Y2K ENGINEERING

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State of Road Safety
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PREPARED FOR:

City of Peoria
DEVELOPMENT AND ENGINEERING DEPARTMENT

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INTRODUCTION

An analysis of crash data was performed for the years 2019 through 2023 to evaluate crash frequency, types, and severity prevalent in the City of Peoria. Data is the foundation of every highway safety program; knowing how, when, where, and why traffic crashes occur and who is involved provides information for engineers and other safety advocates to identify strategies to prevent future crashes and/or reduce their severity.

The results of this analysis provide an overview of road safety on local and arterial roads maintained and operated by the City of Peoria. Crashes on ADOT facilities (highways and ramps) were not included in the analysis. The following roadways were omitted: State Route 74, State Route 303, State Route 101, and US Route 60/Grand Avenue. Crashes at intersections of Peoria roadways and ADOT-maintained facilities were evaluated. Those crashes are classified as "intersection crashes" and were included in segment-level analyses. For example, at the interchange of loop 101 and an arterial road, crashes reported on the arterial road approaching the ramp were evaluated, while crashes on the ramp approaching the arterial road were excluded from the analysis. However, those intersections of ADOT maintained roads and local roads were not evaluated for their crash rates and do not appear on the crash rate maps since volumes were not available at those locations.

Power BI software was used to analyze the crash data pertinent to the City of Peoria. Power BI is a business analytics service provided by Microsoft. It is a collection of software services, apps, and connectors that work together to turn unrelated sources of data into coherent, visually immersive, and interactive insights. The primary source of crash data is the ALISS crash database maintained by the Arizona Department of Transportation. ADOT releases crash data annually, in the late summer/early fall for the previous calendar year.

Principal findings and crash trends in this analysis were used to identify priority locations, which will move forward into further evaluation, development of safety-based improvements, and consideration in future project programming.

The ADOT crash reporting process is based upon standards established in the "Manual on Classification of Motor Vehicles Traffic Accidents ANSI-D16.1-2007 – Seventh Edition", published by the National Safety Council. The following definitions of injury severity are documented in the manual and used in ADOT crash reporting, consistent with the "KABCO" framework.

1. No Injury (O) - No apparent injury is a situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash. There is no physical evidence of injury and the person does not report any change in normal function.
2. Possible Injury (C) - An injury reported or claimed which is not a fatal, suspected serious or suspected minor injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those which are reported by the person or are indicated by his/her behavior, but no wounds or injuries are readily evident.
3. Suspected Minor Injury (B) - A minor injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).
4. Suspected Serious Injury (A) - Any injury other than a fatal which results in one or more of the following: severe laceration, broken or distorted extremity (arm or leg), crush injuries, suspected skull, chest, or abdominal injuries (other than bruises or minor lacerations), significant burns, unconsciousness when taken from the crash scene, or paralysis.
5. Fatal Injury (K) - Any injury that results in death within 30 days after the motor vehicle crash occurred. If the person did not die at the scene but died within 30 days of the motor vehicle crash in which the injury occurred, the injury classification should be changed from the attribute previously assigned to the attribute "Fatal Injury".

CRASH TRENDS

The number of crashes in Peoria has generally held steady at around 3,000 per year. The notable exception is 2020, where there was a decrease in the number of total crashes, and is likely the result of traffic pattern changes associated with the COVID-19 pandemic. Fatal (K) and serious injury (A) crashes represent just below three percent of all crashes reported during the five-year period. Table 1 summarizes the number of crashes by year.

Table 1 – Crash Summary, 2019-2023

Crash Type	2019	2020	2021	2022	2023	Total
All Crashes	2,924	2,403	3,080	3,006	3,086	**14,499**
No injury (O)	1,951	1,608	2,088	1,990	2,021	**9,658**
Possible injury (C)	454	351	380	412	412	**2,009**
Minor injury (B)	463	378	527	529	579	**2,476**
Serious Injury (A)	50	56	72	57	60	**295**
Fatal (K)	6	10	13	18	14	**61**
KA Percent of Total	**1.92%**	**2.75%**	**2.76%**	**2.50%**	**2.40%**	**2.46%**

During the five-year period from 2019 to 2023, 59 percent of all crashes in Peoria were intersection-related. Intersection-related crashes are those who were within 150 feet of the center of the intersection. The separation between signalized and unsignalized was done in GIS using the location of known traffic signals. Of the intersection-related crashes, 73 percent occurred at signalized intersections. The intersection related crashes are summarized in Table 2.

Table 2 – Intersection Related Crash Summary, 2019-2023

Crashes	2019	2020	2021	2022	2023	Total
Intersection-Related Total	1,730	1,403	1,783	1,770	1,801	**8,487**
Signalized	1,235	1,039	1,287	1,311	1,290	**6,162**
Signalized (%)	71%	74%	72%	74%	72%	**73%**
Non-Signalized	495	364	496	459	511	**2,325**
Non-Signalized (%)	29%	26%	28%	26%	28%	**27%**

A heatmap of the location of all reported crashes from 2019 to 2023 is shown in Figure 1.

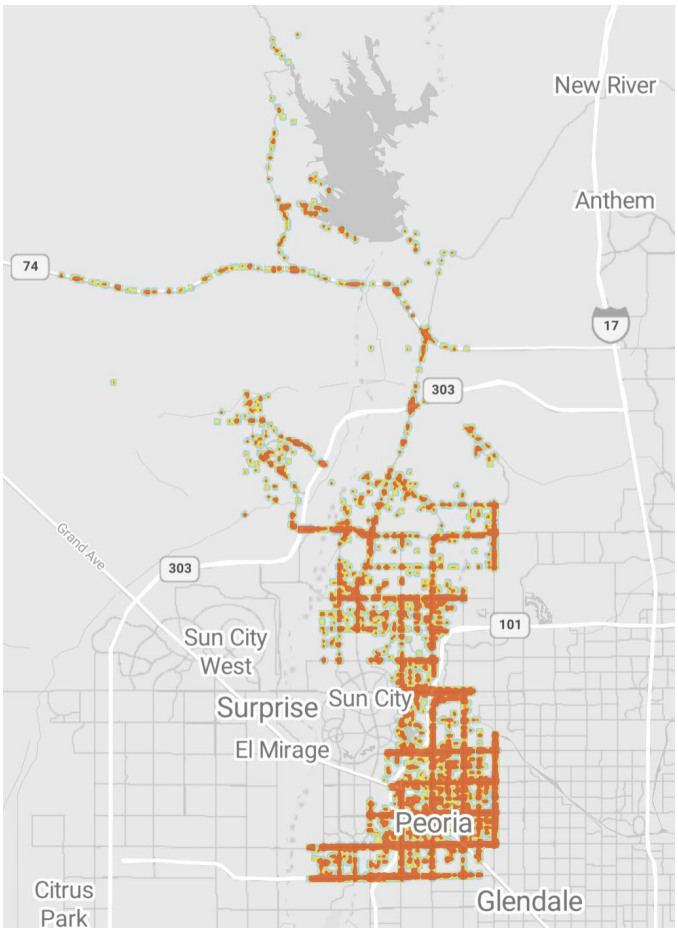

Figure 1 - Heatmap of All Crashes, 2019-2023

During the five-year period from 2019 to 2023, there were a total of 61 fatal crashes and 295 serious injury crashes in the City of Peoria. Bicyclist and pedestrian crashes are more likely to result in injuries and fatalities due to their vulnerability in crashes involving motor vehicles. Bicyclists were involved in 16 serious injury crashes and two fatal crashes during the five-year period, and pedestrians were involved in 32 serious injury crashes and 11 fatal crashes. Figure 2 illustrates the injury severity by person type involved in all crashes, with the sample size noted next to the person type. On average, motorcyclists, pedestrians, and bicyclists are most likely to be involved in serious injury and fatal crashes.

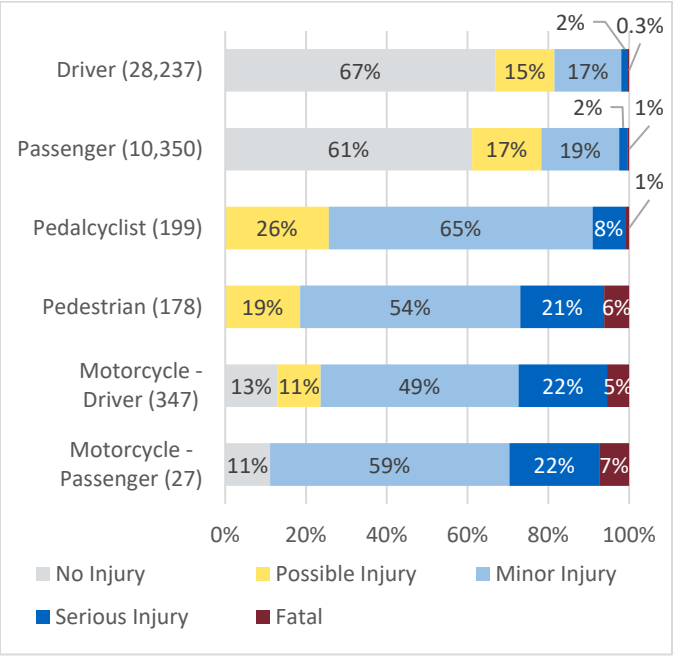

Figure 2 – Injury Severity by Person Type, 2019-2023

LOCATION OF FATAL AND SERIOUS INJURY CRASHES

The location of fatal and serious injury (KA) crashes is shown in **Figure 3**. KA crashes are generally concentrated in the major arterials, and occur most often within the southern portion of the city. More information on crash locations is provided within subsequent sections of this report.

COLLISION MANNER

Figure 4 illustrates the collision manner for all crashes during the five-year period, KA crashes, and less severe BCO crashes. Of all crashes, the most common collision manner was rear-end (35 percent) , followed by left-turn (19 percent) and "other" collisions (16 percent). Of all the KA crashes, left turn crashes were the most prevalent (25 percent), followed by single vehicle (21 percent), and "other" collisions (19 percent). Other collisions involve collision manner reported as head-on, rear to side, rear to rear, u-turn, and unknown.

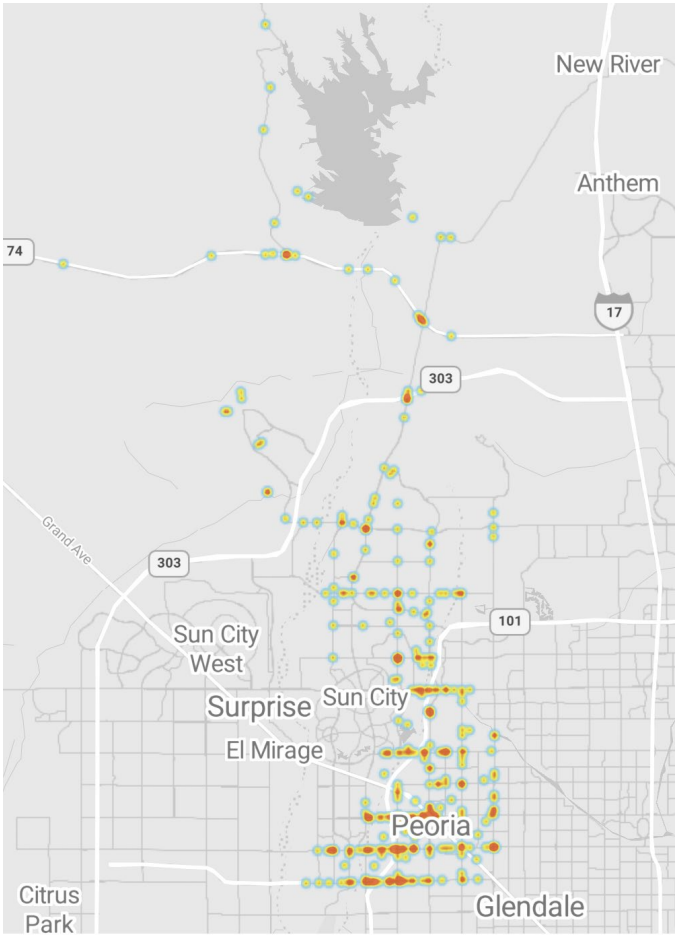

Figure 3 – Location of KA Crashes, 2019-2023

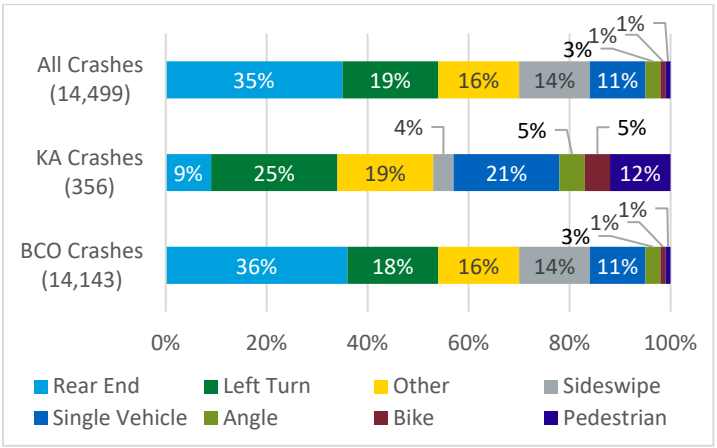

Figure 4 – Collision Manner for KA Crashes, 2019-2023

DRIVER CONDITION AND BEHAVIOR

Driver condition and behavior, including impaired driving, lack of restraint usage, and speeding, are factors in many crashes. Based on the Arizona Crash Report Forms Instruction Manual[1] (2021), Traffic Unit 1 is the vehicle, pedestrian, pedalcycle that caused the collision or was most at fault. Following units are numbered consecutively after Traffic Unit 1.

During the five-year period, impaired driving (Driver 1) was associated with approximately 6 percent of all crashes, 30 percent of fatal crashes, and 16 percent serious injury crashes.

Lack of restraint usage is defined as any driver or passenger not using a lap belt, shoulder and lap belt, or child restraint system. Although it is not required under Arizona law for motorcyclists 18 years or older, this category also includes any motorcycle driver or passenger not wearing a helmet. **Table 3** summarizes the use of safety devices.

"Speeding" in the context of this analysis is based on violation data entered by the reporting officer as: "speed too fast for condition" or "exceeded lawful speed". Speeding can also be identified by the officer as the speed crash being above the posted speed limit on the road, however, the reporting officers' assessments are generally based on traffic, roadway, and weather conditions at the time of the crash and do not necessarily represent speeds in excess of the posted speed limit. When considering all units involved in a crash, speeding is a factor in approximately 32 percent of all crashes and 31 percent of fatal crashes in the City of Peoria during the study period.

Table 3 – Safety Device Usage for Five-year Period, 2019-2023

Safety Device	Driver	Passenger	Motorcyclist	Bicyclist	Total
Seat Belt	24,252	7,996	N/A	N/A	**32,248**
Air Bag	162	44	N/A	N/A	**206**
Child Restraint System	4	1,573	N/A	1	**1,577**
Helmet Used	N/A	N/A	157	26	**183**
Other	28	34	N/A	1	**63**
None Used	387	263	86	70	**806**
Unknown	3,404	440	101	101	**4,046**

The top driver violations are summarized in **Figure 5.** Several violation types were associated with more severe crashes. For example, the Failure to Yield Right of Way violation was reported in 29 percent of KA crashes, compared to 24 percent of all crashes. Disregarding a traffic signal was reported in 12 percent of KA crashes, compared to only 6 percent of all crashes.

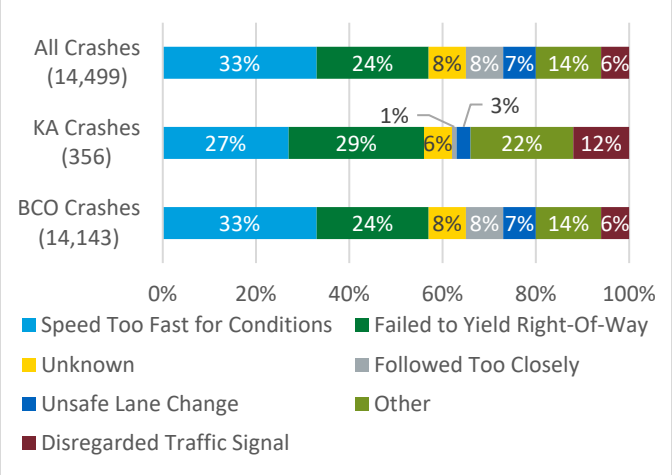

Figure 5 – Top Driver Violations (Violation 1 of Unit 1), 2019-2023

[1] Retrieved 2023-03-10 from https://apps.azdot.gov/files/highway%20safety%20improvement%20program/arizona-crash-forms-instruction-manual.pdf

DRIVER AND PERSON CHARACTERISTICS

Of all crashes during the five-year period from 2019 to 2023, there were a total of 39,338 persons involved. This corresponds to approximately 20 percent of the City's population, assuming individuals were not involved in more than one crash during the study period. **Table 4** summarizes the person types involved in all the crashes.

Table 4 – Person Type of All Crashes, 2019-2023

Person Type	Number
Driver	28,237
Passenger	10,350
Motorcycle – Driver	347
Motorcycle – Passenger	27
Bicyclist	199
Pedestrian	178
Total	39,338

[1] *Note: The US Census Bureau estimates a population of 198,750 (2023) in the City of Peoria. In the statistic provided, it is important to note that not all crashes involve Peoria residents, and some crashes involving Peoria-residents occur outside of City limits. The percentage provides a general comparison of people directly impacted in crashes to the city population.*

Figure 6 illustrates the age range and gender of the driver of the motor vehicle identified as "Unit 1" involved in the crash for the five-year period. Due to missing age and gender information for drivers of unit 1, there are 1,342 (11.4%) records that are not represented in **Figure 6**. The 15 to 19 age range experienced the highest number of crashes comprising 17 percent of all crashes. The 20 to 24 age range comprised 14 percent of all crashes, and the 25 to 29 age range comprised 11 percent of all crashes. Therefore, younger drivers, those in the 15 to 29 age range, comprised 42 percent of all crashes. Males represented 57 percent of the primary drivers in all crashes, and females represented 43 percent.

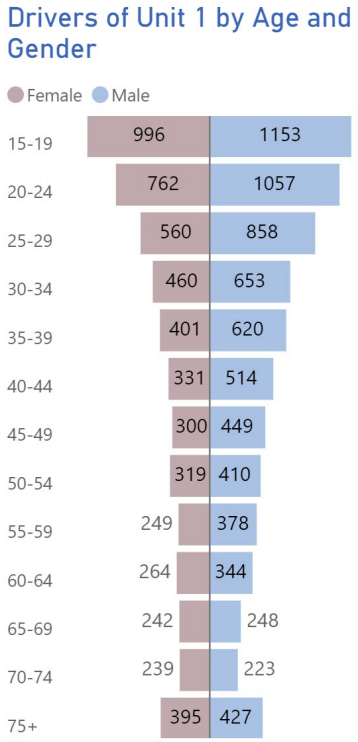

Figure 6 – Age Range and Gender of Unit 1 Driver, 2019-2023

CRASHES BY MONTH

Figure 7 depicts the crashes by month from 2019 to 2023. The greatest number of crashes were observed in September, October, November, December, and March, which generally correlate with months associated with higher seasonal visitors and increased vehicle trips. Fewer crashes were observed in June and July, when traffic volumes are lower.

Figure 8 shows crashes by month for KA crashes, which show seasonal peaks in the spring and fall. Fewer KA are reported in June and July, when traffic volumes are lower.

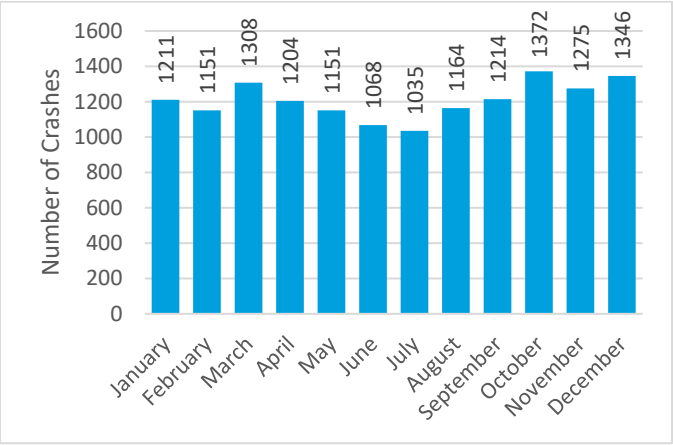

Figure 7 – All Crashes by Month, 2019-2023

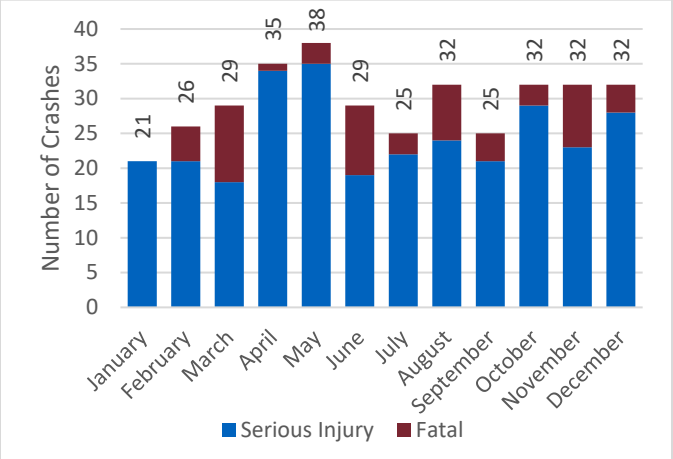

Figure 8 – KA Crashes by Month, 2019-2023

CRASHES BY DAY OF WEEK

Figure 9 depicts the crashes by day of week from 2019 to 2023. The greatest number of crashes were observed on Friday, with fewer crashes on Saturday and Sunday.

