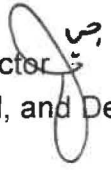




Interoffice Memorandum

DATE: September 23, 2022

TO: Mayor Jerry L. Demings
-AND-
County Commissioners

FROM: Jon V. Weiss, P.E., Director 
Planning, Environmental, and Development Services
Department

CONTACT PERSON: Renzo Nastasi, AICP, Manager
Transportation Planning
(407) 836-8072

SUBJECT: October 25, 2022 – Public Hearing
Town Center Preliminary Design Study Report (CR 545 - Avalon
Road)

The Orange County Transportation Planning Division has completed the Town Center Preliminary Design Study (PDS).

The Town Center Preliminary Design Study recommends improvements providing for additional vehicular capacity, bicycle/pedestrian amenities, traffic control devices and water retention areas. The Town Center PDS limits are from Schofield Road to McKinney Road, a distance of approximately 1.8 miles. The purpose of the study was to develop the most appropriate four lane road alignment with stormwater facilities and bicycle and pedestrian accommodations, while minimizing environmental impacts.

At the October 25, 2022, Public Hearing, staff will present the Town Center PDS background, study analysis, and recommendations.

ACTION REQUESTED: Make a finding of consistency with the Comprehensive Plan, approve the Town Center Preliminary Design Study Report for CR 545 from Schofield Road to McKinney Road, and authorize staff to initiate the design, right-of-way acquisition, and construction phases of the project. District 1.

JVW/RN/bh/ep
Attachment

c: Joseph C. Kunkel, P.E., Director, Public Works Department
Diana Almodovar, P.E., Deputy Director, Public Works Department
Brian Sanders, Assistant Manager, Transportation Planning Division
Blanche Hardy, P.G., Assistant Project Manager, Transportation Planning Division

CR 545 Town Center West

Preliminary Design Study

Orange County, Florida

Prepared For:
Horizon Town Center West



Date:
August 2022

POULOS & BENNETT

2602 E. Livingston Street | Orlando, Florida 32803 | Tel: 407.487.2594 | Fax: 407.487.2594 |
www.poulosandbennett.com
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Executive Summary

ES.1 Introduction

Orange County conducted a Preliminary Design Study (PDS) for the Avalon Road (CR545) corridor from Schofield Road to McKinney Road in west Orange County. The study will only determine an alignment to address current and future transportation needs along CR545 and not review alternatives since all adjacent property owners are participating owners. The project location is shown in **Figure ES 1.1 Project Study Area**. The improvement needs identified in this report will serve as the basis for the design of the roadway improvements. This PDS report summarizes the essential components of the study, including public involvement, data collection, traffic analysis, roadway design, drainage design, and environmental impacts. The appendices include supporting documents such as the Specific Area Plan, Design Traffic Technical Memo and Traffic Design Report, Roadway Network Agreement, Geotechnical, Contamination and Environmental Reports, Preliminary drainage design, Crash History, Corridor Analysis Technical Memo and Concept Plans.

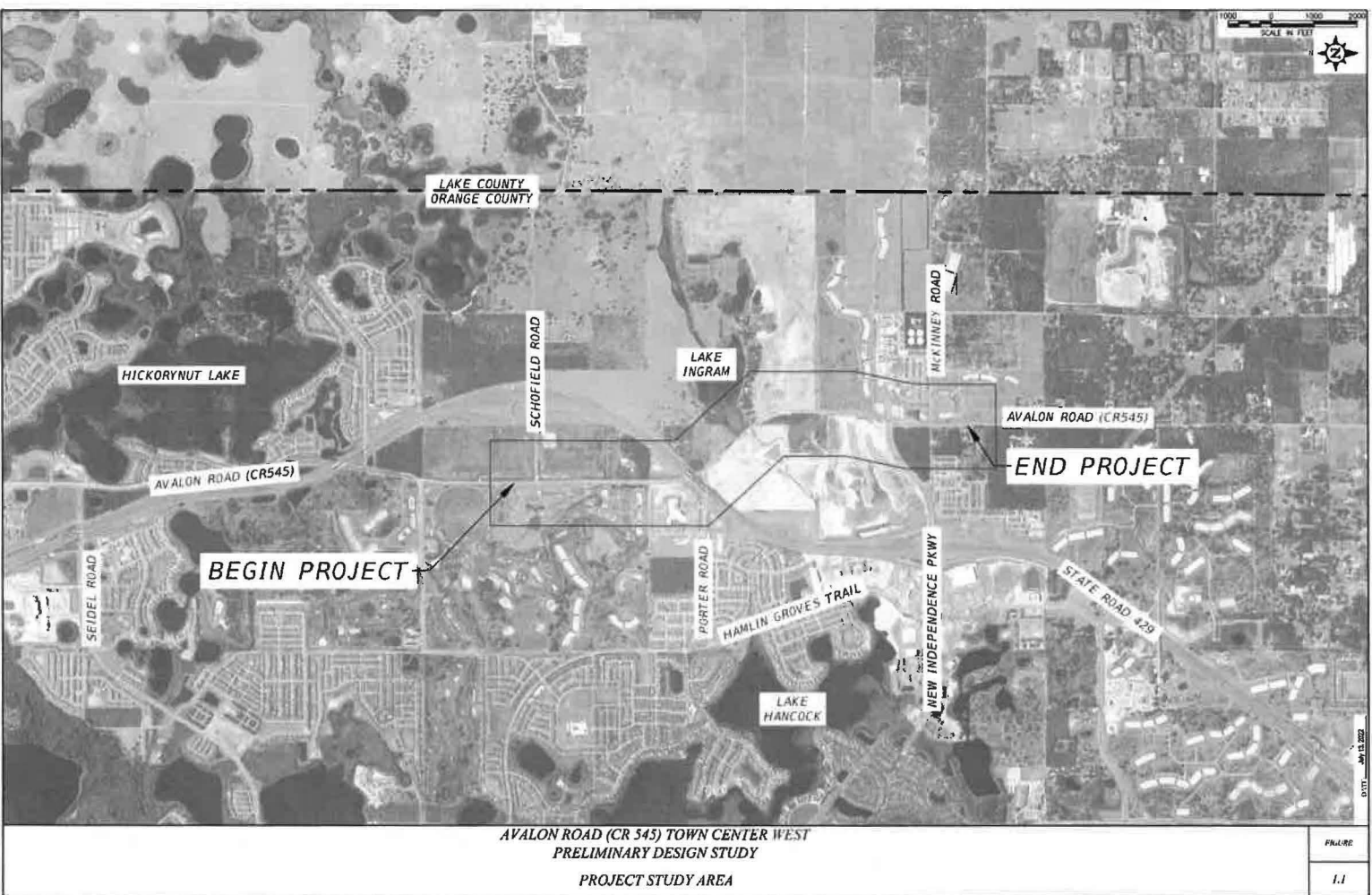


Figure ES 1.1 Project Study Area

ES.2 Purpose and need for Improvement

The purpose and need for the project are based on several factors. These factors are to provide traffic capacity, to meet social/economic demands, to be consistent with transportation plans, and to enhance safety.

The existing roadways and intersections within the Project Roadway Network currently operate at an acceptable level of service (LOS) with a LOS C for the year 2027. However, these segments will operate at LOS F for the years 2035 and 2045. Roadway improvements are needed to provide an acceptable level of service in the future. Avalon (CR545) is located in Horizon West, which includes five mixed use villages surrounded by greenbelts, as well as a Town Center. Existing land use adjacent to the Avalon Road (CR545) corridor consists of undeveloped and developed properties, and wetlands. Roadway improvements including drainage are needed to serve this rapidly growing area.

The widening of Avalon Road (CR545) from Schofield Road to McKinney Road is included in the MetroPlan Orlando 2030 Long Range Transportation Plan. The project is consistent with the Orange County Comprehensive Plan.

Crash reports were obtained for the five-year time period between January 1, 2016 and December 31, 2020 along Avalon Road (CR545) from Schofield Road to McKinney Road (CR545). Individual crash reports were reviewed to ensure the crashes included in the analysis pertained to the corridor limits. A total of 56 crashes occurred within the Avalon Road (CR545) study corridor during the five-year period. The crashes resulted in 3 fatalities, 21 injury crashes, 32 possible injury crashes, and 27 property damage only crashes. Capacity and intersection improvements will enhance safety along the corridor.

Stormwater management will be provided with one new pond and two existing ponds along the corridor that will provide water quality treatment and peak flow attenuation.

ES.3 Existing Conditions

Avalon Road (CR545) within the project limits is a two-lane undivided roadway. The Village I Specific Area Plan, adopted June 10, 2008 by Orange County, identifies Avalon Road (CR545) as a major urban collector from US192 to SR50. Avalon Road (CR545) has a posted speed limit of 45 miles per hour (mph).

Extended distances along Avalon Road (CR545) do not have pedestrian features.

The existing right-of-way along Avalon Road (CR545) varies throughout the project corridor. When originally constructed, the existing right-of-way was typically 66 feet in width. As new development has occurred along the corridor, additional right-of-way has been acquired.

The intersection at Silverleaf Street A and New Independence Parkway have planned temporary signals. These planned signals will be installed before the full four-laning of Avalon Road (CR 545) occurs and will be replaced when Avalon Road (CR 545) is widened.

The existing transportation network within the study corridor is comprised mainly of the current roadway system. LYNX does not have routes along Avalon Road (CR545). The LYNX Vision 2030 Plan does not include any future routes in the vicinity of Avalon Road (CR545). The Comprehensive Plan calls for a multi-modal Horizon West that connects all the Villages and the Specific Area Plan provides a conceptual future transit plan.

Eleven Utility Agency/Owners (UAO) have been identified within the project area through a Sunshine 811 Design Ticket. Existing and Proposed utilities run along both sides of Avalon Road (CR545).

The Avalon Road (CR545) project area is located within the jurisdiction of the South Florida Water Management District (SFWMD). The entire project area is a tributary of the Reedy Creek Improvement District (RCID) Lake Ingram/Lake Hancock. Stormwater runoff from the existing roadway is collected in roadside swales and then discharged into adjacent wetlands and drainage systems.

The project study area is shown in **Figure ES 1.1 Project Study Area**

ES.4 Traffic Analysis

Detailed project traffic analyses are provided in separate documents; the Design Traffic Technical Memorandum and the Design Traffic Engineering Report included in **Figure 7.1 Projected AADT**. These documents provide the existing traffic conditions of the area. A four-lane improvement to CR545 will result in an acceptable level of service along the corridor. Section 7 of this PDS summarizes a future year 2047 traffic evaluation of the roadway network within and surrounding Horizon West Village I. The future year evaluation models future traffic volumes, including potential impacts from anticipated Villages of Horizon West yet to be constructed.

ES.5 Alternatives

An evaluation matrix was developed to compare the relative costs and benefits of the No-build alternative and TSM alternatives. The matrix, shown in

Table ES 1.1 CR545 Evaluation Matrix, considers the natural and physical impacts, and the costs of all of the alternatives. Due to the fact that all adjacent property owners

are participating owners this PDS will only analyze one alignment, and not propose alternate alignments to update the corridor.

The basic elements of the typical section (the preferred typical section, see Section ES.6 below and Figures ES-1.1 and ES-1.2) include the full reconstruction of Avalon Road (CR545). No Build and Transportation Systems Management and Operations (TSM) alternatives were considered and incorporated into the build alternatives. A more extensive description of the alternatives considered for this corridor is included in section 10 of this report.

ES.6 Preferred Alternative

The preferred typical section for CR545 is shown in **Figure ES 1.2 CR545 3D Typical Section** and contains the following roadway design elements:

- Four 11-foot travel lanes
- A 10-foot multi-use path on the west side of the roadway
- A 6' sidewalk on the east side of the roadway from Schofield Road to Porter Road
- A 10' sidewalk on the east side of the roadway from Porter Road to McKinney Road
- Type E curb and gutter along the inside lanes
- Type F curb and gutter along the outside lanes
- A 22-foot raised median
- Variable width utility strips between the curb and gutter and multi-use path/sidewalk
- A grass strip between the multi-use path/sidewalk and the right-of-way line of varying width
- The proposed right-of-way is typically 120 feet
- A design speed of 45 mph from Schofield Road to Porter Road
- A design speed of 40 mph from Porter Road to McKinney Road
- A design speed of 45 mph from McKinney Road to the end of the Project tie-in where the Posted Speed Limit is 55 mph

This section screens the No-Build and Build Alternatives using eight measures to indicate the extent of social, natural, and physical impacts. The preferred alignment should minimize the social, natural, and physical impacts to neighboring residents and businesses along Avalon Road. Listed below are brief descriptions of each of the measures:

- **Social & Neighborhood** reflects anticipated social and neighborhood impacts on mobility, such as effects on parks, schools, or community resources.
- **Archaeological/Historic Sites** reflects anticipated impacts on archaeological/historic sites that are listed in the National Register of Historic Places.
- **Threatened/Endangered Species** reflects anticipated impacts to threatened/endangered species, such as wildlife habitat impact or species relocation.

- **Wetlands** reflects anticipated acreage of wetlands impacted by the proposed right-of-way.
- **Floodplains** reflects anticipated acreage of floodplains impacted by the proposed right-of-way.
- **Potential Contamination Sites** reflects how many potential contamination sites are anticipated to be impacted by the proposed right-of-way and how that contamination may affect construction.
- **County Level of Service Standard** reflects if the lane capacity is able to meet the County Level of Service current standard of LOS D or better.

The preferred alignment alternative minimizes right-of-way impacts, social impacts as measured by project costs. The Preferred Alternative is shown on the concept plans contained in Appendix A. The right-of-way identification maps are contained in Appendix B.

Figure ES 1.2 CR545 3D Typical Section

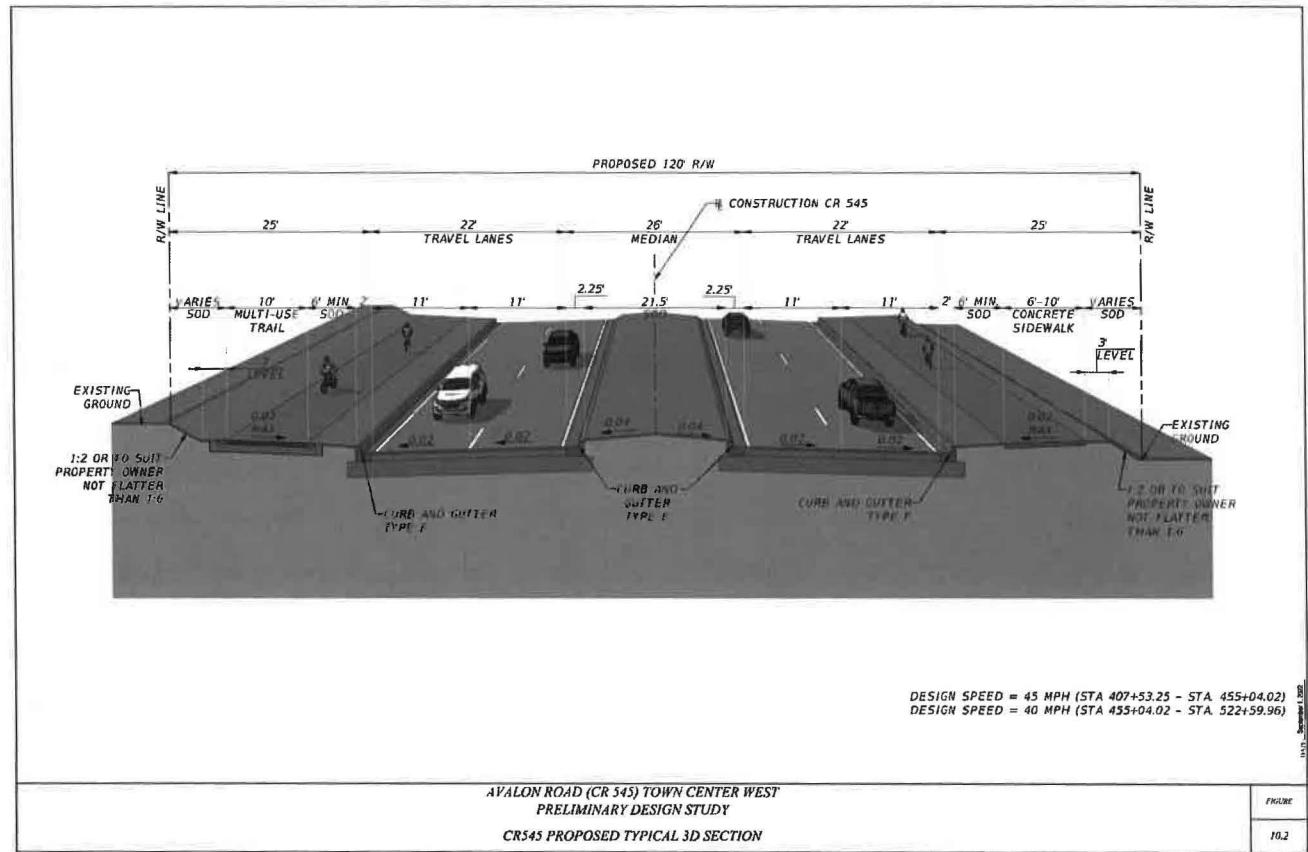


Table ES 1.1 CR545 Evaluation Matrix

Alternative	No-Build Alternative	TSM	CR545 Preferred Alignment
Right of Way Impacts			
# of Residential Impacts	None	None	0
Right-of-Way (ac)	None	None	1.75
Pond Right-of-Way (ac.)	None	None	1.00
Easement (ac.)	None	None	4.32
Total (ac.)	None	None	7.07
Number of Parcels impacted	None	None	31
Social, Natural & Physical Impacts			
Social & Neighborhood	None	Low	Low
Archaeological/Historic Sites	None	None	None
Threatened /Endangered Species	None	None	None
Area of Wetlands (ac)	None	None	0
Area of Floodplains (ac)	None	None	0.21
Potential Contamination Sites	None	None	Low
Meets County LOS Standards	No	N/A	Yes
Estimated Present Day Costs			
Design (15% of Construction)	No Cost	None	\$3,657,037
Right-of-Way Acquisition*	No Cost	None	\$758,246
Roadway Construction**	No Cost	None	\$23,389,500
CEI (15% of Construction)	No Cost	None	\$3,657,037
Total			\$31,461,820

Notes:

* R/W for Participating is \$22,500/acre. R/W for Non-Participating is \$181,290.00/acre and does not include the cost of condemnation/eminent domain taking. Mitigation Costs are \$56,000/acre.

** Construction Cost is based on FDOT LRE Project NDUAL-U-05-BB, July 2019 Prices of \$7.545 Million/mile plus \$75,000/mile landscape budget for CR545.

ES.7 Public Involvement

Critical to the success of this project is the feedback received from the local community. There have been two community meetings held to present project related information to the public and to receive input regarding the project. Meeting summaries, along with the Public Involvement Documents, are contained in Appendix C.

All Public Involvement Information will be included once the meetings have been held.

ES.8 Conclusions and Recommendations

The objective of the Avalon Road (CR545) PDS is to develop and evaluate alternatives for improvement of CR545 from Schofield Road to McKinney Road. The improvements to the roadway balance the safety and mobility needs of all mode users in the corridor. The process incorporated the insights from planning, engineering, and the public to refine the alignment, and ultimately advance a preferred alternative into the design phase. The preferred alignment for CR545 is in conformance with the Comprehensive Plan. It is recommended that the preferred alternative detailed in **10.0 Preliminary Design Analysis** of this report be advanced by Orange County into the design phase.

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1.0 Introduction

In 1995 Orange County approved the framework for the Horizon West sector plan, a development model based on a collection of villages located in southwest Orange County. Each village is designed to be a self-contained community, promoting connectivity between land uses and pedestrian environments. The Horizon West plan is currently planned with five (5) villages and a Town Center. Furthermore, to promote the goals of mixed land use and multimodal connectivity Orange County in 1997 adopted the Adequate Public Facilities (APF) Ordinance, which requires the need for such connectivity measures as roadway networks, stormwater management, utilities, etc.

This Preliminary Design Study (PDS) is being conducted pursuant to the Horizon West Road Network Agreement for Avalon Road (CR545). Avalon Road (CR545) is located within Town Center West and is anticipated to provide inter-village connectivity within Horizon West (**Figure 1.1 Project Study Area**).

The roadway segments included in this study comprise a major component of the critical roadway network required to support Orange County's vision for the Horizon West Planning Area as a "Smart Growth" initiative. Horizon West has served as a model for state-wide growth management innovation. Implementation of this roadway network is a fulfillment of this promise.

Provided below is a brief summary of each section of the report:

- **Project Need:** This chapter presents the purpose and need for the project.
- **Existing Conditions:** This chapter presents existing conditions, including roadway characteristics, crash data, public transportation, long-range transportation improvements, utilities, geotechnical and contamination findings, land use, cultural features, archaeological/historic features, hydrologic features, and wetlands/species.
- **Traffic Analysis:** This chapter presents existing and future traffic volumes and pedestrian/bicycle volumes in the study area.
- **Design Controls and Standards:** This chapter presents roadway design criteria and drainage design criteria applicable to the study area.
- **Preliminary Design Analysis:** This chapter presents an analysis of the No-Build Alternative and the TSM Alternative as well as constraints. This chapter presents the results of the preliminary design analysis, and details of the Preferred Alternative. This chapter presents a summary of the public involvement process through the project, including information distribution, community meetings, small group meetings, and Orange County meetings.

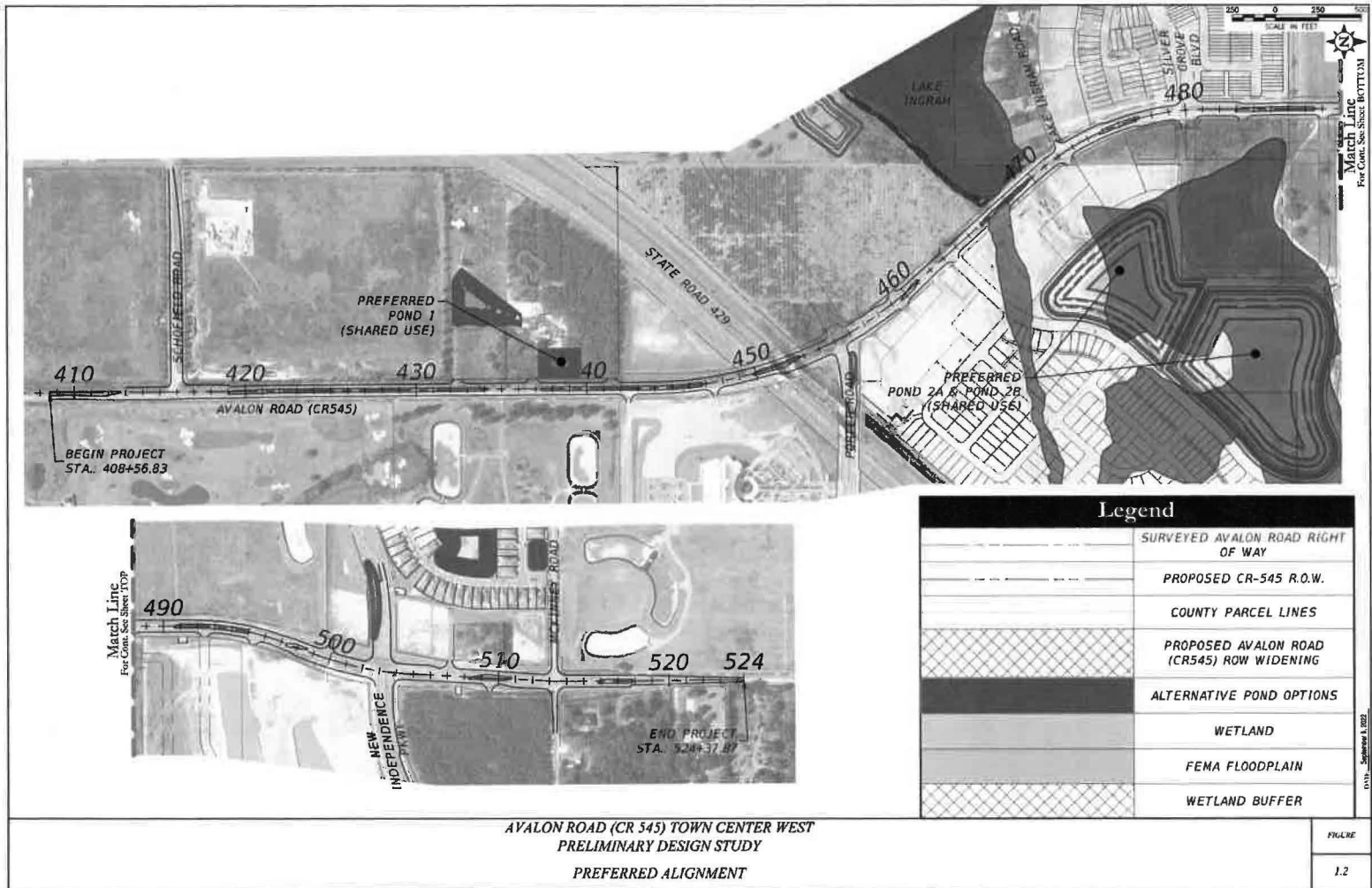
1.1 Study Purpose

The purpose of this PDS is to develop, document, and summarize a recommended alignment and recommended pond locations for the roadway segments described in **1.2 Project Description Study Area**. The recommended alignment will be based on evaluation of safety, geometric requirements (typical section), traffic operations, community and environmental impacts, project cost, public involvement, conceptual drainage analysis, impacts to wetlands, floodplains, threatened and endangered species, wildlife corridors, critical and strategic habitat, archaeological and historic features, lighting, intersections, bicycle and pedestrian project elements. The preferred alignment for Avalon Road (CR545) from Schofield Road to McKinney Road is shown in **Figure 1.2 Preferred Alignment**.

