Appendix K

2017 Downtown Traffic & Parking Report

2017 DOWNTOWN TRAFFIC & PARKING REPORT

Introduction

As part of the City Council's strategic plan to revitalize Downtown Wichita Falls, Traffic Engineering staff included a comprehensive review of traffic and parking in the area bordered as follows:

- 5th Street
- Travis Street
- 15th Street
- Ohio Street

This area encompasses over fifty intersections in the Downtown area. While the "core" area is identified as a subset of this area, a broader area was determined for review. The goal of this project was to review the traffic and parking patterns in the Downtown area from a vehicle, pedestrian, and bicycle perspective. The last time a comprehensive review was conducted for traffic operations in the Downtown area was in 1999. Those changes worked very well for the Community for a number of years. However, like most projects, the results became dated as Downtown developed and driving habits changed. Regardless of the City Council's strategic planning efforts, though, it was time to update the current traffic control plan.

The objective of this report is to provide documentation and recommendations to assist with the following review of Downtown:

- Signalization needs
- STOP Sign placement
- Vehicle Accident Analysis
- Conversion of ONE WAY streets to TWO WAY
- Parking Utilization on Public Streets
- Parking Opportunities on Private Property
- Handicap Accessibility at Intersections
- Sidewalk Inventory
- Sidewalk Condition
- Bicycle Friendly Improvements
- Upgrades of street light and signal infrastructure

The goals of this study are to implement changes that are consistent with safe traffic control principles, that will improve vehicle, pedestrian, and bicycle efficiencies, and that will contribute to the economic well-being of the Downtown area. The recommended implementation plan will be supported by reliance on the Texas Manual of Uniform Traffic Control Devices. Once approved by City and Downtown leadership, Traffic Engineering staff will begin the field work to make the proposed changes.

Signalization Needs

Staff evaluated all intersections for traffic signalization, as well as a review of existing signalized locations. Because of the number of vehicles on Scott, these intersections received the most

focus from an analytical point. In fact, the volume of traffic on all Scott intersections exceeded the volume warrants as established for the Texas MUTCD.

The Texas MUTCD identifies the following nine warrants for evaluating a location for a traffic signal installation or operation:

- Warrant #1 – Eight-Hour Vehicular Volume
- Warrant #2 – Four-Hour Vehicular Volume
- Warrant #3 – Peak Hour
- Warrant #4 – Pedestrian Volume
- Warrant #5 – School Crossing
- Warrant #6 – Coordinated Signal System
- Warrant #7 – Crash Experience
- Warrant #8 – Roadway Network
- Warrant #9 – Intersections Near a Grade Crossing

For the sake of this evaluation, Warrants #5 and #6 were not considered for the Downtown area. Warrant #8 was also not considered because it must meet one or more of Warrants 1, 2, and three during a weekday with over 1,000 vehicles entering Scott per hour during the peak traffic flow. It also did not meet Warrant #8 because there are not 1,000 vehicles per hour for a five-hour period on either Saturday or Sunday. Attachment #3 provides warrant information on the intersections reviewed in detail for Scott Street.

Data collection occurred on Tuesdays, Wednesdays, and Thursdays, and traffic volumes were collected over a 24-hour period. In addition to traffic volumes, speed data was also collected. The side streets were calculated assuming that 9th, 10th, and 11th would be made TWO WAY. While these roadways currently have multiple ONE WAY lanes intersecting Scott, this was the most conservative approach because it lowered the threshold for warrant evaluation.

<u>Warrant #1 – Eight-Hour Vehicular Volume</u>

The Eight-Hour Vehicular Volume warrant is the benchmark by which all intersections are evaluated. With the exception of a couple of locations, all traffic signals in Wichita Falls meet this criterion. The Eight-Hour Vehicular Volume warrant looks at the number of vehicles using the major street lanes and the volume of vehicles using the highest intersecting approach. Adaptation to these figures are made as to the number of major lanes and the number of minor lanes on the highest intersecting approach.

While Scott traffic volumes met the eight-hour criteria set forth under Warrant #1 (600 vehicles per hour for eight individual eight hours in a 24-hour period), the side streets did not meet the projected 150 vehicles needed for the highest volume approach. In fact, the side street volumes did not meet the eight-hour warrant if both approaches (12th, 13th, and 14th streets) were included in the analysis in lieu of the single approach required by the warrant. On the other hand, 10th and 11th streets are ONE WAY. Subsequently, those directions are the highest volume approach. Similarly, both 10th and 11th did not meet a single hour at 150 vehicles. With the exception of

10th Street, traffic volumes on the remaining side streets would have to double or triple to meet this warrant.

