

### **Traffic Analysis Memo**

То:	Oklahoma Department of Transportation	Date:	November 2021
From:	Garver		
RE:	ODOT CI-2262 – US-70 Roosevelt Bridge		

#### 1. Introduction

As part of the Oklahoma Department of Transportation (ODOT) CI-2262 contract, Garver is studying the at-risk Roosevelt Memorial Bridge structure along United States Highway 70 (US-70) between Kingston and Durant, Oklahoma. This memo summarizes the traffic and safety analysis related to the potential bridge widening/replacement options and considers the two adjacent intersections on either end of the project study area.

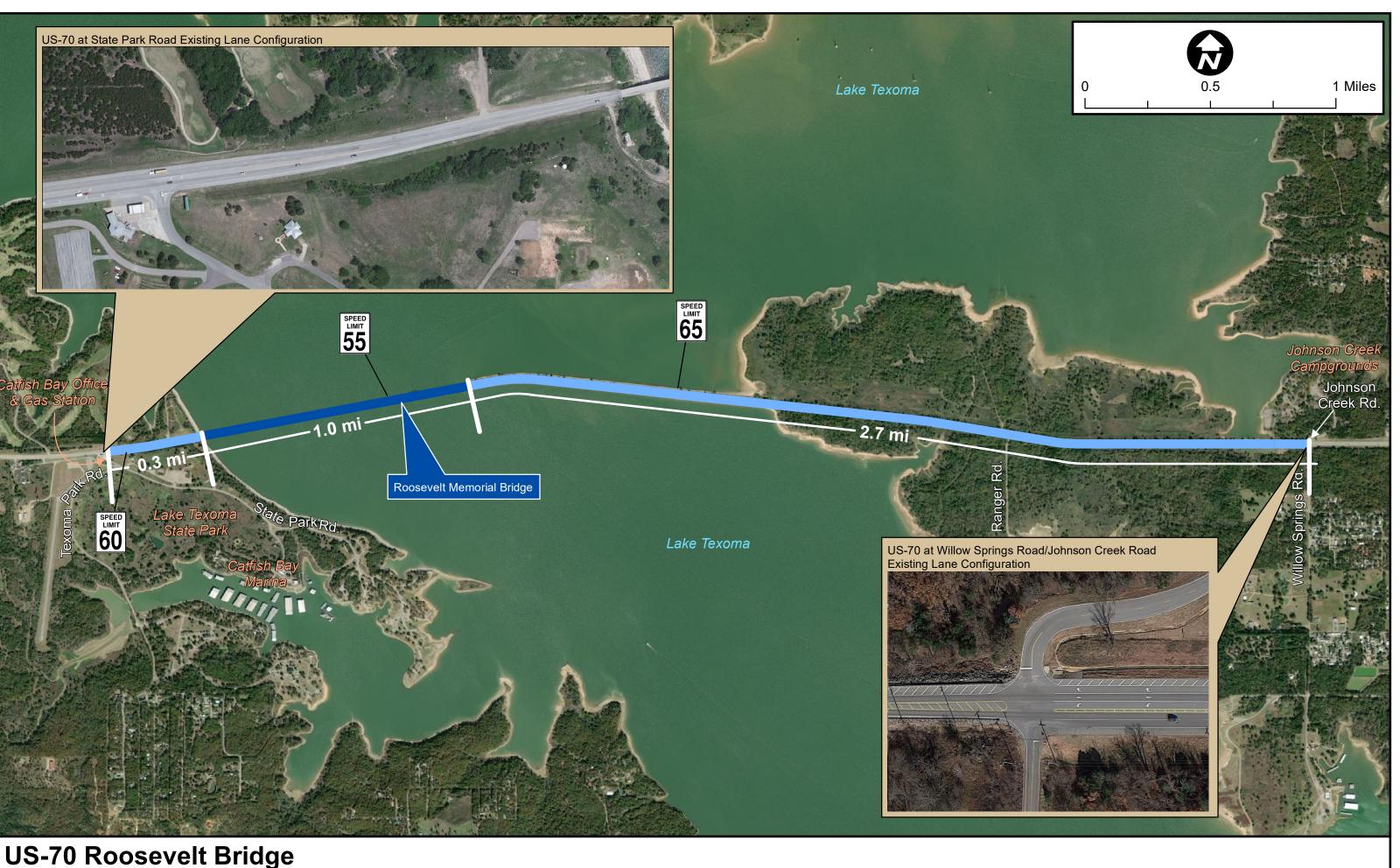
#### 2. Existing Conditions

The study area, shown in **Figure 1**, extends approximately 4 miles along US-70 from State Park Road to Willow Springs Road/Johnson Creek Road. US-70 is an east-west roadway through this area with a varying speed limit of 55 to 65 MPH. The study area includes the US-70 bridge (Roosevelt Memorial Bridge) over Lake Texoma and adjacent causeway to the east. The US-70 intersections at State Park Road to the west and Willow Springs Road/Johnson Creek Road to the east bound the study area. Both intersections have two-way stop control on the side streets.

US-70 is an undivided, two-lane facility over Lake Texoma and along the causeway but transitions to a five-lane facility at the boundary intersections. The bridge itself stretches approximately onemile across Lake Texoma and has two 12' lanes, no shoulders, a flat grade, and a 55 MPH speed limit. The speed limit increases to 60 mph west of the Roosevelt Memorial Bridge and 65 mph over the causeway to the east.

The three-legged State Park Road intersection on the west side serves residential and recreational trips with access to Catfish Bay and Lake Texoma State Park. Access to marinas/boat launches onto Lake Texoma is provided at this intersection, and a gas station with open frontage located in the southwest quadrant. The intersection lane configuration includes a right turn only lane drop for eastbound traffic, a second westbound through lane added just east of the intersection, and a flared northbound approach that can accommodate right turning traffic to move around a single left turning vehicle.

To the east, the four-legged Willow Springs Road/Johnson Creek Road intersection serves residential development on the south side of US-70 and Johnson Creek Campground on the north side of US-70. Similar to State Park Road, a five-lane to two-lane transition at the intersection creates a westbound right and left turn lane drop for traffic heading over Lake Texoma. The eastbound approach does not have a left turn lane.



US-70 Roosevelt Bridge Study Area

Figure 1



#### 2.1. Traffic Volumes

Data was collected in May 2021, to reflect warm-weather and school traffic volumes, and was processed/summarized into the design traffic volumes shown in Figures A-1 and A-2 in Appendix A – Traffic Volumes. 24-hour turning movement counts were collected at the two study intersections on a Tuesday, along with 7-day counts on US-70, to confirm the Tuesday values were representative of the entire week given the fluctuation in traffic common to recreational areas during warmer weather periods.

An analysis of the 7-day information on US-70 indicated Thursday data was approximately 15% higher than Tuesday data, so the 24-hour turning movements were adjusted accordingly. With the adjustment factor, US-70 carries approximately 8,500 vehicles per day across the Roosevelt Memorial Bridge with trucks accounting for 9% of the total volume. State Park Road carries approximately 1,750 vehicles per day, and Willow Springs Road/Johnson Creek Road carries approximately 1,200 vehicles per day.

#### 2.2. Field Observations

Field observations were conducted in March 2021 to determine travel speeds, areas of limited sight distance, and potential safety/operational concerns within the study area. Inventory was also collected for any pertinent roadway features such as traffic control devices, sign locations, lane widths, and intersection configurations.

During the field observations, no significant intersection delay was observed in the AM or PM peak periods. A slight reduction in speed was observed on the bridge as vehicles entered or exited the bridge to the west and while traveling along the narrow bridge. Additional findings from the field observations were noted in the field and summarized in further detail in Appendix B – Safety Analysis Memo.

#### 2.2.1 Roosevelt Memorial Bridge and Causeway

The Roosevelt Memorial Bridge extends approximately one-mile in length over Lake Texoma and includes a 250' truss section. The truss creates a vertical confinement on the already narrow twolane route, as depicted in **Figure 2**. The bridge does not currently have a median to protect drivers from crossing into the opposing lane or any shoulders to offer emergency refuge. Passing opportunities are not provided on the Roosevelt Memorial Bridge; however, the causeway section



Figure 2: Truss Structure on Bridge

and segment east towards the intersection of US-70 at Willow Springs Road/Johnson Creek Road do provide passing zones to allow road users the ability to pass using the opposing lane. The Roosevelt Memorial Bridge is the only portion of the study area with roadway lighting as luminaires are located on power poles at approximately 440-foot intervals.



#### 2.2.2 Sight Distance Restrictions

Intersection sight distance at State Park Road and at Willow Springs Road/Johnson Creek Road was observed in the field. The presence of trees, power poles, signage, and guardrails contribute to less visibility, as shown in **Figure 3** and **Figure 4**.



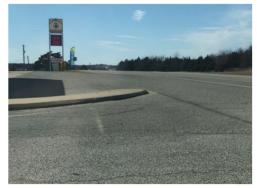


Figure 3: Visibility, looking West – from Stop Bar at Willow Springs Road

Figure 4: Visibility, looking West – from Stop Bar at State Park Road

The sight distance needed to safely complete a right turn, a left turn, or a crossing maneuver can be calculated using guidance in the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*. **Table 1** below depicts the intersection sight distance required for vehicles to conduct the maneuver from a stop condition on a minor street to a major street, along with the current sight distances that were field measured. As shown below, single-unit and combination trucks do not have enough sight distance to safely conduct any of the three maneuvers due to slower acceleration characteristics associated with trucks. Passenger cars cannot make a safe left turn from Willow Springs Road/Johnson Creek Road onto US-70. Due to the adjacent State Park and opportunities to get to Lake Texoma from this route, cars with boat trailers are common and subject to the sight distance conditions.

Table 1 – Required Signi Distances									
Location	Design	Design Vehicle	Required S	Sight Distan	Existing Conditions Sight Distances (feet)				
Speed		besign venicie	Right-Turn Distance	Left-Turn Distance	Crossing Distance	US-70 EB Vehicles	US-70 WB Vehicles		
Willow Springs Road	65	Passenger Cars	621	717	621		1,500		
(NB)	mph	Single-Unit Trucks	812	908	812	650			
		Combination Trucks	1,003	1,099	1,003				
Johnson Creek Rd	65 mph	Passenger Cars	621	717	621		1,500		
(SB)		Single-Unit Trucks	812	908	812	650			
(00)	mpn	Combination Trucks	1,003	1,099	1,003				
State Park Road	60	Passenger Cars	573	662					
(NB)	mph	Single-Unit Trucks	750	838	-	700	> 2,000		
(IND)		Combination Trucks	926	1,014					

Table 1 – Required Sight Distances

Source: AASHTO Policy of Geometric Design of Highways and Streets, equation  $ISD = 1.47V_{major}t_g$  ( $t_g$  from tables 9-6, 9-8, and 9-10).



#### 3. Crash Data

Crash Data was collected using ODOT's Safe-T Database for a five-year period from 2015 to 2019. **Figure B-4** in **Appendix B** – **Safety Analysis Memo** depicts overall crash data along US-70, including a crash frequency heat map and statistics by occurrence, severity, and road condition/location. Over the five-year period, a total of 52 crashes occurred within the corridor limits with 18 crashes (35%) classified as intersection-related. **Figures B-5** and **B-6** in **Appendix B** – **Safety Analysis Memo** include collision diagrams along the project route. The most common crash types included 12 rear-ends, 11 angle-turning, nine fixed-object, eight sideswipe-opposite direction, and six head-on collisions. Four fatal crashes occurred on the route, along with two incapacitating injuries and nine non-incapacitating injuries.

The corridor crash rate (78 crashes per 100 million vehicle miles traveled (MVMT)) was comparable to the statewide crash rate (76 per 100 MVMT). However, the fatal crash rate for the corridor was almost 2.5 times larger at 6.0 per 100 MVMT than the statewide fatal crash rate at 2.6 per 100 MVMT.

Intersection-related collisions accounted for over one-third of the total collisions experienced within the study area – which can be contributed to limited sight distance and high travel speeds along US-70. The nine fixed-object collisions are important to note as these collisions were involving elements located closely alongside the roadway of the study area. Guardrails or barrier rails accounted for six of the collisions, one collision with a tree, another with a traffic sign, and one with a curb.

Additional information regarding the crash data can be found in **Appendix B – Safety Analysis Memo**.

#### 4. Crash Modification Factors

A crash modification factor (CMF) is used to compute the expected number of crashes after implementing a countermeasure on a road or intersection. Several countermeasures with beneficial CMFs are described below that could be implemented to reduce the number of collisions that occur on the route.

Possible solutions to improve safety along the bridge and/or causeway section of the project route could include:

- Installation of any type of median barrier = 43% reduction (CMF ID: 42)
- Convert 2-lane roadway to a 4-lane divided roadway = 66% reduction (CMF ID: 7566)
- Upgrade facility to allow passing = 32% reduction (CMF ID: 9108)
- Installation of street lighting (along the entire route) = 37% reduction of night-time collisions (CMF ID: 7774)

As mentioned in the previous section, intersection-related and fixed object collisions accounted for a significant number of crashes within the study area. According to the *CMF Clearinghouse* online



database, removing or relocating fixed objects outside of a clear zone could result in a 38% reduction of crashes (CMF ID: 1024). The potential addition of an outside shoulder width would also allow additional clearance from objects located on the route (such as guardrails, trees, and signs as previously mentioned). Adding rumble strips on the outside shoulders of the non-bridge segments could also assist in reducing the number of fixed-object collisions by alerting drivers prior to vehicles departing the travel lane, which would result in a 16% crash reduction (CMF ID: 3442).

Additional safety countermeasures and design elements are discussed in Section 9 of this study regarding the bridge cross-section safety analysis.

### 5. Capacity Analysis (Existing Conditions)

Level of Service (LOS) analysis was conducted for the study intersections. LOS is a concept defined by the *Highway Capacity Manual*, 6<sup>th</sup> *Edition* (HCM) to define the quality of operations and is divided into six categories: LOS A through LOS F. LOS A indicates low delay, free flow conditions while LOS F indicates that demand exceeds capacity and results in high delay and low travel speeds. Movement delay (seconds per vehicle) is typically used to define LOS for intersections.

Synchro 11 analysis software was used to evaluate traffic operations at the study intersections. This software was applied to determine the expected LOS at intersections using a procedure consistent with the equation based HCM methodology. In addition, micro-simulation was used to analyze intersection operations via SimTraffic, the companion software to Synchro, to supplement some of the shortcomings of the HCM procedure.

All movements, at both study intersections, resulted in LOS B or better for the existing 2021 design volumes. The results of the analysis are tabulated in **Table C-1** in **Appendix C – Existing and No Build Analysis Results**.

Using the *Highway Capacity Software* 7 (HCS7), analysis was also completed for the existing twolane bridge facility to determine the segment LOS (as compared to the Synchro results producing intersection LOS), which uses density as the measure of evaluation. Segment LOS is a level of service parameter quantifying the proximity of other vehicles and is directly related to the freedom to maneuver within the traffic stream, measured in vehicles per mile per lane.

The existing one-mile bridge segment operates at LOS C for both the AM and PM peak periods. The highest directional volume (vehicles/hour) was used for each peak period to reflect the worst-case scenario results with the density LOS. The reports of the analysis are included in **Appendix C** – **Existing and No Build Analysis Results**.



### 6. No Build Conditions

Existing traffic volumes were grown and analyzed to predict operational conditions in the proposed design year of 2050.

#### 6.1. Growth Trend

Historic growth trends were analyzed at ODOT count stations west of State Park Road in Marshall County on US-70 and east of Willow Springs Road/Johnson Creek Road in Bryan County on US-70, which were the closest stations to the project site. The most recent Average Annual Daily Traffic (AADT) volumes available were from 2019, so a trend function was used to estimate the AADT for 2021 and 2050. These historic volumes can be seen below in **Table 2**. Since the two count locations were not in close proximity and the volumes varied, an average growth rate of 1.5% was determined and used for the purposes of this study.

Road	Site ID	Year	AADT Volume
		2010	7,111
		2011	7,142
		2012	6,449
		2013	6,443
		2014	6,577
US-70		2015	6,900
(West of State Park Road)	480031	2016	7,200
(west of state Park Road)		2017	7,500
		2018	6,700
		2019	6,600
		2021	6,868
		2050	6,896
		<b>Growth Rate</b>	0.014%
		2010	8,705
		2011	8,636
		2012	8,580
		2013	8,749
		2014	8,930
US-70		2015	9,100
(East of Willow Springs	070016	2016	10,200
Road/Johnson Creek Road)		2017	10,600
		2018	11,000
		2019	10,800
		2021	11,566
		2050	20,587
		<b>Growth Rate</b>	2.689%

#### Table 2 - Historic Growth Trends



#### 6.2. Future Traffic Volumes (Background Growth Only)

Using the 1.5% growth rate, US-70 will carry approximately 13,200 and 11,400 vehicles per day east and west of the study area, respectively, by 2050. The bridge is estimated to carry roughly 12,200 vehicles per day. Additionally, State Park Road will carry 2,500 vehicles per day and Willow Springs Road/Johnson Creek Road will carry approximately 1,700 vehicles per day. The 2050 (background growth only) volumes for the study intersections are displayed in Figure A-3 in Appendix A – Traffic Volumes.

#### 6.3. Proposed Development Scenario

An expansive development is planned west of the Roosevelt Memorial Bridge near the intersection of US-70 and State Park Road. This property, referred to as PointeVista Development, features approximately 2,700 acres of mixed-use development and includes the following features:

- 2.100 homes
- Three 4-star resort hotels
- Convention/conference center
- Championship golf course
- Caribbean Lagoon
- Chickasaw Nation Casino

- Full-service marina
- Waterfront town center
- Entertainment venues
- Aquatic center
- 25,000 SF of restaurants (assumed) •
- 100,000 SF retail shops (assumed) •

Conceptual analysis of this development property was considered as a worst-case scenario for the purpose of this study. Volumes were projected for the year 2050 using a trip generation procedure consistent with ITE's Trip Generation Manual. A 20% mixed-use reduction was also applied to the initial trip-generated volumes under the assumption that vehicles will enter the property and visit multiple elements within the same trip.

According to the proposed site plan, the main access to this development would be a new entrance from US-70 opposite Chickasaw Pointe Road, which is approximately 1,000' west of State Park Road. On the south side, Texoma Park Road would be realigned to Chickasaw Pointe Road rather than the current alignment towards State Park Road. Due to this re-alignment, State Park Road would not handle the same traffic demand as today and most new trips using PointeVista would be directed towards the Chickasaw Pointe Road/Texoma Park Road main entrance. When developing the volumes for 2050 with Development, it was assumed that this new roadway configuration will divert 90% of the existing trips from State Park Road to the Chickasaw Pointe Road/Texoma Park Road intersection, though the proposed Casino would be accessed from State Park Road.

With the assumed land use plan at full build out, the PointeVista Development would generate approximately 30,000 trips per day with 10% assumed to be traveling north/south between the development. Of the remaining trips, it was assumed that 45% of the vehicles would be oriented to the west (I-35) and 55% would travel from the east (US-75).



The additional demand brought forth by this development would significantly increase traffic volumes on US-70 within the study area. Projected 2050 traffic volumes inclusive of the development were estimated at approximately 28,200 and 26,700 vehicles per day east and west of the bridge, respectively. The bridge itself is projected to carry approximately 27,300 vehicles per day. The 2050 with Development volumes for the study intersections are displayed in Figure A-4 in Appendix A – Traffic Volumes.

#### 6.4. 2050 No Build Capacity Analysis (Background Growth Only)

As shown in **Table C-2** in **Appendix C – Existing and No Build Analysis Results**, intersection conditions worsen by 2050, but all movements will operate at LOS C conditions or better.

Results for the No Build facility indicated LOS D results for both the AM and PM peak periods for the 2050 design volumes. As with the 2021 existing volumes, the highest directional volume (vehicles/hour) was used for each peak period. The reports for these analyses are included in **Appendix C – Existing and No Build Analysis Results**.

#### 6.5. 2050 No Build Capacity Analysis (Development Scenario)

Analysis was completed with the PointeVista Development, under the assumption that no changes were made to the existing configuration of the roadway. As expected, the results (shown in **Table C-3** in **Appendix C – Existing and No Build Analysis Results)** show significant delay with LOS E and F results on the side street movements at each intersection.

With the development added, the segment LOS also worsens on the Roosevelt Memorial Bridge with LOS E conditions on US-70 during both peak periods. The two-lane bridge would be a bottleneck under this scenario. The reports for each of these analyses are included in Appendix C – Existing and No Build Analysis Results.

#### 7. Traffic Signal Warrant

Traffic signal warrants were analyzed at the study intersections using the existing year and future design year volumes. All signal warrant analysis reports can be found in **Appendix D – Signal Warrants**. The following sections detail the process used for the warrant evaluation and the corresponding results.

#### 7.1. Criteria

The signal warrants were performed using the *Manual on Uniform Traffic Control Devices* (MUTCD) Signal Warrants tool within HCS7. The warrant software considered the speed on the major street, the lane configuration, and the traffic volume over a consecutive 12-hour period. While satisfaction of any of the criteria alone does not mandate signalization, the MUTCD requires that at least one of the following warrants be met:



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- 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 Intersection Near a Grade Crossing

Warrants 1 through 3 were determined to be applicable for this project and are described in additional detail below.

- Warrant 1 typically applies where the volume of intersecting traffic throughout the average day is significant or the intersecting traffic causes excessive delay to the minor street traffic. It is made up of two conditions. Condition A considers the volume of traffic crossing the intersection while Condition B considers the delay and number of conflicts for the minor street traffic. Conditions A and B are independent of one another in determining whether the warrant is satisfied. However, if neither condition is satisfied for 8 hours of an average day, a combination of the warrants may be considered at 80% of the required vehicles per hour (vph). Volume criteria is determined graphically with separate charts for high-speed routes/isolated communities with populations less than 10,000.
- Warrant 2 applies where the volume of intersecting traffic, usually during peak times, is the primary reason for considering a traffic signal. If it is found for any four hours of an average day that the side street traffic suffers undue delay which would be remedied by a traffic signal, then a signal may be justified. Volume criteria is determined graphically with separate charts for high-speed routes/isolated communities with populations less than 10,000.
- Warrant 3 typically applies to facilities that attract or discharge large numbers of vehicles over a short time. It is made up of two conditions. For Condition A, three criteria must occur for this warrant to be met. First, the total stopped time delay for one side street approach must equal or exceed four vehicle-hours for a single lane approach or five vehicle-hours for a two-lane approach. Second, the volume for this side street approach must exceed 100 vph for a single lane approach or 150 vph for a two-lane approach. Finally, the total volume entering the intersection must exceed 650 vph for three-leg intersections and 800 vph for four-leg intersections during the same hour as the first two criteria. For Condition B, the warrant is determined graphically. Like Warrants 1 and 2, reduced criteria is applied for high-speed routes or communities less than 10,000 population.



If the intersection met any criteria for the warrants listed above with initial volumes, a right turn reduction factor was applied to the right turn movements from the side streets to determine if a signal would still be warranted due to those vehicles being able to turn right on red at a proposed signal and thus would not count towards the warrant. The right-turn movements were reduced using Pagones Theorem, which is used by several state DOTs and considers the side street lane configuration and the volumes on the side street and mainline approaches. The right-turn reduction was treated as a separate scenario and is a more conservative approach that is recommended for consideration in the MUTCD. In addition, scenarios were considered that completely removed minor turn lanes and corresponding volumes or tested a heavy mainline left turn versus through movement.

#### 7.2. Warrant Analysis Results

Several scenarios were tested while performing the signal warrant analysis at the two intersections on US-70 within the study area. The existing configuration (No Build) was examined for 2021, 2050 (background growth only), and 2050 with Development volumes. The proposed configuration (Build), which is discussed in further detail in Section 7 of this report, also examines the volumes for the years 2021, 2050 (background growth only), and 2050 with Development. The process and results are discussed below for the various scenarios.

#### 7.2.1. 2021 Existing Results

The following scenarios were completed to determine if a signal would be warranted at the intersections using the current lane configuration and 2021 traffic demand.

- 2021 Raw volumes do not meet warrant criteria at either intersection.
- 2021 Design volumes do not meet warrant criteria at either intersection.

As neither of those scenarios warranted a signal, an additional scenario was examined due to the unique configuration of lane drops/additions occurring near or at these intersections:

• A scenario was tested that included just a single lane through movement in both directions of US-70 to test the warrants against the single approach lane criteria with left turn and right turn traffic on US-70 removed. This situation still did not warrant a signal with the 2021 Design volumes at either intersection.

#### 7.2.2. 2050 No Build Results (Background Growth Only)

The following scenarios were completed to determine if a signal would be warranted at the intersections using the current lane configuration and 2050 traffic demand.

- At the State Park Road intersection, 2050 Design volumes meet Warrants 1 and 2.
  - With right turn volumes reduced, Warrant 1 was still met in 2050 at State Park Road.



- Using the lane reduction scenario mentioned above, Warrants 1, 2, and 3 were met in 2050 with side street right turn volumes maintained at State Park Road
  - o Warrants 1 and 3 were met under this scenario if side street right turn volumes were reduced at the intersection.
- No traffic signal warrants are met at the Willow Springs Road/Johnson Creek Road intersection under any scenario using 2050 Design volumes.

#### 7.2.3. 2050 No Build Results (Development Scenario)

The following scenarios were completed to determine if a signal would be warranted at the intersections using the current lane configuration and 2050 with Development demand.

- With the increased volumes, the State Park Road intersection would warrant signalization in 2050 by Warrants 1, 2, and 3 with and without right turn reductions.
- At Willow Springs Road/Johnson Creek Road, Warrant 2 was met when full volumes were considered but no warrant criteria were met after side street right turns were reduced.

#### 7.2.4. Build Scenario Results

The Build scenario was analyzed for signal warrant criteria at each of the intersections for the years 2021, 2050 (background growth only), and 2050 with Development assuming that the Roosevelt Memorial Bridge and causeway sections are widened to two through lanes in each direction to match the cross-section of the approaches.

- No warrants were met at either study intersection in 2021.
- Using 2050 Design volumes (background growth only),
  - o Traffic signal warrants are met at State Park Road with full volumes (Warrants 1 and 2) and with right turn volumes reduced (Warrant 1).
  - o No warrant criteria is met at Willow Springs Road/Johnson Creek Road.
- Using 2050 Design volumes with Development,
  - o State Park Road meets Warrants 1, 2 and 3 with full volumes and right turns reduced.
  - o Willow Springs Road/Johnson Creek Road meets Warrant 3 with full volumes but no warrant criteria with right turn volumes reduced.
  - o In addition, it is anticipated that the main development entrance into PointeVista (located approximately 1,000' west of State Park Road) would meet Warrants 1, 2, and 3.

### 8. Build Analysis

A potential Build scenario assumed an increased capacity from the existing two-lane configuration bridge/causeway to a four-lane configuration with the addition of 10' wide shoulders.



Analysis was completed for the Build scenario at the study intersections using Synchro 11 software, and along the US-70 mainline utilizing the multi-lane analysis within the HCS7 software. Results of those findings are described in the following sections and included in Appendix E -**Build Analysis Results** 

#### 8.1. Intersection Analysis

The potential expansion of the bridge to four-lanes will modify the configuration of the two intersections within the study area. State Park Road eastbound vehicles currently must merge left before entering the bridge – whereas the Build condition will allow both lanes to continue onto the bridge.

#### 8.1.1. Build Condition – Intersection Configuration

Utilizing the requirements set forth in ODOT's Roadway Design Manual for exclusive right-turn lanes, volumes were analyzed to determine if a right-turn lane would be warranted at either intersection with the projected volumes. 2050 (background growth only) volumes did not warrant a right-turn lane at either intersection for mainline or side street movements. 2050 with Development volumes did warrant a right-turn lane for vehicles traveling eastbound on US-70 making a right-turn onto State Park Road. Volumes did not meet a right-turn lane warrant at the intersection of Willow Springs Road/Johnson Creek Road for the 2050 with Development scenario.

Figure 5 depicts the proposed lane configuration at the US-70 at State Park Road intersection. The northbound leg of this intersection remains the existing configuration with the flared channelized right turn movement. At the east end of the study area approaching the intersection of Willow Springs Road/Johnson Creek Road, US-70 currently has a westbound lane drop that would be

modified to include two continuous through lanes and an eastbound left turn lane in the Build scenario. The potential lane configuration at US-70 and Willow Springs Road/Johnson Creek Road is depicted in Figure 6 on the following page.



Figure 5: Build Conditions - US-70 at State Park Road



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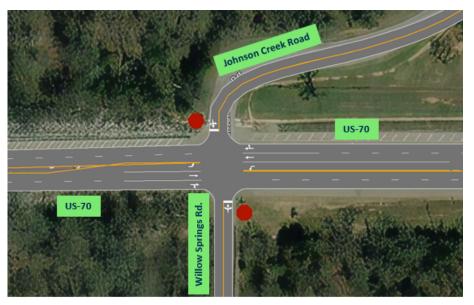


Figure 6: Build Conditions - US-70 at Willow Springs Road/Johnson Creek Road

#### 8.1.2. 2021 Results

Analysis of the Build scenario at the two study intersections with 2021 design volumes resulted in LOS A conditions for all movements. The results of the analysis are tabulated in **Table E-1** in **Appendix E – Build Analysis Results**.

2021 design volumes resulted in LOS A conditions for each direction of travel along the US-70 bridge segment for the Build scenario in both the AM and PM peak period conditions. The reports for these analyses are included in **Appendix E – Build Analysis Results**.

#### 8.1.3. 2050 Results (Background Growth Only)

For the 2050 (background growth only) design volumes, the State Park Road northbound movement improves to LOS A in the AM period and delay is also reduced in the PM peak period. The northbound and southbound movements at the Willow Springs Road/Johnson Creek Road intersection both improve delay from the No Build scenario, with the PM peak improving to LOS B results. The results of the analysis are tabulated in **Table E-2** in **Appendix E – Build Analysis Results**.

2050 design volumes resulted in LOS A conditions for each direction of travel along the bridge segment for both AM and PM peak period conditions when analyzing the bridge using multi-lane criteria. The reports for these analyses are included in **Appendix E – Build Analysis Results**.



#### 8.1.4. 2050 with Development Results

Preliminary analysis was completed for the Build scenario including the PointeVista Development property, which is projected to drastically boost 2050 traffic volumes. **Figure 7** depicts the assumed configuration at the main entrance (turn lanes on all approaches), with State Park Road still providing access to the Chickasaw Nation Casino. State Park Road would warrant a signal with these projected volumes but was assumed to remain unsignalized due to spacing and to gauge LOS.

LOS results for the 2050 with Development volumes produced LOS C for all movements at the signalized intersection location. The analysis indicated LOS E and F movements at both study intersections during the AM and PM peak periods. The results of the analysis are tabulated in **Table E-3** in **Appendix E – Build Analysis Results**.

For multi-lane analysis using 2050 with Development volumes, LOS B results are expected for the eastbound direction of travel and LOS A conditions for the westbound direction of travel during the AM peak period. The PM peak period indicated LOS B results for each direction of travel. The reports for these analyses are included in **Appendix E – Build Analysis Results**.