The Preliminary Design Study is consistent with the approved scope of services.

Figure 1.2 Preferred Alignment

DESIGNED BY: J. J. JENSEN & ASSOCIATES, INC. DATE: 10-10-2013



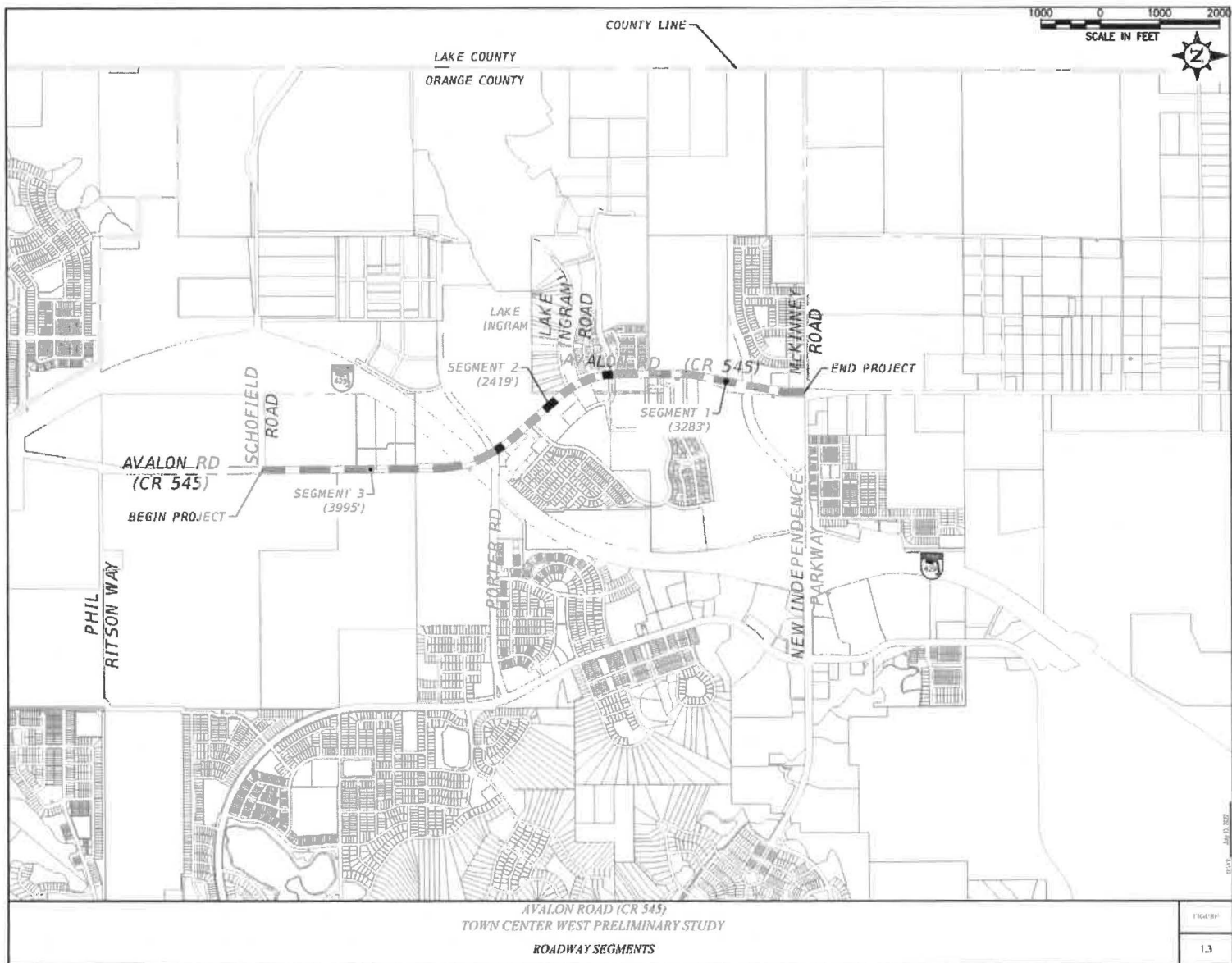
1.2 Project Description Study Area

The proposed project includes the widening of Avalon Road (CR545) from Schofield Road to McKinney Road from a two-lane rural roadway to a four-lane divided urban roadway for a total of 2.19 miles including transitions on the north end. The proposed improvements along Avalon Road (CR545) are split into 3 segments, which are depicted in **Figure 1.3 Roadway Segments**. Segment one is approximately 0.83 miles and begins at McKinney Road and ends at proposed Silver Grove Blvd. Segment two runs from proposed Silver Grove Blvd to Porter Road, and is approximately 0.47 miles. Segment 3 is the final segment of improvement that runs from Porter Road to Schofield Road, which is approximately 0.89 miles.

Improvements to Schofield Road, Porter Road, and New Independence Parkway are also proposed with this study. Schofield Road includes widening Schofield Road at the intersection of Avalon Road and then tapers back down to the existing two-lane road, which is approximately 0.26 miles. There is approximately 0.39 miles of construction proposed with this project to improve Porter Road so that it accounts for the traffic with the full widening of Avalon Road. New Independence Parkway is proposed to be widened and extended west at the intersection of Avalon Road with this study. This accounts for 0.26 miles of additional construction.

For the purposes of this evaluation the extent of the Study is within Town Center West.

Figure 1.3 Roadway Segments



2.0 Project Need

The need for improvements to the Project Roadway Network can be attributed to more than one cause:

1. Traffic:
 - a. An expected deficiency in future traffic operations and capacity
 - b. The ability to meet the future traffic demand of future development within the area
2. Safety:
 - a. Horizontal curves along the roadway that do not conform to current standards
 - b. Deficient Vertical alignment
 - c. Pedestrians and Bicyclists
3. Policy and Plan:
 - a. The need for Context Sensitive and Complete Streets at the Village Center
 - b. Providing consistency with the goals, objectives, and policies of the *Destination 2030, Orange County, FL Comprehensive Plan 2010-2030* (CP), the METROPLAN ORLANDO Long Range Transportation Plan (LRTP), the Village I SAP and the Horizon West planning area.

Each of these causes are discussed below:

2.1 Traffic Operations

The Orange County adopted minimum roadway operating condition is Level of Service (LOS) "E" for County and State maintained roads in the Horizon West planning area. The existing roadway currently operate at LOS "C" during the AM and PM peak periods. However, the current LOS is expected to decline if no improvements are made as traffic volumes continue to increase with the area development. Under the "no-build" condition, many of the roadway sections in the project are anticipated to operate at LOS "F" during design year 2047 AM and PM peak periods. See **7.0 Traffic Analysis** and **Appendix H** for additional information.

2.2 Safety

Historical crash data was obtained from Signal Four Analytics (S4A) for a five-year period from January 01, 2016 to December 31, 2020 along CR545 from Schofield Road to McKinney Road. See **Appendix H** for a detailed summary of crashes. Individual crash reports were reviewed to ensure the crashes included in the analysis pertained to the corridor limits.

CR 545 (Avalon Road): Schofield Rd to McKinney Rd
January 01, 2016 - December 31, 2020 Crashes by Year Summary
Prepared by: Traffic & Mobility Consultants (TMC)

Injury Severity	2016	2017	2018	2019	2020	Total
No.	No.	No.	No.	No.	No.	
Fatalities (K)	2	0	1	0	0	3
Incapacitating (A)	2	0	0	0	1	3
Non-Incapacitating (B)	3	0	6	8	3	18
Possible (C)	3	1	10	14	4	32
Property Damage Only (D)	2	3	5	11	6	27

SHSP EMPHASIS AREAS	2016	2017	2018	2019	2020	TOTAL
No.	No.	No.	No.	No.	No.	
Lane Departure	1	1	1	2	2	7
Impaired Driving	1	0	2	0	0	3
Pedestrian and Bicyclist	0	0	0	0	0	0
Intersection/Ramp	0	0	1	0	0	1
Occupant Protection	0	0	0	0	0	0
Motorcyclists	2	0	0	0	0	2
Aggressive Road Users						
Commercial Vehicles						
Speeding and Aggressive Driving						
Teen Drivers						
Distracted Driving	2	0	6	6	5	19
Work Zones	0	0	0	1	0	1

*Crashes may be accounted by multiple emphasis areas

PERSONS INVOLVED	2016	2017	2018	2019	2020	Total	%
No.	No.	No.	No.	No.	No.	No.	
DRIVERS	9	8	26	80	18	119	89%
PASSENGERS	0	1	0	0	0	1	1%
Total	9	7	26	80	18	120	100%

DAY OF THE WEEK	2016	2017	2018	2019	2020	Total	%
No.	No.	No.	No.	No.	No.	No.	
1 Sunday	0	0	0	1	0	1	2%
2 Monday	0	1	3	4	2	10	21%
3 Tuesday	0	0	4	2	0	6	13%
4 Wednesday	0	1	2	2	1	6	13%
5 Thursday	1	2	3	3	2	11	23%
6 Friday	2	0	0	3	3	8	17%
7 Saturday	2	0	1	1	1	5	11%
Total	5	4	13	16	9	47	100%

TIME OF DAY	2016	2017	2018	2019	2020	Total	%
No.	No.	No.	No.	No.	No.	No.	
12:00 AM - 1:00 AM	1	0	0	1	0	2	4%
1:00 AM - 2:00 AM	1	0	0	0	0	1	2%
2:00 AM - 3:00 AM	0	0	0	1	0	1	2%
3:00 AM - 4:00 AM	0	0	0	0	0	0	0%
4:00 AM - 5:00 AM	0	0	0	0	0	0	0%
5:00 AM - 6:00 AM	0	1	1	1	0	3	7%
6:00 AM - 7:00 AM	0	0	2	1	0	3	7%
7:00 AM - 8:00 AM	0	0	0	0	0	0	0%
8:00 AM - 9:00 AM	0	0	1	1	1	3	7%
9:00 AM - 10:00 AM	0	0	0	0	0	0	0%
10:00 AM - 11:00 AM	0	0	0	1	0	1	2%
11:00 AM - 12:00 PM	0	0	0	1	1	2	4%
12:00 PM - 1:00 PM	0	0	1	1	1	3	7%
1:00 PM - 2:00 PM	0	0	0	0	0	0	0%
2:00 PM - 3:00 PM	2	0	1	1	0	4	9%
3:00 PM - 4:00 PM	0	1	1	0	0	2	4%
4:00 PM - 5:00 PM	0	0	0	3	1	4	9%
5:00 PM - 6:00 PM	0	1	1	1	2	5	11%
6:00 PM - 7:00 PM	0	0	1	2	1	4	9%
7:00 PM - 8:00 PM	0	0	1	1	1	3	7%
8:00 PM - 9:00 PM	0	0	0	0	0	0	0%
9:00 PM - 10:00 PM	1	0	2	0	0	3	7%
10:00 PM - 11:00 PM	0	0	1	0	0	1	2%
11:00 PM - 12:00 AM	0	0	0	0	0	0	0%
Total	5	3	13	16	9	47	100%

PEAK HOURS	2016	2017	2018	2019	2020	Total	%
No.	No.	No.	No.	No.	No.	No.	
Peak Morning 6 AM to 9 AM	0	0	3	2	1	6	26%
Peak Afternoon 11 AM to 1 PM	0	0	1	2	2	5	21%
Peak Evening 4 PM to 7 PM	0	1	2	8	4	13	54%
Total	0	1	6	10	7	24	100%

CRASH TYPE	2016	2017	2018	2019	2020	Total	%
No.	No.	No.	No.	No.	No.	No.	
Animal	0	0	0	0	0	0	0%
Backed into	0	0	0	0	0	0	0%
Bicycle	0	0	0	0	0	0	0%
Head On	0	0	1	0	0	1	2%
Left Enter/into	1	0	1	0	2	4	9%
Left Leaving	1	0	3	8	0	10	21%
Left Rear	0	0	0	0	2	2	4%
Off Road	1	1	1	2	1	6	13%
Opposing Sideswipe	0	0	0	0	0	0	0%
Other	0	0	1	1	1	3	6%
Parked Vehicle	0	0	0	0	1	1	2%
Pedestrian	0	0	0	0	0	0	0%
Rear End	1	0	6	6	0	13	28%
Right Angle	1	0	0	1	3	5	11%
Right/Left	0	0	0	0	0	0	0%
Right/Through	0	0	0	0	0	0	0%
Right/Left-Turn	0	0	0	0	0	0	0%
Rollover	0	1	0	0	0	1	2%
Same Direction Sideswipe	0	1	0	0	0	1	2%
Single Vehicle	0	1	0	0	0	1	2%
Unknown	0	0	0	0	0	0	0%
Total	5	4	13	16	9	47	100%

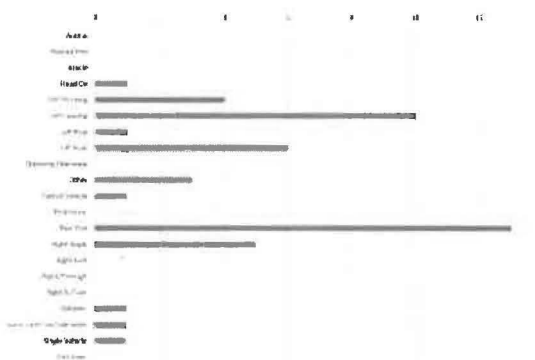
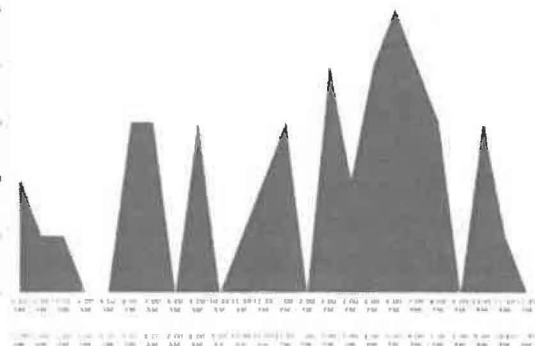
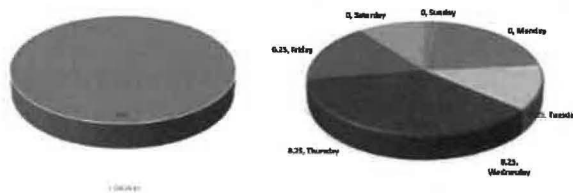
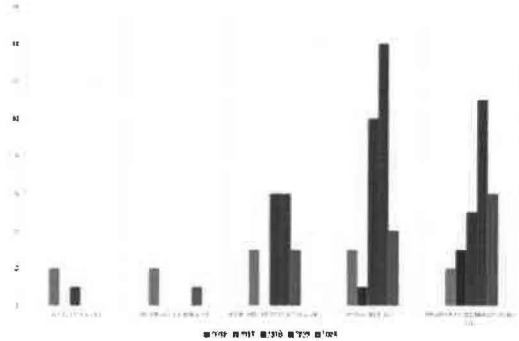


Figure 2.1 Crash Summary

The roadway improvements include widening the existing 2-lane to 4-lane divided roadways. The safety benefits include the following:

1. Four lanes with two lanes going in the same direction permits motorists on the inside lane to continue driving when vehicles on the outside lane are decelerating for turns or to enter and exit driveways and side streets.
2. Four lanes with two lanes going in the same direction allows motorists to pass on the outside lane for motorists on the inside lane and/or turn lane extended queues that are slowing, with the intention to turn across opposing lanes.
3. Four lanes with two lanes going in the same direction increases safety for bicyclists by allowing a motorist to give a wider berth. With two lanes with opposing undivided travel lanes, a motorist shifting around a bicyclist is face-to-face with opposing traffic, or, queues all motor vehicles behind the bicyclist, waiting for a safe interval to pass.

A total of 56 crashes occurred within the study corridor during the five-year period. See **Figure 2.1 Crash Summary**. The crashes resulted in 3 fatalities, 21 injury crashes, 32 possible injury crashes and 27 property damage only crashes. The summary of crashes by injury severity is included in **Table 2.1 Crashes by Severity**

Table 2.1 Crashes by Severity

Severity	2016	2017	2018	2019	2020	Total
Fatalities	2	0	1	0	0	3
Incapacitating	2	0	0	0	1	3
Non-incapacitating	3	0	6	6	3	18
Possible	3	1	10	14	4	32
Property Damage	2	3	5	11	6	27
Total (Fatal + Injury)	10	1	17	20	8	56

Most of the crashes occurred during clear weather conditions (77%) followed by cloudy (19%) and rain (4%). Most of the crashes occurred in daylight (64%) lighting conditions followed by dark – not lighted (19%) and dark - lighted (15%) lighting and dusk (2%) lighting conditions. The roadway surface was dry (87%) for most crashes.

Table 2.2 Crashes by Type, summarizes the total number of crashes within the corridor study area separated by crash type. The predominant crash type was the Rear End (26%) crashes type followed by Left Leaving (21%) crashes. There were no identified bicycle or pedestrian crashes.

Table 2.2 Crashes by Type

Crash Type	2016	2017	2018	2019	2020	Total
Animal	0	0	0	0	0	0
Backed Into	0	0	0	0	0	0
Bicycle	0	0	0	0	0	0
Head On	0	0	1	0	0	1
Left Entering	1	0	1	0	2	4
Left Leaving	1	0	3	6	0	10
Left Rear	0	0	0	0	1	1
Off Road	1	1	1	2	1	6
Opposing Sideswipe	0	0	0	0	0	0
Other	0	0	1	1	1	3
Parked Vehicle	0	0	0	0	1	1
Pedestrian	0	0	0	0	0	0
Rear End	1	0	6	6	0	13
Right Angle	1	0	0	1	3	5
Right/Left	0	0	0	0	0	0
Right/Through	0	0	0	0	0	0
Right/U-Turn	0	0	0	0	0	0
Rollover	0	1	0	0	0	1
Same Direction Sideswipe	0	1	0	0	0	1
Single Vehicle	0	1	0	0	0	1
Unknown	0	0	0	0	0	0
Total	5	4	13	16	9	47

The *Highway Safety Manual* (HSM) method was used to analyze and compare opening year expected number of crashes for the no-build and proposed build conditions. Historical crashes were used to determine the predicted number of crashes (see [Appendix H](#)). The predicted number of all crash severities decreased from a 2-lane undivided to a 4-lane divided typical section by 33.33%.

The Federal Highway Administration (FHWA) Crash Modification Factors (CMF) Clearinghouse was additionally reviewed to determine the potential benefit of the roadway widening. The applicable FHWA factors (*Convert 2-lane roadway to 4-lane divided roadway*) estimates a crash reduction of 28.79% considering all crash types. Both the HSM and CMF Clearinghouse indicate that a 4-lane divided typical section decreases the number of crashes. Detailed HSM analysis and CMF countermeasure are included in [Appendix H](#).

The historical data in **Table 2.1 Crashes by Severity** resulted in a \$41,366,940.00 crash cost. The predicted number of crashes and the anticipated 33.33% reduction results in a \$13,788,980.00 crash cost, which is a \$27,577,960.00 crash cost decrease.

2.3 Policy and Plan

The improvements recommended for the Project Roadway Network are consistent with the Village Land Use Classification policies and the Horizon West planning area objectives. They are also consistent with the goals and objectives of the Town Center West Specific Area Plan (SAP). The Town Center West SAP supports the proposed improvements to the Project Roadway Network as follows:

1. Section A.4, Land Use Principles, states that land necessary for public infrastructure in Village I shall be provided to support each neighborhood, including schools, parks, collector roads, pedestrian/bike paths, and utilities.

As described in Section 2.4.3 and 2.5 below, the public facilities and infrastructure for the Avalon Road (CR 545) improvements will be funded by the Village I participating property owners through the approved Roadway Network Agreement².

2. Section C, Transportation Principles, states the Villages shall provide for connectivity between uses with multiple connections and relatively direct routes; Village I shall provide for traffic calming; Village I shall provide a complete network of streets, pedestrian paths and bike paths and Village I shall encourage and accommodate public transportation route linkage with the regional transit system.

As described in Section 2.4.3 and 2.5 below, Avalon Road (CR 545) will provide connectivity between other villages in Horizon West, specifically Village F, Village H and Town Center. As a major roadway, connections into the Village I developments have been included. Since Avalon Road (CR545) is used by many recreational road cyclists, a 10-foot-wide multi-use trail that is intended for use by pedestrians and bicyclists has been included in the proposed typical section. This will increase safety for the motorist, pedestrian and bicyclist.

A transportation analysis was performed as part of the SAP¹ process. This transportation analysis is included in the Village I SAP Report and specifically supports improvements to the Project Roadway Network by widening the existing two-lane roadway to four lanes

2.4 Conformance with Transportation and Long-Range Plans

2.4.1 Social and Economic Demand

Historically, the existing Roadway Network has been used to support the west Orange County agricultural community, specifically the citrus industry. Today it is located within a predominately rural setting, serving as the main route to the Orange County National Golf Course and access to SR429 and areas to the south. The demand imposed on the Project Roadway Network will increase due to the development of Village I. The corridor must provide an acceptable level of service during this continued growth to serve the needs of emergency services, businesses, schools, construction, sales traffic for ongoing residential projects and other public needs. As a result, the Project Roadway Network provides a direct social and economic impact to the citizens of southwest Orange County.

2.4.2 MetroPlan Orlando Long-Range Transportation Plan

METROPLAN ORLANDO, the Metropolitan Planning Organization (MPO) for Orange, Osceola and Seminole Counties adopted the 2030 LRTP on August 12, 2009. The following roadway corridors are specified in the LRTP to be widened to four lanes: Avalon Road (CR 545) from Seidel Road to McKinney Road.

2.4.3 Orange County Comprehensive Plan (CP)

The Transportation Element of the CP shows Avalon Road (CR545) as a “Planned County Partnership” road. A Planned County Partnership is an agreement between private developers and the County that provides the County with a means for financing necessary transportation network improvements, and obtaining necessary right of way, in exchange for impact fee credits for the private developers.

