### **TECHNICAL REPORT COVERSHEET**

### DESIGN TRAFFIC TECHNICAL MEMORANDUM

Florida Department of Transportation

District One

State Road (SR) 70 PD&E Study

Limits of Project: County Road (CR) 29 to Lonesome Island Road

Highlands County, Florida

Financial Management Number: 414506-5-22-01

ETDM Number: 14364

Date: November 2018

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

### DESIGN TRAFFIC TECHNICAL MEMORANDUM

# Florida Department of Transportation District 1

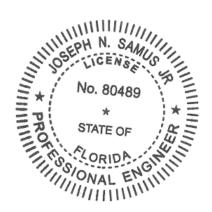
State Road 70 from County Road 29 to Lonesome Island Road Highlands County, Florida

Financial Project Number: 414506-5-22-01

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016 and executed by FHWA and FDOT.

Prepared by: H.W. Lochner, Inc. 4350 West Cypress St, Suite 800 Tampa, FL 33607

November 2018



This item has been digitally signed and sealed by Joseph N. Samus, Jr, PE on the date adjacent to the seal.

Joseph N Samus Samus

Digitally signed by Joseph N Samus

Date: 2020.12.07 16:20:52 -05'00'

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### Table of Contents

1.0 Introduction	1
1.1 Project Description	1
1.2 Purpose	
2.0 Existing Conditions	2
2.1 Hurricane Evacuation	2
2.2 Roadway Characteristics	2
2.3 Validation of Traffic Factors	2
2.4 Validation of Growth Rate	3
2.5 Traffic Volumes	
2.6 Operational Analyses	4
2.7 Crash Data and Safety Analysis	6
3.0 Development of Future Traffic	8
4.0 Future Conditions	
4.1 No-Build Operational Analyses	9
4.2 Alternative Development	10
4.3 Build Operational Analyses	
4.4 Noise Analysis	11
4.5 Air Quality Analysis	11
5.0 Summary	

### **Appendices**

Appendix A: SR 70 PD&E Study DTTM

Appendix B: Evacuation Transportation Analysis Report Appendix C: Florida Traffic Online (2017) Historical Data

Appendix D: Existing Year (2018) HCS7 Reports

Appendix E: Crash Data

Appendix F: TURNS5 Design Hour Volumes

Appendix G: No-Build HCS7 Reports

Appendix H: No-Build HSM Predictive Method Appendix I: Build HSM Predictive Method

Appendix J: Build HCS7 Reports Appendix K: Noise Analysis

Appendix L: Air Quality Analysis

# List of Figures

Figure 1 – SR 70 Study Area Map	1
Figure 2 – Existing (2018) Lane Geometry and Design Traffic Volumes	5
Figure 3 – Collision Diagram	6
Figure 4 – Future Design Traffic Volumes	8
Figure 5 – Build Alternative	10
List of Tables	
Table 1 – Roadway Characteristics	2
Table 2 – Historical D Factors	3
Table 3 – 2017 Field Measured D Factors	3
Table 4 – Recommended Design Traffic Factors	3
Table 5 – Historical AADT Growth	3
Table 6 – D1RPM AADT Growth	4
Table 7 – Highlands County BEBR Population Forecast	
Table 8 – Existing Year (2018) Intersection Analysis	5
Table 9 – Existing Year (2018) Arterial Analysis	5
Table 10 – Summary Crash Data (2013 to 2017)	7
Table 11 – Future Year No-Build Intersection Analyses	9
Table 12 – Future Year No-Build Arterial Analysis	
Table 13 – Design Year (2045) Predicted Crash Frequency	
Table 14 – Future Year Build Intersection Analyses	12
Table 15 – Future Year Build Arterial Analysis	12



### 1.0 Introduction

### 1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) is conducting a roadway capacity improvement project along SR 70 from CR 29 to Lonesome Island Road in Highlands County. This improvement project involves widening SR 70 from an existing two-lane undivided facility to a four-lane divided roadway. SR 70 is a principal arterial and the primary east-west highway for the Lake Placid/southern Highlands County area, providing regional access to employment centers, agricultural lands, and residential areas across the state. SR 70 is a designated hurricane evacuation route and part of the SIS highway network. The project is approximately 4.3 miles in length. The SR 70 study area map is shown in **Figure 1**. This effort supplements the efforts of the SR 70 Project Development and Environment (PD&E) Study (FPID No. 414506-1-22-01) completed by the FDOT, District 1 in March 2017. The SR 70 PD&E Study, hereinafter referred to as the "SR 70 Western Study", Design Traffic Technical Memorandum (DTTM) can be found in **Appendix A**.

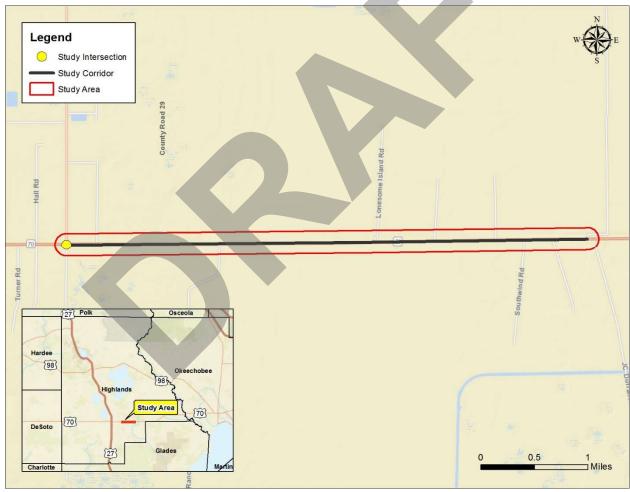


Figure 1 - SR 70 Study Area Map

### 1.2 PURPOSE

The purpose of this project is to improve operational conditions for emergency evacuations along the SR 70 corridor from CR 29 to Lonesome Island Road. As stated in the SR 70 Western Study, the Florida Division

of Emergency Management's Statewide Regional Evacuation Study Program determined that SR 70, within the study area, is a critical segment with significant queues experienced during emergency evacuations.

This memorandum documents the comparison of the SR 70 Western Study with updated traffic data and the development of design traffic for the existing (2018), opening (2025), interim (2035), and design (2045) years within the study area of SR 70 from CR 29 to Lonesome Island Road. The purpose of this memorandum is to justify the widening of SR 70 within the study area from an undivided two-lane typical section to a divided four-lane typical section.

### 2.0 Existing Conditions

### 2.1 HURRICANE EVACUATION

A Florida Statewide Regional Evacuation Study was conducted in 2010 for the Central Florida Region by the Florida Division of Emergency Management, the Division of Community Planning, the FDOT, and Central Florida Regional Planning Council. As part of this study, SR 70 from US 27 to CR 721 was identified as a critical facility in the event of a level D evacuation. The US 27 and CR 721 intersections were also identified amongst the highest vehicle queue segments in the Central Florida Region for a level D evacuation. The Evacuation Transportation Analysis Report from the study can be found in **Appendix B**.

### 2.2 ROADWAY CHARACTERISTICS

SR 70 within the limits of the study area functions as a two-lane rural principle arterial and hurricane evacuation route with a posted speed limit of 60 miles per hour (mph). SR 70 is a Strategic Intermodal System (SIS) highway facility, serves as part of the emergency evacuation route network, and facilitates east-west freight and people mobility. Roadway characteristics for SR 70 that within the study area are included in **Table 1**. There is only one significant one-leg stop controlled intersection within the study area at the cross street of SR 70 and CR 29.

Table 1 - Roadway Characteristics

Description	County	Begin	End	Speed Limit	Functional
	Roadway ID	Milepost	Milepost	(MPH)	Classification
SR 70	09060000	15.657	22.034	60	Rural Principal Arterial

### 2.3 VALIDATION OF TRAFFIC FACTORS

Based on the *FDOT Project Traffic Forecasting Handbook*, a standard K factor of 9.5 percent is used for arterials in a rural area. This is consistent with the K factor utilized in the SR 70 Western Study and is recommended for the SR 70 study corridor.

Historical directional (D) factors and 24-hour bi-directional counts collected on August 15, 2017 were obtained from FDOT Florida Traffic Online (2017), and can be found in **Appendix C**, to verify the recommended D factor of 58.83% along SR 70 from the SR 70 Western Study. **Table 2** and **Table 3** summarize the historical and field measured D factors observed along SR 70, east of US 27 since 2015, respectively. A recommended D factor of 58.83% remains reasonable for the SR 70 study corridor since it lies between the historical and field measured D factors.

Table 2 - Historical D Factors

Year	D Factor (%)
2015	59.2
2016	59.9
2017	60.1
Average	59.7

Table 3 – 2017 Field Measured D Factors

Peak Hour	D Factor (%)	Directionality
AM	56.4	Westbound
PM	52.3	Westbound

Along SR 70, east of US 27, a truck (T) factor of 21.9% was observed for all three years of 2015 to 2017 from FDOT Florida Traffic Online (2017). Assuming that the design hour truck (DHT) factor is one-half of the T factor, the DHT factor for SR 70 would be 11.0%. The recommended DHT factor of 14.0% from the SR 70 Western Study is slightly higher than the observed DHT factor. Therefore, a new DHT of 11.0% is recommended for the SR 70 study corridor.

The design traffic factors, summarized in **Table 4**, are recommended for the SR 70 study corridor.

Table 4 – Recommended Design Traffic Factors

Factor	Value (%)	Consistency with the Western Study
Standard K Factor	9.5	Same
D Factor	58.83	Same
DHT Factor	11.0	Updated

### 2.4 VALIDATION OF GROWTH RATE

In order to update the existing traffic volumes from the SR 70 Western Study from 2015 to 2018, an annual growth rate needs to be established for the study corridor. The historical annual average daily traffic (AADT), the model volumes, and the Bureau of Economic and Business Research (BEBR) estimated population growth rate were compared to determine the growth rate for the study corridor. The Western Study assumed a 2.0% annual growth rate for the SR 70 corridor.

Historical AADT data was gathered from FDOT Florida Traffic Online (2017) for SR 70, east of US 27. **Table 5** shows the historical annual growth rate from 2015 to 2017. An overall growth rate of 3.64% was observed for the study corridor.

Table 5 - Historical AADT Growth

Year	AADT	Annual Growth Rate
2015	4,100	
2016	4,300	3.64%
2017	4,400	

The latest available version of the District 1 Regional Planning Model (D1RPM), Version 1.0.3 with base year 2010 was examined for the study corridor. The maximum observed model volumes along SR 70 from CR 29 to Lonesome Island Road were compared between the 2010 base and 2040 horizon outputs and are summarized in **Table 6**. The model indicates an annual growth rate of 3.17% for the study corridor.

Table 6 - D1RPM AADT Growth

Year	AADT	Annual Growth Rate
2010	4,000	3.17%
2040	7,800	3.17%

Data was obtained from the BEBR "Projections of Florida Population by County, 2020-2045" and is summarized in **Table 7**.

Table 7 - Highlands County BEBR Population Forecast

BEBR Base Year		Population	<b>Annual Growth Rate</b>	
2017		102,138	-	
DEDD 2045	Low	98,000	-0.14%	
BEBR 2045 Forecast	Medium	118,200	0.56%	
	High	143,500	1.45%	

The historical AADT growth rate of 3.64% and model AADT growth rate of 3.17% are both greater than the "High" growth rate of 1.45% projected for Highlands County based on the BEBR data. Therefore, a recommended growth rate of 3.0% is reasonable based upon the historical, model, and BEBR "High" growth rates. This results in a higher growth rate than the 2.0% from the SR 70 Western Study.

### 2.5 TRAFFIC VOLUMES

The existing year (2018) design hour volumes were developed by applying a 3.0% annual growth rate directly to the SR 70 Western Study existing (2015) turning movement volumes. **Figure 2** shows the existing (2018) AM and PM peak hour turning movement volumes, along with the existing lane geometry for the study corridor.

### 2.6 OPERATIONAL ANALYSES

Intersection and arterial operational analysis was conducted along SR 70 from CR 29 to Lonesome Island Road for the existing year (2018). Highway Capacity Software (HCS7) was utilized to conduct Highway Capacity Manual 6<sup>th</sup> Edition (HCM6E) two-way stop control analysis and directional two-lane highway segment analysis, and can be found in **Appendix D**. The results of the existing year (2018) intersection analysis at SR 70 and CR 29 for the AM and PM peak hours are shown in **Table 8**. The results of the analysis indicate that the SR 70 and CR 29 intersection currently meets the level of service (LOS) standard *C*, as defined for non-urbanized areas in the *FDOT 2013 Quality/Level of Service Handbook*, for each of the analysis hours.

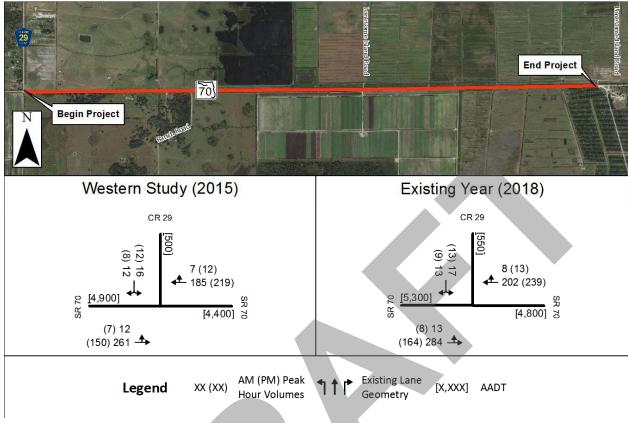


Figure 2 – Existing (2018) Lane Geometry and Design Traffic Volumes

Table 8 – Existing Year (2018) Intersection Analysis

Ammraach	Movement	AM Peak Ho	ur	PM Peak Hour		
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS	
	Left Turn	7.8	Α	7.9	Α	
Eastbound	Through	0.0	Α	0.0	Α	
	Total	0.4	Α	0.4	Α	
Westbound	Total	0.0	Α	0.0	Α	
Southbound	Total	11.7	В	11.2	В	

The results of the existing year (2018) arterial analysis along SR 70 from CR 29 to Lonesome Island Road for the AM and PM peak hours are shown in **Table 9**. The results of the analysis indicate that the SR 70 corridor from CR 29 to Lonesome Island Road currently meets the FDOT LOS standard C for non-urbanized areas for each of the analysis hours.

Table 9 – Existing Year (2018) Arterial Analysis

	AM Peak Ho	ur	PM Peak Hour		
Direction	Volume to Capacity (v/c)	LOS	Volume to Capacity (v/c)	LOS	
Eastbound	0.19	В	0.11	В	
Westbound	0.13	В	0.16	В	

### 2.7 CRASH DATA AND SAFETY ANALYSIS

Crash data along SR 70 from CR 29 to Lonesome Island Road for the years 2013 through 2017 was obtained from Signal Four Analytics and spot-verified against the crash long forms for accuracy. **Figure 3** shows the collision diagram for the study corridor by crash type. **Table 10** details the total number of crashes within the project area separated by crash type, crash severity, lighting conditions, and weather conditions. A total of 37 crashes were reported during the five year period, for an average of seven crashes per year. With 37 total crashes and an average AADT of 4,280 over five years, the results show that the project area has a crash rate of 1.102 crashes per million miles driven, which corresponds to 1.604 times the statewide average of 0.687 crashes per million miles driven for similar facility types. A detailed description of the crash data and the statewide average crash rates for rural segments can be found in **Appendix E**.

The most common crash type was hitting an animal, followed by hitting the guardrail. Twelve of the 37 crashes occurred in the dark without lighting, including a collision with a bicyclist. While unsignalized, nine crashes occurred along the corridor at the intersection of SR 70 and Lonesome Island Road. An analysis of this intersection may lead to the need for additional safety measures to be taken at this location.

Two of the crashes within the five year study period resulted in fatalities. The first of these fatalities was the result of a vehicle colliding with a bicycle just west of Lonesome Island Road. The second occurred when a vehicle drifted over the roadway centerline in the rain, striking another vehicle.

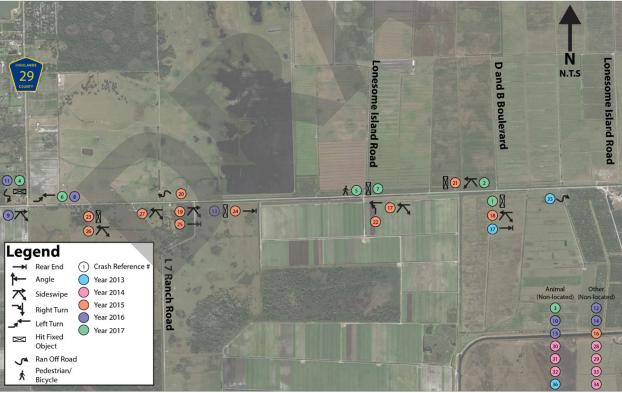


Figure 3 - Collision Diagram

**Table 10 – Summary Crash Data (2013 to 2017)** 

			Years		. ,		Average	Percentage
Crash Data	2013	2014	2015	2016	2017	Total Crashes	Per Year	of Total Crashes
Crash Type								
Animal	1	3	0	2	1	7	1.4	18.9%
Guardrail	0	0	2	1	3	6	1.2	16.2%
Rear End	1	0	2	1	0	4	0.8	10.8%
Sideswipe, Opposite Direction	0	0	4	0	0	4	0.8	10.8%
Other	0	2	0	2	0	4	0.8	10.8%
Sideswipe, Same Direction	0	0	1	1	1	3	0.6	8.1%
Other Non-Fixed Object	0	2	1	0	0	3	0.6	8.1%
Angle	0	0	1	0	1	2	0.4	5.4%
Ran Off Road	1	0	1	0	0	2	0.4	5.4%
Ran into Canal	0	0	0	1	0	1	0.2	2.7%
Bicycle	0	0	0	0	1	1	0.2	2.7%
Total	3	7	12	8	7	37	7.4	100.0%
Crash Severity								
Property Damage Only	1	4	8	6	4	23	4.6	62.2%
Minor Injury	0	2	1	0	1	4	0.8	10.8%
Moderate Injury	1	0	0	2	1	4	0.8	10.8%
Severe Injury	1	1	2	0	0	4	0.8	10.8%
Fatal	0	0	1	0	1	2	0.4	5.4%
Total	3	7	12	8	7	37	7.4	100.0%
Lighting Conditions								
Daylight	1	4	9	5	4	23	4.6	62.2%
Dark, Not Lighted	2	3	1	3	3	12	2.4	32.4%
Dusk	0	0	1	0	0	1	0.2	2.7%
Dawn	0	0	1	0	0	1	0.2	2.7%
Total	3	7	12	8	7	37	7.4	100.0%
Weather Conditions								
Clear	1	3	7	7	5	23	4.6	62.2%
Cloudy	2	3	2	1	2	10	2.0	27.0%
Rain	0	1	3	0	0	4	0.8	10.8%
Total	3	7	12	8	7	37	7.4	100.0%

Four of the crashes within the five year study period resulted in severe injury. These crashes were the result of the following circumstances:

- A vehicle drifted over to the other side of the roadway and collided with an oncoming vehicle, causing both vehicles to strike the guardrail.
- A motorcyclist struck a vehicle carrying a trailer while it was turning left onto Lonesome Island Road, which resulted in serious injury to the motorcyclist.

- As a freight truck slowed down due to a vehicle turning left onto Lonesome Island Road, another freight truck rear ended it, resulting in serious injury of the at fault driver.
- A vehicle ran over a wooden post in the middle of the roadway, causing it to flip up, strike the
  front left driver's window, and causing pieces of glass to fly into the driver's eyes, causing severe
  injury to the driver.

Many crashes were also related to vehicles drifting over the roadway centerline or being run off the road/into the guardrail while attempting to avoid another vehicle or obstacle. Of these crash types, some resulted in injury while others did not. Also, two narratives mention vehicles losing control after driving through standing water.

### 3.0 Development of Future Traffic

Future year design hour traffic volumes were developed using the Standard K and D-factors used in the existing conditions analysis. The same annual growth rate of 3.0% used to develop the existing year (2018) design hour turning movement volumes was used in the development of design year AADT's. The FDOT's TURNS5 spreadsheet was used to develop the turning movement volumes for the AM and PM peak hours and can be found in **Appendix F**. In order to quantify the benefit of the proposed improvements, both nobuild and build conditions were assessed using the same forecasted traffic volume, as was also assumed for the SR 70 and CR 29 intersection in the SR 70 Western Study. The future design hour traffic volumes and AADT's for the opening year (2025), the interim year (2035), and the design year (2045) can be found in **Figure 4**.

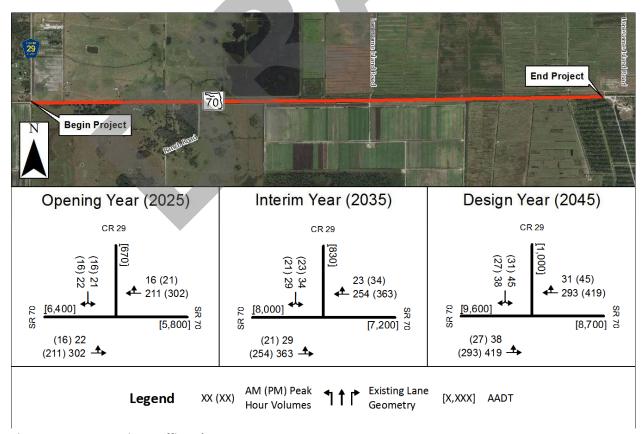


Figure 4 – Future Design Traffic Volumes

### 4.0 Future Conditions

### 4.1 NO-BUILD OPERATIONAL ANALYSES

Intersection and arterial operational analysis was conducted along SR 70 from CR 29 to Lonesome Island Road for the opening year (2025), interim year (2035), and design year (2045) under No-Build conditions. HCS7 was utilized to conduct HCM6E two-way stop control analysis and directional two-lane highway segment analysis, and can be found in **Appendix G**. The results of the future year intersection analyses at SR 70 and CR 29 under No-Build conditions are shown in **Table 11**. The results of the analyses indicate that the SR 70 and CR 29 intersection is expected to meet the FDOT LOS standard C for non-urbanized areas under No-Build conditions through the design year (2045).

Table 11 - Future Year No-Build Intersection Analyses

American	Movement	AM Peak Ho	our	PM Peak Hour	
Approach	iviovement	Delay (s/veh)	LOS	Delay (s/veh)	LOS
Opening Year (2025)					
	Left Turn	7.9	Α	8.2	Α
Eastbound	Through	0.0	Α	0.0	Α
	Total	0.7	Α	0.7	Α
Westbound	Total	0.0	Α	0.0	Α
Southbound	Total	12.0	В	12.2	В
Interim Year (2035)					
	Left Turn	8.1	Α	8.4	Α
Eastbound	Through	0.0	Α	0.0	Α
	Total	0.8	Α	0.8	Α
Westbound	Total	0.0	Α	0.0	Α
Southbound	Total	14.1	В	13.9	В
Design Year (	2045)				
	Left Turn	8.2	Α	8.7	Α
Eastbound	Through	0.0	Α	0.0	Α
	Total	1.0	Α	1.0	Α
Westbound	Total	0.0	Α	0.0	Α
Southbound	Total	16.7	С	16.0	С

The results of the future year arterial analyses along SR 70 from CR 29 to Lonesome Island Road under No-Build conditions are shown in **Table 12**. The results of the analyses indicate that the SR 70 corridor from CR 29 to Lonesome Island Road is expected to meet the FDOT LOS standard C for non-urbanized areas under No-Build conditions through the design year (2045).

Table 12 - Future Year No-Build Arterial Analysis

	AM Peak Ho	ur	PM Peak Ho	ur
Direction	Volume to Capacity (v/c)	LOS	Volume to Capacity (v/c)	LOS
Opening Yea				
Eastbound	0.21	В	0.14	В
Westbound	0.14	В	0.21	В
Interim Year	(2035)			
Eastbound	0.25	В	0.18	В
Westbound	0.18	В	0.25	В
Design Year (2045)				
Eastbound	0.30	В	0.21	В
Westbound	0.21	В	0.30	В

### 4.2 ALTERNATIVE DEVELOPMENT

Based on the results of the No-Build operational analyses, SR 70 from CR 29 to Lonesome Island Road is expected to meet the FDOT LOS standard C for non-urbanized areas through the design year (2045) and does not require any operational improvements. However, capacity improvements are proposed to widen SR 70 from CR 29 to Lonesome Island Road from a two-lane undivided facility to a four-lane divided roadway. The proposed improvements along SR 70 from CR 29 to Lonesome Island Road are shown in **Figure 5**.

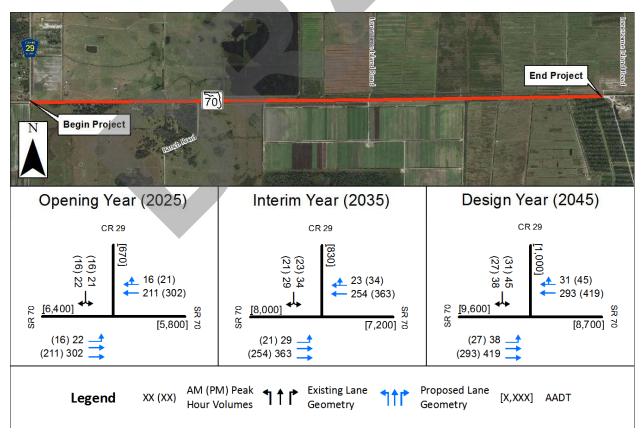


Figure 5 - Build Alternative

This widening is proposed as an initiative to improve operations along SR 70 during emergency evacuations. Highlands County is part of the Rural Area of Critical Economic Concern (RACEC) or Rural Area of Opportunity program defined by the state of Florida legislature to encourage and facilitate the location and expansion of major economic development projects of significant scale in such rural communities.

Furthermore, the Highway Safety Manual (HSM) predictive method was used to analyze SR 70 as a two-lane, undivided rural segment for the No-Build condition and as a multi-lane, divided rural segment for the Build condition. The predicted crash frequency by crash severity type for each condition in the design year (2045) is summarized in **Table 13**. An overall 60 percent decrease in crash frequency is anticipated with the implementation of the build condition. The predicted crash frequency calculations for the No-Build and Build conditions can be found in **Appendix H** and **Appendix I**, respectively.

Table 13 – Design Year (2045) Predicted Crash Frequency

Severity	No-Build Crash Frequency	<b>Build Crash Frequency</b>	Percent Difference
Fatal and Injury	3.83	2.50	-35%
Property Damage Only	8.11	2.23	-73%
Total	11.94	4.73	-60%

### 4.3 BUILD OPERATIONAL ANALYSES

Intersection and arterial operational analysis was conducted along SR 70 from CR 29 to Lonesome Island Road for the opening year (2025), interim year (2035), and design year (2045) under the proposed Build conditions. HCS7 was utilized to conduct HCM6E two-way stop control analysis and directional two-lane highway segment analysis, and can be found in **Appendix J**. The results of the future year intersection analyses at SR 70 and CR 29 under the proposed Build conditions are shown in **Table 14**. The results of the analyses indicate that the SR 70 and CR 29 intersection is expected to meet the FDOT LOS standard C for non-urbanized areas under the proposed Build conditions through the design year (2045).

The results of the future year arterial analyses along SR 70 from CR 29 to Lonesome Island Road under the proposed Build conditions are shown in **Table 15**. The results of the analyses indicate that the SR 70 corridor from CR 29 to Lonesome Island Road is expected to meet the FDOT LOS standard C for non-urbanized areas under the proposed Build conditions through the design year (2045).

### 4.4 NOISE ANALYSIS

The existing year (2018), opening year (2025), and design year (2045) AADT and design traffic factor information for the No-Build and Build conditions for Noise Analysis, as per the FDOT Noise Policy (Part 2, Chapter 17 of the PD&E Manual), can be found in **Appendix K**.

### 4.5 AIR QUALITY ANALYSIS

The opening year (2025) and design year (2045) traffic data for No-Build and Build conditions for the intersection with the greatest peak hour volumes for Air Quality Analysis, as per the FDOT Air Quality Policy (Part 2, Chapter 16 of the PD&E Manual), can be found in **Appendix L**.

**Table 14 – Future Year Build Intersection Analyses** 

		AM Peak Ho		AM Peak Hour PM P		PM Peak Ho	ur
Approach	Movement	Delay (s/veh)	LOS	Delay (s/veh)	LOS		
Opening Year							
	Left Turn	7.9	Α	8.2	Α		
Eastbound	Through	0.0	Α	0.0	Α		
	Total	0.5	Α	0.6	Α		
Westbound	Total	0.0	Α	0.0	Α		
Southbound	Total	10.5	В	10.8	В		
Interim Year	(2035)						
	Left Turn	8.1	Α	8.5	Α		
Eastbound	Through	0.0	Α	0.0	Α		
	Total	0.6	Α	0.6	Α		
Westbound	Total	0.0	Α	0.0	Α		
Southbound	Total	11.4	В	11.6	В		
Design Year (	2045)						
	Left Turn	8.3	Α	8.7	Α		
Eastbound	Through	0.0	Α	0.0	Α		
	Total	0.7	Α	0.7	Α		
Westbound	Total	0.0	Α	0.0	Α		
Southbound	Total	12.3	В	12.5	В		

Table 15 – Future Year Build Arterial Analysis

	AM Peak Hour		PM Peak Hour		
Direction	Volume to Capacity (v/c)	LOS	Volume to Capacity (v/c)	LOS	
Opening Year (2025)					
Eastbound	0.09	Α	0.06	Α	
Westbound	0.06	Α	0.09	Α	
Interim Year	(2035)				
Eastbound	0.11	Α	0.08	Α	
Westbound	0.08	Α	0.11	Α	
Design Year (2045)					
Eastbound	0.13	Α	0.09	Α	
Westbound	0.09	Α	0.13	Α	

### 5.0 Summary

The FDOT is conducting a roadway capacity improvement project to widen SR 70 from CR 29 to Lonesome Island Road from a two-lane undivided facility to a four-lane divided roadway. A DTTM was prepared to compare the SR 70 Western Study, completed in March 2017, with updated traffic data and to analyze the traffic operations along SR 70 with the proposed improvements. Based on the operational analyses of the existing and future traffic conditions documented in this DTTM, the following conclusions have been drawn:

- Within the study area, SR 70 has been identified as a critical facility for hurricane evacuations.
- Currently, SR 70 from CR 29 to Lonesome Island Road operates at a LOS B during the AM and PM peak hours.
- Review of recent crash data revealed that hitting an animal was the most common crash type, followed by hitting the guardrail.
- From 2013 to 2017, there were two fatal crashes, accounting for 5.4% of the total crashes. One fatality involved a bicyclist and the other occurred as a result of the driver running off the road.
- The SR 70 study corridor contains a crash rate 1.604 times that of the statewide average for similar facilities.
- If no improvements are implemented, SR 70 from CR 29 to Lonesome Island Road is projected to continue to operate at a LOS B in the design year (2045), while CR 29 will operate slightly worse as it approaches SR 70 at LOS C.
- The proposed widening of SR 70 from CR 29 to Lonesome Island Road, along with the incorporation of a median, has the potential to reduce fatal and injury crashes by 35%, property damage crashes by 73%, and all crashes by 60%.
- The proposed Build condition is anticipated to operate at a LOS A through the design year (2045), with LOS B operation along CR 29.

Appendix A: SR 70 PD&E Study DTTM

# **Design Traffic Technical Memorandum**

# State Road 70 PD&E Study

From West of Placid Lakes Boulevard/S. Jefferson Avenue to East of County Road 29
Highlands County, Florida



Prepared for:
Florida Department of Transportation
District One
District Environmental Management Office
801 North Broadway
Bartow, Florida 33831-1249

March 2017

# **Design Traffic Technical Memorandum**

# State Road 70 PD&E Study

From West of Placid Lakes Boulevard/S. Jefferson Avenue to East of County Road 29
Highlands County, Florida

Submitted by: Kisinger Campo and Associates in association with H.W. Lochner, Inc.

March 2017

# **Table of Contents**

Executive Summary			1
Project Description			1
Purpose			1
Conclusion			1
Introduction			2
Project Description			2
Purpose			2
Vicinity of the Study Corridor			2
Existing (2015) Conditions			5
Roadway Characteristics			5
Traffic Factors			6
Traffic Volumes			7
Existing (2015) Intersection Level of Service Analysis			9
Safety Considerations			10
Data Collection			10
Segments and Spots			10
Crash History			10
Crash Location Density and Crash Types			10
Future Conditions Analysis			14
Traffic Forecasting Parameters			14
Development of Future Traffic Volumes (No-Build)			14
Development of Future Traffic Volumes (Build)			15
Summary of Findings			24
Conclusion			24
Tables		Figures	
Table 2-1: Summary of Peak Hour Directional Factor (D)	6	Figure 1-1: Project Location Map	3
Table 2-2a:Truck Percentages Summary - (T <sub>24</sub> ) and DHT	6	Figure 1-2: Project Vicinity - Number of Lanes and Signalized	
Table 2-2b:Truck Percentages Summary - DHT	6	Intersection Locations	4
Table 2-3:Recommended Peak Hour Factors	7	Figure 2-1: SR 70 Lane Geometry	5
Table 2-4:Summary of Existing AADTs	7	Figure 2-2: Annual Average Daily Traffic (AADT) Volumes and	
Table 2-5: LOS and Delay (2015)	9	Turning Movement Volume Count Locations	8
Table 2-6: Arterial LOS(2015)	9	Figure 2-2a: Existing (2015) Turning Movement Volumes	8
Table 3-1: Crash History Overview	10	Figure 3-1: Crash Locations Map	11
Table 3-2: Crash Ratio Summary	12	Figure 3-2: One Vehicle & Multi-Vehicle Crashes by Type (2009-2013)	12
Table 4-1: LOS and Delay for Future Years (No Build)	22	Figure 3-3: Crash Ratio Chart	12
Table 4-2: No Build Arterial LOS	22	Figure 3-4: Lighting Conditions, Time of Day and Approach Speeds	13
Table 4-3: LOS and Delay for Future Years (Build)	23	Figure 4-1: Annual Average Daily Traffic Volumes (2020)	16
Table 4-4: Build Arterial LOS (Year 2040)	23	Figure 4-1a: Turning Movement Volumes (2020 No Build)	16
, ,		Figure 4-2: Annual Average Daily Traffic Volumes (2030)	17
		Figure 4-2a: Turning Movement Volumes (2030 No Build)	17
		Figure 4-3: Annual Average Daily Traffic Volumes (2040)	18
		Figure 4-3a: Turning Movement Volumes (2040 No Build)	18
		Figure 4-4a: Proposed Median Opening Locations (1 of 2)	19
		Figure 4-4b: Proposed Median Opening Locations (2 of 2)	20



### **STATE ROAD 70 PD&E STUDY**

FROM WEST OF PLACID LAKES BOULEVARD/S. JEFFERSON AVENUE TO EAST OF COUNTY ROAD 29

Figure 4-5: 2040 Build Turning Movement Volumes (AM and PM)

21

# **Executive Summary**

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study to improve and preserve mobility along the SR 70 study corridor. The project is located within Highlands County, Florida.

### **Project Description**

This roadway capacity improvement project entails widening SR 70 from Jefferson Avenue to CR 29 in Highlands County from a two-lane undivided facility to a four-lane divided roadway. SR 70 is a principal arterial and the primary east-west highway for the Lake Placid/southern Highlands County area, providing regional access to employment centers, agricultural lands, and residential areas across the state. SR 70 is a designated hurricane evacuation route and a part of the Strategic Intermodal System (SIS) highway network. The project is approximately 7 miles in length. Existing right-of-way along the corridor ranges from approximately 80 feet between Jefferson Avenue to east of Monroe Street, approximately 200 feet east of Monroe Street to east of L7 Ranch Road, and approximately 100 feet east of L7 Ranch Road to CR 29. Additional right-of-way will likely be needed to accommodate the proposed widening, particularly at the eastern and western ends of the corridor; however, the specific right-of-way requirements will be determined during the PD&E Study.

The widening of SR 70 is identified in the Capital Improvement Element of the Highlands County 2030 Comprehensive Plan and adopted in the Heartland 2040 Long Range Transportation Plan and Heartland Draft Transportation Improvement Plan. The PD&E study for this project is also identified in the State Transportation Improvement Program and the 2024 - 2040 SIS Long Range Cost Feasible Plan [including the First Five-Year Plan (FY 2014/2015 - FY 2018/2019)]. The project is additionally identified in the FY 2015 - FY 2019 FDOT Work Program with \$1.7 million programmed in FY 2015 for the PD&E Study. Additionally, the widening of SR 70 from Jefferson Avenue to CR 29 is classified as a high priority investment in the Florida Freight Mobility and Trade Plan: Investment Element - Project list. Planning consistency will be achieved prior to submittal of the final environmental document to the Office of Environmental Management (OEM) and issuance of Location and Design Concept Acceptance (LDCA). Further, SR 70 is included as a four-lane facility throughout all of Highlands County in the Florida Department of Transportation's 2035 Strategic Intermodal System Cost Feasible Plan.