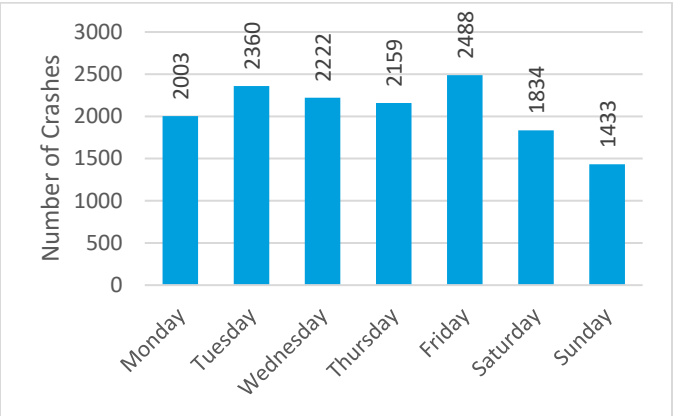

Figure 9 – All Crashes by Day of Week, 2019-2023

Figure 10 shows crashes by day of week for KA crashes from 2019 to 2023. KA crashes occurred more frequently on Wednesdays, Thursdays, and Sundays.

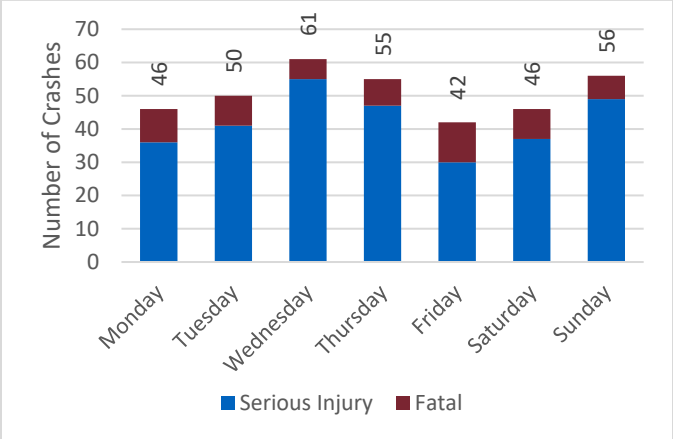

Figure 10 – KA Crashes by Day of Week, 2019-2023

CRASHES BY TIME OF DAY

Figure 11 depicts all crashes by time of day and light condition from 2019 to 2023. The majority of crashes occurred between 7:00 AM and 7:00 PM, with peaks between 7:00 to 8:00 AM and 5:00 to 6:00 PM, which correlate with the typical traffic volume patterns.

Figure 12 shows KA crashes by time of day and light condition from 2019 to 2023. The KA crash pattern generally follows the same time of day trends of all crashes; however, there is a greater proportion of KA crashes occurring during the evening, from 8:00 to 10:00 PM.

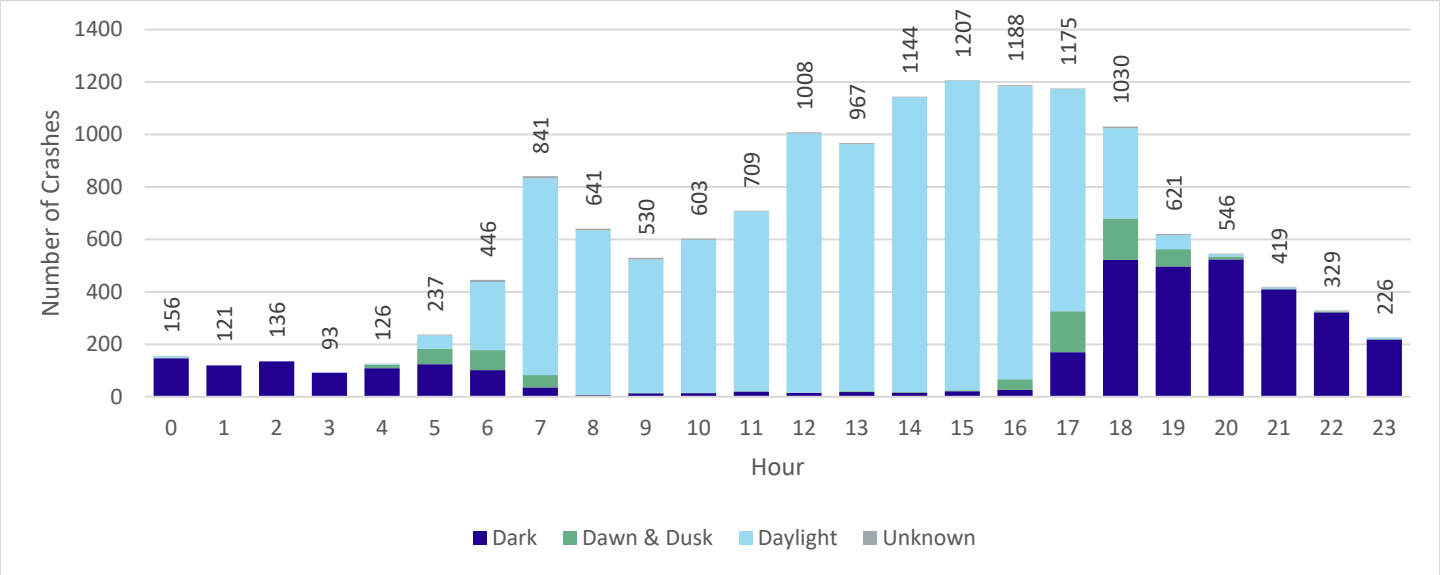

Figure 11 – All Crashes by Time of Day and Light Condition, 2019-2023

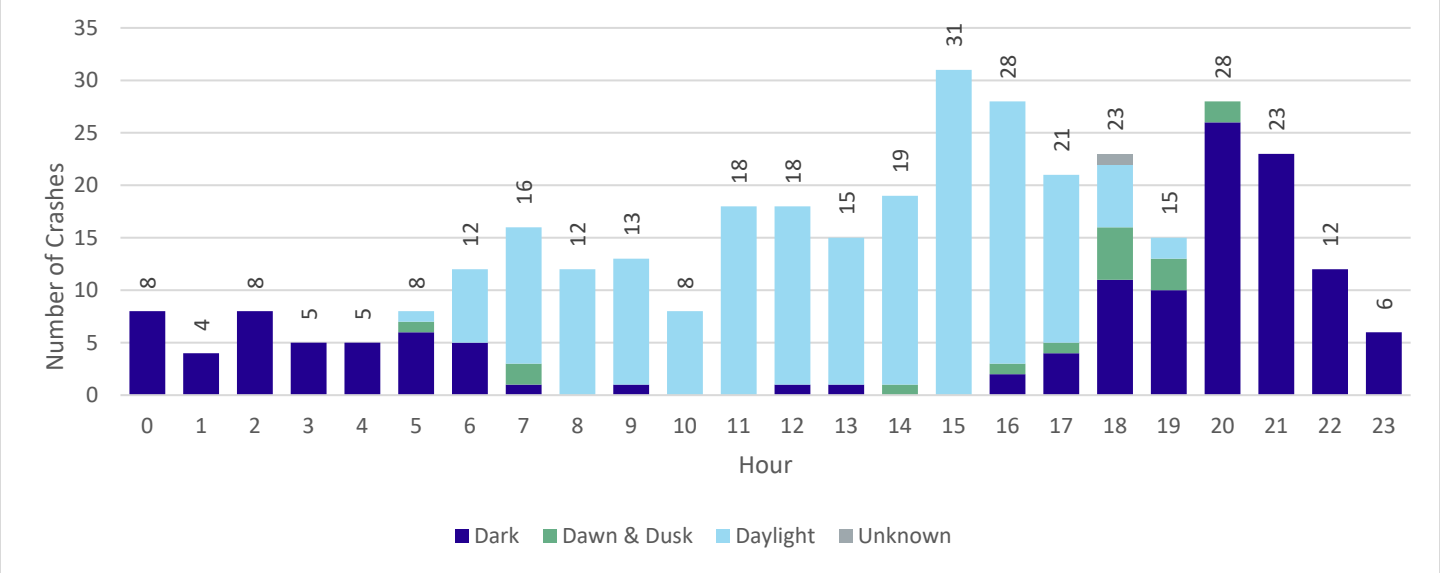

Figure 12 – KA Crashes by Time of Day and Light Condition, 2019-2023

HIGH CRASH LOCATIONS

INTERSECTION-RELATED

Signalized intersections with the highest number of crashes during the five-year period are summarized in **Table 5;** unsignalized intersections are listed in **Table 6**. The number of fatal (K) and serious injury (A) crashes are also shown within the tables. Both signalized and unsignalized intersections with high crash frequency are shown in **Figure 13**.

Table 5 – Intersections with Greatest Crash Frequency, Signalized, 2019-2023

	Intersection	Crashes for 5-year Period ↧	K	A
1.	91ST AV & OLIVE AV [ID: 228]	177	1	1
2.	83RD AV & THUNDERBIRD RD [ID: 1503]	165	0	0
3.	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	116	0	3
4.	91ST AV & NORTHERN AV [ID: 232]	114	1	1
5.	91ST AV & CACTUS RD [ID: 1018]	113	0	1
6.	83RD AV & UNION HILLS DR & [ID: 2770]	111	0	2
7.	91ST AV & PEORIA AV [ID: 552]	105	0	1
8.	99TH AV & NORTHERN AV [ID: 189]	99	0	2
9.	83RD AV & OLIVE AV [ID: 420]	97	0	3
10.	75TH AV & THUNDERBIRD RD [ID: 1331]	97	0	2
11.	83RD AV & NORTHERN AV [ID: 5153]	94	0	2
12.	87TH AV & BELL RD [ID: 2983]	92	0	0
13.	75TH AV & CACTUS RD [ID: 1138]	85	0	2
14.	84TH AV & BELL RD [ID: 2984]	84	0	1
15.	91ST AV & BELL RD [ID: 2985]	83	0	0
16.	95TH AV & OLIVE AV [ID: 224]	82	0	1
17.	83RD AV & CACTUS RD [ID: 1070]	82	1	1
18.	83RD AV & DEER VALLEY RD [ID: 1975]	82	0	0
19.	LAKE PLEASANT PW & BEARDSLEY RD [ID: 2665]	81	1	0
20.	75TH AV & NORTHERN AV [ID: 381]	79	0	1
21.	LAKE PLEASANT PW & DEER VALLEY RD [ID: 4828]	79	0	1

Note: 21 intersections are provided in the table above to preserve a full list of Top 20 locations, given a tie between the #20 and #21 intersections.

Table 6 – Intersections with Greatest Crash Frequency, Unsignalized, 2019-2023

	Intersection	Crashes for 5-year Period ↧	K	A
1.	81ST AV & BEARDSLEY RD [ID: 2686]	68	0	0
2.	89TH AV & BELL RD [ID: 2986]	24	0	0
3.	81ST AV & DEER VALLEY RD [ID: 2035]	14	0	0
4.	89TH AV & CACTUS RD [ID: 1035]	13	0	0
5.	JOMAX RD & HIGH DESERT DR [ID: 1868]	12	0	0
6.	107TH AV & ROSE GARDEN LN [ID: 2143]	12	0	0
7.	83RD AV & MOUNTAIN VIEW RD [ID: 614]	11	0	0
8.	87TH AV & KELTON LN [ID: 2982]	11	0	0
9.	87TH AV & UNION HILLS DR [ID: 3225]	11	0	0
10.	97TH AV & SPECKLED GECKO DR [ID: 4798]	11	0	0
11.	87TH AV & NORTHERN AV [ID: 355]	10	0	1
12.	83RD AV & CALLE LEJOS [ID: 1704]	10	0	1
13.	71ST AV & MOUNTAIN VIEW RD [ID: 701]	9	0	0
14.	WESTBROOK PW & UNION HILLS DR [ID: 3286]	9	0	0
15.	97TH AV & DEER VALLEY RD [ID: 5684]	9	0	1
16.	72ND AV & HAPPY VALLEY RD [ID: 5796]	9	0	0
17.	71ST AV & CHOLLA ST [ID: 823]	8	0	0
18.	95TH AV & PINNACLE PEAK RD [ID: 1627]	8	0	0
19.	111TH AV & BUTLER DR [ID: 110]	7	0	0
20.	107TH AV & BUTLER DR [ID: 133]	7	0	0
21.	79TH AV & SWEETWATER AV [ID: 1410]	7	0	0
22.	91ST AV & DESERT HARBOR DR [ID: 2908]	7	0	0
23.	83RD AV & ACOMA DR [ID: 5505]	7	0	0
24.	75TH AV & JOMAX RD [ID: 5944]	7	0	0
25.	RIDGELINE RD & EL MIRAGE RD [ID: 6481]	7	0	0

Note: 21 intersections are provided in the table above to preserve a full list of Top 20 locations, given a tie between the #20, #21, #22, #23, #24, and #25 intersections.

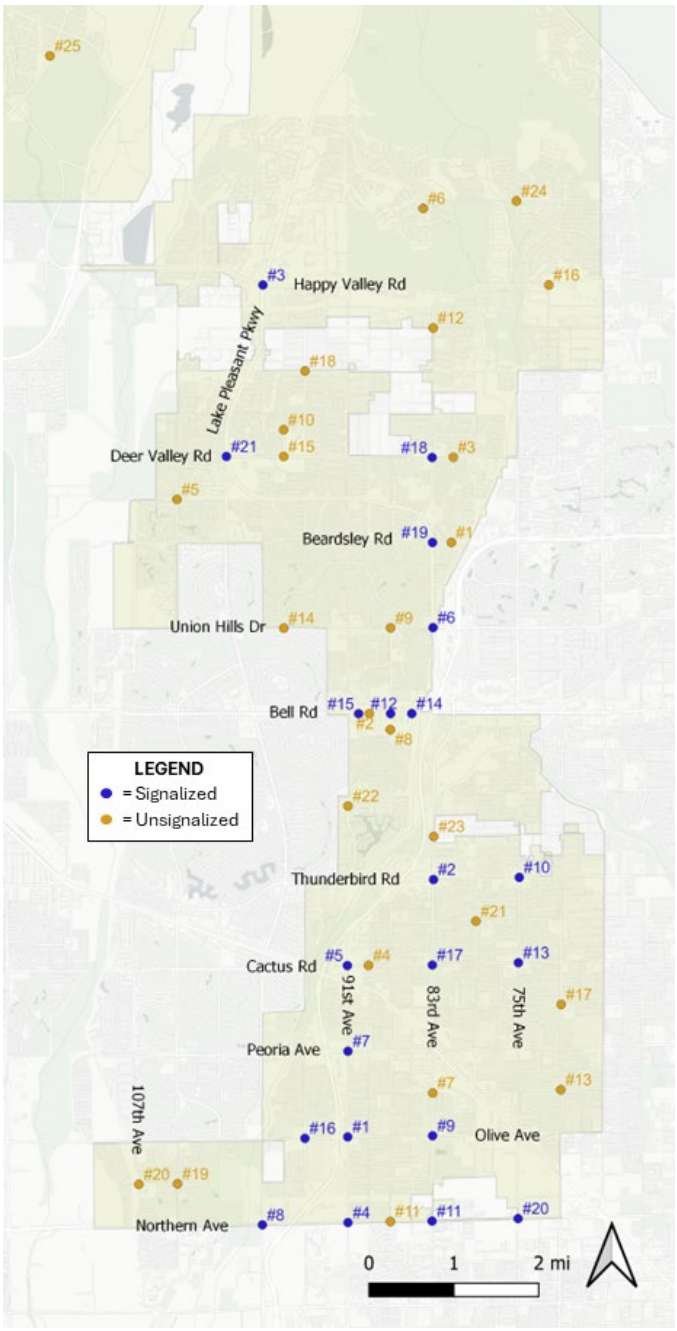

Figure 13 – Intersections with High Crash Frequency, 2019-2023

INTERSECTION-RELATED FATAL AND SERIOUS INJURY (KA) CRASHES

Table 7 lists the intersections with the highest number of KA crashes, most of which are located at signalized intersections. The intersection of 103rd Ave and Northern Ave had the highest number of reported KA crashes with 5 crashes for the five-year period; of those crashes, one resulted in fatal injury and four resulted in serious injury.

Table 7 – Intersections with Highest KA Crashes, 2019-2023

	Intersection	K Crashes	A Crashes	Total KA ↧
1.	103RD AV & NORTHERN AV [ID: 152]	1	4	5
2.	91ST AV & UNION HILLS DR [ID: 3173]	0	5	5
3.	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	0	3	3
4.	83RD AV & OLIVE AV [ID: 420]	0	3	3
5.	87TH AV & OLIVE AV [ID: 395]	1	2	3
6.	91ST AV & DEER VALLEY RD [ID: 2168]	0	3	3
7.	91ST AV & OLIVE AV [ID: 228]	1	1	2
8.	91ST AV & NORTHERN AV [ID: 232]	1	1	2
9.	83RD AV & UNION HILLS DR [ID: 2770]	0	2	2
10.	99TH AV & NORTHERN AV [ID: 189]	0	2	2
11.	75TH AV & THUNDERBIRD RD [ID: 1331]	0	2	2
12.	83RD AV & NORTHERN AV [ID: 5153]	0	2	2
13.	75TH AV & CACTUS RD [ID: 1138]	0	2	2
14.	83RD AV & CACTUS RD [ID: 1070]	1	1	2
15.	99TH AV & OLIVE AV [ID: 5287]	0	2	2
16.	79TH AV & THUNDERBIRD RD [ID: 5434]	0	2	2
17.	107TH AV & HAPPY VALLEY PW [ID: 4437]	1	1	2
18.	LAKE PLEASANT PW & WILLIAMS RD [ID: 2124]	0	2	2
19.	85TH AV & PEORIA AV [ID: 576]	0	2	2
20.	COUNTRY CLUB PW & UNION HILLS DR [ID: 2773]	0	2	2
21.	79TH AV & CACTUS RD [ID: 1104]	1	1	2
22.	83RD AV & SWEETWATER AV [ID: 1464]	0	2	2

Note: 22 intersections are provided in the table above to preserve a full list of Top 20 locations, given a tie between the intersections with 2 KA crashes.

The intersections that have the highest number of KA crashes, as referenced in Table 7 are shown in Figure 14. The number at each intersection represents the total number of KA crashes at that intersection.

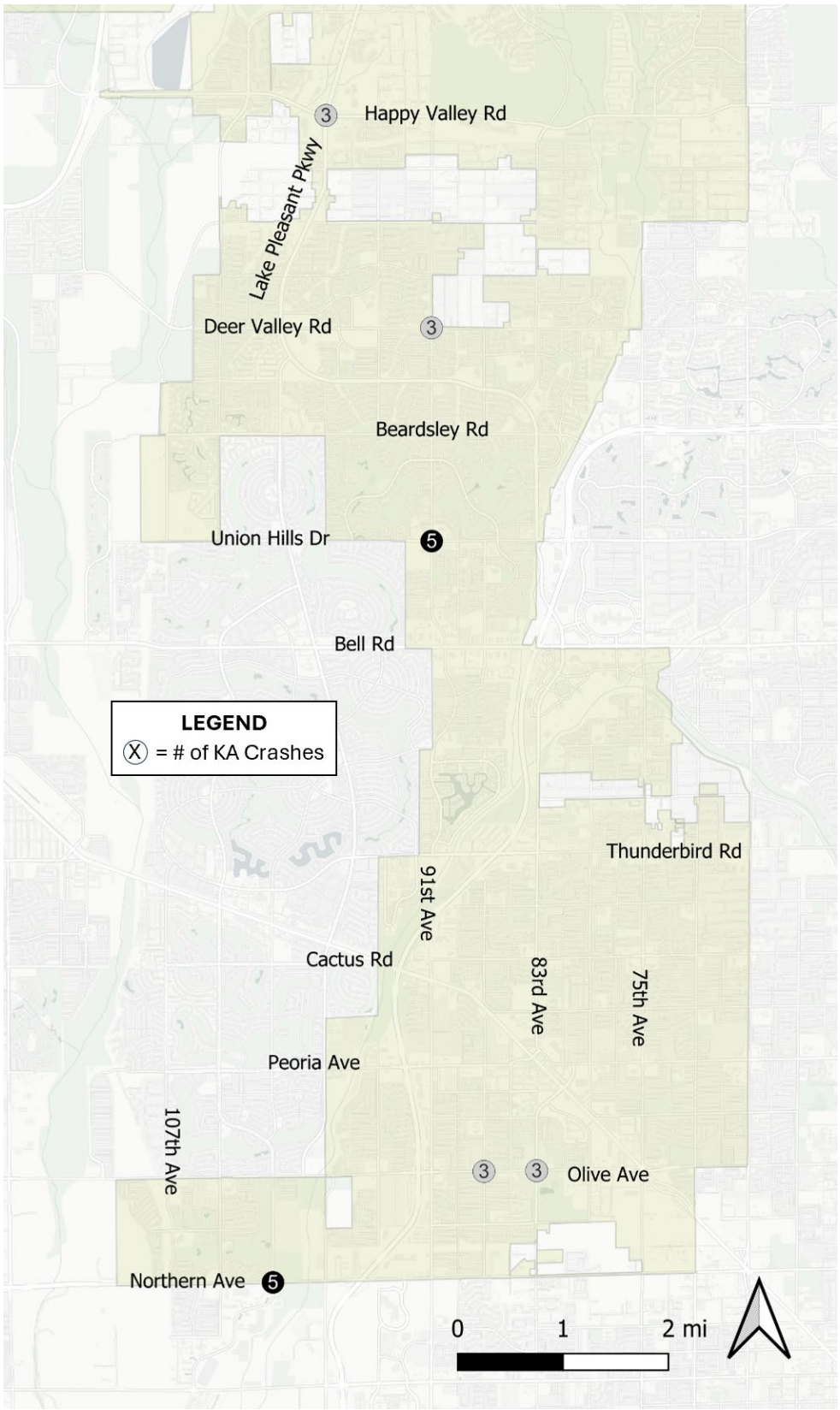

Figure 14 – Fatal and Serious Injury Crash Frequency at High Crash Locations, 2019-2023

INTERSECTION CRASH RATES

The combination of crash data and traffic volumes data provides an opportunity to identify hot spot locations based on relative traffic exposure.