The Transportation Element of the CP provides the goals, objectives, and policies for the future of the transportation system in Orange County. As a whole, Orange County is aimed at creating a multimodal transportation system which minimizes environmental impacts. The area in southwestern Orange County is currently rural and does not have multimodal facilities or transit access. The Transportation Map series shows no major pedestrian facilities or transit routes being added around Horizon West. The Horizon West Trail is the only proposed multiuse facility depicted in the CP. However, there is adequate R/W should transit stops or bus shelters be needed in the future.

According to OBJ FLU4.1 in the CP, the Horizon West development shall provide more sustainable and quality development in southwestern Orange County by replacing piecemeal planning that reacts to development on a project by project basis with a long range vision that uses the Village as the building block to allow the transition of this portion of Orange County from rural to urban use through a specific planning process that uses a creative design approach to address regional, environmental, transportation, and housing issues. Wherever possible, as many activities as feasible shall be located

within an easy walking distance of an existing or designated transit stop. Local and collector streets, pedestrian paths and bike paths shall contribute to a system of fully connected and interesting routes from individual neighborhoods to the Village Center and to other villages. Their design should encourage pedestrian and bicycle use by being spatially defined by buildings, trees, and lighting; and by discouraging high-speed traffic. The Village Center shall be designed to encourage and accommodate linkage with the regional transit system.

This project proposes a 10-foot multiuse path on the west side of the roadway, a six-foot sidewalk from Schofield Road to Porter Road on the east side of the roadway, and a ten-foot sidewalk from Porter Road to McKinney Road on the east side of the roadway. These elements encourage non-motorized vehicle use along Avalon Road (CR545) to connect the Villages within Horizon West.

2.5 Town Center West Roadway Network Agreement

The participating Town Center West property owners have entered into a Roadway Network Agreement with Orange County dated September 4, 2020. This agreement provides the mechanism for the participating Town Center West property owners to perform multiple design and construction tasks for Avalon Road (CR545) in exchange for concurrency vesting and impact fee credits. All property owners adjacent to Avalon Road (CR545) are participating except for Parcel ID 19-23-27-5840-08-010, located adjacent to Lake Ingram Road.

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3.0 Existing Conditions

The following sections document the existing conditions and characteristics of the Project Roadway Network as observed during site visits in July 2020 and information provided by Orange County.

3.1 Roadway Characteristics

The study limits for CR545 begin at Schofield Road and end at McKinney Road. Existing posted speed limit signs include southbound 45 mph north of Schofield, 55 mph south of SR429 and 1,250 feet south of New Independence Parkway and northbound 45 mph south of Lake Ingram Road and 1,250 feet south of New Independence Parkway. The project study area includes approximately 9,700 feet (1.84 miles) of Avalon Road (CR545).

The study corridor consists of Avalon Road (CR545) which has a functional classification of **urban major collector**. The roadways consist of multiple vertical and horizontal curves. Avalon Road (CR545) is a two-lane facility (one lane in each direction) with a northbound left turn lane at Schofield Road, a southbound left turn lane at Porter Road, a northbound right turn and southbound left turn lane at New Independence Parkway and a northbound and southbound left turn lane at McKinney Road. There are no marked bicycle lanes or sidewalks along this section of Avalon Road (CR545). The existing intersection geometries and intersection control are shown in **Figure 3.1 Base Year 2020 Intersection Geometry** and **Figure 3.2 Base Year 2020 Intersection Volumes**

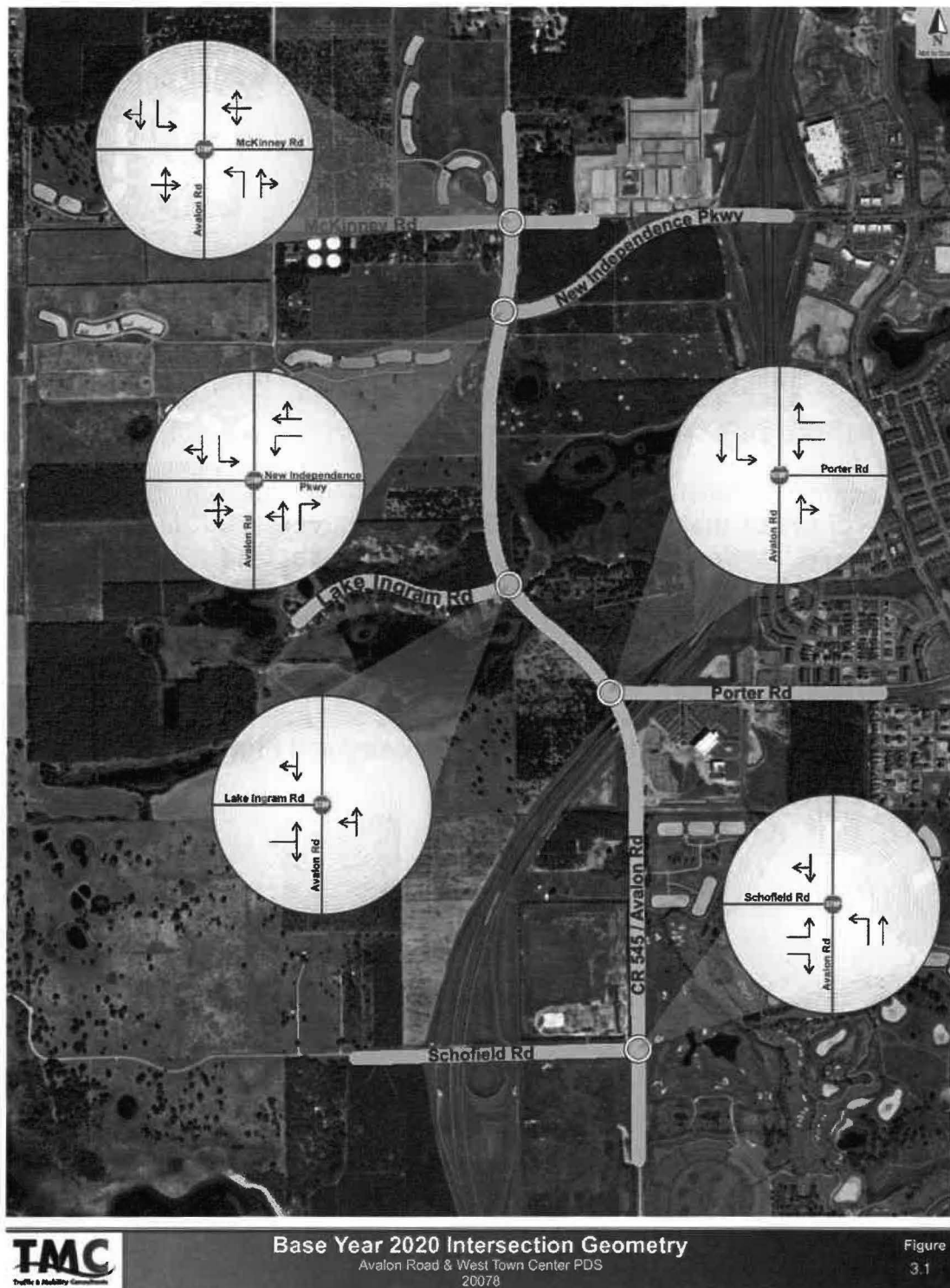


Figure 3.1 Base Year 2020 Intersection Geometry

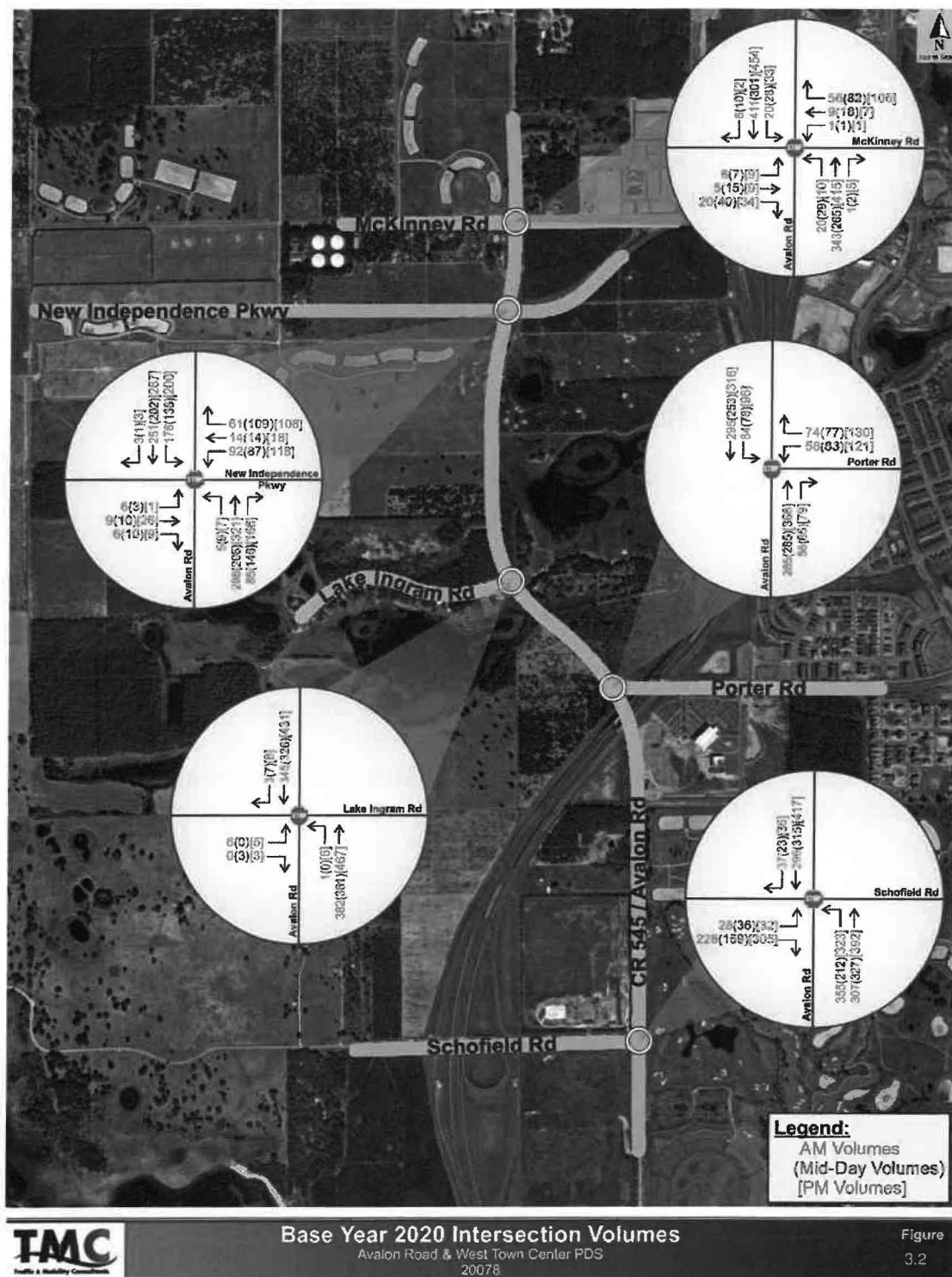


Figure 3.2 Base Year 2020 Intersection Volumes

3.2 Bridges and Structures

There are no cross culverts along this corridor that are considered bridges. There is a 36" RCP cross culvert at the Lake Ingram crossing that allows flow and potentially wildlife crossings. This crossing will be maintained to potentially serve as a wildlife corridor. CR 545 does go under the SR 429 with a bridge overpass just south of the Porter Rd intersection. The bridge structure and associated structural elements are an important consideration with regards to roadway geometry and lane calls.

3.3 Existing Multimodal Accommodations and Services

There are currently no Lynx bus routes or bicycle lanes along this section of Avalon Road (CR545).

3.4 Pavement Conditions

The roadway pavement and markings, based on field observations, are generally in fair to good condition.

3.5 Traffic Data

Under the 2019 base year conditions, Avalon Road (CR545) is a two-lane undivided roadway throughout Orange County. As part of Orange County's vision for the Horizon West Planning Area, Avalon Road (CR545) is being widened from a 2-lane rural road typical section (66 ft of right-of-way) to a four (4) lane divided roadway within a 120-foot right-of-way. See **Figure 3.1 Base Year 2020 Intersection Geometry** and **Figure 3.2 Base Year 2020 Intersection Volumes** for existing intersection geometry and volumes.

The existing volume of Avalon Road (CR545) varies from 7,797 AADT to 13,736 AADT and 379 to 627 peak direction trips (LOS C).

The level of service standard and corresponding peak hour peak direction service volume is LOS "E" and 880 vehicles, respectively for Avalon Road (CR545). Therefore, the roadway is operating at an acceptable level of service (Orange County) under existing conditions.

3.6 Existing Typical Section

The existing typical section for CR 545 is a paved, 2-lane, undivided rural-type roadway. (**Figure 3.3 Existing CR545 Typical Section**).

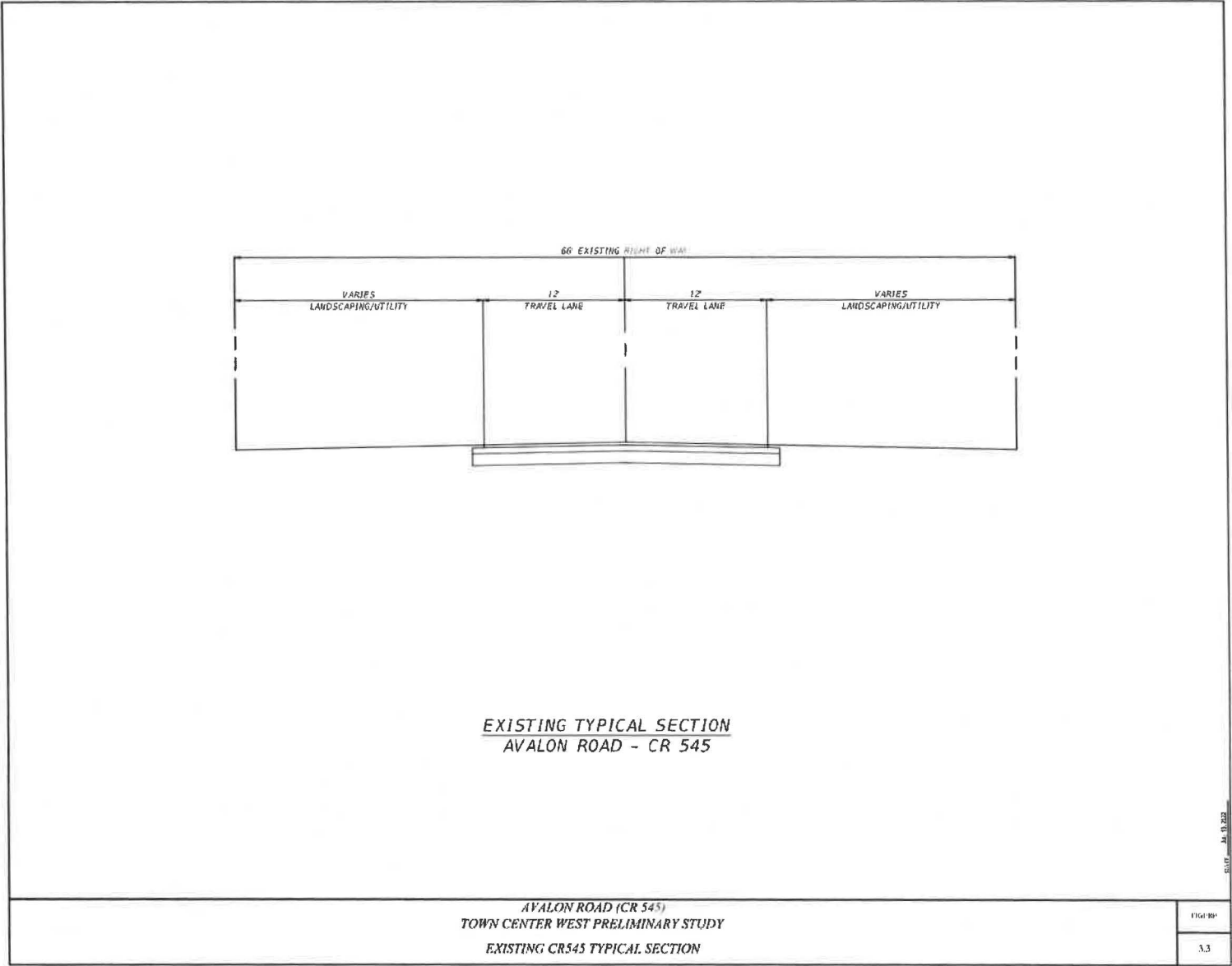


Figure 3.3 Existing CR545 Typical Section

3.7 Right of Way

Currently, CR 545, lies within an approximately 66 feet wide right-of-way corridor owned and maintained by Orange County.

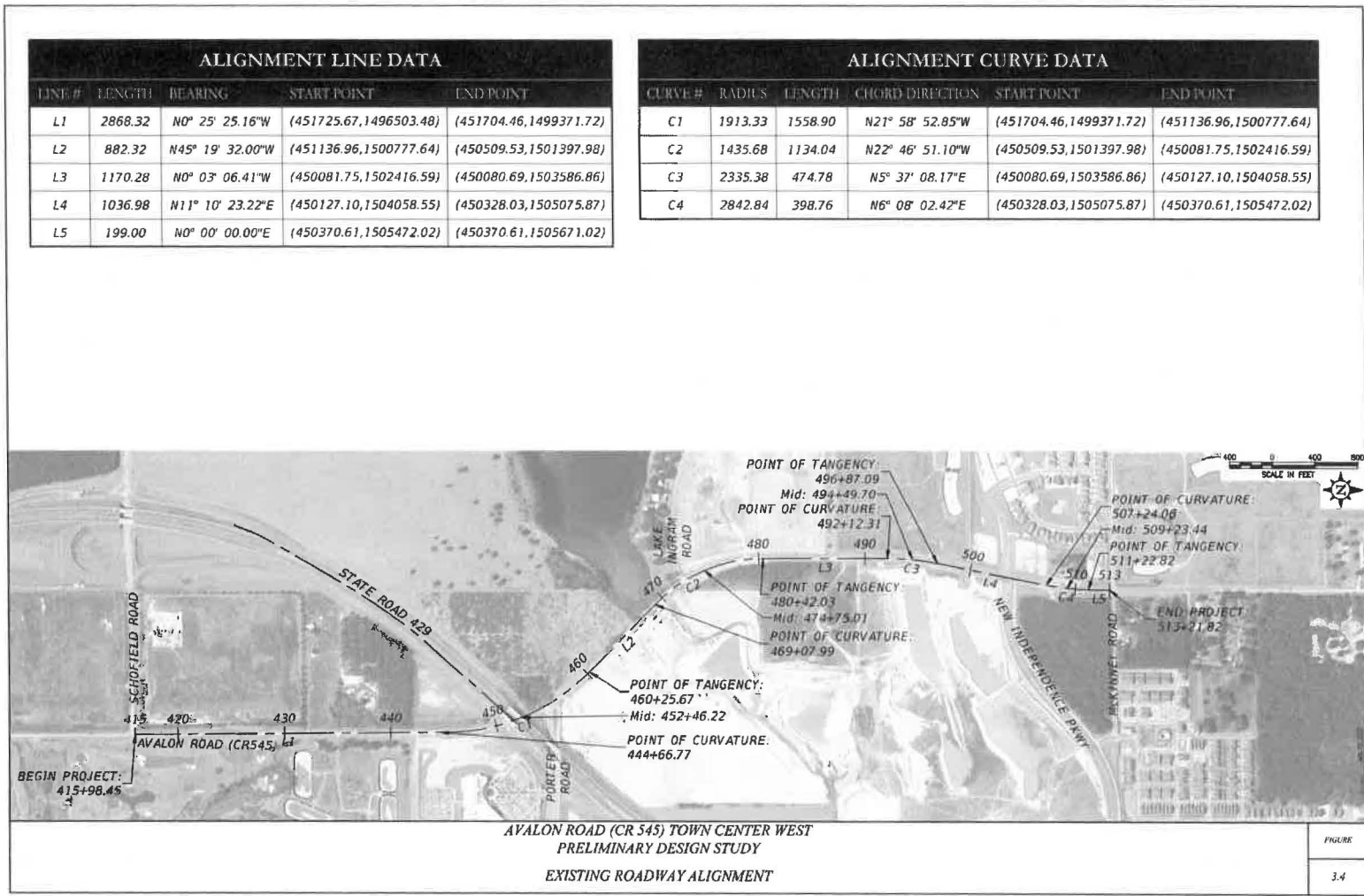
3.8 Existing Roadway Alignment

This section describes the existing alignment along the Project Roadway, which is shown on **Figure 3.4 Existing Road Alignment**. Avalon Road (CR545) generally runs in a south to north direction with multiple horizontal and vertical curves. Proposed alignments will be discussed in Sections 9.1 and 10.3.

The study limits begin at Schofield Road where the horizontal alignment is tangent for 2,868 feet. It then curves to the northwest (left) with a radius of 1,913 feet with no superelevation. The roadway then runs tangent for a distance of approximately 882 feet with a rolling grade and then turns north with an approximate radius of 1,436 feet with no superelevation. The roadway then runs north for approximately 1,170 feet. From this point, the roadway then transitions to a curve to the northeast (right) with a radius of 2,335 feet with superelevation. The roadway is then tangent for another approximately 1,037 feet. It then continues with a curve to the north (left) with a radius of 2,843 ft. with no superelevation. The final section of roadway to the end of the project at McKinney Road is a tangent section of 199 feet to the end project.

The existing vertical alignment is considered to be “rolling” with several high points and low points along the corridor. The low points either include a cross culvert to convey offsite runoff across the roadway to its outfall or flow overtops the roadway. Several of the existing crest vertical curves provide reduced sight distances and must be considered in final design to ensure adequate sight distance is provided. These include the crest vertical curve south of SR429, the crest vertical curve north of SR429 and the crest vertical curve south of New Independence Parkway.

Figure 3.4 Existing Road Alignment



3.9 Lake County Coordination

Orange County and Lake County entered into an Interlocal Agreement dated August 1997 that Lake County will provide maintenance for Schofield Road between CR545 and the County Line. The agreement provides that it will automatically be renewed every two years unless earlier terminated.

4.0 Existing Infrastructure

4.1 Roadway Lighting

No roadway lighting currently exists within the project study area for either CR545.

4.2 Utilities Analysis

Information in this section is based on data supplied by utility companies (through 1800Sunshine field locates), field observations and adjacent design projects as-built information. Utility information was taken from the Horizon West Master Utility Plan, Silverleaf and Hamlin West design projects that included adding utilities along Avalon Road (CR545). See section 6.2 for a list of approved PD projects.

Various overhead and underground utilities are adjacent to and cross the Project Roadway Network. The utility companies below have assets in the study area. The general location of the utilities is shown in **Figure 4.1 Existing Utilities**, **Figure 4.2 Existing Utilities**, **Figure 4.3 Existing Utilities**, **Figure 4.4 Existing Utilities**, **Figure 4.5 Existing Utilities**, **Figure 4.6 Existing Utilities**, **Figure 4.7 Existing Utilities**. The utilities are briefly described in **Table 4.1 Existing Utilities** and the following sections. **Figure 4.8 Existing Utilities** depicts the existing typical section with utility locations.

