

TECHNICAL MEMORANDUM

20th Street Bicycle and Pedestrian Facilities Improvement

Maricopa Association of Governments Design Assistance

Existing Conditions

Date: June 28, 2017 Project #:20486
To: Eileen Yazzie, City of Phoenix
From: Radu Nan and Joel Amarillas
cc: Jason Stephens, Maricopa Association of Governments

SUMMARY OF FINDINGS

- The average and 85th-percentile vehicle speeds along 20th Street between Colter Street and Campbell Avenue are indicative of a highly stressful riding street environment for cyclists. The combination of high speed and daily traffic volumes above 10,000 vehicles would require a separated bicycle facility to maintain a lower level of traffic stress for cyclists.
- Between 2011 and 2015, a total of 23 pedestrian and bicycle related crashes were recorded, four of which were serious injuries and one fatality. The fatal crash took place at the intersection of 20th Street and Camelback Road in 2013, when a car failed to yield the right-of-way and struck a pedestrian.
- The existing street geometric characteristics vary throughout the corridor. The proposed alternatives will be solutions based on the segment context, including: the number of vehicle lanes, speed limit, lighting, sidewalks, bicycle lanes, and on-street parking.
- Daily vehicle traffic volumes along 20th Street are typical of collector streets for the segments between Colter Street and Camelback Road, and Highland Avenue and Campbell Avenue. The weekday 24-hour tube counts for these segments were 10,060 and 10,260 vehicles, respectively.
- Bicycle and pedestrian volumes were collected during the morning and evening commute hours at the intersections of 20th Street and Missouri Avenue, Camelback Road, Highland Avenue, Campbell Avenue, Indian School Road, and Osborn Road. In general, there are more pedestrians than bicycles along the corridor, with bicycle counts ranging from zero to three.

Twentieth Street is a two lane roadway that can provide a safe, easy, low-stress rideable and walkable thoroughfare to connect residents to schools, employment, restaurants and shopping (i.e. Town and Country Shopping Center, Camelback Colonnade Center), and major bus routes. The 20th Street corridor is located approximately a quarter mile east of SR-51, and provides access to four grade separated non-motorized passes of the freeway at the Grand Canal, Campbell Avenue, Maryland Avenue, and the Arizona Canal.

The 3.75 mile long project corridor encompasses 20th Street between the Grand Canal and Glendale Avenue; and a connection to the Piestewa Peak on either Glendale Avenue between 20th Street and Squaw Peak Drive or along Ocotillo Road. This corridor is the 4th highest priority of the City of Phoenix Bicycle Master Plan, connecting the regional shared-use path along the Grand Canal to the access road.

The purpose of this technical memorandum is to catalogue the street geometric characteristics and summarize the existing traffic volumes and vehicle speed information collected along the study corridor.

DATA COLLECTED

Pedestrian and bicycle crossings, and vehicle turning movement volumes were collected Thursday, February 2, 2017 between 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. at these signalized intersections:

- Camelback Road at 20th Street
- Highland Avenue at 20th Street
- Indian School Road at 20th Street
- Osborn Road at 20th Street

A speed study was also conducted for 24 hours on February 2, 2017 along the following corridors:

- Between Campbell Avenue & Highland Avenue (also on February 4, 2017)
- Between Highland Avenue & Camelback Road (also on February 4, 2017)
- Between Camelback Road & Colter Street

12-hour driveway mid-week traffic volumes were collected at six locations along 20th Street between Highland Avenue and Camelback Road. In addition, cut-through traffic counts were collected across the Bethany Home Road traffic diverter on 20th Street.

TRAFFIC DATA SUMMARY

Daily vehicle traffic volumes along 20th Street are typical of collector streets for the segments between Colter Street and Camelback Road, and Highland Avenue and Campbell Avenue. The weekday 24-hour tube counts for these segments were 10,060 and 10,260 vehicles, respectively.

Twentieth Street serves the Town and Country Shopping Center and the Camelback Colonnade Center between Camelback Road and Highland Avenue. It also provides a connection to the SR-51 south ramps at Highland Avenue from Camelback Road. The street cross section is six lanes wide within this segment and serves approximately 21,020 vehicles per day.

Vehicles speeds were also collected along the three road segments listed above. Cyclist comfort or level of traffic street (LTS) is closely related to adjacent vehicle volume and speeds. The 85th-percentile speeds measured along all three road segments are higher than the posted speed limits. Table 1 summarizes the average and 85th-percentile vehicle speeds by travel direction (SB-southbound, NB-northbound) and street segment. These travel speeds are indicative of a highly stressful riding street environment for cyclists. The combination of high speed and daily traffic volumes above 10,000 vehicles would require a physically separated bicycle facility to maintain a lower level of traffic stress for cyclists.

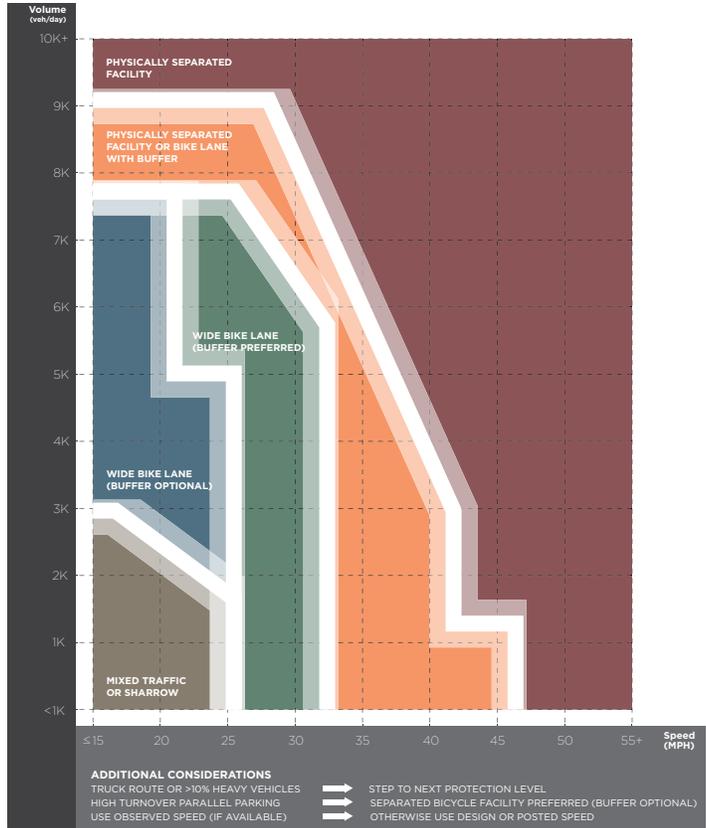
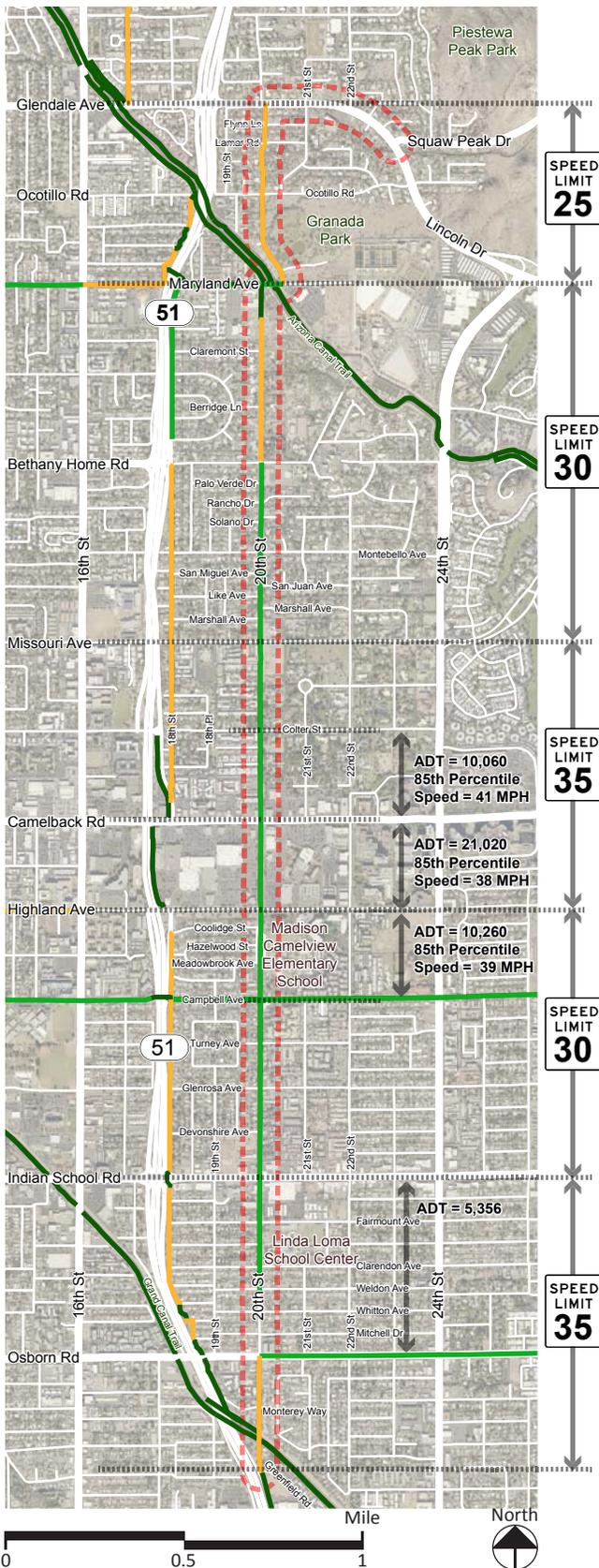
Table 1 Vehicle Speeds Summary by Street Segment