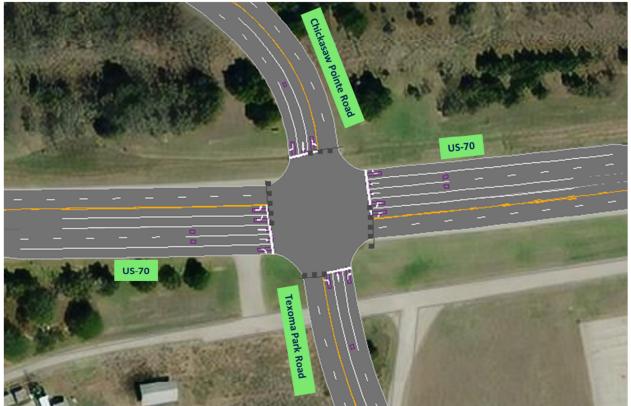


Figure 7: Build Conditions - US-70 at New Signalized Intersection (~1,000' west of State Park Road)



#### 9. Bridge Cross-Section Safety Analysis

The potential safety benefits of additional cross-section elements were considered along the onemile bridge segment, such as providing a median, lighting, or wider shoulders. *Highway Safety Software* (HSS) was utilized to deploy the *Highway Safety Manual* (HSM) methodology to estimate the predicted crashes between potential cross-section configurations. HSS considers Safety Performance Functions (SPFs) for rural two-lane and multi-lane highways to predict the number of expected crashes, then adjusts this total based on CMFs from the presence of a limited number of cross-sectional elements (lane width, shoulder type and width, presence of horizontal curve and superelevation, number of driveways, rumble strips, grade and lighting presence) using data published in the original HSM.

Inside the HSS, segment analysis was completed for the following scenarios:

- Scenario 1: Existing Conditions (2-12' lanes, no shoulders, no median, no barrier separation, some lighting)
- Scenario 2: Build Conditions (4-12' lanes, 2-10' shoulders, no median, no barrier separation, no lighting)
- Scenario 3A: Scenario 2 + the addition of a Median
- Scenario 3B: Scenario 2 + Median, the addition of a Median Barrier
- Scenario 4A: Scenario 2 + Median, the addition of lighting
- Scenario 4B: Scenario 2 + Median, Median Barrier, the addition of lighting

Scenario 1 was completed using HSS Two-Lane Analysis (rural), and Scenarios 2 through 4B were completed using HSS Multi-Lane Analysis (rural).

The HSS analysis is intended to provide a high-level predictive safety analysis. HSS does have limitations within the software due to sensitivity of the measures and the simplicity of the functions used. More detailed analysis using more recent CMFs published in the online clearinghouse can be performed to differentiate between similar sub-options. Below describes the constraints within the software and the effect on the predicted crash results:

- Addition of Shoulders: HSS yielded the same results for an 8' to a 12' right shoulder width. For the purpose of this study, 10' shoulders were used.
- Addition of a Median: Once present, the impact of a median on safety does not change from smaller widths up to 15'. 12' was used for the purpose of this study.
- Addition of a Median Barrier: Presence of a median barrier will result in the same predicted crash frequency (per AADT) regardless of the size of median width; HSS also does not provide an opportunity to specify the type of median barrier installed. A 12' median width was used for the purpose of this study, to stay consistent with the other scenarios.
- *Lighting:* This is a pass/fail option within HSS without judgment of coverage area or gaps.



Given these assumptions, **Table 3** below depicts the predicted annual crashes associated with each bridge scenario for 2021, 2050 (background growth only), and 2050 with Development design volumes. Scenario 1 for 2050 with Development was not included in this report due to the high AADT value associated with the proposed development property. According to Chapter 10 of the *Highway Safety Manual*, application to two-lane rural segments with AADT substantially outside the range of 0 to 17,800 vehicles per day may not provide reliable results. The 2050 with Development volumes are projected to be approximately 27,300 vehicles per day, and therefore were not included in the two-lane analysis for Scenario 1.

	Predicted Annual Crashes							
	2021	2050 (Background Growth Only)	2050 with Development					
Scenario 1	3.3	4.7	-					
Scenario 2	3.1	4.7	12.1					
Scenario 3A	1.7	2.4	5.6					
Scenario 3B	1.6	2.3	5.4					
Scenario 4A	1.5	2.2	5.1					
Scenario 4B	1.5	2.1	4.9					

Table 3 – Highway Safety Software Results (Bridge
---

As more design elements are incorporated into the bridge, the anticipated number of collisions per year is reduced with Scenarios 3A through 4B reducing bridge crashes by more than 50%. Note these reductions apply only to the one-mile bridge; improvements to the causeway would further reduce crashes.

Projecting through the design year, Scenario 3A through 4B would have 57 to 64 fewer total bridge crashes than Scenario 1 (No Build) through 2050 if considered the background growth only design volumes, which includes an estimated savings of 7 to 10 fatal or injury collisions. Due to the restrictions of HSS for Scenario 1 regarding the development property volumes, predicted crash saving calculations were not attained for 2050 with Development scenarios.

Results for each of the various scenarios from the HSS can be found in **Appendix F – Bridge Cross-Section Safety Analysis Results**.



#### 9.1.1. Crash Modification Factors to support HSS Limitations

Additional CMFs were identified to differentiate between limitations of the HSS, including:

- Increasing median width (CMF ID: 5416) from 10 feet to 15 feet would reduce crashes by an additional 4%
- Increasing median shoulder width (CMF ID: 7203) on a divided facility does not help to reduce crashes (increases by 3%)
- Increasing outside shoulder width (CMF ID: 917/919) from 6 feet to 8 feet reduces crashes by 4% and from 6 feet to 10 feet or more reduces crashes by 18%
- Installing cable median barrier (CMF ID: 47) reduces crashes 29%; steel median barriers (CMF ID: 46) reduce crashes by 35%

#### 10. Conclusion

The potential improvements to the US-70 corridor will increase the safety and improve operations across the bridge and at the two adjacent intersections within the study area. The current configuration of the bridge (2-12' lanes with no shoulders) is narrow and provides no opportunity for passing or safe refuge for vehicles. Lane configuration updates (such as removing the lane drops) and increasing sight distances would assist in improving the existing safety issues that occur within the project limits.

Projected traffic volumes are expected to increase by approximately 50% by 2050. If the PointeVista Development property is built out completely, the projected volumes will drastically increase the traffic throughout the study area (roughly double the projected 2050 design volumes). The high development-influenced volumes would create LOS E or worse results on the bridge and major delay at the two intersections.

The potential widening and increased capacity of the bridge would improve the intersection LOS for each of the study intersections. Converting the route from one-lane to two-lane operations will provide additional passing opportunities and a safer route for the projected traffic volumes associated along US-70. With the provision of lighting and median space/barrier, predictive crash analysis showed more than a 50% crash reduction from the existing condition along the bridge.

**Appendix A – Traffic Volumes** 

	-										
7-Day Total Counts											
	Mon, 5/17	Tues, 5/11	Wed, 5/12	Thurs, 5/13	Fri, 5/14	Sat, 5/15	Sun, 5/16	AVG DAILY			
Eastbound	3761	3389	3889	4375	4853	4137	2781	3884			
Westbound	3794	3378	3862	4248	4836	4237	2948	3900			
2-way Truck %	10%	10%	10%	10%	8%	4%	4%	8%			

Peak Hour Volume												
Mon, 5/17		5/17	Tues, 5/11 Wed, 5/12		Thurs, 5/13		Fri, 5/14		AVG DAILY			
	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
AM Peak Vol.	287	241	300	234	317	251	303	252	255	267	242	205
PM Peak Vol.	273	324	268	320	298	323	313	391	376	376	275	321

TM1 State Park Road

TM1

[3468]

(319)

247

←

 $\rightarrow$ 

298 (263)

[3391]

[3114] (237) 296 -

[277] (26) 2

0%

US 70 at State Park Road

17

(10) [209]

[761] (86) 7 4 69 (35) [701]

2%

**-** 230 (309) **[3260]** 

5 (60) **[485]** 

52

(25) [<mark>492]</mark>

[3745]

(369)

235

←

348

(263)

[3608]

10%

Completed: May 11, 2021 24-Hr Truck %

	<u>Legend</u>
18	AM Design Hourly Volume
(18)	PM Design Hourly Volume
[18]	Daily Design Volume
(TM#)	24-Hour Turning Movement Count

TM2

Ŵ

[3607] (358)

219

352

(259)

[3616]

9%

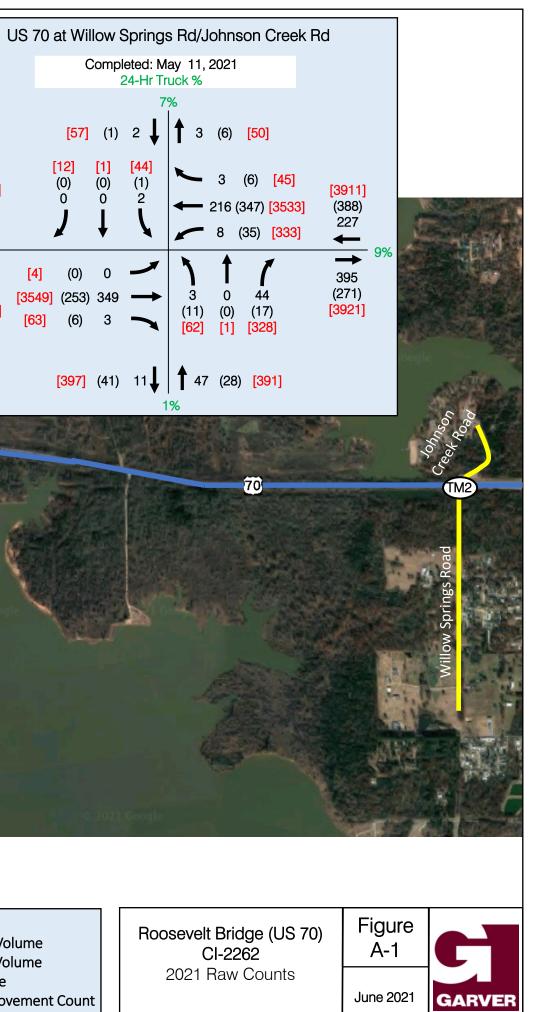
[12] (0) 0

(0)

(6)

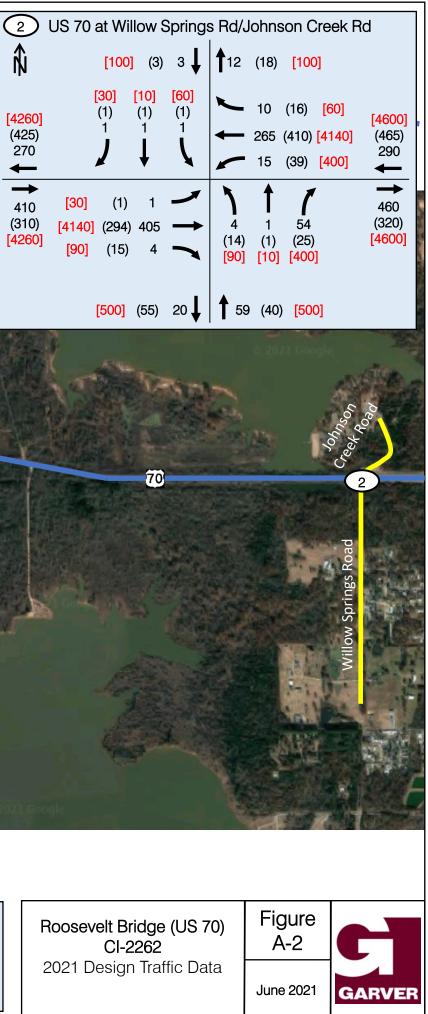
[4]

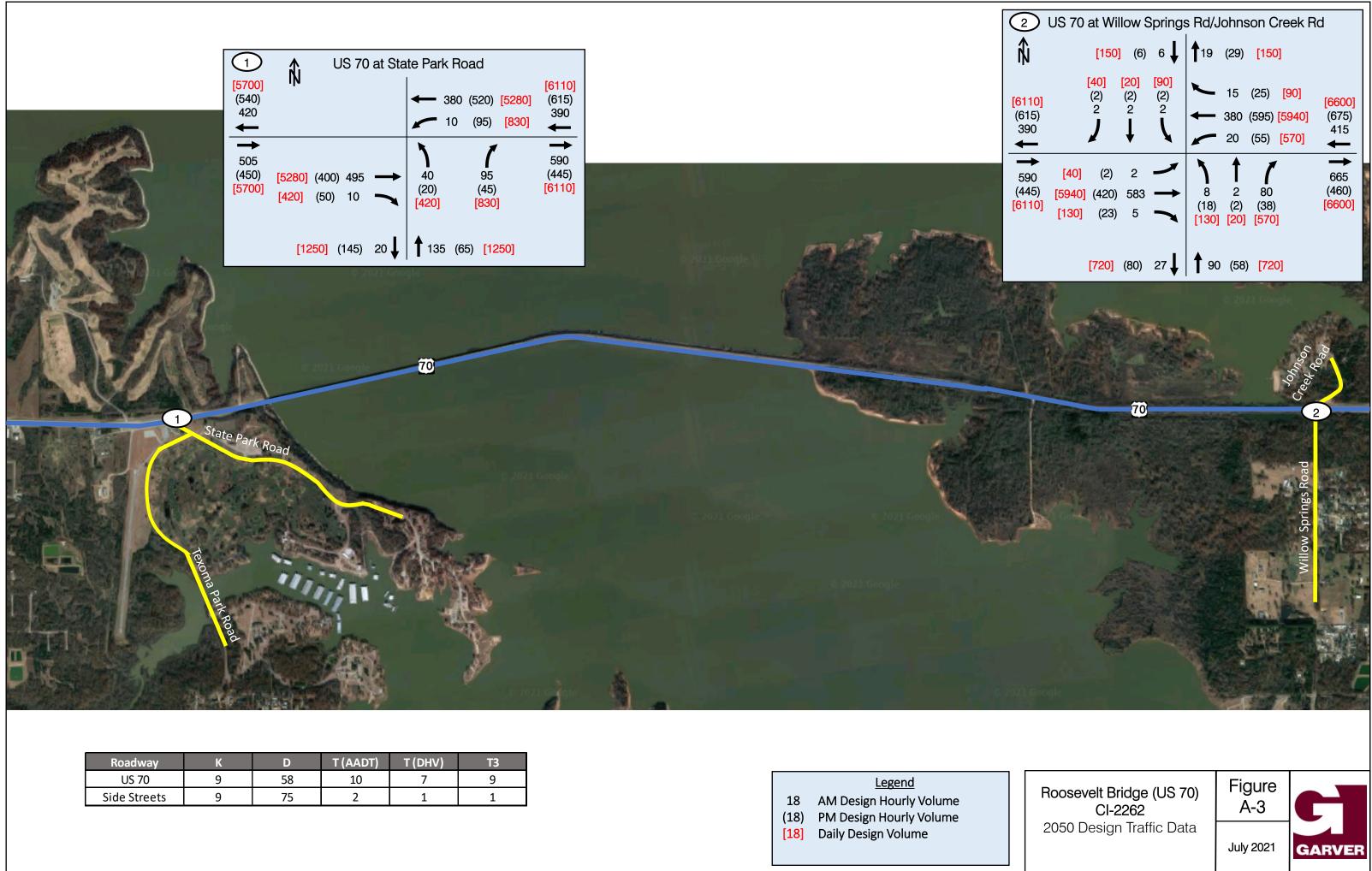
[63]



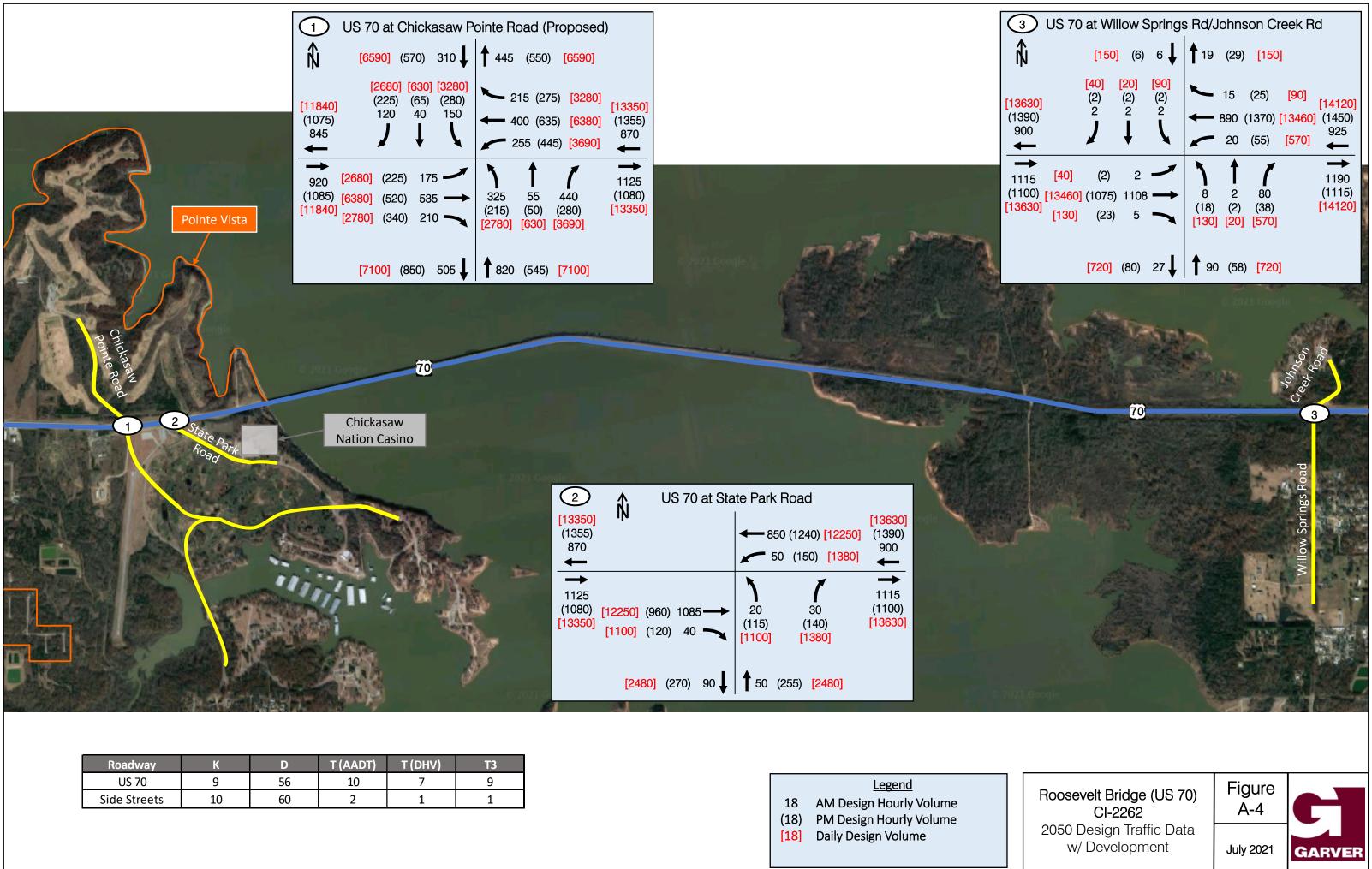
Roadway	К	D	T (AADT)	T (DHV)	Т3
US 70	9	58	10	7	9
Side Streets	9	75	2	1	1

See	e 2021 Google	
	e 2021 (500g)e:	pDiDL Google
1 State p	70	
1 State Park Roa	d	© 2021 Geogle © 2021 Geogle
Texoma park R		e 2021 Geogle
	1       N       US 70 at State Park Road         [3970]       (375)       290         ↓       265 (360) [3680]       (425)         290       5       (65) [580]	
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Legend 18 AM Design Hourly Volume
	[870] (100) 10 <b>1 1</b> 90 (45) [870]	<ul><li>18 AM Design Hourly Volume</li><li>(18) PM Design Hourly Volume</li><li>[18] Daily Design Volume</li></ul>





Roadway	K	D	T (AADT)	T (DHV)	Т3
US 70	9	58	10	7	9
Side Streets	9	75	2	1	1



Roadway	К	D	T (AADT)	T (DHV)	Т3
US 70	9	56	10	7	9
Side Streets	10	60	2	1	1

Lege	end	

# **Appendix B – Safety Analysis Memo**



### **DRAFT Safety Analysis Memo**

То:	Oklahoma Department of Transportation	Date:	March 2021
From:	Garver		
RE:	ODOT CI-2262 – US-70 Roosevelt Bridge		

#### 1. Project Description

The Roosevelt Memorial Bridge currently stretches across Lake Texoma between Kingston and Mead, Oklahoma along United States Highway 70 (US-70). The Oklahoma Department of Transportation (ODOT) plans to correct the at-risk existing bridge structure, with the limits of the project beginning at the intersection of US-70 and State Park Road (west of Lake Texoma) and extending east for approximately four miles inclusive of the span structure.

**Figure B-1** depicts the corridor split into three segments (west of the bridge, the bridge, and east of the bridge), and shows the defining features within each segment including posted speed limits, lighting, passing opportunities, shoulder width, and grade information.

#### 1.1. Segment 1: West of the Roosevelt Memorial Bridge

Segment 1 stretches 0.3 miles from the intersection of US-70 at State Park Road to the beginning of Roosevelt Memorial Bridge. In Segment 1, US-70 experiences a lane configuration transition depicted in **Figure B-2**. West of the intersection, US-70 transitions from a two-lane route to a five-lane section with two lanes in each direction and a center two-way left turn lane (TWLTL). At the State Park Road intersection, the outer eastbound lane terminates as a right turn lane with additional pavement on the departure side that serves as de facto acceleration lane for right turning traffic from State Park Road. On the westbound approach to the State Park Road intersection, a second through lane develops just beyond the western terminus of the Roosevelt Memorial Bridge and the center TWLWL develops approximately 250' in advance of the

intersection. Rumble strips along the 10' shoulders are provided on each side of the highway.

#### 1.2. Segment 2: Roosevelt Memorial Bridge

Segment 2 includes the Roosevelt Memorial Bridge section, stretching approximately one mile across Lake Texoma. The Roosevelt Memorial Bridge is a two-lane highway with 12' lanes, no shoulders, and a flat grade, as shown in the picture to the right. The bridge has a barrier rail on either side. A middle section



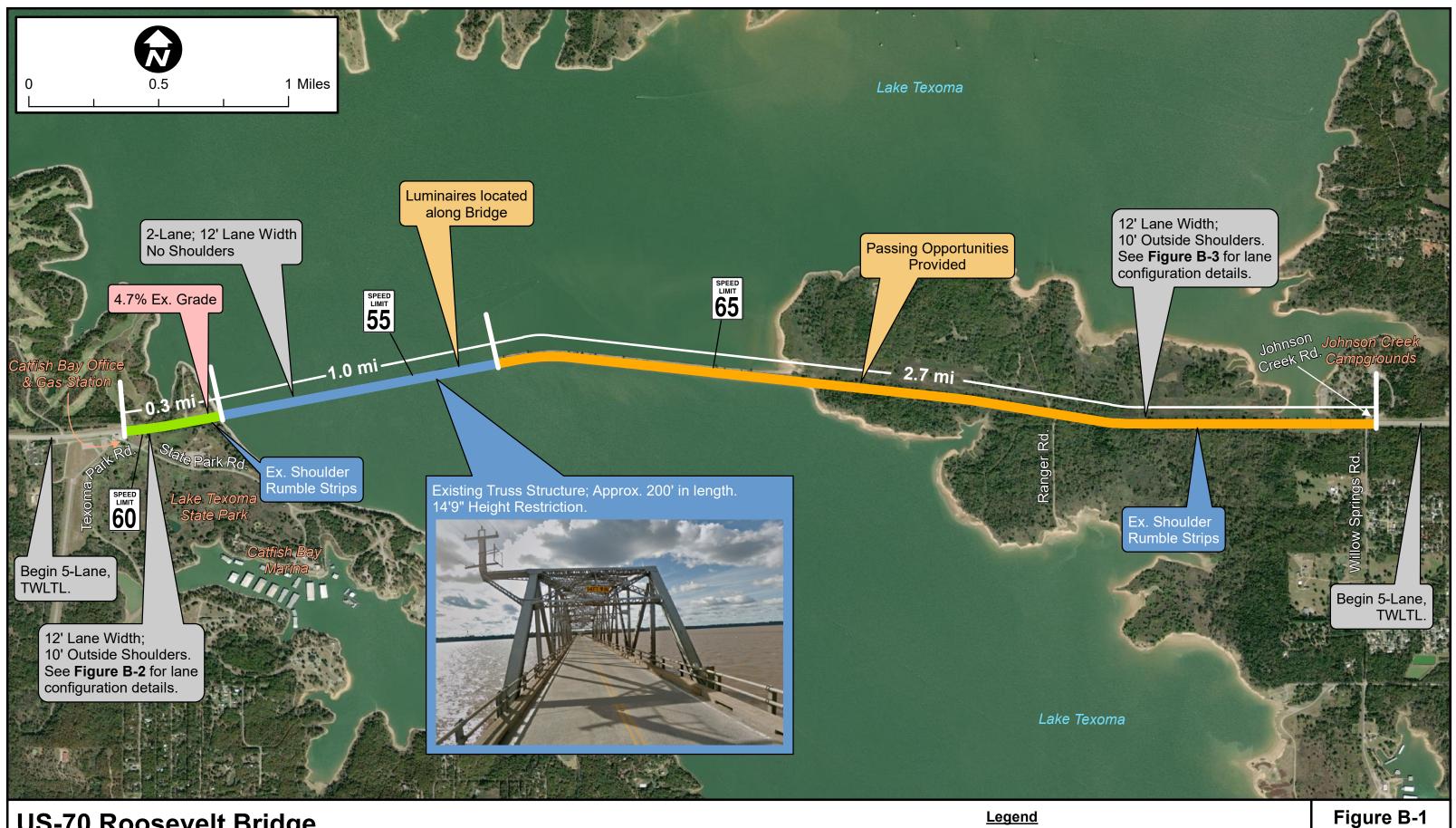




of the bridge is comprised of a truss (depicted in **Figure B-1**) with a clearance of only 14'-9". Overhead electric runs across the south side of the bridge with light poles mounted on the bridge.

#### 1.3. Segment 3: East of the Roosevelt Memorial Bridge

East of the bridge, US-70 remains a two-lane roadway over a causeway before transitioning to a five-lane road with a TWLTL at the intersection of Willow Springs Road/Johnson Creek Road. The lane transition is accomplished via a lane addition on the departure side of the intersection and a right turn lane drop for the westbound right turn lane. Throughout Segment 3, the grade is relatively flat. **Figure B-3** depicts the lane configuration changes near the intersection.



## **US-70 Roosevelt Bridge** *Project Limits Map: Segment Details*

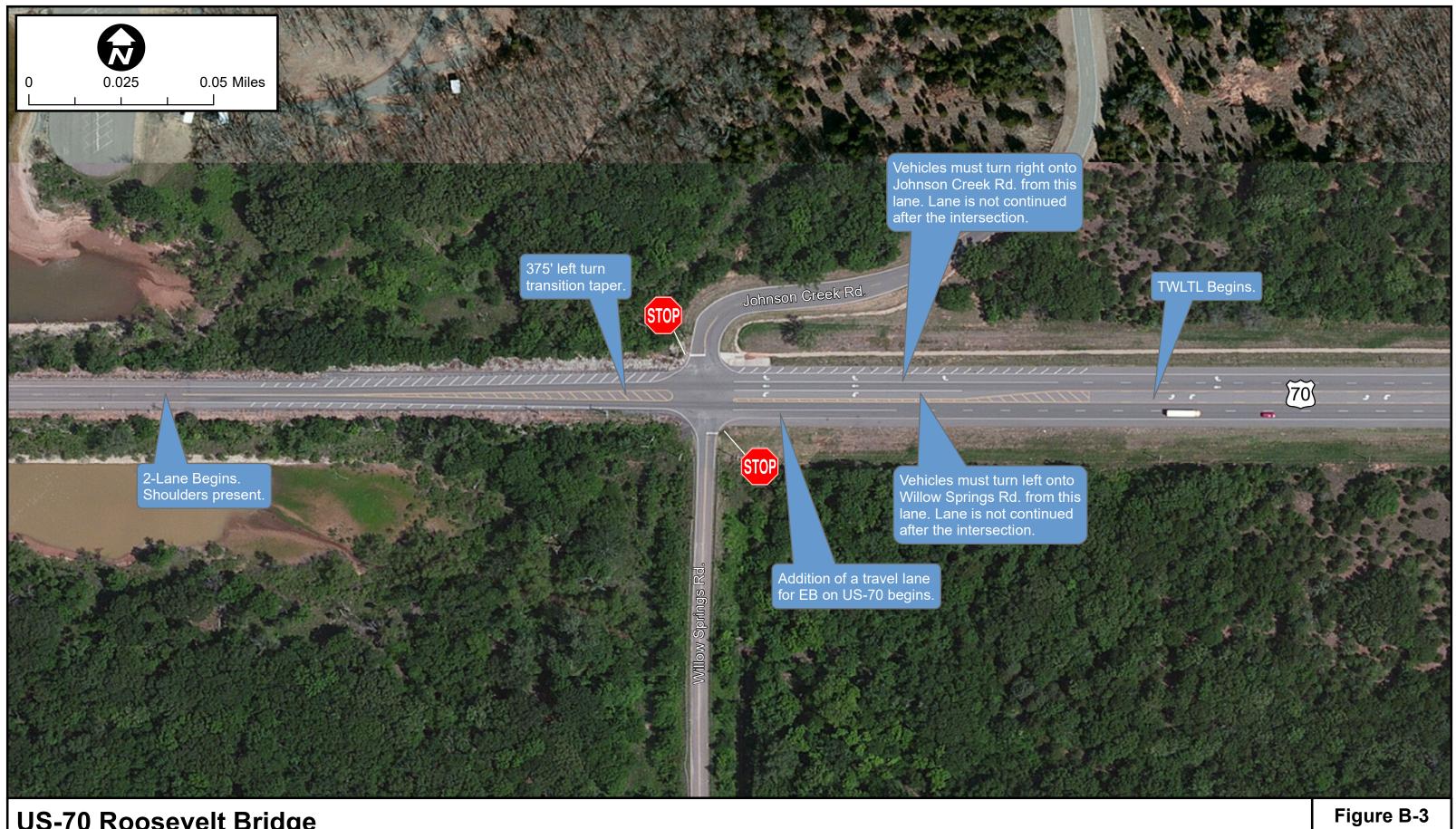
Segment 1: West of Bridge to State Park Rd (0.3 mi) Segment 2: Roosevelt Memorial Bridge (1 mi) Segment 3: East of Bridge to Willow Springs Rd/Johnson Creek Rd (2.7 mi)



## **US-70 Roosevelt Bridge** Lane Configuration Details: Segment 1

2-Lane Section. Approx. 250' prior to edge of Lake Texoma.