Table 4.1 Existing Utilities

Utility Company	Facility type	Description
Water Conserv II	Potable Water	54" water main
BrightHouse Communications) (Charter	Television	Buried FOC
Orange County Utilities	Potable Water	16" water main
Orange County Utilities	Non-Potable Water	12" reclaimed water main
Orange County Utilities	Waste Water	12" force main
Duke Energy	Electric	OH Distribution
	Electric	OH Transmission
Century Link Winter Garden	Communication	Buried FOC
Verizon/MCI	Communication	Buried FOC
Smart City Telecom	Communication	Buried FOC
AT&T	Communication	Buried FOC

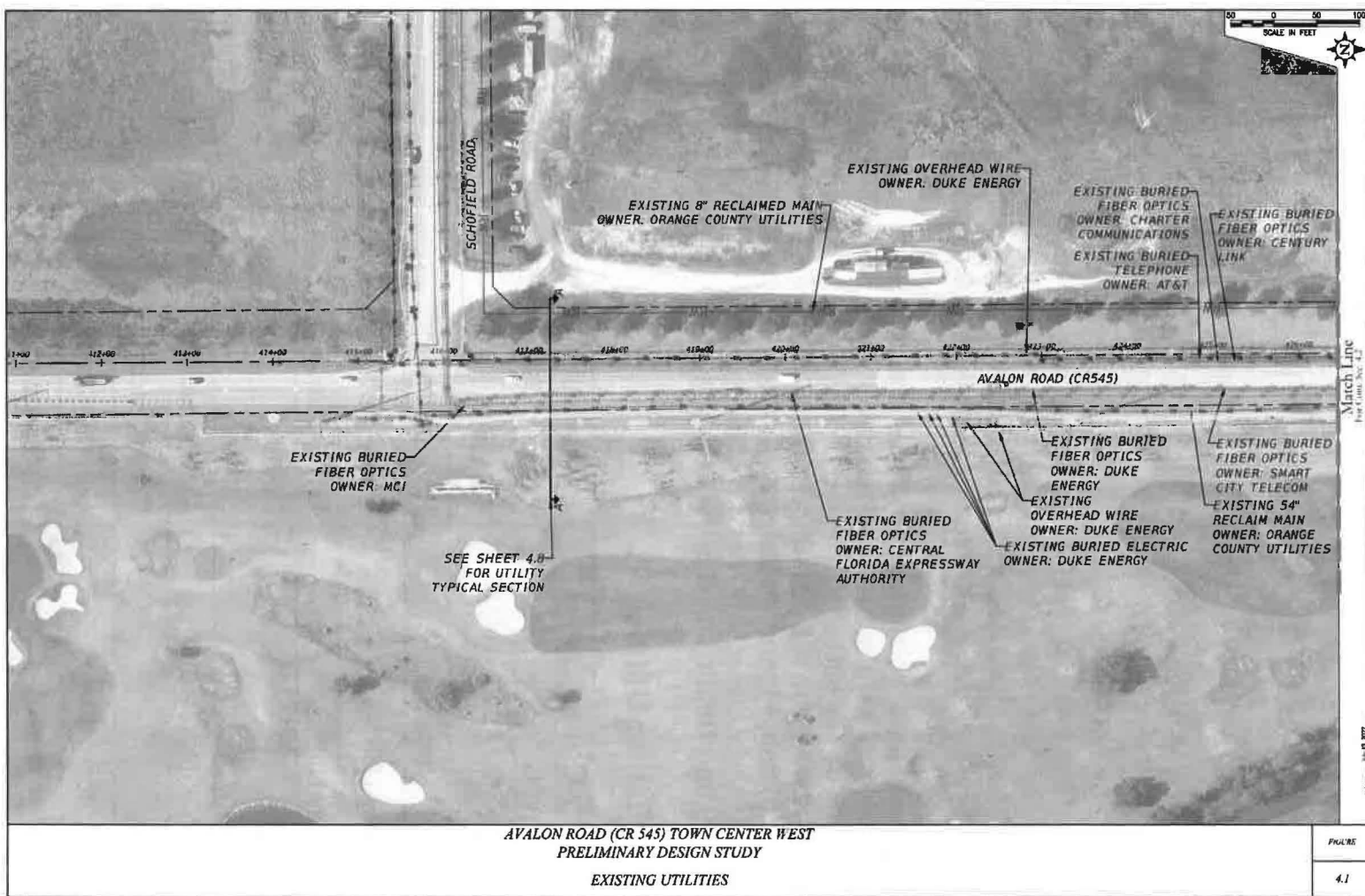


Figure 4.1 Existing Utilities

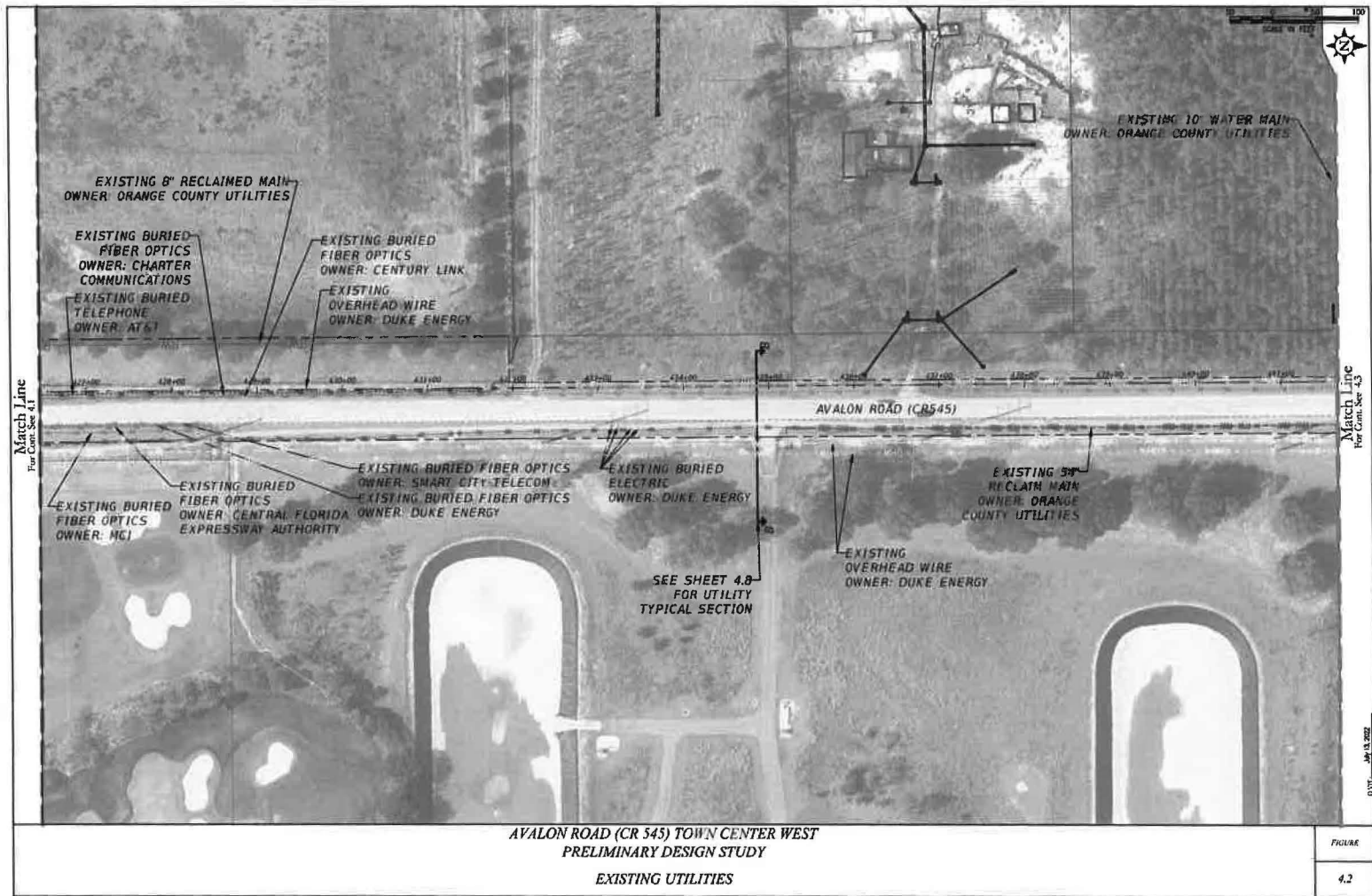
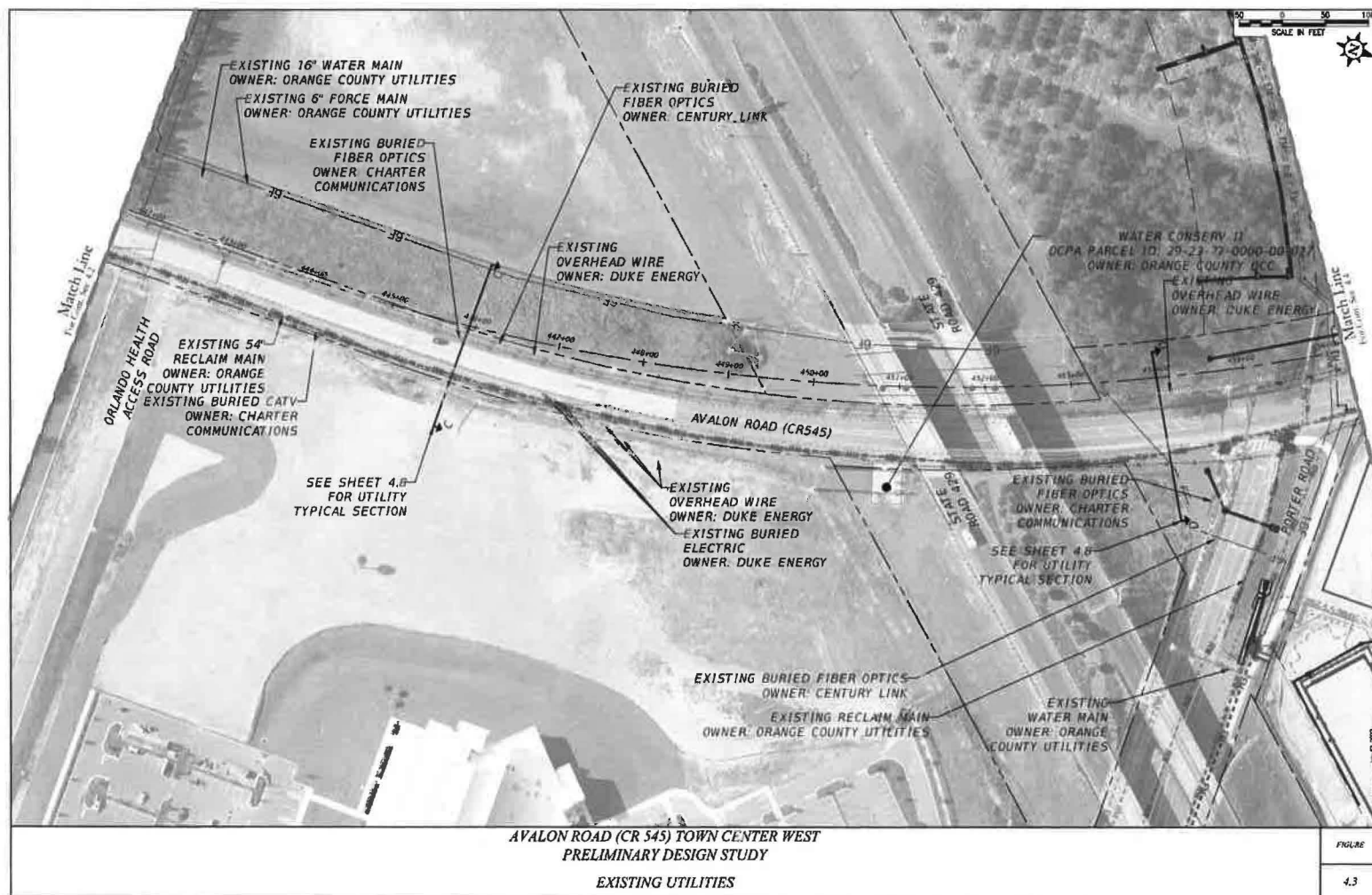


Figure 4.2 Existing Utilities



45



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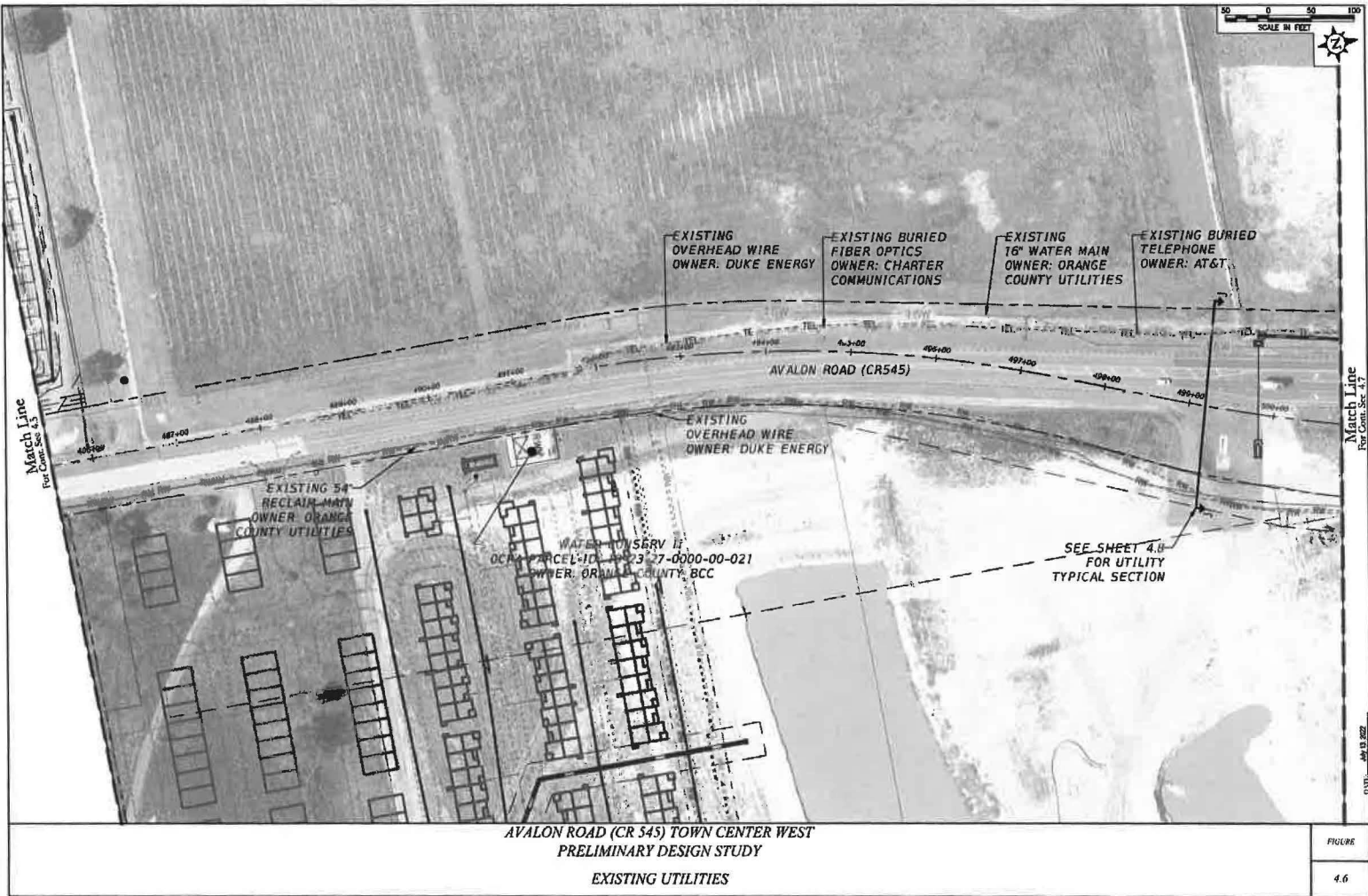


Figure 4.6 Existing Utilities

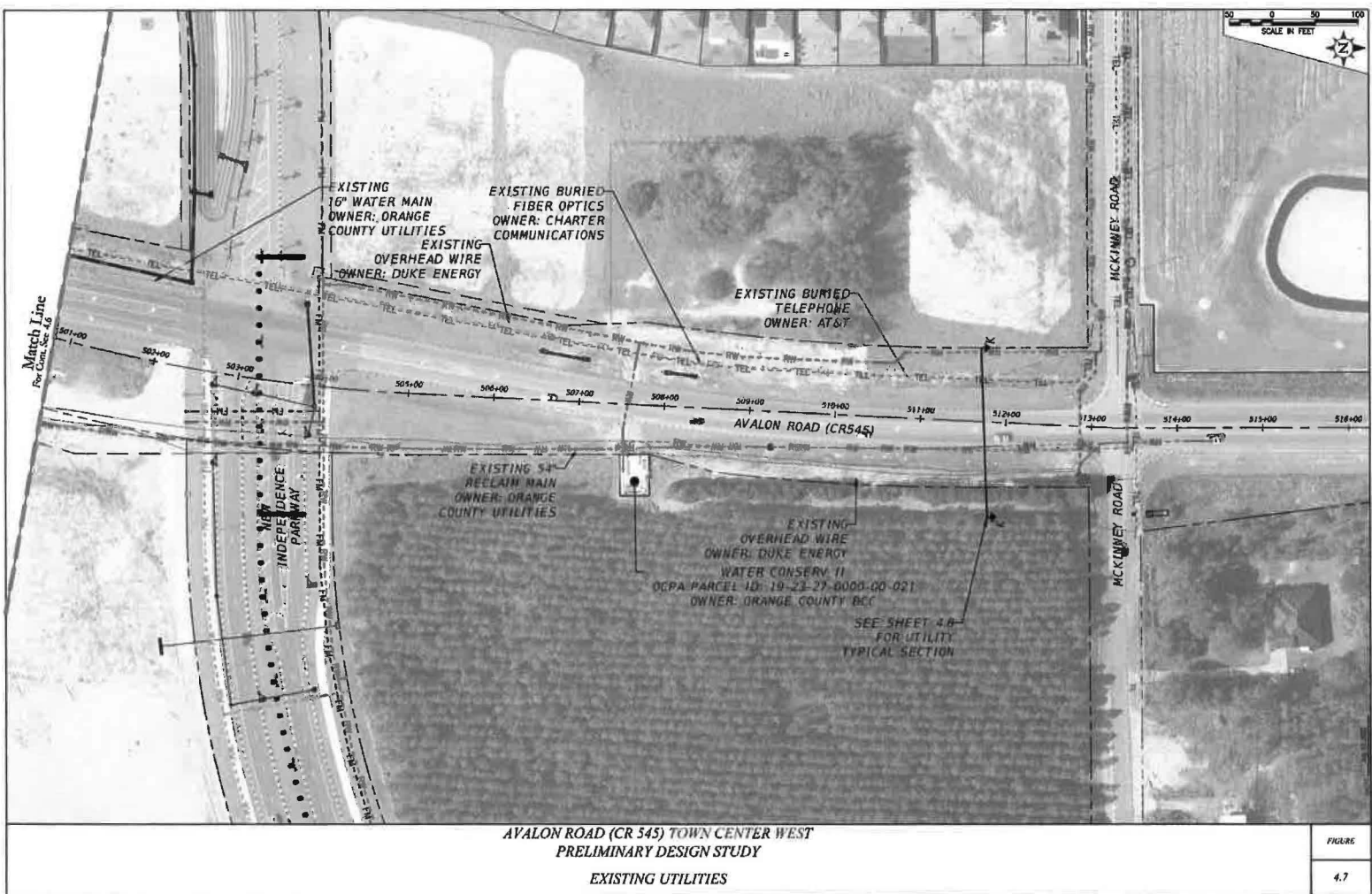
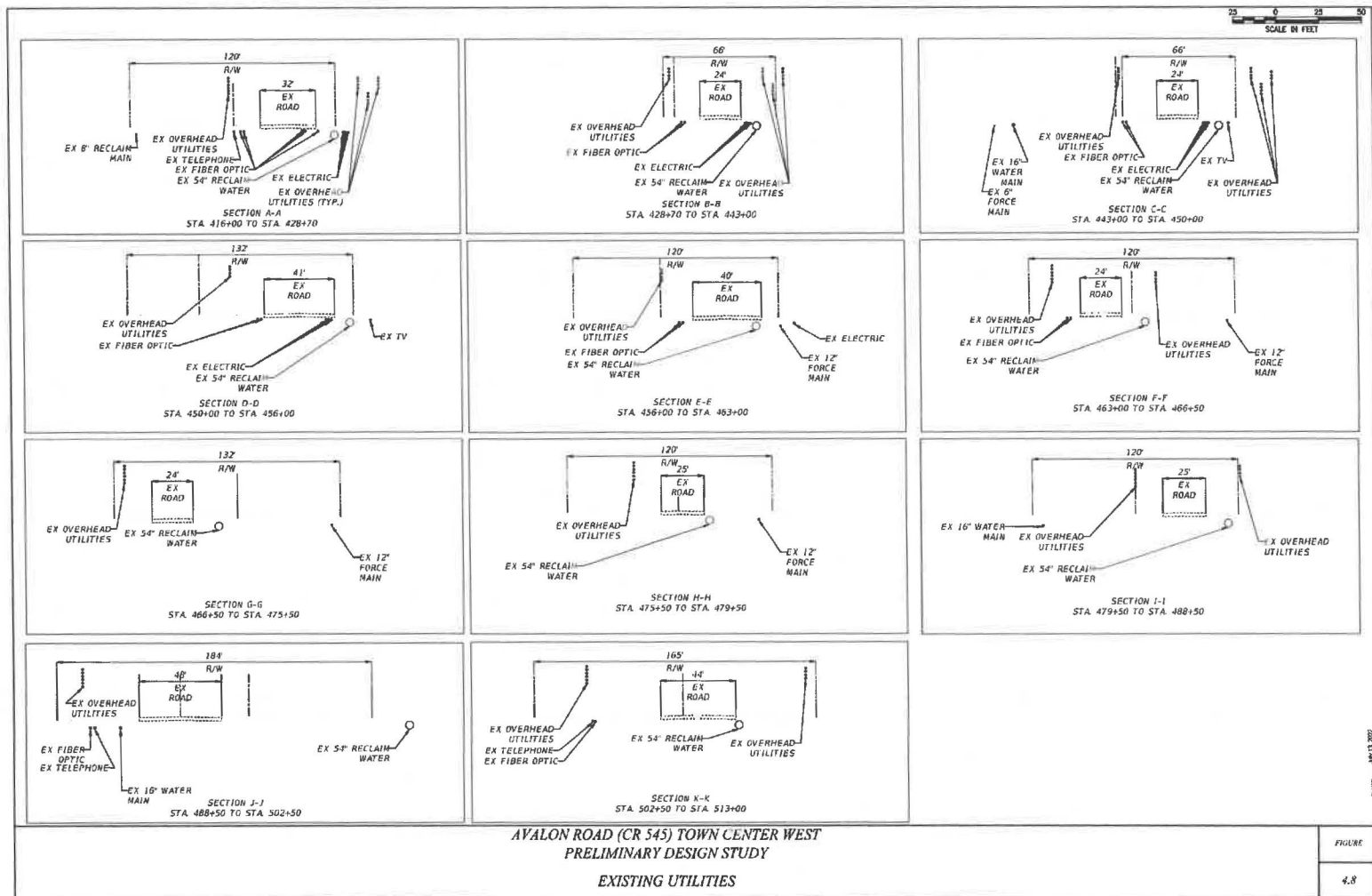


Figure 4.7 Existing Utilities

Figure 4.8 Existing Utilities



4.2.1 Television

Bright House Networks currently has facilities on the east and west sides of CR545 along the alignment from Schofield to McKinney

4.2.2 Communications

Verizon/MCI, Bright House Networks, Smart City Telecom, AT&T and CenturyLink Winter Garden have buried cables along the east side of CR545 within the existing R/W.

4.2.3 Electrical Power

Duke Energy has overhead electrical distribution and transmission lines located inside the existing right-of-way with the transmission line on the east side and the distribution line on the west side of the roadway from Schofield Road to SR429. The transmission line on the east side turns to the east and continues along SR429. From SR429 north, the distribution lines continue north along the both sides of Avalon Road (CR545). From Schofield Road about 1,000 feet north, the line on the east side goes underground. From New Independence Parkway to McKinney Road both lines continue on both sides of Avalon Road (CR545).