### **Purpose**

The purpose of this project is to improve operational conditions for emergency evacuations along the SR 70 corridor from Jefferson Avenue to CR 29. The Florida Division of Emergency Management's Statewide Regional Evacuation Study Program determined the segment of SR 70 between US 27 to east of the end project limit at CR 29 to be a critical segment with the longest vehicle queues among all roadways in the Central Florida region during emergency evacuations.

### Conclusion

Crash analysis along the study corridor showed that more than one-third of the crashes were one vehicle crashes (24 crashes out of 63 total crashes). These crashes involved vehicles crashing into a fixed object, or animal or running into a ditch as a major contributor. Also, it was noted that excessive speeds along the study corridor might have also contributed for crash rates being higher than statewide average crash rates along similar corridors. Implementation of design components to reduce travel speeds and make travelers aware that they are approaching a signalized intersection near US 27 can be achieved by installing signal warning signs or beacons. Widening the study corridor to four lanes should also be considered as a high percentage (14% during peak hour) of truck traffic utilizes this section of the SR 70 corridor.

Hurricane evacuation transportation analysis shows that widening the study corridor to four lanes will reduce the queues along the study corridor from east of US 27 to CR 29 which were observed under No Build conditions.

Intersection Analysis - Design hour traffic evaluation under existing conditions and future Design year (2040) No Build conditions showed that all of the intersections along the SR 70 study corridor operate under acceptable LOS conditions. A Build alternative analysis was also conducted for the Design year (2040) which also shows that the intersections along the SR 70 study corridor will operate under acceptable LOS conditions.

Arterial Analysis - Evaluation of segment LOS conditions showed that under existing (2015) conditions, the segment of SR 70 from Old SR 8 (North) to US 27 operates at LOS D which is worse than acceptable LOS conditions (LOS C). Under future No Build conditions, the segments along SR 70 from Old SR 8 (North) to CR 29 operate at LOS D conditions. This indicates that the study corridor will require capacity improvements to make the corridor operate at acceptable LOS conditions (LOS C). The Build conditions segment analysis showed that the proposed lane addition (2 to 4 lanes) will make the corridor operate at LOS A conditions.

The crash and hurricane evacuation analyses also indicate that a widening of the corridor will be needed. Highlands County is part of the Rural Area of Critical Economic Concern (RACEC) or Rural Area of Opportunity program defined by the state of Florida legislature to encourage and facilitate the location and expansion of major economic development projects of significant scale in such rural communities.

Therefore, widening the study corridor to four lanes should be considered as an alternative after carefully evaluating other PD&E elements.



# Introduction

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study to improve and preserve mobility along the SR 70 study corridor. The project is located within Highlands County, Florida.

### **Project Description**

This roadway capacity improvement project entails widening SR 70 from Jefferson Avenue to CR 29 in Highlands County from a two-lane undivided facility to a four-lane divided roadway. SR 70 is a principal arterial and the primary east-west highway for the Lake Placid/southern Highlands County area, providing regional access to employment centers, agricultural lands, and residential areas across the state. SR 70 is a designated hurricane evacuation route and a part of the SIS highway network. The project is approximately 7 miles in length. Existing right-of-way along the corridor ranges from approximately 80 feet between Jefferson Avenue to east of Monroe Street, approximately 200 feet east of Monroe Street to east of L7 Ranch Road, and approximately 100 feet east of L7 Ranch Road to CR 29. Additional right-of-way will likely be needed to accommodate the proposed widening, particularly at the eastern and western ends of the corridor; however, the specific right-of-way requirements will be determined during the PD&E Study.

The widening of SR 70 is identified in the Capital Improvement Element of the Highlands County 2030 Comprehensive Plan and adopted in the Heartland 2040 Long Range Transportation Plan and Heartland Draft Transportation Improvement Plan. The PD&E study for this project is also identified in the State Transportation Improvement Program and the 2024 - 2040 SIS Long Range Cost Feasible Plan [including the First Five-Year Plan (FY 2014/2015 - FY 2018/2019)]. The project is additionally identified in the FY 2015 - FY 2019 FDOT Work Program with \$1.7 million programmed in FY 2015 for the PD&E Study. Additionally, the widening of SR 70 from Jefferson Avenue to CR 29 is classified as a high priority investment in the Florida Freight Mobility and Trade Plan: Investment Element - Project list. Planning consistency will be achieved prior to submittal of the final environmental document to the Office of Environmental Management (OEM) and issuance of Location and Design Concept Acceptance (LDCA). Further, SR 70 is included as a four-lane facility throughout all of Highlands County in the Florida Department of Transportation's 2035 Strategic Intermodal System Cost Feasible Plan.

### **Purpose**

The purpose of this project is to improve operational conditions for emergency evacuations along the SR 70 corridor from Jefferson Avenue to CR 29. The Florida Division of Emergency Management's Statewide Regional Evacuation Study Program determined the segment of SR 70 between US 27 to east of the end project limit at CR 29 to be a critical segment with the longest vehicle queues among all roadways in the Central Florida region during emergency evacuations. **Appendix A** presents the excerpts from Florida Statewide Regional Evacuation Study Program - Evacuation Transportation Analysis, Volume 4-7, Florida Division of Emergency Management, Central Florida Regional Planning Council, September 2010.

### Vicinity of the Study Corridor

The number of roadway lanes and signalized intersection locations in the vicinity of the study corridor are shown in **Figure 1-2**. The only signalized intersection along SR 70 within the project limits is located at the US 27 intersection. The next closest signalized intersections are approximately 30 miles due east and west of the US 27 intersection. A flashing beacon is located at the intersection of CR 721, which is approximately 15 miles due east of the US 27 intersection.



# Introduction

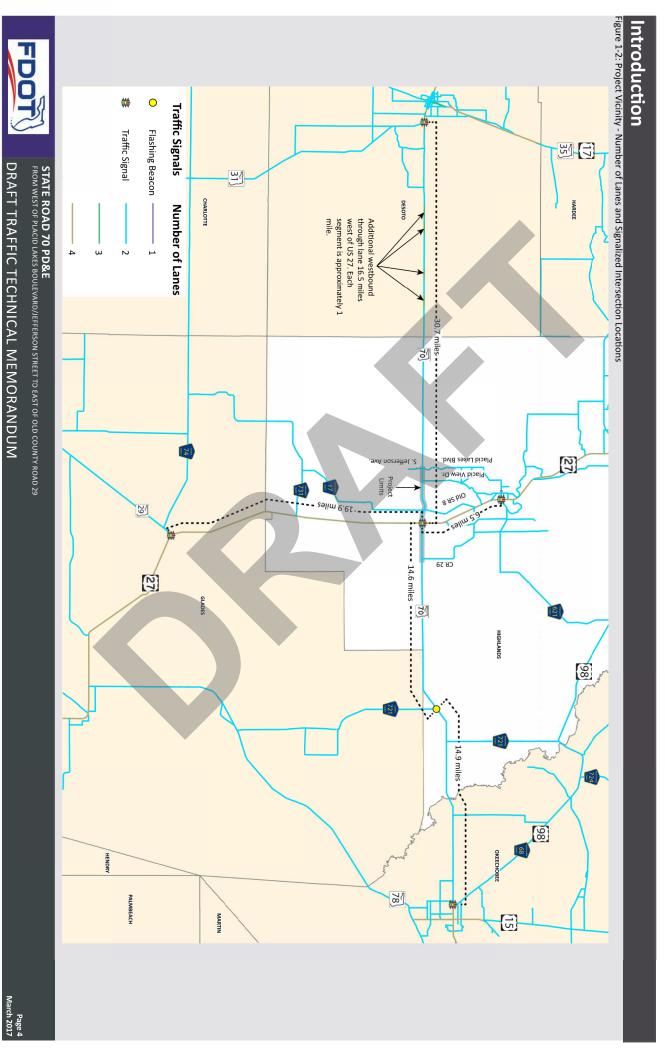
Figure 1-1: Project Location Map





**STATE ROAD 70 PD&E STUDY** 

FROM WEST OF PLACID LAKES BOULEVARD/S. JEFFERSON AVENUE TO EAST OF COUNTY ROAD 29



# **Existing (2015) Conditions**

### **Roadway Characteristics**

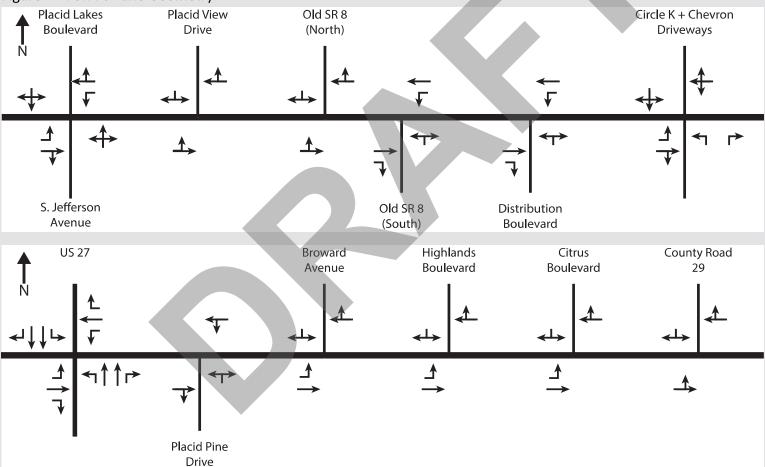
The SR 70 study corridor is a two-lane roadway throughout the project limits, which spans from west of Placid Lakes Boulevard/S. Jefferson Avenue to east of CR 29, a length of approximately 7 miles. It is a Strategic Intermodal System (SIS) Highway facility, serves as part of an emergency evacuation route network, and facilitates the east-west movement of freight and people.

The only major intersection within the project limits is the SR 70 and US 27 intersection. This is also the only signalized intersection within the project limits.

### **Typical Section**

The existing typical section for SR 70 is a two-lane undivided rural roadway with one 12-foot lane in each direction and open ditches. In general, the posted speed limit along the study corridor is 60 miles per hour (MPH). Reduced speed limit signs are in place within the proximity of US 27 signalized intersection. The posted speed limit transitions from 60 MPH to 55 MPH to 45 MPH and back to 60 MPH from west of Old SR 8 (North) to west of Highlands Boulevard. **Figure 2-1** illustrates the existing (2015) intersection lane geometry for SR 70 throughout the study limits.

Figure 2-1: SR 70 Lane Geometry





# **Existing (2015) Conditions**

### **Traffic Factors**

The SR 70 study corridor is located in a rural area; therefore, a standard K factor of 9.5% was used as recommended in the FDOT Project Traffic Forecasting Handbook (2014).

A three year historical average (2012-2014) from 2014 Florida Traffic Information (FTI) was used to calculate the peak hour Directional Factor (D). The D was also calculated using the tube counts (both 24 hour and 72 hour) collected for this study. **Table 2-1** shows a summary of the peak hour D calculations. A peak directional factor (D) of 58.83% was used for the entirety of the SR 70 corridor - this factor is within the suggested D factor range for rural arterial in the FDOT Project Traffic Forecasting Handbook (51.1% to 79.6%).

Table 2-1: Summary of Peak Hour Directional Factor (D)

	2014 Florida	<b>Tube Counts</b>		
Location	2012	2013	2014	2015
SR 70 west of Jefferson Avenue	58.00%	59.10%	59.40%	56.45%
SR 70 west of US 27	58.00%	59.10%	59.40%	52.58%
SR 70 east of US 27	58.00%	59.10%	59.40%	55.88%
SR 70 east of CR 29	N/A	N/A	N/A	55.83%
Yearly Average (D)	58.00%	59.10%	59.40%	55.19%
Average (D)		58.83%		55.19%

Note: Average D 30 from FTI and tube counts were kept separate for calculating overall average

The Design Hour Truck (DHT) percentage was calculated from the average of the available Daily Truck percentage ( $T_{24}$ ) from 2014 FTI. DHT was also calculated from turning movement volume count data collected for this study. **Table 2-2a** and **Table2-2b** shows the  $T_{24}$  and DHT (which is assumed as half of  $T_{24}$ ) calculations from 2014 FTI data and DHT calculated from field collected turning movement count data for this study. A DHT percentage of 14.0 percent was used along SR 70 and at US 27 north and south of SR 70. An average of AM and PM peak hour truck percentages from the turning movement count data (collected for this study) was calculated. This showed that all the cross streets south of SR 70 carried approximately 2 percent truck traffic and all the cross streets north of SR 70 carried approximately 5 percent truck traffic. Therefore, a DHT percentage of 2.0 percent was used at all other cross streets south of SR 70 and a DHT percentage of 5.0 percent was used at all other cross streets north of SR 70.

Table 2-2a:Truck Percentages Summary - (T<sub>24</sub>) and DHT

Location	2012	2013	2014
SR 70 west of Jefferson Avenue	29.20%	29.20%	29.20%
SR 70 west of US 27	28.30%	27.60%	27.60%
SR 70 east of US 27	21.10%	18.10%	18.10%
US 27 north of SR 70	30.20%	29.00%	29.00%
US 27 south of SR 70	30.30%	30.80%	30.40%
Average (T <sub>24</sub> )	27.82%	26.94%	26.86%
Overall Average (T <sub>24</sub> )		27.21%	
DHT		14%	

Source: 2014 FTI

Table 2-2b:Truck Percentages Summary - DHT

Location	2015 DHT
SR 70	14%
US 27 north and south of SR 70	14%
Cross Streets (south of SR 70)	2%
Cross Streets (north of SR 70)	5%

Source: 2015 TMV counts



### STATE ROAD 70 PD&E STUDY

FROM WEST OF PLACID LAKES BOULEVARD/S. JEFFERSON AVENUE TO EAST OF COUNTY ROAD 29

Table 2-3 shows the recommended peak hour factors for this study.

Table 2-3: Recommended Peak Hour Factors

Factors	Standard K	D	DHT
Recommended	9.5%	58.83%	14.0%

Note: A DHT of 2% & 5% was used for all the cross streets south and north of SR 70 Study Corridor, respectively. A DHT of 14% was used for US 27 north and south of SR 70 Study Corridor.

### Traffic Volumes

Traffic data collected for this project includes 24-hour bi-directional approach counts, 72-hour vehicle classification counts, and 2 hour turning movement volume counts (TMCs). All counts were collected in June/July of 2015. **Table 2-4** shows a summary of existing AADTs, **Figure 2-2** shows locations where counts were collected and 2015 Average Annual Daily Traffic (AADT) and **Figure 2-2a** shows existing (2015) turning movement volumes. The existing year (2015) design hour volumes were calculated using the formula: AADT x standard K x D. These design hour volumes were then converted to turning movement volumes by applying the existing unbalanced turn percentages at each study intersection. The resulting turn volumes were then balanced between adjacent intersections.

**Appendix B** shows the raw traffic volumes collected, traffic factor calculations, seasonally adjusted AADTs and TMCs and TMCs balanced to adjacent intersection locations for the 2015 existing year.

Table 2-4: Summary of Existing AADTs

able 2-4.3ullillary of Existing AAD is						
		Seasonal	Axle	NB/EB	SB/WB	2015
Count Location Site	Count Type	Factor	Factor	Approach	Approach	AADT
SR 70 west of Placid Lakes Boulevard	24 Hour Class	1.10	1.00	1,682	1,582	3,600
SR 70 west of US 27	72 Hour Class	1.04	1.00	2,480	2,274	4,900
SR 70 east of US 27	72 Hour Class	1.04	1.00	2,096	1,927	4,200
SR 70 east of CR 29	24 Hour Class	1.08	1.00	2,089	2,024	4,400
Placid Lakes Boulevard north of SR 70	24 Hour Class	1.10	1.00	328	310	700
Park Land Drive south of SR 70	24 Hour Class	1.10	1.00	116	107	200
Placid View Drive north of SR 70	24 Hour Class	1.10	1.00	212	184	400
Old SR 8 (north) north of SR 70	24 Hour Class	1.07	1.00	455	487	1,000
Old SR 8 (south) south of SR 70*	24 Hour Class	1.07	1.00	241	219	460
Distribution Boulevard south of SR 70	24 Hour Class	1.08	1.00	59	25	100
Glades Electric north of SR 70	24 Hour Class	1.07	1.00	94	49	200
Andersons south of SR 70	24 Hour Class	1.07	1.00	63	69	100
US 27 north of SR 70	72 Hour Class	1.04	1.00	3,661	3,465	7,400
US 27 south of SR 70**	72 Hour Class	1.04	1.00	3,622	3,548	7,200
Myers Road north of SR 70	24 Hour Class	1.08	1.00	17	9	30
Placid Pine Drive south of SR 70	24 Hour Class	1.07	1.00	62	29	100
North Edge Street north of SR 70	24 Hour Class	1.08	1.00	31	30	100
Ekhoff Lane north of SR 70	24 Hour Class	1.08	1.00	10	18	30
Broward Avenue north of SR 70	24 Hour Class	1.08	1.00	102	81	200
Highlands Boulevard north of SR 70	24 Hour Class	1.08	1.00	172	177	400
Citrus Boulevard north of SR 70	24 Hour Class	1.08	1.00	14	35	100
Bear Road north of SR 70	24 Hour Class	1.08	1.00	98	83	200
CR 29 north of SR 70	24 Hour Class	1.08	1.00	227	212	500

Notes:

<sup>\*\*2014</sup> counts from the telemetered FTI site was used.

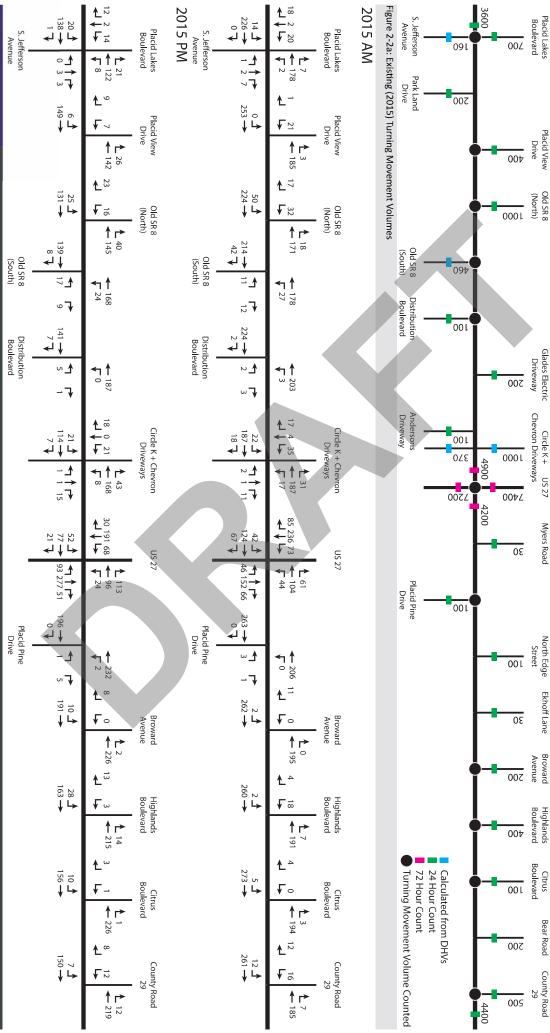


FROM WEST OF PLACID LAKES BOULEVARD/S. JEFFERSON AVENUE TO EAST OF COUNTY ROAD 29

<sup>\*2014</sup> counts from the FTI site projected to year 2015 was used.

# Existing (2015) Conditions

igure 2-2: Annual Average Daily Traffic (AADT) Volumes and Turning Movement Volume Count Locations-





STATE ROAD 70 PD&E FROM WEST OF PLACID LAKES BOULEVARD/JEFFERSON STREET TO EAST OF OLD COUNTY ROAD 29

# Existing (2015) Conditions

### Existing (2015) Intersection Level of Service Analysis

### Level of Service Standards

On April 18, 2012, a FDOT memorandum was issued that states the LOS standard for all FDOT facilities is LOS D within urbanized areas and LOS C in non-urbanized areas. Based on 2010 census data, SR 70 does not pass through urbanized areas. For this reason, the minimum LOS standard for the entire SR 70 study area under existing conditions is LOS C. The FDOT memorandum is shown in **Appendix C**.

### **Existing Conditions Analysis**

Intersection level of service for existing (2015) conditions was estimated using Synchro (Version 9). AM peak hour and PM peak hour analyses were performed under existing conditions. The analysis results for the intersection within the project limits are summarized in **Table 2-5** (LOS and Delay). Segment analysis was conducted using HighPlan and the results are summarized in **Table 2-6**.

The Synchro outputs for intersection analysis and associated queues and HighPlan outputs are included in Appendix D.

Table 2-5: LOS and Delay (2015)

	Existing (2015)					
	AM Peak I	Hour	PM Peak Hour			
SR 70 Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS		
S. Jefferson Ave/Placid Lakes Boulevard*	11.5	В	10.6	В		
Placid View Drive*	11.8	В	9.9	Α		
Old SR 8 (North)*	12.2	В	10.2	В		
Old SR 8 (South)*	10.8	В	10.5	В		
Distribution Blvd*	10.4	В	10.4	В		
Chevron/Circle K Driveways*	12.1	В	10.7	В		
US 27	23.5	С	24.3	С		
Placid Pine Drive*	11.4	В	9.8	Α		
Broward Ave*	9.5	Α	9.6	Α		
Highlands Blvd*	11.7	В	10.1	В		
Citrus Blvd*	9.4	Α	10.1	В		
CR 29*	11.2	В	10.8	В		

<sup>\*</sup> Unsignalized intersection, worst approach delay used.

Table 2-6: Arterial LOS(2015)

Corridor	From	То	Segment Length (Miles)	Percentage Time Spent Following (Sec)	Average Speed (mph)	LOS
	S. Jefferson Avenue/					
	Placid Lakes Boulevard	Old SR 8 (North)	3.2	51.2	58.7	С
SR 70	Old SR 8 (North)	US 27	1.1	68.5	46.4	D
	US 27	Highlands Boulevard	1.3	65.6	46.7	D
	Highlands Boulevard	CR 29	1.5	64.9	56.7	С



# Safety Considerations

### **Data Collection**

Crash data within the project limits was collected for the years 2009 through 2013. The crash data was obtained from the FDOT Crash Analysis Report System (CARS) database, which includes information regarding the number and types of crashes, the locations of the crashes, and the number of resulting injuries and fatalities. The FDOT CARS database contains only crashes reported to state or local law enforcement and does not include any unreported minor crashes.

### **Segments and Spots**

Crash analyses were conducted for the years 2009 through 2013, the five most recent years of data at the time of this analysis. Segment crash analysis for State Road 70 was broken down into the following segments:

- Segment 1: State Road 70 from West of S. Jefferson Avenue to West of US 27 (MP 10.170 14.443)
- Segment 2: State Road 70 from East of US 27 to CR 29 (MP 14.537 17.302)

The spot analysis for this study included only the signalized intersection:

• Spot 1: SR 70 at US 27 (MP 14.443 - 14.537)

### **Crash History**

The crash data collected within the project limits showed 63 crashes for the five-year study period. These 63 crashes involved 1 fatality and 38 injuries. More detailed information on the crashes, including yearly totals and averages, are provided in **Table 3-1**.

Table 3-1: Crash History Overview

Crash Summary	2009	2010	2011	2012	2013	Total	Average
Fatal Crashes	0	0	1	0	0	1	0
Total Fatalities	0	0	1	0	0	1	0
Injury Crashes	8	3	4	1	5	21	4
Total Injuries	12	3	13	1	9	38	8
Property Damage Only Crashes	12	10	5	5	9	41	8
Crash Totals	20	13	10	6	14	63	13

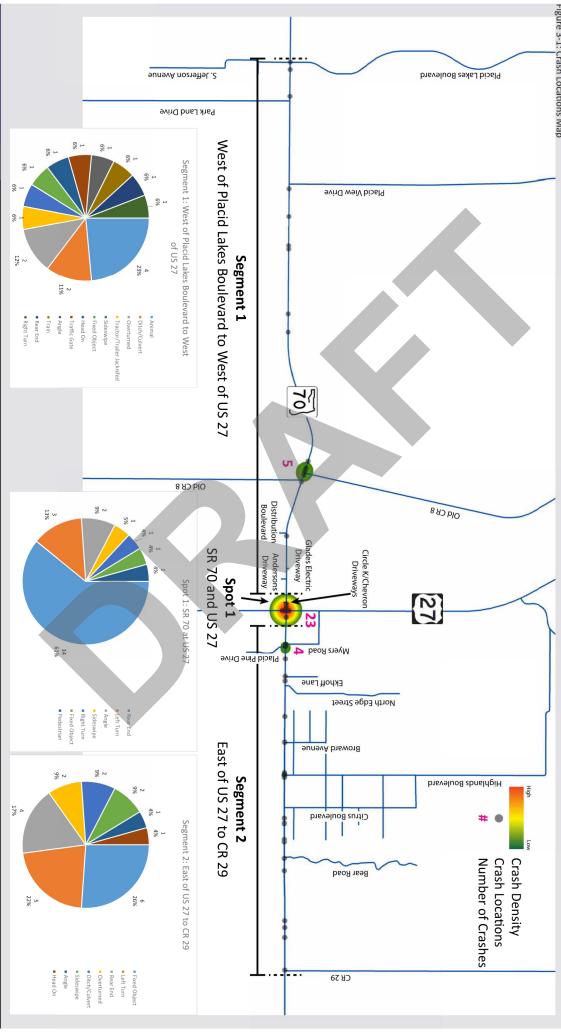
### **Crash Location Density and Crash Types**

Based on crash location density mapping, as shown in **Figure 3-1**, a high number of crashes (23 crashes) are clustered at the SR 70 at US 27 signalized intersection when compared to any other locations along the study corridor. Crash density mapping also shows clusters of crashes near Old State Road 8 (7 crashes) and Placid Pine Drive (4 crashes). An examination of crash types along the segments show that a majority of crashes were either because of colliding with an animal or with fixed objects. An examination of spot crashes shows that a majority of crashes were rear end crashes.

As a majority of segment crashes were because of the vehicle colliding with an animal or fixed object, an examination of number of vehicles involved in the crash was performed. This showed that more than one-third of the crashes (24 crashes) were 1 vehicle crashes. **Figure 3-2** shows one vehicle and multi-vehicle crash type plots.



# Figure 3-1: Crash Locations Map Safety Considerations



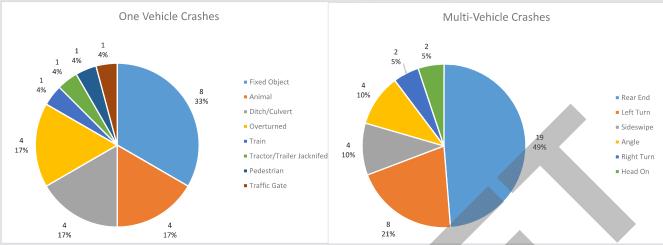


STATE ROAD 70 PD&E FROM WEST OF PLACID LAKES BOULEVARD/JEFFERSON STREET TO EAST OF OLD COUNTY ROAD 29

DRAFT TRAFFIC TECHNICAL MEMORANDUM

# **Safety Considerations**

Figure 3-2: One Vehicle & Multi-Vehicle Crashes by Type (2009-2013)



### **Crash Ratios**

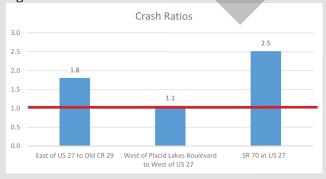
Crash ratios are calculated by dividing the actual crash rate of a spot or segment by the statewide average crash rate for the same type of roadway facility. Crash rates for spots represent the number of crashes per million vehicles entering an intersection and for segments represent the number of crashes per million vehicle miles traveled. Crash ratios larger than 1.00 indicate locations where the actual crash rate exceeds the statewide average crash rate, and therefore signify locations that should be investigated for potential safety issues. The values used to calculate these crash ratios are provided in **Appendix E**. The five-year average crash ratios for the study area are shown in **Table 3-2** and on **Figure 3-3**. Crash ratios larger than 1.00 are indicated in bold italic text in **Table 3-2**.

As summarized in **Table 3-2**, the spot and segment crash ratios indicate that, on average, the crashes along the project corridor are higher than that of the statewide average for similar roadways.

Table 3-2: Crash Ratio Summary

ľ	CRASH	Crash Spot/Segment			Crash Ratios			
SUMMARY		Crash Spot/Segment	2009	2010	2011	2012	2013	Average
I	Spots	SR 70 at US 27	5.8	1.8	1.2	1.5	2.3	2.5
I		West of Placid Lakes Boulevard						
ı	Segments	to west of US 27	1.7	1.6	0.7	0.3	1.1	1.1
l		East of US 27 to CR 29	2.1	2.1	2.6	0.7	1.6	1.8

Figure 3-3: Crash Ratio Chart



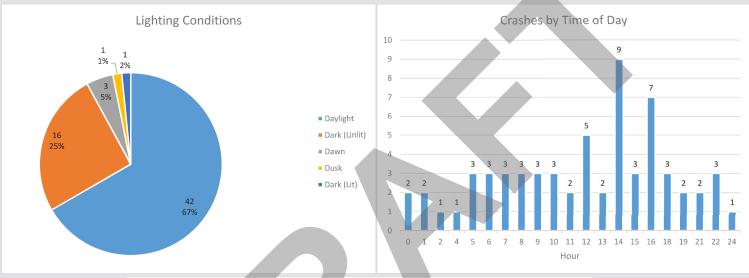


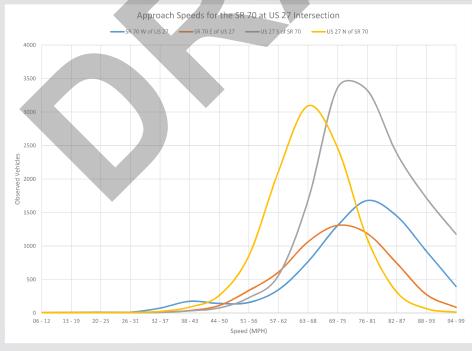
# **Safety Considerations**

### Conclusion

Crash factors such as lighting conditions, crashes by time of day and approach speeds for the SR 70 at US 27 intersection were examined to determine the reason for crash rates being higher than the statewide average. The lighting conditions, crashes by time of day and approach speeds plot from the 72 hour count data are shown in **Figure 3-4**. The lighting condition along the roadway is a concern. However, it does not appear to be a major crash factor. The time of day plot showed that the crashes were higher between 2:00 PM and 4:00 PM, but not during dark conditions. Speed plots showed that the traffic is traveling at speeds that are higher than posted speeds along SR 70 (posted speed 55 MPH) and US 27 (posted speed 45 MPH). The excessive traveling speeds might be a reason for crash rates higher than the statewide average. Implementing design components to reduce travel speeds and make travelers aware that they are approaching the signalized intersection at US 27 could be achieved by installing signal warning signs or beacons. These signs could reduce speed related crashes at the US 27 intersection.

Figure 3-4: Lighting Conditions, Time of Day and Approach Speeds







# **Future Conditions Analysis**

### **Traffic Forecasting Parameters**

The traffic factors used for future volumes development are listed below:

- The standard K factor for rural areas, which is 9.5 percent
- The D factor obtained from averaging the available FTI D factors in the study area, which is 58.83 percent
- A design hour truck percentage of 14 percent

These traffic factors are the same as the traffic factors used for existing (2015) conditions as no major changes in land use conditions were forecasted along the vicinity of the study corridor.

### Development of Future Traffic Volumes (No-Build)

Future year traffic volume were developed after examining the following data sources:

- Historical Traffic
- Travel Demand Model Forecasts
- Population Projections/Estimates

Historical Traffic - An examination of historical traffic trend showed that the AADT volumes along the SR 70 study corridor and US 27 showed minimal to no growth over the past six years (2009-2014).

Travel Demand Model Forecasts - Highlands County Travel Demand Model with a validation year of 2006 and year 2035 needs model was also examined. The model forecasts showed yearly growth rate of 11% to 13% along SR 70 corridor east of US 27 and a 4% growth along SR 70 corridor west of US 27. However, the high yearly growth rate east of US 27 along SR 70 study corridor was determined to be an anomaly after examining the external station data from the neighboring county travel models.

Population Projections/Estimates - Population projections from Bureau of Economic and Business Research (BEBR) were also examined. BEBR Bulletin 175, June 2016 showed a population estimate of 100,748 for the year 2015 and a population projection of 120,227 for the year 2040. The population grows at a rate of 1% per year based on 2015 estimate and 2040 projection.

A summary of projections is listed below:

- Historical traffic data showed minimum to no growth.
- Travel demand model forecasts showed a significant growth because of the underlying socioeconomic data which was projected for a base year of 2006 and future year of 2035. These projections were made before the economic downturn.
- The latest BEBR Population Projections/Estimates showed that population of Highlands County will have an annual growth of 1.0 percent.

Based on the above observations, plus keeping in mind the continuity of SR 70 corridor from the west coast to the east coast of Florida, a significant portion of regional trips will traverse the study corridor. Therefore, it was determined that an annual growth rate of 2.0 percent should be used for future traffic volume development.

**Appendix F** presents the historical traffic trends analyses, growth rates determination memo, BEBR Bulletin 175, June 2016 - Highlands County population projections and raw 2040 turning movement volume calculations.

The future year design hour volumes were calculated using the formula: AADT x standard K x D. These design hour volumes were converted to turning movement volumes by applying the existing unbalanced turn percentages at each study intersection. These unbalanced turning movement volumes were then balanced/smoothed between adjacent intersections prior to performing operational analyses.

Figures 4-1 and Figure 4-1a shows the 2020 No-Build Condition AADT, AM and PM peak hour turning movement volumes along the study corridor.

Figures 4-2 and Figure 4-2a shows the 2030 No-Build Condition AADT, AM and PM peak hour turning movement volumes along the study corridor.

Figures 4-3 and Figure 4-3a shows the 2040 No-Build Condition AADT, AM and PM peak hour turning movement volumes along the study corridor.



# **Future Conditions Analysis**

The calculated turning movement volumes and adjusted/balanced intersection turning movement volumes for the year 2040 are presented in **Appendix G** in stick figure format. Year 2020 and 2030 design hour volumes were calculated via weighted averages of existing (2015) and 2040 volumes, and are also presented in **Appendix G**.

### Development of Future Traffic Volumes (Build)

The proposed Build condition for SR 70 is a four-lane divided facility with median openings. The proposed median opening locations are shown in **Figure 4-4a** and **Figure 4-4b**. The study corridor will be redesignated as Access Class 3 facility under the proposed Build condition and will adhere to minimum spacing requirements included in Florida Administrative Code (F.A.C) Chapter 14-97. The Build condition turning movement volumes were developed by redistributing No-Build turning movement volumes and proposed median opening locations.

Figures 4-5 shows the 2040 Build condition AM and PM peak hour turning movement volumes along the study corridor.