### Figure B-2



## **US-70 Roosevelt Bridge** Lane Configuration Details: Segment 3



#### 2. Crash History

Crash Data was collected using ODOT's Safe-T Database for a five-year period from 2015 to 2019. **Figure B-4** depicts overall crash data along US-70, including a crash frequency heat map and statistics by occurrence, severity, and road condition/location. Over the five-year period, a total of 52 crashes occurred within the corridor limits, with 18 crashes (35%) classified as intersection-related. The most common crash types included 12 rear-ends, 11 angle-turning, nine fixed-object, eight sideswipe-opposite direction, and six head-on collisions.

Four fatal crashes occurred on the route, along with two incapacitating injuries and nine nonincapacitating injuries. Each fatal crash is described in additional detail below:

- November 22, 2016: Head-On collision 0.2 miles west of the intersection of Willow Springs Road/Johnson Creek on US-70. A vehicle traveling westbound crossed over the centerline and struck a vehicle traveling eastbound. This crash involved a four-door passenger vehicle and a pickup truck. The collision occurred around 4pm on a Tuesday afternoon in daylight conditions with cloud presence. This collision resulted in one fatality and one nonincapacitating injury occurring within Segment 3.
- 2) March 27, 2018: Sideswipe Same Direction collision 1.5 miles west of the intersection at US-70 and Willow Spring Road/Johnson Creek. This three-vehicle crash involved a pickup truck, a Single-Unit Truck (two axles) and a Sport Utility Vehicle (SUV) near 4pm on a Saturday afternoon in daylight with dry roadway conditions and clouds present. All vehicles were traveling eastbound, and one took a maneuver to pass another vehicle causing the collision. The crash occurred within Segment 3 and resulted in one fatality and three non-incapacitating injuries.
- 3) June 21, 2018: Head-On collision on the Roosevelt Memorial Bridge, approximately 0.8 miles east of the bridge approach. A vehicle traveling eastbound crossed over the centerline and struck a vehicle traveling westbound on the bridge. The collision occurred between a four-door passenger vehicle and a Truck-Tractor/Semi-Trailer around 1pm on a Thursday. The weather was clear in daylight with dry roadway conditions. This collision resulted in two fatalities and occurred within Segment 2.
- 4) March 22, 2019: Rear-End collision occurring one mile west of the US-70 and Willow Springs Road/Johnson Creek Road intersection. This collision involved a pickup truck and four-door passenger vehicle around 3pm on a Friday afternoon in daylight with dry roadway conditions and clear weather. The collision was caused by a DWI, resulting in one fatality and one possible injury. This collision occurred within Segment 3.

From the Crash Analysis Summary (Figure B-4), a few key items should be noted.

• *Crash Severity:* 61% of crashes were property damage only, 27% injury-related, and 12% fatality or serious injury.



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- Collision Type: Left of Center (crossing the roadway centerline) collisions occurred most often, accounting for 19% of the total crashes. Vehicles following too close and not paying attention accounted for 15% and 13% of the crashes, respectively.
- Weather Conditions: Trends indicated that collisions typically occurred in clear weather conditions during daylight with dry roadway conditions, but an estimated 10% of the total collisions did occur in wet conditions or at night.
- Day and Time: The most common day and time that collisions occurred over the five-year period was on Wednesday between 10am and 1pm, with four collisions total. 17% of crashes occurred during twilight or darkness hours.
- Crash Rates: The corridor crash rate (78 crashes per 100 Million Vehicle Miles Traveled (MVMT)) was comparable to the statewide crash rate (76 per 100 MVMT), however, the fatal crash rate for the corridor was almost 2.5x larger at 6.0 per 100 MVMT than the statewide fatal crash rate at 2.6 per 100 MVMT.
- Location Frequency: The heat map shows hot spot crash locations at the intersections of US-70 at State Park Road and US-70 at Willow Springs Road/Johnson Creek Road, and along the Roosevelt Memorial Bridge near the western bridge end and in the center of the bridge near the truss.

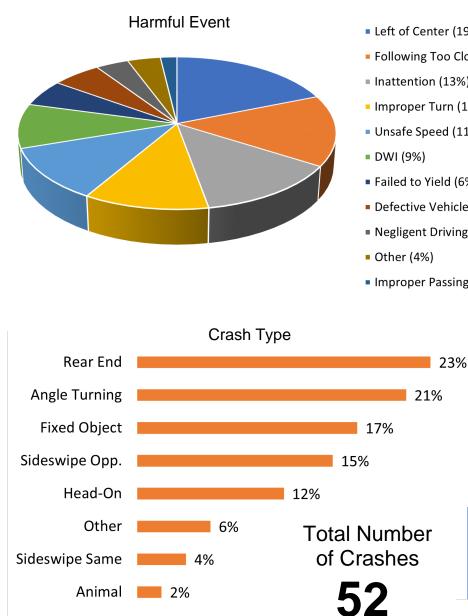
Figure B-5 shows crash diagrams for the West side of the project corridor. Inset A displays the collisions at the intersection of State Park Road. As shown, there were seven angle turning collisions, a rear end, an animal collision, and two fixed-object crashes. Inset B displays the

collisions at the West terminus of the bridge where the shoulders narrow and guardrail is provided to prevent departures leading to the constricted bridge structure (as shown to the right). Near this location, six sideswipes, two rear-ends, a head on collision, and a fixed-object crash occurred over the fiveyear period.



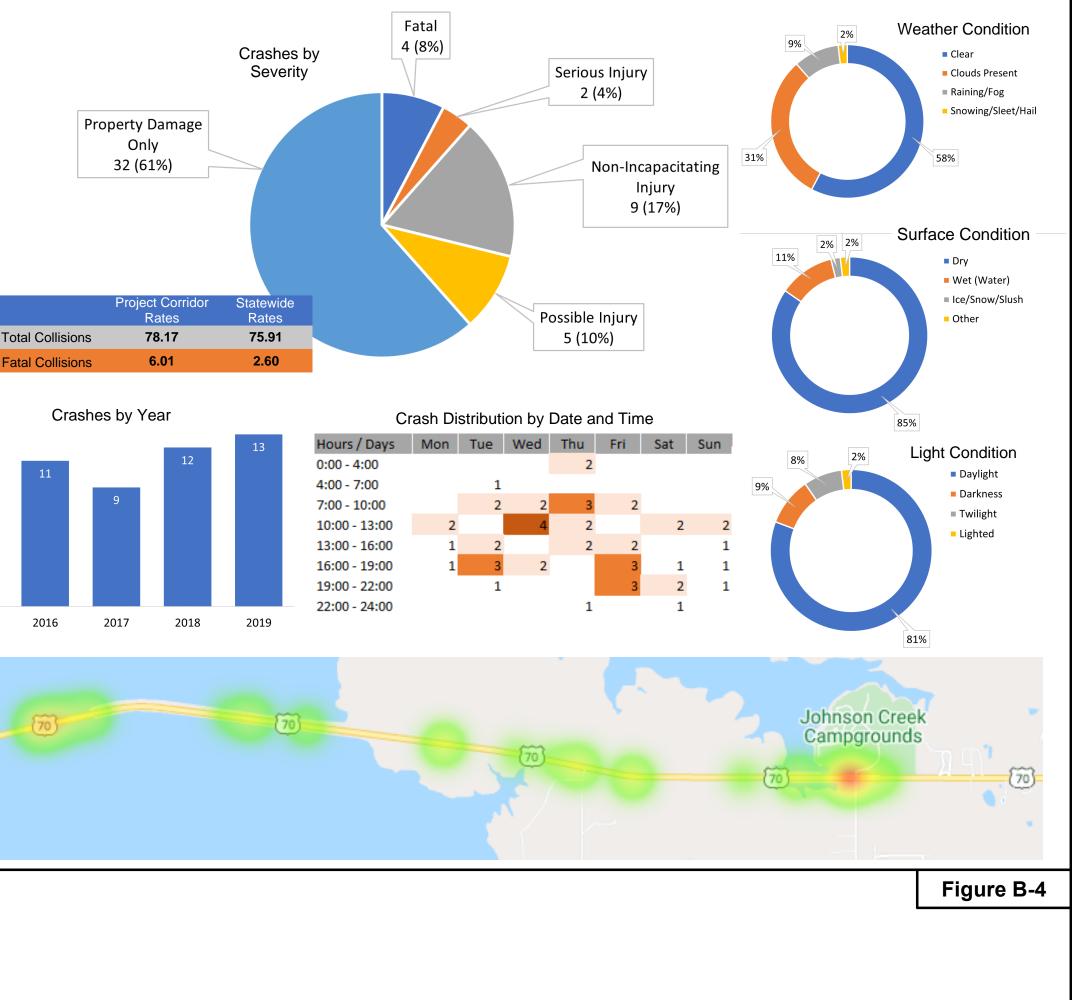
West Terminus of Bridge

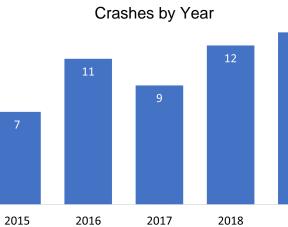
Figure B-6 depicts the crashes that occurred on the East side of the project route, with a focus in Inset C at the intersection of US-70 at Willow Springs Road/Johnson Creek Road. These crash types consist of four angle-turning collisions, three rear ends, a head-on collision, and two fixedobject crashes (one hitting a tree, and another hitting a sign).

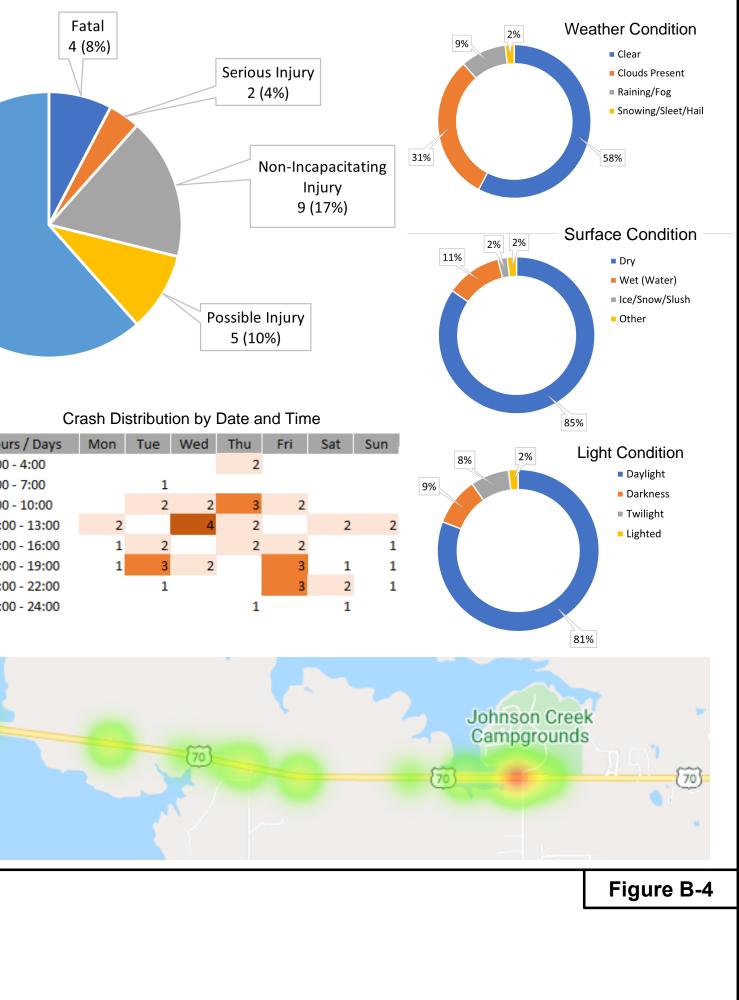


#### Left of Center (19%)

- Following Too Close (15%)
- Inattention (13%)
- Improper Turn (11%)
- Unsafe Speed (11%)
- Failed to Yield (6%)
- Defective Vehicle (6%)
- Negligent Driving (4%)
- Improper Passing (2%)





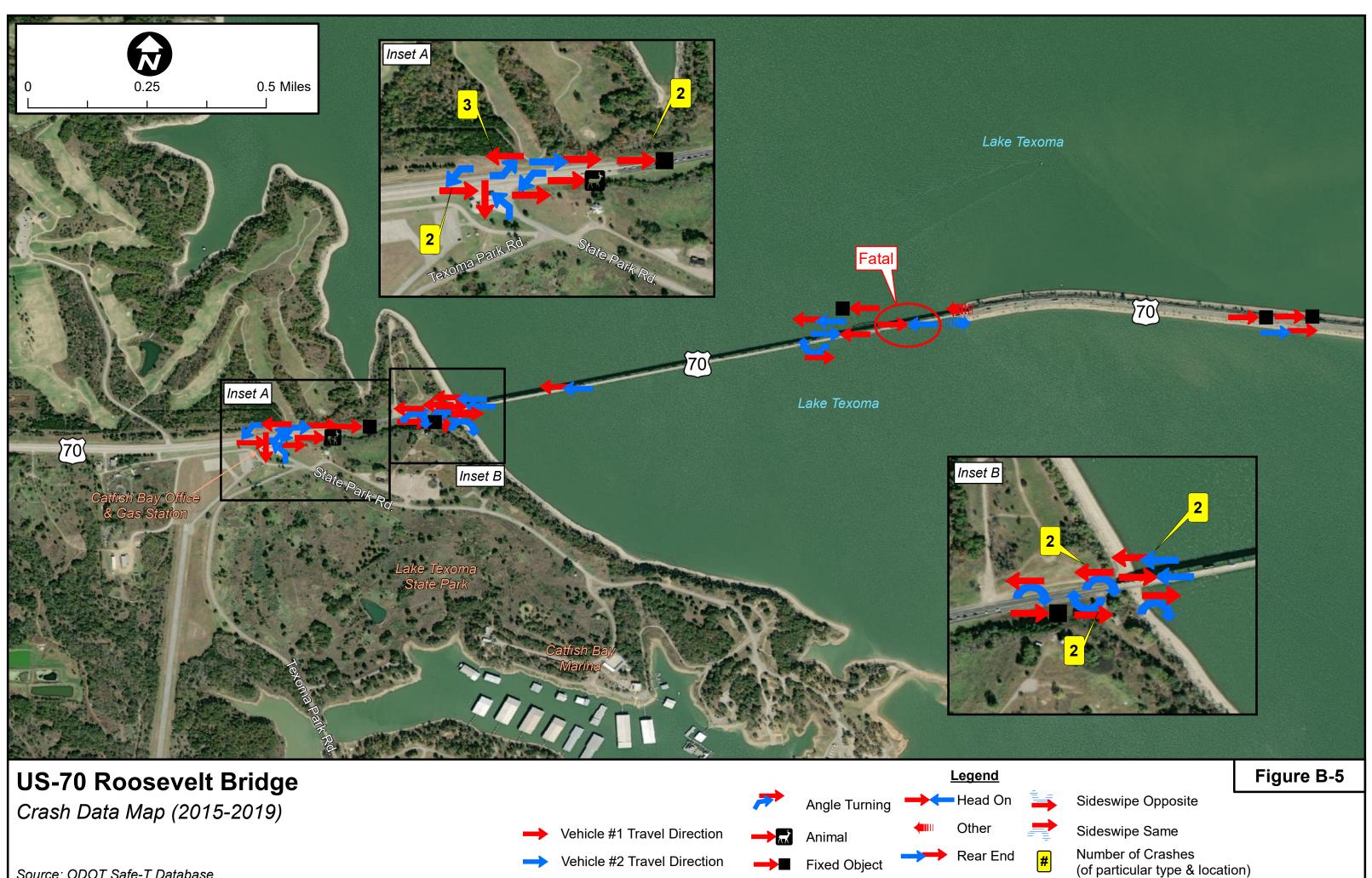


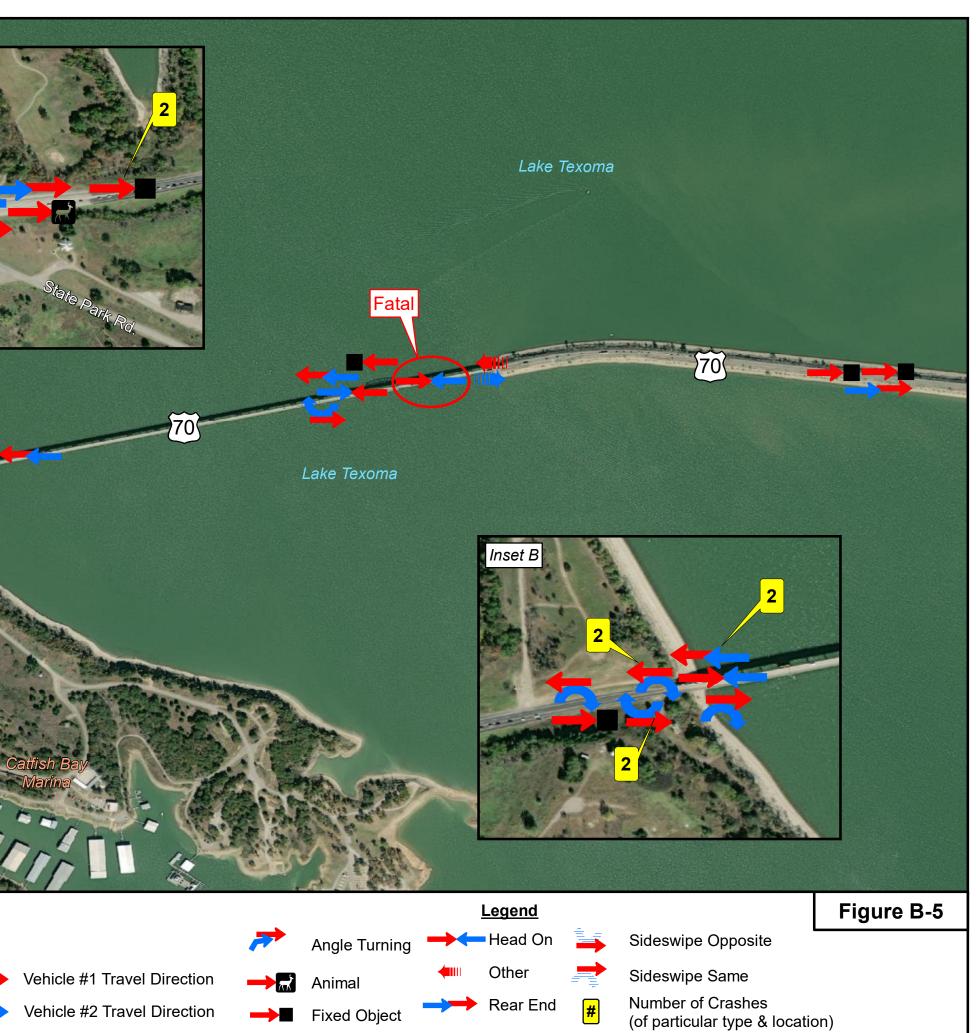


### **US-70 Roosevelt Bridge**

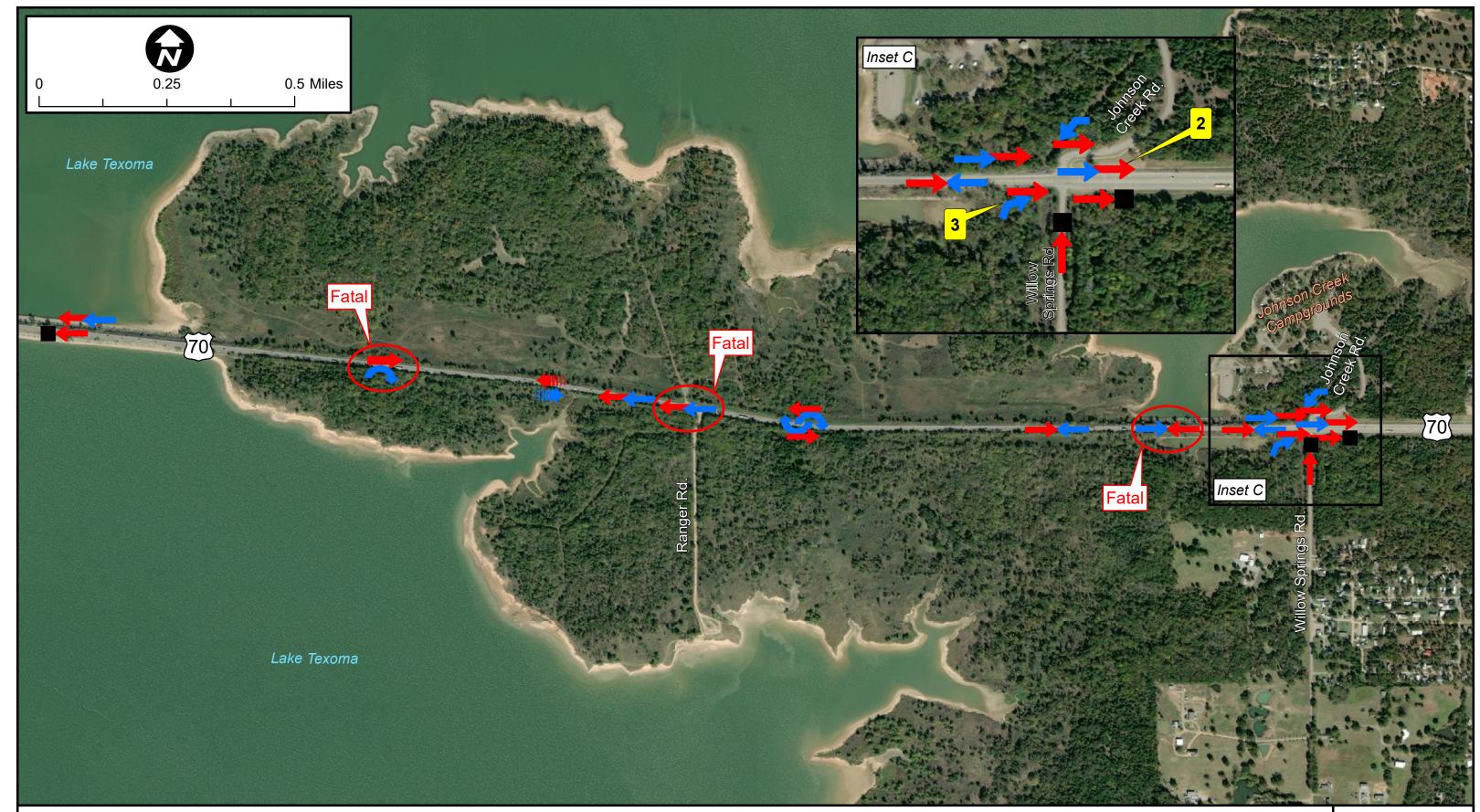
Crash Analysis Summary (2015-2019)

Source: ODOT Safe-T Database.



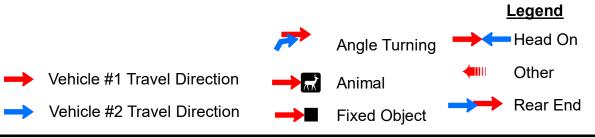


Source: ODOT Safe-T Database.



# US-70 Roosevelt Bridge

Crash Data Map (2015-2019)



Source: ODOT Safe-T Database.

### Figure B-6



Sideswipe Opposite

Sideswipe Same

Number of Crashes (of particular type & location)



### 3. Field Observation of Road Configuration/Crash Causes

Field observations were conducted to verify contributing factors to crashes and identify additional safety issues. Photographs, sight distance measurements, and traffic observations assisted in the safety analysis of the project route.

#### 3.1. Roosevelt Memorial Bridge and Causeway

The 250' truss section of US-70 experienced five crashes over the five-year period. These crashes resulted in one fatal collision, two non-incapacitating injury collisions, and two property damage

only collisions. One of the collisions occurred around 7pm at night, with the rest occurring between the hours of 9am and 4pm. Driving the route, the truss creates a vertical confinement on the narrow two-lane route, which could cause drivers to move towards the centerline and potentially cross over resulting in a collision. Solutions to increase safety along any proposed new or updated bridge include:

- Provision of a median
- Widen to two-lanes in each direction
- Rumble strips (centerline and outside shoulder)
- Shoulder provision



Truss Structure on Bridge

A mile-long causeway is located within Segment 3 directly east of the Roosevelt Memorial Bridge. This section does not have a median to protect drivers from crossing into the opposite lane. As noted previously, the most common crash type along this route was left of center, accounting for 19% of the 52 total crashes. Installation of any type of median barrier, according to the CMF Clearinghouse, would result in a 43% reduction of fatal crashes (CMF ID: 42). The addition of a median would allow an opportunity to connect the far east and west ends of the project to the TWLTL configuration that presently exists at both State Park Road and Willow Springs Road/Johnson Creek Road.

No passing opportunities are provided on the Roosevelt Memorial Bridge, however Segment 3 (including the causeway) does provide passing zones to use the opposing lane along an unlit portion. The installation of passing lanes can be used to improve safety on two-lane highways and still allow faster traffic to overtake slower vehicles, which could result in a reduction of 32% (CMF ID: 9108) over the current configuration. Providing passing opportunities could also be accomplished by providing two lanes in each direction along the bridge and causeway. As with the median addition, widening US-70 on the bridge and east of Lake Texoma would aid in connecting



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the bridge and causeway sections to the existing five-lane cross section at either end of the project.

The lack of shoulders along the bridge do not provide safe refuge for disabled vehicles traveling across Lake Texoma. Adding shoulders would increase safety by providing a recovery area for drivers who leave the travel lane. Shoulders also provide an area for drivers to maneuver to avoid crashes and offer space for maintenance activities which the bridge currently does not provide.

Crashes occurring in darkness or twilight hours made up 17% of the total crashes. The Roosevelt Memorial Bridge is the only portion of the route with lighting where luminaires are located on the existing power-poles. Providing street lighting throughout the entire route could result in a 37% reduction for night-time, injury related collisions according to CMF Clearinghouse (CMF ID: 7774).



Luminaires on Bridge

#### 3.2. Fixed-Object Related Collisions

Nine fixed-object collisions (17%) occurred along the project route. At the intersection of Willow Springs Road and US-70, one collision occurred with a traffic sign and another with a tree. Throughout the corridor there were six collisions involving a guardrail or barrier rail, and one collision with a curb. According to the CMF Clearinghouse, removing or relocating fixed objects outside of a clear zone could result in a 38% reduction of crashes (CMF ID: 1024). An increase in the outside shoulder width would allow additional clearance from objects located on the route, such as guardrails, signs, and curbs, with anticipation of reducing the number of fixed-object related collisions. The addition of rumble strips on the outside shoulders would also assist in preventing fixed-object collisions by alerting drivers prior to vehicles departing the travel lane. Addition of outside shoulder rumble strips would result in a 16% crash reduction (CMF ID: 3442).

#### 3.3. Intersection-Related Collisions

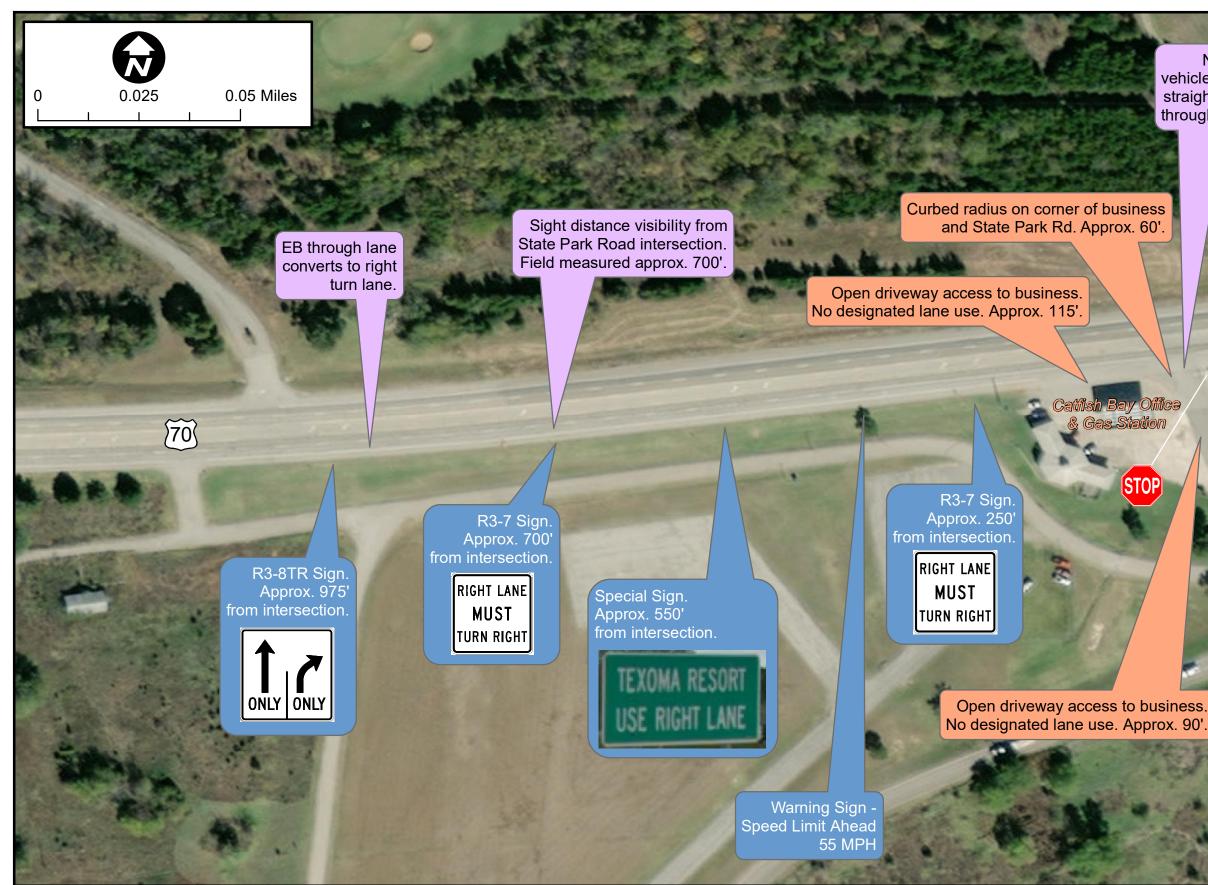
Out of the 52 total crashes, 18 (35%) were intersection-related crashes occurring at both State Park Road and Willow Springs Road/Johnson Creek Road – most of which involved angle-turning maneuvers. Limited intersection sight-distance and high travel speeds on US-70 could play a role in the intersection specific crashes.

**Figure B-7** depicts the current challenges with the right-lane configuration for eastbound travelers on US-70, along with the present signage on US-70. Drivers are alerted almost 1000' in advance of the right turn lane drop. As shown, channelization is not provided at the intersection to restrict vehicles from continuing through the intersection along US-70, other than the provided signage notifying the road-users. As pavement is provided on the departure side of the intersection for the continuation of the through movement, this leads to confusion for drivers making turns to/from State Park Road. Providing striping to hatch out the area (similar to the intersection at US-70 and



Willow Springs Road/Johnson Creek Road) or provision of painted or raised channelization would improve driver expectation.