Roadway Segment	Average Weekday Vehicle Speeds (mph)		85 th -percentile Weekday Vehicle Speeds (mph)	
	SB Travel	NB Travel	SB Travel	NB Travel
Colter Street Ave to Camelback Road	36	35	41	40
Camelback Road to Highland Ave	32	32	39	38
Highland Ave to Campbell Ave	32	33	39	39

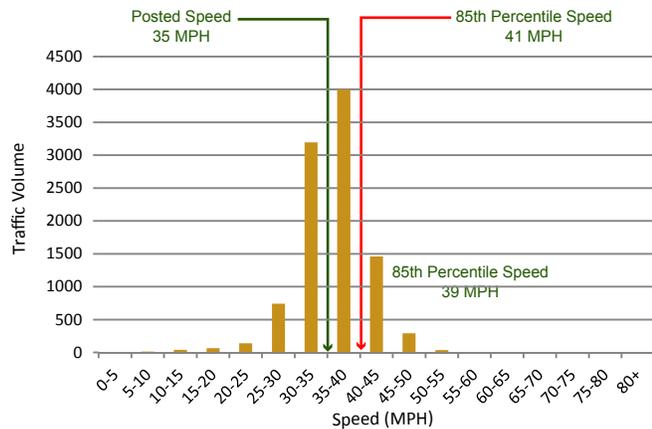
Bicycle activity at the Camelback Road and Highland Avenue intersections is low during the morning and evening commute hours and could be related to the high LTS noted in the previous section.

The following pages summarize the speed, daily volumes, and turning movement counts collected.

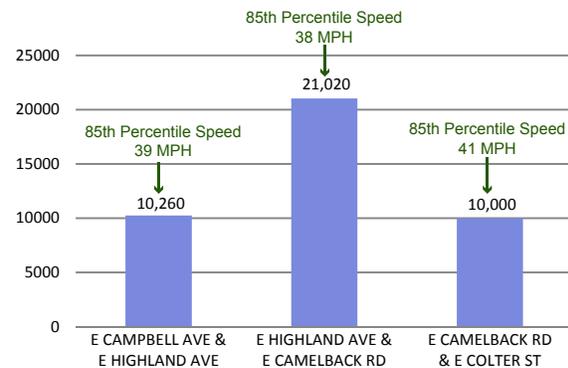
20th Street Pedestrian and Bicycle Facilities Improvements



Bicycle Facility Type for Interested but Concerned Bicyclists

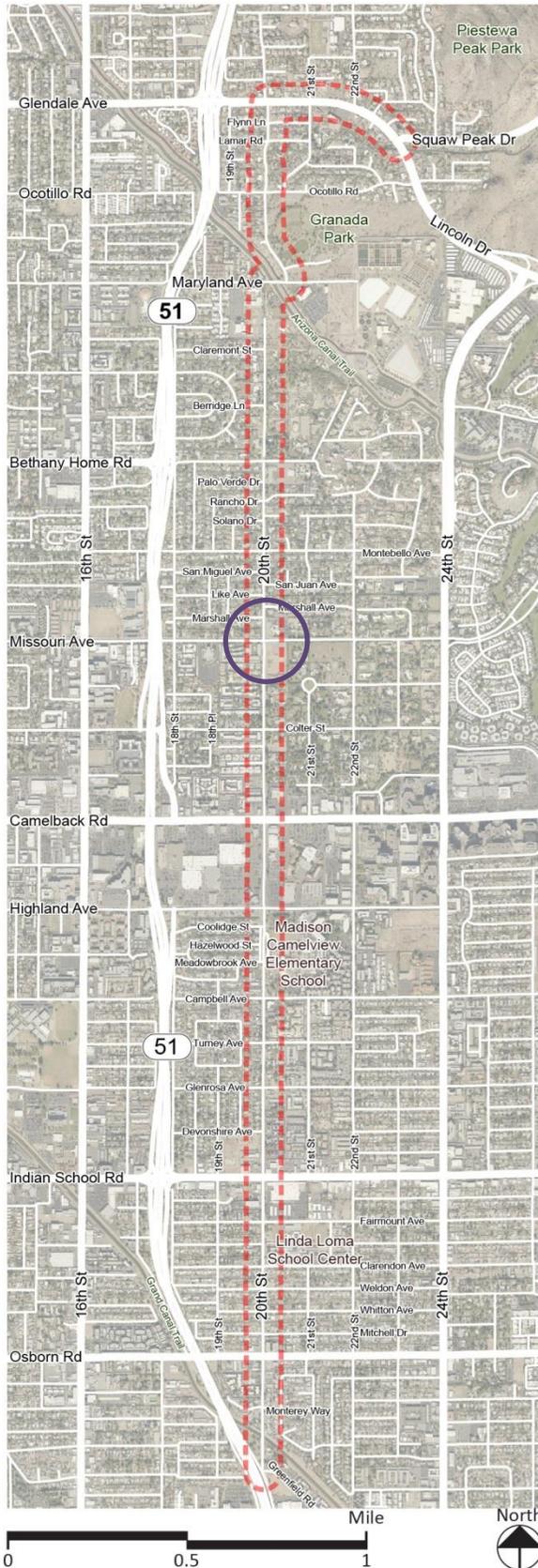


Volume Distribution by Speed between Camelback Rd and Colter St

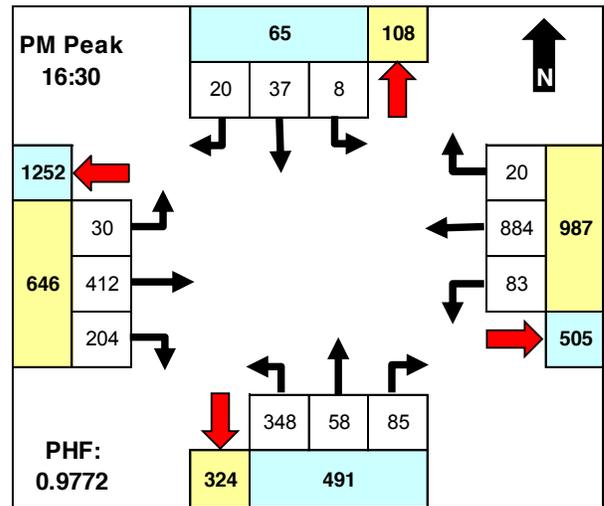
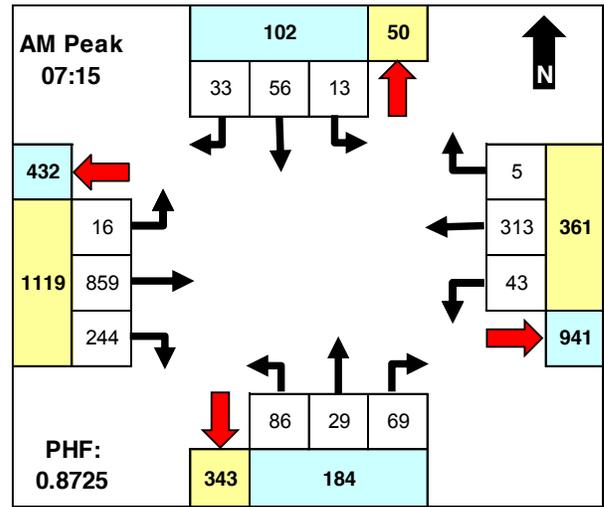