### 4000 2020 AM **Future Conditions Analysis** Placid Lakes Boulevard Figure 4-1a: Turning Movement Volumes (2020 No Build) S. Jefferson Figure 4-1: Annual Average Daily Traffic Volumes (2020) Avenue 022 180 Park Land Drive 220 Placid View Drive 0†† Old SR 8 (North) 1100 Old SR 8 (South) 015 Distribution Boulevard 011 Glades Electric Driveway 220 Chevron Driveways Circle K + US 27 011 015 1100 5400 0018 0062 4600 Myers Road 33 Placid Pine Drive 011 North Edge Ekhoff Lane Street 011 ٤٤ Broward Avenue 220 Highlands Boulevard 077 Citrus Boulevard 011 Bear Road 550 County Road 29 055 4800

7070 7141	2		4								
Placid Lakes Boulevard	akes Placid View ard Drive	ew Old SR 8 (North)			Circle K + Chevron Driveways	US 27		Broward Avenue	Highlands Boulevard	Citrus Boulevard	County Road 29
20 2 22 <b>L V</b>	↑ 194 1 24 <b>1 1 1 1 1 1 1 1 1 1</b>	↑ 202 19 32 ↑ 186	<b>↑</b> 192	<b>↑</b> 221	20 4 38 ← 202 ← 21 ← 21	92 260 78	↑ 223 12 ↑ 0 <b>↑</b>	v 0 ↑ 211 4	<u>20</u> ★ 8	<b>1</b>	13 18 ↑ 8 13 18 ↑ 201
15 <b>-</b>	1 ↑ ↑ 0 ↑ 1 2 8 280 →	56. <u>↑</u> 234. → 248 → 46. ¬	14 T <sub>2</sub>	244 → 2 3 2 → 3	$ \begin{array}{c c} 24 \stackrel{\bullet}{\searrow} & \stackrel{\bullet}{\searrow} \uparrow \uparrow \\ 203 \stackrel{\bullet}{\longrightarrow} & 2 & 1 & 12 \\ 20 \stackrel{\bullet}{\nearrow} & & & \end{array} $	46 ♪ ↑↑↑ 133 → 52 167 72	283 → 3 1	2 <b>→</b> 282 <b>→</b>	2.4 280 →	5 <b>→</b> 295 <b>→</b>	13 <b>→</b> 282 <b>→</b>
S. Jefferson Avenue 2020 PM	son 1		Old SR 8 (South)	Distribution Boulevard	_		Placid Pine Drive				
Placid Lakes Boulevard	akes Placid View	ew Old SR 8 (North)			Circle K + Chevron Driveways	US 27		Broward Avenue	Highlands Boulevard	Citrus Boulevard	County Road 29
13 2 15 \[ \frac{1}{4} \]	↑ 26 ↑ 143 10 8 ↑ ↓ ↓	↑ 168 25 18 ↑ 175	↑ 186 ↑ 25	<b>↑</b> 204	21 0 23 ★ 182 ★ ▼ 9	↑ 125 31 210 73 ↑ 110 ↑ ↓ ↓ ↑ 26	↑ 260 9 ↑ 2 1	0 <del>1</del> 253 14	1	<sup>3</sup> 1 ↑ 253	9 13 <del>1</del> 245
22 <b>^</b>	<b>4</b> ↑↑ 6♪ 033 169→	28. 149 → 158 → 9 ¬	33 <b>♪</b> 18	168 <del>                                     </del>	23 <del> </del>	61 <u>→</u> 91 → 100 305 56 26 →	220 -> 1 7	11 <b>→</b> 216 <b>→</b>	32 <b>→</b> 184 <b>→</b>	11 <b>→</b> 176 →	8 <b>→</b> 169 <b>→</b>
S. Jefferson Avenue	son		Old SR 8 (South)	Distribution Boulevard	-		Placid Pine Drive				
		2747 7047 7077									



### 4700 **Future Conditions Analysis** S. Jefferson Avenue Placid Lakes Boulevard Figure 4-2: Annual Average Daily Traffic Volumes (2030) 016 012 Park Land Drive 097 Placid View Drive 250 Old SR 8 (North) 1300 Old SR 8 (South) 009 Distribution Boulevard 130 Glades Electric Driveway 097 Circle K + US 27 Chevron Driveways 130 081 1300 6400 0096 0076 5500 Myers Road 6٤ Placid Pine Drive 130 North Edge Ekhoff Lane Street 130 68 Broward Avenue 097 Highlands Boulevard 250 Citrus Boulevard 130 Bear Road 760 County Road 29 059 5700

Figure 4-2a: Turning Movement Volumes (2030 No Build)

2030 AM

S. Jefferson Avenue	26 → ↑ ↑ 195 → 0 4	15 3 18	Placid Lakes Boulevard	S. Jefferson Avenue 2030 PM	18 ★ ↑ ↑ 1 3 0 → 1 3	23 3 26 <del>1</del> 224 <del>1</del> 224	Placid Lakes Boulevard
	7 <u>↑</u> 4 210 →	2 11 9 <del>1</del> 43	Placid View Drive		r→ 0 → 9 331 →	<sup>4</sup> 2 31 ↑ 4 <b>1</b>	Placid View Drive
	186 →	13 123 30 21 ← 236 14 ↓	Old SR 8 (North)		66 <b>→</b> 296 <b>→</b>	1 23 33 1 22 33 1 215	Old SR 8 (North)
Old SR 8 (South)	196 → 66 35	52 236		Old SR 8 (South)	275 → 20 11 54 →	23 215 <b>←</b> 218 <b>√</b> 38	
Distribution Boulevard	2222 → 11 2 9 →	<b>↑</b> 242		Distribution Boulevard	283 → 2 4 3 → 2 4	<b>↑</b> 254	
	29 <u>→</u> 186 <del>→</del> 2 2 20	23 0 28 <del>1</del> 217	Circle K + Chevron Driveways	_	29 <b>△</b> 235 <b>→</b> 3 1 15 23 <b>→</b>	22 5 45 <del>**</del> 233 <del>**</del> 28	Gircle K + Chevron Driveways
	* 81	33 248 83 ★ 140 ★ ↓ ↓ ↓ ▼ 31	US 27		→ 56	106 307 92 ← 132 ← 132 ← 55	US 27
Placid Pine Drive	265 → 2 12	↑ 313 10 ↑ 313 10		Placid Pine Drive	84 327 → 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	
	13 <b>→</b> 264 <b>→</b>	0 0 16 306 16	Broward Avenue		3 <b>→</b> 325 →	<b>1</b>	Broward Avenue
	39 <b>→</b> 225 <b>→</b>	16 4 ↑ 293	Highlands Boulevard		3 <b>→</b> 322 <b>→</b>	5 24 ↑ 9 ↑ 244	Highlands Boulevard
	13 <b>→</b> 216 →	4 2 ★ 307	Citrus Boulevard		6 <b>→</b> 340 <b>→</b>	<b>1</b>	Citrus Boulevard
	209 →	7 10 15 ↑ 299	County Road 29		16 <b>→</b> 324 →	8 16 21 ↑ 9 ↑ 7 ↑ 236	County Road 29



### 5400 **Future Conditions Analysis** S. Jefferson Figure 4-3: Annual Average Daily Traffic Volumes (2040) Placid Lakes Boulevard Avenue 0≤0′ι 740 Park Land Drive 300 Placid View Drive 009 Old SR 8 (North) 1200 Old SR 8 (South) 069 Distribution Boulevard 0S l Glades Electric Driveway 300 Chevron Driveways Circle K + US 27 120 099 00S L 7400 11100 10800 6300 Myers Road St Placid Pine Drive 0S l North Edge Street OSΙ Ekhoff Lane St Broward Avenue 300 Highlands Boulevard 009 Citrus Boulevard 120 Bear Road 300 County Road 29 057 6600

Figure 4-3a: Turning Movement Volumes (2040 No Build)

2040 AM

S. J <sub>6</sub>	30 <u>→</u> 234 →	17 3 21 <b>1 1 1 1</b>	Plac Bou	S. Jefferso Avenue 2040 PM	21 <b>→</b> 343 <b>→</b>	27 3 30 1	Plac Bou
S. Jefferson Avenue	0 5 <del>1</del>	↑ 39 ↑ 239 12	Placid Lakes Boulevard	S. Jefferson Avenue	1 <del>1</del>	↑ 11 ↑ 253 253	Placid Lakes Boulevard
	8 <b>→</b> 251 →	<b>1</b> 3 <b>√</b> 10	Placic Dr		383 →	<b>1</b>	Placic Dr
		<u>►</u> 54 <u>↑</u> 277	Placid View Drive			↑ <del>1</del> 264	Placid View Drive
	38 <b>→</b> 223 <b>→</b>	<b>1</b> 24 <b>√</b> 24	Old SR 8 (North)		76 <b>→</b> 344 <b>→</b>	<b>1</b> 26 ₹ 33	Old SR 8 (North)
OId	234 <b>→</b> 13 <b>→</b>	↑ 60 296	R 8	Old (So	314 <b>→</b>	<b>►</b> 27 <b>←</b> 242	R 8 h)
Old SR 8 (South)	<b>↑ ↑</b> 99 53	↑ 257 136		Old SR 8 (South)	26 T₁	<b>↑</b> 243	
Distribution Boulevard	276 → 11 <b>→</b>			Distribution Boulevard	322 <b>→</b>		
ution vard	15 3	<b>↑</b> 278		ution vard	2 <b>1</b> 5	<b>↑</b> 286	
	32 <b>→</b> 236 <b>→</b>	27 0 3 <b>1</b> ↓ ↓	Circle I Dr		33 <b>→</b> 267 <b>→</b> 27 <b>→</b>	26 6 5 1	Circle I Dr
	2 2 23	2 1 249 2 12	Circle K + Chevron Driveways	_	3 1 7 18	2 1 46 2 261 36	Circle K + Chevron Driveways
	101 → 3 144 → 46 →	35 286 92 14 + F			8 169 → 104 <b>→</b>	118 354 104 <b>AJ</b>	
	133.4	P2 ↑ 166 92 ↑ 168 168 135	US 27		↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	► 92 104 151 62	US 27
Pi	1775 311 →	8 6		Pla	99 372 → 0	1	
Placid Pine Drive	<b>L</b> w	<b>↑</b> 366		Placid Pine Drive	5 <u>↑</u>	<b>↑</b> 300	
	r→ 15 → 17 313 →	<b>1</b>	Br Aı		* 4 <b>→</b> 1 369 →	<b>1</b> 7 <b>√</b> 0	Brı Aı
	<b>,</b>	↑ <sup>4</sup> 358 18	Broward Avenue		<b>V</b>	↑ r→ 283	Broward Avenue
	47 <b>→</b> 266 →	<b>1</b>	High Boul		365 →	<b>1</b> _6 √28	High Boul
		<b>↑</b> 21	Highlands Boulevard			↑ 10 ↑ 277	Highlands Boulevard
	15 <b>→</b> 256 →	<b>1</b>	Citrus Boulevard		7 <b>→</b> 386 <b>→</b>	<b>^</b> o	Citrus Boulevard
		↑ 2 ↑ 361 12	us vard			↑ 5 ↑ 281 18	us vard
	10 <b>→</b> 248 <b>→</b>	<b>1</b>	County Road 29		18 <b>→</b>	<b>1</b> 2°	County Road 29
		↑ <del>  ↑</del> 18	Road			↑ <del>10</del> 268	₹oad



Figure 4-4a: Proposed Median Opening Locations (1 of 2)

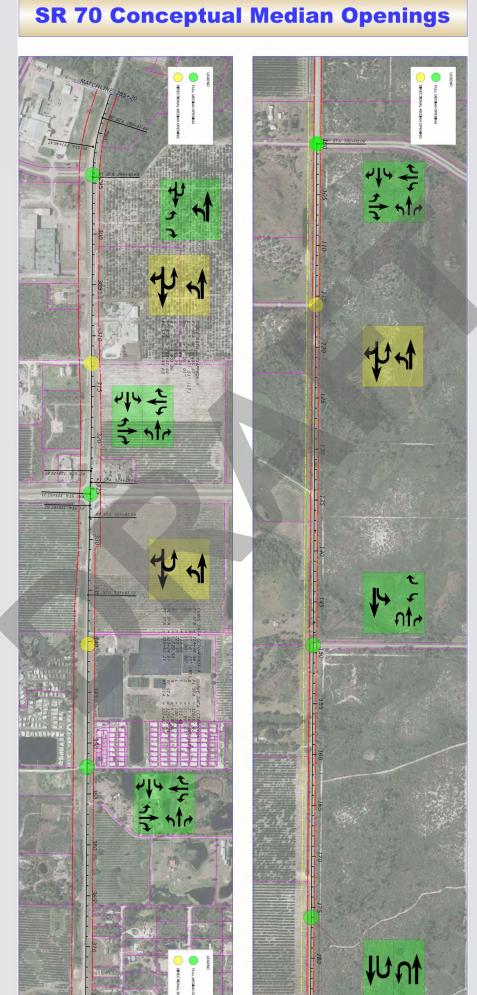




Figure 4-4b: Proposed Median Opening Locations (2 of 2)

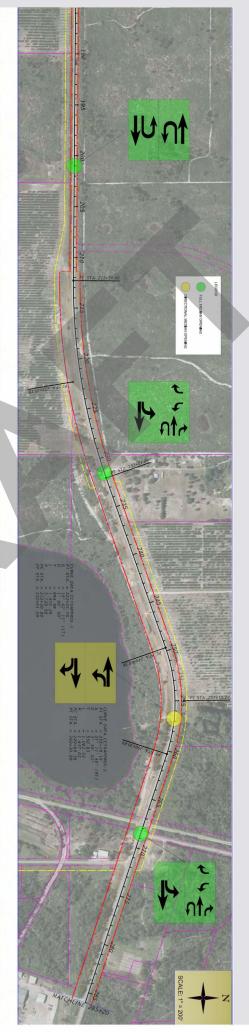






Figure 4-5: 2040 Build Turning Movement Volumes (AM and PM)

### 2040 AM

S. Je Av	30 → 234 → 2 →	17 3 21 <b>↓</b> ↓	Placi Bou	S. Jefferso Avenue 2040 PM	21 <b>→</b> 343 <b>→</b> 0 <b>→</b>	27 3 30 <b>1 ↓ ↓</b>	Placi Bou
S. Jefferson Avenue	0 5 4 0 5 4	↑↑ 39 12	Placid Lakes Boulevard	S. Jefferson Avenue	1 <b>3</b> → 10	↑↑ 11 235	Placid Lakes Boulevard
	8 <b>→</b> 251 →	<b>1</b> 2	Placid View Drive		383 →	<b>1</b>	Placid View Drive
		↑ 54 277 34	View ⁄e			↑ <sup>264</sup> 26	View /e
	38 <b>→</b> 223 <b>→</b>	<b>- - - - - - - - - -</b>	Old SR 8 (North)		76 <b>→</b> 344 <b>→</b>	- √‰	Old SR 8 (North)
Old SR 8 (South)	234 <b>→</b>	<b>↑↑</b> ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	0 8	Old SR 8 (South)	314 <b>→</b>	↑ 27 242 45	0 8
	P 99 ★ 152 276 → 11 →	↑ 392			26 <del>→</del> 37 322 <del>→</del> 3 3 <del>→</del>	<b>↑</b> 314	
Distribution Boulevard	15_1	<b>↑</b> 278		Distribution Boulevard	~ <u>↓</u>	1 286 4 286	
	r 3 236 → 43 √	<b>^</b> 29	Circle K + Chevron Driveways		\$ 5 267 → 60 →	<b>≜</b> 29	Circle K + Chevron Driveways
	55	↑ 87 249	Chevron ways		707	↑ 82 1 261 1	Chevron
	158 <b>→</b> 126 <b>→</b> 45 <b>→</b>	35 286 92 1	US 27	\ \	104 104 104	118 354 104 <b>A V</b>	US 27
	<b>←</b> ] ↑   ↑   ↑   ↑   ↑   ↑   ↑   ↑   ↑   ↑	↑ 166 ↑ 168 ↑ 35	27		74 228 99	↑ ↑ 92 151 62	27
Placid Pine Drive	311 → 20	<b>←</b> 1 ↑		Placid Pine Drive	372 → 6 6 7	<b>←</b> , ↑	
0	3 328	↑ 369 ↑ 4 ↓ ↓	z	Ā	373	↑ 305 ↑ 0 <b>↑</b> ↓	z
	→ → + + + + +	<b>↑</b> 370 12	North Edge Street	-	<u>↑</u>	√ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑	North Edge Street
North Edge Stre redistributio	* 15 <b>→</b> 313 <b>→</b>	<b>1</b> 2 0	Broward Avenue		* 4 <b>→</b> 369 <b>→</b>	<b>1</b> 7 <b>√</b> 0	Broward Avenue
et is shown to illus on, it is assumed th	4 26	↑ 4 358	vard nue		36	↑ p 1 283	Broward Avenue
trate U-tums. The s at full amount of th	47 <b>→</b> 266 <b>→</b>	18 ↑ r> 34	Highlands Boulevard		365 →	<b>1</b>	Highlands Boulevard
plits of the remaini e remaining volum	15 <b>→</b> 251 →	21 344 4 7	Во		7 <b>→</b> 358 <b>→</b>	10 277 6 28	Во
North Edge Street is shown to illustrate U-turns. The splits of the remaining volumes are unknown. For the purposes of volume redistribution, it is assumed that full amount of the remaining volume continues through the intersection without turning.	¥ <b>~</b>	7 1 1 2 361	Citrus Boulevard		* -	↑ r> 281	Citrus Boulevard
known. For the pur yh the intersection	10 <b>→</b> 248 →	<b>1</b> 2 17 <b>√</b> 17	County Road 29		368 <b>→</b>	<b>1</b> 8 24 <b>▼</b>	County Road 29
poses of volume without turning.		↑ 18 351	/Road 9			↑ r> 10 268	nty Road 29



### **Future Traffic Conditions**

Future traffic conditions were analyzed under No Build and Build conditions. The No Build alternative analysis was conducted for the Opening year (2020), Interim year (2030), and Design year (2040) per the project scope; while the Build alternative was analyzed only for the Design year (2040) because Build analysis for the Design year (2040) showed that the intersections along the corridor operate under acceptable LOS conditions, rendering it unnecessary to analyze the Build alternative in prior years.

### No Build Alternative

This alternative assumes that no improvements will be made along the study corridor until Design year 2040. The lane geometry for No Build conditions is shown in **Figure 2-1**.

### No Build Condition Analysis

Intersection level of service for Opening year (2020), Interim year (2030), and Design year (2040) conditions was evaluated using Synchro (Version 9). The analysis results for the intersections within the project limits are summarized in **Table 4-1** (LOS and Delay). Segment analysis was conducted using HighPlan and the results are summarized in **Table 4-2**. The Synchro outputs and HighPlan outputs are included in **Appendix H**.

All intersections along the study corridor operate under acceptable LOS conditions under the No Build alternative. However, arterial LOS conditions analysis shows the segments from Old SR 8 (North) to CR 29 operate at LOS D conditions which is worse than acceptable LOS conditions (LOS C).

Table 4-1: LOS and Delay for Future Years (No Build)

		20	20			20	30			20	40	
	AM Peak I	lour	PM Peak I	Hour	AM Peak I	lour	PM Peak i	lour	AM Peak I	lour	PM Peak I	Hour
SR 70 Intersection	Delay (sec/veh)	LOS										
S. Jefferson Ave/Placid Lakes Boulevard*	12.0	В	11.0	В	13.2	В	12.1	В	14.5	В	13.4	В
Placid View Drive*	12.4	В	10.2	В	13.4	В	10.9	В	14.8	В	11.7	В
Old SR 8 (North)*	12.7	В	10.7	В	13.9	В	11.6	В	15.1	С	12.8	В
Old SR 8 (South)*	11.3	В	11.1	В	12.5	В	12.7	В	13.9	В	15.1	С
Distribution Blvd*	10.6	В	10.8	В	10.9	В	11.6	В	11.2	В	12.6	В
Chevron/Circle K Driveways*	12.6	В	11.1	В	14.1	В	12.1	В	16.0	С	13.1	В
US 27	23.8	С	24.6	С	24.7	С	25.5	С	25.6	С	27.4	С
Placid Pine Drive*	11.7	В	9.9	Α	12.7	В	10.4	В	13.8	В	11.0	В
Broward Ave*	9.6	Α	9.8	Α	9.8	Α	10.2	В	10.1	В	10.6	В
Highlands Blvd*	12.1	В	10.4	В	13.1	В	11.0	В	14.2	В	11.9	В
Citrus Blvd*	9.5	Α	10.3	В	9.8	Α	11.1	В	10.0	Α	11.8	В
CR 29*	11.6	В	11.1	В	12.4	В	12.0	В	13.4	В	13.0	В

<sup>\*</sup> Unsignalized intersection, worst approach delay used.

Table 4-2: No Build Arterial LOS

				2	020		2	030		20	040	
Corridor	From	То	Segment Length (Miles)	Percentage Time Spent Following (Sec)	Average Speed (mph)	LOS	Percentage Time Spent Following (Sec)	Average Speed (mph)	LOS	Percentage Time Spent Following (Sec)	Average Speed (mph)	LOS
	S. Jefferson Avenue/											
	Placid Lakes Boulevard	Old SR 8 (North)	3.2	53.7	58.3	С	59.0	57.8	С	62.0	57.2	С
SR 70	Old SR 8 (North)	US 27	1.1	69.7	46.1	D	71.0	45.5	D	74.2	44.9	D
	US 27	Highlands Boulevard	1.3	66.9	46.6	D	69.8	46.0	D	70.8	45.5	D
	Highlands Boulevard	CR 29	1.5	67.4	56.5	D	69.4	55.9	D	71.0	55.3	D



FROM WEST OF PLACID LAKES BOULEVARD/S. JEFFERSON AVENUE TO EAST OF COUNTY ROAD 29

### **Build Alternative**

The proposed improvements include four-laning the study corridor from the existing two lanes. The proposed alternative lane geometry median openings are shown in **Figure 4-4a** and **Figure 4-4b**.

### **Build Conditions Analysis**

Intersection level of service only for Design year (2040) conditions was evaluated using Synchro (Version 9). Only Design year (2040) conditions was analyzed because Build analysis for the Design year (2040) showed that the intersections along the corridor would operate under acceptable LOS conditions, rendering it unnecessary to analyze the Build alternative in prior years. The analysis results for the intersection within the project limits are summarized in **Table 4-3** (LOS and delay). Segment analysis was conducted using HighPlan and the results are summarized in **Table 4-4**. The analysis results for the existing condition are also included for comparison purposes. The Synchro outputs and HighPlan outputs are included in **Appendix I**.

All intersections operate under acceptable LOS conditions under the Build alternative. Arterial LOS conditions analysis shows all the segments operate at acceptable LOS conditions.

Table 4-3: LOS and Delay for Future Years (Build)

		20	40	
	AM Peak I	lour	PM Peak H	lour
SR 70 Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
S. Jefferson Ave/Placid Lakes Boulevard*	12.5	В	12.1	В
Placid View Drive*	12.7	В	10.6	В
Old SR 8 (North)*	14.3	В	12.2	В
Old SR 8 (South)*	9.5	Α	9.9	A
Distribution Blvd*	10.4	В	13.8	В
Chevron/Circle K Driveways*	9.7	A	9.6	A
US 27	24.5	C	26.3	С
Placid Pine Drive*	9.5	А	9.4	Α
Broward Ave*	9.3	Α	9.6	Α
Highlands Blvd*	9.3	Α	9.6	Α
Citrus Blvd*	12.5	В	12.0	В
CR 29*	12.0	В	12.2	В

<sup>\*</sup> Unsignalized intersection, worst approach delay used.

Table 4-4: Build Arterial LOS (Year 2040)

Corridor	From	То	Segment Length (Miles)	Density (pc/ln/mi)	Average Speed (mph)	LOS
	S. Jefferson Avenue/					
	Placid Lakes Boulevard	Old SR 8 (North)	3.2	3.6	65.0	Α
SR 70	Old SR 8 (North)	US 27	1.1	5.8	55.0	Α
	US 27	Highlands Boulevard	1.3	4.9	55.0	Α
	Highlands Boulevard	CR 29	1.5	4.6	65.0	А



### **Summary of Findings**

Traffic operational analysis along the SR 70 study corridor was conducted to evaluate the need to widen the study corridor from a 2-lane undivided arterial facility to a 4-lane divided arterial facility. Along with the traffic operational analysis, safety and hurricane evacuation evaluations were also conducted. Hurricane evacuation transportation analysis using the Transportation Interface for Modeling Evacuations (TIME) model is shown in **Appendix J**.

### Conclusion

Crash analysis along the study corridor showed that more than one-third of the crashes were one vehicle crashes (24 crashes out of 63 total crashes). These crashes involved vehicles crashing into a fixed object, or animal or running into a ditch as a major contributor. Also, it was noted that excessive speeds along the study corridor might have also contributed for crash rates being higher than statewide average crash rates along similar corridors. Implementation of design components to reduce travel speeds and make travelers aware that they are approaching a signalized intersection near US 27 can be achieved by installing signal warning signs or beacons. Widening the study corridor to four lanes should also be considered as a high percentage (14% during peak hour) of truck traffic utilizes this section of the SR 70 corridor.

Hurricane evacuation transportation analysis shows that widening the study corridor to four lanes will reduce the queues along the study corridor from east of US 27 to CR 29 which were observed under No Build conditions.

Intersection Analysis - Design hour traffic evaluation under existing conditions and future Design year (2040) No Build conditions showed that all of the intersections along the SR 70 study corridor operate under acceptable LOS conditions. A Build alternative analysis was also conducted for the Design year (2040) which also shows that the intersections along the SR 70 study corridor will operate under acceptable LOS conditions.

Arterial Analysis - Evaluation of segment LOS conditions showed that under existing (2015) conditions, the segment of SR 70 from Old SR 8 (North) to US 27 operates at LOS D which is worse than acceptable LOS conditions (LOS C). Under future No Build conditions, the segments along SR 70 from Old SR 8 (North) to CR 29 operate at LOS D conditions. This indicates that the study corridor will require capacity improvements to make the corridor operate at acceptable LOS conditions (LOS C). The Build conditions segment analysis showed that the proposed lane addition (2 to 4 lanes) will make the corridor operate at LOS A conditions.

The crash and hurricane evacuation analyses also indicate that a widening of the corridor will be needed. Highlands County is part of the Rural Area of Critical Economic Concern (RACEC) or Rural Area of Opportunity program defined by the state of Florida legislature to encourage and facilitate the location and expansion of major economic development projects of significant scale in such rural communities.

Therefore, widening the study corridor to four lanes should be considered as an alternative after carefully evaluating other PD&E elements.





### Appendix B: Evacuation Transportation Analysis Report



### FLORIDA STATEWIDE REGIONAL EVACUATION STUDY PROGRAM





### EVACUATION TRANSPORTATION ANALYSIS

VOLUME 4-7

FLORIDA DIVISION OF EMERGENCY MANAGEMENT

CENTRAL FLORIDA
REGIONAL PLANNING COUNCIL

GENTRAL FLORIDA REGION







### EVACUATION TRANSPORTATION ANALYSIS

**VOLUME 4-7** 

### **CENTRAL FLORIDA REGION**

Prepared for:

Central Florida Regional Planning Council Florida Division of Emergency Management

Prepared by:



in association with:

BCC Engineering, Inc.

September 2010

### **Congested Roadways**

A summary of the total number of evacuating vehicles for each of the operational scenarios is presented in **Table IV-25**. It is important to note that the total number of evacuating vehicles in the table below includes vehicles evacuating from all of the counties included in the operational scenario, as identified in Table IV-19. The number of counties varies by scenario, with four of the scenarios including 10 counties stretching from Collier County to Sumter County.

**Evacuation Evacuation Evacuation Evacuation Evacuation** Level A Level B **Level C** Level D Level E Operational Operational Operational Operational **Operational Scenario** Scenario Scenario Scenario Scenario 386,000 236,914 283,276 621,822 371,482 2010 2015 366,801 270,276 880,514 396,546 380,628

**Table IV-25 – Total Evacuating Vehicles for Operational Scenarios** 

Similar to the base scenarios, critical roadways were identified by reviewing roadways in the model network that have the highest vehicle queues for extended periods of time during an evacuation. Due to the nature of a major evacuation in general, nearly all roadway facilities will have extended vehicle queues at some point during the evacuation process. The point of this analysis is to identify those roadway facilities that have vehicle queues for the longest time periods during each of the evacuation scenarios. Critical roadway segments for the Central Florida region are identified in **Figures IV-14** through **IV-23** for each of the operational scenarios for 2010 and 2015.

Critical facilities for the operational scenarios vary greatly depending upon the scenario, as illustrated in the figures. For example, for the 2015 level D operational scenario, which assumes a southeast to northwest storm track west of Okeechobee City, critical facilities include US 441 and SR 70 in Okeechobee County and SR 70, US 27, and US 98 in Highlands County. In contrast, for the 2015 level C operational scenario, which assumes a west to east storm track along the I-4 corridor, the critical facilities within the Central Florida region are concentrated in Polk County.

In addition to the identification of critical roadway segments, the total number of evacuating vehicles entering and exiting each county by evacuation scenario was also determined. Evacuating vehicles exiting each county by major evacuation route are identified in **Table IV-26** for 2010 and **Table IV-27** for 2015. In addition, evacuating vehicles entering each county by major evacuation route are identified in **Table IV-28** for 2010 and **Table IV-29** for 2015. Detailed volume figures for all evacuation routes in the Central Florida Region for each operational scenario are included in Volume 5-7.

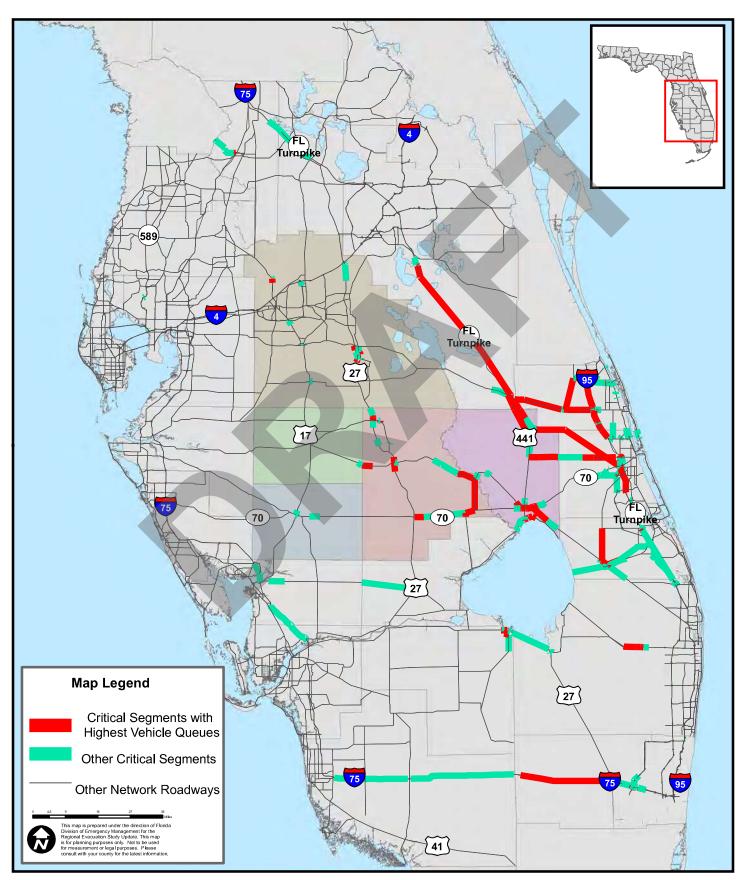
The number of vehicles entering and exiting each county during an evacuation varies widely depending upon the scenario, roadway, and county. As expected, major interstates and state highways generally carry larger volumes of evacuating traffic. The vehicle flows into and out of each county also generally follow the same pattern as the critical segment figures, as locations with higher queues and congestion generally have higher traffic volumes.



### Figure IV-22



### Critical Roadway Segments with Excessive Vehicle Queues for 2015 Operational Scenario Evacuation Level D



### Appendix C: Florida Traffic Online (2017) Historical Data

A.M. P.M. DAILY	24-HOUR	00000000000000000000000000000000000000		COUNTY: STATION: DESCRIPT START D; START T]
DI) HOUR 745 1630 1630	TOTAL	1	1ST	OTION:
RECTION:	M   ··         	111112244335221 11112244376411352777 101112988376411352777	DIR 2ND	09 0003 SR 70, 08/15/ 1000
N: E VOLUME 171 193 193	 	44477777777777777777777777777777777777	ECTION:	EAST 0 2017
'n	             	1122284539000000000000000000000000000000000000	E 4TH	)F SR 25
VO [OU 64 21	2605	117 117 1180 117 1180 117 117 117 117 117 117 117 117 117 11	TOTAL	/US 27
UME IN RECTIO	 	L 1000000000000000000000000000000000000	1ST	BAIRS
INFORMATION ION: W VOLUME 191 209 209	             	000000000000000000000000000000000000000	2ND	S DEN
Ż	             		IRECTION 3RD	 
COMBINE HOUR 700 1215		014001/00001/00400000000000000000000000	)N: W 4TH	 
D	270	7507500055555575777242 	TOT	 
OLUME 337 383 383	0		L CC	;   
	5311	12222222222222222222222222222222222222	IN	 

## FLORIDA DEPARTMENT OF TRANSPORTATION TRANSPORTATION STATISTICS OFFICE 2017 HISTORICAL AADT REPORT

COUNTY: 09 - HIGHLANDS

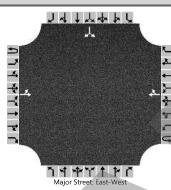
SITE:
0003 -
I TO
SR
70,
EAST
O <sub>F</sub>
SR
25/US
SD/
27
BAI
IRS
DEN

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		YEAR
	4200 C	4100 C			4700 C		4100 C	4100 C			4300 C			4100 C	4300 F			AADT
							E 2000											DIRECTION 1
•	W 2000	W 2100	W 2700	W 2300	W 2300		W 2100		W 2100	W 2100	W 2200	W 2200	W 2200	W 2100	W 2200	W 2200		DIRECTION 2
	10.10	10.10	11.50	10.50	10.72	10.95	11.63	12.37	12.41	9.50	9.50	9.50	9.50	9.50	9.50	9.50	1	*K FACTOR
	60.30	62.90	61.10	55.40	57.46	57.39	62.31	64.47	61.34	59.30	58.00	59.10	59.40	59.20	59.90	60.10		D FACTOR
	23.40	26.20	26.20	26.20	24.30	22.90	24.80		24.90	24.90	21.10	18.10	18.10	21.90	21.90	21.90		T FACTOR

\*K FACTOR: AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
\*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES Appendix D: Existing Year (2018) HCS7 Reports

	HCS7 Two-Way Sto	p-Control Report							
<b>General Information</b>		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street SR 70							
Analysis Year	2018	North/South Street	CR 29						
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description	Project Description SR 70 from CR 29 to Lonesome Island Road								

### Lanes

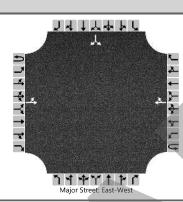


Vehicle Volumes and Ad	ljustme	nts														
Approach	$\top$	Eastb	ound			West	oound			North	bound		Southbound			
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT			,			TR							LR	
Volume (veh/h)		13	284				202	8						17		13
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)	457												0			
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	leadwa	ys														
Base Critical Headway (sec)	T	4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, ar	nd Leve	l of S	ervice													
Flow Rate, v (veh/h)	Т	14													33	$\Box$
Capacity, c (veh/h)		1289													569	
v/c Ratio		0.01													0.06	
95% Queue Length, Q <sub>95</sub> (veh)		0.0													0.2	
Control Delay (s/veh)		7.8													11.7	
Level of Service (LOS)		Α													В	
Approach Delay (s/veh)		0	.4											1:	1.7	
Approach LOS															В	

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	HCS7 Two-Way Sto	p-Control Report	
<b>General Information</b>		Site Information	
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County
Date Performed	Oct 2018	East/West Street	SR 70
Analysis Year	2018	North/South Street	CR 29
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00
Project Description	SR 70 from CR 29 to Lonesome Island Road		

### Lanes



Vehicle Volumes and Adj	ustme	ents														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	10	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		8	164				239	13						13		9
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)															0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	eadwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	d Leve	of S	ervice													
Flow Rate, v (veh/h)	Π	9													24	
Capacity, c (veh/h)		1239													608	
v/c Ratio		0.01													0.04	
95% Queue Length, Q <sub>95</sub> (veh)		0.0					Ì				Ì				0.1	
Control Delay (s/veh)		7.9													11.2	
Level of Service (LOS)		А					Ì				Ì				В	
Approach Delay (s/veh)		0	.4					•		•				1:	1.2	
Approach LOS															В	

Directional Page 1 of 2

	ONAL TWO-LANE HIGHWA	1	VOUCEI
General Information	El' al alla Espaciale	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	AM Peak Hour	Analysis Year	2018
Project Description: Existing Condi	tions Eastbound		
Input Data	Ť		
	\$\frac{1}{2} Shoulder widthft		
<del>s</del>	Lane widthtt	Class I	highway Class II
	Lane width tt		
	\$\frac{1}{st} Shoulder widthtt	highway	Class III highway
		Terrain	Level Rolling
Segment le	ngth, L <sub>t</sub> mi	Grade Leng Peak-hour fo	
±1		No-passing	
Analysis direction vol., V <sub>d</sub> 3	01veh/h	Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
ű	210veh/h		nal vehicles, P <sub>R</sub> 0%
3	1.0	Access poin	
	0.0		
Segment Length mi 2.	5		
Average Travel Speed		1 1 1 2 2 4 4 2	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.5
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>	$_{V,ATS}$ =1/(1+ $P_T(E_T$ -1)+ $P_R(E_R$ -1))	0.958	0.948
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (E		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (	PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	342	241
Free-Flow Speed	I from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Total demand flow rate, both direction		, ,	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776	S(v/ f <sub>HV,ATS</sub> )	Free-flow speed, FFS (FSS=BF	20 //
Adj. for no-passing zones, f <sub>np.ATS</sub> (E	Exhibit 15-15) 1.6 mi/h	Average travel speed, ATS <sub>d</sub> =FF	FS-0.00776(v <sub>d,ATS</sub> + 50.5 mi/h
14.0		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	30.3 1111/11
		Percent free flow speed, PFFS	89.2 %
Percent Time-Spent-Following			_
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>	<sub>7</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (E		1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(	PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	331	231
Base percent time-spent-following <sup>4</sup> ,	BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )		33.3
Adj. for no-passing zone, f <sub>np,PTSF</sub> (E	Exhibit 15-21)		14.9
Percent time-spent-following, PTSF	$_{\rm d}$ (%)=BPTSF $_{\rm d}$ +f $_{\rm np,PTSF}$ *( $v_{d,PTSF}$ / $v_{d,PTSF}$ +		42.1
V <sub>o,PTSF</sub> )			
Level of Service and Other Perform	mance Measures	1	
Level of service, LOS (Exhibit 15-3)			В
Volume to capacity ratio, <i>v/c</i>		1	0.19

