S.R. 50 PD&E Study

from U.S. 301/S.R. 35 to C.R. 33

Hernando, Lake, and Sumter Counties, Florida

FM Number: 435859-1-22-1

ETDM Number: 14269

Preliminary Engineering Report

FINAL

FDOT Office
District Five
719 South Woodland Boulevard
DeLand, Florida 32720

Publication Date
March 2019

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Author
Kittelson & Associates, Inc
Orlando, FL

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March 2019

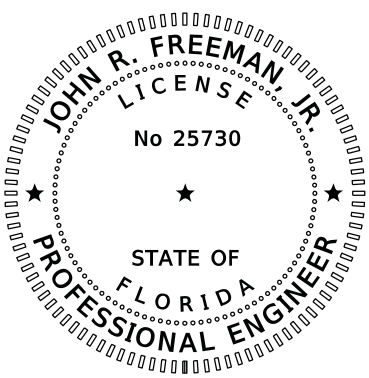
The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 14, 2016, and executed by FHWA and FDOT.

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a Registered Professional Engineer in the State of Florida practicing with Kittelson & Associates, Inc. and that I have supervised the preparation and approve the evaluation, findings, opinions, conclusions, and technical advice hereby reported for:

PROJECT:	S.R. 50 PD&E Study
FINANCIAL PROJECT ID:	435859-1-22-01
FEDERAL AID PROJECT NO:	N/A
LOCATION:	S.R. 50 from U.S. 301 to C.R. 33 in Hernando, Sumter, and Lake Counties, Florida

This report includes a summary of data collection efforts, corridor analysis, and conceptual design analyses for S.R. 50 from U.S. 301 to C.R. 33. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgment and experience.



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1. Summary

In December 2014, the Florida Department of Transportation (FDOT) District Five requested a Corridor Planning Study to evaluate S.R. 50 for a small portion in eastern Hernando County from U.S. 301 to the Hernando/Sumter County (within FDOT District Seven), then from the Hernando/Sumter County Line to the Sumter/Lake County Line within Sumter County and from the Sumter/Lake County Line to C.R. 33 in western Lake County. The total distance is approximately 20 miles. The Corridor Planning Study, completed in the fall of 2016, documented the engineering and environmental analysis, and indicated the need to widen S.R. 50 in Hernando, Sumter, and Lake Counties.

Initiated in December 2016, this Project Development and Environment (PD&E) Study has been conducted to assess various widening alternatives for S.R. 50. This Preliminary Engineering Report (PER) documents the project's purpose and need, the alternatives developed, the process of selecting the locally preferred alternative, and presents the preliminary design analysis for the preferred alternative.

1.1 Project Overview

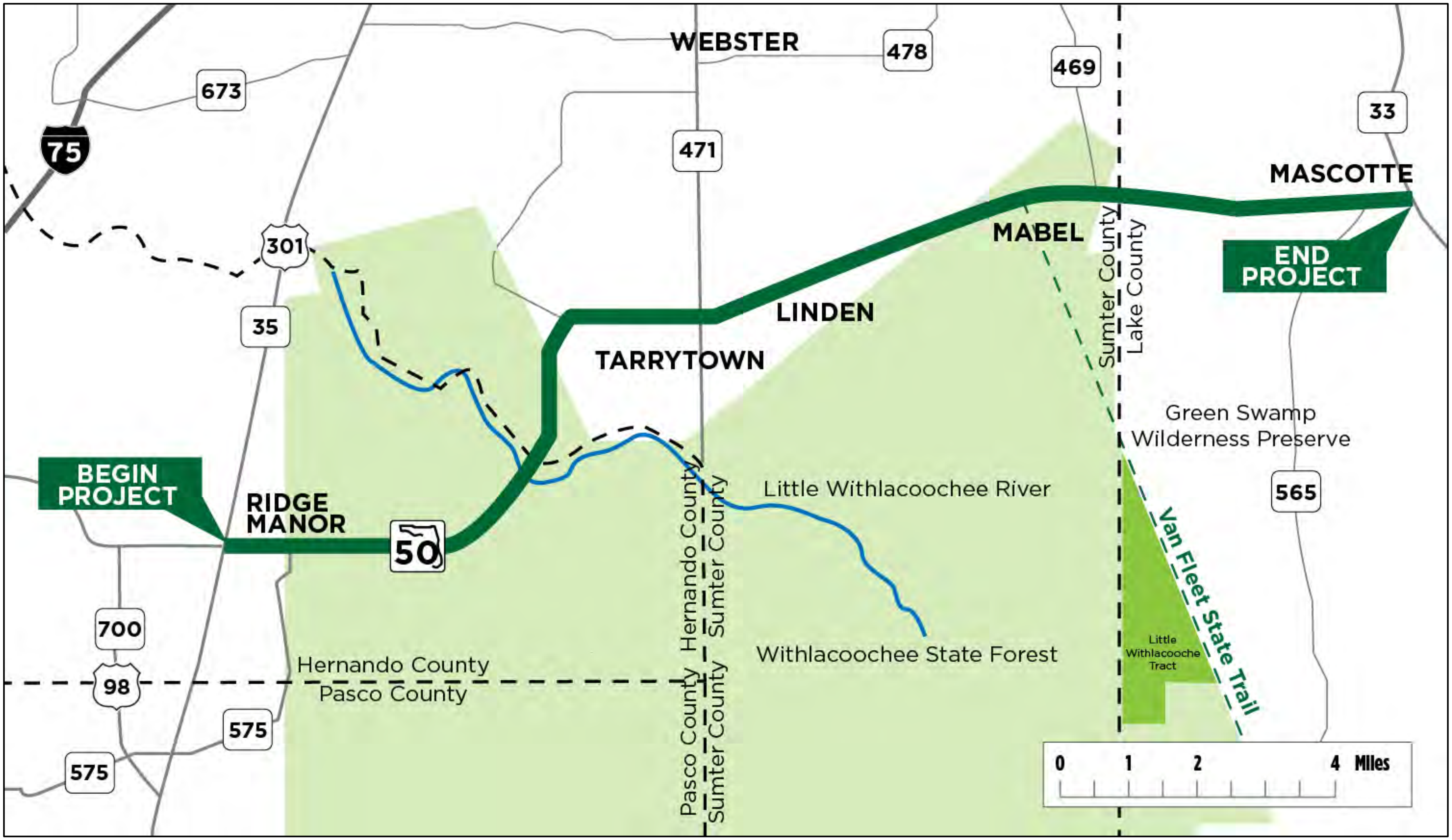
S.R. 50 is a principal arterial running east-west across the State of Florida, from S.R. 55 in Hernando County to U.S. 1 in Brevard County. Within the study area, S.R. 50 is primarily a two-lane undivided, rural principal arterial except for the eastern portion near the City of Mascotte, which is classified as an urban principal arterial. The transition from a rural principal arterial to an urban principal arterial occurs approximately 1.75 miles east of the Sumter/Lake County Line. The limits of the S.R. 50 PD&E Study span from U.S. 301 in Hernando County to C.R. 33 in Lake County, as displayed in **Figure 1**. S.R. 50 from I-75 to U.S. 27 is also designated as an Emerging Strategic Intermodal System (SIS) corridor. S.R. 50 is known as Cortez Boulevard in Hernando County and Myers Boulevard in the City of Mascotte.

1.2 Project Purpose and Need

The purpose of this proposed project is to increase capacity on the study segment of S.R. 50, as well as improve safety along the corridor. This project is part of a greater effort addressing existing and future congestion and delay, improving safety and traffic flow, and allowing the S.R. 50 corridor to operate at an improved level of service for all users. The corridor's context were also considered, and bicycle and pedestrian facilities were evaluated in urban areas.

The project's need is based on six primary factors: system linkage, roadway capacity, legislation/plan consistency, modal interrelationships, safety, and hurricane evacuation. The following summarizes the project's need based on these primary factors.

Figure 1: Study Corridor



- *System Linkage* – S.R. 50 is an east-west facility connecting Brooksville with Clermont and the Orlando Metro area. It is the only regional east-west connection serving Hernando County. It serves regional distribution centers for movement of goods by truck as well as aggregate mining operations located along the study corridor. S.R. 50 is a four/six-lane roadway from U.S. 19/S.R. 55/Commercial Way to U.S. 98/McKethan Road, with the two-lane portion from U.S. 98/McKethan Road to U.S. 301 programmed to be widened to four-lanes. S.R. 50 is also a four and six-lane roadway from CR 33 east to Titusville. The 20-mile S.R. 50 study limits are the only portion of S.R. 50 with no programmed construction funding for widening to four lanes.
- *Roadway Capacity* – This S.R. 50 segment is currently operating at an acceptable level of service (LOS) (LOS C and D) with an Annual Average Daily Traffic (AADT) ranging between 7,200 and 15,500, as shown in **Table 1**. The target LOS is D within the urban area and LOS C outside the urban area. The projected future year 2045 LOS is expected to exceed the target LOS in both the corridor's rural and urban segments. Within the project's rural portions, the 2045 AADT ranges between 15,500 to 19,700 resulting in LOS E. The target LOS C service volume threshold of 8,400 daily vehicles is expected to be reached by approximately year 2025 for the project's rural portions. For the urban areas, a projected 2045 volume of 30,500 AADT will result in a LOS E.

Table 1: S.R. 50 2017 and 2045 AADT and LOS

S.R. 50 Segment	No. of Lanes	2017 AADT	2017 LOS[1]	2045 AADT	2045 LOS[1]
U.S. 301 to C.R. 757	2	7,200	C	15,500	E
C.R. 757 to Tuscanooga Road	2	8,900	D	19,700	E
Tuscanooga Road to C.R. 33	2	15,500	D	30,500	E

[1] Displayed LOS is for worst peak hour (AM/PM) and peak direction (EB/WB).

- *Legislation/Plan Consistency* – FDOT District 7 has funded the Preliminary Engineering (FY 2018), Right-of-Way (ROW) (FY 2018), and Construction (FY 2019) phases for the two- to four-lane widening of S.R. 50 from U.S. 98/McKethan Road to U.S. 301. FDOT District 7 has also funded the Preliminary Engineering (FY 2018) phase for the two- to four-lane widening of S.R. 50 from U.S. 301 to the Hernando/Sumter County Line. The Hernando/Citrus Metropolitan Planning Organization (MPO) identifies a two- to four-lane widening of S.R. 50 from U.S. 301 to the Sumter County line as an unfunded need in their 2040 Long Range Transportation Plan (LRTP). The S.R. 50 widening project is the number 5 project in the Hernando County MPO Priority Project List. Improvements to S.R. 50 from the Hernando/Sumter County line to C.R. 33 is an unfunded need in the adopted Lake-Sumter MPO 2040 LRTP Needs Plan. The S.R. 50 widening project is the number 16 project in the Lake-Sumter MPO Priority Project List. FDOT District 5 funded the Preliminary Engineering phase in FY 2018 for the two- to four-lane widening of S.R. 50 from the Hernando/Sumter County Line to C.R. 33. FDOT District 5 has not identified ROW or construction funding for the two- to four-lane widening of S.R. 50 from U.S. 301 to C.R. 33.

- *Modal Interrelationships* –
    - Within the City of Mascotte, sidewalk is intermittently present. Due to the uninterrupted flow conditions west of C.R. 33, no marked pedestrian crossings are currently provided across S.R. 50 to serve the elementary school on the study corridor's south side. Throughout the corridor, bicycles are served on the 4' paved shoulder.
    - A 10' shared-use path is planned within the Hernando County portion of the project, from U.S. 301 to the Sumter County Line. The South Sumter Connector Trail portion of the Coast-to-Coast Trail, from S.R. 471 to the Van Fleet Trailhead, is planned to be in the S.R. 50 ROW with a 12' shared-use path. At S.R. 471, the South Sumter Connector Trail may head north toward Webster out of the project area or may extend west along S.R. 50 from S.R. 471 to the Hernando/Sumter County Line. The study includes coordinated planning for S.R. 50 improvements to be compatible with implementation of the Coast-to-Coast Trail within the same corridor. The specific alignment is still to be determined by the South Sumter Connector Trail PD&E Study. Upon further discussions with FDOT, there is a possibility the Coast-to-Coast Trail may extend within S.R. 50 ROW east of the Van Fleet Trailhead into Mascotte and connect to the South Lake Trail.
- *Safety* –
    - A total of 189 crashes were reported during the period between 2011 and 2015, 98 resulted in injury and 11 resulted in at least one fatality (12 total fatalities). Due to the length of the corridor, crash types and trends varied by sub-segment, but fatal crashes were distributed throughout most of the corridor. By widening from a two-lane undivided roadway to a four-lane divided roadway, crashes may be reduced by up to 50 percent based on the Highway Safety Manual analysis performed for the study corridor. Many parts of SR 50 have high safety ratios for one or more years as compared to statewide and district wide averages for similar roadways.
    - S.R. 50 from Tuscanooga Road to C.R. 33 was the only high crash segment along the study corridor, accounting for 21 of the 189 crashes (11 percent) with 10 crashes resulting in at least one injury.
    - Three high crash intersections were identified along the study corridor. The intersection of S.R. 50 at U.S. 301 accounted for 25 of the 189 crashes (13 percent) along the study corridor, with 12 crashes resulting in at least one injury. S.R. 50 at S.R. 471 accounted for 11 of the 189 crashes (6 percent) along the study corridor, with six crashes resulting in at least one injury. S.R. 50 at Tuscanooga Road accounted for five of the 189 crashes (3 percent) along the study corridor, with one crash resulting in a fatality and two crashes resulting in at least one injury.
- *Emergency Evacuation* – S.R. 50 within the project limits is a designated evacuation route. A possible expansion and enhanced traffic flow of this S.R. 50 section will enhance the hurricane and emergency evacuation capabilities in Hernando, Sumter, and Lake Counties.

1.3 COMMITMENTS

The FDOT has included the following commitments for the S.R. 50 PD&E Study:

- Conduct sand skink coverboard surveys in suitable sand skink habitat per US Fish and Wildlife Service (USFWS) protocol;
- Implement the Standard Protection Measures for the Eastern Indigo Snake during project construction;
- Continue to evaluate the inclusion of wildlife crossings and/or habitat connectivity enhancements during design; and
- FDOT will adhere to the stipulations included in the 2019 Memorandum of Agreement between FDOT and SHPO.

1.4 DESCRIPTION OF PREFERRED BUILD ALTERNATIVE

The preferred alternative will widen S.R. 50 from two to four lanes from U.S. 301 to C.R. 33. Two different, typical sections are present along the corridor:

- U.S. 301 to Lee Road (17.34 miles) –
  - Two-lane to four-lane rural widening alternative.
- Lee Road to C.R. 33 (2.54 miles) –
  - Two-lane to four-lane urban widening alternative.

The rural four-lane widening, from U.S. 301 to the Hernando/Sumter County Line, utilizes/resurfaces the existing S.R. 50 lanes as the new westbound lanes and constructs two new lanes for eastbound traffic. For the existing S.R. 50 lanes, the cross slope will remain the same and the inside travel lane will drain into the median. This is the predominate typical section between U.S. 301 and the Hernando/Sumter County Line and is shown as **Figure 2**. During Value Engineering, a bridge over the CSX railroad tracks, 0.75 miles east of U.S. 301, was recommended for review. Based on engineering review and discussions with FDOT District 7, a bridge over the railroad tracks is proposed as part of the preferred widening concept. The S.R. 50 typical section from U.S. 301 to the railroad bridge has a maximum proposed 374.44' ROW width to account for the railroad bridge approach embankment, a railroad access road and an offsite drainage conveyance ditch. This typical section is shown as **Figure 4**. The bridge over the railroad is shown in **Figure 3** and will have the shared use path connected to the south side of the eastbound bridge. Currently, the S.R. 50 typical section from the railroad bridge to the Sumter County Line has a 200' ROW width and no ROW acquisition is needed, except for the railroad approaches, the two proposed stormwater retention ponds and floodplain compensation areas. A 10' asphalt shared-use path on the roadway's south side will also be constructed, which was a suggestion from the Alternatives Public Meeting.

The rural widening pavement match, from the Hernando/Sumter County Line to Lee Road, utilizes/resurfaces the existing S.R. 50 lanes and constructs two new lanes for approximately 4.6 miles of the 12.3-mile section. The remaining 7.7 miles consists of a full rebuild of S.R. 50 from a two-lane to a four-lane facility. These 7.7 miles include areas where the roadway profile should be raised because the groundwater/vertical base clearance requirements are not met, where the roadway needs to be reconstructed around curves or where the roadway needs new construction changes from eastbound lanes to westbound lanes to minimize ROW impacts. A 12’ asphalt shared-use path will also be constructed on the roadway’s south side, from the Hernando/Sumter County Line to Lee Road, to accommodate pedestrians and bicyclists. Within this typical section, the proposed ROW widths range from a minimum of 190’ to a maximum of 241’ where drainage conveyance ditches are provided on both sides. The typical sections for this 12.3-mile section vary considerably throughout and are best reviewed in the typical section package contained in **Appendix A**. Illustrative typical sections showing the minimum and maximum ROW and pavement match or full rebuild are shown in **Figure 5** and **Figure 6**. The existing Withlacoochee River Bridge will remain in place and serve as the new westbound travel lanes for S.R. 50. A new two-lane bridge across the Withlacoochee River will be constructed for the eastbound lanes. The 12’ shared-use path will be included on the south side of the new eastbound bridge. This bridge typical section is shown as **Figure 7**.

The urban widening from Lee Road to C.R. 33 includes a new four-lane roadway, adds curb and gutter, provides a raised median, and incorporates a 6’ sidewalk on the north side. A 12’ shared-use path will be constructed on the roadway’s south side to approximately 400’ west of Barry Avenue where it connects to the proposed South Lake Trail and departs the S.R. 50 corridor. East of Barry Avenue, a 6’ sidewalk will be incorporated to C.R. 33. Seven-foot buffered bicycle lanes will also be provided in this typical section. This S.R. 50 typical section falls within the urban service boundary and a majority is within the City of Mascotte. The proposed ROW widths range from a minimum of 112’ to a maximum of 174’ where drainage conveyance ditches are provided on both sides. **Figure 8** and **Figure 9** illustrate the typical sections requiring the minimum and maximum ROW with the shared use path. **Figure 10** illustrates the typical section with 6’ sidewalks on both sides. The urban four-lane section will connect to the existing urban four-lane section near C.R. 33.

Roundabouts are also preferred at the intersections of S.R. 471, C.R. 469, and Tuscanooga Road. The intersection concepts are shown within this report as **Figure 92**, **Figure 93**, and **Figure 94**. The C.R. 33 intersection is preferred to remain signalized and be shifted approximately 0.10 miles to the west.

The concept plans for the preferred alternative are provided in **Appendix B**.

Figure 2: Typical Section – U.S. 301 to Hernando/Sumter County Line (Minimum ROW)

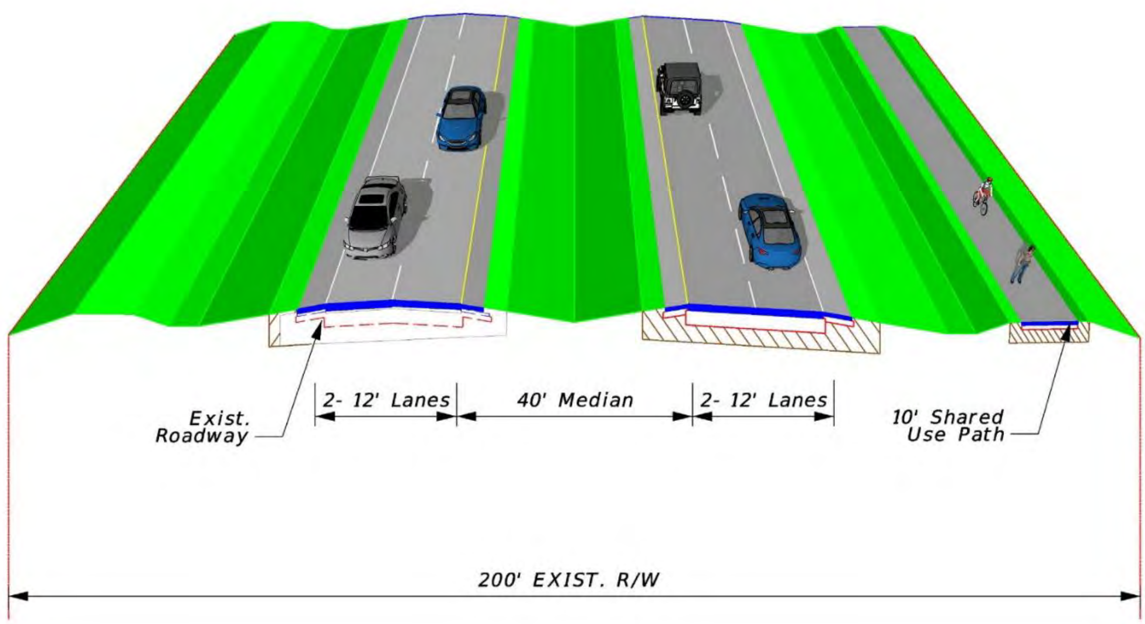


Figure 3: Typical Section – Railroad Overpass Bridges

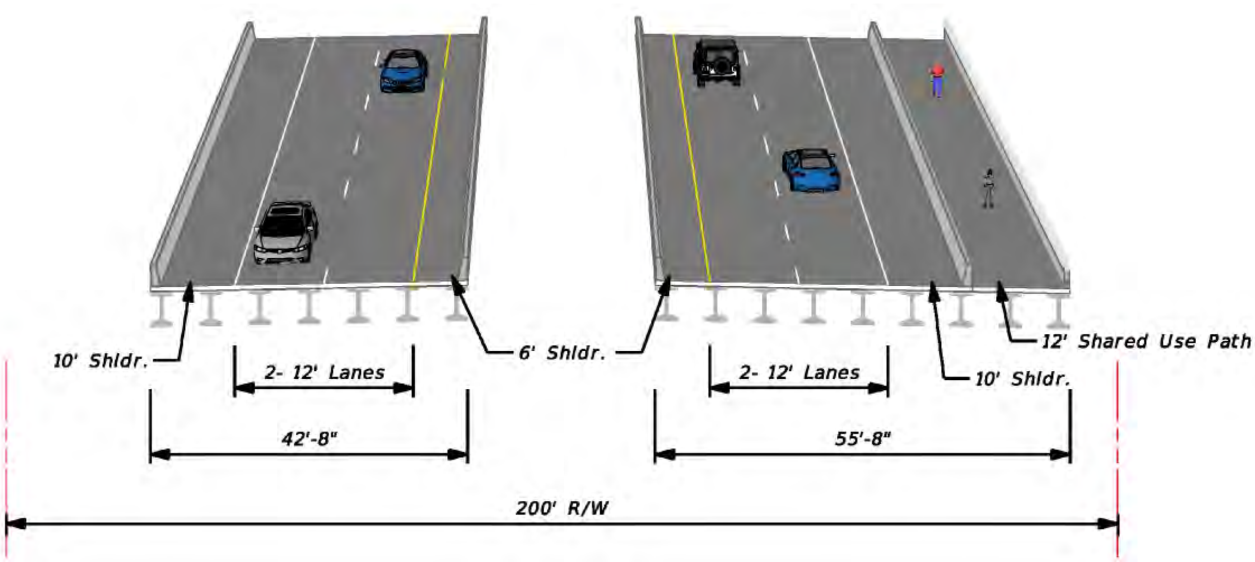


Figure 4: Typical Section – U.S. 301 to Hernando/Sumter County Line (Maximum ROW at Railroad Overpass Approach)

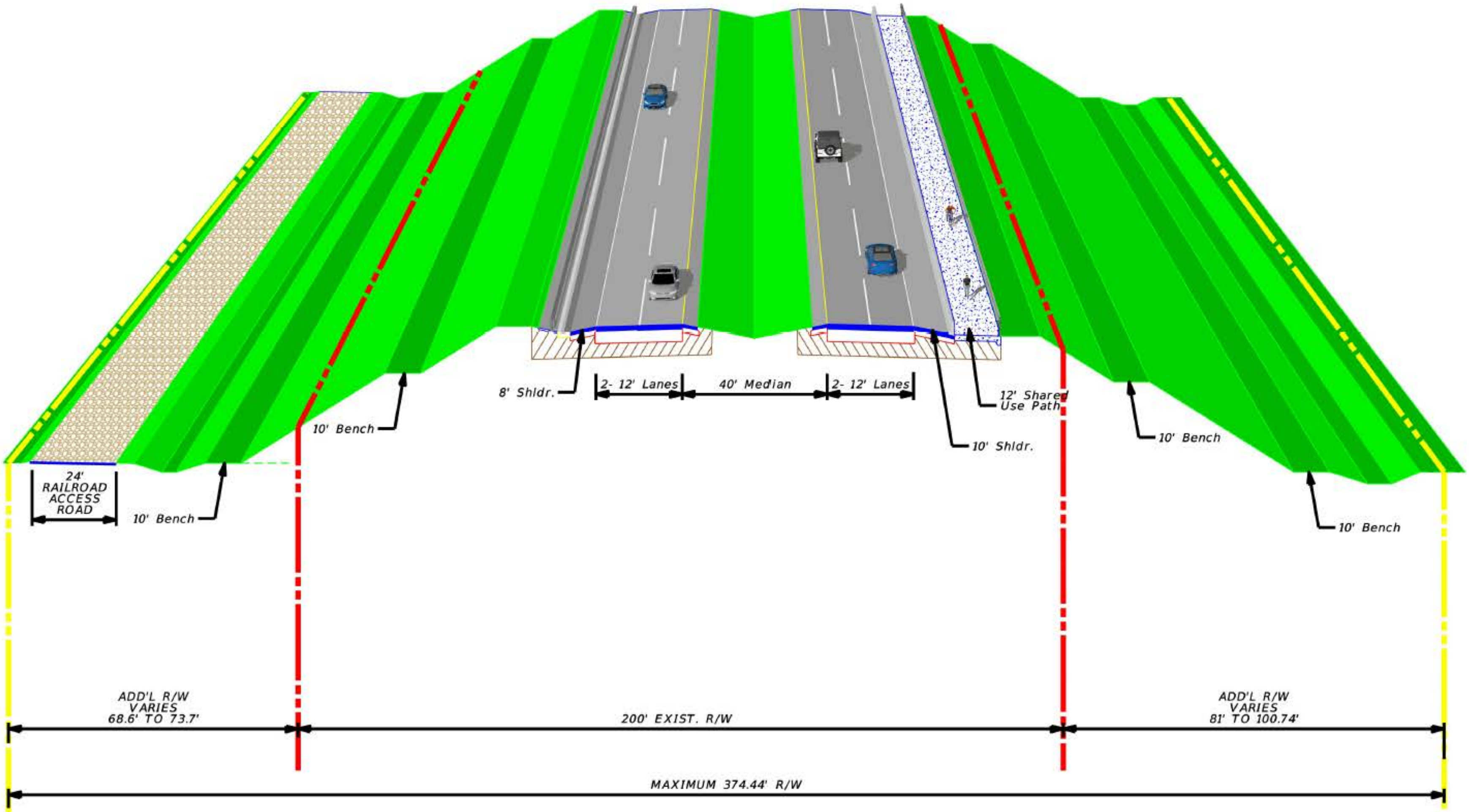


Figure 5: Typical Section – Hernando/Sumter County Line to Lee Road (Minimum ROW with Resurfacing Existing Roadway)

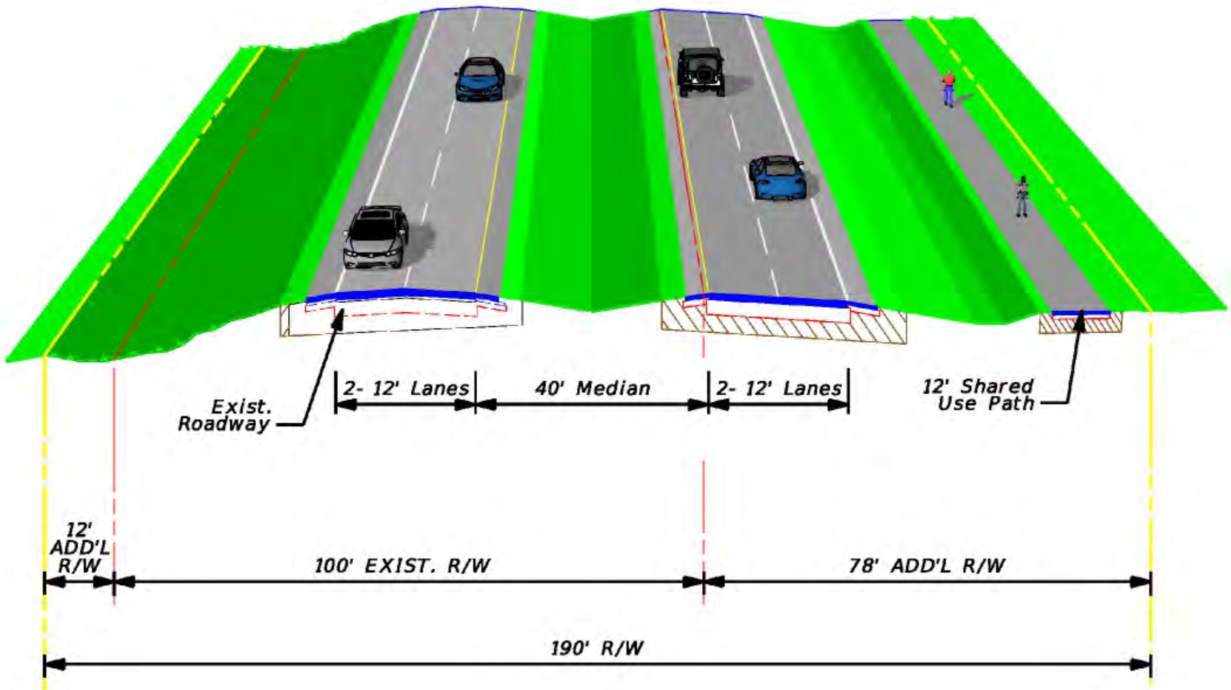


Figure 6: Typical Section – Hernando/Sumter County Line to Lee Road (Maximum ROW with New Construction and Drainage Conveyance Ditches)

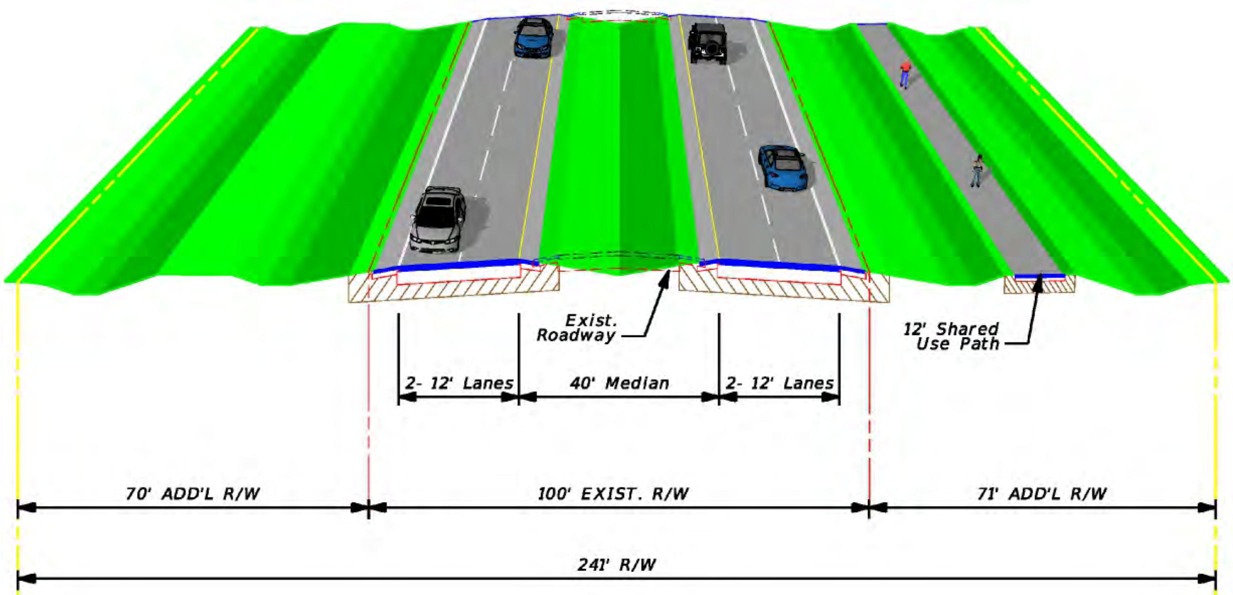


Figure 7: Typical Section – Hernando/Sumter County Line to Lee Road (Little Withlacoochee River Bridges)

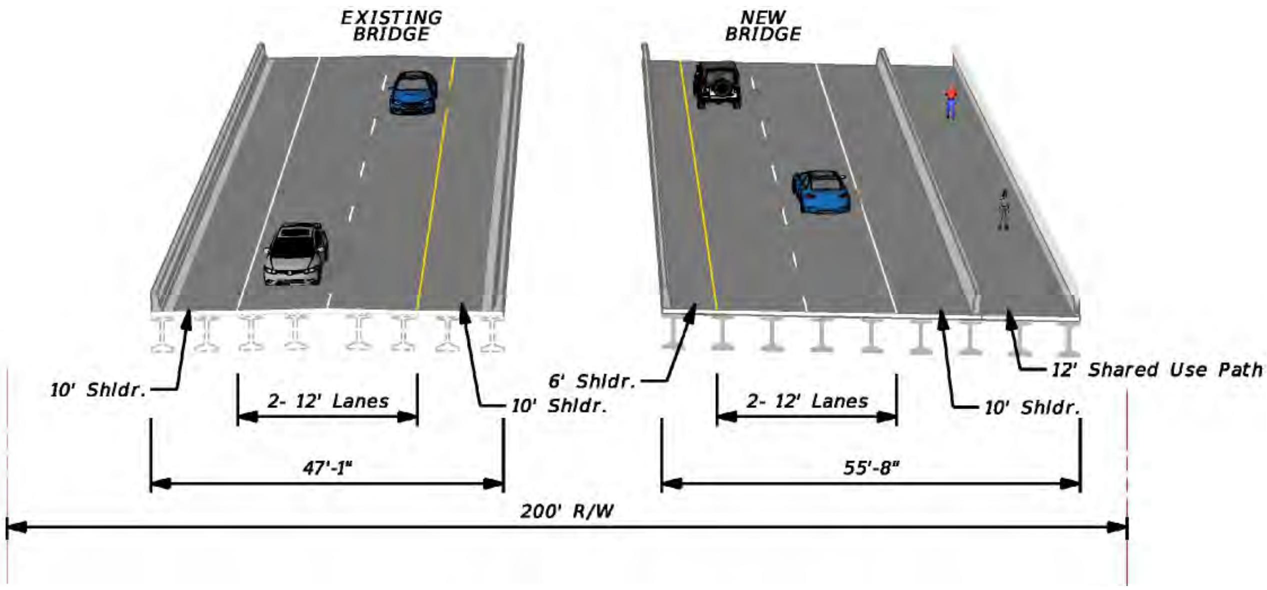


Figure 8: Typical Section – Lee Road to West of Barry Avenue (Minimum ROW)

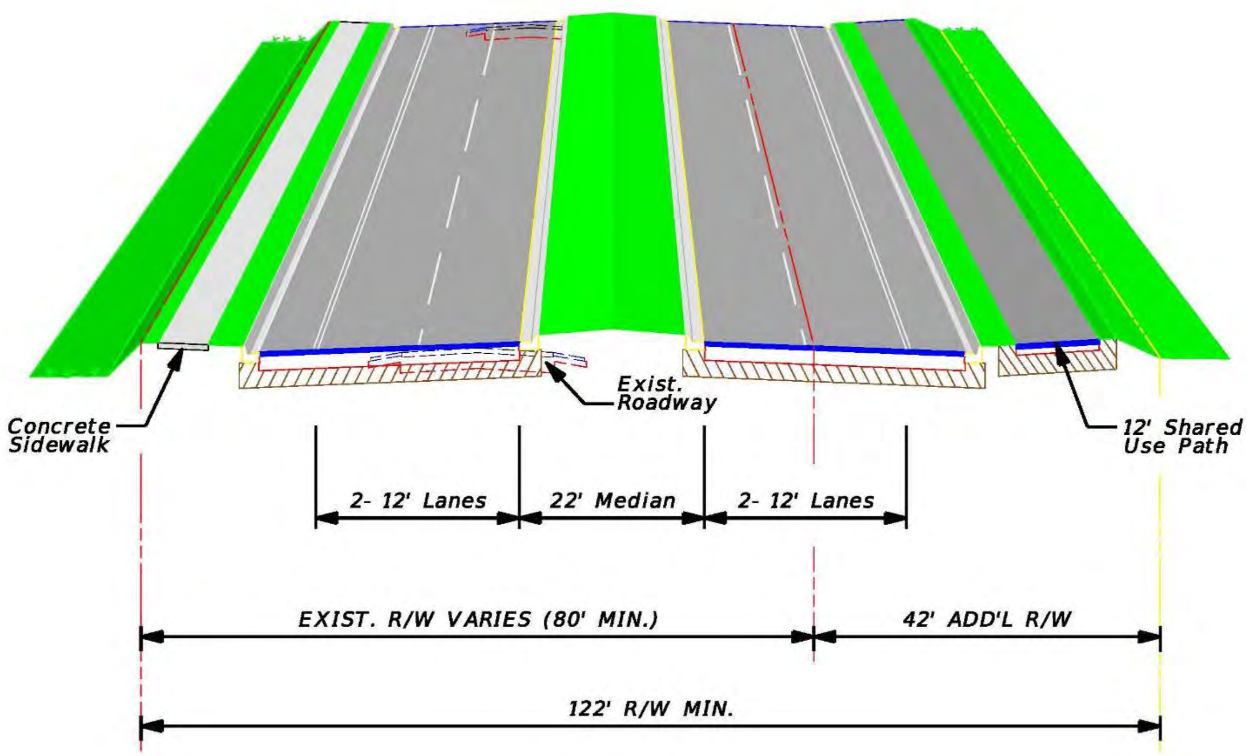


Figure 9: Typical Section – Lee Road to West of Barry Avenue (Maximum ROW with Drainage Conveyance Ditches)

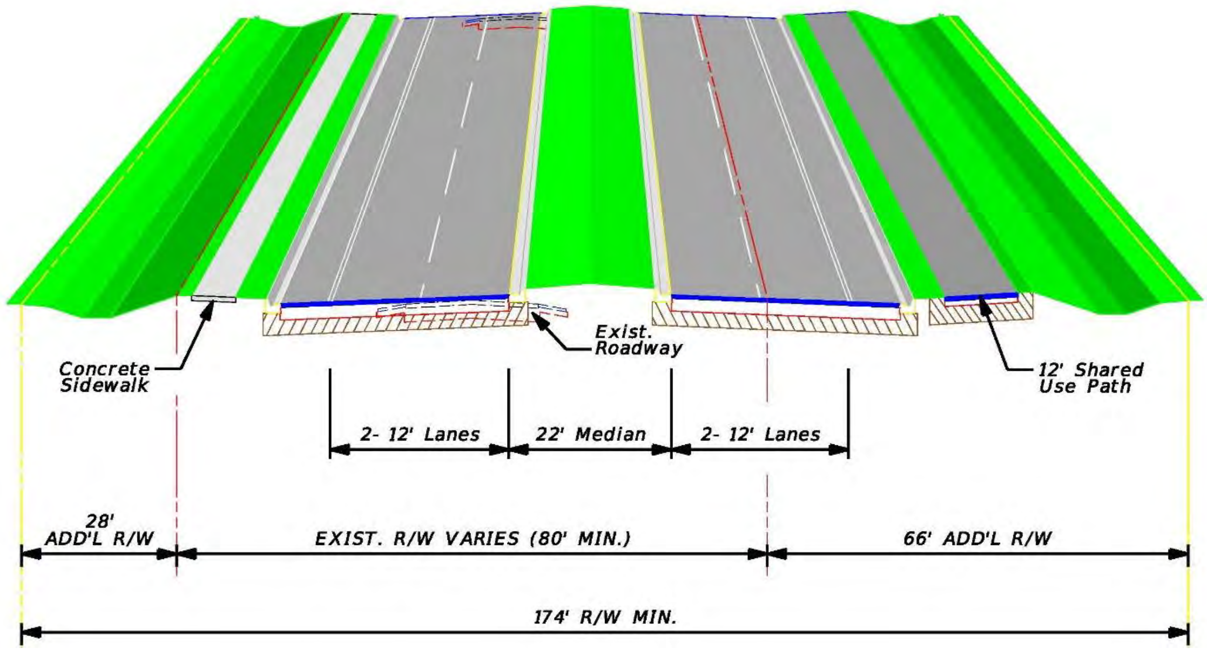
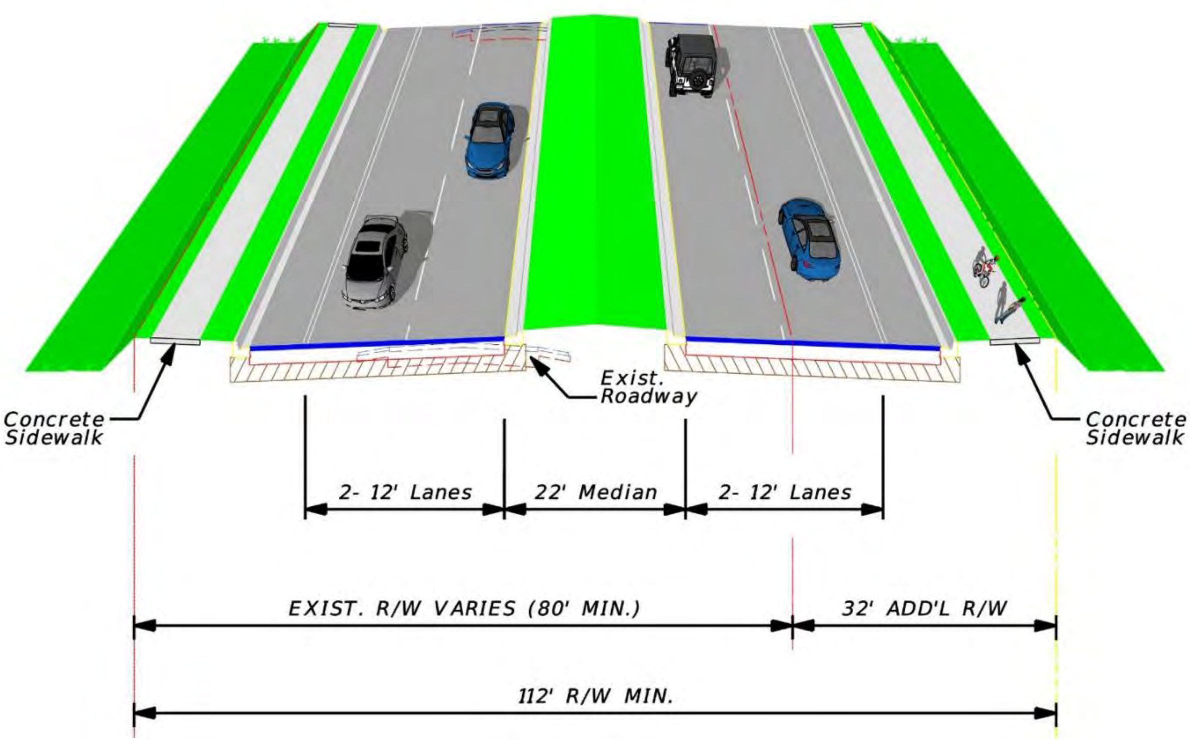


Figure 10: Typical Section – West of Barry Ave to C.R. 33



The S.R. 50 study corridor crosses FDOT District boundaries and, due to the project's overall 20-mile length, has been divided into the following four construction segments (FM 435859-1 is this PD&E study; thus the design segment numbering begins at 435859-2):

- Segment 2: U.S. 301 to the Hernando/Sumter County Line (4.78 miles);
- Segment 3: The Hernando/Sumter County Line to 0.13 miles west of C.R. 751 (2.78 miles);
- Segment 4: 0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road (8.21 miles); and
- Segment 5: 1,000' east of Sloans Ridge Road to C.R. 33 (3.98 miles).

Section 3.1 provides more detail on the construction segmentation. **Table 2** displays the project cost estimates for each of the segments for the preferred build alternative.

Table 2: Project Cost Estimates

Segment	Limits	Total Const. Cost	Utility Relocation Cost	ROW Cost	Total Project Cost
2	U.S. 301 to the Hernando/Sumter County Line	$53,726,862	$5,200,000	$3,456,000	$62,382,862
3	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	$19,446,860	$3,100,000	$4,311,000	$26,857,860
4	0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road	$46,779,529	$7,228,000	$20,088,000	$74,095,529
5	1,000' east of Sloans Ridge Road to C.R. 33	$27,018,876	$8,047,000	$31,539,500	$66,605,376
	Total	**$146,972,127**	**$23,575,000**	**$59,394,500**	**$229,941,627**

2. Existing Conditions

The purpose of the existing conditions analysis is to inform future improvement efforts by gaining an understanding of how the corridor performs today. The topics addressed in the existing conditions analysis include existing typical sections, ROW, roadway characteristics, traffic operations, safety, geotechnical information, and drainage information, among others.

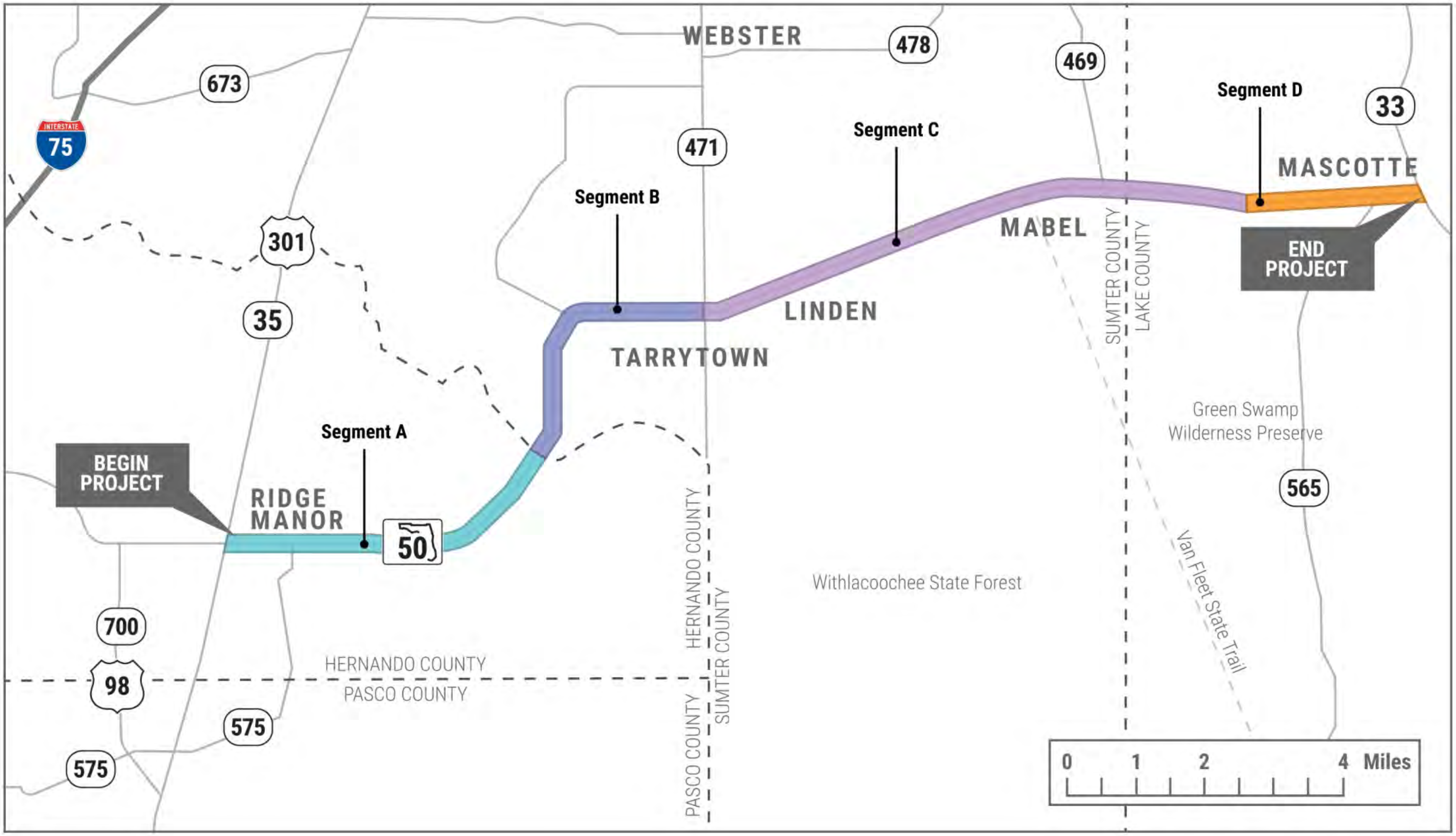
2.1 Study Corridor Segmentation

For the purposes of the existing and future alternatives analysis, the S.R. 50 study corridor has been divided into the following four study segments:

- Segment A: U.S. 301 to the Hernando/Sumter County Line (5.00 miles) –
    - The County Line is the dividing line between FDOT Districts 7 and 5.
- Segment B: The Hernando/Sumter County Line to S.R. 471 (4.17 miles) –
    - Higher traffic volumes were observed east of S.R. 471 than west.
- Segment C: S.R. 471 to Lee Road (8.17 miles) –
    - Lee Road is approximately where the Mascotte urban service boundary is located.
- Segment D: Lee Road to C.R. 33 (2.54 miles).

More detail regarding the study segmentation reasoning is provided in the report's Alternatives Analysis section. **Figure 11** displays the segmentation utilized for the existing conditions analysis.

Figure 11: Study Corridor Segmentation



2.2 SUMMARY OF FUNDED IMPROVEMENTS

This section summarizes the funded transportation-related projects located within a five-mile radius of the study corridor.

S.R. 50 Widening from U.S. 98/McKethan Road to U.S. 301

FDOT District 7 plans to widen the 1.5-mile section of S.R. 50 from U.S. 98/McKethan Road to U.S. 301 from two to four lanes. District 7 has funded the Preliminary Engineering (FY 2018), ROW (FY 2018), and Construction (FY 2019) phases for this two- to four-lane widening. As part of this project, a 10’ concrete sidewalk is being provided on the south side of S.R. 50. This concrete sidewalk will connect to the 10’ shared-use path planned for S.R. 50 from U.S. 301 to the Hernando/Sumter County Line on the eastern end.

Coast-to-Coast South Sumter Connector Trail

The South Sumter Connector Trail PD&E Study is currently underway to evaluate a multi-use trail between the Withlacoochee State Trail in Hernando County and the James A. Van Fleet Trail east Sumter/west Lake County (a figure displaying the potential alignment can be found in **Appendix C**). The trail’s proposed alignment is anticipated to run parallel to S.R. 50 on the south side, from S.R. 471 to the Van Fleet Trail, where it would connect to the South Lake Trail. An alternative for the Coast-to-Coast Trail alignment is being considered from U.S. 98 to S.R. 471.

South Lake Trail

The South Lake Trail, which is currently in the final design phase, is an 8-mile-long trail beginning at the Van Fleet Trail in Sumter County and ending at Villa City Road in Groveland, Lake County (a figure displaying the potential alignment can be found in **Appendix C**). Throughout the course of the S.R. 50 PD&E Study, coordination meetings were held with representatives working on the South Lake Trail study. Current plans have the trail running parallel to S.R. 50 on the south side from approximately ½ mile east of Sloan’s Ridge Road to approximately ¼ mile east of Lee Road. There is a possibility for the trail to be adjacent to S.R. 50 from the Van Fleet Trail to the vicinity of Lee Road, but this decision would be based upon FDOT’s ability to negotiate the purchase of the South Lake Trail ROW, as currently designed. The trail is proposed to have an elevated bridge crossing over S.R. 50 in Mascotte just west of Barry Avenue.

FDOT Five Year Work Program (2017 to 2021)

A review of the five-year work program (2017 to 2021) was performed to identify planned projects within a five-mile radius of the study corridor. **Table 3** through **Table 5** provides a summary of those projects by county.

Table 3: FDOT Five Year Work Program (2017 to 2021) Hernando County Projects

Roadway	Segment	Type of Work	Financial Management Number
I-75 (S.R. 93)	Pasco/Hernando County Line to North of U.S. 98/S.R. 50/Cortez Boulevard	Add Lanes & Reconstruct	411011-2
I-75 (S.R. 93)	North of S.R. 50 to Hernando/Sumter County Line	Add Lanes & Rehabilitate Pavement	411012-2
I-75 (S.R. 93)	Pasco/Hernando County Line to South of U.S. 98/S.R. 50	Landscaping	411011-7
S.R. 50	Lockhart Road to East of Remington Road	Add Lanes & Rehabilitate Pavement	430051-2
S.R. 50	Windmere Road/Bronson Boulevard to U.S. 98/McKethan Road	Add Lanes & Rehabilitate Pavement	416732-4
S.R. 50	U.S. 98/McKethan Road to U.S. 301	Add Lanes & Rehabilitate Pavement	416732-3
S.R. 50	U.S. 301 to Hernando/Sumter County Line	Preliminary Engineering	435859-2
S.R. 50	Brooksville Bypass to I-75	PD&E/EMO Study	430051-1

Table 4: FDOT Five Year Work Program (2017 to 2021) Sumter County Projects

Roadway	Segment	Type of Work	Financial Management Number
South Sumter Connector Trail	Withlacoochee State Trail to Van Fleet Trail	Bike Path/Trail	435471-1
S.R. 471	At C.R. 478	Intersection Improvement	422228-1
C.R. 478	U.S. 301 to West of S.R. 471	Widen/Resurface Existing Lanes	434403-1
S.R. 50	Hernando/Sumter County Line to C.R. 757	Preliminary Engineering	435859-3

Table 5: FDOT Five Year Work Program (2017 to 2021) Lake County Projects

Roadway	Segment	Type of Work	Financial Management Number
South Lake Trail Phase IIIB	S.R. 33 (Crittengen Street) to Silver Eagle Road	Bike Path/Trail	422570-3
S.R. 50	Sumter/Lake County Line to C.R. 33	Preliminary Engineering	435859-5
S.R. 50	North Bay Lake Avenue to Fiske Avenue	Drainage Improvements	434658-1
S.R. 50/S.R. 33	C.R. 565 (Villa City) to C.R. 565A (Montevista)	Future Capacity (New 4-Lane Road)	427056-1
S.R. 50	S.R. 33 to East of Lake Village Avenue	Resurfacing	430652-1

2.3 TRANSPORTATION PLAN REVIEW

This section summarizes the planned, but currently unfunded, cost feasible transportation-related projects located within a five-mile radius of the study corridor. The following sources were reviewed to identify projects:

1. FDOT State Transportation Improvement Program (STIP)
2. Hernando-Citrus 2040 Long Range Transportation Plan (LRTP)
3. Lake-Sumter 2040 LRTP
4. Hernando County Comprehensive Plan
5. Sumter County Comprehensive Plan
6. Lake County Comprehensive Plan

The Hernando County projects identified from the Hernando-Citrus 2040 LRTP and Hernando County Comprehensive Plan are displayed in **Table 6**.

Table 6: Planned Hernando County Projects

Roadway	Segment	Type of Work	Source
Dashbach Street	Kettering Road to Lockhart Road	New 2 Lane Roadway	Hernando-Citrus LRTP
Spine Road	Powerline Road to Dashbach Street	New 2 Lane Roadway	Hernando-Citrus LRTP
New Road C	Cortez Boulevard to Lockhart Road	New 2 Lane Roadway	Hernando-Citrus LRTP
Powerline Road	Lockhart Road to Kettering Road	New 2 Lane Roadway	Hernando-Citrus LRTP
S.R. 50	Brooksville Bypass to I-75	Widen to 4/6 Lanes	Hernando-Citrus LRTP
S.R. 50	Lockhart Road to East of Remington Road	Widen to 4/6 Lanes	Hernando-Citrus LRTP
S.R. 50	Lockhart Road to U.S. 98	Widen to 6 Lanes	Hernando-Citrus LRTP
S.R. 50	U.S. 98 to U.S. 301	Widen to 4 Lanes	Hernando-Citrus LRTP
S.R. 50	U.S. 301 to Burwell Road	Widen to 4 Lanes	Hernando-Citrus LRTP
Lockhart Road	Dashbach Street to Cortez Boulevard	Widen to 4 Lanes	Hernando-Citrus LRTP
I-75 (S.R. 93)	South of S.R. 50 to Hernando/Sumter County Line	Widen from 6 to 8 Lanes	Hernando-Citrus LRTP
S.R. 50	Frontage Road East of I-75	New Roadway Capacity	Hernando County Comprehensive Plan
Norman Street	N/A	Surface Treatment	Hernando County Comprehensive Plan
Shasta Street	N/A	Surface Treatment	Hernando County Comprehensive Plan

The Sumter and Lake County projects identified in the Lake-Sumter 2040 LRTP, Sumter County Comprehensive Plan, and Lake County Comprehensive Plan are displayed in **Table 7**.

Table 7: Planned Sumter and Lake County Projects

Roadway	Segment	Type of Work	Source
S.R. 50	Hernando County to C.R. 33	Corridor Improvements	Lake-Sumter LRTP
S.R. 19	S.R. 50 to C.R. 455	Widen from 2 to 4 Lanes	Lake-Sumter LRTP
C-478	U.S. 301 to S.R. 471	New Road Construction	Lake-Sumter LRTP
S.R. 471	At C.R. 528	Add Turn Lanes	Lake-Sumter LRTP
S.R. 471	South of Unnamed Canal to South of Little Withlacoochee River	Resurfacing	Lake-Sumter LRTP
South Lake Trail	Clermont Trail to Silver Eagle Drive	Bike Path/Trail	Lake-Sumter LRTP
South Lake Trail Phase IIIB	S.R. 33 (Crittengen Street) to Silver Eagle Road	Bike Path/Trail	Lake-Sumter LRTP
South Sumter Connector Trail S.R. 50	South Lake Trail to Withlacoochee Trail	Bike Path/Trail	Lake-Sumter LRTP
South Lake Trail Phase 4	Van Fleet Trail to Villa City Road (C.R. 565)	Bike Path/Trail	Lake-Sumter LRTP
C-469	C-48 to S.R. 50	Corridor Improvements	Sumter County Comprehensive Plan
S.R. 50	Hernando County Line to S.R. 471	Resurfacing	Sumter County Comprehensive Plan
C.R. 656 (Villa City Road)	Bible Camp Road to Simon Brown Road	Widen to 30’, Resurface	Lake County Comprehensive Plan

The projects identified in FDOT State Transportation Improvement Program (STIP) are displayed in **Table 8**.

Table 8: Planned Projects from FDOT STIP

Roadway	Segment	Type of Work	Financial Management Number
S.R. 50	U.S. 301 to C.R. 33	Corridor Planning	435859-1
South Lake Trail Phase 4	Van Fleet Trail to Villa City Road (C.R. 565)	Bike Path/Trail	435893-1
I-75	Pasco/Hernando County Line to S.R. 50	Add Lanes & Reconstruct	411011-2
I-75	South of S.R. 50 to North of S.R. 50	Add Lanes & Reconstruct	411011-4
I-75	Pasco/Hernando County Line to S.R. 50	Landscaping	411011-7
I-75	North of S.R. 50 to Hernando/Sumter County Line	Add Lanes & Rehabilitate Pavement	411012-2
I-75	North of S.R. 50 to Hernando/Sumter County Line	Landscaping	411012-5
S.R. 50	U.S. 98/McKethan Road to U.S. 301	Add Lanes & Rehabilitate Pavement	416732-3

Table 8 Cont.: Planned Projects from FDOT STIP

Roadway	Segment	Type of Work	Financial Management Number
S.R. 50	Brooksville Bypass to I-75	PD&E/EMO Study	430051-1
S.R. 50	Lockhart Road to East of Remington Road	Add Lanes & Rehabilitate Pavement	430051-2
S.R. 50	U.S. 301 to Hernando/Sumter County Line	Preliminary Engineering	435859-2
S.R. 50	Sumter County Line to C.R. 33	Resurfacing	423346-1
S.R. 50	Villa City Road (C.R. 565) to Monte Vista Road	Preliminary Engineering for Future Capacity	427056-1
S.R. 50	S.R. 33 to East of Lake Village Avenue	Resurfacing	430652-1
S.R. 50	North Bay Lake Avenue to Fiske Avenue	Drainage Improvements	434658-1
S.R. 50	Sumter/Lake County Line to C.R. 33	Preliminary Engineering	435859-5
South Lake Trail Phase IIIB	S.R. 33 (Crittengen Street) to Silver Eagle Road	Bike Path/Trail	422570-3
S.R. 471	At C.R. 478	Intersection Improvement	422228-1
S.R. 50	Bridge #180021 over Abandoned Railroad	Bridge Demolition	424524-1
C.R. 478	U.S. 301 to West of S.R. 471	Widen/Resurface Existing Lanes	434403-1
S.R. 471	South of Unnamed Canal to South of Little Withlacoochee River	Resurfacing	435662-1
S.R. 50	Hernando/Sumter County Line to West of C.R. 757	Preliminary Engineering	435859-3
S.R. 471	Bridge #180023 over Withlacoochee River	Bridge-Repair/Rehabilitation	439271-1
C.R. 478	U.S. 301 to C.R. 734	Safety Project	439912-1
South Sumter Connector Trail	Withlacoochee State Trail to Van Fleet Trail	Bike Path/Trail	435471-1

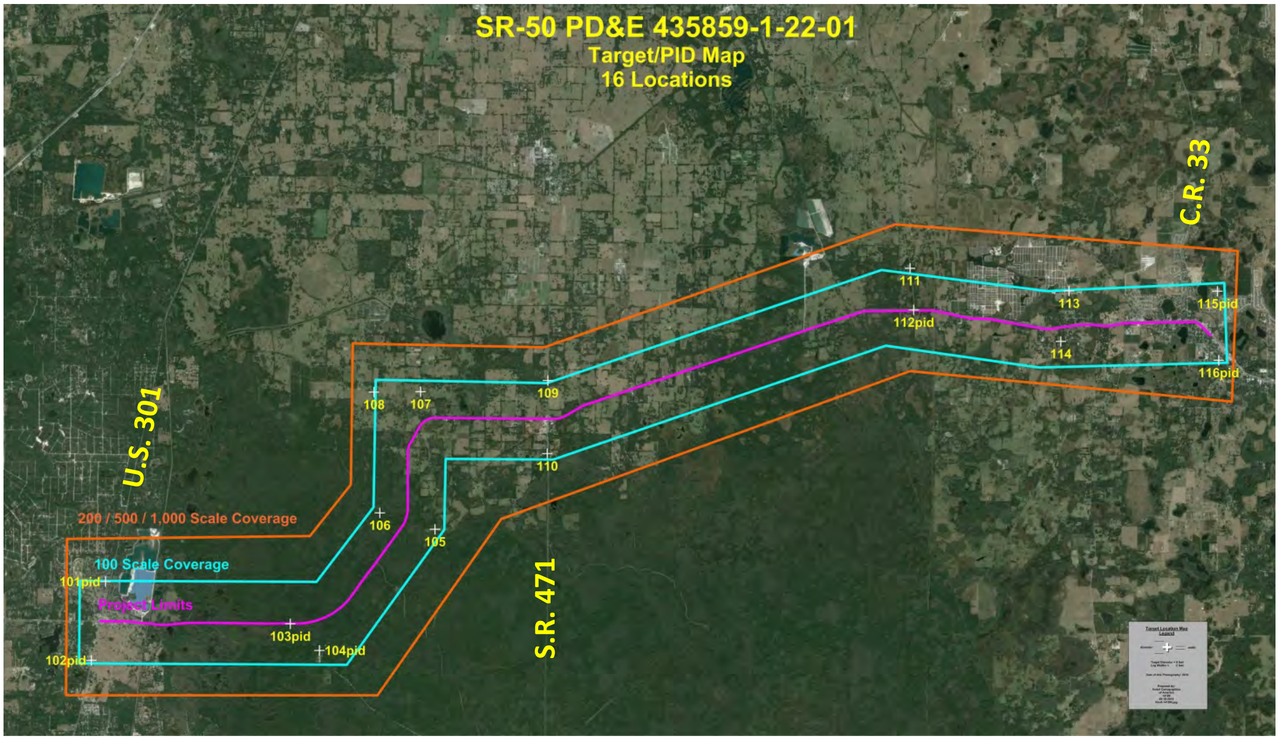
2.4 SURVEY

The study area was targeted in January 2017 and the project aerials were flown the same month. For this study, aerial photography was prepared for the following uses at the following scales:

- Overall Project Location Map – 1”=1,000’
- Drainage Map – 1”=500’
- Corridor Maps – 1”=200’
- Concept Plans – 1”=100’

Figure 12 displays the targeting locations for each of the above aerial map types. These targets were surveyed using SP NAD83 East datum for northern and easting coordinates. No horizontal survey was conducted. One-foot contours in electronic format were obtained from the respective Water Management Districts for use in this project.

Figure 12: S.R. 50 Aerial Targeting Locations



2.5 ROADWAY CHARACTERISTICS

Within the study area, S.R. 50 is primarily a two-lane undivided, rural principal arterial, except for the eastern portion near the City of Mascotte classified as an urban principal arterial. S.R. 50 from I-75 to U.S. 27 is also designated as an Emerging Strategic Intermodal System (SIS) corridor. From U.S. 301 to S.R. 471, S.R. 50 is primarily a context class C2 Rural corridor with approximately 6.3 miles of C1 Natural through the Withlacoochee State Forest. From S.R. 471 to Lee Road, S.R. 50 has the C2 Rural context classification, and from Lee Road to C.R. 33 the S.R. 50 context classification is C4 Urban General. Within the project limits of this study, S.R. 50 has the geometric characteristics summarized in **Table 9**. Aerial and street view imagery taken in 2017, along with FDOT straight line diagrams (SLDs) and the 2015 Florida Transportation Information (FTI) DVD, were utilized to determine the summarized characteristics.

Table 9: Existing Roadway Characteristics Summary

Characteristic	Roadway Segment			
	Segment A – S.R. 50 from U.S. 301 to Hernando/Sumter CL	Segment B – S.R. 50 from Hernando/Sumter CL to S.R. 471	Segment C – S.R. 50 from S.R. 471 to Lee Road	Segment D – S.R. 50 from Lee Road to C.R. 33/Bluff Lake Road
Location	M.P. 8.543 – 9.519 M.P. 2.049 – 6.041	M.P. 0.000 – 4.210	M.P. 0.000 – 6.421 M.P. 0.000 – 1.757	M.P. 1.757– 4.293
FDOT Roadway ID	08070000 & 08060000	18030000	18020000 & 11070000	11070000
Functional Classification	Rural Principal Arterial	Rural Principal Arterial	Rural Principal Arterial	Urban Principal Arterial
Context Classification	C2 – Rural / C1 Natural (only through State Forest from MP 2.049 to 6.041	C2 – Rural / C1 Natural (only through State Forest from MP 0.000 to 1.289	C2 – Rural	C4 – Urban General
SIS Designation	Emerging SIS	Emerging SIS	Emerging SIS	Emerging SIS
Speed Limit	55 – 60 MPH	45 – 60 MPH	45 – 55 MPH	35 – 55 MPH
Lane Width	12‘	12‘	12‘	12‘
Shoulder Width	4‘, paved	4‘, paved	4‘, paved	Varies (None, 4’ and 5‘ paved)
Median	None	None	None	Varies (None and 14’ TWLTL E of Bay Lake)
Access Classification	4	4	4	4
Passing Zones	Approximately 75% of roadway allows EB/WB passing	Approximately 50% of roadway allows EB/WB passing	Approximately 50% of roadway allows EB/WB passing	No passing is allowed EB/WB
Curb and Gutter	None	None	None	Varies (None and Type F)
Sidewalks	None	None	None	Varies (None and Present)
Bike Lanes	None – 4’, paved shoulder provided	None – 4’, paved shoulder provided	None – 4’, paved shoulder provided	None – 4’ or 5’, paved shoulder provided
Street Lighting	None	None	None	Varies (None and Present)

2.6 EXISTING RIGHT-OF-WAY

Table 10 provides a detailed overview of the existing ROW present along the S.R. 50 study corridor.

Table 10: Existing ROW Summary

From	To	Stationing	ROW Width (Feet)
U.S. 301	Hernando/Sumter County Line	1825+45 to 2089+02	200
Hernando/Sumter County Line	C.R. 773	2089+02 to 274+00	100
C.R. 773	500’ East of the Van Fleet Trail	274+00 to 290+00	150
500’ East of the Van Fleet Trail	1,150’ East of the Van Fleet Trail	290+00 to 296+50	225
1,150’ East of the Van Fleet Trail	1,750’ East of the Van Fleet Trail	296+50 to 302+50	125
1,750’ East of the Van Fleet Trail	700’ West of C.R. 469	302+50 to 334+00	150
700’ West of C.R. 469	1,000’ East of C.R. 469	334+00 to 351+00	125
1,000’ East of C.R. 469	Bay Lake Road	351+00 to 551+00	100
Bay Lake Road	Hickory Avenue	551+00 to 577+00	80
Hickory Avenue	C.R. 33	577+00 to 583+29	105

2.7 EXISTING TYPICAL SECTIONS

Generally, the S.R. 50 corridor is a two-lane undivided roadway with 12’ wide travel lanes and 4’ paved shoulders. S.R. 50 has an open drainage system with swales directly adjacent to the roadway in most locations. Grass is approximately 10’-20’ wide from the edge of the paved shoulder. Trees are located beyond the grass to the ROW line. Many locations do not meet clear zone requirements for posted speeds of 55 and 60 miles per hour (MPH) requiring clear zones of 30’ and 36’ respectively. Intermittent sidewalk is present within the Mascotte city limits and no formal bicycle facilities are present beyond the 4’ paved shoulders. **Figure 13** displays the existing typical section for S.R. 50 from U.S. 301 to the Hernando/Sumter County Line. **Figure 14** displays the existing typical section for S.R. 50 from the Hernando/Sumter County Line to C.R. 33.