Another option for reducing intersection-related collisions would be to install an Intersection Conflict Warning System (ICWS) for intersections with limited sight distance. According to the CMF Clearinghouse database, implementation of an ICWS could result in a 31% reduction (CMF ID: 8471) by alerting and notifying road-users ahead of an intersection. Refer to Section 3.4/3.5 for a discussion of intersection sight distance.



# **US-70 Roosevelt Bridge**

State Park Road Intersection Safety Issues

Nothing to prevent vehicles from continuing straight in this right lane through the intersection.

No channelized island at this location.

State Park Rd.

Driver confusion on if acceleration lane is provided.

70

Figure B-7

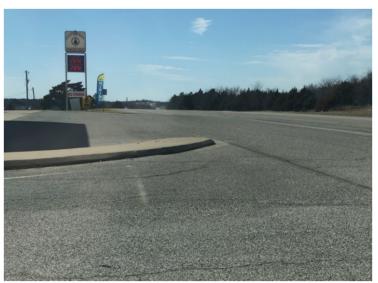


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#### 3.4. Sight Distance Evaluation

Sight distance from the side streets (State Park Road and Willow Springs Road/Johnson Creek Road) could be improved to increase visibility of vehicles traveling along US-70. The presence of trees, power poles, signage, and guardrails contribute to less visibility. The suggested sight distance to safely complete a right turn, a left turn, or a crossing maneuver can be calculated using guidance in the American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets.



Visibility, looking West – from Stop Bar at State Park Rd.

Table 1 on the following page depicts the intersection sight distances required for vehicles to conduct the maneuver from a stop condition on a minor street to a major street. The table also lists the current sight distances that were field measured, representing the distance from the crossing street stop bar to the point where a driver's eye could begin locating the vehicle traveling on US-70. This analysis revealed that the intersection sight distances are adequate for passenger car vehicles making right turns or crossing, but do not provide enough sight distance for a left turn maneuver from Willow Springs Road/Johnson Creek Road. Trucks do not have enough sight distance available for right turns, left turns, or crossing US-70. Per ODOT's Traffic Data, US-70



carries approximately 5% single unit trucks and 7% combination trucks. Sight distance improvements can be achieved through grade corrections, widening, trimming vegetation, and shoulder provisions.

Visibility, looking West - from Stop Bar at Willow Springs Rd.



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	Design	DesireVakiala	Required	Sight Distan	ces (feet)		Conditions ances (feet)
Location	Speed	Design Vehicle	Right Turn Distance	Left Turn Distance	Crossing Distance	US-70 EB Vehicles	US-70 WB Vehicles
Willow		Passenger Cars	621	717	621		
Springs	65 mph	Single-Unit Trucks	812	908	812	650	1500
Road (NB)	mpn	Combination Trucks	1,003	1,099	1,003		
Johnson	65	Passenger Cars	621	717	621		
Creek	65 mph	Single-Unit Trucks	812	908	812	650	1500
Road (SB)	mpn	Combination Trucks	1,003	1,099	1,003		
	60	Passenger Cars	573	662			
	State Park 60	Single-Unit Trucks	750	838	-	700	> 2000
Road (NB) mph	Combination Trucks	926	1,014				

#### Table 1 - Required Sight Distances

Source: AASHTO Policy of Geometric Design of Highways and Streets, equation  $ISD = 1.47V_{major}t_g$  ( $t_g$  from tables 9-6, 9-8, and 9-10).

#### 3.5. Additional Segment 1 Issues

A steep grade (estimated at 4.7%) exists west of the Roosevelt Memorial Bridge causing potential visibility concerns. For vehicles traveling westbound from the bridge on US-70, it is difficult to see vehicles traveling eastbound from the top of the curve and creates hesitation for vehicles needing to get into the center left turn lane leading to State Park Road or into the gas station. The new



Uphill traveling WB on US-70

bridge would provide an opportunity to reduce the existing grade, by potentially raising the profile of the bridge approaches, which could increase visibility.

A site visit revealed faded striping at the Stop/Yield condition at State Park Road, which could be a factor into the collisions occurring. Restriping the pavement markings would increase driver awareness of the stop/yield condition at the intersection.

In addition, the gas station on the Southwest corner of the US-70 at State Park Road intersection currently has no defined access management for vehicles entering or exiting the business. Vehicles can access the property through the large driveway off US-70, as well as through the large driveway opening from State Park Road (these distances are highlighted in **Figure B-7**). Providing access management for this business would allow vehicles to have guided lanes to enter and exit the property safely and reduce high-speed conflict on US-70.

# Appendix C – Existing and No Build Analysis Results

Time	Analysis	MOE	EBI	Novem	ent	WB	Moven	nent	NBI	Moverr	nent	SB	Novem	ent	Overall
Period	Means	WOL	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	overall
				U	S-70 a	t Stat	e Parl	< Road							
	нсм	LOS		n/a¹	n/a <sup>1</sup>	А	n/a¹			А					А
АМ		Delay		n/a¹	n/a1	8.2	n/a¹			9.5					1.3
AW	SimTraffic	LOS		А	А	А	Α		А		А				А
	Simmanic	Delay		2.1	1.0	1.6	0.5		8.0		2.1				1.7
	нсм	LOS		n/a¹	n/a1	А	n/a¹			А					А
РМ	HC WI	Delay		n/a¹	n/a <sup>1</sup>	8.2	n/a¹			8.4					1.2
I- IVI	SimTraffic	LOS		А	А	А	А		А		Α				А
	Simmanic	Delay		1.7	1.1	2.1	0.5		8.8		1.9				1.3
		US	-70 at	Willo	w Spri	ings R	load/J	ohnso	n Cre	ek Ro	ad				
	нсм	LOS	А	n/a¹		А	n/a¹			В			В		А
АМ	HC WI	Delay	8.0	n/a¹		8.5	n/a¹			12.7			13.2		1.2
AW	SimTraffic	LOS	n/a¹	А	А	А	Α	Α	А	Α	Α	n/a¹	А	А	А
	Simmanic	Delay	n/a¹	1.2	0.0	2.4	1.6	0.5	8.0	6.2	3.2	n/a¹	7.3	2.7	1.5
	нсм		А	n/a¹		А	n/a¹			В			В		А
РМ		Delay	8.4	n/a¹		8.1	n/a¹			14.1			13.4		1.1
I- IVI	M Sim Traffic	LOS	n/a¹	А	Α	А	А	А	А	А	А	А	А	А	А
		Delay	n/a¹	1.4	0.2	3.1	2.5	1.2	7.5	8.0	3.1	3.4	9.1	5.9	2.2