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	89.2
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	327.2
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.89
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Directional Page 1 of 2

DIRECTION		lau i e u	
General Information	F" shall Farmal	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
	PM Peak Hour	Analysis Year	2018
Project Description: Existing Conditions Input Data	Eastbound		
IIIput Data	I		
	Shoulder widthtt		
-	Lane widthtt	Class I	highway Class II
	Lane widthft		Class III highway
	Shoulder widthtt		
12	3	/ Terrain	Level Rolling
Segment length	. L <sub>t</sub> mi	Grade Leng Peak-hour fo	
24	-1	No-passing	
Analysis direction vol., V <sub>d</sub> 177ve	eh/h	Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
Opposing direction vol., V 252ve	sh/h	% Recreation	onal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0	7.7.11	Access poin	
Lane Width ft 10.0			
Segment Length mi 2.5			
Average Travel Speed		Analysis Direction (d)	Opposing Direction (o)
	(E   111   45   44   45   40)		1
Passenger-car equivalents for trucks, E <sub>T</sub>		1.5	1.4
Passenger-car equivalents for RVs, E <sub>R</sub> (		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub>		0.948	0.958
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibi		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (PHF		203	286
Free-Flow Speed from	m Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub> Total demand flow rate, both directions, v		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	bit 15-8) 1.0 mi/h
		Free-flow speed, FFS (FSS=BF	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776( <i>v</i> / f			20 //
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhib	it 15-15)	Average travel speed, ATS <sub>d</sub> =FF	-S-0.00776(V <sub>d,ATS</sub> + 51.3 mi/h
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
Davis and Times Consult Fallowing		Percent free flow speed, PFFS	90.6 %
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub>	(Exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs, $E_R$ (	<u> </u>	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/		0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhib		1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(PHF		195	277
		<b>+</b>	22.9
Base percent time-spent-following <sup>4</sup> , BPT			
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhib			14.8
Percent time-spent-following, PTSF <sub>d</sub> (%)=	$= BPTSF_d + f_{np,PTSF} * (v_{d,PTSF} / v_{d,PTSF} + c_{d,PTSF} )$		29.0
v <sub>o,PTSF</sub> )			
Level of Service and Other Performant	ce Measures	1	D
Level of service, LOS (Exhibit 15-3)		i	В

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	90.6
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	192.4
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.62
Bicycle level of service (Exhibit 15-4)	F
Notes	

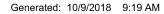
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Directional Page 1 of 2

Analysis   Elizabeth Fernandez   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Highwary   Direction of Travel   SR 70   CR 29 to Lonesome (st   Line		TWO-LANE HIGHWA		KSHEET
Agency of Company   Color Ferford   Color 2018   Analysis Trine Period   Analysis Trine   Analysis Trine Period   Analysis Trine Period   Analysis Trine	General Information		Site Information	
Date Performed				
Project Description: Existing Conditions Westbound  Imput Data  Shoulder width It   Lane Widt				
Shoulder width   It   Lane width   Lane wid	. ,		Analysis Year	2018
Shoulder width  Lane width  Lane width  It  Lane width  It  Lane width  It  Shoulder width  It  It  Shoulder width  It  It  Shoulder width  It  It  Shoulder width  It  It  It  Shoulder width  It  It  It  It  It  It  It  It  It		bound		
Lane width It Lane width It Shoulder width It Segment Length. L₁ mil Slaw Recreational vehicles, P₂ 0.92 Narpassing 200 0% Narpassing 200	Input Data		1	
Lane width It Lane width It Shoulder width It Segment Length. L₁ mil Slaw Recreational vehicles, P₂ 0.92 Narpassing 200 0% Narpassing 200		oulder width		
Lane width It Shoulder width It Opposing direction vol., V <sub>0</sub> 301velvh Shoulder width It 4.0 Lane Width It 10.0 Segment Length it 10.0 Segment Lengt				
Shoulder width  Segment length. L  mi  Segment length. L  mi  Segment length. L  mi  Segment length. L  mi  Analysis direction vol., V <sub>d</sub> 210veh/h  Opposing direction vol., V <sub>d</sub> 301veh/h  Shoulder width 100  Shoulder width 100  Segment Length mi 2.5  Avarage Travel Speed  Analysis Direction (d) Opposing Directic Access points mi  Free-Flow Speed from Field Measurement Estimated Free-Flow Speed  Free-Flow Speed from Field Measurement Estimated Free-Flow Speed  Free-Flow Speed free-Flow Speed  Free-Flow Speed, FFS F <sub>fol</sub> 1000776(w f <sub>frv,ATS</sub> ) Adj. for lane and shoulder width, 4 f <sub>fol</sub> (Exhibit 15-8) 1.  Adj. for lane and shoulder width, 4 f <sub>fol</sub> (Exhibit 15-8) 1.  Free-flow speed, FFS F <sub>fol</sub> 1000776(w f <sub>frv,ATS</sub> ) 5.  Free-flow speed, FFS Fol, 1000776(w f <sub>frv,ATS</sub> ) 7.  Free-flow speed, FFS Fol, 1000776(w f <sub>frv,ATS</sub> ) 8.  Free-flow speed, FFS Fol, 1000776(w f <sub>frv,ATS</sub> ) 8.  Free-flow speed, FFS Fol, 1000776(w f <sub>frv,ATS</sub> ) 9.  Analysis Direction (d) Opposing Directic Access points 4.  Analysis Direction (d) Opposing Directic Access poi				
Segment length. L <sub>1</sub> mi  Segment length. L <sub>2</sub> mi  Segment length. L <sub>3</sub> mi  Analysis direction vol., V <sub>d</sub> 210veh/h Opposing direction vol., V <sub>d</sub> 307veh/h Shoulder width 1 10.0 Segment Length mi 1.0.0 Segment Length mi 2.5  Average Travel Speed  Analysis Direction (d) Opposing Directic 1.0  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)  Average Travel Speed  Analysis Direction (d) Opposing Directic 1.0  Access points mi 4.0  1.0  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)  1.0  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)  1.0  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-9)  Demand flow rate <sup>2</sup> , V, (pc/h) v, =V, (PHF* f <sub>B</sub> ATs *f <sub>IN,ATS</sub> )  Adj. for lane and shoulder width 4 f <sub>LS</sub> (Exhibit 15-7)  Adj. for no-passing zones, f <sub>ID,ATS</sub> (Exhibit 15-15)  1.4 mi/h  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-15)  1.4 mi/h  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-16)  1.7  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-16)  1.8  Parcent Time-Spent-Following  Analysis Direction (d) Opposing Directic 1.0  Adj. for lane and shoulder width 4 f <sub>LS</sub> (Exhibit 15-7)  Adj. for access points 4 f <sub>LS</sub> (Exhibit 15-8)  Analysis Direction (d) Opposing Directic 1.0  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)  1.1  1.1  1.1  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-16 or Ex 15-17)  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.00  1.		The state of the s	highway 🗹	Class III highway
Analysis direction vol., V <sub>d</sub> 2/10veh/h Opposing direction vol., V <sub>d</sub> 3/10veh/h Opposing direction vol., V <sub>d</sub> 4/mi Lane Width in 10.0 Segment Length mi 2.5  Average Travel Speed  Analysis Direction (d) Opposing Directic Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12) 1.5 1.4  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13) 1.0 1.0  Heavy-vehicle adjustment factor 1, 1 <sub>9</sub> ATS (Exhibit 15-9) 1.00 1.00  Demand flow rate <sup>2</sup> , V <sub>1</sub> (pc/h) V <sub>1</sub> =V <sub>1</sub> /(PHF* 1 <sub>9</sub> ATS* 1 <sub>1</sub> V <sub>1</sub> V <sub>1</sub> V <sub>2</sub> V <sub>3</sub> Free-Flow Speed from Field Measurement  Estimated Free-Flow Speed  Base free-flow speed, FFS (FSS=BFFS-1 <sub>LS</sub> 1 <sub>A</sub> ) 5/4 Adj. for lane and shoulder width, 4 1 <sub>LS</sub> (Exhibit 15-7) 2.  Adj. for no-passing zones, 1 <sub>no-NTS</sub> (Exhibit 15-15) 1.4 mi/h  Arabysis Direction (d) Opposing Directic  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19) 1.1  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19) 1.1  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19) 1.0  Heavy-vehicle adjustment factor 1, 1 <sub>10</sub> PTSF (Exhibit 15-18 or Ex-17) 1.00  Grade adjustment factor 1, 1 <sub>2</sub> PTSF (Exhibit 15-18 or Ex-17) 1.00  Directional flow rate <sup>2</sup> , V <sub>1</sub> (pch) V <sub>1</sub> =V/(PHF* 1 <sub>1</sub> V <sub>1</sub> V <sub>2</sub> FSF 1 <sub>2</sub> S <sub>1</sub> S <sub>1</sub> S <sub>1</sub> S <sub>2</sub> S <sub>3</sub>			Terrain	Level Rolling
Analysis direction vol., $V_d$ 2/10veh/h  Analysis direction vol., $V_d$ 301veh/h  Analysis direction vol., $V_o$ 301veh/h  Access points mi  4.0  Lane Width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Analysis Direction (d) Opposing Directic Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12) 1.5  1.4  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13) 1.0  1.0  1.0  Heavy-vehicle adjustment factor $f_{\text{HV},\text{ATS}} = 1/(1+P_T(E_T-1)+P_R(E_R-1))$ 0.946  Opposing Directic Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-9) 1.00  1.00  Demand flow rate <sup>2</sup> , $V_{\text{L}}$ ( $V$	Segment length, L	mi		
Analysis direction vol., $V_d$ 210veh/h  Opposing direction vol., $V_d$ 301veh/h  Shoulder width fit 4.0  Access points mi 10.0  Segment Length mi 2.5  Access points mi 2.5  Analysis Direction (d) Opposing Directic Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)  1.0  1.0  Demand flow rate <sup>2</sup> , $V_f$ (pc/h) $V_f$ = $V_f$ (FHF* $f_g$ Arg. $f_f$ HVATS)  Adj. for no-passing zories, $f_{rp}$ Arg. (Exhibit 15-15)  Adj. for no-passing zories, $f_{rp}$ Arg. (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for $E_T$ (Exhibit 15-18 or $E_T$ 1)  Passenger-car equivalents for $E_T$ (Exhibit 15-18 or $E_T$ 1)  Passenger-car equivalents for $E_T$ (Exhibit 15-18 or $E_T$ 1)  Passenger-car equivalents for $E_$				
Opposing direction vol., $V_0$ 30 tveh/h Shoulder width ft Lane Width ft 10.0 Segment Length mi 2.5  Average Travel Speed  Analysis Direction (d)  Analysis Direction (d)  Opposing Directic  Analysis Direction (d)  Opposing Directic  Analysis Direction (d)  Opposing Directic  Analysis Direction (d)  1.0  Analysis Direction (d)  Opposing Directic  1.0  1.0  1.0  1.0  Heavy-vehicle adjustment factor, $f_{\text{HVATS}} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$ Opposing Directic (d)  Free-Flow Speed from Field Measurement  Free-Flow Speed from Field Measurement  Estimated Free-Flow Speed  Base free-flow speed, BFFS  Adj. for lane and shoulder width, $^4f_{LS}(\text{Exhibit 15-7})$ Adj. for access points, $^4f_{LS}(\text{Exhibit 15-8})$ Adj. for access points, $^4f_{LS}(\text{Exhibit 15-8})$ Analysis Direction (d)  Opposing Directic (d)  Free-flow speed, FFS=S <sub>EM</sub> +0.00776(v $^4f_{HV,ATS})$ Average travel speed, ATS_g=FFS-0.00776(v $^4f_{HV,ATS})$ Are all the speed, ATS_g=FFS-0.00776(v $^4f_{HV,ATS})$ Analysis Direction (d)  Opposing Directic (d)  Passenger-car equivalents for trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ Analysis Direction (d)  Opposing Directic free flow speed, PFFS  Analysis Direction (d)  Opposing Directic free flow speed, PFFS  On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ Analysis Direction (d)  Opposing Directic free flow speed, PFFS  On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks, E $_T(\text{Exhibit 15-18 or 15-19})$ On the speed of trucks o	Analysis direction vol. V 210veh/h		7 1 1 1	
Shoulder width fit 4.0 Access points $mi$ 4/mi 2.10 Access points $mi$ 4/mi 2.20 Segment Length mi 2.5 Average Travel Speed  Analysis Direction (d) Opposing Direction (d) Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12) 1.5 1.4  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13) 1.0 1.0  Heavy-vehicle adjustment factor, $f_{PVATS}=I/(1+P_T(E_T-1)+P_R(E_R-1))$ 0.948 0.958  Grade adjustment factor <sup>1</sup> , $f_{gATS}$ (Exhibit 15-9) 1.00 1.00  Demand flow rate <sup>2</sup> , $V_1$ (pch) $V_1$ (PHF* $f_{gATS}$ * $f_{HVATS}$ ) 241 342  Free-Flow Speed from Field Measurement Estimated Free-Flow Speed  Mean speed of sample <sup>3</sup> , $S_{FM}$ Adj. for lane and shoulder width, $f_{LS}$ (Exhibit 15-7) 2. Adj. for access points $f_{LS}$ (Exhibit 15-8) 1.4 mith Arage travel speed, ATS_a=FFS-0.00776( $V_{LS}$ Adj. for non-passing zones, $f_{LS}$ (Exhibit 15-15) 1.4 mith Arage travel speed, ATS_a=FFS-0.00776( $V_{LS}$ Average travel speed, ATS_a=FFS-0.00776(	ū			
Lane Width ff 10.0 Segment Length mi 2.5 Average Travel Speed	9			
Analysis Direction (d)   Opposing Directice			Access point	4/111
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-11 or 15-12)  1.5  1.4  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)  1.0  1.0  1.0  Heavy-vehicle adjustment factor, $f_{HV,ATS} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$ Demand flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF^* f_{g,ATS}^*) f_{HV,ATS}^*)$ Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-9)  Demand flow rate <sup>2</sup> , $v_i(pc/h) v_i = V_i/(PHF^* f_{g,ATS}^*) f_{HV,ATS}^*)$ Pree-Flow Speed from Field Measurement  Estimated Free-Flow Speed  Base free-flow speed <sup>4</sup> , BFFS  Adj. for lane and shoulder width, ${}^4 f_{LS}$ (Exhibit 15-7)  Adj. for access points <sup>4</sup> , $f_{g,ATS}^*$ (Exhibit 15-7)  Adj. for no-passing zones, $f_{np,ATS}^*$ (Exhibit 15-15)  1.4 mi/h  Pree-flow speed, FFS = $F_{EN}^*$ (Exhibit 15-15)  1.4 mi/h  Pree-flow speed, FFS = $F_{EN}^*$ (Exhibit 15-15)  1.4 mi/h  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  1.1  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.				
Passenger-car equivalents for trucks, $E_{T}$ (Exhibit 15-11 or 15-12)  1.6  1.4  Passenger-car equivalents for RVs, $E_{R}$ (Exhibit 15-11 or 15-13)  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.	Average Travel Speed			
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-11 or 15-13)  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.			Analysis Direction (d)	Opposing Direction (o)
Heavy-vehicle adjustment factor, $f_{\text{HV,ATS}} = 1/(1+P_T(E_T^{-1})+P_R(E_R^{-1}))$ 0.948  0.958  0.958  Grade adjustment factor, $f_{\text{HV,ATS}} = 1/(1+P_T(E_T^{-1})+P_R(E_R^{-1}))$ 0.948  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.958  0.968  0.958  0.968  0.958  0.958  0.968  0.968  0.958  0.968  0.968  0.958  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968  0.968	Passenger-car equivalents for trucks, $E_T$ (Exhil	bit 15-11 or 15-12)	1.5	1.4
Grade adjustment factor $^1$ , $f_{g,ATS}$ (Exhibit 15-9)  Demand flow rate $^2$ , $v_i$ (pc/h) $v_i$ = $V_i$ / (PHF* $^4$ $^4$ $^4$ $^4$ $^4$ $^4$ $^4$ $^4$	Passenger-car equivalents for RVs, $E_R$ (Exhibit	t 15-11 or 15-13)	1.0	1.0
Demand flow rate <sup>2</sup> , $v_i(pch)$ $v_i = V_i/(PHF^*f_{g,ATS}^*, f_{HV,ATS})$ Pree-Flow Speed from Field Measurement  Estimated Free-Flow Speed  Base free-flow speed, BFFS 64, Adj. for lane and shoulder width, $^4f_{LS}$ (Exhibit 15-7) 2. Adj. for access points $^4$ , $^4f_{LS}$ (Exhibit 15-8) 1. Free-flow speed, FFS= $^4f_{LS}$ $^4f_{LS}$ (Exhibit 15-15) 1.4 mi/h Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{HV,ATS}$ ) Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{HV,ATS}$ ) Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 4.4 mi/h Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.6 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.7 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.8 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.8 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.8 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.8 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.8 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.9 Average travel speed, ATS $_d$ =FFS-0.00776( $v_i^4f_{LS}$ ) 5.9 Average travel speed, ATS $_d$ =	Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/ (1	$+ P_T(E_T-1)+P_R(E_R-1) )$	0.948	0.958
Free-Flow Speed from Field MeasurementEstimated Free-Flow SpeedBase free-Flow speed4, BFFS60Adj. for lane and shoulder width, $^4$ $^4$ $^4$ (Exhibit 15-7)2.Adj. for lane and shoulder width, $^4$ $^4$ $^4$ (Exhibit 15-8)7.Free-flow speed, FFS= $^4$ $^4$ $^4$ $^4$ $^4$ (Exhibit 15-8)7.Free-flow speed, FFS= $^4$ $^4$ $^4$ $^4$ (Exhibit 15-8)7.Adj. for no-passing zones, $^4$ $^4$ $^4$ $^4$ $^4$ $^4$ $^4$ $^4$	Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)		1.00	1.00
Base free-flow speed, BFFS 66  Adj. for lane and shoulder width, $^4f_{LS}$ (Exhibit 15-7) 2.  Adj. for access points $^4$ , $f_A$ (Exhibit 15-8) 1.  Free-flow speed, FFS=S <sub>FM</sub> +0.00776( $W_{HV,ATS}$ ) Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15) 1.4 mi/h Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $W_{d,ATS}$ ) 50  Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $W_{d,ATS}$ ) 4.4 mi/h Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $W_{d,ATS}$ ) 50  Percent Time-Spent-Following Analysis Direction (d) Opposing Direction (d) Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19) 1.1 1.1  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19) 1.0 1.0  Heavy-vehicle adjustment factor $f_{HV}$ =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1)) 0.989 0.989  Grade adjustment factor $f_{HV}$ =1/ (2+ P <sub>T</sub> (Exhibit 15-16 or Ex 15-17) 1.00 1.00  Directional flow rate $f_{HV}$ =1/ (PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ ) 231 331  Base percent time-spent-following $f_{HV,PTSF}$ (S)=BPTSF $f_{HV,PTSF}$ $f_{g,PTSF}$ (Va,PTSF) 14.9  Percent time-spent-following, PTSF $f_{HV,PTSF}$ (S)=BPTSF $f_{HV,PTSF}$ $f_{$	Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (PHF* $f_{g,AT}$	s*f <sub>HV,ATS</sub> )	241	342
Mean speed of sample $^3$ , $S_{FM}$ Total demand flow rate, both directions, $v$ Free-flow speed, FFS= $S_{FM}$ +0.00776( $v$   $f_{HV,ATS}$ ) Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  1.4 mi/h  Are rage travel speed, ATS <sub>d</sub> =FFS-0.00776( $v$   $f_{HV,ATS}$ )  Analysis Direction (d)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1))  Grade adjustment factor $^1$ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  Base percent time-spent-following 4, BPTSF <sub>d</sub> ( $v$ )=BPTSF <sub>d</sub> + $f_{np,PTSF}$ *( $v_{d,PTSF}$ ) $v_{d,PTSF}$ +  Adj. for lane and shoulder width, $^4$ $f_{LS}$ (Exhibit 15-8)  Adj. for lane and shoulder width, $^4$ $f_{LS}$ (Exhibit 15-8)  Adj. for lane and shoulder width, $^4$ $f_{LS}$ (Exhibit 15-8)  Adj. for lane and shoulder width, $^4$ $f_{LS}$ (Exhibit 15-8)  Adj. for access points $^4$ , $f_{LS}$ (Exhibit 15-8)  1.4 mi/h  Free-flow speed, FFS (FSS=BFFS- $f_{LS}$ - $f_{A}$ )  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  50  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  51  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  52  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  53  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  54  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  54  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  55  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  56  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FFS-0.00776( $v_{d,ATS}$ +  57  Average travel speed, ATS <sub>g</sub> =FTS-0.00776( $v_{d,ATS}$ +  57  A	Free-Flow Speed from Fiel	d Measurement	Estimated F	ree-Flow Speed
Mean speed of sample*, $S_{FM}$ Total demand flow rate, both directions, $v$ Free-flow speed, FFS= $S_{FM}$ +0.00776( $v$ / $f_{HV,ATS}$ ) Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  1.4 mi/h  Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,			Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
Mean speed of sample*, $S_{FM}$ Total demand flow rate, both directions, $v$ Free-flow speed, FFS= $S_{FM}$ +0.00776( $v$ / $f_{HV,ATS}$ ) Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  1.4 mi/h  Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,ATS + 50    Average travel speed, ATS $_a$ =FFS-0.00776( $v$ _d,	2		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Free-flow speed, FFS= $S_{PM}$ +0.00776( $v$ / $f_{HV,ATS}$ )  Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  1.4 mi/h  Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $v$ / <sub>d,ATS</sub> + $f_{Np,ATS}$ )  Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $v$ / <sub>d,ATS</sub> + $f_{Np,ATS}$ )  Average travel speed, ATS <sub>d</sub> =FFS-0.00776( $v$ / <sub>d,ATS</sub> + $f_{Np,ATS}$ )  Percent Time-Spent-Following  Analysis Direction (d)  Opposing Direction Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)  1.0  1.0  1.0  1.0  1.00  1.00  Directional flow rate <sup>2</sup> , $v$ / <sub>s</sub> (pc/h) $v$ <sub>i</sub> =V/ <sub>i</sub> (PHF* $f$ <sub>HV,PTSF</sub> * $f$ <sub>g,PTSF</sub> )  231  331  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> <sub>d</sub> <sup>b</sup> )  Adj. for no-passing zone, $f$ <sub>np,PTSF</sub> (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *( $v$ <sub>d,PTSF</sub> / $v$ <sub>d,PTSF</sub> +  33.2	7			<del></del>
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit 15-15)  1.4 mi/h  Average travel speed, $ATS_d$ =FFS-0.00776( $V_{d,ATS}$ + $V_{0,ATS}$ ) - $V_{0,ATS}$ - $V_$			,,	
Percent Time-Spent-Following  Analysis Direction (d)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-16 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhi	Free-flow speed, FFS= $S_{FM}$ +0.00776( $v$ / $f_{HV,ATS}$	3)		20 //
Percent Time-Spent-Following  Analysis Direction (d)  Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1))  One of the proof of	Adj. for no-passing zones, f <sub>np.ATS</sub> (Exhibit 15-1	5) 1.4 mi/h	Average travel speed, ATS <sub>d</sub> =FF	FS-0.00776(v <sub>d,ATS</sub> + 50.7 mi/h
Percent free flow speed, PFFS 88  Percent Time-Spent-Following  Analysis Direction (d) Opposing Direction  Passenger-car equivalents for trucks, $E_T(Exhibit 15-18 \text{ or } 15-19)$ Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  1.0  Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$ O.989  O.989  Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  Directional flow rate <sup>2</sup> , $v_f(pc/h)$ $v_i=v_f/(PHF^*f_{HV,PTSF}^*f_{g,PTSF})$ Base percent time-spent-following <sup>4</sup> , BPTSF $_d$ (%)=100(1-eav $_d$ )  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)  Percent time-spent-following, PTSF $_d$ (%)=BPTSF $_d$ +f $_{np,PTSF}$ *( $v_{d,PTSF}$ ) $v_{d,PTSF}$ +  33.2			v <sub>o.ATS</sub> ) - f <sub>np.ATS</sub>	30.7 111111
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  1.1  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  1.0  1.0  1.0  Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1))  O.989  O.989  Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  1.00  1.00  Directional flow rate <sup>2</sup> , $v_j$ (pc/h) $v_i$ = $V_j$ /(PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ )  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> + $f_{np,PTSF}$ *( $v_{d,PTSF}$ )  33.2			Percent free flow speed, PFFS	89.5 %
Passenger-car equivalents for trucks, $E_T$ (Exhibit 15-18 or 15-19)  1.1  Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  1.0  1.0  Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1))  0.989  0.989  Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  1.00  1.00  Directional flow rate <sup>2</sup> , $v_f$ (pc/h) $v_f$ = $v_f$ /(PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ )  231  331  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1- $e^{av_d}^b$ )  27.1  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> + $f_{np,PTSF}$ *( $v_{d,PTSF}$ ) $v_{d,PTSF}$ +  33.2	Percent Time-Spent-Following		•	
Passenger-car equivalents for RVs, $E_R$ (Exhibit 15-18 or 15-19)  1.0  1.0  Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1))  0.989  0.989  Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  1.00  1.00  Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ (PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ )  231  331  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> <sub>d</sub> <sup>b</sup> )  27.1  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> + $f_{np,PTSF}$ *( $v_{d,PTSF}$ ) $v_{d,PTSF}$ +  33.2			Analysis Direction (d)	Opposing Direction (o)
Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$ -1)+ $P_R$ ( $E_R$ -1)) 0.989 0.989  Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17) 1.00 1.00  Directional flow rate <sup>2</sup> , $v_f$ (pc/h) $v_i$ = $V_f$ (PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ ) 231 331  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> ) 27.1  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21) 14.9  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> + $f_{np,PTSF}$ *( $v_{d,PTSF}$ ) $v_{d,PTSF}$ + 33.2	Passenger-car equivalents for trucks, E <sub>T</sub> (Exhib	oit 15-18 or 15-19)	1.1	1.1
Grade adjustment factor $^{1}$ , $f_{g,PTSF}$ (Exhibit 15-16 or Ex 15-17)  1.00  1.00  Directional flow rate $^{2}$ , $v_{f}$ (pc/h) $v_{i}$ = $V_{f}$ (PHF* $f_{HV,PTSF}$ * $f_{g,PTSF}$ )  231  331  Base percent time-spent-following $^{4}$ , BPTSF $_{d}$ (%)=100(1-e <sup>av</sup> $_{d}$ )  27.1  Adj. for no-passing zone, $f_{np,PTSF}$ (Exhibit 15-21)  Percent time-spent-following, PTSF $_{d}$ (%)=BPTSF $_{d}$ + $f_{np,PTSF}$ *( $v_{d,PTSF}$ / $v_{d,PTSF}$ +  33.2	Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibi	t 15-18 or 15-19)	1.0	1.0
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )  Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )  27.1  Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + 33.2	Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/ (1+ P <sub>T</sub>	-(E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.989	0.989
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )  Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + 33.2	U'		1.00	1.00
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)  Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> + 33.2			231	331
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +	Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%	6)=100(1-e <sup>av</sup> d <sup>D</sup> )		27.1
33.2	Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-2	21)		14.9
v <sub>o,PTSF</sub> )	Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTS	$^{6}F_{d}^{+f}_{np,PTSF}^{*(V}_{d,PTSF}^{/V}_{d,PTSF}^{+}$		33.2
1. 1.00 : 1.00 B. 6				
Level of Service and Other Performance Measures		asures	1	D
Level of service, LOS (Exhibit 15-3)  Volume to capacity ratio, v/c  0.13	,		ļ	

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	89.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	228.3
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.71
Bicycle level of service (Exhibit 15-4)	F
Notes	

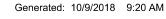
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If v<sub>i</sub>(v<sub>d</sub> or v<sub>o</sub>) >=1,700 pc/h, terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Directional Page 1 of 2

	NAL TWO-LANE HIGHWA	1	
General Information	Fl. abath Francis	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2018
Project Description: Existing Condition Input Data	ns westbound		
Input Bata	I		
	\$\Displays \tag{Shoulder widthft}		
-	Lane widthtt	Class I	highway Class II
	Lane widthtt		Class III highway
	\$\ Shoulder widthft		
12		/ Terrain	Level Rolling
Segment leng	pth, L <sub>t</sub> mi	Grade Leng Peak-hour f	
24		No-passing	
Analysis direction vol., V <sub>d</sub> 252	2veh/h	Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
· ·	₹veh/h	% Recreation	onal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0		Access poin	
Lane Width ft 10.0			
Segment Length mi 2.5			
Average Travel Speed		Analysis Direction (d)	Opposing Direction (o)
	E (E 13.3.45.44 45.40)		1
Passenger-car equivalents for trucks,	E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.5
Passenger-car equivalents for RVs, E		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,A</sub>		0.958	0.948
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exh		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (Ph		286	203
Free-Flow Speed f	rom Field Measurement		ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub> Total demand flow rate, both directions	2.14	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	bit 15-8) 1.0 mi/h
		Free-flow speed, FFS (FSS=BF	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v			20 //
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exl	nibit 15-15) 1.6 mi/h	Average travel speed, ATS <sub>d</sub> =FF	51.2 mi/h
		V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	22.4.24
Daysont Time Chart Fallowing		Percent free flow speed, PFFS	90.4 %
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks,	E_(Exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs, E	•	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =	·	0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exl		1.00	1.00
Directional flow rate <sup>2</sup> , $v_i(pc/h)$ $v_i=V_i/(Pc/h)$		277	195
Base percent time-spent-following <sup>4</sup> , B		<u></u>	28.3
			14.8
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Ex			17.0
	%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *( $v_{d,PTSF} / v_{d,PTSF}$ +		37.0
V <sub>o,PTSF</sub> )	and Manager		
Level of Service and Other Perform	ance Measures		В
Level of service, LOS (Exhibit 15-3)		I	ט

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	90.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	273.9
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.81
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Generated: 10/9/2018 9:21 AM



Appendix E: Crash Data

Section/Roadway ID:	09060000
Intersecting Route:	CR 29 to Lonesome Island Road
Milepost:	17.255 - 21.573
County:	Highlands County