85th % Speeds and Traffic Volumes

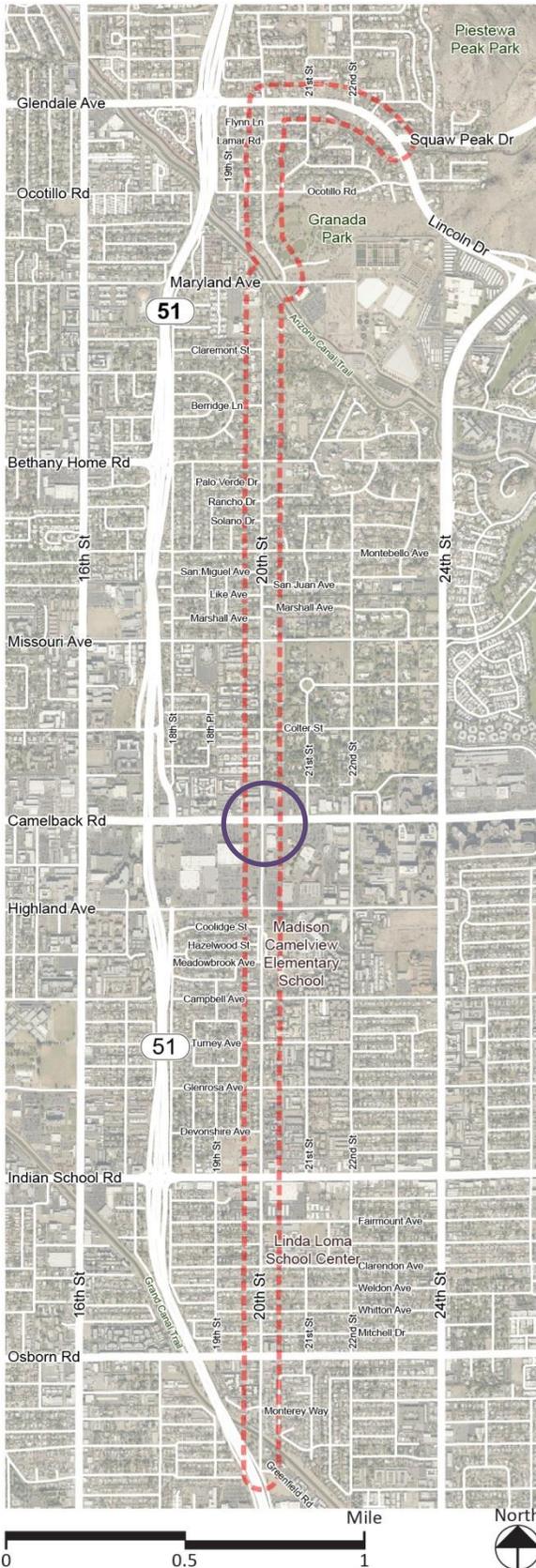
Missouri Avenue at 20th Street



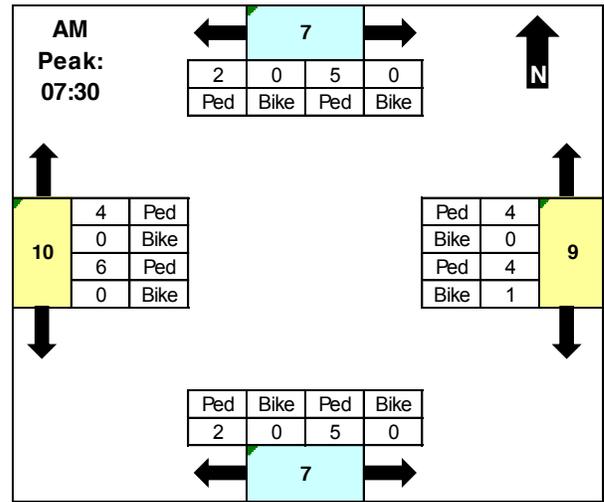
Only vehicle counts were available (count date 10/15/2015)