#### Table C-1 – 2021 Existing Analysis Results

<sup>1</sup> free movement

Time	Analysis	MOE	EBI	Novem	ent	WB	Moven	nent	NB	Novem	ent	SBI	Novem	ent	Overall
Period	Means	WOE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Overall
					US-70	at Stat	e Park	Road							
	НСМ	LOS		n/a¹	n/a1	А	n/a¹			В					Α
АМ	nom	Delay		n/a¹	n/a¹	8.8	n/a¹			11.0					1.5
	SimTraffic	LOS		А	А	А	А		В		А				А
	ommunic	Delay		3.0	1.2	2.9	0.5		12.5		2.3				2.3
	нсм	LOS		n/a¹	n/a¹	А	n/a¹			А					Α
РМ	TICIWI	Delay		n/a¹	n/a <sup>1</sup>	8.8	n/a¹			9.3					1.3
L IAI	SimTraffic	LOS		А	А	А	А		В		А				Α
	Simmanic	Delay		2.7	1.2	3.2	0.5		14.2		2.0				1.8
			US-70	at Will	ow Spi	rings R	oad/Jo	hnson	Creek	Road					
	нсм	LOS	А	n/a¹		А	n/a¹			С		С			Α
АМ	nom	Delay	8.4	n/a¹		9.2	n/a¹			18.6			16.8		1.8
~~~	SimTraffic	LOS	А	А	А	А	А	А	В	С	А	А	А	А	Α
	ommanic	Delay	1.8	1.5	0.1	4.8	2.0	0.9	13.0	18.0	3.4	5.7	8.0	3.2	2.0
	НСМ		А	n/a¹		А	n/a¹			С			С		Α
РМ	1.51	Delay	9.0	n/a¹		8.6	n/a¹			21.3			17.0		1.5
I IVI	Sim Traffic	LOS	А	А	А	А	А	А	В	В	А	С	С	А	А
		Delay	1.9	2.1	0.2	5.2	3.8	1.3	11.3	14.8	4.1	24.6	16.8	6.2	3.4

#### Table C-2 - 2050 No Build Analysis Results

<sup>1</sup> free movement

Time	Analysis	MOE	EB	Mover	ent	WB	Mover	nent	NB	Novem	ent	SB	Novem	ent	Overall
Period	Means	MOE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Overall
					US-70	) at Sta	ite Par	k Road							
	нсм	LOS		n/a¹	n/a¹	В	n/a¹			С					А
АМ	TIOM	Delay		n/a¹	n/a¹	12.8	n/a¹			16.9					0.7
AM	SimTraffic	LOS		Α	Α	С	Α		F		А				Α
	Simmanic	Delay		8.3	2.6	18.7	0.6		114.3		2.6				6.2
	нсм	LOS		n/a¹	n/a1	В	n/a¹			F					В
РМ	TICIWI	Delay		n/a¹	n/a¹	14.6	n/a¹			145.4					14.4
FIVI	SimTraffic	LOS		A	А	С	Α		F		F				F
	Simmanic	Delay		7.1	3.0	21.8	0.7		1191.2		1051.8				70.9
			US-70	) at Wi	llow Sp	orings	Road/J	ohnsoi	n Creek	Road					
	нсм	LOS	В	n/a¹		В	n/a¹			F			Е		Α
АМ		Delay	10.8	n/a¹		12.5	n/a¹			181.3			46.9		7.9
AM	SimTraffic	LOS	А	А	А	С	А	Α	Е	n/a¹	А	Е	С	В	Α
	Simmanic	Delay	2.4	2.2	0.1	16.0	5.1	1.2	36.2	n/a¹	4.4	43.6	15.8	14.0	3.7
	нсм	LOS	В	n/a¹		В	n/a¹			F			F		E
РМ	TICIWI	Delay	14.7	n/a¹		13.0	n/a¹			1833.8			66.1		41.1
F IVI	Sim Traffic	LOS	А	А	А	С	С	Α	F	F	F	F	F	F	С
		Delay	7.9	2.7	0.3	23.9	17.8	5.9	529.0	361.9	384.2	311.5	172.5	97.1	22.7

#### Table C-3 – 2050 with Development No Build Analysis Results

<sup>1</sup> free movement

		HCS7 Two-La	ane	Highv	vay Re	eport	
Project Info	mation		_				
Analyst		Garver		Date			9/16/2021
Agency				Analysis	Year		2021
Jurisdiction				Time Ana	alyzed		
Project Descriptio	n	No-Build, AM		Units			U.S. Customary
		S	egm	nent 1			
Vehicle Inpu	ts						
Segment Type		Passing Constrained		Length, f	ť		5280
Lane Width, ft	12		Shoulder	der Width, ft 0 s Point Density, pts/mi 0.0			
Speed Limit, mi/h 55				Access P	oint Dens	ity, pts/mi	0.0
Demand and	l Capacity						
Directional Dema	nd Flow Rate, veh/h	488		Opposin	g Demano	d Flow Rate, veh/h	-
Peak Hour Factor		0.84		Total Tru	cks, %		9.00
Segment Capacity, veh/h		1700		Demand	/Capacity	(D/C)	0.29
Intermediate	e Results						
Segment Vertical	Class	1		Free-Flov	w Speed,	mi/h	58.2
Speed Slope Coef	ficient	3.71463		Speed Power Coefficient			0.41674
PF Slope Coefficie	ent	-1.31135		PF Power Coefficient			0.75701
In Passing Lane E	fective Length?	No		Total Segment Density, veh/mi/ln			4.7
%Improved % Fol	lowers	0.0		% Impro	ved Avg S	Speed	0.0
Subsegment	Data						
# Segment Ty	/pe	Length, ft	Radi	ius, ft		Superelevation, %	Average Speed, mi/h
1 Tangent		5280	-			-	55.7
Vehicle Resu	lts	-					-
Average Speed, m	Average Speed, mi/h 55.7			Percent F	ollowers,	%	53.3
Segment Travel Ti	Segment Travel Time, minutes 1.08			Follower	Density, t	followers/mi/ln	4.7
Vehicle LOS		С					
Facility Resu	lts						
т	T Follower Density, followers/mi/ln					LO	S
1	4.7					C	

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	HCS7 Two-La	ane High	way Re	eport	
Project Information					
Analyst	Garver	Date			9/16/2021
Agency		Analys	s Year		2021
Jurisdiction		Time A	nalyzed		
Project Description	No-Build, PM	Units			U.S. Customary
	Se	egment '			
Vehicle Inputs					
Segment Type	Passing Constrained	Length	ft		5280
Lane Width, ft	12	Should	er Width, f	t	0
Speed Limit, mi/h	55	Access	Point Dens	sity, pts/mi	0.0
Demand and Capacity					
Directional Demand Flow Rate, veh/h	483	Oppos	ng Deman	d Flow Rate, veh/h	-
Peak Hour Factor	0.88	Total T	ucks, %		9.00
Segment Capacity, veh/h	1700	Demar	d/Capacity	r (D/C)	0.28
Intermediate Results					
Segment Vertical Class	1	Free-Fl	ow Speed,	mi/h	58.2
Speed Slope Coefficient	3.71463	1463 Speed		fficient	0.41674
PF Slope Coefficient	-1.31135	PF Pow	PF Power Coefficient		0.75701
In Passing Lane Effective Length?	No	Total S	egment De	nsity, veh/mi/ln	4.6
%Improved % Followers	0.0	% Imp	oved Avg S	Speed	0.0
Subsegment Data					
# Segment Type	Length, ft	Radius, ft		Superelevation, %	Average Speed, mi/h
1 Tangent	5280	-		-	55.7
Vehicle Results					
Average Speed, mi/h 55.7			Followers,	, %	53.0
Segment Travel Time, minutes 1.08			er Density,	followers/mi/ln	4.6
Vehicle LOS	С				
Facility Results					
T Follower Density, followers/mi/In				LO	S
1 4.6				C	

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		HCS7 Two-La	ne Hig	ghw	vay Re	eport	
Project Infor	mation						
Analyst		Garver	Date	5			9/16/2021
Agency			Analy	lysis `	fear		2050
Jurisdiction			Time	e Ana	lyzed		
Project Description	า	No-Build, AM	Units	s			U.S. Customary
		S	egment	t 1			
Vehicle Input	s						
Segment Type		Passing Constrained	Leng	gth, fi	t		5280
Lane Width, ft	Lane Width, ft 12		Shou	ulder	Width, ft	:	0
Speed Limit, mi/h 55			Acce	ess Po	oint Dens	ity, pts/mi	0.0
Demand and	Capacity						
Directional Demar	nd Flow Rate, veh/h	702	Орро	osing	g Demano	d Flow Rate, veh/h	-
Peak Hour Factor	eak Hour Factor 0.84		Total	l Truc	:ks, %		9.00
Segment Capacity	Segment Capacity, veh/h 1700		Dem	nand/	'Capacity	(D/C)	0.41
Intermediate	Results						
Segment Vertical (	Class	1	Free-	-Flov	v Speed, ı	mi/h	58.2
Speed Slope Coeff	icient	3.71463	Spee	Speed Power Coefficient			0.41674
PF Slope Coefficie	nt	-1.31135	PF Pc	PF Power Coefficient			0.75701
In Passing Lane Eff	fective Length?	No	Total	l Seg	ment Der	nsity, veh/mi/ln	8.1
%Improved % Foll	owers	0.0	% Im	nprov	ved Avg S	peed	0.0
Subsegment	Data						
# Segment Typ	pe	Length, ft	Radius, ft	:		Superelevation, %	Average Speed, mi/h
1 Tangent		5280	-			-	55.2
Vehicle Resul	ts						•
Average Speed, mi/h 55.2			Perce	ent F	ollowers,	%	63.3
Segment Travel Tir	Segment Travel Time, minutes 1.09			ower	Density, f	ollowers/mi/ln	8.1
Vehicle LOS D							
Facility Resul	ts						·
т	Follower	Density, followers/mi/	In			LO	S
1	·					D	

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	HCS7 Two	o-Lane	Highv	vay Re	eport			
Project Information								
Analyst	Garver		Date			9/16/2021		
Agency			Analysis	Year		2050		
Jurisdiction			Time Ana	alyzed				
Project Description	No-Build, PM		Units			U.S. Customary		
		Segn	nent 1					
Vehicle Inputs								
Segment Type	Passing Constrain	ined	Length, f	t		5280		
Lane Width, ft	12		Shoulder	Width, f	t	0		
Speed Limit, mi/h	55		Access P	oint Dens	ity, pts/mi	0.0		
Demand and Capacity								
Directional Demand Flow Rate, veh/	/h 699		Opposin	g Deman	d Flow Rate, veh/h	-		
Peak Hour Factor	0.88	0.88				9.00		
Segment Capacity, veh/h	1700		Demand,	/Capacity	(D/C)	0.41		
Intermediate Results								
Segment Vertical Class	1		Free-Flov	v Speed,	mi/h	58.2		
Speed Slope Coefficient	3.71463		Speed Power Coefficient			0.41674		
PF Slope Coefficient	-1.31135		PF Power	r Coefficie	0.75701			
In Passing Lane Effective Length?	No		Total Seg	ment De	nsity, veh/mi/ln	8.0		
%Improved % Followers	0.0		% Impro	ved Avg S	Speed	0.0		
Subsegment Data	·					•		
# Segment Type	Length, ft	Rad	lius, ft		Superelevation, %	Average Speed, mi/h		
1 Tangent	5280	-			-	55.2		
Vehicle Results								
Average Speed, mi/h	55.2		Percent F	ollowers,	%	63.2		
Segment Travel Time, minutes	1.09		Follower	Density,	followers/mi/ln	8.0		
Vehicle LOS	D							
Facility Results			I					
T Follo	ower Density, followers	s/mi/ln			LC	)5		

1

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		HCS7 Two-	Lane	Highway R	eport	
Project Informa	ation					
Analyst		Garver		Date		9/16/2021
Agency				Analysis Year		2050 w/ Dev
Jurisdiction				Time Analyzed		
Project Description		No-Build, AM		Units		U.S. Customary
			Segr	nent 1		
Vehicle Inputs						
Segment Type Passing Constrained				Length, ft		5280
Lane Width, ft		12	Shoulder Width, f	īt	0	
Speed Limit, mi/h		55		Access Point Den	sity, pts/mi	0.0
Demand and C	apacity					
Directional Demand Flow Rate, veh/h 1327 Opposing Dema				nd Flow Rate, veh/h	-	
Peak Hour Factor		0.84	0.84			9.00
Segment Capacity, ve	h/h	1700		Demand/Capacity	y (D/C)	0.78
Intermediate R	esults					
Segment Vertical Clas	SS	1		Free-Flow Speed,	mi/h	58.2
Speed Slope Coefficie	ent	3.71463		Speed Power Coe	efficient	0.41674
PF Slope Coefficient		-1.31135		PF Power Coeffici	ent	0.75701
In Passing Lane Effect	tive Length?	No		Total Segment De	ensity, veh/mi/ln	19.7
%Improved % Follow	ers	0.0		% Improved Avg	Speed	0.0
Subsegment Da	ata					
# Segment Type		Length, ft	Rad	dius, ft	Superelevation, %	Average Speed, mi/h
1 Tangent			-		-	54.2
Vehicle Results		-			•	•
Average Speed, mi/h		54.2		Percent Followers	5, %	80.3
Segment Travel Time,	minutes	1.11		Follower Density,	followers/mi/ln	19.7
						1

-		
т	Follower Density, followers/mi/ln	LOS
1	19.7	E

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	HCS7 Two-Lane	Highway Report	
Project Information			
Analyst	Garver	Date	9/16/2021

Analyst		Garver		Date			9/16/2021		
Agency				Analysis	Year		2050 w/ Dev		
Jurisdiction				Time An	alyzed				
Project Descripti	on	No-Build, PM		Units			U.S. Customary		
			Segn	nent 1					
Vehicle Inpu	ıts								
Segment Type		Passing Constrain	ed	Length, f	ť		5280		
Lane Width, ft		12		Shoulder	r Width, f	t	0		
Speed Limit, mi/l	h	55		Access P	oint Dens	ity, pts/mi	0.0		
Demand and	d Capacity								
Directional Dema	and Flow Rate, veh/h	1580		Opposin	g Deman	d Flow Rate, veh/h	-		
eak Hour Factor 0.88		Total Tru	cks, %		9.00				
Segment Capacity, veh/h 1700			Demand/Capacity (D/C)			0.93			
Intermediat	e Results	·					·		
Segment Vertical	Class	1		Free-Flow	w Speed,	mi/h	58.2		
Speed Slope Coe	efficient	3.71463		Speed Po	ower Coe	fficient	0.41674		
PF Slope Coeffici	ent	-1.31135		PF Power Coefficient			0.75701		
In Passing Lane E	ffective Length?	No		Total Segment Density, veh/mi/ln			24.7		
%Improved % Fc	ollowers	0.0		% Improved Avg Speed			0.0		
Subsegmen	t Data								
# Segment T	ype	Length, ft	Rac	lius, ft		Superelevation, %	Average Speed, mi/h		
1 Tangent		5280	-			-	53.8		
Vehicle Resu	ults	·				-			
Average Speed, I	Average Speed, mi/h 53.8				ollowers,	%	84.3		
Segment Travel Time, minutes 1.11			Follower	Density,	followers/mi/ln	24.7			
Vehicle LOS		E							
Facility Resu	ılts								
т	Follower	Density, followers/	/mi/ln			LC	LOS		
		24.7				E			

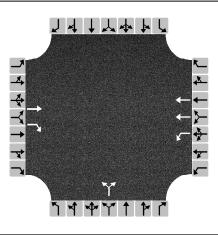
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**Appendix D – Signal Warrants** 

### **Project Information**

Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2021
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	No Build - Raw Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

#### **Geometry and Traffic**



Approach		Eastbound	ł		Westboun	d	N	lorthbour	ıd	S	outhbour	ıd		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	1	1	2	0	0	0	0	0	0	0		
Lane Usage		Т	R	L	Т			LR						
Vehicle Volumes Averages (veh/h)	0	210	17	30	213	0	14	0	31	0	0	0		
Pedestrian Averages (peds/h)		0	-		0			0	-		0	<u></u>		
Gap Averages (gaps/h)		0			0			0						
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No					
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		ŀ	ligh Occu	pancy Bu	ses (%)		0					
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Truck	s (%)		9					

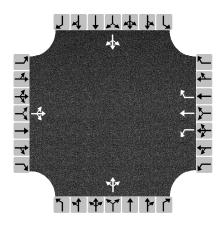
#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	492	66	558	0	0	No	No	No	No	No	No	No	No	No
08 - 09	460	51	511	0	0	No	No	No	No	No	No	No	No	No
09 - 10	409	58	467	0	0	No	No	No	No	No	No	No	No	No
10 - 11	428	52	480	0	0	No	No	No	No	No	No	No	No	No
11 - 12	396	39	435	0	0	No	No	No	No	No	No	No	No	No
12 - 13	431	52	483	0	0	No	No	No	No	No	No	No	No	No
13 - 14	445	46	491	0	0	No	No	No	No	No	No	No	No	No
14 - 15	447	46	493	0	0	No	No	No	No	No	No	No	No	No
15 - 16	519	29	548	0	0	No	No	No	No	No	No	No	No	No
16 - 17	540	44	584	0	0	No	No	No	Yes	No	No	No	No	No
17 - 18	602	36	638	0	0	No	No	No	No	No	No	No	No	No
18 - 19	499	31	530	0	0	No	No	No	No	No	No	No	No	No
Total	5668	550	6218	0	0	0	0	0	1	0	0	0	0	0
Warrants	<u> </u>										<u> </u>	<u> </u>	<u> </u>	
Warrant 1:	Fiaht-Hoi	ır Vehicu	lar Volu	ne										
	ım Vehicula				ichesand	d higher	minor apr	proach)c	)r					
	otion of Co													
	ularand						-							
Warrant 2:														
	r Vehicular				esand	higher mi	nor appro	ach)						
Warrant 3:			j											
	our Condit		or delay	and min	or volume	and to	otal volum	e)or						
	our Vehicu		2					-						
Warrant 4:														
	our Volume		-											
	our Volume													
Warrant 5: 1	School Cr	ossina												
	e Period													
Student V														
	affic Contr	ol Signal (	optional)											
Warrant 6:		-												
	Platooning	-	-	tion or bo	th directic	uns)								
Warrant 7:						-,								
	te trials of		es, observa	nce and e	nforceme	nt failed	and							
	ed crashes													
•	lumes for V	•			-		.,							
Warrant 8: 1														
	ay Volume			d proiec	ted warra	nts 1, 2, or	3)or							
	nd Volume			projec			5, 01							
Warrant 9:														
	Crossing wi		and											
	our Vehicu													
D. PedK-III				<b>D</b>		CCTT C	1.1.47	Varsian 7 (					0/24/2021	

#### **Project Information**

Garver	Date	8/2/2021
	Analysis Year	2021
Willow Springs Road/Johnson	Time Period Analyzed	
Creek Road		
No Build - Raw Volumes		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	Willow Springs Road/Johnson Creek Road No Build - Raw Volumes East-West 7 Undivided	East-West     Population < 10,000

#### **Geometry and Traffic**



Approach		Eastbound	ł		Westboun	d	N	Iorthboun	d	S	outhboun	d		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0		
Lane Usage		LTR		L	Т	R		LTR			LTR			
Vehicle Volumes Averages (veh/h)	0	238	5	19	228	2	3	0	20	2	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0		0				
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Weekend (	Counts			No					
Number of Minutes in Period	0			Ľ	5-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		ł	High Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	Tractor-Tra	iler Truck	s (%)		9					

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#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	543	42	586	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	454	21	484	0	0	No	No	No	No	No	No	No	No	No
09 - 10	448	21	473	0	0	No	No	No	No	No	No	No	No	No
10 - 11	444	16	468	0	0	No	No	No	No	No	No	No	No	No
11 - 12	419	18	438	0	0	No	No	No	No	No	No	No	No	No
12 - 13	490	26	520	0	0	No	No	No	No	No	No	No	No	No
13 - 14	481	21	503	0	0	No	No	No	No	No	No	No	No	No
14 - 15	495	13	511	0	0	No	No	No	No	No	No	No	No	No
15 - 16	512	19	535	0	0	No	No	No	No	No	No	No	No	No
16 - 17	647	28	676	0	0	No	No	No	No	No	No	No	No	No
17 - 18	550	27	582	0	0	No	No	No	No	No	No	No	No	No
18 - 19	456	41	500	0	0	No	No	No	No	No	No	No	No	No
Total	5939	293	6276	0	0	0	0	0	1	0	0	0	0	0
Warrants		1												
Warrant 1:	Eiaht-Hoi	ur Vehicu	lar Volu	ne										
	ım Vehicula				ichesand	d hiaher	minor apr	proach)c	)r					
	otion of Co													
·	cularand				-		-							
Warrant 2:						ouches								
	r Vehicular				esand	higher mi	nor appro	ach)						
Warrant 3:			j											
	our Condit		or delay	and min	or volume	and to	otal volum	e)or						
	our Vehicu		-					-						
Warrant 4:						ia ingrie		proderty						
	our Volume													
	our Volume													
Warrant 5:														
	e Period													
Student V														
	affic Contr	ol Signal (	optional)											
Warrant 6: (														
	Platooning	-	-		th directic	ons)								
Warrant 7:		-										_		
	ate trials of		es. observa	ance and e	nforceme	nt failed	and							
•	ed crashes													
-	lumes for V	•			-									
Warrant 8: 1														
	ay Volume			nd proiec	ted warra	nts 1, 2, or	3)or							
	nd Volume						-, 01							
Warrant 9:														
	Crossing wi		and											
	our Vehicu													
				Deconved				Vorsion 7				Carranata di	0/24/2021	2.47.40 5

#### HCS7 Warrants Report **Project Information** Garver Date 8/2/2021 Analysis Year 2021 State Park Road Time Period Analyzed Project Description No Build - Full Volumes

Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

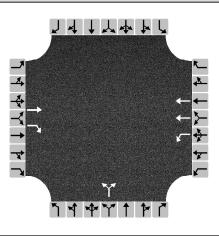
#### **Geometry and Traffic**

Analyst

Agency

Jurisdiction

General



Approach		Eastbound	b		Westboun	d	N	lorthbour	d	S	outhbour	nd		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	1	1	2	0	0	0	0	0	0	0		
Lane Usage		Т	R	L	Т			LR						
Vehicle Volumes Averages (veh/h)	0	246	20	40	240	0	18	0	37	0	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	v Netwo	rk												
Number of Students in Highest Hour	0			-	wo or Mo	re Major	Routes		No					
Number of Adequate Gaps in Period	0			Ň	Weekend (	Counts			No					
Number of Minutes in Period	0			!	5-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			1	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		I	ligh Occu	pancy Bu	ses (%)		0					
Distance to Stop Line (ft)	-			-	Tractor-Tra	iler Truck	s (%)		9					

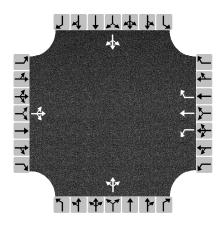
#### Volume Summary

Hour 07 - 08 08 - 09	Major Volume 620	Minor Volume	Total Volume	Peds/h	Gaps/h	1A	1A	1B	1B	2	3A	3B	4A	4B
	620		volume			(70%)	(56%)	(70%)	(56%)	(70%)	(70%)	(56%)	(70%)	(56%)
08 - 09		90	710	0	0	No	Yes	No	Yes	No	No	No	No	No
	514	55	569	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	449	68	517	0	0	No	No	No	No	No	No	No	No	No
10 - 11	501	74	575	0	0	No	No	No	No	No	No	No	No	No
11 - 12	463	43	506	0	0	No	No	No	No	No	No	No	No	No
12 - 13	503	59	562	0	0	No	No	No	No	No	No	No	No	No
13 - 14	488	59	547	0	0	No	No	No	No	No	No	No	No	No
14 - 15	528	50	578	0	0	No	No	No	Yes	No	No	No	No	No
15 - 16	637	43	680	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	643	51	694	0	0	No	No	No	Yes	No	No	No	No	No
17 - 18	740	45	785	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	487	41	528	0	0	No	No	No	No	No	No	No	No	No
Total	6573	678	7251	0	0	0	1	0	6	0	0	0	0	0
Warrants	11													
	icht Us.	w Vehier	lar Valu											
Warrant 1: E	-						•							
A. Minimur														
B. Interrupt							-							
56% Vehicu		-			najor appr	oachesa	and high	er minor a	pproach)					
Warrant 2: F														
Four-Hour			oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: P														
A. Peak-Ho			-											
B. Peak-Ho				ajor appro	achesan	d higher	minor ap	proach)						
Warrant 4: P			?											
A. Four Ho	ur Volume	sor												
B. One-Ho		-												
Warrant 5: S														
Gaps Same	e Period	and												
Student Vo														
Nearest Tra			•											
Warrant 6: C		-	-											
Degree of	Platooning	g (Predomi	inant direc	tion or bo	th directio	ns)								
Warrant 7: C	Crash Exp	erience												
A. Adequat	te trials of	alternative	es, observa	ince and e	nforcemer	nt failed	and							
B. Reported	d crashes s	susceptible	e to correc	tion by sig	ınal (12-m	onth perio	d)and							
C. 56% Vol	umes for \	Warrants 1	A, 1B,or	4 are sa	tisfied									
Warrant 8: R	Roadway	Network												
A. Weekda	y Volume	(Peak hour	totalar	d projec	ted warrar	nts 1, 2, or	3)or							
B. Weeken	d Volume	(Five hours	s total)											
Warrant 9: G	Grade Cro	ossing												
A. Grade C	rossing wi	thin 140 ft	and											
B. Peak-Ho	our Vehicul	ar Volume	s											

#### **Project Information**

Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2021
Jurisdiction	Willow Springs Road/Johnson	Time Period Analyzed	
	Creek Road		
Project Description	No Build - Full Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0	-	

#### **Geometry and Traffic**



Approach		Eastbound	k		Westboun	d	N	Iorthbour	d	S	outhboun	d		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0		
Lane Usage		LTR		L	Т	R		LTR			LTR			
Vehicle Volumes Averages (veh/h)	1	276	6	26	267	4	6	0	24	3	0	2		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0		0				
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No					
Number of Minutes in Period	0			Ľ	5-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	iy)		0					
Highest Volume Hour with Trains	Unknow	'n		ł	High Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	Tractor-Tra	iler Truck	s (%)		9					

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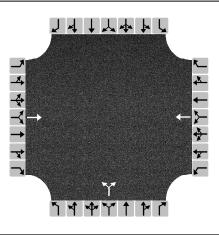
#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	700	59	762	0	0	No	No	Yes	Yes	No	No	No	No	No
08 - 09	545	36	593	0	0	No	No	No	No	No	No	No	No	No
09 - 10	518	29	556	0	0	No	No	No	No	No	No	No	No	No
10 - 11	548	24	585	0	0	No	No	No	No	No	No	No	No	No
11 - 12	479	15	497	0	0	No	No	No	No	No	No	No	No	No
12 - 13	560	39	604	0	0	No	No	No	No	No	No	No	No	No
13 - 14	544	27	574	0	0	No	No	No	No	No	No	No	No	No
14 - 15	577	23	603	0	0	No	No	No	No	No	No	No	No	No
15 - 16	562	19	584	0	0	No	No	No	No	No	No	No	No	No
16 - 17	675	29	711	0	0	No	No	No	No	No	No	No	No	No
17 - 18	775	40	818	0	0	No	No	No	No	No	No	No	No	No
18 - 19	513	35	561	0	0	No	No	No	No	No	No	No	No	No
Total	6996	375	7448	0	0	0	0	1	1	0	0	0	0	0
Warrants														
Warrant 1:	-													
	ım Vehicula													
·	otion of Co						-							
	ularand				major appi	roaches	and high	ner minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	lar Volun	1e										
Four-Hou	r Vehicular	Volume (E	Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	r												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-H	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	ıd higheı	r minor ap	proach)						
Warrant 4:	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	s												
Warrant 5:	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant dired	tion or bo	th directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	ate trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	d)and	-						
C. 56% Vo	lumes for V	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8:														
	ay Volume			id projec	ted warra	nts 1, 2, or	3)or							
	nd Volume													
Warrant 9:			,											
	Crossing wi		tand											
	our Vehicu													
Convright © 20				Posonuod	1		al Marrante	Vorsion 7				Conoratod:	0/24/2021	2.40.14

#### **Project Information**

Garver	Date	8/26/2021
	Analysis Year	2021
State Park Road	Time Period Analyzed	
No Build - Single Thru Lane		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	State Park Road No Build - Single Thru Lane East-West 7 Undivided	Analysis Year       State Park Road     Time Period Analyzed       No Build - Single Thru Lane       East-West     Population < 10,000

#### **Geometry and Traffic**



Approach		Eastbound	ł	١	Westboun	d	Northbound			Southbound		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	0	1	0	0	1	0	0	0	0	0	0	0
Lane Usage		Т			Т			LR				
Vehicle Volumes Averages (veh/h)	0	246	0	0	240	0	18	0	37	0	0	0
Pedestrian Averages (peds/h)		0			0	-		0	-		0	<u>.</u>
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0		0.0			0.0		
Delay (veh-hrs)		0.0			0.0			0.0			0.0	
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No			
Number of Adequate Gaps in Period	0			1	Weekend Counts			No				
Number of Minutes in Period	0			5	5-year Growth Factor (%)					0		
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ıy)		0			
Highest Volume Hour with Trains	Unknow	'n		H	High Occupancy Buses (%)				0	0		
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Trucks	s (%)		9			

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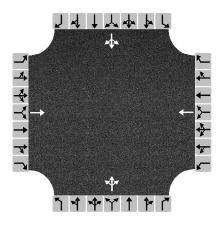
#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A ( 70% )	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	610	90	700	0	0	No	Yes	Yes	Yes	No	No	No	No	No
08 - 09	503	55	558	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	405	68	473	0	0	No	No	No	No	No	No	No	No	No
10 - 11	451	74	525	0	0	No	No	No	Yes	No	No	No	No	No
11 - 12	416	43	459	0	0	No	No	No	No	No	No	No	No	No
12 - 13	452	59	511	0	0	No	No	No	Yes	No	No	No	No	No
13 - 14	440	59	499	0	0	No	No	No	Yes	No	No	No	No	No
14 - 15	473	50	523	0	0	No	No	No	Yes	No	No	No	No	No
15 - 16	523	43	566	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	529	51	580	0	0	No	No	No	Yes	No	No	No	No	No
17 - 18	640	45	685	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	398	41	439	0	0	No	No	No	No	No	No	No	No	No
Total	5840	678	6518	0	0	0	1	1	9	0	0	0	0	0
Warrants				-		-				-				
Warrant 1:	-													
	ım Vehicula													
	otion of Co						-							
	ularand	-			major appi	roaches	and high	ner minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	lar Volun	1e										
Four-Hou	r Vehicular	Volume (E	Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	r												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-He	our Vehicu	ar Volume	es (Both m	ajor appro	achesar	ıd highei	r minor ap	proach)						
Warrant 4:	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	th directic	ons)								
Warrant 7:	Crash Exp	erience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for V	Narrants 1	А, 1В,ог	4 are sa	itisfied								√	
Warrant 8: I	Roadway	Network	ſ											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
	Crossing wi		tand											
	our Vehicu													
	24.11.1	( = 1 - 1		<b>D</b>			1.1.47					<u> </u>	0/24/2024	

#### **Project Information**

Analyst	Garver	Date	9/24/2021
Agency		Analysis Year	2021
Jurisdiction	Willow Springs Road/Johnson	Time Period Analyzed	
	Creek Road		
Project Description	No Build - Single Thru Lane		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

#### **Geometry and Traffic**



Approach		Eastbound	b	, v	Westboun	d	N	Iorthbour	nd	S	outhbour	ıd	
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0	
Lane Usage		Т			Т			LTR			LTR		
Vehicle Volumes Averages (veh/h)	0	276	0	0	267	0	6	0	24	3	0	2	
Pedestrian Averages (peds/h)		0			0			0			0		
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0					0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0		
School Crossing and Roadway	v Netwo	rk											
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No				
Number of Adequate Gaps in Period	0			١	Weekend Counts			No					
Number of Minutes in Period	0			5	5-year Growth Factor (%)				0	0			
Railroad Crossing													
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0				
Highest Volume Hour with Trains	Unknow	'n		ł	High Occupancy Buses (%)				0	0			
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Truck	s (%) 9						
	1				/						0.00000		

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#### Volume Summary

Vol           07 - 08         6           08 - 09         5           09 - 10         4           10 - 11         5           11 - 12         4           12 - 13         5           13 - 14         5           14 - 15         5           15 - 16         5	5	Minor /olume 59 36 29 24 15 39 27	Total Volume 732 572 526 553 465 569	Peds/h 0 0 0	Gaps/h 0 0	1A (70%) No No	1A (56%) No	1B ( 70% ) Yes	1B ( 56% ) Yes	2 ( 70% ) No	3A ( 70% ) No	3B (56%) No	4A ( 70% ) No	4B ( 56% ) No
08 - 09       5         09 - 10       4         10 - 11       5         11 - 12       4         12 - 13       5         13 - 14       5         14 - 15       5         15 - 16       5	524 516 525 539 539 552 552 552 552 5539 552 552 552 552 5539 552 552 552 552 552 552 552 552 552 55	36 29 24 15 39	572 526 553 465	0 0 0	0	No		Yes	Yes	No	No	No	No	No
09 - 10       4         10 - 11       5         11 - 12       4         12 - 13       5         13 - 14       5         14 - 15       5         15 - 16       5	488 516 516 525 512 539 5	29 24 15 39	526 553 465	0 0	0		No							
10 - 11     5       11 - 12     4       12 - 13     5       13 - 14     5       14 - 15     5       15 - 16     5	516 447 525 512 539 5	24 15 39	553 465	0				No	No	No	No	No	No	No
11 - 12     4       12 - 13     5       13 - 14     5       14 - 15     5       15 - 16     5	447 525 512 539	15 39	465			No	No	No	No	No	No	No	No	No
12 - 13     5       13 - 14     5       14 - 15     5       15 - 16     5	525 512 539	39		-	0	No	No	No	No	No	No	No	No	No
13 - 14     5       14 - 15     5       15 - 16     5	512 539		E 60	0	0	No	No	No	No	No	No	No	No	No
14 - 15     5       15 - 16     5	539	27	209	0	0	No	No	No	No	No	No	No	No	No
15 - 16 5			542	0	0	No	No	No	No	No	No	No	No	No
	516	23	565	0	0	No	No	No	No	No	No	No	No	No
16 - 17 6		19	538	0	0	No	No	No	No	No	No	No	No	No
	519	29	655	0	0	No	No	No	No	No	No	No	No	No
17 - 18 7	704	40	747	0	0	No	No	No	No	No	No	No	No	No
18 - 19 4	470	35	518	0	0	No	No	No	No	No	No	No	No	No
Total 65	530	375	6982	0	0	0	0	1	1	0	0	0	0	0
Warrants														
Warrant 1: Eigh					-l	I http://www.	•							
A. Minimum Ve														
B. Interruption							-							
56% Vehicular					najor appr	oachesa	and high	er minor a	pproach)					
Warrant 2: Four														
Four-Hour Veh		olume (Bo	oth major	approache	esand	nigner mi	nor appro	acn)						
Warrant 3: Peak		() A <sup>*</sup>												
A. Peak-Hour C		-	-											
B. Peak-Hour V				ajor approa	achesan	d higher	minor ap	proach)						
Warrant 4: Pede			2											
A. Four Hour V		or												
B. One-Hour Vo	eranice.													
Warrant 5: Scho														
Gaps Same Per		nd												
Student Volum														
Nearest Traffic		-												
Warrant 6: Coor		-	•											
Degree of Plate	-		nant direc	tion or bo	th directio	ns)								
Warrant 7: Cras	-													
A. Adequate tri														
B. Reported cra		-				onth perio	d)and							
C. 56% Volume				4 are sa	tisfied									
Warrant 8: Road	-													
A. Weekday Vo	olume (Pe	eak hour	totalan	d projec	ted warrar	nts 1, 2, or	3)or							
B. Weekend Vo			total)											
Warrant 9: Graa	de Cross	sing												
A. Grade Cross	sing withi	in 140 ft	and											
B. Peak-Hour V	/ehicular	Volumes	S											

#### HCS7 Warrants Report **Project Information** Garver Date 8/2/2021 Analysis Year 2050 State Park Road Time Period Analyzed

Jurisdiction

Project Description

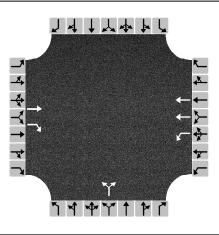
Analyst

Agency

General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

No Build - Full Volumes

#### **Geometry and Traffic**



Approach		Eastbound	k		Westboun	d	Northbound			Southbound			
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0	1	1	1	2	0	0	0	0	0	0	0	
Lane Usage		Т	R	L	Т			LR					
Vehicle Volumes Averages (veh/h)	0	353	29	57	345	0	27	0	54	0	0	0	
Pedestrian Averages (peds/h)		0			0			0			0		
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0			0.0		0.0			0.0			
Delay (veh-hrs)		0.0			0.0			0.0			0.0		
School Crossing and Roadway	/ Netwo	rk											
Number of Students in Highest Hour	0			-	Гwo or Mo	ore Major	Routes		No				
Number of Adequate Gaps in Period	0			\ \	Neekend (	Counts			No	No			
Number of Minutes in Period	0			!	5-year Growth Factor (%)				0	0			
Railroad Crossing													
Grade Crossing Approach	None			1	Rail Traffic	(trains/da	ay)		0				
Highest Volume Hour with Trains	Unknow	'n		I	High Occu	pancy Bu	ses (%)		0	0			
Distance to Stop Line (ft)	-			-	Fractor-Tra	iler Truck	s (%)		9				

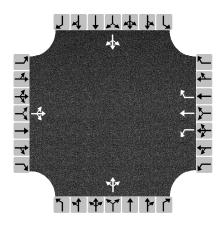
#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A ( 70% )	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	895	135	1030	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	741	79	820	0	0	No	No	Yes	Yes	No	No	No	No	No
09 - 10	646	99	745	0	0	No	Yes	Yes	Yes	No	No	No	No	No
10 - 11	719	105	824	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
11 - 12	665	61	726	0	0	No	No	Yes	Yes	No	No	No	No	No
12 - 13	722	84	806	0	0	No	Yes	Yes	Yes	No	No	No	No	No
13 - 14	700	84	784	0	0	No	Yes	Yes	Yes	No	No	No	No	No
14 - 15	759	72	831	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	909	62	971	0	0	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	919	72	991	0	0	No	No	Yes	Yes	Yes	No	No	No	No
17 - 18	1065	65	1130	0	0	No	No	Yes	Yes	Yes	No	No	No	No
18 - 19	694	58	752	0	0	No	No	Yes	Yes	No	No	No	No	No
Total	9434	976	10410	0	0	2	5	12	12	5	0	0	0	0
Warrants				-	-		-							
Warrant 1:	-												✓	
	ım Vehicula					-								
·	otion of Co				•		-						✓	
	ularand				major appi	oaches	and high	ner minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	ar Volun	1e									✓	
Four-Hou	r Vehicular	Volume (E	oth major	approach	esand	higher mi	nor appro	ach)					$\checkmark$	
Warrant 3:	Peak Hou	r												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-He	our Vehicu	ar Volume	s (Both ma	ajor appro	achesar	d highei	r minor ap	proach)						
Warrant 4:	Pedestria	n Volum	?											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: :	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	ıl System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	th directio	ns)								
Warrant 7: (	Crash Exp	erience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	nforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for V	Narrants 1	A, 1B,or	4 are sa	tisfied								✓	
Warrant 8: I	Roadway	Network	-											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
	Crossing wi		and											
	our Vehicu													
	21   Iniversit			Decembral			al \\/auxauta	Manaian 70				Cananahad	0/24/2021	2.55.46.5

#### **Project Information**

Garver	Date	8/2/2021
	Analysis Year	2050
Willow Springs Road/Johnson	Time Period Analyzed	
Creek Road		
No Build - Full Volumes		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0	•	-
	Willow Springs Road/Johnson Creek Road No Build - Full Volumes East-West 7 Undivided	Analysis Year       Willow Springs Road/Johnson Creek Road     Time Period Analyzed       No Build - Full Volumes       East-West     Population < 10,000

#### **Geometry and Traffic**



Approach		Eastbound	ł	\ \	Nestboun	d	Ν	lorthbour	d	S	outhbour	nd	
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0	
Lane Usage		LTR		L	Т	R		LTR			LTR		
Vehicle Volumes Averages (veh/h)	2	396	9	37	384	6	8	1	35	6	1	2	
Pedestrian Averages (peds/h)		0			0			0			0		
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0			0.0		0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0		
School Crossing and Roadway	v Netwo	rk											
Number of Students in Highest Hour	0			1	wo or Mc	ore Major	Routes		No				
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No	No			
Number of Minutes in Period	0			5	5-year Growth Factor (%)					0			
Railroad Crossing													
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0				
Highest Volume Hour with Trains	Unknow	'n		ł	High Occupancy Buses (%)					0			
Distance to Stop Line (ft)	-			1	Tractor-Trailer Trucks (%)				9	9			

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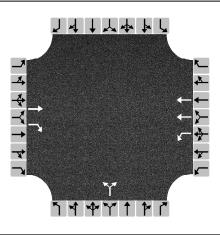
#### Volume Summary

4B (56%
No
0
1

#### **Project Information**

Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2050
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	No Build - Right Turn Red	luction	
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

#### **Geometry and Traffic**



Approach		Eastbound	ł	, ,	Nestboun	d	N	Iorthboun	d	Southbound				
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	0 1 1			2	0	0	0	0	0	0	0		
Lane Usage		Т	R	L	Т			LR						
Vehicle Volumes Averages (veh/h)	0	353	29	57	345	0	27	0	33	0	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0		0.0				
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	Two or More Major Routes					No				
Number of Adequate Gaps in Period	0			١	Veekend (	Counts	N			No				
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%) 0			0				
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic (trains/day)					0				
Highest Volume Hour with Trains	Unknow	'n		H	ligh Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Trucks	s (%)		9	9				

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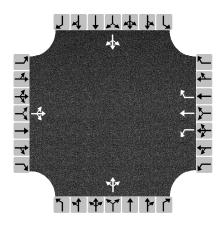
#### Volume Summary

volume Si	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	895	102	997	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	741	61	802	0	0	No	No	Yes	Yes	No	No	No	No	No
09 - 10	646	73	719	0	0	No	No	Yes	Yes	No	No	No	No	No
10 - 11	719	78	797	0	0	No	No	Yes	Yes	No	No	No	No	No
11 - 12	665	45	710	0	0	No	No	No	Yes	No	No	No	No	No
12 - 13	722	62	784	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	700	62	762	0	0	No	No	Yes	Yes	No	No	No	No	No
14 - 15	759	53	812	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	909	46	955	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	919	53	972	0	0	No	No	Yes	Yes	No	No	No	No	No
17 - 18	1065	49	1114	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	694	43	737	0	0	No	No	No	Yes	No	No	No	No	No
Total	9434	727	10161	0	0	0	1	8	12	1	0	0	0	0
Warrants	1	<u> </u>	<u>I</u>					I			<u> </u>	<u> </u>	<u> </u>	
			1 1 (-1											
Warrant 1: I	-											_	✓	
A. Minimu						-								
-	otion of Co				•		-						✓	
56% Vehic					major appi	roaches	and high	ner minor a	approach)					
Warrant 2: I				-										
Four-Hou			Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I														
A. Peak-H														
	our Vehicul			ajor appro	achesar	id highei	r minor ap	proach)						
Warrant 4: I			e											
A. Four Ho														
<i>D.</i> One me	our Volume	.5												
Warrant 5: S														
Gaps Sam		and												
Student Vo														
Nearest Tr			•											