 State Road:
 SR 70

 Study Period:
 1/1/2013
 To: 12/31/2017

 Data by:
 SPM

 Date:
 11/5/2018

Number   Date   Date   Day   Time   Fatal   Injury   Damage   Crash Type   Night   Dry   Caraleas's Negligent   Driving   Action	Crash				Sev	erity	Property		Day /	Wet /	
1		Date	Day	Time				Crash Type			Contributing Cause
2 10/1/2017 Sun 06:21 PM 0 2 \$49,000 Sicieswipe, same direction Night Dry Action Animal (Non-Located) Night Dry Action Driving Action Driving Action Driving No Contributing Cause No Contributing No Contributing Cause No Contributing Cau	1	11/24/2017	Eei	04:02 AM	0	0	<b>¢</b> E 200	Hit Fixed Object	Dov	Dn	
No Contributing Action   Section		11/24/2017	ГП	04.03 AW	U	U	φ5,200	•	Day	ыу	•
3 9/30/2017 Sat 05:53 PM 0 0 \$2,000 Located) Night Dry Action 4 7/6/2017 Thu 03:32 PM 0 1 \$5,000 Hit Fixed Object Night Dry Careless/ Negligent Driving 5 4/15/2017 Sat 10:30 PM 1 3 \$4.300 Pedestrian Day Dry Action 6 2/11/2017 Sat 02:00 PM 0 0 \$8,000 Angle Night Dry Mocontributing Action 7 1/26/2017 Thu 11:30 PM 0 0 \$100 Hit Fixed Object Day Dry Contributing Cause 8 12/24/2016 Sat 11:50 AM 0 1 \$12,000 Rear End Night Dry Contributing Cause 9 12/21/2016 Wed 02:20 PM 0 0 \$1.000 Animal (Non-Located) Day Dry Contributing Cause 10 11/16/2016 Wed 01:30 AM 0 0 \$2,000 Animal (Non-Located) Day Dry Contributing Cause 11 7/17/2016 Sat 11:20 AM 0 0 \$12,000 Animal (Non-Located) Day Dry Contributing Cause 13 6/29/2016 Wed 11:01 AM 0 0 \$20,200 Ran Off Road Day Dry Contributing Cause 14 4/6/2016 Wed 11:35 AM 0 2 \$5,500 Other Night Dry Action Careless/ Negligent Driving 14 4/6/2016 Wed 11:35 AM 0 2 \$5,500 Other Night Dry Action 15 1/10/2016 Sun 12:00 AM 0 0 \$14,000 Located) Day Dry Action 16 12/6/2015 Sun 12:00 AM 0 0 \$5,200 Other Night Dry Action 17 11/28/2015 Sat 06:40 PM 0 1 \$133,000 Animal (Non-Located) Day Dry Action 18 10/16/2015 Fri 08:45 AM 0 0 \$5,200 Other Night Dry Action 19 9/21/2015 Mon 09:00 AM 0 0 \$5,200 Other Night Dry Proper Lane 19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Hit Fixed Object Night Dry Action Driving 19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Hit Fixed Object Night Dry Action Driving 19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 20 9/6/2015 Sun 09:45 PM 0 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 20 9/6/2015 Sun 09:45 PM 0 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 20 9/6/2015 Sun 09:45 PM 0 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 20 9/6/2015 Sun 09:45 PM 0 0 0 \$3,000 Mit Rection Night Dry Careless/ Negligent Driving 20 9/6/2015 Sun 09:45 PM 0 0	2	10/1/2017	Sun	06:21 PM	0	2	\$49,000		Night	Dry	
4 7/6/2017 Thu 03:32 PM 0 1 \$5,000 Hit Fixed Object Night Dry Driving 5 4/15/2017 Sat 10:30 PM 1 3 \$4,300 Pedestrian. Day Dry No Contributing Action 6 2/11/2017 Sat 02:00 PM 0 0 \$8,000 Angle Night Dry Of-Way Action 6 2/11/2017 Thu 11:30 PM 0 0 \$100 Hit Fixed Object Day Dry Contributing Cause No Contributing No	3	9/30/2017	Sat	05:53 PM	0	0	\$2,000	,	Night	Dry	
5         4/15/2017         Sat         10:30 PM         1         3         \$4,300         Pedestrian         Day         Dry         Action           6         2/11/2017         Sat         02:00 PM         0         0         \$8,000         Angle         Night         Dry         Failed to Yield Right-of-Way           7         1/26/2017         Thu         11:30 PM         0         0         \$100         Hit Fixed Object         Day         Dry         Contributing Cause           8         12/24/2016         Sat         11:50 AM         0         1         \$12.000         Rear End.         Night         Dry         Contributing Cause           9         12/21/2016         Wed         02:20 PM         0         0         \$1,000         Rear End.         Night         Dry         Contributing Cause           10         11/16/2016         Wed         01:30 AM         0         0         \$2,000         Ran Off Road         Day         Dry         Action           11         7/16/2016         Sat         11:20 AM         0         0         \$12,000         Other         Night         Dry         Action           13         6/29/2016         Wed         11:31 AM <td>4</td> <td>7/6/2017</td> <td>Thu</td> <td>03:32 PM</td> <td>0</td> <td>1</td> <td>\$5,000</td> <td>Hit Fixed Object</td> <td>Night</td> <td>Dry</td> <td>Driving</td>	4	7/6/2017	Thu	03:32 PM	0	1	\$5,000	Hit Fixed Object	Night	Dry	Driving
6	5	4/15/2017	Sat	10:30 PM	1	3	\$4,300	Pedestrian	Day	Dry	
7         1/26/2017         Thu         11:30 PM         0         0         \$100         Hit Fixed Object         Day         Dry         Contributing Cause No Contributing Action           8         12/24/2016         Sat         11:50 AM         0         1         \$12,000         Rear End         Night         Dry         Action           9         12/21/2016         Wed         02:20 PM         0         0         \$1,000         Sideswipe, same direction Animal (Non-Located)         Day         Dry         Contributing Cause No Contributing Action           10         11/16/2016         Wed         01:30 AM         0         0         \$2,000         Ran Off Road         Day         Dry         Octorributing Action           11         7/17/2016         Sun         04:30 AM         0         0         \$20,200         Ran Off Road         Day         Dry         Action           12         7/16/2016         Sat         11:20 AM         0         0         \$12,000         Other         Night         Dry         Action           13         6/29/2016         Wed         11:01 AM         0         2         \$5,500         Other         Night         Dry         Action           15	6	2/11/2017	Sat	02:00 PM	0	0	\$8,000	Angle	Night	Dry	•
8 12/24/2016 Sat 11:50 AM 0 1 \$12,000 Rear End Night Dry Action  9 12/21/2016 Wed 02:20 PM 0 0 0 \$1,000 direction Night Dry Contributing Cause Animal (Non-Located)  10 11/16/2016 Wed 01:30 AM 0 0 \$22,000 Ran Off Road Day Dry Action  11 7/17/2016 Sun 04:30 AM 0 0 \$20,200 Ran Off Road Day Dry Driving  12 7/16/2016 Sat 11:20 AM 0 0 \$12,000 Other Night Dry Action  13 6/29/2016 Wed 11:01 AM 0 0 \$9,000 Hit Fixed Object Night Dry Action  14 4/6/2016 Wed 11:35 AM 0 2 \$5,500 Other Night Dry Action  15 1/10/2016 Sun 12:05 AM 0 0 \$14,000 Located) Day Dry Action  16 12/6/2015 Sun 12:00 AM 0 0 \$5,200 Other Night Dry Action  17 11/28/2015 Sat 06:40 PM 0 1 \$13,000 Other Night Dry Action  18 10/16/2015 Fri 08:45 AM 0 0 \$6,500 Other Night Dry Action Other Opposite Greeks/ Negligent Dry Action Other Opposite Greeks/ Negligent Dry Action Other Other Night Dry Action Other Opposite Greeks/ Negligent Dry Action Other Other Night Dry Action Other Other Opposite Greeks/ Negligent Dry Action Other Other Night Dry Action Other Other Opposite Greeks/ Negligent Dry Action Other Other Night Dry Action Other Other Night Dry Action Other Ot	7	1/26/2017	Thu	11:30 PM	0	0	\$100	Hit Fixed Object	Day	Dry	Contributing Cause
9 12/21/2016 Wed 02:20 PM 0 0 \$1,000 direction Night Dry Contributing Cause Animal (Non-Located) Day Dry Action  10 11/16/2016 Wed 01:30 AM 0 0 \$2,000 Ran Off Road Day Dry Action  11 7/17/2016 Sun 04:30 AM 0 0 \$20,200 Ran Off Road Day Dry Dry Action  12 7/16/2016 Sat 11:20 AM 0 0 \$12,000 Other Night Dry Action  13 6/29/2016 Wed 11:01 AM 0 0 \$9,000 Hit Fixed Object Night Dry Action  14 4/6/2016 Wed 11:35 AM 0 2 \$5,500 Other Night Dry Action  15 1/10/2016 Sun 12:05 AM 0 0 \$14,000 Cher Night Dry Action  16 12/6/2015 Sun 12:00 AM 0 0 \$5,200 Other Night Dry Action  17 11/28/2015 Sat 06:40 PM 0 1 \$13,000 direction Night Dry Action  18 10/16/2015 Fri 08:45 AM 0 0 \$6,500 direction Night Dry Driving  19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 direction Night Dry Driving  20 9/6/2015 Sun 09:45 PM 0 0 \$2,100 Ran Off Road Day /moving)  Miscellaneous No Contributing Miscellaneous Contributing Miscellaneous No Contributing Cause No Contributing Cause	8	12/24/2016	Sat	11:50 AM	0	1	\$12,000	Rear End	Night	Dry	•
10	9	12/21/2016	Wed	02:20 PM	0	0	\$1,000		Night	Dry	
11	10	11/16/2016	Wed	01:30 AM	0	0	\$2,000	,	Day	Dry	
12         7/16/2016         Sat         11:20 AM         0         \$12,000         Other         Night         Dry         Action           13         6/29/2016         Wed         11:01 AM         0         0         \$9,000         Hit Fixed Object         Night         Dry         Careless/ Negligent Driving           14         4/6/2016         Wed         11:35 AM         0         2         \$5,500         Other         Night         Dry         Action           15         1/10/2016         Sun         12:05 AM         0         0         \$14,000         Located)         Day         Dry         Action           16         12/6/2015         Sun         12:00 AM         0         0         \$5,200         Other         Night         Dry         Action           17         11/28/2015         Sat         06:40 PM         0         1         \$13,000         direction         Night         Dry         Proper Lane           18         10/16/2015         Fri         08:45 AM         0         0         \$6,500         direction         Night         Dry         Careless/ Negligent           19         9/21/2015         Mon         09:00 AM         0         0 <td>11</td> <td>7/17/2016</td> <td>Sun</td> <td>04:30 AM</td> <td>0</td> <td>0</td> <td>\$20,200</td> <td>Ran Off Road</td> <td>Day</td> <td>Dry</td> <td>Driving</td>	11	7/17/2016	Sun	04:30 AM	0	0	\$20,200	Ran Off Road	Day	Dry	Driving
13	12	7/16/2016	Sat	11:20 AM	0	0	\$12,000	Other	Night	Dry	_
14         4/6/2016         Wed         11:35 AM         0         2         \$5,500         Other         Night         Dry         Action           15         1/10/2016         Sun         12:05 AM         0         0         \$14,000         Located)         Day         Dry         No Contributing Action           16         12/6/2015         Sun         12:00 AM         0         0         \$5,200         Other         Night         Dry         Action           17         11/28/2015         Sat         06:40 PM         0         1         \$13,000         Gideswipe, Opposite direction         Night         Dry         Proper Lane           18         10/16/2015         Fri         08:45 AM         0         0         \$6,500         direction         Night         Dry         Careless/ Negligent Driving           19         9/21/2015         Mon         09:00 AM         0         0         \$3,000         Sideswipe, same direction         Night         Dry         Careless/ Negligent Driving           20         9/6/2015         Sun         09:45 PM         0         0         \$2,100         Ran Off Road         Day         /moving)         Contributing Cause	13	6/29/2016	Wed	11:01 AM	0	0	\$9,000	Hit Fixed Object	Night	Dry	
15	14	4/6/2016	Wed	11:35 AM	0	2	\$5,500	Other	Night	Dry	
16	4.5	4/40/2040	Cum	40.05 AM	0	0	¢44.000	· ·	-		
Sideswipe, Opposite direction Night Dry Proper Lane  Sideswipe, Opposite direction Night Dry Proper Lane  Sideswipe, Opposite direction Night Dry Proper Lane  Sideswipe, Opposite direction Night Dry Driving  Sideswipe, Opposite direction Night Dry Driving  Sideswipe, Sideswipe, Sideswipe, Same direction Night Dry Driving  Sideswipe, S	15	1/10/2016	Sun	12.05 AW	U	U	\$14,000	Located)	Day	Dry	
17 11/28/2015 Sat 06:40 PM 0 1 \$13,000 direction Night Dry Proper Lane  Sideswipe, Opposite direction Night Dry Driving  18 10/16/2015 Fri 08:45 AM 0 0 0 \$6,500 direction Night Dry Driving  19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 direction Night Dry Driving  20 9/6/2015 Sun 09:45 PM 0 0 \$2,100 Ran Off Road Day /moving)  Night Dry Careless/ Negligent Miscellaneous Contributing Cause No Contributing	16	12/6/2015	Sun	12:00 AM	0	0	\$5,200		Night	Dry	
18 10/16/2015 Fri 08:45 AM 0 0 \$6,500 Opposite direction Night Dry Driving  19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 Sideswipe, same direction Night Dry Driving  20 9/6/2015 Sun 09:45 PM 0 0 \$2,100 Ran Off Road Day /moving)  Careless/ Negligent Driving  Water (standing /moving) Miscellaneous Contributing Cause No Contributing	17	11/28/2015	Sat	06:40 PM	0	1	\$13,000	Opposite	Night	Dry	
19 9/21/2015 Mon 09:00 AM 0 0 \$3,000 direction Night Dry Driving  Water (standing Miscellaneous Contributing Cause No Contributing Cause)	18	10/16/2015	Fri	08:45 AM	0	0	\$6,500	Opposite	Night	Dry	
Water (standing Miscellaneous 20 9/6/2015 Sun 09:45 PM 0 0 \$2,100 Ran Off Road Day /moving) Contributing Cause No Contributing	19	9/21/2015	Mon	09:00 AM	0	0	\$3,000		Night	Dry	
								Ran Off Road		Water (standing	Contributing Cause
	21	8/23/2015	Sun	05:50 PM	0	2	\$5,000	Hit Fixed Object	Night	Wet	9

Crash	Date	Day	Time	Seve	erity	Property	Crash Type	Day /	Wet /	Contributing Cause
Number	Date	Day	Time	Fatal	Injury	Damage	Crasn Type	Night	Dry	Contributing Cause
22	8/10/2015	Mon	12:20 PM	0	2	\$4,000	Angle	Night	Dry	Failed to Yield Right- of-Way
23	6/1/2015	Mon	09:30 AM	0	0	\$10,400	Hit Fixed Object	Night	Dry	Careless/ Negligent Driving
24	5/12/2015	Tue	12:10 PM	0	0	\$4,000	Rear End	Night	Dry	Careless/ Negligent Driving
25	4/16/2015	Thu	06:30 AM	0	0	\$7,500	Rear End	Night	Dry	Careless/ Negligent Driving
26	3/27/2015	Fri	03:51 PM	1	2	\$30,000	Sideswipe, Opposite direction	Night	Wet	Failed to Keep in Proper Lane
27	2/13/2015	Fri	06:00 PM	0	0	\$501	Sideswipe, Opposite direction	Night	Dry	Unknown
28	11/7/2014	Fri	08:55 AM	0	1	\$12,000	Other	Night	Dry	No Contributing Action
29	7/2/2014	Wed	12:00 PM	0	0	\$2,000	Other	Night	Dry	Miscellaneous Contributing Cause
30	6/19/2014	Thu	09:20 PM	0	0	\$11,500	Animal (Non- Located)	Day	Wet	No Contributing Action
31	5/3/2014	Sat	12:50 AM	0	1	\$10,000	Animal (Non- Located)	Day	Dry	No Contributing Action
32	4/14/2014	Mon	01:00 AM	0	0	\$500	Animal (Non- Located)	Day	Wet	No Contributing Action
33	3/5/2014	Wed	08:15 AM	0	1	\$1,000	Other	Night	Dry	No Contributing Action
34	1/28/2014	Tue	02:30 PM	0	0	\$1,500	Other	Night	Dry	Unknown
35	12/15/2013	Sun	05:37 PM	0	1	\$5,000	Ran Off Road	Day	Dry	Failed to Keep in Proper Lane
36	9/15/2013	Sun	11:45 PM	0	0	\$9,000	Animal (Non- Located)	Day	Dry	Careless/ Negligent Driving
37	1/1/2013	Tue	10:30 AM	0	1	\$8,500	Rear End	Night	Dry	Careless/ Negligent Driving

	Florida Average Crash Rat				nents		
СС	Category	2011	2012	2013	2014	2015	5 Year Average
40	One Way	6.755	8.357	10.061	10.940	10.757	9.399
10	2-3 Lanes 2wy Div Rasd	4.545	4.857	6.004	6.267	7.535	5.849
11	2-3 Lanes 2wy Div Pavd	3.207	4.018	4.654	5.428	6.238	4.701
12	2-3 Lanes 2wy Undivided	2.238	2.685	3.198	3.461	3.452	2.993
20	4-5 Lanes 2wy Div Rasd	2.331	2.756	3.168	3.495	3.753	3.124
21	4-5 Lanes 2wy Div Pavd	3.942	4.665	5.141	5.795	6.162	5.145
22	4-5 Lanes 2wy Undivided	3.972	5.228	6.067	6.263	6.992	5.683
30	6+ Lanes 2wy Div Rasd	3.183	3.570	4.085	4.511	4.867	4.066
31	6+ Lanes 2wy Div Pavd	3.287	4.197	4.760	5.175	5.493	4.591
32	6+ Lanes 2wy Undivided	66.184	39.769	54,148	71.186	68.039	58.320
1	Interstate	0.671	0.771	0.888	0.907	0.991	0.850
3	Toll Road	0.529	0.609	0.766	0.761	0.779	0.695
7	Ramp	0.000	0.000	0.000	0.000	0.000	0.000
5	Other Limited access	1.385	1.873	1.803	1.928	2.089	1.799

	Florida Average (				nents		
	Crash Rates	s Per Mill	lion Vehic	cle Miles			
СС	Category	2011	2012	2013	2014	2015	5 Year Average
42	One Way	6.835	9.368	13.940	3.149	3.624	4.946
16	2-3 Lanes 2wy Div Rasd	0.869	0.995	1.510	0.794	0.901	1.012
17	2-3 Lanes 2wy Div Pavd	1.761	1.705	1.884	1.755	1.885	1.808
18	2-3 Lanes 2wy Undivided	0.560	0.647	0.718	0.727	0.777	0.687
26	4-5 Lanes 2wy Div Rasd	0.540	0.605	0.684	0.643	0.717	0.641
27	4-5 Lanes 2wy Div Pavd	0.437	0.401	0.636	0.531	0.499	0.492
28	4-5 Lanes 2wy Undivided	0.000	0.000	0.000	0.000	0.000	0.000
36	6+ Lanes 2wy Div Rasd	1.383	1.386	1.030	0.369	0.793	1.054
37	6+ Lanes 2wy Div Pavd	0.076	0.060	0.000	0.000	0.000	0.093
38	6+ Lanes 2wy Undivided	0.000	0.000	0.000	0.000	0.000	0.000
2	Interstate	0.339	0.366	0.438	0.415	0.498	0.412
4	Toll Road	0.322	0.354	0.426	0.370	0.454	0.384
8	Ramp	0.000	0.000	0.000	0.000	0.000	0.000
6	Other Limited access	0.224	0.112	0.502	0.819	1.224	0.545

Appendix F: TURNS5 Design Hour Volumes

### **TURNS5 ANALYSIS SHEET - INPUT**

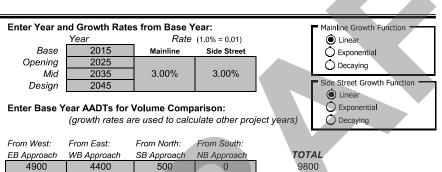
Analyst:	H.V	V. Lochner		
Date:	7-Jan-19		!	
Highway:		SR 70		
Intersection:		CR 29		
From:	AM	Peak Hour		
To:				
County:	H	ighlands		
Is the Mainline Oriented North/South?	Enter Yes or No Yes No			
K Factors	Mainline	D Factors	Mainline	
ĺ	9.50%		41.2%	Westbound (WB)
	Sidestreet		58.8%	Eastbound (EB)
	9.50%		Sidestreet	_
			41.2%	Northbound (NB)
			58.8%	Southbound (SB)
				$\overline{}$

Do you have FTSUTMS Model Year traffic from which you would like to interpolate/extrapolate for project years? (Y/N)

Enter Yes or No
Yes
No

If "Yes" go to cell C47

If "No" go to cell C31



### **Enter Project and Model Years**

	i cai
Base	2015
Opening	2025
Mid	2035
Design	2045
Model	2040

### Enter Base and Model Year AADTs for Volume Comparison:

(volumes for other project years are calculated by interpolation)

	From West:	⊢rom East:	From North:	From South:
	EB Approach	WB Approach	SB Approach	NB Approach
2015	4900	4400	500	0
2040	7300	7700	1000	0

TOTAL
9800
16000

		1st Guess urning %'s for ADT Balancing		red
(EB LT)	West-to-North	12%	12	
(EB THRU)	West-to-East	88%	261	
(EB RT)	West-to-South	0%	0	
(WB LT)	East-to-South	0%	0	(must be done manually)
(WB THRU)	East-to-West	91%	185	
(WB RT)	East-to-North	9%	7	
(SB LT) (SB THRU) (SB RT)	North-to-East North-to-South North-to-West	41% 1% 58%	16 0 12	
(NB LT)	South-to-West	55%	0	
(NB THRU)	South-to-North	7%	0	
(NB RT)	South-to-East	38%	0	
Desired Clos	sure:	0.10		

# **TURNS5 INITIAL TURNING VOLUME SUMMARY**

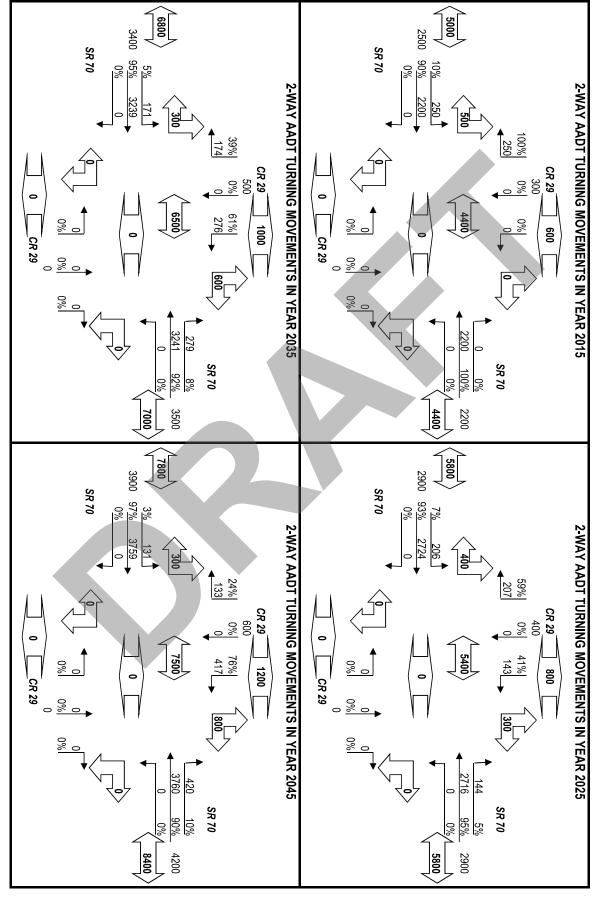
From: <u>.</u> Highway: Intersection: SR 70 CR 29 AM Peak Hour Date: Analyst: County: H.W. Lochner 10-Oct-18 Highlands

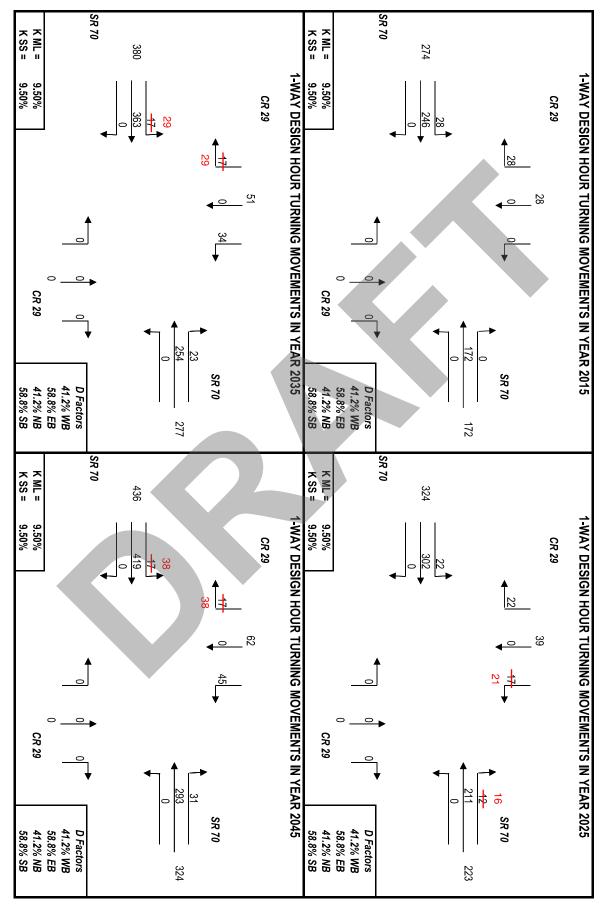
0		0		0		0		outh:	Total Flow From South:
)00 )00	0.000 0.000 0.000	000	0.000 0.000 0.000	0	0.000 0.000 0.000	0 0 0	0.000 0.000 0.000	0.55 0.07 0.38	South-To-West (LT) South-To-North (Thru) South-To-East (RT)
		500		300		200		orth:	Total Flow From North:
758 )00 ?42	0.758 0.000 0.242	300 0 200	0.613 0.000 0.387	100 0 200	0.407 0.000 0.593	0 0 200	0.000 0.000 1.000	0.41 0.01 0.58	North-To-East (LT) North-To-South (Thru) North-To-West (RT)
		3500		2800		2200		ast:	Total Flow From East:
)00 )00	0.000 0.900 0.100	0 3200 300	0.000 0.921 0.079	0 2700 100	0.000 0.949 0.051	0 2200 0	0.000 1.000 0.000	0.00 0.91 0.09	East-To-South (LT) East-To-West (Thru) East-To-North (RT)
		3400		2900		2400		est:	Total Flow From West:
100 966 3800 900 0	0.034 0.966 0.000	200 3200 0	0.050 0.950 0.000	200 2700 0	0.070 0.930 0.000	200 2200 0	0.102 0.898 0.000	0.12 0.88 0.00	West-To-North (LT) West-To-East (Thru) West-To-South (RT)
nal Calculated mate Volume	Final Estimate	Turning Volume	Final Estimate	Calculated Volume	Final Estimate	Turning Volume	Final Estimate	Initial Estimate	Approach-To- Approach
2045		2035		2025	20	2015	20	2015	

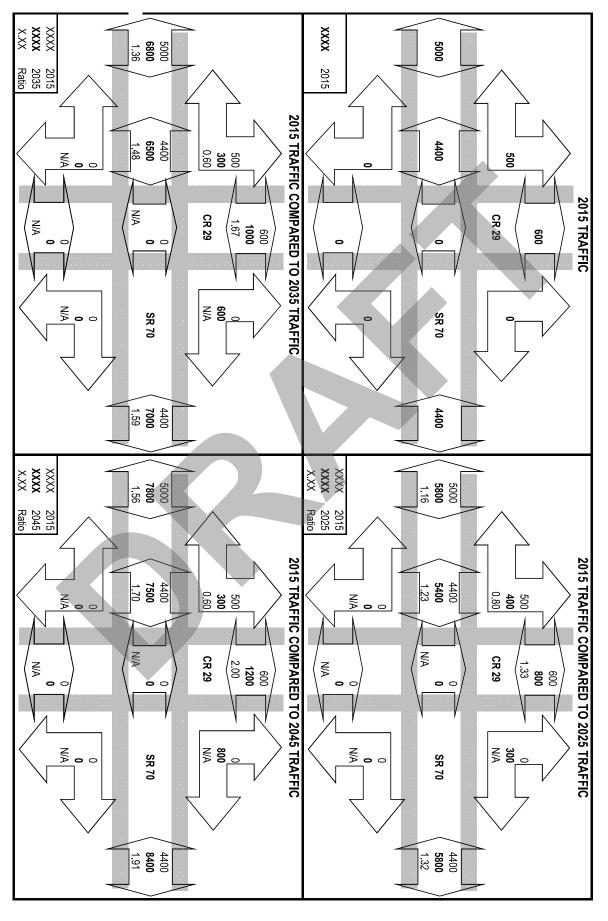
PLEASE NOTE: These are the Initial Balanced Turning Movements. They are directional.

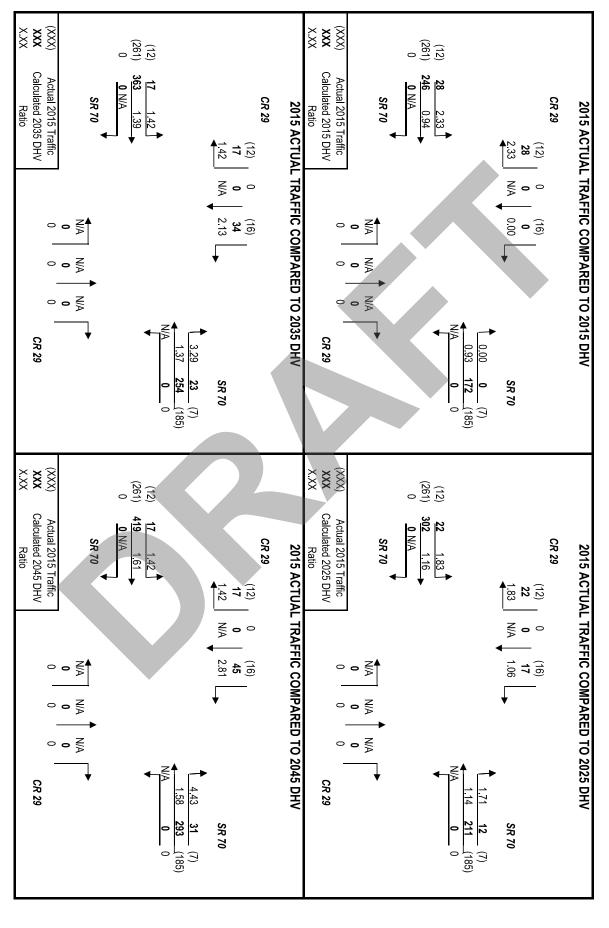
The volumes as shown in the the output Turning Movement Diagrams have been smoothed to reflect two-way flow.

## PROJECT TRAFFIC FOR SR 70 AT CR 29: AM Peak Hour

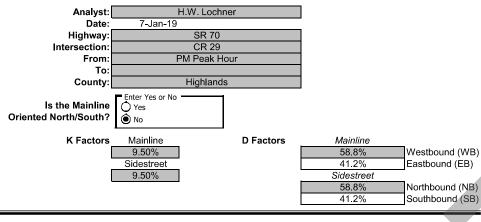








### **TURNS5 ANALYSIS SHEET - INPUT**



Do you have FTSUTMS Model Year traffic from which you would like to interpolate/extrapolate for project years? (Y/N)

Enter Yes or No

Yes

No

If "Yes" go to cell C47

If "No" go to cell C31

### Enter Year and Growth Rates from Base Year:

	Year	Rate	(1.0% = 0.01)
Base	2015	Mainline	Side Street
Opening	2025		
Mid	2035	3.00%	3.00%
Design	2045		

### Enter Base Year AADTs for Volume Comparison:

(growth rates are used to calculate other project years)

	O Exponential O Decaying
Į	Side Street Growth Function Linear
	Exponential Decaying

Mainline Growth Function

Linear

From West:	From East:	From North:	From South:
EB Approach	WB Approach	SB Approach	NB Approach
4900	4400	500	0

**TOTAL** 9800

**TOTAL** 9800 16000

### **Enter Project and Model Years**

	Year
Base	2015
Opening	2025
Mid	2035
Design	2045
Model	2040

Desired Closure:

### **Enter Base and Model Year AADTs for Volume Comparison:**

(volumes for other project years are calculated by interpolation)

Fr	om West:	From East:	From North:	From South:
EE	3 Approach	WB Approach	SB Approach	NB Approach
2015	4900	4400	500	0
2040	7300	7700	1000	0

1st Guess Actual/Counted Turning %'s for Traffic

	AA	DT Balancing	for 2015
(EB LT)	West-to-North	12%	7
(EB THRU)	West-to-East	88%	150
(EB RT)	West-to-South	0%	0
(WB LT)	East-to-South	0%	0
(WB THRU)	East-to-West	91%	219
(WB RT)	East-to-North	9%	12
(SB LT)	North-to-East	41%	12
(SB THRU)	North-to-South	1%	0
(SB RT)	North-to-West	58%	8
(NB LT)	South-to-West	55%	0
(NB THRU)	South-to-North	7%	0
(NB RT)	South-to-East	38%	0

0.10

(must be done manually)

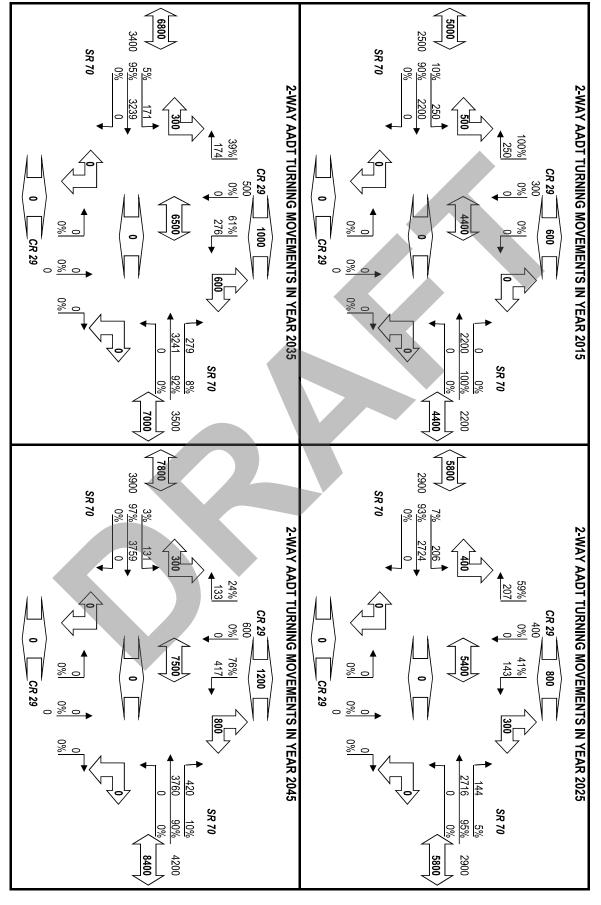
# **TURNS5 INITIAL TURNING VOLUME SUMMARY**

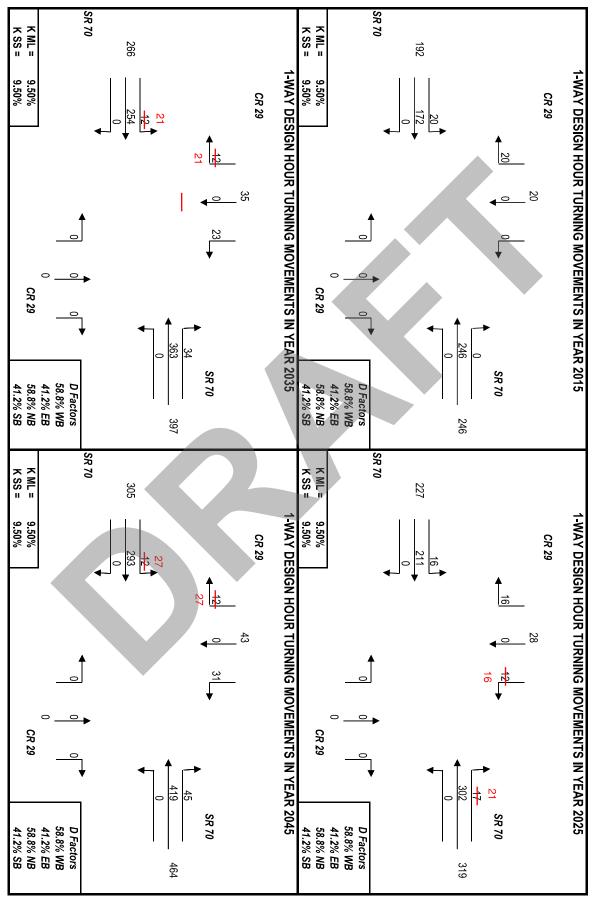
From: <u>.</u> Highway: Intersection: SR 70 CR 29 PM Peak Hour Date: Analyst: County: H.W. Lochner 10-Oct-18 Highlands

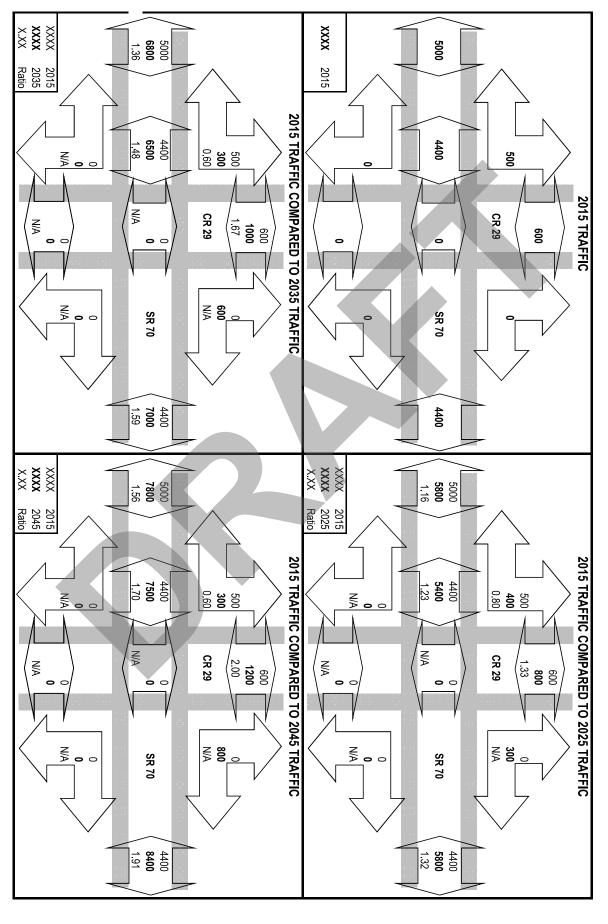
0		0		0		0		outh:	Total Flow From South:
000	0.000 0.000 0.000	0 0	0.000 0.000 0.000	0 0 0	0.000 0.000 0.000	0	0.000 0.000 0.000	0.55 0.07 0.38	South-To-West (LT) South-To-North (Thru) South-To-East (RT)
500		500		300		200		orth:	Total Flow From North:
400 0 100	0.758 0.000 0.242	300 0 200	0.613 0.000 0.387	100 0 200	0.407 0.000 0.593	0 0 200	0.000 0.000 1.000	0.41 0.01 0.58	North-To-East (LT) North-To-South (Thru) North-To-West (RT)
4200		3500		2800		2200		ast:	Total Flow From East:
0 3800 400	0.000 0.900 0.100	0 3200 300	0.000 0.921 0.079	0 2700 100	0.000 0.949 0.051	0 2200 0	0.000 1.000 0.000	0.00 0.91 0.09	East-To-South (LT) East-To-West (Thru) East-To-North (RT)
3900		3400		2900		2400		/est:	Total Flow From West:
100 3800 0	0.034 0.966 0.000	200 3200 0	0.050 0.950 0.000	200 2700 0	0.070 0.930 0.000	200 2200 0	0,102 0.898 0.000	0.12 0.88 0.00	West-To-North (LT) West-To-East (Thru) West-To-South (RT)
Calculated Volume	Final Estimate	Turning Volume	Final Estimate	Calculated Volume	Final Estimate	Turning Volume	Final Estimate	Initial Estimate	Approach-To- Approach
2045	20	2035		2025	2	2015	2	2015	

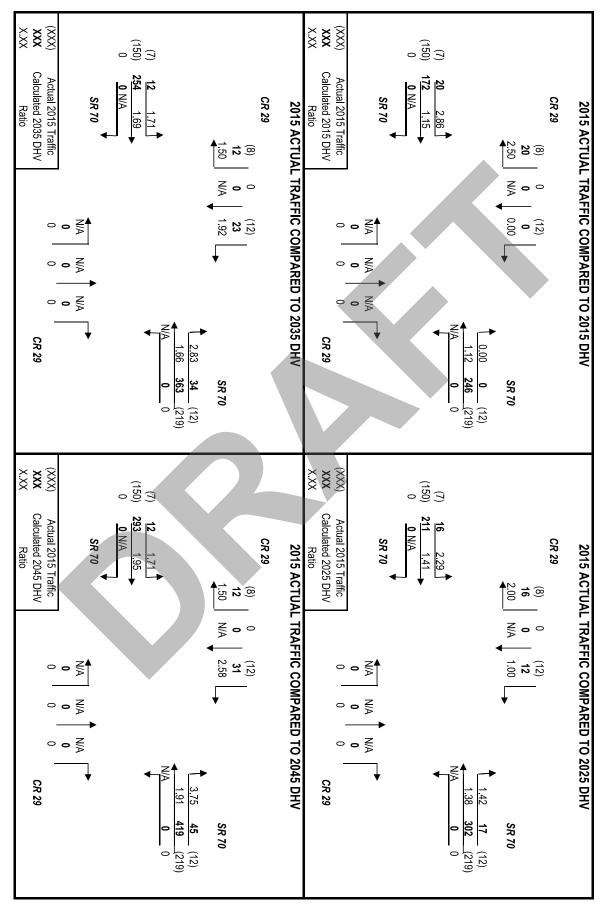
PLEASE NOTE: These are the Initial Balanced Turning Movements. They are directional.