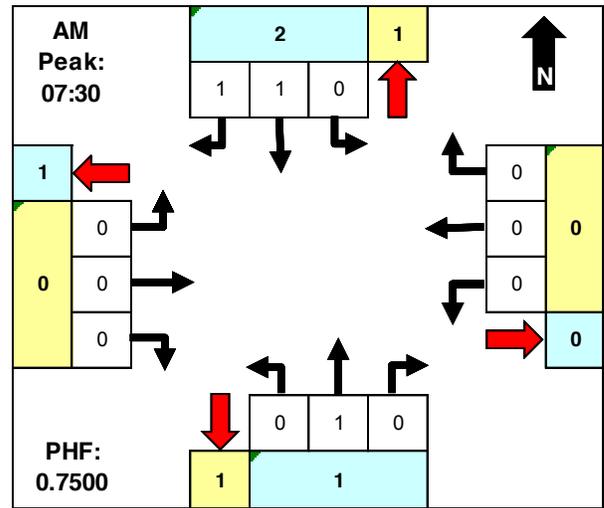
Camelback Road at 20th Street



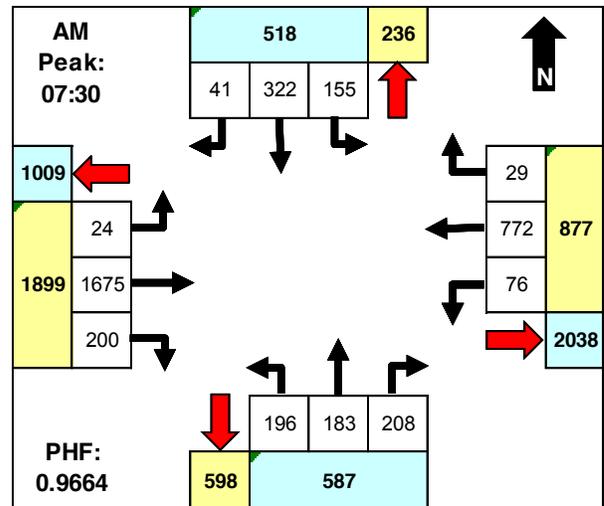
Pedestrian Counts



Bicycle Counts



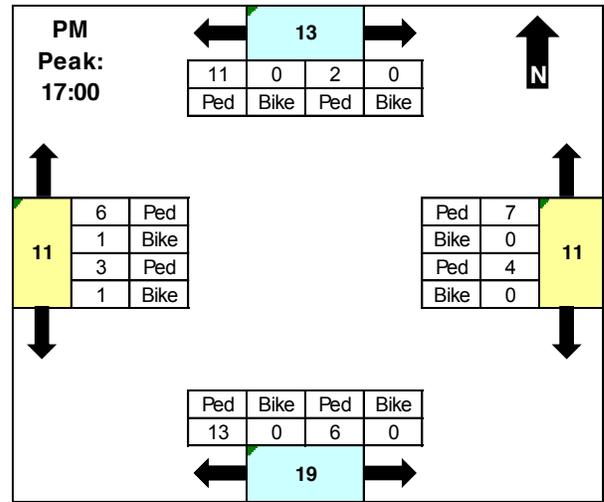
Vehicle Turning Movements Count



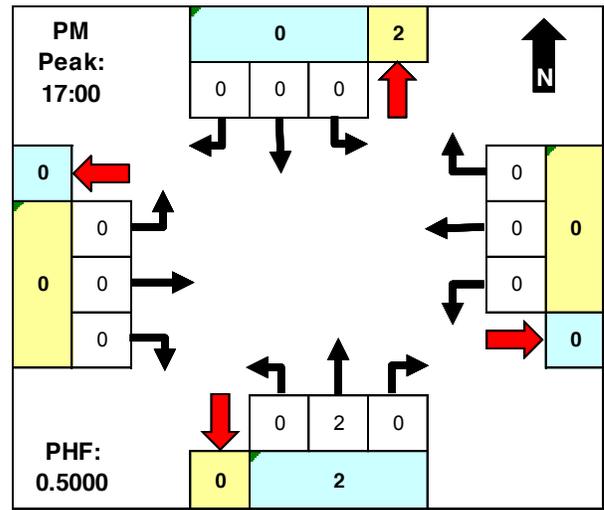
Camelback Road at 20th Street



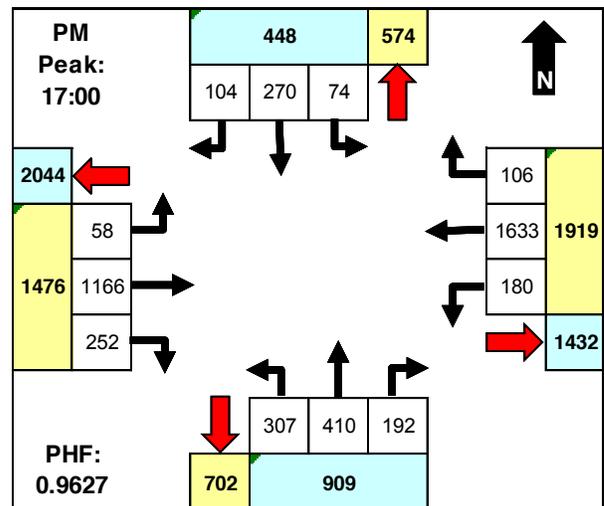
Pedestrian Counts



Bicycle Counts



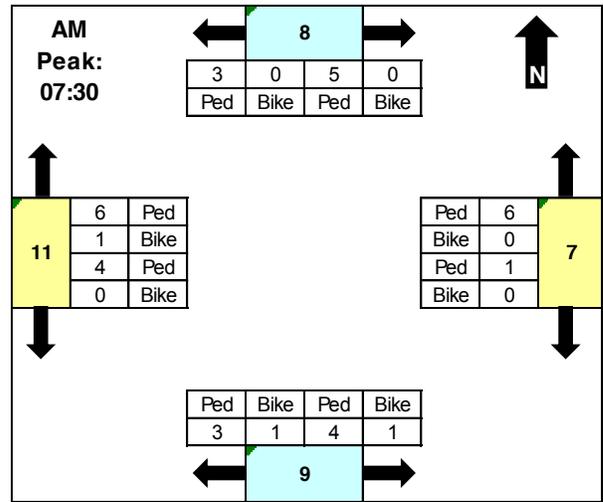
Vehicle Turning Movements Count



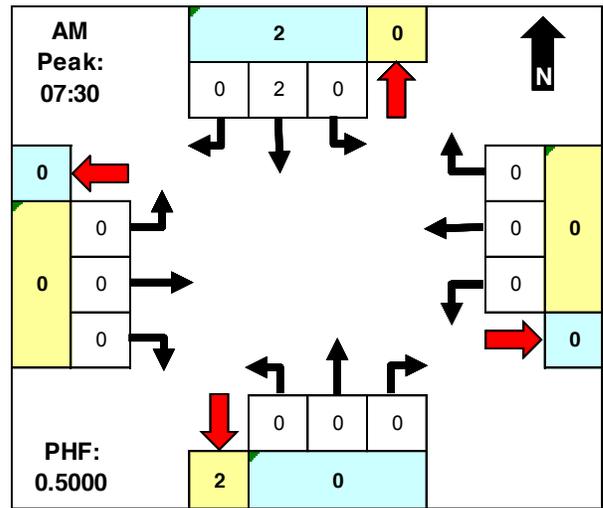
Highland Avenue at 20th Street



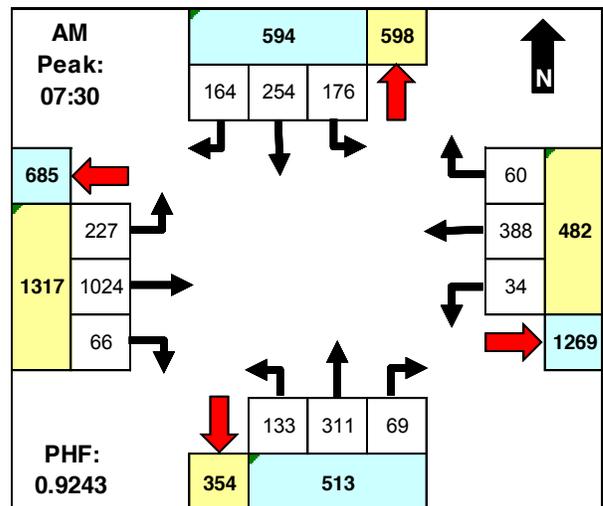
Pedestrian Counts



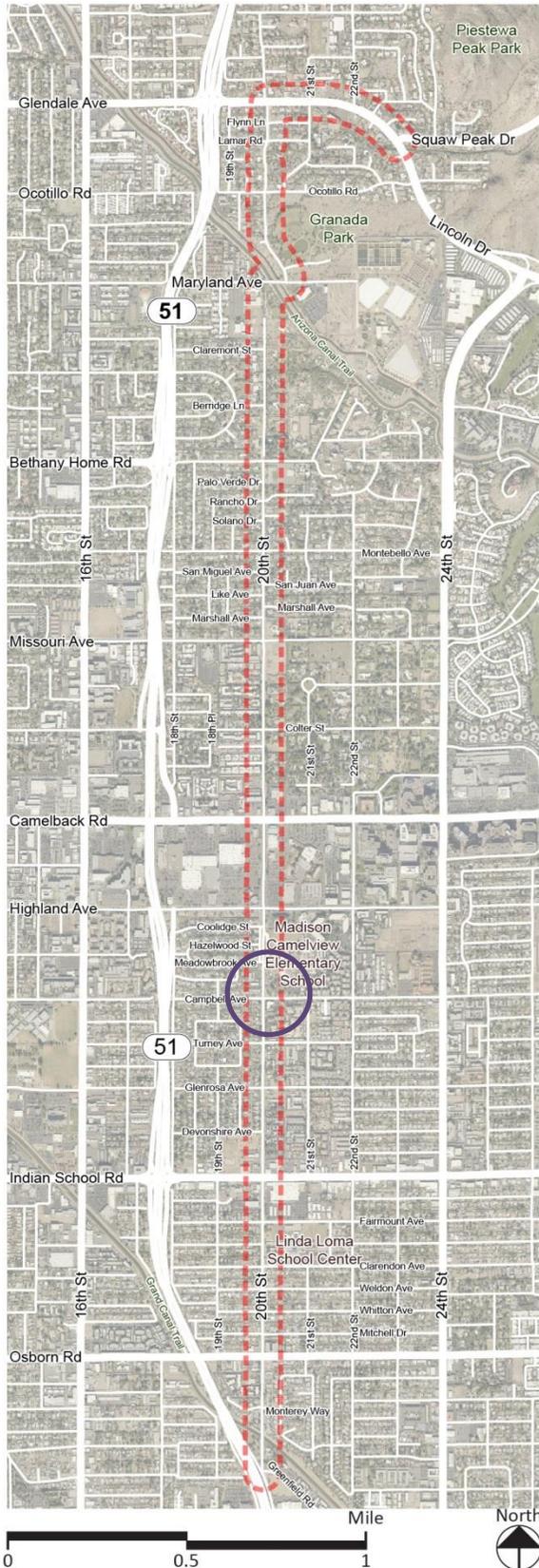
Bicycle Counts



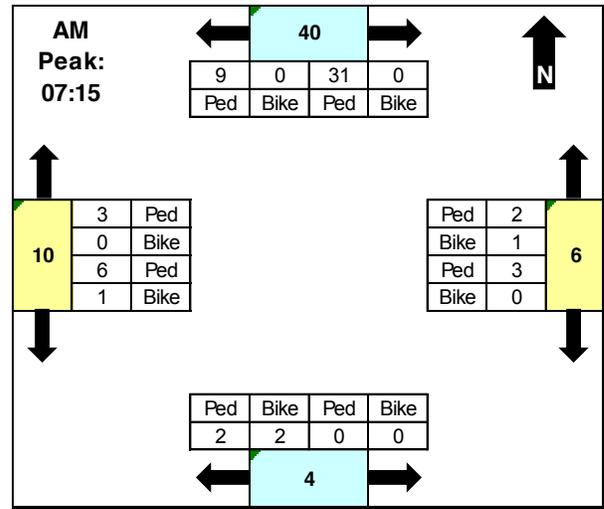
Vehicle Turning Movements Count



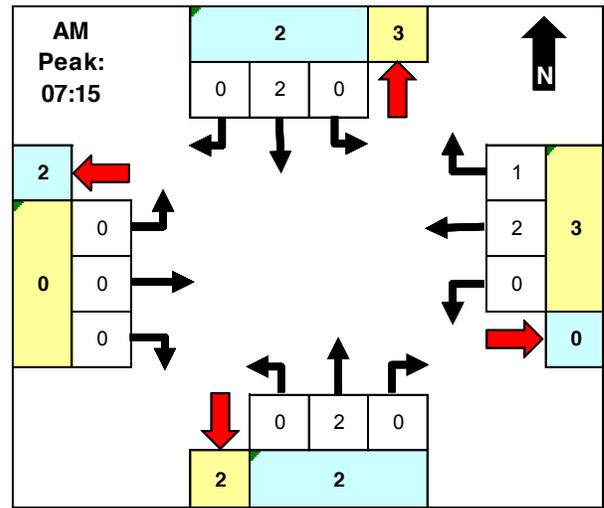
Campbell Avenue at 20th Street



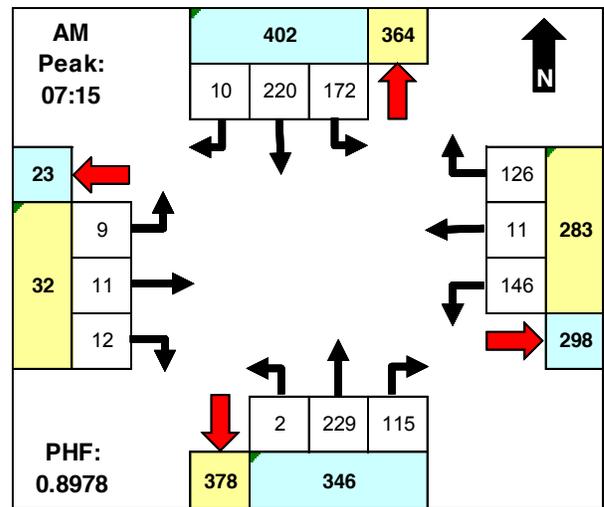
Pedestrian Counts



Bicycle Counts



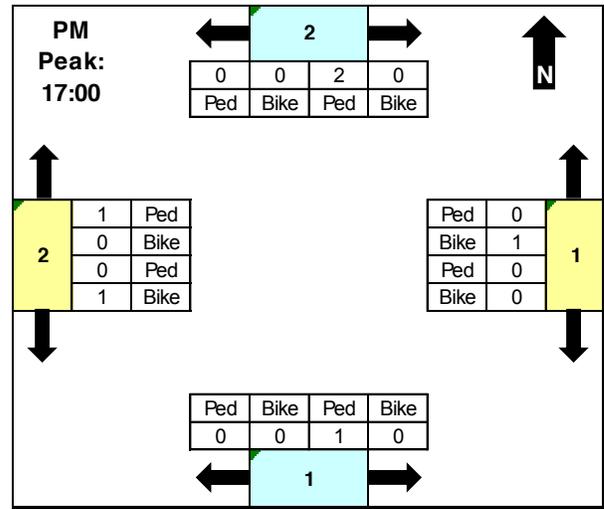
Vehicle Turning Movements Count



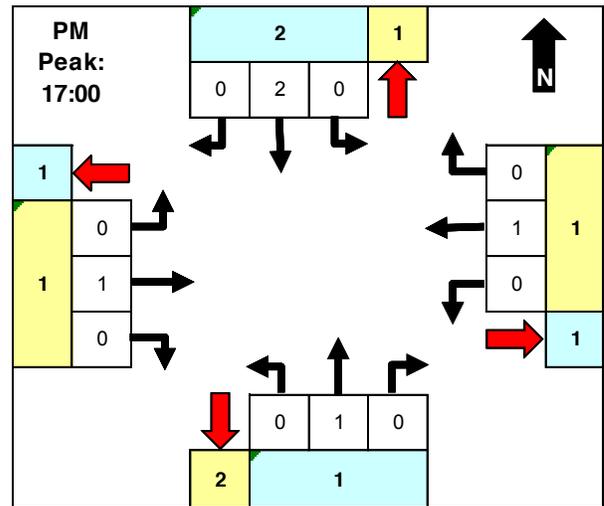
Campbell Avenue at 20th Street



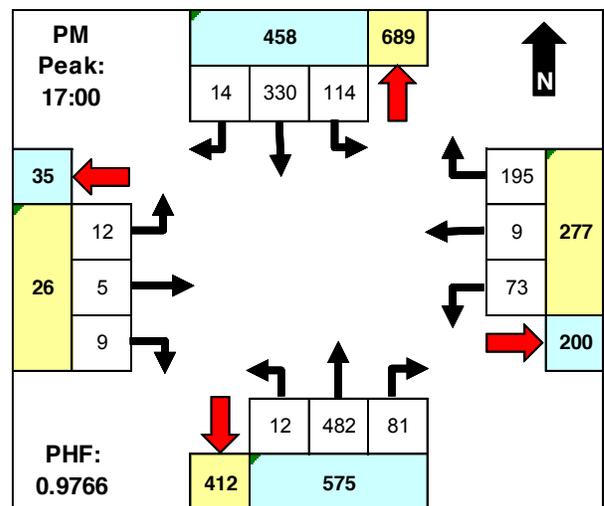
Pedestrian Counts



Bicycle Counts



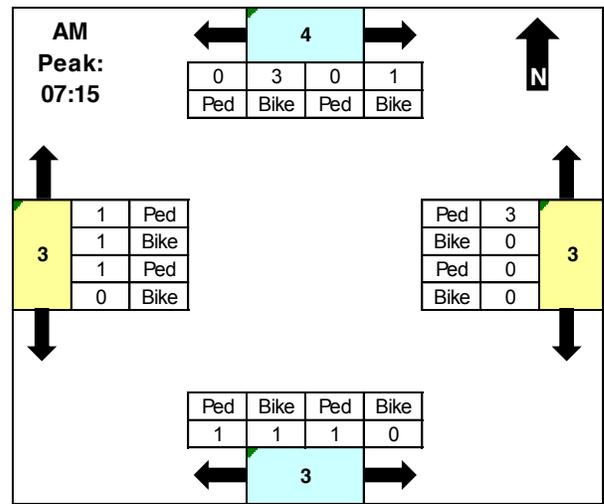
Vehicle Turning Movements Count



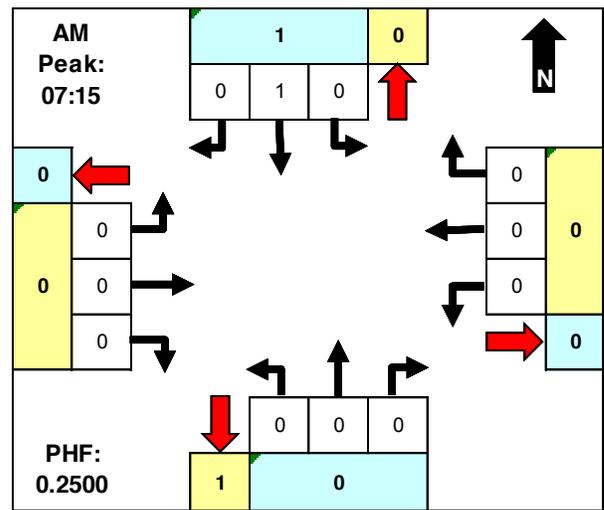
Indian School Road at 20th Street



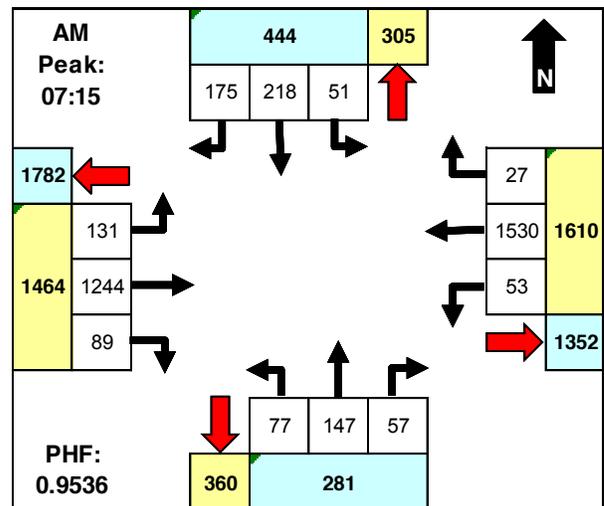
Pedestrian Counts



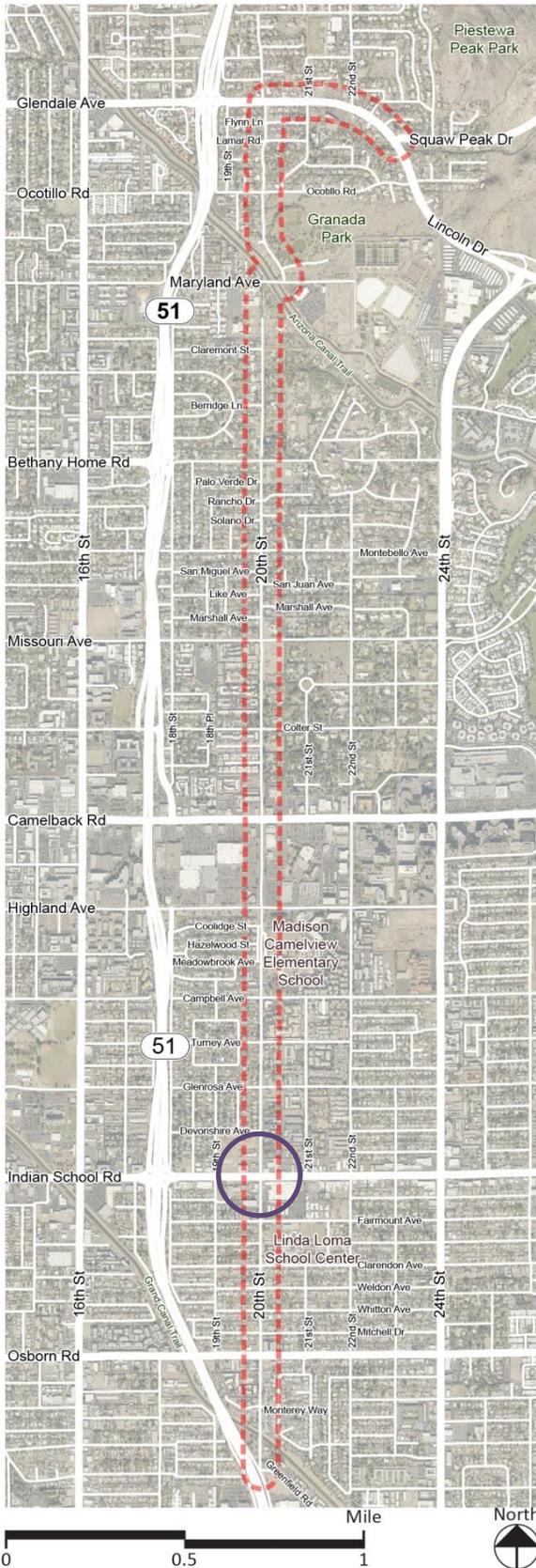
Bicycle Counts