As a result, the non-signalized intersections do not meet Warrant #1.

Warrant #2 – Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic signal. Using the numbered streets as the determining factor, the four-hour vehicular volume warrant then looks at the number of vehicles traveling on Scott during the four highest hour increments. As a result, approximately 1,100 vehicles would have to travel on Scott for each of four full hours of a day.

The highest count taken on Scott Street during the data collection was 830 vehicles. This occurred at 14th/Scott from 12 PM to 1 PM. This falls short of the 1,100 vehicle threshold set forth in Warrant #2 and this count was just for one of the four hours required.

As a result, the non-signalized intersections do not meet Warrant #2.

Warrant #3 – Peak Hour

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy facilities that attract or discharge large number of vehicles over a short period of time. For this analysis it is assumed that the entire Downtown area serves as one big office complex. Warrant #3 is similar to the four-hour vehicular volume (Warrant #2). The exception is that the Peak Hour warrant looks at a single hour of traffic flow. Once again, using the side street data as the determining factor under this warrant, there would need to be 1,500 vehicles for a single hour on Scott Street to meet Warrant #3.

As a result, the non-signalized intersections do not meet Warrant #3.

Warrant #4 – Pedestrian Volume

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. Using the four-hour pedestrian volume warrant and the amount of traffic on Scott during the highest four-hour period (550 vehicle threshold consistent with all intersections), 300 pedestrians would have to cross during the corresponding timeframe. If using the Pedestrian Peak Hour formula, at 830 vehicles (highest count along Scott Street for any particular hour), approximately 380 people would need to cross the street during that same timeframe. Those pedestrian volumes do not exist anywhere in Downtown (with the exception of the 6th/Scott area).

As a result, the non-signalized intersections do not meet Warrant #4.

Warrant #6 – Coordinated Signal System

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles. Even though Scott Street meets the warrant volumes, platooning has an opportunity to begin at both 9th Street for the northbound direction. In the southbound direction, platooning actually begins at either 5th Street for southbound traffic and 6th Street for eastbound traffic. The warrant further adds that the Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet apart. From the center of each intersection, there is approximately 430 feet of space between each block.

As a result, the non-signalized intersections do not meet Warrant #6.

Warrant #7 – Crash Experience

The Crash Experience signal warrant conditions are intended for application where the severity and frequency of the crashes are the principal reasons to consider installing a traffic control signal. Typically, if there are five or more collisions, of types susceptible to correction by a traffic control signal, that have occurred in a twelve-month period, then 80% of the traffic volumes can be used from the guidelines provided in Warrant #1 (Eight-Hour Vehicular Volumes).

According to collision data provided by the Wichita Falls Police Department, there was only two intersections in the study area that qualified for review under the Crash Experience warrant: 10th/Scott and 11th/Scott. During several of the review years collected on accident data (January 1, 2014 to June 30, 2017), there were incidents were five or more collisions, of types susceptible to correction by a traffic control signal, that occurred at these two intersections. As part of the analysis, to compare these two locations to other intersections in the Downtown Study area, accidents per million vehicles using these intersections was calculated using the collision data and traffic volume numbers. At 10th/Scott, there were 2.16 accidents per million vehicles over the timeframe studied. At 11th/Scott, there was 1.34 accidents per million vehicles. These numbers are relatively low. However, given that five or more accidents did occur, the analysis was performed.

Based on Warrant #1, the traffic volume figures drop from 600 to 500 vehicles on the major street, and from 150 vehicles to 120 vehicles on the highest approach minor street. Since both 10th and 11th are ONE WAY traffic flow on the numbered street, this simplified the data review. Scott Street traffic met the 80% criterion. However, the 10th Street approach only had one hour of traffic volume out of the eight required to meet this warrant. In addition, it still needed over 1,180 additional vehicles for the remaining seven hours to meet the 80% benchmark.

With the intersection of 11th/Scott, there was not a single hour that met the 80% criterion for this minor approach. Similar to 10th/Scott, the Scott traffic volume did meet the required traffic

volumes. A review of the numbers indicated that an additional 1,935 vehicles would need to use 11th Street during the same eight-hour period before the warrant was met.