Crash rates can be an effective tool to measure relative safety at a particular location. The combination of crash frequency (crashes per year) and vehicle exposure (traffic volumes or miles traveled) results in a crash rate. Crash rates are expressed as "crashes per Million Entering Vehicles" (MEV) for intersections and as "crashes per Million Vehicle Miles Traveled" (MVMT) for roadway segments.

This study's analysis included crashes of all severity levels and all intersections and roadways within Peoria's jurisdiction with available data. A map of Peoria's crash rates is provided in **Appendix A**. Further details on the crash rate map methodology are provided in **Appendix B**.

The equation used to calculate an intersection crash rate is as follows:

$$R = \frac{1{,}000{,}000 \times C}{365 \times N \times V}$$

Where:

- **R** = Crash rate for the intersection expressed as accidents per million entering vehicles (MEV).
- **C** = Total number of intersection crashes in the study period.
- **N** = Number of years of data.
- **V** = Traffic volumes entering the intersection daily.

The signalized intersections with the highest rate of crashes are summarized in **Table 8.** The unsignalized intersections with the highest crash rates are shown in **Table 9.**

Table 8 – Intersections with Highest Crash Rate – Signalized, 2019-2023

	Intersection	Crashes 5-year Period	Entering Volume	Crash Rate (Crashes / MEV) ↧
1.	91ST AV & PEORIA AV [ID: 552]	105	29,974	1.919
2.	91ST AV & OLIVE AV [ID: 228]	177	50,838	1.908
3.	83RD AV & THUNDERBIRD RD [ID: 1503]	165	49,490	1.827
4.	99TH AV & NORTHERN AV [ID: 189]	99	32,845	1.652
5.	91ST AV & CACTUS RD [ID: 1018]	113	38,338	1.615
6.	91ST AV & NORTHERN AV [ID: 232]	114	40,169	1.555
7.	83RD AV & NORTHERN AV [ID: 5153]	94	34,975	1.473
8.	95TH AV & OLIVE AV [ID: 224]	82	33,368	1.347
9.	83RD AV & OLIVE AV [ID: 420]	97	39,526	1.345
10.	LAKE PLEASANT PW & DEER VALLEY RD [ID: 4828]	79	32,936	1.314
11.	83RD AV & CACTUS RD [ID: 1070]	82	34,947	1.286
12.	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	116	50,742	1.253
13.	75TH AV & NORTHERN AV [ID: 381]	79	34,835	1.243
14.	75TH AV & CACTUS RD [ID: 1138]	85	37,918	1.228
15.	84TH AV & BELL RD [ID: 2984]	84	41,611	1.106
16.	103RD AV & NORTHERN AV [ID: 152]	67	33,343	1.101
17.	83RD AV & PARADISE LN [ID: 3141]	53	26,527	1.095
18.	75TH AV & THUNDERBIRD RD [ID: 1331]	97	48,865	1.088
19.	87TH AV & BELL RD [ID: 2983]	92	47,115	1.070
20.	RIO VISTA BL & THUNDERBIRD RD [ID: 5447]	55	29,247	1.030

Table 9 – Intersections with Highest Crash Rate – Unsignalized, 2019-2023

	Intersection	Crashes 5-year Period	Entering Volume	Crash Rate (Crashes /MEV) ↧
1.	97TH AV & SPECKLED GECKO DR [ID: 4798]	11	2704	2.229
2.	112TH AV & ROSE GARDEN LN [ID: 5596]	3	1077	1.526
3.	81ST AV & BEARDSLEY RD [ID: 2686]	68	30596	1.218
4.	71ST AV & CHOLLA ST [ID: 823]	8	3895	1.125
5.	71ST AV & MOUNTAIN VIEW RD [ID: 701]	9	5260	0.938
6.	87TH AV & MOUNTAIN VIEW RD [ID: 522]	6	3645	0.902
7.	87TH AV & KELTON LN [ID: 2982]	11	6837	0.882
8.	79TH AV & SWEETWATER AV [ID: 1410]	7	4466	0.859
9.	71ST AV & SWEETWATER AV [ID: 1240]	6	3931	0.836
10.	87TH AV & MONROE ST [ID: 514]	5	3306	0.829
11.	111TH AV & BUTLER DR [ID: 110]	7	4675	0.820
12.	112TH AV & BEARDSLEY RD [ID: 3834]	1	681	0.805
13.	95TH AV & PINNACLE PEAK RD [ID: 1627]	8	5483	0.799
14.	85TH AV & MONROE ST [ID: 533]	6	4187	0.785
15.	WESTLAND RD & LONE MOUNTAIN RD [ID: 5122]	5	3511	0.780
16.	WESTBROOK DR & VILLAGE PW [ID: 2711]	2	1423	0.770
17.	72ND AV & CALLE LEJOS [ID: 1724]	2	1685	0.650
18.	89TH AV & GROVERS AV [ID: 3193]	2	1836	0.597
19.	79TH AV & CHOLLA ST [ID: 895]	5	4686	0.585
20.	JOMAX RD & HIGH DESERT DR [ID: 1868]	12	12234	0.537

SEGMENT RELATED

A segment's crash frequency was measured in terms of non-intersection crashes per mile. The segments with the highest number of non-intersection crashes per mile with daily traffic volumes below 5,000 vehicles per day are shown in **Table 10**. The segments with the highest number of non-intersection crashes per mile and daily traffic volumes above 5,000 vehicles per day are shown in **Table 11**.

Table 10 – Segments with Highest Number of Crashes per Mile – below 5,000 vehicles per day, 2019-2023

	Segment	Length (miles)	Non-Intersection crashes	Non-intersection crashes/mile ↧	Crashes at Signalized Intersections	Crashes at Unsignalized Intersections	Total
1.	77TH AVE, FROM PARADISE LN TO BELL RD [ID: 186]	0.21	35	163.55	34	0	69
2.	RIO VISTA BLVD, FROM THUNDERBIRD RD TO INTO RIO VISTA PARK [ID: 292]	0.34	7	20.65	13	2	22
3.	87TH AVE, FROM PEORIA AVE TO CHOLLA ST (VARNEY RD) [ID: 224]	0.50	10	19.92	3	1	14
4.	SPECKLED GECKO DR, FROM WILLIAMS RD TO 97TH AVE [ID: 519]	0.43	8	18.60	0	0	8
5.	85TH AVE, FROM PEORIA AVE TO GRAND AVE [ID: 446]	0.52	9	17.24	6	2	17
6.	94TH DR, FROM THUNDERBIRD RD TO PERSHING AVE [ID: 526]	0.31	4	13.07	5	0	9
7.	99TH AVE, FROM NORTHERN AVE TO OLIVE AVE [ID: 257]	0.50	5	10.06	31	2	38
8.	97TH AVE, FROM SPECKLED GECKO DR TO DEER VALLEY RD [ID: 521]	0.31	3	9.62	0	14	17
9.	ARROWHEAD FOUNTAIN DR, FROM 83RD AVE TO PARADISE LN [ID: 261]	0.57	5	8.82	0	0	5
10.	CASTLE HOT SPRINGS RD, FROM CAREFREE HIGHWAY TO NORTH LAKE PLEASANT PARK ENTRANCE [ID: 264]	2.27	19	8.38	0	0	19
11.	103RD AVE, FROM NORTHERN AVE TO BUTLER DR [ID: 147]	0.61	5	8.21	13	3	21
12.	VISTANCIA BL, FROM SONORAN VIEW DR TO WESTLAND RD [ID: 491]	0.54	4	7.37	0	0	4
13.	79TH AVE, FROM MOUNTAIN VIEW RD TO PEORIA AVE [ID: 191]	0.49	3	6.16	0	3	6
14.	LONE CACTUS DR, FROM 83RD AVE TO 87TH AVE [ID: 63]	0.50	3	6.04	6	4	13
15.	95TH AVE, FROM OLIVE AVE TO MOUNTAIN VIEW RD [ID: 251]	0.50	3	6.00	9	5	17
16.	79TH AVE, FROM SWEETWATER AVE TO THUNDERBIRD RD [ID: 193]	0.50	3	5.96	15	5	23
17.	SWEETWATER AVE, FROM 75TH AVE TO 79TH AVE [ID: 120]	0.51	3	5.94	6	1	10
18.	YEARLING RD, FROM LAKE PLEASANT PKWY TO 1700' WEST [ID: 909]	0.34	2	5.90	4	0	6
19.	WACKER RD, FROM 79TH AVE TO 83RD AVE [ID: 531]	0.52	3	5.76	0	0	3
20.	KELTON LN, FROM 84TH AVE TO 91ST AVE [ID: 406]	0.37	2	5.36	0	9	11

Table 11 – Segments with Highest Number of Crashes per Mile – above 5,000 vehicles per day, 2019-2023

	Segment	Length (miles)	Non-Intersection crashes	Non-intersection crashes/mile ↧	Crashes at Signalized Intersections	Crashes at Unsignalized Intersections	Total
1.	BELL RD, FROM LOOP 101 TO 87TH AVE [ID: 475]	0.21	50	238.10	60	0	110
2.	THUNDERBIRD RD, FROM 79TH AVE TO 83RD AVE [ID: 126]	0.50	109	216.70	61	12	182
3.	NORTHERN AVE, FROM 91ST AVE TO 95TH AVE [ID: 78]	0.57	109	191.56	115	0	224
4.	BELL RD, FROM 84TH AVE TO 87TH AVE [ID: 498]	0.25	45	180.00	73	0	118
5.	75TH AVE, FROM PARADISE LN TO BELL RD [ID: 182]	0.28	50	179.21	31	0	81
6.	UNION HILLS DR, FROM LOOP 101 TO 83RD AVE [ID: 137]	0.27	46	172.93	47	0	93
7.	OLIVE AVE, FROM 87TH AVE TO 91ST AVE [ID: 89]	0.50	85	170.00	63	80	228
8.	NORTHERN AVE, FROM 95TH AVE TO 99TH AVE [ID: 79]	0.44	69	157.18	187	0	256
9.	OLIVE AVE, FROM 91ST AVE TO 95TH AVE [ID: 90]	0.50	67	133.20	189	44	300
10.	THUNDERBIRD RD, FROM 83RD AVE TO 87TH AVE [ID: 127]	0.47	57	122.06	183	0	240
11.	THUNDERBIRD RD, FROM 67TH AVE TO 71ST AVE [ID: 123]	0.50	57	113.32	88	6	151
12.	OLIVE AVE, FROM 67TH AVE TO 71ST AVE [ID: 84]	0.50	52	103.59	152	34	238
13.	83RD AVE, FROM GREENWAY RD TO BELL RD [ID: 202]	1.01	103	102.39	79	0	182
14.	NORTHERN AVE, FROM 87TH AVE TO 91ST AVE [ID: 77]	0.50	47	94.19	27	28	102
15.	HAPPY VALLEY RD, FROM LAKE PLEASANT PKWY TO 107TH AVE [ID: 52]	0.78	73	94.07	19	0	92
16.	PEORIA AVE, FROM 91ST AVE TO 95TH AVE [ID: 102]	0.51	45	88.41	110	0	155
17.	THUNDERBIRD RD, FROM 71ST AVE TO 75TH AVE [ID: 124]	0.50	44	87.48	26	19	89
18.	91ST AVE, FROM GRAND AVE TO CACTUS RD [ID: 233]	0.19	16	82.90	56	35	107
19.	BELL RD, FROM 87TH AVE TO 91ST AVE [ID: 12]	0.38	31	82.67	63	45	139
20.	91ST AVE, FROM OLIVE AVE TO MOUNTAIN VIEW RD [ID: 238]	0.25	19	75.40	10	5	34

The location of the segments listed in **Table 10** and **Table 11** are shown in **Figure 15** and **Figure 16**, respectively.

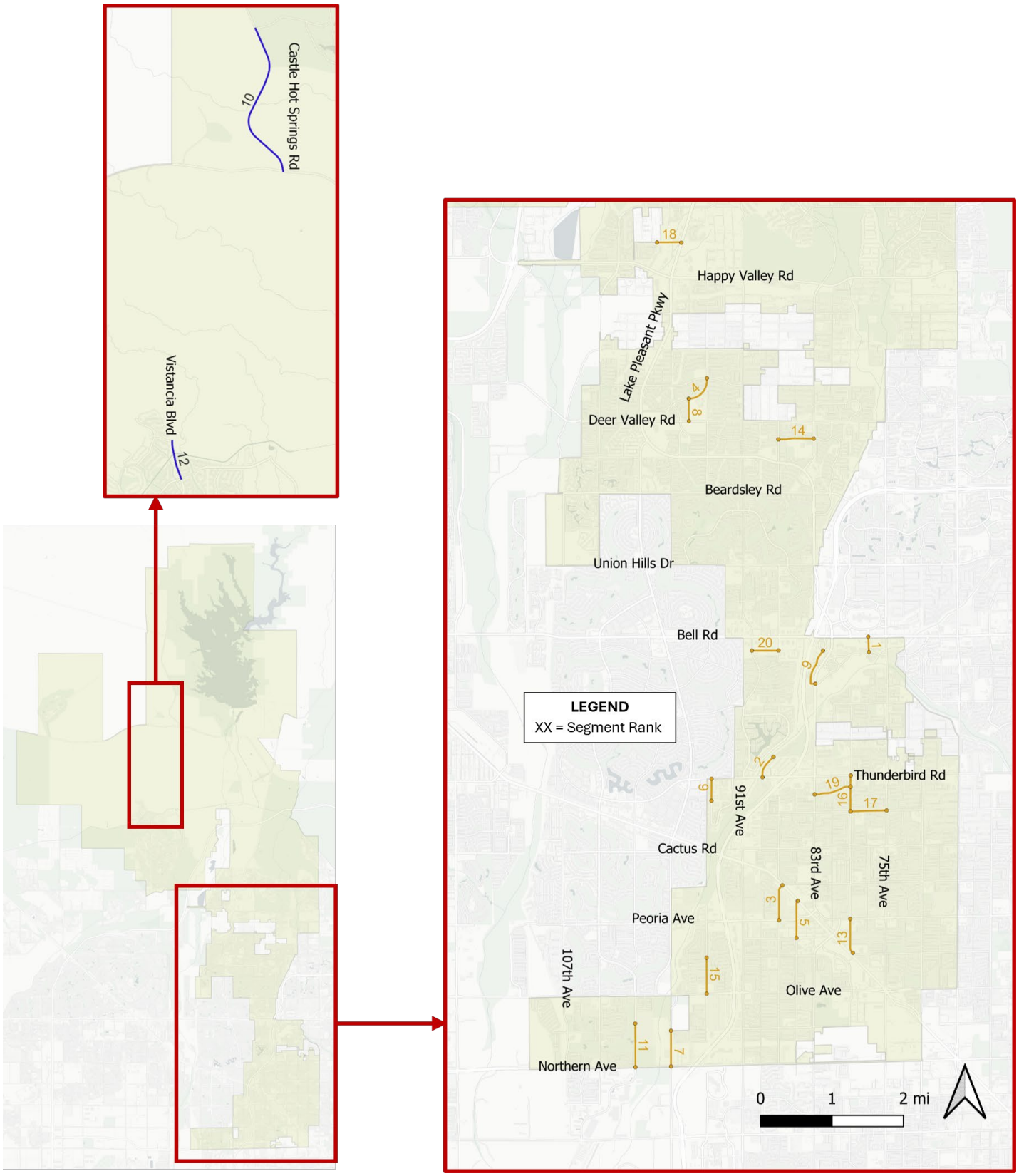

Figure 15 - Segments with Highest Number of Non-Intersection Crashes per Mile – below 5,000 vehicles per day, 2019-2023

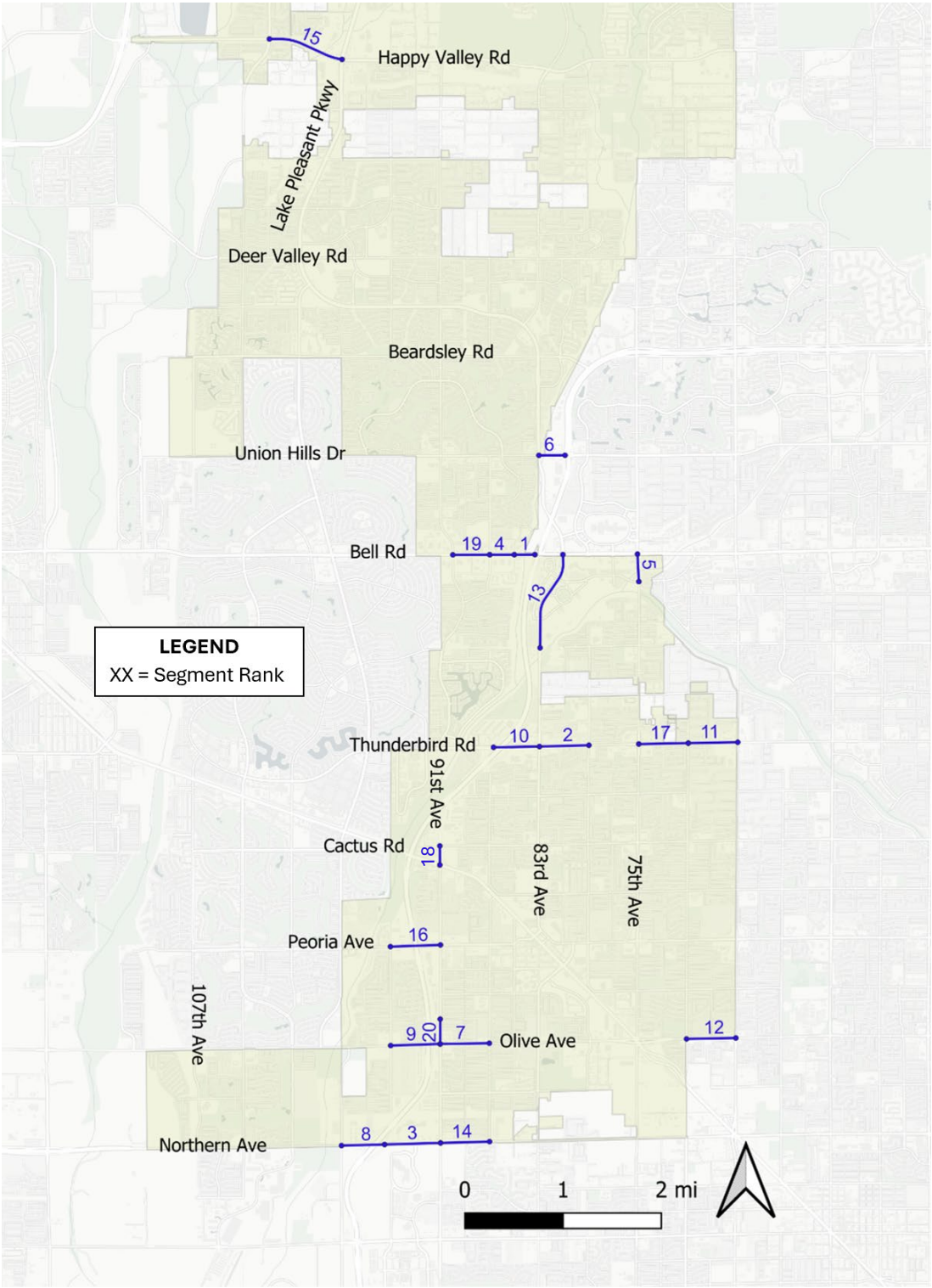

Figure 16 - Segments with Highest Number of Non-Intersection Crashes per Mile - above 5,000 vehicles per day, 2019-2023

SEGMENT CRASH RATES

The crash rate for road segments is calculated as:

$$R = \frac{100{,}000{,}000 \times C}{365 \times N \times V \times L}$$

Where:

- R = Crash rate for the road segment expressed as crashes per 100 million vehicle-miles of travel (MVMT).
- C = Total number of crashes in the study period – excludes crashes at major intersections but includes minor intersections and driveways. Refer to **Appendix B** for more information.
- N = Number of years of data.
- V = Number of vehicles per day (both directions).
- L = Length of the roadway segment in miles.