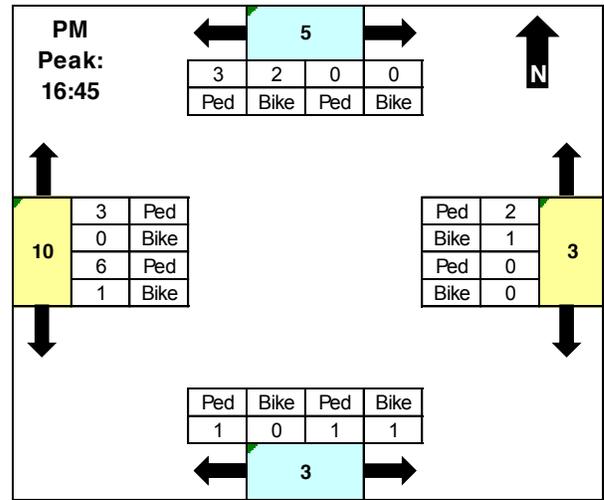
Vehicle Turning Movements Count



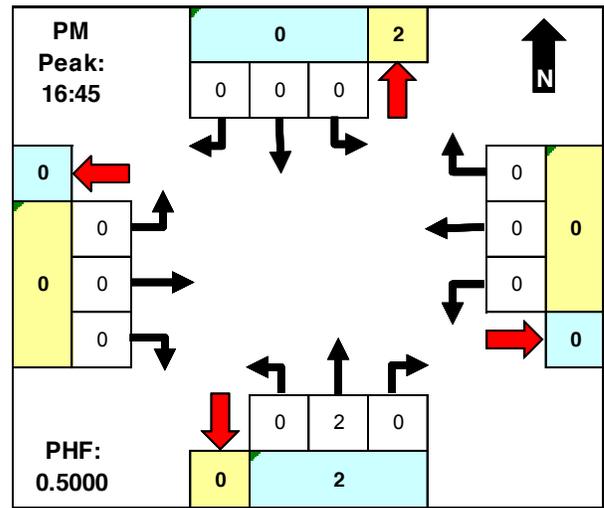
Indian School Road at 20th Street



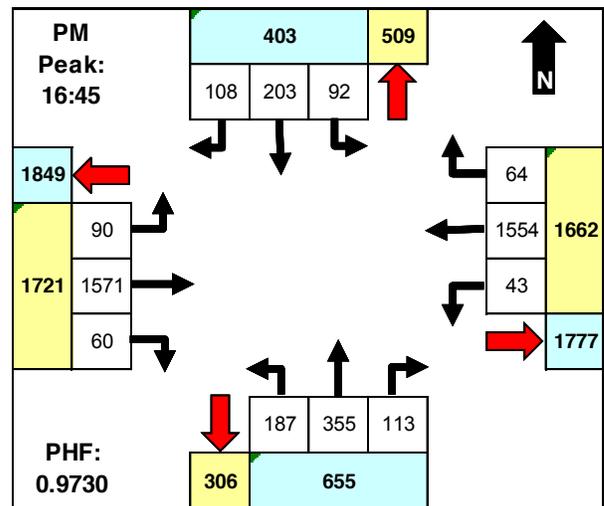
Pedestrian Counts



Bicycle Counts



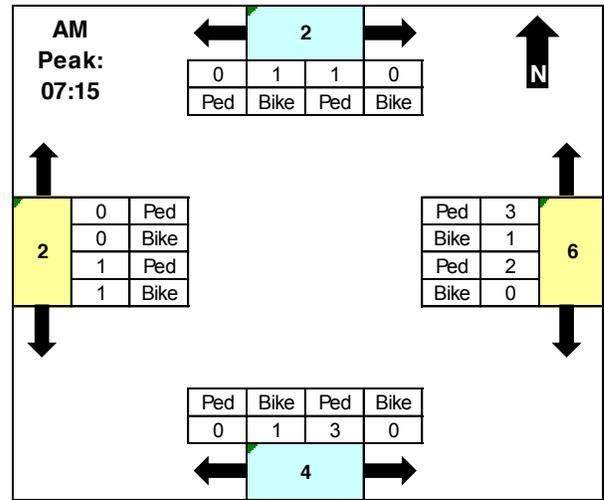
Vehicle Turning Movements Count



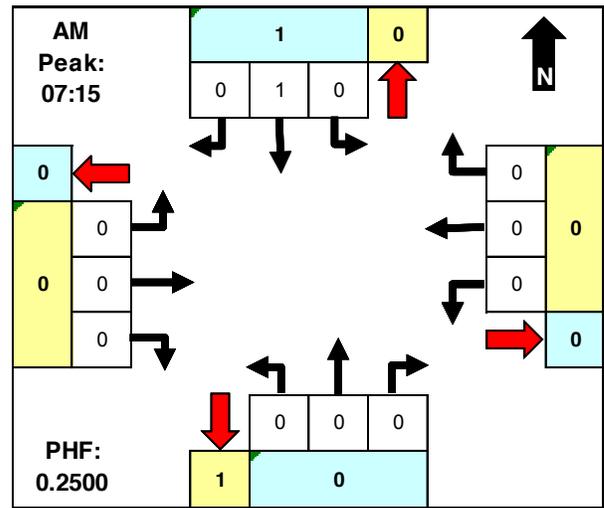
Osborn Road at 20th Street



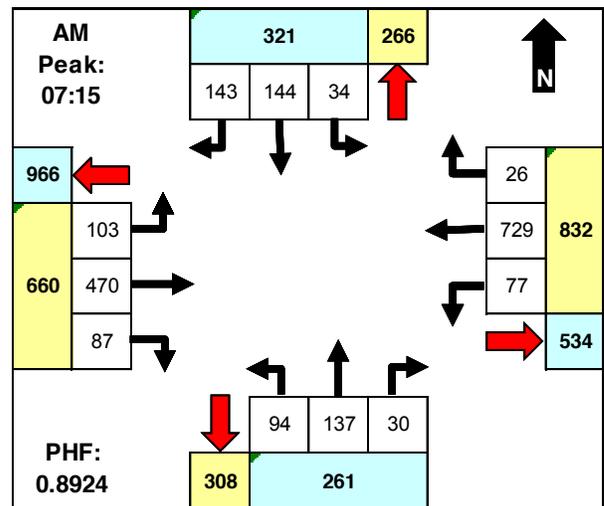
Pedestrian Counts



Bicycle Counts



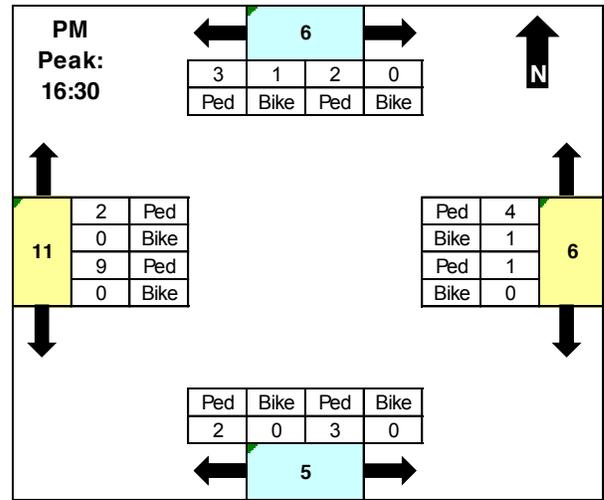
Vehicle Turning Movements Count



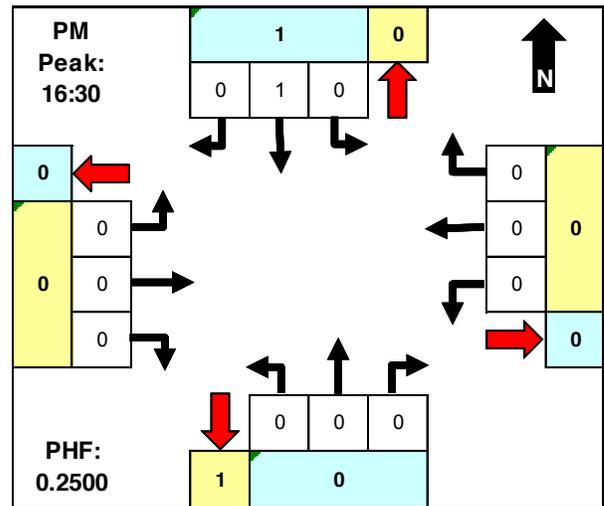
Osborn Road at 20th Street



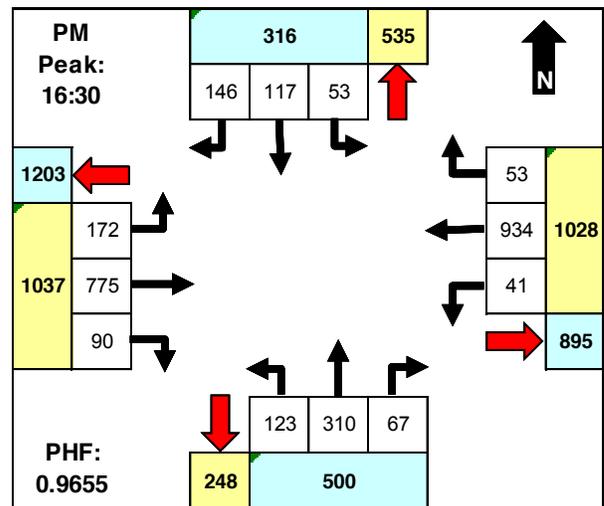
Pedestrian Counts



Bicycle Counts



Vehicle Turning Movements Count



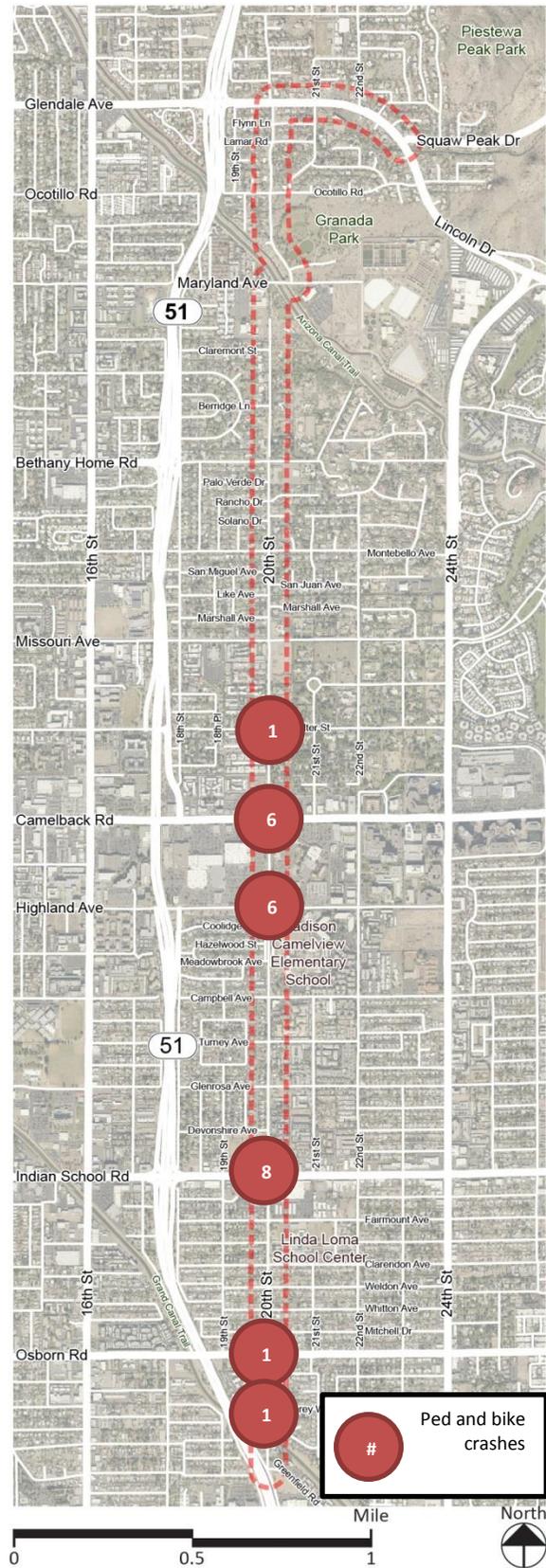
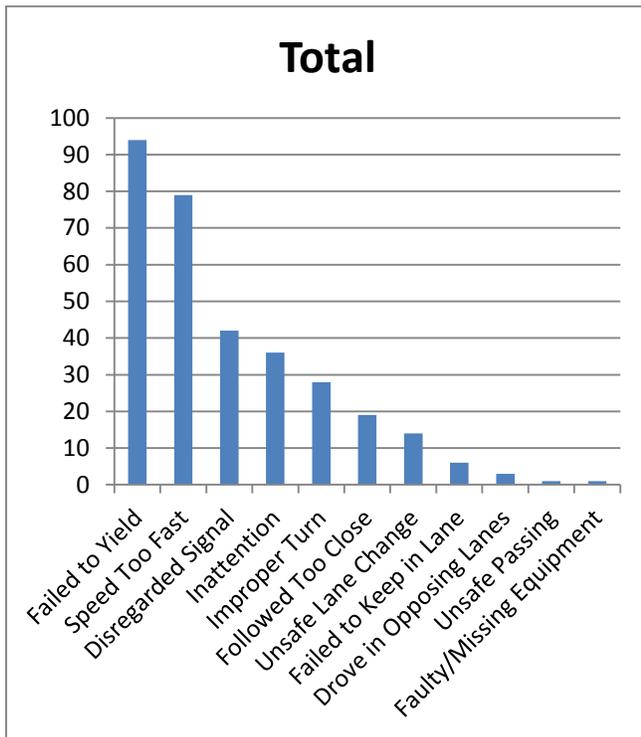
CRASH DATA SUMMARY

City of Phoenix provided crash data along 20th Street between 2011 and 2015. A total of 23 pedestrian and bicycle related crashes were recorded during those five years, four of which were serious injuries and one fatality. The fatal crash took place at the intersection of 20th Street and Camelback Road in 2013, when a car failed to yield the right-of-way and struck a pedestrian.

Serious injury crashed took place at the intersections with Osborn Road, Indian School Road, Highland Avenue, and Camelback Road.

The majority of crashes involving pedestrians and cyclists, 10 out of 23, were due to failure to yield by vehicles.