Recommendations

There will be no changes to the current traffic signal infrastructure in the review area. While 5th/Scott did not warrant the operation of a traffic signal, the Multi-Purpose Events Center (MPEC) is one of the largest traffic generators in the Community. The construction of an event hotel should also strengthen MPEC's status as a traffic generator.

Staff recommends that the existing traffic signal poles and infrastructure be replaced, as well as the entire infrastructure reconstructed. No one knows how old the poles and equipment are and signal cable cannot be pulled through any of the existing conduits. This reconstruction can occur either through annual budgeting at two intersections per year or through a bond program. It is also recommended that the work be performed by Traffic staff to minimize the cost of reconstructing these six intersections. The Streetscapes Subcommittee can assist in selection of the new traffic signal "street" furniture.

Similarly, in an effort to predict an increase in traffic patterns, it is highly recommended that every intersection that receives streetscape upgrades include the following during construction:

- A 3" conduit installed around all four approaches of the intersection for traffic signal cable
- A sacrificial panel that can be removed from the new sidewalk paving for the installation of a 36" diameter signal pier
- An additional 2" conduit to be installed around all four approaches to address future street lighting improvement

This will address future expansion needs while protecting the integrity of the streetscape improvements.

Finally, while the intersections along Scott Street are not eligible for signalization under the current warrant review, economic development can greatly increase traffic volumes. It is recommended that Traffic staff continue to monitor both 10th and 11th at Scott for traffic volume changes and collision impacts. Similarly, a day care at the intersection of 10th/Scott may impact pedestrian volumes in that area. As the core area of Downtown is improved, it is further recommended that a new traffic analysis occur within five years in this area.

STOP Sign Placement

The current pattern of STOP Sign placement was based on traffic data collected in 1999. Much has changed in not only vehicle traffic patterns, but also pedestrian patterns. One of the biggest complaints received in gathering public input was that many motorists are still not sure of "who" has to STOP at an intersection. The second biggest complaint received is that there is no consistency or pattern in where the STOP signage is placed.

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The Texas Manual of Uniform Traffic Control Devices (MUTCD) establishes minimum traffic volumes that must be met in an hour for eight hours out of a day if multi-way STOPs are to be considered: 300 vehicles per hour on the major street and 200 vehicles on the minor street. The section on Multi-Way STOPs can be found in Section 2B.07 of the Texas MUTCD. In addition, the MUTCD does make some concessions to these traffic volumes if there are five or more accidents in a twelve-month period that are susceptible to correction by a multi-way STOP. Accident data collected for the sample is included in Attachment 1, and it covers the period from 2014-2017. Excluding signalized intersections, the following non-signalized intersections exceeded the five accident threshold for at least one of the review years:

- 6th/Travis (3.38 accidents per million vehicles)
- 7th/Indiana (4.20 accidents per million vehicles)
- 10th/Scott (2.16 accidents per million vehicles)
- 11th/Scott (1.34 accidents per million vehicles)

6th/Travis collision data greatly improved after the installation of the flexible barrier system. In fact, only three accidents have occurred since January 2016 once the barrier system was installed. The Scott Street intersection are also not candidates for a Multi-Way STOP because over 87% of the traffic volume for the non-signalized intersections travel on Scott Street. In addition, the minor street traffic volumes do not come close to meeting the minimum 200 vehicle criteria set forth in Section 2B.07. As a result, the Scott Street non-signalized intersections will be evaluated for signalization.

A review of the traffic volume data in Attachment 2, however, indicates that none of the intersections in the review area met the minimum 300/200 criteria for eight hours of the data collection day.

The Texas MUTCD, however, does allow some flexibility from the minimum traffic volume requirements. Specifically, the Texas MUTCD identifies the following exceptions:

- The need to control left-turn conflicts
- The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes
- Locations where a road user, after stopping, cannot see conflicting traffic and is not able to negotiation the intersection unless conflicting cross street traffic is also allowed to stop

The Texas MUTCD also notes that *"Multi-Way STOP control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way STOPs include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way STOP control is used where the volume of traffic on the intersecting roads is approximately equal."* The Texas MUTCD in Section 1A.04 Placement and Operation of Traffic Control Devices also states that "*Traffic control devices should be placed and operated in a uniform and consistent manner."*

Recommendation

Based on a review of the collected data (both vehicle traffic volume and accident data) and guidance allowed under the Texas MUTCD in regards to pedestrian and bicycle road users, the following intersections are recommended for conversion to Multi-Way STOPs.