Figure 13: Existing S.R. 50 Typical Section – U.S. 301 to Hernando/Sumter County Line

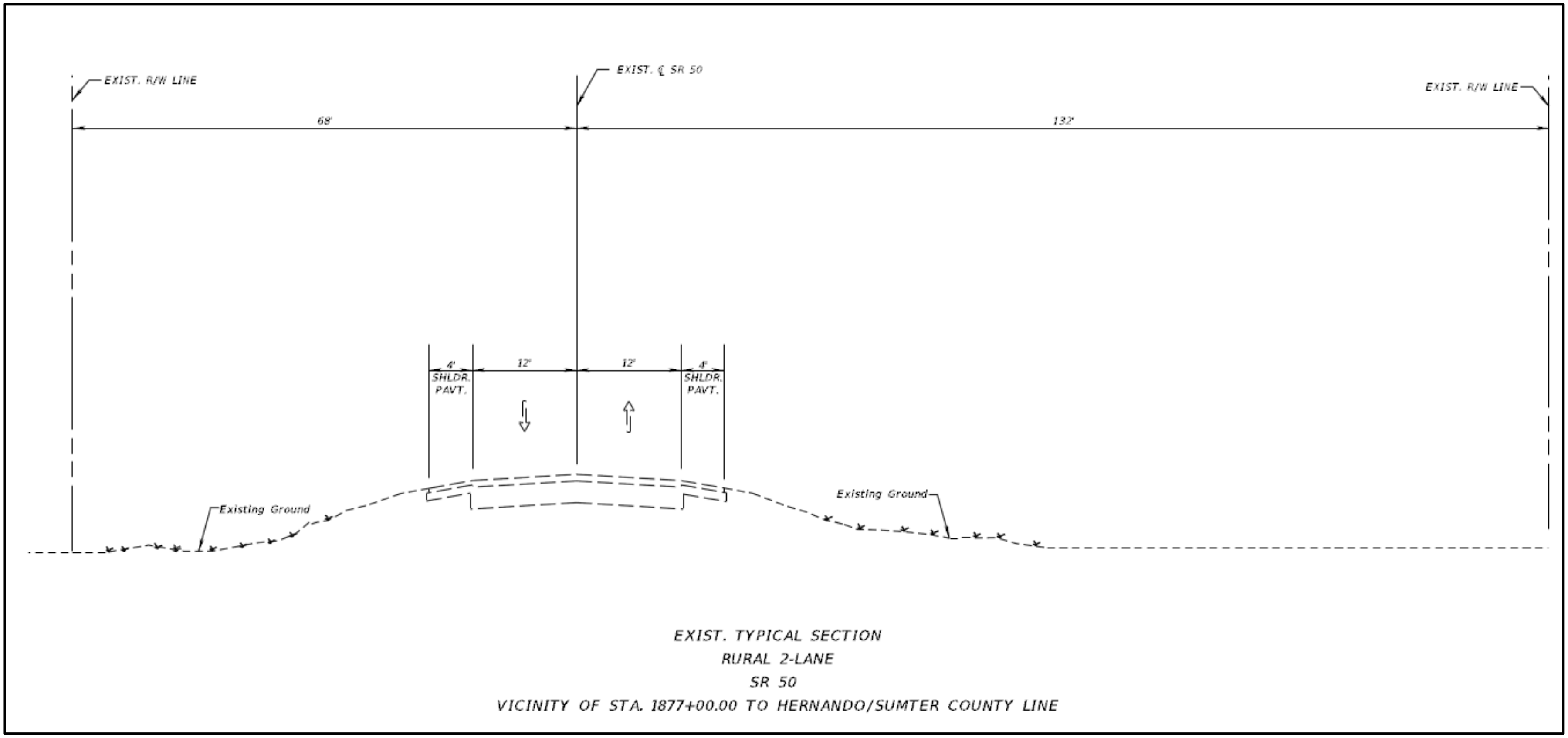
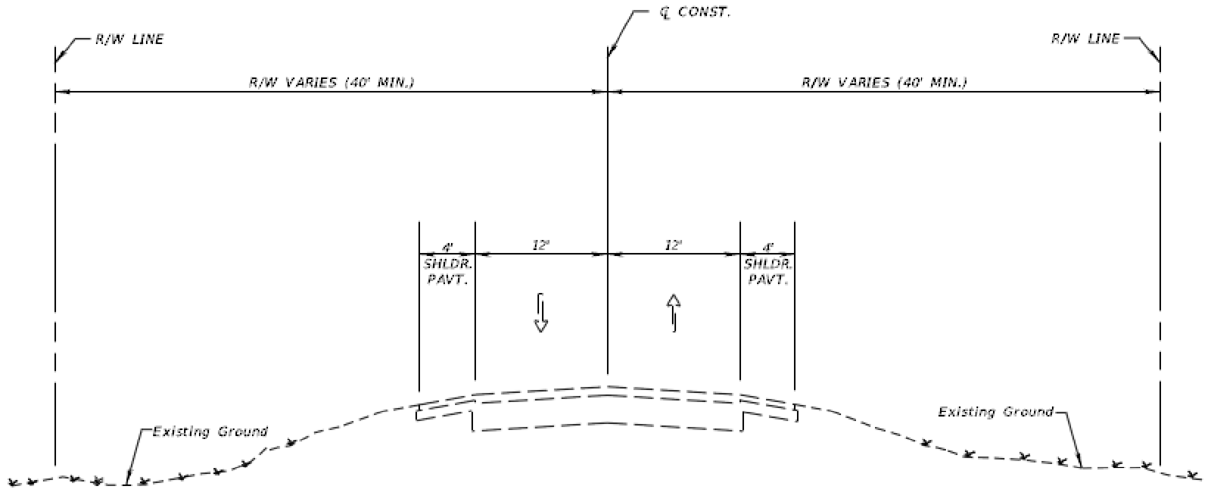


Figure 14: Existing S.R. 50 Typical Section – Hernando/Sumter County Line to C.R. 33



EXIST. TYPICAL SECTION
RURAL 2-LANE
SR 50
STA. 2018+54.00 TO STA. 451+00.00
STATION EQUATIONS:
STA. 2090+19.60 BK = STA. 41+91.22 AH
STA 260+71.84 BK = STA. 19+00.00 AH

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

2.8 Bicycle and Pedestrian Facilities

As noted in **Table 9** and Section 2.7, no formal bicycle facilities are present beyond the 4’ paved shoulders which is 1’ smaller than the 5’ paved shoulder needed for rural roadways. Intermittent sidewalk is present within the Mascotte city limits at the following locations:

- Along the S.R. 50 north side from 350’ west of Palmwood Avenue to Tuscanooga Road;
- Along the S.R. 50 south side from Tuscanooga Road to Bay Lake Avenue; and
- Along the S.R. 50 north and south sides from Bay Lake Avenue to C.R. 33.

As discussed in Section 2.2, two shared-use paths are being considered. The shared-use paths would parallel S.R. 50 on the south side of the roadway within the project limits and connect near the Van Fleet Trail. Please see Section 6.5 for information regarding proposed pedestrian facilities.

2.9 Transit Considerations

Currently no fixed-route transit operates along S.R. 50 within Hernando or Sumter County. Within Lake County, the Lake Express Route 50 West operates from the Mascotte Civic Center east into Clermont on one-hour headways. The Mascotte Civic Center functions as a park and ride lot with 10 spaces. There are no other bus stops within the study limits.

2.10 Horizontal Alignment

Horizontal curve data was obtained from as-built and ROW maps from past projects. Eighteen curves exist within the study area along S.R. 50 between U.S. 301 and C.R. 33, as displayed in **Figure 15**. Two specific curves (CL 26 & CL 27) do not meet FDOT minimum standards for curve radii based on posted speed and superelevation (SE). Curve 26 is located approximately 1.6 miles north of the Little Withlacoochee River Bridge and approximately 0.33 miles south of C.R. 757. Curve 27 is located just east of C.R. 757 and approximately 1.80 miles west of the S.R. 50/S.R. 471 intersection. Both curves have radii of 1,433’ (3.9925-degree curve). FDOT minimum curve standards are based upon a max SE of 10 percent, and according to the 2018 *FDOT Design Manual (FDM)* Table 210.9.1, neither of these curves meet current design standards for their existing SE rates. For current posted speeds of 60 MPH, Curve 26 (SE = 6.30 percent) would need its radius increased to 2,445’ or its SE increased to 9.30 percent. Curve 27 (SE = 7.30 percent) would need its radius increased to 2,035’ or its SE increased to 9.30 percent. Both curves have curve warning signs with a supplemental 55 MPH speed sign, even though the existing curve radii and SE do not meet the 55 MPH design guidance. Data for all existing curves can be seen in **Table 11** through **Table 13**.

Figure 15: Existing Horizontal Curve Locations along Study Corridor

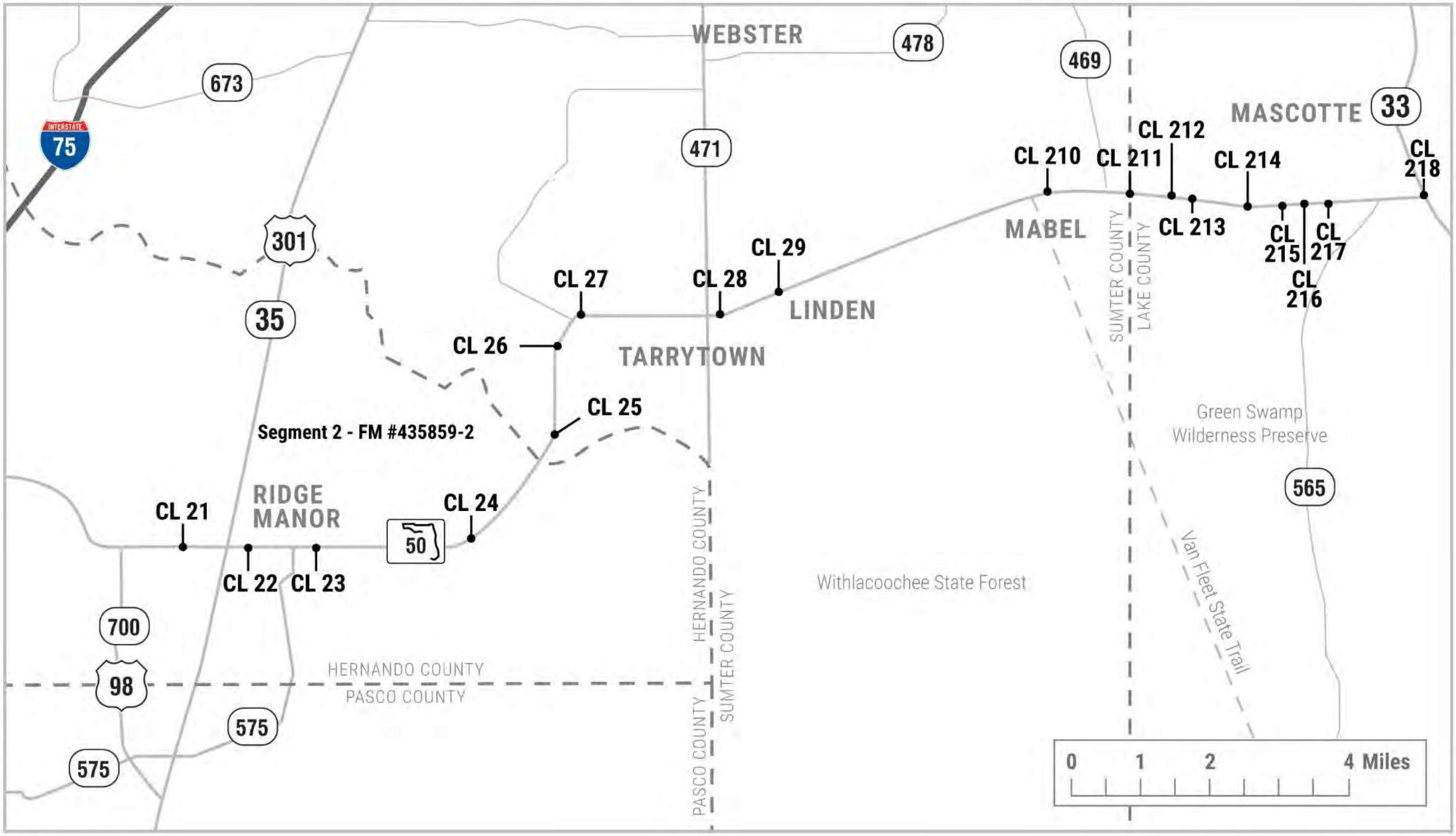


Table 11: Horizontal Curve Summary

Curve Characteristic	Curve Number					
	CL 21	CL 22	CL 23	CL 24	CL 25	CL 26*
Design Speed (MPH)	55	55	60	60	60	**60**
PI Sta.	1850+47.14	1876+74.42	1899+18.86	2018+99.55	73+41.31	**132+37.77**
Δ	5°14’47” (RT)	11°23’41” (LT)	5°56’48” (RT)	54°15’00” (LT)	36°17’54” (LT)	**29°31’38” (RT)**
D	1°00’00”	1°59’59”	1°00’00”	1°00’00”	2°00’00”	**3°59’57”**
T	262.53	285.83	297.62	2935.13	939.12	**377.56**
L	524.69	569.77	594.71	5425.00	1815.00	**738.33**
R	5730.00	2865.00	5730.00	5730.00	2864.93	**1432.69**
PC Sta.	1847+84.61	1873+88.60	1896+21.24	1989+54.42	64+02.19	**128+60.21**
PT Sta.	1853+09.30	1879+58.37	1902+15.95	2043+89.42	82+17.19	**135+98.54**
e	unknown	unknown	unknown	unknown	5.50%	**6.30%**

***CL 26 does not meet FDOT minimum curve standards.**

Table 12: Horizontal Curve Summary Cont.

Curve Characteristic	Curve Number					
	CL 27*	CL 28	CL 29	CL 210	CL 211	CL 212
Design Speed (MPH)	**60**	55	55	55	55	55
PI Sta.	**160+72.62**	30+57.19	51+71.39	299+34.61	358+22.72	389+16.13
Δ	**61°01’14” (RT)**	30°44’00” (LT)	11°31’00” (RT)	18°41’00” (RT)	12°28’00” (RT)	11°15’00” (LT)
D	**3°59’57”**	3°00’00”	3°00’00”	1°30’00”	3°00’00”	2°00’00”
T	**844.27**	524.93	192.61	628.34	208.62	282.17
L	**1525.83**	1024.44	383.89	1245.56	415.56	562.50
R	**1432.69**	1910.08	1910.08	3819.83	1910.08	2864.93
PC Sta.	**152+28.35**	25+02.70	49+54.88	292+79.43	355+91.01	386+34.50
PT Sta.	**167+54.18**	35+25.74	53+36.76	305+18.71	360+06.79	391+95.96
e	**7.30%**	5.00%	5.00%	3.00%	unknown	unknown

***CL 27 does not meet FDOT minimum curve standards.**

Table 13: Horizontal Curve Summary Cont.

Curve Characteristic	Curve Number					
	CL 213	CL 214	CL 215	CL 216	CL 217	CL 218
Design Speed (MPH)	55	55	55	55	55	35
PI Sta.	406+55.73	453+55.36	483+48.25	505+09.05	519+14.26	579+22.15
Δ	9°40’40” (RT)	19°40’00” (LT)	12°50’00” (RT)	15°22’00” (LT)	10°25’00” (RT)	46°04’23” (RT)
D	3°00’00”	3°00’00”	2°00’00”	3°00’00”	2°00’00”	5°00’00”
T	161.52	331.07	322.19	257.69	261.15	487.43
L	322.22	655.56	641.67	512.22	520.83	921.46
R	1910.08	1910.00	2864.93	1910.08	2864.93	1146.28
PC Sta.	404+13.53	450+24.26	480+20.73	502+52.30	516+52.98	574+72.54
PT Sta.	408+96.77	456+79.94	486+72.95	507+62.74	521+74.10	583+29.50
e	unknown	unknown	unknown	unknown	unknown	unknown

Horizontal Curve Definitions

- Design Speed = The speed the roadway is designed for, normally equal to or slightly higher than the posted speed.
- PI Sta. = Location along the corridor where the forward and back tangent lines for the curve intersect.
- Δ = Change in direction of the forward and back tangent lines for the curve.
- D = Degree of curve.
- T = Length of the tangent lines for the curve.
- L = Length of the curve.
- R = Radius of the curve.
- PC Sta. = Location along the corridor where the curve starts.
- PT Sta. = Location along the corridor where the curve ends.
- e = Superelevation of the curve.

2.11 VERTICAL ALIGNMENT

Based upon existing digital terrain models, the overall corridor is generally flat; however, gentle rolling hills are present within the Lake County portion of S.R. 50. Elevations vary from approximately 71’ to 163’. Due to the age of S.R. 50, as-built vertical curve information for large portions of Hernando and Lake Counties was unobtainable. However, from FDOT Projects 18030-3502, 1803-107, F-022-2, and FG-022-2, existing vertical curve information has been obtained for S.R. 50 from 1,100’ west of the Little Withlacoochee River to the Sumter/Lake County Line. Data for 27 vertical curves is provided in **Table 14**.

Where existing information was available, SR 50 grades fall under maximum grade values for posted speed limits as stated on *Table 210.10.1 Maximum Grades* of the *2018 FDM*. Ten of the existing curves (highlighted in orange in **Table 14**) do not meet current *FDM* design standards for length as stated in

Table 210.10.1 Minimum Vertical Curve Lengths. Of those 10 curves, six of the grade changes were not required to have vertical curves based upon *Table 210.10.2 Maximum Change in Grade without Vertical Curve.* All existing curves meet current design K values as stated in *Table 2.10.10.3 K Values for Vertical Curves*.

Table 14: Vertical Curve Summary

PVC Station	PVT Station	Curve Type	Curve Length (FT)	Design Speed (mph)	Calc. K Value	Meets FDM Criteria? (Length)(K)	Grade In (%)	Grade Out (%)	Grade Change (%)
FDOT Project No. 18030-3502 – Project begin approximately 1025' west of Hernando/Sumter Co. Line at STA 87+74.99									
90+00	93+00	Sag	300	60	414.60	(Y)(Y)	+0.16	+0.8836	0.7236
94+40	98+40	Crest	400	60	369.10	(Y)(Y)	+0.8836	-0.20	1.0836
FDOT Project No. 1803-107 – Project begin at Little Withlacoochee Bridge End at Hernando/Sumter Co. Line at STA 41+91.22									
PVC Station	**PVT Station**	**Curve Type**	**Curve Length (FT)**	**Design Speed (mph)**	**Calc. K Value**	**Meets FDM Criteria? (Length)(K)**	**Grade In (%)**	**Grade Out (%)**	**Grade Change (%)**
42+00	45+00	Crest	300	60	529.40	(N)(Y)	0.00	-0.5667	0.5667
45+00	48+00	Sag	300	60	472.40	(Y)(Y)	-0.5667	+0.0684	0.6351
167+50*	170+50	Crest	300	60	1287.60	(N)(Y)	0.00	-0.233	0.233
170+50*	173+50	Sag	300	60	1287.60	(Y)(Y)	-0.233	0.00	0.233
242+00*	244+00	Crest	200	60	1874.40	(N)(Y)	+0.0933	+0.20	0.1067
251+00*	253+00	Crest	200	60	1000.00	(N)(Y)	+0.20	0.00	0.20
FDOT FA Projects F-022-2 and FG-022-2 – Projects begin approximately 100' west of SR 471 intersection at STA 19+00									
17+00	18+00	Crest	200	45	193.30	(Y)(Y)	+1.10	+0.0653	1.0347
64+50*	67+50	Crest	300	55	4594.20	(N)(Y)	+0.0653	0.00	0.0653
89+00	92+00	Sag	300	55	250.00	(Y)(Y)	0.00	+1.20	1.20
95+00	99+00	Crest	400	55	378.40	(Y)(Y)	+1.20	+0.1429	1.0571
102+50	105+50	Sag	300	55	456.60	(Y)(Y)	+0.1429	+0.80	0.6571
112+50	115+50	Crest	300	55	264.80	(N)(Y)	+0.80	-0.3333	1.1333
129+50	134+50	Sag	500	55	342.90	(Y)(Y)	-0.3333	+1.125	1.4583
137+50	142+50	Crest	500	55	230.50	(Y)(Y)	+1.125	-1.04375	2.16875

Table 14 Cont.: Vertical Curve Summary

FDOT FA Projects F-022-2 and FG-022-2 – Projects begin approximately 100' west of SR 471 intersection at STA 19+00									
PVC Station	PVT Station	Curve Type	Curve Length (FT)	Design Speed (mph)	Calc. K Value	Meets FDM Criteria? (LENGTH)(K)	Grade In (%)	Grade Out (%)	Grade Change (%)
154+00	157+00	Sag	400	55	383.20	(Y)(Y)	-1.04375	0.00	1.04375
170+50*	173+50	Sag	300	55	750.00	(Y)(Y)	0.00	+0.40	0.40
173+50*	176+50	Crest	300	55	750.00	(N)(Y)	+0.40	0.00	0.40
206+50	209+50	Sag	300	55	449.80	(Y)(Y)	0.00	+0.667	0.667
209+50	212+50	Crest	300	55	224.90	(N)(Y)	+0.667	-0.667	1.334
212+50	215+50	Sag	300	55	449.80	(Y)(Y)	-0.667	0.00	0.667
219+50	222+50	Sag	300	55	409.10	(Y)(Y)	0.00	+0.733	0.733
222+50	225+50	Crest	300	55	409.30	(N)(Y)	+0.733	0.00	0.733
250+50*	253+50	Sag	300	55	1800.70	(Y)(Y)	0.00	+0.1666	0.1666
253+50*	256+50	Crest	300	55	1799.60	(N)(Y)	+0.1666	0.00	0.1666
353+00	357+00	Sag	400	55	148.10	(Y)(Y)	0.00	+2.70	2.70

Note vertical curve begin and end stationing is approximate.

Rows highlighted in orange indicate the curve does not meet length criteria.

Rows with an * indicate that no vertical curve was required.

2.12 PAVEMENT CONDITION

Based on field review observations, the pavement condition along S.R. 50 within the project limits is generally in good condition. The following bullets provide pavement condition details regarding the most recent resurfacing projects along the S.R. 50 study corridor:

- U.S. 301 to Hernando/Sumter County Line – date of most recent resurfacing was not available but the 2018/2019 Pavement Condition Survey ratings are as follows:
  - U.S. 301 to C.R. 575 – Cracking = 10.0; Ride = 7.8; Rutting = 10.0
  - C.R. 575 to Hernando/Sumter County Line – Cracking = 9.0; Ride = 8.2; Rutting = 9.0
- Hernando/Sumter County Line to S.R. 471 – construction was completed in June 2012 and the 2018 Pavement Condition Survey ratings are as follows: Cracking = 10.0; Ride = 8.0; Rutting = 10.0; pavement in good condition.
- S.R. 471 to Sumter/Lake County Line – construction was completed in May 2001 and the 2018 Pavement Condition Survey ratings are as follows:
  - MP 0.000 to MP 4.743: Cracking = 7.5; Ride = 7.8; Rutting = 9.0.

  - MP 4.743 to MP 5.356: Cracking = 10.0; Ride = 7.8; Rutting = 9.0 (Bridge Removal/Lower Profile Grade in late 2012/early 2013 = "newer" pavement).
  - MP 5.356 to MP 6.421: Cracking = 6.0; Ride = 7.6; Rutting = 8.0.
  - Pavement in fair/poor condition.
- Sumter/Lake County Line to C.R. 33 – construction was completed in October 2010 and the 2018 Pavement Condition Survey ratings are as follows: Cracking = 10.0; Ride = 7.9; Rutting = 10.0; pavement in good condition.

2.13 STRUCTURES

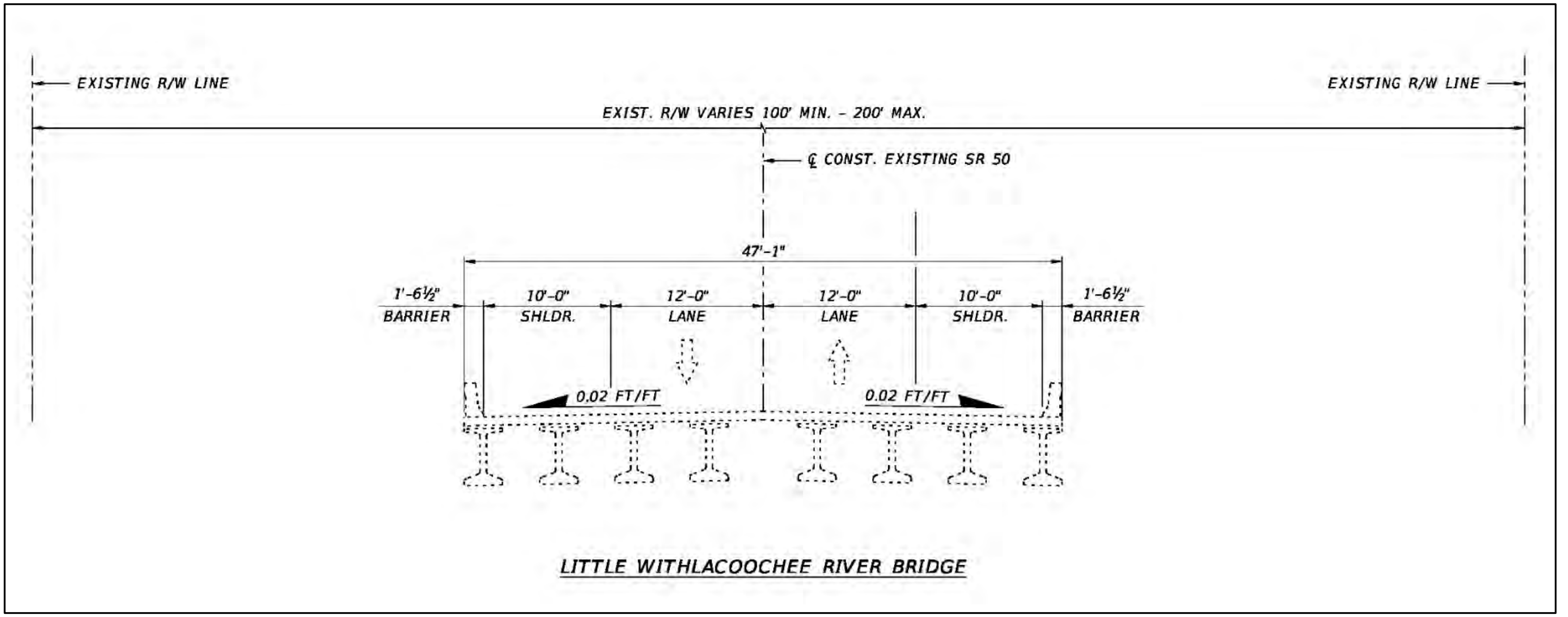
The existing S.R. 50 bridge over Little Withlacoochee River (bridge No. 180071) was constructed in 1995 to replace the previous short span bridge constructed in 1952. The Little Withlacoochee River at this location is not considered navigable due to its narrow width and shallow water depth. Also, the existing bridge only provides approximately 3' of vertical clearance over the 50-year design high water.

The existing bridge provides for two 12' traffic lanes, two 10' shoulders and two 1'-6 ½" wide barriers for a total bridge width of 47'-1" as displayed in **Figure 16**. The existing bridge is located on a tangent section of S.R. 50 and the longitudinal grade is 0.2 percent. The bridge is 250' long with five equal 50'-0" spans. The bridge superstructure consists of an eight-inch concrete deck slab supported on seven AASHTO Type II prestressed concrete beams. Concrete pile bents are used for the substructure. Each pile bent has five 18" square prestressed concrete piles. Bridge drainage is accommodated by scuppers discharging directly into the Little Withlacoochee River.

The bridge sufficiency rating is derived by evaluating factors indicative of the structure's ability to remain in service. A rating of 100 percent would represent an entirely sufficient bridge and a rating of zero percent would represent an entirely deficient bridge. The FDOT standards indicate structures with a sufficiency rating of 80 percent or less require some rehabilitation and those less than 60 percent require replacement.

The latest above water bridge inspection is dated 10/05/2017 and an underwater inspection was performed on 10/09/2017. The bridge inspection reports indicate the bridge is in very good condition with sufficiency rating of 95.5 and health index of 99.88. National Bridge Rating (NBI) is 7 for all the bridge elements, indicating above minimum criteria. The existing load rating was performed in 1999 and it used the LFR rating method. Therefore, a new load rating utilizing the current LRFR load rating method was performed. The Minimum Inventory Rating Factor calculated is 1.21, the Minimum Permit Rating Factor is 1.12 and the Minimum Operating Rating Factor is 1.57. Based on the existing bridge inspection reports, sufficiency rating, health index, and updated LRFR load rating, widening, or reuse of the existing bridge is a viable option.

Figure 16: Existing S.R. 50 Bridge Typical Section



There are two existing concrete box culverts and one bridge culvert within the project limits. The existing concrete box culvert CD-13 is a 46' long 8'x3'double barrel located at approximately Station 62+32. The existing concrete box culvert CD-14 is a 46' long 8'x5' single barrel located at approximately Station 91+73. Although these culverts visually appear to be in good condition and only show slight scale damage, they are 67 years old and at end of their 75-year service life. Therefore, it is recommended these box culverts be replaced.

The existing triple 10'x5' bridge culvert No. 180910 is located approximately at Station 350+49 and is 67' long. The main section (middle) of the culvert was constructed in 1951. In 1995, the inside of the box culvert was repaired by adding 1" thick gunite. In 2000, both ends of the box culvert were extended by approximately 12'. The 2015 inspection report indicates the bridge culvert is in very good condition with sufficiency rating of 96.5 and health index of 99.54. The existing load rating was performed in 2011 and it used the LFR rating method. This load rating indicated Inventory Rating Factor of 1.05 and Operating Rating Factor of 1.75. A new load rating utilizing the current LRFR rating method was performed.

The Minimum Inventory Rating Factor calculated is 0.34, the Minimum Permit Rating Factor is 0.35 and the Minimum Operating Rating Factor is 0.45. Based on the Structures Design Guideline Flow Chart for widening existing structures (SDG 7.1.1-1), if the LRFR load rating is less than 1.0 then the LFR Inventory Rating Factor is required to be more than 1.0 and Operating Rating Factor is required to be more than 1.67. Since the existing LFR rating is more than the above requirement, extending the existing bridge culvert is a viable option. Considering age of the bridge culvert (67 years old), history of the repair (1" thick gunite application as stated above), and a load rating of slightly above the minimum 1.0, it is recommended that this bridge culvert be replaced.

2.14 LIGHTING

No street lighting is present from U.S. 301 to 350' west of Palmwood Avenue along S.R. 50. Cobra-head street lighting is present at 200' intervals along the south side of S.R. 50 from 350' west of Palmwood Avenue to C.R. 33.

2.15 SOILS AND GROUNDWATER INFORMATION

The Natural Resources Conservation Service (NRCS) Soil Surveys of Hernando, Sumter, and Lake Counties were reviewed to obtain near-surface soils information along the project alignment. The soils depicted along the project alignment by the NRCS Soil Survey maps can be found in **Appendix D**. The NRCS Soil Survey soil units identified along the project alignment are summarized **Appendix D**. Additional soils information can be found in the *S.R. 50 Preliminary Roadway Soil Survey* report.

The soils depicted along the project alignment by the NRCS Soil Survey maps are generally suitable to support the proposed roadway widening. However, shallow groundwater, shallow clay, shallow limestone, and organic soils are present along the project corridor. These soil and groundwater conditions can have impacts on the design and construction of a roadway widening. A summary of the existing soil and groundwater conditions along the project alignment, and the associated construction limitations of those soil and groundwater conditions are included in **Table 15**.

The NRCS Soil Survey map depicts several soil types associated with organic soils along the project alignment. These organic soils are typically associated with lowland/wetland depressional areas and can have shallow to deep surficial muck deposits, which can have severe limitations for roadway embankment construction. A summary of the estimated organic soil areas, based on the preliminary roadway boring results, is included on **Table 16**.

Table 15: Summary of Existing Soil and Groundwater Conditions and Construction Limitations

Approximate Station Limits	County	Predominant NRCS Soil Units	Description Of Existing Soil and Groundwater Conditions	Soil and Groundwater Construction Limitations
1825+45 to 1857+00	Hernando	14, 15	Nearly level to gently sloping, excessively drained, fine sands in upland, sandhill areas. Seasonal high groundwater levels are typically below a depth of 6'.	• None.
1857+00 to 2090+20	Hernando	17, 18, 23, 24, 38, 47, 51	Nearly level, very poorly to poorly drained soils consisting of surficial sands underlain by shallow sandy loam to clay and shallow limestone. These soils are in low ridges in flatwoods and poorly defined drainage ways and depressions on floodplains. Seasonal high groundwater levels are typically 1' below to 2' above the natural ground surface.	• Shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments. • Intermittent, shallow organic soils will require removal. • Shallow clay layers can cause perched groundwater conditions and settlement issues with high fill embankments. • Shallow limestone layers can be difficult to excavate and can impact pond design.
41+91 to 104+00	Sumter	26, 60, 63		
104+00 to 205+00	Sumter	23, 30, 32, 61, 67	Nearly level, very poorly to poorly drained fine sands in broad flatwoods. Seasonal high groundwater levels are typically at a depth of 0' to 1.5' below the natural ground surface.	• Shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments.
205+00 to 258+00	Sumter	10, 28, 30	Nearly level to gently sloping somewhat poorly drained fine sands in broad, low ridges and knolls. Occasional, isolated areas of very poorly drained soils in depressional areas and in poorly defined drainage ways that pond. Seasonal high groundwater levels are typically at a depth of 1.5' to 3.5' below the natural ground surface.	• Isolated areas of shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments.

Table 15 Cont.: Summary of Existing Soil and Groundwater Conditions and Construction Limitations

Approximate Station Limits	County	Predominant NRCS Soil Units	Description Of Existing Soil and Groundwater Conditions	Soil and Groundwater Construction Limitations
258+00 to 260+72 & 19+00 to 83+00	Sumter	23	Nearly level and poorly drained fine sands on broad flatwoods. Seasonal high groundwater levels are typically at a depth of 0' to 1.5' below the natural ground surface.	• Shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments.
83+00 to 144+00	Sumter	10, 11, 13	Nearly level to gently sloping somewhat poorly drained to moderately well drained fine sands underlain by sandy loam soils on broad, low ridges and knolls. Seasonal high groundwater levels are typically at a depth of 1.5' to 6.0' below the natural ground surface.	• None.
144+00 to 294+00	Sumter	9, 26, 33, 36, 46, 58	Nearly level to gently sloping, poorly drained soils consisting of surficial sands underlain by shallow sandy loam to clay and shallow limestone and boulders. These soils are in low broad flatwoods and small knolls. Seasonal high groundwater levels are typically 0' to 1.5' below the natural ground surface. Several isolated, nearly level and very poorly drained soil features in wet, depressional areas cross the project alignment in this area. Typically, the surface layer of these features includes shallow, organic soils underlain by sandy loam to clay. Seasonal high groundwater levels are typically 0' below to 2' above the natural ground surface within these depressional areas.	• Shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments. • Intermittent, shallow organic soils will require removal. • Shallow clay layers can cause perched groundwater conditions and settlement issues with high fill embankments. • Shallow limestone layers can be difficult to excavate and can impact pond design.

Table 15 Cont.: Summary of Existing Soil and Groundwater Conditions and Construction Limitations

Approximate Station Limits	County	Predominant NRCS Soil Units	Description Of Existing Soil and Groundwater Conditions	Soil and Groundwater Construction Limitations
294+00 to 355+00	Sumter	23, 30, 32, 36, 60, 61	Nearly level and poorly to very poorly drained fine sands on broad, low flats and in poorly defined drainageways. Seasonal high groundwater levels are typically at a depth of 0' to 1.5' below the natural ground surface. Several isolated, nearly level and very poorly drained soil features in wet, depressional areas cross the project alignment in this area. Typically, the surface layer of these features includes shallow, organic soils underlain by sandy loam to clay. Seasonal high groundwater levels are typically 0' below to 2' above the natural ground surface within these depressional areas.	• Shallow groundwater conditions can impact roadway base clearance and require roadway profile adjustments. • Intermittent, shallow organic soils will require removal.
356+00 to 583+29	Sumter	37	Soils are predominantly gently to moderately sloping, excessively drained, fine sands in upland, sandhill areas. Seasonal high groundwater levels are typically at a depth of 3.5' to greater than 6' below the natural ground surface. Several isolated, nearly level and very poorly drained soil features in wet, depressional areas cross the project alignment in this area. Typically, the surface layer of these features includes shallow, organic soils underlain by sandy loam to clay. Seasonal high groundwater levels are typically 0' below to 2' above the natural ground surface within these depressional areas.	• Shallow groundwater conditions in low areas can impact roadway base clearance and require roadway profile adjustments. • Intermittent, shallow organic soils will require removal.
	Lake	1, 2, 5, 6, 8, 9, 28, 32, 38, 39, 45		

Table 16: Summary of Organic Soil Areas

County	Station Start	Station End	Length (feet)	Approximate Offset Range (feet)	Approximate Organic Soil Depth Range (feet)
Hernando	1931+50	1936+50	500	40 RT to 130 RT	0 – 4
	1938+50	1950+50	1200	30 RT to 130 RT	0 – 4
	1940+00	1949+00	900	20 LT to 45 LT	0 – 4
	1954+00	1956+50	250	30 RT to 130 RT	0 – 4
	1991+50	2005+00	1350	30 RT to 130 RT	0 – 4
	1991+50	2005+00	1350	20 LT to 45 LT	0 – 4
Sumter (West Stationing)	49+50	54+50	500	20 RT to 50 RT	0 – 3
	87+40	91+75	435	20 LT to 50 LT	0 – 6
	87+40	91+75	435	20 RT to 50 RT	0 – 2
	109+50	114+50	500	20 RT to 50 RT	0 – 5
Sumter (East Stationing)	174+75	181+80	805	20 RT to 50 RT	0 – 7
Lake	404+80	407+00	220	25 RT to 50 RT	0 – 2
	405+20	414+50	930	20 LT to 50 LT	0 – 2
	425+50	430+00	450	20 LT to 50 LT	0 – 2
	464+50	466+00	150	30 RT to 50 RT	0 – 4

Based on the locations summarized in **Table 16**, **Table 17** displays the specific muck removal locations by Design Segment along the corridor.

Table 17: Estimated Roadway Muck Removal Locations

Design Segment	Station Start	Station End	Length (ft)	Approximate Offset Range (ft)	Actual Width (ft)	Organic Soil Depth Range (ft)
2	1924+00	1927+50	350	30 RT to 130 RT	100	0-4
	1931+50	1936+50	500	40 RT to 130 RT	90	0-4
	1938+50	1950+50	1200	30 RT to 130 RT	100	0-4
	1940+00	1949+00	900	20 LT to 45 LT	25	0-4
	1954+00	1956+50	250	30 RT to 130 RT	100	0-4
	1991+50	2005+00	1350	30 RT to 130 RT	100	0-4
	1991+50	2005+00	1350	20 LT to 45 LT	0	0-4
3	42+00	46+80	480	30 LT to 50 LT	0	0-2
	49+50	54+50	500	20 RT to 50 RT	30	0-3
	87+40	91+75	435	20 LT to 50 LT	30	0-6
	87+40	91+75	435	20 RT to 50 RT	30	0-2
	109+50	114+50	500	20 RT to 50 RT	30	0-4.5
4	179+50	184+50	500	20 LT to 50 LT	30	0-5
	20+00	20+70	70	45 RT to 70 RT	35	0-1.5
	174+75	181+80	805	20 RT to 50 RT	30	0-7
	342+00	348+00	600	40 LT to 50 LT	10	0-2
5	404+80	407+00	220	25 RT to 50 RT	25	0-2
	405+20	414+50	930	20 LT to 50 LT	0	0-2
	425+50	430+00	450	20 LT to 50 LT	0	0-2
	464+50	466+00	150	30 RT to 50 RT	20	0-4

In addition, the NRCS Soil Survey map depicts Arents soils and pits along a portion of the project alignment in Sumter and Lake County. Arents soils are the result of numerous earthmoving and filling activities resulting in non-indigenous soils with high variability in physical and chemical properties. Pits consist of excavated areas of unconsolidated soil and geological materials, removed mainly for use in road construction or as fill in low areas for building construction. These soils are typically 100' or more off the roadway alignment, except for a borrow pit area on the northeast corner of the S.R. 50 and Tuscanooga Road intersection. This area consists of a pit or depressed area, which is surrounded by sidewalls of variable steepness. A shallow auger boring performed within the borrow pit encountered sands to the boring termination depth of 10' below the bottom of the pit.

Temporary piezometers were installed along the corridor to monitor groundwater elevations. FDOT Flexible Pavement Design Manual Section 5.2.2 requires a 3’-0” base clearance to high water table elevations from the base of the roadway. Because existing roadway thickness information is not readily available along the corridor, the piezometer readings were measured to the top of the roadway. Thus, any location where the piezometer reading was less than 4’, it was assumed the groundwater clearance would not be met. Profile adjustments or a reduction in the pavement design resilient modulus must be made to attain required elevation clearances. **Table 18** summarizes the locations along the corridor where the roadway may have to be raised to meet vertical base clearance based on this methodology.

If 3’ of vertical separation is not achieved, the design resilient modulus should be reduced in accordance with the *Flexible Design Manual*. If final grades do not provide at least 1’ of vertical separation between the bottom of the base course and the estimated seasonal high groundwater level, then an alternative base course such as asphalt (black base) and/or pavement underdrains may be required.

Table 18: Summary of Average Profile Elevation Increases

Station or Range		Average Needed Profile Elevation Increase to Meet Current Base Clearance Standard
1865+25	1890+00	1.46 ft.
1900+00	1985+00	1.00 ft.
2049+00	2051+00	1.00 ft.
52+00	97+00	1.00 ft.
107+00	117+00	0.84 ft.
167+00	217+00	0.83 ft.
40+00	50+00	0.62 ft.
209+00	211+00	1.00 ft.
240+00	270+00	1.00 ft.
284+00	286+00	1.50 ft.
300+00	310+00	0.42 ft.
333+60	340+00	0.75 ft.
350+00	355+00	1.00 ft.
404+00	430+00	1.65 ft.

2.16 DRAINAGE

The S.R. 50 study corridor is located within the Green Swamp Basin under the following jurisdictions:

- The Southwest Florida Water Management District (SWFWMD) between U.S. 301 and the Sumter County/Lake County Line; and
- The St. John’s River Water Management District (SJRWMD) between the Sumter County/Lake County Line and C.R. 33.

S.R. 50 traverses two Outstanding Florida Waters (OFW's): The Withlacoochee River System and the Chassahowitzka National Wildlife Refuge. SWFWMD requires an additional 50 percent water quality treatment volume for direct discharges into OFW's from roadway improvement projects. Additionally, S.R. 50 traverses seven (7) different Waterbody IDs (WBID's) which have been reviewed for impairments. Refer to **Table 19** for more information. **Figure 17** displays the WBID's along the S.R. 50 corridor.

Table 19: Summary of WBID's and Impairments

WBID	Waterbody Name	Impaired?	Limiting Nutrients
1329F	Withlacoochee River	YES – Mercury	N/A
1359D	Walled Sink Ditch	NO	N/A
1360B	Juniper Creek Canal	NO	N/A
1378	Big Gant Canal	YES – Nutrients (Chlorophyll-a)	TN & TP
1381	Little Withlacoochee	NO	N/A
1383	Giddon Lake Outlet	NO	N/A
1388	Long Lake Outlet	NO	N/A

If the post development pollutant loadings exceed the existing condition, then nutrient loading analysis will be required for any reviewed roadway improvements within WBID 1378 – Big Gant Canal. Additionally, the project is located within a Sensitive Karst region where the formation of sinkholes is relatively common.

Currently, the stormwater is collected by roadside swale systems flowing to existing cross drains with runoff from bridges discharging into adjacent wetlands and depressional areas. Generally, the flow pattern is from east to west toward the Little Withlacoochee River, flowing northwest toward the Withlacoochee River. There are forty-six (46) cross drains, one (1) bridge, and one (1) bridge culvert based on a review of the FDOT SLDs within the project limits. These cross drains allow stormwater runoff to flow beneath S.R. 50 along its historical path. The main water crossings are the Little Withlacoochee River (Bridge No. 180071) and an Unnamed Stream (Bridge No. 180910). **Table 20** displays the approximate location of existing cross drains and bridges along the S.R. 50 study corridor.

Figure 17: WBID Map

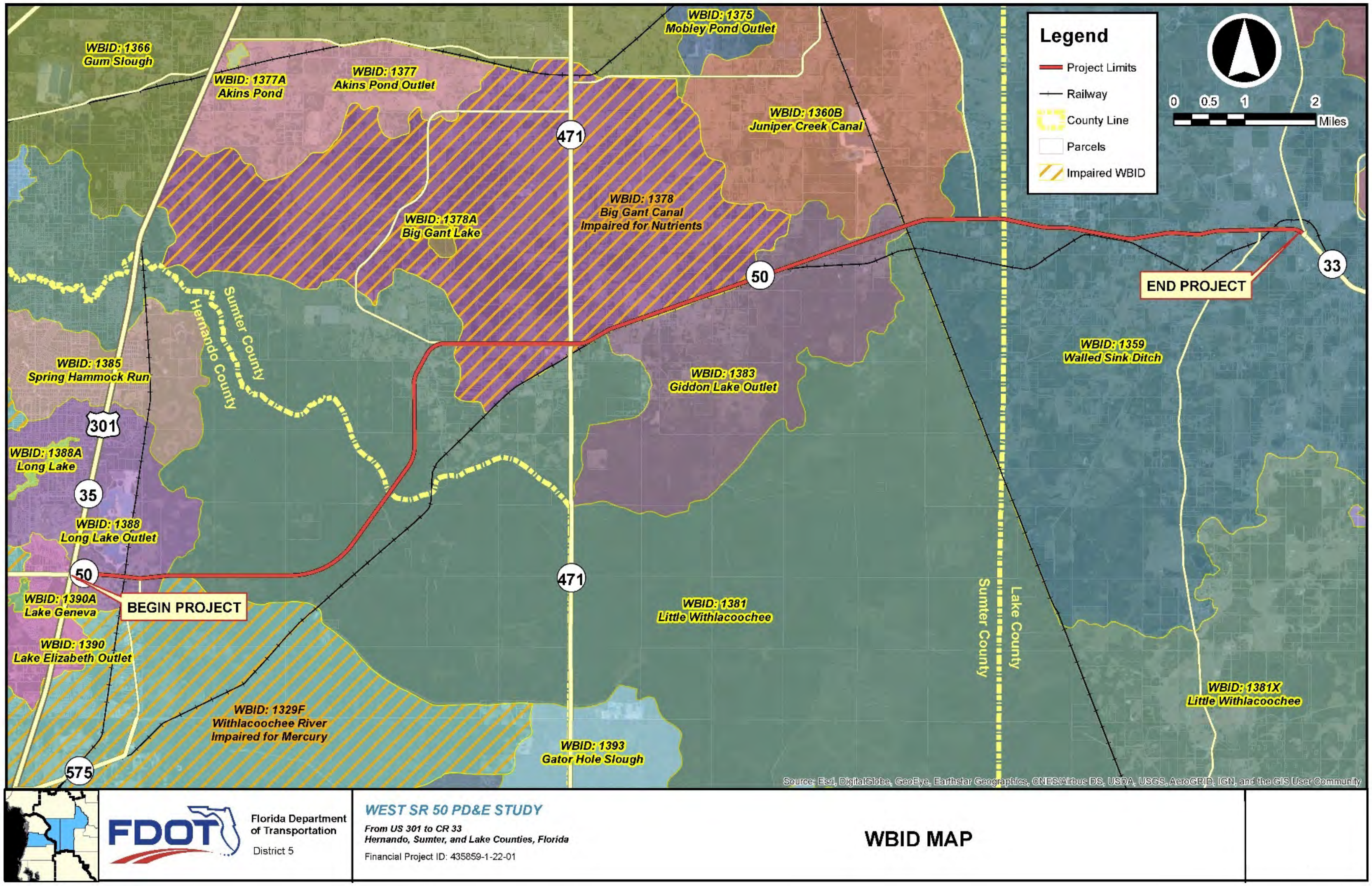


Table 20: Summary of Existing Cross Drains, Bridges, and Bridge Culverts

Structure No.	FDOT Milepost	Station	Description	Remarks
CD-01	8.884	1851+02	Single 24" RCP	
CD-02	9.299	1872+31	Single 24" RCP	
CD-03	9.329	1873+95	Single 24" RCP	
CD-04	2.813	1925+79	Single 30" RCP	
CD-05	3.382	1955+73	Double 30" RCP	
CD-06	4.370	2007+79	Double 36" RCP	
CD-07	4.811	2031+63	Quadruple 48" RCP	
CD-08	5.055	2044+55	Single 30" RCP	
CD-09	5.207	2051+62	Single 30" RCP	
CD-10	5.539	2070+22	Double 42" RCP	
CD-11	5.977	2093+10	Single 48" RCP	
Bridge – 1	0.000 to 0.047	2098+00		Little Withlacoochee River
CD-12	0.137	46+46	Single 48" RCP	
CD-13	0.437	62+32	Double 8' X 3' CBC	
CD-14	0.993	91+94	Single 8' X 5' CBC	
CD-15	1.225	103+92	Single 48" RCP	
CD-16	1.448	115+92	Single 24" RCP	
CD-17	1.826	135+87	Single 48" RCP	
CD-18	2.000	144+85	Single 24" RCP	
CD-19	2.141	152+42	Single 48" RCP	
CD-20	2.280	159+25	Single 24" RCP	
CD-21	2.846	189+69	Single 30" RCP	
CD-22	2.965	195+89	Single 60" RCP	
CD-23	3.000	197+40	Single 42" RCP	
CD-24	3.563	227+76	Single 24" RCP	
CD-25	4.036	252+25	Single 24" RCP	
CD-26	0.322	36+80	Single 24" RCP	
CD-27	1.055	74+87	Triple 48" RCP	
CD-28	1.555	101+56	Single 30" RCP	
CD-29	2.103	130+59	Single 24" RCP	
CD-30	2.752	164+77	Single 36" RCP	

Table 20 Cont.: Summary of Existing Cross Drains, Bridges, and Bridge Culverts

Structure No.	FDOT Milepost	Station	Description	Remarks
CD-31	3.031	179+58	Single 24” RCP	
CD-32	3.451	201+63	Single 24” RCP	
CD-33	3.708	215+22	Single 24” RCP	
CD-34	4.038	232+56	Single 36” RCP	
CD-35	4.317	247+30	Single 24” RCP	
CD-36	4.626	263+63	Single 30” RCP	
CD-37	4.830	274+50	Single 24” RCP	
CD-38	5.952	333+21	Single 36” RCP	
Bridge Culvert - 1	6.264 to 6.270	350+27	Triple 10’ X 5’ CBC	Unnamed Waterway
CD-39	0.594	389+67	Single 24” RCP	
CD-40	0.920	406+71	Single 24” RCP	
CD-41	1.014	411+59	Double 48” RCP	
CD-42	1.291	426+45	Single 48” RCP	
CD-43	1.591	442+17	Single 24” RCP	
CD-44	2.014	464+68	Single 24” RCP	
CD-45	2.562	493+48	Quadruple 48” RCP	
CD-46	2.926	512+23	Single 24” RCP	

*CBC = Concrete Box Culvert; RCP = Reinforced Concrete Pipe

According to the Federal Emergency Management Agency (FEMA), the relevant Flood Insurance Rate Map (FIRM) panel numbers are 12053C0244D dated February 2, 2012; 12119C313D, 12119C0312D, 12119C0316D, 12119C0308D, 12119C0317D, 12119C0309D, 12119C0328D, 12119C0329D dated September 27, 2013; and 12069C0535E dated December 18, 2012. These are shown in **Figure 18** through **Figure 22**. According to the FEMA FIRMs, the project is within Zone AE of Hernando County’s 100-year floodplain. These areas are associated with wetlands draining to the Little Withlacoochee River and have established 100-year flood elevations. Floodplain areas within Sumter County are designated as Zone A and are associated with adjacent wetlands and depressional areas, having a one percent probability of flooding every year where predicted flood water elevations have not been established. Floodplains within Lake County are designated as both Zone AE and Zone A. SWFWMD has several watershed models along the project corridor within Hernando and Sumter Counties: Eastern Hernando, Little Withlacoochee, Gant Lake, and Big Prairie. The floodplain boundaries defined by these watershed models differ from the current adopted FEMA boundaries.

Figure 18: FEMA Floodplains Map 1

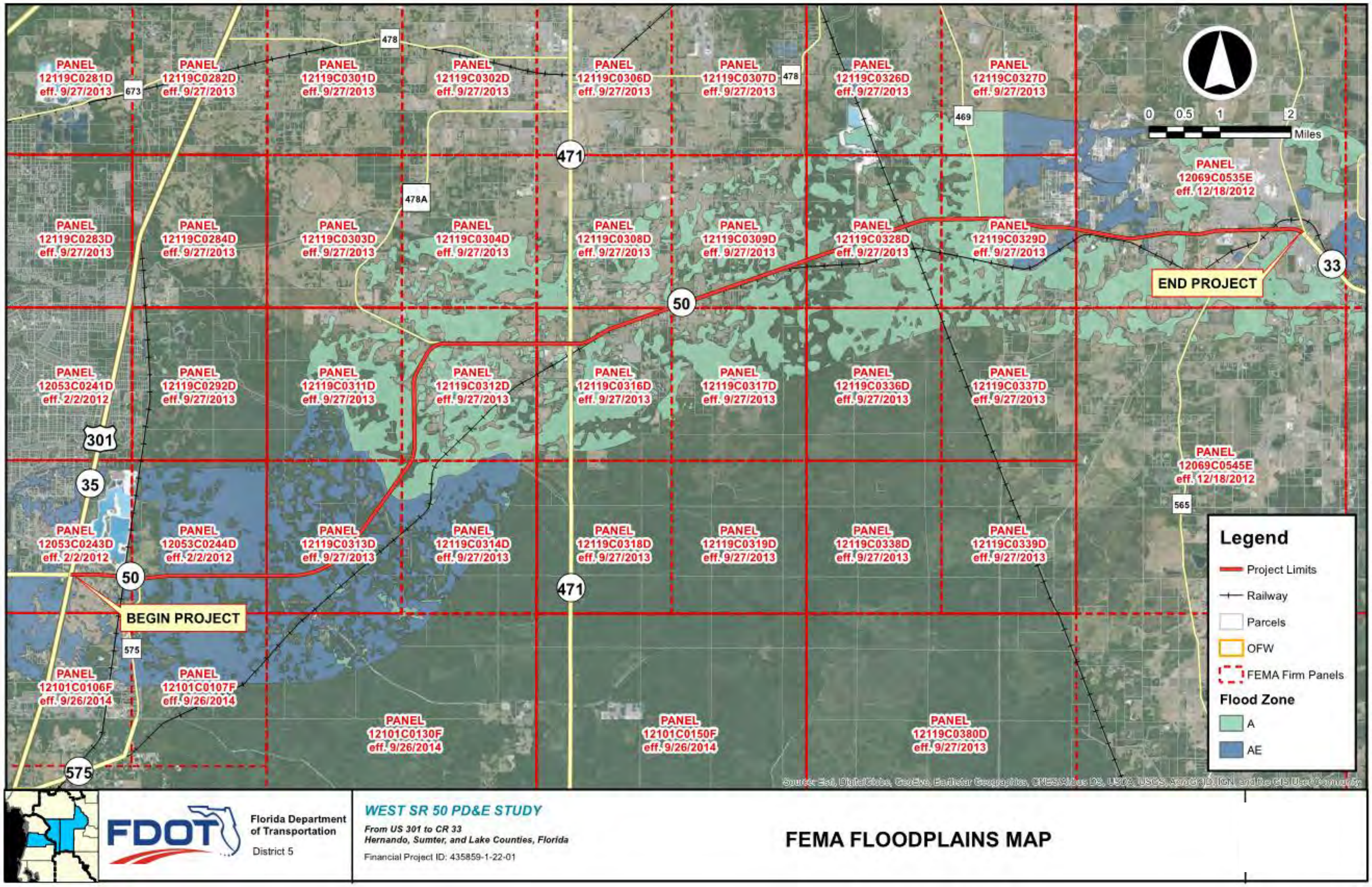


Figure 19: FEMA Floodplains Map 2

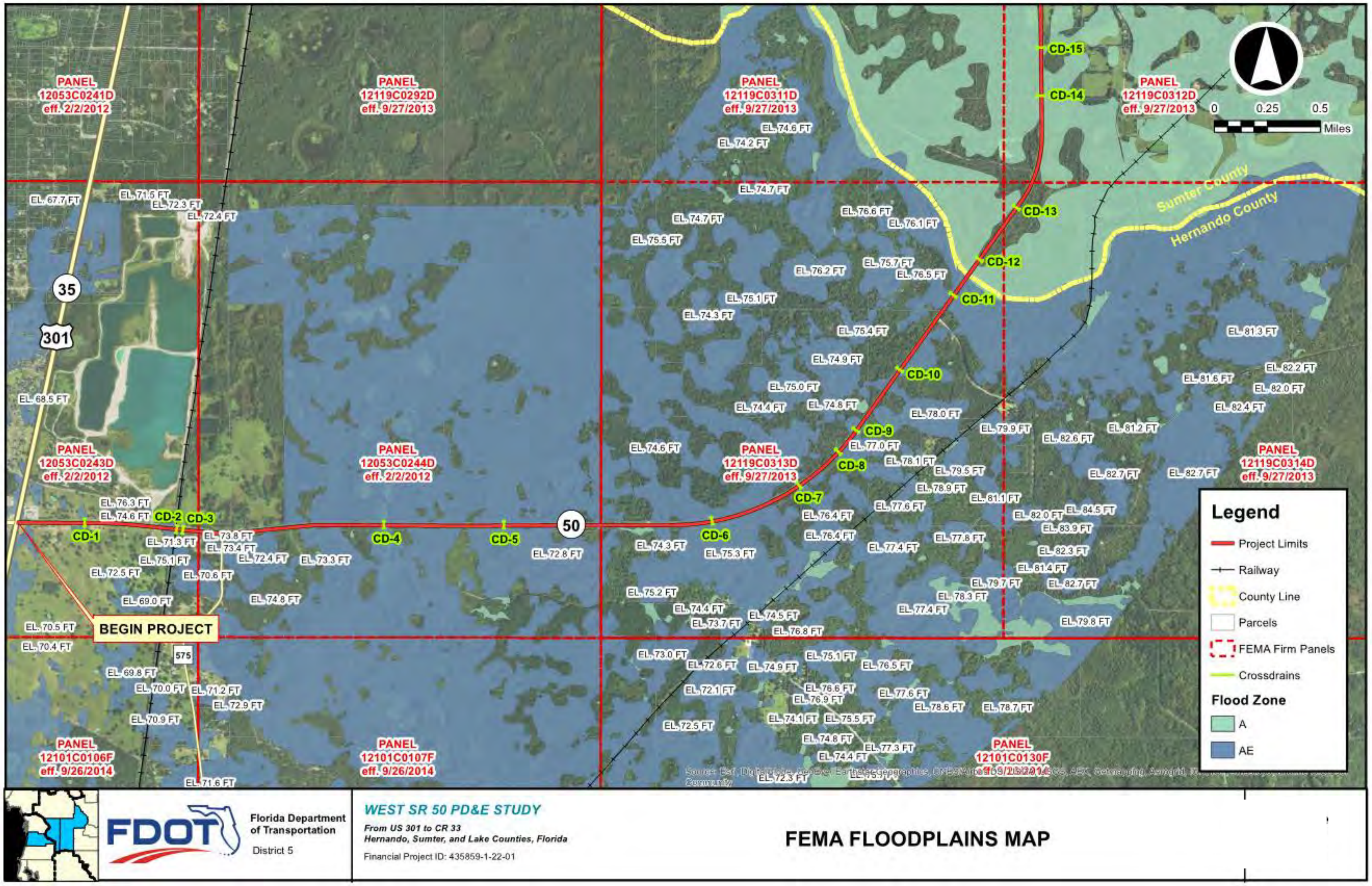


Figure 20: FEMA Floodplains Map 3

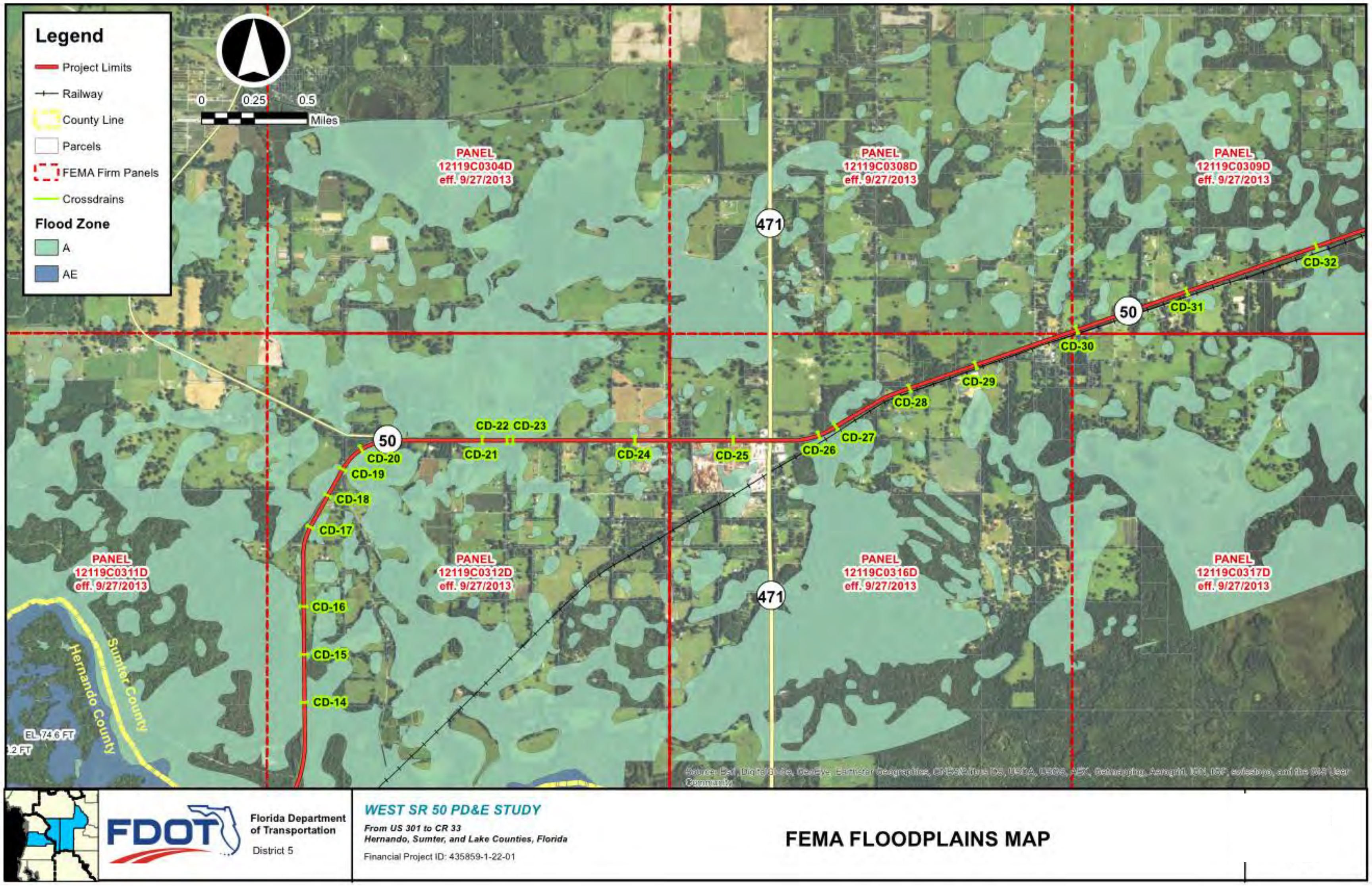


Figure 21: FEMA Floodplains Map 4

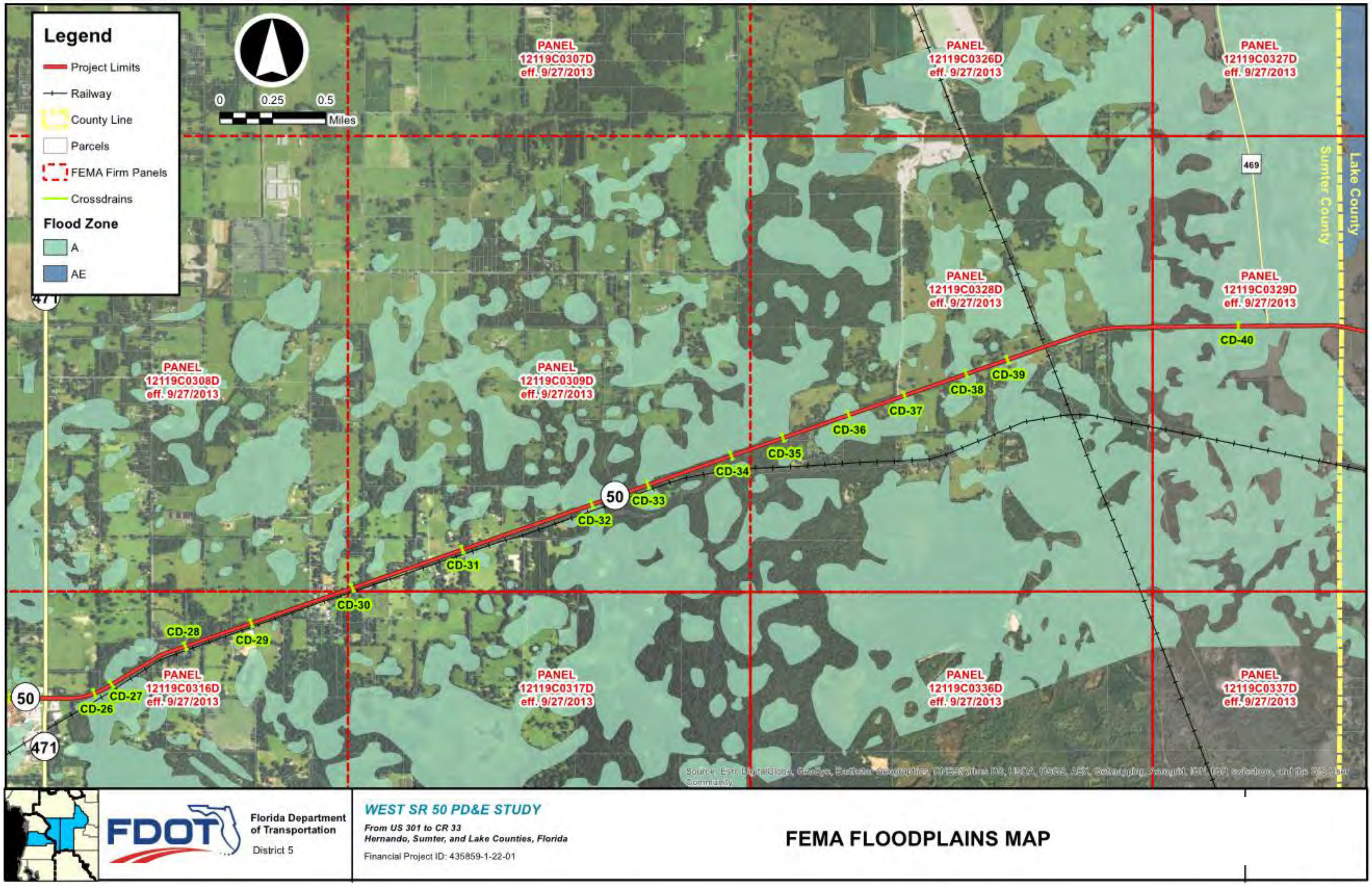
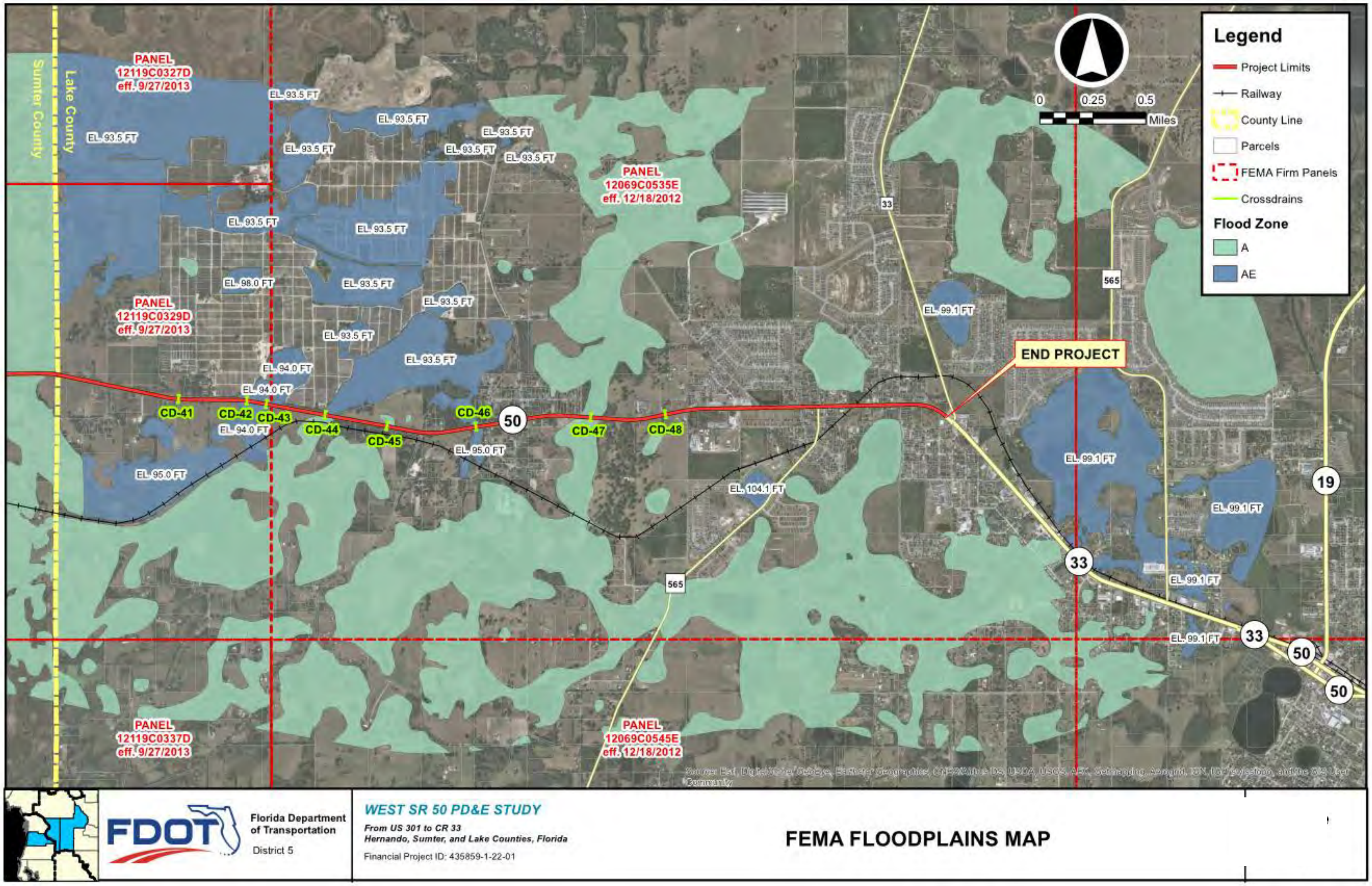


Figure 22: FEMA Floodplains Map 5



Existing Drainage Permits

There are currently, five (5) SWFWMD permits and four (4) SJRWMD permits expected to be impacted within the project limits. The sections below briefly describe the permitted condition, the impacts to the permit associated with the proposed improvements, and the action necessary to mitigate impacts.

Permit No. 43-4773.006

This permit is an Individual permit authorizing the construction of a new storm water management system designed to serve the 1.9 miles of S.R. 50 widening from U.S. 98 to east of U.S. 301. S.R. 50 is to be widened from 2 lanes to 4 lanes with future widening to 6 lanes accounted for in the stormwater management design. U.S. 301 intersects with S.R. 50 and is to be widened from 2 lanes to 4 lanes along a length of 1.2 miles. Water quality treatment and attenuation are to be provided in 3 on-line retention ponds authorized under this permit as well as in future facilities, yet to be permitted in the segment of S.R. 50, just west of this project. This project is expected to involve this permit as the proposed widening of S.R. 50, approved with this permit, extends into the study limits. From the existing permit that was previously conveyed, the proposed pond evaluated as part of the PD&E Study will accommodate the runoff from the easternmost basin to a temporary linear pond.

Permit No. 40-9935.001

This permit is a standard general permit for a replacement of Bridge #180071 over the Withlacoochee River on the Hernando/Sumter county line. This project is expected to impact this permit, as adding additional travel lanes to the existing roadway is being proposed.

Permit No. 40-2506.006

This permit is a standard general permit for a commercial business ("Tarrytown Pole Plant", owned by the Robbins Manufacturing company) at the southwest corner of the intersection of S.R. 50 and S.R. 471. Stormwater runoff is collected in on-site swales and routed to on-site retention ponds. The project is expected to impact the existing permit, as the proposed S.R. 50 improvements include a 10' wide shared-use trail to the south. The construction of this trail will impact one of the existing routing swales.

Permit No. 48-7284.000

This permit is a noticed general permit for a commercial development, Little Food Town, located on the northwest corner of the S.R. 50 and S.R. 471 intersection. Stormwater runoff is treated in an on-site retention pond. This project is expected to impact the existing permit, as a roundabout that will impact the driveway, parking lot, and gas station pumps in the permitted site is proposed to replace the S.R. 50 and S.R. 471 intersection.

Permit No. 40-19888.001

This permit is a standard general permit for roadway construction along S.R. 50. The "S.R. 50 at Mabel" project involves construction to remove an existing bridge and embankment over the former CSX Railroad alignment. The final roadway configuration will be at a lower grade and include the addition of turn lanes and an acceleration lane. On-site stormwater runoff is collected and directed to existing discharge points to match existing drainage patterns for each basin. The proposed swale block drainage system, a linear roadside retention pond cut from the existing roadway embankment to the south of S.R. 50, will retain the additional runoff from the roadway. This project is expected to impact this permit because the proposed widening of S.R. 50 on the south side would impact the permitted roadside swales. The permitted treatment and attenuation volume should be included in the proposed ponds for these roadway drainage basins.

Permit No. 81035-1 & 81035-2

These permits are standard general permits for the construction and expansion of the Rose of Sharon Church. Stormwater runoff is collected and retained in on-site retention swales. This project is expected to impact the existing permit, as widening S.R. 50 in this area requires right-of-way from the permitted area. One of the existing retention swales could potentially be impacted by this widening.

Permit No. 42520-0

This permit is a standard general permit for a commercial business, “Mascotte Truss Facility”, south of S.R. 50 in Lake county. Stormwater runoff is treated in an on-site retention pond. This permit includes plans for future buildings, conveyance swales, and an expansion of the on-site retention pond on the permit site. As of submitting this report, none of these items have been constructed. This project could potentially impact the existing permit, as the proposed widening of S.R. 50 on the south side could impact the permitted future conveyance swale.