Warrant 6: (			-											
-	Platooning	-	inant direo	tion or bo	th directio	ons)								
Warrant 7: (														
A. Adequa														
B. Reporte						onth peric	od)and	-						
C. 56% Vo	lumes for \	Warrants 1	А, 1В,ог	4 are sa	tisfied								$\checkmark$	
Warrant 8: I	Roadway	Network	٢											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	d Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade C	Crossing wi	thin 140 ft	tand											
B. Peak-Ho	our Vehicul	lar Volume	es											
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#### **Project Information**

Garver	Date	8/2/2021		
	Analysis Year	2050		
Willow Springs Road/Johnson	Time Period Analyzed			
Сгеек коаd				
No Build - Right Turn Reduction				
East-West	Population < 10,000	Yes		
7	Coordinated Signal System	No		
Undivided	Crashes (crashes/year)	0		
60	Adequate Trials of Crash Exp. Alt.	No		
0		•		
	Willow Springs Road/Johnson Creek Road No Build - Right Turn Reduction East-West 7 Undivided 60	Analysis Year       Willow Springs Road/Johnson Creek Road     Time Period Analyzed       No Build - Right Turn Reduction		

#### **Geometry and Traffic**



Approach		Eastbound	k		Westboun	d	N	Iorthboun	d	Southbound				
Movement	L T R L T R L T R					R	L	Т	R					
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0		
Lane Usage		LTR		L	Т	R		LTR			LTR			
Vehicle Volumes Averages (veh/h)	2	396	9	37	384	6	8	1	17	6	1	2		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0		0				
Delay (s/veh)	0.0 0.0 0.0						0.0							
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	Two or More Major Routes					No				
Number of Adequate Gaps in Period	0			١	Weekend (	Counts		No	No					
Number of Minutes in Period	0			Ľ	5-year Growth Factor (%)					0				
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0	0				
Highest Volume Hour with Trains	Unknow	'n		ł	High Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-	- Tractor-Trailer Trucks (%) 9												

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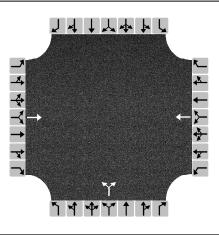
#### Volume Summary

volume Si	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	1005	50	1061	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	781	25	823	0	0	No	No	No	No	No	No	No	No	No
09 - 10	743	22	777	0	0	No	No	No	No	No	No	No	No	No
10 - 11	787	19	824	0	0	No	No	No	No	No	No	No	No	No
11 - 12	687	12	704	0	0	No	No	No	No	No	No	No	No	No
12 - 13	802	29	839	0	0	No	No	No	No	No	No	No	No	No
13 - 14	778	21	804	0	0	No	No	No	No	No	No	No	No	No
14 - 15	828	17	850	0	0	No	No	No	No	No	No	No	No	No
15 - 16	806	20	831	0	0	No	No	No	No	No	No	No	No	No
16 - 17	966	31	1006	0	0	No	No	No	No	No	No	No	No	No
17 - 18	1120	45	1171	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	735	37	791	0	0	No	No	No	No	No	No	No	No	No
Total	10038	328	10481	0	0	0	0	0	2	0	0	0	0	0
Warrants				-		-	-			-				
Warrant 1: I	-													
A. Minimu														
	tion of Co						-							
56% Vehic					major appi	roaches	and high	ner minor a	approach)					
Warrant 2: I	Four-Hou	r Vehicul	lar Volun	1e										
Four-Hou	r Vehicular	Volume (E	Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I														
A. Peak-H														
B. Peak-Ho	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	ıd higheı	r minor ap	proach)						
Warrant 4: I	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	s												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student Vo	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directic	ons)								
Warrant 7: (	Crash Exp	perience												
A. Adequa	ite trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	d)and	-						
C. 56% Vo	lumes for \	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8: I	Roadway	Network	ſ											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade C			tand											
	our Vehicu													
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#### **Project Information**

Garver	Date	8/26/2021
	Analysis Year	2050
State Park Road	Time Period Analyzed	
No Build - Single Thru Lane		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	State Park Road No Build - Single Thru Lane East-West 7 Undivided	Analysis Year       State Park Road     Time Period Analyzed       No Build - Single Thru Lane       East-West     Population < 10,000

#### **Geometry and Traffic**



Approach	Eastbound Westbound Northbound						d	Southbound						
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	0	0	1	0	0	0	0	0	0	0		
Lane Usage		Т			Т			LR						
Vehicle Volumes Averages (veh/h)	0	353	0	0	345	0	27	0	54	0	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0		0.0				
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts	No			)				
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%) 0							
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0	0				
Highest Volume Hour with Trains	Unknow	'n		ł	ligh Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-	- Tractor-Trailer Trucks (%) 9												

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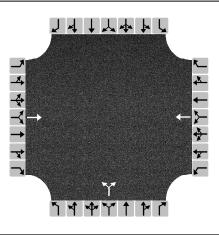
#### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	875	135	1010	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	720	79	799	0	0	No	No	Yes	Yes	Yes	No	No	No	No
09 - 10	582	99	681	0	0	No	Yes	Yes	Yes	No	No	No	No	No
10 - 11	647	105	752	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
11 - 12	597	61	658	0	0	No	No	Yes	Yes	No	No	No	No	No
12 - 13	648	84	732	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
13 - 14	631	84	715	0	0	No	Yes	Yes	Yes	No	No	No	No	No
14 - 15	679	72	751	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	752	62	814	0	0	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	761	72	833	0	0	No	No	Yes	Yes	Yes	No	No	No	No
17 - 18	920	65	985	0	0	No	No	Yes	Yes	Yes	No	No	No	No
18 - 19	571	58	629	0	0	No	No	Yes	Yes	No	No	No	No	No
Total	8383	976	9359	0	0	2	5	12	12	7	0	1	0	0
Warrants		0.0										<u> </u>		
Warrant 1:	-												✓	
	ım Vehicula					-								
·	otion of Co				•		-						✓	
	ularand				major app	roaches	and high	ier minor a	approach)					
Warrant 2:													✓	
	r Vehicular		oth major	approach	esand	higher mi	nor appro	ach)					✓	
Warrant 3:	Peak Hou	r											✓	
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-He	our Vehicul	ar Volume	s (Both ma	ajor appro	achesar	id highe	r minor ap	proach)					✓	
Warrant 4:	Pedestria	n Volum	2											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	l System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directio	ons)								
Warrant 7:	Crash Exp	erience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	ed crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and							
C. 56% Vo	lumes for \	Narrants 1	A, 1B,or	4 are sa	itisfied								✓	
Warrant 8: I	Roadway	Network												
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9:	Grade Cro	ossing												
A. Grade (	Crossing wi	thin 140 ft	and											
B. Peak-He	our Vehicul	ar Volume	s											
	01.11.1	C FLord 1		<b>D</b>		CCTTA C'	1.1.1.					<u> </u>	0/04/2024	2 50 50 5

## **Project Information**

Analyst	Garver	Date	8/26/2021
Agency		Analysis Year	2050
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	No Build - Single Thru Lan	e + Right Turn Reduction	
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

### **Geometry and Traffic**



Approach		Eastbound	ł	, v	Westboun	d	N	lorthbour	ıd	S	outhbour	ıd		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	0	0	1	0	0	0	0	0	0	0		
Lane Usage		Т			Т			LR						
Vehicle Volumes Averages (veh/h)	0	353	0	0	345	0	27	0	33	0	0	0		
Pedestrian Averages (peds/h)		0			0			0	-		0	<u></u>		
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mc	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No					
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		ł	ligh Occu	pancy Bu	ses (%)		0					
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Truck	s (%)		9					

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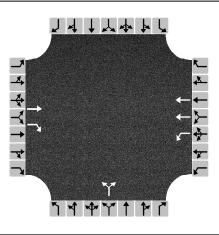
## Volume Summary

volume St	unnar y													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%
07 - 08	875	102	977	0	0	(70%) No	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	720	61	781	0	0	No	No	Yes	Yes	No	No	No	No	No
09 - 10	582	73	655	0	0	No	No	Yes	Yes	No	No	No	No	No
10 - 11	647	78	725	0	0	No	No	Yes	Yes	No	No	No	No	No
11 - 12	597	45	642	0	0	No	No	No	Yes	No	No	No	No	No
12 - 13	648	62	710	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	631	62	693	0	0	No	No	Yes	Yes	No	No	No	No	No
14 - 15	679	53	732	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	752	46	798	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	761	53	814	0	0	No	No	Yes	Yes	No	No	No	No	No
17 - 18	920	49	969	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	571	43	614	0	0	No	No	No	Yes	No	No	No	No	No
Total	8383	727	9110	0	0	0	1	8	12	1	0	1	0	0
	0303	121	5110	0	0	0		0	12		0	<u> </u>	0	0
Warrants														
Warrant 1: I	-												✓	
A. Minimu						-								
B. Interrup	tion of Co	ntinuous T	raffic (Bot	n major ap	proaches	and hi	gher mino	r approach	n)or				<u>√</u>	
56% Vehic	ularand	Interrup	tion Volun	nes (Both r	major appi	roaches	and high	ier minor a	approach)					
Warrant 2: I	Four-Hou	r Vehicul	ar Volun	ie										
Four-Hour	<sup>·</sup> Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I	Peak Hou	r											<u>√</u>	
A. Peak-Ho	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho	our Vehicul	ar Volume	s (Both ma	ajor appro	achesan	d highei	r minor ap	proach)					<u>√</u>	
Warrant 4: I	Pedestria	n Volum	2											
A. Four Ho	our Volume	sor												
B. One-Ho	ur Volume	S												
Warrant 5: 9	School Cr	ossing												
Gaps Same	e Period	and												
Student Vo	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	l System											
Degree of	Platooning	g (Predom	inant direc	tion or bo	th directio	ons)								
Warrant 7: (	Crash Exp	erience												
A. Adequa	te trials of	alternative	es, observa	nce and e	nforcemer	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	ınal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for \	Warrants 1	A, 1B,or	4 are sa	tisfied								$\checkmark$	
Warrant 8: I	Roadway	Network	-											
A. Weekda	y Volume	(Peak hou	r totalar	d projec	ted warra	nts 1, 2, or	3)or							
B. Weeken	d Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
	rossing wi	thin 140 ft	and											
A. Grade C	lossing wi													

### **Project Information**

Analyst	Garver	Date	9/17/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	No Build - Full Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

### **Geometry and Traffic**



Approach		Eastbound	b	· ·	Westboun	d	N	Iorthbour	d	S	outhbour	d		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	1	1	2	0	0	0	0	0	0	0		
Lane Usage		Т	R	L	Т			LR						
Vehicle Volumes Averages (veh/h)	0	819	76	93	804	0	71	0	88	0	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mc	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No					
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		H	High Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Truck	s (%)		9					

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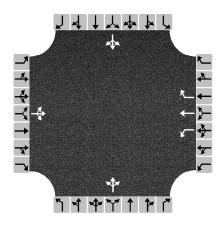
## Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2025	50	2075	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	1721	163	1884	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
09 - 10	1480	205	1685	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
10 - 11	1646	219	1865	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
11 - 12	1520	128	1648	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	1650	175	1825	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1606	175	1781	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1729	149	1878	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	2052	128	2180	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	2073	149	2222	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	2470	255	2725	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1561	121	1682	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	21533	1917	23450	0	0	11	11	11	12	11	0	11	0	0
Warrants				-							-			
Warrant 1:	-												✓	
	ım Vehicula					-							✓	
·	otion of Co						-						✓	
	ularand	-			major appi	roaches	and high	ner minor a	approach)				√	
Warrant 2:													✓	
	r Vehicular		oth major	approach	esand	higher mi	inor appro	ach)					$\checkmark$	
Warrant 3:													✓	
	our Condit		-											
B. Peak-He	our Vehicul	ar Volume	es (Both ma	ajor appro	achesar	id highe	r minor ap	proach)					<u>√</u>	
Warrant 4:	Pedestria	n Volum	9											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	ıl System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directic	ons)								
Warrant 7:	Crash Exp	erience												
A. Adequa	te trials of	alternative	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for \	Narrants 1	A, 1B,or	4 are sa	tisfied								$\checkmark$	
Warrant 8: I	Roadway	Network												
A. Weekda	ay Volume	(Peak hou	r totalar	nd projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade (	Crossing wi	thin 140 ft	and											
B. Peak-He	our Vehicul	ar Volume	s											
an minht @ 20	21.1	ب مل ۲۱ مین از		Deeenverd			al \\/auna - + -	Manaian 70				Constant	0/24/2021	4.01.42.5

### **Project Information**

-			
Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	Willow Springs Road/Johnson	Time Period Analyzed	
	Creek Road		
Project Description	No Build - Full Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

## **Geometry and Traffic**



Approach		Eastbound	ł	\ \	Westboun	d	N	Iorthbour	ıd	S	outhbour	ıd		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0		
Lane Usage		LTR		L	Т	R		LTR			LTR			
Vehicle Volumes Averages (veh/h)	2	897	9	37	872	6	8	1	35	6	1	2		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0						
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0		0.0				0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Weekend (	Counts			No					
Number of Minutes in Period	0			5	5-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0					
Highest Volume Hour with Trains	Unknow	'n		ł	High Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	Tractor-Tra	iler Truck	s (%)		9					

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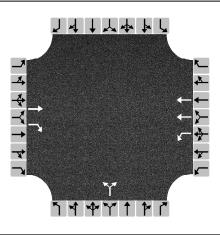
### Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2040	90	2136	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1716	50	1784	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	1631	40	1683	0	0	No	No	No	No	No	No	No	No	No
10 - 11	1726	35	1781	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1498	22	1525	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1755	56	1819	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	1733	37	1752	0	0	No	No	No		No	No	No	No	No
13 - 14	1805	33	1843	0	0	No	No	No	No No	No	No	No	No	No
14 - 13	1762	28	1795	0	0	No	No	No	No	No	No	No	No	No
16 - 17				0	0									
17 - 18	2114	41 F 9	2165 2614	0	0	No	No	No	No	No	No	No	No	No
	2550	58	-			No	No	Yes	Yes	No	No	No	No	No
18 - 19	1604	51	1675	0	0	No	No	No	Yes	No	No	No	No	No
Total	21911	541	22572	0	0	0	1	3	5	1	0	1	0	0
Warrants														
Warrant 1:	Eight-Hou	ur Vehicu	lar Volui	ne										
A. Minimu	m Vehicula	ar Volumes	(Both ma	jor approa	chesand	d higher	minor app	oroach)c	or					
B. Interrup	tion of Co	ntinuous T	raffic (Botl	n major ap	proaches	and hi	gher mino	r approacl	ר)or					
56% Vehic	ularand	Interrup	tion Volun	nes (Both i	major appi	roaches	and high	er minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	ar Volun	ne										
Four-Hou	r Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	r											✓	
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-H	our Vehicu	lar Volume	s (Both ma	ajor appro	achesar	ıd highei	r minor ap	proach)					✓	
Warrant 4:	Pedestria	n Volum	2											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5:	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	l System											
	Platooning	-	-		th directio	ons)								
Warrant 7:		-												
	te trials of		es, observa	ance and e	enforceme	nt failed	and							
•	d crashes													
	lumes for V	-			-	p	.,							
Warrant 8:														
	ay Volume			id proiec	ted warra	nts 1, 2, or	3)0r							
	nd Volume						3, 01							
Warrant 9:														
	Crossing wi	-	and											
	our Vehicu													
B. Peak-H				Decented		ICSTM Sian	al Marranta	Version 7 (	) E			Generated:	0/24/2021	4.02.50

### **Project Information**

Garver	Date	8/2/2021
	Analysis Year	2050 with Development
State Park Road	Time Period Analyzed	
No Build - Right Turn Reduction		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	State Park Road No Build - Right Turn Reduction East-West 7 Undivided	Analysis Year       State Park Road     Time Period Analyzed       No Build - Right Turn Reduction       East-West     Population < 10,000

### **Geometry and Traffic**



Approach		Eastbound	ł	, ,	Westboun	d	N	Iorthboun	d	S	outhbour	ıd		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R		
Number of Lanes, N	0	1	1	1	2	0	0	0	0	0	0	0		
Lane Usage		Т	R	L	Т			LR						
Vehicle Volumes Averages (veh/h)	0	819	76	93	804	0	71	0	73	0	0	0		
Pedestrian Averages (peds/h)		0			0			0			0			
Gap Averages (gaps/h)		0			0			0			0			
Delay (s/veh)		0.0			0.0			0.0			0.0			
Delay (veh-hrs)		0.0			0.0			0.0			0.0			
School Crossing and Roadway	Netwo	rk												
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No					
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No					
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0					
Railroad Crossing														
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	iy)		0					
Highest Volume Hour with Trains	Unknow	n		H	ligh Occu	pancy Bus	ses (%)		0					
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Trucks	s (%)		9					

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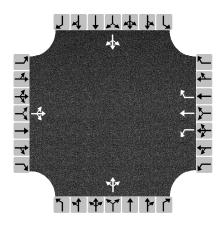
## Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2025	49	2074	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	1721	154	1875	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
09 - 10	1480	182	1662	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
10 - 11	1646	194	1840	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
11 - 12	1520	110	1630	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	1650	156	1806	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1606	161	1767	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1729	132	1861	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	2052	118	2170	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	2073	138	2211	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	2470	241	2711	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1561	102	1663	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	21533	1737	23270	0	0	10	11	11	12	11	0	11	0	0
Warrants														
Warrant 1:	-												✓	
	ım Vehicula					-							✓	
·	otion of Co				•		-						✓	
	ularand	-			major app	roaches	and high	ier minor a	approach)				✓	
Warrant 2:													✓	
	r Vehicular		Both major	approach	esand	higher mi	inor appro	ach)					$\checkmark$	
Warrant 3:													✓	
	our Condit		-											
B. Peak-H	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	id highe	r minor ap	proach)					<u>√</u>	
Warrant 4:	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	25												
Warrant 5:	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	ıl System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	th directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for \	Warrants 1	А, 1В,ог	4 are sa	itisfied								$\checkmark$	
Warrant 8:	Roadway	Network	1											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	· 3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9:	Grade Cro	ossing												
A. Grade (	Crossing wi	ithin 140 fi	tand											
B. Peak-H	our Vehicu	lar Volume	2S											
	21.1.1	f El	All D'alata	D			- 1 \ \ \ / -	Man: 70				C	0/24/2021	4.02.21 5

### **Project Information**

Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	Willow Springs Road/Johnson	Time Period Analyzed	
	Creek Road		
Project Description	No Build - Right Turn Reduction		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		•

## **Geometry and Traffic**



Approach		Eastbound	k	, ,	Westboun	d	N	Iorthboun	d	S	outhboun	d	
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	0	1	0	1	1	1	0	1	0	0	1	0	
Lane Usage		LTR		L	Т	R		LTR			LTR		
Vehicle Volumes Averages (veh/h)	2	897	9	37	872	6	8	1	26	6	1	2	
Pedestrian Averages (peds/h)		0			0			0			0		
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0			0.0			0.0			0.0		
Delay (veh-hrs)		0.0			0.0		0.0				0.0		
School Crossing and Roadway	Netwo	rk											
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No				
Number of Adequate Gaps in Period	0			١	Veekend (	Counts	N			No			
Number of Minutes in Period	0			5	5-year Gro	wth Facto	or (%)		0				
Railroad Crossing													
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0				
Highest Volume Hour with Trains	Unknown				High Occupancy Buses (%)			0					
Distance to Stop Line (ft)	-			1	Fractor-Tra	iler Truck	s (%)		9	9			

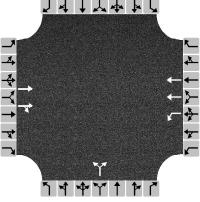
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## Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2040	74	2120	0	0	No	No	Yes	Yes	Yes	No	No	No	No
08 - 09	1716	39	1772	0	0	No	No	No	No	No	No	No	No	No
09 - 10	1631	30	1673	0	0	No	No	No	No	No	No	No	No	No
10 - 11	1726	26	1772	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1498	15	1518	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1755	40	1803	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1710	28	1743	0	0	No	No	No	No	No	No	No	No	No
14 - 15	1805	24	1834	0	0	No	No	No	No	No	No	No	No	No
15 - 16	1762	25	1792	0	0	No	No	No	No	No	No	No	No	No
16 - 17	2114	39	2163	0	0	No	No	No	No	No	No	No	No	No
17 - 18	2550	56	2613	0	0	No	No	Yes	Yes	No	No	No	No	No
18 - 19	1604	44	1668	0	0	No	No	No	Yes	No	No	No	No	No
Total	21911	440	22471	0	0	0	0	2	3	1	0	0	0	0
Warrants										· ·				
Warrant 1:	-													
	ım Vehicula													
	otion of Co						-							
56% Vehic	ularand	Interrup	tion Volun	nes (Both i	major appi	roaches	and high	ner minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	lar Volun	ne										
Four-Hou	r Vehicular	Volume (E	Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	ır												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-He	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	ıd highei	r minor ap	proach)						
Warrant 4:	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	es												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directic	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for V	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8: I	Roadway	Network	ſ											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9:	Grade Cro	ossing												
	Crossing wi		tand											
	our Vehicu													
Conviriant @ 20				<b>D</b>			1.1.4./	Version 7 (				<u> </u>	0/24/2021	1.02.45.5

	HCS7 V	Varrants Report	
Project Information			
Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2021
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	Build - Full Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0	·	
Geometry and Traffic			
	ال References	1 + Y 4 P 7	



	Eastbound	k	١	Vestboun	d	N	Iorthboun	d	Southbound			
L	Т	R	L	Т	R	L	Т	R	L	Т	R	
0	2	0	1	2	0	0	0	0	0	0	0	
	TR		L	Т			LR					
0	246	20	40	240	0	18	0	37	0	0	0	
	0			0			0			0		
	0			0			0			0		
	0.0			0.0			0.0			0.0		
	0.0			0.0			0.0			0.0		
Netwo	rk											
0			Т	wo or Mo	re Major	Routes		No				
0			V	Veekend (	Counts			No	No			
0			5	-year Gro	wth Facto	or (%)		0				
None			F	ail Traffic	(trains/da	ıy)		0				
Unknow	'n		ŀ	ligh Occu	pancy Bus	ses (%)		0				
-			Т	ractor-Tra	iler Trucks	s (%)		9				
	L 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	L       T         0       2         0       7R         0       246         0       246         0       0         0       0.0         0.0         Network         0       0         0       0         0       0	0         2         0           0         2         0           TR         7           0         246         20           0         246         20           0         0         0         0           0         0.0         0.0         0 <b>Network</b> 0         0         0           0         0         0         0           None           Unknown         -	L       T       R       L         0       2       0       1         0       TR       L       L         0       246       20       40         0       246       20       40         0       246       20       40         0       0       0       1         0.0       0.0       0       1         Network         0       0.0       7         0       0.0       5         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9         0       1       9	L       T       R       L       T         0       2       0       1       2         0       2       0       1       7         0       246       20       40       240         0       246       20       40       240         0       0       246       20       40       240         0       0       0       0       0       0         0.0       0.0       0.0       0.0       0.0         Network         0       Two or Mo       0.0         0       Two or Mo       0       5-year Gro         None       Rail Traffic       High Occu       High Occu         0       Tractor-Tra       High Occu       1       1	L         T         R         L         T         R           0         2         0         1         2         0           1         TR         L         T         R           0         246         20         40         240         0           0         246         20         40         240         0           0         0         246         0         0         0         0           0         0.0         0.0         0.0         0.0         0.0         0.0           0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Image: Large of the sector	L       T       R       L       T       R       L       T         0       2       0       1       2       0       0       0         1       TR       L       T       R       LR       LR         0       246       20       40       240       0       18       0         0       246       20       40       240       0       18       0         0       0       0       0       0       0       0       0         0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Two or More Major Routes         0       Two or More Major Routes       0       0.0         0       Two or More Major Routes       0       0.0         0       Two or More Major Routes       0       0.0         0       Two or More Major Routes       0       0.0       0.0         0       S-year Growth Factor (%)       1       2       1       2         None       Rail Traffic (trains/day)       High Occupancy Buses (%)       1       1       1       1 <th1< th="">       1       1       1       &lt;</th1<>	L       T       R       L       T       R       L       T       R       L       T       R         0       2       0       1       2       0       0       0       0         1       TR       L       T       I       0       0       0       0         0       246       20       40       240       0       18       0       37         0       246       20       40       240       0       18       0       37         0       246       20       40       240       0       18       0       37         0       246       0       0       0       0       0       0       37         0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0         Network       Veckend Counts       No         0       Image: Sign of the set of	L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       T       L       T       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       T       T	L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       C       C       C	

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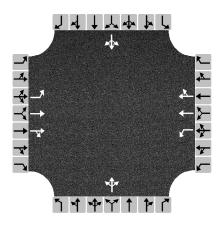
## Volume Summary

volume Si	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	620	90	710	0	0	No	Yes	No	Yes	No	No	No	No	No
08 - 09	514	55	569	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	449	68	517	0	0	No	No	No	No	No	No	No	No	No
10 - 11	501	74	575	0	0	No	No	No	No	No	No	No	No	No
11 - 12	463	43	506	0	0	No	No	No	No	No	No	No	No	No
12 - 13	503	59	562	0	0	No	No	No	No	No	No	No	No	No
13 - 14	488	59	547	0	0	No	No	No	No	No	No	No	No	No
14 - 15	528	50	578	0	0	No	No	No	Yes	No	No	No	No	No
15 - 16	637	43	680	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	643	51	694	0	0	No	No	No	Yes	No	No	No	No	No
17 - 18	740	45	785	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	487	41	528	0	0	No	No	No	No	No	No	No	No	No
Total	6573	678	7251	0	0	0	1	0	6	0	0	0	0	0
Warrants	1	<u> </u>	<u>I</u>		I			I	I		<u> </u>	<u> </u>	<u> </u>	
Warrant 1: I	-													
A. Minimu														
	otion of Co						-							
56% Vehic					major app	roaches	and high	ner minor a	approach)					
Warrant 2: I														
Four-Hou			Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I														
A. Peak-H			-					-						
B. Peak-Ho				ajor appro	achesar	id highe	r minor ap	proach)						
Warrant 4: I			e											
A. Four Ho	our Volume	esor												
5. 6.16 1.16	our Volume													
Warrant 5: S														
Gaps Sam	e Period	and												
Student Vo	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for V	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8: I	Roadway	Network	1											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	cted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade C	Crossing wi	thin 140 ft	tand											
B. Peak-Ho	our Vehicu	lar Volume	es											
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### **Project Information**

Garver	Date	8/2/2021
	Analysis Year	2021
Willow Springs Road/Johnson	Time Period Analyzed	
Creek Road		
Design - Full Volumes		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		-
	Willow Springs Road/Johnson Creek Road         Design - Full Volumes         East-West         7         Undivided	Analysis Year       Willow Springs Road/Johnson Creek Road     Time Period Analyzed       Design - Full Volumes     Time Period Analyzed       East-West     Population < 10,000

## **Geometry and Traffic**



Approach		Eastbound	b	\ \	Westboun	d	N	lorthbour	ıd	Southbound			
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	1	2	0	1	2	0	0	1	0	0	1	0	
Lane Usage	L	TR		L	TR			LTR			LTR		
Vehicle Volumes Averages (veh/h)	1	276	6	26	267	4	6	0	24	3	0	2	
Pedestrian Averages (peds/h)		0			0			0			0		
Gap Averages (gaps/h)		0			0			0			0		
Delay (s/veh)		0.0			0.0			0.0			0.0		
Delay (veh-hrs)		0.0			0.0		0.0				0.0		
School Crossing and Roadway	Netwo	rk		-									
Number of Students in Highest Hour	0			1	wo or Mo	ore Major	Routes		No				
Number of Adequate Gaps in Period	0			١	Weekend (	Counts	N			No			
Number of Minutes in Period	0			5	5-year Gro	wth Facto	or (%)		0				
Railroad Crossing													
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0				
Highest Volume Hour with Trains	Unknow	'n		H	High Occu	pancy Bus	ses (%) 0						
Distance to Stop Line (ft)	-			1	Tractor-Tra	iler Truck	s (%)		9				

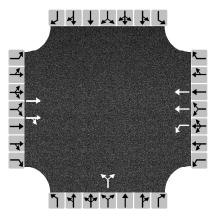
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## Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	700	59	762	0	0	No	No	Yes	Yes	No	No	No	No	No
08 - 09	545	36	593	0	0	No	No	No	No	No	No	No	No	No
09 - 10	518	29	556	0	0	No	No	No	No	No	No	No	No	No
10 - 11	548	24	585	0	0	No	No	No	No	No	No	No	No	No
11 - 12	479	15	497	0	0	No	No	No	No	No	No	No	No	No
12 - 13	560	39	604	0	0	No	No	No	No	No	No	No	No	No
13 - 14	544	27	574	0	0	No	No	No	No	No	No	No	No	No
14 - 15	577	23	603	0	0	No	No	No	No	No	No	No	No	No
15 - 16	562	19	584	0	0	No	No	No	No	No	No	No	No	No
16 - 17	675	29	711	0	0	No	No	No	No	No	No	No	No	No
17 - 18	775	40	818	0	0	No	No	No	No	No	No	No	No	No
18 - 19	513	35	561	0	0	No	No	No	No	No	No	No	No	No
Total	6996	375	7448	0	0	0	0	1	1	0	0	0	0	0
Warrants														
Warrant 1:	-													
	ım Vehicula													
·	otion of Co						-							
	ularand				major app	roaches	and high	ner minor a	approach)					
Warrant 2:	Four-Hou	r Vehicul	lar Volun	1e										
Four-Hou	r Vehicular	Volume (E	Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3:	Peak Hou	ır												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-He	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	id highe	r minor ap	proach)						
Warrant 4:	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	es												
Warrant 5:	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	th directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for V	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8: I	Roadway	Network	ſ											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
	nd Volume													
Warrant 9:			· · ·											
	Crossing wi		tand											
	our Vehicu													
Convright © 20				Decembral				Vorsion 7				Carranata di	0/24/2021	4.00.201

	HCS7	Warrants Report	
Project Information			
Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2050
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	Build - Full Volumes	·	
General	·		
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0	·	•
Geometry and Traffic			



	Eastbound	ł	١	Nestboun	d Northbound Southb					outhboun	d
L	Т	R	L	Т	R	L	Т	R	L	Т	R
0	2	0	1	2	0	0	0	0	0	0	0
	TR		L	Т			LR				
0	353	29	57	345	0	27	0	54	0	0	0
	0			0			0			0	
	0			0			0			0	
	0.0			0.0			0.0			0.0	
	0.0			0.0			0.0			0.0	
Netwo	rk										
0			1	wo or Mo	ore Major	Routes		No			
0			1	Veekend (	Counts			No	No		
0			5	-year Gro	wth Facto	or (%)		0			
None			F	Rail Traffic	(trains/da	ıy)		0			
Unknow	'n		H	ligh Occu	pancy Bus	ses (%)		0			
-			T	Tractor-Trailer Trucks (%)				9			
	L 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	L     T       0     2       0     353       0     353       0     0       0     0.0       Vetwork     0.0       0     0.0       0     0.0	0         2         0           0         2         0           TR         TR         1           0         353         29           0         0         0           0         0.0         0           0         0.0         0.0 <b>Network</b> 0         0           0         0           0         -	Image: constraint of the sector of the s	Image: Image	L         T         R         L         T         R           0         2         0         1         2         0           1         TR         L         T         R           0         353         29         57         345         0           0         353         29         57         345         0           0         0         353         29         0         0         0           0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	Image: Normal constraints of the sector (%)         Image: Normal constraint of the sector (%) <t< td=""><td>Image: Image: Image</td><td>L       T       R       L       T       R       L       T       R       L       T       R         0       2       0       1       2       0       0       0       0         1       TR       L       T       I       0       0       0       0         0       353       29       57       345       0       27       0       54         0       353       29       57       345       0       27       0       54         0       0       0       0       0       0       0       54         0       0.0       0.0       0.0       0.0       0       0       54         No       0.0       0.0       0.0       0.0       0.0       0.0         Network       Veckend Counts       No         0       Veckend Counts       No         0       S-year Growth Factor (%)       0         0       None         None       Rail Traffic (trains/day)       0       0         Unknown       Rail Traffic Trucks (%)       0       0     <td>L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       R       L         0       2       0       1       2       0       0       0       0       0       0         1       TR       L       T       R       LR       LR       LR       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0</td><td>L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       T       T       T</td></td></t<>	Image: Image	L       T       R       L       T       R       L       T       R       L       T       R         0       2       0       1       2       0       0       0       0         1       TR       L       T       I       0       0       0       0         0       353       29       57       345       0       27       0       54         0       353       29       57       345       0       27       0       54         0       0       0       0       0       0       0       54         0       0.0       0.0       0.0       0.0       0       0       54         No       0.0       0.0       0.0       0.0       0.0       0.0         Network       Veckend Counts       No         0       Veckend Counts       No         0       S-year Growth Factor (%)       0         0       None         None       Rail Traffic (trains/day)       0       0         Unknown       Rail Traffic Trucks (%)       0       0 <td>L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       R       L         0       2       0       1       2       0       0       0       0       0       0         1       TR       L       T       R       LR       LR       LR       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0     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    R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       T       T       T</td>	L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       R       L         0       2       0       1       2       0       0       0       0       0       0         1       TR       L       T       R       LR       LR       LR       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0	L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       R       L       T       T       T       T