The volumes as shown in the the output Turning Movement Diagrams have been smoothed to reflect two-way flow.



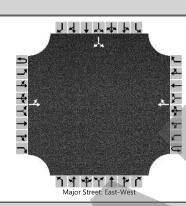






Appendix G: No-Build HCS7 Reports

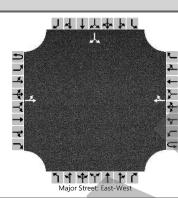
HCS7 Two-Way Stop-Control Report								
<b>General Information</b>		Site Information						
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29					
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County					
Date Performed	Oct 2018	SR 70						
Analysis Year	2025	North/South Street	CR 29					
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92					
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00					
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road						



Vehicle Volumes and Adju	ıstme	nts														
Approach		Eastb	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		22	302				211	16						21		22
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)														(	0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	l Leve	l of S	ervice	•												
Flow Rate, v (veh/h)		24													47	
Capacity, c (veh/h)		1268													559	
v/c Ratio		0.02													0.08	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.3	
Control Delay (s/veh)		7.9													12.0	
Level of Service (LOS)		А													В	
Approach Delay (s/veh)		0	.7											12	2.0	
Approach LOS														ı	В	

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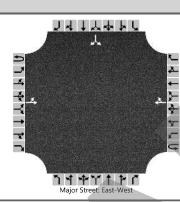
HCS7 Two-Way Stop-Control Report							
<b>General Information</b>		Site Information					
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29				
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County				
Date Performed	Oct 2018	East/West Street	SR 70				
Analysis Year	2025	North/South Street	CR 29				
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92				
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00				
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road					



Vehicle Volumes and Ad	ljustme	ents														
Approach	T	Eastb	ound		П	West	bound		Northbound					South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		16	211				302	21						16		16
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)	457														0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up H	leadwa	ys														
Base Critical Headway (sec)	$\top$	4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, ar	nd Leve	of S	ervice	•												
Flow Rate, v (veh/h)	Т	17													35	
Capacity, c (veh/h)		1159													535	
v/c Ratio		0.02													0.07	
95% Queue Length, Q <sub>95</sub> (veh)		0.0													0.2	
Control Delay (s/veh)		8.2													12.2	
Level of Service (LOS)		Α													В	
Approach Delay (s/veh)		0	.7											1.	2.2	
Approach LOS															В	

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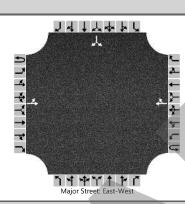
HCS7 Two-Way Stop-Control Report								
General Information		Site Information						
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29					
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County					
Date Performed	Oct 2018	East/West Street	SR 70					
Analysis Year	2035	North/South Street	CR 29					
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92					
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00					
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road						



Vehicle Volumes and Adj	ustme	ents														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		29	363				254	23						34		29
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)															0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	d Leve	l of S	ervice													
Flow Rate, v (veh/h)		32													68	
Capacity, c (veh/h)		1210													466	
v/c Ratio		0.03													0.15	
95% Queue Length, Q <sub>95</sub> (veh)		0.1			Ì		Ì				Ì				0.5	
Control Delay (s/veh)		8.1													14.1	
Level of Service (LOS)		Α			Ì		Ì				Ì				В	
Approach Delay (s/veh)		0	.8					•		•				14	4.1	
Approach LOS															В	

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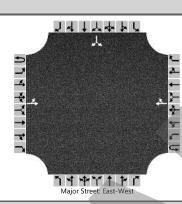
	HCS7 Two-Way Stop-Control Report									
<b>General Information</b>		Site Information								
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29							
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County							
Date Performed	Oct 2018	East/West Street	SR 70							
Analysis Year	2035	North/South Street	CR 29							
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92							
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00							
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road								



Vehicle Volumes and Adju	ustme	nts														
Approach		Eastb	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		21	254				363	34						23		21
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)															0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	l Leve	l of S	ervice													
Flow Rate, v (veh/h)		23													48	
Capacity, c (veh/h)		1082													454	
v/c Ratio		0.02													0.11	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.4	
Control Delay (s/veh)		8.4													13.9	
Level of Service (LOS)		А													В	
Approach Delay (s/veh)		0	.8											13	3.9	
Approach LOS															В	

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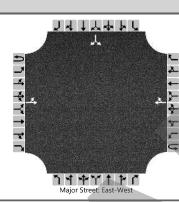
	HCS7 Two-Way Stop-Control Report									
General Information		Site Information								
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29							
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County							
Date Performed	Oct 2018	East/West Street	SR 70							
Analysis Year	2045	North/South Street	CR 29							
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92							
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00							
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road								



Vehicle Volumes and Adju	ustme	nts														
Approach		Eastb	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		38	419				293	31						45		38
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)														(	0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	l Leve	l of S	ervice													
Flow Rate, v (veh/h)		41													90	
Capacity, c (veh/h)		1158													399	
v/c Ratio		0.04													0.23	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.9	
Control Delay (s/veh)		8.2													16.7	
Level of Service (LOS)		Α													С	
Approach Delay (s/veh)		1	.0											16	5.7	
Approach LOS														(	С	

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	HCS7 Two-Way Stop-Control Report									
<b>General Information</b>		Site Information								
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29							
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County							
Date Performed	Oct 2018	East/West Street	SR 70							
Analysis Year	2045	North/South Street	CR 29							
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92							
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00							
Project Description	No-Build, SR 70 from CR 29 to Lonesome Islan	d Road								



Vehicle Volumes and Adj	ustme	ents														
Approach		Eastb	ound			West	bound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		27	293				419	45						31		27
Percent Heavy Vehicles (%)		11												11		11
Proportion Time Blocked																
Percent Grade (%)															0	
Right Turn Channelized																
Median Type   Storage				Undi	vided											
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.21												6.51		6.31
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.30												3.60		3.40
Delay, Queue Length, and	d Leve	l of S	ervice													
Flow Rate, v (veh/h)		29													63	
Capacity, c (veh/h)		1015													389	
v/c Ratio		0.03													0.16	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.6	
Control Delay (s/veh)		8.7													16.0	
Level of Service (LOS)		Α													С	
Approach Delay (s/veh)		1	.0											16	5.0	
Approach LOS														(	С	

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Analyst Elizabeth Fernandez Agency or Company H.W. Lochner Date Performed October 2018 Analysis Time Period AM Peak Hour  Project Description: No-Build, Eastbound  Input Data  Shoulder width It Lane width It Shoulder width It Segment length, L Shoulder width It Segment length, L Shoulder width It Segment length, L Shoulder width It Segment length It Shoulder width It	Class I h highway  Terrain Grade Length Peak-hour far No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % nal vehicles, P <sub>R</sub> 0%
Agency or Company Date Performed October 2018 Analysis Time Period AM Peak Hour  Project Description: No-Build, Eastbound Input Data  Shoulder width It Lane width It Shoulder width It Segment length, L Shoulder width It Segment length, L Shoulder width It Segment length, L Shoulder width It Shoulder	Class I highway Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	CR 29 to Lonesome Island Roa Highlands County 2025  Dighway Class II  Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0%  B Buses , P <sub>T</sub> 11 %  Dial vehicles, P <sub>R</sub> 0%  S mi 4/mi  Opposing Direction (o)
Date Performed October 2018 Analysis Time Period AM Peak Hour  Project Description: No-Build, Eastbound  Input Data  Shoulder width tt Lane width tt Shoulder width tt Shoulder width tt Shoulder width tt  Shoulder width tt  Segment length, Lt mi  Analysis direction vol., Vd 323veh/h Opposing direction vol., Vo 227veh/h Shoulder width ft 4.0 Lane Width ft 10.0 Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for RVs, ER (Exhibit 15-11 or 15-13)	Class I highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Highlands County 2025  Dighway Class II  Class III highway  Level Rolling  Mi Up/down  Ctor, PHF 0.92  One 0%  Dighway Buses , P <sub>T</sub> 11 %  Dighway Highway  All vehicles, P <sub>R</sub> 0%  Dighway Rolling  Mi Up/down  Dighway Rolling  Mi Up/down  Dighway Rolling  Mi Up/down  Dighway All Mi
Analysis Time Period AM Peak Hour  Project Description: No-Build, Eastbound  Input Data  Shoulder width It Lane width It Shoulder width It Segment length, L <sub>1</sub> mi  Analysis direction vol., V <sub>0</sub> 227veh/h Shoulder width It Lane Width It Segment Length It Lane Width	Class I In highway Terrain Grade Length Peak-hour fact No-passing 20 % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	nighway Class II  Class III highway  Level Rolling  n mi Up/down  ctor, PHF 0.92  one 0%  d Buses , P <sub>T</sub> 11 %  nal vehicles, P <sub>R</sub> 0%  s mi 4/mi  Opposing Direction (o)
Shoulder width tt Lane width tt Lane width tt Shoulder width tt 10.0 Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Shoulder width tt  Lane width tt  Lane width tt  Shoulder width tt  Segment length, L <sub>1</sub> mi  Analysis direction vol., V <sub>0</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Lane width tt  Lane width tt  Shoulder width tt  Shoulder width tt  Shoulder width tt  Shoulder width tt  Segment length, L <sub>1</sub> mi  Analysis direction vol., V <sub>0</sub> 323veh/h  Opposing direction vol., V <sub>0</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Lane width tt  Lane width tt  Shoulder width tt  Shoulder width tt  Shoulder width tt  Shoulder width tt  Segment length, L <sub>1</sub> mi  Analysis direction vol., V <sub>0</sub> 323veh/h  Opposing direction vol., V <sub>0</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Analysis direction vol., V <sub>d</sub> Segment length, L <sub>t</sub> Shoulder width  tt  Shoulder width  tt  Shoulder width  Manalysis direction vol., V <sub>d</sub> Segment length, L <sub>t</sub> Manalysis direction vol., V <sub>d</sub> Segment direction vol., V <sub>d</sub> Segment width ft  4.0  Lane Width ft  10.0  Segment Length mi  2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	highway  Terrain Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Class III highway  Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Segment length, L <sub>t</sub> mi  Analysis direction vol., V <sub>d</sub> 323veh/h  Opposing direction vol., V <sub>o</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Terrain Grade Length Peak-hour fac No-passing 2c % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % nal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Segment length, L <sub>t</sub> mi  Analysis direction vol., V <sub>d</sub> 323veh/h  Opposing direction vol., V <sub>o</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Terrain Grade Length Peak-hour fac No-passing 2c % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Level Rolling mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % nal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Analysis direction vol., V <sub>d</sub> 323veh/h  Opposing direction vol., V <sub>o</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Grade Length Peak-hour fac No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	mi Up/down ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % hal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Analysis direction vol., V <sub>d</sub> 323veh/h  Opposing direction vol., V <sub>o</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Peak-hour factor No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	ctor, PHF 0.92 one 0% d Buses , P <sub>T</sub> 11 % all vehicles, P <sub>R</sub> 0% s <i>mi</i> 4/mi  Opposing Direction (o)
Analysis direction vol., V <sub>d</sub> 323veh/h  Opposing direction vol., V <sub>o</sub> 227veh/h  Shoulder width ft 4.0  Lane Width ft 10.0  Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	No-passing zo % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	one 0% d Buses , P <sub>T</sub> 11 % nal vehicles, P <sub>R</sub> 0% s <i>mi</i> 4/mi  Opposing Direction (o)
Opposing direction vol., V <sub>o</sub> 227veh/h Shoulder width ft 4.0 Lane Width ft 10.0 Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Show North Arrow % Trucks and % Recreation Access points  Analysis Direction (d)  1.3	Buses , P <sub>T</sub> 11 %  all vehicles, P <sub>R</sub> 0%  is mi 4/mi  Opposing Direction (o)
Opposing direction vol., V <sub>o</sub> 227veh/h Shoulder width ft 4.0 Lane Width ft 10.0 Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	% Recreation Access points  Analysis Direction (d)  1.3	onal vehicles, P <sub>R</sub> 0% s mi 4/mi  Opposing Direction (o)
Shoulder width ft Lane Width ft Lane Width ft 10.0 Segment Length mi 2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	Access points  Analysis Direction (d)  1.3	os mi 4/mi Opposing Direction (o)
Shoulder width ft Lane Width f	Analysis Direction (d)	Opposing Direction (o)
Segment Length mi  2.5  Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.3	,, ,
Average Travel Speed  Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.3	
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-11 or 15-12)  Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.3	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.3	
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)		1.5
	10	
Heavy-vehicle adjustment factor f =1/(1+ D /F -1)+D /F -1)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV,ATS}$ =1/ (1+ $P_T(E_T$ -1)+ $P_R(E_R$ -1) )	0.968	0.948
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$ )	363	260
Free-Flow Speed from Field Measurement	Estimated Fre	ee-Flow Speed
Ba	sase free-flow speed <sup>4</sup> , BFFS	60.0 mi/t
Ar	dj. for lane and shoulder width, <sup>4</sup>	f <sub>1.0</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>ex</sub> ,		— <del>-</del>
Total demand flow rate, both directions, <i>v</i>	dj. for access points <sup>4</sup> , f <sub>A</sub> (Exhibi	it 15-8) 1.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )	ree-flow speed, FFS (FSS=BFF	-S-f <sub>LS</sub> -f <sub>Δ</sub> ) 56.6 mi/t
HV,A(S)	verage travel speed, ATS <sub>d</sub> =FFS	20 /1
пр,дта		50.2 mi/f
$v_o$	<sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
	Percent free flow speed, PFFS	88.7 %
Percent Time-Spent-Following	Analysis Direct (1)	Operation D' (1)
	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}=1/(1+P_T(E_T-1)+P_R(E_R-1))$	0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	355	249
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=100(1-e <sup>av<sub>d</sub>b</sup> )	3	86.3
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)	1	4.9
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +	4	
V <sub>o,PTSF</sub> )		
Level of Service and Other Performance Measures		2
Level of service, LOS (Exhibit 15-3)  Volume to capacity ratio, v/c		D.21

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	88.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	351.1
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.93
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If v<sub>i</sub>(v<sub>d</sub> or v<sub>o</sub>) >=1,700 pc/h, terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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HCS<sup>TM</sup> TwoLane Version 7.6

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	ONAL TWO-LANE HIGHWA		SHEET
General Information		Site Information	
Analyst Agency or Company Date Performed	Elizabeth Fernandez H.W. Lochner October 2018	Highway / Direction of Travel From/To Jurisdiction	SR 70 CR 29 to Lonesome Island Road Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2025
Project Description: No-Build, East	bound		
Input Data			
<u> </u>			
	\$\ Shoulder width ft \\ \$\ Lane width  ft \\ \$\ \tag{t}\$		A
	T		highway Class II
	Lane widthtt	highway 🛂	Class III highway
		Terrain	Level Rolling
Segment le	ngth, L <sub>t</sub> mi	Grade Lengi Peak-hour fa	actor, PHF 0.92
Analysis direction vol., V <sub>d</sub> 2	227veh/h	No-passing : Show North Arrow % Trucks an	zone 0% ad Buses , P <sub>T</sub> 11 %
Opposing direction vol., V	23veh/h	% Recreatio	nal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4	1.0	Access poin	ts <i>mi</i> 4/mi
Lane Width ft 10 Segment Length mi 2.	).0 5		
Average Travel Speed	<u> </u>		
morage mater epoca		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.5	1.3
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>	<sub>/,ATS</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.948	0.968
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (E	xhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (l		260	363
Free-Flow Speed	I from Field Measurement		ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Total demand flow rate, both direction	ons v	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	oit 15-8) 1.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776		Free-flow speed, FFS (FSS=BF	FS-f <sub>1.6</sub> -f <sub>4.</sub> ) 56.6 mi/h
		Average travel speed, ATS <sub>d</sub> =FF	20 //
Adj. for no-passing zones, f <sub>np,ATS</sub> (E	Exhibit 15-15) 1.4 mi/h	V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	3-0.00776(V <sub>d,</sub> ATS + 50.4 mi/h
		Percent free flow speed, PFFS	89.0 %
Percent Time-Spent-Following		Anglusia Direction (4)	Opposing Direction (a)
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	. •	1.1	1.1
Passenger-car equivalents for RVs,		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>		0.989	0.989
Grade adjustment factor <sup>1</sup> , $f_{g,PTSF}$ (EDirectional flow rate <sup>2</sup> , $v_i(pc/h)$ $v_i=V_i/(pc/h)$		249	355
Base percent time-spent-following <sup>4</sup> ,		+	29.2
Adj. for no-passing zone, f <sub>np.PTSF</sub> (E			14.9
	$_{d}^{(\%)}$ =BPTSF $_{d}^{+}$ f $_{np,PTSF}^{*}$ ( $v_{d,PTSF}^{/}$ $v_{d,PTSF}^{+}$		
v <sub>o,PTSF</sub> )	g d 114,F13F 4,F13F 4,F13F		35.3
Level of Service and Other Perform	mance Measures	1	
Level of service, LOS (Exhibit 15-3)			В
Volume to capacity ratio, v/c			0.14

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	89.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	246.7
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.75
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If v<sub>i</sub>(v<sub>d</sub> or v<sub>o</sub>) >=1,700 pc/h, terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information		Site Information	
	lizabeth Fernandez	Highway / Direction of Travel	SR 70
Agency or Company H	.W. Lochner	From/To	CR 29 to Lonesome Island Roa
	ctober 2018 M Peak Hour	Jurisdiction Analysis Year	Highlands County 2025
Project Description: No-Build, Westbound		Allalysis Teal	2023
Input Data			
Leeeeeeeee			
1	Shoulder width ft		
<u> </u>	Lane widthtt	Class I	highway Class II
- I	Lane widthft	highway	Class III highway
<del>-</del>	Shoulder widthtt	Terrain	✓ Level ☐ Rolling
- S		Grade Lengt	
Segment length,	-t mi	Peak-hour fa	actor, PHF 0.92
		Show North Arrow % Trucks an	
Analysis direction vol., V <sub>d</sub> 227veh	/h	% Trucks an	nd Buses , P <sub>T</sub> 11 %
Opposing direction vol., V <sub>o</sub> 323veh	/h		nal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0		Access poin	ts <i>mi</i> 4/mi
Lane Width ft 10.0 Segment Length mi 2.5			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (l	Exhibit 15-11 or 15-12)	1.5	1.3
Passenger-car equivalents for RVs, E <sub>R</sub> (E	khibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =	1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.948	0.968
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit	15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (PHF* f	g,ATS * f <sub>HV,ATS</sub> )	260	363
Free-Flow Speed from	Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/
2		Adj. for lane and shoulder width	<sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	
Total demand flow rate, both directions, v		Free-flow speed, FFS (FSS=BF	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>H</sub> )	/,ATS )		20 //
Adj. for no-passing zones, $f_{np,ATS}$ (Exhibit	15-15)	Average travel speed, ATS <sub>d</sub> =FF	'S-0.00776(v <sub>d,ATS</sub> + <i>50.4 mi/</i>
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
151 0 1511		Percent free flow speed, PFFS	89.0 %
Percent Time-Spent-Following	•	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (E	exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs, E <sub>R</sub> (E		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/ (1		0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit		1.00	1.00
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PHF*f	HV,PTSF <sup>* f</sup> g,PTSF <sup>)</sup>	249	355
Base percent time-spent-following <sup>4</sup> , BPTS	F <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )		29.2
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit	15-21)		14.9
Percent time-spent-following, PTSF <sub>d</sub> (%)=E	BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +		35.3
v <sub>o,PTSF</sub> )			
Level of Service and Other Performance	e Measures	1	
_evel of service, LOS (Exhibit 15-3)			В

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	89.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	246.7
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.75
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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	ONAL TWO-LANE HIGHWA	•	COLLET
General Information		Site Information	
Analyst Agency or Company Date Performed	Elizabeth Fernandez H.W. Lochner October 2018	Highway / Direction of Travel From/To Jurisdiction	SR 70 CR 29 to Lonesome Island Road Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2025
Project Description: No-Build, Wes	stbound		
Input Data		T	
	1 Shoulder width tt		
-	Lane width ft		hildren II
	Lane width tt		highway Class II
1	\$\frac{1}{2}\$ Shoulder widthft	highway	Class III highway
		Terrain	Level Rolling
Segment le	ength, L <sub>t</sub> mi	Grade Lengi Peak-hour fa No-passing	actor, PHF 0.92
Analysis direction vol., V <sub>d</sub>	323veh/h	Show North Arrow % Trucks an	nd Buses , P <sub>T</sub> 11 %
Opposing direction vol., V <sub>o</sub>	227veh/h		nal vehicles, P <sub>R</sub> 0%
	4.0	Access poin	ts <i>mi</i> 4/mi
	0.0 .5		
Average Travel Speed			
	_	Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.3	1.5
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H</sub>	$V_{ATS} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.968	0.948
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (E		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (	(PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	363	260
Free-Flow Speed	d from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	.4 f. a(Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	<del></del>
Total demand flow rate, both directi			
Free-flow speed, FFS=S <sub>FM</sub> +0.0077	6(v/ f <sub>HV,ATS</sub> )	Free-flow speed, FFS (FSS=BF	20 //
Adj. for no-passing zones, $f_{np,ATS}$ (E	Exhibit 15-15) 1.5 mi/h	Average travel speed, ATS <sub>d</sub> =FF	S-0.00776(v <sub>d,ATS</sub> + 50.2 mi/h
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> Percent free flow speed, PFFS	88.7 %
Percent Time-Spent-Following		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	s, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.1
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H</sub>	V=1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.989	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (I		1.00	1.00
Directional flow rate <sup>2</sup> , <i>v<sub>i</sub></i> (pc/h) <i>v</i> <sub>i</sub> =V <sub>i</sub> /		355	249
Base percent time-spent-following <sup>4</sup> ,	BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )	36.3	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (I		14.9	
Percent time-spent-following, PTSF	$_{d}$ (%)=BPTSF $_{d}$ +f $_{np,PTSF}$ *( $v_{d,PTSF}$ / $v_{d,PTSF}$ +	+ 45.1	
v <sub>o,PTSF</sub> ) Level of Service and Other Perfor	rmance Measures		
			В
Level of service, LOS (Exhibit 15-3)  Volume to capacity ratio, v/c		+	0.21

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	88.7
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	351.1
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.93
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information		Site Information	
	Fernandez	Highway / Direction of Travel	SR 70
Agency or Company H.W. Lock	hner	From/To	CR 29 to Lonesome Island Roa
Date Performed October 2		Jurisdiction	Highlands County 2035
Analysis Time Period AM Peak Project Description: No-Build, Eastbound	nour	Analysis Year	2035
Input Data			
I			
‡ Should	er widthtt		
Lane w	idthtt	Class I	highway Class II
	idthtt		
Should	er widthtt	highway	Class III highway
		/ Terrain	Level Rolling
Segment length, L <sub>t</sub>	mi	Grade Leng Peak-hour fa	
	M.	No-passing	
Analysis direction vol., V <sub>d</sub> 397veh/h		Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
<del>-</del>			nal vehicles, P <sub>R</sub> 0%
Opposing direction vol., V <sub>o</sub> 277veh/h Shoulder width ft 4.0		Access poin	10
Lane Width ft 4.0		, idead pain	
Segment Length mi 2.5			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, $E_T$ (Exhibit 1	5-11 or 15-12)	1.3	1.4
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15	assenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-11 or 15-13)		1.0
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/ (1+ P	$_{T}(E_{T}^{-1})+P_{R}^{-}(E_{R}^{-1}))$	0.968	0.958
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{g,ATS}$	<sub>HV,ATS</sub> )	446	314
Free-Flow Speed from Field M	easurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/
		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>Le</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	<del></del>
Total demand flow rate, both directions, <i>v</i>		1	
Free-flow speed, FFS= $S_{FM}$ +0.00776( $v$ / $f_{HV,ATS}$ )		Free-flow speed, FFS (FSS=BF	20 //
Adj. for no-passing zones, f <sub>np.ATS</sub> (Exhibit 15-15)	1.5 mi/h	Average travel speed, ATS <sub>d</sub> =FF	S-0.00776(v <sub>d,ATS</sub> +
пр,дто		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	49.2 mi/
		Percent free flow speed, PFFS	87.0 %
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15	5-18 or 15-19)	1.0	1.1
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15	-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub>	-1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or	Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , <i>v<sub>i</sub></i> (pc/h) <i>v<sub>i</sub></i> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub>	* f <sub>g,PTSF</sub> )	432	304
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=1	00(1-e <sup>av</sup> d <sup>b</sup> )	43.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)		14.2	
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +	-f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +	+ 51.4	
v <sub>o,PTSF</sub> )			
Level of Service and Other Performance Measu	res		
_evel of service, LOS (Exhibit 15-3)			В

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	87.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	431.5
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.04
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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		lau 1 6 41	
General Information	Flinch of Famous don	Site Information	CD 70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Roa
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2035
Project Description: No-Build, East	bound		
Input Data	1		
	1 Shoulder width tt		
#	Lane width ft	Close I	highway Class II
	Lane width tt		
3	I Shoulder widthtt	highway	Class III highway
		Terrain	Level Rolling
Segment ler	ngth, L. mi	Grade Leng	
	3 1 -	Peak-hour for No-passing	
Analysis dispeties and M	77		nd Buses , P <sub>T</sub> 11 %
, a	77veh/h	70 Tradito di	
, ,	97veh/h		nal vehicles, P <sub>R</sub> 0%
	.0 0.0	Access poin	ts <i>mi</i> 4/mi
Segment Length mi 2.8			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.3
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub>	$_{Y,ATS}$ =1/(1+ $P_T(E_T-1)+P_R(E_R-1)$ )	0.958	0.968
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Ex	xhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (F	PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	314 446	
Free-Flow Speed	from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	.4 f. a(Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>			
Total demand flow rate, both direction	ons, v	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776	S(v/ f <sub>HV,ATS</sub> )	Free-flow speed, FFS (FSS=BF	FFS-f <sub>LS</sub> -f <sub>A</sub> ) 56.6 mi/f
Adj. for no-passing zones, f <sub>np.ATS</sub> (E	xhibit 15-15) 1.2 mi/h	Average travel speed, ATS <sub>d</sub> =FF	FS-0.00776(v <sub>d,ATS</sub> + 49.5 mi/f
пр, Ато		V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
		Percent free flow speed, PFFS	87.4 %
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.0
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub>	,=1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.989	1.000
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (E	xhibit 15-16 or Ex 15-17)	1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(	PHF*f <sub>HV,PTSF</sub> * f <sub>g,PTSF</sub> )	304	432
Base percent time-spent-following <sup>4</sup> ,	BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )	36.2	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (E	xhibit 15-21)	14.2	
Percent time-spent-following, PTSF	(%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +	+ 42.1	
,			12.1
v <sub>o,PTSF</sub> )			
V <sub>o,PTSF</sub> ) <b>Level of Service and Other Perforn</b> Level of service, LOS (Exhibit 15-3)	mance Measures		В

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	87.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	301.1
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.85
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If v<sub>i</sub>(v<sub>d</sub> or v<sub>o</sub>) >=1,700 pc/h, terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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	NAL TWO-LANE HIGHWA	1	
General Information	F" shall Farmada	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	AM Peak Hour	Analysis Year	2035
Project Description: No-Build, Westh	oound		
Input Data	Ti .		
	\$\frac{1}{2}\$ Shoulder widthft		
<b></b>	Lane widthft	Class I	highway Class II
	Lane width tt		
	\$\frac{1}{2}\$ Shoulder widthft	highway	Class III highway
		Terrain	Level Rolling
Segment len	gth, L <sub>t</sub> mi	Grade Leng Peak-hour f	
54		No-passing	
Analysis direction vol., V <sub>d</sub> 27	7veh/h	Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
4	7veh/h		onal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0		Access poin	
Lane Width ft 10.0			
Segment Length mi 2.5			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks,	E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.4	1.3
Passenger-car equivalents for RVs, E	R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,</sub>	$_{ATS}$ =1/ (1+ $P_T(E_T$ -1)+ $P_R(E_R$ -1) )	0.958	0.968
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exl		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (P	HF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	314	446
Free-Flow Speed t	from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
_		Adj. for lane and shoulder width	,4 f <sub>Le</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Total demand flow rate, both direction		, ,	
Free-flow speed, FFS= $S_{FM}$ +0.00776(	v/ f <sub>HV,ATS</sub> )	Free-flow speed, FFS (FSS=BF	20 /1
Adj. for no-passing zones, f <sub>np.ATS</sub> (Ex	hibit 15-15) 1.2 mi/h	Average travel speed, ATS <sub>d</sub> =FF	FS-0.00776(v <sub>d,ATS</sub> + 49.5 mi/h
115,7110		V <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
		Percent free flow speed, PFFS	87.4 %
Percent Time-Spent-Following		_	_
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks,	E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.0
Passenger-car equivalents for RVs, E	R (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =	=1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.989	1.000
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Ex		1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(P	·	304	432
Base percent time-spent-following <sup>4</sup> , B	BPTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )	36.2	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Ex	chibit 15-21)	14.2	
Percent time-spent-following, PTSF <sub>d</sub> (	%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *( $v_{d,PTSF}$ / $v_{d,PTSF}$ +	+ 42.1	
v <sub>o,PTSF</sub> )			
Level of Service and Other Perform	ance Measures	1	В
Level of service, LOS (Exhibit 15-3)			

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	87.4
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	301.1
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.85
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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	NAL TWO-LANE HIGHWA	T	
General Information		Site Information	
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Roa
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2035
Project Description: No-Build, Westbo	und		
Input Data			
L			
	\$\frac{1}{2}\$ Shoulder width ft		
<del>*</del> 5.	Lane widtht	Class I	highway Class II
	Lane widthtt		Class III highway
	\$\frac{1}{shoulder widthtt	nignway	
		/ Terrain	Level Rolling
Segment lengt	h, L, mi	Grade Leng	
, ,		Peak-hour fa	
Analysis direction vol., V <sub>d</sub> 397	veh/h	% Trucks an	nd Buses , P <sub>T</sub> 11 %
Opposing direction vol., V <sub>0</sub> 2779	/eh/h	% Recreation	nal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0		Access poin	ts <i>mi</i> 4/mi
Lane Width ft 10.0			
Segment Length mi 2.5			
Average Travel Speed		1 1 1 1 1 1 1 1 1 1 1 1	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E	T (Exhibit 15-11 or 15-12)	1.3	1.4
Passenger-car equivalents for RVs, E <sub>R</sub>	(Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,AT</sub>	$P_{S}=1/(1+P_{T}(E_{T}-1)+P_{R}(E_{R}-1))$	0.968	0.958
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhil	pit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (PH	nd flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (PHF* $f_{g,ATS}$ * $f_{HV,ATS}$ ) 446		314
Free-Flow Speed fre	om Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	.4 f. a(Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>			<del></del>
Total demand flow rate, both directions.	v	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	bit 15-8) 1.0 mi/h
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/	function	Free-flow speed, FFS (FSS=BF	FFS-f <sub>LS</sub> -f <sub>Δ</sub> ) 56.6 mi/l
		Average travel speed, ATS <sub>d</sub> =FF	20 //
Adj. for no-passing zones, f <sub>np,ATS</sub> (Exhi	bit 15-15) 1.5 mi/h		3-0.00770(V <sub>d,ATS</sub> 49.2 <i>mi/l</i>
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
		Percent free flow speed, PFFS	87.0 %
Percent Time-Spent-Following		T	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E	-	1.0	1.1
Passenger-car equivalents for RVs, E <sub>R</sub>		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =1		1.000	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhi		1.00	1.00
Directional flow rate <sup>2</sup> , v <sub>i</sub> (pc/h) v <sub>i</sub> =V <sub>i</sub> /(PH		432	304
Base percent time-spent-following <sup>4</sup> , BP	TSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>D</sup> )	43.1	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exh	bit 15-21)	14.2	
Percent time-spent-following, PTSF <sub>d</sub> (%	)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> $^*$ ( $^{v}_{d,PTSF}$ / $^{v}_{d,PTSF}$ +	+ 51.4	
V <sub>o,PTSF</sub> )	maa Maaayyaa		
Level of Service and Other Performa	rice Weasures		
Level of service, LOS (Exhibit 15-3)			В
Volume to capacity ratio, v/c			0.25

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	87.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	431.5
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.04
Bicycle level of service (Exhibit 15-4)	F
Notes	

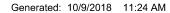
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If v<sub>i</sub>(v<sub>d</sub> or v<sub>o</sub>) >=1,700 pc/h, terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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General Information	Flizabath Famond	Site Information	CD 70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	AM Peak Hour	Analysis Year	2045
Project Description: No-Build, Eastbo	ouna		
I			
	\$\frac{1}{2} Shoulder widthtt		
4	Lane width ft	Class I	highway Class II
	Lane widthft		Class III highway
	\$\ Shoulder widthft		
12		Terrain	Level Rolling
Segment leng	gth, L <sub>t</sub> mi	Grade Leng Peak-hour f	
54		No-passing	
Analysis direction vol., V <sub>d</sub> 46	4veh/h	Show North Arrow % Trucks ar	nd Buses , P <sub>T</sub> 11 %
•	4veh/h	% Recreation	onal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.6		Access poin	
Lane Width ft 10.0	0		
Segment Length mi 2.5			
Average Travel Speed		Analysis Discretion (d)	Outrasian Biasatian (a)
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks,	E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.2	1.3
Passenger-car equivalents for RVs, E	R (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,</sub>	$ATS$ =1/(1+ $P_T(E_T-1)+P_R(E_R-1)$ )	0.978	0.968
-	djustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)		1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (P	HF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	516	364
Free-Flow Speed t	from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
2		Adj. for lane and shoulder width	, <sup>4</sup> f <sub>I S</sub> (Exhibit 15-7) 2.4 <i>mi/h</i>
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Total demand flow rate, both direction		, ,	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(	v/ f <sub>HV,ATS</sub> )	Free-flow speed, FFS (FSS=BF	20 /1
Adj. for no-passing zones, f <sub>np,ATS</sub> (Ex	hibit 15-15) 1.4 mi/h	Average travel speed, ATS <sub>d</sub> =FF	FS-0.00776(v <sub>d,ATS</sub> + 48.4 mi/h
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	
		Percent free flow speed, PFFS	85.5 %
Percent Time-Spent-Following		T	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks,	E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.1
Passenger-car equivalents for RVs, E		1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV</sub> =		1.000	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Ex		1.00	1.00
Directional flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ /(P		504	356
Base percent time-spent-following <sup>4</sup> , B	PTSF <sub>d</sub> (%)=100(1-e <sup>av</sup> d <sup>b</sup> )	48.8	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Ex	hibit 15-21)	13.7	
Percent time-spent-following, PTSF <sub>d</sub> (	%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *( $v_{d,PTSF}$ / $v_{d,PTSF}$ +	+ 56.8	
v <sub>o,PTSF</sub> )			
Level of Service and Other Perform	ance Measures	1	В
Level of service, LOS (Exhibit 15-3)			

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	85.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	504.3
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.11
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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	ONAL TWO-LANE HIGHWA	T	KOHLLI
General Information	El' aballa Escardo	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2045
Project Description: No-Build, East	bound		
Input Data			
	1 Shoulder width tt		
4	Lane width tt	Class I	highway Class II
	Lane width tt		
	\$\frac{1}{2}\$ Shoulder width tt	highway 🗹	Class III highway
		Terrain	Level Rolling
Segment le	ngth, L <sub>t</sub> mi	Grade Leng	
	3 1	Peak-hour for No-passing	
Analysis disastina val V	22.4		nd Buses , P <sub>T</sub> 11 %
, · a	324veh/h	70 Tradito di	
, , ,	<i>164</i> veh/h		onal vehicles, P <sub>R</sub> 0%
	1.0 2.0	Access points <i>mi</i> 4/mi	
Segment Length mi 2.			
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.3	1.2
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>	<sub>/,ATS</sub> =1/(1+P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1))	0.968	0.978
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (E	xhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (	PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	364	516
Free-Flow Speed from Field Measurement		Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	. <sup>4</sup> f. <sub>o</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>			
Total demand flow rate, both direction	ons, v	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776	6(v/ f <sub>HV.ATS</sub> )	Free-flow speed, FFS (FSS=BF	FS-f <sub>LS</sub> -f <sub>A</sub> ) 56.6 mi/h
Adj. for no-passing zones, f <sub>np.ATS</sub> (E		Average travel speed, ATS <sub>d</sub> =FF	S-0.00776(v <sub>d.ATS</sub> +
np,AIS		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	48.7 mi/h
		Percent free flow speed, PFFS	86.0 %
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks	s, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.1	1.0
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H\</sub>	<sub>/</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	0.989	1.000
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (E		1.00	1.00
Directional flow rate <sup>2</sup> , <i>v<sub>i</sub></i> (pc/h) <i>v<sub>i</sub></i> =V <sub>i</sub> /0		356	504
Base percent time-spent-following <sup>4</sup> ,		41.6	
Adj. for no-passing zone, f <sub>np,PTSF</sub> (E	Exhibit 15-21)	13.7	
Percent time-spent-following, PTSF	(%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +	47.3	
v <sub>o,PTSF</sub> )			T1.3
Level of Service and Other Perfor	mance Measures		
Level of service, LOS (Exhibit 15-3)			В
Volume to capacity ratio, v/c			0.21