4.2.4 Potable Water and Sewer

Water Conserv II has a 54" Water Main along the east right of way line along Avalon Road (CR545) from Schofield Road to McKinney Road. Normal adjustments vertically and horizontally to WCII's ARV's and pipeline drainage structures are expected.

Orange County Utilities (OCU) currently provides potable water and sewer mains in the study area.

The proposed Silverleaf project is installing a 16" WM and a 12" FM along the west side of Avalon Road (CR545) from Porter Road to New Independence Parkway. The Hamlin SW project installed a 12"RW line along the east side of Avalon Road (CR545).

4.2.5 Reclaimed Water

Orange County Utilities currently has a 36-inch reclaimed water main on the east side of CR 545.

4.3 Multimodal Accommodations and Services

4.3.1 Transit Concept

LYNX is the Regional Bus Service provider for Orange County. Based on the LYNX Vision 2030 Plan, no bus routes are planned for CR 545 and was not included in the future study typicals.

Future bus stops can be accommodated within the proposed R/W. The proposed typical includes an area between the back of curb and the right-of-way lines on both sides of Avalon Road (CR545) with a minimum of 4 feet between the back of curb and the sidewalk/Path. Bus stops can be accommodated by providing benches and shelters in these areas.

4.3.2 Multi-Use Trails Map

The Orange County Trails Master Plan does not list a trail along this section of Avalon Road (CR545). However, the Horizon West Trails Study was completed by the Orange County Planning and Parks and Recreation Divisions to connect the Horizon West Villages and Town Center together (see **Figure 4.9 Horizon West Trails**). This map shows a Future Arterial Trail along Avalon Road (CR545), Schofield Road and New Independence Parkway and a Future Collector Trail along Porter Road and Lake Ingram Road.

The purpose of the arterial trails is to connect the residential areas to schools, parks, public facilities and commercial areas. The location of these trails will be determined by the Horizon West development requirements. The policies specify that Collector trails will connect Village amenities such as schools and parks to the residential areas as well as connect to the Arterial network, but the final location of these trails will be determined by the developer. In the existing Villages, many collector trails are either constructed or have approved design plans.

The proposed typical for Avalon Road (CR545) includes a Trail on the west side.

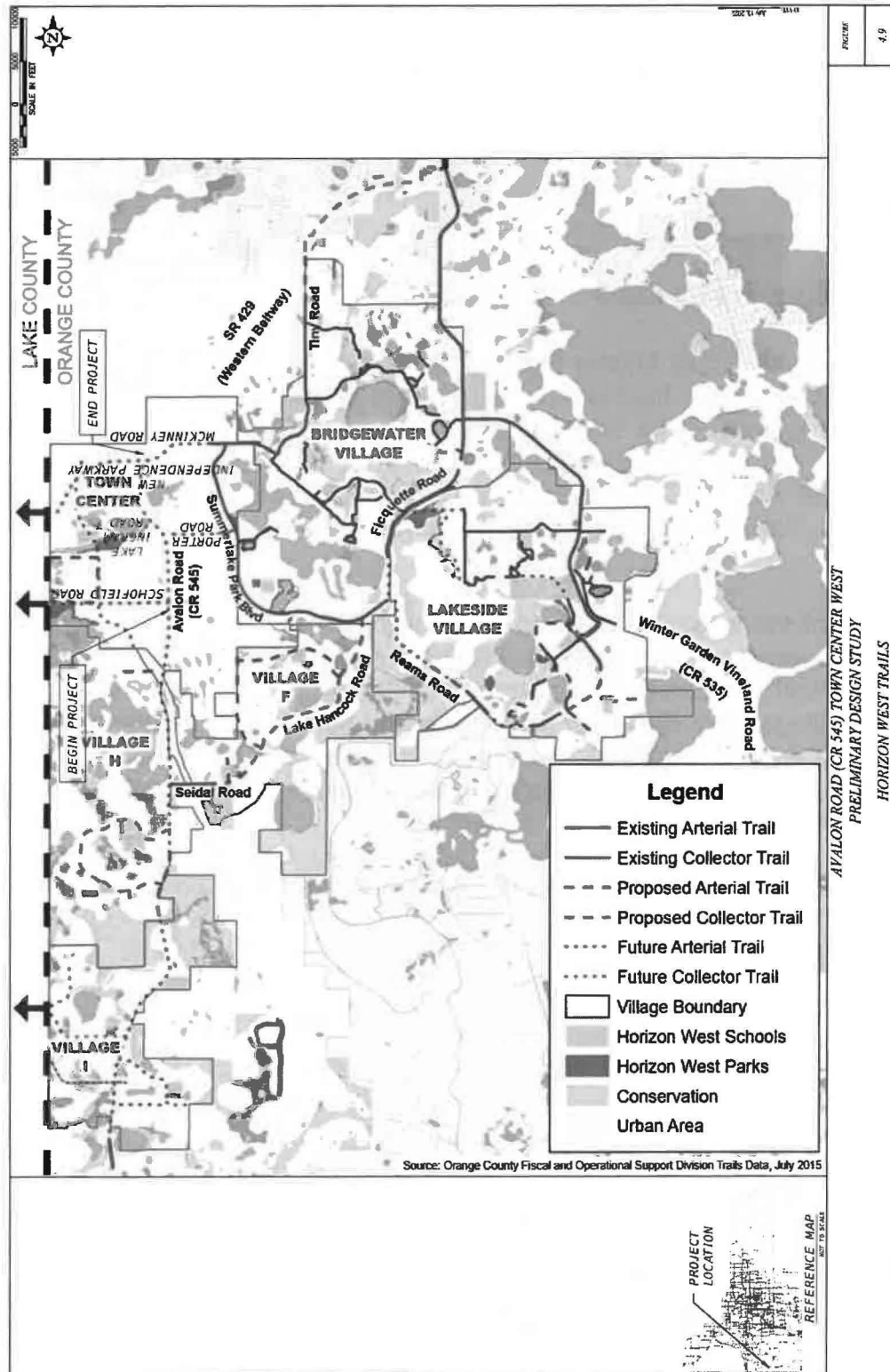


Figure 4.9 Horizon West Trails

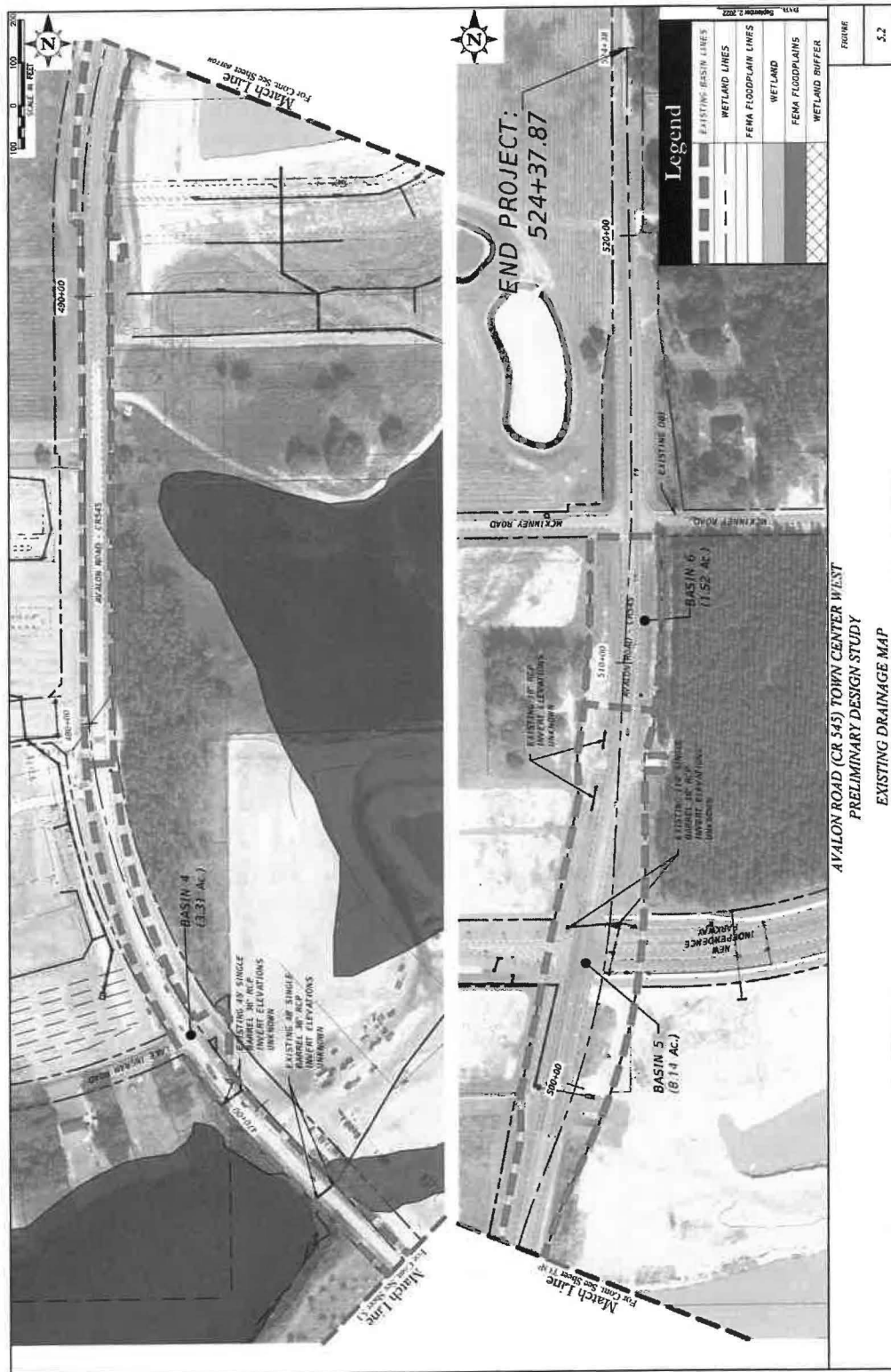
5.0 Existing Hydrology

5.1 Drainage Basins

The limits of the corridor analysis are located within the jurisdiction of South Florida Water Management District (SFWMD). The corridor is within the Lake Ingram basin that is part of the Reedy Creek basin (but not in RCID boundary or jurisdiction). The Lake Ingram system receives stormwater runoff and inflows from land that is primarily agricultural with substantial residential development occurring along either side of Avalon Road (CR545). The project site north of SR429 contains a substantial amount of topographic relief with the site and surrounding area discharging towards Lake Ingram on either side of CR545 and a number of self-contained interconnected depressional surface water and wetland areas. This portion of the Reedy Creek basin can be characterized as having numerous depressions that are virtually land-locked during even the most extreme conditions. Lake Ingram is land-locked. Some drainage from land in Lake County flow toward Lake Ingram but contributes flow only during extreme hydrologic conditions. The existing drainage basins are depicted in **Figure 5.1 Existing Drainage Map & Figure 5.2 Existing Drainage Map**

Also, CONSERV II has several rapid infiltration basin sites located in the vicinity and several deep wells. Levels measured in the wells follow water levels in Lake Ingram very closely. This implies that Lake Ingram is well connected to the Floridan Aquifer and that lake levels are strongly influenced by pressure in the Floridan.

The Orange County Comprehensive Plan includes FLU 4.5.7 and FLU4.5.8. FLU 4.5.7 requires that an analysis be completed to ensure that appropriate water recharge of the Floridan Aquifer can be maintained. The analysis must demonstrate that the recharge characteristic of water entering the soil in the post development condition is comparable to that in the pre-development condition. FLU4.5.8 requires an evaluation of the development impacts on listed plants and wildlife and wildlife habitats. If there are impacts to these natural resources, an evaluation of the impacts will be completed and mitigation will be recommended (see Environmental Assessment in Appendix E).



5.2 Roadway Drainage

The existing roadway is a two-lane rural roadway with a center crown, unpaved shoulders and shallow sodded roadside swales. Some of the roadside swales convey the runoff to existing cross drains that then discharge to the Lake Ingram basin. The proposed roadway is located within this land-locked basin and, as such, the collected runoff is either discharged to Lake Ingram or infiltrated into the ground. The roadway south of SR429 discharges towards self-contained depressional areas along the roadway and infiltrates into the ground.

5.3 Existing Cross Drains

There are three existing cross drains along the alignment that allow drainage to cross the roadway and discharge into Lake Ingram from the west side to the east. **Table 5.1 Existing Cross Drains** below lists the existing cross drains

Table 5.1 Existing Cross Drains

Culvert	Station	Length/Size/Material	End Treatment
1	467+54	49' of 36" RCP	MES
2	470+61	51' of 36" RCP	MES
3	503+71	122' of 18" RCP	DBI

5.4 Existing Permits

At the time of this report, the following stormwater permits exist within the proposed corridor. These include:

1. Hamlin SW Medical Environmental Resource Permit (ERP) 48-103912-P, located at the intersection of the proposed Avalon Road (CR545) and SR429.
2. Hamlin West ERP No. 48-100701-P mass grading, located in the east side of Avalon Road (CR545) from SR429 to McKinney Road.
3. Horizon Health Horizon West Hospital ERP No. 48-02558-P
4. Horizon West Jaffers Property ERP No. 48-105216-P
5. Orange County National Golf ERP No. 48-00885-P located on the east side of Avalon Road (CR545) south of SR429.
6. Porter Road Widening ERP No. 48-02176-P between CR545 and Hamlin Groves Trail. The project includes the widening of Porter Road from 2 lanes to 4-lanes divided.
7. Schofield Class III Landfill ERP 48-00639-S located at the southwest quadrant of Schofield Road and Avalon Road (CR545).
8. Silverleaf Phase 1 Infrastructure & Phase 2 & 3 Mass Grading ERP 48-104132-P located on the west side of Avalon Road (CR545) from Schofield Road to the

Northern Entrance Road and from the Lake/Orange County line to Avalon Road (CR545).

9. Site 89 Elementary School ERP 48-104590-P.
10. West Orange C&D Landfill ERP 48-016125-009-EM for the Orange County C&D Disposal Facility located in the northwest quadrant of the Schofield Road and Avalon Road (CR545) intersection.
11. Wincey Groves ERP No. 48-02562-P

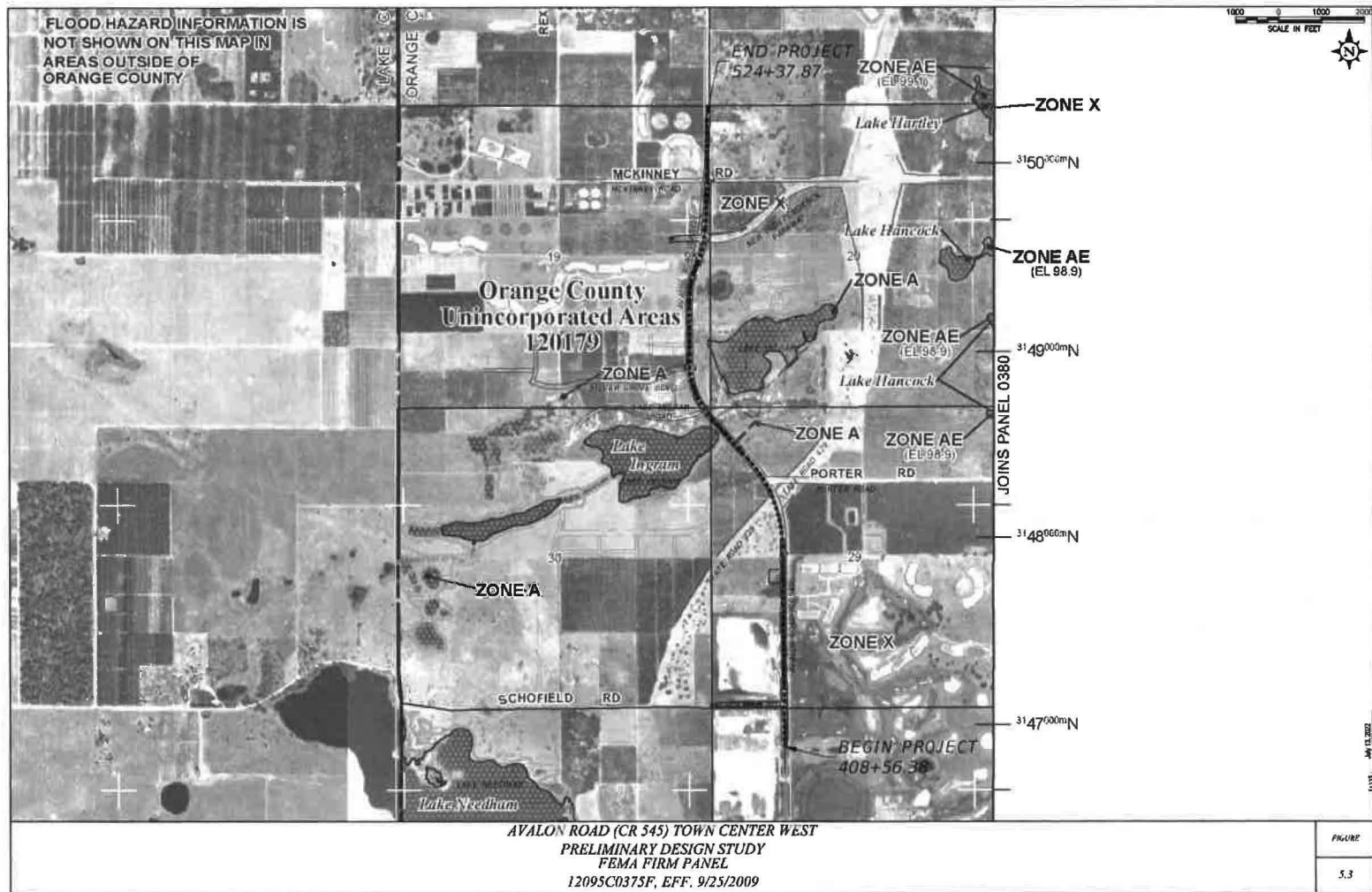
These systems should be accommodated to minimize any impacts in final design.

There are several Conservation Area Determinations (CAD) on properties along the corridor. These CAD agreements establish by agreement with Orange County, the existing wetland areas. The existing permits and CAD's are outlined in the Environmental Evaluation in Appendix I.

5.5 Floodplains

There are no floodways within the project corridor. As shown of **Figure 5.3 FEMA Floodplain Map**, there are several floodplain areas along the proposed corridor. Management of floodplain impacts is presented in section 10 of this study. The site lies within Zone A (Lake Ingram) as delineated on the FEMA/FIRM panel number 12095C0375 F dated September 25, 2009. This area has been studied extensively and the mapped floodplain zone elevations have been established. All developments within a depressional flood hazard area must compensate for the impacts on an equal volume basis by providing compensating storage for all floodwater displaced by development below the elevation of the 100-year flood. Compensating storage is to be provided between the normal high water of the special flood hazard area and the estimated 100-year flood elevation. Minor floodplain impacts are anticipated along Avalon Road (CR545). Mitigation for potential floodplain impacts can be achieved by expanding the proposed stormwater ponds to provide additional volume to compensate for the floodplain impacts as needed.

Figure 5.3 FEMA Floodplain Map



6.0 Environmental Site Assessment Issues

6.1 Land Use and Development Plan

6.1.1 Existing Development Permits

Town Center West, one of the residential villages within the Horizon West area, is comprised of approximately 2,223 gross acres. It is bisected by the north/south alignment of CR 545.

Town Center West is one of the last of the Horizon West Villages to develop, as the progression of development with Horizon West has taken place over the past decade. Development pressure is coming from all sides of the Village. On its south, new projects in Village H continues to build-out as more projects come on line near its southern boundary. To the east, the Hamlin West project is under design and the Silverleaf on the west is also under design.

6.2 Existing and Proposed Land Use

The existing land use along Avalon Road (CR545) within the project limits is “Village” (see **Figure 6.1 Current Future Land Use Plan**). The majority of the project falls within the Horizon West Village I SAP¹, with the exception of the parcels owned by the Orange County BCC.

The property owners in Town Center West are responding to the demands of the marketplace. The list of PDs includes the following projects (see **Figure 6.2 Master Development Plan**):

1. Hamlin South PD
2. Silverleaf PD

The majority of the approved PD's are moving forward into the Preliminary Subdivision Plan phase. Based on the close proximity of the timing of the Town Center West PD approvals, it can be anticipated that significant development activity will commence in a close timeframe, with a bubble expected in years 2022-2027. The adjacent developments have anticipated the improvements to Avalon Road (CR545) and have already dedicated the necessary right-of-way.