Permit No. 41996-3

This permit is a standard general permit which authorizes improvements to the existing drainage system located in the vicinity of the North Bay Lake Avenue and S.R. 50 intersection. The existing dry retention pond was intended to provide water quality treatment only, not flow attenuation. The pond is situated on the north side of S.R. 50, across from Fiske Avenue, and drains to Lake Jackson via an outfall system along S.R. 50 and North Bay Lake Avenue. The proposed improvements include removal of sediment and infiltration-limiting soils to correct its deficient treatment volume recovery function and the construction of a new, larger outfall system that eliminates flooding conditions for the critical duration storm event. This project is expected to impact the existing permit, as additional travel lanes proposed for S.R. 50 through this area will generate additional stormwater runoff. The permitted treatment volume should be accounted for in ponds within this basin.

Permit No. 100330-1

This permit is a standard general permit for a commercial business, “Mascotte Commerce Center”, located on the southeast corner of the S.R. 50 (W. Myers Boulevard) and Howard Avenue intersection. Stormwater runoff is treated in an on-site retention pond. This project is expected to impact the existing permit, as the proposed widening of S.R. 50 to the south will impact the existing retention pond. Since this impact is to a private business center, future coordination is required to address options for impact mitigation.

2.17 ENVIRONMENTAL CHARACTERISTICS

Richloam Tract of Withlacoochee State Forest

The Richloam Tract of the Withlacoochee State Forest is crossed three times by S.R. 50 east of U.S. 301 as shown in **Figure 23**. The largest area is on either side of the Little Withlacoochee River, an Outstanding Florida Water. Within Hernando County, S.R. 50 enters the Withlacoochee State Forest approximately 200’ east of C.R. 575/Burwell Road having an existing 200’ ROW. Once into Sumter County, the roadway ROW within the State Forest narrows to 100’. The Withlacoochee State Forest extends about 1.18 miles into Sumter County. This overall section within the State Forest is approximately 5.18 miles. S.R. 50 within Sumter County crosses into the Withlacoochee State Forest in two additional locations: 1. Approximately 0.20 miles west of C.R. 711 at Station 160+30 until Station 217+00, a distance of 1.07 miles, and 2. At SE 80th Street about 1500’ east of the Van Fleet Trail (Station 300+80) to CR 469 (Station 340+50), a distance of 0.75 miles. The existing ROW width for the western portion of the state forest is 100’ and in the eastern portion is mostly 150’ with short sections of 125’.

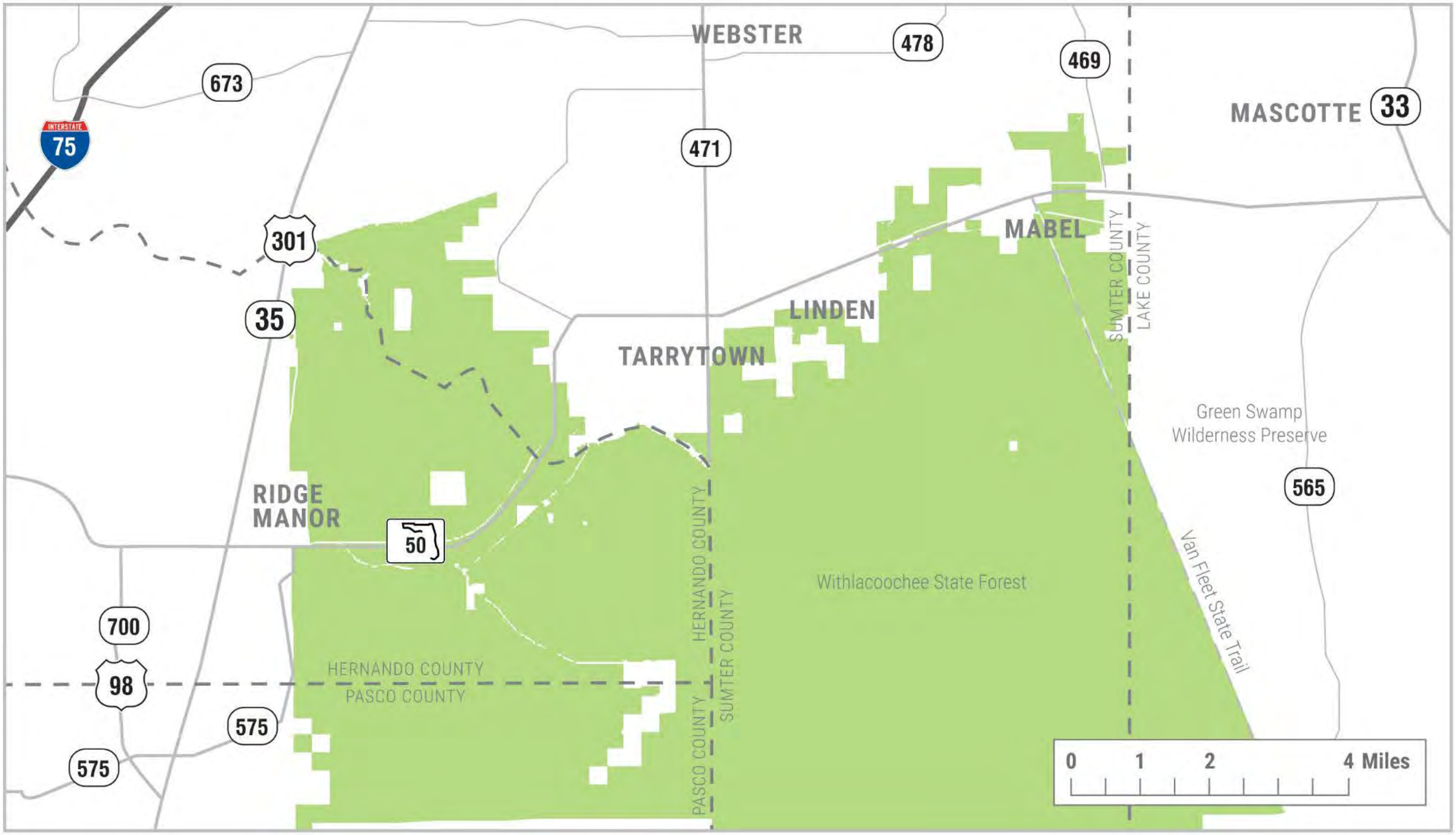
Social Environment

The existing land use has three areas of development at both ends and in the middle of the study corridor. The land use at the corridor’s western terminus (Ridge Manor) consists primarily of public/institutional parcels and single-family residences. There are also office and commercial parcels adjacent to U.S. 301. The eastern terminus (City of Mascotte) has the same major land use elements but includes industrial and commercial elements as well. In the study corridor’s middle, the land use near Tarrytown at S.R. 471 contains residential, public, commercial, and industrial components. Most of the land uses south of the corridor are coded as conservation, while most of the land uses in the north are categorized as agriculture.

The Mascotte City Hall near the project’s eastern end at MP 4.122 (Sta. 576) is the only governmental/institutional facility immediately adjacent to the study corridor. There are multiple cemeteries and religious facilities along or near the corridor. These are listed below.

- At MP 1.380 (Sta. 94) of S.R. 50 (18020000): Church of God of Linden
- At MP 1.440 (Sta. 95) of S.R. 50 (18020000): First Baptist Church of Linden
- At MP 1.520 (Sta. 99) of S.R. 50 (18020000): Linden United Methodist Church
- At MP 1.823 (Sta. 113) of S.R. 50 (18020000): Linden Cemetery
- At MP 0.160 (Sta. 365) of S.R. 50 (11070000): Rose of Sharon Worship Center
- At MP 2.122 (Sta. 471) of S.R. 50 (11070000): Stuckey Memorial Cemetery
- At MP 2.190 (Sta 473) of S.R. 50 (11070000): St. Paul’s A.M.E. Church
- At MP 2.810 (Sta. 505) of S.R. 50 (11070000): Faithful and True Ministries
- At MP 3.006 (Sta. 517) of S.R. 50 (11070000): La Primera Iglesia Bautisa De Mascotte
- At MP 3.520 (Sta. 545) of S.R. 50 (11070000): Mascotte Cemetery
- At MP 3.650 (Sta. 552) of S.R. 50 (11070000): The Mascotte Church
- At MP 3.871 (Sta. 564) of S.R. 50 (11070000): First Missionary Baptist Church

Figure 23: Richloam Tract of the Withlacoochee State Forest



Overall, future land use along the corridor does not vary from the existing land use. However, the land uses in the southeast quadrant are planned to be converted from agriculture to conservation.

The General James Van Fleet Trail State Park is a part of Florida's Statewide System of Greenways and Trails. It is an old railroad corridor converted to recreational use from Polk City in Polk County to Mabel at S.R. 50 in Sumter County. It is a rural, paved rail to trail and traverses through the Green Swamp and Withlacoochee River, ending at S.R. 50 in the north where it will connect with two planned future trails, the South Sumter Connector Trail and the South Lake Trail. These two trails will become a part of the Coast-to-Coast Trail as discussed in Section 2.2.

S.R. 50, from just west of C.R. 469 to C.R. 478A, is also classified as part of the Scenic Sumter Heritage Byway, which is included in the Florida Scenic Highways Program, Central Region. The goal of the Byway is to "Promote and protect the natural beauty, recreational potential, and outstanding historical resources and traditions of the Scenic Sumter Heritage Byway for residents, visitors, and future generations." The Byway traverses several small towns such as Sumterville, Bushnell, and Webster. It also passes through multiple attractions, ranches, and farms. There are two Scenic Sumter Heritage Byway resources along S.R. 50 within the project's corridor. The first is the Richloam Wildlife Management Area consisting of more than 58,000 acres providing hunting, fishing, wildlife viewing, camping, and horseback riding. The second resource is the previously mentioned Van Fleet Trail State Park. A map of the Scenic Sumter Heritage Byway can be found in **Figure 24**.

There are recorded historic and archaeological resources along S.R. 50. These have been documented in the *Cultural Resources Assessment Survey* (CRAS). This document is in the FDOT files and is available for review upon request.

Natural Environment

The S.R. 50 has multiple wetlands along the study corridor. The wetland locations are documented in the project's *Natural Resources Evaluation* (NRE) Report. The NRE also documents the research and field reviews for federally and state protected wildlife and plant species found along the corridor. The NRE is in the FDOT project files and is available for review.

Physical Environment

A *Contamination Screening Evaluation Report* (CSER) has been conducted for this project. The CSER has identified and documented 19 low risk and 33 medium and high risk contamination site along and near the S.R. 50 corridor. The CSER is in the FDOT project files and is available for review.

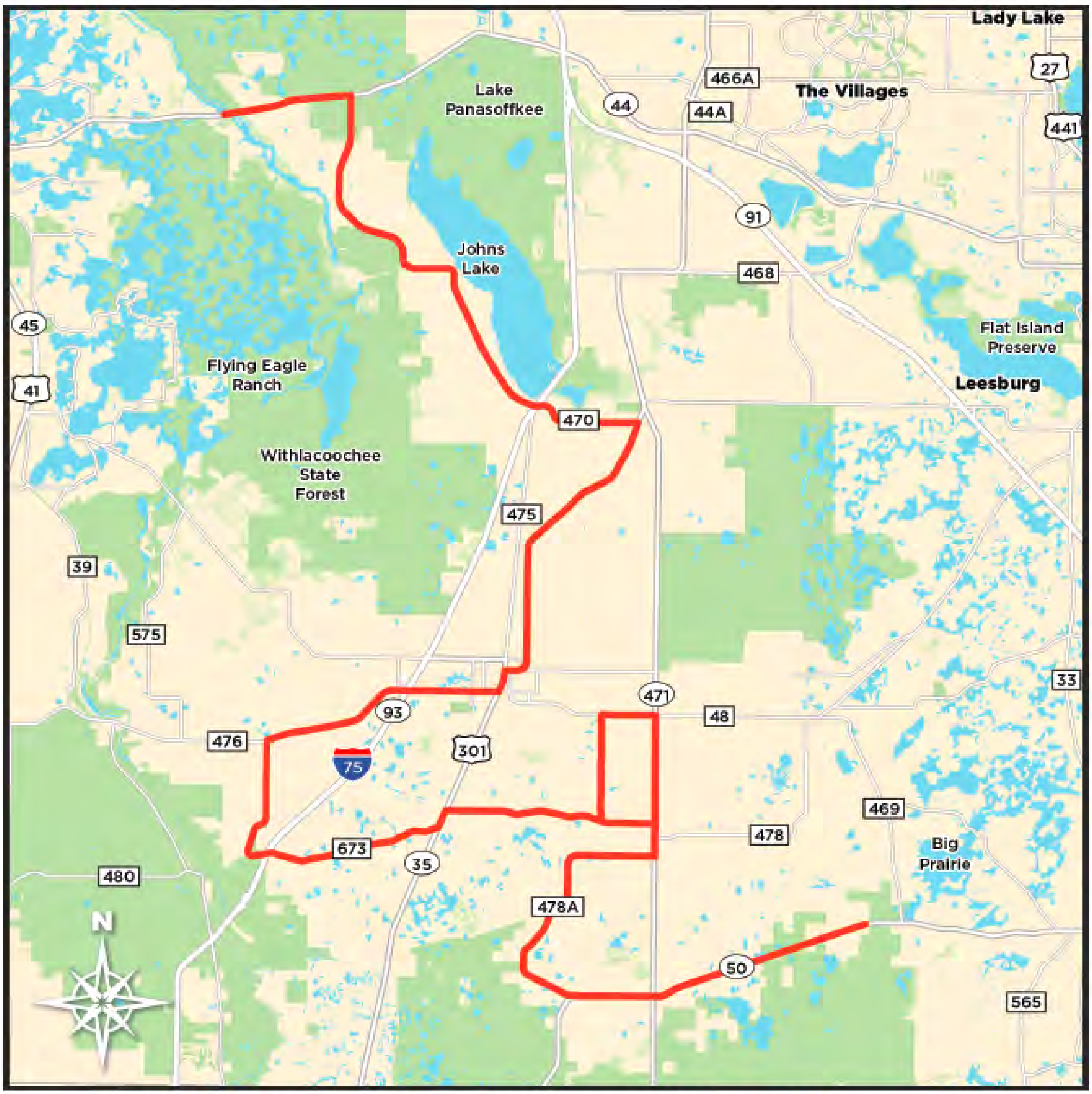
Figure 24: Scenic Sumter Heritage Byway

FLORIDA SCENIC HIGHWAYS
Real Places. Real Stories...

Scenic Sumter Heritage Byway

Length of the Byway: 62 Miles
Designation Date: May 2, 2013
FDOT District: 5
Website: sumterbyway.com

Clearly off the beaten path from Florida's surf and sand, this byway traverses pastoral farmlands, cattle ranches and horse farms with wide open green fields along with quiet country towns, lush hardwood forests, and a slow moving river lined with moss covered cypress trees. Bass fishing in the Withlacoochee River and Lake Panasoffkee is a popular attraction.



FDOT For more about our byway collection, visit **floridascenichighways.com**
Florida Scenic Highways is a program of the Florida Department of Transportation

2.18 UTILITIES

Thirteen Utility Agencies/Owners (UAO) have been identified within the project area through utility coordination efforts and a Sunshine 811 Design Ticket. **Table 21** identifies the UOA's contacted and a description of their facilities located on the project (utility company contact information can be found in the *S.R. 50 435859-1-22-01 Utility Assessment Package*). In accordance with Part 2, Chapter 10 of the PD&E Manual, the utility providers listed in **Table 21** were notified of the proposed improvements and they submitted files to identify easements and the location of their existing/planned utilities within the project area. Additional information regarding the existing utilities and anticipated impacts can be found in Section 6.6 and in the *S.R. 50 435859-1-22-01 Utility Assessment Package*.

Table 21: Existing Utilities in the Study Area

Utility Company	Facility	Description
Charter Communications	CATV/BTV	• Aerial facilities along the south side of S.R. 50 from C.R. 469 to S.R. 33. • Buried service drops throughout aerial limits.
Hernando County Utilities	Water	• Existing 2” water line along the north side of S.R. 50 and west side of U.S. 301 (Tremain Blvd.) • ***Future*** facilities include a 16” water main along the south side of S.R. 50 and a 12” water main crossing S.R. 50 just east of U.S. 301 (Tremain Blvd.)
AT&T Distribution	FOC/Phone	• FOC along north side of S.R. 50 from U.S. 301 to Elizabeth Ave. • FOC along the south side of S.R. 50 from Elizabeth Ave to S.R. 33.
AT&T Corp	FOC	• No Facilities
Sumter Electric Cooperative, Inc. (SECO)	Electric	• Aerial distribution electric along S.R. 50 from Porter Gap Road to Elizabeth Ave. in the City of Mascotte.
Century Link	FOC/Phone	• Buried FOC and copper cable along the south side of S.R. 50 from U.S. 301 to C.R. 755. • Buried FOC cable along the south side of S.R. 50 from C.R. 755 to C.R. 773. • Buried copper cable along the north side of S.R. 50 from C.R. 755 to C.R. 773. • Buried FOC along the south side of S.R. 50 and buried copper along the north side of S.R. 50 continue from C.R. 773 to S.R. 33.
Withlacoochee River Electric Cooperative	Electric	• Distribution electric on the western portion of the project, primarily along U.S. 301. • Aerial distribution electric on the south side of S.R. 50 from U.S. 301 to C.R. 575, aka Burwell Rd.
Verizon/MCI	FOC	• Single buried fiber crossing S.R. 50 just east of C.R. 773. The FOC line is in an easement outside the limits of the S.R. 50 ROW.
Spectra Energy Sabal Trail	36” Trans. Gas Pipeline	• 36” high pressure natural gas pipeline crossing S.R. 50 just east of C.R. 469 adjacent to the power company transmission line easement.
City of Mascotte	Water/Sewer	• 2” water line on north side of S.R. 50 from Palmwood Ave. to Elizabeth Ave. • 8-12” water main along south side of S.R. 50 from Palmwood Ave. to S.R. 33. • Lift station at the southwest corner of S.R. 50 and Talbott Ave. • 4” force main along south side of S.R. 50 from Talbott Ave. to S.R. 33.
Duke Energy-Dist.	Electric	• Aerial distribution electric servicing the City of Mascotte. Facilities are primarily located along the south side of S.R. 50 from Elizabeth Ave. to S.R. 33.
Duke Energy-Trans.	Transmission Electric	• 500kV transmission line located in a 190’ easement crosses S.R. 50 just east of C.R. 469.
Duke Energy-Fiber	Fiber	• No Facilities

2.19 RAILROAD CROSSINGS

The project includes one CSXT railroad grade crossing located along S.R. 50 at approximately Station 1865+00 (570' east of Ridge Manor Boulevard). **Table 22** summarizes the characteristics and location of the existing railroad crossing identified on the project.

Table 22: CSXT Railroad Crossing Characteristics

Crossing Element	S.R. 50
National Grade Crossing No.	625307P
No. of Tracks	1
Railroad Milepost	787.35
Type of Crossing	Public
Safety Index	608
Crashes Reported (past 5 years)	0
Crossing Surface	Concrete
Traffic Control Equipment	4 cross buck signs and 2 each W10-1 signs. 2 Bells, 2 cantilevered flashing lights over the traffic lanes, 2 gates and 8 pairs of Flashing Lights
Maintained By	State
Average No. of Trains (per day)	16 (7 daytime, 8 nighttime, 1 switching)
Average Crossing Speed (MPH)	55-60
Average School Bus Count (per day)	7 (2014 survey)
Recent Repairs (past 3 years)	3 (emergency)

2.20 EXISTING TRAFFIC ANALYSIS

Forty-three (43) intersections along the study corridor were analyzed for existing conditions. Data was collected at the 43 existing intersections in January and February 2017 to provide a comprehensive snapshot of existing conditions and inform decisions regarding access management. Many of these 43 locations are low volume residential or farm access points expected to maintain low trip generation through the design year. Of the study intersections, two are signalized intersections (S.R. 471 and C.R. 33) and the remaining are two-way stop-controlled (TWSC) intersections. The U.S. 301 signalized intersection is being reconstructed as part of FDOT District 7 Financial Management (FM) Number 416732-3, thus the reason it was not included in the traffic analysis.

Intersection geometry was determined using Google Earth Aerials flown in March 2017, project aerials flown in January 2017, and multiple field reviews performed throughout the project. Details on the data collection and existing conditions methodology can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

Existing Peak Hour Intersection Operations

Existing intersection LOS analyses were conducted using *2010 Highway Capacity Manual (HCM)* methodologies as implemented by Synchro 9. **Figure 25** through **Figure 29** summarize the existing AM and PM peak hour intersection operations and turning movement volumes, along with the existing lane configurations. For the two-way stop-controlled (TWSC) intersections, the critical movement is shown, along with the volume-to-capacity (v/c) ratio, and delay for the critical movement. For the signalized intersections, the delay and LOS shown represent the overall intersection.

All movements operate with a v/c ratio of less than 1.0 and with a LOS of C or better during both the AM and PM peak hours at intersections west of Tuscanooga Road. South Bay Lake Road and Howard Avenue in Mascotte each have side street left-turn movements operating with a LOS E during the PM peak hours. All other analyzed intersections in Mascotte east of Tuscanooga Road operate with a LOS D or better and with a v/c ratio of less than 1.0. Synchro 9 output results can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

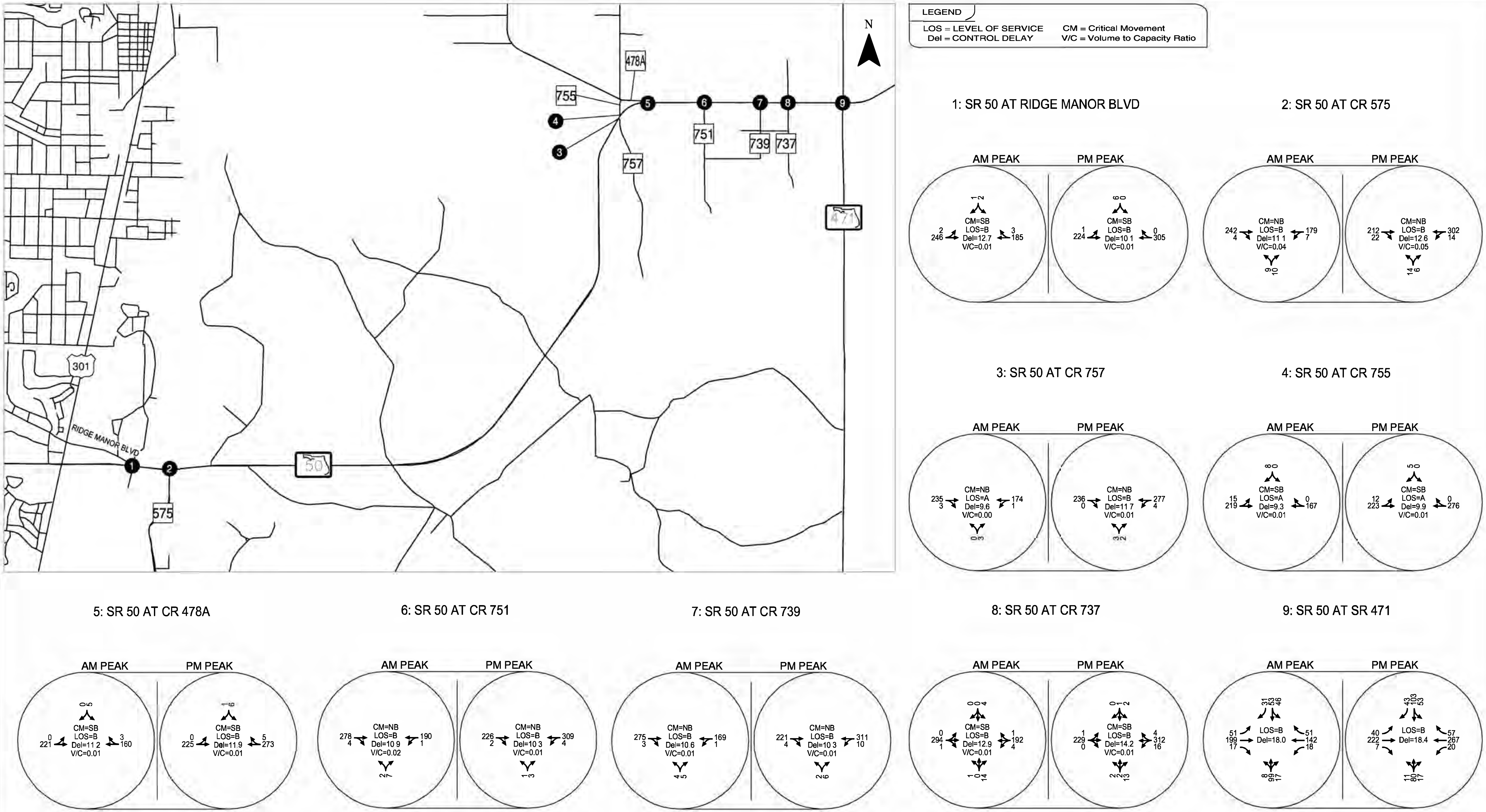
Existing Peak Hour Arterial Operations

An analysis of the uninterrupted flow of two-lane highway segments was performed using the *HCM 2010* procedures as implemented in HCS software for the S.R. 50 study corridor. Two-lane highway operations are influenced by vehicle travel speeds and the presence or absence of passing zones. The level of service for these two-lane highway facilities is based upon Average Travel Speed (ATS) and the Percent Time Spent Following (PTSF) for Class I Highways, PTSF for Class II Highways, and Percent Free Flow Speed (PFFS) for Class III Highways. The methodology presents only a directional segment analysis. The LOS thresholds for two-lane highways are summarized in **Table 23**.

Table 23: LOS for Two-Lane Highways (HCM 2010)

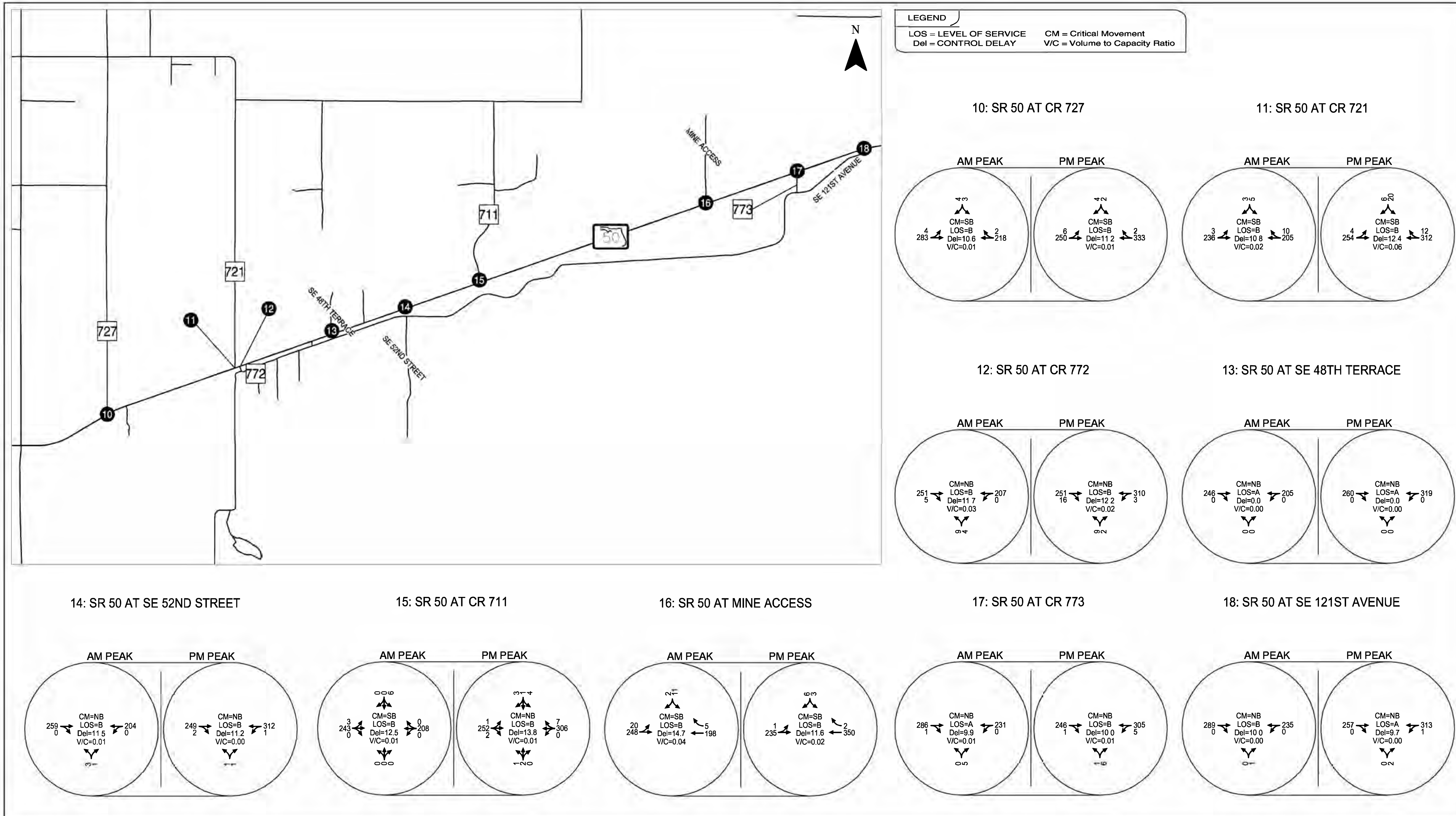
LOS	Class I Highways		Class II Highways	Class III Highways
	ATS (MPH)	PTSF (%)	PTSF (%)	PFFS (%)
A	>55	≤35	≤40	>91.7
B	>50-55	>35-50	>40-55	>83.3-91.7
C	>45-50	>50-65	>55-70	>75.0-83.3
D	>40-45	>65-80	>70-85	>66.7-75.0
E	≤40	>80	>85	≤66.7

*Source: *HCM 2010*



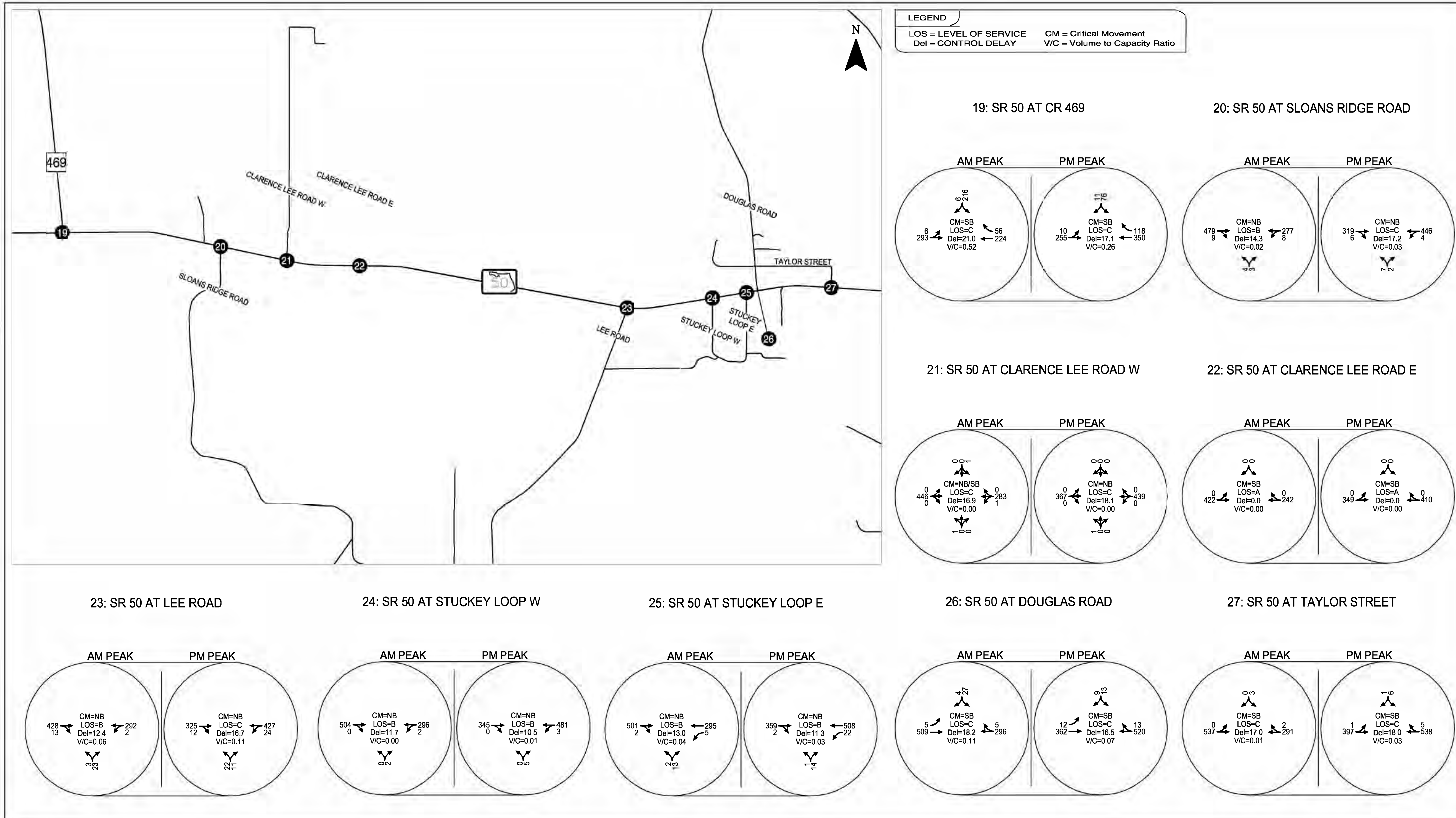
EXISTING (2017) INTERSECTION OPERATING CONDITION
RIDGE MANOR BOULEVARD TO S.R. 471

FIGURE **25**



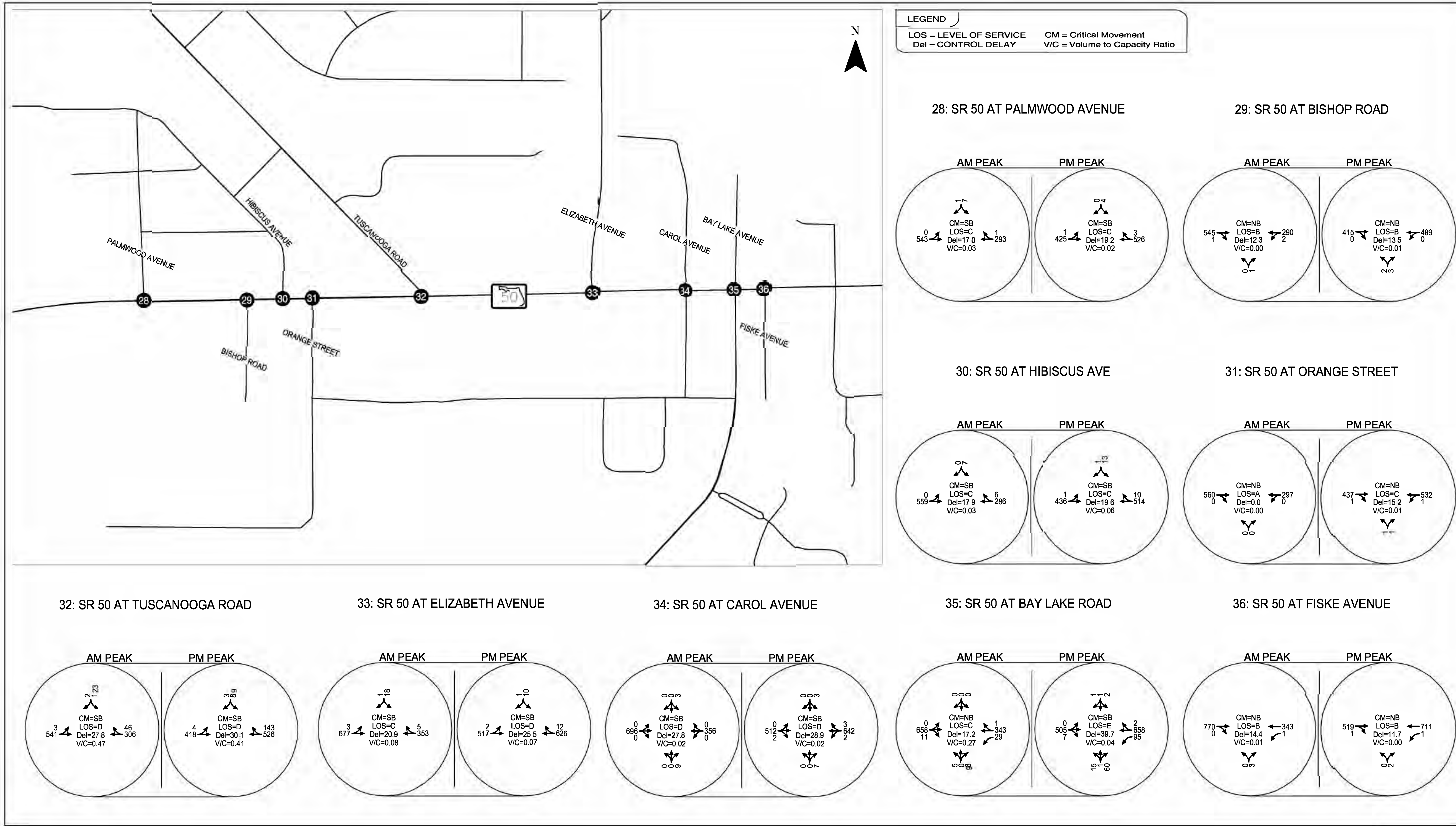
EXISTING (2017) INTERSECTION OPERATING CONDITION
C.R. 727 TO SE 121ST AVENUE

FIGURE 26



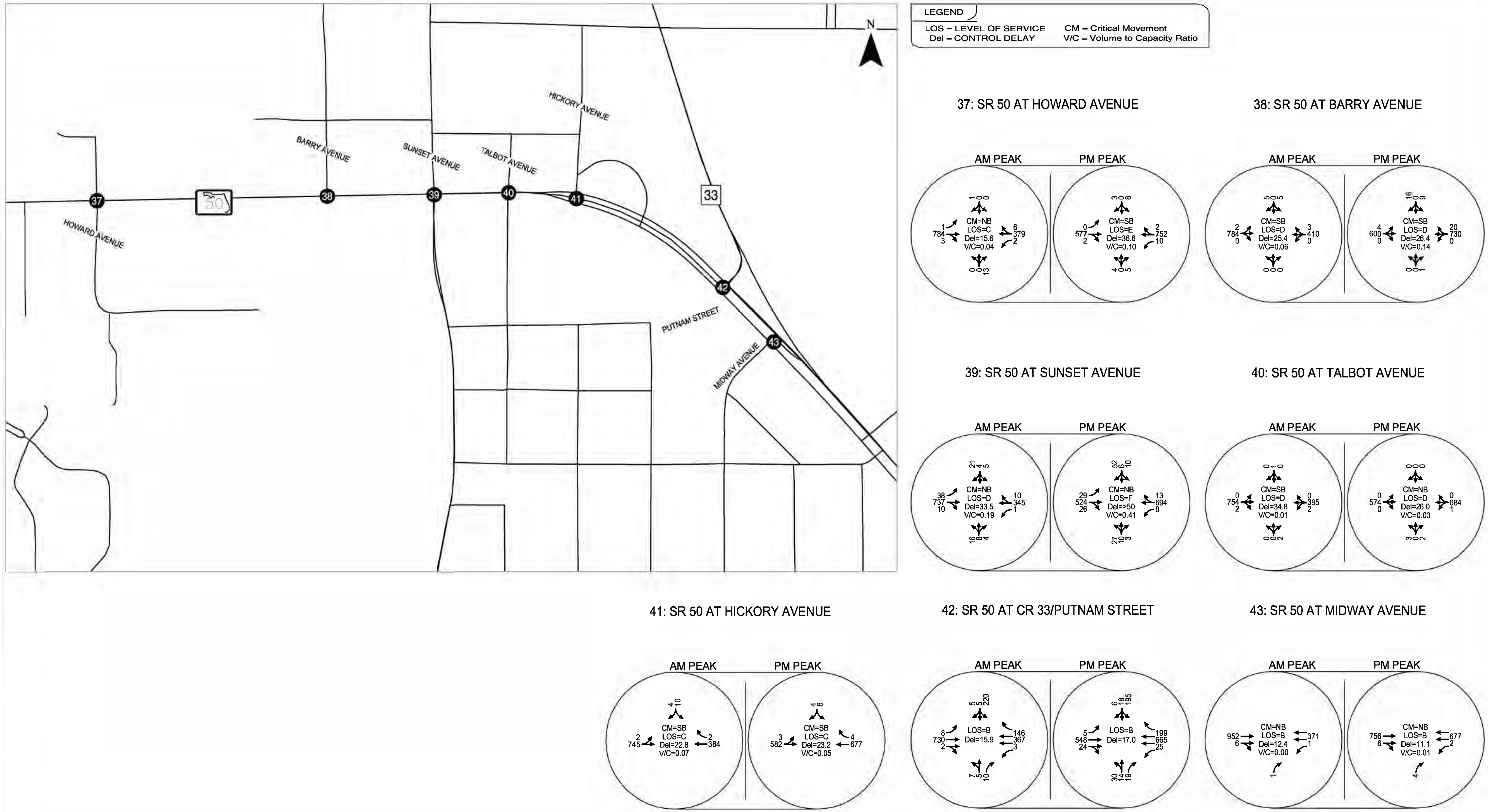
EXISTING (2017) INTERSECTION OPERATING CONDITION
C.R. 469 TO TAYLOR STREET

FIGURE
27



EXISTING (2017) INTERSECTION OPERATING CONDITION
PALMWOOD AVENUE TO RISKE AVENUE

FIGURE
28



EXISTING (2017) INTERSECTION OPERATING CONDITION
HOWARD AVENUE TO MIDWAY AVENUE

FIGURE
29

From U.S. 301 to Tuscanooga Road, S.R. 50 is classified as a Class I Highway (LOS threshold shown in the second and third columns of **Table 23**). Class I Highways include daily commuter routes and major links serving mostly long-distance strips in state or national networks. Motorists expect to travel at relativity high speeds. The westbound direction of travel for S.R. 50 from Tuscanooga Road to C.R. 33 exhibits characteristics of a Class III Highway (LOS threshold shown in the last column of **Table 23**). Class III Highways serve moderately developed areas where there is often a mix of local and regional traffic. The number of driveways and cross-streets on Class III Highways is noticeably higher than Class I Highways, and they usually have reduced speed limits. The results of segment analysis for the eastbound and westbound directions are summarized in **Table 24** and **Table 25**, respectively.

The Tuscanooga Road to C.R. 33 section of S.R. 50 was analyzed using the *HCM 2010* Urban Street methodologies as implemented by HCS software for the eastbound direction only. In the westbound direction, heading out of Mascotte, there is no signal or stop sign to interrupt through travel; therefore the *HCM* Two-Lane Highway analysis for uninterrupted flow conditions is most appropriate. When traveling in the eastbound direction, however, the signal at C.R. 33 interrupts vehicle flow, adding stops and delay which impact average travel speeds along the segment. The number of vehicles that can travel through the segment is effectively controlled by the traffic signal at the C.R. 33 intersection. The Urban Street methodology more appropriately captures these effects. The results of this analysis are shown in **Table 26**. HCS output results can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

Table 24: Existing 2017 Segment LOS – Eastbound Direction Only (HCM Two-Lane Highway)

S.R. 50 Section	Analysis Direction	BFFS (MPH)	AM Peak Hour			PM Peak Hour		
			ATS (MPH)	PTSF (%)	LOS	ATS (MPH)	PTSF (%)	LOS
U.S. 301 to C.R. 757	Eastbound	70	61.6	49.9	B	61.5	46.0	B
C.R. 757 to C.R. 469	Eastbound	65	55.0	53.6	C	55.1	51.1	C
C.R. 469 to Tuscanooga Road	Eastbound	65	49.6	76.2	D	51.1	61.4	C

Note: **BFFS** is Base Free Flow Speed, **ATS** is Average Travel Speed, and **PTSF** is Percent Time Spent Following

Table 25: Existing 2017 Segment LOS – Westbound Direction Only (HCM Two-Lane Highway)

S.R. 50 Section	Analysis Direction	BFFS (MPH)	AM Peak Hour			PM Peak Hour		
			ATS (MPH)	PTSF (%)	LOS	ATS (MPH)	PTSF (%)	LOS
U.S. 301 to C.R. 757	Westbound	70	61.7	44.5	B	61.2	54.4	C
C.R. 757 to C.R. 469	Westbound	65	54.9	52.1	C	54.7	56.2	C
C.R. 469 to Tuscanooga Road	Westbound	65	50.8	57.9	C	50.8	68.6	D
Tuscanooga Road to C.R. 33	Westbound	51	-	73.3*	D	-	71.5*	D

***Note**: Segment 4 exhibits characteristics of a Class III Highway and the LOS is based on Percent Free Flow Speed (PFFS)

Table 26: Existing 2017 Segment LOS – Eastbound Direction Only (HCM Urban Street)

S.R. 50 Section	Analysis Direction	# Lanes	AM Peak Hour			PM Peak Hour		
			PBFFS* (%)	V/C Ratio	LOS	PBFFS* (%)	V/C Ratio	LOS
Tuscanooga Road to C.R. 33	Eastbound	1	82.94	0.51	B	83.72	0.51	B

***Note: PBFFS** is the Percent of Base Free Flow Speed

2.21 HISTORICAL SAFETY ASSESSMENT

Crash records were obtained for S.R. 50 between U.S. 301 and C.R. 33 for the most recent five-year period on record (2011 through 2015). The crash data was obtained from FDOT's Crash Analysis Reporting System (CARS). This section summarizes the corridor wide crash statistics and then reviews crash data for the high crash locations along the study corridor. A detailed review of fatal crash incidents is also discussed.

Corridor Wide Crash Statistics

Figure 30 displays a summary of crash frequency by year along with the respective severities from 2011 to 2015. There was a total of 189 reported crashes during this period, 98 (52 percent) resulted in at least one injury and 11 (6 percent) resulted in at least one fatality. As displayed in **Figure 30**, the crashes per year along the corridor increase from a low of 32 in 2011 to a high of 46 in 2013, but has since decreased to 34 in 2015. A detailed summary of the fatal crashes is included in **Appendix E**.

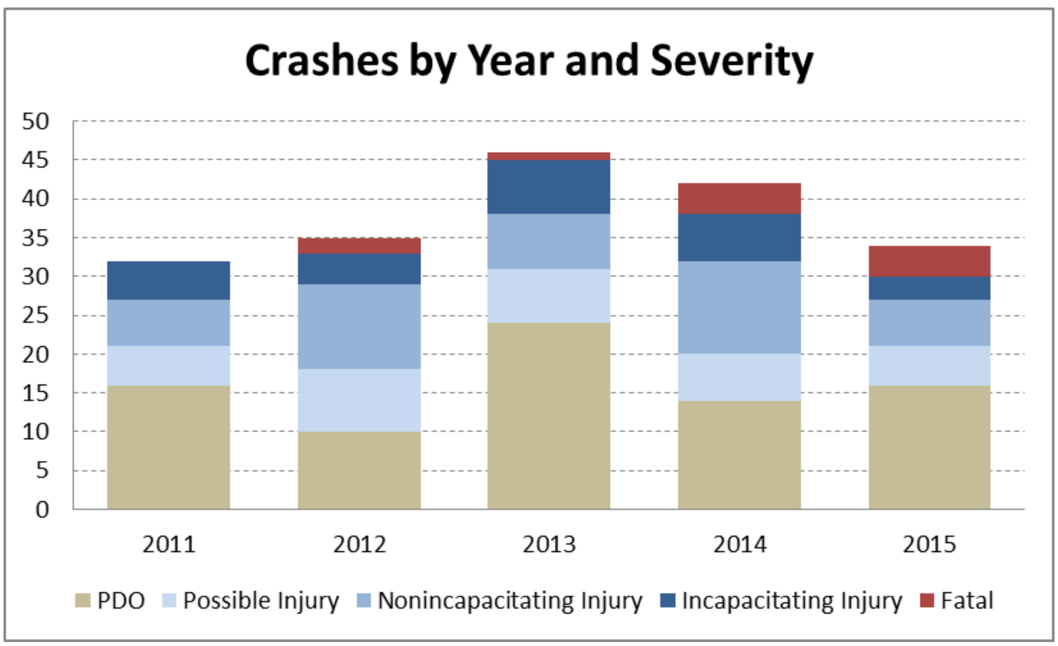


Figure 30: Crashes per Year (Corridor Wide)

Figure 31 displays the crashes along the corridor by type and severity for the five-year study period. The highest crash type observed was fixed object/run-off-the-road, comprising 30 percent of the total crashes. Rear end (25 percent) and angle crashes (10 percent) were the second and third highest crash types. These crash types are consistent with the existing two-lane undivided roadway geometric conditions that are present.

Of the 11 fatal crashes occurring over the 5-year study period, 7 were head on or fixed object/run-off-the-road crashes. Left turn, sideswipe, bicycle, and rollover each had one fatal crash. A detailed summary of the fatal crashes is included in **Appendix E**.

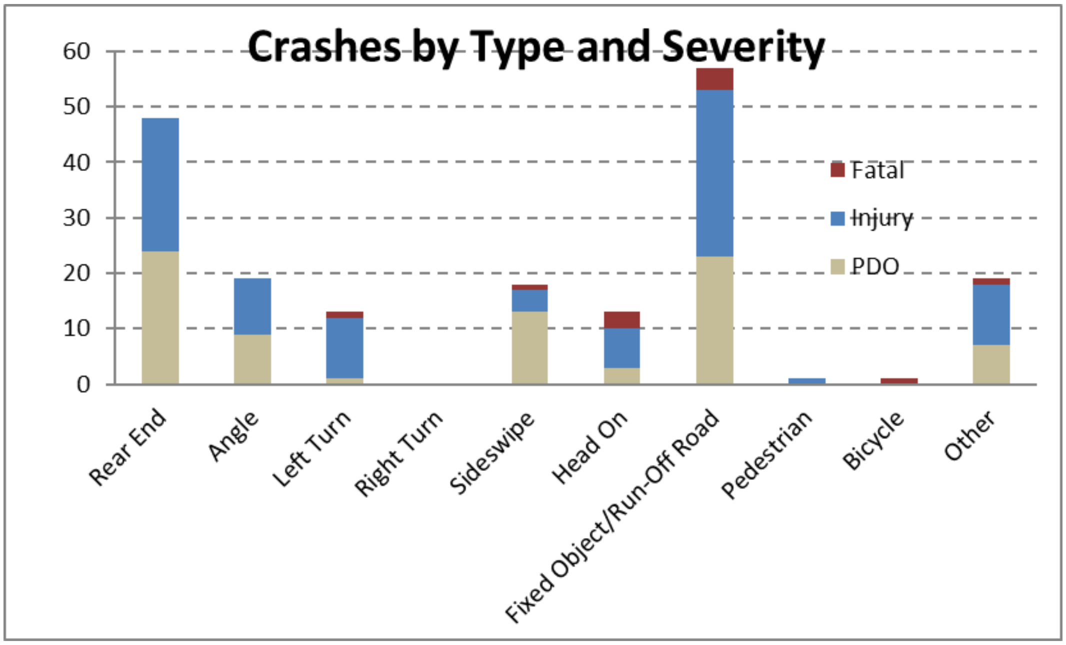


Figure 31: Crashes by Type and Severity (Corridor Wide)

Other crash statistics to note include the following:

- Crashes occurring during non-daylight hours accounted for 37 percent of the crashes.
- Crashes involving alcohol and/or drugs accounted for 7 percent of the crashes.
- The highest crash hours of the day were observed in the afternoon between 4 PM and 6 PM (19 percent of crashes). Ten percent of crashes were observed from 10 AM to 11 AM.
- Seven wildlife related crashes occurred along the study corridor, with three occurring within the State Forest portion of S.R. 50 between C.R. 711 and C.R. 469.

Safety Ratio Evaluation

The corridor's safety ratio was calculated to compare the annual crash rates of the corridor to the critical crash rates of similar facilities throughout FDOT District 7, District 5, and the State of Florida. The method takes into account the traffic volume along the corridor, considers the variance in crash data by including regional and statewide averages, and classifies roadway segment types into categories for more applicable comparisons. Crash rates were calculated for five segments and three intersections within the study area at the following locations:

- S.R. 50 at U.S. 301
- S.R. 50 from U.S. 301 to Hernando/Sumter County Line
- S.R. 50 from Hernando/Sumter County Line to S.R. 471
- S.R. 50 at S.R. 471
- S.R. 50 from S.R. 471 to Lee Road
- S.R. 50 from Lee Road to Tuscanooga Road
- S.R. 50 at Tuscanooga Road
- S.R. 50 from Tuscanooga Road to C.R. 33

The calculated rates were compared to critical rates for similar facilities across FDOT District 7, District 5, and the State of Florida. The safety ratio, calculated for each segment annually, is equal to the segment's actual crash rate divided by the Statewide (or Districtwide) critical crash rate. The Statewide and Districtwide 2011 to 2015 safety ratios for the segments noted above are displayed in **Table 27** and **Table 28**. A safety ratio greater than 1.0 means the segment or intersection is experiencing a higher crash rate compared to segments/intersections with similar roadway characteristics. Safety ratios greater than 1.0 are highlighted in red and safety ratios approaching 1.0 are highlighted in yellow.

Table 27: Statewide Segment Safety Ratios

Year	US 301/SR 35 to Hernando/Sumter Couty Line	Hernando/Sumter Couty Line to SR 471	SR 471 to Lee Road	Lee Road to Tuscanooga Road	Tuscanooga Road to CR 33
2011	0.256	0.310	0.524	0.618	0.760
2012	0.226	0.457	0.251	0.137	2.523
2013	0.414	0.418	0.497	0.752	0.771
2014	0.751	0.580	0.417	0.497	0.000
2015	0.258	0.313	0.286	0.587	0.579

Table 28: Districtwide Segment Safety Ratios

Year	US 301/SR 35 to Hernando/Sumter Couty Line	Hernando/Sumter Couty Line to SR 471	SR 471 to Lee Road	Lee Road to Tuscanooga Road	Tuscanooga Road to CR 33
2011	0.198	0.345	0.586	0.687	0.845
2012	0.173	0.557	0.309	0.166	3.070
2013	0.321	0.527	0.632	0.945	0.968
2014	0.513	0.678	0.490	0.579	0.000
2015	0.205	0.388	0.357	0.725	0.714

From a segment perspective, S.R. 50 from Tuscanooga Road to C.R. 33 in 2012 was the only segment to exceed the Statewide and Districtwide safety ratio of 1.0 during the analysis period. S.R. 50 from Lee Road to Tuscanooga Road and from Tuscanooga Road to C.R. 33 both observed a safety ratio between 0.90 and 1.00 in 2013.

The Statewide and Districtwide 2011 to 2015 safety ratios for the intersections noted above are displayed in **Table 29** and **Table 30**.

Table 29: Statewide Intersection Safety Ratios

Year	SR 50 at US 301/ SR 35	SR 50 at SR 471	SR 50 at Tuscanooga Road
2011	1.747	2.197	0.000
2012	2.084	0.492	0.000
2013	2.350	0.888	2.156
2014	3.614	0.427	0.000
2015	2.110	1.197	0.489

Table 30: Districtwide Intersection Safety Ratios

Year	SR 50 at US 301/ SR 35	SR 50 at SR 471	SR 50 at Tuscanooga Road
2011	1.198	2.007	0.000
2012	1.364	0.544	0.000
2013	1.494	0.870	2.651
2014	2.997	0.439	0.000
2015	1.529	1.194	0.552

Each of the three intersections analyzed along the S.R. 50 corridor exceeded the Statewide and Districtwide safety ratios of 1.0 for at least one of the five years. U.S. 301/S.R. 35 exceeded the safety ratios in each of the five analysis years. S.R. 471 exceeded the safety ratios in 2011 and 2015. Details of the safety ratio evaluation are included in **Appendix E**.

High Crash Locations

To determine high crash locations along the S.R. 50 study corridor, the 189 crashes were mapped using GIS software; the corresponding maps were visually reviewed. **Figure 33** through **Figure 36** displays the crash frequency maps for the study corridor. From this review, the following locations were identified for further analysis:

- The intersection of S.R. 50 and U.S. 301 accounted for 25 of the 189 crashes (13 percent) along the study corridor.
- S.R. 50 between Clay Sink Road and Porter Gap Road accounted for 6 of the 189 crashes (3 percent) along the study corridor.
- S.R. 50 from 0.30 miles south of C.R. 757 to C.R. 478-A accounted for 12 of the 189 crashes (6 percent) along the study corridor.
- The intersection of S.R. 50 and S.R. 471 accounted for 11 of the 189 crashes (6 percent) along the study corridor.
- S.R. 50 from 0.50 miles west of C.R. 711 to 0.30 miles east of C.R. 711 accounted for 7 of the 189 crashes (4 percent) along the study corridor.
- S.R. 50 from 0.25 miles west of Lee Road to Lee Road accounted for 10 of the 189 crashes (5 percent) along the study corridor.

- The intersection of S.R. 50 and Tuscanooga Road accounted for 5 of the 189 crashes (3 percent) along the study corridor.
- S.R. 50 between Tuscanooga Road and C.R. 33 accounted for 21 of the 189 crashes (11 percent) along the study corridor.

In total, crashes at these locations accounted for 97 of the 189 crashes (51 percent) along the S.R. 50 study corridor. The remainder of this section discusses these high crash locations in more detail. The raw crash data obtained from CARS can be found in **Appendix E**. A more detailed summary of the 2011 to 2015 corridor wide crash data set in tabular and graphical format is also provided in **Appendix E**.

S.R. 50 at U.S. 301 (25 crashes)

The signalized intersection of S.R. 50 with U.S. 301 accounted for 25 of the 189 crashes (13 percent) along the study corridor. **Figure 32** displays the crashes by type and severity at the intersection. The highest crash type observed was rear end, comprising 52 percent of the total crashes. Angle (16 percent), sideswipe (8 percent), and head on (8 percent) were the other highest crash types. There were zero fatal crashes and 12 injury crashes (48 percent) at the intersection. A more detailed summary of the S.R. 50 at U.S. 301 crash data set in tabular and graphical format is provided in **Appendix E**.

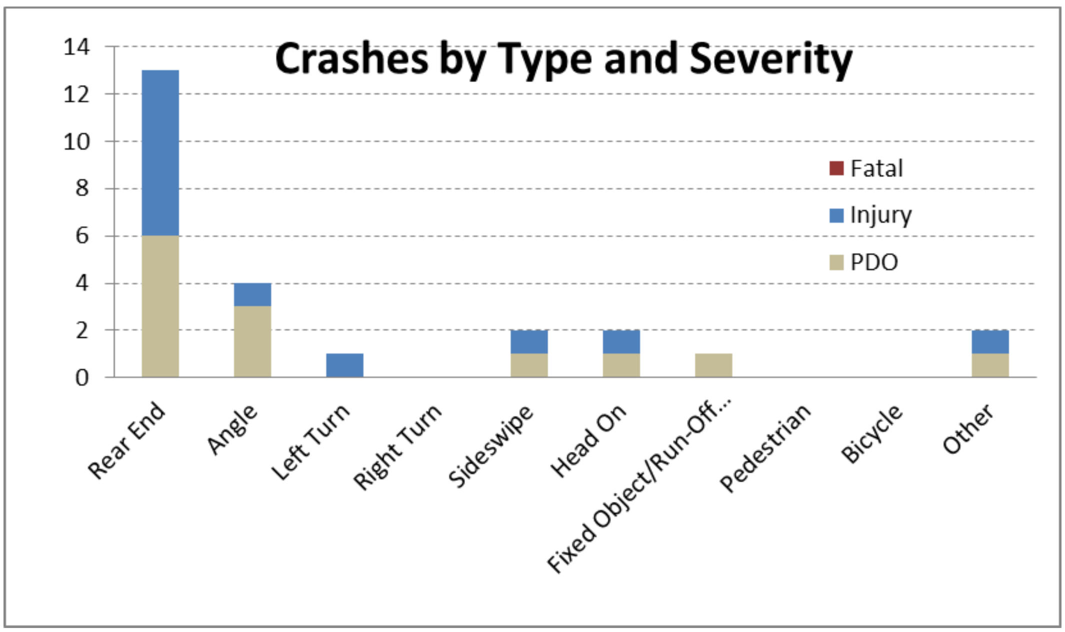


Figure 32: Crashes by Type and Severity (S.R. 50 at U.S. 301)

Figure 33: Crash Locations from U.S. 301 to the Hernando/Sumter County Line (2011 – 2015)

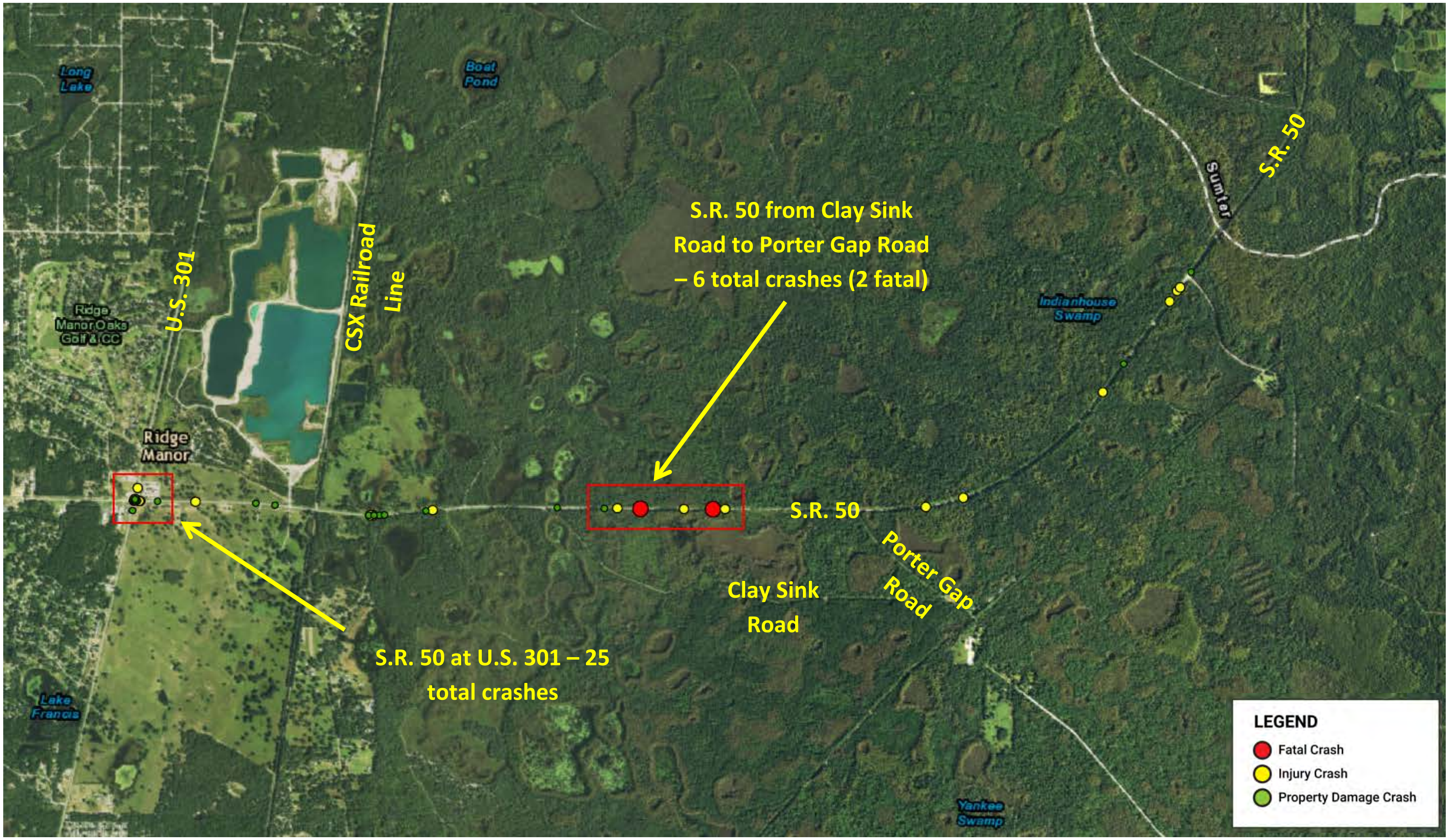


Figure 34: Crash Locations from the Hernando/Sumter County Line to C.R. 711 (2011 – 2015)

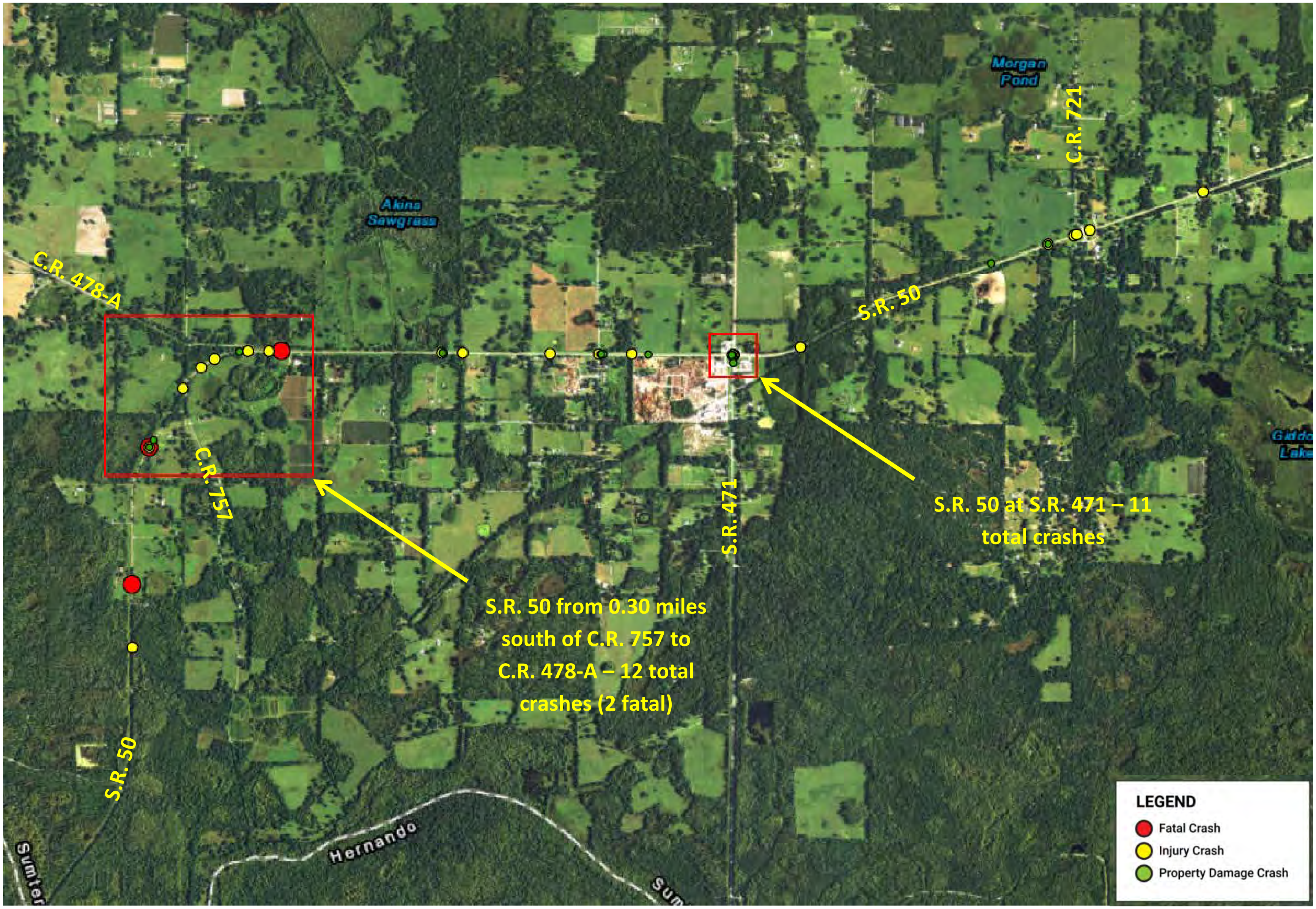


Figure 35: Crash Locations from C.R. 711 to East of the Sumter/Lake County Line (2011 – 2015)

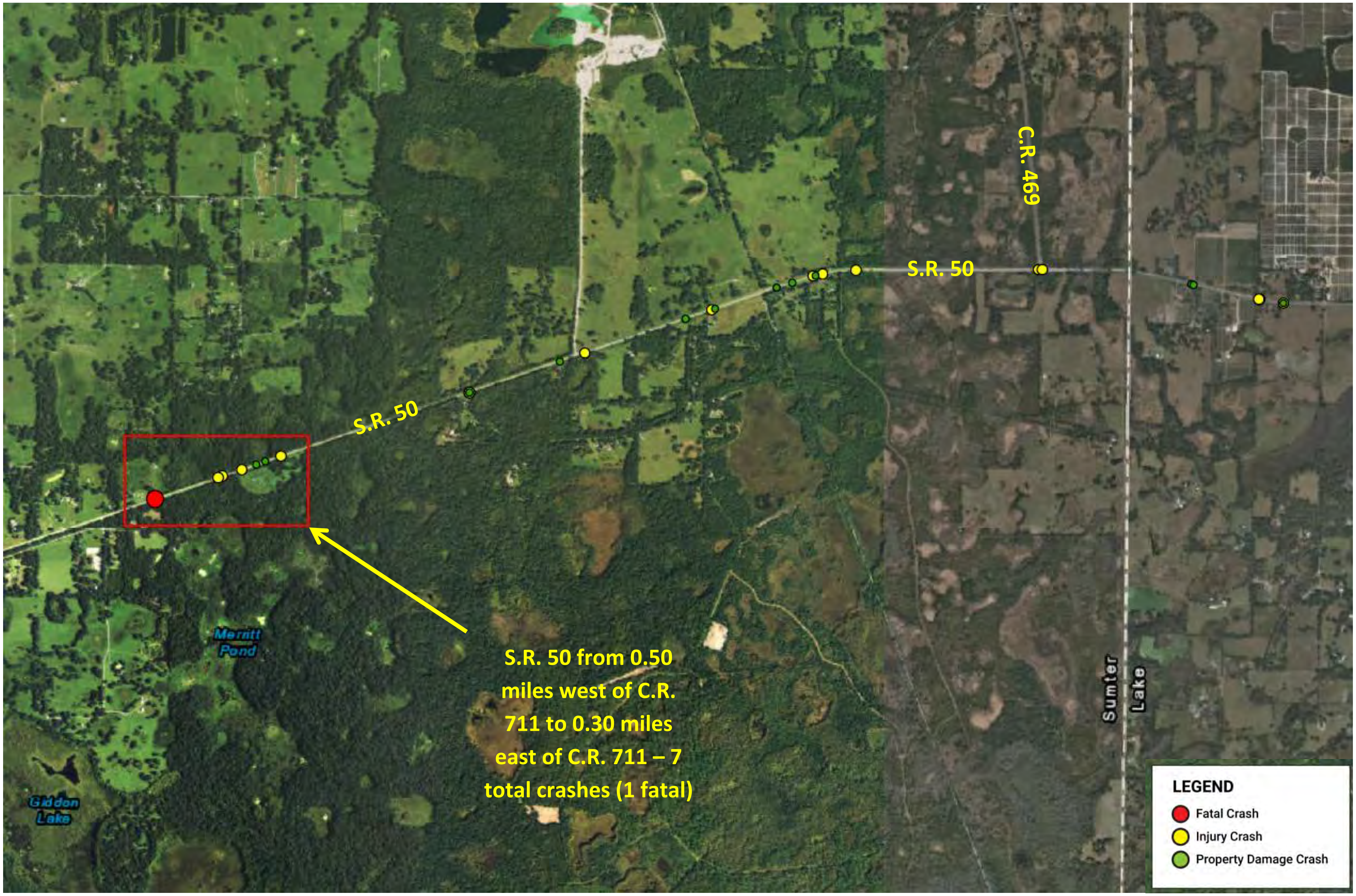
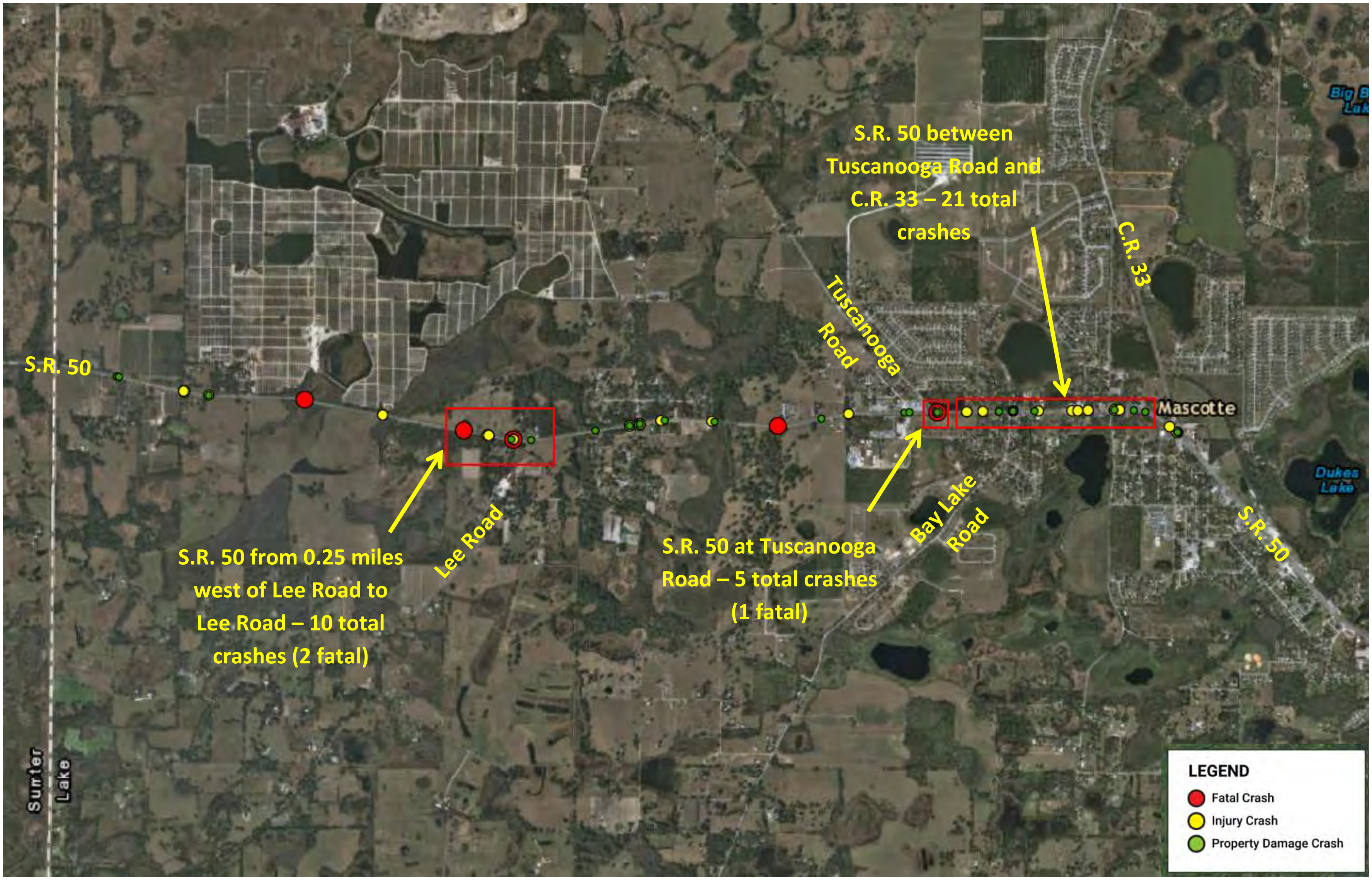


Figure 36: Crash Locations from East of the Sumter/Lake County Line to C.R. 33 (2011 – 2015)



S.R. 50 between Clay Sink Road and Porter Gap Road (6 crashes)

S.R. 50 between Clay Sink Road and Porter Gap Road accounted for six crashes, among which were two fatal crashes. **Figure 37** displays the crashes by type and severity along the segment. The highest crash type observed was fixed object/run-of-the-road, comprising 50 percent of the total crashes. Head-on, sideswipe, and bicycle had one crash each, with the head-on and bicycle crashes resulting in a fatality. Of the six crashes recorded at this location, four occurred at night, including both fatal crashes. Alcohol and/or drugs were contributing causes in two of the six crashes. A more detailed summary of the S.R. 50 between Clay Sink Road and Porter Gap Road data set in tabular and graphical format is provided in **Appendix E**.