- 8th/Ohio
- 7th/Indiana
- 8th/Indiana
- 9th/Indiana
- 11th/Indiana
- 12th/Indiana
- 7th/Lamar
- 9th/Lamar
- 11th/Lamar
- 14th/Lamar
- 15th/Lamar

If not included in the Multi-Way STOP list above, all other intersections will remain the same. With the placement of ALL WAY STOPs, though, in an effort to be consistent and uniform in application, the warning beacons at 7th/Ohio and 9th/Lamar are recommended for removal.

Vehicle Accident Data

Forty intersections were evaluated from 5th Street to Travis to 12th Street to Ohio. In order to objectively evaluate the various intersections, staff used the number of accidents per million vehicles using the intersection over a twelve-month period. Typical traffic studies conduct vehicle counts on Tuesdays, Wednesdays, and Thursdays, which gives one the average daily traffic volume. Traffic was adjusted higher for Monday and Friday, and it was adjusted lower for Saturday and Sunday. Once a weekly count was established using this logic, an annual traffic volume was then established. The annual traffic volume is then divided by one million to provide the denominator. The number of accidents is then divided by the denominator for that intersection. This rationale benchmarks the accident rate to the number of vehicles using an intersection. Subsequently, if the same number of accidents occurs at each intersection, a location with fewer vehicles using it each day will yield a higher number of collisions per million vehicles than one with more traffic. Higher accidents per million vehicles may indicate a problem at a particular intersection compared to other locations. Subsequently, a location with a higher collision rate per million vehicles will require more attention than one with a smaller number.

Attachment 1 provides background information on the number of accidents per million vehicles for the area studied. An average was taken over the four-year period from 2014 to 2017, and 2017 data was adjusted for the whole year. Only three intersections revealed more than three accidents per million vehicles:

- 6th/Travis (3.38 accidents per million vehicles)
- 7th/Indiana (4.2 accidents per million vehicles)
- 9th/Travis (3.31 accidents per million vehicles)

With the placement of the flexible barrier system at 6th/Austin, accidents appear to be trending downwards at Travis. However, 2017 showed an increase the number of accidents when compared to 2016. There still is a weaving movement that occurs from vehicles wanting to turn at Travis. It should be noted that this is also a high pedestrian crossing location because of foot traffic from the parking lot to the north and the Wichita County Courthouse.

With the recommended installation of an ALL WAY stop at 7th/Indiana, it is hoped that the number of accidents is reduced at this intersection. Previous history has indicated that this is a successful solution at locations such as this.

The intersection of 9th/Travis bears continued monitoring. There were a reported seven accidents over the 3.5-year period from 2014 to 2017. Four of the accidents, though, happened in 2014. There were two reported accidents in 2016 and one thus far in 2017.

On the other hand, there were more accidents at the following locations:

- 6th/Scott (1.27 accidents per million vehicles)
- 7th/Scott (1.89 accidents per million vehicles)
- 10th/Scott (2.16 accidents per million vehicles)
- 11th/Scott (1.34 accidents per million vehicles)

This is a great example of more accidents, but a smaller number of accidents per million vehicles. The reason is because of the larger number of vehicles using Scott. Statistically, more accidents may occur because there are more vehicles using that intersection. However, these figures appear to be in line with other intersections in the Downtown area.

<u>Recommendations</u>

Staff should continue to review accident data in the Downtown area every 2-3 years to determine if there are changes or trends developing. Consideration should be given to placing a crosswalk at the intersection of 6th/Travis to reflect the number of people crossing to and from the Court House.

As noted above, it is recommended to install an ALL WAY STOP at 7th/Lamar. This should correct the trend of accidents at this location. It should also be noted that drivers become very complacent to their commute or travels. If there is a slight increase in accidents AFTER the installation of Multi-Way STOPs Downtown, it is to be expected until drivers adjust to the new environment.

Finally, the intersection of 9th/Travis is an anomaly given the other intersections in the Downtown area. There is plenty of site distance in all directions, and the traffic control for the intersection is adequate. With the recommendation to make 9th Street TWO WAY traffic flow, staff will continue to monitor this intersection after those changes.