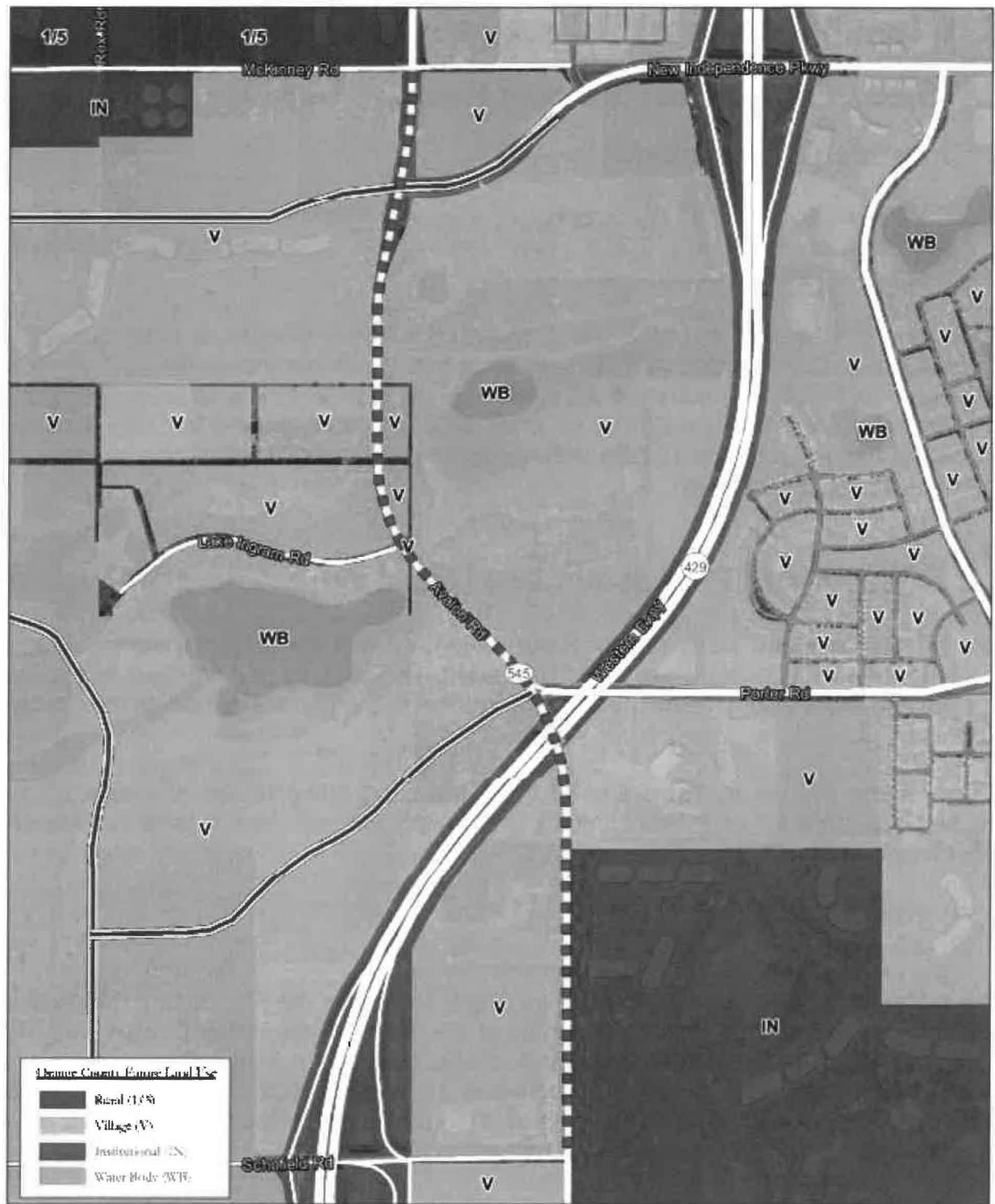


Figure 6.1 Current Future Land Use Plan

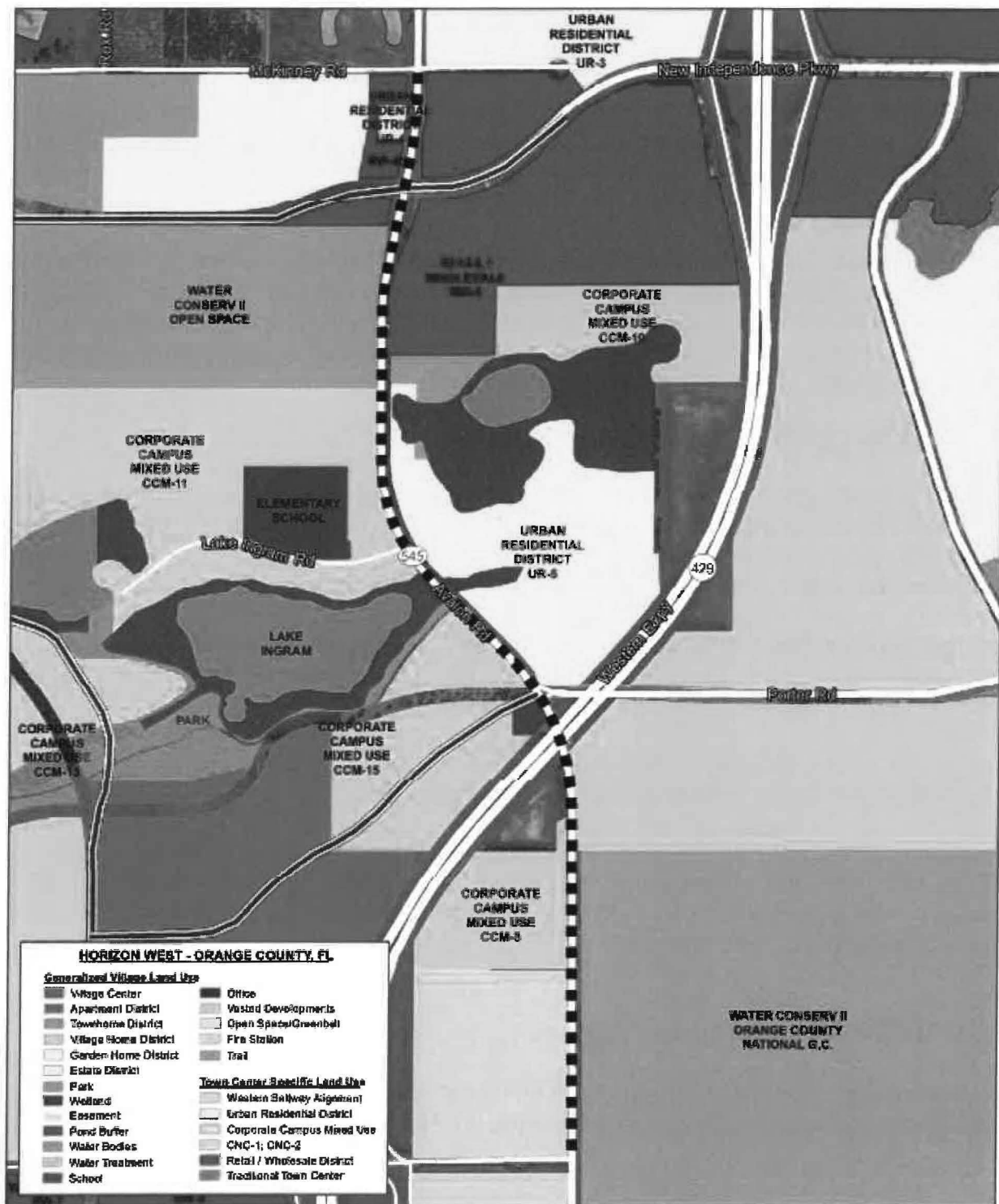


Figure 6.2 Master Development Plan

6.3 Soil Survey and Geotechnical Data

The Preliminary Roadway Soil Survey Reports provided by Universal Engineering Services, and included in **Appendix D** of this report, describes the general subsurface conditions and preliminary geotechnical engineering recommendations for roadway design for Avalon Road (CR545).

The field investigation for this portion of Avalon Road (CR545) consisted of performing fifty-two (52) auger borings within the proposed roadway right-of-way and proposed ponds and to depths up to 20.0 feet below the existing ground surface. In general, the borings were performed on alternating sides of the proposed roadway right-of-way and at an approximate spacing of 200 feet on center.

6.3.1 Existing Physical Characteristics

Based on observations made at the site (see **Appendix D** for Geotech Reports) and review of the USGS quadrangle map for the subject alignment, existing ground surface elevations along the Project Roadway Network can be described as ranging from approximately +94 feet to +188 feet National Geodetic Vertical Datum (NGVD) 1988.

The soil survey encountered two (2) generalized soil strata within the survey limits to the maximum depth explored at the boring locations. This strata description includes light brown to orange fine sand and light orange and grey brown clayey fine sand.

During the field exploration (August 2020), the groundwater table was encountered at only one of our boring locations within the drilled depths (boring P-02, encountered at depth of 13 feet below grade). Based upon review of the St. Johns River Water Management District Potentiometric map (May 2009) of the Upper Floridian Aquifer for the project area, the estimated potentiometric level at the site is estimated to be at elevation +80 feet, NGVD. This indicates an artesian level ranging from about 70 to 130 feet below current ground surface.

6.3.2 USDA/NRCS Soil Survey

Review of the USDA/NRCS map for the study area (**Figure 6.3 Soil Survey Map**) indicates that the near-surface soils along the subject alignment are mapped as follows:

1. Basinger fine sand, frequently ponded, 0 to 1 % slopes (3), HSG B/D
2. Candler fine sand, 0 to 5 percent slopes (4), HSG A
3. Candler fine sand, 5 to 12 percent slopes (5), HSG A
4. Candler-Apopka fine sand, 5 to 12 % slopes (6), HSG A
5. Water (99)



Figure 6.3 Soil Survey Map

6.3.3 Geotechnical Evaluation and Recommendations

The Universal Report describes the existing shallow subsurface soils encountered in the borings performed as capable of supporting the proposed typical pavement section after proper near surface soil preparation.

No highly plastic or organic (muck) soils were encountered at any of our boring locations within the drilled depths during our exploration.

The groundwater table will fluctuate seasonally depending upon local rainfall. The rainy season in Central Florida is normally between June and October. Based upon our review of USGS data, Soil Survey of Orange County and regional hydrogeology, we estimate that the normal seasonal high groundwater table typically forms below a depth of 10 feet below the existing surface at the boring locations.

We recommend positive drainage be established and maintained on the site during construction. We further recommend permanent measures be constructed to maintain positive drainage from the site throughout the life of the project. We recommend all pavement design analyses incorporate the seasonal high groundwater conditions. Temporary dewatering is not anticipated for this project. Control of groundwater should be maintained in accordance with the FDOT Standard Specifications

6.4 Contamination

A Level 1 Contamination Screening Evaluation Report (CSER) for this section of Avalon Road (CR545) was completed and is in [Appendix G](#). The subject alignment area is located between approximately McKinney Road to the north to Schofield Road to the south. The purpose of this report is to present the findings resulting from an evaluation for potential Recognized Environmental Conditions (RECs) within and immediately adjacent to the proposed improvement corridor. The CSER corridor is located in Sections 19, 20, 29, 30 and 32, Township 23 South, Range 27 East, Orange County, Florida.

At the time of the evaluation the proposed alignment included portions of the existing Avalon Road (CR545), McKinney Road, Wincey Grove Road, Lake Ingram Road, SR 429, Schofield Road, Porter Road and New Independence Parkway rights-of-way, including above and underground utilities infrastructure (electrical power, water, telecommunications, reclaimed water, etc....), as well as municipal lands occupied by City of Orlando/Orange County Water Conserve II facilities (Rapid Infiltration Basin [RIB] sites and related infrastructure), historical agricultural use lands being developed for residential and commercial purposes, lands associated with single-family homesites, natural wetland and surface water areas, inactive agricultural use lands historically associated with citrus and timber production, agricultural use lands actively in use for timber production, lands associated with landscape buffers of active and inactive landfill facilities, lands associated with a buffer of an active golf course facility (Orange County International) and lands occupied by an Orlando Health Central medical/hospital facility.

There were no habitable structures, or evidence of any previously existing habitable structures identified on the subject lands during the on-site assessment.

A summary of the Low Risks, Medium Risks and High Risks for contamination in the corridor area are as follows. See the CSER in Appendix L for a detailed summary of Contamination Risk Potential Sites.

Low Risk Facilities and Land Uses

1. Other than the reported West Orange Environmental Resources CDS, the area regulated facilities identified in State and Federal environmental record sources reviewed as part of this evaluation appear to present low (or no) risk of contaminant impacts. This conclusion is based on public file information reviewed regarding reported discharge/release specifics and cleanup statuses, as well as the topographic character in the area and their locations with respect to the subject property (potential for these reported facilities to have affected the subject lands appears low). With regards to West Orange Environmental Resources CDS, this facility/listing was considered to be of a medium risk based on information reviewed.
2. The northern portion of the corridor was identified within either a known area of ethylene dibromide (EDB) groundwater contamination, an associated 1000-foot EDB contamination setback area or a known historical EDB application area. This EDB zone is identified by the FDEP as a pesticide, or nematicide, formally utilized in the citrus industry (1962-1983) which is a known contaminant of groundwater. Responsible parties and property owners are not required to assess or cleanup EDB. Instead, the Florida Legislature requested the FDEP establish EDB application groundwater delineation zones. New potable water wells located within EDB zones are subject to provisions of Chapter 62-524, Florida Administrative Code, which include specific construction and/or produced water treatment requirements. Based on the regulations in place, the intended use of lands in this portion of the corridor (roadway area), the area EDB zone would be considered a low-risk item.
3. Based on previous experience in this area, historical uses of the majority of the lands within and immediately adjacent to the corridor are associated with citrus crop production. This use appears to present a low risk for the accumulation of agrochemicals associated with historical application activities.

Medium Risk Facilities and Land Uses

1. The West Orange Environmental Resources C&D site identified in the radius report obtained for the evaluation is reported as a closed construction/demolition debris disposal facility with a groundwater monitoring component. Based on a

review of public file information gathered from the FDEP's Division of Waste Management OCULUS System, this facility's listing appears notable with respect to the subject property and this assessment at this time (potential for discharges associated with this area landfill listing to have impacted the subject property appears possible). This determination is based on the physical distance from the subject property (adjoining the western boundary of the improvement project at its southern extent), the topographic character in the area (subject property is cross/down-gradient from this landfill site), and groundwater assessment sampling results and flow determinations reported by others in association with the closed landfill facility's on-going monitoring program. Based on information reviewed, it appears elevated arsenic and benzene groundwater levels have been documented at the northeastern and eastern most monitoring wells sampled as part of the program. The northeastern and eastern most monitoring wells appear to be located approximately 100-feet and 200-feet, respectively, from the improvement project's western boundary. Additionally, groundwater flow determinations associated with the on-going monitoring for this facility generally suggest a northeasterly flow direction, in the direction of the subject lands.

High Risk Facilities and Land Uses

1. None identified.

Chapter 22, Section 22-2.7 of FDOT's PD&E guidelines states that a Level 2 Contamination Impact Assessment (CIA) should be conducted, at a minimum, on all sites rated Medium Risk or High Risk. Additionally, all sites with previously documented contamination, whether or not the sites have received closure documentation defining "no existing" contamination onsite, should be tested. Considering the improvements project, it is recommended further consideration with regards to the West Orange Environmental Resources CDS SWF/LF site.

1. The West Orange Environmental Resources C&D site is reported as a closed construction/demolition debris disposal facility with a groundwater monitoring component. Based on a review of public file information gathered from the FDEP's Division of Waste Management OCULUS System, this facility's listing appears notable with respect to the subject property and this assessment at this time (potential for discharges associated with this area landfill listing to have impacted the subject property appears possible). This determination is based on the physical distance from the subject property (adjoining the western boundary of the improvement project at its southern extent), the topographic character in the area (subject property is cross/down-gradient from this landfill site), and groundwater assessment sampling results and flow determinations reported by others in association with the closed landfill facility's on-going monitoring program. Based on information reviewed, it appears elevated arsenic and

benzene groundwater levels have been documented at the northeastern and eastern most monitoring wells sampled as part of the program. The northeastern and eastern most monitoring wells appear to be located approximately 100-feet and 200-feet, respectively, from the improvement project's western boundary. Additionally, groundwater flow determinations associated with the on-going monitoring for this facility generally suggest a northeasterly flow direction, in the direction of the subject lands.

6.5 Cultural Features Including Trails

Several public facilities are planned for the general Horizon West planning area per the Land Use Plan, including schools, parks and trails. Currently, there are no known plans for law enforcement complexes, fire stations, or a public library in the study area.

Several schools are included in the future land use plans that include an Elementary School, a Middle School and a High School (see **Figure 6.1 Current Future Land Use Plan**).

6.6 Archaeological and Historical Features

SouthArc, Inc. conducted an archaeological and historical survey of the project area in August 2020 and is included in **Appendix F**.

No previously recorded archaeological or historic resources are located within the corridor, nor do there appear to be any structures over 50 years old in the area. There is also a degree of disturbance along the corridor from construction of a series of stormwater retention ponds and agricultural activity. However, based on the excessively drained soils and the presence of potential water resources nearby, the area has a medium potential for prehistoric Native American archaeological sites. We recommend that a subsurface survey be conducted within the corridor to make a determination whether such sites are present or not.

Based on an exhaustive internet search, a Sanborn Map is not available for this area.

6.7 Hydrologic and Natural Features

The limits of the corridor analysis are located within the jurisdiction of South Florida Water Management District (SFWMD). The corridor is within the Lake Ingram basin that is part of the Reedy Creek basin (but not in RCID boundary or jurisdiction). The Lake Ingram system receives stormwater runoff and inflows from land that is primarily agricultural with substantial residential development occurring along either side of Avalon Road (CR545). The project site north of SR429 contains a substantial amount of topographic relief with the site and surrounding area discharging towards Lake Ingram

on either side of CR545 and a number of self-contained interconnected depressional surface water and wetland areas. This portion of the Reedy Creek basin can be characterized as having numerous depressions that are virtually land-locked during even the most extreme conditions. Lake Ingram is land-locked. Some drainage from land in Lake County flow toward Lake Ingram but contributes flow only during extreme hydrologic conditions.

6.8 Threatened and Endangered Species

Using methodologies outlined in the Florida's Fragile Wildlife (Wood, 2001); Measuring and Monitoring Biological Diversity Standard Methods for Mammals (Wilson, et al., 1996); and Florida Fish and Wildlife Conservation Commission's Gopher Tortoise Permitting Guidelines (revised January 2017); an assessment for "listed" floral and faunal species was conducted at the site on August 3, 2020. This assessment, which covered approximately 100% of the subject site's developable area, included both direct observations and indirect evidence, such as tracks, burrows, tree markings and vocalizations which indicated the presence of species observed. The assessment focused on species that are "listed" by the FFWCC's Official Lists - Florida's Endangered Species, Threatened Species and Species of Special Concern (updated December 2018) that have the potential to occur in Orange County.

Reptiles and Amphibians

1. black racer
2. brown anole
3. gopher tortoise
4. green anole
5. six-lined racerunner

Birds

1. Black Vulture
2. Blue Jay
3. Northern Mockingbird
4. Northern Cardinal
5. Turkey Vulture

Mammals

1. eastern gray squirrel
2. nine-banded armadillo
3. Virginia opossum

One (1) of the above identified species, the gopher tortoise (*Gopherus polyphemus*), is listed in the FFWCC's Official Lists - Florida's Endangered Species, Threatened Species and Species of Special Concern (updated December 2018). The gopher tortoise (*Gopherus polyphemus*) is currently listed as "Threatened" by FFWCC. The

following provides a brief description of all relevant species as it relates to development of the property.

Gopher Tortoise

1. State Listed as "Threatened" by FFWCC

Currently the gopher tortoise is classified as a "Category 2 Candidate Species" by USFWS, and as of September 2007 is now classified as "Threatened" by FFWCC. The basis of the "Threatened" classification by the FFWCC is due to habitat loss and destruction of burrows. Gopher tortoises are commonly found in areas with well-drained soils associated with the pine flatwoods, pastures and abandoned orange groves. Several other protected species have a possibility of occurring in this area, as they are gopher tortoise commensal species. However, none of these commensal species were observed during the survey conducted.

The subject site was surveyed for the existence of gopher tortoises through the use of pedestrian transects. The survey covered approximately 100% of the suitable habitat present within the subject site boundaries. Ten (10) gopher tortoise burrows were observed and recorded using GPS technology. Based on ten (10) potentially occupied burrows, it is estimated that all ten (10) burrows may be occupied by a gopher tortoise. Therefore, for the purpose of estimating costs associated with the subject project, as many as ten (10) gopher tortoises are estimated to occupy these burrows.

Resolution of the gopher tortoise issue will need to be permitted through FWC during final design.

Bald Eagle

1. State protected by F.A.C. 68A-16.002 and federally protected by both the Migratory Bird Treaty Act (1918) and the Bald and Golden Eagle Protection Act (1940)

Under the USFWS's management plans, buffer zones are recommended based on the nature and magnitude of the project or activity. The recommended protective buffer zone is 660 feet or less from the nest tree, depending on what activities or structures are already near the nest. The USFWS is the regulating body responsible for issuing permits for Bald Eagles. In 2017, the need to obtain a State permit (FFWCC) for the take of Bald Eagles or their nests in Florida was eliminated following revisions to Rule 68A-16.002, F.A.C. A USFWS Bald Eagle "Non-Purposeful Take Permit" is not needed for any activity occurring outside of the 660-foot buffer zone. No activities are permitted within 330 feet of a nest without a USFWS permit.

In addition to the on-site evaluation for listed species, a review of FFWCC's database and Audubon's Eagle Watch program database was conducted for recorded Bald Eagle nests within the surrounding 660 feet of the subject site. This review revealed that there are no Bald Eagle nests through the 2018-2019 nesting season, within 660 feet of the

project site boundaries. Thus, no developmental constraints are expected with respect to Bald Eagle nests.

The Avalon Road (CR545) site is located within three (3) USFWS Consultation Areas which include the Everglade Snail Kite, Florida Scrub-Jay and Sand Skink. The following paragraphs include a list of the USFWS Consultations Areas associated with the subject site. Also included, is a brief description of the respective species habitat and potential for additional review:

Everglade Snail Kite

1. Federally Listed as "Endangered" by USFWS

The subject property falls within the USFWS Consultation Area for the Everglade Snail Kite. Currently the Everglade Snail Kite is listed as "Endangered" by the USFWS. They may occur in nearly all of the wetlands of central and southern Florida. They regularly occur in lake shallows along the shores and islands of many major lakes, including Lakes Okeechobee, Kissimmee, Tohopekaliga (Toho) and East Toho. They also regularly occur in the expansive marshes of southern Florida.

No Snail Kites were observed within the subject site during the wildlife survey conducted. As no suitable habitat exists within the subject property boundaries, no further action should be required pertaining to Everglades Snail Kites.

Florida Scrub-Jay

1. Federally Listed as "Threatened" by USFWS

Currently the Florida Scrub-Jay is listed as threatened by the USFWS. Florida Scrub-Jays are largely restricted to scattered, often small and isolated patches of sand pine scrub, xeric oak, scrubby flatwoods, and scrubby coastal stands in peninsular Florida (Woolfenden 1978a, Fitzpatrick et al. 1991). They avoid wetlands and forests, including canopied sand pine stands. Although the subject site falls within the USFWS Florida Scrub-Jay consultation area, no Florida Scrub-Jays were observed and no suitable habitat for this species exists within the project boundaries. No further action should be required pertaining to Florida Scrub-Jays.

Sand Skink (*Neoseps reynoldsi*)

1. Federally Listed as "Threatened" by USFWS

The subject site falls within the Sand Skink Consultation Area for the USFWS. The sand skink is listed as "Threatened" by the USFWS. The sand skink exists in areas vegetated with sand pine (*Pinus clausa*) - rosemary scrub or a long leaf pine - turkey oak association. Habitat destruction is the primary threat to this species' survival. Citrus groves, residential, commercial and recreational facilities have depleted the xeric upland habitat of the sand skink. All properties within the limits of this consultation area that are located at elevations greater than 80' and contain suitable (moderate-to-well drained soils) soils are believed by USFWS to be areas of potential sand skink habitat.

The results of the pedestrian survey in August of 2020 showed no evidence (i.e., sinusoidal tracks) that indicate the presence of the sand skink. The site is within the USFWS Sand Skink Consultation Area. However, the site consists of graded and maintained roadway easement and does not provide any suitable habitat within the project boundaries. As such, a formal survey is not anticipated to be required by USFWS or any other agency. No further action should be required pertaining to the sand skink.

6.9 Critical and Strategic Habitats and Wildlife Corridors

6.9.1 Wildlife Corridor

The project area was surveyed for the possibility of wildlife corridors (see Environmental Assessment Reports in [Appendix E](#)). A wildlife corridor is defined as a route that permits the direct travel or spread of animals or plants from one area or region to another, either by the gradual spread of a population of a species along the route or by actual movement of animals, seeds, pollen, spores or microbes. Both upland and wetland habitats were inspected along the length of the proposed roadway improvements.

During the site review conducted by Bio-Tech Consulting no significant wildlife corridors were identified along the Avalon Road (CR 545) roadway. The adjacent land uses along the roadway contain a mixture of improved pasture lands, pine plantations, citrus groves, golf courses, and new development. The only area with the potential for wildlife to frequent is the Lake Ingram basin which includes residential homes and agricultural land uses. However, this basin no longer provides any viable wildlife access as the land opposite Lake Ingram is currently cleared for future development. The only remaining habitat east of Avalon Road (CR 545) would include the potential for freshwater turtles to cross the roadway. As such, there are no viable wildlife corridors located along the CR 545 roadway.

6.9.2 Wetlands/Surface Waters

618 – Willow and Elderberry

A portion of the project area contains a previously delineated wetland area which extends west to Lake Ingram. The vegetative community within the roadway easement is most consistent with the Willow and Elderberry (618) FLUCFCS classification. Vegetative species identified within this community type consist of Carolina willow, common buttonbush, saltbush, elderberry, soft rush, maidencane, wax myrtle, Peruvian primrosewillow, guineagrass, greenbriar and wild taro.

The extent of the wetland area within the project limits has been approved under Orange County CAD-19-10-151 and is considered a Class I Surface Water due to its connection to Lake Ingram.

Mitigation for any species found on site will be provided as part of permitting of the final design.

7.0 Traffic Analysis

On behalf of Orange County, a Design Traffic Technical Memorandum (DTTM) titled Avalon Road (CR545) at West Town Center DTTM Draft was prepared to assess future traffic conditions within Horizon Town Center West (included in [Appendix H](#)). The memorandum summarizes years 2027, 2037 and 2047 traffic evaluation of the roadway network within and surrounding Horizon Town Center West.

The existing roadways and intersections within the Project Roadway Network currently operate at an adequate level of service (LOS). However, traffic volumes are expected to increase as the rapid development in western Orange County continues. This section summarizes the analysis scenarios, traffic volumes, and operational analysis for the anticipated opening year (2027), interim year (2037) and design year (2047).

7.1 Traffic Forecast

The study limits for Avalon Road (CR545) extends from Schofield Road to McKinney Road.

In 2019, the Central Florida Expressway Authority (CFX) conducted a study for a new East-West Connector, which is planned to connect SR429 (just south of Schofield Road) in Orange County to US27 in Lake County. The Central Florida Regional Planning Model was modified to incorporate this new proposed connector along with other planned roadways in the area and was used as the basis to develop traffic projections along the Avalon Road (CR545) corridors for the opening year 2027, interim year 2037 and design year 2047 for both the Build and No-Build Scenarios.

7.1.1 Historical Trends Analysis

Based on the historical count information obtained from the FDOT 2019 Florida Traffic Online and the 2019 Orange County Annual Traffic Counts, linear regression trends were performed for the roadway segments within the study area using historical Traffic volumes. Based on the available historical traffic data at these locations, simple annual growth rates were calculated using least square linear regression for each location. An average historical annual growth rate was calculated to be 13.43%. The historical traffic data and trends analysis sheets are provided in [Appendix H](#).

7.1.2 Population Estimates

Low, medium, and high population projections for Orange County were obtained from the most current population projections from Bureau of Economics and Business Research (BEBR) Volume 52, Bulletin 183, dated April 2019. The low, medium, and high population estimates for Orange County obtained from BEBR reported an annual growth rate of 0.62%, 1.42%, and 2.08% per year.

The BEBR average annual growth rate of 1.37% was selected to be included in the final growth rate evaluation.

7.1.3 Model Growth Rates

Simple annual growth rates were calculated using the Central Florida Regional Planning Model (CFRPM) networks 2025 and 2045 Average Annual Daily Traffic (AADT) volumes. An average annual growth rate of 7.27% was determined using the CFRPM model. The model average annual growth rate for the Avalon Road study corridors of 7.27% was used in the final growth rate evaluation.

7.1.4 Recommendation Growth Rates

The growth rates obtained from trends analysis, FSUTMS model scenarios, and population estimates were compared to arrive at the recommended growth rate for Avalon Road study corridors. An average growth rate of 7.36 % was calculated using the historical, BEBR and the model growth rate. Accordingly, an annual growth rate of 7.25% was used to project the future years AADT's for the Avalon (CR545) Study corridors.

7.1.5 Sub-Area Validation

Because the trends analysis is based solely on historical traffic data and does not accurately predict traffic diversion to other roadways associated with roadway capacity improvements and new roadway corridors, the traffic forecasts used for the DTTM analysis will rely primarily on the traffic volume projections obtained from the model runs compared to the growth rate analysis using the existing AADTs. The CFRPM model better reflected the development trends and future capacity increases, due to the major roadway improvements proposed along competing parallel corridors.

The CFRPM-CFX model has a 2017 base validated model, a 2027, 2037 and 2047 future year model networks. Subarea model validation for this study was performed for base year 2020 traffic conditions.

7.2 Future Traffic Conditions

The 2-lane segments on Avalon Road (CR545) will operate below the adopted LOS in the No-Build Scenario for the years 2037 and 2047. Some segments of Avalon Road are expected to operate deficiently for the year 2027.

The evaluation was based on roadway level of service, a method to indicate the operations of a roadway (travel time, congestion, etc.) Avalon Road (CR545) would need to be a four-lane divided section to operate at an acceptable level of service in a future year 2047 build-out condition.

7.2.1 Daily Traffic Projections

The opening year 2027, interim year 2037 and design year 2047 projected AADTs were developed by applying the average annual growth rate of 7.25% to the existing 2020 AADTs for all study roadway segments. It should be noted that for the segments of Porter Road west of Avalon Road, the AADTs for the study years were obtained from the model, because the road is a new roadway segment and no existing counts were available. The projected AADTs for the years 2027, 2037, and 2047 No-Build and Build Scenarios are shown in **Figure 7.1 Projected AADT**



Figure 7.1 Projected AADT

7.2.2 Peak Hour Directional Traffic Projections

Based on the previous recommendations, a K Factor (PM peak hour) of 9.0% was used for Avalon Road (CR545) to calculate the Design Hour Volumes (DHV), and a D Factor of 54.0% on Avalon Road (CR545) was used to calculate the directional volumes.

Turning Movement Projections

A spreadsheet was developed for balancing future turning movement volumes, using the existing turning splits for all approaches, and adjusting those splits based on projected approach volumes for 2027, 2037, and 2047. Input data in the spreadsheet consists of existing turning movement counts (where available), base year 2020 AADTs, opening year 2027, interim year 2037, and design year 2047 projected AADTs, AM and PM peak to daily (K), and directional distribution (D) factors. The printouts of the spreadsheets with the final calculated turning movement volumes are included in Appendix H.

The calculated AM K factor of 0.09, MD K factor of 0.07 and PM K factor of 0.09 and D factor of 0.54 were used to develop the spreadsheets for AM, MD and PM peak-hour to obtain the first estimated turning movement volumes for the years 2027, 2037, and 2047 at each intersection approach for the two scenarios (No-Build and Build). These turning movement volumes were adjusted to best meet the calculated peak hour approach volumes. The projected 2027, 2037, and 2047 turning volumes for the No-Build and Build Scenarios are shown in **Figure 7.2 2027 Intersection Volumes (No Build Scenario)**, **Figure 7.3 2027 Intersection Volumes (Build Scenario)**, **Figure 7.4 2037 Intersection Volumes (No Build Scenario)**, **Figure 7.5 2037 Intersection Volumes (Build Scenario)**, **Figure 7.6 2047 Intersection Volumes (No Build Scenario)**, & **Figure 7.7 2047 Intersection Volumes (Build Scenario)** respectively.

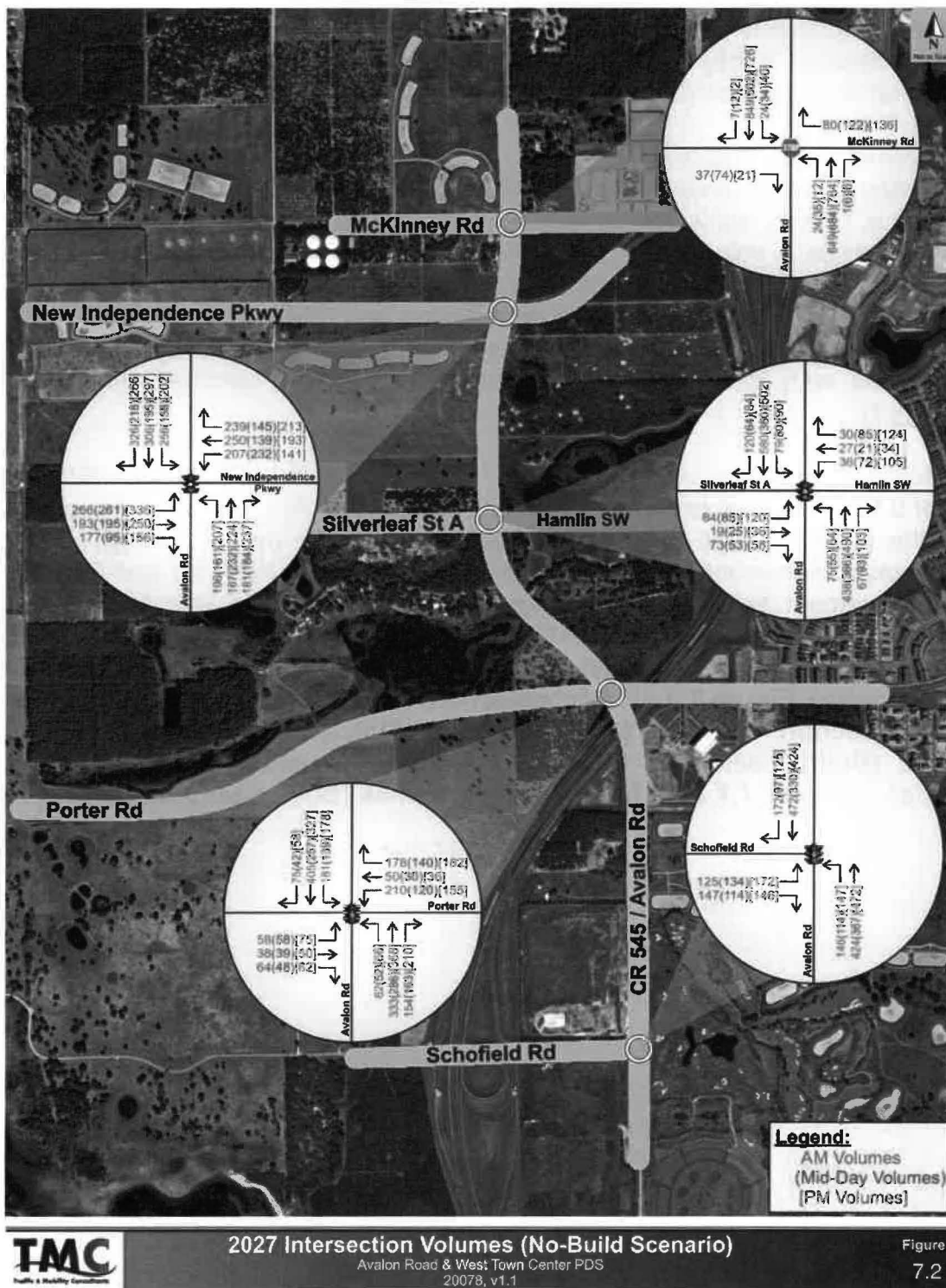


Figure 7.2 2027 Intersection Volumes (No Build Scenario)

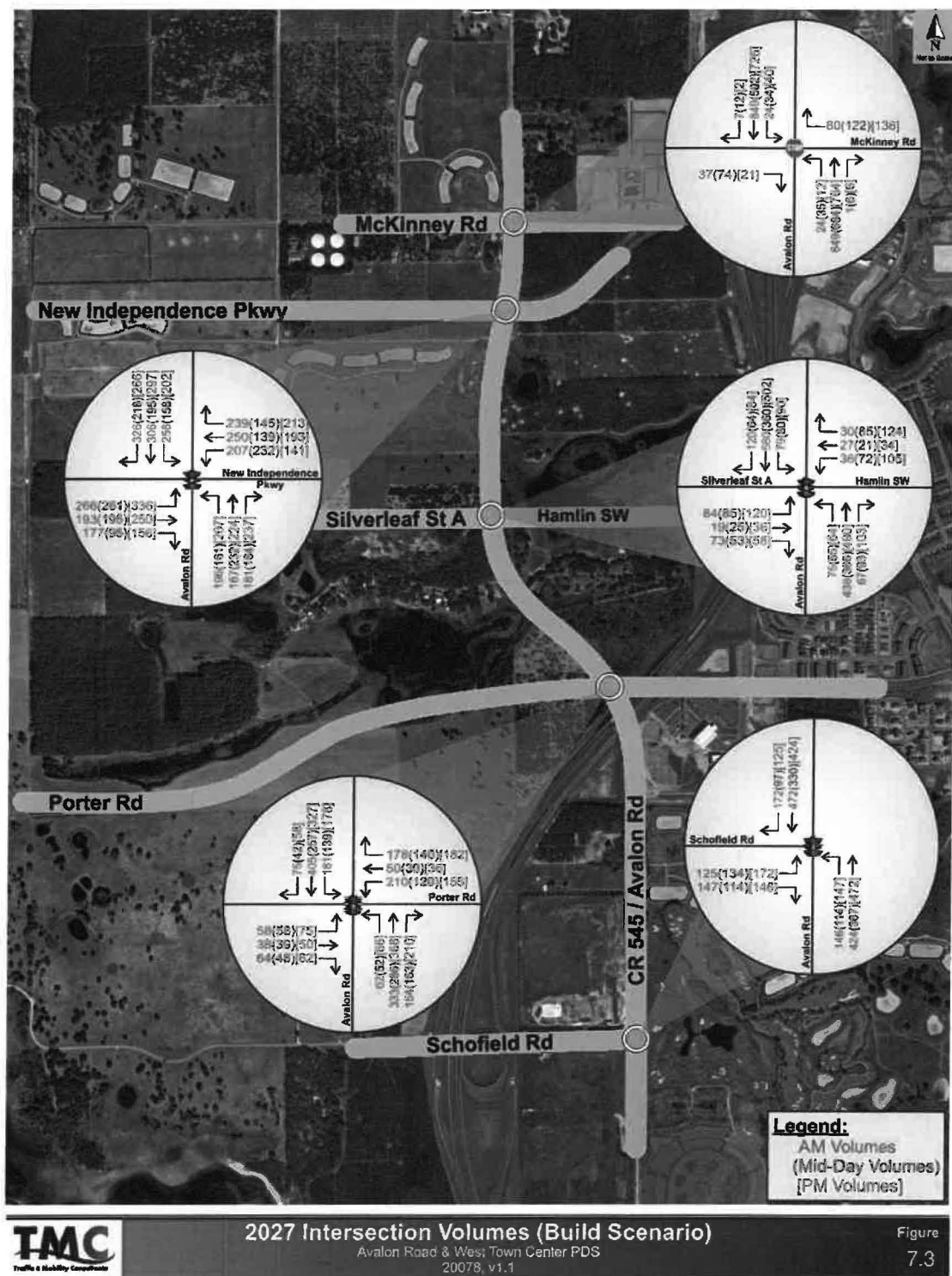


Figure 7.3 2027 Intersection Volumes (Build Scenario)

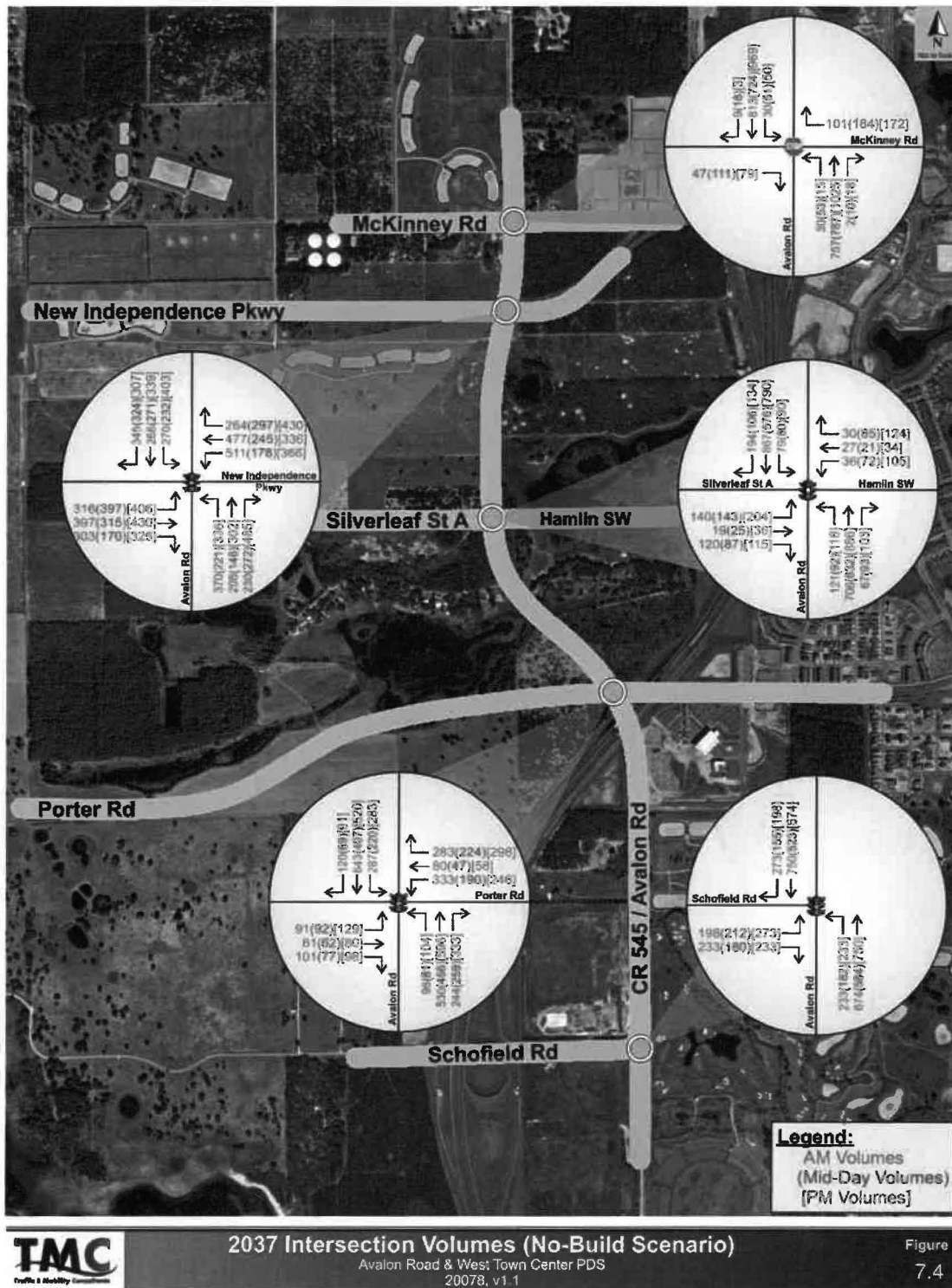


Figure 7.4 2037 Intersection Volumes (No Build Scenario)

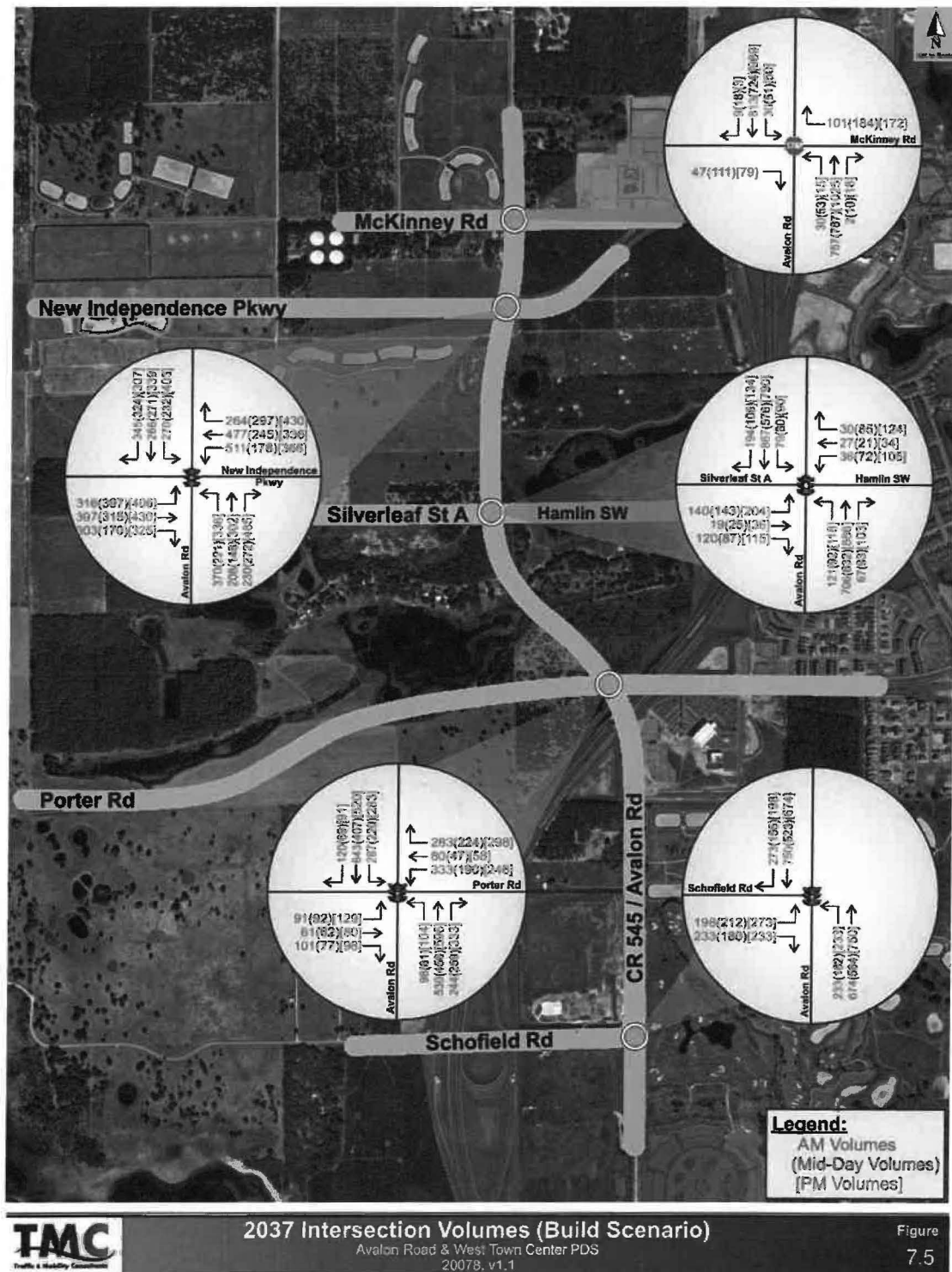


Figure 7.5 2037 Intersection Volumes (Build Scenario)



Figure 7.6 2047 Intersection Volumes (No Build Scenario)

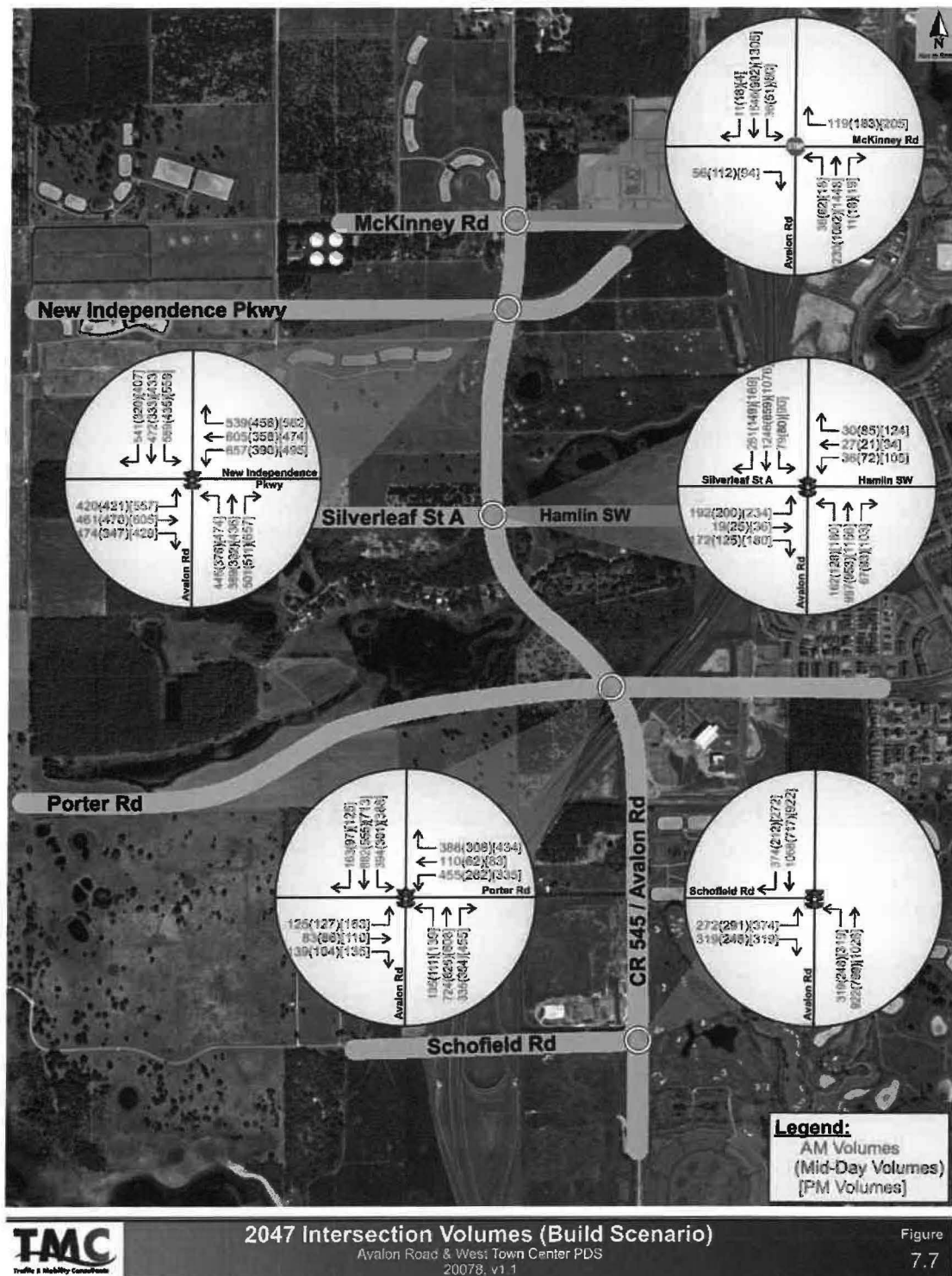


Figure 7.7 2047 Intersection Volumes (Build Scenario)

7.3 Future Conditions

The No-Build Scenario includes Avalon Road (CR545) as a 2-lane undivided roadway within the study limits of this project, while the Build Scenario evaluates Avalon Road (CR545) as 4-lane divided roadway within the study limits of this project. The following intersections were evaluated as part of the analyses of both Scenarios:

1. Avalon Road and McKinney Road
2. Avalon Road and New Independence Parkway
3. Avalon Road and Lake Ingram Road
4. Avalon Road and Porter Road
5. Avalon Road and Schofield Road

7.3.1 Future Conditions Analysis

An analysis of future conditions was conducted by Traffic Mobility Consultants, and their findings are shown in detail in the Design Traffic Technical Memo which is located in **Appendix H**. The analysis was based on estimated turns made by vehicles in each direction at each intersection, shown in **Figure 7.2 2027 Intersection Volumes (No Build Scenario)**, **Figure 7.3 2027 Intersection Volumes (Build Scenario)**, **Figure 7.4 2037 Intersection Volumes (No Build Scenario)**, **Figure 7.5 2037 Intersection Volumes (Build Scenario)**, **Figure 7.6 2047 Intersection Volumes (No Build Scenario)**, & **Figure 7.7 2047 Intersection Volumes (Build Scenario)**. Assumptions were made on the percentage of truck traffic and the amount of vehicular traffic during peak hours of travel. The purpose of this analysis was to determine a level of service, which is the ease with which a driver can use the roadway from LOS A-F. LOS A means traffic is moving freely with no interruptions, while a LOS E is bumper to bumper traffic. The analysis determined a level of service (LOS) for the intersections along Avalon Road (CR545) at 10-year intervals from 2027 to 2047 if the road remains in its current condition and a level of service for the intersections if the proposed widening of Avalon Road described in this PDS is constructed.