Overall, 368 crashes were recorded along the study corridor. The following chart indicates the main causes of crashes.



STREET GEOMETRIC CHARACTERISTICS

Existing street geometric characteristics are summarized in Table 2 below.

Table 2 Roadway Segment Geometric Characteristics

Roadway Segment	# of Vehicle Lanes	Speed Limit (mph)	Lighting	Sidewalks	Bicycle Lanes	On-Street Parking
Glendale Ave – Squaw Peak Dr to 20 th St	6 Lanes ¹	40	Yes ⁴	Yes	None	None
Ocotillo Rd – 20 th St to Lincoln Dr	2 Lanes	25	Yes	Yes	No	Yes
Glendale Ave to Maryland Ave	2 Lanes	25	Partial ³	Partial ⁵	None	Yes
Maryland Ave – Between 20 th St	3 Lanes ²	25	Yes	Partial ⁶	South Side	None
North of Claremont St to Bethany Home Rd	2 Lanes	30	None	None	None	None
Bethany Home Rd to Missouri Ave	2 Lanes	30	West Side	None	Yes	None
Missouri Ave to Camelback Road	2 Lanes	35	West Side	Yes	Yes	None
Camelback Road to Highland Ave	6 Lanes	35	West Side	Yes	Yes	None
Highland Ave to Campbell Ave	3 Lanes	30	West Side	Yes	Yes	None
Campbell Ave to Indian School Rd	2 Lanes	30	Yes	Yes	Yes	None
Indian School Rd to Whitton Ave	2 Lanes	35	West Side	Yes	Yes	None
Whitton Ave to Grand Canal Trail	2 Lanes	35	Yes	Yes	None	None
Notes: ¹ Includes a Two-Way Left-Turn lane (TWLT) and a residential access frontage road on the south side ² Includes an Eastbound Left-Turn lane ³ Lighting is present between Glendale Ave and Ocotillo Rd ⁴ North lighting west of 22 nd St, south lighting east of 22 nd St ⁵ No sidewalk on west side south of Ocotillo Rd for 600 feet ⁶ No sidewalk along north side of bridge						

Sidewalk construction along the study corridor features an older design which is not compliant with current Access Board Public Rights-of-Way Accessibility Guidelines (PROWAG) at residential and commercial driveways. This old design does not feature a flat pedestrian apron around the driveway ramp; however, they can be retrofitted per the City of Phoenix Standard Construction Detail P1255-3.

Overall, pedestrian access ramps along the corridor appear to have PROWAG compliant slopes and resting areas; however, the majority lack truncated dome pads at the edge of the roadway. KAI staff observed pedestrian and bicycle usage along the corridor and visually inspected the state of pedestrian facilities on January 26, 2017. The following curb return locations are possible candidates for replacement or upgrade to meet PROWAG:

- SE corner at Ocotillo Rd and 20th St
- NW & NE corners at Maryland Ave and 20th St
- All corners at Missouri Ave
- NE & SE corners of Glenrosa Ave
- NW corner of Devonshire Ave

The following exhibits show graphical representations of street cross sections along the study corridor.

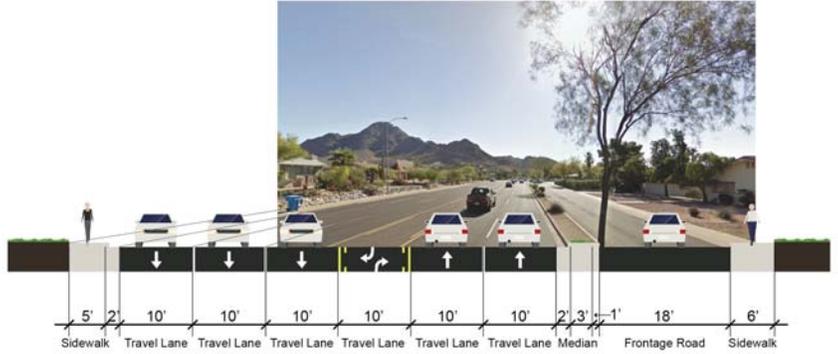
20th Street Pedestrian and Bicycle Facilities Improvements