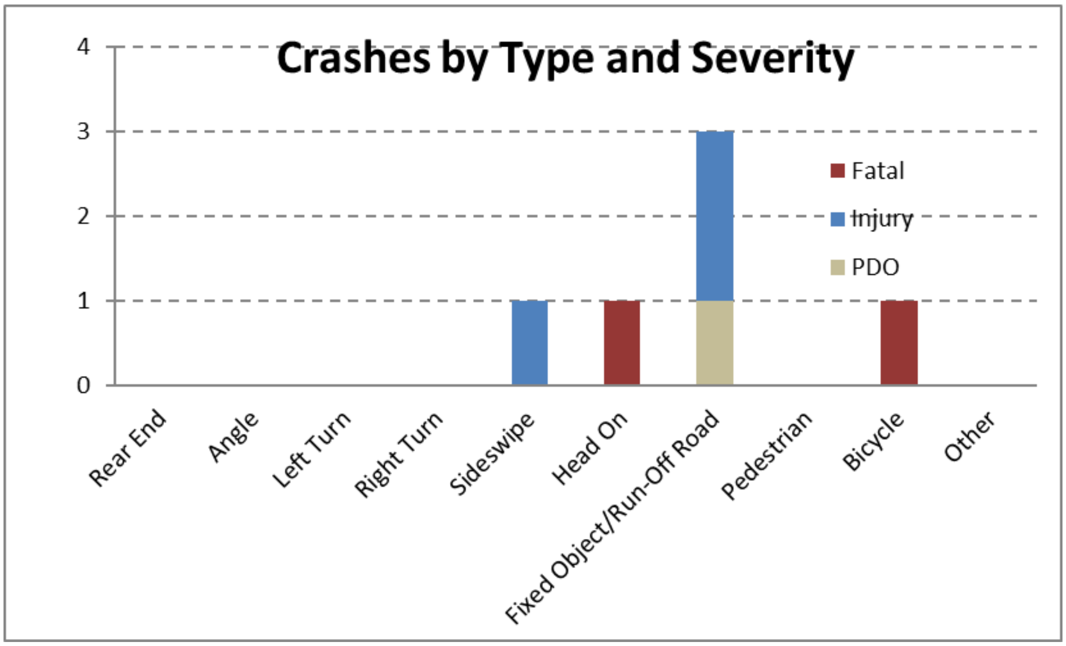


Figure 37: Crashes by Type and Severity (S.R. 50 between Clay Sink Road and Porter Gap Road)

S.R. 50 from 0.30 Miles South of C.R. 757 to C.R. 478-A (12 crashes)

S.R. 50 from 0.30 miles south of C.R. 757 to C.R. 478-A accounted for 12 of the 189 crashes (6 percent) along the study corridor. **Figure 38** displays the crashes by type and severity at the intersection. The highest crash type observed was fixed object/run-of-the-road, comprising 11 of the 12 crashes. There was one rear-end crash within this section. Two fatal fixed object/run-of-the-road crashes occurred within this section. Seven of the remaining 10 crashes resulted in at least one injury. Of the 12 crashes recorded at this location, four occurred at night, including one of the two fatal crashes. As noted in Section 2.10, the horizontal curve present through this section would require either radius or SE adjustments to meet current design standards. A more detailed summary of the S.R. 50 from 0.30 miles south of C.R. 757 to C.R. 478-A crash data set in tabular and graphical format is provided in **Appendix E**.

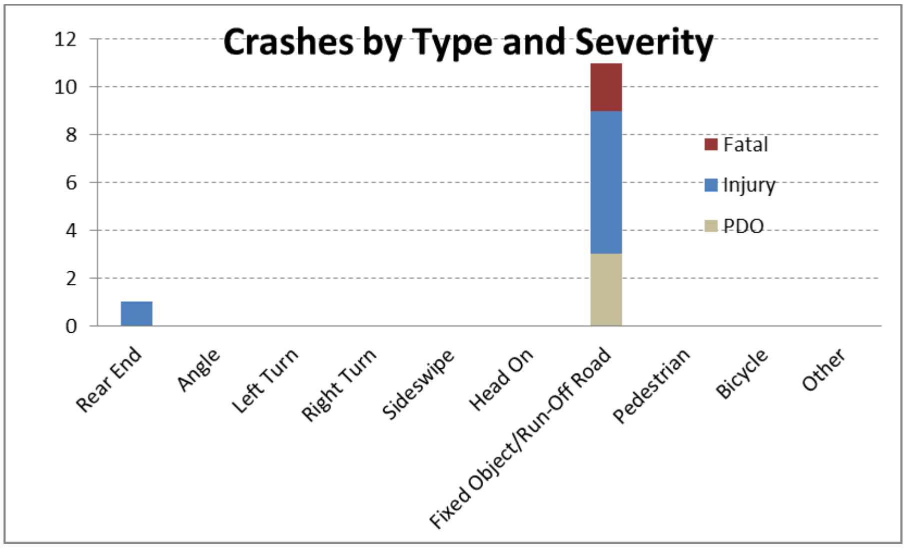


Figure 38: Crashes by Type and Severity (S.R. 50 from 0.30 Miles South of C.R. 757 to C.R. 478-A)

S.R. 50 at S.R. 471 (11 crashes)

The signalized intersection of S.R. 50 with S.R. 471 accounted for 11 of the 189 crashes (6 percent) along the study corridor. S.R. 471 is a signalized intersection with exclusive right turn lanes in the eastbound, westbound, and southbound directions. Exclusive left turn lanes are present in the eastbound and westbound directions with protected/permissive signal phasing. **Figure 39** displays the crashes by type and severity at the intersection. The highest crash type observed was rear end, comprising 46 percent of the total crashes. Angle (36 percent) was the second highest crash type. There were no fatal crashes at this intersection and six of the 11 crashes resulted in at least one injury. A more detailed summary of the S.R. 50 at S.R. 471 crash data set in tabular and graphical format is provided in **Appendix E**.

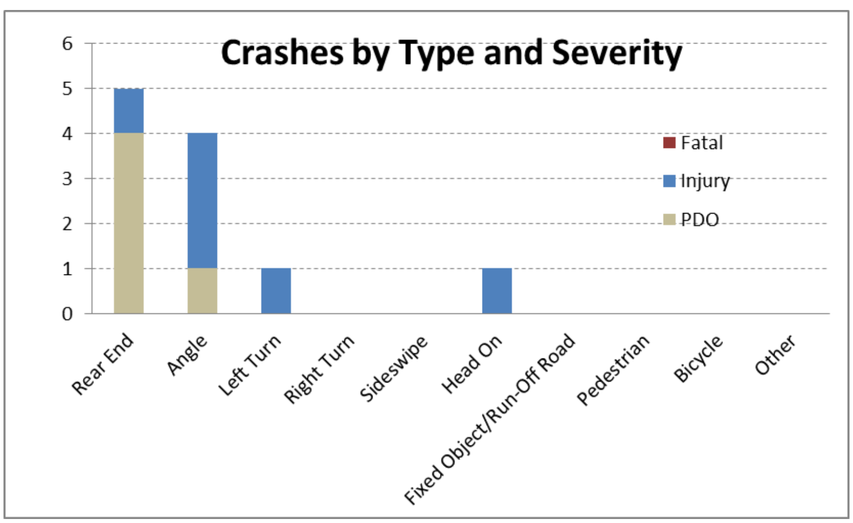


Figure 39: Crashes by Type and Severity (S.R. 50 at S.R. 471)

S.R. 50 from 0.50 Miles West of C.R. 711 to 0.30 Miles East of C.R. 711 (7 crashes)

S.R. 50 from 0.50 miles west of C.R. 711 to 0.30 miles east of C.R. 711 accounted for seven of the 189 crashes (4 percent) along the study corridor. **Figure 40** displays the crashes by type and severity along the segment. Fixed object/run-of-the-road (three crashes), angle (two crashes), and head-on (one crash, resulted in a fatality) were the highest crash types. Of the six crashes occurring in this section, five occurred during non-daylight conditions. A more detailed summary of the S.R. 50 from 0.50 miles west of C.R. 711 to 0.30 miles east of C.R. 711 crash data set in tabular and graphical format is provided in **Appendix E**.

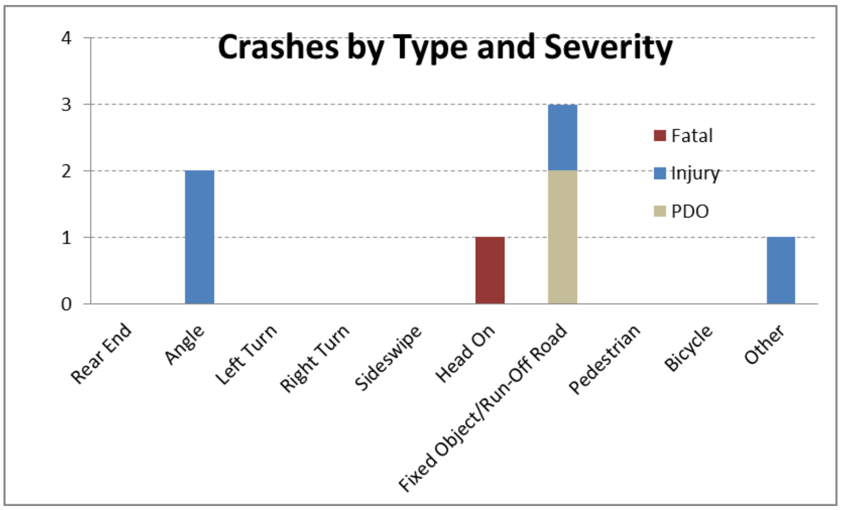


Figure 40: Crashes by Type and Severity (S.R. 50 from West of C.R. 711 to East of C.R. 711)

S.R. 50 from 0.25 Miles West of Lee Road to Lee Road (10 crashes)

S.R. 50 from 0.25 miles west of Lee Road to Lee Road accounted for 10 of the 189 crashes (5 percent) along the study corridor. Lee Road is an unsignalized t-intersection with no exclusive left or right turn lanes. Lee Road is aligned with a 70-degree skew from S.R. 50, with a curve located just east of the intersection. **Figure 41** displays the crashes by type and severity along the segment. The highest crash type observed was fixed object/run-of-the-road, comprising 30 percent of the total crashes. Rear end (two crashes) was the second highest crash type. Two fatal (one head-on and one fixed object/run-of-the-road) and six injury crashes occurred at this location. Of the 10 crashes recorded at this location, five occurred in non-daylight conditions. A more detailed summary of the S.R. 50 from 0.25 miles west of Lee Road to Lee Road crash data set in tabular and graphical format is provided in **Appendix E**.

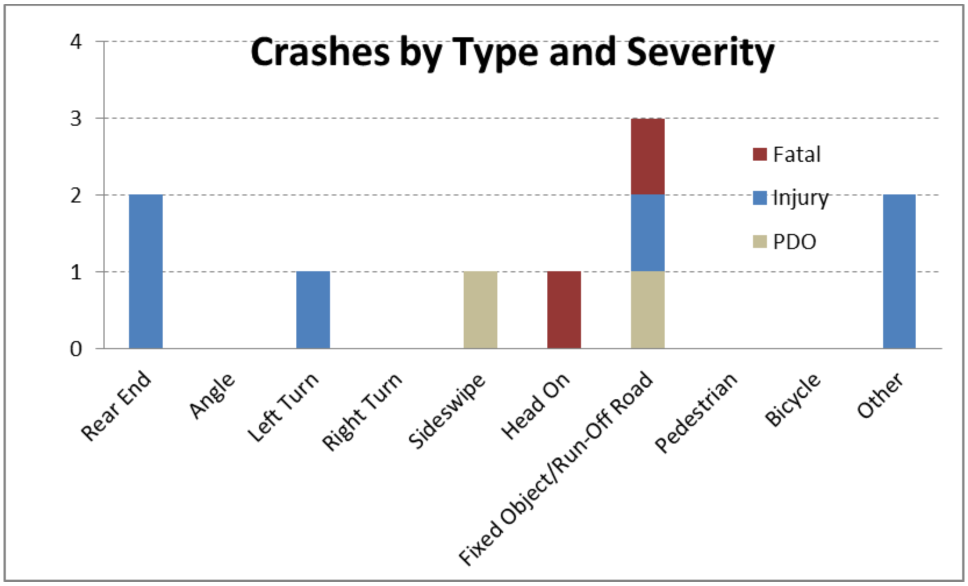


Figure 41: Crashes by Type and Severity (S.R. 50 from 0.25 Miles West of Lee Road to Lee Road)

S.R. 50 at Tuscanooga Road (5 crashes)

The unsignalized intersection of S.R. 50 with Tuscanooga Road accounted for five of the 189 crashes (3 percent) along the study corridor. **Figure 42** displays the crashes by type and severity at the intersection. Rear end, angle, head-on, and fixed object/run-of-the-road each had one crash at this intersection. The one fatal crash occurred when a motorcycle operator fell off his bike when he was making a left turn onto Tuscanooga Road. A more detailed summary of the S.R. 50 at Tuscanooga Road crash data set in tabular and graphical format is provided in **Appendix E**.

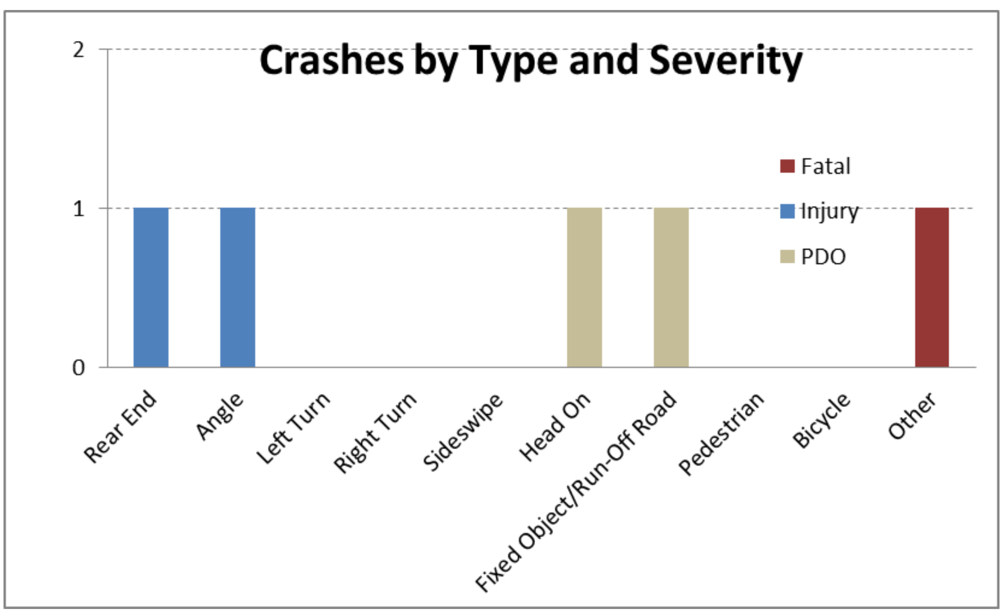


Figure 42: Crashes by Type and Severity (S.R. 50 at Tuscanooga Road)

S.R. 50 between Tuscanooga Road and C.R. 33 (22 crashes)

S.R. 50 between Tuscanooga Road and C.R. 33 accounted for 21 of the 189 crashes (11 percent) along the study corridor. **Figure 43** displays the crashes by type and severity along the segment. The highest crash type observed was rear end, comprising 43 percent of the total crashes. Angle (14 percent) and sideswipe (14 percent) were the second and third highest crash types. There were no fatal crashes and 10 injury crashes at this location. Thirty-three percent of the crashes occurred in non-daylight conditions. A more detailed summary of the S.R. 50 between Tuscanooga Road and C.R. 33 crash data set in tabular and graphical format is provided in **Appendix E**.

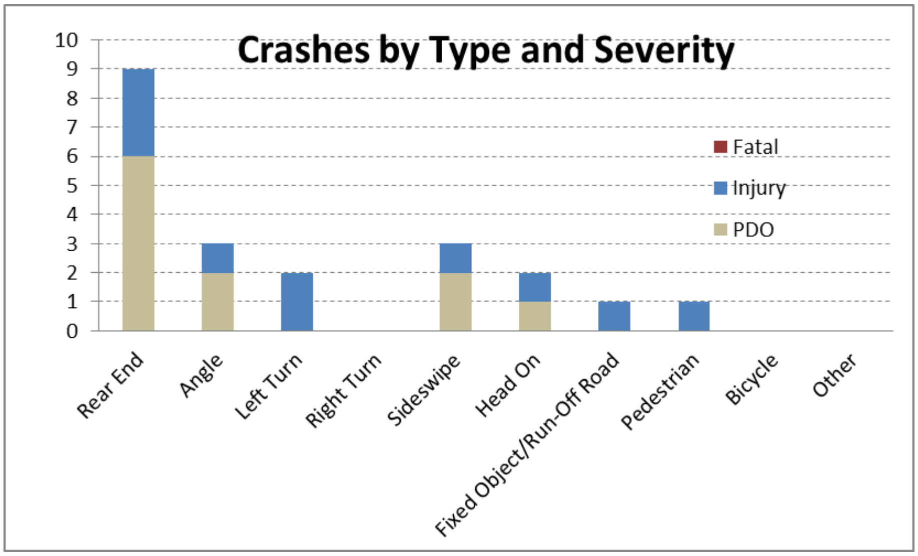


Figure 43: Crashes by Type and Severity (S.R. 50 between Tuscanooga Road and C.R. 33)

3. Design Controls and Criteria

The study team established design criteria for the proposed improvements based on the *2018 FDM*.

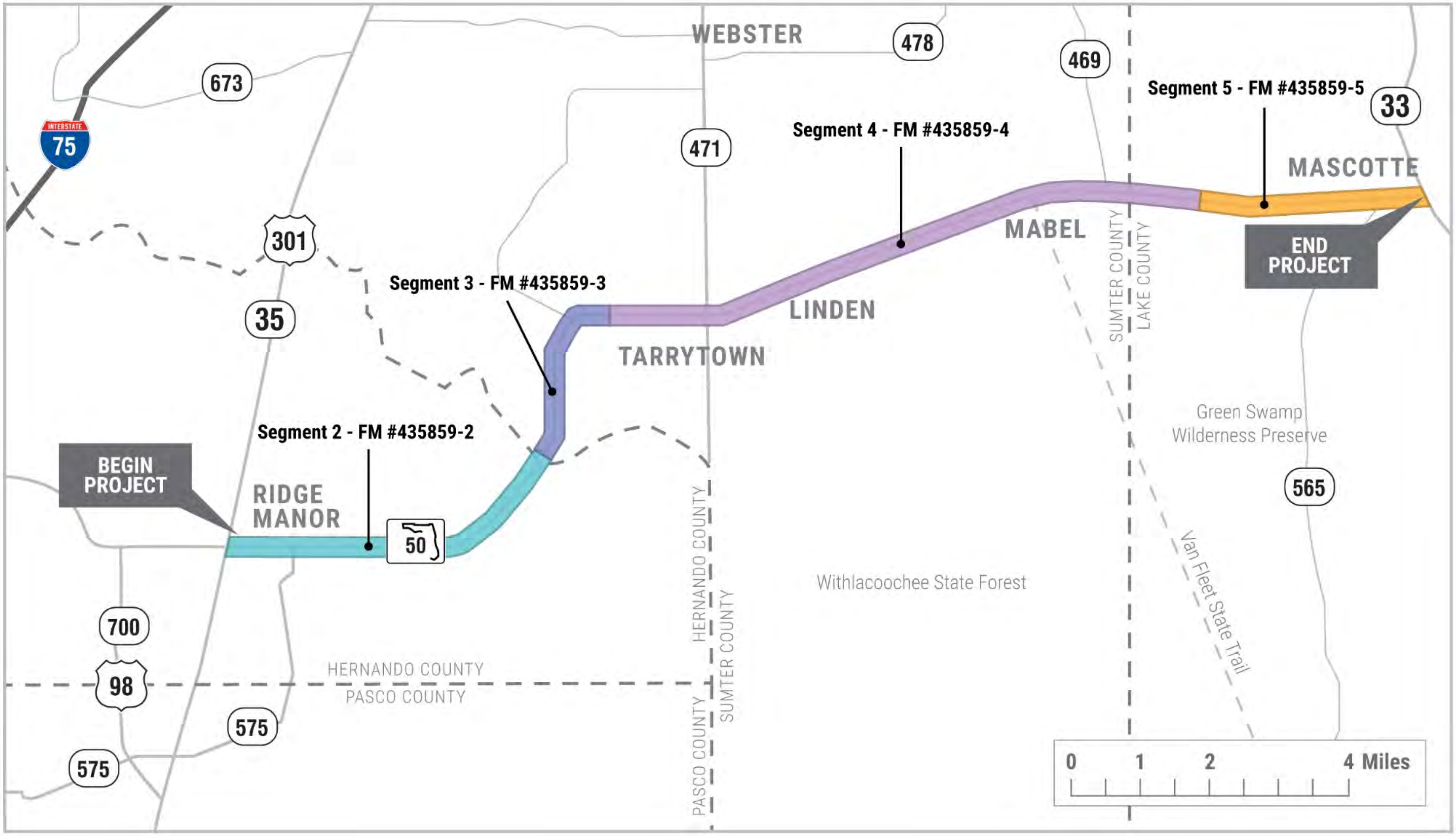
3.1 CONSTRUCTION SEGMENTS

The S.R. 50 study corridor has been divided into the following four construction segments:

- Segment 2: U.S. 301 to the Hernando/Sumter County Line (4.78 miles) –
  - FM Number 435859-2 – FDOT District 7 will be managing the design/construction.
- Segment 3: The Hernando/Sumter County Line to 0.13 miles west of C.R. 751 (2.78 miles) –
  - FM Number 435859-3 – FDOT District 5 will be managing the design/construction.
- Segment 4: 0.13 miles west of C.R. 751 to 1,000’ east of Sloans Ridge Road (8.21 miles) –
  - FM Number 435859-4 – FDOT District 5 will be managing the design/construction.
- Segment 5: 1,000’ east of Sloans Ridge Road to C.R. 33 (3.98 miles) –
  - FM Number 435859-5 – FDOT District 5 will be managing the design/construction.

Figure 44 displays the construction segmentation for the S.R. 50 study corridor.

Figure 44: S.R. 50 Construction Segmentation



3.2 ROADWAY DESIGN CRITERIA

The design control list used for this study is listed in **Table 31**. The current design criteria used for this study are listed in **Table 32** through **Table 34**. This design criterion is subject to change and only the most current design criteria should be used for the final design phase. As discussed in Section 4.3, two typical section alternatives were assessed between S.R. 471 and Lee Road. One of these alternatives was a rural typical section fitting with context classification C2, whereas the other alternative was a high speed urban fitting with context classification C3. **Table 31** presents the criteria/standards for both C2 Rural and C3 Suburban.

Table 31: Design Control List

Design Control		S.R. 50 – U.S. 301 to S.R. 471	S.R. 50 – S.R. 471 to Lee Road	S.R. 50 – Lee Road to C.R. 33	Source
General Criteria	Design Vehicle	WB-62FL	WB-62FL	WB-62FL	Standard for SHS Facilities – FDM 201.5
	Functional Class	Rural Principal Arterial	Rural/Urban Principal Arterial	Urban Principal Arterial	Set by District
	Context Classification	C2 – Rural / C1 Natural (only through State Forest from MP 2.049 to 6.041 and MP 0.000 to 1.289	C2/C3 – Rural/ Suburban	C4 – Urban General	Set by District
	Proposed Access Management Classification	3	3	5	Selected by Study; FDM Table 201.3.2
	Design/ Posted Speed	60	50/55	45	Selected by Study; FDM Table 201.4.1
	Design Year	2045	2045	2045	Scope of Services
	Facility within 1-Mile Urban Boundary	No	Yes	Yes	Florida Urban Area Buffer Maps

Table 32: Design Standards List for Typical Sections

Design Standards		S.R. 50 – U.S. 301 to S.R. 471	S.R. 50 – S.R. 471 to Lee Road	S.R. 50 – Lee Road to C.R. 33	Source
Typical Section	Proposed Typical Section Type	Rural	Rural or Suburban	Urban	Selected by Study
	Lane Widths	12’	12’	12’ *	FDM Table 210.2.1
	Median Width (ft) (min)	40	40/30	22	FDM Table 210.3.1
	Border Width (ft) (min)	40’-0”	40’-0”	14’-0”	FDM Table 210.7.1
	Pavement Cross Slope	0.02	0.02	0.02	FDM Section 210.2.5
	Outside Shoulder Width (Full/Paved) (ft.)	10/5	10/5 (rural only)	N/A	FDM Table 210.4.1
	Inside Shoulder Width (Full/Paved) (ft.)	8/4	8/4	N/A	FDM Table 210.4.1
	Curb & Gutter Type	N/A	Type E, F (suburban only)	Type E, F	FDM Section 210.5
	Roadside Slopes	1:2 to 1:6	1:4 to 1:6	1:4 to 1:6	FDM Table 215.2.3
	Sidewalk Width (ft.) (with grass strip)	N/A	6 (suburban only)	6	FDM Table 222.1.1
	Bicycle Lane Width	N/A	6.5’ (suburban only)	7’ Buffered	FDM Section 223.2.1.1
	Shared-Use Path Width	10’ (min)/ 12’ in Sumter County	12’	12’	FDM Section 224.4

* Note: 12’ lane widths chosen for the urban typical section to accommodate 14.5% truck traffic along S.R. 50.

Table 33: Design Standards List for Horizontal Alignment

Design Standards		S.R. 50 – U.S. 301 to S.R. 471	S.R. 50 – S.R. 471 to Lee Road	S.R. 50 – Lee Road to C.R. 33	Source
Horizontal Alignment	Max Deflection Without a Horizontal Curve	0° 45’ 00”	0° 45’ 00” (rural) / 1° 00’ 00” (urban)	1° 00’ 00”	FDM Section 210.8.1
	Max Deflection Angle Through Intersections	3° 00’ 00”	3° 00’ 00”	3° 00’ 00”	FDM Table 212.2.1
	Minimum Radius of Curve (ft.)	1,091	694 / 881	694	FDM Table 210.8.2
	Desired Length of Curve	900 ft.	750 ft. / 825 ft.	675 ft.	FDM Table 210.8.1
	e_{max}	0.10	0.10	0.05	FDM Table 210.9.1 and 210.9.2

Table 34: Design Standards List for Vertical Alignment

Design Standards		S.R. 50 – U.S. 301 to S.R. 471	S.R. 50 – S.R. 471 to Lee Road	S.R. 50 – Lee Road to C.R. 33	Source
Vertical Alignment	Max Profile Grade	3%	6% / 5%	6%	FDM Table 210.10.1
	Max Change in Grade w/o Vertical Curve	0.40	0.60 / 0.50	0.70	FDM Table 210.10.2
	Base Clearances	3 ft.	3 ft.	3 ft.	FDOT Flexible Pavement Manual Section 5.2.2
	Min distance requirements between VPIs	N/A	250 ft.*	250 ft.	FDM Section 210.10.1.1
	Minimum Grade	N/A	0.3%*	0.3%	FDM Section 210.10.1.1
	Min Sight Distance (Downgrade)	598 ft. (3%)	464 ft.* / 541 ft. (5%) 474 ft.* / 553 ft. (6%)	400 ft. (6%)	FDM Table 210.11.1
	Min Sight Distance (Upgrade)	538 ft. (3%)	456 ft.* / 393 ft. (5%) 450 ft.* / 388 ft. (6%)	331 ft. (6%)	FDM Table 210.11.1
	Min Crest Vertical Curve (K)	245	136* / 185	98	FDM Table 210.10.3
	Min Sag Vertical Curve (K)	136	96* / 115	79	FDM Table 210.10.3
	Min Crest Vertical Curve Length	400 ft.	300 ft.* / 350 ft.	135 ft.	FDM Table 210.10.4
	Min Sag Vertical Curve Length	300 ft.	200 ft.* / 250 ft.	135 ft.	FDM Table 210.10.4

* High Speed Urban typical section only

3.3 STRUCTURES DESIGN CRITERIA

The FDOT 2017-18 Design Standards and revised Standard Index Drawings, as appended herein, and the January 2018 Standard Specifications for Road and Bridge Construction, as amended by contract documents, will be the guiding documents for the S.R. 50 bridge design. The following structure design specification reference materials will be utilized for the design of the new S.R. 50 bridge over the railroad tracks and the bridge over the Little Withlacoochee River (bridge No. 180071):

1. American Association of State Highway and Transportation Officials (AASHTO), LRFD Bridge Design Specifications, Seventh Edition and interims thru 2016;
2. FDOT Structures Manual (January 2018);
3. 2018 FDM (Draft); and
4. FDOT Bridge Load Rating Manual (January 2017 Edition in Accordance with the FDOT Structures Design Guidelines (SDG) Section 2.3.

Table 35 displays the various design standards for structures elements as part of the S.R. 50 project.

Table 35: Design Standards for Structures

Design Criteria	Standard	Source
Lane Width, Bridge	12 ft.	FDM Figure 260.1.1
Outside Shoulder Width, Bridge	10 ft.	FDM Figure 260.1.1
Inside Shoulder Width, Bridge	6 ft.	FDM Figure 260.1.1

3.4 STORMWATER DESIGN/DRAINAGE CRITERIA

The design of the stormwater management facilities for the project is governed by the rules established by the SWFWMD, SJRWMD, and FDOT. Water treatment and attenuation requirements will comply with the guidelines as defined in Chapter 62-330 of the Florida Administrative Code (F.A.C), the SWFWMD Environmental Resource Permit Applicant's Handbook (Volume II), and the SJRWMD Permit Information Manual.

Wet detention and dry retention ponds will provide for water quality improvements as well as water quantity attenuation for the project runoff. The stormwater ponds are conservatively designed and sized for each segment's typical section. Please refer to the sections below for the water quality, water quantity, and detention/retention pond facilities configuration criterion used for the project.

The *Pond Siting Report* for the project outlines the specific drainage design criteria (water quality, water quantity, and detention/retention pond configuration) for the SWFWMD, SJRWMD, and FDOT.

4. Alternatives Analysis

The following section describes the S.R. 50 design traffic volumes, the no-build alternative, roadway improvement alternatives, roundabout intersection alternatives, Value Engineering results, environmental analysis, and the preferred alternative selection.

4.1 DESIGN TRAFFIC VOLUMES

See the *S.R. 50 Design Traffic Technical Memorandum* for the recommended traffic factors, model validation, and growth rate selection methodology for the design traffic portion of the project.

Traffic Forecasting Years

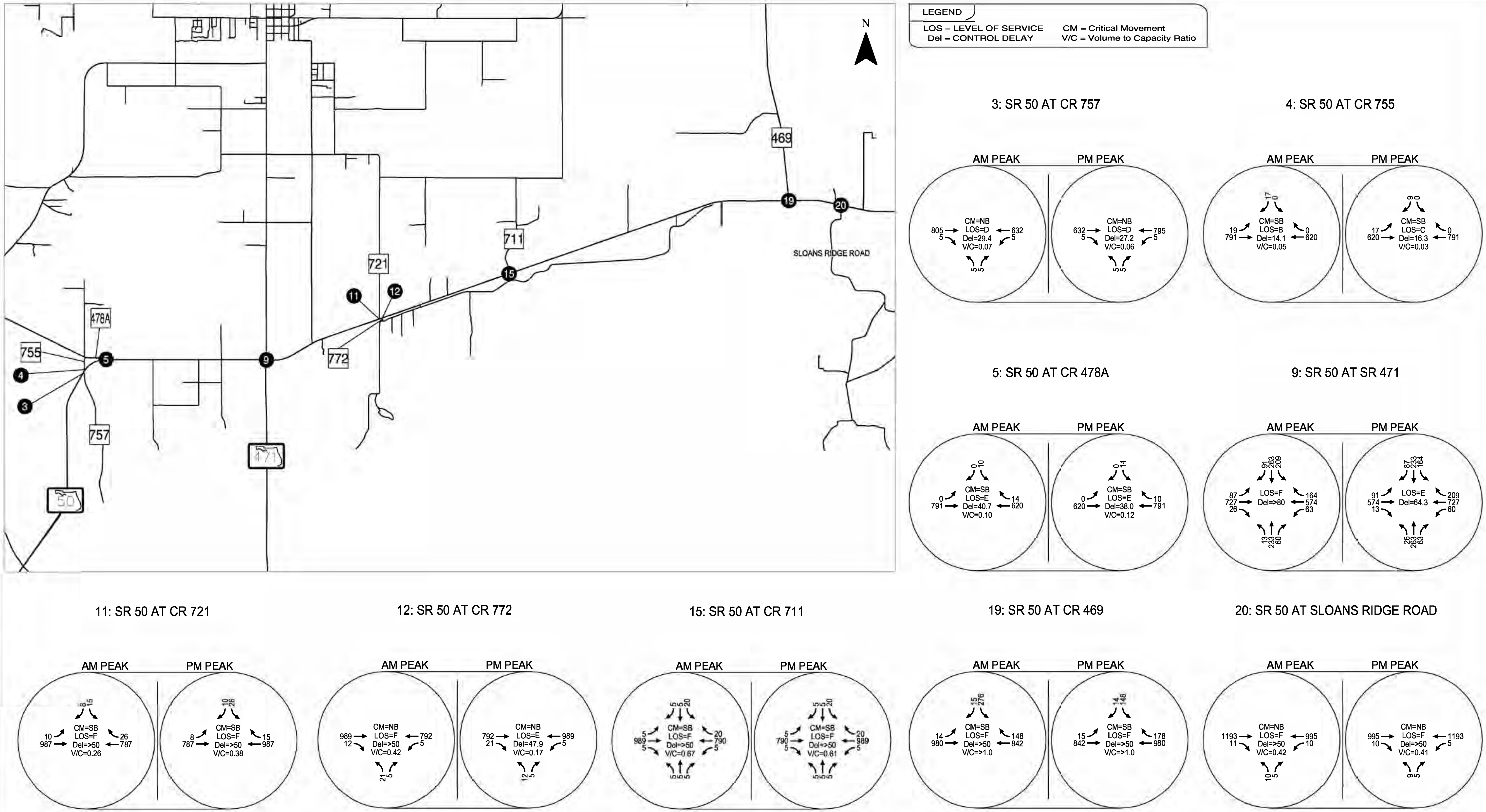
Traffic volumes were developed for present year, opening year, 10 years from open, and 20 years from open:

- Present year – 2017
- Opening year – 2025
- 10 years from open – 2035
- 20 years from open – 2045

For this report, only the 2045 volumes and subsequent roadway operations will be discussed. Information regarding the opening year and interim year traffic volumes and analysis can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

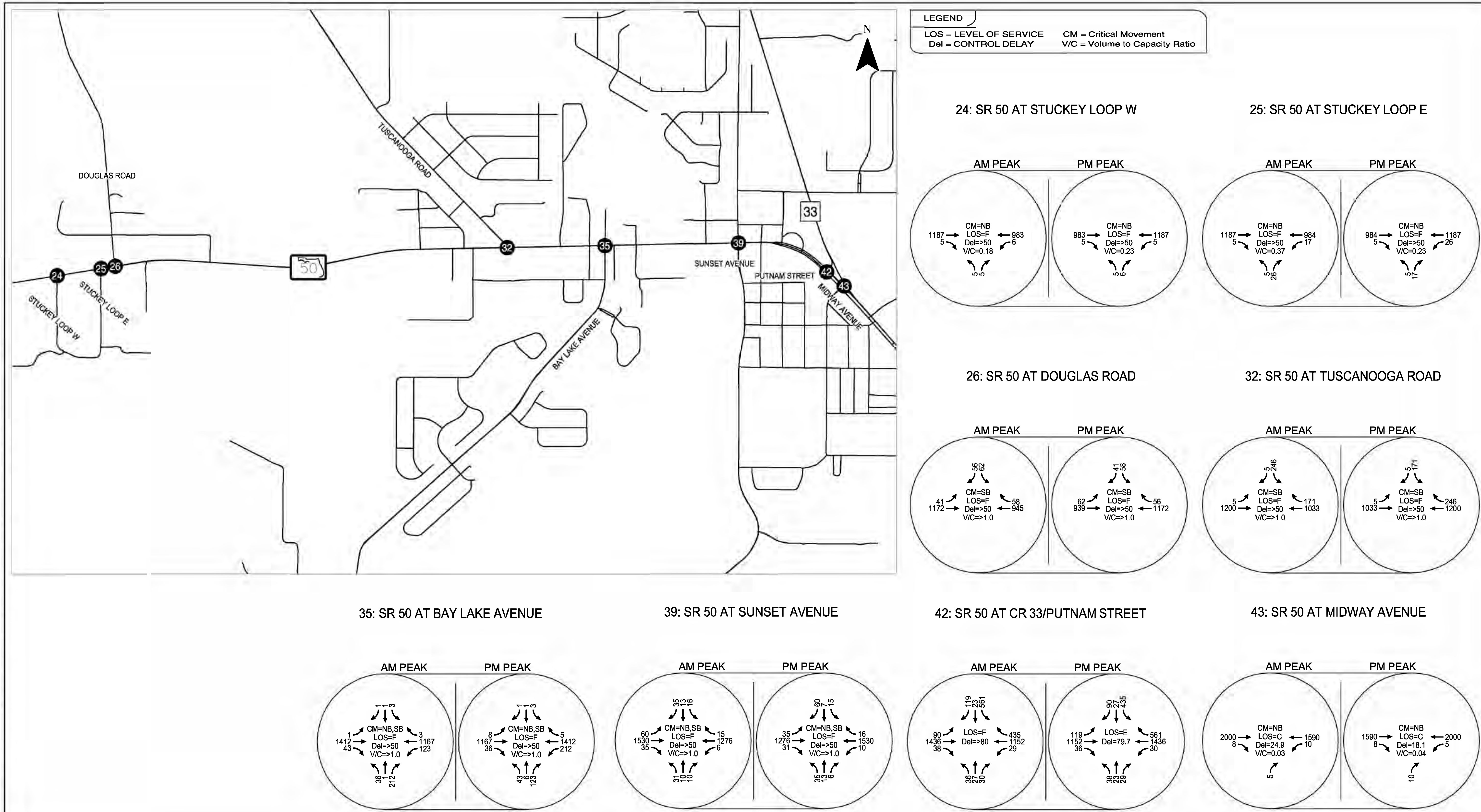
Future Traffic Volumes

Based on the existing conditions data, the PM peak hour had higher intersection volumes than the AM peak hour. Thus, these PM characteristics were selected for use in establishing the design hour. Forty-three (43) intersections along the study corridor were analyzed for existing conditions. Many of these 43 locations are low volume residential or farm access points expected to maintain low trip generation through the design year. Therefore, traffic forecasting and analysis was conducted for the selected seventeen intersections agreed upon with FDOT staff. At two locations (four total intersections), closely spaced intersections were identified for minor realignment to consolidate them into one intersection; this reduces the number of study intersections from seventeen to fifteen for the future year analysis. The projected 2045 no-build turning movement volumes and operating conditions for the 15 study intersections are illustrated in **Figure 45** and **Figure 46**. The projected 2045 build turning movement volumes and operating conditions for the 15 study intersections are illustrated in **Figure 47** and **Figure 48**.



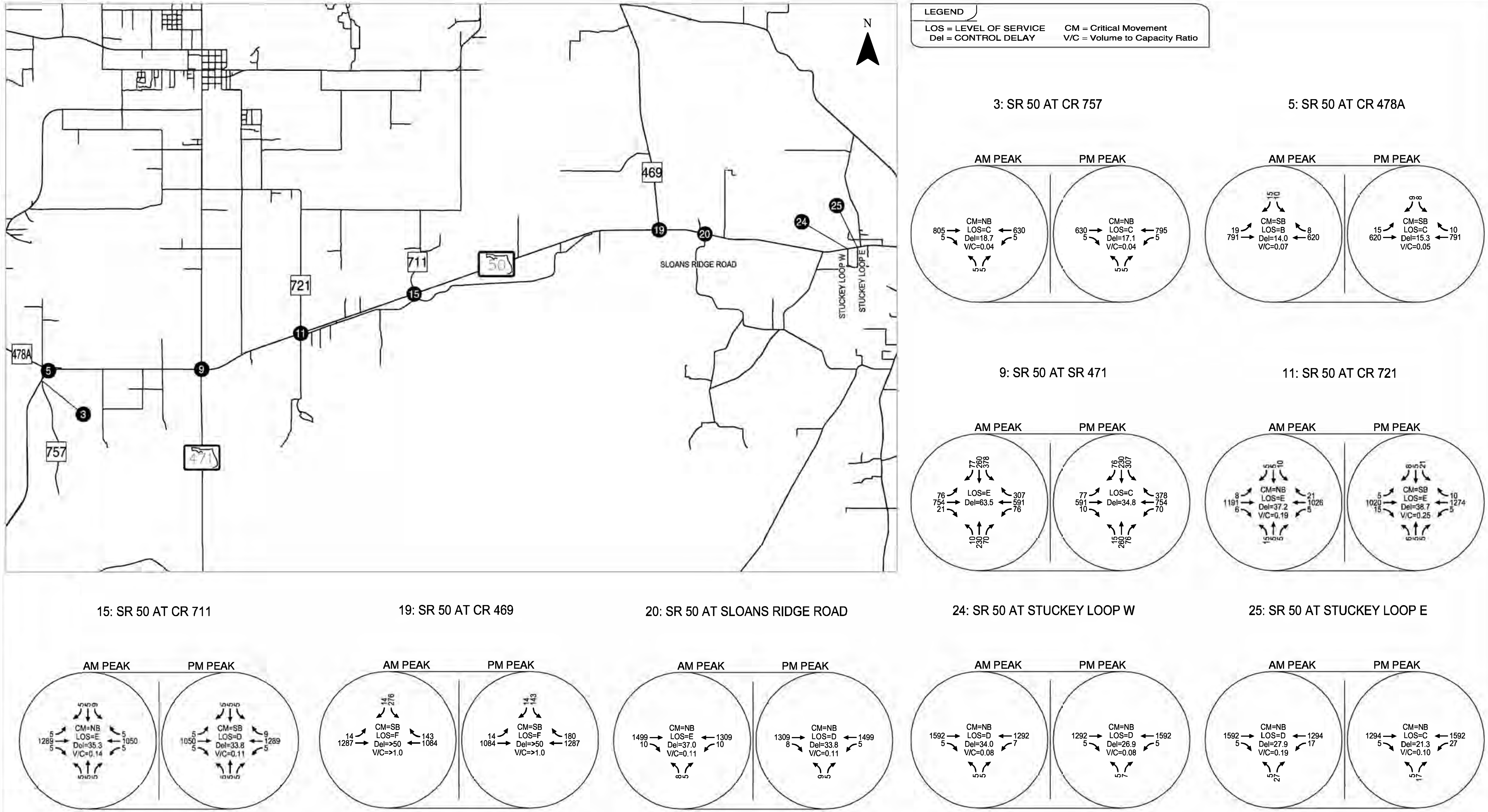
2045 NO-BUILD INTERSECTION OPERATING CONDITION
C.R. 757 TO SLOANS RIDGE ROAD

FIGURE 45



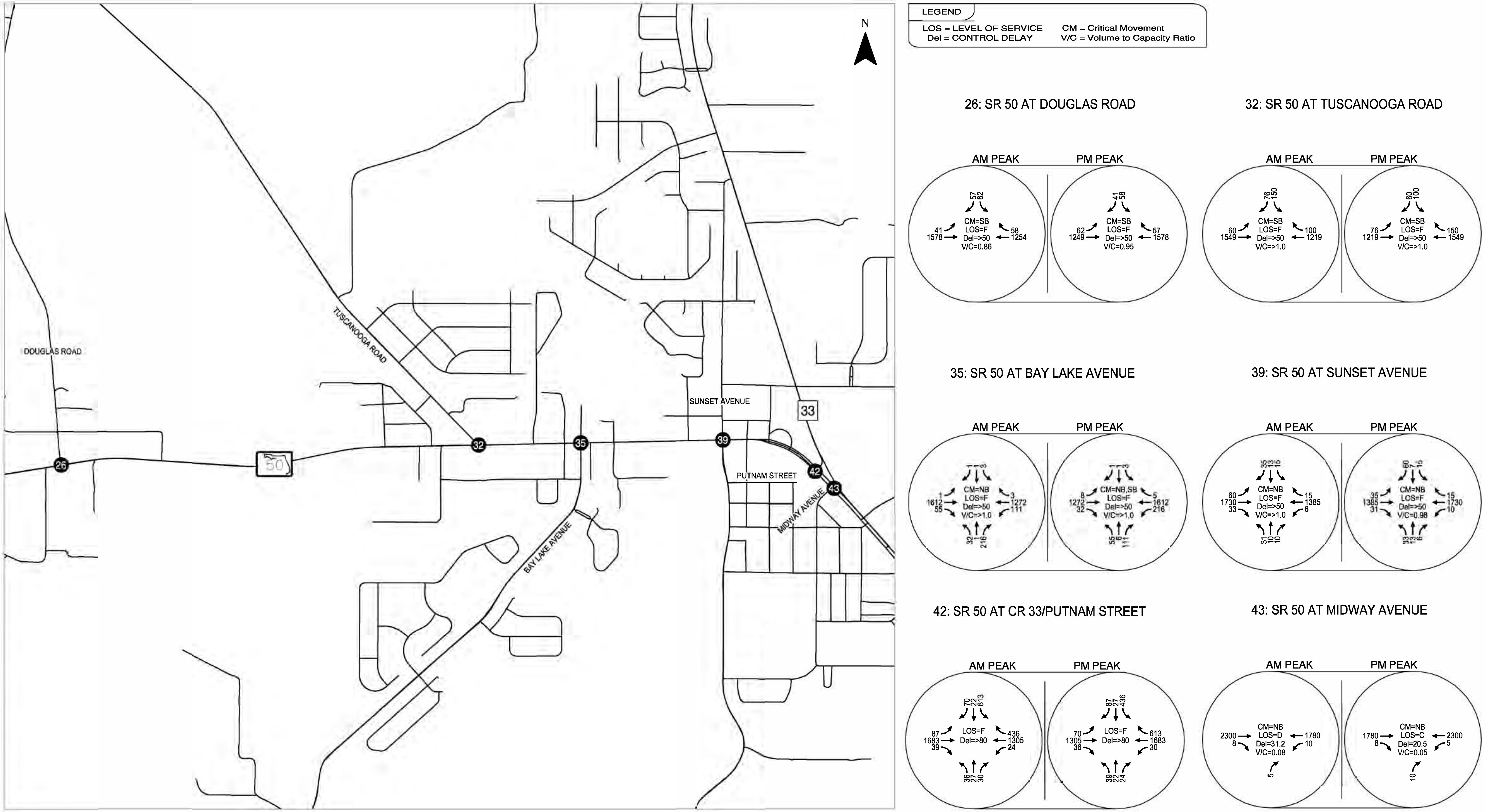
2045 NO-BUILD INTERSECTION OPERATING CONDITION
STUCKEY LOOP W TO C.R. 33

FIGURE 46



2045 BUILD INTERSECTION OPERATING CONDITION
C.R. 757 TO SLOANS RIDGE ROAD

FIGURE
47



2045 BUILD INTERSECTION OPERATING CONDITION
STUCKEY LOOP W TO C.R. 33

FIGURE
48

4.2 NO-BUILD ALTERNATIVE

The no-build alternative assumes S.R. 50 will maintain its current roadway conditions through the Design Year 2045 without any facility improvements; this does not include improvements to facilities adjacent to S.R. 50. The no-build alternative eliminates costs related to right-of-way acquisition and construction, traffic delays caused by construction, and impacts to the natural and social environments. In contrast, the no-build alternative does not fulfill this project's purpose and need including enhancing system linkage, increasing roadway capacity, consistency with adopted transportation plans, improving modal relationships, improving corridor safety, and enhancing S.R. 50 as an evacuation route.

No-Build Intersection Operations

The S.R. 50 study intersections were analyzed using *HCM 2010* methodologies, implemented in Synchro 9. The following TWSC intersections are expected to have one or more stop-controlled approaches operate at LOS F in at least one peak hour in 2045:

- C.R. 721;
- C.R. 772;
- C.R. 711;
- C.R. 469;
- Stuckey Loop W and E;
- Douglas Road;
- Tuscanooga Road;
- Bay Lake Road; and
- Sunset Avenue.

The signalized intersections, S.R. 471 and C.R. 33, are expected to operate at LOS F by 2045. **Figure 45** and **Figure 46** in the previous section display the intersection operations for the no-build scenario in 2045. More detail on the intersection analysis can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

No-Build Arterial Operations

For the S.R. 50 study corridor, a segment analysis was performed using the *HCM 2010* methodology for two-lane highways. Tuscanooga Road to C.R. 33 exhibits uninterrupted flow characteristics westbound as vehicles are leaving the City of Mascotte, and when approaching the signalized intersection at C.R. 33, it exhibits the characteristics of a signalized arterial eastbound as vehicles travel through the City of Mascotte. This segment was analyzed using *HCM 2010 Urban Street* methodologies for the eastbound direction only. The results of this analysis are shown in **Table 36**, **Table 37**, and **Table 38**. Despite relatively high travel speeds, the high PTSF results in arterial operations exceeding the adopted LOS targets in the AM and PM peak periods for S.R. 50 from U.S 301 to Tuscanooga Road. Likewise, from Tuscanooga Road to C.R. 33 in the westbound direction, a low percent free-flow speed results in a LOS

F and E for the AM and PM peak hours, respectively. More detail on the arterial analysis can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

Table 36: Future 2045 No-Build Segment LOS – HCM Two-Lane Highway

S.R. 50 Section	Analysis Direction	BFFS (MPH)	AM Peak Hour			PM Peak Hour		
			ATS (MPH)	PTSF (%)	LOS	ATS (MPH)	PTSF (%)	LOS
U.S. 301 to C.R. 757	Eastbound	70	54.6	81.1	E	54.2	75.9	D
C.R. 757 to C.R. 469	Eastbound	65	47.8	84.1	E	48.1	77.1	D
C.R. 469 to Tuscanooga Road	Eastbound	65	40.2	93.1	E	42.1	87.2	E

Note: **BFFS** is Base Free Flow Speed, **ATS** is Average Travel Speed, and **PTSF** is Percent Time Spent Following

Table 37: Future 2045 No-Build Segment LOS – HCM Two-Lane Highway

S.R. 50 Section	Analysis Direction	BFFS (MPH)	AM Peak Hour			PM Peak Hour		
			ATS (MPH)	PTSF (%)	LOS	ATS (MPH)	PTSF (%)	LOS
U.S. 301 to C.R. 757	Westbound	70	54.9	73.9	D	53.9	83.1	E
C.R. 757 to C.R. 469	Westbound	65	47.9	77.7	D	47.8	84.6	E
C.R. 469 to Tuscanooga Road	Westbound	65	40.4	89.3	E	41.9	91.1	E
Tuscanooga Road to C.R. 33	Westbound	51	--	37.7*	F	--	40.4*	E

***Note**: Segment 4 exhibits characteristics of a Class III Highway and the LOS is based on Percent Free Flow Speed (PFFS)

Table 38: Future 2045 No-Build Segment LOS – HCM Urban Street

S.R. 50 Section	Analysis Direction	# Lanes	AM Peak Hour			PM Peak Hour		
			PBFFS* (%)	V/C Ratio	LOS	PBFFS* (%)	V/C Ratio	LOS
Tuscanooga Road to C.R. 33	Eastbound	1	53.9	0.93	C	71.5	0.61	B

***Note: PBFFS** is the Percent of Base Free Flow Speed

Purpose and Need Considerations

If S.R. 50 remains a two-lane roadway, multiple purpose and need elements will not be met. From a system linkage perspective, this 20-mile section of S.R. 50 will be the only two-lane portion from U.S. 19 to Titusville. A four-lane widening would also increase capacity for evacuation events. As noted in the previous subsections, the roadway's two-lane capacity will not support future traffic volume, resulting in S.R. 50 not achieving the target LOS of C, except for the eastbound direction from Tuscanooga Road to C.R. 33. The two- to four-lane widening of S.R. 50 from U.S. 301 to C.R. 33 is identified as an unfunded need in both the adopted Hernando/Citrus MPO and Lake-Sumter MPO 2040 LRTP Needs Plans. Safety purpose and need considerations for the two-lane and four-lane alternatives is discussed in Section 4.3.

4.3 ALTERNATIVES EVALUATION

This section describes the alternative typical sections, segment and intersection operations, *Highway Safety Manual* (HSM) analysis, and the comparative evaluation matrix for the build alternatives.

Alternative Typical Sections

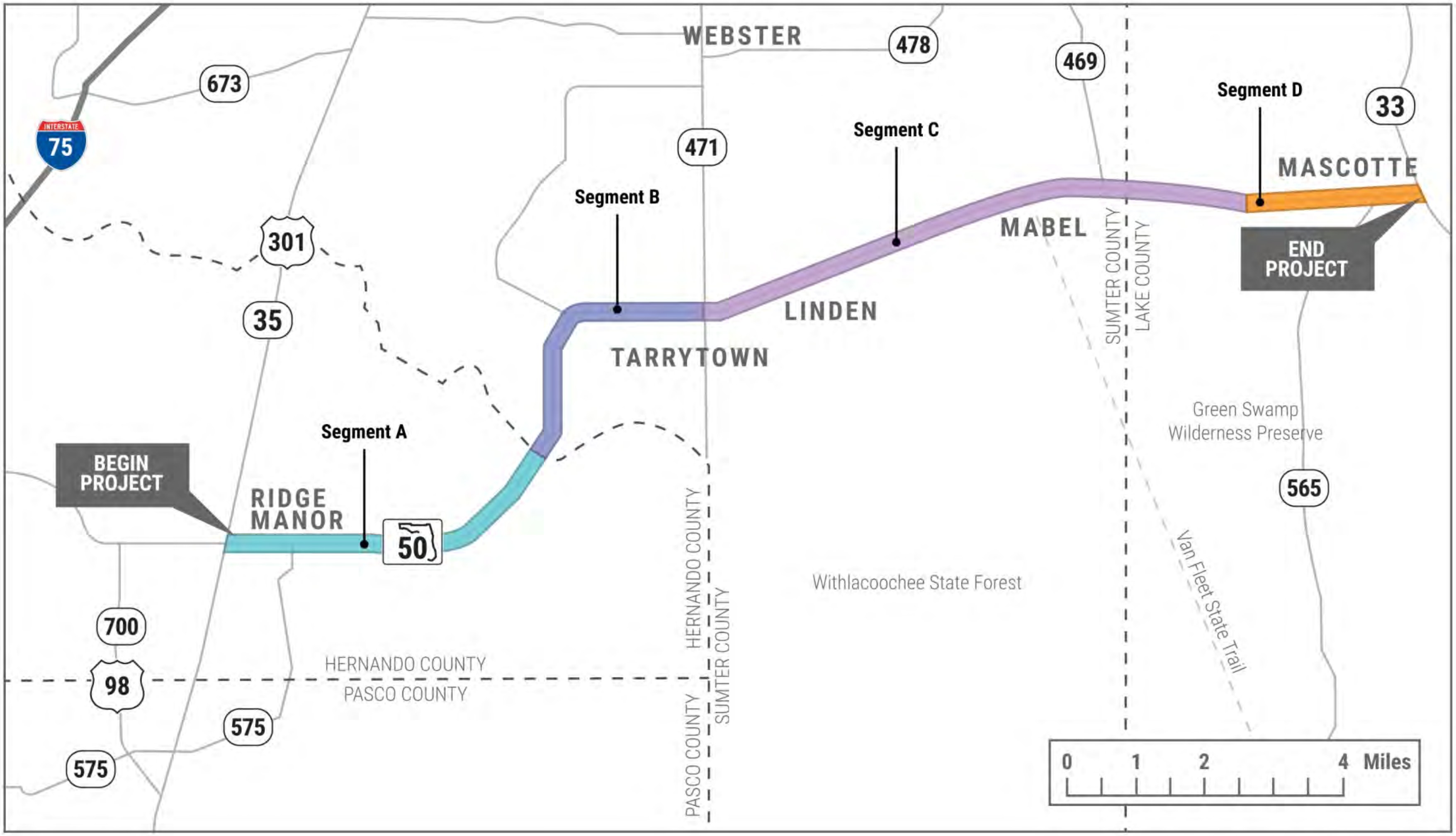
Two general alternatives were developed as part of this study to provide safety and operational benefits along the corridor: a three-lane passing lane alternative and a two- to four-lane widening alternative. Different variations of these alternatives (left/center/right) were evaluated for four specific segments of the S.R. 50 corridor defined below and illustrated in **Figure 49**. The remainder of this section references stationing throughout the project limits. Refer to **Appendix B** for a concept plan displaying the stationing along the study corridor.

- Segment A: U.S. 301 to the Hernando/Sumter County Line (5.00 miles) –
    - Assessed a three-lane passing lane (eastbound and westbound) alternative.
    - Assessed a two-lane to four-lane rural widening alternative.
- Segment B: The Hernando/Sumter County Line to S.R. 471 (4.17 miles) –
    - Higher traffic volumes were observed east of S.R. 471 than west.
    - Assessed a three-lane passing lane (westbound) alternative.
    - Assessed a two-lane to four-lane rural widening alternative.
- Segment C: S.R. 471 to Lee Road (8.17 miles) –
    - Lee Road is approximately where the Mascotte urban service boundary is located.
    - Assessed a two-lane to four-lane rural widening alternative.
    - Assessed a two-lane to four-lane high speed urban widening alternative.
- Segment D: Lee Road to C.R. 33 (2.54 miles) –
    - Within urban service area.
    - Assessed a two-lane to four-lane urban widening alternative.

Passing lanes were evaluated as a potential solution to break up the platooning occurring along the corridor, reduce the amount of time spent traveling behind slower vehicles, improve LOS, and minimize potential environmental impacts. Platooning creates a feeling of congestion along the corridor and may result in unsafe passing maneuvers. Based upon the 2045 forecast volume conditions, showing S.R. 50 would need two- to four-lane widening east of S.R. 471 to maintain an acceptable level of service, the passing lanes were only considered between U.S. 301 and S.R. 471. Various passing lane alternatives were considered; however, the following passing lanes were selected for analysis:

- 2.7-mile-long eastbound passing lane starting near C.R. 575 and ending just west of the Hernando/Sumter County Line; and
- 3.1-mile-long westbound passing lane starting where the eastbound passing lane ends and ending just south of C.R. 757.

Figure 49: Study Corridor Segmentation



Four-lane widening was considered along the entire study corridor to increase the overall roadway capacity to meet the system needs through 2045. Widening to four lanes provides opportunities to implement median turn lanes and access management strategies throughout the corridor. A full four-lane widening of S.R. 50 would improve safety along the corridor and provide enhanced mobility for freight traffic; however, widening the entire 20-mile corridor would require additional right-of-way and would increase the potential impacts to adjacent properties and environmentally sensitive areas, such as the Withlacoochee State Forest.

The remainder of this section reviews the specific typical section alternatives and the typical section elements for each of the four S.R. 50 study segments.

Segment A – U.S. 301 to Hernando/Sumter County Line (5.00 miles)

Two typical section alternatives were analyzed within the Hernando County portion of S.R. 50 from U.S. 301 to the Sumter County Line:

1. Three-lane passing lane alternative – right widening (south-shifted)
    a. Eastbound passing lane from Station 1877+00 (C.R. 575/Burwell Road) to Station 2018+54 (approximately 0.66 miles east of Clay Sink Road); and
    b. Westbound passing lane from Station 2018+54 (approximately 0.66 miles east of Clay Sink Road) to Station 2089+02 (Sumter County Line).
2. Four-lane rural widening alternative – right widening
    a. Eastbound travel lanes new construction from Station 1837+84 (0.23 miles east of U.S. 301) to Station 2089+02 (Sumter County Line); and
    b. Westbound travel lanes milling and resurfacing from Station 1858+60 (0.62 miles east of U.S. 301) to Station 2089+02 (Sumter County Line)

The three-lane passing lane alternative is a combination of an eastbound passing lane spanning for 2.7 miles followed by 3.1 miles of westbound passing lane, 1.3 miles of which is located within Segment A. The eastbound passing lane typical section is displayed in **Figure 50** and the westbound passing lane typical section is displayed in **Figure 51**.

Both the eastbound and westbound passing lane typical sections have similar roadway characteristics: 12’ travel lanes, 5’ paved shoulders, and 5’ outside grass shoulders. In both passing lane typical sections, S.R. 50 would be widened to the right (south) and the existing two-lane roadway would be milled/resurfaced. The existing centerline of the roadway lies approximately 68’ from the north ROW line and 132’ from the south ROW line, thus a minimum border width of 40’ would be achieved throughout the entire length of each section. While not considered in this typical section analysis, this border width can be used to accommodate roadway drainage.

Figure 50: Eastbound Passing Lane Typical Section – Station 1877+00 to Station 2018+54

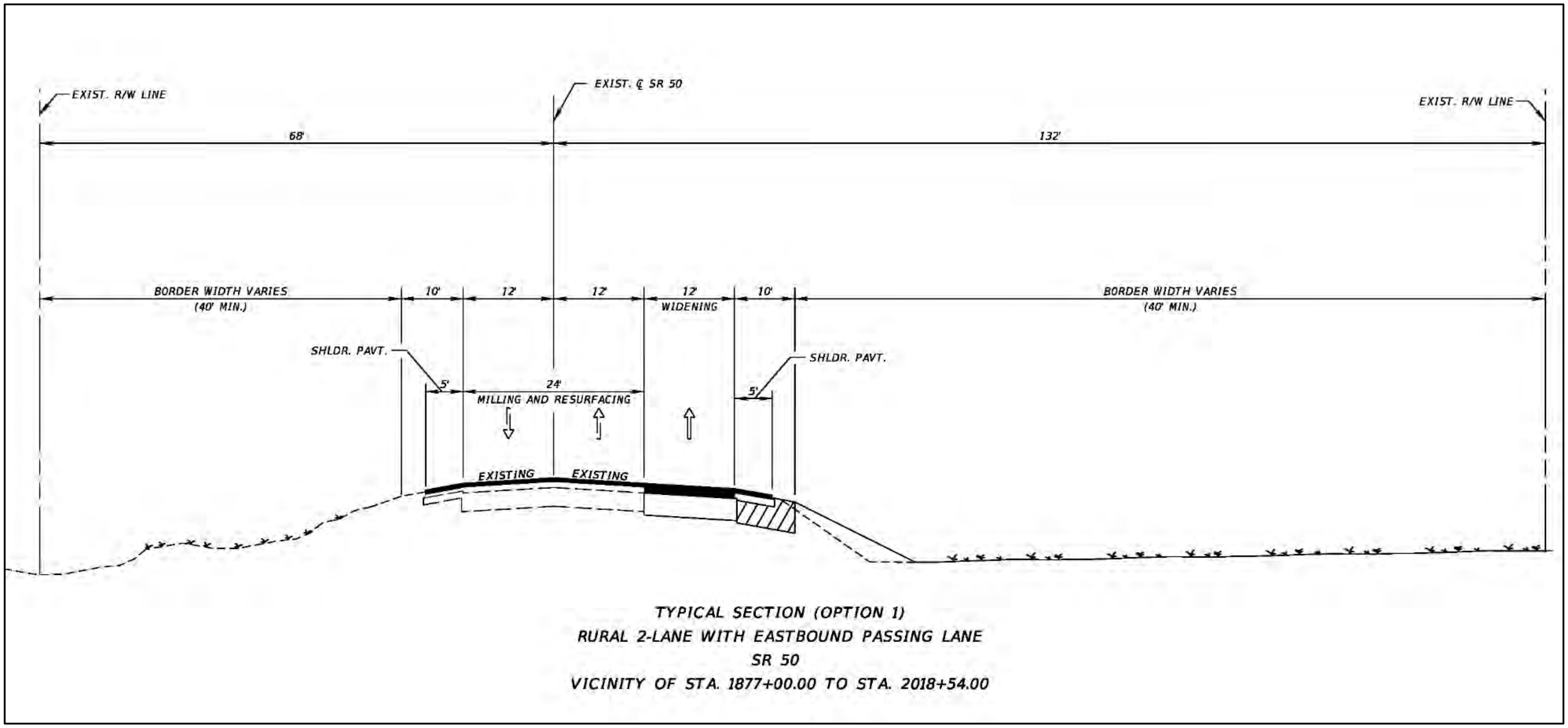
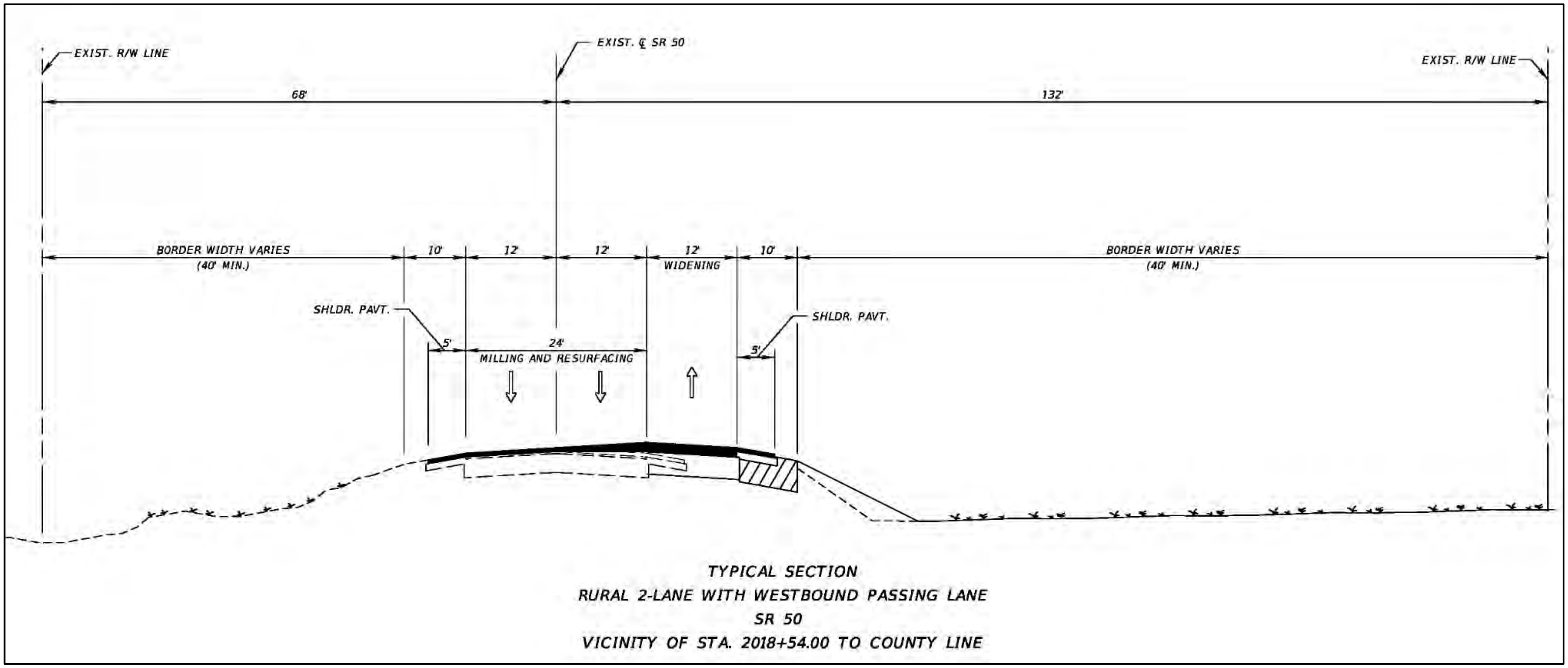


Figure 51: Westbound Passing Lane Typical Section – Station 2018+54 to Station 2089+02



The four-lane rural widening alternative will connect to the S.R. 50 four-lane widening, under design by FDOT District 7 as of October 2018, from U.S. 98 to just east of U.S. 301. The eastbound and westbound tie-in locations are slightly different, as noted in **Figure 52**. The eastbound construction is anticipated to extend approximately 0.40 miles longer than the westbound construction. In total, the four-lane widening is anticipated to span approximately 4.8 miles along Segment A.

The four-lane rural typical section has the following roadway characteristics: 12’ travel lanes, 5’ paved outside shoulders, 5’ grass outside shoulders, 4’ paved inside shoulders, 4’ grass inside shoulders, and 40’ grass median. S.R. 50 would be widened to the right (south) and the existing two-lane roadway would be reconstructed to account for cross-slope corrections. The existing centerline of the roadway lies approximately 68’ from the north ROW line and 132’ from the south ROW line, thus a minimum border width of 40’ would be achieved throughout the entire length of each section. While not considered in this typical section analysis, this border width can be used to accommodate roadway drainage without the need for additional ROW. The proposed roadway centerline would fall in the center of the existing ROW, 100’ from the north and south ROW lines.