The roadway segments with the highest rate of crashes are summarized in **Table 12.** Very short section lengths or low volumes can lead to extremely high rates even if the actual crash frequency is low. For that reason, segments shorter than 1/8-mile (660 feet) were excluded in the crash rate evaluation. The crash rates map is shown in **Appendix A** and the crash rate methodology is displayed in **Appendix B**.

Table 12 – Roadway Segments with Highest Crash Rate – below 5,000 vehicles per day, 2019-2023

	Segment	Length (miles)	Classification	Volume (veh per day)	All Crashes in 5 years	Segment Crashes in 5 years	Crash Rate ↧ (Crashes/ 100 MVMT)
1.	77th Ave, from Paradise Ln to Bell Rd [ID:186]	0.21	Collector	3,480	69	35	2,575.2
2.	Castle Hot Springs Rd, from Carefree Highway to North Lake Pleasant Park Entrance [ID:264]	2.27	Arterial	795	19	19	577.7
3.	Speckled Gecko Dr, from Williams Rd to 97th Ave [ID:519]	0.43	Collector	1987	8	8	513.1
4.	87th Ave, from Peoria Ave to Cholla St (Varney Rd) [ID:224]	0.50	Collector	2397	14	10	455.4
5.	85th Ave, from Peoria Ave to Grand Ave [ID:446]	0.52	Collector	2,381	17	9	396.8
6.	Rio Vista Blvd, from Thunderbird Rd to Into Rio Vista Park [ID:292]	0.34	Collector	3,434	22	7	329.5
7.	Greenway Rd, from 72nd Ave to 75th Ave [ID:904]	0.30	Collector	570	6	1	319.4
8.	Yucca St, from 8701 W to 91st Ave [ID:435]	0.40	Collector	949	6	2	286.5
9.	Pinnacle Peak Rd, from 77th Ave to 79th Ave [ID:106]	0.25	Arterial	1,008	2	1	219.2
10.	Tierra Buena Ln, from 75th Av to 79th Av [ID:437]	0.50	Collector	536	3	1	202.8
11.	Rose Garden Ln, from 107th Ave to 111th Ave [ID:114]	0.55	Collector	501	3	1	200.3
12.	84th Ave, from Bell Rd to Grovers Ave [ID:439]	0.72	Collector	1168	6	3	194.4
13.	Sweetwater Ave, from 71st Ave to 75th Ave [ID:119]	0.51	Collector	1,119	7	2	193.9
14.	Butler Dr, from 94th Ave to 99th Ave [ID:476]	0.66	Collector	863	3	2	193.9
15.	97th Ave, from Speckled Gecko Dr to Deer Valley Rd [ID:521]	0.31	Collector	2,728	17	3	193.1
16.	Butler Dr, from 104th Ave to 114th Ave [ID:401]	1.04	Collector	1402	11	5	188.8
17.	89th Ave, from Grovers Ave to Union Hills Dr [ID:315]	0.55	Collector	1111	20	2	179.3
18.	87th Ave, from Carefree Hwy to Joy Ranch Road [ID:219]	1.65	Collector	1,111	8	6	178.9
19.	Wacker Rd, from 79th Ave to 83rd Ave [ID:531]	0.52	Collector	1,780	3	3	177.3
20.	Williams Rd, from 107th Ave to 109th Ave [ID:913]	0.25	Collector	1248	2	1	174.2

The roadway segments (volume above 5,000 vehicles per day) with the highest rate of crashes are summarized in **Table 13.**

Table 13 – Roadway Segments with Highest Crash Rate – above 5,000 vehicles per day, 2019-2023

	Segment	Length (miles)	Classification	Volume (veh per day)	All Crashes in 5 years	Crashes in 5 years	Crash Rate ↧ (Crashes/ 100 MVMT)
1.	75th Ave, from Paradise Ln to Bell Rd [ID:182]	0.28	Arterial	18,659	81	50	526.3
2.	Plaza Del Rio, from Thunderbird Rd to Pershing Ave [ID:527]	0.35	Collector	5,313	17	17	505.3
3.	Thunderbird Rd, from 79th Ave to 83rd Ave [ID:126]	0.50	Arterial	32,777	182	109	362.3
4.	75th Ave, from Butler Dr to Olive Ave [ID:175]	0.50	Arterial	11,788	103	37	343.3
5.	Northern Ave, from 91st Ave to 95th Ave [ID:78]	0.57	Arterial	30,620	224	109	342.8
6.	Bell Rd, from Loop 101 to 87th Ave [ID:475]	0.21	Arterial	38,283	110	50	340.8
7.	91st Ave, from Olive Ave to Mountain View Rd [ID:238]	0.25	Arterial	12,498	34	19	330.6
8.	83rd Ave, from Greenway Rd to Bell Rd [ID:202]	1.01	Arterial	19,884	182	103	282.1
9.	Olive Ave, from 87th Ave to 91st Ave [ID:89]	0.50	Arterial	37,010	228	85	251.7
10.	Northern Ave, from 95th Ave to 99th Ave [ID:79]	0.44	Arterial	34,880	256	69	246.9
11.	Union Hills Dr, from Loop 101 to 83rd Ave [ID:137]	0.27	Arterial	39,296	93	46	241.1
12.	91st Ave, from Butler Dr to Olive Ave [ID:230]	0.50	Arterial	15,733	81	34	236.4
13.	Northern Ave, from 87th Ave to 91st Ave [ID:77]	0.50	Arterial	22,287	102	47	231.6
14.	Peoria Ave, from 91st Ave to 95th Ave [ID:102]	0.51	Arterial	21,332	155	45	227.1
15.	Bell Rd, from 84th Ave to 87th Ave [ID:498]	0.25	Arterial	43,760	118	45	225.4
16.	Olive Ave, from 91st Ave to 95th Ave [ID:90]	0.50	Arterial	34,106	300	67	214.0
17.	Thunderbird Rd, from 83rd Ave to 87th Ave [ID:127]	0.47	Arterial	31,357	240	57	213.3
18.	Paradise Ln, from 77th Ave to 83rd Ave [ID:94]	0.58	Collector	6,397	37	14	207.1
19.	Thunderbird Rd, from 67th Ave to 71st Ave [ID:123]	0.50	Arterial	30,443	151	57	204.0
20.	83rd Ave, from Sweetwater Ave to Thunderbird Rd [ID:210]	0.50	Arterial	16,131	91	30	203.8

TRENDS IN CRASHES INVOLVING BICYCLISTS AND PEDESTRIANS

Crashes involving non-motorized road users are not always identified in crash reports or databases. Crashes involving a single bicycle (run-off-road/path or falls), single pedestrian (trip and falls), bicycle-bicycle, or pedestrian-bicycle are not included in the motor vehicle crash database. As a result, it is likely that many crashes involving pedestrians and bicycles are not accurately reported or included in available crash statistics. The crash data summarized in this report includes crashes that involve at least one motor vehicle unit involved in a pedestrian or bicyclist collision. Crashes involving scooters are recorded as pedestrian.

Agencies do not typically collect and maintain the extent of exposure data for pedestrian and bicyclist volumes to calculate rates. There are continuing efforts to expand this data collection; but rate calculations are not included in this report due to data availability.

During the five-year period from 2019 to 2023, there were a total of 198 crashes involving bicyclists and 171 crashes involving pedestrians. The bicyclist and pedestrian crash statistics are summarized by year in **Table 14**.

Table 14 – Crashes by Year (Bicyclist & Pedestrian), 2019-2023

Crashes	2019	2020	2021	2022	2023	Total
All Crashes	2,924	2,403	3,080	3,006	3,086	**14,499**
Bicyclist	32	29	42	43	52	198
Bicyclist (%)	1.09%	1.21%	1.36%	1.43%	1.69%	1.37%
Pedestrian	32	25	32	36	46	171
Pedestrian (%)	1.09%	1.04%	1.04%	1.20%	1.49%	1.18%

NON-MOTORIST INJURY SEVERITY STATISTICS

Injury severity statistics are depicted in **Figure 17** for pedestrian crashes and **Figure 18** for bicycle crashes.

During the five-year study period, there were 11 fatal crashes involving a pedestrian, which represents 18 percent of all fatal crashes citywide. There were 32 serious injury crashes involving a pedestrian. 25 percent of all pedestrian crashes resulted in serious or fatal injury.

Two fatal bicyclist crashes were reported during the five-year period, and 16 serious injury crashes were reported, accounting for 9% of all bicycle crashes.

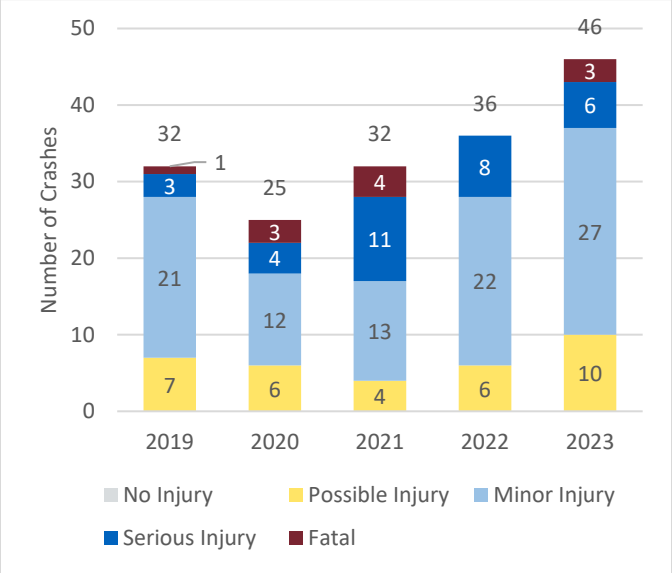

Figure 17 – Pedestrian Crashes by Injury Severity, 2019-2023

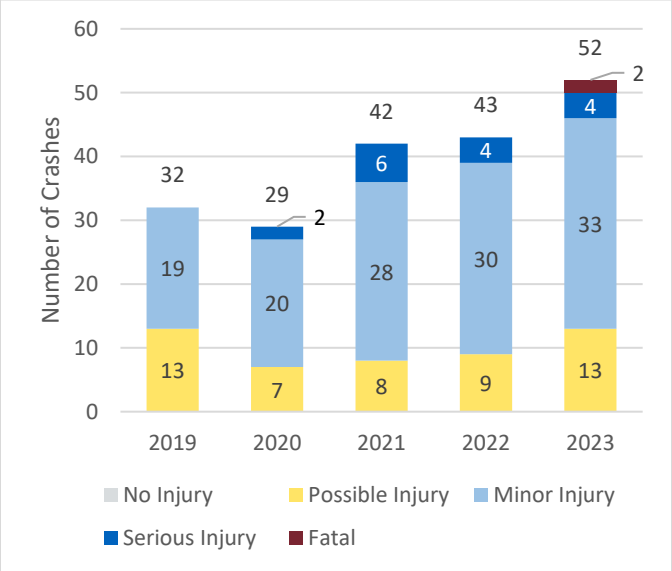

Figure 18 – Bicycle Crashes by Injury Severity, 2019-2023

NON-MOTORIST CRASHES BY AGE & GENDER

30 percent of non-motorists (bicyclists and pedestrians) involved in a crash were between the ages of 10 and 19. Males comprised 71 percent of non-motorists involved in a crash. The non-motorist crashes by age and gender are depicted in **Figure 19.**

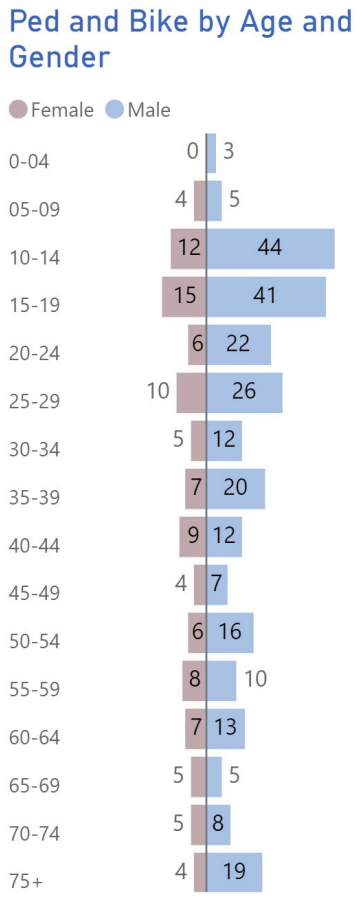

Figure 19 – Non-Motorist Crashes by Age & Gender, 2019-2023

NON-MOTORIST CRASHES BY MONTH

Figure 20 and **Figure 21** depict crashes by month for pedestrian and bicycle crashes respectively. Pedestrian crashes peaked during the months of October, November, December, and May. Bicycle crashes peaked during January, March, October, and November.

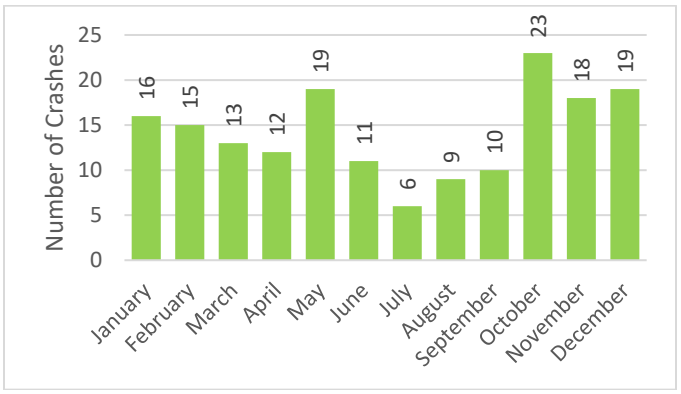

Figure 20 –Pedestrian Crashes by Month, 2019-2023

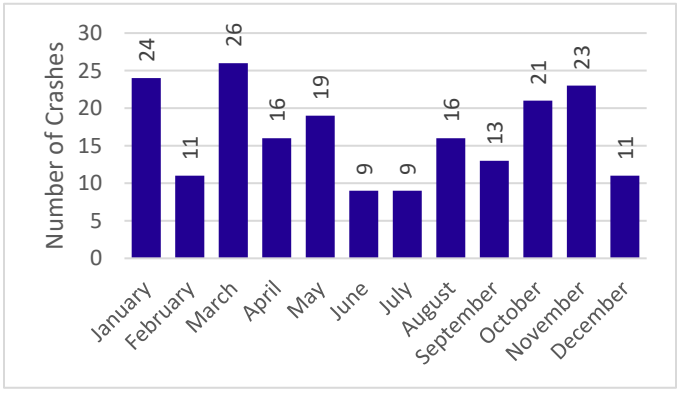

Figure 21 –Bicycle Crashes by Month, 2019-2023

NON-MOTORIST CRASHES BY DAY OF WEEK

Figure 22 and **Figure 23** depict the crashes by day of week for pedestrian and bicycle crashes respectively. Pedestrian and bicyclist crashes occurred most frequently during weekdays. Non-motorist crashes were lower on weekend days.

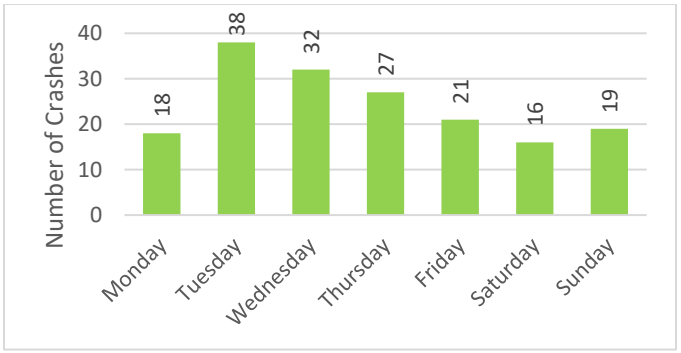

Figure 22 –Pedestrian Crashes by Day of Week, 2019-2023

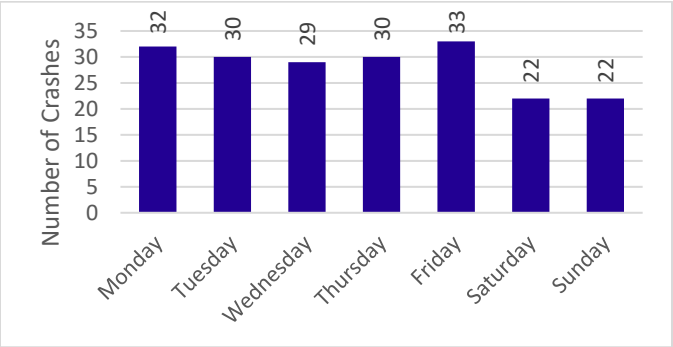

Figure 23 –Bicycle Crashes by Day of Week, 2019-2023

NON-MOTORIST CRASHES BY TIME OF DAY AND LIGHT CONDITION

Figure 24 and **Figure 25** depict the crashes by time of day and light condition for the pedestrian and bicycle crashes respectively. The pedestrian crashes peaked at 7:00 AM, 5:00 PM, and 6:00 PM. More pedestrian crashes occur in the late afternoon and evening when greater walking activity is usually observed, but also correlates with low light conditions. Bicycle crashes peaked at 7:00 AM and 3:00 PM, generally consistent with commuting periods.

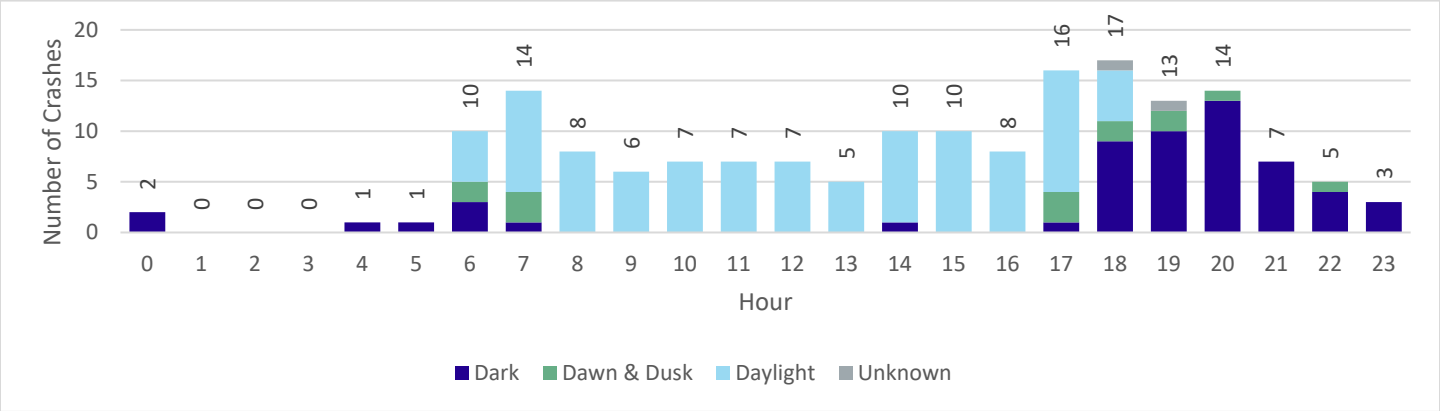

Figure 24 –Pedestrian Crashes by Time of Day and Light Condition, 2019-2023

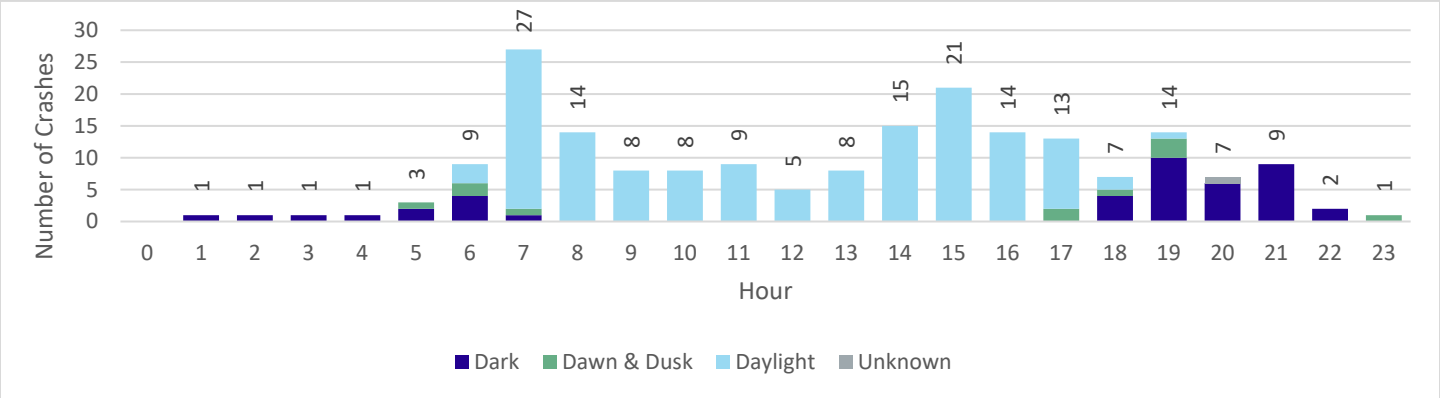

Figure 25 –Bicycle Crashes by Time of Day and Light Condition, 2019-2023

NON-MOTORIST CRASHES BY LOCATION

Of all the crashes involving a pedestrian, approximately 73 percent were intersection-related. **Figure 26** describes the proportion of pedestrian crashes that occurred at signalized intersections, unsignalized intersections, and at non-intersection locations. **Figure 27** provides the location of the pedestrian walking when the collision occurred. Thirty-nine percent of pedestrian crashes involved the pedestrian crossing a driveway access, 15 percent were reported in the roadway, 21 percent were designated as an "other" location, and 11 percent at the intersection, but not in the crosswalk.

