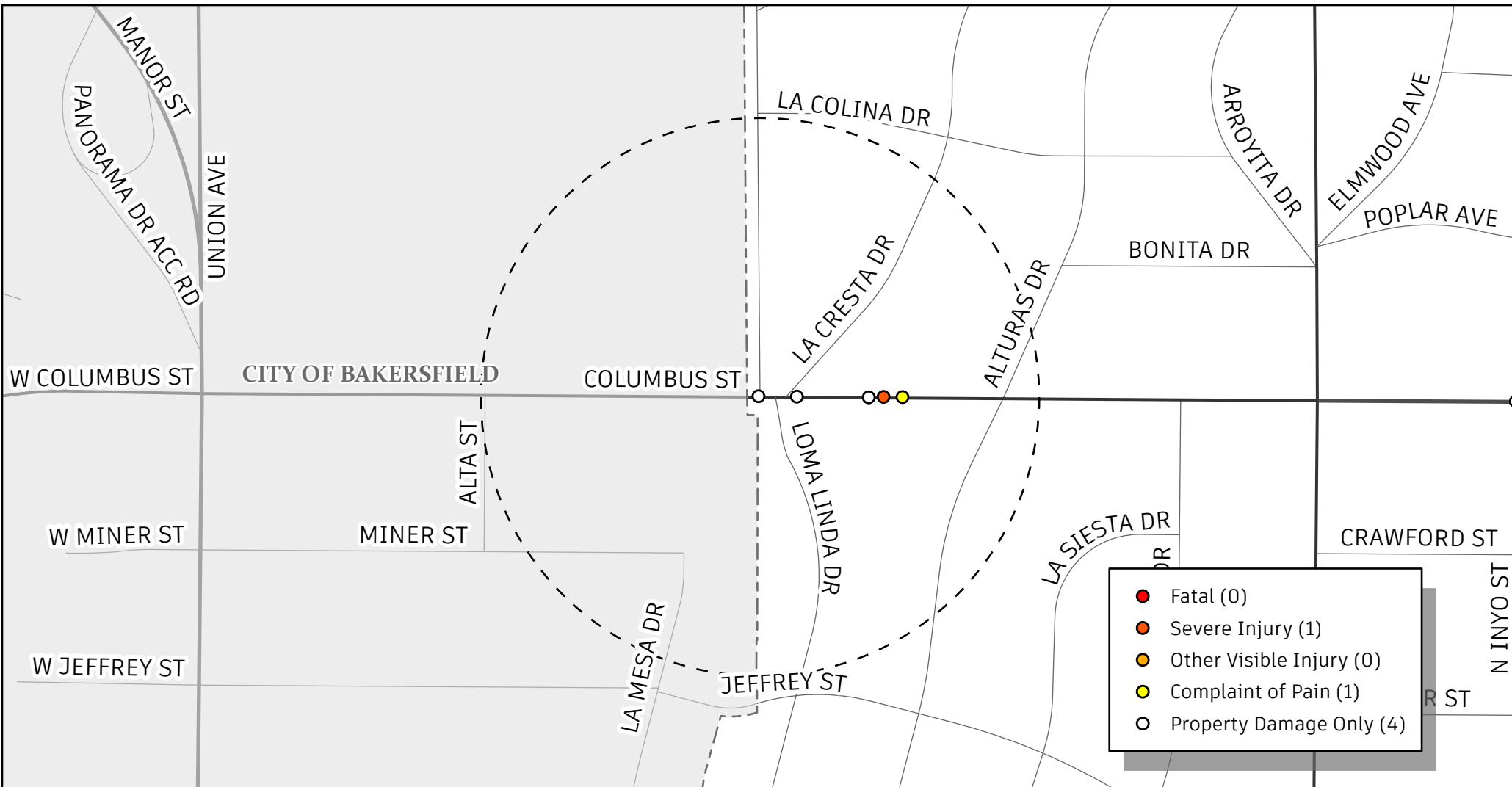
COLUMBUS ST
COLUMBUS ST @ LOMA LINDA DR
ROUNDABOUT

TRAFFIC COLLISION MAP

COLUMBUS ST (@ LOMA LINDA DR)

JANUARY 2022 - DECEMBER 2024

LOCATION: METRO BAKERSFIELD



- Fatal (0)
- Severe Injury (1)
- Other Visible Injury (0)
- Complaint of Pain (1)
- Property Damage Only (4)

CITY LIMITS
 1/8 MILE BUFFER

Total Collisions: 6
Fatalities: 0
Injuries: 2

Collision Rate (c/mve)

Statewide Average: 0.39
Before Rate: 0.6
After Rate: 0.49

Fatality Rate (c/mve)

Statewide Average: 0.003
Before Rate: 0.0
After Rate: 0.0

$$\text{Collision Rate} = \frac{(\text{Number of Collisions} \times 1 \text{ Million})}{(\text{ADT} \times 365 \text{ Days Per Year} \times \text{Segment Length} \times \text{Number of Years})}$$

C/MVE: Collisions per mile vehicles
entering intersection

ADT: Average Daily Traffic Volume

0 0.07 0.15 Miles



Collision Data Source:

California Highway Patrol (CHP), 2024

California State Transportation Agency (CalSTA) Department of Transportation, 2020
Collision Data on California State Highways (road miles, travel, collisions, collision rates). 2022

Federal Highway Administration (FHWA) U.S. Department of Transportation, (2010)
Roadway Safety Information Analysis: A Manual for Local Rural Road Owners. 2023

ROUNABOUT COLUMBUS @ LOMA LINDA

Kern Council of Governments **MS2**
Transportation Data Management System

Home | TMS | TCLS | TIDS | PMS | PMDS | RSMS | NMDS | PMMS | WOTS | RTTV
Login | Locate | Locate All | Email This | Auto-Locate OFF

Disclaimer: The data provided through this resource represents accurate reproductions of the records on file with Kern Council of Governments; however, Kern COG cannot guarantee the accuracy of the underlying data, nor will Kern COG assume any liability for the misuse, misinterpretation or misrepresentation of any requested data.

List View | All DIRs

Record: 4 of 14 Goto Record: go

Location ID: 2234	MPO ID: 20
Type: SPOT	HPMS ID: 06F262105000
On NHS: No	On HPMS: Yes
LRS ID:	LRS Loc Pt:
SF Group: 22	Route Type:
AF Group:	Route:
GF Group:	
Class Dist Grp:	
WIM Group:	
QC Group: Default	
Fnc1 Class:	Milepost:
Located On: Columbus Street	
Loc On Alias:	
EAST OF: Union Avenue	
PR:	MP:
PT:	

More Details

STATION DATA

Directions: 2-WAY EB WB

Year	AAOT	DHV-30	K %	D %	PA	BC	Src
2016	9,083	1,034	11	50			
2015	8,695	822	9	50			
2014	9,388	1,031	11	51			
2013	11,926	945	9	51	11,926 (100%)		
2012	11,549	931	9	51	11,549 (100%)		

<< < > >> 1-5 of 12

Travel Demand Model

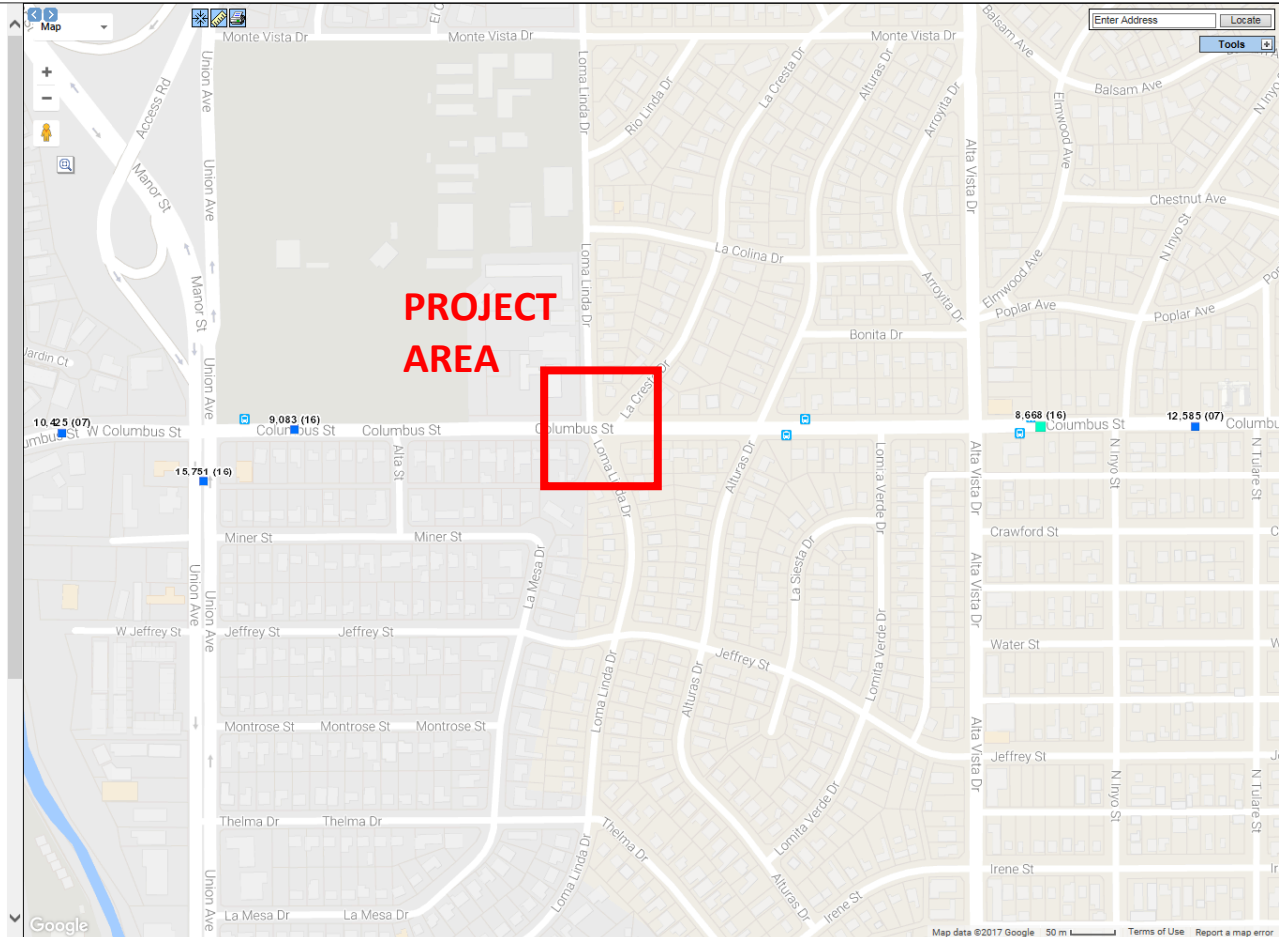
Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT

Date	Int	Total
Thu 11/10/2016	60	9,694
Tue 4/19/2016	60	10,095
Tue 6/16/2015	60	9,513
Wed 11/5/2014	60	9,952
Tue 3/11/2014	60	10,139
Tue 9/10/2013	60	10,225
Wed 4/24/2013	60	10,825
Tue 6/26/2012	60	10,436

VOLUME TREND

Year	Annual Growth
2016	4%
2015	-7%
2014	-21%
2013	3%
2012	-1%
2011	50%
2010	-1%





EMISSIONS BENEFIT & COST EFFECTIVENESS

CMAQ Roundabout Project:
Columbus Street (Loma Linda Drive and La Cresta Drive)

Project Limits: Intersection of Columbus Street, Loma Linda Drive and La Cresta Drive

Columbus @ Loma Linda Emission Data

Peak Hour	Year	Control	Emissions (kg)					
			CO		NOx		VOC	
			Peak Hour	Annual	Peak Hour	Annual	Peak Hour	Annual
AM	2025	All-Way Stop	0.25	120	0.362	174	0.024	11
		Roundabout	0.2	98	0.303	146	0.017	8
	2035	Roundabout	0.21	103	0.319	153	0.018	8
	2045	Roundabout	0.23	108	0.336	161	0.019	9

Emission Reductions

	AM			
	CO	NOx	VOC	Units
All-Way Stop	120	174	11	kg/year
Roundabout	98	146	8	kg/year
Annual Reduction	22	28	3	kg/year
Daily Difference	0.060	0.077	0.008	kg/day

$$\text{COST-EFFECTIVENESS} = (\text{CRF} \times \text{CMAQ funding}) / (\text{CO reduction} + \text{NOx reduction} + \text{VOC reduction})$$

$$\text{where CRF (Capital Recovery Factor)} = ((1 + i)^n \times i) / ((1 + i)^n - 1)$$

$$i \text{ (discount rate)} = 3 \text{ percent (assumed)}$$

$$n \text{ (project life)} = 20 \text{ years}$$

$$\text{therefore CRF} = [(1 + 0.03)^{20} \times 0.03] / [(1 + 0.03)^{20} - 1] = 0.07$$

$$\text{CMAQ FUNDING} = \$ 6,565,050$$

$$\text{CO Reduction} = 22 \text{ kg}$$

$$\text{NOx Reduction} = 28 \text{ kg}$$

$$\text{Vox Reduction} = 3 \text{ kg}$$

$$\text{CRF} = 0.07$$

$$\text{COST EFFECTIVENESS} = (0.07 * \$6,565,050) / (22 + 28 + 3)$$

$$\text{COST EFFECTIVENES} \$ 8,670.82 \text{ per kg}$$

$$\$ 3,933.02 \text{ per lb}$$



LEVEL OF SERVICE

CMAQ Roundabout Project:
Columbus Street (Loma Linda Drive and La Cresta Drive)

Project Limits: Intersection of Columbus Street, Loma Linda Drive and La Cresta Drive

Columbus Street (Loma Linda Drive - Alta Vista Drive) Before BLOS/PLOS

7/15/25, 2:55 PM

BLOS and PLOS

BLOS and PLOS for the following road segment

Lanes per direction:	1
Outside lane width:	12 ft
Paved shoulder/bike lane/marked parking width:	0 ft
Bidirectional ADT traffic volume:	9209 (veh/day)
Posted speed limit:	35 mph
Heavy vehicle percentage:	2%
FHWA's pavement condition rating:	4
% of segment with occupied parking:	50%
% of segment with sidewalks:	0%

	Score	Level-of-service	Compatibility Level
BLOS:	4.49	D (3.51-4.50)	Moderately Low
PLOS:	4.55	E (4.51-5.50)	Very Low

Columbus Street (Loma Linda Drive - Alta Vista Drive) After BLOS/PLOS

7/15/25, 2:59 PM

BLOS and PLOS

BLOS and PLOS for the following road segment

Lanes per direction:	1
Outside lane width:	12 ft
Paved shoulder/bike lane/marked parking width:	0 ft
Bidirectional ADT traffic volume:	9209 (veh/day)
Posted speed limit:	35 mph
Heavy vehicle percentage:	2%
FHWA's pavement condition rating:	4
% of segment with occupied parking:	50%
% of segment with sidewalks:	100%
Sidewalk width:	5 ft
Sidewalk buffer/parkway width:	8 ft

	Score	Level-of-service	Compatibility Level
BLOS:	4.49	D (3.51-4.50)	Moderately Low
PLOS:	2.74	C (2.51-3.50)	Moderately High

**Columbus Street
(Loma Linda Drive to Alta Vista
Drive) Annual Automobile VMT**

Reduced =

Where, **$(D) * (ADT) * (A+C) * (L)$**

D = days of use per year (default is 200 days)

ADT = annual average two-way daily vehicular traffic on parallel road (project-specific data, with a maximum of 30,000)

A = adjustment factor (table lookup value)

C = activity center credit (table lookup value)

L = walking trip length (1.0 miles/trip in one direction)

Columbus Street Annual VMT Reduction:

$(200) * (9,209) * (0.0019 + 0.0015) * (.29) =$

1,816.01

Automobile VMT Reduction Calculations

CARB's current method estimates the annual VMT reductions from new pedestrian facilities using Equation 1 (CARB, 2016 [B-1], 2018 [26], 2019 [16]):

Equation 1: Auto VMT Reductions (current method)

$$\text{Auto VMT Reduced} = (D) * (ADT) * (A + C) * (L)$$

Where,

		Units
D	= days of use per year (default is 200 days)	Days
ADT	= annual average two-way daily vehicular traffic on parallel road (project-specific data, with a maximum of 30,000)	Trips/day
A	= adjustment factor (table lookup value)	-
C	= activity center credit (table lookup value)	-
L	= walking trip length (1.0 miles/trip in one direction)	Miles/trip

The adjustment factor and activity center credit tables from CARB's 2016 report are replicated below in Tables 1 and 2. The multi-component adjustment factor uses mode share and facility-level bicycle ridership change data¹ and assumptions to estimate how much of the measured ADT would be converted to walking trips after pedestrian facility

Table 1. Adjustment Factor (A) Lookup Table

Average Daily Traffic (ADT)	Pedestrian Project Length (one-direction)	A (for cities with population >250,000 and non-university towns <250,000)	A (for university towns with population <250,000)
ADT ≤12,000 vehicles per day	≤1 mile	.0019	.0104
	>1 mile & ≤2 miles	.0029	.0155
	>2 miles	.0038	.0207
12,000<ADT ≤24,000 vehicles per day	≤1 mile	.0014	.0073
	>1 mile & ≤2 miles	.0020	.0109
	>2 miles	.0027	.0145
24,000<ADT≤30,000 vehicles per day (max is 30,000)	≤1 mile	.0010	.0052
	>1 mile & ≤2 miles	.0014	.0078
	>2 miles	.0019	.0104

Table 2. Activity Center Credit (C) Lookup Table

Count Your Activity Centers if There Are...	Within ½ Mile of the Project Area	Within ¼ Mile of the project Area
3	.0005	.001
>3 & <7	.0010	.002
≥7	.0015	.003

The adjustment factors in Table 1 "were derived from a limited set of bicycle commute mode split data for cities and university towns in the southern and western United States,"² then multiplied by 0.7³ to "estimate potential auto travel diverted to bikes" (same factor assumed for auto-walking substitution) and again by a 0.65 "growth factor" to "estimate the growth in bicycle trips from construction of the bike facility"⁴ (same