The section of S.R. 50 from U.S. 301 to the Hernando/Sumter County Line is located within 200’ of ROW, thus the reason no left/center/right assessment was performed for either the three-lane or four-lane rural widening alternatives.

Segment B – Hernando/Sumter County Line to S.R. 471 (4.17 miles)

Two typical section alternatives were analyzed within Segment B from the Hernando/Sumter County Line to S.R. 471:

1. Three-lane passing lane alternative – left/center/right widening
    a. Westbound passing lane from Station 2089+02 (Hernando/Sumter County Line) to Station 140+00 (0.20 miles west of C.R. 757). Two lanes thereafter to SR 471.
2. Four-lane rural widening alternative – left/center/right widening
    a. Station 2089+02 (Hernando/Sumter County Line) to Station 260+71 (S.R. 471).

The three-lane passing lane alternative is a continuation of the westbound passing lane from Segment A. The total length of the westbound passing lane is 3.1 miles, 1.8 miles of which is located within Segment B. The left/center/right three-lane passing lane typical section alternatives are presented in **Figure 53** through **Figure 55**.

The three westbound passing lane typical sections have similar roadway characteristics: 12’ travel lanes, 5’ paved shoulders, and 5’ outside grass shoulders. For the left (north) widening and the right (south) widening sections, the existing two-lane roadway will be milled/resurfaced. In the center widening section, the existing two-lane roadway will be reconstructed to account for cross-slope corrections of the travel lanes.

Figure 52: Rural Four-Lane Typical Section – Station 1837+84 Station 2089+02

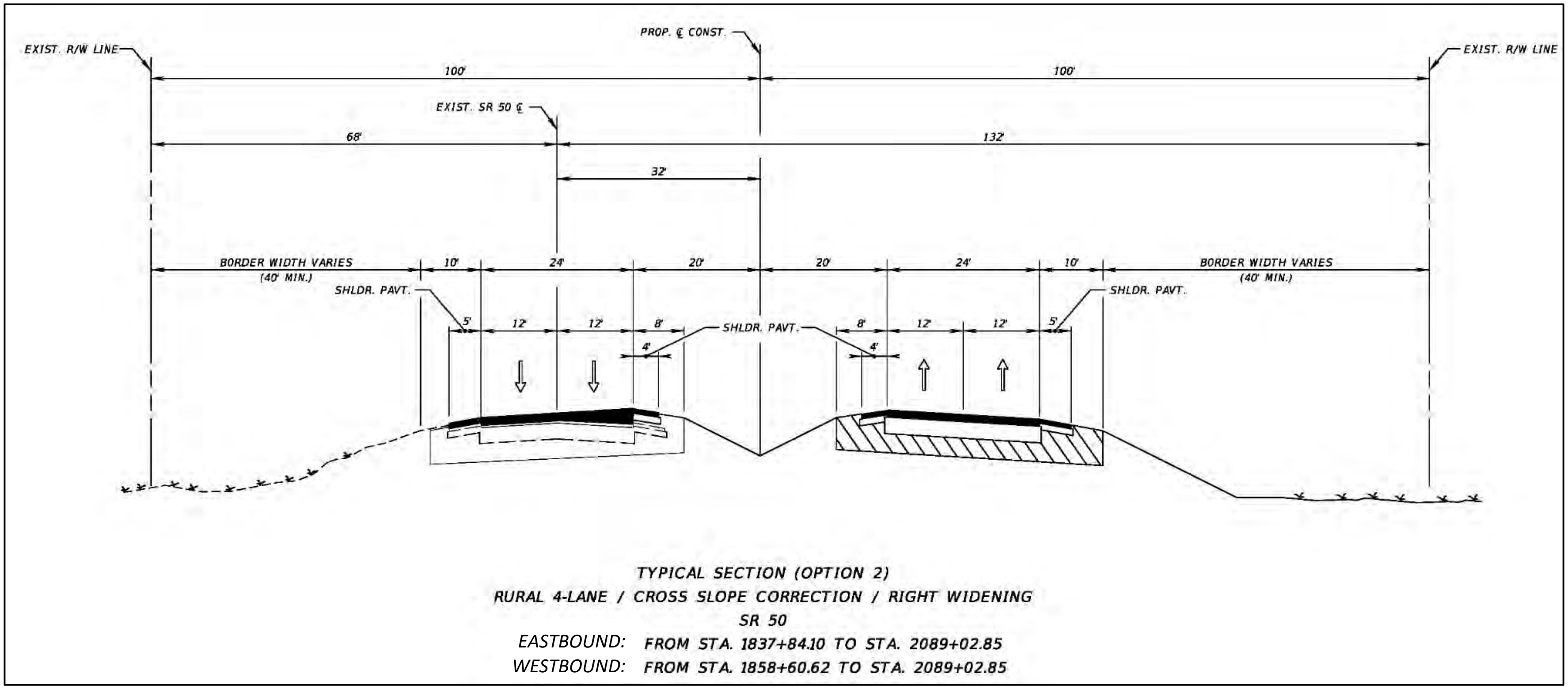
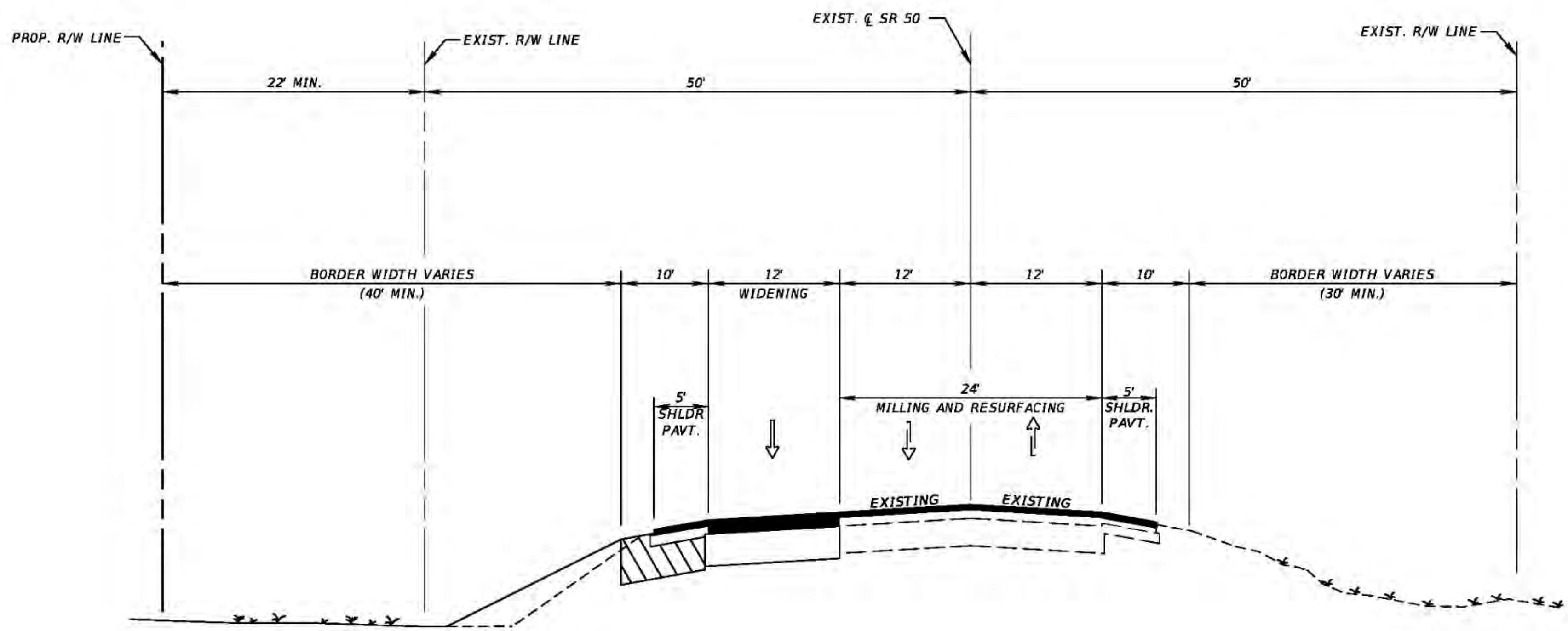


Figure 53: Westbound Passing Lane Left Widening – Station 2089+02 to Station 140+00



TYPICAL SECTION (LEFT WIDENING)
RURAL 2-LANE WITH WESTBOUND PASSING LANE
SR 50
FROM COUNTY LINE TO STA. 140+00.00

Figure 54: Westbound Passing Lane Center Widening – Station 2089+02 to Station 140+00

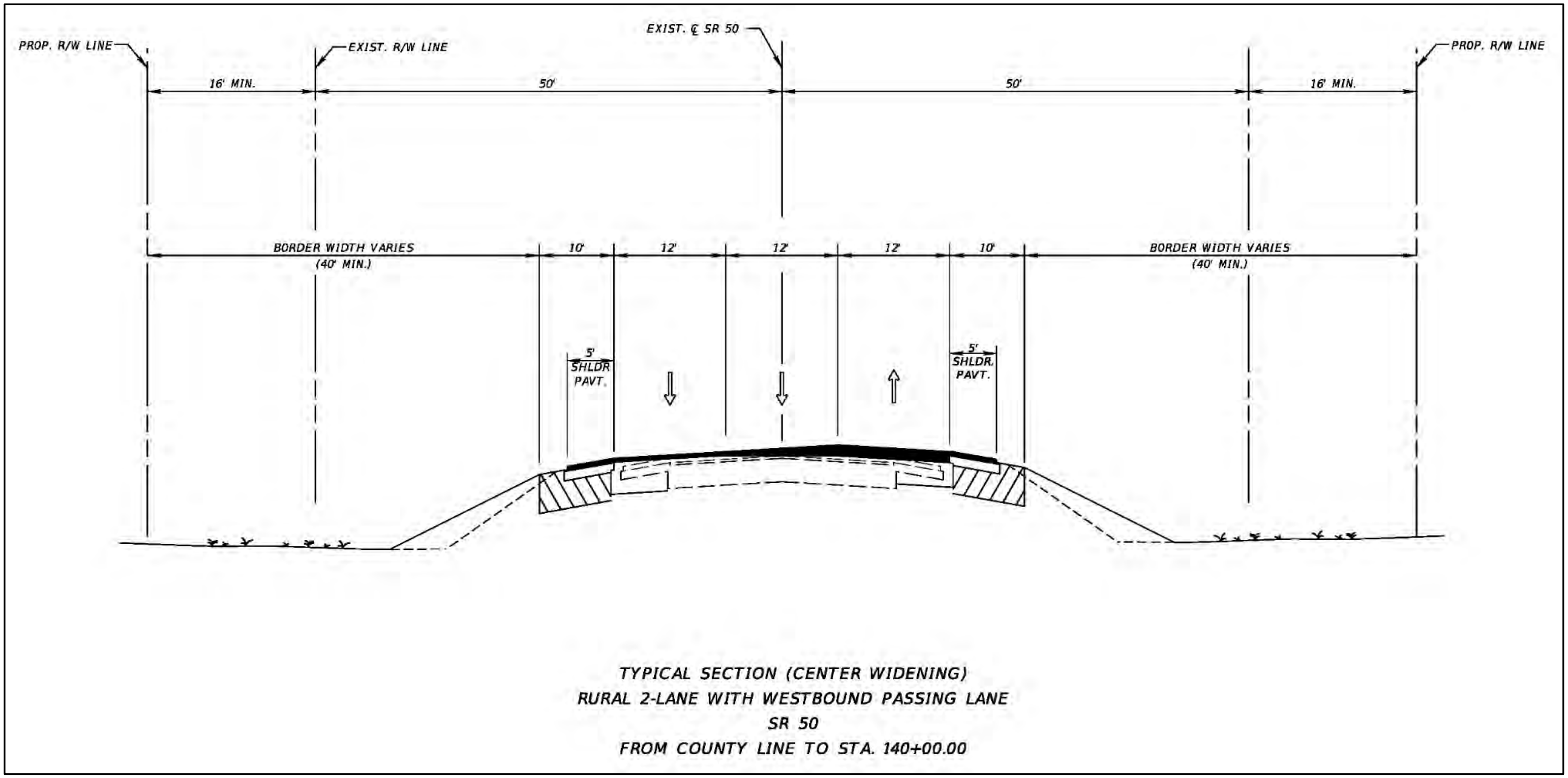
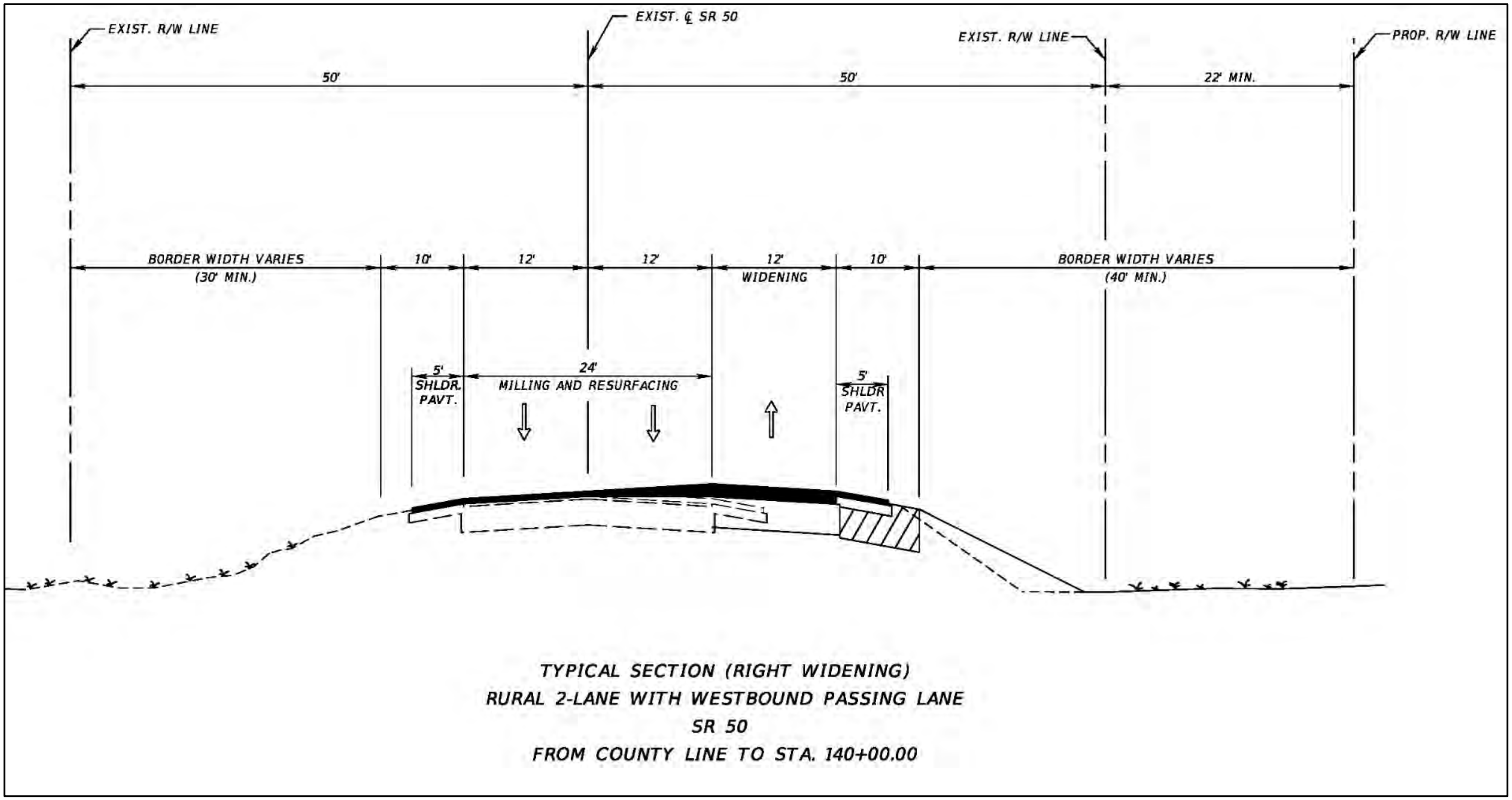


Figure 55: Westbound Passing Lane Right Widening – Station 2089+02 to Station 140+00



The existing centerline of the roadway lies approximately 50' from the north and south ROW lines; thus, ROW would be required for each of the three passing lane alternatives to achieve border width standards:

- Left Widening – 22' would be needed on the north side of S.R. 50
    - 40' border width would be achieved on the north side
    - 30' border width would be achieved on the south side (existing condition)
- Center Widening – 16' would be needed on the north and south sides of S.R. 50
    - 40' border width would be achieved on both sides
- Right Widening – 22' would be needed on the south side of S.R. 50
    - 30' border width would be achieved on the north side (existing condition)
    - 40' border width would be achieved on the south side

The left/center/right four-lane rural widening typical section alternatives are presented in **Figure 56** through **Figure 58**. The three four-lane rural widening typical sections have similar roadway characteristics: 12' travel lanes, 5' paved outside shoulders, 5' grass outside shoulders, 4' paved inside shoulders, 4' grass inside shoulders, and 40' grass median. For each widening alternative, the existing two-lane roadway will be reconstructed to account for cross-slope corrections of the travel lanes. In total, each four-lane widening alternative is anticipated to span the entire 4.17 miles along Segment B.

The existing centerline of the roadway lies approximately 50' from the north and south ROW lines; thus, ROW would be required for each of the three four-lane widening alternatives to achieve border width standards:

- Left Widening – 88' would be needed on the north side of S.R. 50
    - 40' border width would be achieved on both sides
- Center Widening – 44' would be needed on the north and south sides of S.R. 50
    - 40' border width would be achieved on both sides
- Right Widening – 88' would be needed on the south side of S.R. 50
    - 40' border width would be achieved on both sides

Segment C – S.R. 471 to Lee Road (8.17 miles)

Two typical section alternatives were analyzed within Segment C from S.R. 471 to Lee Road:

1. Four-lane rural widening alternative – left/center/right widening
    a. Station 20+00 (S.R. 471) to Station 451+00 (Lee Road).
2. Four-lane high speed urban widening alternative – left/center/right widening
    a. Station 20+00 (S.R. 471) to Station 451+00 (Lee Road).

Figure 56: Rural Four-Lane Left Widening – Station 2089+02 to Station 260+71

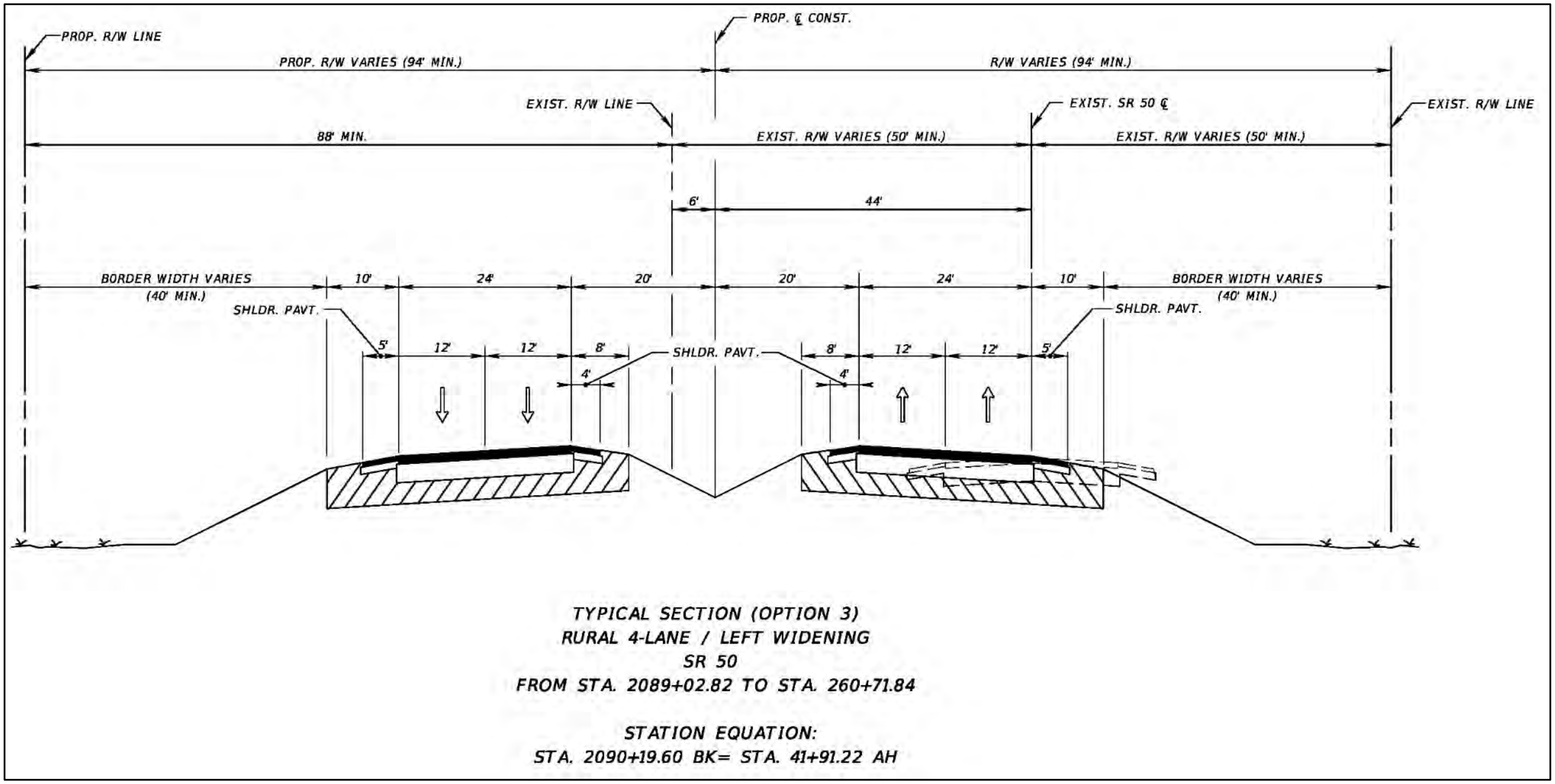
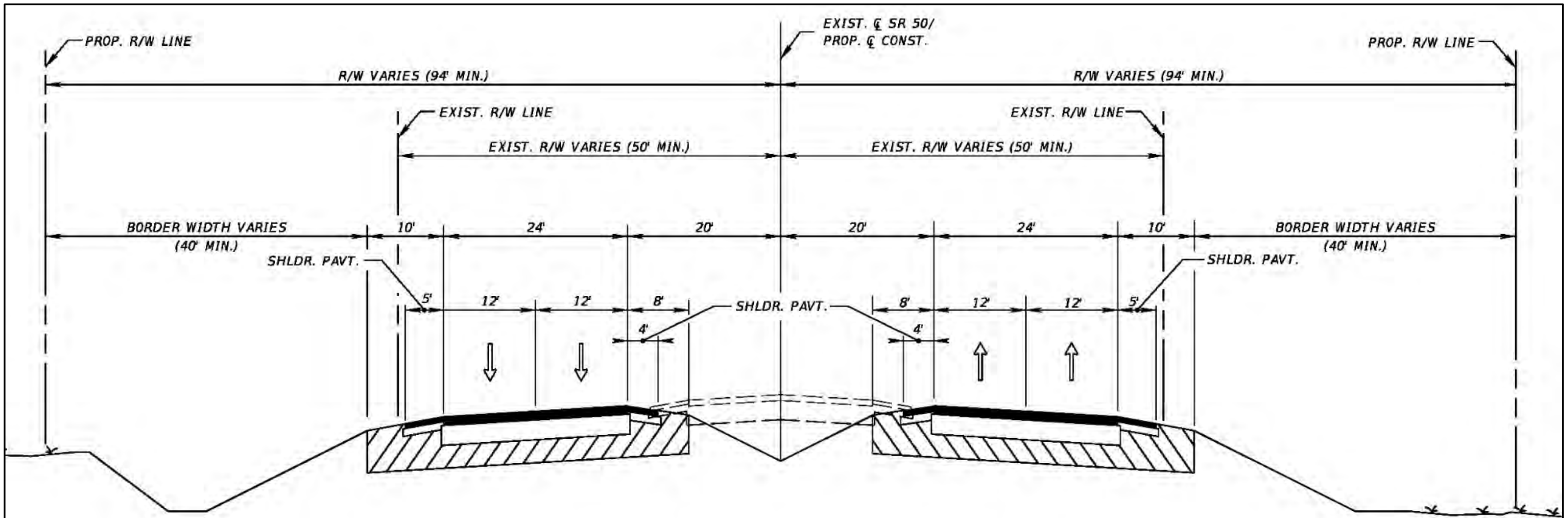


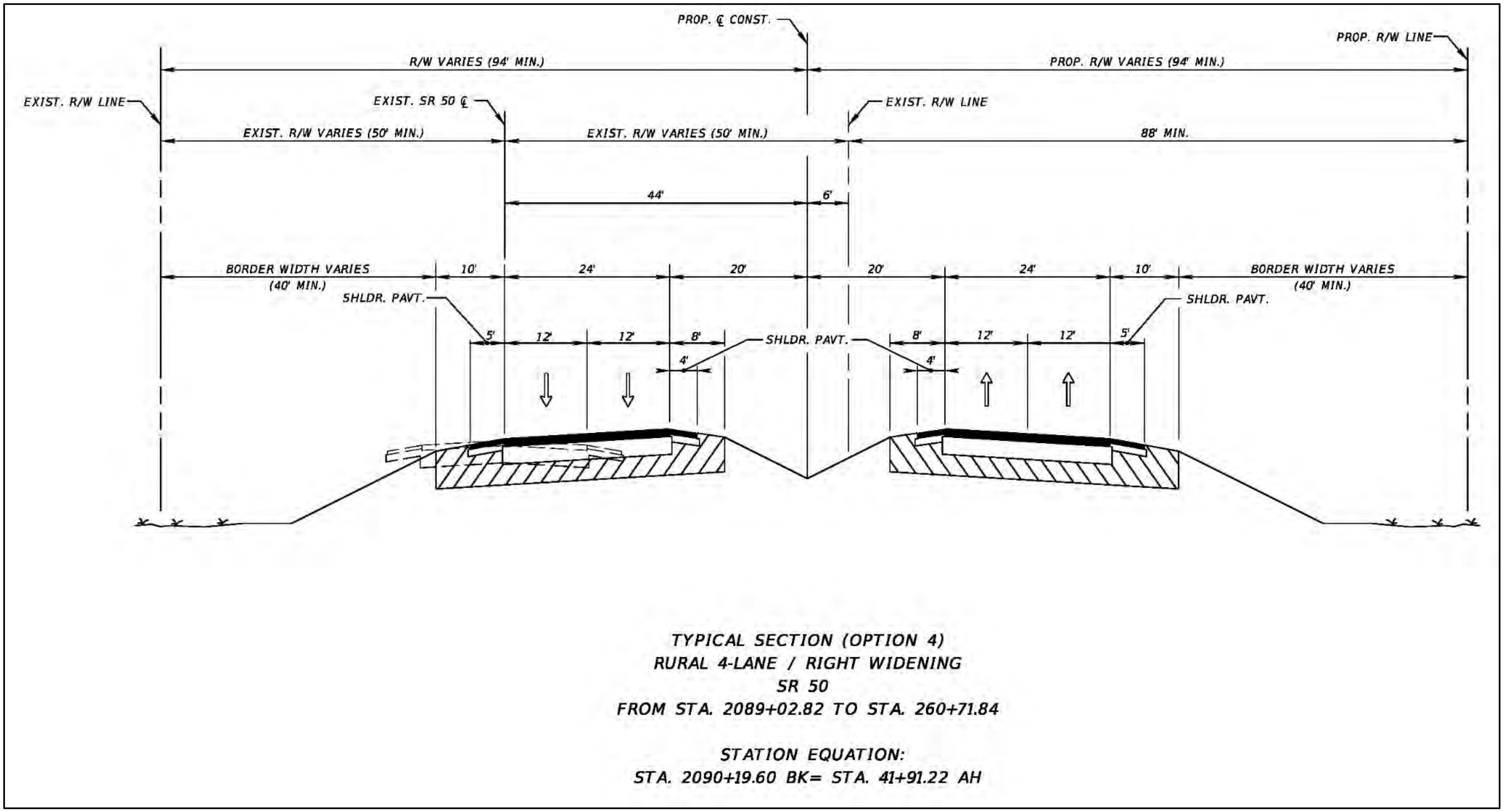
Figure 57: Rural Four-Lane Center Widening – Station 2089+02 to Station 260+71



TYPICAL SECTION (OPTION 2)
RURAL 4-LANE / CENTER WIDENING
SR 50
FROM STA. 2089+02.82 TO STA. 260+71.84

STATION EQUATION:
STA. 2090+19.60 BK= STA. 41+91.22 AH

Figure 58: Rural Four-Lane Right Widening – Station 2089+02 to Station 260+71



The left/center/right four-lane rural widening typical section alternatives are presented in **Figure 59** through **Figure 61**. The three four-lane rural widening typical sections have similar roadway characteristics: 12' travel lanes, 5' paved outside shoulders, 5' grass outside shoulders, 4' paved inside shoulders, 4' grass inside shoulders, and 40' grass median. In addition to the roadway improvements, a 10'-wide shared-use path is proposed on the south side of S.R. 50 for each of the three four-lane rural widening alternatives. The distance from the edge of the shoulder to the edge of the path varies, but at a minimum, the path would be located 5' from the southern ROW line. For each widening alternative, the existing two-lane roadway will be reconstructed to account for cross-slope corrections of the travel lanes. In total, each four-lane rural widening alternative is anticipated to span the entire 8.17 miles along Segment C.

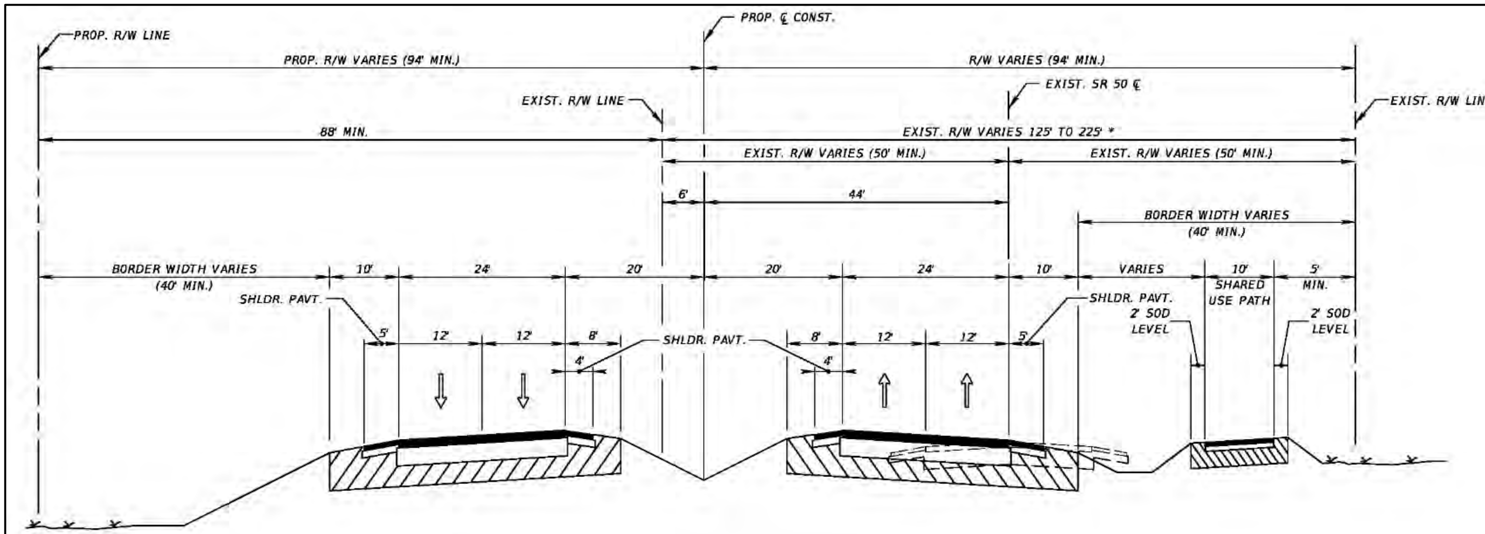
The existing ROW for much of this segment is 100' however; as shown in **Table 10**, it varies up to 225'. For the 100' ROW areas, the existing centerline of the roadway lies approximately 50' (minimum) from the north and south ROW lines, thus ROW would be required for each of the three four-lane rural widening alternatives to achieve border width standards:

- Left Widening – 88' would be needed on the north side of S.R. 50
    - 40' border width would be achieved on both sides
- Center Widening – 44' would be needed on the north and south sides of S.R. 50
    - 40' border width would be achieved on both sides
- Right Widening – 88' would be needed on the south side of S.R. 50
    - 40' border width would be achieved on both sides

Note the above ROW widths would be the maximum required due to the ROW varying between 100' and 225' throughout Segment C.

The left/center/right four-lane high speed urban widening typical section alternatives are presented in **Figure 62** through **Figure 64**. The three four-lane high speed urban widening typical sections have similar roadway characteristics: 12' travel lanes, 6.5' bicycle lanes, 4' paved inside shoulders, Type E (median) and Type F (roadside) curb and gutter, and 22' raised median. In addition to the roadway improvements, a 10'-wide shared-use path is proposed on the south side and a concrete sidewalk is proposed on the north side for each of the three four-lane high speed urban widening alternatives. The distance from the back of curb to the edge of the path varies between 4' and 13'. For each widening alternative, the existing two-lane roadway will be reconstructed due to the change from the rural to the urban typical section. In total, each four-lane high speed urban widening alternative is anticipated to span the entire 8.17 miles along Segment C.

Figure 59: Rural Four-Lane Left Widening – Station 20+00 to Station 451+00

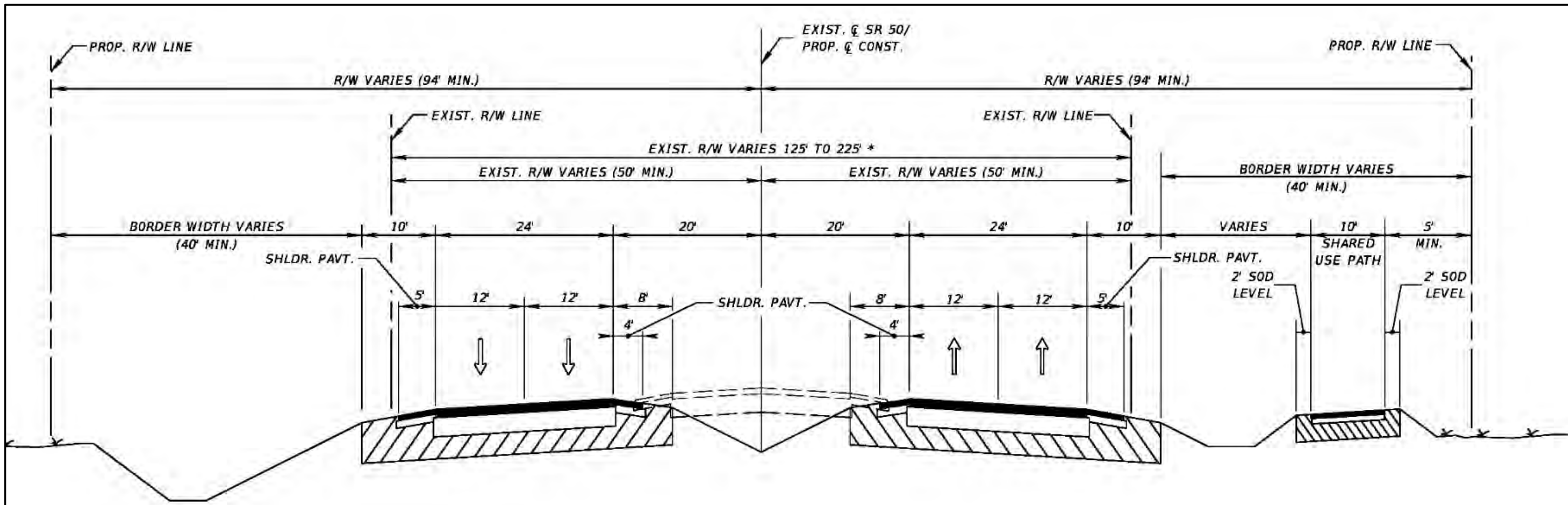


TYPICAL SECTION (OPTION 2)
RURAL 4-LANE / LEFT WIDENING
SR 50
FROM STA. 20+00.00 TO STA. 451+00.00

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

Figure 60: Rural Four-Lane Center Widening – Station 20+00 to Station 451+00

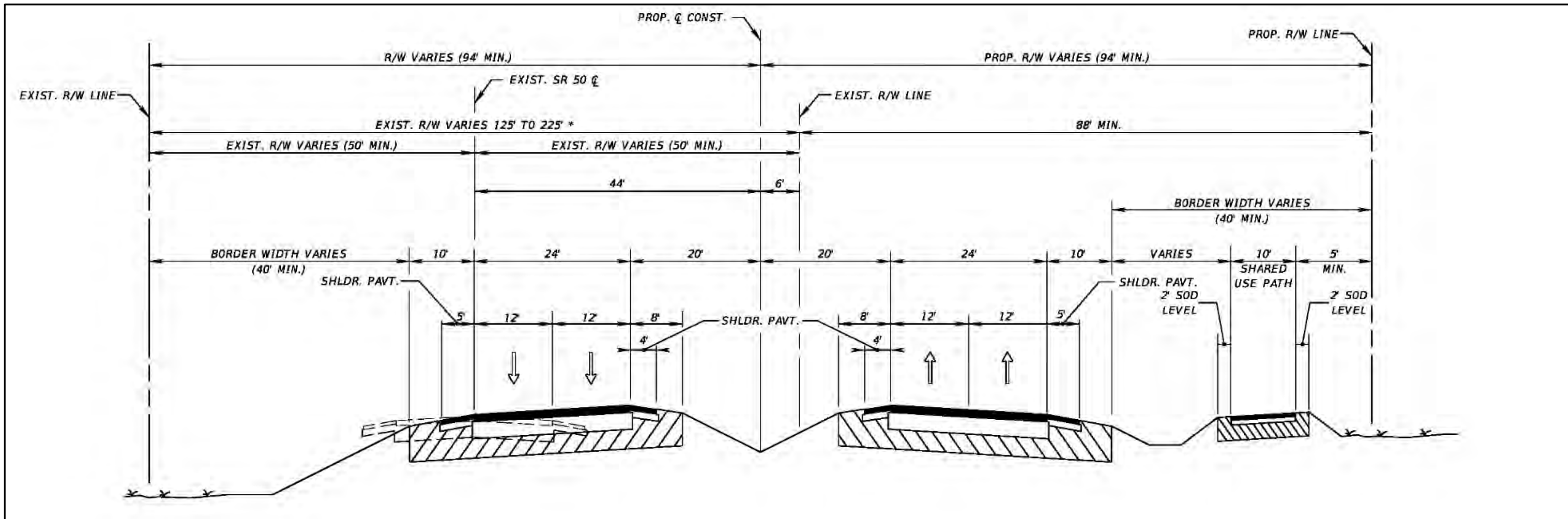


TYPICAL SECTION (OPTION 1)
RURAL 4-LANE / CENTER WIDENING
SR 50
FROM STA. 20+00.00 TO STA. 451+00.00

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

Figure 61: Rural Four-Lane Right Widening – Station 20+00 to Station 451+00



TYPICAL SECTION (OPTION 3)
RURAL 4-LANE / RIGHT WIDENING
SR 50
FROM STA. 20+00.00 TO STA. 451+00.00

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

Figure 62: High Speed Urban Four-Lane Left Widening – Station 20+00 to Station 451+00

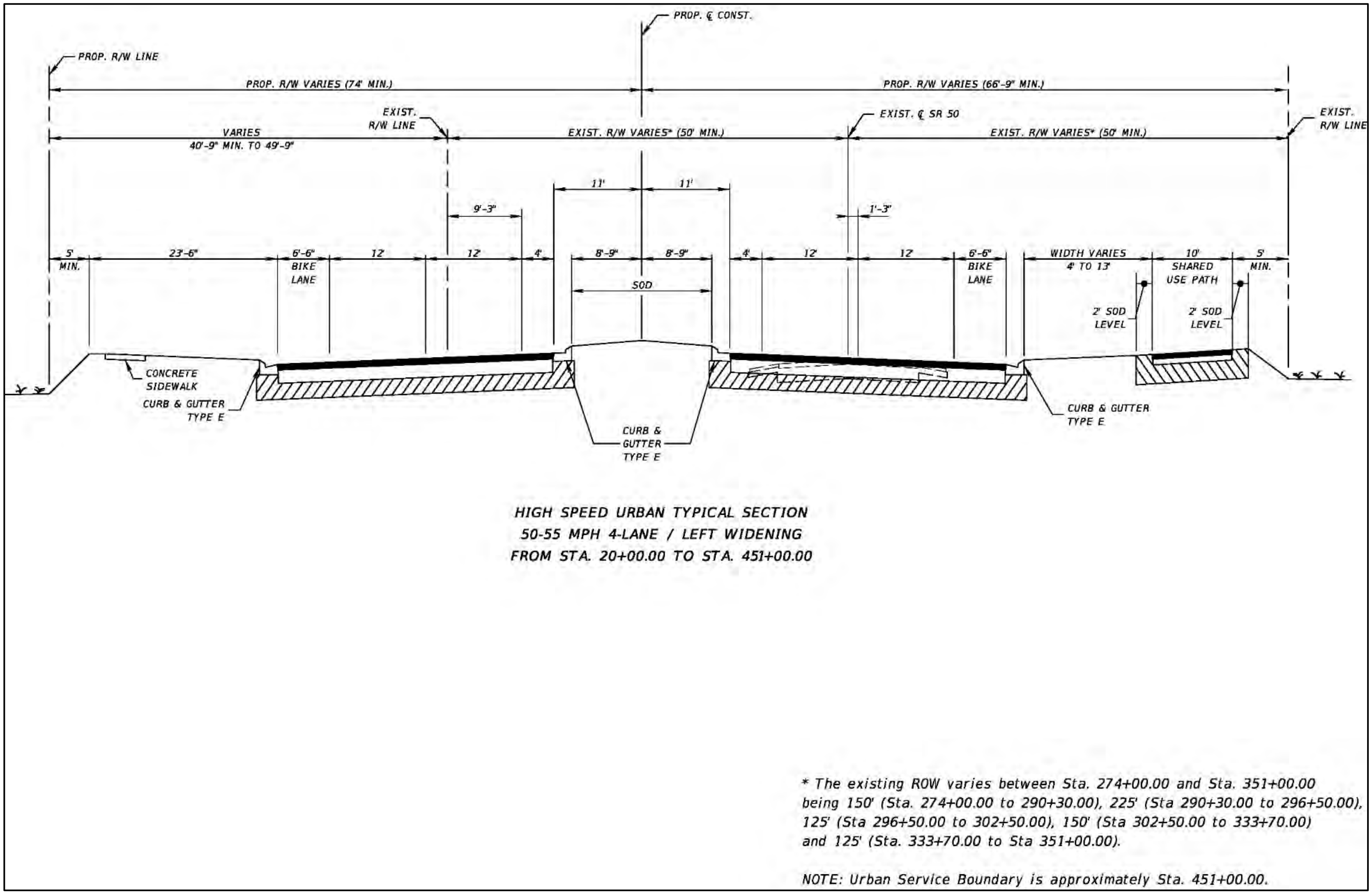
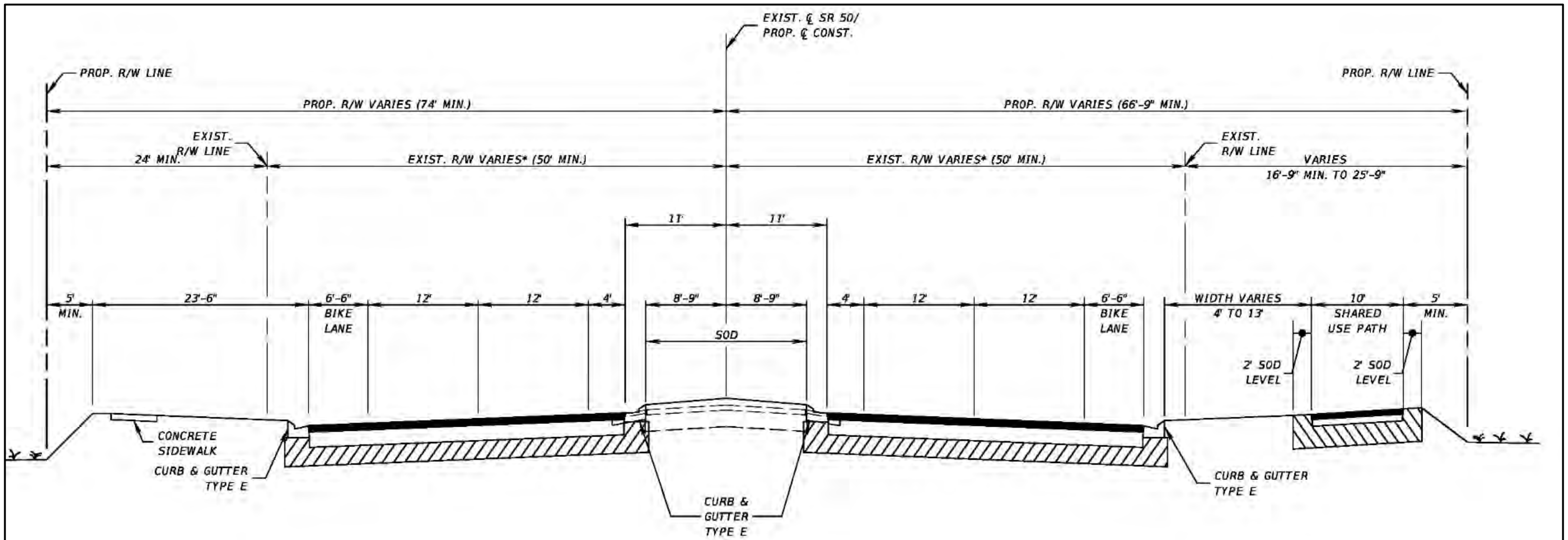


Figure 63: High Speed Urban Four-Lane Center Widening – Station 20+00 to Station 451+00

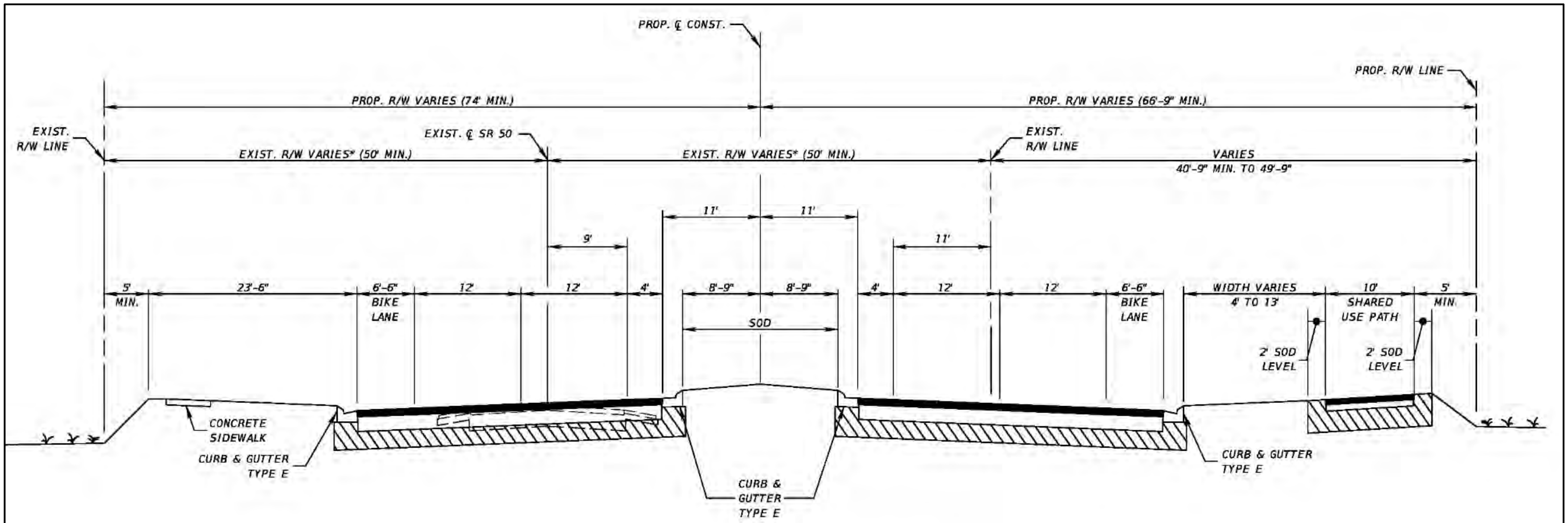


HIGH SPEED URBAN TYPICAL SECTION
50-55 MPH 4-LANE / CENTER WIDENING
FROM STA. 20+00.00 TO STA. 451+00.00

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

Figure 64: High Speed Urban Four-Lane Right Widening – Station 20+00 to Station 451+00



HIGH SPEED URBAN TYPICAL SECTION
50-55 MPH 4-LANE / RIGHT WIDENING
FROM STA. 20+00.00 TO STA. 451+00.00

* The existing ROW varies between Sta. 274+00.00 and Sta. 351+00.00 being 150' (Sta. 274+00.00 to 290+30.00), 225' (Sta 290+30.00 to 296+50.00), 125' (Sta 296+50.00 to 302+50.00), 150' (Sta 302+50.00 to 333+70.00) and 125' (Sta. 333+70.00 to Sta 351+00.00).

NOTE: Urban Service Boundary is approximately Sta. 451+00.00.

As previously noted, most of this segment has 100’ of ROW, but as shown in **Table 10** it can be as much as 225’. For areas with 100’ of existing ROW, the existing centerline of the roadway lies approximately 50’ (minimum) from the north and south ROW lines, thus ROW would be required for each of the three four-lane high speed urban widening alternatives:

- Left Widening – 40.75’ to 49.75’ would be needed on the north side of S.R. 50
- Center Widening –
  - 24’ would be needed on the north side of S.R. 50
  - 16.75’ to 25.75’ would be needed on the south side of S.R. 50
- Right Widening – 40.75’ to 49.75’ would be needed on the south side of S.R. 50

Note the above ROW widths would be the maximum required due to the ROW varying between 100’ and 225’ throughout Segment C. For areas having 150’ of ROW or more, little to no additional ROW would be needed for the roadway widening.

<u>Segment D – Lee Road to C.R. 33 (2.54 miles)</u>

East of Lee Road, S.R. 50 enters the Mascotte Urban Service Boundary and is a C-4 Urban General Context Classification. One typical section alternative was analyzed within Segment D from Lee Road to C.R. 33:

1. Four-lane urban widening alternative – left/center/right widening
   a. Station 451+00 (Lee Road) to Station 578+00 (C.R. 33).

The left/center/right four-lane urban widening typical section alternatives are presented in **Figure 65** through **Figure 67**. The three four-lane urban widening typical sections have similar roadway characteristics: 12’ travel lanes, 7’ buffered bicycle lanes, Type E (median) and Type F (roadside) curb and gutter, and 22’ raised median. In addition to the roadway improvements, a 10’-wide shared-use path is proposed on the south side and a 6’ concrete sidewalk is proposed on the north side for each of the three four-lane urban widening alternatives. 4’ separates the back of curb to the edge of the shared-use path. For each widening alternative, the existing two-lane roadway will be reconstructed to due to the change from the rural to the urban typical section. In total, each four-lane urban widening alternative is anticipated to span the entire 2.54 miles along Segment D.

As shown in **Table 10**, the existing ROW varies between 80’ and 105’. For the 80’ ROW areas, the existing centerline of the roadway lies approximately 40’ (minimum) from the north and south ROW lines, thus ROW would be required for each of the three four-lane urban widening alternatives:

- Left Widening – 39’ would be needed on the north side of S.R. 50
- Center Widening –
  - 16’ would be needed on the north side of S.R. 50
  - 23’ would be needed on the south side of S.R. 50
- Right Widening – 39’ would be needed on the south side of S.R. 50

Figure 65: Urban Four-Lane Left Widening – Station 451+00 to Station 578+00

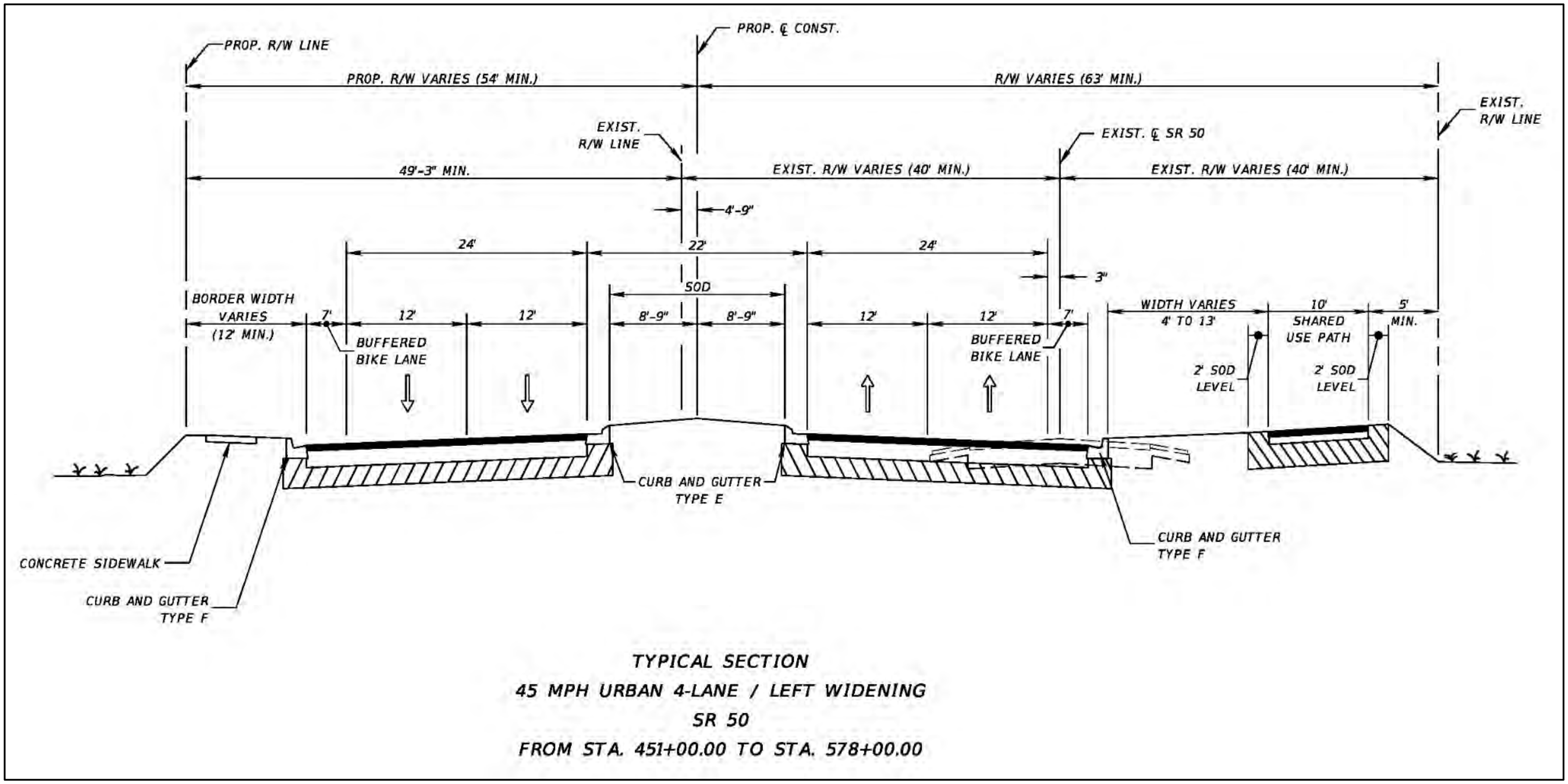


Figure 66: Urban Four-Lane Center Widening – Station 451+00 to Station 578+00

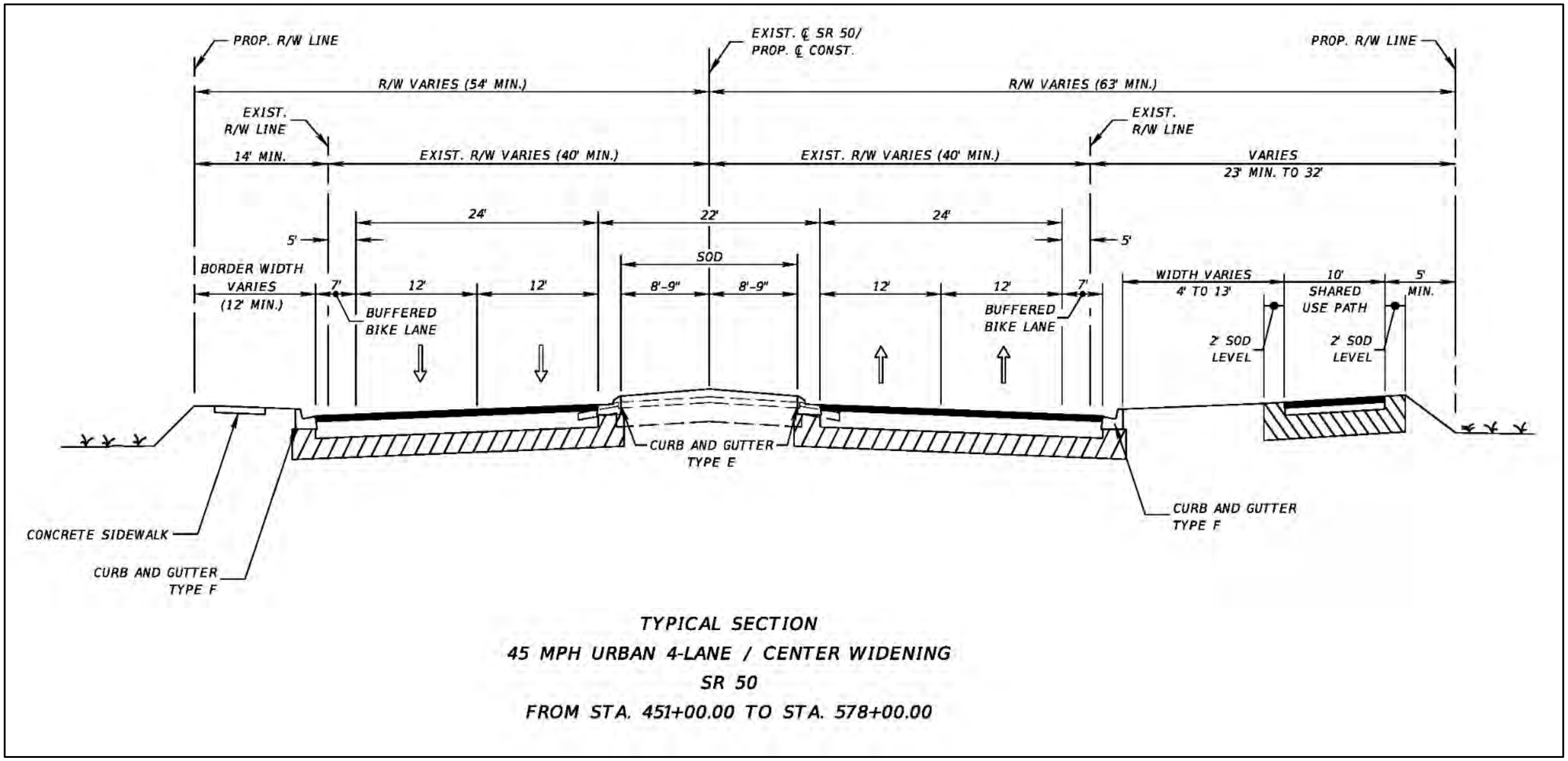
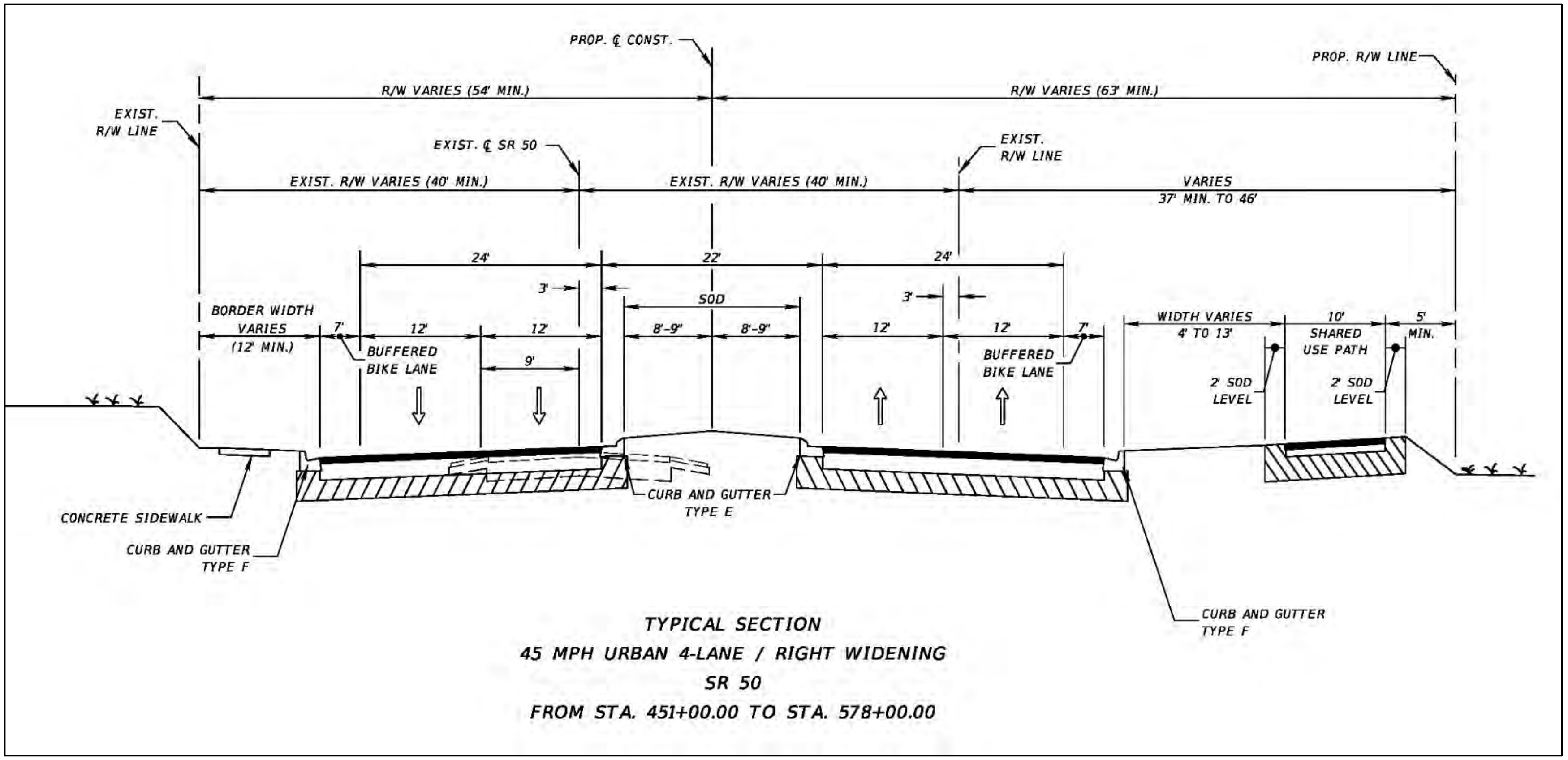


Figure 67: Urban Four-Lane Right Widening – Station 451+00 to Station 578+00



Build Three-Lane Passing Lane Arterial Operations

An *HCM 2010* Two-Lane Highway segment analysis for directional passing lanes was performed to evaluate the effects of an eastbound and westbound passing lane between U.S. 301 and C.R. 757. The lengths of the passing lanes were determined to achieve the target LOS of C. From **Table 23**, the PTSF threshold for LOS D is 65 percent and, as shown in **Table 39**, the PTSF is just below 65 percent for the eastbound passing lane in the AM peak hour and for the westbound passing lane in the PM peak hour. The passing lane is expected to provide a level of service C through the 2045 design-year. More detail on the three-lane arterial analysis can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

Table 39: 2045 Three-Lane Passing Lane Segment LOS (HCM Two-Lane Highway)

S.R. 50 Section	Analysis Direction	BFFS (MPH)	AM Peak Hour			PM Peak Hour		
			ATS (MPH)	PTSF (%)	LOS	ATS (MPH)	PTSF (%)	LOS
U.S. 301 to C.R. 757	Eastbound	70	56.7	64.7	C	56.2	58.5	C
	Westbound	70	57.4	55.6	C	56.4	64.8	C

Note: **BFFS** is Base Free Flow Speed, **ATS** is Average Travel Speed, and **PTSF** is Percent Time Spent Following

Build Four-Lane Arterial Operations

A Multilane Highway Segment analysis was performed for the S.R. 50 between U.S. 301 and Tuscanooga Road using the *HCM 2010* methodologies. The methodology evaluates the density of vehicles on the roadway segment in passenger cars per mile per lane (pc/mi/ln). The procedure evaluated each direction separately. The LOS thresholds for multilane highways are summarized in **Table 40**. Roadways features included in the analysis methodology include number of lanes, lane width, lateral clearance, median type, and access points per mile. S.R. 50 from Tuscanooga Road to C.R. 33 is expected to operate as an arterial in both directions and was analyzed using the *HCM 2010* Urban Street methodologies. The results of the multilane highway and urban street segment analysis for the eastbound and westbound directions are summarized in **Table 41** through **Table 43**. The four-lane alternative is expected to provide adequate segment LOS for all segments through the 2045 design year. More detail on the four-lane arterial analysis can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

Table 40: LOS for Two-Lane Highways (HCM 2010)

LOS	Density (pc/mi/ln)
A	≤11
B	>11-18
C	>18-26
D	>26-35
E	>35-45
F	Demand exceeds capacity OR density >45

Table 41: 2045 Four-Lane Segment LOS – HCM Multilane Highway Eastbound

S.R. 50 Section	Analysis Direction	AM Peak Hour		PM Peak Hour	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
U.S. 301 to C.R. 757	Eastbound	7.8	A	6.5	A
C.R. 757 to C.R. 469	Eastbound	7.8	A	6.5	A
C.R. 469 to Tuscanooga Road	Eastbound	17.2	B	12.7	B

Table 42: 2045 Four-Lane Segment LOS – HCM Multilane Highway Westbound

S.R. 50 Section	Analysis Direction	AM Peak Hour		PM Peak Hour	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
U.S. 301 to C.R. 757	Westbound	6.1	A	8.3	A
C.R. 757 to C.R. 469	Westbound	8.3	A	9.8	A
C.R. 469 to Tuscanooga Road	Westbound	14.0	B	15.7	B

Table 43: 2045 Four-Lane Segment LOS (HCM Urban Street)

S.R. 50 Section	Analysis Direction	# Lanes	AM Peak Hour			PM Peak Hour		
			PBFFS* (%)	V/C Ratio	LOS	PBFFS* (%)	V/C Ratio	LOS
Tuscanooga Road to C.R. 33	Eastbound	2	53.3	0.85	C	58.5	0.70	C
	Westbound	2	69.9	0.58	B	69.8	0.69	B

***Note: PBFFS** is the Percent of Base Free Flow Speed

Highway Safety Manual (HSM) Analysis

Crash prediction tools and methods from the *HSM* with FDOT calibration factors were applied to estimate the predicted crash frequency within the study corridor over a 15-year design life for the project. The fundamental purpose for using the *HSM* crash prediction methods is to compensate for the randomness in crash occurrence. Crashes include a human component not directly related to geometry or presence of certain roadway features. Any given set of crash data for a period of time will reflect randomness in crash frequency not related to changes to the roadway.

Crash frequency and severity along roadway segments is predicted using HSM provided Safety Performance Functions (SPFs). The SPFs were calibrated to reflect variations between conditions in Florida and other states studied to develop the SPFs. Variations could include driver characteristics, roadway design, terrain, and other factors associated with geometry, human factors, and driving environment. Predicting crashes for the no-build scenarios (existing and future) estimates the expected number of crashes, assuming only traffic volume varies between years. As a baseline crash estimate, the expected number of no-build crashes will be compared with the various roadway widening alternatives.

Crash Prediction Results

Crash prediction estimates were computed using spreadsheet tools designed to implement the *HSM* crash prediction methodology, as adopted by FDOT. The following Existing and Future No-Build scenarios were analyzed to be representative areas for predicting crashes for the S.R. 50 corridor:

- U.S. 301 to S.R. 471: two-lane undivided rural road segment
- 0.25 miles east of C.R. 711 to 0.17 miles west of the Mine Access (1.00 miles): two-lane undivided rural road segment
- Douglas Avenue to 0.07 miles west of Palmwood Avenue (1.00 miles): two-lane undivided urban road segment

For the Future Build analysis from U.S. 301 to S.R. 471, a passing lane scenario was assessed versus a two- to four-lane rural widening alternative. The following describes the roadway segment configurations for the scenarios analyzed:

- Passing Lane Scenario –
    - Two-lane undivided rural road segment from U.S. 301 to C.R. 575 (0.96 miles);
    - Three-lane passing lane road segment from C.R. 575 to 0.22 miles west of C.R. 757 (5.80 miles); and
    - Two-lane undivided rural road segment from 0.22 miles west of C.R. 757 to S.R. 471 (2.28 miles).
- Four-Lane Widening Scenario –
    - Four-lane divided rural road segment from U.S. 301 to S.R. 471.

In addition to the build scenarios assessed from U.S. 301 to S.R. 471, two one-mile segments of S.R. 50 where assessed east of S.R. 471. These one-mile segments were utilized as representative samples to predict crashes for the corridor. The two- to four-lane widening alternative is the only build scenario east of S.R. 471, but the typical section changes from rural to urban at Lee Road. For this reason, one segment is located in the S.R. 471 to Lee Road section of S.R. 50 and the other segment is located in the Lee Road to C.R. 33 section. The following describes the limits of the one-mile representative samples:

- 0.25 miles east of C.R. 711 to 0.17 miles west of the Mine Access (1.00 miles): four-lane divided rural road segment.
- Douglas Avenue to 0.07 miles west of Palmwood Avenue (1.00 miles): four-lane divided urban road segment.

The future no-build crash predictions were calculated using the same SPFs as the existing condition but updated for the future volumes. The future build crash predictions utilized build future volumes and utilized different SPFs for the four-lane rural and urban conditions. **Table 44** displays the results of the predictive crash analysis in terms of the future no-build's increased or decreased crash percentages for the build alternatives.

Table 44: Crash Prediction Estimates for S.R. 50

Build Condition	% Increase/Decrease from No-Build
U.S. 301 to S.R. 471 – Two Lane with Passing Lane Alternative	-10% to -25%
U.S. 301 to S.R. 471 – Four-Lane Rural Alternative	-50% to -60%
0.25 miles east of C.R. 711 to 0.17 miles west of the Mine Access – Four-Lane Rural Alternative	-40% to -50%
Douglas Avenue to 0.07 miles west of Palmwood Avenue – Four-Lane Urban Alternative	+5% to +15%

As displayed in **Table 44**, the passing lane alternative is predicted to reduce crashes up to 25 percent from the future no-build condition from U.S. 301 to S.R. 471. For U.S. 301 to S.R. 471, the rural four-lane widening would reduce crashes up to 60 percent from the no-build condition. Based on the analysis performed from 0.25 miles east of C.R. 711 to 0.17 miles west of the Mine Access, and if a rural four-lane widening was implemented, it would be reasonable to assume a crash reduction up to 50 percent from S.R. 471 and Lee Road. This crash reduction is lower than the 60 percent observed for the U.S. 301 to S.R. 471 segment because traffic volumes forecast between S.R. 471 and Lee Road are approximately 5,000 to 10,000 higher. A high speed urban alternative is also proposed for this section but an *HSM* analysis could not be completed for this typical section because the models do not support crash prediction for urban roadways greater than 45 MPH.

The Douglas Avenue to 0.07 miles west of Palmwood Avenue provides a representative sample of crash prediction for the section of S.R. 50 from Lee Road to C.R. 33. As displayed in **Table 44**, crashes are predicted to increase from the future no-build if the roadway was widened to four-lanes. The reason for the increase is because traffic volumes projected for the build are approximately 5,000 to 7,000 higher than the no-build condition, which would be capacity constrained in the future year.

Comparative Evaluation Matrix

The S.R. 50 comparative evaluation matrix is presented in **Figure 68** and **Figure 69**. The comparative evaluation matrix reviews the following metrics for each of the no-build and build alternatives:

- Purpose and Need –
  - Improves LOS;
  - Accommodates Future Traffic Demand; and
  - Enhances Corridor Safety.
- Social Environment –
  - 2045 Peak Hour LOS;
  - Vehicle Crash Reduction;
  - Enhanced Pedestrian/Bicycle Facilities;
  - Impacted ROW (without ponds);
  - Impacted Non-State Forest Parcels (without ponds); and
  - Business/Residential Relations.
- Cultural Environment –
  - Historical Resources Potentially Impacted; and
  - Archeological Sites Potentially Impacted.
- Natural Environment –
  - State Forest Impacts (without ponds);
  - Wetland Impacts; and
  - Potential Threatened/Endangered Species Impacts.
- Physical Environment –
  - Access Management Classification;
  - Medium and High-Risk Contamination Sites Impacted;
  - Potential Floodplain Impacts;
  - Potential Noise Impacts; and
  - Potential Utility Impacts.
- Project Cost –
  - Design;
  - Wetland Mitigation;
  - ROW Acquisition (without ponds);
  - Construction; and
  - Construction Engineering and Inspection (CEI).

The evaluation matrix was done to evaluate typical section alternatives being:

- Two lanes with passing lane versus four-lane rural alternatives from U.S. 301 to S.R. 471; and
- Four-lane rural versus four-lane high speed urban alternatives from S.R. 471 to Lee Road.

The evaluation did not contain the section from Lee Road to C.R. 33 as the four lane urban typical section was the only typical section alternative considered because traffic volumes warranted four lanes and from Lee Road east S.R. 50 is within the Mascotte Urban Service Boundary having a C-4 Urban General Context Classification.

The alternatives were developed to evaluate widening by taking ROW solely on the left side, right side, or both sides with the center widening. Each alternative was evaluated based upon meeting the project's purpose and need and the metrics listed above and summarized in the evaluation matrix. The evaluation of environmental factors was a higher-level quantitative and qualitative evaluation to determine the magnitude of potential impacts.

This matrix was presented to the FDOT staff and partnering agencies on August 3, 2017. Notes and slide presentation from this meeting can be found in **Appendix F**. The focus of the meeting was to discuss considerations toward recommending the typical section to be further evaluated in the PD&E study's alignment alternatives analysis and is summarized as follows.

U.S. 301 to S.R. 471

From U.S. 301 to S.R. 471, the future traffic demand and LOS is anticipated to be addressed with either the two-lane with passing lane or four-lane rural widening alternatives. From a safety perspective, Highway Safety Manual (HSM) analysis shows the four-lane alternative is anticipated to reduce crashes by approximately 50 to 60 percent from the existing condition, whereas the two-lane with passing lane alternative is anticipated to reduce crashes by 10 to 25 percent. Maintaining the existing condition or providing a two-lane section with passing lane would still leave this section of S.R. 50 as the only non-four-lane section from U.S. 19 to Titusville. While both alternatives meet the project's purpose and need, the four-lane alternative better enhances the project's purpose and need through better traffic operations, improved safety and better serves as an Emerging SIS facility, Further, the public preference from the Alternatives Public Workshops conducted in July 2017 was predominately for the four-lane alternative, with 90 percent of comments supporting one of the four-lane typical sections.

From an environmental perspective, the four-lane alternative would have approximately 3.5 times more state forest, wetland, and floodplain impacts than the three-lane passing lane alternatives. The overall approximate cost for the four-lane alternative is $89 million whereas the two-lane with passing lane alternative is anticipated to cost $45 million. Pond ROW costs are not included in the cost estimates. It was discussed the long-term safety benefit of the four-lane alternative combined with the system improvement were key considerations. The environmental impacts will be minimized or mitigated.

The factors discussed above were presented to the meeting attendees. There was discussion of several environmental factors during the meeting; however, based upon the four lane typical section enhancing the project's purpose and need, the consensus was to move forward with a four-lane rural widening alternative from U.S. 301 to S.R. 471.

Figure 68: Comparative Evaluation Matrix – U.S. 301 to S.R. 471

Evaluation Criteria		US 301 to H/S County Line			H/S County Line to SR 471						
		No-Build	Passing Lane Alternative A-	Four Lane Alternative A-2	No-Build	Passing Lane Alternatives			4-Lane Rural Widening Alternatives		
						B-1 Left	B-2 Center	B-3 Right	B-4 Left	B-5 Center	B-6 Right
PURPOSE AND NEED	Improves Level of Service	×	✓	✓	×	✓	✓	✓	✓	✓	✓
	Accommodates Future Traffic Demand	×	✓	✓	×	✓	✓	✓	✓	✓	✓
	Enhances Corridor Safety	×	✓	✓	×	✓	✓	✓	✓	✓	✓
SOCIAL ENVIRONMENT	2045 Peak Hour[1] Level of Service (LOS)	E	C	A	E	C			A		
	Reduces Vehicle Crashes (%)	N/A	15 to 25	50 to 60	N/A	10 to 20			50 to 60		
	Enhanced Bicycle & Pedestrian Facilities	×	✓	✓	×	✓	✓	✓	✓	✓	✓
	Impacted ROW - Without Ponds (acres)	0	0	0	0	8.8	8.7	9.2	46.0	48.1	44.9
	pacted Non-State Forest Parcels - Without Ponds (#)	0	0	0	0	5	11	6	27	47	34
	Business / Residential Relocations (#)	0	0 / 0	0 / 0	0	0 / 0	0 / 0	0 / 0	0 / 2	0 / 3	1 / 4
CULTURAL ENVIRONMENT	Historic Resources Potentially Impacted (#)	0	1	3	0	0	0	0	0	0	0
	Archeological Sites Potentially Impacted (#)	0	1	1	0	1	1	0	1	1	0
NATURAL ENVIRONMENT	State Forest Impacts - Without Ponds (acres)	0	0	0	0	2.4	3.2	4.0	14.3	14.3	14.3
	Wetland Impacts (acres)	0	3.8	21.1	0	5.2	6.0	6.7	14.4	12.7	12.5
	Potential Threatened & Endangered Species Impacts	None	Low	High	None	Low	Low	Low	Moderate	High	Moderate
PHYSICAL ENVIRONMENT	Access Management Classification	4	4	3	4	4			3		
	Medium Risk Contamination Sites Impacted (#)	0	0	0	0	2	3	2	2	3	2
	High Risk Contamination Sites Impacted (#)	0	1	1	0	1	2	2	1	3	2
	Potential Floodplain Impacts (acres)	None	13.1	45.2	None	9.6	9.5	9.5	33.5	32.0	30.9
	Potential Noise Impacts (# Noise Sensitive Sites)	None	None	None	None	5	4	10	10	10	15
	Potential Utility Impacts	None	Low	Moderate	None	Low	Low	Low	Moderate	High	Moderate
PROJECT COST	Design Costs	None	$1,900,000	$3,300,000	None	$1,800,000	$1,800,000	$1,700,000	$3,400,000	$3,700,000	$3,400,000
	Wetland Mitigation Costs	None	$460,000	$2,500,000	None	$620,000	$720,000	$800,000	$1,700,000	$1,500,000	$1,500,000
	ROW Acquisition Costs (Without Ponds)	None	$0	$0	None	$940,000	$1,200,000	$1,000,000	$3,000,000	$6,300,000	$5,000,000
	Construction Costs	None	$18,800,000	$32,500,000	None	$14,400,000	$15,100,000	$14,000,000	$28,100,000	$30,100,000	$28,000,000
	Construction Engineering & Inspection Costs	None	$2,800,000	$4,900,000	None	$2,200,000	$2,300,000	$2,100,000	$4,200,000	$4,500,000	$4,200,000
	PRELIMINARY ESTIMATE OF TOTAL PROJECT COST	**None**	**$23,960,000**	**$43,200,000**	**None**	**$19,960,000**	**$21,120,000**	**$19,600,000**	**$40,400,000**	**$46,100,000**	**$42,100,000**

[1] Peak Hour - The one hour time period having the highest traffic flow during the day

[2] The four lane urban scenario has approximately 5,000 more vehicles than the two lane, thus the reason for more projected crashes in the future build condition

Figure 69: Comparative Evaluation Matrix – S.R. 471 to C.R. 33

Evaluation Criteria		SR 471 to Lee Road							Lee Road to CR 33			
		No-Build	4-Lane Rural Widening Alternatives			Lane High Speed Urban Widening Alternativ			No-Build	4-Lane Urban Widening Alternatives		
			C-1 Left	C-2 Center	C-3 Right	C-4 Left	C-5 Center	C-6 Right		D-1 Left	D-2 Center	D-3 Right
PURPOSE AND NEED	Improves Level of Service	×	✓	✓	✓	✓	✓	✓	×	✓	✓	✓
	Accommodates Future Traffic Demand	×	✓	✓	✓	✓	✓	✓	×	✓	✓	✓
	Enhances Corridor Safety	×	✓	✓	✓	✓	✓	✓	×	✓	✓	✓
SOCIAL ENVIRONMENT	2045 Peak Hour[1] Level of Service (LOS)	E	B			B			F	C		
	Reduces Vehicle Crashes (%)	N/A	40 to 50			N/A			N/A	Increase of 5 to 15[2]		
	Enhanced Bicycle & Pedestrian Facilities	×	✓	✓	✓	✓	✓	✓	×	✓	✓	✓
	Impacted ROW - Without Ponds (acres)	0	89.8	78.5	70.1	44.5	32.9	32.4	0	11.8	9.9	7.9
	pacted Non-State Forest Parcels - Without Ponds (#)	0	53	98	52	50	95	46	0	66	106	66
	Business / Residential Relocations (#)	0	6 / 6	5 / 1	0 / 2	5 / 1	2 / 1	0 / 0	0	6 / 5	5 / 2	6 / 3
CULTURAL ENVIRONMENT	Historic Resources Potentially Impacted (#)	0	3	3	2	3	3	3	0	0	0	0
	Archeological Sites Potentially Impacted (#)	0	1	1	1	1	1	1	0	0	0	0
NATURAL ENVIRONMENT	State Forest Impacts - Without Ponds (acres)	0	17.5	11.9	10.2	8.2	4.6	4.3	0	0	0	0
	Wetland Impacts (acres)	0	26.9	25.6	25.8	16.7	15.2	15.6	0	0.6	0.4	0.4
	Potential Threatened & Endangered Species Impacts	None	Moderate	High	Moderate	High	High	High	None	Low	Moderate	Low
PHYSICAL ENVIRONMENT	Access Management Classification	4	3			3			4	5		
	Medium Risk Contamination Sites Impacted (#)	0	4	6	3	6	6	6	0	9	10	2
	High Risk Contamination Sites Impacted (#)	0	3	6	4	6	6	6	0	3	5	3
	Potential Floodplain Impacts (acres)	None	46.0	39.1	42.0	31.0	27.8	29.4	None	2.2	1.9	2.0
	Potential Noise Impacts (# Noise Sensitive Sites)	None	15	23	27	10	10	14	None	17	17	14
	Potential Utility Impacts	None	Moderate	High	Moderate	Moderate	High	Moderate	None	Moderate	High	High
PROJECT COST	Design Costs	None	$7,000,000	$7,500,000	$7,000,000	$8,600,000	$8,800,000	$8,600,000	None	$2,900,000	$3,000,000	$2,900,000
	Wetland Mitigation Costs	None	$3,200,000	$3,100,000	$3,100,000	$2,000,000	$1,800,000	$1,900,000	None	$70,000	$50,000	$50,000
	ROW Acquisition Costs (Without Ponds)	None	$14,700,000	$22,300,000	$11,500,000	$8,600,000	$11,000,000	$5,300,000	None	$45,500,000	$59,000,000	$37,200,000
	Construction Costs	None	$57,700,000	$61,600,000	$57,700,000	$70,600,000	$72,300,000	$70,400,000	None	$24,000,000	$24,300,000	$23,600,000
	Construction Engineering & Inspection Costs	None	$8,700,000	$9,200,000	$8,700,000	$10,600,000	$10,800,000	$10,600,000	None	$3,600,000	$3,600,000	$3,500,000
	PRELIMINARY ESTIMATE OF TOTAL PROJECT COST	**None**	**$91,300,000**	**$103,700,000**	**$88,000,000**	**$100,400,000**	**$104,700,000**	**$96,800,000**	**None**	**$76,070,000**	**$89,950,000**	**$67,250,000**

[1] Peak Hour - The one hour time period having the highest traffic flow during the day

[2] The four lane urban scenario has approximately 5,000 more vehicles than the two lane, thus the reason for more projected crashes in the future build condition

S.R. 471 to Lee Road

From S.R. 471 to Lee Road, the future traffic demand and LOS is anticipated to be addressed with either of the four-lane typical section alternatives. From a safety perspective, HSM analysis shows the four-lane alternatives are anticipated to reduce crashes by approximately 40 to 50 percent from the no-build. Maintaining the no-build would still leave this section of S.R. 50 as the only non- four-lane roadway section from U.S. 19 to Titusville. Both four lane typical sections alternatives would meet the project's purpose and need equally. FDOT received no public comments from the July 2017 Alternatives Public Workshops supporting the no-build alternative.

For the four-lane rural alternative, the business relocations would range from 0 to 6 and the residential relocations would range from 1 to 6 depending on the side of the roadway where widening occurred. For the four-lane high speed urban alternative, the business relocations would range from 0 to 6 and the residential relocations would range from 0 to 1 again depending on the side of roadway the widening occurred. From an environmental perspective, the four-lane rural alternatives would have approximately 1.5 to 2.1 times more state forest, wetland, and floodplain impacts than the four-lane high speed urban. There were no environmental factors which would preclude the development of either alternative. The overall approximate cost for the four-lane rural alternative ranges from $88 million to $104 million. The overall approximate cost for the four-lane high speed urban alternative ranges from $97 million to $105 million.

The factors presented above were presented to the meeting attendees for discussion. Several attendees stated they felt the four-lane rural typical section was more in keeping with context of the existing and future land use in this S.R. 50 section. The C2 – rural context classification was discussed and considered. The consensus was to move forward with a four-lane rural typical section alternative from S.R. 471 to Lee Road.

Build Intersection Operations

The preferred build scenario includes widening S.R. 50 to four lanes throughout the corridor; intersection control and minor street approaches were not changed under this scenario. The 2045 build intersection operations and future year turning volumes are illustrated in **Figure 47** and **Figure 48** in Section 4.1. A summary of the intersection operations is provided in **Table 45**, which also includes the 2025 and 2035 build operations. Performance measures evaluated for each intersection include volume-to-capacity (v/c) ratio, delay, and LOS. The target LOS is C for the rural intersections and D for the urban intersections along the study corridor. In this build scenario, all analyzed intersections along the corridor were provided with median openings and exclusive left-turn lanes off S.R. 50. Select intersections were also provided with exclusive right-turn lanes off S.R. 50 due to safety concerns.

Table 45: LOS Summary of Build Intersection Operations

Intersection			2045	
Number	Location	Control	AM	PM
3	S.R. 50 at C.R. 757	TWSC	C	C
5	S.R.50 at C.R. 478A	TWSC	B	C
9	S.R.50 at S.R. 471	Signal	E*	C*
11	S.R.50 at C.R. 721	TWSC	E	E
15	S.R. 50 at C.R. 711	TWSC	E	D
19	S.R. 50 at C.R. 469	TWSC	F	F
20	S.R. 50 at Sloans Ridge Road	TWSC	E	D
24	S.R. 50 at Stuckey Loop W	TWSC	D	D
25	S.R. 50 at Stuckey Loop E	TWSC	D	C
26	S.R. 50 at Douglas Road	TWSC	F	F
32	S.R. 50 at Tuscanooga Road	TWSC	F	F
35	S.R. 50 at Bay Lake Road	TWSC	F	F
39	S.R. 50 at Sunset Avenue	TWSC	F	F
42	S.R. 50 at C.R. 33/Putnam Street	Signal	F	F
43	S.R. 50 at Midway Avenue	TWSC	D	C

**Includes a phasing change from permitted to protected-permitted in 2045*

Based on the future intersection operations shown in **Figure 47**, **Figure 48**, and **Table 45**, select intersections do not provide acceptable operations for future volume conditions. In addition to the two-to-four lane widening of S.R. 50, these locations will need further traffic control or turn lane improvements to operate within its identified level of service target through 2045. The following existing intersections are projected to operate over-capacity prior to the design year 2045. For the intersections in **bold**, both traffic signal and roundabout options were evaluated. It is the policy of the FDOT to evaluate a roundabout whenever an intersection is being considered for signalization.

- TWSC intersections requiring traffic control improvements:
  - **S.R. 50 at C.R. 469**;
  - S.R. 50 at Douglas Road;
  - **S.R. 50 at Tuscanooga Road**;
  - **S.R. 50 at South Bay Lake Road**; and
  - S.R. 50 at Sunset Avenue.
- Existing signalized intersections requiring improvements:
  - **S.R. 50 at S.R. 471**; and
  - **S.R. 50 at C.R. 33**.

Multilane roundabout feasibility was evaluated at C.R. 469, Tuscanooga Road and South Bay Lake Road as these intersections will meet signal warrants by 2045. The existing C.R. 33 signalized intersection was also evaluated for roundabout feasibility. A roundabout was also evaluated at S.R. 471 due to the potential safety benefits a roundabout can provide over the existing signalized configuration. Roundabouts were evaluated using *HCM* 6th edition methodologies. Detailed output reports of both signalized and roundabout alternatives are provided in the *S.R. 50 Design Traffic Technical Memorandum*.

The intersections of S.R. 50 with C.R. 721, C.R. 711, and Sloan's Ridge Road experience LOS E operations for the minor street stop-controlled movements in 2045 but LOS C or better in 2025 and 2035. At this time, no operational recommendations are being made for these intersections, but further analysis could be performed in the future to determine if additional turn lanes should be added to facilitate minor street movements.

The remainder of this section reviews each intersection noted above for potential improvement alternatives. More information on the build intersection operations can be found in the *S.R. 50 Design Traffic Technical Memorandum*.

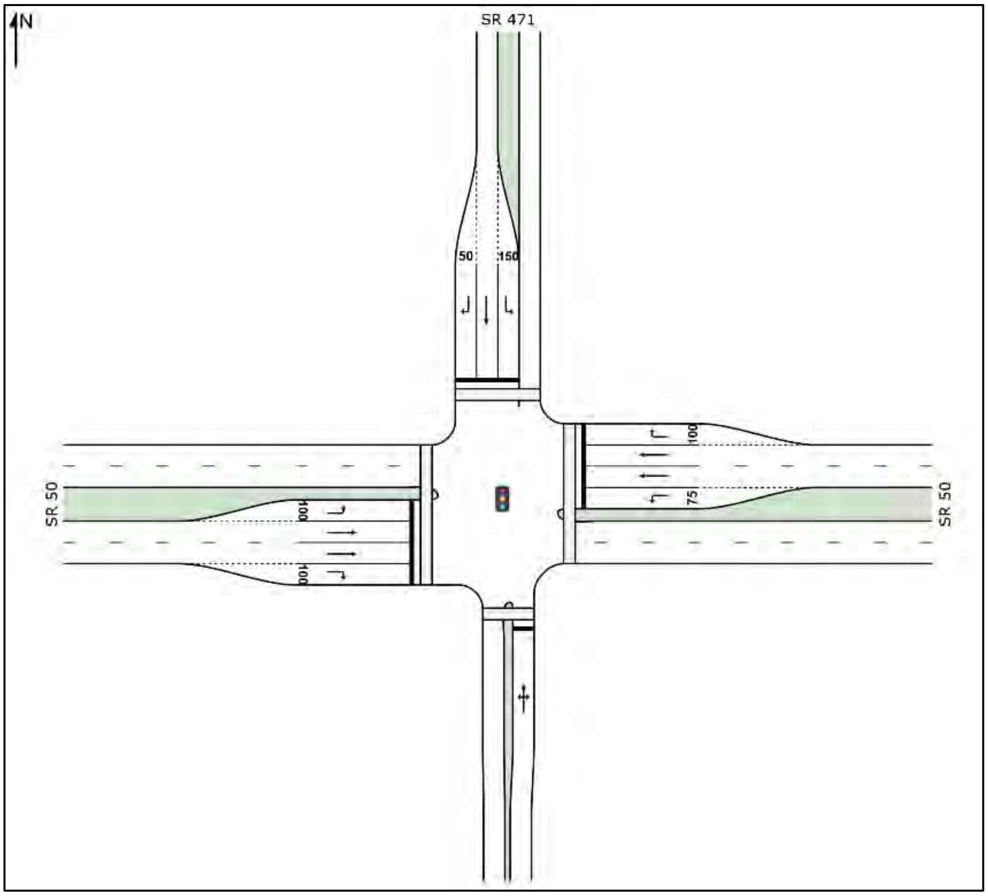
S.R. 50 at S.R. 471

Improvements to the existing traffic signal at S.R. 471 were evaluated to enhance future operations. For a signal at this intersection to maintain LOS C operations through 2045, an exclusive southbound left-turn lane is needed. The results of the signal operations in 2045 with the additional southbound left-turn lane are provided in **Table 46**. The lane configurations are shown in **Figure 70**.

Table 46: S.R. 50 at S.R. 471 – Signal Operations

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	Left	0.46	38.4 (D)	100	0.54	41.1 (D)	95
	Through	0.81	32.1 (C)	390	0.60	23.1 (C)	250
	Right	0.00	0.0 (A)	< 25	0.00	0.0 (A)	< 25
	Approach	-	**32.7 (C)**	-	-	**25.2 (C)**	-
Westbound	Left	0.65	53.5 (D)	115	0.34	31.7 (C)	75
	Through	0.63	26.7 (C)	290	0.76	26.9 (C)	330
	Right	0.00	0.0 (A)	< 25	0.00	0.0 (A)	< 25
	Approach	-	**29.8 (C)**	-	-	**27.3 (C)**	-
Northbound	Left / Through / Right	0.82	44.6 (D)	375	0.80	37.3 (D)	355
	Approach	-	**44.6 (D)**	-	-	**37.3 (D)**	-
Southbound	Left	0.85	30.9 (C)	360	0.76	24.5 (C)	250
	Through	0.33	12.8 (B)	190	0.30	12.2 (B)	150
	Right	0.12	11.1 (B)	50	0.12	10.9 (B)	45
	Approach	-	**22.2 (C)**	-	-	**18.2 (B)**	-
Overall Intersection		-	**30.4 (C)**	-	-	**25.9 (C)**	-

Figure 70: S.R. 50 at S.R. 471 – Signal Lane Configurations

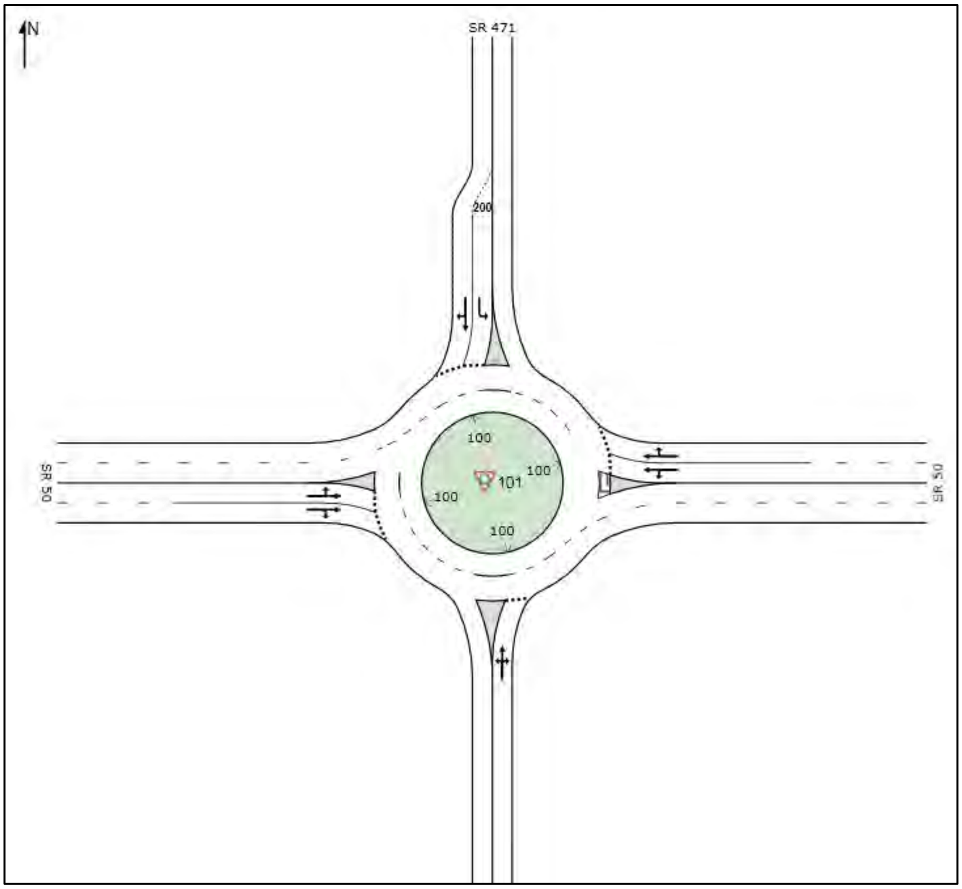


A roundabout was evaluated at the S.R. 50/S.R. 471 intersection as a potential alternative to enhance safety and operational performance. The results of the operations analysis are provided in **Table 47**. The assumed lane configuration for the multilane roundabout is provided in **Figure 71**. A partial two-lane roundabout is expected to operate at LOS C or better through the 2045 design year and has roughly half the queue as the signal alternative.

Table 47: S.R. 50 at S.R. 471 – Multilane Roundabout Operations

Year	Approach	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec/veh) (LOS)	95% Queue (ft)	V/C	Delay (sec/veh) (LOS)	95% Queue (ft)
2045	Westbound	0.56	11.8 (B)	100	0.72	17.8 (C)	190
	Northbound	0.85	48.2 (E)	200	0.76	31.3 (D)	165
	Eastbound	0.76	25.7 (D)	170	0.54	14.1 (B)	85
	Southbound	0.61	18.2 (C)	130	0.62	20.7 (C)	120
	Overall Intersection	--	**21.5 (C)**	--	--	**19.2 (C)**	--

Figure 71: S.R. 50 at S.R. 471 – Multilane Roundabout Configuration



A Roundabout Step 2 benefit/cost evaluation was performed for the four-leg intersection of S.R. 50 and S.R. 471. At this location there is an existing traffic signal that will continue to be warranted in the future, so the safety and operational (delay) costs were compared to the construction and operations/maintenance costs for roundabout and traffic signal alternatives. Operations analysis for the design year shows less delay per vehicle for the roundabout compared to the traffic signal; 21.5 seconds vs 30.4 seconds in the AM Peak Hour and 19.2 seconds vs 25.9 seconds in the PM Peak Hour. For the life cycle of the project, the delay reduction benefit of the roundabout is $980,874. The results of the safety analysis show a safety benefit of $11,509,828 for the roundabout as compared to a traffic signal. Compared to a traffic signal, the benefit/cost analysis shows both the safety and delay costs are improved for a roundabout. Additionally, the roundabout has a lower total initial capital cost than a traffic signal alternative, $7,866,899 compared to $8,846,322. As a result, the roundabout is the preferred alternative at this intersection, with greater benefits and lower costs compared to a traffic signal.

The roundabout slows intersection approach speeds to 45 MPH and the roadway transitions to have curb and gutter with narrower median approaching the roundabout. At the S.R. 471, the four corner parcels have all been identified as contamination sites. The narrower roadway reduces or eliminates ROW takes in the four contaminated parcels over the signalized alternative. An illustration of S.R. 471

as a roundabout is located in **Appendix B**. An illustration of S.R. 471 as a signalized intersection is located in **Appendix G**.

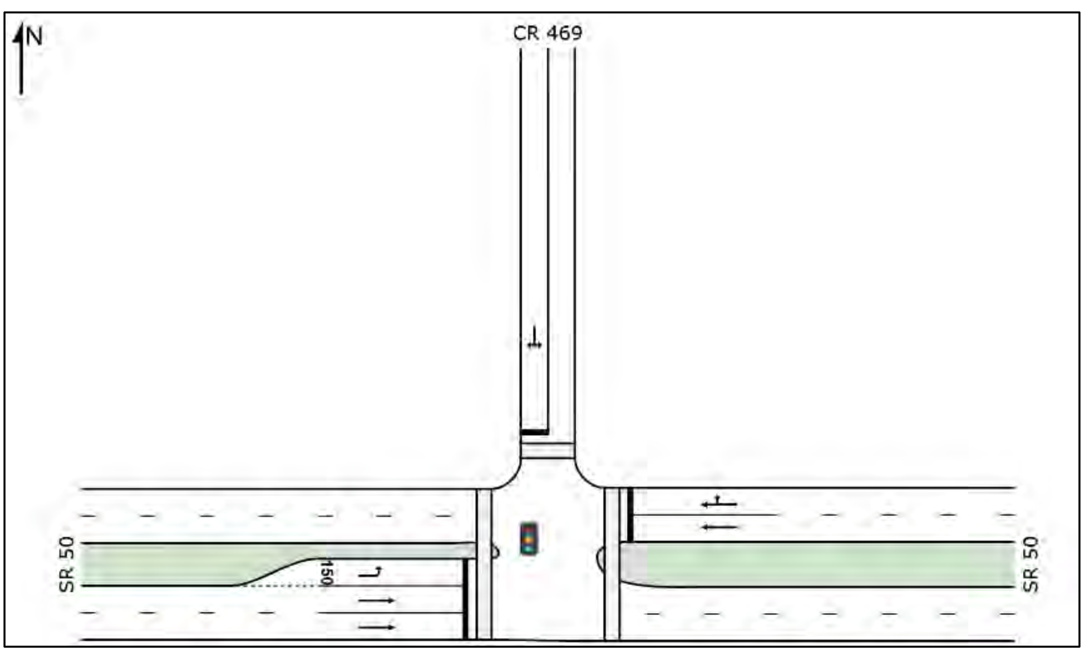
S.R. 50 at C.R. 469

A traffic signal alternative was evaluated to improve minor street operations compared to the existing stop control. The results of the S.R. 50/C.R. 469 signalized intersection operational analysis are provided in **Table 48**. Preliminary signal warrant analysis shows this location is expected to meet the peak hour signal warrant by year 2035. This alternative's lane configuration is shown in **Figure 72**.

Table 48: S.R. 50 at C.R. 469 – Signal Operations

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	Left	0.07	18.8 (B)	<25	0.10	20.5 (C)	< 25
	Through	0.83	14.5 (B)	360	0.60	7.0(A)	285
	Approach	-	**14.6 (B)**	-	-	**7.2 (A)**	-
Westbound	Through	0.78	15.4 (B)	345	0.80	12.5(B)	470
	Right	0.79	15.5 (B)	350	0.82	13.5 (B)	500
	Approach	-	**15.4 (B)**	-	-	**13.0 (B)**	-
Southbound	Left	0.84	27.6 (C)	225	0.82	36.0 (D)	180
	Right						
	Approach	-	**27.6 (C)**	-	-	**36.0 (D)**	-
Overall Intersection		-	**16.3 (B)**	-	-	**12.0 (B)**	-

Figure 72: S.R. 50 at C.R. 469 – Signal Lane Configurations

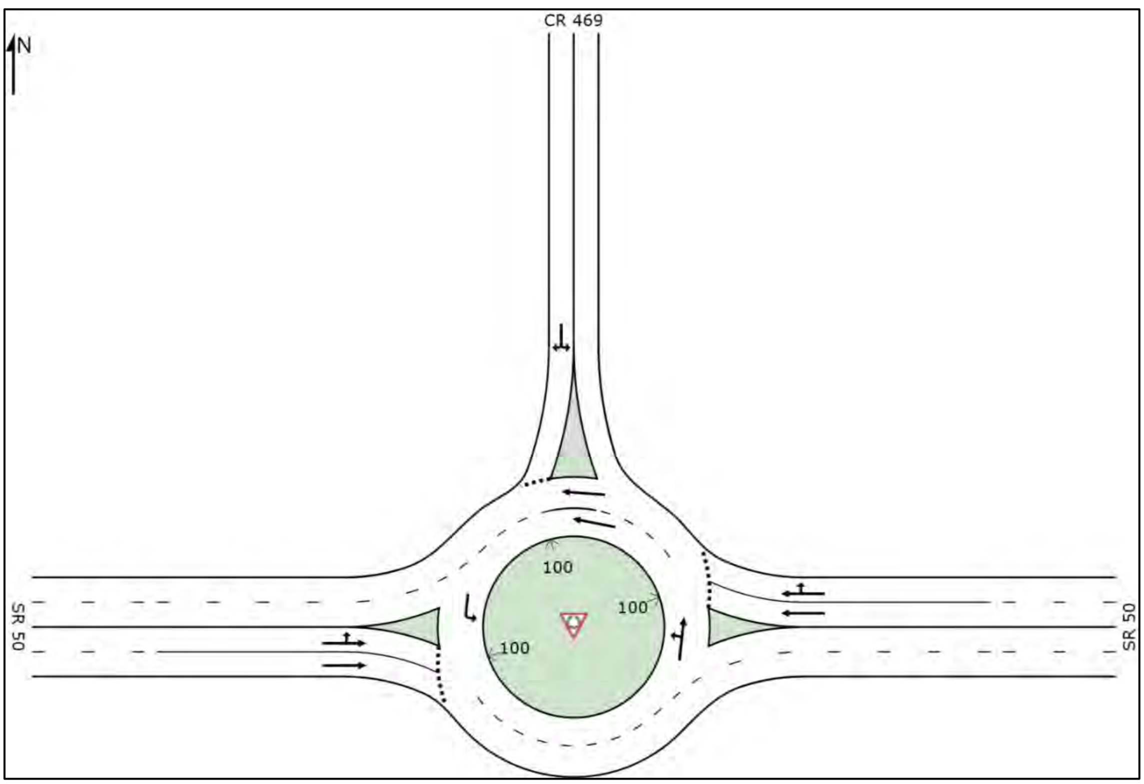


A roundabout was evaluated at the S.R. 50/C.R. 469 intersection as a potential alternative to enhance safety and operational performance. The operational analysis results are provided in **Table 49**. The multilane roundabout assumed lane configuration is provided in **Figure 73**. A partial two-lane roundabout is expected to operate at LOS C or better through the 2045 design year and has roughly half the queue as the signalized alternative.

Table 49: S.R. 50 at C.R. 469 – Multilane Roundabout Operations

Year	Approach	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec/veh) (LOS)	95% Queue (ft)	V/C	Delay (sec/veh) (LOS)	95% Queue (ft)
2045	Westbound	0.51	8.5 (A)	85	0.62	10.4 (B)	130
	Eastbound	0.72	16.7 (C)	190	0.53	9.6 (A)	90
	Southbound	0.70	29.0 (D)	135	0.47	21.1 (C)	60
	Overall Intersection	--	**14.4 (B)**	--	--	**10.7 (B)**	--

Figure 73: S.R. 50 at C.R. 469 – Multilane Roundabout Configuration



A Roundabout Step 2 benefit/cost evaluation was performed for the three-leg intersection of S.R. 50 and C.R. 469. This is currently a stop-controlled intersection; however, the projected future conditions at this location show a signal or roundabout will be needed to maintain desired traffic operations. Operations analysis shows less delay per vehicle for the roundabout compared to the traffic signal in the design year; 14.4 seconds vs 16.3 seconds in the AM Peak Hour and 10.7 seconds vs 12.0 seconds in the PM Peak Hour. For the life cycle of the project, the delay reduction benefit of the roundabout is $251,757. The results of the safety analysis show a safety benefit of $940,533 for the roundabout compared to a traffic signal. The roundabout has a higher initial capital cost than a traffic signal alternative ($462,005 greater). As a result, the roundabout is the preferred alternative at this intersection, with a life cycle benefit/cost ratio of 2.8.

Similar to the S.R. 471 roundabout, the roadway speeds are reduced to 45 MPH on the roundabout approaches and curb and gutter with reduced median are provided. This reduces the ROW requirements on S.R. 50's south side as compared to a signalized intersection. An illustration of C.R. 469 as a roundabout is located in **Appendix B**. An illustration of C.R. 469 as a signalized intersection is located in **Appendix G**.

S.R. 50 at Douglas Road

At the S.R. 50/Douglas Road intersection, future traffic control improvements are expected. However, the potential need for traffic control changes is directly tied to development of adjacent property, not general regional growth. Therefore, a bi-directional median opening is proposed as part of the preferred alternative for this intersection. At the time the adjacent properties develop, intersection operations and traffic control can be re-evaluated based upon the specific development program and site access configuration.

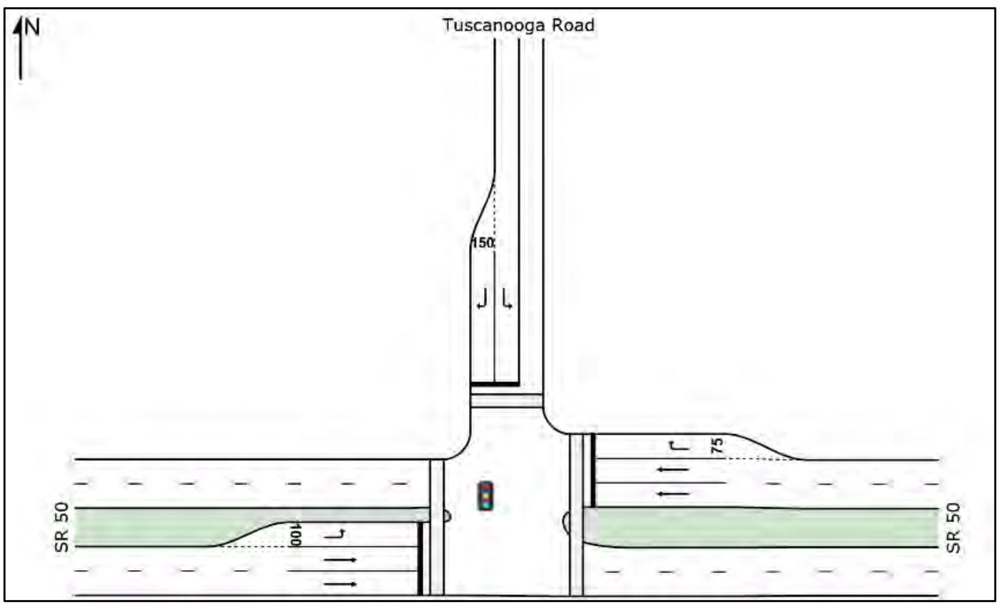
S.R. 50 at Tuscanooga Road

For the existing stop control intersection, a traffic signal alternative was evaluated to improve minor street operations. The results of the S.R. 50/Tuscanooga Road signalized intersection operational analysis is provided in **Table 50**. In this alternative, an additional southbound lane is added, providing an exclusive left-turn and an exclusive right-turn lane on the north intersection leg. Preliminary signal warrant analysis indicates this location is expected to meet the peak hour signal warrant by year 2035. Lane configuration for this alternative is shown in **Figure 74**.

Table 50: S.R. 50 at Tuscanooga Road – Signal Operations

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	Left	0.23	9.0 (A)	45	0.46	22.1 (C)	70
	Through	0.78	16.2 (B)	685	0.60	11.2 (B)	440
	Approach	-	**15.9 (B)**	-	-	**11.9 (B)**	-
Westbound	Through	0.60	0.4 (A)	< 25	0.86	14.6 (B)	665
	Right	0.11	0.0 (A)	< 25	0.19	6.5 (A)	65
	Approach	-	**0.4 (A)**	-	-	**13.9 (B)**	-
Southbound	Left	0.43	43.3 (D)	215	0.30	41.8 (D)	145
	Right	0.25	40.1 (D)	110	0.21	40.4 (D)	180
	Approach	-	**42.2 (D)**	-	-	**41.3 (D)**	-
Overall Intersection		-	**11.3 (B)**	-	-	**14.4 (B)**	-

Figure 74: S.R. 50 at Tuscanooga Road – Signal Lane Configurations

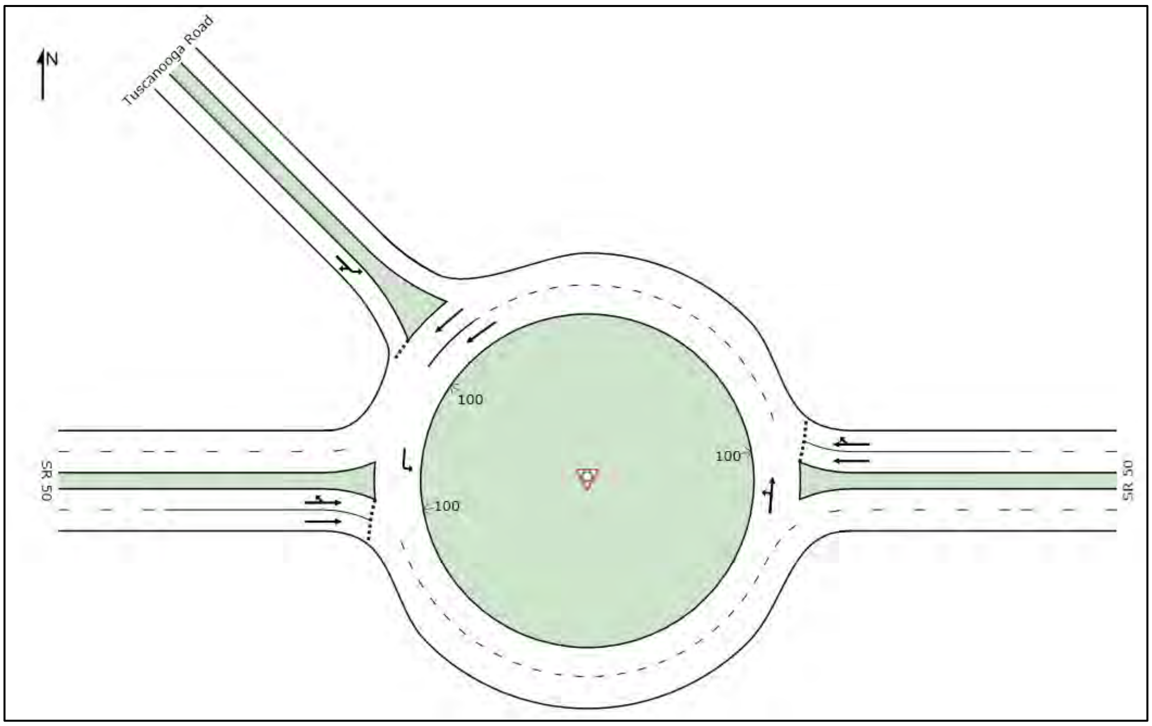


A roundabout was evaluated at the S.R. 50/Tuscanooga Road intersection as a potential alternative to enhance safety and operational performance. The operational analysis results are provided in **Table 51**. The multilane roundabout's assumed lane configuration is provided in **Figure 75**. A partial two-lane roundabout is expected to operate at LOS B or better through the 2045 design year and has roughly half the queue as the signal alternative.

Table 51: S.R. 50 at Tuscanooga Road – Multilane Roundabout Operations

Year	Approach	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec/veh) (LOS)	95% Queue (ft)	V/C	Delay (sec/veh) (LOS)	95% Queue (ft)
2045	Westbound	0.53	8.8 (A)	90	0.69	12.9 (B)	175
	Eastbound	0.73	15.4 (C)	205	0.56	9.8 (A)	105
	Southbound	0.52	19.5 (C)	75	0.50	24.3 (C)	70
	Overall Intersection	--	**12.9 (B)**	--	--	**12.2 (B)**	--

Figure 75: S.R. 50 at Tuscanooga Road – Multilane Roundabout Configuration



A Roundabout Step 2 benefit/cost evaluation was performed for the three-leg intersection of S.R. 50 and Tuscanooga Road. This is currently a stop-controlled intersection; however, at this location the projected future conditions show a signal or roundabout will be needed to maintain desired traffic operations. Operations analysis for the design year shows less delay per vehicle for the roundabout compared to the traffic signal; 12.9 seconds vs 11.3 seconds in the AM Peak Hour and 12.2 seconds vs 14.4 seconds in the PM Peak Hour. For the life cycle of the project, the delay reduction benefit of the roundabout is $346,784. The results of the safety analysis show a safety benefit of $5,579,935 for the roundabout compared to a traffic signal. The roundabout has a higher initial capital cost than a traffic signal alternative ($186,440 greater). As a result, the roundabout is the preferred alternative at this intersection, with a life cycle benefit/cost ratio of 40.8.

The Tuscanooga Road roundabout was coupled with an improvement to the north approach intersection skew angle and a S.R. 50 alignment shift to the south to avoid existing grave sites within the S.R. 50 R/W at the Mascotte Cemetery. An illustration of Tuscanooga Road as a roundabout is located in **Appendix B**. An illustration of Tuscanooga Road as a signalized intersection is located in **Appendix G**.

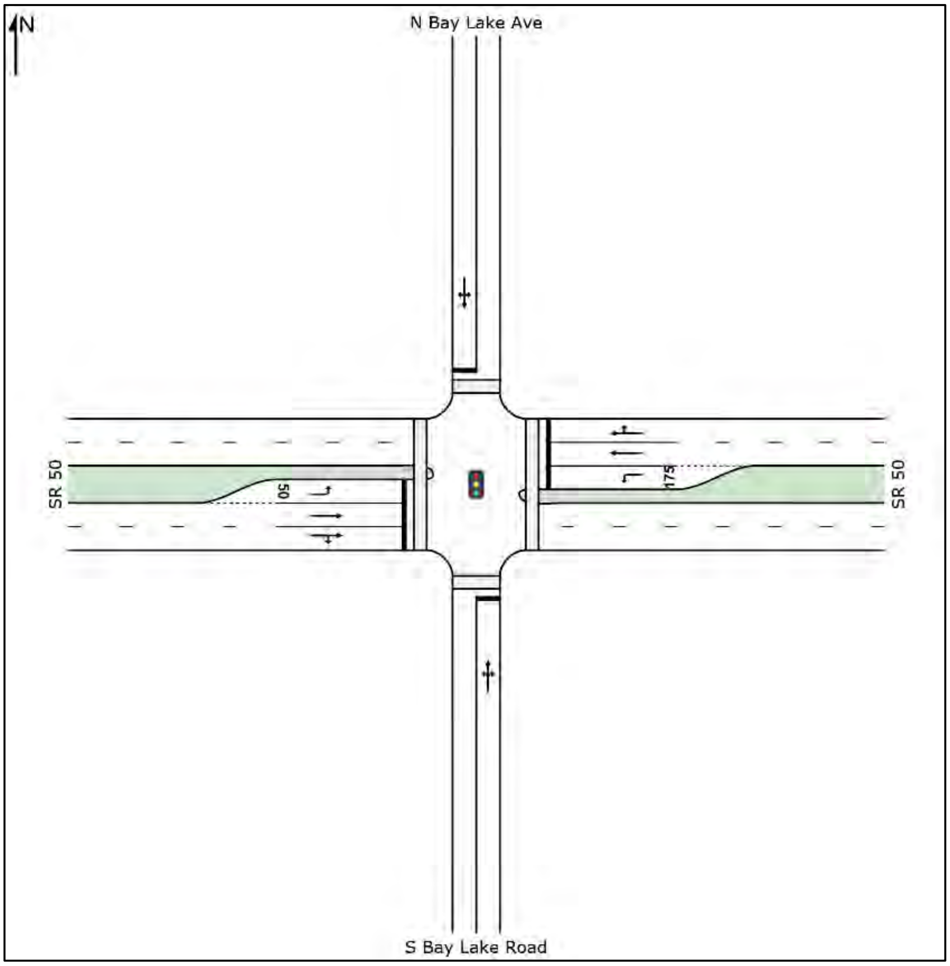
S.R. 50 at South Bay Lake Road

For the existing stop control intersection, a traffic signal alternative was evaluated to improve minor street operations. The results of the S.R. 50/South Bay Lake Road signalized intersection operational analysis is provided in **Table 52**. Preliminary signal warrant analysis indicates this location is expected to meet the peak hour signal warrant by year 2025. Lane configuration for this alternative is shown in **Figure 76**.

Table 52: S.R. 50 at South Bay Lake Road – Signal Operations

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	Left	0.00	13.8 (B)	< 25	0.07	6.7 (A)	< 25
	Through	0.91	30.4 (C)	745	0.81	6.0 (A)	65
	Right	0.92	31.1 (C)	790	0.81	5.8 (A)	65
	Approach	-	**30.7 (C)**	-	-	**5.9 (A)**	-
Westbound	Left	0.61	25.0 (C)	85	0.62	12.2 (B)	165
	Through	0.59	9.2 (A)	355	0.79	18.3 (B)	720
	Right	0.59	9.2 (A)	370	0.79	18.1 (B)	760
	Approach	-	**10.5 (B)**	-	-	**17.5 (B)**	-
Northbound	Left Through Right	0.65	39.2 (D)	280	0.49	44.5 (D)	250
	Approach	-	**39.2 (D)**	-	-	**44.5 (D)**	-
Southbound	Left Through Right	0.02	26.2 (C)	< 25	0.01	35.3 (D)	< 25
	Approach	-	**26.2 (C)**	-	-	**35.3 (D)**	-
Overall Intersection		-	**22.9 (C)**	-	-	**14.3 (B)**	-

Figure 76: S.R. 50 at South Bay Lake Road – Signal Lane Configurations

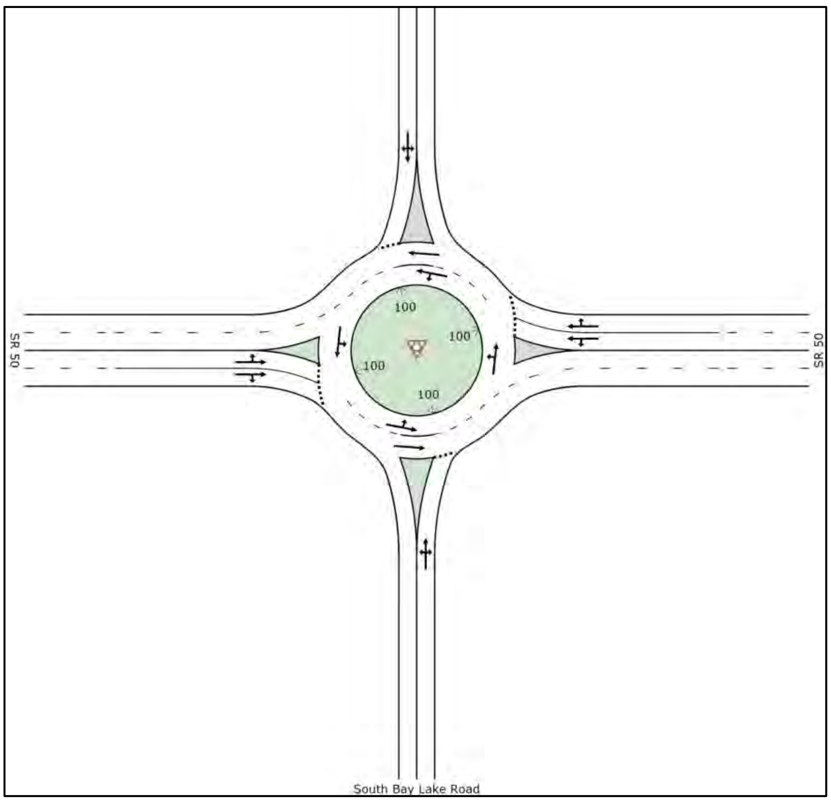


A roundabout was evaluated at the S.R. 50/South Bay Lake Road intersection as a potential alternative to enhance safety and operational performance. The operational analysis results are provided in **Table 53**. The multilane roundabout's assumed lane configuration is provided in **Figure 77**. A partial two-lane roundabout is expected to operate at LOS B or better through the 2045 design year and has roughly half the queue as the signal alternative.

Table 53: S.R. 50 at South Bay Lake Road – Multilane Roundabout Operations

Year	Approach	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec/veh) (LOS)	95% Queue (ft)	V/C	Delay (sec/veh) (LOS)	95% Queue (ft)
2045	Westbound	0.53	8.8 (A)	95	0.74	14.6 (B)	215
	Northbound	0.81	51.8 (F)	170	0.42	16.9 (C)	50
	Eastbound	0.70	13.6 (B)	185	0.62	11.7 (B)	125
	Southbound	0.01	10.0 (B)	<25	0.02	15.4 (C)	<25
	Overall Intersection	**--**	**14.5 (B)**	**--**	**--**	**13.6 (B)**	**--**

Figure 77: S.R. 50 at South Bay Lake Road – Multilane Roundabout Configuration



S.R. 50 at C.R. 33

As part of the build condition, the C.R. 33 intersection is proposed to be relocated towards the west to address a severe intersection skew angle and allow for additional turn lanes to be added. This realignment has been environmentally reviewed and it does cross a potential medium risk contamination site. There are no wetlands or protected species in the realignment area. The realignment was checked for archaeological artifacts and none were found. The realignment will not result in any business or residential relocations.

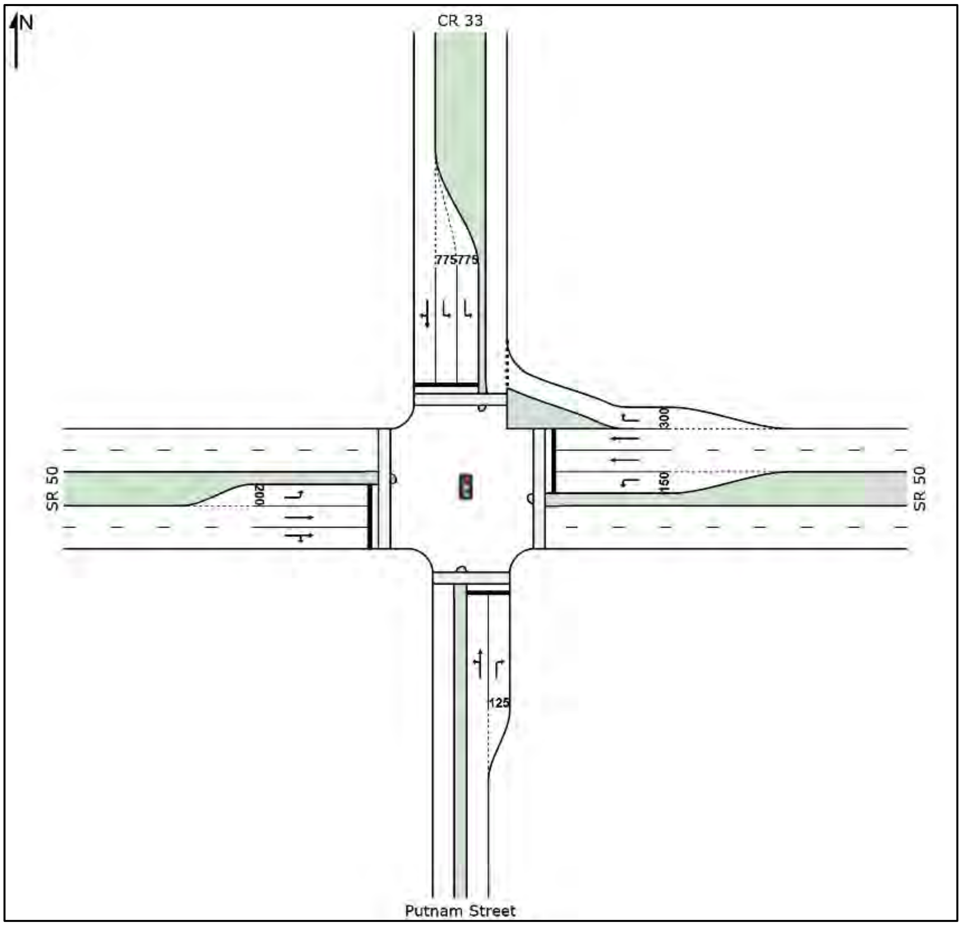
As a result of the realignment, the distance between Sunset Avenue and C.R. 33 will be reduced to less than 600’. The close intersection spacing will preclude consideration of a traffic signal at the Sunset Avenue intersection, thus this intersection is proposed to be a bi-directional median opening in the preferred alternative.

Improvements to the existing S.R. 50/C.R. 33 traffic signal were evaluated to enhance future operations. The addition of two southbound exclusive left-turn lanes was identified for this intersection to operate within its identified level of service target through design year 2045. The 2045 signal operations analysis results (with the addition of two southbound left-turn lanes) is provided in **Table 54**. Lane configuration for this alternative is shown in **Figure 78**.

Table 54: S.R. 50 at C.R. 33 – Signal Operations

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	Left	0.59	31.1 (C)	90	0.60	36.0 (D)	80
	Through	0.94	37.9 (D)	950	0.66	14.5 (B)	540
	Right	0.95	38.8 (D)	970	0.67	14.5 (B)	560
	Approach	-	**38.0 (D)**	-	-	**15.5 (B)**	-
Westbound	Left	0.36	60.3 (E)	45	0.18	25.8 (C)	35
	Through	0.88	32.3 (C)	775	1.01	49.3 (F)	1630
	Right	0.00	0.0 (A)	< 25	0.00	0.0 (A)	< 25
	Approach	-	**32.8 (C)**	-	-	**48.9 (D)**	-
Northbound	Left / Through	0.38	56.5 (E)	115	0.62	81.6 (F)	135
	Right	0.23	53.3 (D)	55	0.41	74.0 (E)	55
	Approach	-	**55.5 (E)**	-	-	**79.4 (E)**	-
Southbound	Left	1.14	131.6 (F)	770	1.09	119.7 (F)	520
	Through / Right	0.20	28.8 (C)	115	0.35	38.8 (D)	160
	Approach	-	**118.2 (F)**	-	-	**102.9 (F)**	-
Overall Intersection		-	**51.0 (D)**	-	-	**45.0 (D)**	-

Figure 78: S.R. 50 at C.R. 33 – Signal Lane Configurations

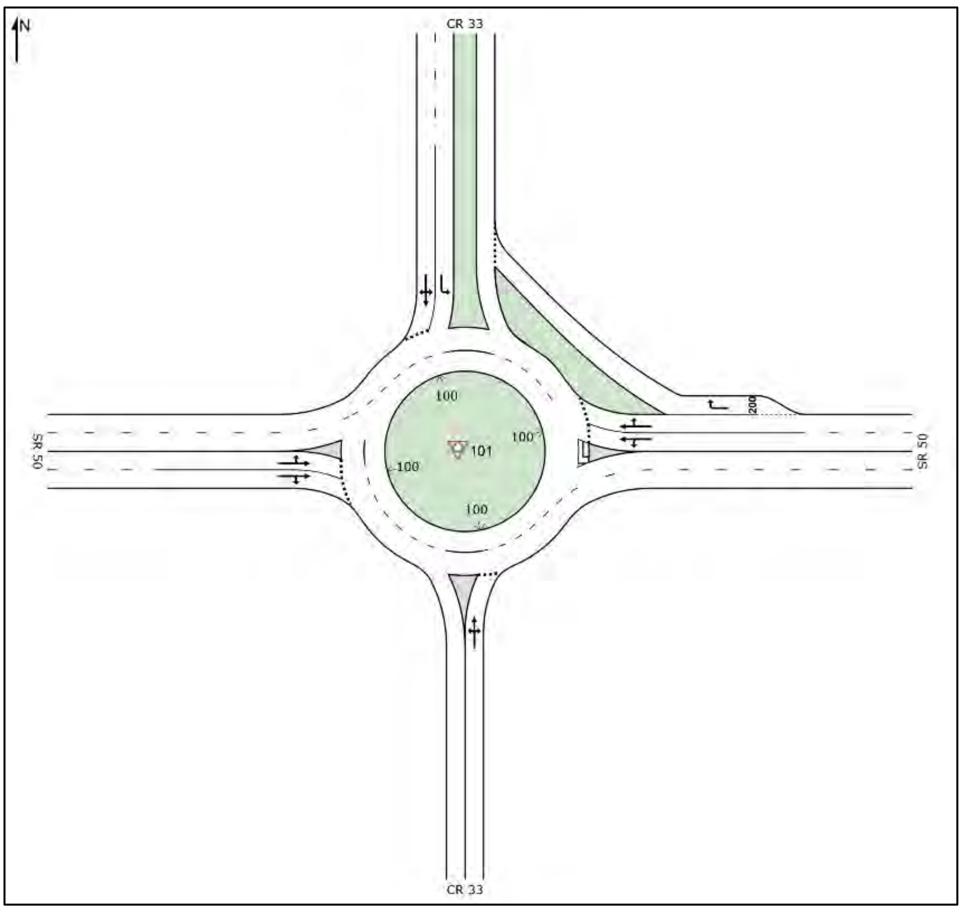


A roundabout was evaluated at the S.R. 50/C.R. 33 intersection as a potential alternative to enhance safety and operational performance. The operations analysis results are provided in **Table 55**. The multilane roundabout's assumed lane configuration is provided in **Figure 79**. In the 2045 design year, a partial two-lane roundabout is expected to operate with a v/c ratio greater than 1.0 on multiple movements. The overall intersection in expected to operate at LOS F in the AM peak hour with delay exceeding 100 seconds. A partial three-lane roundabout would be needed at this location to provide adequate level of service. Current FDOT policies discourage three-lane roundabouts. Therefore, a roundabout at C.R. 33 is not recommended for further evaluation at this time.

Table 55: S.R. 50 at C.R. 33 – Multilane Roundabout Operations

Year	Approach	AM Peak Hour			PM Peak Hour		
		V/C	Delay (sec/veh) (LOS)	95% Queue (ft)	V/C	Delay (sec/veh) (LOS)	95% Queue (ft)
2045	Westbound	0.57	10.3 (B)	130	0.72	15.4 (C)	255
	Northbound	0.72	80.0 (F)	105	0.38	26.5 (D)	45
	Eastbound	1.42	214.9 (F)	1,155	0.94	41.2 (E)	375
	Southbound	1.13	133.2 (F)	470	1.31	213.2 (F)	470
	Overall Intersection	**--**	**116.2 (F)**	**--**	**--**	**48.8 (E)**	**--**

Figure 79: S.R. 50 at C.R. 33 – Multilane Roundabout Configuration



4.4 *BEST FIT ALIGNMENT ALTERNATIVE*

Following the typical section alternatives selection, the alignment alternatives evaluation was conducted. Using the left/right/center analysis conducted with the typical section analysis, an alignment was developed for further evaluation known as the "Best Fit" alignment. This was the alignment alternative presented to the Value Engineering team for their consideration. This alignment chose either the left or right widening based upon the previous analysis. This alignment generally avoids impacts to parcels on both roadway sides and is summarized as follows:

- Segment A - U.S. 301 to Hernando-Sumter County Line – The existing ROW width is 200' with the existing roadway offset to the north side. The future widening would occur within existing ROW on the right side and no additional ROW is required. No left/right/center analysis was conducted.
- Hernando-Sumter County Line to S.R. 471 – The existing ROW width east of the county line reduces to 100' centered on the existing roadway. Using the left/right/center analysis done for the typical section analysis, the evaluation matrix presented in **Figure 68** shows the left widening has the lowest ROW acquisition cost, the lowest overall project cost, the fewest residential and business relocations, and the lowest number of contamination sites impacted. The right widening has the lowest number of wetland impacts. For these reasons, the "best fit" alignment generally used left widening. The preferred alternative concept plans provided in **Appendix B** can be used to identify roadway station (Sta) locations referred to in the following text. Initially the existing roadway is used for the westbound lanes with widening for the eastbound lanes on the right-side needing ROW on both sides. At the first curve into Sumter County at approximate Sta 78+00, the alignment has a slight transition to not have any ROW needs on the left-side. Curve A-22 at approximate Sta 135+00, requires improvement to meet current design criteria and following this curve the alignment shifts to left widening to have all ROW to be needed on the left side. Curve A-25 at approximate Sta 160+00 also requires improvement to meet current design criteria necessitating total roadway rebuild between approximate Sta 150+00 and Sta 170+00. Between Sta 170+00 and S.R. 471, the alignment is left widening and continues to need all ROW on the left side. S.R. 50 will be totally reconstructed through Curves A-22 and A-25.
- S.R. 471 to Lee Road – The existing ROW width is primarily 100' with some 150' up to 225' for a very short section (See Table 10 for the variations in ROW widths). Using the left/right/center analysis done for the typical section analysis evaluation matrix presented in **Figure 69** shows the right widening requires the least amount of ROW with the lowest ROW cost and the lowest overall project cost. It also has the fewest business and residential relocations, the lowest impacts to the Withlacoochee State Forest and equal contamination impacts to the left widening. For these reasons, the "best fit" alignment generally used right widening. Again referring to the preferred alternative concept plans in **Appendix B**, the alignment curves at approximate Sta 30+00 initially transitioning to a center widening to minimize ROW impacts on both sides of S.R. 50. This occurs between approximate Sta 25+00 and Sta 52+00. The alignment then transitions to a right widening to utilize the former railroad ROW which is now privately owned and undeveloped. The alignment maximizes the use of the undeveloped former railroad ROW to approximate Sta 190+00 with minor ROW needs on the north side. Between approximate Sta 190+00 and Sta 217+00, the alignment is a center widening within the Withlacoochee State Forest transitioning to a left widening to avoid residential impacts on S.R. 50's south side. The alignment generally stays with the left widening until Curve A-48 at approximate Sta 297+00 where is transitions back to right widening. The right widening reduces

impacts to the State Forest and remains until the C.R. 469 intersection at approximate Sta 340+00. Through the C.R. 469 intersection the alignment transitions to a center widening to reduce impacts to residences, existing nurseries and the Rose of Sharon Worship Center. The alignment stays with the center widening to approximate Sta 390+00 where it transitions to right widening until Lee Road.

- Lee Road to C.R. 33 – The existing ROW width is generally 100' narrowing to 80' at Bay Lake Ave (approximate Sta 552+00). The left/right/center analysis done for the typical section analysis evaluation matrix presented in **Figure 69** shows the right widening generally has the lowest ROW cost, lowest overall project cost, fewer business relocations, fewer contamination parcels impacted and lower noise impacts. For these reasons, the "best fit" alignment generally used right widening. In the S.R. 50 curve at Lee Road the typical section transitions to the urban typical section, the design speed reduces to 45 MPH and the alignment transitions to a right widening. The right widening remains from Lee Road at approximate Sta 451+00 to Sta 500+00 where it transitions to left widening to avoid a residence on the south side. The alignment transitions back to right widening by approximate Sta 520+00 remaining as right widening to the end of project at C.R. 33. The right widening avoids impacts to Mascotte City Hall, First Missionary Baptist Church, the Mascotte Cemetery and The Mascotte Church all on the north side of SR 50. It will impact frontage of the La Primera Iglesia Bautista De Mascotte Church but no buildings.

4.5 VALUE ENGINEERING RESULTS

Based on the operational analyses results and typical section alternatives comparative evaluation, the "best fit" recommended alternative was presented to the FDOT Value Engineering Team. The Value Engineering was conducted the week of September 25 through 29, 2017. The Value Engineering Resolution Meeting was conducted on Tuesday, October 31, 2017. The following outlines the 24 recommendations from the Value Engineering review along with their disposition:

- Recommendation CT 2: Use Asphalt for Multi-Use Path – Accepted
- Recommendation CT 7: Build Roundabout at Intersection with C.R. 33 – Rejected
- Recommendation CT 9: Realign Tuscanooga Road to the West – Rejected
- Recommendation CT 11: Provide 11' Inside Lanes at East End of Project – Rejected
- Recommendation CT 13: Create Directional Opening at Bay Lake Avenue – Accepted
- Recommendation CT 18: Reconfigure Access to Lumber Yards – Accepted
- Recommendation CN 2: Reuse Milled Asphalt to Build Trail – Accepted
- Recommendation CN 3: Build Overpass over Railroad – Accepted
- Recommendation CN 5: Build Recreation Area/Trailhead at the Withlacoochee River Bridge – Rejected
- Recommendation CN 8: Rehabilitate Existing Pavement In-Lieu of Complete Reconstruction – Accepted for Portions of Corridor
- Recommendation CN 15: Extend Curb and Gutter Section One Mile Further West of Lee Road – Rejected

- Recommendation CN 16: From Station 90+145, Acquire Frontage Road and Widen to the South – Rejected
- Recommendation CN 17: Revise Tuscanooga Roundabout and Shift to the Southeast – Accepted
- Recommendation CN 19: Build U-Turns Pads at Van Fleet Trail and EB/WB at Mabel Intersection – Rejected
- Recommendation DR 1: Build Regional Ponds – Accepted in some locations
- Recommendation DR 9: Use of Bio-Sorption Activated Media (B.A.M.) – Rejected
- Recommendation DR 12: Repurpose Borrow Pit as Pond – Rejected
- Recommendation DR 14: Selectively Build Covered Drainage Swales for Dual Use as Path – Rejected
- Recommendation SY 1: Construct a Separate Structure across Withlacoochee River for Shared-Use Path – Rejected
- Recommendation SY 2: Build 7' Bike Lane throughout Project – Rejected
- Recommendation SY 6: Provide Deceleration Lanes at Truck Entrances – Accepted
- Recommendation SY 7: Incorporate ITS and Message Boards – Rejected
- Recommendation SY 8: Build Truck Pull-Offs at Regular Intervals – Rejected
- Recommendation SY 11: Install Roundabouts at S.R. 471, C.R. 469, and Tuscanooga Road – Accepted Pending Completion of Step 1 and 2 Roundabout Forms

Of the 24 recommendations made by the Value Engineering Team, 10 were accepted and 14 were rejected. The full VE Resolution Memorandum is available in the FDOT project files.

Recommendation CN 8: Rehabilitate Existing Pavement In-Lieu of Complete Reconstruction

As noted in the previous section, the Project Team presented the "best fit" recommended alternative to the Value Engineering Team. This alternative primarily focused on minimizing the ROW impacts along the corridor while conservatively rebuilding the entire roadway, from a construction cost estimation perspective. One recommendation from the Value Engineering Team focused on resurfacing the existing two-lane roadway and building a new two-lane roadway from the Hernando/Sumter County Line to Lee Road, thus reducing construction costs. With this new alternative, Alternative A – ROW Best Fit and Alternative B – Pavement Match were evaluated for the portion of S.R. 50, from the Hernando/Sumter County Line to Lee Road. The next two sections discuss Alternative B – Pavement Match and reviews the analysis performed to determine the preferred build alternative for this section of S.R. 50.

4.6 PAVEMENT MATCH ALTERNATIVE

The Pavement Match Alternative, also known as Alternative B – Pavement Match, evaluated an alignment shift between the Hernando-Sumter County Line to Lee Road. The shift was to maximize the reuse of existing pavement. The changes from Alternative A – ROW Best Fit are described below.

- Hernando-Sumter County Line to C.R. 757 – As with Alternative A – ROW Best Fit, the Alternative B – Pavement Match aligns with the existing roadway for the westbound lanes east of the Little Withlacoochee River Bridge. Both alignments use the existing roadway to the first curve at Sta 73+00 where Alternative B – Pavement Match remains on the existing roadway for the westbound lanes until Curve A-22 at Sta 135+00, requiring improvement to meet current design criteria. Through the Curve A-22, no existing pavement can be reused. Using the curve, the alignment transitions to use the existing roadway for the eastbound lanes. After Curve A-22, Alterative B – Pavement Match will require ROW acquisition on both sides of the existing 100' ROW width with most on the roadway's south side.

- C.R. 757 to S.R. 471 - Similar to Alternative A – ROW Best Fit and as previously noted, Curve A-25 requires improvement to meet current design criteria. Through the curve, no existing pavement can be reused. Coming out of this curve, the alignment continues to use the existing roadway for the eastbound lanes to S.R. 471. ROW will be required on both roadway sides with more on the south side.
- S.R. 471 to S.E. 52nd Street – Alternative B – Pavement Fit alignment does not have many opportunities to reuse the existing pavement and maximize the use of the previously noted abandoned railroad ROW along the roadway's south side. The abandoned railroad ROW is privately owned and undeveloped entering this section about 1,500' east of S.R. 417 and continues throughout this segment. The best opportunity to reuse the westbound existing pavement is a short section between approximate Sta 70+00 and Sta 90+00. Another limitation with reusing the existing pavement is C. R. 772 located about 150' south and paralleling S.R. 50 for about 5,000' between approximate Sta 95+00 and Sta 145+00. Relocating C.R. 772 to the south could impact the Church of God of Linden and the Linden Cemetery. The abandoned railroad ROW is about 60' wide and is located between S.R. 50 and C.R. 772.
- S.E. 52nd Street to the Sumter-Lake County Line – The abandoned railroad ROW continues into this section for about 4300' (between approximate Sta 145+00 to Sta 188+00) before it turns south away from SR 50. As with the previous section, both alignments maximize the use of this privately owned, undeveloped land. Several hundred feet after the abandoned railroad property stops paralleling S.R. 50, Alternative B – Pavement Match aligns with the existing roadway for the westbound lanes. The existing ROW width is 100' in this area extending an additional 8500' until the ROW widens to 150'. The existing ROW generally stays 150' wide to about 700' west of C.R. 469 where it returns to 100' wide for the remainder of this section. For locations having 100' ROW width, additional ROW will be required on both roadway sides. Where the ROW is 150' wide, ROW will only be needed on the south side with this alignment.
- Sumter-Lake County Line to Lee Road – Both alternatives are identical for the first 5,000' (between approximate Sta 358+50 to Sta 409+00) into Lake County. The alignment is a center widening to minimize impacts to residences and agricultural businesses until east of the Marian Gardens entrance. For the remainder of this section, Alternative B – Pavement Match retains the existing pavement as the westbound lanes. For most of this section, Alternative B – Pavement Match will require ROW from both sides of the road, with the majority of the ROW acquired from the south side. Alternative A- Best Fit only requires ROW on the south side east of Marian Gardens to Lee Road.

Alternative B – Pavement Match, from the Hernando/Sumter County Line to Lee Road, utilizes/resurfaces the existing S.R. 50 lanes and constructs two new lanes for approximately 4.6 miles of the 12.3-mile section. The remaining 7.7 miles consist of a full rebuild of S.R. 50 from a two-lane to a four-lane facility. Concept plans for both Alternative A – ROW Best Fit and Alternative B – Pavement Match are available for review in the FDOT project files.

4.7 SELECTION OF PREFERRED ALTERNATIVE

The Preferred Alternative for Segments A and D were the alignment alternatives previously discussed in Section 4.4. Segment A from U.S. 301 to the Hernando-Sumter County Line recommended the right widening fitting within the existing 200' ROW. Segment D from Lee Road to C.R. 33 recommended the right widening because it has the lowest ROW cost, lowest overall project cost, fewer business relocations, fewer contamination parcels impacted and lower noise impacts. This evaluation focuses on Alternatives A and B for Segments B and C from the Hernando-Sumter County Line to Lee Road. Alternative A – ROW Best Fit and Alternative B – Pavement Match were evaluated within the comparative evaluation matrix presented in **Figure 80.** The matrix reviews the following metrics for Alternatives A and B:

- Project Cost –
  - Design;
  - Wetland Mitigation;
  - ROW Acquisition (without ponds);
  - Construction; and
  - Construction Engineering and Inspection (CEI).
- Social Environment –
  - Business/Residential Relations.
- Natural Environment –
  - State Forest Impacts (without ponds);
  - Wetland Impacts; and
  - Potential Threatened/Endangered Species Impacts.
- Physical Environment –
  - Medium and High-Risk Contamination Sites Impacted; and
  - Potential Utility Impacts.
- Cultural Environment –
  - Historical Resources Potentially Impacted; and
  - Archeological Sites Potentially Impacted.

This matrix was presented to FDOT staff on January 4, 2018. The meeting's notes can be found in **Appendix F**. The meeting's focus was to select either Alternative A – ROW Best Fit or Alternative B – Pavement Match as the preferred alignment alternative. From a social environment perspective, both alternatives would have the same number of business/residential relocations, except for one additional residential relocation for Alternative B in the SE 52nd Street to Sumter/Lake County Line section. Both alternatives would have approximately the same impacts to the Withlacoochee State forest, wetlands, wildlife, and habitat. From a physical and cultural environment perspective, the number of medium and high-risk contamination sites and historical/archaeological sites impacted is approximately the same. The cost of utility relocation differ by approximately $4 million between Alternative A ($14.4 million) and Alternative B ($10.5 million), as displayed in **Figure 81**. The overall approximate project cost for Alternative A is $116.2 million, whereas Alternative B is anticipated to cost $111.7 million. Pond ROW costs are not included in the cost estimates.

Because of the similarity in potential environmental impacts and lower cost of Alternative B, the consensus from the meeting attendees was to move forward with Alternative B – Pavement Match from the Hernando/Sumter County Line to Lee Road.

Figure 80: Comparative Evaluation Matrix – Hernando/Sumter County Line to Lee Road

Evaluation Criteria		Hernando / Sumter County Line to CR 757 (2.1 miles)		CR 757 to SR 471 (2.05 miles)		SR 471 to SE 52nd Street (2.4 miles)		SE 52nd Street to Sumter / Lake County Line (4 miles)		Sumter / Lake County Line to East of Lee Road (1.75 miles)	
		Alternative A	Alternative B	Alternative A	Alternative B	Alternative A	Alternative B	Alternative A	Alternative B	Alternative A	Alternative B
PROJECT COST	Design Costs	$1,700,000	$1,600,000	$1,500,000	$1,400,000	$1,800,000	$1,800,000	$3,400,000	$3,100,000	$1,300,000	$1,100,000
	Wetland Mitigation Costs	$1,300,000	$1,300,000	$190,000	$210,000	$20,000	$20,000	$2,300,000	$2,500,000	$440,000	$460,000
	ROW Acquisition Costs (Without Ponds)	$1,022,000	$1,234,000	$1,872,000	$3,272,000	$4,468,000	$4,989,000	$1,805,000	$2,515,000	$1,719,000	$2,092,000
	Construction Costs	$13,600,000	$12,800,000	$12,600,000	$11,300,000	$14,900,000	$14,400,000	$28,000,000	$25,200,000	$10,400,000	$9,400,000
	Construction Engineering & Inspection Costs	$2,000,000	$1,900,000	$1,900,000	$1,700,000	$2,200,000	$2,200,000	$4,200,000	$3,800,000	$1,600,000	$1,400,000
	PRELIMINARY ESTIMATE OF TOTAL PROJECT COST	**$19,622,000**	**$18,834,000**	**$18,062,000**	**$17,882,000**	**$23,388,000**	**$23,409,000**	**$39,705,000**	**$37,115,000**	**$15,459,000**	**$14,452,000**
SOCIAL ENVIRONMENT	Business Relocations (#)	0	0	0	0	2	2	0	0	4	4
	Residential Relocations (#)	0	0	1	1	0	0	0	1	4	4
NATURAL ENVIRONMENT	State Forest Impacts - Without Ponds (acres)	14.10	14.05	0	0	0	0	13.96	14.74	0	0
	Wetland Impacts (acres)	10.65	10.46	1.62	1.75	0.17	0.17	19.22	21.14	3.68	3.84
	Potential Threatened & Endangered Species Impacts	Moderate	Moderate	Low	Low	Low	Low	Moderate	Moderate	Low	Low
PHYSICAL ENVIRONMENT	Medium Risk Contamination Sites Impacted (#)	1	1	2	3	2	2	1	1	6	7
	High Risk Contamination Sites Impacted (#)	0	0	2	3	4	4	1	1	5	5
	Potential Utility Impacts	Low	Low	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate	Moderate
CULTURAL ENVIRONMENT	Historical Resources Potentially Impacted (#)	5	5	15	15	28	28	16	16	53	53
	Archeological Sites Potentially Impacted (#)	3	4	1	1	2	2	10	9	1	1

Figure 81: Utility Comparative Evaluation Matrix – Hernando/Sumter County Line to Lee Road

Evaluation Criteria	H/S County Line to CR 757		CR 757 to SR 471		SR 471 to SE 52nd St.		SE 52nd St. to S/L County Line		S/L County Line to E of Lee Rd	
	Alt A	Alt B	Alt A	Alt B	Alt A	Alt B	Alt A	Alt B	Alt A	Alt B
Potential Utility Impacts	**Low**	**Low**	**Moderate**	**Moderate**	**Moderate**	**Moderate**	**High**	**Moderate**	**Moderate**	**Moderate**
** **Century Link**	• 6,900 LF BFO	• 6,900 LF BFO	• 1,500 LF BFO • 11,000 LF BT	• 1,500 LF BFO • 11,000 LF BT	• 12,600 LF BFO • 12,600 LF of BT	• 12,600 LF BFO • 12,600 LF of BT	• 14,200 LF BFO • 12,700 LF of BT	• 21,200 LF BFO • 3,400 LF of BT	• 9,200 LF BFO • 3,300 LF of BT	• 9,200 LF BFO • 3,300 LF of BT
Relocation Cost	**$690,000**	**$690,000**	**$4,550,000**	**$4,550,000**	**$6,300,000**	**$6,300,000**	**$6,500,000**	**$3,480,000**	**$2,240,000**	**$2,240,000**
Charter/Spectrum Communications	• None	• None	• None	• None	• None	• None	• 1,800 BTV	• 1,800 BTV	• 2,200 BTV • 7,100 aerial CATV	• 2,200 BTV • 7,100 aerial CATV
Relocation Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$180,000**	**$180,000**	**$575,000**	**$575,000**
AT&T Distribution	• 2,100 LF BFO	• 2,100 LF BFO	• 11,000 LF BFO	• 11,000 LF BFO	• 12,600 LF BFO	• 12,600 LF BFO	• 16,500 LF BFO	• 1,900 LF BFO	•3,350 LF BFO	•3,350 LF BFO
Relocation Cost	**$210,000**	**$210,000**	**$1,100,000**	**$1,100,000**	**$1,260,000**	**$1,260,000**	**$1,650,000**	**$190,000**	**$335,000**	**$335,000**
** **SECO**	• None	• None	• 45 Poles	• 45 Poles	• 56 Poles	• 56 Poles	• 70 Poles	• 130 Poles	• 61 Poles	• 61 Poles
Relocation Cost	**$0**	**$0**	**$450,000**	**$450,000**	**$560,000**	**$560,000**	**$700,000**	**$1,300,000**	**$610,000**	**$610,000**
Withlacoochee River Electric	• 15 Poles	• 15 Poles	• None	• None	• None	• None	• None	• None	• None	• None
Relocation Cost	**$150,000**	**$150,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
** **Verizon**	• None	• None	• None	• None	• None	• None	140 LF of BFO	140 LF of BFO	• None	• None
Relocation Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$14,000**	**$14,000**	**$0**	**$0**
** **Spectra Energy Sabal Trail**	• None	• None	• None	• None	• None	• None	350 LF 36" Pipeline	350 LF 36" Pipeline	• None	• None
Relocation Cost	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$5,350,000**	**$5,350,000**	**$0**	**$0**
City of Mascotte	• None	• None	• None	• None	• None	• None	• None	• None	• None	• None
Hernando County Utilities	• None	• None	• None	• None	• None	• None	• None	• None	• None	• None
Duke Energy-Dist.	• None	• None	• None	• None	• None	• None	• None	• None	• None	• None
Duke Energy-Trans.	• None	• None	• None	• None	• None	• None	• None	• None	• None	• None
Total Utility Relocation Cost	**$1,050,000**	**$1,050,000**	**$6,100,000**	**$6,100,000**	**$8,120,000**	**$8,120,000**	**$14,394,000**	**$10,514,000**	**$3,760,000**	**$3,760,000**

** Portions of the utility relocation may be eligible for reimbursement by the Department

The acronyms in the table above and additional detail regarding the utility impacts can be found in the *S.R. 50 435859-1-22-01 Utility Assessment Package.*

5. Public Involvement and Project Coordination

The following sections outline the public outreach and meetings taken place during the study.

5.1 ETDM

Initial evaluations of the proposed S.R. 50 project occurred during the Efficient Transportation Decision Making (ETDM) process. The ETDM process helps to identify project stakeholders and affected communities, obtain preliminary agency and public comments, and determine environmentally sensitive areas and project impact levels. The ETDM Summary Report (# 14269) for S.R. 50, from U.S. 301 to C.R. 33, was published on December 1, 2016. The report can be accessed on the ETDM public website (https://etdmpub.fla-etat.org/est/) and is found in **Appendix H**.

5.2 Project Kick-Off Letter

To announce the project's start, and in place of a project kick-off meeting, letters were emailed to elected and appointed officials, and newsletters were mailed to property owners within 300' of each side of the study corridor. The project kick-off letter described the PD&E study process, the project purpose and need, and the project schedule. Agency websites included the names and contact information for elected and appointed officials. Property appraiser websites for Hernando, Sumter, and Lake Counties provided property owner names and addresses. The *Comments, Coordination, and Agreement Report* includes a package of the kick-off letters, Newsletter #1, contact information, mailing addresses, and a map identifying properties receiving mailed notifications.

5.3 Project Update Meetings

Leading up to the Alternatives Public Workshops conducted in July 2017, various agency meetings were attended to give a project update presentation and collect comments. Project update presentations were provided to the following agencies on the following days:

1. FDOT Management Team – presented 5/25/17 and 5/22/18
2. Hernando-Citrus MPO Technical Advisory Committee – presented 5/31/17 and 5/30/18
3. Hernando-Citrus MPO Citizen's Advisory Committee – presented 5/31/17 and 5/30/18
4. City of Mascotte City Council – presented 6/5/17
5. Hernando-Citrus MPO Board – presented 6/20/17 and 6/19/18
6. Sumter County Board of County Commissioners – emailed to county administrator 7/10/17 for discussion at 7/11/17 Board Meeting
7. Lake County Board of County Commissioners – presented 7/11/17
8. Hernando-Citrus MPO Bicycle Pedestrian Advisory Committee – presented 7/20/17 and 5/30/18
9. Lake-Sumter MPO Technical Advisory Committee – presented 5/9/18
10. Lake-Sumter MPO Board – presented 5/23/18

The first round of presentations was given prior to the Alternatives Public Workshops to the Technical Advisory Committee (TAC), Citizens Advisory Committee (CAC), Bicycle and Pedestrian Advisory Committee (BPAC), and Governing Board of the Hernando-Citrus Metropolitan Planning Organization (MPO). The Lake-Sumter MPO did not conduct meetings in June and July. Therefore, project presentations were made to the Mascotte City Council and the Lake County Board of County Commissioners.

In the second round of presentations, the project update was given to the Hernando-Citrus MPO TAC, CAC, BPAC, and Governing Board, and the Lake-Sumter MPO TAC and Governing Board. The Lake-Sumter MPO CAC and BPAC meetings scheduled for May 9 and 10, 2018, respectively, were cancelled shortly before their occurrence, and therefore, not listed.

Meeting agendas, along with questions and comments obtained from these project update presentations, are contained in the *Comments, Coordination, and Agreement Report*.

5.4 Public Workshop Announcements

To announce the July 2017 public workshops and solicit participation, the following notifications were sent to potential attendees or published on the following dates:

1. Invitation letter to elected and appointed officials – emailed 6/12/17 and 6/13/17
2. Invitation letter to property owners – mailed 6/16/17
3. Invitation letter to businesses – hand delivered 6/20/17
4. Newspaper ads:
    - Sumter County Times – 6/29/17
    - Hernando Sun – 6/30/17
    - Hernando Times (through Tampa Bay Times) – 6/30/17
    - Daily Commercial – 7/2/17
    - Lake Sentinel (through Orlando Sentinel) – 7/2/17
5. Florida Administrative Register (FAR) Ad – 6/28/17
6. FDOT Public Notice Website Ad – 7/3/17
7. Press Release – 7/3/17

A package of the announcements is contained in the *Comments, Coordination, and Agreement Report, March 2019*.

5.5 Alternatives Public Workshops

Due to the length of the project, two alternatives public workshops, presenting the same information, were conducted in an open house format to seek agency and public input on the S.R. 50 transportation improvements. These workshops took place at the following locations and on the following days:

1. Public Workshop #1

- Tuesday, July 11, 2017 at the Mascotte Civic Center from 5:30 p.m. to 7:30 p.m.

2. Public Workshop #2
   - Thursday, July 13, 2017 at the Ridge Manor Community Center from 5:30 p.m. to 7:30 p.m.

These workshops presented the transportation improvement alternatives to S.R. 50 and associated impacts, described the purpose and need for improvements, and gave interested persons an opportunity ask questions and express concerns to FDOT representatives about the alternatives. A variety of visualization techniques were used to convey project information, including a looping narrated presentation, a project handout, banners with project aerials and alternative overlays, boards displaying traffic demand and level of service, Withlacoochee Bridge widening typical sections, and a comparative evaluation matrix for the alternatives. Attendees to the first workshop in Mascotte included:

- Fifty-five (55) members of the public,
- Seven (7) FDOT staff,
- One (1) County staff member,
- One (1) Lake-Sumter MPO staff member, and
- Seven (7) study team members.

The public provided verbal comments and completed 12 comment forms. Some citizens attending this meeting were concerned about proposed pond sites and how they would impact their properties or businesses. Attendees to the second workshop in Ridge Manor included:

- Seventy (70) members of the public,
- Six (6) FDOT staff,
- Two (2) Hernando-Citrus MPO staff, and
- Seven (7) study team members.

The public provided verbal comments and completed 21 comment forms. A large majority of the attendees supported a four-lane widening of S.R. 50 for the entire study limits. The *Comments, Coordination, and Agreement Report* includes a package of workshop sign-in sheets, the presentation, copies of public comment forms, a list of workshop materials provided on the project website, and the *Public Information Workshop Summary*.

5.6 SMALL GROUP MEETINGS

Following the Alternatives Public Workshops in July 2017, the project team held several meetings regarding the public and property impacts. These meetings were held with the following groups on the following dates:

1. Harris Harris Bauerle Ziegler Lopez – attorney meetings regarding Marian Gardens/Shaun Hillary property, conducted 8/8/17 and 2/7/18

2. Ort Law Group – meeting regarding stormwater pond locations, conducted 2/12/18
3. Kay Roush – property owner meeting regarding property impacts, conducted 2/26/18

5.7 PUBLIC HEARING ANNOUNCEMENTS

To announce the November 2018 public hearings and solicit participation, the following notifications were sent or published on the following dates:

1. Invitation letter to elected and appointed officials – 11/2/18 and 11/5/18
2. Invitation letter to property owners – mailed 11/5/18
3. Newspaper ads:
    - Sumter County Times – 11/8/18 and 11/15/18
    - Hernando Sun – 11/9/18 and 11/16/18
    - Tampa Bay Times Hernando County Issue – 11/9/18 and 11/16/18
    - Daily Commercial – 11/11/18 and 11/18/18
    - Orlando Sentinel Lake County Issue – 11/11/18 and 11/18/18
4. Florida Administrative Register (FAR) Ad – 11/20/18
5. Press Release – 11/20/18

A package of the announcements is contained in the *Comments, Coordination, and Agreement Report* dated March 2019.

5.8 PUBLIC HEARINGS

Due to the length of the project, two public hearings presenting the same information were conducted in both an open house and formal presentation format to seek agency and public input on the S.R. 50 recommended transportation improvements. These hearings took place at the following locations and on the following days:

1. Public Hearing #1
    - Tuesday, November 27, 2018 at the Mascotte Civic Center from 5:30 p.m. to 7:30 p.m.
2. Public Hearing #2
    - Thursday, November 29, 2018 at Ridge Manor Community Center from 5:30 p.m. to 7:30 p.m.

These hearings presented the recommended transportation improvement alternatives to S.R. 50 and associated impacts, described the purpose and need for improvements, and gave interested persons an opportunity to ask questions and express concerns to the project team about the recommendations. A variety of visualization techniques were used to convey project information including a formal narrated presentation; a project handout; grand format banners with project aerials showing the recommended alternative; and boards displaying traffic demand and level of service, engineering factors and environmental factors on the recommended project alternatives.

Attendees to the first hearing in Mascotte included:

- Eighty-three (83) members of the public,
- Eight (8) FDOT staff,
- One (1) City staff member, and
- Nine (9) study team members.

The public provided several verbal comments, completed nine (9) comment forms, and made two (2) public statements following the formal presentation. Many people attending this hearing were primarily concerned with access management changes and how they would be able to access their properties. Attendees to the second hearing in Ridge Manor included:

- Sixty-seven (67) members of the public,
- Twelve (12) FDOT staff members,
- One (1) Hernando-Citrus MPO staff member, and
- Ten (10) study team members.

The public provided several verbal comments, completed 11 comment forms and made three (3) public statements following the formal presentation. Many people attending this hearing were primarily concerned with the proposed roundabouts, particularly at S.R. 50 and S.R. 471. After both hearings, FDOT received 10 additional comments via email within the commenting period. The *Comments, Coordination, and Agreement Report* includes a package of written and email comments provided by the public and the FDOT's response to the comments.

6. Design Details of Preferred Build Alternative

This section reviews the design details, environmental evaluation, and engineering assessment performed for the preferred build alternative. This concept was presented and compared to the no-build alternative at the Public Hearings conducted November 27 and 29, 2018.

6.1 PREFERRED BUILD ALTERNATIVE DESCRIPTION

The preferred build alternative will widen S.R. 50 from two to four lanes from U.S. 301 to C.R. 33. Two different general typical sections are preferred along the corridor for the four design segments (FM 435859-1 is this PD&E Study, thus the design segment numbering begins at 435859-2):

- Design Segment 435859-2: U.S. 301 to the Hernando/Sumter County Line (4.78 miles) –
  - Two-lane to four-lane rural pavement match widening alternative.
- Design Segments 435859-3, 435859-4, and portion of 435859-5: The Hernando/Sumter CL to 0.13 miles west of C.R. 751 (2.78 miles), 0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road (8.21 miles), and 1,000' east of Sloans Ridge Road to Lee Road (1.34 miles) –
  - Two-lane to four-lane rural widening pavement match alternative.
- Portion of Design Segment 435859-5: Lee Road to C.R. 33 (2.63 miles) –
  - Two-lane to four-lane urban right widening alternative.

The rural four-lane widening, from U.S. 301 to the Hernando/Sumter County Line, utilizes/resurfaces the existing S.R. 50 lanes as the new westbound lanes and constructs two new lanes for eastbound traffic. For the existing S.R. 50 lanes, the cross slope will remain the same and the inside travel lane will drain into the median. This is the predominate typical section between U.S. 301 and the Hernando/Sumter County Line and is shown as **Figure 82**. During Value Engineering, a bridge over the CSX railroad tracks, 0.75 miles east of U.S. 301, was recommended for review. Based on engineering review and discussions with FDOT District 7, a bridge over the railroad tracks is proposed as part of the preferred widening concept. The S.R. 50 typical section from U.S. 301 to the railroad bridge has a maximum proposed 374.44' ROW width to account for the railroad bridge approach embankment, a railroad access road and an offsite drainage conveyance ditch. This typical section is shown as **Figure 84**. The bridge over the railroad is shown in **Figure 83** and will have the shared use path connect to the south side of the eastbound bridge. Currently, the S.R. 50 typical section from the railroad bridge to the Sumter County Line has a 200' ROW width and no ROW acquisition is needed, except for the railroad approaches, the two proposed stormwater retention ponds and floodplain compensation areas. A 10' asphalt shared-use path on the roadway's south side will also be constructed, which was a suggestion from the Alternatives Public Meeting.

The rural widening pavement match, from the Hernando/Sumter County Line to Lee Road, utilizes/resurfaces the existing S.R. 50 lanes and constructs two new lanes for approximately 4.6 miles of the 12.3-mile section. The remaining 7.7 miles consists of a full rebuild of S.R. 50 from a two-lane to a four-lane facility. These 7.7 miles include areas where the roadway profile should be raised because the groundwater/vertical base clearance requirements are not met, where the roadway needs to be reconstructed around curves or where the roadway needs new construction changes from eastbound lanes to westbound lanes to minimize ROW impacts. A 12’ asphalt shared-use path will also be constructed on the roadway’s south side, from the Hernando/Sumter County Line to Lee Road, to accommodate pedestrians and bicyclists. Within this typical section, the proposed ROW widths range from a minimum of 190’ to a maximum of 241’ where drainage conveyance ditches are provided on both sides. The typical sections for this 12.3-mile section vary considerably throughout and are best reviewed in the typical section package contained in **Appendix A**. Illustrative typical sections showing the minimum and maximum ROW and pavement match or full rebuild are shown in **Figure 85** and **Figure 86.** The existing Withlacoochee River Bridge will remain in place and serve as the new westbound travel lanes for S.R. 50. A new two-lane bridge across the Withlacoochee River will be constructed for the eastbound lanes. The 12’ shared-use path will be included on the south side of the new eastbound bridge. This bridge typical section is shown as **Figure 87**.

The urban widening from Lee Road to C.R. 33 includes a new four-lane roadway, adds curb and gutter, provides a raised median, and incorporates a 6’ sidewalk on the north side. A 12’ shared-use path will be constructed on the roadway’s south side to approximately 400’ west of Barry Avenue where it connects to the proposed South Lake Trail and departs the S.R. 50 corridor. East of Barry Avenue, a 6’ sidewalk will be incorporated to C.R. 33. Seven-foot buffered bicycle lanes will also be provided in this typical section. This S.R. 50 typical section falls within the urban service boundary and a majority is within the City of Mascotte. The proposed ROW widths range from a minimum of 112’ to a maximum of 174’ where drainage conveyance ditches are provided on both sides. **Figure 88** and **Figure 89** illustrate the typical sections requiring the minimum and maximum ROW with the shared use path. **Figure 90** illustrates the typical section with 6’ sidewalks on both sides. The urban four-lane section will connect to the existing urban four-lane section near C.R. 33.

Roundabouts are also preferred at the intersections of S.R. 471, C.R. 469, and Tuscanooga Road. The intersection concepts are shown within this report as **Figure 92**, **Figure 93**, and **Figure 94**. The C.R. 33 intersection is preferred to remain signalized and be shifted approximately 0.10 miles to the west.

The concept plans for the preferred build alternative are provided in **Appendix B**.

Figure 82: Typical Section – U.S. 301 to Hernando/Sumter County Line (Minimum ROW)

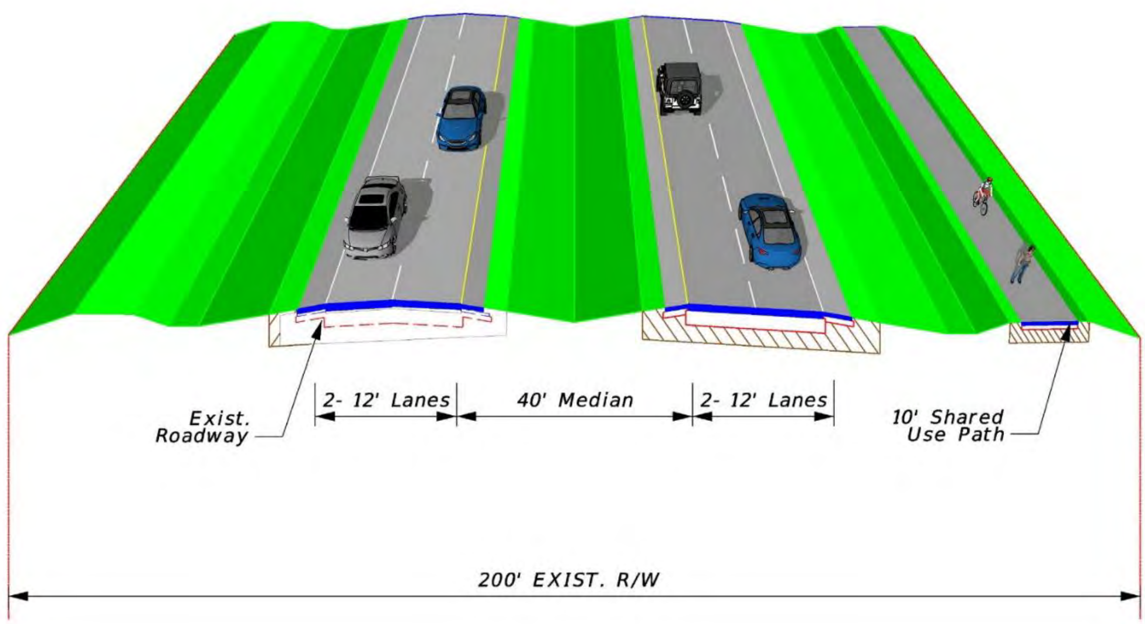


Figure 83: Typical Section – Railroad Overpass Bridges

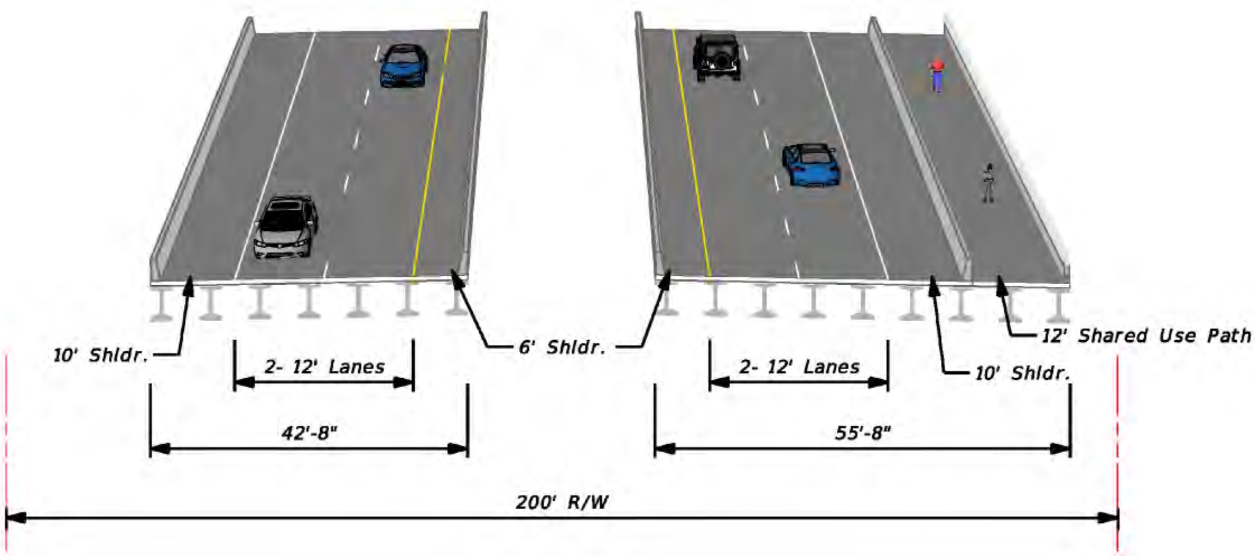


Figure 84: Typical Section – U.S. 301 to Hernando/Sumter County Line (Maximum ROW at Railroad Overpass Approach)

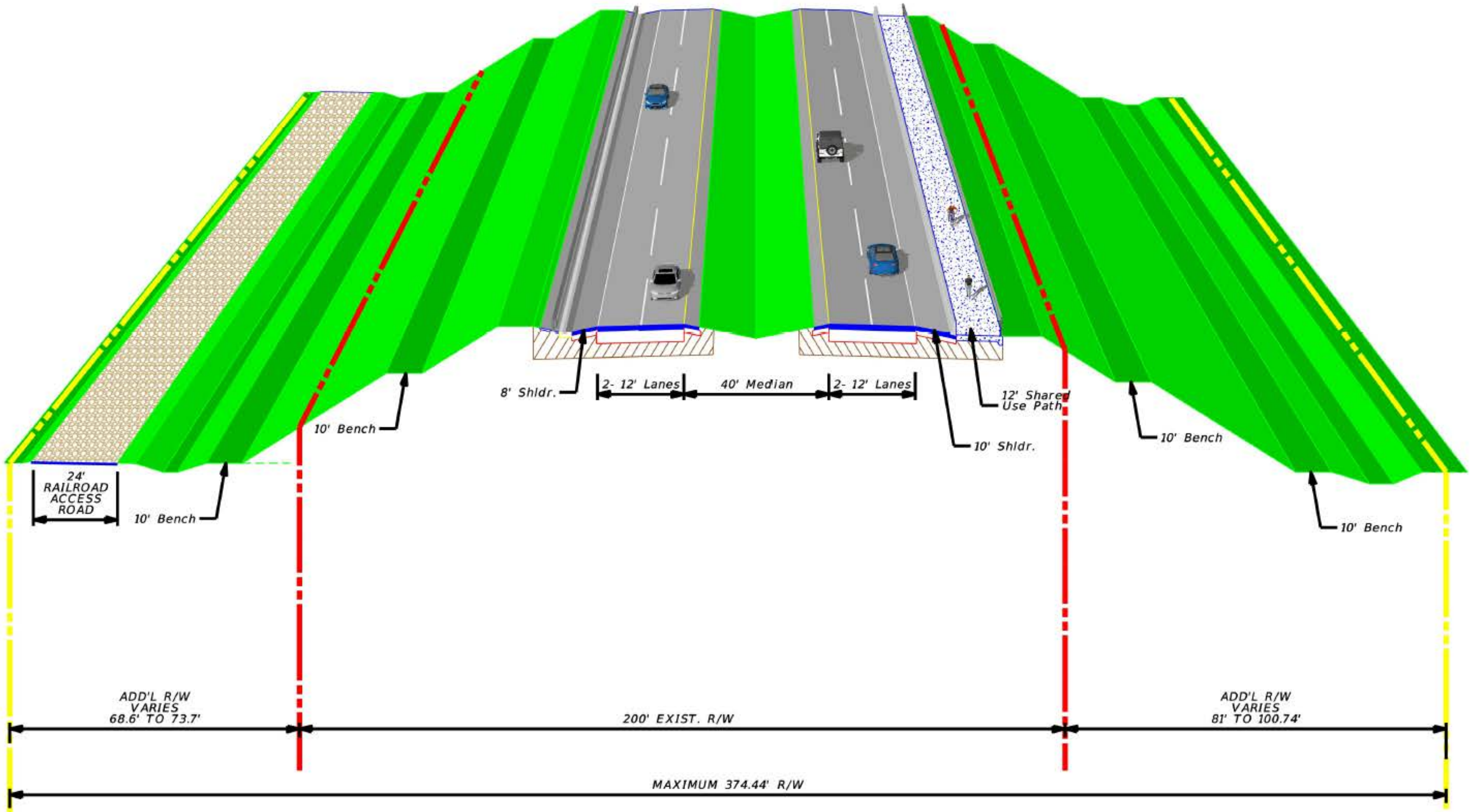


Figure 85: Typical Section – Hernando/Sumter County Line to Lee Road (Minimum ROW with Resurfacing Existing Roadway)

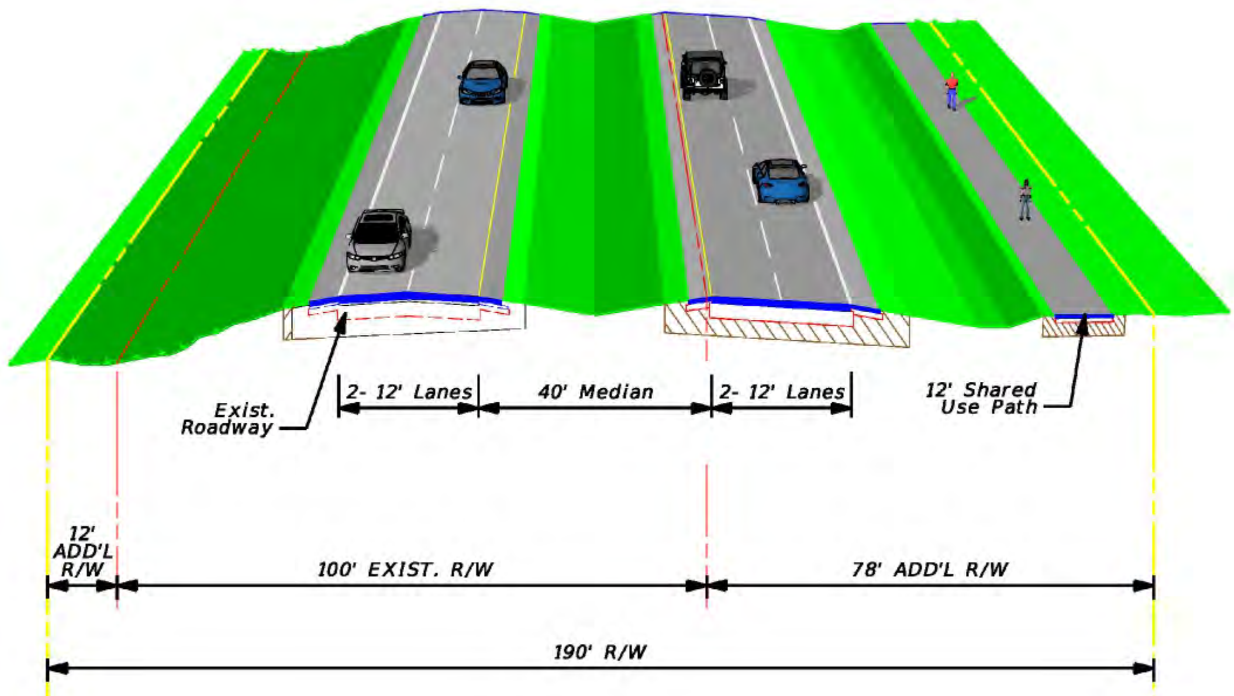


Figure 86: Typical Section – Hernando/Sumter County Line to Lee Road (Maximum ROW with New Construction and Drainage Conveyance Ditches)

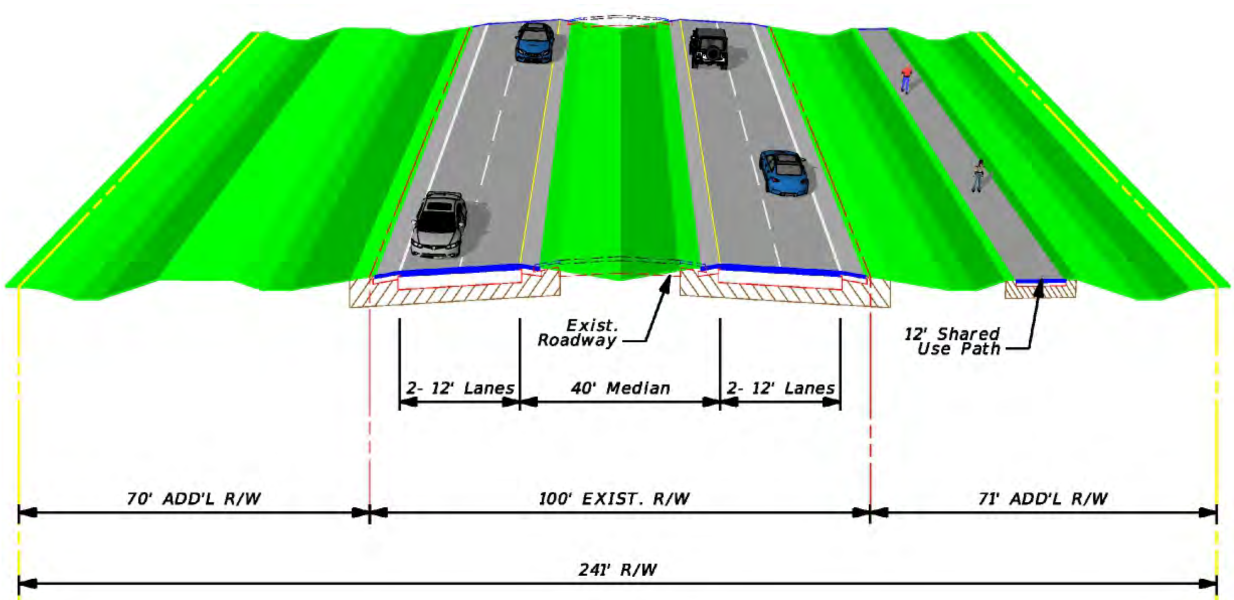


Figure 87: Typical Section – Hernando/Sumter County Line to Lee Road (Little Withlacoochee River Bridges)

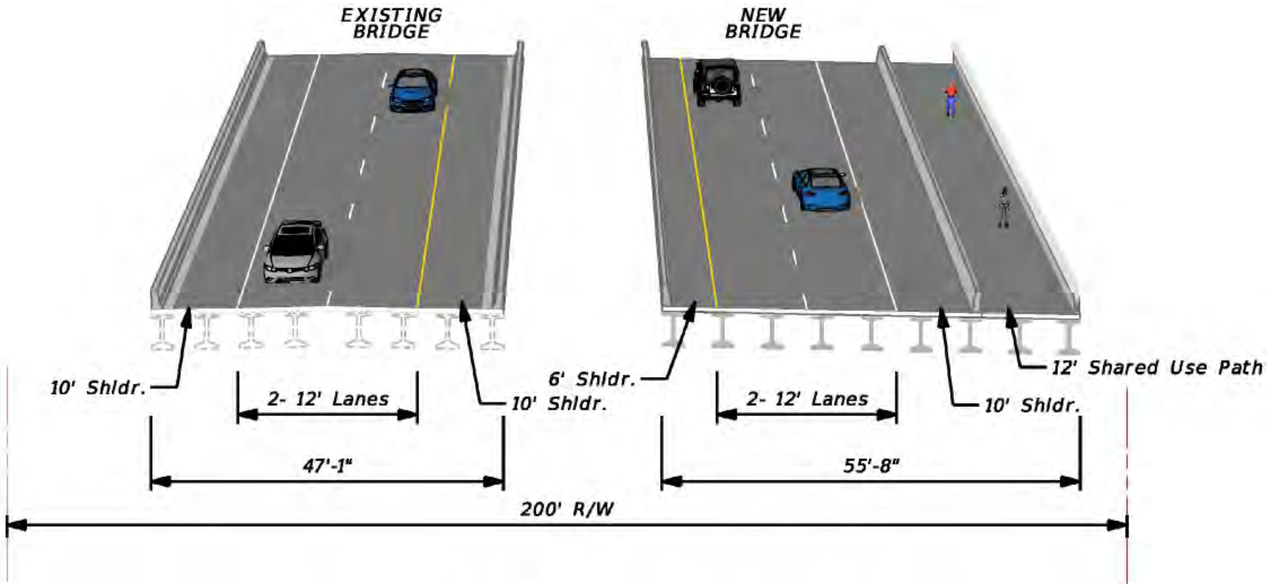


Figure 88: Typical Section – Lee Road to West of Barry Avenue (Minimum ROW)

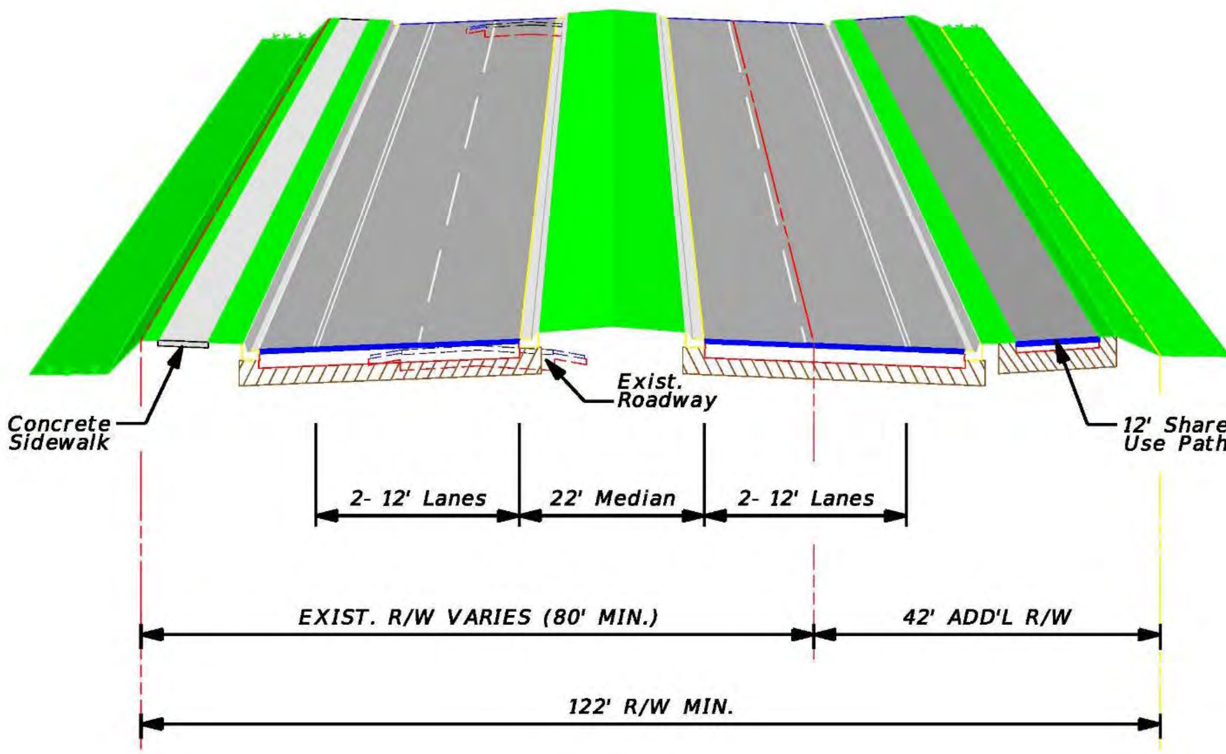


Figure 89: Typical Section – Lee Road to West of Barry Avenue (Maximum ROW with Drainage Conveyance Ditches)

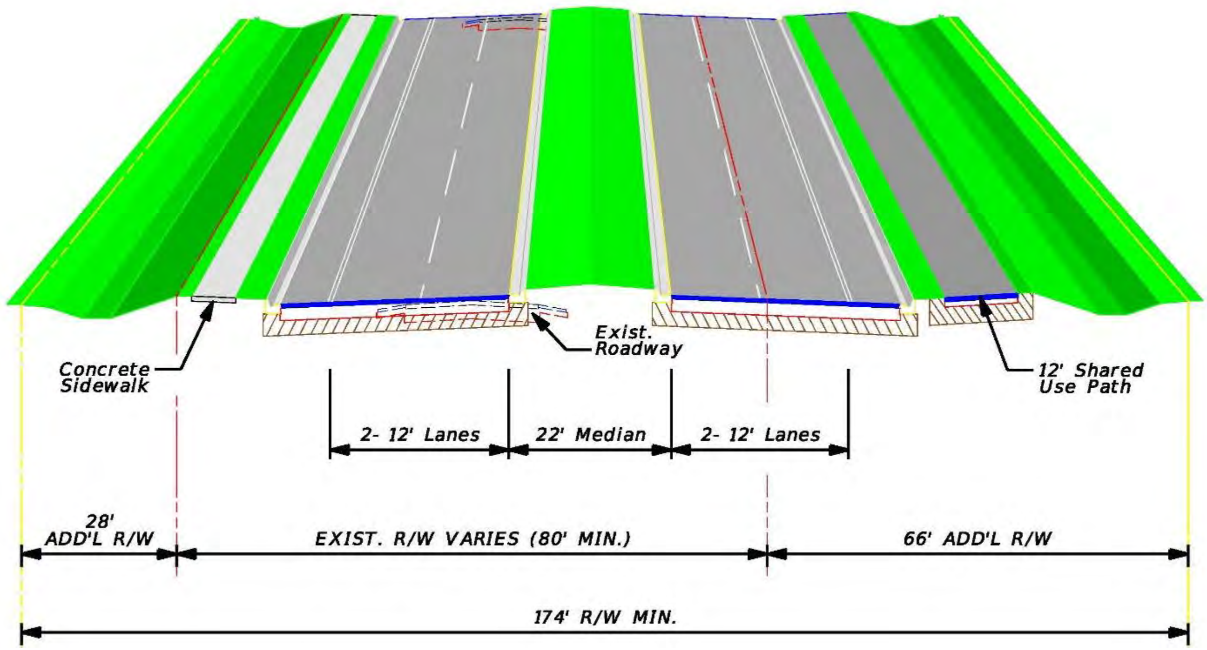
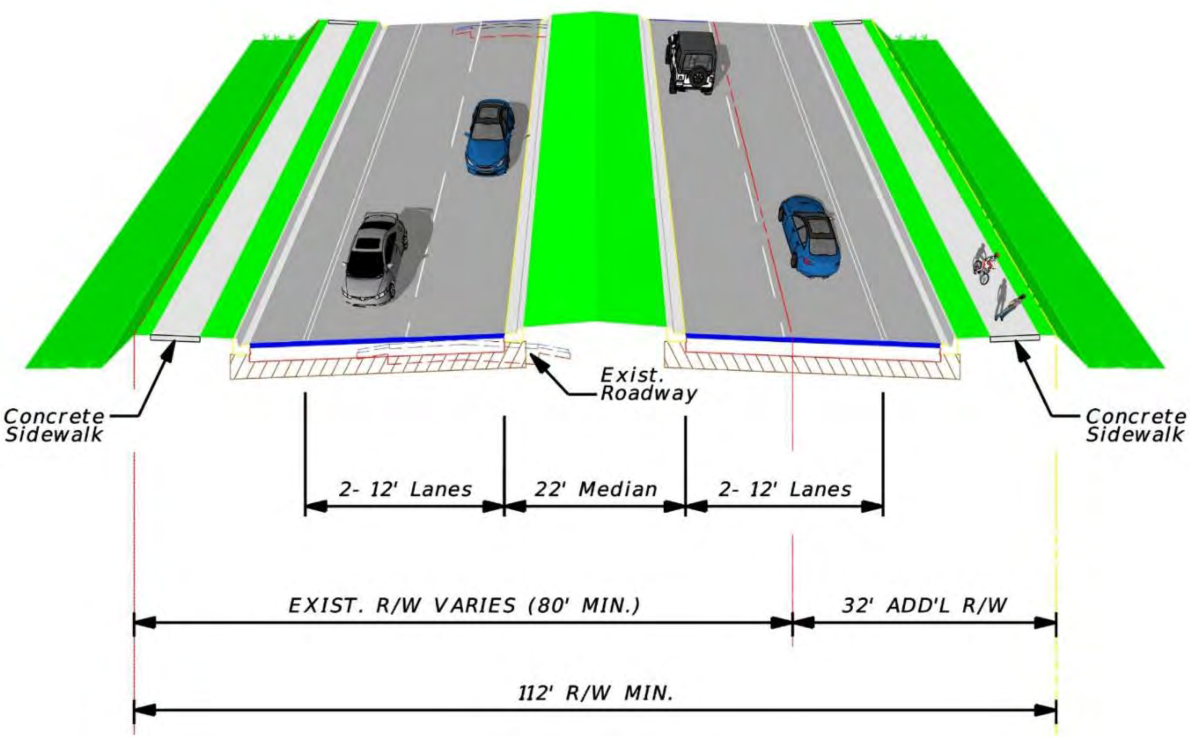


Figure 90: Typical Section – West of Barry Ave to C.R. 33



6.2 TYPICAL SECTIONS

A summary of the preferred typical sections along the corridor has been provided in Section 6.1. The approved Typical Section Package is included in **Appendix A**.

6.3 ALIGNMENT GEOMETRY

Horizontal Alignment

Twenty-one horizontal curves are present for the preferred alternative along S.R. 50 between U.S. 301 and C.R. 33, as displayed in **Figure 91**. Horizontal curves meet criteria defined by FDOT minimum curve standards found in the *2018 FDM* Tables 210.9.1 (e_{max} = 0.10) and 210.9.2 (e_{max} = 0.05). Data for the preferred alternative curves can be seen in **Table 56** through **Table 59**.

Table 56: S.R 50 Preferred Build Alternative Horizontal Curve Summary

Curve Characteristic	S.R. 50 – Curve Number					
	F5	F8	F13	F18	F23	F26
Design Speed (MPH)	55	55	60	60	60	60
PI Sta.	1857+91.91	1885+09.90	1908+30.41	2026+86.11	73+29.40	133+48.23
Δ	5°14’47” (RT)	11°23’41” (LT)	5°56’48” (RT)	54°04’49” (LT)	36°16’11” (LT)	29°30’37” (RT)
D	1°09’22”	1°09’22”	1°00’20”	0°59’40”	1°55’10”	2°51’53”
T	227.06	494.44	295.96	2940.97	977.66	526.75
L	453.81	985.62	591.39	5438.63	1889.58	1030.10
R	4956.00	4956.00	5698.00	5762.00	2985.00	2000.00
PC Sta.	1855+64.85	1880+15.46	1905+34.45	1997+45.14	63+51.74	128+21.48
PT Sta.	1860+18.66	1890+01.07	1911+26.84	2051+83.77	82+41.33	138+51.58
e Max (%)	2.54	2.54	3.37	2.98	5.31	7.43

Figure 91: Proposed Horizontal Curve Locations along Study Corridor

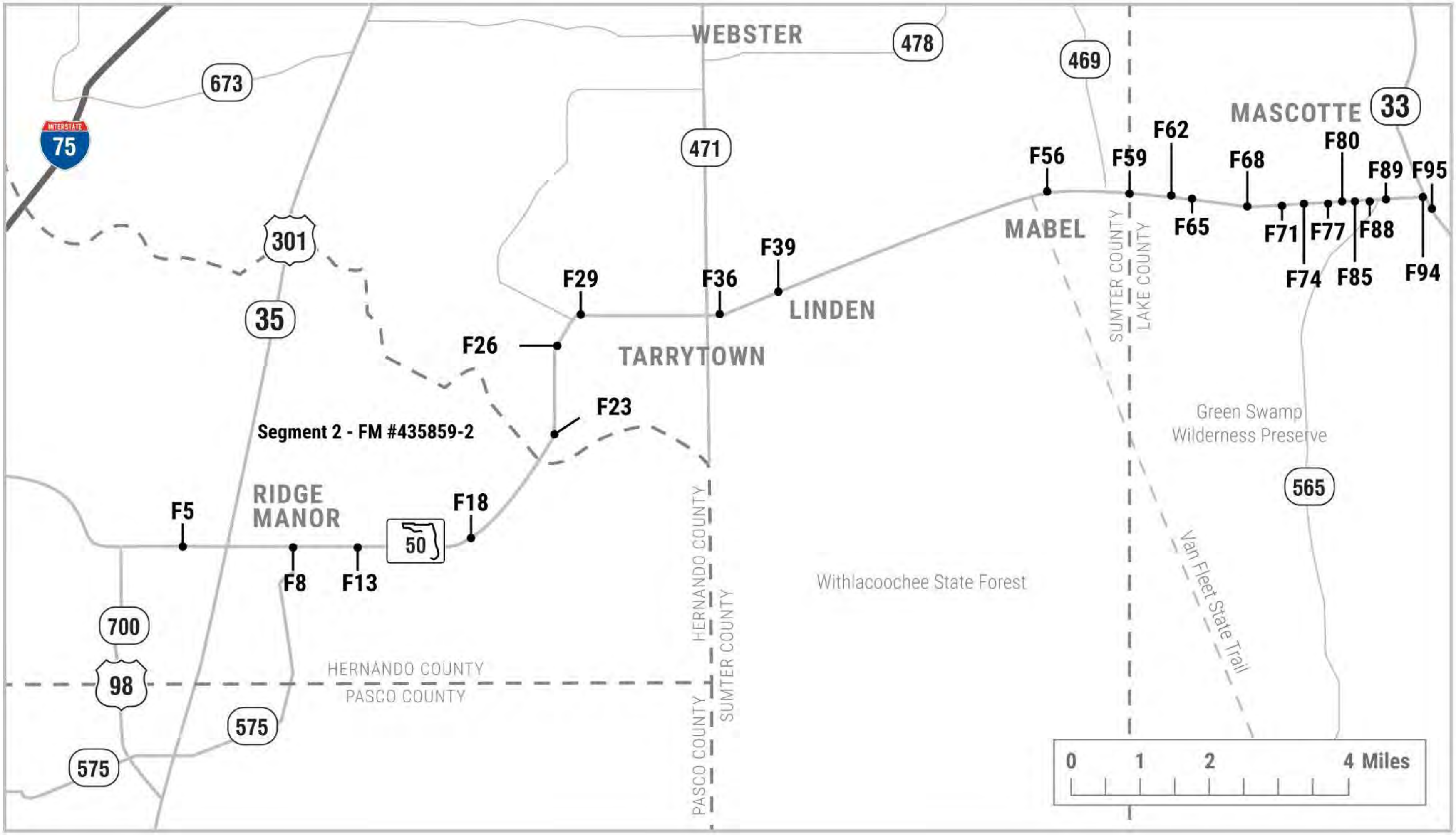


Table 57: S.R 50 Preferred Build Alternative Horizontal Curve Summary Cont.

Curve Characteristic	S.R. 50 – Curve Number					
	F29	F36	F39	F56	F59	F62
Design Speed (MPH)	60	45	55	55	55	55
PI Sta.	160+73.29	30+80.73	49+11.61	298+28.75	358+69.77	392+04.91
Δ	60°58’33” (RT)	30°41’20” (LT)	11°11’12” (RT)	19°10’47” (RT)	12°28’21” (RT)	12°37’27” (LT)
D	2°51’53”	2°59’59”	2°59’59”	1°00’00”	1°15’00”	1°30’00”
T	1177.52	524.11	187.05	968.11	500.92	422.55
L	2128.46	1023.04	372.92	1918.11	997.88	841.68
R	2000.00	1910.00	1910.00	5730.00	4584.00	3820.00
PC Sta.	148+95.77	25+56.61	47+24.56	288+60.63	353+68.85	387+82.36
PT Sta.	170+24.23	35+79.66	50+97.48	307+78.75	363+66.73	396+24.03
e Max (%)	7.43	4.90	6.70	2.50	3.10	3.70

Table 58: S.R 50 Preferred Build Alternative Horizontal Curve Summary Cont.

Curve Characteristic	S.R. 50 – Curve Number					
	F65	F68	F71	F74	F77	F80
Design Speed (MPH)	55	55	55	55	55	45
PI Sta.	406+49.11	450+21.20	481+12.36	504+05.15	517+75.19	529+57.94
Δ	11°03’35” (RT)	15°09’39” (LT)	13°02’37” (RT)	15°18’44” (LT)	10°25’18” (RT)	10°47’26” (RT)
D	1°59’59”	1°58’11”	2°00’15”	1°59’59”	1°59’59”	4°38’22”
T	277.38	387.13	326.84	385.13	261.28	116.64
L	553.03	769.74	650.86	765.67	521.12	232.59
R	2865.00	2909.00	2859.00	2865.00	2865.00	1235.00
PC Sta.	403+71.73	446+34.07	477+85.52	500+20.02	515+13.91	528+41.31
PT Sta.	409+24.76	454+03.80	484+36.38	507+85.69	520+35.02	530+73.89
e Max (%)	4.80	4.73	4.80	4.80	4.80	RC

Table 59: S.R 50 Preferred Build Alternative Horizontal Curve Summary Cont.

Curve Characteristic	S.R. 50 – Curve Number				
	F85	F88	F89	F94	F95
Design Speed (MPH)	45	45	45	35	35
PI Sta.	536+96.00	547+78.11	554+56.86	577+86.34	582+04.17
Δ	2°57’21” (LT)	3°46’48” (RT)	2°41’01” (RT)	20°18’44” (RT)	25°44’33” (RT)
D	1°08’54”	0°28’34”	0°28’34”	6°26’42”	4°59’54”
T	128.72	397.14	281.91	159.25	261.93
L	257.38	793.98	563.71	315.16	515.02
R	4989.00	12035.00	12035.00	889.00	1146.28
PC Sta.	535+67.28	543+80.97	551+74.96	576+27.08	578+42.25
PT Sta.	538+24.67	551+74.96	557+38.67	579+42.25	584+57.26
e Max (%)	NC	NC	NC	RC	RC

Vertical Alignment

The existing curves should be reconstructed to match the existing grades. Within the urban section where the roadway profile does not meet drainage slope criteria, rocking of the buffered bicycle lane may be necessary to achieve positive drainage flow. Rocking the bicycle lane should not impact the vertical curve grades.

Where existing pavement is to be reused, it is suggested to maintain the existing roadway profile. However, there are multiple locations along the preferred alignment where clearance between the pavement base and the seasonal high-water elevation is believed to be less than the FDOT required 3’-0” (see **Table 18** and discussion in Section 2.15 for more information). In these locations, it is conservatively recommended to raise the profile to provide necessary base clearance. Locations for profile adjustment areas and the suggested elevation adjustments can be found in **Table 60**. Pavement corings should be completed along sections of the existing corridor to determine: structural integrity of existing pavement section, pavement section depths, and base design resilient modulus. If pavement corings indicate a base design resilient modulus to be structurally sufficient, determined by the District Pavement Design Engineer, base clearance can be reduced to a minimum of 1’-0”. In the field reviews, there were no obvious areas of base failure.

Table 60: Profile Adjustment Locations

Station From	Station To	Average Needed Profile Elevation Increase
1865+25	1985	1.15 ft
2049+00	2051+00	1.00 ft
52+00	97+00	1.00 ft
107+00	117+00	0.84 ft
167+00	217+00	0.83 ft
40+00	50+00	0.62 ft
209+00	211+00	1.00 ft
240+00	270+00	1.00 ft
284+00	286+00	1.50 ft
300+00	310+00	0.42 ft
333+60	340+00	0.75 ft
350+00	355+00	1.00 ft
404+00	430+00	1.65 ft

6.4 INTERSECTION CONCEPTS AND ANALYSIS

The initial intersection operational analysis identified the S.R. 471, C.R. 469, Tuscanooga Road, S. Bay Lake Road, and C.R. 33 intersections as potential locations for either signalization or a roundabout treatment. Through additional operational analysis, Value Engineering, potential environmental impacts, and concept development, roundabouts are preferred at the S.R. 50 intersections of S.R. 471, C.R. 469, and Tuscanooga Road. The South Bay Lake Road intersection is preferred to be converted into a Restricted Crossing U-Turn (RCUT) intersection and supporting analysis has been included in this section. The C.R. 33 intersection is recommended to be shifted approximately 0.10 miles to the west, remain signalized, and receive additional turn lane improvements. The remainder of this section provides design details of the preferred concept for these locations.

S.R. 471, C.R. 469, and Tuscanooga Road Step 3 Roundabout Analysis

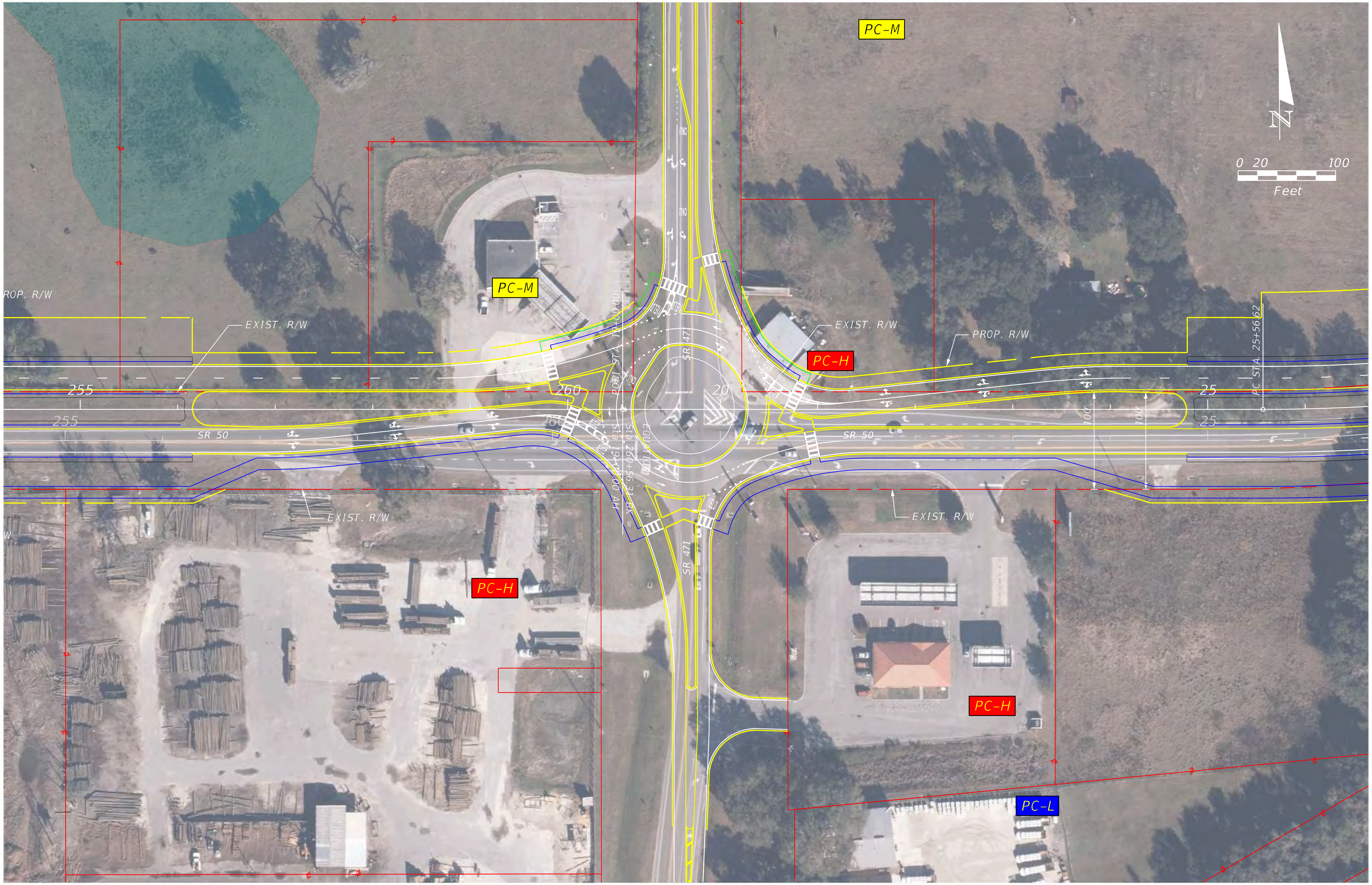
Each roundabout was conceptually designed to criteria as presented in *NCHRP Report 672: Roundabout Design Guide.* The roundabouts were analyzed for the following criteria:

- **Entry speed**: Multilane entries were designed and checked based on an entry speed of 30 MPH or less. Single lane entry speeds were designed and checked to limit entry speed to 25 MPH or less.

- **Truck Checks:** The design vehicle for each roundabout is a WB-62FL. All turning movements were checked for the design vehicle's maneuverability. This includes through movements, right turns, and left turns.
- **Stopping Sight Distance:** Stopping sight distance (SSD) checks for entry and crosswalks were completed for all roundabouts. Circulatory SSD checks were also completed. SSD allows motorists to have enough time to react and completely stop before reaching objects within the road. No landscaping or hardscape fixtures over 2.5' in height should be constructed within SSD view angles.
- **Intersection Sight Distance:** Intersection sight distance checks were completed at all roundabout entries. Once again, no landscaping or hardscape fixtures over 2.5' in height should be constructed within the view angles.

Figure 92, **Figure 93**, and **Figure 94** display the roundabout concepts for S.R. 50 at S.R. 471, C.R. 469, and Tuscanooga Road, respectively. **Appendix G** contains the Step 1, 2, and 3 signed roundabout forms and the design checks related to the Step 3 roundabout analysis.

In addition to the roundabout geometric design, lighting will be included at each of the roundabouts per FDM Section 231.3.3.



LEGEND

- FLOODPLAIN COMPENSATION AREA
- POND - RECOMMENDED
- POND - REGIONAL BASIN
- POND - ACCESS EASEMENT
- ROADWAY WIDENING OR FULL CONSTRUCTION
- PC-L POTENTIAL CONTAMINATION LOW
- PC-M POTENTIAL CONTAMINATION MEDIUM
- PC-H POTENTIAL CONTAMINATION HIGH

STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 50	HERNANDO SUMTER LAKE	435859-1-22-01

SR 50 PD&E STUDY
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FIGURE NO. 92

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LEGEND

- FLOODPLAIN COMPENSATION AREA
- POND - RECOMMENDED
- POND - REGIONAL BASIN
- POND - ACCESS EASEMENT
- ROADWAY WIDENING OR FULL CONSTRUCTION
- PC-L POTENTIAL CONTAMINATION LOW
- PC-M POTENTIAL CONTAMINATION MEDIUM
- PC-H POTENTIAL CONTAMINATION HIGH

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FIGURE NO. 93

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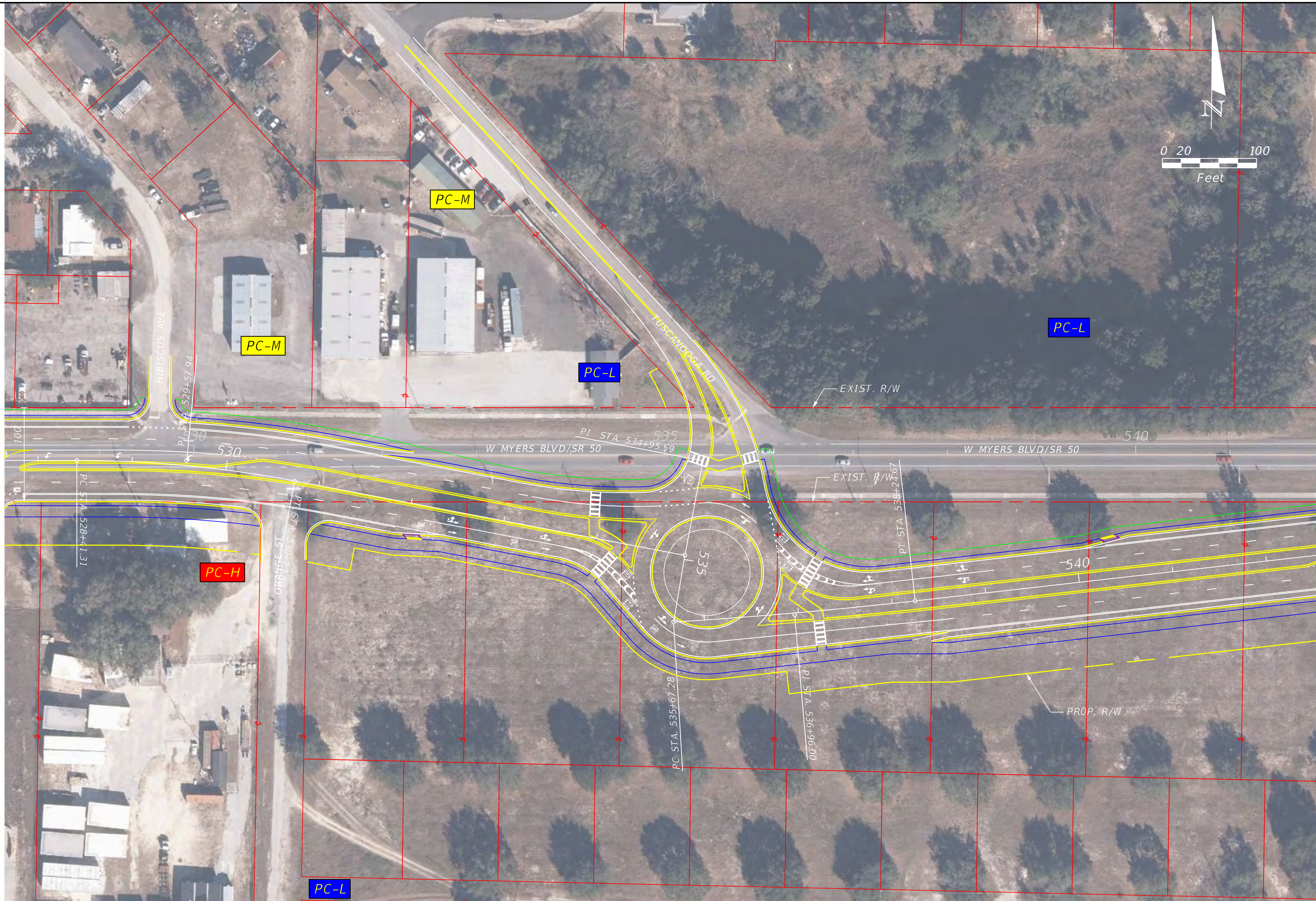

LEGEND

FLOODPLAIN COMPENSATION AREA
POND - RECOMMENDED
POND - REGIONAL BASIN
POND - ACCESS EASEMENT
ROADWAY WIDENING OR FULL CONSTRUCTION
PC-L POTENTIAL CONTAMINATION LOW
PC-M POTENTIAL CONTAMINATION MEDIUM
PC-H POTENTIAL CONTAMINATION HIGH

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FIGURE NO.
94

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S.R. 50 at Tuscanooga Road Roundabout

As displayed in **Figure 94**, the Tuscanooga Road roundabout will be shifted south based on Recommendation CN 17 from Value Engineering. The following factors explain the reasoning for shifting the roundabout location:

- The intersection skew angle has caused a crash problem at the intersection and increased skew at unsignalized intersections has been proven to increase crashes.
- The alignment avoids the Mascotte Cemetery, which has multiple grave sites within the existing FDOT ROW dating back to 1910.
- A borrow pit is located in the northeast corner of the intersection with a 40'+ depth. If the roundabout was located further to the north, a retaining wall would be needed for elevation difference.

S.R. 50 at South Bay Lake Road

As follow-up to Value Engineering Recommendation CT 13, an unsignalized restricted crossing U-turn (RCUT) intersection was analyzed at the S.R. 50 and South Bay Lake Road intersection. This analysis includes the South Bay Lake Road northbound and southbound stop controlled right-turn only movements, as well as the two U-turn movements both east and west of South Bay Lake Road. Results are provided in **Table 61**. In the AM and PM peak hours, the critical movement is the South Bay Lake Road northbound approach. The northbound approach experiences greater AM peak hour delay per vehicle (67.1 sec/veh, LOS F) than in the PM peak hour (24.5 sec/veh, LOS C) and in both cases the movement is under capacity (AM v/c is 0.89 and PM v/c is 0.51). **Figure 95** displays the RCUT concept at this intersection. **Appendix G** contains the operational output reports for the analysis.

Table 61: S.R. 50 at South Bay Lake Road RCUT Analysis

Approach	Movement	AM Peak Hour			PM Peak Hour		
		V/C Ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)	V/C Ratio	Delay (sec/veh) (LOS)	95th Percentile Queue (ft)
Eastbound	U-Turn	0.10	16.5 (C)	< 25	0.29	27.1 (D)	30
	Through	0.00	0.0	0	0.00	0.0	0
	Right	0.00	0.0	0	0.00	0.0	0
Westbound	U-Turn	0.02	18.1 (C)	< 25	0.01	15.4 (C)	< 25
	Through	0.00	0.0	0	0.00	0.0	0
	Right	0.00	0.0	0	0.00	0.0	0
Northbound	Right	0.89	67.1 (F)	203	0.51	24.5 (C)	70
Southbound	Right	0.01	14.6 (B)	< 25	0.02	18.9 (C)	< 25

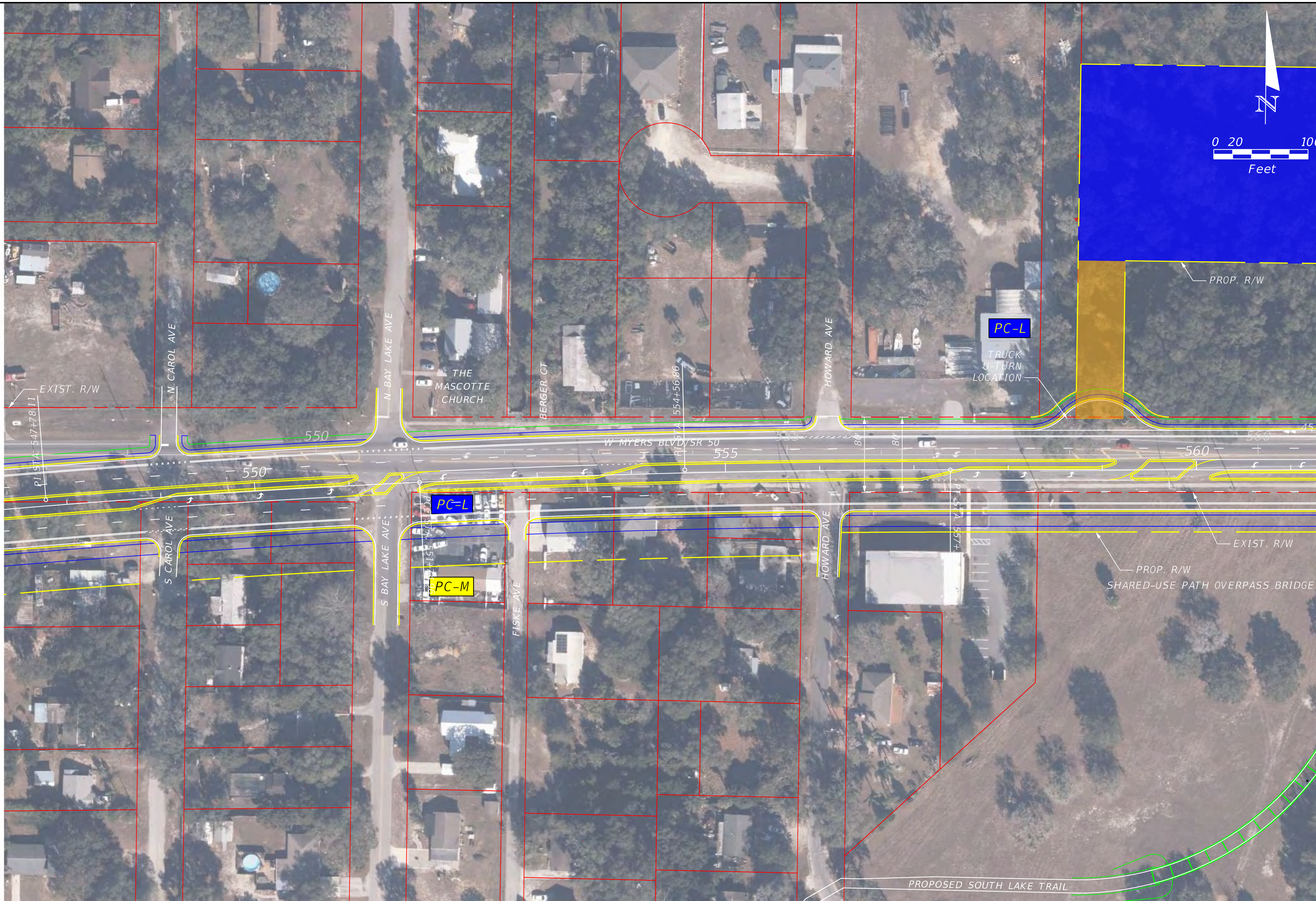
S.R. 50 at C.R. 33

To address a severe intersection skew angle and allow for additional turn lanes to be added, the C.R. 33 intersection is proposed to be relocated westward. As displayed in **Figure 96**, the eastbound approach will have an exclusive left turn lane accompanied by two through lanes (the outside lane is a shared through/right lane). The westbound approach will have exclusive left and right turn lanes with two through lanes. The northbound approach will have an exclusive left turn lane accompanied by a shared through/right turn lane. The southbound approach will feature dual left turn lanes and a shared through/right turn lane. The C.R. 33 signalized intersection improvement shall include an ATC controller, a CCTV and cellular modems. The intent is to obtain intersection counts and other intersection data electronically.

With the westward realignment, a new 475’ south leg will be constructed connecting S.R. 50 to Putnam Street and Line Avenue. This will provide more direct access to Mascotte Elementary School located three blocks to the south. Constructing a new 800’ north leg will connect S.R. 50 to Bluff Lake Road near Underpass Road. Minor widening will occur along Bluff Lake Road north of Underpass Road to accommodate the connection/transition near the intersection.

S.R. 50 U-turns

The RCUTs will cause U-turn movements for those desiring to make a left turn from the minor street. This movement will be required to right turn and go a distance generally about 600’ to 800’ for a U-turn. S.R. 50 has greater than 18 percent truck traffic in Mascotte. The percent heavy trucks is 7.7 percent and most of these are S.R. 50 through trucks not making turning movements from minor streets. Major intersecting roadways of S.R. 471, C.R. 469 and Tuscanooga Road will become roundabouts which are designed for heavy trucks and facilitate U-turn movements. Further, locations such as the Mazak Mine Access Road and Marian Gardens main entrance known to have heavy trucks will be full median openings. The corridor will still need to accommodate truck U-turn movements so truck U-turn bulb-outs will be strategically located to facilitate these movements based upon where the highest volume truck left turn movements are currently occurring. The loon will be designed to accommodate a Class 5 single unit truck to reduce ROW impacts and accommodate a majority of the trucks. They are identified in the roadway concept plans as “Truck U-turn Location” and are located at the RCUTs associated with the Lee Road, Sloan’s Ridge Road and South Bay Lake Road intersections.



LEGEND

- FLOODPLAIN COMPENSATION AREA
- POND - RECOMMENDED
- POND - REGIONAL BASIN
- POND - ACCESS EASEMENT
- ROADWAY WIDENING OR FULL CONSTRUCTION
- PC-L POTENTIAL CONTAMINATION LOW
- PC-M POTENTIAL CONTAMINATION MEDIUM
- PC-H POTENTIAL CONTAMINATION HIGH

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FIGURE NO. 95

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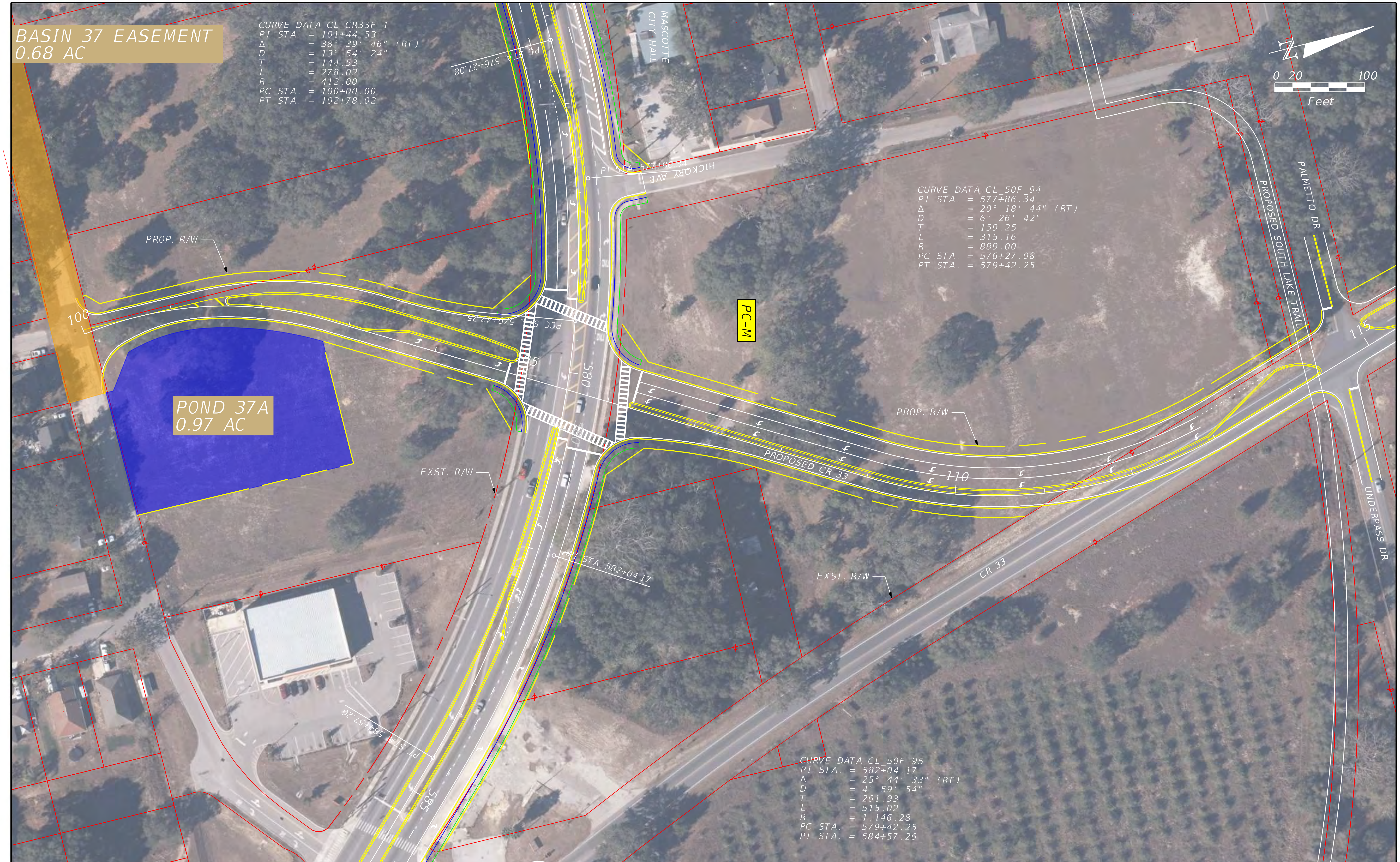

LEGEND

FLOODPLAIN COMPENSATION AREA	POTENTIAL CONTAMINATION LOW
POND - RECOMMENDED	PC-M POTENTIAL CONTAMINATION MEDIUM
POND - REGIONAL BASIN	PC-H POTENTIAL CONTAMINATION HIGH
POND - ACCESS EASEMENT	
ROADWAY WIDENING OR FULL CONSTRUCTION	

STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 50	HERNANDO SUMTER LAKE	435859-1-22-01

SR 50 PD&E STUDY
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FIGURE NO. 96

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6.5 Pedestrian and Bicycle Facilities

The preferred build alternative incorporates some form of pedestrian/bicycle facilities along the entire S.R. 50 study corridor. The following details the facilities preferred for each specific section of S.R. 50:

- U.S. 301 to the Hernando/Sumter County Line –
  - 5’ paved shoulders.
  - 10’ shared-use path on the south side of the roadway.
  - A 12’ shared-use path will be located on the south side of the eastbound travel lane across the CSX Railroad Bridge and the Withlacoochee River Bridge.
- The Hernando/Sumter County Line to S.R. 471 –
  - 5’ paved shoulders.
  - 12’ shared-use path on the south side of the roadway.
    - As noted in Section 2.2, an alternative for the Coast-to-Coast Trail alignment is being considered from U.S. 98 to S.R. 471.
- S.R. 471 to the Van Fleet Trail –
  - 5’ paved shoulders.
  - The Coast-to-Coast Trail, a 12’ shared-use path, is anticipated to run parallel to S.R. 50 on the south side. It would connect to the South Lake Trail at the Van Fleet Trail.
- The Van Fleet Trail to Lee Road –
  - 5’ paved shoulders.
  - 12’ shared-use path on the south side of the roadway.
    - Part of the Coast-to-Coast Trail will parallel S.R. 50 from Clarence Lee Road to approximately 0.30 miles east of Lee Road.
    - Provisions are currently being made to have a trail on the south side of S.R. 50. This will be the secondary alignment for the Coast-to-Coast Trail if the ROW for the primary alignment cannot be obtained.
- Lee Road to C.R. 33 –
  - 7’ buffered bike lanes.
  - 6’ sidewalk on the north side of the roadway.
  - 12’ shared-use path on the south side of the roadway connecting to the Coast-to-Coast Trail pedestrian overpass bridge at Station 562+00.
  - 6’ sidewalk on the south side of the roadway from Station 562+00 to C.R. 33.

Milled asphalt from the existing roadway will be re-used for the shared-use paths along the corridor per VE recommendation CT 2.

6.6 UTILITY IMPACTS

Based on information provided by the UAOs, the existing utilities identified on the project were evaluated and potential utility impacts due to the preferred alternative improvements were quantified. **Table 62** outlines preferred alternative potential utility impacts and associated relocation costs.

To minimize existing utility's impacts to the fullest extent possible, mitigation measures would be taken during the project's design phase. If impacts are unavoidable, design alternatives would be reviewed to allow for relocation of impacted facilities in a manner minimizing cost to the UAO and minimizing disruption to their customers.

Since relocations of facilities located in easements would likely be eligible for reimbursement, all measures will be taken to avoid impacting facilities identified in lands of compensable interest. Utility companies identified as having potential easements on the project are listed in the S.R. 50 435859-1-22-01 *Utility Assessment Package*, located within the project files. Utility coordination should be performed during the project's design phase to clearly identify all utility easements and potential reimbursable relocations.

Table 62: Potential Utility Impacts

Utility Company	Description of Impacted Facilities	Relocation Estimate
CenturyLink	**Segment 2 – U.S. 301 to Hernando/Sumter County Line** • 5,000 LF of BT • 21,000 LF of BFO **Segment 3 – Hernando/Sumter County Line to 0.13 Miles West of CR 751** • 4,200 LF of BT • 6,700 LF of BFO **Segment 4 – 0.13 Miles West of CR 751 to 1,000' East of Sloans Ridge Road** • 34,080 LF of BFO • 2,780 LF of BT **Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 3,120 LF of BT • 20,320 LF of BFO	**Segment 2** $4,100,000 **Segment 3** $2,350,000 **Segment 4** $4,520,000 **Segment 5** $3,280,000 **Total** $14,250,000
Charter/Bright House	**Segment 4 – 0.13 Miles West of CR 751 to 1,000' East of Sloans Ridge Road** • 3,240 LF of BTV • 8,520 LF of CATV **Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 760 LF of BTV • 5,860 LF of CATV	**Segment 4** $360,000 **Segment 5** $495,000 **Total** $855,000
Hernando County Utilities	**Segment 2 – U.S. 301 to Hernando/Sumter County Line** • 200 LF of 16" Water Main (future) • 150 LF of 12" Water Main (future)	**Segment 2 (Total)** $50,000
AT&T Distribution	**Segment 2 – U.S. 301 to Hernando/Sumter County Line** • 500 LF of BFO **Segment 3 – Hernando/Sumter County Line to 0.13 Miles West of CR 751** • 5,700 LF of BFO **Segment 4 – 0.13 Miles West of CR 751 to 1,000' East of Sloans Ridge Road** • 7,080 LF of BFO **Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 1,720 LF of BFO	**Segment 2** $50,000 **Segment 3** $570,000 **Segment 4** $708,000 **Segment 5** $172,000 **Total** $1,500,000

Table 71 Cont.: Potential Utility Impacts

Utility Company	Description of Impacted Facilities	Relocation Estimate
Sumter Electric Cooperative, Inc. (SECO)	**Segment 3 – Hernando/Sumter County Line to 0.13 Miles West of CR 751** • 2,800 LF of Aerial Electric **Segment 4 – 0.13 Miles West of CR 751 to 1,000' East of Sloans Ridge Road** • 25,000 LF of Aerial Electric **Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 27,320 LF of Aerial Electric	**Segment 3** $180,000 **Segment 4** $1,610,000 **Segment 5** $1,850,000 **Total** $3,640,000
Withlacoochee River Electric	**Segment 2 – U.S. 301 to Hernando/Sumter County Line** • 12,000 LF of Aerial Electric	**Segment 2 (Total)** $1,000,000
Verizon/MCI	**Segment 4 – 0.13 Miles West of CR 751 to 1,000' East of Sloans Ridge Road** • 300 LF of BFO	**Segment 4 (Total)** $30,000
Spectra Energy-Sabal Trail	• None	$0
City of Mascotte	**Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 6,200 LF of 8" to 12" Water Main • 1,000 LF of 4" Force Main • Lift station of SW corner of Talbot Ave. and SR 50	**Segment 5 (Total)** $2,000,000
Duke Energy-Distribution	**Segment 5 – 1,000' East of Sloans Ridge Road to C.R. 33** • 3,000 LF of Aerial Electric	**Segment 5 (Total)** $250,000
Duke Energy-Transmission	• None	$0
	Segment 2 Relocation Total: **Segment 3 Relocation Total:** **Segment 4 Relocation Total:** **Segment 5 Relocation Total:**	**$5,200,000** **$3,100,000** **$7,228,000** **$8,047,000**
	Project Relocation Totals:	**$23,575,000**

6.7 DRAINAGE

Topography between U.S. 301 and C.R. 469 is virtually flat, but between C.R. 469 and C.R. 33 the topography is better described as rolling terrain. Existing ground elevations vary between elevations, 65’ near the Little Withlacoochee River to 125’ (NAVD) near Mascotte.

Location Hydraulics

A *Location Hydraulics Report* (February 2019) was prepared for this proposed project and provides a detailed discussion of the potential floodplain encroachments and preliminary cross drain evaluation.

A preliminary analysis of the cross drains has been performed to determine whether the existing cross drains can be extended or would require a replacement, because the increase in the cross drain length caused an increase in the headwater elevations due to the wider roadway footprint. Please note that the hydraulic analysis is based on providing adequate conveyance capacity. The decision to extend or replace a cross drain may also be affected by the physical condition and age of each cross drain and should be examined further during the design phase. **Table 63** provides a summary of cross drains along the S.R. 50 corridor.

Table 63: Summary of Cross Drains

Structure No.	Station	Existing Condition				Proposed Condition				Remarks
		# of Barrels	Size	Type	Length (ft)	# of Barrels	Size	Type	Length (ft)	
CD-01	1851+01	1	24”	RCP	96	1	30”	RCP	190	Upsize
CD-02	1872+92	1	24”	RCP	100	1	30”	RCP	345	Upsize
CD-03	1874+20	1	24”	RCP	106	1	30”	RCP	310	Upsize
CD-04	1925+79	1	30”	RCP	98	1	36”	RCP	190	Upsize
CD-05	1955+73	2	30”	RCP	98	2	36”	RCP	190	Upsize
CD-06	2007+79	2	36”	RCP	96	2	42”	RCP	190	Upsize
CD-07	2031+62	4	48”	RCP	104	5	48”	RCP	190	Upsize
CD-08	2044+53	1	30”	RCP	106	1	36”	RCP	190	Upsize
CD-09	2051+61	1	30”	RCP	106	1	36”	RCP	190	Upsize
CD-10	2070+21	2	42”	RCP	99	2	48”	RCP	190	Upsize
CD-11	2093+09	1	48”	RCP	112	1	54”	RCP	190	Upsize
CD-12	2098+41	1	48”	RCP	120	1	48”	RCP	190	Same – Extend
CD-13	46+45	2	8’X3’	CBC	46	2	8’X3’	CBC	190	Same – Replace
CD-14	62+31	1	8’X5’	CBC	46	1	9’X5’	CBC	190	Upsize
CD-15	91+89	1	48”	RCP	66	1	48”	RCP	190	Same – Extend
CD-16	103+86	1	24”	RCP	66	1	30”	RCP	190	Upsize
CD-17	115+86	1	48”	RCP	67	1	48”	RCP	190	Same – Extend
CD-18	135+83	1	24”	RCP	70	1	30”	RCP	190	Upsize

Table 63 Cont.: Summary of Cross Drains

Structure No.	Station	Existing Condition				Proposed Condition				Remarks
		# of Barrels	Size	Type	Length (ft)	# of Barrels	Size	Type	Length (ft)	
CD-19	144+80	1	48”	RCP	70	1	48”	RCP	190	Same – Extend
CD-20	152+38	1	24”	RCP	73	1	30”	RCP	190	Upsize
CD-21	159+13	1	30”	RCP	66	1	36”	RCP	190	Upsize
CD-22	189+51	1	60”	RCP	87	1	66”	RCP	190	Upsize
CD-23	195+71	1	42”	RCP	62	1	48”	RCP	190	Upsize
CD-24	197+21	1	24”	RCP	65	1	30”	RCP	190	Upsize
CD-25	227+57	1	24”	CMP	68	1	30”	CMP	190	Upsize
CD-26	252+07	1	24”	RCP	68	1	30”	RCP	190	Upsize
CD-27	36+70	3	48”	RCP	50	3	48”	RCP	190	Same - Extend
CD-28	74+90	1	30”	RCP	53	1	30”	RCP	190	Same - Extend
CD-29	101+59	1	24”	RCP	47	1	30”	RCP	190	Upsize
CD-30	130+62	1	36”	RCP	66	1	42”	RCP	190	Upsize
CD-31	164+80	1	24”	RCP	78	1	30”	RCP	190	Upsize
CD-32	179+61	1	24”	RCP	85	1	30”	RCP	190	Upsize
CD-33	201+66	1	24”	RCP	63	1	30”	RCP	190	Upsize
CD-34	215+25	1	36”	RCP	58	1	42”	RCP	190	Upsize
CD-35	232+59	1	24”	RCP	79	1	30”	RCP	190	Upsize
CD-36	247+34	1	30”	RCP	69	1	36”	RCP	190	Upsize
CD-37	263+66	1	24”	RCP	82	1	30”	RCP	200	Upsize
CD-38	274+53	1	36”	RCP	56	1	42”	RCP	200	Upsize
Bridge Culvert -1	333+15	3	5’X10’	CBC	67	3	10’X5’	CBC	190	Same - Replace
CD-39	350+23	1	24”	RCP	62	1	30”	RCP	190	Upsize
CD-40	389+60	1	24”	RCP	60	1	30”	RCP	190	Upsize
CD-41	406+65	2	48”	RCP	64	2	48”	RCP	190	Same - Extend
CD-42	411+54	1	48”	RCP	64	1	54”	RCP	190	Upsize
CD-43	426+40	1	24”	RCP	60	1	30”	RCP	190	Upsize
CD-44	464+60	1	24”	RCP	60	1	30”	RCP	120	Upsize
CD-45	464+60	4	48”	RCP	64	4	48”	RCP	120	Same - Extend
CD-46	493+40	1	24”	RCP	64	1	30”	RCP	120	Upsize

*CBC = Concrete Box Culvert; RCP = Reinforced Concrete Pipe; CMP = Corrugated Metal Pipe

With the introduction of additional travel lanes, the runoff from offsite areas, which currently flows into the existing roadside ditches, may be blocked. Additionally, the new travel lanes have the potential to cut off wetland and floodplain connectivity. Offsite ditches will be provided in the proposed condition to carry the offsite runoff along its historical path and re-establish wetland and floodplain connectivity.

The resulting floodplain encroachment areas caused by the proposed S.R. 50 roadway widening were quantified. It was determined that, throughout the project limits, the floodplain associated with the proposed widening will be impacted as well as the addition of a new bridge structure for the eastbound lanes at Bridge #180071 (Little Withlacoochee River), and at cross drains CD-02 through CD-24, CD-26, CD-29 through CD-38, CD-40 through CD-45, and at Bridge Culvert #180910.

It was concluded the project will impact approximately 105.47 ac-ft of floodplain based on the proposed roadway alignment. These impacts are minimal compared to the overall extent of the floodplain, therefore, it was determined the floodplain encroachment is classified as “minimal”. Minimal encroachments on a floodplain occur when there is a floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts.

In conclusion, the following floodplain statement is a slightly modified version of statement Number 4 in the FDOT *PD&E Manual* (Part 2, Chapter 13 “Floodplains”), tailored for this project:

“The proposed cross drains and Floodplain compensation areas will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

Stormwater Management

A *Pond Siting Report* (February 2019) was prepared for this proposed project and provides a detailed discussion of the proposed stormwater management approach. Wet detention and dry retention ponds will provide for water quality improvements as well as water quantity attenuation for the project runoff.

There are currently 37 drainage basins within the project limits. Three pond alternatives for each basin have been analyzed, except for Basin 1, where the proposed roadway improvements drain to a permitted stormwater facility as part of the U.S. 301 and S.R. 50 widening improvements; these improvements fall under SWFWMD permit no. 43-4773.006. The ponds were sized on the assumption that offsite runoff would bypass the pond site alternative and go toward its historical path. Also, for contingency purposes, the ponds were upsized by 20 percent.

Due to the proposed increase in impervious areas within each basin, the ponds have been conservatively sized to accommodate the increased attenuation volume. **Table 64** provides a summary of the proposed basin limits.

Table 64: Summary of Proposed Drainage Basins

Basin Name	Segment Number	From Station	To Station
Basin 1	2	1834+69	1854+10
Basin 2	2	1854+10	1873+76
Basin 3	2	1873+76	1900+95
Basin 4	2	1900+95	1925+79
Basin 5	2	1925+79	1955+73
Basin 6	2	1955+73	2007+78
Basin 7	2	2007+78	2031+62
Basin 8	2	2031+62	2070+21
Basin 9	2	2070+21	2098+41
Basin 10	3	2098+41	62+31
Basin 11	3	62+31	91+89
Basin 12	3	91+89	115+86
Basin 13	3	115+86	159+13
Basin 14	3/4	159+13	195+71
Basin 15	4	195+71	221+30
Basin 16	4	221+30	242+66
Basin 17	4	242+66	31+94
Basin 18	4	31+94	74+90
Basin 19	4	74+90	114+31
Basin 20	4	114+31	137+91
Basin 21	4	137+91	164+80
Basin 22	4	164+80	222+87
Basin 23	4	222+87	251+63
Basin 24	4	251+63	284+72
Basin 25	4	284+72	333+15
Basin 26	4	333+15	350+23
Basin 27	4	350+23	366+41
Basin 28	4/5	366+41	397+30
Basin 29	5	397+30	421+14
Basin 30	5	421+14	436+31
Basin 31	5	436+31	453+71
Basin 31	5	436+31	453+71
Basin 32	5	453+71	476+05
Basin 33	5	476+05	505+21
Basin 34	5	505+21	533+00
Basin 35	5	533+00	562+04
Basin 36	5	562+04	578+65
Basin 37	5	578+65	586+53

There are 26 proposed floodplain compensation sites within the project limits. All of the alternatives are offsite, scraped down areas outside of the 100-year floodplain. Preliminary coordination with SWFWMD has occurred in regard to an alternative option for demonstrating floodplain compensation within the Withlacoochee River State Forest. Due to the proposed roadway encroachments, this alternative involves utilizing the existing watershed model for the Withlacoochee River and demonstrating no net increase in the 100-year flood elevations. Another alternative discussed with the Department is demonstrating no increase in the 100-year floodplain associated with the river in conjunction with the anticipated bridge hydraulic analysis required for the bridge improvements over the river.

For this study, offsite floodplain compensation ponds within the Withlacoochee State Forest are preferred as well as the more conservative approach for ROW estimation purposes. The discussion with SWFWMD about the floodplain model approach is in its preliminary stage requiring further coordination during the design phase.

Preferred Pond Alternatives

Based on numerous factors (such as existing soil characteristics, hydrology features, outfall location, hydraulic conditions, environmental concerns, cultural resources, potential utility conflicts, ROW, and construction costs and contamination potential), **Table 65** provides recommendations for the stormwater management and floodplain compensation sites.

Table 65: Summary of Preferred Stormwater & Floodplain Compensation Pond Sites

Basin	Preferred Pond Alternative	Pond Access Easement Area (ac)	Pond Right-of-Way Area (ac)	Total Required Right-of-Way Area (ac)
1	Permitted under adjacent Permit No. 43-4773.006			
2	Pond 2C	0.00	2.32	2.32
3	Pond 3R	0.00	12.55	12.55
4				
5				
6				
7	Pond 12R	0.00	11.56	11.56
8				
9				
10				
11				
12				
13				
14	Pond 14C	0.00	2.91	2.91
15	Pond 15A	0.00	2.36	2.36
16	Pond 16B	0.00	1.53	1.53
17	Pond 17B	0.00	4.30	4.30
18	Pond 18A	0.24	4.26	4.50
19	Pond 19C	0.12	3.57	3.69
20	Pond 20A	0.00	1.94	1.94
21	Pond 21B	0.50	2.58	3.08
22	Pond 22B	0.00	2.82	2.82
23	Pond 23A	0.00	1.82	1.82
24	Pond 24C	0.00	3.86	3.86
25	Pond 25C	0.00	6.48	6.48
26	Pond 26C	0.00	1.55	1.55
27	Pond 27A	0.00	0.84	0.84
28	Pond 28A	0.21	2.68	2.89
29	Pond 29B	0.00	2.48	2.48
30	Pond 30 + 31	0.00	3.58	3.58
31				
32	Pond 32B	0.00	2.84	2.84
33	Pond 33A	0.00	2.08	2.08
34	Pond 34A	0.00	1.72	1.72
35	Pond 35A	0.19	1.31	1.50
36	Pond 36B	0.15	0.63	0.78
37	Pond 37A	0.68	0.97	1.65
---	FPCA 1	0.00	0.23	0.23
---	FPCA 2	No FPCA Required		

Table 65 Cont.: Summary of Preferred Stormwater & Floodplain Compensation Pond Sites

Basin	Preferred Pond Alternative	Pond Access Easement Area (ac)	Pond Right-of-Way Area (ac)	Total Required Right-of-Way Area (ac)
---	FPCA 3	0.00	0.65	0.65
---	FPCA 4	0.00	4.12	4.12
---	FPCA 5	0.00	10.14	10.14
---	FPCA 6	0.00	1.33	1.33
---	FPCA 7	0.00	7.09	7.09
---	FPCA 8	0.00	2.15	2.15
---	FPCA 9	0.00	3.40	3.40
---	FPCA 10	0.00	9.29	9.29
---	FPCA 11	0.00	3.32	3.32
---	FPCA 12	0.00	3.56	3.56
---	FPCA 13	No FPCA Required		
---	FPCA 14	0.00	2.33	2.33
---	FPCA 15	0.00	5.00	5.00
---	FPCA 16A	0.00	1.49	1.49
---	FPCA 17	0.34	3.20	3.54
---	FPCA 18B	0.00	2.99	2.99
---	FPCA 19B-1	0.00	2.53	2.53
---	FPCA 19B-2	0.00	0.86	0.86
---	FPCA 20	0.00	1.92	1.92
---	FPCA 21	No FPCA Required		
---	FPCA 22	0.00	10.96	10.96
---	FPCA 23	0.00	3.71	3.71
---	FPCA 24	0.00	0.56	0.56
---	FPCA 25	0.00	0.33	0.33
---	FPCA 26B	0.00	0.56	0.56
---	FPCA 27	0.00	0.17	0.17
			Totals:	**169.69**

* FPCA = Floodplain Compensation Areas

Environmental Look Arounds (ELAs)

Environmental Look Arounds (ELAs) provide a unique opportunity to team up with regional stakeholders in order to explore watershed wide stormwater needs and alternative permitting approaches for the project. As the design moves forward, areas of potential cooperation are documented in the *Pond Siting Report* for future follow-up.

In order to minimize impacts to the Withlacoochee State Forest, a preliminary analysis was conducted to determine the viability of two regional/compensating treatment ponds for the basins traversing the State Forest (Basins 3 through 12). Stormwater runoff from all existing and proposed lanes in some basins would be collected and treated to compensate for letting an equivalent amount of impervious area runoff (net new lanes) in adjacent basins go untreated. Preferred Ponds 3R and 12R located outside of the State Forest parcels will provide compensating treatment and attenuation for Basins 3 through 13.

6.8 STRUCTURES ANALYSIS

The proposed roadway improvements included in the preferred alternative will require new dual bridges at the existing grade crossing with the CSX Railroad, the construction of a new eastbound bridge at the SR 50 crossing of the Little Withlacoochee River, and replacement of the existing triple 10' x 5' concrete bridge culvert. The existing two-way SR 50 bridge over the Little Withlacoochee River (Bridge No. 180071) will remain and will carry westbound traffic only after the proposed roadway improvements are completed.

The proposed eastbound structures at both bridge locations will accommodate the proposed shared-use path on the structure's south side. The new bridges at the existing at-grade railroad crossing will provide the minimum horizontal and vertical clearances, as specified in the *American Railway Engineering and Maintenance-of-Way Association* (AREMA) *Manual for Railway Engineering and FDOT Structures Design Guidelines,* required to eliminate the use of crashwalls. The culvert replacement will accommodate both directions of traffic as well as the proposed shared-use path.

Table 66 summarizes the configurations of the proposed bridge structures included in the preferred alternative and associated vertical clearances.

Table 66: Proposed Bridge Structure Configurations

Feature Crossed	Bridge No.	Direction	Length	Width	Depth	No. of Spans	Vertical Clearance
CSX Railroad	N/A	WB	130.00'	42.67'	6.25'	1	23.50'
	N/A	EB	130.00'	55.67'	6.25'	1	23.50'
Little Withlacoochee River	180071	WB	250.00'	47.08'	4.00'	5	3.00'
	N/A	EB	250.00'	55.67'	4.75'	3	3.00'
Ditch	N/A*	WB & EB	175.00'	30.80'	5.00'	3	N/A

* Replaces Existing Bridge Culvert No. 180910

Bridges over CSX Railroad

Two new single-span structures will replace the existing grade crossing from Station 1873+20 to Station 1874+50. Both the westbound and eastbound bridges have two 12'-0" lanes with 10'-0" outside and 6'-0" median shoulders. Additionally, the east bound bridge accommodates the 12'-0" wide shared-use path on the outside. Both bridges utilize 1'-4" traffic barriers. The total out to out widths of the westbound and eastbound bridges are 42'-8" and 55'-8", respectively. The 130'-0" long structures will accommodate 10’-0” wide maintenance berms outside of the railroad right-of-way in addition to the horizontal clearance requirements outlined in the AREMA specifications. On both of the new structures, a vertical clearance of 23’-6” will be provided from the top of the highest existing track rail to the lowest member. **Figure 97** displays the concept for the bridge over the CSX Railroad. The typical section for this bridge has been previously shown as **Figure 83**.

Bridges over the Little Withlacoochee River

This crossing utilizes the existing 250’ long, five span S.R. 50 structure to carry westbound traffic over the Little Withlacoochee River. A new three span bridge will be provided on the south side of the existing structure to accommodate eastbound traffic. The four proposed pile bents will line up with existing bents to minimize hydraulic impacts to the waterway. The westbound bridge has two 12’-0” lanes with 10’-0” shoulders and 1’-6 ½” barriers on each side providing an out to out width of 47’-1”. The new eastbound structure has two 12’-0” lanes with a 6’-0” shoulder and 1’-4” barrier on the median side of the bridge. The outside of the bridge has a 10’-0 shoulder with a 1’-4” barrier separating traffic from a 12’-0” wide shared-use path. The total out to out width is 55’-8”. The new eastbound bridge will maintain the same minimum vertical clearance that currently exists from design high water. **Figure 98** displays the concept for the bridge over the Little Withlacoochee River. The typical section for this bridge has been previously shown as **Figure 87**.

Bridge Culvert Replacement

Replacement of the triple box concrete bridge culvert located at Station 350+00, approximately 900’ west of the Sumter/Lake County Line, is included in the preferred alternative. The culvert will be replaced in kind, but with a total length of approximately 188’ to accommodate required clearances and the proposed roadway section.

Figure 97: Bridges over CSX Railroad Concept

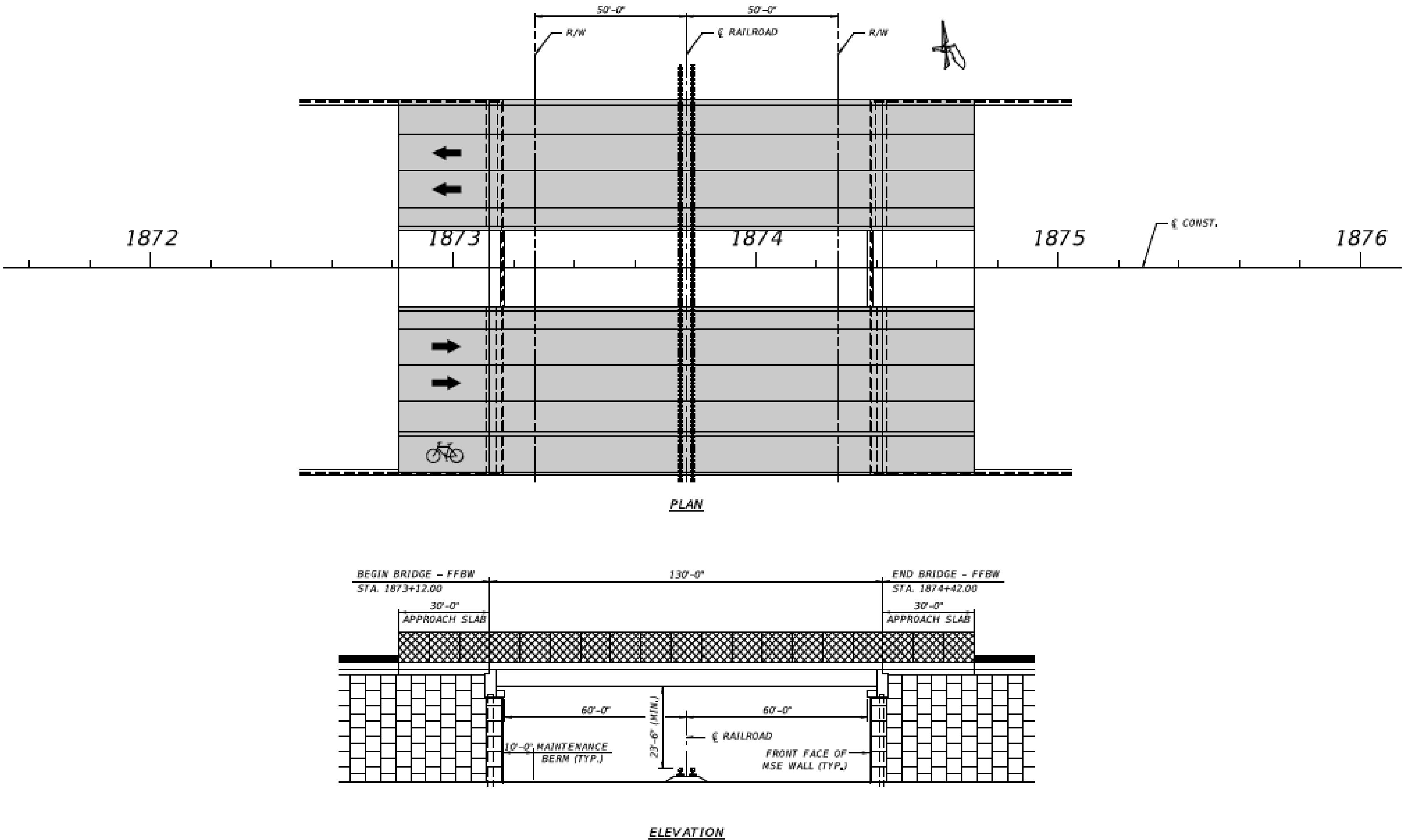
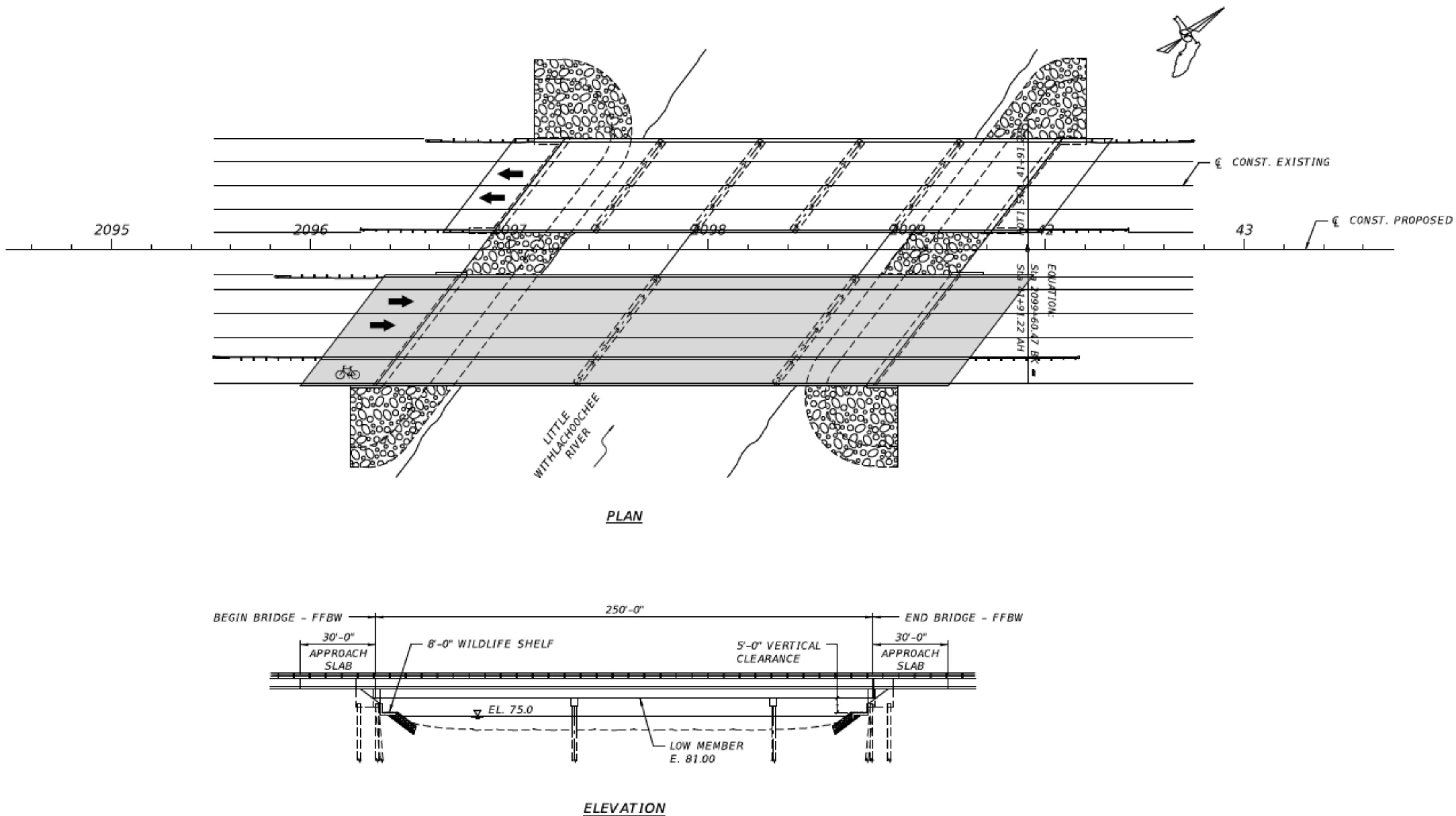


Figure 98: Bridges over Little Withlacoochee River Concept



6.9 ENVIRONMENTAL IMPACTS

The environmental impacts of the preferred alternative have been summarized in the S.R. 50 *State Environmental Impact Report* (SEIR). There are also supporting documents prepared providing additional details regarding the environmental impacts. These are:

- *Conceptual Stage Relocation Plan*; *March 2019*
- *Cultural Resources Assessment Survey*; *February 2019*
- *Natural Resources Evaluation*; *February 2019*
- *Contamination Screening Evaluation Report*; *July 2018*
- *Noise Study Report*; *January 2019* and
- *Air Quality Report; September 2017*.

Tables 4 and 5 of the SEIR have noted those environmental resources affected by this project and some of these are summarized below. For additional information regarding other environmental resources please consult the SEIR or the supporting documents listed above.

Relocations – The number of residential and business relocations are summarized in **Table 68**. All relocations will occur in either Sumter or Lake County. Eleven of the residential structures are considered historical, being aged 50 years or older, however, none of the historical structures listed are recommended eligible for the National Register of Historic Places (NRHP) and the State Historic Preservation Officer (SHPO) did not raise any concerns. Five of the businesses are located on sites with potentially hazardous waste of varying levels. Reviewing publicly available residential and commercial listings, the displaced residences and businesses have relocation options with both Sumter and Lake Counties.

Archaeological Sites – The *Cultural Resources Assessment Survey* identified four sites for Phase II archaeological testing. The testing and SHPO consultation identified two of these sites to be eligible for NRHP listing. As both sites span the S.R. 50 roadway within existing and proposed ROW, avoidance is not possible and the SHPO concurred that the project will have an adverse effect on both. These site locations are not provided as archaeological site locations are exempt from Sunshine Law provisions because of the threat of being disturbed and removed by unauthorized persons. A Memorandum of Agreement (MOA) between FDOT and SHPO will be executed to formalize the commitment to conduct Phase III mitigative excavation prior to project construction.

Recreation Areas – The Richloam Tract of the Withlacoochee State Forest is crossed by S.R. 50 in three locations as previously discussed in Section 2.17. The preferred alternative impacts 41.49 acres in Hernando County and 23.53 acres in Sumter County. The 41.49 acres in Hernando County are for nine floodplain compensation areas (FPCAs). The need for these FPCAs will be evaluated in final design using floodplain models to determine the floodplain elevation rise due to roadway embankment fill. This analysis is explained in detail in the *Location Hydraulics Report* (LHR). The project will accommodate portions of the Coast-to-Coast Trail by accommodating parts of the South Sumter Connector Trail and the South Lake Trail within the S.R. 50 ROW. Further detail is available in the SEIR.

Wetlands and Other Surface Waters – The preferred alternative may impact 76 wetlands and seven surface waters. The impacts associated with the preferred roadway alternative are 76.50 acres of forested wetlands, 13.22 acres of non-forested wetlands, and 0.60 acres of surface water impacts. Preferred stormwater ponds and FPCAs impacts include 23.83 acres of forested impacts, 4.22 acres of non-forested wetlands, and no surface water impacts. Further detail is available in the *Natural Resources Evaluation.*

Aquatic Preserves and Outstanding Florida Waters – The Withlacoochee River System, which traverses the proposed project, and the Chassahowitzka Wildlife Refuge are hydrologically connected and are designated as OFW's. Activities or discharges within an OFW, or which significantly degrade an OFW, must meet more stringent requirements. The stormwater retention ponds with the Withlacoochee River System have been designed to meet these criteria. Further detail is available in the *Pond Siting Report.*

Contamination – The *Contamination Screening Evaluation Report* has the results for the corridor and has assigned risk ratings for the sites of concern along the preferred alternative, the preferred stormwater ponds and the floodplain compensation areas. Design Segment 2 has no roadway widening related contamination impacts but has 1 medium risk rated stormwater retention area and 2 high risk rated plus 4 medium rated floodplain compensation areas. Design Segment 3 has no roadway widening related contamination impacts but has 2 medium risk rated stormwater retention areas and 1 medium rated floodplain compensation area. There are 5 high risk rated and 4 medium risk rated sites in Design Segment 4. Additionally, Design Segment 4 has 10 medium risk rated stormwater retention areas and 5 medium risk rated floodplain compensation areas. Design Segment 5 has 5 high risk rated and 14 medium risk rated sites along the roadway corridor. Additionally, Design Segment 5 has 2 high risk rated plus 6 medium risk rated stormwater retention areas and 1 high risk rated plus 2 medium risk rated floodplain compensation areas.

Natural Environment – The FDOT received concurrence from the USFWS regarding the effect determinations made for all federally-protected species on December 19, 2018 (FWS Log No. 2019-TA-0196). The concurrence from the USFWS fulfills the requirements of the Endangered Species Act of 1973, as amended. However, it is contingent on implementation of the commitments during subsequent phases of the project. A copy of the concurrence letter is included in Appendix H of the *Natural Resource Evaluation* report.

6.10 Right-of-Way Needs and Relocations

This section describes the ROW needs and potential relocations based on the preferred build alternative for each of the four design segments.

ROW Needs

The following bullets outline the ROW needs by specific design segment:

- Design Segment 2: U.S. 301 (Sta. 1847+00) to the Hernando/Sumter CL (Sta. 2096+47) –
  - Proposed ROW varies from 200’ minimum to 374.44’ maximum, where the existing ROW is 200’.
- Design Segment 3: The Hernando/Sumter County Line (Sta. 2096+47) to 0.13 miles west of C.R. 751 (Sta.188+00) –
  - Proposed ROW varies from 190’ minimum to 241’ maximum, where the existing ROW is 100’.
- Design Segment 4: 0.13 miles west of C.R. 751 (Sta.188+00) to 1,000’ east of Sloans Ridge Road (Sta. 380+00) –
  - Proposed ROW varies from 190’ minimum to 241’ maximum, where the existing ROW varies between 100’ to 225’.
- Design Segment 5: 1,000’ east of Sloans Ridge Road (Sta. 380+00) to Lee Road (Sta. 451+00) –
  - Proposed ROW varies from 190’ minimum to 216’ maximum, where the existing ROW is 100’.
- Design Segment 5: Lee Road (Sta. 451+00) to C.R. 33 (Sta. 590+00) –
  - Proposed ROW varies from 112’ minimum to 174’ maximum, where the existing ROW varies between 80’ to 100’.

Table 67 displays the ROW needs and cost estimates for each of the design segments along the S.R. 50 study corridor. The concept plans for the preferred alternative displaying the ROW acquisitions along the study corridor are provided in **Appendix B**.

Table 67: ROW Needs and Cost Estimates

Design Segment	Limits	Parcels Impacted	ROW Acreage	Pond + FPCA Acreage	Total ROW Acreage	Cost Estimate
2	U.S. 301 to the Hernando/Sumter County Line	9	7.0	56.7	63.7	$3,456,000
3	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	35	36.7	22.9	59.5	$4,311,000
4	0.13 miles west of C.R. 751 to 1,000’ east of Sloans Ridge Road	123	87.1	65.9	153.0	$20,088,000
5	1,000’ east of Sloans Ridge Road to C.R. 33	132	34.5	20.3	54.8	$31,539,500
	Total	**299**	**165.3**	**165.8**	**331.0**	**$59,394,500**

As displayed in **Table 67**, Design Segment 2 has the lowest impacts (9 total parcels) and the lowest ROW cost. Design Segment 5 has the highest impacts at 132 parcels affected and also has the highest ROW cost at approximately $31.5 million. This is largely due to the denser urban parcels and more relocations in Mascotte than the sparse rural parcels west of the City.

Potential Relocations

Table 68 displays the potential residential and business relocations for each of the design segments along the S.R. 50 study corridor. As displayed in **Table 68**, no relocations are anticipated for Design Segment 2 or Design Segment 3. Design Segment 4 has four residential and three business relocations. Design Segment 5, which is largely located in the City of Mascotte, has the highest number of residential (17) and business relocations (8).

Table 68: Potential Relocations

Design Segment	Limits	Residential Relocations	Business Relocations
2	U.S. 301 to the Hernando/Sumter County Line	0	0
3	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	0	0
4	0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road	4	3
5	1,000' east of Sloans Ridge Road to C.R. 33	17	8
Total		**21**	**11**

6.11 COST ESTIMATES

Table 69 displays the construction cost estimates for the preferred build alternative's design segments. The maintenance of traffic (MOT) was calculated as eight percent of the base construction cost in District 7 and 10 percent in District 5. The mobilization (MOB) was calculated as eight percent of the base construction plus MOT cost in District 7 and 10 percent in District 5. The project unknowns were calculated as 15 percent of the base construction cost plus MOT plus MOB.

As displayed in the table, Design Segment 2 has the highest construction cost at approximately $53.7 million. Design Segment 4 costs approximately $46.8 million to construct, Design Segment 5 will cost approximately $27 million to construct, while Design Segment 3 will cost approximately $19.4 million. On a per mile cost estimate basis, Design Segment 2 is $11.24 million/mile, Segment 3 is $7.00 million/mile, Segment 5 is $6.79 million/mile, and Segment 4 is $5.70 million/mile.

Table 69: Construction Cost Estimates

Design Segment	Limits	Base Const. Cost	MOT	MOB	Project Unknowns	Initial Contingency	Total Const. Cost
2	U.S. 301 to the Hernando/Sumter County Line	$39,942,194	$3,195,376	$3,451,006	$6,988,286	$150,000	$53,726,862
3	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	$13,867,667	$1,386,767	$1,525,443	$2,516,982	$150,000	$19,446,860
4	0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road	$33,510,261	$3,351,026	$3,686,129	$6,082,112	$150,000	$46,779,529
5	1,000' east of Sloans Ridge Road to C.R. 33	$18,469,755	$2,770,463	$2,124,022	$3,504,636	$150,000	$27,018,876
	Total	**$105,789,877**	**$10,703,632**	**$10,786,600**	**$19,092,016**	**$600,000**	**$146,972,127**

The total project cost, as shown in **Table 70**, displays the total construction cost, the utility relocation cost, and the anticipated ROW cost for the S.R. 50 widening from U.S. 301 to C.R. 33. The final long range estimates (LREs) for the four design segments can be found in the project files.

Table 70: Project Cost Estimates

Segment	Limits	Total Const. Cost	Utility Relocation Cost	ROW Cost	Total Project Cost
2	U.S. 301 to the Hernando/Sumter County Line	$53,726,862	$5,200,000	$3,456,000	$62,382,862
3	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	$19,446,860	$3,100,000	$4,311,000	$26,857,860
4	0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road	$46,779,529	$7,228,000	$20,088,000	$74,095,529
5	1,000' east of Sloans Ridge Road to C.R. 33	$27,018,876	$8,047,000	$31,539,500	$66,605,376
	Total	**$146,972,127**	**$23,575,000**	**$59,394,500**	**$229,941,627**

6.12 *Access Management*

As noted in Section 2.5, the existing access management classification is Class 4. As part of the two- to four-lane widening preferred build alternative, the proposed access management classifications and spacing requirements are as follows:

- U.S. 301 to Lee Road – Class 3 – Spacing Requirements
  - Full Median Opening: 2,640'
  - Directional Median Opening: 1,320'
- Lee Road to C.R. 33 – Class 5 – Spacing requirements
  - Full Median Opening: 1,320'
  - Directional Median Opening: 660'

The Public Hearing will be part of adopting the change in access management classification. **Table 71** displays the proposed access management summary for the S.R. 50 study corridor.

Table 71: Proposed Access Management Summary

Design Segment (Length)	Limits	Full Median Openings	Bi-Directional Median Openings
2 (4.78 miles)	U.S. 301 to the Hernando/Sumter County Line	6	4
3 (2.78 miles)	Hernando/Sumter County Line to 0.13 miles west of C.R. 751	1	6
4 (8.21 miles)	0.13 miles west of C.R. 751 to 1,000' east of Sloans Ridge Road	4	26
5 (3.98 miles)	1,000' east of Sloans Ridge Road to C.R. 33	3	17

The following discusses the specific characteristics of the full median openings along the S.R. 50 corridor:

- Six full median openings in Design Segment 2 –
  - U.S. 301 – signalized intersection
  - Entrance into West Florida Aggregate Mine – full median opening
    - This full median opening was created due to the railroad bridge eliminating the current access road entrance.
  - C.R. 575/Burwell Road – full median opening
  - Clay Sink Road – full median opening
  - Porter Gap Road/Richloam Claysink Road – full median opening
  - Riverland Claysink Road – full median opening
- One full median opening in Design Segment 3 – State Forest Access Road at Station 72+80
- Four full median openings in Design Segment 4 –
  - S.R. 471 – roundabout
  - Mazak Mine Access Road at Station 245+50 – full median opening
  - Secondary Mazak Mine Access Road at Station 284+80 – full median opening
    - This full median opening remained in place because of an agreement between FDOT and the property owner as part of removing the S.R. 50 overpass for the railroad at the Van Fleet Trail.
  - C.R. 469 – roundabout
- Three full median openings in Design Segment 5 –
  - Marian Gardens Main Entrance/Clarence Lee Road – full median opening
  - Tuscanooga Road – roundabout
  - C.R. 33 – signalized intersection

The matrix in **Appendix I** shows the spacing between the proposed median openings. The full median opening at the West Florida Aggregate Mine Entrance does not meet FDOT spacing standards but it achieves over 90 percent of the spacing standard. For directional and bi-directional median openings, about half do not meet the 1,320’ Class 3 directional spacing standard. Only three directional and bi-directional median openings do not meet the 660’ Class 5 directional median opening standard. The full S.R. 50 Median Access Control Summary can be found in **Appendix I**.

6.13 TEMPORARY TRAFFIC CONTROL PLAN

The preferred build alternative overlays or rebuilds existing pavement throughout large portions of the study area. This will allow new construction to occur in Stage 1 while existing traffic patterns remain. Stage 2 will shift traffic onto recently constructed Stage 1 pavement and Stage 2 construction will occur where proposed travel lanes align with the existing roadway. Where construction shifts between east and westbound lanes, temporary pavement will be needed to transition traffic between existing and newly constructed travel lanes. Channelizing devices will be needed to safely navigate motorists through these areas. Once travel lanes in each direction are constructed, the temporary pavement will be removed. **Table 72** provides staging direction for the corridor. **Figure 99** through **Figure 104** show the different staging construction approaches which could be utilized.

Table 72: Construction Staging

Begin Station	End Station	Direction
1846+95.00	133+00.00	Construct rural eastbound lanes (**Figure 99**)
133+00.00	138+51.58	Transition Area (**Figure 100** and **Figure 101**)
138+51.58	150+00.00	Construct rural westbound lanes (**Figure 102**)
150+00.00	155+00.00	Transition Area (**Figure 100** and **Figure 101**)
155+00.00	165+00.00	Construct rural eastbound lanes (**Figure 99**)
165+00.00	170+00.00	Transition Area (**Figure 100** and **Figure 101**)
170+00.00	47+25.00	Construct rural westbound lanes (**Figure 102**)
47+25.00	51+00.00	Transition Area (**Figure 100** and **Figure 101**)
51+00.00	500+00.00	Construct eastbound lanes (**Figure 99** and **Figure 102**)
500+00.00	503+00.00	Transition Area (**Figure 100** and **Figure 101**)
503+00.00	517+00.00	Construct urban westbound lanes (**Figure 104**)
517+00.00	520+00.00	Transition Area (**Figure 100** and **Figure 101**)
520+00.00	530+00.00	Construct urban eastbound lanes (**Figure 103**)
530+00.00	545+00.00	Construct Tuscanooga Roundabout
545+00.00	592+00.28	Construct urban eastbound lanes (**Figure 103**)

Figure 99: Rural Eastbound Widening

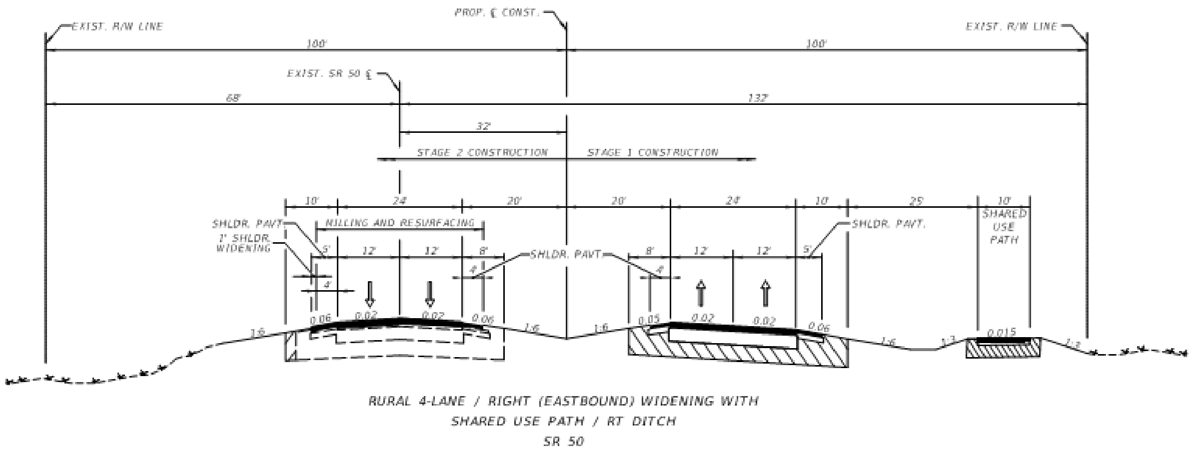


Figure 100: Rural Transitioning Widening

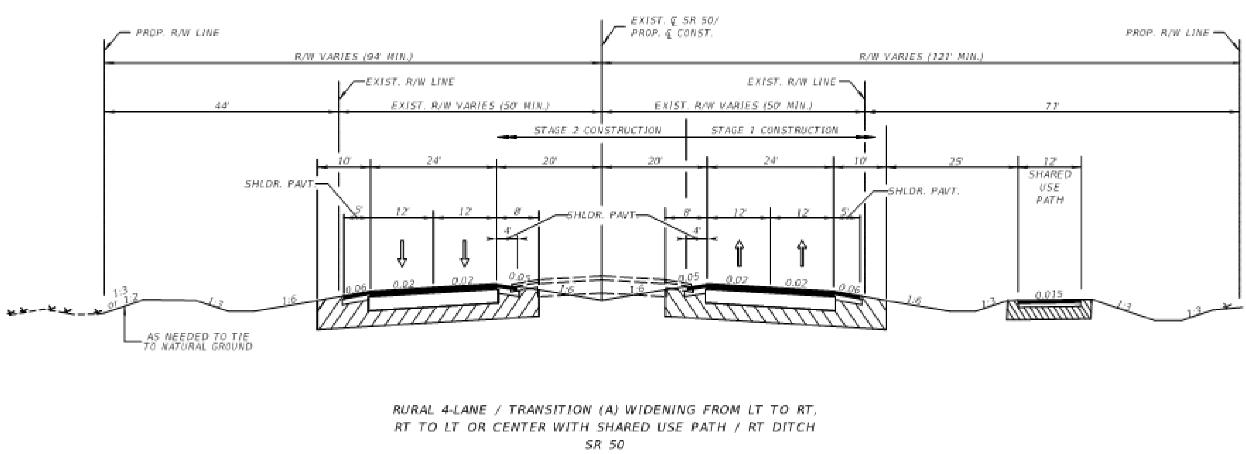


Figure 101: Rural Transitioning Widening Alternative

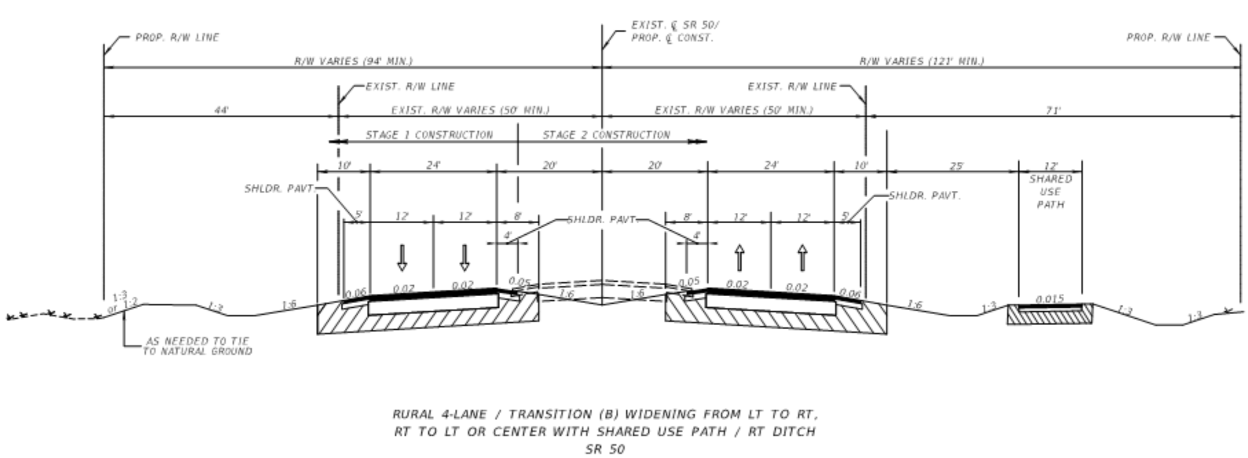


Figure 102: Rural Westbound Widening

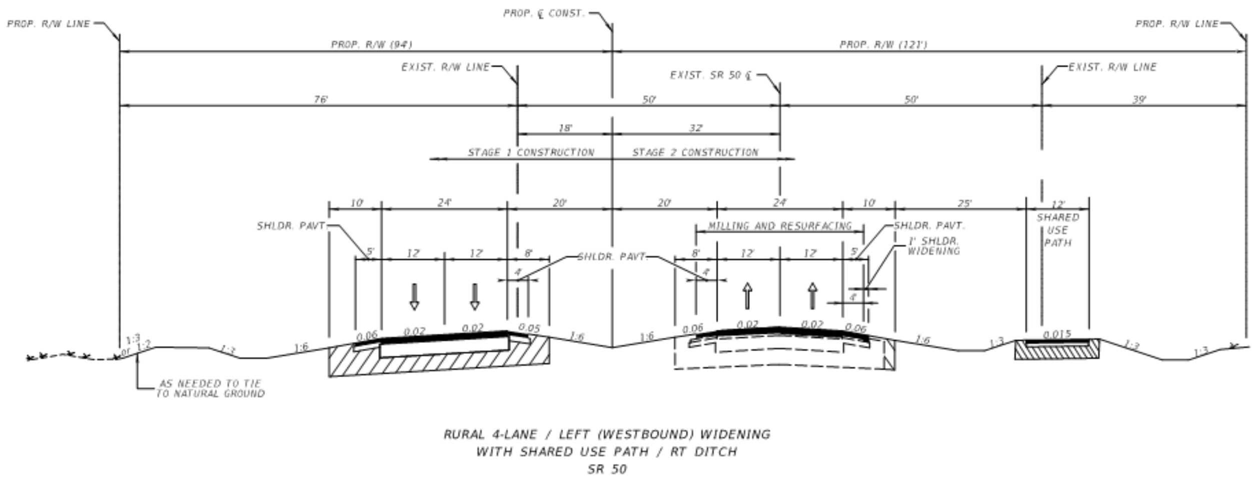


Figure 103: Urban Eastbound Widening

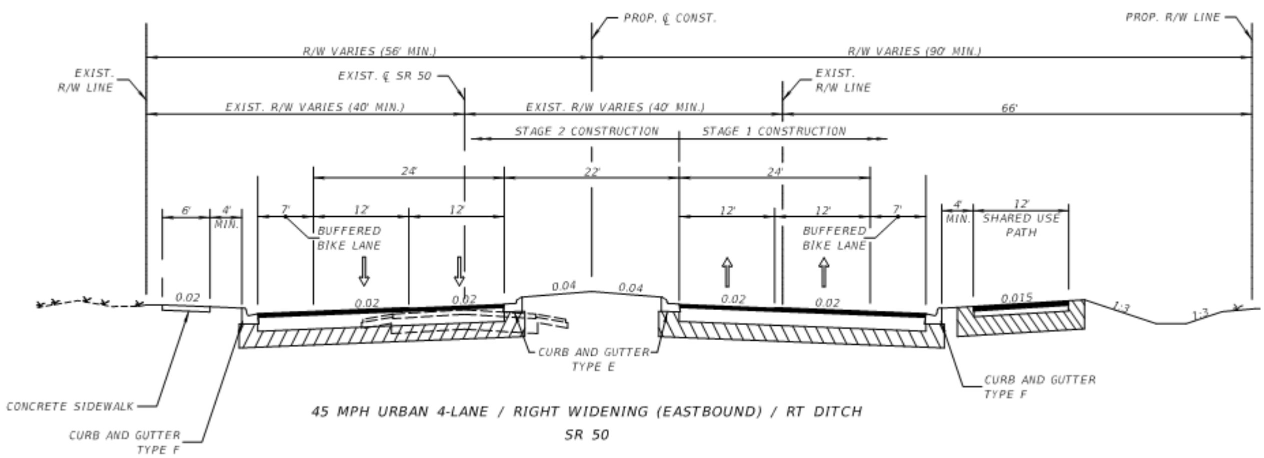
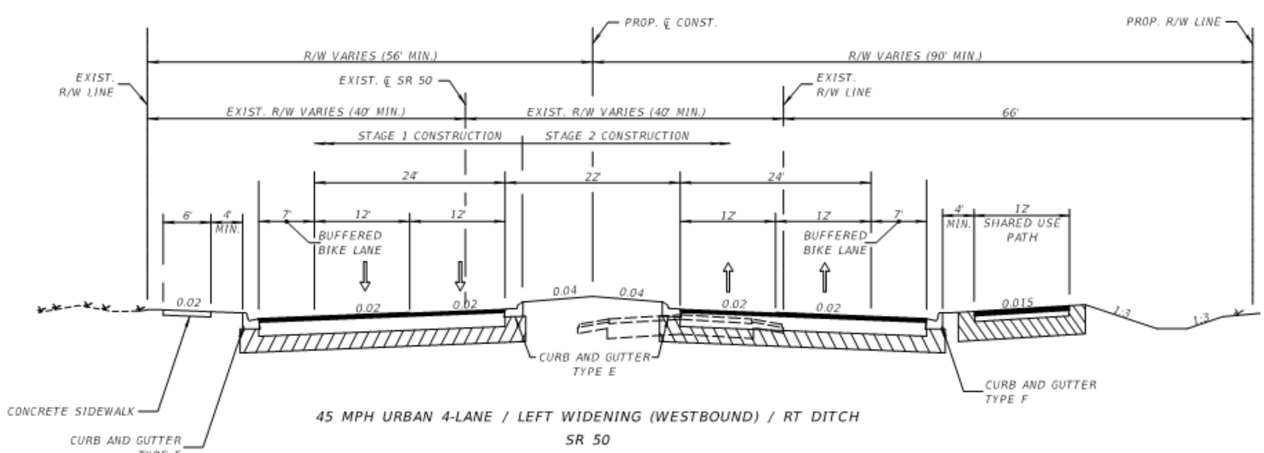


Figure 104: Urban Westbound Widening



6.14 SCHEDULE

The following outlines the schedule/next steps for the S.R. 50 corridor for District 7 and District 5:

- District 7 Design Segment 2 –
  - Design funding in FY 2018
  - ROW and construction are currently unfunded
- District 5 Design Segments 3 through 5 –
  - Design funding in FY 2018
  - ROW and construction are unfunded

6.15 LIST OF TECHNICAL REPORTS COMPLETED FOR THE PROJECT

This report summarizes the purpose and need for the project, documents existing conditions, reviews design controls/criteria, discusses the alternatives evaluation process, and details the preferred build alternative. Numerous documents have been prepared to support the S.R. 50 PD&E Study, as noted below:

- Engineering Reports –
  - Design Traffic Technical Memorandum
  - Pond Siting Report
  - Typical Section Package
  - Utilities Coordination Package
  - Value Engineering Resolution Memorandum
- Environmental Reports –
  - Air Quality Technical Memorandum
  - Conceptual Stage Relocation Plan
  - Contamination Screening Evaluation Report
  - Cultural Resources Assessment Survey
  - Natural Resources Evaluation
  - Noise Study Report
  - State Environmental Impact Report
- Public Involvement Reports –
  - Comments and Coordination Summary
  - Public Involvement Plan
- Other Supporting Documents –
  - ETDM Summary Report