Maryland Ave to Glendale Ave + Glendale Ave from 20th St to Squaw Peak Dr

 Study Corridor



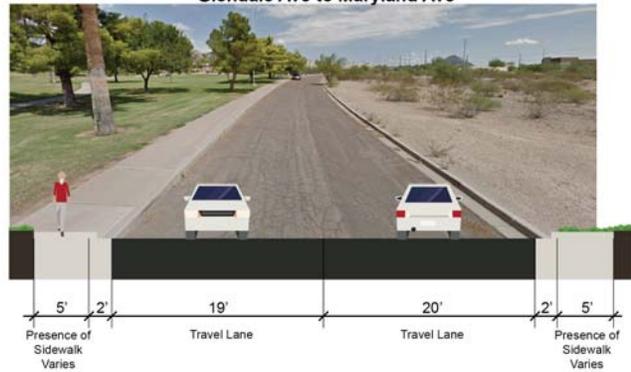
Glendale Ave - 20th St to Squaw Peak Dr



Ocotillo Rd - 20th St to Lincoln Dr



Glendale Ave to Maryland Ave



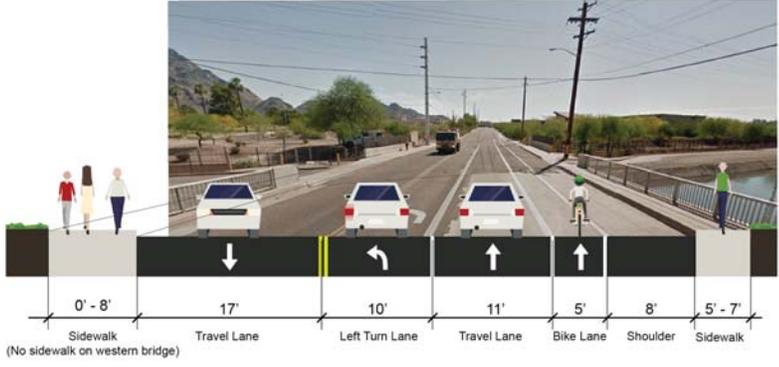
Existing Cross-Sections

20th Street Pedestrian and Bicycle Facilities Improvements Bethany Home Rd to Maryland Ave

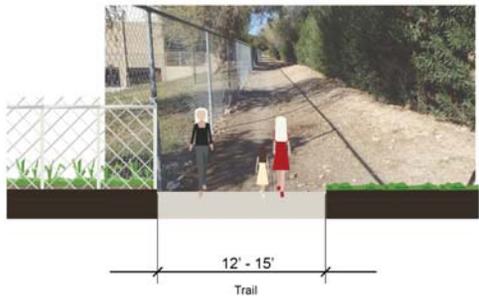


█ Study Corridor

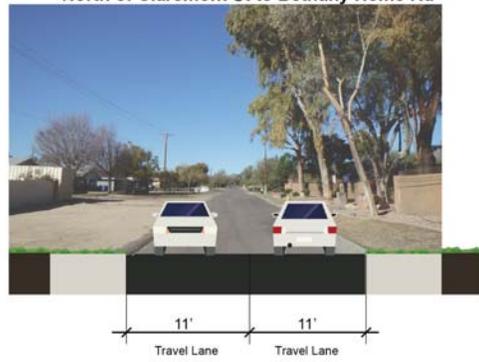
Maryland Ave - Between 20th St



Trail - Maryland Ave to North of Claremont St

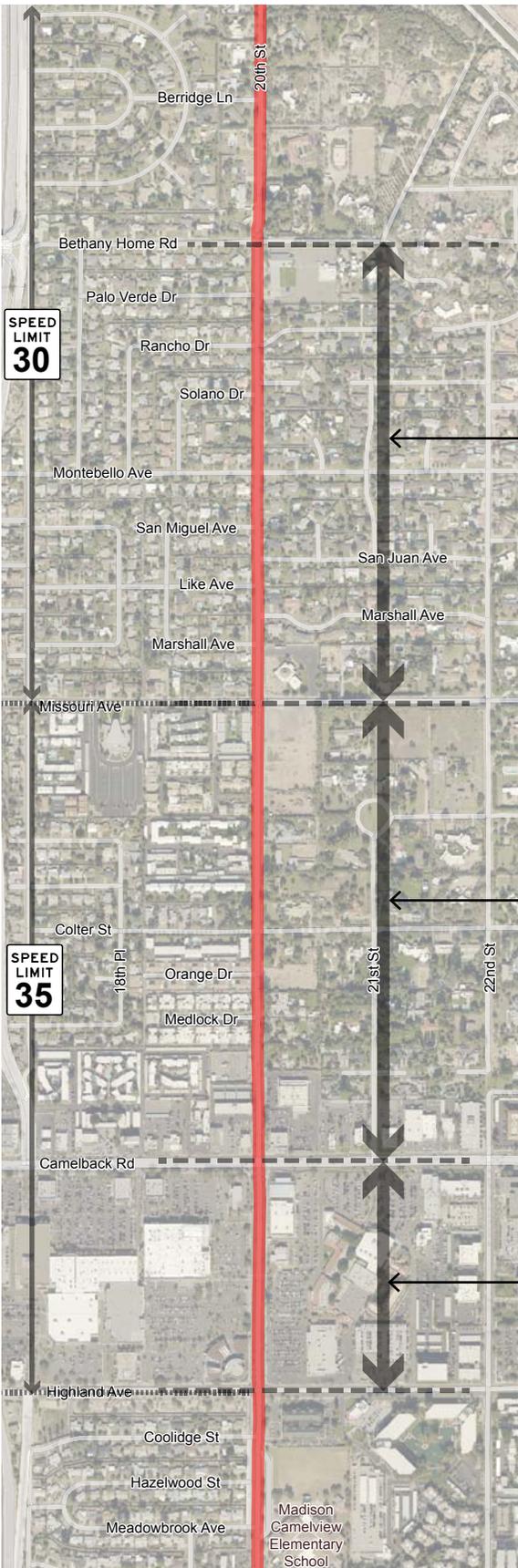


North of Claremont St to Bethany Home Rd



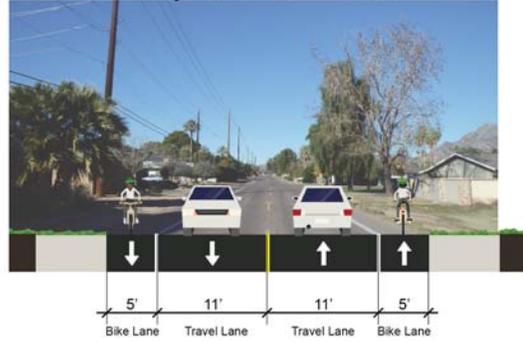
Existing Cross-Sections

20th Street Pedestrian and Bicycle Facilities Improvements Highland Ave to Bethany Home Rd

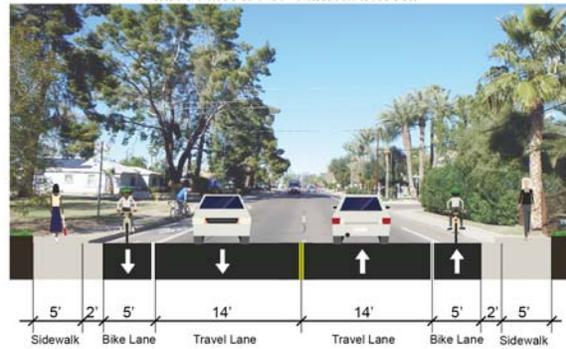


Study Corridor

Bethany Home Rd to Missouri Ave



Missouri Ave to Camelback Rd



Camelback Rd to Highland Ave



Feet
0 1,000 2,000
North

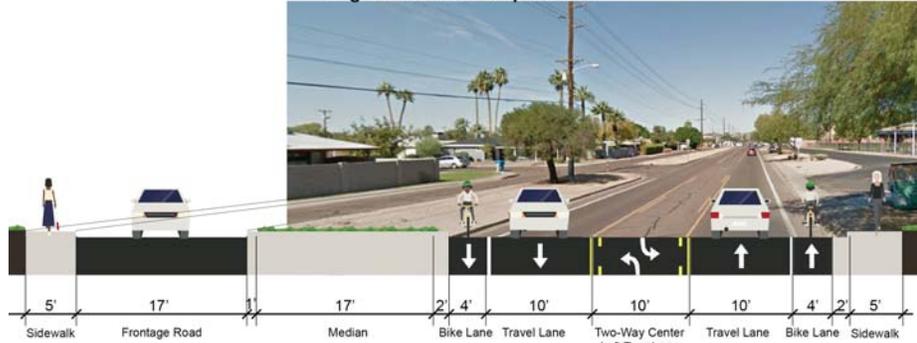
Existing Cross-Sections

20th Street Pedestrian and Bicycle Facilities Improvements Grand Canal to Highland Ave

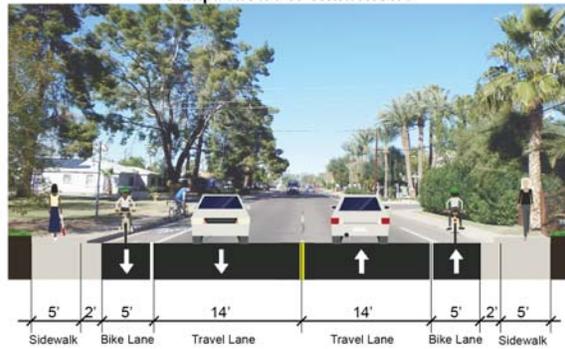


Study Corridor

Highland Ave to Campbell Ave



Campbell Ave to Whitton Ave



Whitton Ave to Grand Canal Trail



Feet
0 1,000 2,000
Existing Cross-Sections