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	86.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	352.2
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.93
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Directional Page 1 of 2

General Information		Site Information	
	Fernandez	Highway / Direction of Travel	SR 70
Agency or Company H.W. Loch	nner	From/To	CR 29 to Lonesome Island Roa
Date Performed October 2 Analysis Time Period AM Peak		Jurisdiction Analysis Year	Highlands County 2045
Project Description: No-Build, Westbound	TOUI	Arialysis Teal	2043
Input Data			
L			
1 Should	er width ft		
<del>✓</del> ‡ Lane wi	dthtt	Class I	highway Class II
—→ Ĵ Lane wi	dthtt		Class III highway
\$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	er widthft		
		Terrain Crode Length	Level Rolling
Segment length, L <sub>t</sub>	mi	Grade Leng Peak-hour fa	
•		No-passing	
Analysis direction vol., V <sub>d</sub> 324veh/h		Show North Arrow % Trucks ar	d Buses , P <sub>T</sub> 11 %
Opposing direction vol., V 464veh/h		% Recreation	nal vehicles, P <sub>R</sub> 0%
Shoulder width ft 4.0		Access poin	10
Lane Width ft 10.0			
Segment Length mi 2.5			
Average Travel Speed		Analysis Direction (d)	Opposing Direction (a)
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 1	5-11 or 15-12)	1.3	1.2
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-	11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>HV,ATS</sub> =1/ (1+ P <sub>7</sub>	$_{r}(E_{T}^{-1})+P_{R}(E_{R}^{-1}))$	0.968	0.978
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (Exhibit 15-9)		1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i$ = $V_i$ / (PHF* $f_{g,ATS}$ * $f_i$		364	516
Free-Flow Speed from Field Mo	easurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/
2		Adj. for lane and shoulder width	<sup>4</sup> f <sub>LS</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>		Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhil	
Total demand flow rate, both directions, <i>v</i>		**	
Free-flow speed, FFS=S <sub>FM</sub> +0.00776(v/ f <sub>HV,ATS</sub> )		Free-flow speed, FFS (FSS=BF	20 //
Adj. for no-passing zones, f <sub>no.ATS</sub> (Exhibit 15-15)	1.1 mi/h	Average travel speed, ATS <sub>d</sub> =FF	'S-0.00776(v <sub>d,ATS</sub> + 48.7 <i>mi/</i>
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub>	10.7 1111
		Percent free flow speed, PFFS	86.0 %
Percent Time-Spent-Following		1 4 1 : 5: :: (1)	
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for trucks, E <sub>T</sub> (Exhibit 15		1.1	1.0
Passenger-car equivalents for RVs, E <sub>R</sub> (Exhibit 15-		1.0	1.0
Heavy-vehicle adjustment factor, $f_{HV}$ =1/ (1+ $P_T$ ( $E_T$		0.989	1.000
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (Exhibit 15-16 or		1.00	1.00
Directional flow rate <sup>2</sup> , <i>v<sub>i</sub></i> (pc/h) <i>v</i> <sub>i</sub> =V <sub>i</sub> /(PHF*f <sub>HV,PTSF</sub> *		356	504
Base percent time-spent-following <sup>4</sup> , BPTSF <sub>d</sub> (%)=1	00(1-e <sup>av</sup> d <sup>b</sup> )		41.6
Adj. for no-passing zone, f <sub>np,PTSF</sub> (Exhibit 15-21)			13.7
Percent time-spent-following, PTSF <sub>d</sub> (%)=BPTSF <sub>d</sub> +	f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> / v <sub>d,PTSF</sub> +		47.3
v <sub>o,PTSF</sub> )			
Level of Service and Other Performance Measu	res		
Level of Service and Other Performance Weasu		T	В

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	86.0
Bicycle Level of Service	
Directional demand flow rate in outside lane, v <sub>OL</sub> (Eq. 15-24) veh/h	352.2
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	7.93
Bicycle level of service (Exhibit 15-4)	F
Notes	

1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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Directional Page 1 of 2

	ONAL TWO-LANE HIGHWA	1	TOTILLI
General Information	Fl' shalls Farmanda	Site Information	00.70
Analyst Agency or Company	Elizabeth Fernandez H.W. Lochner	Highway / Direction of Travel From/To	SR 70 CR 29 to Lonesome Island Road
Date Performed	October 2018	Jurisdiction	Highlands County
Analysis Time Period	PM Peak Hour	Analysis Year	2045
Project Description: No-Build, Wes	tbound		
Input Data		Ī	
	1 Shoulder width tt		
4	Lane width tt	Class	highway Class II
	Lane width tt		
	\$\frac{1}{2}\$ Shoulder widthtt	highway 🗹	Class III highway
		Terrain	Level Rolling
Segment le	ngth, L, mi	Grade Leng	
3	3 · 1	Peak-hour for No-passing	
Analysis disastina val. V	46 4 h		nd Buses , P <sub>T</sub> 11 %
, a	464veh/h	70 Tradito di	
3	324veh/h		onal vehicles, P <sub>R</sub> 0%
	4.0 0.0	Access poin	nts <i>mi</i> 4/mi
	5		
Average Travel Speed			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	s, E <sub>T</sub> (Exhibit 15-11 or 15-12)	1.2	1.3
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-11 or 15-13)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H</sub>	$V_{ATS} = 1/(1 + P_T(E_T - 1) + P_R(E_R - 1))$	0.978	0.968
Grade adjustment factor <sup>1</sup> , f <sub>g,ATS</sub> (E	Exhibit 15-9)	1.00	1.00
Demand flow rate <sup>2</sup> , $v_i$ (pc/h) $v_i = V_i$ / (	PHF* f <sub>g,ATS</sub> * f <sub>HV,ATS</sub> )	516	364
Free-Flow Speed	d from Field Measurement	Estimated F	ree-Flow Speed
		Base free-flow speed <sup>4</sup> , BFFS	60.0 mi/h
		Adj. for lane and shoulder width	. <sup>4</sup> f. <sub>c</sub> (Exhibit 15-7) 2.4 mi/h
Mean speed of sample <sup>3</sup> , S <sub>FM</sub>			
Total demand flow rate, both direction	ons, v	Adj. for access points <sup>4</sup> , f <sub>A</sub> (Exhi	
Free-flow speed, FFS=S <sub>FM</sub> +0.0077	6(v/ f <sub>HV ATS</sub> )	Free-flow speed, FFS (FSS=BF	FFS-f <sub>LS</sub> -f <sub>A</sub> ) 56.6 mi/h
Adj. for no-passing zones, f <sub>np.ATS</sub> (E		Average travel speed, ATS <sub>d</sub> =FF	S-0.00776(v <sub>d ATS</sub> +
raji ioi iio passiiig 251166, inp,ATS (2	zxiisk is is)		48.4 mi/h
		v <sub>o,ATS</sub> ) - f <sub>np,ATS</sub> Percent free flow speed, PFFS	85.5 %
Percent Time-Spent-Following			
		Analysis Direction (d)	Opposing Direction (o)
Passenger-car equivalents for truck	s, E <sub>T</sub> (Exhibit 15-18 or 15-19)	1.0	1.1
Passenger-car equivalents for RVs,	E <sub>R</sub> (Exhibit 15-18 or 15-19)	1.0	1.0
Heavy-vehicle adjustment factor, f <sub>H</sub>	<sub>V</sub> =1/ (1+ P <sub>T</sub> (E <sub>T</sub> -1)+P <sub>R</sub> (E <sub>R</sub> -1) )	1.000	0.989
Grade adjustment factor <sup>1</sup> , f <sub>g,PTSF</sub> (E		1.00	1.00
Directional flow rate <sup>2</sup> , <i>v<sub>i</sub></i> (pc/h) <i>v<sub>i</sub></i> =V <sub>i</sub> /		504	356
Base percent time-spent-following <sup>4</sup> ,			48.8
Adj. for no-passing zone, f <sub>np,PTSF</sub> (E	Exhibit 15-21)		13.7
Percent time-spent-following, PTSF	d(%)=BPTSF <sub>d</sub> +f <sub>np,PTSF</sub> *(v <sub>d,PTSF</sub> /v <sub>d,PTSF</sub> +		56.8
v <sub>o,PTSF</sub> )			
Level of Service and Other Perfor	mance Measures		
Level of service, LOS (Exhibit 15-3)			В
Volume to capacity ratio, <i>v/c</i>			0.30

Page 2 of 2 Directional

Capacity, C <sub>d,ATS</sub> (Equation 15-12) veh/h	1700
Capacity, C <sub>d,PTSF</sub> (Equation 15-13) veh/h	1700
Percent Free-Flow Speed PFFS <sub>d</sub> (Equation 15-11 - Class III only)	85.5
Bicycle Level of Service	
Directional demand flow rate in outside lane, $v_{ m OL}$ (Eq. 15-24) veh/h	504.3
Effective width, Wv (Eq. 15-29) ft	14.00
Effective speed factor, $S_t$ (Eq. 15-30)	4.79
Bicycle level of service score, BLOS (Eq. 15-31)	8.11
Bicycle level of service (Exhibit 15-4)	F
Notes	

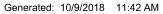
1. Note that the adjustment factor for level terrain is 1.00,as level terrain is one of the base conditions. For the purpose of grade adjustment, specific downgrade segments are treated as level terrain.

- 2. If  $v_i(v_d \text{ or } v_o) >= 1,700 \text{ pc/h}$ , terminate analysis--the LOS is F.

- 3. For the analysis direction only and for v>200 veh/h.
  4. For the analysis direction only
  5. Exhibit 15-20 provides coefficients a and b for Equation 15-10.
  6. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

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### Appendix H: HSM Predictive Method Computations - 2045 No Build

### Instructions

### Highway Safety Manual 1st Edition, Volume 2, Chapter 10 -- Predictive Method for Rural Two-Lane, Two-Way Roads -- Analysis Spreadsheet Summary

### **Overview**

Rural 2-lane Project Total

This spreadsheet has been developed to demonstrate the predictive models for rural two-lane highways as contained in the new Highway Safety Manual. The content was developed for training purposes and all users should verify that the answers they obtain with these worksheets correctly represent their target analysis.

The page tabs shown at the bottom of this file represent the various analyses that can be performed using this spreadsheet tool and the HSM predictive methods. A user can evaluate an individual road segment or intersection as well as analyze multiple road segments and intersections. If more than one segment type requires analysis, the user should create a blank worksheet and then copy the contents of the segment worksheet into the blank sheet and name the worksheet accordingly.

The current contents of this spreadsheet include the following:

### **Worksheet Name** Contents Instructions Current worksheet displaying overview, summary of spreadsheet worksheets, and description of color coding included in the worksheets. Segment 1 Analysis for the rural 2-lane segments that uses lookup tables from exhibits included in the worksheet "Segment Tables." The associated HSM worksheets are 1A, 1B, 1C, 1D, and 1E. Segment 2 Duplicate segment worksheet for additional highway segments. Segment Tables Includes segment tables used for analysis of HSMprovided crash trends as well as locally-derived crash information. These are HSM Tables 10-3, 10-4, and 10-12. This worksheet also includes tables used for CMF calculations. These tables include Table 10-8, 10-9, and 10-10. Analysis for the rural 2-lane intersections that Intersection 1 uses lookup tables from exhibits included in the worksheet "Intersection Tables." The associated HSM worksheets are 2A, 2B, 2C, 2D, and 2E, Intersection 2 Duplicate intersection worksheet for additional highway segments. Intersection Tables Includes intersection tables used for analysis of HSMprovided crash trends as well as locally-derived crash information. These are HSM Tables 10-5, 10-6, and 10-15. This worksheet also includes tables used for CMF calculations. These tables include Tables 10-13 and 10-14. Rural 2-lane Site Total Analysis for site-specific EB analysis using

results from the rural 2-lane segment as well as rural 2-lane intersection worksheets. This analysis can be performed if the analyst knows the exact location of historic crashes within the study limits. The associated HSM worksheets are 3A and 3B.

Analysis for project-specific EB analysis using results from the rural 2-lane segment as well as rural 2-lane intersection worksheets. This analysis can be performed if the analyst has historic crash data, but does not know the exact location within the project limits at which the crashes occurred. The associated

### **Color Coding in the Worksheets**

The worksheets include three specific color options to help users identify locations where input data is required. In some cases, the shaded cells require the user to input specific numbers. In other cases the input is restricted to a select set of options included in pull-down lists. The respective color coding is as follows:

### Color Used

### Type of Information Required from User



Required input information as identified in the HSM.



Input data required from the user but restricted to options provided in pull-down



Optional input information that can be used to supplement the analysis if this information is available. This optional input information is reserved for locally-derived crash information. If the analyst elects to use this option so as to improve analysis for local crash distribution trends, each of the Exhibits with the locallyderived input also includes a pull-down box where the analyst should indicate they are using locally derive crash information. The worksheets will then use the local values instead of the HSM default values.

### Spreadsheet developed by:

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Phone: 541-737-6337

### Segment 1 2045 No Build

	1.194	1.00	1.00	1.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.09	1.03
	x(11)x(12)	10.7.1	10-21	10-20	Equation 10-18 & 10- 19	Section 10.7.1	Section 10.7.1	10-17	10-11	10-14, 10-15, or 10-16	10-13	10-12	10-11
	(1)x(2)x	fro	from Equation from Equation	from Equation		from	from	from Equation	from Table	from Equations	tion	tion	from Equation
	CMF comb	CMF 12r	CMF 11r	CMF 10r	CMF 9r	CMF 8r	CMF 7r	CMF 6r	CMR 5r	CMF 4r	CMF 3r	CMF 2r	CMF 1r
		Enforcement		Design	Lane	Lanes	Strips	Density			Curves	and Type	
	CMF	Automated	Lighting	Roadside	Two-Way	_	Centerline	Driveway	Grades	elevation	Horizontal	Shoulder Width	Width
	Combined	CMF for	CMF for	CMF for	CMF for		CMF for	CMF for	CMF for	CMF for Super-		CMF for	CMF for Lane
	(13)	(12)	(11)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
				y Segments	Vay Roadway	Lane Two-V	Rural Two-	n Factors for I	า Modificatio	Worksheet 1B - Crash Modification Factors for Rural Two-Lane Two-Way Roadway Segments	Works		
			,										
			1.00									or, Cr	Calibration Factor, Cr
			Not Present			Not Present	Not F				not present)	Auto speed enforcement (present/not present)	Auto speed enfo
			Not Present			Not Present	Not F				ent)	Segment lighting (present/not present)	Segment lighting
			4			3					)	Roadside hazard rating (1-7 scale)	Roadside hazaro
			Not Present			Not Present	Not F				t present)	Two-way left-turn lane (present/not present)	Two-way left-tur
			Not Present			Not Present	Not F			not present)]	esent (2 lane) /	Passing lanes [present (1 lane) /present (2 lane) / not present)]	Passing lanes [p
			Not Present			Not Present	Not F				າot present)	Centerline rumble strips (present/not present)	Centerline rumbl
			3			5						Driveway density (driveways/mile)	Driveway density
			0			0							Grade (%)
			0			< 0.01	< 0					ariance (ft/ft)	Superelevation variance (ft/ft)
			Not Present			Not Present	Not F				: present)	Spiral transition curve (present/not present)	Spiral transition
Radius Value OK			0			0						ure (ft)	Radius of curvature (ft)
			0.0			0						ntal curve (mi)	Length of horizontal curve (mi)
	Paved	Left Shld:		Paved	Right Shld:	Paved	Pe						Shoulder type
	4	Left Shld:		4	Right Shld:	6						ft)	Shoulder width (ft)
			11			12							Lane width (ft)
AADT OK			8,700			I		(veh/day)	17,800	AADT <sub>MAX</sub> =			AADT (veh/day)
			4.3			-						nt, L (mi)	Length of segment, L (mi)
		<b>J</b> "	Site Conditions	S		Base Conditions	Base Co			ata	Input Data		
		5	2045			ear	Analysis Year						
		inty, Florida	Highlands County, Florida			J	Jurisdiction		11/07/18				Date Performed
		- 21 573	MP 17 255 - 21 573			Section	Roadway Section		HW Lochner	_		any	Agency or Company
		0	SR 70				Roadway		SPM				Analyst
			nation	Location Information	Ę					rmation	General Information		
			ts	dway Segmen	vo-Way Road	wo-Lane Tv	for Rural T	nd Input Data	nformation a	Worksheet 1A General Information and Input Data for Rural Two-Lane Two-Way Roadway Segments	Worksheet		

Crash Severity Level

Worksheet 1C -- Roadway Segment Crashes for Rural Two-Lane Two-Way Roadway Segments

(2) (3) (4) (5) (6) (7)

N spf rs Overdispersion Parameter, Crash Severity N spf rs by Severity Combined Calibration

K Distribution Distribution CMFs Factor, Cr

from Equation 10-6 9.995

from Equation 10-7

from Table 10-3 (proportion)

(2)TOTAL  $\times$  (4)

(13) from Worksheet 1B

(5)x(6)x(7) 11.939 (8)
Predicted average
crash frequency, N

### Segment 1 2045 No Build

Fatal and Injury (FI)	1	1	0.321	3.208	1.19
Property Damage Only (PDO)	1		0.679	6.787	1.19
V	/orksheet 1D -	Worksheet 1D Crashes by Severity Level and Collision Type for Rural Two-Lane Two-Way Roadway Segmen	and Collision Type for Ru	ıral Two-Lane Two-Way	/ Roadway Segme
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type(TOTAL)	N producted in (TOTAL) (Crashes/year)	Proportion of Collision Type <sub>(FI)</sub>	N predicted rs (FI) (crashes/year)	Proportion of Co Type(PDO)
	from Table 10-4	(8) TOTAL from Worksheet 1C	from Table 10-4	(8)⊧ı from Worksheet 1C	from Table 10-4
Total	1.000	11.939	1.000	3.832	1.000
		(2)x(3)TOTAL		(4)x(5)⊧i	
			SINGLE-VEHICLE		
Collision with animal	0.121	1 445	0.038	0.146	0.184
Collision with bicycle	0.002	0.024	0.004	0.015	0.001
Collision with pedestrian	0.003	0.036	0.007	0.027	0.001
Overturned	0.025	0.298	0.037	0.142	0.015
Ran off road	0.521	6.220	0.545	2.089	0.505
Other single-vehicle collision	0.021	0.251	0.007	0.027	0.029
Total single-vehicle crashes	0.693	8.273	0.638	2.445	0.735
			MULTIPLE-VEHICLE		
Angle collision	0.085	1.015	0.100	0.383	0.072
Head-on collision	0.016	0.191	0.034	0.130	0.003
Rear-end collision	0.142	1 695	0.164	0.628	0.122
Sideswipe collision	0.037	0.442	0.038	0 146	0.038
Other multiple-vehicle collision	0.027	0.322	0.026	0.100	0.030
de anne anne anne anne anne anne anne			0.000	2002	390.0

	Worksheet 1F Summary Results for Rural Two-I and Two-Way Roadway Segments	Two-I and Two-Way Roadway Se	amente	
	Worksheet IE Julillary Results for Rural	I WO-Laile I WO-Way I Cauway Je	gilicitis	
(1)	(2)	(3)	(4)	(5)
Crash severity level	Crash Severity Distribution (proportion)	Predicted average crash frequency (crashes/year)	Roadway segment length (mi)	Crash rate (crashes/mi/year)
	(4) from Worksheet 1C	(8) from Worksheet 1C		(3)/(4)
Total	1.000	11.9	4.3	2.8
Fatal and Injury (FI)	0.321	3.8	4.3	0.9
Property Damage Only (PDO)	0.679	8.1	4.3	1.9

# Supplemental CMF Calculations for Shoulders:

Adjusted Horizontal Curve CMF:	Calculated Horizonatal Curve CMF:	Numeric Value for S:	Adjusted Curve Length (if less than 100 ft):	Adjusted Curve Radius (if less than 100 ft):	Supplemental CMF Calculations for Horizontal Curves:	Computed Right Shoulder CMF <sub>2r</sub> :	Calculated Right Shoulder Type (CMF <sub>tra</sub> ) :	Calculated Right Shoulder Width (CMF <sub>wra</sub> ) :
1.000	1.000	0	0	0	tal Curves:	1.09	1.00	1.15

Computed Left Shoulder CMF<sub>2r</sub>:

Calculated Left Shoulder Width (CMF $_{wa}$ ) : Calculated Left Shoulder Type (CMF $_{tra}$ ) :

1.00

# Tables Affiliated with Crash Modification Factors:

Table 10-8: CMF for Lane Width on Roadway Segments (CMF <sub>ra</sub> )	or Lane Width	on Roadway Seç	jments (CMF <sub>ra</sub> )
j		AADT (veh/da)	у)
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.05	3.38	1.50
9.5	1.04	2.93	1.40
10	1.02	2.47	1.30
10.5	1.02	1.85	1.18
11	1.01	1.22	1.05
11.5	1.01	1.11	1.03
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe crashes.

Table 10-9: CMF for Shoulder Width on Roadway Segments (CMF	Shoulder Width	n on Roadway S	egments (CMF <sub>wra</sub> )
Shoulder Width (ft)	< 400	400 to 2000	> 2000
0	1.10	3.18	1.50
1	1.09	2.72	1.40
2	1.07	2.26	1.30
3	1.05	1.98	1.23
4	1.02	1.69	1.15
5	1.01	1.35	1.08
6	1.00	1.00	1.00
7	0.99	0.70	0.94
8	0.98	0.41	0.87

Note: The collision types related to shoulder width to which this CMF applies include single-vehicle run-off-the-road and multiple-vehicle head-on, opposite-direction sideswipe, and same-direction sideswipe grashes.

### Tables Affiliated with Crash Statistics:

Table 10-3: Distribution for Cras	h Severity	Level on Rural Two-Lane Two-Way Roadv	Table 10-3: Distribution for Crash Severity Level on Rural Two-Lane Two-Way Roadway Segments plus Locally-Derived Values
Crash severity level		Percentage of total	Percentage of total roadway segment crashes
Locally-Derived Values?	No	HSM-Provided Values	Locally-Derived Values
Fatal		1.3	
Incapacitating Injury		5.4	
Nonincapacitating Injury		10.9	
Possible Injury		14.5	
Total Fatal Plus Injury		32.1	0.0
Property Damage Only		67.9	100.0
TOTAL		100.0	100.0

Note: HSM-provided crash severity data based on HSIS data for Washington (2002-2006)

Table 10-4: Default Distribution by Collision Type for Specific Crash Severity Levels on Rural Two-Lane Two-Way Roadway Segments plus Locally-Derived Values

	ì			Percentage of total roadway segment crashes by crash severity level	dway segment o	rashes by crash s	everity level
			HSM-Prov	HSM-Provided Values		Local	Locally-Derived Values
Collision type		Total fatal	Property	TOTAL (all severity levels	Total fatal and	Property	
Locally-Derived Values?	No	and injury	damage	combined)	injury	damage only	TOTAL (all severity levels combined)
SINGLE-VEHICLE CRASHES							
Collision with animal		3.8 8	18.4	12.1			
Collision with bicycle		0.4	0.1	0.2			
Collision with pedestrian		0.7	0.1	0.3			
Overturned		3.7	1.5	2.5			
Ran off road		54.5	50.5	52.1			
Other single-vehicle crash		0.7	2.9	2.1			
Total single-vehicle crashes		63.8	73.5	69.3	0.0	0.0	0.0
MULTIPLE-VEHICLE CRASHES							
Angle collision		10.0	7.2	8.5			
Head-on collision		3.4	0.3	1.6			
Rear-end collision		16.4	12.2	14.2			
Sideswipe collision		3.8	3.8	3.7			
Other multiple-vehicle collision		2.6	3.0	2.7			
Total multiple-vehicle crashes		36.2	26.5	30.7	0.0	0.0	0.0
TOTAL CRASHES		100.0	100.0	100.0	0.0	0.0	100.0

Note: HSM-provided values based on crash data for Washington (2002-2006); includes approximately 70 percent opposite-direction sideswipe and 30 percent same-direction sideswipe.

	Table 10	)-12: Nighttim	Table 10-12: Nighttime Crash Proportions for Unlighted Roadway Segments plus Locally-Derived Values	/ Segments plus Locally-Derived	Values	
		HSM Default Values	lt Values	Loca	Locally Derived Value	res
	Locally-Derived Values?	No				
Roadway Type	Roadway Type Proportion of total nighttime crashes by	crashes by		Proportion of total nighttime crashes	crashes by	Proportion of crashes that
	severity level		Proportion of crashes that occur at night	severity level		occur at night
	Fatal and Injury p <sub>inr</sub> PDO p <sub>pnr</sub>	PDO p <sub>pnr</sub>	Pnr	Fatal and Injury p <sub>inr</sub>	PDO p <sub>pnr</sub>	Pnr
2U	0.382	0.618	0.370			
Note: HSM-provided	Note: HSM-provided values based on HSIS data for Washington (2002-2006)	n (2002-2006)				

Note: HSM-provided values based on HSIS data for Washington (2002-2006)

### Segment Tables

# Tables Affiliated with Crash Modification Factors:

	Table 10	10: Crash Modifi	cation Factors f	or Shoulder Ty	Table 10-10: Crash Modification Factors for Shoulder Types and Shoulder Widths on Roadway Segments (CMF	r Widths on Roa	dway Segments	(CMF <sub>tra</sub> )	
				8	Shoulder width (ft	t)			
Shoulder Type	0	1	2	3	4	5	6	7	8
Paved	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Grave	1.00	1.00	1.01	1.01	1.01	1.02	1.02	1.02	1.02
Composite	1.00	1.01	1.02	1.02	1.03	1.04	1.04	1.05	1.06
Turf	1.00	1.01	1.03	1.04	1.05	1.07	1.08	1.10	1.11

Note: The values for composite shoulders in this exhibit represent a shoulder for which 50 percent of the shoulder width is paved and 50 percent of the shoulder width is turf.

# Rural 2-Lane Site Total

Worksheet 3	A – Predicted an	d Observed Cras	shes by Severity	≀ and Site Type L	Worksheet 3A – Predicted and Observed Crashes by Severity and Site Type Using the Site-Specific EB Method	citic EB Method	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type				Observed	Overdispersion	Weighted	Expected
	Predicted	Predicted average crash frequency	requency	crashes,	Parameter, k	Parameter, k adjustment, w	average crash
		(crashes/year)		$N_{observed}$			frequency,
	N predicted	N predicted (FI)	${\sf N}$ $_{\sf predicted}$	(crashes/year)		Equation A-5	Equation A-4
	(TOTAL)		(PDO)			from Part C	from Part C
			,			Appendix	Appendix
		RO	ROADWAY SEGMENTS	IENTS			
Segment 1 2045 No Build	11.939	3.832	8.106				
COMBINED (sum of column)	11.939	3.832	8.106		1	I	

# Worksheet 3B - Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	N predicted	N expected
Total	(2) <sub>COMB</sub> from Worksheet 3A	(8) <sub>COMB</sub> from Worksheet 3A
	11.939	
Fatal and Injury (FI)	(3) <sub>COMB</sub> from Worksheet 3A	$(3)_{TOTAL} * (2)_{FI} / (2)_{TOTAL}$
	3.832	
Property Damage Only (PDO)	(4) <sub>COMB</sub> from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	8.106	

### Appendix I: HSM Predictive Method Computations - 2045 Build

### Instructions

### Highway Safety Manual 1st Edition, Volume 2, Chapter 11-- Predictive Method for Rural Multilane Highways - Analysis Spreadsheet Summary

### **Overview**

**Worksheet Name** 

Intersection Tables

Rural Multilane Site Total

This spreadsheet has been developed to demonstrate the predictive models for rural multilane highways as contained in the new Highway Safety Manual. The content was developed for training purposes and all users should verify that the answers they obtain with these worksheets correctly represent their target analysis.

The page tabs shown at the bottom of this file represent the various analysEs that can be performed using this spreadsheet tool and the HSM predictive methods. A user can evaluate an individual road segment or intersection as well as analyze multiple road segments and intersections. If more than one segment type (such as rural divided) needs analysis, the user should create a blank worksheet and then copy the contents of the associated sheet (in this example the rural divided sheet) into the blank sheet and name the file accordingly.

Contents

The current contents of this spreadsheet include the following:

TTOTALON TALLING	
Instructions	Current worksheet displaying overview, summary of spreadsheet worksheets, and description of color coding included in the worksheets.
Rural Divided Multilane Seg	Analysis for the rural divided multilane segment analysis includes AADT specific Table 11-16. The associated HSM worksheets are Worksheets 1A, 1B(a), 1C(a), 1D(a), and 1E.
Rural Undivided Multilane Seg	Analysis for the rural undivided multilane segment analysis includes AADT specific Tables 11-11 and 11-12. The associated HSM worksheets are Worksheets 1A, 1B(b), 1C(b), 1D(b), and 1E.
Segment Tables	Worksheet shows exhibits for use by the segment worksheets. These exhibits are independent and do not depend on input values. This worksheet includes exhibits that summarize crash information and can be modified for locally-derived conditions. These are Tables 11-4, 11-6, 11-15, and 11-19. Tables specific to CMFs are also included. The CMF tables in this worksheet are 11-13, 11-14, 11-17, and 11-18.
Rural Multilane Intersection	Analysis for the rural multilane intersection analysis includesTables 11-9 and 11-24. The associated HSM worksheets are Worksheets 2A, 2B, 2C, 2D, and 2E.

Tables 11-9 and 11-24 are intersection

Analysis for site-specific EB analysis using results from the rural divided and undivided segment as well as rural intersection multilane worksheets. This analysis can be performed if the analyst knows the exact location of historic crashes within the study limits. The associated HSM worksheets are

this information is available.

Worksheets 3A and 3B.

exhibits for estimating crash distributions and can be modified for locally-derived conditions if

### **Color Coding in the Worksheets**

The worksheets include three specific color options to help users identify locations where input data is required. In some cases, the shaded cells require the user to input specific numbers. In other cases the input is restricted to a select set of options included in pull-down lists. The respective color coding is as follows:

### Color Used Type

### Type of Information Required from User



Required input information as identified in the HSM.



Input data required from the user but restricted to options provided in pull-down boxes.



Optional input information that can be used to supplement the analysis if this information is available. This optional input information is reserved for locally-derived crash informatic If the analyst elects to use this option so as to improve analysis for local crash distribution trends, each of the Exhibits with the locally-derived input also includes a pull-down box where the analyst should indicate they are using locally derive crash information. The worksheets will then use the local values instead of the HSM default values.

### Spreadsheet developed by:

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Phone: 541-737-6337

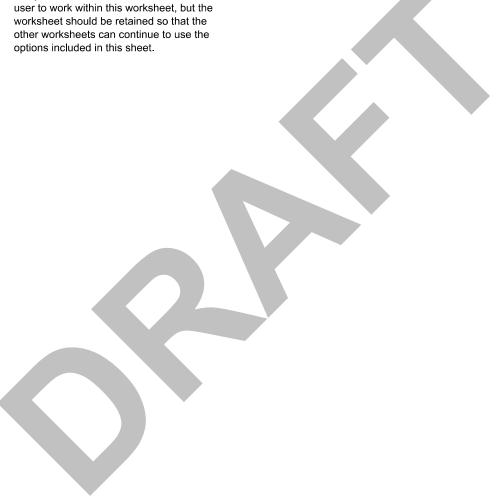
### Instructions

Rural Multilane Project Total

Analysis for project-specific EB analysis using results from the rural divided and undivided segment as well as rural intersection multilane worksheets. This analysis can be performed if the analyst has historic crash data, but does not know the exact location within the project limits at which the crashes occurred. The associated HSM worksheets are Worksheets 4A and 4B.

Construction

Data in this worksheet has been used to help define the pull-down options in the analysis worksheets. There is no need for a user to work within this worksheet, but the





on.

### Divided Segment 1 2045

	0.68	1.00		Calibration Factor, Cr
	Not Present	Not Present		Auto speed enforcement (present/not present)
	Not Present	Not Present		Lighting (present/not present)
•	Not Applicable	1:7 or flatter		Side Slopes - for undivided only
	40	30		Median width (ft) - for divided only
	Composite	Paved		Shoulder type - right shoulder type for divided
	8	8	directions of travel, use average width]	Shoulder width (ft) - right shoulder width for divided [if differ for directions of travel, use average width
	12	12		Lane width (ft)
AADT OK	8,700	-	$AADT_{MAX} = 89,300$ (veh/day)	AADT (veh/day)
	4.3	:		Length of segment, L (mi)
•	Divided	Undivided		Roadway type (divided / undivided)
	Site Conditions	Base Conditions		Input Data
	2045	Analysis Year		
	Highlands County, Florida	Jurisdiction	11/07/18	Date Performed
	MP 17 255 - 21 573	Roadway Section	H.W. Lochner	Agency or Company
	SR 70	Roadway	SPM	Analyst
	Location Information			General Information
	yments	ta for Rural Multilane Roadway Se	Worksheet 1A General Information and Input Data for Rural Multilane Roadway Segments	Worksheet '

1.00	from Equation 11-16	CMF 1rd		CMF for Lane Width	(1)		
1.00	from Table 11-17	CMF 2rd		CMF for Right Shoulder Width	(2)	Worksheet 1B (a) Crash	
0.99	from Table 11-18	CMF 3rd		CMF for Median Width	(3)	Worksheet 1B (a) Crash Modification Factors for Rural Multilane Divided Roadway Segments	
1.00	from Equation 11-17	CMF 4rd		CMF for Lighting	(4)	ural Multilane Divided Ro	
1.00	from Section 11.7.2	CMF 5rd	Enforcement	CMF for Automated Speed	(5)	adway Segments	
0.99	$(1)^*(2)^*(3)^*(4)^*(5)$	CMF comb		Combined CMF	(6)		

	٧	Vorksheet 1C	(a) – Roadwa	Worksheet 1C (a) – Roadway Segment Crashes for Rural Multilane Divided Roadway Segments	Rural Multilane Divided R	oadway Segments		
(1)		(2)		(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SI	SPF Coefficients	S	N spf rd	Overdispersion	Combined CMFs	Calibration	Predicted average crash
	f	from Table 11-5			Parameter, k	(6) from Worksheet	Factor, Cr	frequency, N predicted rs(d)
	а	ь	С	from Equation 11-9	from Equation 11-10	1B (a)		(3)*(5)*(6)
Total	9.025	1.049	1.549	7.023	0.049	0.99	0.68	4.728
Fatal and Injury (FI)	8 837	0.958	1.687	3.713	0.043	0.99	0.68	2.499
Fatal and Injury <sup>a</sup> (FI <sup>a</sup> )	-8.505	0.874	1.740	2.415	0.041	0.99	0.68	1.626
Property Damage Only (PDO)	ı	ł	:	ŀ	ŀ	-	1	$(7)_{TOTAL} - (7)_{FI}$
r reporty barriage only (r bo)								2.229

NOTE: <sup>a</sup> Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

Tota							
					Collision Type	(1)	
1.000	11-6	from Table	Type(TOTAL)	of Collision	Proportion	(2)	Workshee
4.728	(a)	from Table  (7) TOTAL from Worksheet 1C   from Table 11- (7) From Worksheet   from Table   (7) Frame Worksheet		(crashes/year)	N predicted rs(d) (TOTAL)	(3)	Worksheet 1D (a) Crashes by Severity Level and Collision Type for Rural Multilane Divided Roadway Segmen
1.000	6	from Table 11-	Type(FI)	Collision	Proportion of	(4)	erity Level and
2.499	1C (a)	(7) <sub>FI</sub> from Worksheet		(crashes/year)	Proportion of N predicted rs(d) (FI)	(5)	Collision Type for Ru
1.000	11-6	from Table	Type (Fl <sup>a</sup> )	of Collision	Proportion	(6)	ral Multilane
1.626	1C (a)	(7) Fl from Worksheet		(crashes/year)	Proportion N predicted rs (FI <sup>a</sup> )	(7)	Divided Roadway Segi
1.000	11-6	from Table	Type (PDO)	of Collision	Proportion	(8)	nents
2.229	(a)	(7)PDO from Worksheet 1C		(crashes/year)	N predicted rs(d) (PDO)	(9)	

### Divided Segment 1 2045

		$(2)^*(3)_{TOTAL}$		(4)x(5) <sub>FI</sub>		(6)*(7) <sub>FI</sub> <sup>a</sup>		(8)*(9) <sub>PDO</sub>
Head-on collision	0.006	0.028	0.013	0.032	0.018	0.029	0.002	0.004
Sideswipe collision	0.043	0.203	0.027	0.067	0.022	0.036	0.053	0.118
Rear-end collision	0.116	0.548	0.163	0.407	0.114	0.185	880.0	0.196
Angle collision	0.043	0.203	0.048	0.120	0.045	0.073	0.041	0.091
Single-vehicle collision	0.768	3.631	0.727	1 817	0.778	1.265	0.792	1.765
Other collision	0.024	0.113	0.022	0.055	0.023	0.037	0.024	0.053
NOTE: I Ising the KARCO scale, those include only KAR crashes. Crashes with severity level C (possible injury) are not included	neli ide only KAR en	shes Crashes with severity level (	? (nossible inium) a	re not included				

NOTE: <sup>a</sup> Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

	Worksheet 1E Summary Results for Rural Multilane Roadway Segments	e Roadway Segments	
(1)	(2)	(3)	(4)
Crash severity level	Predicted average crash frequency (crashes/year)	Roadway segment length (mi)	Crash rate (crashes/mi/year)
	(7) from Worksheet 1C (a) or (b)		(2)/(3)
Total	7.7	4.3	1.1
Fatal and Injury (FI)	2.5	4.3	0.6
Fatal and Injury <sup>a</sup> (FI <sup>a</sup> )	1.6	4.3	0.4
Property Damage Only (PDO)	2.2	4.3	0.5
NOTE: a Using the KARCO scale, these include only KAR or	NOTE: 8 Heing the KARCO scale, these include only KAR crashes. Crashes with severity level C (possible injury) are not included		

NOTE: " Using the KABCO scale, these include only KAB crashes. Crashes with severity level C (possible injury) are not included.