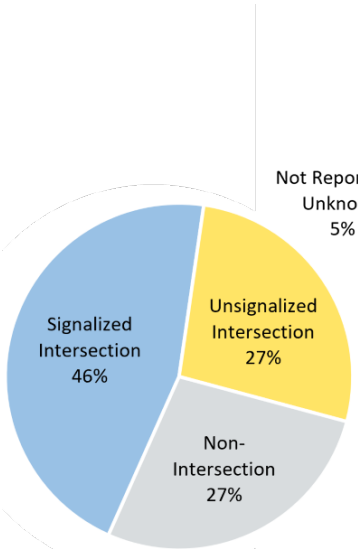

Figure 27 – Location of Pedestrian Crashes, 2019-2023

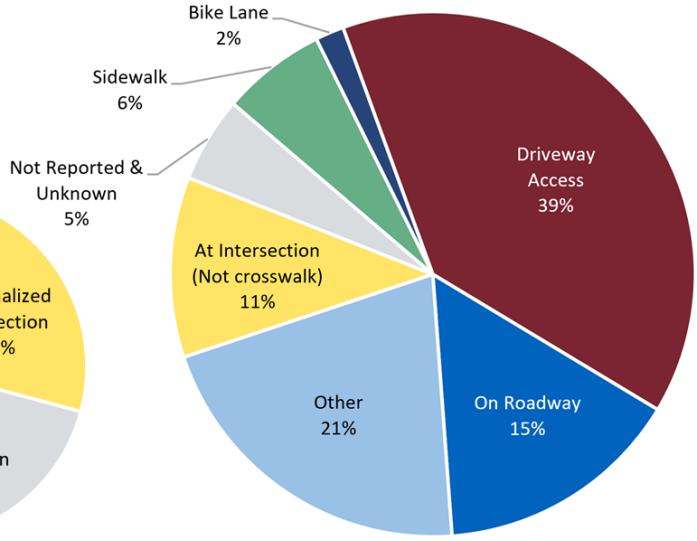

Figure 26 – Pedestrian Location, 2019-2023

Of all the crashes involving a bicyclist, approximately 80 percent were intersection-related. **Figure 28** describes the proportion of bicyclist crashes that occurred at signalized intersections, unsignalized intersections, and at non-signalized intersections. As shown in **Figure 29**, the bicyclist was reported to be crossing a driveway access in 45 percent of all bicycle crashes, 13 percent were reported in a dedicated bike lane, 11 percent at the intersection not in the crosswalk, and 11 percent were not reported or unknown.

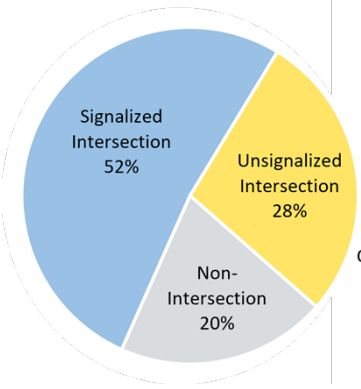

Figure 29 – Location of Bicycle Crashes, 2019-2023

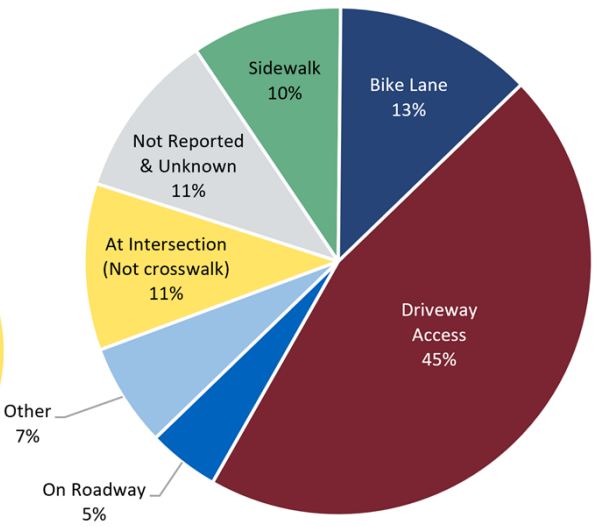

Figure 28 – Bicyclist Location, 2019-2023

NON-MOTORIST HIGH CRASH LOCATIONS

Non-motorized crashes were reviewed by intersection and segment. The top crash locations are summarized in terms of top intersections and segments by pedestrian crashes, top intersections and segments by bicyclist crashes, and top intersections by all non-motorized users. The identifiers used in **Table 15** through **Table 19** use the following convention:

User Type – Location Type – Rank

User types include either pedestrians, bicyclists, or non-motorized users, and the location type is either an intersection or segment. For example, the third highest ranking intersection by pedestrian crashes would have the following identifier "P-I-3".

Due to the small sample size of crashes involving pedestrians and bicyclists at select locations, ranking was performed using multi-level sorting. Locations were sorted by overall crash frequency in the category, then by fatal crashes in the category, and then by location overall crash rate. The resulting order corresponds to the ranks shown in the following sub-sections.

Pedestrians

The top 10 intersections by pedestrian crashes are provided in **Table 15**. All intersections in the top 10 are signalized intersections. The intersection of Cactus Road and 75th Avenue had the highest number of pedestrian crashes during the five-year period, with a total of four crashes. Of the top 10 intersections, a fatal pedestrian occurred at the Olive Avenue/91st Avenue and Deer Valley Road/83rd Avenue intersections.

Table 15 – Top Intersections by Pedestrian Crashes, 2019-2023

	Intersection	Pedestrian Crashes		Crash Rate (Crashes/ MEV)
		Total ↧	Fatal	
P-I-1	75TH AV & CACTUS RD [ID: 1138]	4	0	1.228
P-I-2	91ST AV & PEORIA AV [ID: 552]	3	0	1.919
P-I-3	79TH AV & THUNDERBIRD RD [ID: 5434]	3	0	0.942
P-I-4	91ST AV & MONROE ST [ID: 520]	3	0	0.625
P-I-5	91ST AV & OLIVE AV [ID: 228]	2	1	1.908
P-I-6	99TH AV & NORTHERN AV [ID: 189]	2	0	1.652
P-I-7	LAKE PLEASANT PW & DEER VALLEY RD [ID: 4828]	2	0	1.314
P-I-8	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	2	0	1.253
P-I-9	75TH AV & THUNDERBIRD RD [ID: 1331]	2	0	1.088
P-I-10	83RD AV & DEER VALLEY RD [ID: 1975]	2	1	0.915

Note: Several other intersections feature a total of 2 pedestrian-related crashes, tied with P-I-10.

The top 10 segments by pedestrian crashes are provided in **Table 16.**

Table 16 – Top Segments by Pedestrian Crashes, 2019-2023

	Segment	Pedestrian Crashes		Crash Rate (crashes/ MVMT)
		Total ↧	Fatal	
P-S-1	PEORIA AVE, FROM 95TH AVE TO 99TH AVE [ID: 103]	5	1	344.17
P-S-2	91ST AVE, FROM MOUNTAIN VIEW RD TO PEORIA AVE [ID: 236]	4	0	534.99
P-S-3	PEORIA AVE, FROM GRAND AVE TO 87TH AVE [ID: 104]	4	1	461.66
P-S-4	PEORIA AVE, FROM 87TH AVE TO 91ST AVE [ID: 101]	4	0	384.33
P-S-5	OLIVE AVE, FROM 91ST AVE TO 95TH AVE [ID: 90]	3	1	958.21
P-S-6	OLIVE AVE, FROM 67TH AVE TO 71ST AVE [ID: 84]	3	0	857.31
P-S-7	103RD AVE, FROM BUTLER DR TO OLIVE AVE [ID: 146]	3	0	680.47
P-S-8	83RD AVE, FROM PEORIA AVE TO CHOLLA ST (VARNEY RD) [ID: 208]	3	1	558.59
P-S-9	91ST AVE, FROM PEORIA AVE TO GRAND AVE [ID: 240]	3	0	500.61
P-S-10	83RD AVE, FROM GREENWAY RD TO BELL RD [ID: 202]	3	1	498.55

Note: Several other segments feature a total of 3 pedestrian-related crashes, tied with P-S-10.

Bicyclists

The top intersections by bicycle crashes are provided in **Table 17.** The highest number of bicycle crashes during the five-year period occurred at the intersection of Peoria Avenue and 91st Avenue, with a total of seven crashes.

Table 17 – Top Intersections by Bicyclist Crashes, 2019-2023

	Intersection	Bicyclist Crashes Total ↧	Bicyclist Crashes Fatal	Crash Rate (Crashes/ MEV)
B-I-1	91ST AV & PEORIA AV [ID: 552]	7	0	1.919
B-I-2	83RD AV & DEER VALLEY RD [ID: 1975]	5	0	0.915
B-I-3	83RD AV & UNION HILLS DR [ID: 2770]	4	0	1.023
B-I-4	71ST AV & OLIVE AV [ID: 748]	4	0	0.882
B-I-5	91ST AV & OLIVE AV [ID: 228]	3	0	1.908
B-I-6	79TH AV & PEORIA AV [ID: 659]	3	0	0.837
B-I-7	85TH AV & OLIVE AV [ID: 415]	3	0	0.549
B-I-8	91ST AV & DEER VALLEY RD [ID: 2168]	3	0	0.475
B-I-9	79TH AV & THUNDERBIRD RD [ID: 5434]	2	0	0.942
B-I-10	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	2	0	1.253

Note: Several other intersections feature a total of 2 bicyclist-related crashes, tied with B-I-10.

The top segments by bicycle crashes are shown in **Table 18**. Bicycle crashes were reported most frequently on 83rd Avenue, between Sweetwater Avenue to Thunderbird Road.

Table 18 – Top Segments by Bicyclist Crashes, 2019-2023

	Segments	Bicyclist Crashes Total ↧	Bicyclist Crashes Fatal	Crash Rate (Crashes/ 100 MVMT)
B-S-1	PEORIA AVE, FROM 91ST AVE TO 95TH AVE [ID: 102]	5	0	782.20
B-S-2	OLIVE AVE, FROM 91ST AVE TO 95TH AVE [ID: 90]	4	0	958.21
B-S-3	OLIVE AVE, FROM 67TH AVE TO 71ST AVE [ID: 84]	4	0	857.31
B-S-4	83RD AVE, FROM SWEETWATER AVE TO THUNDERBIRD RD [ID: 210]	4	0	618.23
B-S-5	79TH AVE, FROM THUNDERBIRD RD TO ACOMA RD [ID: 194]	4	0	289.98
B-S-6	PEORIA AVE, FROM 87TH AVE TO 91ST AVE [ID: 101]	3	0	384.33
B-S-7	83RD AVE, FROM PEORIA AVE TO CHOLLA ST (VARNEY RD) [ID: 208]	3	0	558.59
B-S-8	79TH AVE, FROM SWEETWATER AVE TO THUNDERBIRD RD [ID: 193]	3	0	688.52
B-S-9	91ST AVE, FROM NORTHERN AVE TO BUTLER DR [ID: 237]	3	0	590.65
B-S-10	PEORIA AVE, FROM 67TH AVE TO 71ST AVE [ID: 95]	3	0	573.06

Note: Several other segments feature a total of 3 bicyclist-related crashes, tied with B-S-10.

All Non-Motorized Users

The intersections with the most combined pedestrian and bicycle crashes are listed in **Table 19** and shown in **Figure 30**. The intersection with the greatest frequency of pedestrian and bicycle crashes is Peoria Avenue and 91st Avenue, with a total of 10 crashes in the past 5 years.

Table 19 – Top Intersections by Non-Motorized Users, 2019-2023

	Intersection	Ped+ Bike Total ↧	Ped Crashes T	Ped Crashes F	Bike Crashes T	Bike Crashes F	Crash Rate (Crashes/ MEV)
NM-I-1	91ST AV & PEORIA AV [ID: 552]	10	3	0	7	0	1.919
NM-I-2	83RD AV & DEER VALLEY RD [ID: 1975]	7	2	0	5	0	0.915
NM-I-3	91ST AV & OLIVE AV [ID: 228]	5	2	1	3	0	1.908
NM-I-4	75TH AV & CACTUS RD [ID: 1138]	5	4	0	1	0	1.228
NM-I-5	79TH AV & THUNDERBIRD RD [ID: 5434]	5	3	0	2	0	0.942
NM-I-6	79TH AV & PEORIA AV [ID: 659]	5	2	0	3	0	0.837
NM-I-7	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	4	2	0	2	0	1.253
NM-I-8	83RD AV & UNION HILLS DR [ID: 2770]	4	0	0	4	0	1.023
NM-I-9	71ST AV & OLIVE AV [ID: 748]	4	0	0	4	0	0.882
NM-I-10	91ST AV & UNION HILLS DR [ID: 3173]	3	1	0	2	0	0.924

Note: Several other intersections feature a total of 3 non-motorist-related crashes, tied with NM-I-10.

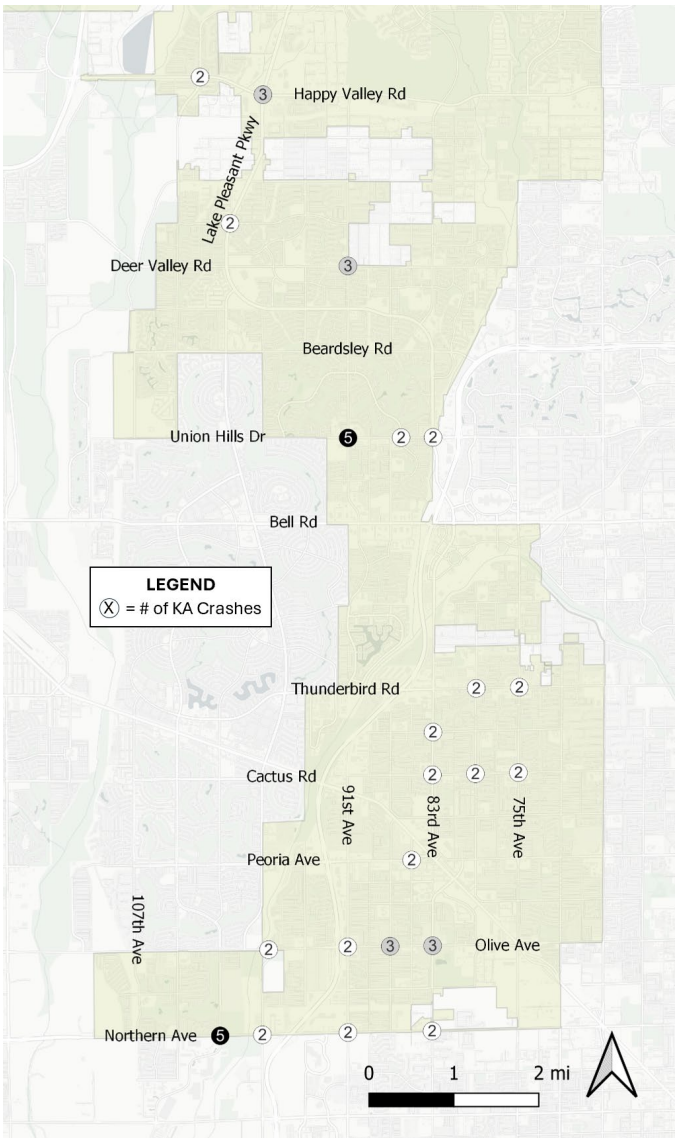

Figure 30 – Frequency of Non-Motorist Crashes at High Crash Locations, 2019-2023

PRIORITIZATION AND NEXT STEPS

The prioritization was performed for four different groups, namely signalized intersections, unsignalized intersections, segments with daily volumes above 5,000 vehicles, and segments with daily volumes below 5,000 vehicles.

Segments were prioritized based on crash frequency of all crash severities (including crashes at major intersections), crash frequency of non-intersection KSI crashes, and crash rate. Intersections were prioritized by crash frequency (all severities), crash rate, and Intersection Safety Score. The intersection safety score (ISS) was calculated based on an adaptation of the MAG Intersection Safety Score network screening methodology. The ISS methodology considered crash frequency, crash severity, and crash type. The prioritization methodology are provided in Appendix C.

INTERSECTIONS

The overall intersection priority list was developed based on the following five steps:

1. Rank intersections by highest crash rate and identify the top 20 (Table 8 for signalized intersections and Table 9 for unsignalized intersections)
2. Rank intersections by highest crash frequency and identify the top 20 (Table 5, signalized, and Table 6, unsignalized)
3. Rank intersections by highest ISS and identify top 20
4. Bring all intersections that made any of the lists into a master table, with their associated rank for each factor in the adjacent column.
5. Calculated the combined rank score of the intersection.

Overall intersection scores were calculated by assigning points to each rank position. The highest rank (#1) got the highest number of points (20). Intersections that ranked lower then 20 received zero points. The combined rank score is the sum of the rank points for crash frequency, crash rate, and intersection safety score.

Table 20 – Combined Rank Score Points

Crash Frequency	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

$$Overall\ Intersection\ Score = Crash frequency\ points + Crash\ rate\ points + ISS\ points$$

The criteria used to prioritize segments were crash frequency as non-intersection crashes per mile, crash severity as non-intersection KSI crashes per mile, and crash rate. **Figure 31** shows the combined rank for unsignalized and signalized intersections and the lists of intersections are displayed in **Table 21** and **Table 22**. More details on the Top 20 signalized and unsignalized intersections can be found in **Appendix C.**

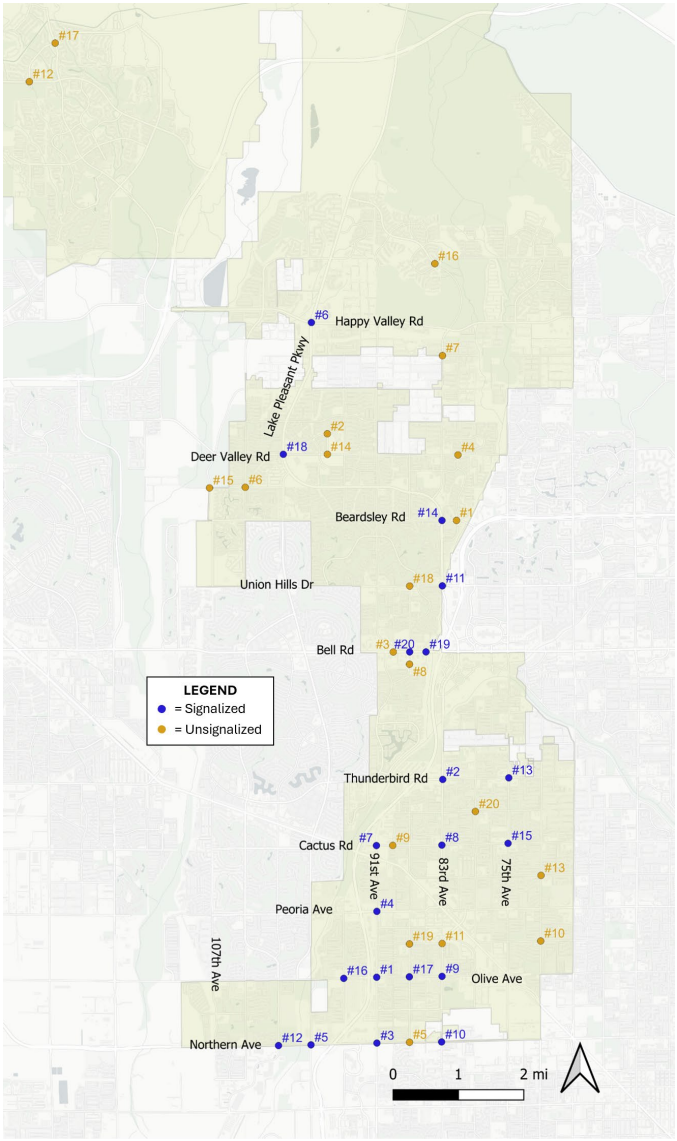

Figure 31 – Combined Rank for Intersections

SEGMENTS

Similar to intersections, the overall ranks for segments were developed in five steps:

1. Rank segments by highest crash rate and identify the top 20 (**Table 12** for segments with less than 5,000 daily vehicles and **Table 13** for segments with more than 5,000 daily vehicles)
2. Rank segments by highest crash frequency, all severities (total number of crashes, including crashes at major intersections) and identify the top 20 (**Table 10** for segments with fewer than 5,000 vehicles and **Table 11** for segments with more than 5,000 daily vehicles)
3. Rank segments by the crash frequency, KSI Crashes (number of non-intersection KSI crashes per mile) and identify top 20
4. Bring all segments that made any of the lists into a master table, with their associated rank for each factor in the adjacent column.
5. Calculated the combined rank score of the segment.

The same rank scoring process described in **Table 20** as used for segments, along with the equation listed below.

$$\begin{aligned} &Overall\ Segment\ Score \\ &\quad = Crash frequency\ points \\ &\quad + Crash\ rate\ points \\ &\quad + KA\ Crash\ frequency\ points \end{aligned}$$

The list of top intersection and segment locations may be used by the City of Peoria to select locations for a more detailed review, development of safety countermeasures, and future project programming. **Figure 32** shows the Top 20 segments in both Above 5,000 daily vehicles and Below 5,000 daily vehicles categories. **Table 23** and **Table 24** show the Segment Score for the top 20 Segments in the Above 5,000 daily vehicles category and Below 5,000 daily vehicles category, respectively. More details on the Top 20 lists of segments can be found in **Appendix C.**

Table 21 – Top 20 Signalized Intersections

Final Rank	Intersection Name	Crash Rate Rank	Crash Frequency Rank	Intersection Safety Score Rank	INTERSECTION SCORE ↧
1	91ST AV & OLIVE AV [ID: 228]	2	1	1	59
2	83RD AV & THUNDERBIRD RD [ID: 1503]	3	2	6	52
3	91ST AV & NORTHERN AV [ID: 232]	6	4	2	51
4	91ST AV & PEORIA AV [ID: 552]	1	7	8	47
5	99TH AV & NORTHERN AV [ID: 189]	4	8	11	40
6	LAKE PLEASANT PW & HAPPY VALLEY RD [ID: 4436]	12	3	10	38
7	91ST AV & CACTUS RD [ID: 1018]	5	5	16	37
8	83RD AV & CACTUS RD [ID: 1070]	11	17	4	31
9	83RD AV & OLIVE AV [ID: 420]	9	10	14	30
10	83RD AV & NORTHERN AV [ID: 5153]	7	11	15	30
11	83RD AV & UNION HILLS DR [ID: 2770]		6	9	27
12	103RD AV & NORTHERN AV [ID: 152]	16		3	23
13	75TH AV & THUNDERBIRD RD [ID: 1331]	18	9	13	23
14	LAKE PLEASANT PW & BEARDSLEY RD [ID: 2665]		19	5	18
15	75TH AV & CACTUS RD [ID: 1138]	14	13	18	18
16	95TH AV & OLIVE AV [ID: 224]	8	18		16
17	87TH AV & OLIVE AV [ID: 395]			7	14
18	LAKE PLEASANT PW & DEER VALLEY RD [ID: 4828]	10	20	19	14
19	84TH AV & BELL RD [ID: 2984]	15	14		13
20	87TH AV & BELL RD [ID: 2983]	19	12		11

Table 22 – Top 20 Unsignalized Intersections

Final Rank	Intersection Name	Crash Rate Rank	Crash Frequency Rank	Intersection Safety Score Rank	INTERSECTION SCORE ↧
1	81ST AV & BEARDSLEY RD [ID: 2686]	3	1	1	58
2	97TH AV & SPECKLED GECKO DR [ID: 4798]	1	7	12	43
3	89TH AV & BELL RD [ID: 2986]		2	4	36
4	81ST AV & DEER VALLEY RD [ID: 2035]		3	9	30
5	87TH AV & NORTHERN AV [ID: 355]		11	2	29
6	107TH AV & ROSE GARDEN LN [ID: 2143]		6	8	28
7	83RD AV & CALLE LEJOS [ID: 1704]		12	3	27
8	87TH AV & KELTON LN [ID: 2982]	7	8		27
9	89TH AV & CACTUS RD [ID: 1035]		4	13	25
10	71ST AV & MOUNTAIN VIEW RD [ID: 701]	5	13		24
11	83RD AV & MOUNTAIN VIEW RD [ID: 614]		9	10	23
12	WESTLAND RD & LONE MOUNTAIN RD [ID: 5122]	15		6	21
13	71ST AV & CHOLLA ST [ID: 823]	4	17		21
14	97TH AV & DEER VALLEY RD [ID: 5684]		15	7	20
15	112TH AV & ROSE GARDEN LN [ID: 5596]	2			19
16	JOMAX RD & HIGH DESERT DR [ID: 1868]	20	5		17
17	WESTLAND RD & VISTANCIA BL [ID: 5111]			5	16
18	87TH AV & UNION HILLS DR [ID: 3225]		10	16	16
19	87TH AV & MOUNTAIN VIEW RD [ID: 522]	6			15
20	79TH AV & SWEETWATER AV [ID: 1410]	8	20		14

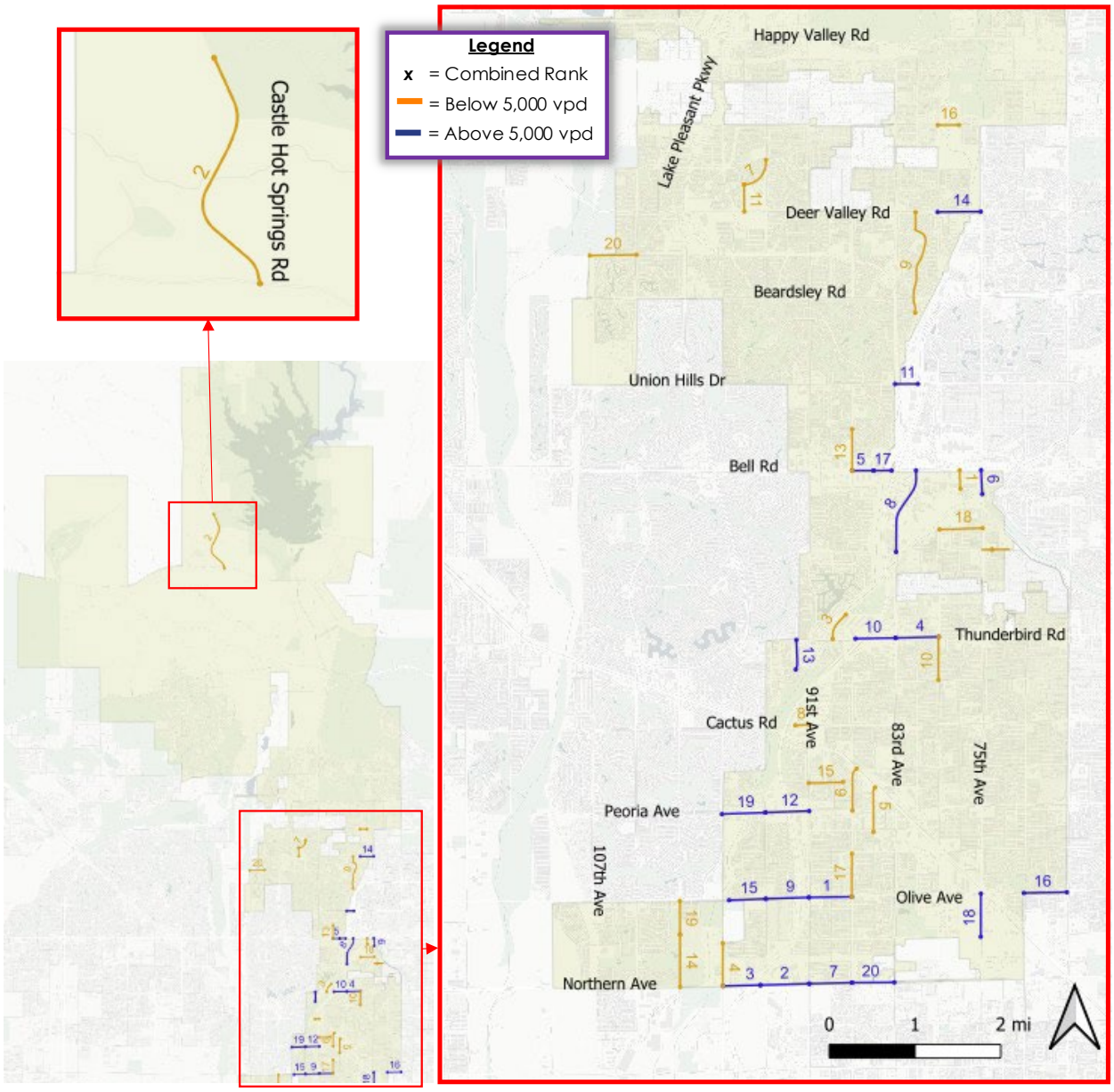

Figure 32 – Combined Rank for Segments

Table 23 – Top 20 Segments Above 5,000 Daily Vehicles

Final Rank	Segment Name	Crash Rate Rank	Crash Frequency Rank	Non-Intersection KSI Crashes/ Mile Rank	SEGMENT SCORE ↧
1	Olive Ave, from 87Th Ave to 91St Ave [ID: 89]	9	5	9	40
2	Northern Ave, from 91St Ave to 95Th Ave [ID: 78]	5	6	13	39
3	Northern Ave, from 95Th Ave to 99Th Ave [ID: 79]	10	2	19	32
4	Thunderbird Rd, from 79Th Ave to 83Rd Ave [ID: 126]	3	7		32
5	Bell Rd, from 84Th Ave to 87Th Ave [ID: 498]	15	15	2	31
6	75Th Ave, from Paradise Ln to Bell Rd [ID: 182]	1		12	29
7	Northern Ave, from 87Th Ave to 91St Ave [ID: 77]	13		1	28
8	83Rd Ave, from Greenway Rd to Bell Rd [ID: 202]	8	8		26
9	Olive Ave, from 91St Ave to 95Th Ave [ID: 90]	16	1		25
10	Thunderbird Rd, from 83Rd Ave to 87Th Ave [ID: 127]	17	3		22
11	Union Hills Dr, from Loop 101 to 83Rd Ave [ID: 137]	11		11	20
12	Peoria Ave, from 91St Ave to 95Th Ave [ID: 102]	14	9		19
13	Plaza Del Rio, from Thunderbird Rd to Pershing Ave [ID: 527]	2			19
14	Deer Valley Rd, from 75Th Ave to 79th Ave [ID: 35]			3	18
15	Olive Ave, from 95Th Ave to 99Th Ave [ID: 91]			4	17
16	Olive Ave, from 67Th Ave to 71St Ave [ID: 84]		4		17
17	Bell Rd, from Loop 101 to 87Th Ave [ID: 475]	6	19		17
18	75Th Ave, from Butler Dr to Olive Ave [ID: 175]	4			17
19	Peoria Ave, from Grand Ave to 87Th Ave [ID: 104]			5	16
20	Northern Ave, from 83Rd Ave to 87Th Ave [ID: 76]			6	15

Table 24 – Top 20 Segments Below 5,000 Daily Vehicles

Final Rank	Segment Name	Crash Rate Rank	Crash Frequency Rank	Non-Intersection KSI Crashes/ Mile Rank	SEGMENT SCORE ↧
1	77Th Ave, from Paradise Ln to Bell Rd [ID: 186]	1	1		40
2	Castle Hot Springs Rd, from Carefree Highway to North Lake Pleasant Park Entrance [ID: 264]	2	9	6	32
3	Rio Vista Blvd, from Thunderbird Rd to Into Rio Vista Park [ID: 292]	6	6		30
4	99Th Ave, from Northern Ave to Olive Ave [ID: 257]		2	1	25
5	85TH AVE, from PEORIA AVE to GRAND AVE [ID: 446]	5	12		25
6	87Th Ave, from Peoria Ave to Cholla St (Varney Rd) [ID: 224]	4	20	3	22
7	Speckled Gecko Dr, from Williams Rd to 97TH Ave [ID: 519]	3			18
8	Cactus Rd, from 91St Ave to 92Nd Dr [ID: 402]		3		18
9	81St Ave, from Oraibi Dr to Deer Valley Rd [ID: 416]		4		17
10	79Th Ave, from Sweetwater Ave to Thunderbird Rd [ID: 193]		5		16
11	97TH Ave, from Speckled Gecko Dr to Deer Valley Rd [ID: 521]	15	13		14
12	Greenway Rd, from 72Nd Ave to 75Th Ave [ID: 904]	7			14
13	87Th Ave, from Bell Rd to Grovers Ave [ID: 216]		7		14
14	103Rd Ave, from Northern Ave to Butler Dr [ID: 147]		8		13
15	Yucca St, from 8701 W to 91St Av [ID: 435]	8			13
16	Pinnacle Peak Rd, from 77Th Ave to 79Th Ave [ID: 106]	9			12
17	87Th Ave, from Olive Ave to Mountain View Rd [ID: 222]		10		11
18	Tierra Buena Ln, from 75Th Av to 79Th Av [ID: 437]	10			11
19	103Rd Ave, from Butler Dr to Olive Ave [ID: 146]		11		10
20	Rose Garden Ln, from 107Th Ave to 111Th Ave [ID: 114]	11			10

COMPARISON TO NATIONAL AND REGIONAL STATISTICS

Comparisons between the Peoria data, statewide, and nationwide data were conducted to analyze trends. Statewide data was collected from ADOT Crash Facts and US Census while nationwide data was obtained from Fatality Annual Reporting System (FARS).

Fatality rates (number of people killed in motor vehicle collisions divided by 100,000 population) have been increasing in the City of Peoria over the past five years. This trend is consistent with the trends observed statewide and nationwide, though the actual fatality rate in Peoria is lower than both.

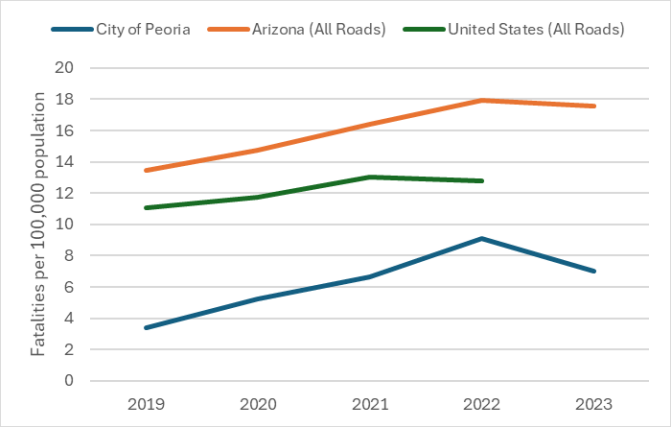

Figure 33 – Fatality Rate Trends in Peoria, Statewide, and Nationwide, 2019-2023

ADOT Crash Facts[2] provides information for all jurisdictions in Arizona. The 2023 percentage of fatal and serious injury crashes for several cities in Maricopa County are provided in **Figure 34**. The nine cities with the greatest frequency of crashes were selected for analysis along with countywide data for Maricopa County.

The percentage of fatal crashes in the City of Peoria is 0.45%, which is among the lower ranks of the selected cities. Compared to countywide data for Maricopa County, the fatal crash percentage is much lower. The percentage of injury crashes for the selected cities and countywide data is shown in **Figure 35**. The percentage of injury crashes for Peoria is higher than all the selected cities, and even higher than the countywide rate. Overall, fatal crashes are less frequent in comparison, but injury crashes are more frequent.

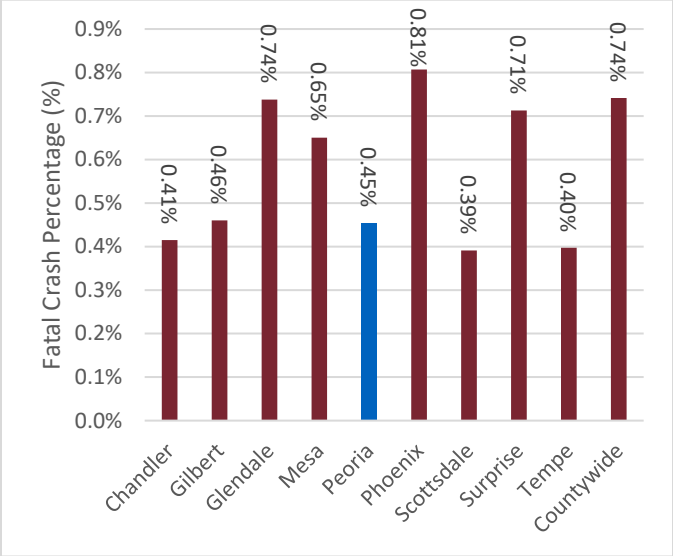

Figure 34 – Fatal Crash Percentage for Cities in Maricopa County, 2023

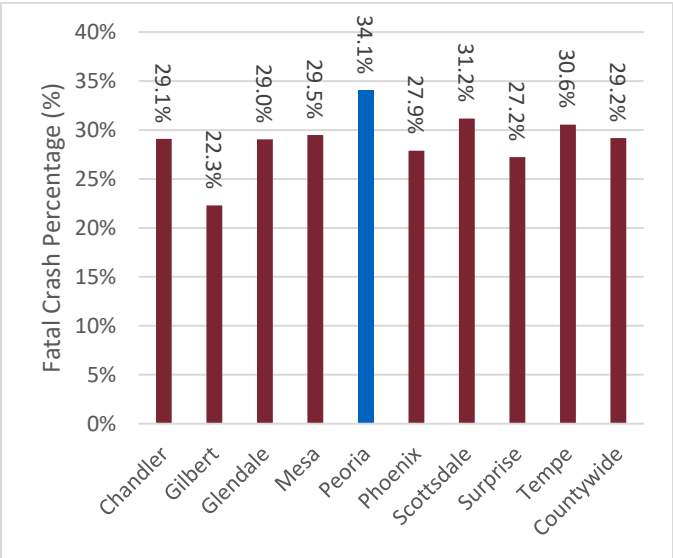

Figure 35 – Injury Crash Percentage for Cities in Maricopa County, 2023

[2] Retrieved 05-15-2025 from https://azdot.gov/sites/default/files/2024-07/2023-Crash-Facts_0.pdf

Appendices

Appendix A – Peoria 2019-2023 Crash Rate Map

Appendix B – Crash Rate Map Methodology

Appendix C – Prioritization Methodology

APPENDIX A – PEORIA 2019-2023 CRASH RATE MAP

2025

Crash Rate Analysis

by Signalized Intersections

NORTH

0 0.5 1 2

scale in miles

Legend

Standard Score of Crash Rate *

Signalized Intersections

- < -0.50
- -0.50 - 0.50
- 0.50 - 1.50
- 1.50 - 2.50
- > 2.50

* Distance from the Mean, Measured in Standard Deviations

Lake Pleasant Area Inset

Data: City of Peoria/Y2K

Visualization Analysis | Y2K engineering 2025

Peoria, AZ | Crash Rate Analysis 2025

2025

Crash Rate Analysis

by Unsignalized Intersections

NORTH

0 0.5 1 2

scale in miles

Legend

Standard Score of Crash Rate *

Unsignalized Intersections

- < -0.50
- -0.50 - 0.50
- 0.50 - 1.50
- 1.50 - 2.50
- > 2.50

* Distance from the Mean, Measured in Standard Deviations

Lake Pleasant Area Inset

Data: City of Peoria/Y2K

Visualization Analysis | Y2K engineering 2025

Peoria, AZ | Crash Rate Analysis 2025

2025

Crash Rate Analysis

by Segments < 5,000 ADT

NORTH

0 0.5 1 2

scale in miles

Legend

Standard Score of Crash Rate *

- Outside Scope

Segments < 5,000 ADT

- < -0.50
- -0.50 - 0.25
- 0.25- 1.00
- 1.00 - 1.75
- > 1.75

* Distance from the Mean, Measured in Standard Deviations

Lake Pleasant Area Inset

Data: City of Peoria/Y2K

Visualization Analysis | Y2K engineering 2025

2025

Crash Rate Analysis

by Segments > 5,000 ADT

NORTH

0 0.5 1 2

scale in miles

Legend

Standard Score of Crash Rate *

- Outside Scope

Segments > 5,000 ADT

- < -0.50
- -0.50 - 0.25
- 0.25 - 1.00
- 1.00 - 1.75
- > 1.75

* Distance from the Mean, Measured in Standard Deviations

Lake Pleasant Area Inset

Data: City of Peoria/Y2K

Visualization Analysis | Y2K engineering 2025

Peoria, AZ | Crash Rate Analysis 2025

2025

Crash Rate Analysis

by Segment & Intersection

NORTH

0 0.5 1 2

scale in miles

Legend

Standard Score of Crash Rate *

- Outside Scope

Intersections

- < -0.50
- -0.50 - 0.50
- 0.50 - 1.50
- 1.50 - 2.50
- > 2.50
- Signalized Intersection Indicator

Segments

- < -0.50
- -0.50 - 0.25
- 0.25- 1.00
- 1.00 - 1.75
- > 1.75

Lake Pleasant Area Inset

Data: City of Peoria/Y2K

Visualization Analysis | Y2K engineering 2025

APPENDIX B – CRASH RATE MAP METHODOLOGY

Peoria Crash Rate Map Methodology Memorandum

TO:	Austin Kennedy, PE, City of Peoria Assistant Traffic Engineer Brandon Forrey, PE, City of Peoria Traffic Engineer
FROM:	Denise Baker, PhD, PE, RSP_1, Y2K Engineering Marty Shaeffer, Engineering Mapping Solutions Melissa Gende, PE, PTOE, RSP_1, Y2K Engineering Kurt Larson, EIT, Y2K Engineering
DATE:	May 15, 2023
SUBJECT:	2019-2023 Peoria Crash Rate Map Methodology – *Revised*

INTRODUCTION

This memorandum describes the methodology used to create the latest crash rate maps for the City of Peoria. This effort was the result of a collaboration between Y2K Engineering and Engineering Mapping Solutions. The crash rate maps consider traffic volumes and crash data from 2019 to 2023. The prepared crash rate maps involve an intersection map, a segment map, and a combined intersection and segment map.

DATA

Crash data was obtained from ADOT's Arizona Crash Information System Database yearly for the period from 2017 to 2023 (the latest available at the evaluation time). City of Peoria GIS staff provided the shapefiles that represent the city's signalized intersections, roadway segments, functional classification, and historically collected volumes from 2012 to 2024. The following GIS shapefiles were used:

- Streets (Peoria)
- Intersections (Peoria)
- Traffic_Count_Segments (Peoria)
- Traffic Lights (Peoria, with updates)
- City_Limits (Peoria)

Crash Selection

Statewide crash data were filtered based on the latitude and longitude. The latitude and longitude filter used was as follows:

$$33.52738 \leq \text{Latitude} \leq 33.99590$$
$$-112.47107 \leq \text{Longitude} \leq -112.15384$$

Then GIS software was used to select and extract crashes within 300 feet of City of Peoria boundary. This approach was used to provide a better understanding of crashes along the City boundary roads such as Northern Avenue.

Additionally, the area of Happy Valley Parkway, from 107th Avenue to Vistancia Boulevard was included in the GIS selection, even though that is not within the city boundary. Happy Valley Parkway, from 107th Avenue to Vistancia Boulevard was considered in the analysis as it is maintained by the City of Peoria.

Crashes on ADOT facilities (SR 74, SR 101, SR 303, and Grand Avenue) were excluded and not considered on either segment or intersection assignment. At traffic interchanges, a spatial review was conducted to exclude crashes on the freeway mainline and ramps but include crashes on the arterial crossing the interchange.

SEGMENTS

The segment network is focused on major arterials and collector roadways on the mile and half-mile network. To be considered in the crash rate map, segments must have historical crash data associated from the period of 2019 to 2023. Seven residential segments for which volumes were available were not included in the analysis. City streets were separated into segments at signalized intersections, or through other breaks in the traffic volume data. Each segment was then assigned a unique ID number and a street name. Whenever possible, the assigned segment IDs match the data collection ID provided by City of Peoria. The street classification provided in the roadway segment file was used to assign a functional classification to the evaluated segments.

Y2K coordinated with the City of Peoria in previous versions of the crash rate maps to omit segments that are within the City but not owned or operated by the City. Additionally, segments were omitted from the map and analysis if traffic volumes were not available for the latest five years.

Segments shorter than 1/8 mile (660 feet) were evaluated individually to decide if they should be excluded from the analysis or incorporated into adjacent segments. Due to the high importance of segment length in the crash rate calculation, shorter segments can appear to have inflated crash rates despite very low crash frequencies. Segments with less than 750 vehicles per day were not included in the analysis unless they had 3 or more crashes in the evaluated 5-year period.

Volumes

Volume evaluation was performed in GIS software. It considers volume data from 2019 to 2024, other years were excluded. If multiple years of data are available for a segment, the latest volume was used. In previous iterations, the average of volumes available was used, so this assumption reflects a change in the 2024 analysis. If multiple subsegments of volume data are available for the project segments, the weighted average (based on length) is used. Directional separations of the volumes were maintained (e.g., total, eastbound, and westbound).

Segment Assignment

All crashes within 150 feet of a segment were assigned to the closest segment. Crashes were assigned to segments independently from their intersection assignment. The total number of crashes at a segment excludes crashes at evaluated signalized and unsignalized intersections. It includes crashes at minor intersections and driveways that were not evaluated as part of the intersection analysis. Crashes on segments were further evaluated on the annual report based on their location and separated by intersection versus non-intersection crashes. Segment assignment includes crashes at the intersection with ADOT ramps, even if the intersection itself was not considered.

Crash Rate

Segment crash rates are calculated using AADT, the number of crashes per segment, and segment length, as described in Equation (1). Segment crash rates are measured in terms of crashes per 100 million vehicle miles traveled.

$$Segment\ Crash\ Rate = \frac{Number\ of\ Crashes\ (2019\ to\ 2023) \times 100{,}000{,}000}{AADT\ \times Segment\ Length\ (mi) \times 365\ (days) \times 5\ (years)} \quad (1)$$

Map Categories

For better interpretation of the calculated crash rates, segments were separated according to their daily volumes. Segments with daily volume of 5,000 vehicles per day or lower were grouped together. An equivalent map shows the comparison of segments with daily volumes of more than 5,000 vehicles per day.

INTERSECTIONS

Signalized and unsignalized intersections are included in the crash rate map separately, as long as the available volume supported the calculation of the crash rate. The intersections were identified using City of Peoria's data collection IDs. Intersections were classified based on the functional classification of the crossing streets. The list of intersections considered includes:

- Arterial/Arterial
- Arterial/Collector
- Arterial/Local
- Collector/Collector
- Collector/Local
- Local/Local

Driveways were not included in the analysis. Intersections were removed from the analysis if there was not enough volume data for the crash rate calculation. Intersections on ADOT ramps were not included in the analysis.

Intersections signalized since the last analysis

New signals were installed since the last crash rate analysis during Spring 2023. Table 1 shows the list of newly signalized intersections provided by the City, along with a description of their inclusion into the new evaluation.

Table 1: Newly Signalized Intersections Reviewed

Location	Status
111th Avenue and Northern Avenue	Included in the signalized analysis
Lake Pleasant Parkway & Rose Garden Lane	Included in the signalized analysis
83rd Avenue and Hillcrest Boulevard	Included in the signalized analysis
El Mirage Road & Lone Mountain Parkway	Included in the signalized analysis
Ridgeline Road and Vistancia Boulevard	Included in the signalized analysis
Vistancia Boulevard and Jomax Road	Included in the signalized analysis
99th Avenue and Olive Avenue	Included in the signalized analysis
Lake Pleasant Parkway and Dixileta	Volumes not available
79th Avenue and Happy Valley Road	Volumes not available
77th Lane and Happy Valley Road	Volumes not available
98th Avenue and Happy Valley Road	Volumes not available
Loop 303 and Lake Pleasant Parkway	Volumes not available
Loop 303 and Jomax Road	Volumes not available
99th Avenue HAWK, north of Northern	Not applicable for evaluation
Mystic HAWK, Westland and Garambullo	Not applicable for evaluation

Volumes

Similar to the segment volume evaluation, intersection volume only considers data from 2017 to 2024 with other years of data excluded. If multiple years of data are available for a segment approaching the intersection, the latest volume was used. The total entering volume (TEV) was estimated by capturing the sum of the directional volumes towards the intersection, as shown in Figure 1.

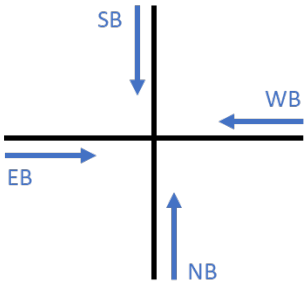

Figure 1: Directional Volumes towards the Intersection

When volumes were not available at one or more legs of the intersections, assumptions were made for that missing approach based on the available data on a case-by-case basis. If volume was available for only three of the four legs, the missing leg volume was assumed as the same as the opposing volume. If volumes could not be reasonably estimated or if all the minor street volume was missing, the intersection was excluded from crash rate calculations. Selected intersections on the city boundary were also removed from the crash rate map as volumes were not fully available at those locations. While intersection turn movement counts were not considered as part of this project, future evaluation of intersection counts will enhance the accuracy of the intersection crash rate evaluations.

Intersection Assignment

Crashes were associated with an intersection if they occurred within a 150-foot radius of the intersection center. If a crash were within 150 feet of two intersections, it was assigned to the nearest one.

Crash Rate

Intersection crash rates are calculated using the total entering vehicles (TEV) per day, and the number of crashes per intersection, as shown in Equation (2). Intersection crash rates are measured in terms of crashes per 1 million entering vehicles.

$$Intersection\ Crash\ Rate = \frac{Number\ of\ Crashes\ (2017\ to\ 2021) \times 1{,}000{,}000}{TEV\ per\ day\ \times 365\ (days) \times 5\ (years)} \quad (2)$$

Map Categories

Signalized intersections were evaluated separately from unsignalized intersections; a separate map was prepared for each group.

DISTANCE FROM THE MEAN (z)

The standard score method was used to evaluate how far from the citywide mean each of the segments and intersections are and to identify potential outliers in terms of crash rate. The process for calculating the citywide crash rate mean and standard deviation calculations were completed separately for signalized intersections, unsignalized intersections, segments with volume above 5,000 vehicles per day, and segments with volumes below 5,000 vehicles per day.

The standard deviation (σ) is calculated for the entire population using **Equation (3)**.

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}} \quad (3)$$

Where x is the crash rate of each segment/intersection *i*, μ is the mean crash rate on the evaluated segments or intersections, and N is the sample size of evaluated segments or intersections. **Table 2** shows the summary of the crash rate evaluation in each of the four samples analyzed.

Table 2: Summary of Crash Rate Evaluation

Sample	Sample Size (N)	Unit	Mean (μ)	Standard Deviation (σ)
Segments with volume below 5,000 vehicles a day	196	Crashes/ 100 million vehicle miles traveled	67.0	203.4
Segments with volume above 5,000 vehicles a day	172	Crashes/ 100 million vehicle miles traveled	83.5	90.2
Signalized intersections	106	Crashes/ Million Entering Vehicles	0.66	0.43
Unsignalized intersections	106	Crashes/ Million Entering Vehicles	0.33	0.36

The standard scores measure the distance from each segment/intersection crash rate to the mean, in standard deviation units. The standard score (z) is calculated for each sample observation *i* using **Equation (4)**.

$$z_i = \frac{x_i - \mu}{\sigma} \quad (4)$$

Where μ is the mean crash rate on the evaluated segments or intersections and σ is the standard deviation of the crash rate on the evaluated segments/intersections, as calculated in **Equation (3)**.

It is generally accepted that z scores greater than 3 or smaller than -3 are considered outliers. Negative z values indicate a crash rate below the average, zero indicates the crash rate is the same as the average, and positive values indicate crash rates above average. On the crash rate maps, intersections were marked as higher than average when the crash rate is greater than 2.5 standard deviations from the mean. Segments were marked as higher than average where the crash rate is greater than 1.75 standard deviations from the mean. Those thresholds were selected based on the z scores observed in the samples and are consistent with the mark ups shown in the Spring 2023 analysis.

COMPARISON TO PREVIOUS CRASH RATE EVALUATION

Table 3 shows a comparison of the mean crash rates observed in the Spring 2023 analysis and the crash rates observed in the Spring 2025 analysis presented in this memorandum. Crash rate reductions were observed at evaluated intersection categories. Given the change in the methodology to calculate segment crash rate, where crashes at major intersections are excluded from the segment evaluation, a comparison between crash rates obtained on both reports is not possible.

Table 3: Crash Rate Comparison with Previous Evaluation

Sample	Unit	2017-2021 Mean (μ)	2019-2023 Mean (μ)	Change
Segments with volume below 5,000 vehicles a day	Crashes/ 100 million vehicle miles traveled	345.4	67.0 (excludes crashes at major intersections)	N/A
Segments with volume above 5,000 vehicles a day	Crashes/ 100 million vehicle miles traveled	299.4	83.5 (excludes crashes at major intersections)	N/A
Signalized intersections	Crashes/ Million Entering Vehicles	0.68	0.66	-2.9%
Unsignalized intersections	Crashes/ Million Entering Vehicles	0.39	0.33	-14.9%

OUTSIDE SCOPE INDICATION

Multiple segments within the city of Peoria and close to the City limits were not included in the evaluation as they are not under Peoria's jurisdiction. Those segments were identified by the City and are marked on the crash rate maps as "Outside scope". The segments include:

- Grand Avenue (ADOT)
- Loop 101 (ADOT)
- Loop 303 (ADOT)
- Carefree Highway/ SR74 (ADOT)
- 83rd Avenue from Northern Ave to Las Palmaritas (MCDOT)
- Olive Avenue from New River to 115th Ave (MCDOT)
- 67th Avenue from Olive Avenue to Acoma Drive (Glendale)
- 91st Avenue from Cactus Road to Loop 101 (ADOT)
- Bell Road from Loop 101 to 73rd Avenue (Glendale)
- 83rd Avenue from Bell Road to Union Hills Drive (Glendale)
- Union Hills Drive from 9300W to 115th Avenue (MCDOT)
- 75th Avenue from Deer Valley Road to Hillcrest Boulevard (Glendale)
- Pinnacle Peak Road from 83rd Avenue to 91st Avenue (MCDOT)
- 87th Avenue from Pinnacle Peak Road to Calle Lejos (MCDOT)
- 95th Avenue from Pinnacle Peak Road to Calle Lejos (MCDOT)
- Calle Lejos from 85th Avenue to 86th Avenue (MCDOT)
- Calle Lejos from 89th Avenue to 93rd Avenue (MCDOT)
- 67th Avenue from Happy Valley Road to Jomax Road (Phoenix)

Note: The segment length (from Peoria traffic volume map) was modified, as the original segment spanned within both Peoria jurisdiction and MCDOT jurisdiction.

NEXT STEPS

The crash rate maps identify intersections and segments with the greatest crash rates.

The information obtained in the crash rate evaluations presented in this memorandum will be incorporated into the Citywide Crash Evaluation report and expanded to include crash frequency where volumes are not available for a more robust network screening evaluation. A more detailed analysis of the crash profile at the evaluated segments is performed in the annual crash report, where the crashes are broken down by severity and intersection versus non intersection crashes.

APPENDIX C – PRIORITIZATION METHODOLOGY

Peoria Intersection and Segment Prioritization Methodology Memorandum

TO: Austin Kennedy, PE, City of Peoria Assistant Traffic Engineer
Brandon Forrey, PE, City of Peoria Traffic Engineer

FROM: Denise Baker, PhD, PE, RSP_1, Y2K Engineering
Melissa Gende, PE, PTOE, RSP_1, Y2K Engineering

DATE: May 15, 2025

SUBJECT: Intersection and Segment Prioritization Methodology – *Revised*

INTRODUCTION

This memorandum describes the methodology used to prioritize intersections and segments based on historical crash trends. The prioritization effort builds crash dashboard preparation and crash rate analysis, based on crash data from 2019 to 2023.

DATA

Crash data was obtained from ADOT's Arizona Crash Information System Database yearly for the period from 2019 to 2023 (the latest available at the evaluation time). The crash rates are based on traffic volumes provided by City of Peoria GIS staff. More information on crash rate calculations is provided in the Crash Rate Map Methodology Memorandum.

PREPARATION

The crash data used in the prioritization effort was prepared using the following four steps:

1. Intersection node (signalized and unsignalized), roadway segment, and traffic volume data were provided in GIS
2. Crashes were assigned to each intersection (within 150 feet) and segment
3. Crash rates were calculated for all intersections and segments (with traffic volume data available)
4. Basic crash attributes were queried for each location (crash frequency, crash severity, crash type)

Locations were separated into four separate groups; signalized intersections, unsignalized intersections, segments with an average daily traffic volume less than 5,000 ADT, and segments with an average daily traffic volume over 5,000 ADT.

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INTERSECTIONS

Intersection prioritization considered the following three elements:

- Crash Frequency
- Crash Rate
- Intersection Safety Score (based on MAG Network Screening Methodology)

MAG's Network Screening Methodology for Intersections[1] calculates an Intersection Safety Score (ISS) for signalizes intersections. For Peoria's network screening the same methodology was applied to both unsignalized and signalized intersections. MAG's ISS is calculated using three attributes, namely crash frequency (CF), crash severity (CS), and crash type (CT). The crash type factor represents a cost analysis based on the average cost of each crash type. For the Peoria network screening, the cost values were calculated using Peoria crash data and cost rates from ADOT 2023 Crash Facts. The Intersection Safety Score was then calculated using the formula below.

$$\mathbf{ISS} = \left(\frac{\mathbf{1}}{\mathbf{4}} * \frac{\mathbf{CF}}{\mathbf{Max(CF)}}\right) + \left(\frac{\mathbf{1}}{\mathbf{2}} * \frac{\mathbf{CS}}{\mathbf{Max(CS)}}\right) + \left(\frac{\mathbf{1}}{\mathbf{4}} * \frac{\mathbf{CT}}{\mathbf{Max(CT)}}\right)$$

The prioritization effort for intersections involved five steps:

1. Rank intersections by highest crash rate and identify the top 20
2. Rank intersections by highest crash frequency and identify the top 20
3. Rank intersections by highest ISS and identify top 20
4. Bring all intersections that made any of the lists into a master table, with their associated rank for each factor in the adjacent column.
5. Calculated the overall score of the intersection.

For each category (i.e., crash rate), points were assigned based on the rank position. The highest rank (#1), was assigned the highest number of points (20). Intersections that ranked lower than #20 were assigned zero points. The Overall Intersection Score is the sum of points given from each of the three categories; crash frequency, crash rate, and Intersection Safety Score. An example of this process is shown in the image below.

[1] https://azmag.gov/Portals/0/Documents/TSC_2010-07-20_MAG-Network-Screening-Methodology-for-Intersections-May-2010_.pdf?ver=K0SzW-xzwE6twOamF36zJg%3D%3D, accessed 2023-05-17.

Overall Intersection Score = Crash Frequency Points + Crash Rate Points + ISS Points

Point System for Crash Frequency:

Crash Frequency	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Point System for Crash Rate:

Crash Rate	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Point System for ISS:

ISS	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Higher Intersection Score = Greater Safety Need

In the case of ties in the Overall Intersection Score, the crash rate rank was used as a tie breaker. The top 20 unsignalized intersections are presented in Table 1 and in Figure 1. The top 20 signalized intersections are shown in Table 2 and in Figure 2.

Table 1: Top 20 Unsignalized Intersections by Overall Intersection Score

Final Rank	Intersection Name	Crash Rate Rank	Crash Frequency Rank	Intersection Safety Score Rank	INTERSECTION SCORE ↧
1	81ST AV & BEARDSLEY RD [ID: 2686]	3	1	1	58
2	SPECKLED GECKO DR & 97TH AV [ID: 4798]	1	7	12	43
3	BELL RD & 89TH AV [ID: 2986]		2	4	36
4	81ST AV & DEER VALLEY RD [ID: 2035]		3	9	30
5	NORTHERN AV & 87TH AV [ID: 355]		11	2	29
6	ROSE GARDEN LN & 107TH AV [ID: 2143]		6	8	28
7	83RD AV & CALLE LEJOS [ID: 1704]		12	3	27
8	KELTON LN & 87TH AV [ID: 2982]	7	8		27
9	CACTUS RD & 89TH AV [ID: 1035]		4	13	25
10	71ST AV & MOUNTAIN VIEW RD [ID: 701]	5	13		24
11	MOUNTAIN VIEW RD & 83RD AV [ID: 614]		9	10	23
12	WESTLAND RD & LONE MOUNTAIN RD [ID: 5122]	15		6	21
13	71ST AV & CHOLLA ST [ID: 823]	4	17		21
14	DEER VALLEY RD & 97TH AV [ID: 5684]		15	7	20
15	112TH AV & ROSE GARDEN LN [ID: 5596]	2			19
16	JOMAX RD & HIGH DESERT DR [ID: 1868]	20	5		17
17	WESTLAND RD & VISTANCIA BL [ID: 5111]			5	16
18	UNION HILLS DR & 87TH AV [ID: 3225]		10	16	16
19	87TH AV & MOUNTAIN VIEW RD [ID: 522]	6			15
20	79TH AV & SWEETWATER AV [ID: 1410]	8	20		14

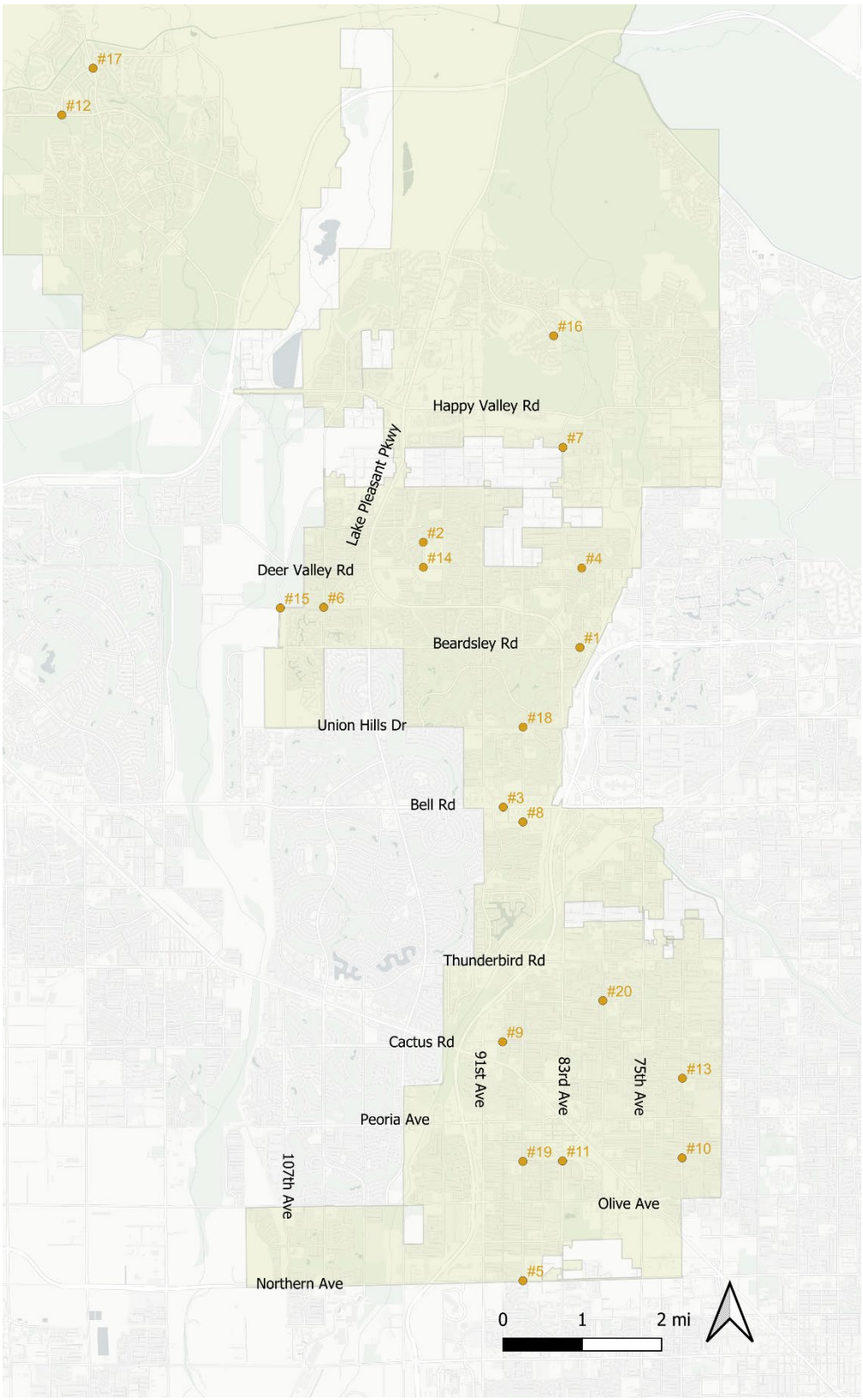

Figure 1: Top 20 Unsignalized Intersections by Overall Over all Intersection Score

Table 2: Top 20 Signalized Intersections by Overall Intersection Score

Final Rank	Intersection Name	Crash Rate Rank	Crash Frequency Rank	Intersection Safety Score Rank	INTERSECTION SCORE ↧
1	OLIVE AV & 91ST AV [ID: 228]	2	1	1	59
2	83RD AV & THUNDERBIRD RD [ID: 1503]	3	2	6	52
3	NORTHERN AV & 91ST AV [ID: 232]	6	4	2	51
4	PEORIA AV & 91ST AV [ID: 552]	1	7	8	47
5	99TH AV & NORTHERN AV [ID: 189]	4	8	11	40
6	HAPPY VALLEY RD & LAKE PLEASANT PW [ID: 4436]	12	3	10	38
7	91ST AV & CACTUS RD [ID: 1018]	5	5	16	37
8	83RD AV & CACTUS RD [ID: 1070]	11	17	4	31
9	83RD AV & OLIVE AV [ID: 420]	9	10	14	30
10	NORTHERN AV & 83RD AV [ID: 5153]	7	11	15	30
11	UNION HILLS DR & 83RD AV [ID: 2770]		6	9	27
12	NORTHERN AV & GLEN HARBOR BLVD [ID: 152]	16		3	23
13	75TH AV & THUNDERBIRD RD [ID: 1331]	18	9	13	23
14	LAKE PLEASANT PW & BEARDSLEY RD [ID: 2665]		19	5	18
15	CACTUS RD & 75TH AV [ID: 1138]	14	13	18	18
16	OLIVE AV & 95TH AV [ID: 224]	8	18		16
17	87TH AV & OLIVE AV [ID: 395]			7	14
18	LAKE PLEASANT PW & DEER VALLEY RD [ID: 4828]	10	20	19	14
19	BELL RD & 84TH AV [ID: 2984]	15	14		13
20	BELL RD & 87TH AV [ID: 2983]	19	12		11

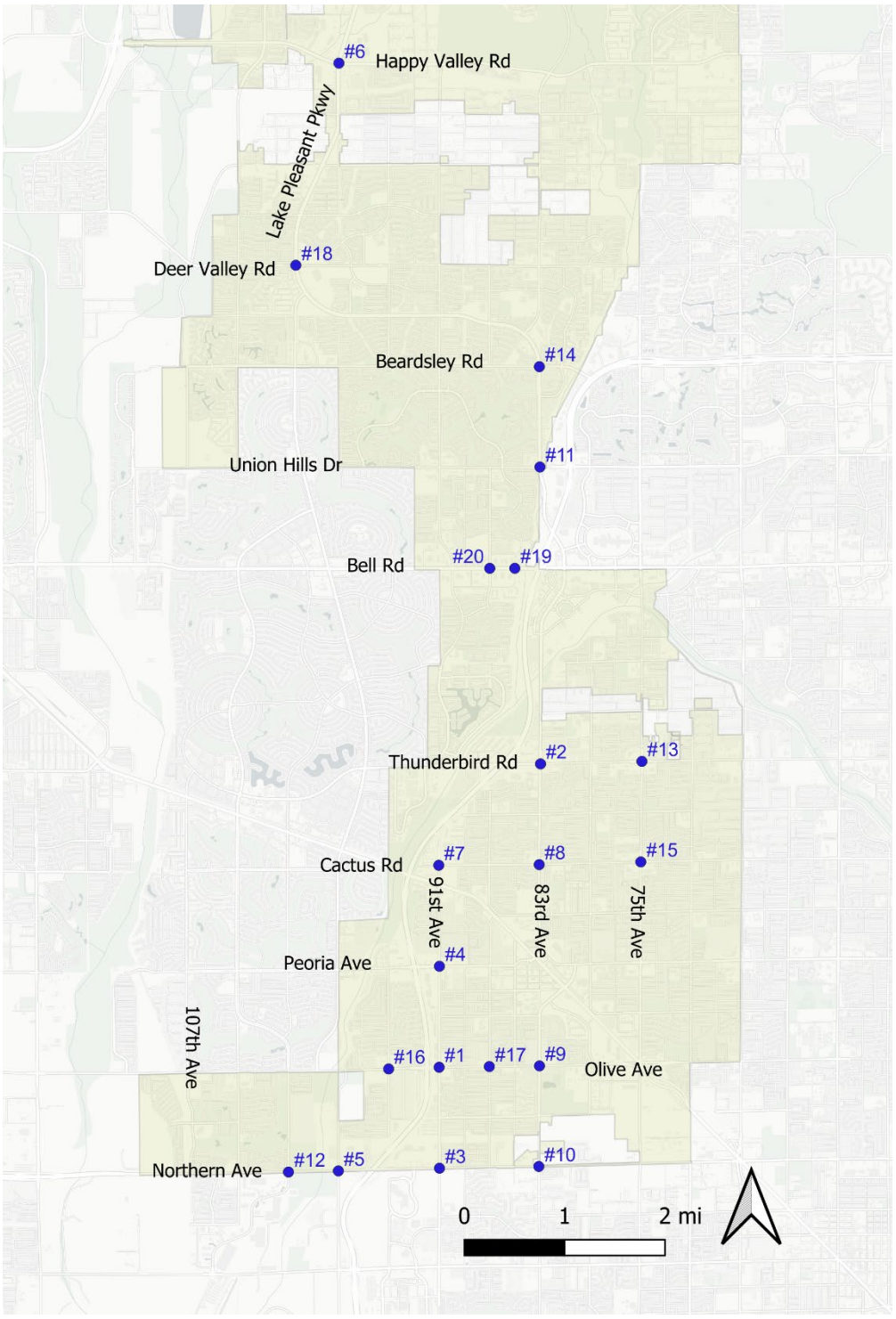

Figure 2: Top 20 Signalized Intersection by Overall Intersection Score

SEGMENTS

Segment prioritization considered the following three elements:

- Crash Frequency (including crashes at major intersections)
- Fatal and Serious Injury (KSI) Crash Frequency (filtered to non-intersection crashes per mile)
- Crash Rate (excluding crashes at major intersections)

The prioritization effort for segments involved five steps:

1. Rank intersections by highest crash frequency (including crashes at major intersections) and identify the top 20
2. Rank intersections by highest KSI crash frequency (non-intersection crashes per mile) and identify the top 20
3. Rank intersections by highest crash rate (excluding crashes at major intersections) and identify top 20
4. Bring all intersections that made any of the lists into a master table, with their associated rank for each factor in the adjacent column.
5. Calculated the overall score of the segment.

For each category (i.e., crash rate), points were assigned based on the rank position. The highest rank (#1), was assigned the highest number of points (20). Segments that ranked lower than #20 were assigned zero points. The Overall Segment Score is the sum of points given from each of the three categories; crash frequency, KSI crash frequency, and the crash rate. An example of this process is shown in the image below. Due to the limited number of segments with fatal and serious injuries, the maximum score for KSI Crash Frequency on lower volume segments (<5,000 ADT) was 6.

Overall Segment Score = Crash Frequency Points + KSI Crash Frequency Points* + Crash Rate Points

Point System for Crash Frequency:

Crash Frequency	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Point System for KA Crash Frequency:

Crash Rate	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Note 1: KSI = Fatal and Serious Injury Crashes
Note 2: Due to the infrequent location of KSI crashes on lower volume segments, the max score for KSI Crash Frequency for Roadway Segments < 5,000 group was 9.

Point System for Crash Rate

Crash Frequency	Points
Rank 1	20
Rank 2	19
Rank 3	18
↓	↓
Rank 19	2
Rank 20	1

Higher Segment Score = Greater Safety Need

The top 20 lower volume segments (<5,000 ADT) are shown in Table 3. The top 20 higher volume segments (>5,000 ADT) are presented in Table 4.

Table 3: Top 20 Segments Below 5,000 Daily Vehicles

Final Rank	Segment Name	Crash Rate Rank	Crash Frequency Rank	Non-Intersection KSI Crashes/ Mile Rank	SEGMENT SCORE ↧
1	77Th Ave, from Paradise Ln to Bell Rd [ID: 186]	1	1		40
2	Castle Hot Springs Rd, from Carefree Highway to North Lake Pleasant Park Entrance [ID: 264]	2	9	6	32
3	Rio Vista Blvd, from Thunderbird Rd to Into Rio Vista Park [ID: 292]	6	6		30
4	99Th Ave, from Northern Ave to Olive Ave [ID: 257]		2	1	25
5	85TH AVE, from PEORIA AVE to GRAND AVE [ID: 446]	5	12		25
6	87Th Ave, from Peoria Ave to Cholla St (Varney Rd) [ID: 224]	4	20	3	22
7	Speckled Gecko Dr, from Williams Rd to 97TH Ave [ID: 519]	3			18
8	Cactus Rd, from 91St Ave to 92Nd Dr [ID: 402]		3		18
9	81St Ave, from Oraibi Dr to Deer Valley Rd [ID: 416]		4		17
10	79Th Ave, from Sweetwater Ave to Thunderbird Rd [ID: 193]		5		16
11	97TH Ave, from Speckled Gecko Dr to Deer Valley Rd [ID: 521]	15	13		14
12	Greenway Rd, from 72Nd Ave to 75Th Ave [ID: 904]	7			14
13	87Th Ave, from Bell Rd to Grovers Ave [ID: 216]		7		14
14	103Rd Ave, from Northern Ave to Butler Dr [ID: 147]		8		13
15	Yucca St, from 8701 W to 91St Av [ID: 435]	8			13
16	Pinnacle Peak Rd, from 77Th Ave to 79Th Ave [ID: 106]	9			12
17	87Th Ave, from Olive Ave to Mountain View Rd [ID: 222]		10		11
18	Tierra Buena Ln, from 75Th Av to 79Th Av [ID: 437]	10			11
19	103Rd Ave, from Butler Dr to Olive Ave [ID: 146]		11		10
20	Rose Garden Ln, from 107Th Ave to 111Th Ave [ID: 114]	11			10

Table 4: Top 20 Segments Above 5,000 Daily Vehicles

Final Rank	Segment Name	Crash Rate Rank	Crash Frequency Rank	Non-Intersection KSI Crashes/ Mile Rank	SEGMENT SCORE ↧
1	Olive Ave, from 87Th Ave to 91St Ave [ID: 89]	9	5	9	40
2	Northern Ave, from 91St Ave to 95Th Ave [ID: 78]	5	6	13	39
3	Northern Ave, from 95Th Ave to 99Th Ave [ID: 79]	10	2	19	32
4	Thunderbird Rd, from 79Th Ave to 83Rd Ave [ID: 126]	3	7		32
5	Bell Rd, from 84Th Ave to 87Th Ave [ID: 498]	15	15	2	31
6	75Th Ave, from Paradise Ln to Bell Rd [ID: 182]	1		12	29
7	Northern Ave, from 87Th Ave to 91St Ave [ID: 77]	13		1	28
8	83Rd Ave, from Greenway Rd to Bell Rd [ID: 202]	8	8		26
9	Olive Ave, from 91St Ave to 95Th Ave [ID: 90]	16	1		25
10	Thunderbird Rd, from 83Rd Ave to 87Th Ave [ID: 127]	17	3		22
11	Union Hills Dr, from Loop 101 to 83Rd Ave [ID: 137]	11		11	20
12	Peoria Ave, from 91St Ave to 95Th Ave [ID: 102]	14	9		19
13	Plaza Del Rio, from Thunderbird Rd to Pershing Ave [ID: 527]	2			19
14	Deer Valley Rd, from 75Th Ave to 79th Ave [ID: 35]			3	18
15	Olive Ave, from 95Th Ave to 99Th Ave [ID: 91]			4	17
16	Olive Ave, from 67Th Ave to 71St Ave [ID: 84]		4		17
17	Bell Rd, from Loop 101 to 87Th Ave [ID: 475]	6	19		17
18	75Th Ave, from Butler Dr to Olive Ave [ID: 175]	4			17
19	Peoria Ave, from Grand Ave to 87Th Ave [ID: 104]			5	16
20	Northern Ave, from 83Rd Ave to 87Th Ave [ID: 76]			6	15

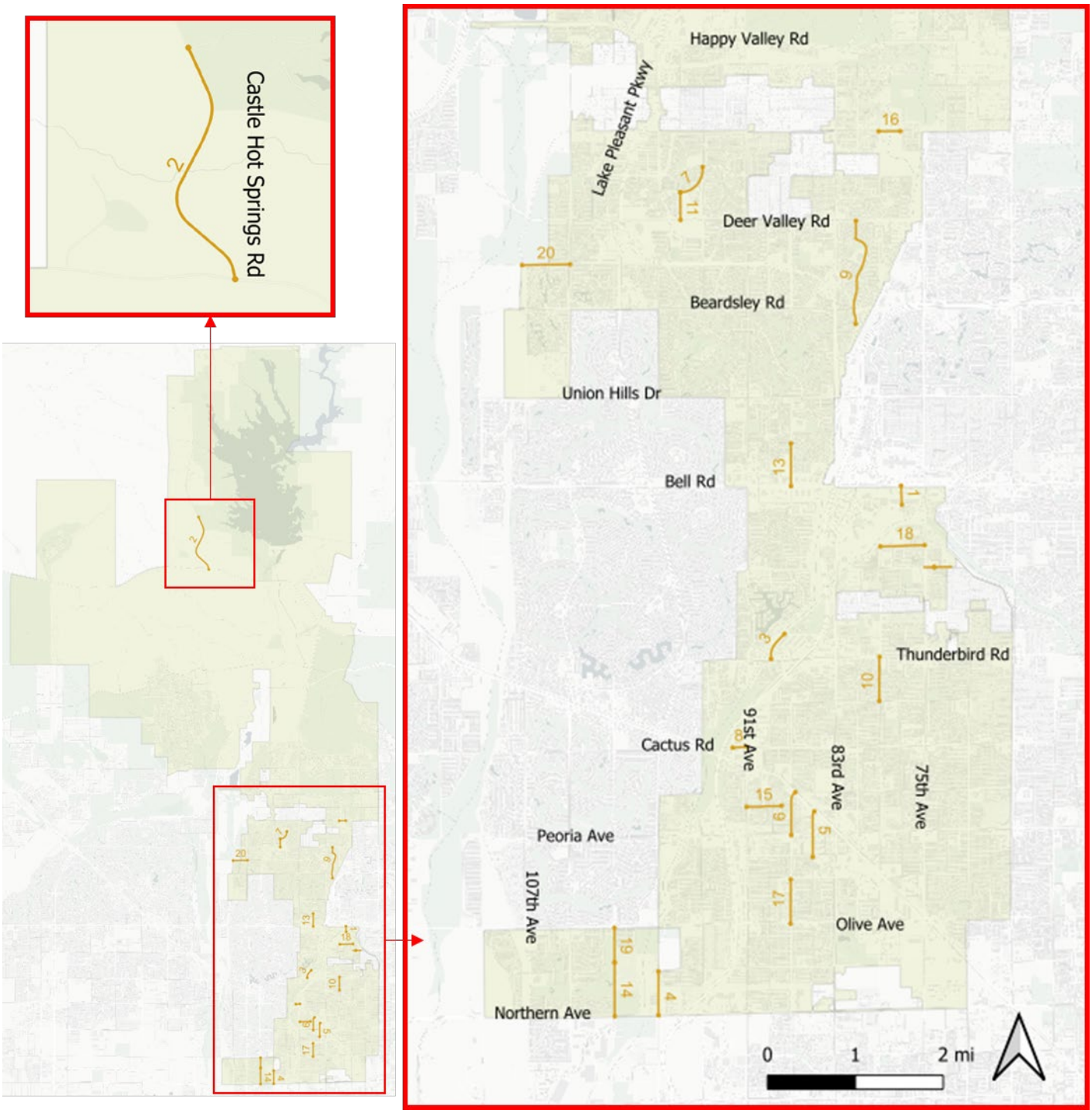

Figure 3 – Final Rank for Segments with Less than 5,000 Vehicles per Day

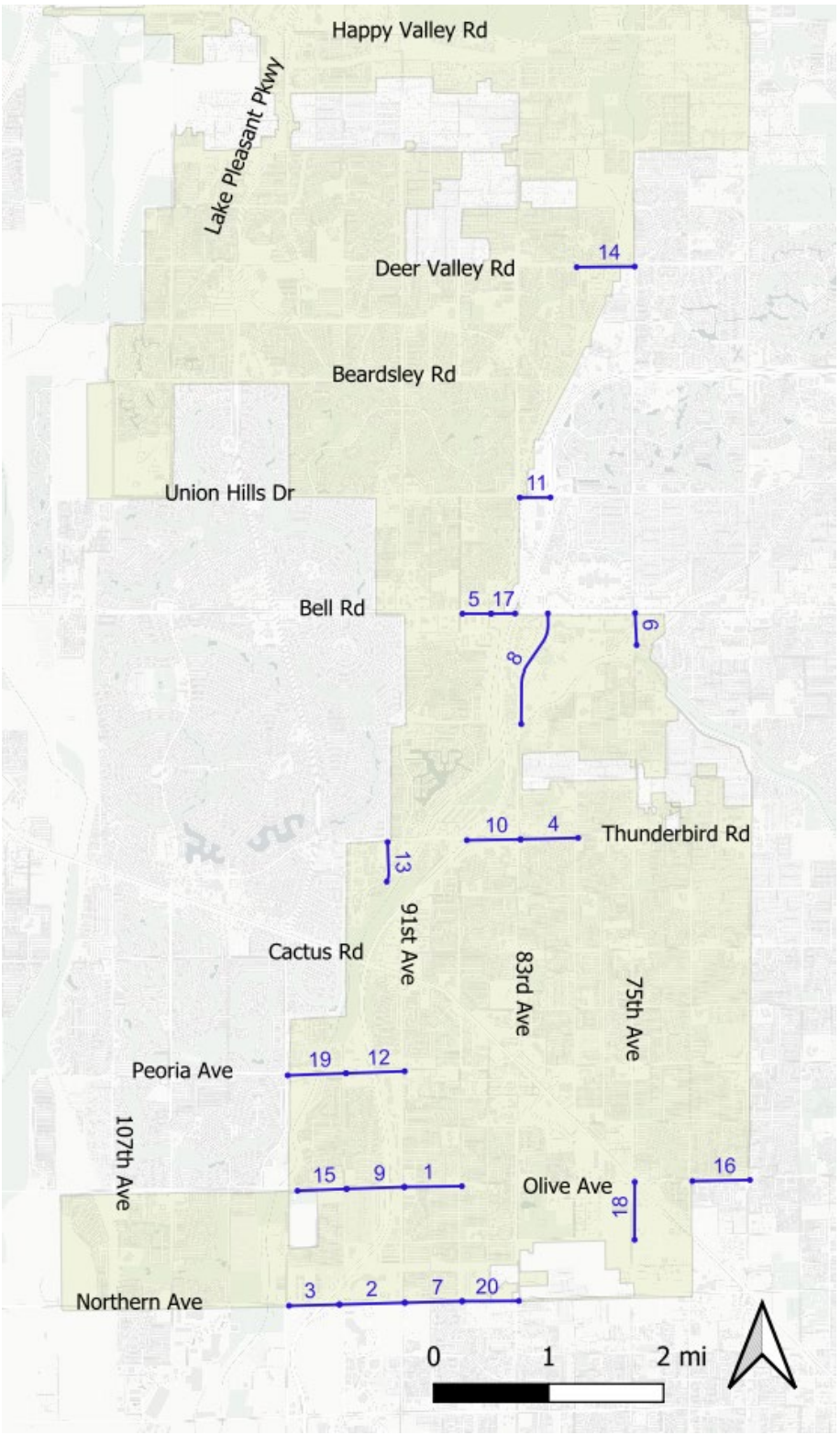

Figure 4 – Final Rank for Segments with More than 5,000 Vehicles per Day