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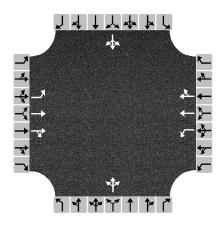
## Volume Summary

volume St	iiiiiiai y													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	895	135	1030	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	741	79	820	0	0	No	No	Yes	Yes	No	No	No	No	No
09 - 10	646	99	745	0	0	No	Yes	Yes	Yes	No	No	No	No	No
10 - 11	719	105	824	0	0	Yes	Yes	Yes	Yes	Yes	No	No	No	No
11 - 12	665	61	726	0	0	No	No	Yes	Yes	No	No	No	No	No
12 - 13	722	84	806	0	0	No	Yes	Yes	Yes	No	No	No	No	No
13 - 14	700	84	784	0	0	No	Yes	Yes	Yes	No	No	No	No	No
14 - 15	759	72	831	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	909	62	971	0	0	No	No	Yes	Yes	Yes	No	No	No	No
16 - 17	919	72	991	0	0	No	No	Yes	Yes	Yes	No	No	No	No
17 - 18	1065	65	1130	0	0	No	No	Yes	Yes	Yes	No	No	No	No
18 - 19	694	58	752	0	0	No	No	Yes	Yes	No	No	No	No	No
Total	9434	976	10410	0	0	2	5	12	12	5	0	0	0	0
Warrants														-
			1											
Warrant 1: E	-												✓	
A. Minimu						-								
B. Interrup					•		-						✓	
56% Vehic		-			major appi	oaches	and high	ier minor a	approach)					
Warrant 2: F													✓	
Four-Hour			oth major	approach	esand	higher mi	nor appro	ach)					✓	
Warrant 3: F														
A. Peak-Ho			-											
B. Peak-Ho				ajor appro	achesar	id highei	r minor ap	proach)						
Warrant 4: F			2											
A. Four Ho														
B. One-Ho		-												
Warrant 5: S														
Gaps Same		and												
Student Vo														
Nearest Tra		-												
Warrant 6: C		-	-											
Degree of			inant direc	tion or bo	th directio	ons)								
Warrant 7: C														
A. Adequa														
B. Reporte		•			-	onth peric	od)and							
C. 56% Vol				4 are sa	tisfied								$\checkmark$	
Warrant 8: F	-													
A. Weekda	-			d projec	ted warra	nts 1, 2, or	3)or							
B. Weeken		-	s total)											
Warrant 9: (		-												
A. Grade C	rossing wi	thin 140 ft	and											
B. Peak-Ho			S All Rights				al Warrants						9/24/2021	

### **Project Information**

Garver	Date	8/2/2021
	Analysis Year	2050
Willow Springs Road/Johnson	Time Period Analyzed	
Creek Road		
Build - Full Volumes		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	Willow Springs Road/Johnson Creek Road Build - Full Volumes East-West 7 Undivided 60	Image: Second

## **Geometry and Traffic**



Approach	Eastbound			,	Westboun	d	N	Iorthboun	d	d Southbound		
Movement	L T R			L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	1	2	0	1	2	0	0	1	0	0	1	0
Lane Usage	L	TR		L	TR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	2	396	9	37	384	6	8	1	35	6	1	2
Pedestrian Averages (peds/h)		0			0			0		0		
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0			0.0			0.0		0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No			
Number of Adequate Gaps in Period	0			١	Weekend (	Counts			No			
Number of Minutes in Period	0			Ļ	5-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0			
Highest Volume Hour with Trains	Unknown			H	High Occupancy Buses (%)			0				
Distance to Stop Line (ft)	-			1	Tractor-Tra	iler Truck	s (%)		9			

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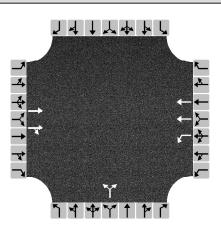
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## Volume Summary

volume Si	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	1005	90	1101	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	781	50	849	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	743	40	795	0	0	No	No	No	No	No	No	No	No	No
10 - 11	787	35	842	0	0	No	No	No	No	No	No	No	No	No
11 - 12	687	22	714	0	0	No	No	No	No	No	No	No	No	No
12 - 13	802	56	866	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	778	37	820	0	0	No	No	No	No	No	No	No	No	No
14 - 15	828	33	866	0	0	No	No	No	No	No	No	No	No	No
15 - 16	806	28	839	0	0	No	No	No	No	No	No	No	No	No
	16 - 17 966 41 1017 0 0 No													
17 - 18	1120	58	1184	0	0	No	No	Yes	Yes	No	No	No	No	No
18 - 19														
Total														
Warrants		_												
Warrant 1: I	-													
	ım Vehicula													
B. Interrup	otion of Co	ntinuous T	raffic (Bot	h major ap	proaches	and hi	gher mino	r approacl	n)or					
56% Vehic	ularand	Interrup	tion Volun	nes (Both r	major appi	roaches	and high	ner minor a	approach)					
Warrant 2: Four-Hour Vehicular Volume														
Four-Hour Vehicular Volume (Both major approachesand higher minor approach)														
Warrant 3: I	Peak Hou	ır												
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-Ho	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	ıd highei	r minor ap	proach)						
Warrant 4: I	Pedestria	n Volum	e											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: S	School Cr	ossing												
Gaps Sam	e Period	and												
Student Ve	olumes													
Nearest Tr	affic Contr	ol Signal (	optional)											
Warrant 6: (	Coordina	ted Signa	ıl System											
Degree of	Platooning	g (Predom	inant direo	tion or bo	th directio	ons)								
Warrant 7: (	Crash Exp	oerience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	nforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	d)and	-						
C. 56% Volumes for Warrants 1A, 1B,or 4 are satisfied														
Warrant 8: I	Roadway	Network	1											
A. Weekda	ay Volume	(Peak hou	r totalar	nd projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade C	Crossing wi	thin 140 ft	and											
B. Peak-Ho	our Vehicu	lar Volume	2S											
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#### **HCS7 Warrants Report Project Information** Garver Date 8/2/2021 Analyst Analysis Year Agency 2050 Jurisdiction State Park Road Time Period Analyzed **Project Description** Build - Right Turn Reduction General Major Street Direction East-West Population < 10,000 Yes 7 Starting Time Interval Coordinated Signal System No 0 Undivided Median Type Crashes (crashes/year) Major Street Speed (mi/h) 60 Adequate Trials of Crash Exp. Alt. No 0 Nearest Signal (ft)

### **Geometry and Traffic**



Approach	Eastbound Westbou			Nestboun	d	N	lorthbour	d	Southbound			
Movement	L	L T R L T			R	L	Т	R	L	Т	R	
Number of Lanes, N	0 2 0 1			1	2	0	0	0	0	0	0	0
Lane Usage		TR		L	Т			LR				
Vehicle Volumes Averages (veh/h)	0	353	29	57	345	0	27	0	33	0	0	0
Pedestrian Averages (peds/h)		0			0			0			0	
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0			0.0			0.0		0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			1	wo or Mo	re Major	Routes		No	No		
Number of Adequate Gaps in Period	0			1	Veekend (	Counts			No	No		
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0			
Highest Volume Hour with Trains	Unknown			H	High Occupancy Buses (%)				0			
Distance to Stop Line (ft)	-			T	ractor-Tra	iler Truck	rs (%) 9					

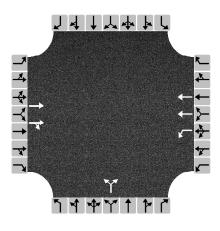
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## Volume Summary

volume St	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	895	102	997	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
08 - 09	741	61	802	0	0	No	No	Yes	Yes	No	No	No	No	No
09 - 10	646	73	719	0	0	No	No	Yes	Yes	No	No	No	No	No
10 - 11	719	78	797	0	0	No	No	Yes	Yes	No	No	No	No	No
11 - 12	665	45	710	0	0	No	No	No	Yes	No	No	No	No	No
12 - 13	722	62	784	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	700	62	762	0	0	No	No	Yes	Yes	No	No	No	No	No
14 - 15	759	53	812	0	0	No	No	Yes	Yes	No	No	No	No	No
15 - 16	909	46	955	0	0	No	No	No	Yes	No	No	No	No	No
16 - 17	16 - 17 919 53 972 0 0 No No Yes Yes No No No No No													
17 - 18	1065	49	1114	0	0	No	No	No	Yes	No	No	No	No	No
18 - 19	694	43	737	0	0	No	No	No	Yes	No	No	No	No	No
Total         9434         727         10161         0         0         0         1         8         12         1         0         0         0														
Warrants														
Warrant 1: I	Fight-Hou	ur Vehicu	ılar Volu										✓	
A. Minimu	-				choc and	d bighor	minoran	aroach) a	\r				V	
						-							√	
B. Interrup					•		-						<b>v</b>	
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)														
Warrant 2: Four-Hour Vehicular Volume         Four-Hour Vehicular Volume (Both major approachesand higher minor approach)														
Warrant 3: I			both major	арргоасп										
			r dalau	and min	or volumo	and to		o) or						
A. Peak-Ho			-											
B. Peak-Ho Warrant 4: I				ajor appro	achesan	id nighe	тппог ар	proach)						
A. Four Ho			e											
B One-Ho														
D. Offer Ho		.5												
Warrant 5: 9														
Gaps Sam		and												
Nearest Tr		-												
Warrant 6: ( Degree of			-		عاد ما : مع ام									
			inant direc	tion or bo	oth directic	ons)								
Warrant 7: (				unco and a	nfarrama	at failed	and							
A. Adequa														
B. Reporte						onth peric	od)and	-						
C. 56% Vo				4 are sa	ustied								$\checkmark$	
Warrant 8: I	-			d meter	tod were	otc 1 2	2) 07							
A. Weekda	-			iu projec	.teu warrai	nts 1, 2, 0r	3)0r							
B. Weeken			s total)											
			h a											
	-													
A. Grade C B. Peak-Ho	Crossing wi	thin 140 fi lar Volume	25	Reserved		ICSTM Sign	al Warrants	: Version 70	2.5			Generated	• 9/24/2021	4:08

HCS7 Warrants Report											
Project Information											
Analyst	Garver	Date	8/2/2021								
Agency		Analysis Year	2050 with Development								
Jurisdiction	State Park Road	Time Period Analyzed									
Project Description	Build - Full Volumes										
General											
Major Street Direction	East-West	Population < 10,000	Yes								
Starting Time Interval	7	Coordinated Signal System	No								
Median Type	Undivided	Crashes (crashes/year)	0								
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No								
Nearest Signal (ft)	0		<u>.</u>								
Geometry and Traffic											



Approach	Eastbound			\ \	Nestboun	d	Northbound			Southbound		ıd
Movement	L	Т	R	L	Т	R	L	T	R	L	Т	R
Number of Lanes, N	0 2 0 1			1	2	0	0	0	0	0	0	0
Lane Usage		TR		L	Т			LR				
Vehicle Volumes Averages (veh/h)	0	819	76	93	804	0	71	0	88	0	0	0
Pedestrian Averages (peds/h)		0			0			0		0		
Gap Averages (gaps/h)         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0												
Delay (s/veh) 0.0 0.0 0.0 0.0												
Delay (veh-hrs)		0.0			0.0			0.0			0.0	
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			г	wo or Mo	re Major	Routes		No			
Number of Adequate Gaps in Period	0			١	Veekend (	Counts			No			
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ıy)		0			
Highest Volume Hour with Trains Unknown				H	High Occupancy Buses (%)					0		
Distance to Stop Line (ft)	-			1	ractor-Tra	iler Trucks	s (%)		9			
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State Park\_2050 w Dev-Design.xsw

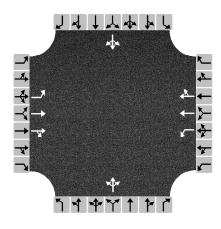
## Volume Summary

volume S	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 ( 70% )	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2025	50	2075	0	0	No	No	No	Yes	No	No	No	No	No
08 - 09	1721	163	1884	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
09 - 10	1480	205	1685	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
10 - 11	1646	219	1865	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
11 - 12	1520	128	1648	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
12 - 13	1650	175	1825	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
13 - 14	1606	175	1781	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
14 - 15	1729	149	1878	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	2052	128	2180	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	16 - 17 2073 149 2222 0 0 Yes Yes Yes Yes Yes No Yes No No													
17 - 18	2470	255	2725	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
18 - 19	1561	121	1682	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
Total	21533	1917	23450	0	0	11	11	11	12	11	0	11	0	0
Iotal         21533         1917         23450         0         0         11         11         11         12         11         0         11         0         0           Warrants         Image: State Sta														
	<b></b>	. 1/. /.*.	1 1 / - 1											
Warrant 1: I	-												✓	
	m Vehicula					-							✓	
·	otion of Co						-						✓	
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)											<b>√</b>			
Warrant 2: Four-Hour Vehicular Volume														
	r Vehicular		oth major	approach	esand	higher mi	inor appro	ach)					✓	
Warrant 3:													✓	
	our Condit		-											
	our Vehicul		-	ajor appro	achesar	id highe	r minor ap	proach)					✓	
Warrant 4:			2											
A. Four Ho	our Volume	esor												
B. One-Ho	our Volume	S												
Warrant 5: :	School Cr	ossing												
Gaps Sam	e Period	and												
Student V														
	affic Contr	<u> </u>	•											
Warrant 6:			-											
-	Platooning	-	inant direc	tion or bo	oth directio	ons)								
Warrant 7:														
	te trials of													
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
	lumes for \			4 are sa	tisfied								$\checkmark$	
Warrant 8: I	-													
A. Weekda	ay Volume	(Peak hou	r totalar	nd projec	cted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade (	Crossing wi	thin 140 ft	and											
B. Peak-He	our Vehicul	ar Volume	s											
anuriaht @ 20	21 1 100 10			Decembra	1		- 1 1 1 / + -	Manalan 70	<u></u>			Canadada	0/24/2021	1.10.10

### **Project Information**

•			
Analyst	Garver	Date	8/2/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	Willow Springs Road/Johnson	Time Period Analyzed	
	Creek Road		
Project Description	Build - Full Volumes		
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0	- ·	•

## **Geometry and Traffic**



Approach	Eastbound				Westboun	ound Nor			d	Southbound		
Movement	L T R			L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	1	1 2 0			2	0	0	1	0	0	1	0
Lane Usage	L	TR		L	TR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	2	897	9	37	872	6	8	1	35	6	1	2
Pedestrian Averages (peds/h)		0			0			0		0		
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0			0.0			0.0		0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			1	Гwo or Mc	ore Major	Routes		No			
Number of Adequate Gaps in Period	0			١	Neekend (	Counts			No			
Number of Minutes in Period	0			Ļ	5-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0			
Highest Volume Hour with Trains	Unknown			ł	High Occu	pancy Bu	ses (%) 0		0			
Distance to Stop Line (ft)	-			1	Fractor-Tra	iler Truck	s (%)		9			

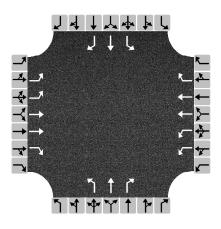
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HCSTM Signal Warrants Version 7.9.5 WillowJohnson\_2050 w Dev-Design.xsw Generated: 9/24/2021 4:11:22 PM

### Volume Summary

volume 5	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2040	90	2136	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
08 - 09	1716	50	1784	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	1631	40	1683	0	0	No	No	No	No	No	No	No	No	No
10 - 11	1726	35	1781	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1498	22	1525	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1755	56	1819	0	0	No	No	Yes	Yes	No	No	No	No	No
13 - 14	1710	37	1752	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1805	33	1843	0	0	No	No	No	No	No	No	No	No	No
15 - 16	1762	28	1795	0	0	No	No	No	No	No	No	No	No	No
	16 - 17         2114         41         2165         0         0         No         No													
17 - 18	2550	58	2614	0	0	No	No	Yes	Yes	No	No	No	No	No
					-									
Total	18 - 19         1604         51         1675         0         0         No         No         No         Yes         No         No													
	21911	541	22512	0	0	0	<u> </u>	5	5	<u> </u>	0	<u> </u>	0	0
Warrants														
Warrant 1:	Eight-Hou	ur Vehicu	ılar Voluı	ne										
A. Minimu	ım Vehicula	ar Volumes	s (Both ma	jor approa	ichesand	d higher	minor app	proach)o	or					
B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or														
56% Vehic	ularand	Interrup	tion Volun	nes (Both i	major appi	roaches	and high	ner minor a	approach)					
Warrant 2: Four-Hour Vehicular Volume														
Four-Hour Vehicular Volume (Both major approachesand higher minor approach)														
Warrant 3: Peak Hour														
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or						
B. Peak-H	our Vehicu	lar Volume	es (Both m	ajor appro	achesar	nd highei	r minor ap	proach)					$\checkmark$	
Warrant 4:	Pedestria	n Volum	e											
A. Four He	our Volume	esor												
B. One-Ho	our Volume	2S												
Warrant 5:	School Cr	ossing												
Gaps Sam	e Period	and												
Student V	olumes													
Nearest T	affic Contr	ol Signal (	optional)											
Warrant 6:	Coordina	ted Signa	al System											
Degree of	Platooning	g (Predom	inant dired	tion or bo	th directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	nforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	d)and	-						
C. 56% Vo	lumes for V	Warrants 1	А, 1В,ог	4 are sa	tisfied									
Warrant 8:	Roadway	Network	(											
A. Weekd	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
	nd Volume													
Warrant 9:		-												
	Crossing wi	-	tand											
	our Vehicu													
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HCS7 Warrants Report											
Project Information											
Analyst	Garver	Date	8/2/2021								
Agency		Analysis Year	2050 with Development								
Jurisdiction New Intersection Time Period Analyzed											
Project Description	Build - Full Volumes										
General	- -										
Major Street Direction	East-West	Population < 10,000	Yes								
Starting Time Interval	7	Coordinated Signal System	No								
Median Type	Undivided	Crashes (crashes/year)	0								
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No								
Nearest Signal (ft) 0											
Geometry and Traffic											



Approach	Eastbound L T R				Westboun	d	Northbound			Southbound		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	2	2	1	2	2	1	1	1	1	1	1	1
Lane Usage	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Vehicle Volumes Averages (veh/h)	179	424	190	246	419	212	183	41	242	211	40	173
Pedestrian Averages (peds/h)		0			0			0			0	
Gap Averages (gaps/h)		0			0			0		0		
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0			0.0		0.0			0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			1	wo or Mc	ore Major	Routes		No			
Number of Adequate Gaps in Period	0			١	Weekend (	Counts			No	No		
Number of Minutes in Period	0			5	5-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ay)		0			
Highest Volume Hour with Trains	Unknow	'n		H	High Occupancy Buses (%)				0			
Distance to Stop Line (ft)	-			1	Tractor-Trailer Trucks (%)				9			

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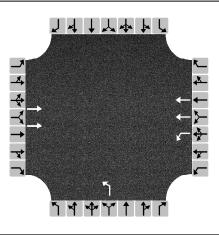
## Volume Summary

volume S	ummary														
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)	
07 - 08	1790	820	2920	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
08 - 09	1610	431	2470	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
09 - 10	1373	538	2446	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
10 - 11	1533	577	2684	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
11 - 12	1421	336	2092	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
12 - 13	1539	461	2459	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
13 - 14	1488	461	2408	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
14 - 15	1622	394	2408	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
15 - 16	1898	337	2570	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
16 - 17	1913	395	2701	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
17 - 18	2440	570	3555	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
18 - 19	1449	319	2084	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
Total	20076	5639	30797	0	0	12	12	12	12	12	0	12	0	0	
Warrants															
Warrant 1:	-												✓		
A. Minimum Vehicular Volumes (Both major approachesand higher minor approach)or													✓		
B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or													✓		
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)													✓		
Warrant 2:													✓		
	r Vehicular		Both major	approach	esand	higher mi	inor appro	ach)					<ul> <li>✓</li> </ul>		
Warrant 3:													✓		
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or							
B. Peak-He	our Vehicul	lar Volume	es (Both m	ajor appro	achesar	nd highe	r minor ap	proach)					<u>√</u>		
Warrant 4:	Pedestria	n Volum	e												
A. Four Ho	our Volume	esor													
B. One-Ho	our Volume	S													
Warrant 5: S	School Cr	ossing													
Gaps Sam	e Period	and													
Student V	olumes														
Nearest Tr	affic Contr	ol Signal (	optional)												
Warrant 6:			-												
Degree of	Platooning	g (Predom	inant direo	tion or bo	oth directio	ons)									
Warrant 7:	Crash Exp	perience													
A. Adequate trials of alternatives, observance and enforcement failedand															
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth perio	od)and								
C. 56% Vo	lumes for \	Warrants 1	А, 1В,ог	4 are sa	tisfied								$\checkmark$		
Warrant 8: I	Roadway	Network	[												
A. Weekda	ay Volume	(Peak hou	r totalar	nd projec	ted warra	nts 1, 2, or	3)or								
B. Weeker	nd Volume	(Five hour	s total)												
Warrant 9: (	Grade Cro	ossing													
A. Grade (	Crossing wi	thin 140 ft	and												
B. Peak-He	our Vehicul	lar Volume	es												
	21.1.1			Deserved			- 1 3 4 /	14	2.5			C	0/24/2021	4 4 2 2 2 1	

## **Project Information**

Analyst	Garver	Date	8/27/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	State Park Road	Time Period Analyzed	
Project Description	Build - Right Turn Reduct	tion	
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

### **Geometry and Traffic**



Approach	Eastbound L T R			١	Westboun	d	Northbound			Southbound		
Movement	L	Т	R	L	Т	R	L	T	R	L	Т	R
Number of Lanes, N	0	2	0	1	2	0	1	0	0	0	0	0
Lane Usage		Т		L	Т		L					
Vehicle Volumes Averages (veh/h)	0	819	0	93	804	0	71	0	0	0 0		0
Pedestrian Averages (peds/h)		0			0			0				
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0		0.0			0.0			0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			т	wo or Mo	re Major	Routes		No			
Number of Adequate Gaps in Period	0			V	Veekend (	Counts			No	No		
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	ail Traffic	(trains/da	ıy)		0			
Highest Volume Hour with Trains	Unknow	n		High Occupancy Bus			Buses (%) 0		0			
Distance to Stop Line (ft)	-			Tractor-Trailer Trucks (%)					9			

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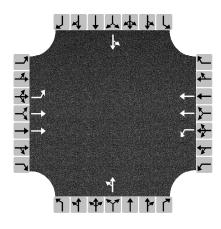
## Volume Summary

volume S	ummary															
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)		
07 - 08	1985	20	2005	0	0	No	No	No	No	No	No	No	No	No		
08 - 09	1681	68	1749	0	0	No	No	Yes	Yes	Yes	No	No	No	No		
09 - 10	1414	91	1505	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No		
10 - 11	1576	97	1673	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No		
11 - 12	1461	57	1518	0	0	No	No	Yes	Yes	No	No	No	No	No		
12 - 13	1584	78	1662	0	0	No	No	Yes	Yes	Yes	No	Yes	No	No		
13 - 14	1533	78	1611	0	0	No	No	Yes	Yes	Yes	No	Yes	No	No		
14 - 15	1666	66	1732	0	0	No	No	Yes	Yes	Yes	No	No	No	No		
15 - 16	1933	60	1993	0	0	No	No	Yes	Yes	No	No	No	No	No		
16 - 17	1949	70	2019	0	0	No	No	Yes	Yes	Yes	No	No	No	No		
17 - 18	2350	115	2465	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No		
18 - 19	1478	57	1535	0	0	No	No	Yes	Yes	No	No	No	No	No		
Total	20610	857	21467	0	0	1	3	11	11	8	0	5	0	0		
Warrants						1										
Warrant 1:	-												✓			
A. Minimum Vehicular Volumes (Both major approachesand higher minor approach)or																
B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or													√			
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)																
Warrant 2:				-									<ul> <li>✓</li> </ul>			
	r Vehicular		Both major	approach	esand	higher mi	inor appro	ach)					√			
Warrant 3:													✓			
	our Condit		-													
	our Vehicu			ajor appro	achesar	nd highe	r minor ap	proach)					✓			
Warrant 4:			e													
A. Four He	our Volume	esor														
B. One-Ho	our Volume	es														
Warrant 5:	School Cr	ossing														
Gaps Sam	e Period	and														
Student V	olumes															
Nearest T	affic Contr	ol Signal (	optional)													
Warrant 6:	Coordina	ted Signa	al System													
Degree of	Platooning	g (Predom	inant direo	ction or bo	oth directio	ons)										
Warrant 7:	Crash Exp	perience														
A. Adequate trials of alternatives, observance and enforcement failedand																
B. Reporte	ed crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth perio	od)and	-								
C. 56% Vo	lumes for \	Warrants 1	А, 1В,ог	4 are sa	itisfied								$\checkmark$			
Warrant 8:	Roadway	Network	r													
A. Weekd	ay Volume	(Peak hou	r totalar	nd projec	cted warra	nts 1, 2, or	· 3)or									
B. Weeker	nd Volume	(Five hour	s total)													
Warrant 9:	Grade Cro	ossing														
A. Grade (	Crossing wi	ithin 140 fi	tand													
B. Peak-H	our Vehicu	lar Volume	25													
	24 11	C EL C L		<b>D</b>		COMPACT	1.1.4.4	N/ · 7/				<u> </u>	0/04/0004	1 10 10 0		

### **Project Information**

Garver	Date	8/27/2021
	Analysis Year	2050 with Development
Willow Springs Road/Johnson	Time Period Analyzed	
Creek Road		
Build - Right Turn Reduction		
East-West	Population < 10,000	Yes
7	Coordinated Signal System	No
Undivided	Crashes (crashes/year)	0
60	Adequate Trials of Crash Exp. Alt.	No
0		
	Willow Springs Road/Johnson Creek Road Build - Right Turn Reduction East-West 7 Undivided	Analysis Year       Willow Springs Road/Johnson Creek Road     Time Period Analyzed       Build - Right Turn Reduction     Time Period Analyzed       East-West     Population < 10,000

## **Geometry and Traffic**



Approach	Eastbound L T R			\ \	Westboun	d	N	Iorthboun	d	Southbound			
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R	
Number of Lanes, N	1	2	0	1	2	0	0	1	0	0	1	0	
Lane Usage	L	Т		L	Т			LT			LT		
Vehicle Volumes Averages (veh/h)	2	897	0	37	872	0	8	1	0	6	1	0	
Pedestrian Averages (peds/h)		0			0			0		0			
Gap Averages (gaps/h)		0			0			0					
Delay (s/veh)		0.0			0.0			0.0			0.0		
Delay (veh-hrs)		0.0			0.0		0.0				0.0		
School Crossing and Roadway	Netwo	rk											
Number of Students in Highest Hour	0			T	wo or Mo	re Major	Routes		No	No			
Number of Adequate Gaps in Period	0			1	Weekend (	Counts			No				
Number of Minutes in Period	0			5	5-year Gro	wth Facto	or (%)		0				
Railroad Crossing													
Grade Crossing Approach	None			F	Rail Traffic	(trains/da	ıy)		0				
Highest Volume Hour with Trains	Unknown				High Occupancy Buses (%)				0				
Distance to Stop Line (ft)	-				Tractor-Trailer Trucks (%)				9				

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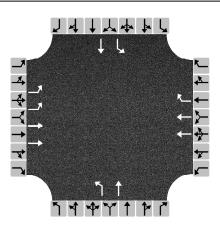
## Volume Summary

volume Si	ummary													
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	2020	10	2034	0	0	No	No	No	No	No	No	No	No	No
08 - 09	1710	13	1728	0	0	No	No	No	No	No	No	No	No	No
09 - 10	1620	9	1637	0	0	No	No	No	No	No	No	No	No	No
10 - 11	1715	15	1737	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1488	5	1497	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1744	12	1762	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1699	8	1711	0	0	No	No	No	No	No	No	No	No	No
14 - 15	1794	7	1805	0	0	No	No	No	No	No	No	No	No	No
15 - 16	1746	9	1759	0	0	No	No	No	No	No	No	No	No	No
16 - 17	2095	13	2115	0	0	No	No	No	No	No	No	No	No	No
17 - 18	2502	20	2526	0	0	No	No	No	No	No	No	No	No	No
18 - 19	1590	16	1621	0	0	No	No	No	No	No	No	No	No	No
Total	21723	137	21932	0	0	0	0	0	0	0	0	0	0	0
Warrants	1	1	1		I			I			<u> </u>	<u> </u>	<u> </u>	
	<b>-</b> :- <i>i</i>		1											
Warrant 1: I	-													
A. Minimum Vehicular Volumes (Both major approachesand higher minor approach)or														
B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or 56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)														
					major appi	roachesa	and high	ner minor a	approach)					
Warrant 2:								•						
	r Vehicular		Both major	approach	esand	higher mi	nor appro	ach)						
Warrant 3: I														
	our Condit													
	our Vehicu		-	ajor appro	achesar	ıd higheı	r minor ap	proach)						
Warrant 4: I			e											
A. Four Ho	our Volume	esor												
5. 6.16 1.16	our Volume													
Warrant 5: S														
Gaps Sam	e Period	and												
Student Vo														
	affic Contr													
Warrant 6:		-	-											
Degree of	Platooning	g (Predom	inant dired	tion or bo	oth directio	ons)								
Warrant 7:	Crash Exp	perience												
A. Adequa	te trials of	alternativ	es, observa	ance and e	enforceme	nt failed	and							
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth peric	od)and	-						
C. 56% Vo	lumes for <b>\</b>	Warrants 1	А, 1В,ог	4 are sa	itisfied									
Warrant 8: I	Roadway	Network	(											
A. Weekda	ay Volume	(Peak hou	r totalar	id projec	ted warra	nts 1, 2, or	3)or							
B. Weeker	nd Volume	(Five hour	s total)											
Warrant 9: (	Grade Cro	ossing												
A. Grade C	Crossing wi	ithin 140 fi	tand											
B. Peak-Ho	our Vehicu	lar Volume	es											
om might @ 20	21.1.1	v of Florida		Deeensed			- 1 \ \ /	Varcian 7 (				Canada	0/24/2021	4.11.50

## **Project Information**

Analyst	Garver	Date	8/26/2021
Agency		Analysis Year	2050 with Development
Jurisdiction	New Intersection	Time Period Analyzed	
Project Description	Build - Right Turn Reducti	on	
General			
Major Street Direction	East-West	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	60	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	0		

### Geometry and Traffic



Approach	Eastbound L T R			١	Vestboun	d	Northbound			Southbound		
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Number of Lanes, N	2	2	0	0	2	1	1	1	0	1	1	0
Lane Usage	L	Т			Т	R	L	Т		L	Т	
Vehicle Volumes Averages (veh/h)	179	424	0	0	246	419	183	41	0	211	40	0
Pedestrian Averages (peds/h)		0			0			0			0	
Gap Averages (gaps/h)		0			0			0			0	
Delay (s/veh)		0.0			0.0			0.0			0.0	
Delay (veh-hrs)		0.0		0.0			0.0			0.0		
School Crossing and Roadway	Netwo	rk										
Number of Students in Highest Hour	0			Т	wo or Mo	re Major	Routes		No			
Number of Adequate Gaps in Period	0			V	Veekend (	Counts			No	No		
Number of Minutes in Period	0			5	-year Gro	wth Facto	or (%)		0			
Railroad Crossing												
Grade Crossing Approach	None			F	ail Traffic	(trains/da	ıy)		0			
Highest Volume Hour with Trains	Unknow	n		High Occupancy Bus			Buses (%) 0		0			
Distance to Stop Line (ft)	-			Т	Tractor-Trailer Trucks (%)				9			

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## Volume Summary

volume S	ummary														
Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)	
07 - 08	1365	380	1935	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
08 - 09	1244	255	1701	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
09 - 10	1046	316	1621	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
10 - 11	1167	339	1784	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
11 - 12	1079	198	1439	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
12 - 13	1170	271	1663	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
13 - 14	1134	271	1627	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
14 - 15	1231	232	1653	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
15 - 16	1435	197	1799	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
16 - 17	1442	231	1868	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
17 - 18	1825	345	2435	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
18 - 19	1097	186	1441	0	0	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	
Total	15235	3221	20966	0	0	12	12	12	12	12	0	12	0	0	
Warrants															
Warrant 1:	-												✓		
A. Minimum Vehicular Volumes (Both major approachesand higher minor approach)or													✓		
B. Interruption of Continuous Traffic (Both major approachesand higher minor approach)or													✓		
56% Vehicularand Interruption Volumes (Both major approachesand higher minor approach)													<b>√</b>		
Warrant 2:	Four-Hou	r Vehicul	ar Volun	1e									✓		
Four-Hou	r Vehicular	Volume (B	oth major	approach	esand	higher mi	nor appro	ach)							
Warrant 3:	Peak Hou	r											✓		
A. Peak-H	our Condit	ions (Minc	or delay	and min	or volume	and to	otal volum	e)or							
B. Peak-He	our Vehicu	ar Volume	s (Both ma	ajor appro	achesar	id highe	r minor ap	proach)					<u>√</u>		
Warrant 4:	Pedestria	n Volum	?												
A. Four Ho	our Volume	esor													
B. One-Ho	our Volume	S													
Warrant 5:	School Cr	ossing													
Gaps Sam	e Period	and													
Student V	olumes														
Nearest Tr	affic Contr	ol Signal (	optional)												
Warrant 6:	Coordina	ted Signa	l System												
Degree of	Platooning	g (Predom	inant direc	tion or bo	oth directic	ons)									
Warrant 7:	Crash Exp	oerience													
A. Adequa	te trials of	alternative	es, observa	ance and e	enforceme	nt failed	and								
B. Reporte	d crashes	susceptible	e to correc	tion by sig	gnal (12-m	onth perio	od)and	-							
C. 56% Vo	lumes for V	Narrants 1	A, 1B,or	4 are sa	tisfied								$\checkmark$		
Warrant 8:	Roadway	Network													
A. Weekda	ay Volume	(Peak hou	r totalar	nd projec	ted warra	nts 1, 2, or	· 3)or								
B. Weeker	nd Volume	(Five hour	s total)												
Warrant 9:	Grade Cro	ossing													
A. Grade (	Crossing wi	thin 140 ft	and												
B. Peak-He	our Vehicu	ar Volume	S												
anunialat @ 20	21.1.1		All Dislate	Deserved			-1.147	11				<u></u>	0/24/2021	4.12.27.5	

# **Appendix E – Build Analysis Results**

Time	Analysis	MOE	EB	Novem	ent	WB	Moven	nent	NB	Novem	ent	SBMovement			Overall
Period	Means	MOE	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
					US-70	at Stat	e Park	Road							
	нсм	LOS		n/a¹	n/a1	А	n/a¹			А					А
АМ		Delay		n/a¹	n/a1	8.2	n/a¹			8.5					1.2
AW	Sim Traffic	LOS		А	А	А	А		А		А				А
	Simmanic	Delay		1.5	1.0	2.0	0.6		8.0		2.2				1.4
	нсм	LOS		n/a¹	n/a¹	А	n/a¹			А					А
РМ	HC WI	Delay		n/a¹	n/a <sup>1</sup>	8.3	n/a¹			8.0					1.2
PIVI	Sim Traffic	LOS		А	А	А	А		А		А				А
	Simmanic	Delay		1.5	1.2	1.9	0.6		7.6		1.9			1.2	
			US-70	at Will	ow Spi	rings R	oad/Jo	hnson	Creek	Road					
	нсм	LOS	А	n/a¹		А	n/a¹			В			В		А
АМ	HC WI	Delay	8.0	n/a¹		8.5	n/a¹			10.9			12.2		1.0
Alvi	Sim Traffic	LOS	n/a¹	А	А	А	А	А	А	А	А	n/a¹	А	А	А
	Simmanic	Delay	n/a¹	0.7	0.0	3.0	1.2	0.9	6.6	5.4	3.9	n/a1	6.6	2.3	1.2
	нсм	LOS	А	n/a¹		А	n/a¹			В			В		А
РМ	new	Delay	8.4	n/a¹		8.2	n/a¹		12.1				12.8		1.0
FIVI	Sim Traffic	LOS	А	А	А	А	А	А	А	С	А	А	В	А	А
	Simmanic	Delay	0.0	0.8	0.1	2.5	1.7	1.5	8.0	20.5	3.7	4.4	11.8	3.1	1.6

### Table E-1 - 2021 Build Analysis Results

<sup>1</sup> free movement

### Table E-2 - 2050 Build Analysis Results

Time Analysis EB Movement WB Movement NB Movement SB Movement															
Time Analysis Period Means	MOE			Right										Overall	
					US-70	at Stat	e Park	Road							
	НСМ	LOS		n/a¹	n/a1	А	n/a¹			А					Α
АМ		Delay	1	n/a¹	n/a1	8.8	n/a¹			9.2					1.3
	SimTraffic	LOS		А	А	А	А		В		А				А
		Delay		2.0	1.3	2.0	0.7		11.5		2.4				1.9
PM	НСМ	LOS		n/a¹	n/a <sup>1</sup>	А	n/a¹			А					А
		Delay		n/a¹	n/a1	8.9	n/a¹			8.5					1.3
	SimTraffic	LOS		A	А	А	А		В		А				А
		Delay	1	1.4	1.2	2.9	0.7		12.7		2.0				1.6
US-70 at Willow Springs Road/Johnson Creek Road															
	нсм	LOS	А	n/a¹		А	n/a1		В			В			А
AM		Delay	8.4	n/a¹		9.3	n/a¹			13.8			14.5		1.4
	SimTraffic	LOS	А	А	А	А	А	А	В	В	А	В	В	А	А
		Delay	0.5	1.1	0.1	3.0	1.5	1.2	10.8	10.5	5.3	11.9	11.6	2.7	1.7
РМ	НСМ	LOS	А	n/a¹		А	n/a¹		С		С		А		
		Delay	9.1	n/a¹		8.7	n/a¹			15.8			15.8		1.3
	SimTraffic	LOS	А	А	А	А	А	А	А	В	А	В	В	А	А
		Delay	0.8	1.0	0.0	3.1	2.3	1.6	9.7	13.3	4.0	10.3	10.3	3.9	2.0

<sup>1</sup> free movement

Time	Analysis Means	MOE	EBMovement			WBMovement			NBMovement			SBMovement			Quarall
Period			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Overall
			US-70	at Chi	ckasaw	/ Point	e Road	l (New	Interse	ction)					
	НСМ	LOS	С		С		С			С			С		
АМ		Delay		26.2			24.5			29.1			24.1		26.2
	SimTraffic	LOS				А	А	Α		А	А	А	А		А
		Delay				4.6	0.2	2.1		0.2	0.3	1.7	0.1		1.3
	нсм	LOS	С			С			С			С			С
РМ		Delay	28.9				25.9			28.0		25.9			27.1
	SimTraffic	LOS				А	Α	А		А	А	А	А		Α
	oini iranic	Delay				4.3	0.0	2.6		0.4	0.2	1.7	0.3		1.4
					US-70	) at Sta	ite Par	k Road							
	НСМ	LOS		n/a¹	n/a¹	В	n/a¹			С					А
АМ		Delay		n/a¹	n/a¹	12.9	n/a¹			15.2					0.7
~	SimTraffic	LOS		Α	А	А	А		А		А				А
		Delay		1.5	1.4	1.5	0.2		7.3		2.2				1.4
	НСМ	LOS		n/a¹	n/a¹	В	n/a¹			F					В
РМ		Delay		n/a¹	n/a¹	14.0	n/a¹			113.7					11.4
	SimTraffic	LOS		A	А	А	А		А		А				А
		Delay		0.0	2.6	4.3	0.0		0.4		0.2				1.4
			US-70	) at Wi	llow Sp	orings	Road/J	ohnsoi	n Creek	Road					
	НСМ	LOS	В	n/a¹		В	n/a¹			E			D		A
АМ		Delay	10.9	n/a¹		12.7	n/a¹			44.7	-		27.8		2.1
~~~	SimTraffic	LOS	n/a¹	Α	А	Α	Α	Α	Α	A	Α	n/a¹	А	А	Α
		Delay	n/a¹	0.8	0.1	2.4	1.2	0.5	6.5	9.5	3.7	n/a¹	5.4	3.2	1.2
	НСМ	LOS	В	n/a¹		В	n/a¹			F			E		A
РМ		Delay	13.8	n/a¹		12.3	n/a¹			180.2	-		39.8		4.4
	SimTraffic	LOS	n/a¹	А	A	А	Α	А	А	А	А	n/a¹	А	А	A
		Delay	n/a¹	0.4	2.6	4.3	0.4	0.4	4.8	0.0	2.9	n/a¹	0.0	2.9	2.9