# Tables Affiliated with CMFs for Specific Segment AADT values:

lable 11-16: CMF for Lane Width on Divided Roadway Segments (CMF <sub>RA</sub> )	(CMF <sub>RA</sub> )	led Koadway S	egments
	,	AADT (veh/day)	
Lane Width (ft)	< 400	400 to 2000	> 2000
9	1.03	2.18	1.25
9.5	1.02	1.96	1.20
10	1.01	1.74	1 15
10.5	1.01	1.43	1.09
11	1.01	1.11	1.03
11.5	1.01	1.06	1.02
12	1.00	1.00	1.00

Note: The collision types related to lane width to which this CMF applies include run-off-the-road, head-on crashes, and sideswipes.

### Segment Tables

### Tables Affiliated with Crash Statistics:

Collision type				Proportion of cr	ashes by collisi	ion type and cr	Proportion of crashes by collision type and crash severity level		
			HSM-Prov	HSM-Provided Values			Locally-Derive	ived Values	
Locally-Derived Values?	No	Total	Fatal and injury	Fatal and injury Fatal and injury a	PDO	Total	Fatal and injury Fa	Fatal and injury a PDO	ъ
Head-on		0.009	0.029	0.043	0.001				
Sideswipe		0.098	0.048	0.044	0.120				
Rear-end		0.246	0.305	0.217	0.220				
Angle		0.356	0.352	0.348	0.358				
Single		0.238	0.238	0.304	0.237				
Other		0.053	0.028	0.044	0.064				
SV run-off-rd, Head-on, Sideswipe		0.270							

			HSM-Prov	HSM-Provided Values			Locally-Derive	ived Values	
Locally-Derived Values?	No	Total	Fatal and injury	Fatal and injury   Fatal and injury a	PDO	Total	Fatal and injury Fa	Fatal and injury <sup>a</sup> PDO	
Head-on		0.006	0.013	0.018	0.002				
Sideswipe		0.043	0.027	0.022	0.053				
Rear-end		0.116	0.163	0.114	0.088				
Angle		0.043	0.048	0.045	0.041				
Single		0.768	0.727	0.778	0.792				
Other		0.024	0.022	0.023	0.024				
SV run-off-rd Head-on Sideswine		0.500							

	Table 11-15: N	light-time Crash	Table 11-15: Night-time Crash Proportions for Unlighted Roadway Segments	lway Segments		
Roadway Type		HSM-Provided Values	ded Values		Locally-Derived Values	ved Values
Locally-Derived Values? No	Proportion of to	otal night-time	Proportion of total night-time Proportion of crashes that Proportion of total night-time	Proportion of t	otal night-time	Proportion of crashes that
	crashes by severity level	everity level	occur at night	crashes by severity level	everity level	occur at night
	Fatal and injury, PDO, ppnr	PDO, p <sub>pnr</sub>	Pnr	Fatal and injury, PDO, ppnr	PDO, p <sub>pnr</sub>	Pnr
	Pinr			Pinr		
4U	0.361	0.639	0.255			

Roadway Type		HSM-Provi	HSM-Provided Values		Locally-Deri	Locally-Derived Values
						4
Locally-Derived Values? No	Proportion of total night-time	otal night-time	Proportion of crashes that Proportion of total night-time	Proportion of to	Ф	Proportion of crashes that
	crashes by severity level	everity level	occur at night	crashes by severity level	everity level	occur at night
	Fatal and injury, PDO, pp	PDO, p <sub>pnr</sub>	$\rho_{nr}$	Fatal and injury, PDO, ppnr	PDO, p <sub>pnr</sub>	Pnr
	Pinr			Pinr		
4D	0 323	0 677	967 0			

## Tables Affiliated with Crash Modification Factors:

Table 11-13: CMF for Collision Types Related to Shoulder Types and Shoulder Widths (CMF<sub>TRA</sub>)

Shoulder	Shoulder width (	ר (ft) ר				
Type 0 1 2 3 4	5	6	7	8	9	10
Paved 1.00 1.00 1.00 1.00 1.00 1.00	1.00	1.00	1.00	1.00	1.00	1.00
Gravel 1.00 1.00 1.01 1.01 1.01 1.01	1.02	1.02	1.02	1.02	1.03	1.03
Composite   1.00   1.01   1.02   1.02   1.03	1.04	1.04	1.05	1.06	1.07	1.07
Turf 1.00 1.01 1.03 1.04 1.05	1.07	1.08	1.10	1.11	1.13	1.14

Table 11-14: CMF for Side Slope on Undivided Roadway Segments (CMF<sub>3ru</sub>)

Table 11-17. Only for olde olope on olidivided Roadway orginelits (olid 3m)	Sign for Green	Ciope on on	alvided Road	way beginen	ita (Oiri 3ru)
1:2 or Steeper	1:3	1:4	1:5	1:6	1:7 or Flatter
1.18	1.15	1.12	1.09	1.05	1.00

rable 11-17: CMF for Right Shoulder Width on Divided Roadway Segments (CMF2 <sub>rd</sub> )
------------------------------------------------------------------------------------------------

10	9	8	7	6	5	4	3	2	1	0	Average Shoulder Width (ft)	
1.00	1.00	1.00	1.02	1.04	1.07	1.09	1.11	1.13	1.16	1.18		CMF

 Segments without a Median Barrier(CMF3 <sub>rd</sub> )	Table 11-18: CMF for Median Width on Divided Roadway
	way

Segments without a Median Barrier(CMF3 <sub>rd</sub> )	sarrier(CMF3 <sub>rd</sub> )
Median Width (ft)	CMF
10	1.04
20	1.02
30	1.00
40	66.0
50	0.97
60	0.96
70	0.96
80	0.95
90	0.94
100	0.94

# Rural Multilane Site Total

<b>⊗</b>
rkshe
et 3/
<b>Predicte</b>
d and
dicted and Observed Crashes by Severity and Site Type
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and
Site
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Method

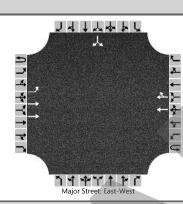
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Site type				Observed	Overdispersion	Weighted	Expected
	Predicted	Predicted average crash frequency	requency	crashes,	Parameter, k adjustment, w		average crash
		(crashes/year)		$N_{observed}$			frequency,
	N predicted	N <sub>predicted</sub> (FI)	${\sf N}$ predicted	(crashes/year)		Equation A-5	Equation A-4
	(TOTAL)		(PDO)	•		from Part C	from Part C
						Appendix	Appendix
		R	ROADWAY SEGMENTS	IENTS			
Divided Segment 1 2045	4.728	2.499	2.229				
COMBINED (sum of column)	4.728	2.499	2.229	0	-	1	

# Worksheet 3B - Site-Specific EB Method Summary Results

(1)	(2)	(3)
Crash severity level	N predicted	N expected
Total	(2) <sub>COMB</sub> from Worksheet 3A	(8) <sub>COMB</sub> from Worksheet 3A
	4.7	
Fatal and injury (FI)	(3) <sub>COMB</sub> from Worksheet 3A	(3) <sub>TOTAL</sub> * (2) <sub>FI</sub> / (2) <sub>TOTAL</sub>
	2.5	
Property damage only (PDO)	(4) <sub>COMB</sub> from Worksheet 3A	$(3)_{TOTAL} * (2)_{PDO} / (2)_{TOTAL}$
	2.2	

Appendix J: Build HCS7 Reports

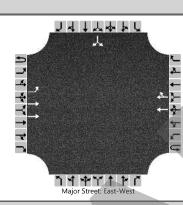
HCS7 Two-Way Stop-Control Report									
General Information		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2025	North/South Street	CR 29						
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adj	ustme	nts															
Approach		Eastk	ound			Westl	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0	
Configuration		L	Т				Т	TR							LR		
Volume (veh/h)	0	22	302				211	16						21		22	
Percent Heavy Vehicles (%)	3	11												11		11	
Proportion Time Blocked																	
Percent Grade (%)													0				
Right Turn Channelized																	
Median Type   Storage	Left Only																
Critical and Follow-up Headways																	
Base Critical Headway (sec)		4.1												7.5		6.9	
Critical Headway (sec)		4.32												7.02		7.12	
Base Follow-Up Headway (sec)		2.2												3.5		3.3	
Follow-Up Headway (sec)		2.31												3.61		3.41	
Delay, Queue Length, and	l Leve	l of S	ervice														
Flow Rate, v (veh/h)		24													47		
Capacity, c (veh/h)		1253													699		
v/c Ratio		0.02													0.07		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.2		
Control Delay (s/veh)		7.9													10.5		
Level of Service (LOS)	A														В		
Approach Delay (s/veh)	0.5									10.5							
Approach LOS															В		

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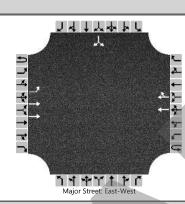
HCS7 Two-Way Stop-Control Report									
General Information		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2025	North/South Street	CR 29						
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adju																	
Approach		Eastb	ound			Westl	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0	
Configuration		L	Т				Т	TR							LR		
Volume (veh/h)	0	16	211				302	21						16		16	
Percent Heavy Vehicles (%)	3	11												11		11	
Proportion Time Blocked																	
Percent Grade (%)													0				
Right Turn Channelized																	
Median Type   Storage				Left	Only								1				
Critical and Follow-up He	Headways																
Base Critical Headway (sec)		4.1												7.5		6.9	
Critical Headway (sec)		4.32												7.02		7.12	
Base Follow-Up Headway (sec)		2.2												3.5		3.3	
Follow-Up Headway (sec)		2.31												3.61		3.41	
Delay, Queue Length, and	Leve	l of S	ervice														
Flow Rate, v (veh/h)		17													35		
Capacity, c (veh/h)		1142													654		
v/c Ratio		0.02													0.05		
95% Queue Length, Q <sub>95</sub> (veh)		0.0													0.2		
Control Delay (s/veh)		8.2													10.8		
Level of Service (LOS)		А													В		
Approach Delay (s/veh)	0.6											10.8					
Approach LOS														ı	3		

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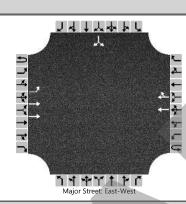
HCS7 Two-Way Stop-Control Report									
General Information		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2035	North/South Street	CR 29						
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adjustments																	
Approach		Eastb	ound			Westl	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0	
Configuration		L	Т				Т	TR							LR		
Volume (veh/h)	0	29	363				254	23						34		29	
Percent Heavy Vehicles (%)	3	11												11		11	
Proportion Time Blocked																	
Percent Grade (%)														(	0		
Right Turn Channelized																	
Median Type   Storage				Left	Only							:	1				
Critical and Follow-up He	eadways																
Base Critical Headway (sec)		4.1												7.5		6.9	
Critical Headway (sec)		4.32												7.02		7.12	
Base Follow-Up Headway (sec)		2.2												3.5		3.3	
Follow-Up Headway (sec)		2.31												3.61		3.41	
Delay, Queue Length, and	l Leve	l of S	ervice	•													
Flow Rate, v (veh/h)		32													68		
Capacity, c (veh/h)		1194													633		
v/c Ratio		0.03													0.11		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.4		
Control Delay (s/veh)		8.1													11.4		
Level of Service (LOS)		Α													В		
Approach Delay (s/veh)	0.6									11.4							
Approach LOS															В		

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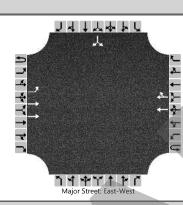
HCS7 Two-Way Stop-Control Report									
<b>General Information</b>		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2035	North/South Street	CR 29						
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adju	ıstme	nts															
Approach		Eastb	ound			Westl	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0	
Configuration		L	Т				Т	TR							LR		
Volume (veh/h)	0	21	254				363	34						23		21	
Percent Heavy Vehicles (%)	3	11												11		11	
Proportion Time Blocked																	
Percent Grade (%)													0				
Right Turn Channelized																	
Median Type   Storage	Left Only								1								
Critical and Follow-up Headways																	
Base Critical Headway (sec)		4.1												7.5		6.9	
Critical Headway (sec)		4.32												7.02		7.12	
Base Follow-Up Headway (sec)		2.2												3.5		3.3	
Follow-Up Headway (sec)		2.31												3.61		3.41	
Delay, Queue Length, and	Leve	l of S	ervice														
Flow Rate, v (veh/h)		23													48		
Capacity, c (veh/h)		1063													592		
v/c Ratio		0.02													0.08		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.3		
Control Delay (s/veh)		8.5													11.6		
Level of Service (LOS)	A												В				
Approach Delay (s/veh)	0.6									11.6							
Approach LOS										В							

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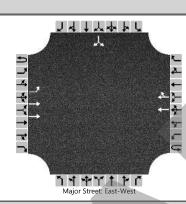
HCS7 Two-Way Stop-Control Report									
General Information		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2045	North/South Street	CR 29						
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adju																	
Approach		Eastb	ound			Westl	oound			North	bound			South	bound		
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R	
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12	
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0	
Configuration		L	T				Т	TR							LR		
Volume (veh/h)	0	38	419				293	31						45		38	
Percent Heavy Vehicles (%)	3	11												11		11	
Proportion Time Blocked																	
Percent Grade (%)													0				
Right Turn Channelized																	
Median Type   Storage				Left	Only								1				
Critical and Follow-up He	leadways																
Base Critical Headway (sec)		4.1												7.5		6.9	
Critical Headway (sec)		4.32												7.02		7.12	
Base Follow-Up Headway (sec)		2.2												3.5		3.3	
Follow-Up Headway (sec)		2.31												3.61		3.41	
Delay, Queue Length, and	Leve	l of S	ervice														
Flow Rate, v (veh/h)		41													90		
Capacity, c (veh/h)		1141													585		
v/c Ratio		0.04													0.15		
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.5		
Control Delay (s/veh)		8.3													12.3		
Level of Service (LOS)		Α													В		
Approach Delay (s/veh)	0.7									12.3							
Approach LOS														ı	3		

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HCS7 Two-Way Stop-Control Report									
<b>General Information</b>		Site Information							
Analyst	Elizabeth Fernandez	Intersection	SR 70 and CR 29						
Agency/Co.	H.W. Lochner	Jurisdiction	Highlands County						
Date Performed	Oct 2018	East/West Street	SR 70						
Analysis Year	2045	North/South Street	CR 29						
Time Analyzed	PM Peak Hour	Peak Hour Factor	0.92						
Intersection Orientation	East-West	Analysis Time Period (hrs)	1.00						
Project Description Build, SR 70 from CR 29 to Lonesome Island Road									



Vehicle Volumes and Adju	ustme	nts														
Approach		Eastk	ound			Westl	oound			North	bound			South	bound	
Movement	U	L	Т	R	U	L	Т	R	U	L	Т	R	U	L	Т	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	0	2	0		0	0	0		0	1	0
Configuration		L	Т				Т	TR							LR	
Volume (veh/h)	0	27	293				419	45						31		27
Percent Heavy Vehicles (%)	3	11												11		11
Proportion Time Blocked																
Percent Grade (%)														(	0	
Right Turn Channelized																
Median Type   Storage				Left	Only								1			
Critical and Follow-up He	adwa	ys														
Base Critical Headway (sec)		4.1												7.5		6.9
Critical Headway (sec)		4.32												7.02		7.12
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.31												3.61		3.41
Delay, Queue Length, and	l Leve	l of S	ervice	•												
Flow Rate, v (veh/h)		29													63	
Capacity, c (veh/h)		996													541	
v/c Ratio		0.03													0.12	
95% Queue Length, Q <sub>95</sub> (veh)		0.1													0.4	
Control Delay (s/veh)		8.7													12.5	
Level of Service (LOS)		А													В	
Approach Delay (s/veh)		0	).7											12	2.5	
Approach LOS															В	

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	HCS7 Multilane	Highway Report					
Project Information	Project Information						
Analyst	Elizabeth Fernandez	Date	October 2018				
Agency	H.W. Lochner	Analysis Year	2025				
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour				
Project Description	Build, Eastbound						
Direction 1 Geometric Data							
Direction 1	Eastbound						
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00				
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6				
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00				
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0				
Direction 1 Adjustment Factor	ors						
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000				
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000				
Driver Population CAF	1.000						
Direction 1 Demand and Cap	acity						
Volume(V) veh/h	323	Heavy Vehicle Adjustment Factor (fHV)	0.901				
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	195				
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180				
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180				
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.09				
Direction 1 Speed and Density							
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0				
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.3				
Median Type Adjustment (fм)	0.0	Level of Service (LOS)	А				
Access Point Density Adjustment (fA)	1.0						
Direction 1 Bicycle LOS							
Flow Rate in Outside Lane (vol.),veh/h	176	Effective Speed Factor (St)	4.94				
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.47				
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E				
L	1	<u> </u>	<u> </u>				

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	HCS7 Multilane	Highway Report				
Project Information	Project Information					
Analyst	Elizabeth Fernandez	Date	October 2018			
Agency	H.W. Lochner	Analysis Year	2025			
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour			
Project Description	Build, Eastbound					
Direction 1 Geometric Data						
Direction 1	Eastbound					
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00			
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6			
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00			
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0			
Direction 1 Adjustment Factor	ors					
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000			
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000			
Driver Population CAF	1.000					
Direction 1 Demand and Cap	acity					
Volume(V) veh/h	227	Heavy Vehicle Adjustment Factor (fHV)	0.901			
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	137			
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180			
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180			
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.06			
Direction 1 Speed and Density						
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0			
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	2.3			
Median Type Adjustment (fм)	0.0	Level of Service (LOS)	А			
Access Point Density Adjustment (fA)	1.0					
Direction 1 Bicycle LOS						
Flow Rate in Outside Lane (vol.),veh/h	123	Effective Speed Factor (St)	4.94			
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.29			
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E			
	1	I .	<u> </u>			

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	HCS7 Multilane	Highway Report			
Project Information					
Analyst	Elizabeth Fernandez	Date	October 2018		
Agency	H.W. Lochner	Analysis Year	2025		
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour		
Project Description	Build, Westbound				
Direction 1 Geometric Data					
Direction 1	Westbound				
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00		
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0		
Direction 1 Adjustment Factor	ors				
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000		
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000		
Driver Population CAF	1.000				
Direction 1 Demand and Cap	acity				
Volume(V) veh/h	227	Heavy Vehicle Adjustment Factor (fHV)	0.901		
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	137		
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180		
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.06		
Direction 1 Speed and Density					
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	2.3		
Median Type Adjustment (fм)	0.0	Level of Service (LOS)	А		
Access Point Density Adjustment (fA)	1.0				
Direction 1 Bicycle LOS					
Flow Rate in Outside Lane (vol.),veh/h	123	Effective Speed Factor (St)	4.94		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.29		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		
	1	I .	<u> </u>		

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	HCS7 Multilane	Highway Report					
Project Information	Project Information						
Analyst	Elizabeth Fernandez	Date	October 2018				
Agency	H.W. Lochner	Analysis Year	2025				
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour				
Project Description	Build, Westbound						
Direction 1 Geometric Data							
Direction 1	Westbound						
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00				
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6				
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00				
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0				
Direction 1 Adjustment Facto	rs						
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000				
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000				
Driver Population CAF	1.000						
Direction 1 Demand and Capa	acity						
Volume(V) veh/h	323	Heavy Vehicle Adjustment Factor (fHV)	0.901				
Peak Hour Factor	0.92	Flow Rate (V <sub>p</sub> ), pc/h/ln	195				
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180				
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180				
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.09				
Direction 1 Speed and Density							
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0				
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.3				
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А				
Access Point Density Adjustment (fA)	1.0						
Direction 1 Bicycle LOS							
Flow Rate in Outside Lane (vol),veh/h	176	Effective Speed Factor (St)	4.94				
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.47				
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	Е				

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	HCS7 Multilane	Highway Report	
Project Information			
Analyst	Elizabeth Fernandez	Date	October 2018
Agency	H.W. Lochner	Analysis Year	2035
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour
Project Description	Build, Eastbound		
Direction 1 Geometric Data			
Direction 1	Eastbound		
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0
Direction 1 Adjustment Factor	ors		
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		
Direction 1 Demand and Cap	pacity		
Volume(V) veh/h	397	Heavy Vehicle Adjustment Factor (fHV)	0.901
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	240
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.11
Direction 1 Speed and Densi	ty		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D), pc/mi/ln	4.1
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А
Access Point Density Adjustment (fA)	1.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vOL),veh/h	216	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.58
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	F
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	HCS7 Multilane	Highway Report			
Project Information					
Analyst	Elizabeth Fernandez	Date	October 2018		
Agency	H.W. Lochner	Analysis Year	2035		
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour		
Project Description	Build, Eastbound				
Direction 1 Geometric Data					
Direction 1	Eastbound				
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00		
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0		
Direction 1 Adjustment Factor	ors				
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000		
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000		
Driver Population CAF	1.000				
Direction 1 Demand and Cap	acity				
Volume(V) veh/h	277	Heavy Vehicle Adjustment Factor (fHV)	0.901		
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	167		
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180		
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.08		
Direction 1 Speed and Density					
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	2.8		
Median Type Adjustment (fм)	0.0	Level of Service (LOS)	А		
Access Point Density Adjustment (fA)	1.0				
Direction 1 Bicycle LOS					
Flow Rate in Outside Lane (vol.),veh/h	151	Effective Speed Factor (St)	4.94		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.40		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E		
<u> </u>	1	<u> </u>			

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	HCS7 Multilane	Highway Report				
Project Information						
Analyst	Elizabeth Fernandez	Date	October 2018			
Agency	H.W. Lochner	Analysis Year	2035			
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour			
Project Description	Build, Westbound					
Direction 1 Geometric Data						
Direction 1	Westbound					
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00			
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6			
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00			
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0			
Direction 1 Adjustment Factor	ors					
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000			
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000			
Driver Population CAF	1.000					
Direction 1 Demand and Cap	acity					
Volume(V) veh/h	277	Heavy Vehicle Adjustment Factor (fHV)	0.901			
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	167			
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180			
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180			
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.08			
Direction 1 Speed and Density						
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0			
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	2.8			
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А			
Access Point Density Adjustment (fA)	1.0					
Direction 1 Bicycle LOS						
Flow Rate in Outside Lane (vol.),veh/h	151	Effective Speed Factor (St)	4.94			
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.40			
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	Elizabeth Fernandez	Date	October 2018				
Agency	H.W. Lochner	Analysis Year	2035				
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour				
Project Description	Build, Westbound						
Direction 1 Geometric Data							
Direction 1	Westbound						
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00				
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6				
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00				
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0				
Direction 1 Adjustment Facto	ors						
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000				
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000				
Driver Population CAF	1.000						
Direction 1 Demand and Cap	acity						
Volume(V) veh/h	397	Heavy Vehicle Adjustment Factor (fHV)	0.901				
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	240				
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180				
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180				
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.11				
Direction 1 Speed and Densit	у						
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0				
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	4.1				
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А				
Access Point Density Adjustment (fA)	1.0						
Direction 1 Bicycle LOS							
Flow Rate in Outside Lane (vol),veh/h	216	Effective Speed Factor (St)	4.94				
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.58				
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	F				

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	HCS7 Multilane	Highway Report			
Project Information					
Analyst	Elizabeth Fernandez	Date	October 2018		
Agency	H.W. Lochner	Analysis Year	2045		
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour		
Project Description	Build, Eastbound				
Direction 1 Geometric Data					
Direction 1	Eastbound				
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00		
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6		
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00		
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0		
Direction 1 Adjustment Facto	rs				
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000		
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000		
Driver Population CAF	1.000				
Direction 1 Demand and Capa	acity				
Volume(V) veh/h	464	Heavy Vehicle Adjustment Factor (fHV)	0.901		
Peak Hour Factor	0.92	Flow Rate (V <sub>p</sub> ), pc/h/ln	280		
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180		
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180		
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.13		
Direction 1 Speed and Density					
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0		
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	4.7		
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А		
Access Point Density Adjustment (fA)	1.0				
Direction 1 Bicycle LOS					
Flow Rate in Outside Lane (vol),veh/h	252	Effective Speed Factor (St)	4.94		
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.66		
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	F		

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	HCS7 Multilane	e Highway Report	
Project Information			
Analyst	Elizabeth Fernandez	Date	October 2018
Agency	H.W. Lochner	Analysis Year	2045
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour
Project Description	Build, Eastbound		
Direction 1 Geometric Data			
Direction 1	Eastbound		
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0
Direction 1 Adjustment Fact	ors		
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		
Direction 1 Demand and Ca	pacity		
Volume(V) veh/h	324	Heavy Vehicle Adjustment Factor (fHV)	0.901
Peak Hour Factor	0.92	Flow Rate (V <sub>p</sub> ), pc/h/ln	196
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.09
Direction 1 Speed and Dens	ity		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.3
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А
Access Point Density Adjustment (fA)	1.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vol.),veh/h	176	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.47
	24	Bicycle Level of Service (LOS)	E

	HCS7 Multilane	Highway Report					
Project Information	Project Information						
Analyst	Elizabeth Fernandez	Date	October 2018				
Agency	H.W. Lochner	Analysis Year	2045				
Jurisdiction	Highlands County	Time Period Analyzed	AM Peak Hour				
Project Description	Build, Westbound						
Direction 1 Geometric Data							
Direction 1	Westbound						
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00				
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6				
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00				
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0				
Direction 1 Adjustment Facto	ors						
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000				
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000				
Driver Population CAF	1.000						
Direction 1 Demand and Cap	acity						
Volume(V) veh/h	324	Heavy Vehicle Adjustment Factor (fHV)	0.901				
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	196				
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180				
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180				
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.09				
Direction 1 Speed and Densit	Direction 1 Speed and Density						
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0				
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	3.3				
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А				
Access Point Density Adjustment (fA)	1.0						
Direction 1 Bicycle LOS							
Flow Rate in Outside Lane (vol.),veh/h	176	Effective Speed Factor (St)	4.94				
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.47				
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	E				

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	HCS7 Multilane	Highway Report	
<b>Project Information</b>			
Analyst	Elizabeth Fernandez	Date	October 2018
Agency	H.W. Lochner	Analysis Year	2045
Jurisdiction	Highlands County	Time Period Analyzed	PM Peak Hour
Project Description	Build, Westbound		
Direction 1 Geometric Data			
Direction 1	Westbound		
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	60.0	Total Ramp Density (TRD), ramps/mi	0.00
Lane Width, ft	12	Left-Side Lateral Clearance (LCR), ft	6
Median Type	Divided	Total Lateral Clearance (TLC), ft	12.00
Access Point Density, pts/mi	4.0	Free-Flow Speed (FFS), mi/h	59.0
Direction 1 Adjustment Factor	ors		
Driver Population	All Familiar	Final Speed Adjustment Factor (SAF)	1.000
Driver Population SAF	1.000	Final Capacity Adjustment Factor (CAF)	1.000
Driver Population CAF	1.000		
Direction 1 Demand and Cap	acity		
Volume(V) veh/h	464	Heavy Vehicle Adjustment Factor (fHV)	0.901
Peak Hour Factor	0.92	Flow Rate (Vp), pc/h/ln	280
Total Trucks, %	11.00	Capacity (c), pc/h/ln	2180
Single-Unit Trucks (SUT), %	-	Adjusted Capacity (cadj), pc/h/ln	2180
Tractor-Trailers (TT), %	-	Volume-to-Capacity Ratio (v/c)	0.13
Direction 1 Speed and Densi	ty		
Lane Width Adjustment (fLW)	0.0	Average Speed (S), mi/h	59.0
Total Lateral Clearance Adj. (fLLC)	0.0	Density (D ), pc/mi/ln	4.7
Median Type Adjustment (fM)	0.0	Level of Service (LOS)	А
Access Point Density Adjustment (fA)	1.0		
Direction 1 Bicycle LOS			
Flow Rate in Outside Lane (vol.),veh/h	252	Effective Speed Factor (St)	4.94
Effective Width of Volume (Wv), ft	18	Bicyle LOS Score (BLOS)	5.66
Average Effective Width (We), ft	24	Bicycle Level of Service (LOS)	F

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Appendix K: Noise Analysis

### TRAFFIC DATA FOR NOISE STUDIES - SUMMARY OUTPUT FDOT DISTRICT 1

Federal Aid Number(s):				
FPID Number(s):	414506-	5-22-01		
State/Federal Route No.:	SR	70		
Road Name:	Fritz S	itreet	<del></del>	
Project Description:	SR 70 PD8	&E Study		
Segment Description:	SR 70 from CR 29 to L	onesome Island Road	_	
Section Number:	9060	0000		
Mile Post To/From:	17.255 to	o 19.805		
_				
Existing Facility:		D =	58.83% %	
		T24 =	<b>22.00%</b> % of 24 Hour	Volume
Year:	2018	Tpeak =	11.00% % of Design H	
		MT =	3.00% % of Design H	lour Volume
LOS C Peak Hour Directional Volu		HT =	<b>8.00%</b> % of Design ⊢	lour Volume
Demand Peak Hour Volume:	268	B =	<b>0.11%</b> % of Design H	lour Volume
Posted Speed:	60	MC =	<b>0.10%</b> % of Design H	lour Volume
No Build Alternative (Design Year	):	D =	58.83% %	
		T24 =	<b>22.00%</b> % of 24 Hour	Volume
Year:	2045	Tpeak =	<b>11.00%</b> % of Design H	lour Volume
		MT =	<b>3.00</b> % % of Design ⊢	lour Volume
LOS C Peak Hour Directional Volu	me: 670	HT =	8.00% % of Design H	lour Volume
Demand Peak Hour Volume:	486	B =	<b>0.11%</b> % of Design H	lour Volume
Posted Speed:	60	MC =	<b>0.10%</b> % of Design ⊢	lour Volume
Build Alternative (Design Year):		D =	58.83% %	
		T24 =	<b>22.00%</b> % of 24 Hour	Volume
Year:	2045	Tpeak =	11.00% % of Design H	lour Volume
		MT =	<b>3.00</b> % % of Design ⊢	lour Volume
LOS C Peak Hour Directional Volu	me: 1530	HT =	8.00% % of Design H	lour Volume
Demand Peak Hour Volume:	486	B =	<b>0.11%</b> % of Design H	lour Volume
Posted Speed:	60	MC =	<b>0.10%</b> % of Design H	lour Volume
I certify that the above informa	tion is accurate and appropriat	e for use with the traffic noise	e analysis	
,			,	
Prepared By:	Elizabeth Fernandez		Date:	1/7/2019
· · · · · · · · · · · · · · · · · · ·	Print Name	Signature		
		Č		
I have reviewed and concur tha	t the above information is appr	opriate for use with the traff	ic noise analysis	
	- -		,	
FDOT Reviewer:			Date:	

Print Name

Signature

# FDOT TRAFFIC DATA FOR NOISE STUDIES - DETAILED OUTPUT

							LOS C													Demand Peak Hour						See Columns			Hour/LOS C	Demand Deak										
				Off-Peak Direction			Peak Direction					Off-Peak Direction							Peak Direction					to Right > for Which Volume			Direction	Deak or Off-Deak			Segment Description:	Project Description:	Road Name:	State/rederal Route No.:	State /Foderal Boute No :	FPID Number(s):	Federal Aid Number(s):	Prepared By:		
	Total	Motorcycles	Buses	Heavy Trucks	Med Trucks	Autos	lotal	Total	Motorcycles	Buses	Heavy Trucks	Med Trucks	Autos	Total	Motorcycles	Buses	Heavy Trucks	Med Trucks	Autos	Total	Motorcycles	Buses	Heavy Trucks	Med Trucks	Autos	See Columns to Right > for Which Volumes To Use (Demand or LOS C)			Vehicle Type			Note: Data sheets are to be	SR 70							Elizabeth Fernandez
																											Number	avel L	Posted Speed:	Year:	Exi	Note: Data sheets are to be completed for each segment having a change in traffic parameters (i.e., volume posted speed, typical section)	SR 70 from CR 29 to Lonesome Island Road	SR 70 PD&E Study	Fritz Street	SR /0	SB 70	414506-5-22-01		Date:
	670	1	1	54	20	594	870	20	7	I	54	20	594	188	1	1	15	6	165	268	1	1	21	8	237	Use Demand Volumes	Number of Vehicles	2	60	2018	Existing	naving a change in traffic par	nd Road							1/7/2019
																										Use De	Numb	Number of Travel Lanes:	Posted Speed:	Year:	No Buil	ameters (i.e., volume posted	•		I	1		Mile Post To/From:	Section Number:	Approved for Use By:
	670	1	1	54	20	594	0/0	£20 1	7	1	54	20	594	340	1	1	27	10	301	486	1	1	39	15	430	Use Demand Volumes	ber of Vehicles	2	60	2045	No Build (Design Year)	speed, typical section)						17.255 to 19.805	9060000	
-																										Use De	Numb	Number of Travel Lanes:	Posted Speed:	Year:	Build									Date:
	1530	2	2	122	46	1358	1930	1530	2	2	122	46	1358	340	1	1	27	10	301	486	1	1	39	15	430	Use Demand Volumes	Number of Vehicles		60	2045	Build (Design Year)									is

Appendix L: Air Quality Analysis

### PD&E TRAFFIC DATA FOR AIR STUDY SCREENING TEST

Financial Project Number(s):

Work Program Item No.:

Federal Aid Numbers (s):

Project Description:

A14506-5-22-01

414506-5

414506-5

SR 70 from CR 29 to Lonesome Island Road PD&E Study

NOTE:

Approach Speed:

The most congested intersection is the intersection with the highest total volume and lowest departure speeds and it could be two different intersections based on the "Build" vs. "No-Build" alternatives. The traffic volumes are to be the vph of the most congested leg approaching the intersection. The speeds are to be the approach speed for the most congested leg no closer than 152.4 m (500') from the intersection.

OPENING YEAR: 2025

"Build" "No-Build" Signalized Intersection: Signalized Intersection: SR 70 and CR 29 SR 70 and CR 29 Design or Peak Hour Traffic Design or Peak Hour Traffic 324 vph for most congested leg: for most congested leg: 324 vph Specify leg: Eastbound Specify leg: Eastbound

60 mph

DESIGN YEAR: 2045

Approach Speed:

60 mph

"Build" "No-Build" Signalized Intersection: Signalized Intersection: SR 70 and CR 29 SR 70 and CR 29 Design or Peak Hour Traffic Design or Peak Hour Traffic 464 vph 464 vph for most congested leg: for most congested leg: Westbound Westbound Specify leg: Specify leg: 60 mph Approach Speed: 60 mph Approach Speed: