



PARKWAY 303 WEST OLIVE AVENUE/COTTON LANE TRAFFIC IMPACT ANALYSIS

Executive Summary

The purpose of this traffic study is to evaluate the current and future transportation system within the project study area surrounding the site without and with the proposed.

Existing Traffic Data

The westbound left turn/through/right turn movement at the intersection of Peoria Avenue/Cotton Lane currently experiences inadequate delays during the weekday PM peak hour.

All of the remaining study intersections currently operate at an adequate LOS during the weekday peak hours.

Future Traffic Data Without Project

Several developments near the project site are expected to be constructed within the near future in the area. Expected trips from these developments were added to this analysis based on traffic assignments from the following reports:

- *Northern Farms Traffic Impact Analysis (TIA)* completed by Y2K Engineering, August 2019.
- *Cotton Lane and Northern Avenue TIA* completed by Kimley-Horn and Associates February 2019.
- *Residential Development Traffic Impact Study* completed by United Civil Group, June 2020.
- *Granite Vista TIA* completed by CivTech, 2014.
- *Clarius Park TIA* completed by Southwest Traffic Engineering, LLC (SWTE), April 2021.

The intersection of Loop 303 Northbound Ramps/Northern Avenue is anticipated to experience inadequate delays in 2037 without traffic from the project and with adjacent developments.

Several movements at the intersections of Peoria Avenue/Cotton Lane and Northern Avenue/Cotton Lane are expected to experience inadequate delays during the weekday peak hours in 2022, 2027, 2032, and 2037 without the project and with adjacent developments.

The remaining study intersections are expected to continue to operate at an acceptable LOS in 2022, 2027, 2032, and 2037 without the project.



Future Traffic Data With Project

Delays are expected at the intersection of Loop 303 Northbound Ramps/Peoria Avenue during the weekday peak hours in 2022, 2027, 2032, 2037 with traffic from the project and with adjacent developments. The intersection of Loop 303 Northbound Ramp/Northern Avenue is expected to experience delays during the weekday peak hours in 2027, 2032, and 2037 with traffic from the project.

Several movements at the intersections of Peoria Avenue/Cotton Lane and Northern Avenue/Cotton Lane are expected to experience inadequate delays during the weekday peak hours in 2022, 2027, 2032, and 2037 without and with the project and with adjacent developments.

The minor approaches to the intersections of 170th Lane/Peoria Avenue, 170th Avenue/Peoria Avenue, 169th Lane/Peoria Avenue, and 169th Avenue/Peoria Avenue are anticipated to experience inadequate delays during the weekday peak hours in 2022, 2027, 2032, and 2037 with traffic from the project and with adjacent developments.

The remaining study intersections are expected to continue to operate at an acceptable LOS in 2022, 2027, 2032, and 2037 with the project and with adjacent developments.

Turn Lane Analysis

Northbound right turn lanes are warranted at the following intersections:

- Cochise Drive/Cotton Lane
- Cheryl Drive/Cotton Lane
- Brown Street/Cotton Lane
- Mountain View Road/Cotton Lane
- Vogel Avenue/Cotton Lane
- Hatcher Road/Cotton Lane

Eastbound right turn lanes are also warranted at the following intersections:

- 170th Lane/Peoria Avenue
- 170th Avenue/Peoria Avenue
- 169th Lane/Peoria Avenue
- 168th Lane/Peoria Avenue

The warranted northbound right turn lanes on Cotton Lane and the warranted eastbound right turn lanes on Peoria Avenue are expected to need storage lengths of 100 feet or less.

The future two-way center left turn lanes on Peoria Avenue, Cotton Lane, and Olive Avenue are expected to adequately serve left turning vehicles at the project driveways and no queue overlap is expected to occur between any of the study intersections.



Traffic Signal Warrant Analysis

The intersection of Peoria Avenue/Cotton Lane currently meets and is expected to meet traffic signal warrants #1 and #2 in 2022, 2027, 2032, and 2037 without and with traffic from the project.

The intersections of Cheryl Drive/Cotton Lane, Mountain View Road/Cotton Lane, and Hatcher Road/Cotton Lane are not expected to meet traffic signal warrants #1 or #2 in 2022, 2027, 2032, or 2037 with traffic from the project.

169th Avenue/Peoria Avenue is anticipated to meet traffic signal warrants #1 and #2 in 2022, 2027, 2032, 2037 with traffic from the project and with adjacent developments.

The intersection Northern Avenue/Cotton Lane does not currently meet traffic signal warrants #1 or #2. Traffic signal warrants #1 and #2 are expected to be met in 2022, 2027, 2032, and 2037 without and with traffic from the project.

Crash Analysis

Crash history for the existing study intersections was obtained from the Arizona Department of Transportation (ADOT) from 1 January 2017 to 31 December 2019.

One crash was reported at the intersection of Loop 303 Southbound Ramp/Northern Avenue within the three-year period. The collision was a single vehicle crash and resulted in injury.

A total of five crashes were reported at the intersection of Northern Avenue/Cotton Lane during the three-year study period, one of which resulted in injury. Two of the crashes were rear-ends.

The intersection of Olive Avenue/Cotton Lane had a total of fourteen reported crashes during the three-year study period. Six of these crashes resulted in injury. Angled crashes and rear-ends made up approximately 70% of the crashes at this intersection. This intersection was recently signalized, which could result in a reduction of reported crashes in the future.

Nine collisions were reported at the intersection of Peoria Avenue/Cotton Lane during the study period. One of these crashes resulted in injury. Four of these crashes were angled collisions and two were rear-ends.

The intersection of Loop 303 Northbound Ramp/Peoria Avenue had one reported crash during the three-year study period. This crash was a rear-end collision.

No crashes were reported at the intersections of Loop 303 Northbound Ramp/Northern Avenue and Loop 303 Southbound Ramps/Peoria Avenue.



The intersections of Peoria Avenue/Cotton Lane and Olive Avenue/Cotton Lane had a higher number of reported crashes than the other existing study intersections. These crashes were likely due to the ALL-WAY STOP control and the limited capacity of these intersections and could be expected to decrease in future years at Olive Avenue/Cotton Lane and at Peoria Avenue/Cotton Lane after a traffic signal is installed.

Mitigation

Delays are expected at the intersection of Loop 303 Northbound Ramps/Peoria Avenue during the weekday peak hours in 2022, 2027, 2032, 2037 with traffic from the project and with adjacent developments. The intersection of Loop 303 Northbound Ramp/Northern Avenue is also expected to experience delays during the weekday peak hours in 2027, 2032, and 2037 with traffic from the project and with adjacent developments. While the overall intersection of Loop 303 Southbound Ramps/Peoria Avenue is expected to operate at an adequate LOS during the weekday peak hours in 2022, 2027, 2032, and 2037 with traffic from the project and adjacent developments, the eastbound through and the southbound right turning movements are expected to experience inadequate delays. The delays at these intersections are due to the limited capacity provided at these intersections not adequately serving the growing traffic volumes in the area.

Excess pavement is provided at these intersections in anticipation of the widening of Peoria Avenue and Northern Avenue. As development occurs adjacent to these intersections, half street improvements are expected to be completed, and the intersections of Loop 303 Northbound Ramps/Peoria Avenue, Loop 303 Southbound Ramps/Peoria Avenue, and Loop 303 Northbound Ramps/Northern Avenue are expected to be restriped to provide additional travel lanes.

Restriping the intersection of Loop 303 Northbound Ramps/Northern Avenue to provide two westbound through lanes and dual northbound left turn lanes is expected to alleviate the delays at the intersection.

The delays at the intersection of Loop 303 Northbound Ramps/Peoria Avenue can be alleviated with the striping of two eastbound and two westbound through lanes and dual eastbound left turn lanes.

At the intersection of Loop 303 Southbound Ramps/Peoria Avenue, the striping of two eastbound and two westbound through lanes, in addition to an exclusive left turn lane, shared through/right turn lane, and an exclusive right turn lane for the southbound approach to the intersection, is expected to alleviate the delays.

Several movements at the intersections of Peoria Avenue/Cotton Lane and Northern Avenue/Cotton Lane are expected to experience inadequate delays during the weekday peak hours in 2022, 2027, 2032, and 2037 without and with the project and with adjacent developments. These delays are due to the ALL-WAY STOP control of the intersections becoming inefficient with the growing traffic volumes in the area, as each vehicle is required to stop and proceed through the intersection one at a time.



The installation of a traffic signal in conjunction with the installation of dual westbound left turn lanes and dual northbound right turn lanes with right turn overlap signal phasing is expected to alleviate the delays at Peoria Avenue/Cotton Lane.

The installation of a traffic signal, exclusive left turn lanes for each approach to the intersection, and an exclusive westbound right turn lane with right turn overlap signal phasing is expected to alleviate the delays at Northern Avenue/Cotton Lane.

The minor approaches to the intersections of 170th Lane/Peoria Avenue, 170th Avenue/Peoria Avenue, 169th Lane/Peoria Avenue, and 169th Avenue/Peoria Avenue are anticipated to experience inadequate delays during the weekday peak hours in 2022, 2027, 2032, and 2037 with traffic from the project and with adjacent developments. These delays are due to the relatively large traffic volumes on Peoria Avenue not providing adequate gaps for vehicles turning from the minor approaches to these roadways.

Peoria Avenue is expected to be widened to a five-lane cross section in the future. After this widening is completed, the delay at 170th Lane/Peoria Avenue is expected to be alleviated and the delays at 170th Avenue/Peoria Avenue, 169th Lane/Peoria Avenue, and 169th Avenue/Peoria Avenue are expected to be reduced. The installation of the warranted traffic signal at 169th Avenue/Peoria Avenue is anticipated to alleviate the delays at this intersection.

Mitigation measures for the intersections of 170th Avenue/Peoria Avenue and 169th Lane/Peoria Avenue are limited. Due to the proximity of these intersections to the future traffic signal at Cotton Lane/Peoria Avenue, a traffic signal would not be appropriate at these locations. However, the installation of a traffic signal at Cotton Lane/Peoria Avenue and 169th Avenue/Peoria Avenue would be expected to generate additional gaps for vehicles turning from the minor approaches of 170th Avenue/Peoria Avenue and 169th Lane/Peoria Avenue onto Peoria Avenue. These gaps would be expected to further reduce the delays at 170th Avenue/Peoria Avenue and 169th Lane/Peoria Avenue. In actuality, northbound left turning vehicles at these intersections would not be expected to experience significant delays after the widening of Peoria Avenue and the installation of traffic signals at Cotton Lane/Peoria Avenue and 169th Avenue/Peoria Avenue.

Recommendations

The warranted northbound right turn lanes on Cotton Lane and the warranted eastbound right turn lanes on Peoria Avenue should be constructed to provide 160 feet of storage per the MCDOT *Roadway Design Manual*.

The warranted traffic signal should be installed at the intersection of Peoria Avenue/Cotton Lane. This intersection is expected to be widened in the future when development occurs adjacent to the intersection and Peoria Avenue and Cotton Lane are widened to five lane cross sections. In anticipation of growing traffic volumes in the area, this intersection should be constructed with space for future dual westbound left turn lanes and dual northbound right turn lanes.



The intersection of Northern Avenue/Cotton Lane should be monitored, and a traffic signal should be installed along with necessary geometric improvements to the intersection when warranted. These improvements include the installation of exclusive left turn lanes at each approach and an exclusive westbound right turn lane with right turn overlap signal phasing.

With economic conditions driving the development of the commercial portion of the site, the intersection of 169th Avenue/Peoria Avenue should be monitored, and a traffic signal should be installed when warrants are met.

The intersection of Loop 303 Northbound Ramps/Peoria Avenue should be re-stripped to offer dual eastbound left turn lanes, two eastbound through lanes, and two westbound through lanes. Loop 303 Southbound Ramps/Peoria Avenue should also be restriped to provide an exclusive southbound left turn lane, a shared southbound through/right turn lane, an exclusive southbound right turn lane, two eastbound through lanes, and two westbound through lanes.

The intersections of Loop 303 Northbound Ramp/Northern Avenue and Loop 303 Southbound Ramp/Northern Avenue should be striped to provide two westbound through lanes. Loop 303 Northbound Ramp/Northern Avenue should also be striped to provide dual northbound left turn lanes.