Table E-3 – 2050 with Development Build Analysis Results	
Table E-3 – 2000 With Development build Analysis Results	

<sup>1</sup> free movement

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# HCS7 Multilane Highway Report

## **Project Information**

Project Information					
Analyst	Garver	Date	9/19/2021		
Agency		Analysis Year	2021		
Jurisdiction		Time Analyzed			
Project Description	Build, AM	Units	U.S. Customary		
Direction 1 Geometric Data					
Direction 1	EB				
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 1 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968				
Direction 1 Demand and Ca	pacity				
Volume(V) veh/h	410	Heavy Vehicle Adjustment Factor (fHV)	0.917		
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	266		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006		
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.13		
Direction 1 Speed and Dens	ity				
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	5.0		
Median Type Adjustment (fм) 0.0		Level of Service (LOS)	A		
Access Point Density Adjustment (fA)	0.0				
Direction 1 Bicycle LOS					
Flow Rate in Outside Lane (vOL),veh/h	Flow Rate in Outside Lane (vol.),veh/h 244		4.62		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.56		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		

Direction 2 Geometric Data					
Direction 2	WB				
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 2 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968				
Direction 2 Demand and Cap	oacity				
Volume(V) veh/h	270	Heavy Vehicle Adjustment Factor (fHV)	0.917		
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	176		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln         2006			
Tractor-Trailers (TT), %	-	- Volume-to-Capacity Ratio (v/c) (			
Direction 2 Speed and Densi	ty				
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.3		
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A		
Access Point Density Adjustment (fA)	0.0				
Direction 2 Bicycle LOS					
Flow Rate in Outside Lane (vol),veh/h	244	Effective Speed Factor (St)	4.62		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.56		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		

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## HCS7 Multilane Highway Report

#### **Project Information**

Project Information			
Analyst	Garver	Date	9/19/2021
Agency		Analysis Year	2021
Jurisdiction		Time Analyzed	
Project Description	Build, PM	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1	EB		
Number of Lanes (N), In	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12
Free-Flow Speed (FFS), mi/h	55.0		
Direction 1 Adjustment Fact	tors		
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968
Driver Population CAF	0.968		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	310	Heavy Vehicle Adjustment Factor (fHV)	0.917
Peak Hour Factor	0.88	Flow Rate (Vp), pc/h/ln	192
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.10
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.6
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vOL),veh/h	176	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.40
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D

Direction 2 Geometric Data					
Direction 2	WB				
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 2 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968	168			
Direction 2 Demand and Cap	acity	·	÷		
Volume(V) veh/h	425	Heavy Vehicle Adjustment Factor (fHV)	0.917		
Peak Hour Factor	0.88	Flow Rate (Vp), pc/h/ln	264		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln 200			
Tractor-Trailers (TT), %	-	- Volume-to-Capacity Ratio (v/c) 0			
Direction 2 Speed and Densi	ty				
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	4.9		
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A		
Access Point Density Adjustment (fA)	0.0				
Direction 2 Bicycle LOS					
Flow Rate in Outside Lane (vol),veh/h	176	Effective Speed Factor (St)	4.62		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.40		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	D		

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## HCS7 Multilane Highway Report

#### **Project Information**

Project Information			
Analyst	Garver	Date	9/19/2021
Agency		Analysis Year	2050
Jurisdiction		Time Analyzed	
Project Description	Build, AM	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1	EB		
Number of Lanes (N), In	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12
Free-Flow Speed (FFS), mi/h	55.0		
Direction 1 Adjustment Fact	tors		
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968
Driver Population CAF	0.968		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	590	Heavy Vehicle Adjustment Factor (fHV)	0.917
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	383
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.19
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	7.1
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vOL),veh/h	351	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.75
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E

Direction 2 Geometric Data					
Direction 2	WB				
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 2 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968				
Direction 2 Demand and Cap	acity				
Volume(V) veh/h	390	) Heavy Vehicle Adjustment Factor (fHV)			
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	253		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln 2006			
Tractor-Trailers (TT), %	-	- Volume-to-Capacity Ratio (v/c) (			
Direction 2 Speed and Densi	ty				
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	4.7		
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A		
Access Point Density Adjustment (fA)	0.0				
Direction 2 Bicycle LOS					
Flow Rate in Outside Lane (vol),veh/h	351	Effective Speed Factor (St)	4.62		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.75		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		

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## HCS7 Multilane Highway Report

#### **Project Information**

Project Information			
Analyst	Garver	Date	9/19/2021
Agency		Analysis Year	2050
Jurisdiction		Time Analyzed	
Project Description	Build, PM	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1	EB		
Number of Lanes (N), In	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12
Free-Flow Speed (FFS), mi/h	55.0		
Direction 1 Adjustment Fact	tors		
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968
Driver Population CAF	0.968		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	445	Heavy Vehicle Adjustment Factor (fHV)	0.917
Peak Hour Factor	0.88	Flow Rate (V <sub>P</sub> ), pc/h/ln	276
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.14
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	5.1
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A
Access Point Density Adjustment (fA)	0.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vOL),veh/h	253	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.58
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E

Direction 2 Geometric Data				
Direction 2	WB			
Number of Lanes (N), In	2	Terrain Type	Level	
Segment Length (L), ft	-	Percent Grade, %	-	
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-	
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0	
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6	
Median Type	Divided	Total Lateral Clearance (TLC), ft	12	
Free-Flow Speed (FFS), mi/h	55.0			
Direction 2 Adjustment Factor	ors			
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975	
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968	
Driver Population CAF	0.968			
Direction 2 Demand and Cap	acity	·		
Volume(V) veh/h	615	Heavy Vehicle Adjustment Factor (fHV)	0.917	
Peak Hour Factor	0.88	Flow Rate (Vp), pc/h/ln	381	
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072	
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln 2006		
Tractor-Trailers (TT), %	- Volume-to-Capacity Ratio (v/c) (		0.19	
Direction 2 Speed and Densi	ty			
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6	
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	7.1	
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	A	
Access Point Density Adjustment (fA)	0.0			
Direction 2 Bicycle LOS				
Flow Rate in Outside Lane (vol),veh/h	253	Effective Speed Factor (St)	4.62	
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	4.58	
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E	

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## HCS7 Multilane Highway Report

#### **Project Information**

Project Information			
Analyst	Garver	Date	9/19/2021
Agency		Analysis Year	2050 with Development
Jurisdiction		Time Analyzed	
Project Description	Build, AM	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1	EB		
Number of Lanes (N), In	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12
Free-Flow Speed (FFS), mi/h	55.0		
Direction 1 Adjustment Fac	tors		
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968
Driver Population CAF	0.968		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	1115	Heavy Vehicle Adjustment Factor (fHV)	0.917
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	724
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.36
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	13.5
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	В
Access Point Density Adjustment (fA)	0.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vOL),veh/h	664	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.07
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E

Direction 2	WB		1		
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 2 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968				
Direction 2 Demand and Cap	pacity				
Volume(V) veh/h	900	Heavy Vehicle Adjustment Factor (fHV)	0.917		
Peak Hour Factor	0.84	Flow Rate (Vp), pc/h/ln	584		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
	-	Adjusted Capacity (cadj), pc/h/ln	2006		
Single-Unit Trucks (SUT), %					
-	-	Volume-to-Capacity Ratio (v/c)	0.29		
Tractor-Trailers (TT), %			0.29		
Tractor-Trailers (TT), % Direction 2 Speed and Densi			0.29 53.6		
Tractor-Trailers (TT), % Direction 2 Speed and Densi Lane Width Adjustment (fLW)	ty	Volume-to-Capacity Ratio (v/c)			
Single-Unit Trucks (SUT), % Tractor-Trailers (TT), % <b>Direction 2 Speed and Densi</b> Lane Width Adjustment (fLW) Total Lateral Clearance Adj. (fLLC) Median Type Adjustment (fM)	<b>ty</b> 0.0	Volume-to-Capacity Ratio (v/c)         Average Speed (S), mi/h	53.6		
Tractor-Trailers (TT), % <b>Direction 2 Speed and Densi</b> Lane Width Adjustment (fLW) Total Lateral Clearance Adj. (fLLC) Median Type Adjustment (fM)	ty 0.0 0.0	Volume-to-Capacity Ratio (v/c)         Average Speed (S), mi/h         Density (D ), pc/mi/ln	53.6 10.9		
Tractor-Trailers (TT), % Direction 2 Speed and Densi Lane Width Adjustment (fLW) Total Lateral Clearance Adj. (fLLC)	ty 0.0 0.0 0.0 0.0	Volume-to-Capacity Ratio (v/c)         Average Speed (S), mi/h         Density (D ), pc/mi/ln	53.6 10.9		
Tractor-Trailers (TT), % <b>Direction 2 Speed and Densi</b> Lane Width Adjustment (fLW) Total Lateral Clearance Adj. (fLLC) Median Type Adjustment (fM) Access Point Density Adjustment (fA)	ty 0.0 0.0 0.0 0.0	Volume-to-Capacity Ratio (v/c)         Average Speed (S), mi/h         Density (D ), pc/mi/ln	53.6 10.9		
Tractor-Trailers (TT), % <b>Direction 2 Speed and Densi</b> Lane Width Adjustment (fLW) Total Lateral Clearance Adj. (fLLC) Median Type Adjustment (fM) Access Point Density Adjustment (fA) <b>Direction 2 Bicycle LOS</b>	ty         0.0         0.0         0.0         0.0         0.0         0.0	Volume-to-Capacity Ratio (v/c)         Average Speed (S), mi/h         Density (D ), pc/mi/ln         Level of Service (LOS)	53.6 10.9 A		

### HCS7 Multilane Highway Report

#### **Project Information**

Project Information			
Analyst	Garver	Date	9/19/2021
Agency		Analysis Year	2050 with Development
Jurisdiction		Time Analyzed	
Project Description	Build, PM	Units	U.S. Customary
Direction 1 Geometric Data			
Direction 1	EB		
Number of Lanes (N), In	2	Terrain Type	Level
Segment Length (L), ft	-	Percent Grade, %	-
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12
Free-Flow Speed (FFS), mi/h	55.0		
Direction 1 Adjustment Fac	tors		
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968
Driver Population CAF	0.968		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	1110	Heavy Vehicle Adjustment Factor (fHV)	0.917
Peak Hour Factor	0.88	Flow Rate (Vp), pc/h/ln	688
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2006
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.34
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	12.8
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	В
Access Point Density Adjustment (fA)	0.0		
Direction 1 Bicycle LOS	·		
Flow Rate in Outside Lane (vOL),veh/h	631	Effective Speed Factor (St)	4.62
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.05
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E

Direction 2 Geometric Data					
Direction 2	WB				
Number of Lanes (N), In	2	Terrain Type	Level		
Segment Length (L), ft	-	Percent Grade, %	-		
Measured or Base Free-Flow Speed	Base	Grade Length, mi	-		
Base Free-Flow Speed (BFFS), mi/h	55.0	Access Point Density, pts/mi	0.0		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12		
Free-Flow Speed (FFS), mi/h	55.0				
Direction 2 Adjustment Fact	ors				
Driver Population	Mostly Familiar	Final Speed Adjustment Factor (SAF)	0.975		
Driver Population SAF	0.975	Final Capacity Adjustment Factor (CAF)	0.968		
Driver Population CAF	0.968				
Direction 2 Demand and Cap	oacity				
Volume(V) veh/h	1390	Heavy Vehicle Adjustment Factor (fHV)	0.917		
Peak Hour Factor	0.88	Flow Rate (Vp), pc/h/ln	862		
Total Trucks, %	9.00	Capacity (c), pc/h/ln	2072		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln 2006			
Tractor-Trailers (TT), %	- Volume-to-Capacity Ratio (v/c)		0.43		
Direction 2 Speed and Densi	ty				
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	53.6		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	16.1		
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	В		
Access Point Density Adjustment (fA)	0.0				
Direction 2 Bicycle LOS					
Flow Rate in Outside Lane (vOL),veh/h	631	Effective Speed Factor (St)	4.62		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.05		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		

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# Appendix F – Bridge Cross-Section Safety Analysis Results

Highway Safety Software Rural Two Lane Segment Report						
Project Information						
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	cenario 1			
Input Data		<u>.</u>				
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Grade (S	%)	0.0
Shoulder Type		Paved		Shoulde	r Width (ft)	0
Driveway Density (driveway/mi)		0		Roadsid	e Hazard Rating	6
Centerline Rumble Strips		No		Passing	Lanes	No Passing or Climbing Lanes
Two-Way Left Turn Lane		No		Segmen	t Lighting	Yes
Automated Speed Enforcement		No		Calibration Factor		1.00
<b>Crash Modification Fac</b>	ctors					
Lane Width - CMF1		1.000		Centerline Rumble Strips - CMF7		1.000
Shoulder Type/Width - CMF2		1.287		Passing Lanes - CMF8		1.000
Horizontal Curve - CMF3		1.000		Two-Way Left Turn Lane - CMF9		1.000
Superelevation - CMF4		1.000		Roadside Design - CMF10		1.222
Grade - CMF5		1.000		Lighting - CMF11		0.922
Driveway Density - CMF6		1.000		Auto Speed Enforcement - CMF12		1.000
Combined CMF		1.449				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		0.729		1.056	1.056
Property Damage Only (PDO)	-		1.542		2.235	2.235
Total	0.236	5	2.271		3.291	3.291
Economic Analysis (Pro	edict	ed Crashes)			1	
Crash Severity		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		1.056		\$167,130.12
Property Damage Only (PDO)		\$7,400.00		2.235		\$16,536.54
Total		-		3.291		\$183,666.66

Hig	ghw	ay Safety Softw	are Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	enario 2	·		•
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Roadwa	у Туре	Undivided
Right Shoulder Width/Type (ft)		10/Paved		Sideslop	pes	1
Auto Speed Enforcement		No		Calibrati	on Factor	1.00
Crash Modification Fac	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		0.965	Automat CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		-				
Combined CMF		1.139				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.630		1.855	1.855
Property Damage Only (PDO)	-		1.054		1.200	1.200
Total	0.187	7	2.684		3.056	3.056
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity Per Crash Societal C		rash Cost Pr		edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		1.855		\$293,524.27
Property Damage Only (PDO)		\$7,400.00		1.200		\$8,882.51
Total		-		3.056		\$302,406.79

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Hi	ghwa	ay Safety Softw	are Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	cenario 3A			1
Input Data		<u>`</u>				
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
Crash Modification Fa	ctors					
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.040				
Combined CMF		1.040				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		0.844		0.878	0.878
Property Damage Only (PDO)	-		0.750		0.779	0.779
Total	0.212	2	1.594		1.658	1.658
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity Per Crash Societ		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		0.878		\$138,919.37
Property Damage Only (PDO)		\$7,400.00		0.779		\$5,768.29
Total		-		1.658		\$144,687.67

HSSTM Version 7.9.5 Scenario3A\_2021.xhz Generated: 09/24/2021 11:19:14

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	cenario 3B			
Input Data		<u>.</u>				
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.000				
Combined CMF		1.000				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		0.844		0.844	0.844
Property Damage Only (PDO)	-		0.750		0.750	0.750
Total	0.212	2	1.594		1.594	1.594
Economic Analysis (Pr	edict	ed Crashes)			·	
Crash Severity Per Crash Societal		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		0.844		\$133,576.32
Property Damage Only (PDO)		\$7,400.00		0.750		\$5,546.44
Total		-		1.594		\$139,122.76

HSSTM Version 7.9.5 Scenario3B\_2021.xhz Generated: 09/24/2021 11:18:51

Hi	ghwa	ay Safety Softw	are Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	enario 4A	·		•
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
<b>Crash Modification Fa</b>	ctors					
Lane Width - CMF1		1.000	Lighting		- CMF4	0.912
Shoulder Type/Width - CMF2		1.000	Automat CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.040				
Combined CMF		0.949				
Predicted Roadway Se	ctior	n Crashes				·
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		0.844		0.801	0.801
Property Damage Only (PDO)	-		0.750		0.711	0.711
Total	0.212	2	1.594		1.512	1.512
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		0.801		\$126,756.18
Property Damage Only (PDO)		\$7,400.00	0.711			\$5,263.25
Total		-		1.512		\$132,019.43

HSSTM Version 7.9.5 Scenario4A\_2021.xhz Generated: 09/24/2021 11:18:19

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2021
Project Description		Roosevelt Bridge - So	cenario 4B	·		•
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	8500
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	0.912
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.000				
Combined CMF		0.912				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		0.844		0.770	0.770
Property Damage Only (PDO)	-		0.750		0.684	0.684
Total	0.212	2	1.594		1.454	1.454
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity Per Crash Societal		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		0.770		\$121,880.94
Property Damage Only (PDO)		\$7,400.00		0.684		\$5,060.81
Total		-		1.454		\$126,941.76

HSSTM Version 7.9.5 Scenario4B\_2021.xhz Generated: 09/24/2021 11:17:35

Hi	ghwa	ay Safety Softw	vare Rui	ral Two	o Lane Segment Re	oort
Project Information						
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 1			
Input Data		<u>.</u>				
Length of Segment (mi)		1.000		AADT (v	reh/day)	12200
Lane Width (ft)		12.0		Grade (	%)	0.0
Shoulder Type		Paved		Shoulde	er Width (ft)	0
Driveway Density (driveway/mi)		0		Roadsid	e Hazard Rating	6
Centerline Rumble Strips		No		Passing	Lanes	No Passing or Climbing Lanes
Two-Way Left Turn Lane		No		Segmer	nt Lighting	Yes
Automated Speed Enforcement		No	Calibration Factor			1.00
<b>Crash Modification Fa</b>	ctors	;				
Lane Width - CMF1		1.000		Centerli	ne Rumble Strips - CMF7	1.000
Shoulder Type/Width - CMF2		1.287		Passing	Lanes - CMF8	1.000
Horizontal Curve - CMF3		1.000		Two-Wa	ay Left Turn Lane - CMF9	1.000
Superelevation - CMF4		1.000		Roadsid	e Design - CMF10	1.222
Grade - CMF5		1.000		Lighting - CMF11		0.922
Driveway Density - CMF6		1.000		Auto Sp	eed Enforcement - CMF12	1.000
Combined CMF		1.449				
Predicted Roadway Se	ctior	n Crashes		·		·
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.046		1.516	1.516
Property Damage Only (PDO)	-		2.213		3.207	3.208
Total	0.236	5	3.260		4.724	4.724
Economic Analysis (Pr	edict	ed Crashes)	1		1	-
Crash Severity		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00	\$158,200.00			\$239,880.87
Property Damage Only (PDO)		\$7,400.00		3.207		\$23,734.80
Total		-		4.724		\$263,615.67

Hig	ghw	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	enario 2	·		•
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	12200
Lane Width (ft)		12.0		Roadwa	у Туре	Undivided
Right Shoulder Width/Type (ft)		10/Paved		Sideslop	pes	1
Auto Speed Enforcement		No		Calibrati	on Factor	1.00
Crash Modification Fac	ctors	;				
Lane Width - CMF1		1.000	Lightin		- CMF4	1.000
Shoulder Type/Width - CMF2		0.965	Automated S CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		-				
Combined CMF		1.139				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		2.420		2.755	2.755
Property Damage Only (PDO)	-		1.685		1.919	1.919
Total	0.187	7	4.105		4.674	4.674
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity Per Crash Societal C		rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00	2.755			\$435,850.32
Property Damage Only (PDO)		\$7,400.00		1.919		\$14,199.38
Total		-		4.674		\$450,049.70

HSSTM Version 7.9.5 Scenario2\_2050.xhz Generated: 09/26/2021 19:43:23

Hi	ghw	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 3A			
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	12200
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	on Factor	1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.040				
Combined CMF		1.040				
Predicted Roadway Se	ctior	n Crashes				·
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.194		1.241	1.241
Property Damage Only (PDO)	-		1.135		1.180	1.180
Total	0.212	2	2.329		2.422	2.422
Economic Analysis (Pr	edict	ted Crashes)	-			-
Crash Severity Per Crash Societal C		rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		1.241		\$196,386.76
Property Damage Only (PDO)		\$7,400.00		1.180		\$8,734.21
Total		-		2.422		\$205,120.97

HSSTM Version 7.9.5 Scenario3A\_2050.xhz Generated: 09/26/2021 19:44:03

Hig	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 3B			·
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	12200
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.000				
Combined CMF		1.000				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.194		1.194	1.194
Property Damage Only (PDO)	-		1.135		1.135	1.135
Total	0.212	2	2.329		2.329	2.329
Economic Analysis (Pr	edict	ted Crashes)				
Crash Severity Per Crash Societal C		Per Crash Societal C	rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00	1.194			\$188,833.42
Property Damage Only (PDO)		\$7,400.00		1.135		\$8,398.28
Total		-		2.329		\$197,231.70

HSSTM Version 7.9.5 Scenario3B\_2050.xhz Generated: 09/26/2021 19:45:39

Hig	ghw	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 4A			·
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	12200
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrat	ion Factor	1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000	Lighting		- CMF4	0.912
Shoulder Type/Width - CMF2		1.000	Automat CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.040				
Combined CMF		0.949				
Predicted Roadway Se	ctior	n Crashes				·
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.194		1.133	1.133
Property Damage Only (PDO)	-		1.135		1.077	1.077
Total	0.212	2	2.329		2.210	2.210
Economic Analysis (Pr	edict	ted Crashes)	-		- -	-
Crash Severity Per Crash Societal C		rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		1.133		\$179,191.96
Property Damage Only (PDO)		\$7,400.00		1.077		\$7,969.48
Total		-		2.210		\$187,161.44

HSSTM Version 7.9.5 Scenario4A\_2050.xhz Generated: 09/26/2021 19:46:32

Hig	ghwa	ay Safety Softw	vare Rui	ral Mu	tilane Segment Rep	ort
Project Information	_			_		
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 4B			·
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	12200
Lane Width (ft)		12.0		Roadwa	у Туре	Divided
Right Shoulder Width (ft)		6		Median	Width (ft)	12
Auto Speed Enforcement		No		Calibrati	on Factor	1.00
Crash Modification Fac	ctors					
Lane Width - CMF1		1.000	Lighting		- CMF4	0.912
Shoulder Type/Width - CMF2		1.000	Automa CMF5		ted Speed Enforcement -	1.000
Median Width - CMF3		1.000				
Combined CMF		0.912				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		1.194		1.089	1.089
Property Damage Only (PDO)	-		1.135		1.036	1.036
Total	0.212	2	2.329		2.125	2.125
Economic Analysis (Pr	edict	ed Crashes)				-
Crash Severity Per Crash Societal C		rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		1.089		\$172,299.96
Property Damage Only (PDO)		\$7,400.00		1.036		\$7,662.96
Total		-		2.125		\$179,962.93

HSSTM Version 7.9.5 Scenario4B\_2050.xhz Generated: 09/26/2021 19:47:13

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst		Garver		Date		9/8/2021
Jurisdiction				Analysis	Year	2050
Project Description		Roosevelt Bridge - So	cenario 2 (v	v/ Dev)		•
Input Data						
Length of Segment (mi)		1.000		AADT (v	eh/day)	27300
Lane Width (ft)		12.0		Roadwa	у Туре	Undivided
Right Shoulder Width/Type (ft)		10/Paved		Sideslop	pes	1
Auto Speed Enforcement		No		Calibrat	on Factor	1.00
<b>Crash Modification Fa</b>	ctors					
Lane Width - CMF1		1.000	Lighting		- CMF4	1.000
Shoulder Type/Width - CMF2		0.965		Automa CMF5	ted Speed Enforcement -	1.000
Median Width - CMF3		-				
Combined CMF		1.139				
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	dispersion Parameter	Nspf,rs by	Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-		5.841		6.650	6.650
Property Damage Only (PDO)	-		4.744		5.402	5.402
Total	0.187	7	10.585		12.052	12.052
Economic Analysis (Pr	edict	ed Crashes)				
Crash Severity Per Crash Societal Cr		rash Cost	Pr	edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		6.650		\$1,052,014.33
Property Damage Only (PDO)		\$7,400.00		5.402		\$39,973.03
Total		-		12.052		\$1,091,987.36

HSSTM Version 7.9.5 Scenario2\_2050.xhz Generated: 09/29/2021 09:44:53

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort	
Project Information	_						
Analyst	Garver			Date		9/8/2021	
Jurisdiction				Analysis Year		2050	
Project Description		Roosevelt Bridge - So	cenario 3A	(w/ Dev)	(w/ Dev)		
Input Data							
Length of Segment (mi)		1.000		AADT (veh/day)		27300	
Lane Width (ft)		12.0		Roadway Type		Divided	
Right Shoulder Width (ft)		6		Median Width (ft)		12	
Auto Speed Enforcement		No		Calibration Factor		1.00	
Crash Modification Fa	ctors	;					
Lane Width - CMF1		1.000		Lighting - CMF4		1.000	
Shoulder Type/Width - CMF2		1.000		Automated Speed Enforcement - CMF5		1.000	
/ledian Width - CMF3		1.040					
Combined CMF		1.040					
Predicted Roadway Se	ctior	n Crashes					
Crash Severity	Over	Overdispersion Parameter		Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)	
Fatal and Injury (FI)	-	-			2.685	2.685	
Property Damage Only (PDO)	-	-			2.952	2.952	
Total	0.212		5.420		5.637	5.637	
Economic Analysis (Pr	edict	ed Crashes)	-		- -	-	
Crash Severity Per Crash		Per Crash Societal C	Crash Societal Crash Cost		edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		2.685		\$424,837.94	
Property Damage Only (PDO)		\$7,400.00		2.952		\$21,842.66	
Total -			5.637			\$446,680.60	

HSSTM Version 7.9.5 Scenario3A\_2050.xhz Generated: 09/29/2021 09:45:37

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort
Project Information	_					
Analyst	t Garver		Garver			9/8/2021
Jurisdiction				Analysis Year		2050
Project Description		Roosevelt Bridge - So	cenario 3B	(w/ Dev)		·
Input Data						
Length of Segment (mi)		1.000		AADT (veh/day)		27300
Lane Width (ft)		12.0		Roadway Type		Divided
Right Shoulder Width (ft)		6		Median Width (ft)		12
Auto Speed Enforcement		No		Calibration Factor		1.00
Crash Modification Fa	ctors	;				
Lane Width - CMF1		1.000		Lighting - CMF4		1.000
Shoulder Type/Width - CMF2		1.000		Automated Speed Enforcement - CMF5		1.000
/ledian Width - CMF3		1.000				
Combined CMF	ombined CMF		1.000			
Predicted Roadway Se	ctior	n Crashes				
Crash Severity	Over	Overdispersion Parameter		Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)
Fatal and Injury (FI)	-	-			2.582	2.582
Property Damage Only (PDO)	-	-			2.838	2.838
Total	0.212		5.420		5.420	5.420
Economic Analysis (Pr	edict	ed Crashes)	-		- -	-
Crash Severity Per 0		Per Crash Societal Crash Cost		Predicted Annual Crashes		Total Societal Crash Cost
Fatal and Injury (FI)		\$158,200.00		2.582		\$408,498.02
Property Damage Only (PDO)		\$7,400.00		2.838		\$21,002.55
Total		-	5.420			\$429,500.58

HSSTM Version 7.9.5 Scenario3B\_2050.xhz Generated: 09/29/2021 09:46:17

Hig	ghw	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort		
Project Information	_							
Analyst		Garver		Date		9/8/2021		
Jurisdiction				Analysis Year		2050		
Project Description		Roosevelt Bridge - Scenario 4A (w/ Dev)						
Input Data								
Length of Segment (mi)		1.000		AADT (veh/day)		27300		
Lane Width (ft)		12.0		Roadway Type		Divided		
Right Shoulder Width (ft)		6		Median Width (ft)		12		
Auto Speed Enforcement		No		Calibration Factor		1.00		
Crash Modification Fa	ctors	;						
Lane Width - CMF1		1.000		Lighting - CMF4		0.912		
noulder Type/Width - CMF2		1.000		Automated Speed Enforcement - CMF5		1.000		
Median Width - CMF3		1.040						
Combined CMF		0.949						
Predicted Roadway Se	ctior	n Crashes						
Crash Severity	Over	dispersion Parameter	Nspf,rs by Severity		Predicted Crash Frequency	Crash Rate (crashes/mi/year)		
Fatal and Injury (FI)	-		2.582		2.450	2.450		
Property Damage Only (PDO)	-		2.838		2.693	2.693		
Total	0.212		5.420		5.144	5.144		
Economic Analysis (Pr	edict	ted Crashes)						
Crash Severity P		Per Crash Societal Crash Cost		Predicted Annual Crashes		Total Societal Crash Cost		
Fatal and Injury (FI)		\$158,200.00		2.450		\$387,640.93		
Property Damage Only (PDO)		\$7,400.00		2.693		\$19,930.20		
Fotal -		-	5.144			\$407,571.13		

HSSTM Version 7.9.5 Scenario4A\_2050.xhz Generated: 09/29/2021 09:46:46

Hi	ghwa	ay Safety Softw	vare Rui	ral Mu	ltilane Segment Rep	ort	
Project Information	_						
Analyst	alyst		Garver			9/8/2021	
Jurisdiction	•				Year	2050	
Project Description		Roosevelt Bridge - Scenario 4B (w/ Dev)					
Input Data							
Length of Segment (mi)		1.000		AADT (veh/day)		27300	
Lane Width (ft)		12.0		Roadway Type		Divided	
Right Shoulder Width (ft)		6		Median Width (ft)		12	
Auto Speed Enforcement		No		Calibration Factor		1.00	
Crash Modification Fa	ctors	;					
Lane Width - CMF1		1.000		Lighting - CMF4		0.912	
Shoulder Type/Width - CMF2		1.000		Automated Speed Enforcement - CMF5		1.000	
Median Width - CMF3		1.000					
ombined CMF		0.912					
Predicted Roadway Se	ctior	n Crashes					
Crash Severity	Over	Overdispersion Parameter		Severity	Predicted Crash Frequency	Crash Rate (crashes/mi/year)	
Fatal and Injury (FI)	-	-			2.356	2.356	
Property Damage Only (PDO)	-	-			2.590	2.590	
Total	0.212		5.420		4.946	4.946	
Economic Analysis (Pr	edict	ted Crashes)	-		- -	-	
Crash Severity Per Crash Soc		Per Crash Societal C	Crash Cost		edicted Annual Crashes	Total Societal Crash Cost	
Fatal and Injury (FI)		\$158,200.00		2.356		\$372,731.66	
Property Damage Only (PDO)		\$7,400.00		2.590		\$19,163.66	
Total		-		4.946		\$391,895.32	

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