7.3.2 No-Build Scenario

Table 7.1 Road Segments Future Operational LOS – No Build Scenario summarizes the results of the No-Build Scenario for 2027, 2037, and 2047 operational LOS for the Avalon Road and all DTTM study segments

Table 7.1 Road Segments Future Operational LOS – No Build Scenario

2027 Road Name	Segment	# of Lanes	A T	LOS Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2027	
							Peak Dir	LOS
Avalon Road	N of McKinney Road	2	U	E	15,717	880	760	C
	McKinney Rd to New Independence Parkway	2	U	E	19,441	880	940	F
	New Independence Pkwy to Lake Ingram Rd	2	U	E	13,135	880	640	C
	Lake Ingram Rd to Schofield Rd	2	U	E	12,063	880	590	C
	Porter Road to Schofield Rd	2	U	E	11,754	880	570	C
	S. of Schofield Road	2	U	E	20,707	880	1,010	F
2037 Road Name	Segment	# of Lanes	A T	LOS Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2037	
							Peak Dir	LOS
Avalon Road	N of McKinney Road	2	U	E	23,276	880	1,130	F
	McKinney Rd to New Independence Parkway	2	U	E	28,790	880	1,400	F
	New Independence Pkwy to Lake Ingram Rd	2	U	E	19,452	880	950	F
	Lake Ingram Rd to Schofield Rd	2	U	E	17,864	880	870	D
	Porter Road to Schofield Rd	2	U	E	17,407	880	850	D
	S. of Schofield Road	2	U	E	30,666	880	1,490	F
2047 Road Name	Segment	# of Lanes	A T	LOS Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2047	
							Peak Dir	LOS

Avalon Road	N of McKinney Road	2	U	E	30835	880	1,500	F
	McKinney Rd to New Independence Parkway	2	U	E	38140	880	1,850	F
	New Independence Pkwy to Lake Ingram Rd	2	U	E	25769	880	1,250	F
	Lake Ingram Rd to Schofield Rd	2	U	E	23666	880	1,150	F
	Porter Road to Schofield Rd	2	U	E	23060	880	1,120	F
	S. of Schofield Road	2	U	E	40624	880	1,970	F

As shown in **Table 7.1 Road Segments Future Operational LOS – No Build Scenario**, the 2-lane segments of Avalon Road (CR545) will operate below the adopted LOS in the No-Build Scenario for the years 2037 and 2047. Some segments of Avalon Road (CR545) are expected to operate deficiently for the year 2027.

Table 7.2: 2027 Intersections Operational LOS- No Build Scenario, Table 7.3: 2037 Intersections Operational LOS- No Build Scenario, and Table 7.4 2047 Intersections Operational LOS No Build Scenario summarize the intersection operational analysis results of the No-Build Scenario for 2027, 2037, and 2047, respectively. The intersections of Avalon Road (CR545) & New Independence Parkway, Avalon Road (CR545) & Porter Road and Avalon Road (CR545) & Schofield Road were analyzed as a directional median opening because the side street volumes are low and do not warrant a signal.

Table 7.2: 2027 Intersections Operational LOS- No Build Scenario

Intersecti on	Traffic Control	Scenario	EB		WB		NB		SB		Overall	
			Delay	L O S	Delay	L O S	Delay	L O S	Delay	L O S	Delay	L O S
Avalon Rd & McKinney Road	TWSC	AM	17.5	C	14.9	B	10.1	B	9.1	A	---	- - -
		Mid	13.7	B	17.0	C	8.9	A	9.3	A	---	- - -
		PM	14.8	B	19.9	C	9.4	A	9.7	A	---	- - -
Avalon Rd & New Independence Pkwy	Signal	AM	40.2	D	36.6	D	34.3	C	37.6	D	37.3	D
		Mid	29.9	C	31.8	C	38.4	D	47.9	D	37.5	D
		PM	68.7	E	43.8	D	41.1	D	49.0	D	51.8	D
Avalon Rd & Lake Ingram Rd	TWSC	AM	14.1	B	---	- - -	9.1	A	---	- - -	---	- - -
		Mid	12.5	B	---	- - -	8.6	A	---	- - -	---	- - -
		PM	10.7	B	---	- - -	8.7	A	---	- - -	---	- - -
Avalon Rd & Porter Rd	Signal	AM	22.8	C	24.6	C	22.9	C	22.1	C	22.8	C
		Mid	26.1	C	27.9	C	29.1	C	25.5	C	27.3	C
		PM	25.7	C	27.3	C	23.4	C	21.8	C	23.9	C
Avalon Rd & Schofield Rd	Signal	AM	21.5	C	---	- - -	13.5	B	19.1	B	17.2	B
		Mid	18.2	B	---	- - -	10.4	B	16.5	B	13.7	B
		PM	24.6	C	---	- - -	17.1	B	22.4	C	20.8	C

As shown in **Table 7.2: 2027 Intersections Operational LOS- No Build Scenario** all study intersections are expected to operate at an acceptable LOS for the year 2027 under the NO-Build Scenario with the proposed intersection controls.

Table 7.3: 2037 Intersections Operational LOS- No Build Scenario

Intersection	Traffic Control	Scenario	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Avalon Rd & McKinney Road	TWSC	AM	17.3	C	17.8	C	10.0	B	9.5	A	---	--
		Mid	18.4	C	24.8	C	9.8	A	9.8	A	---	--
		PM	14.0	B	23.1	C	8.9	A	9.8	A	---	--
Avalon Rd & New Independence Pkwy	Signal	AM	31.2	C	31.6	C	31.2	C	34.1	C	31.9	C
		Mid	25.9	D	29.4	D	29.0	D	32.4	D	29.0	C
		PM	27.1	D	28.2	D	28.6	D	30.5	D	28.3	C
Avalon Rd & Lake Ingram Rd	TWSC	AM	19.8	C	---	--	10.2	B	---	--	---	--
		Mid	13.1	B	---	--	8.7	A	---	--	---	--
		PM	16.3	C	---	--	9.4	A	---	--	---	--
Avalon Rd & Porter Rd	Signal	AM	29.2	C	32.0	C	29.1	C	28.3	C	29.4	C
		Mid	28.8	D	29.6	D	88.7	F	39.5	E	55.6	E
		PM	32.5	D	34.3	D	28.0	D	24.1	C	28.4	C
Avalon Rd & Schofield Rd	Signal	AM	24.4	C	---	--	16.3	B	23.8	C	21.0	C
		Mid	23.7	C	---	--	12.6	B	19.5	C	16.7	B
		PM	23.5	C	---	--	14.7	B	20.3	C	18.6	B

As shown in **Table 7.3: 2037 Intersections Operational LOS- No Build Scenario**, the signalized intersection of Avalon Road and Porter Road is expected to operate below the adopted LOS for the northbound approach on Avalon Road (CR545) under the No-Build Scenario conditions. The remaining study intersections are expected to operate at

an acceptable LOS for the year 2037 under the No-Build Scenario with the proposed intersection controls.

Table 7.4 2047 Intersections Operational LOS No Build Scenario

Intersection	Traffic Control	Scenario	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Avalon Rd & McKinney Road	TWS C	AM	40.1	E	37.9	E	13.5	B	11.6	B	---	---
		Mid	24.6	C	30.3	D	10.7	B	10.3	B	---	---
		PM	90.2	F	>300	F	14.3	B	15.9	C	---	---
Avalon Rd & New Independence Pkwy	Signal	AM	56.3	E	48.2	D	110.7	F	89.6	F	76.5	E
		Mid	36.2	D	34.4	C	92.6	F	54.8	D	55.3	E
		PM	49.0	D	46.3	D	151.5	F	221.9	F	123.2	F
Avalon Rd & Lake Ingram Rd	TWS C	AM	162.1	F	---	---	16.3	C	---	---	---	---
		Mid	35.5	E	---	---	11.7	B	---	---	---	---
		PM	171.2	F	---	---	15.3	C	---	---	---	---
Avalon Rd & Porter Rd	Signal	AM	31.1	C	38.4	D	200.3	F	249.6	F	186.8	F
		Mid	29.5	C	31.1	C	259.1	F	141.2	F	159.0	F
		PM	42.0	D	46.4	D	312.3	F	206.4	F	204.4	F
Avalon Rd & Schofield Rd	Signal	AM	31.2	C	---	---	20.4	C	125.7	F	60.2	E
		Mid	27.6	C	---	---	16.4	B	113.5	F	52.1	D
		PM	48.9	D	---	---	41.1	D	255.0	F	113.8	F

As shown in **Table 7.4 2047 Intersections Operational LOS No Build Scenario** all the signalized intersections are expected to operate below the adopted LOS under the No-Build Scenario conditions. The intersection of Avalon Road and Lake Ingram Road is expected to experience heavy delays on the side street (eastbound approach) resulting in LOS F conditions. Similarly, the intersection of Avalon Road and McKinney Road will experience delays on the side street but with V/C ratios less than 1.0, which is acceptable.

7.3.3 Build Scenario

Table 7.5 Road Segments Future Operational LOS Build Scenario

2027 Road Name	Segment	# of Lane s	A T	LO S Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2027	
							Peak Dir	LOS
Avalon Road	N of McKinney Rd	4	U	E	15,717	2,000	760	C
	McKinney Rd to New Independence Pkwy	4	U	E	19,441	2,000	940	C
	New Independence Pkwy to Lake Ingram Rd	4	U	E	13,135	2,000	640	C
	Lake Ingram Road to Porter Road	4	U	E	12,063	2,000	590	C
	Porter Rd to Schofield Rd	4	U	E	11,754	2,000	570	C
	S. of Schofield Road	4	U	E	20,707	2,000	1,010	C
2037 Road Name	Segment		A T	LO S Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2037	
							Peak Dir	LOS
Avalon Road	N of McKinney Rd	4	U	E	23,276	2,000	1130	C
	McKinney Rd to New Independence Pkwy	4	U	E	28,790	2,000	1400	C
	New Independence Pkwy to Lake Ingram Rd	4	U	E	19,452	2,000	950	C
	Lake Ingram Road to Porter Road	4	U	E	17,864	2,000	870	C
	Porter Rd to Schofield Rd	4	U	E	17,407	2,000	850	C
	S. of Schofield Road	4	U	E	30,666	2,000	1,490	C
2047 Road Name	Segment		A T	LO S Std	AADT	Pk. Hr. Dir LOS Cap	LOS 2047	
							Peak Dir	LOS
Avalon Road	N of McKinney Rd	4	U	E	30,835	2,000	1,500	C

McKinney Rd to New Independence Pkwy	4	U	E	38,140	2,000	1,850	C
New Independence Pkwy to Lake Ingram Rd	4	U	E	25,769	2,000	1,250	C
Lake Ingram Road to Porter Road	4	U	E	23,666	2,000	1,150	C
Porter Rd to Schofield Rd	4	U	E	23,060	2,000	1,120	C
S. of Schofield Road	4	U	E	40,624	2,000	1,970	D

As shown in **Table 7.5 Road Segments Future Operational LOS Build Scenario**, both Avalon Road and New Independence Parkway study corridors are expected to operate at an adequate LOS under the Build Scenario for all projected years.

Table 7.6 2027 Intersection Operational LOS Build Scenario, **Table 7.7 Intersections Operational LOS- Build Scenario** and **Table 7.8 2047 Intersections Operational LOS Build Scenario** summarize the intersection operational analysis results of the Build Scenario for 2027, 2037, and 2047, respectively. The intersection analysis was performed using the proposed intersection geometries provided in **Figure 7.8 Year 2027 Recommended Intersection Geometry** for the opening year 2027 and **Figure 7.9 Years 2037 & 2047 Recommended Intersection Geometry** for the interim year 2037 and design year 2047 Build Scenario.

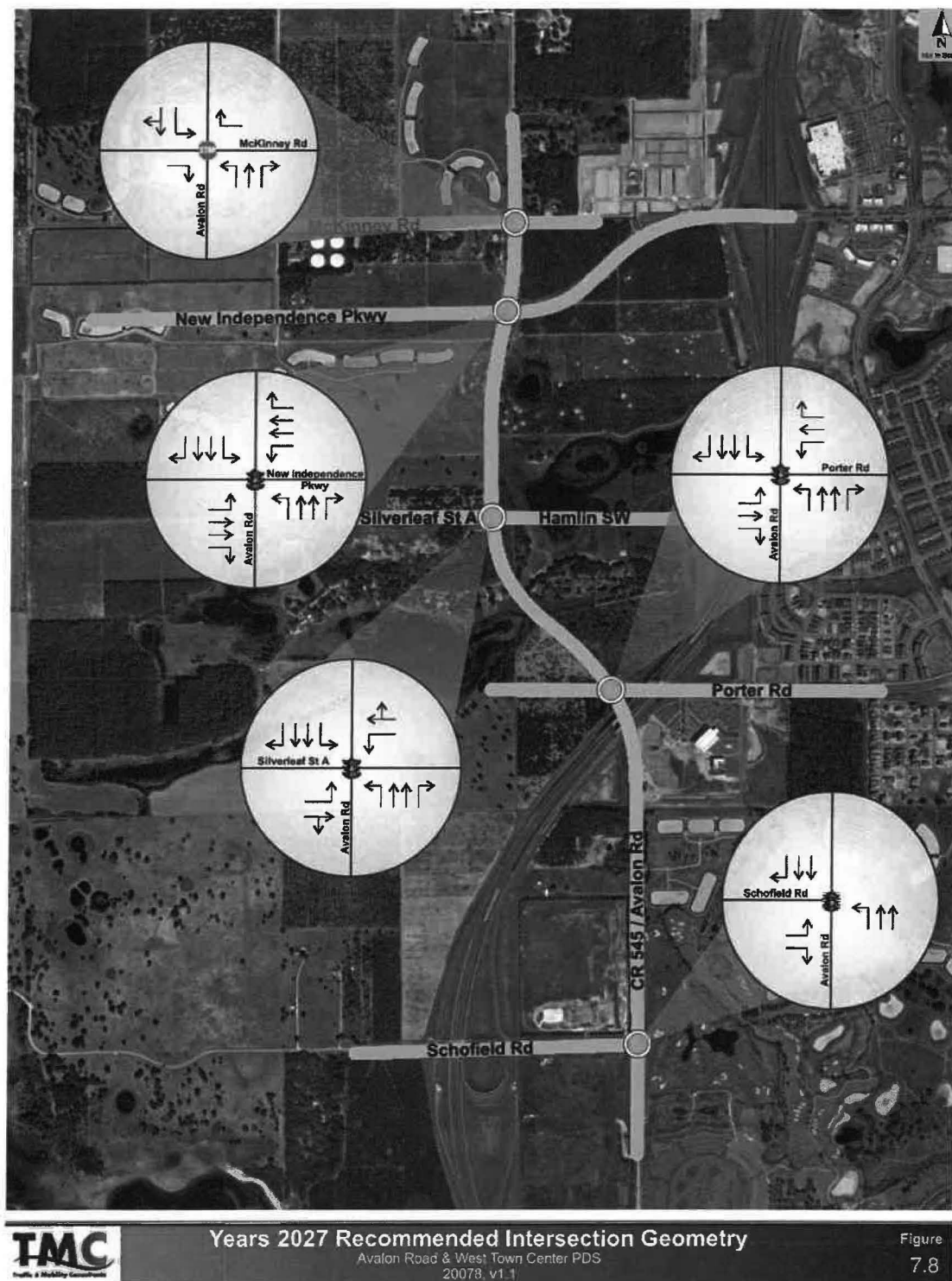


Figure 7.8 Year 2027 Recommended Intersection Geometry

Table 7.6 2027 Intersection Operational LOS Build Scenario

Intersecti on	Traffic Contr ol	Scenar io	EB		WB		NB		SB		Overall	
			Dela y	LO S	Dela y	LO S	Dela y	LO S	Dela y	LOS	Dela y	LO S
Avalon Rd & McKinney	TWS C	AM	17.5	C	14.9	B	10.1	B	9.1	A	---	---
		Mid	13.7	B	17.0	C	8.9	A	9.3	A	---	---
		PM	14.8	B	19.9	C	9.4	A	9.7	A	---	---
Avalon Rd & New Independence	Signal	AM	34.5	C	32.1	C	32.1	C	32.2	C	32.7	C
		Mid	25.5	C	28.1	C	29.8	C	36.6	D	30.1	C
		PM	39.3	D	34.6	C	35.1	D	37.3	D	36.8	D
Avalon Rd & Lake Ingram	TWS C	AM	11.1	B	---	---	9.1	A	---	---	---	---
		Mid	10.5	B	---	---	8.6	A	---	---	---	---
		PM	10.7	B	---	---	8.8	A	---	---	---	---
Avalon Road & Porter Road	Signal	AM	19.8	B	21.6	C	20.5	C	20.1	C	20.4	C
		Mid	21.6	C	23.5	C	20.7	C	21.7	C	21.6	C
		PM	21.3	C	23.1	C	20.6	C	20.5	C	21.1	C
Avalon Rd & Schofield Road	Signal	AM	20.3	C	---	---	12.7	B	17.7	B	16.1	B
		Mid	16.9	B	---	---	9.4	A	15.6	B	12.6	B
		PM	20.9	C	---	---	14.8	B	20.6	C	18.2	B

As shown in **Table 7.6 2027 Intersection Operational LOS Build Scenario** all study intersections are expected to operate at acceptable LOS using the recommended

geometries provided in **Figure 7.8 Year 2027 Recommended Intersection Geometry** for the opening year 2027.

Table 7.7 Intersections Operational LOS- Build Scenario

Intersecti on	Traffic Control	Scenar io	EB		WB		NB		SB		Overall	
			Del a y	LO S	Del a y	LO S	Del a y	LO S	Del a y	LO S	Del a y	LO S
Avalon Rd & McKinney Rd.	TWSC	AM	17.3	C	17.8	C	10.0	B	9.5	A	---	---
		Mid	18.4	C	24.8	C	9.8	A	9.8	A	---	---
		PM	14.0	B	23.1	C	8.9	A	9.8	A	---	---
Avalon Rd & New Independence Parkway	Signal	AM	29.9	C	30.2	C	29.8	C	32.0	C	30.4	30. 4
		Mid	24.1	C	27.4	C	27.9	C	28.9	C	26.9	26. 9
		PM	27.1	C	28.2	C	28.0	C	30.1	C	28.1	28. 1
Avalon Rd & Lake Ingram Road	TWSC	AM	13.0	B	---	---	10.2	B	---	---	---	---
		Mid	10.8	B	---	---	8.7	A	---	---	---	---
		PM	12.0	B	---	---	9.4	A	---	---	---	---
Avalon Road & Porter Road	Signal	AM	23.6	C	24.9	C	20.9	C	19.9	B	21.4	C
		Mid	24.9	C	25.8	C	21.4	C	20.1	C	21.9	C
		PM	25.2	C	26.4	C	21.9	C	20.8	C	22.7	C
Avalon Rd & Schofield Road	Signal	AM	20.5	C	---	---	13.9	B	19.1	B	17.4	B
		Mid	19.9	B	---	---	10.3	B	16.2	B	13.8	B
		PM	19.7	B	---	---	12.3	B	18.7	B	16.0	B

As shown in **Table 7.7 Intersections Operational LOS- Build Scenario**, all study intersections are expected to operate at acceptable LOS using the recommended geometries provided in **Figure 7.9 Years 2037 & 2047 Recommended Intersection Geometry** for the interim year 2037.

Table 7.8 2047 Intersections Operational LOS Build Scenario

Intersection	Traffic Control	Scenario	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Avalon Rd & McKinney	TWS C	AM	40.1	E	37.9	E	13.5	B	11.6	B	---	---
		Mid	24.6	C	30.3	D	10.7	B	10.3	B	---	---
		PM	90.2	F	>300	F	14.3	B	15.9	C	---	---
Avalon Rd & New	Signal	AM	54.2	D	46.6	D	51.6	D	52.2	D	51.0	D
		Mid	32.2	C	30.9	C	64.5	E	36.2	D	41.6	D
		PM	49.0	D	46.3	D	47.7	D	55.6	E	49.9	D
Avalon Rd & Lake Ingram	TWS C	AM	24.9	C	---	---	16.5	C	---	---	---	---
		Mid	16.0	C	---	---	11.8	B	---	---	---	---
		PM	25.0	D	---	---	15.4	C	---	---	---	---
Avalon Road &	Signal	AM	30.3	C	37.5	D	29.3	C	32.3	C	31.7	C
		Mid	29.0	C	30.5	C	30.3	C	28.4	C	29.5	C
		PM	41.5	D	45.9	D	41.0	D	36.5	D	40.2	D
Avalon Rd & Schofield Road	Signal	AM	28.3	C	---	---	17.0	B	25.4	C	22.3	C
		Mid	24.3	C	---	---	11.7	B	18.4	B	16.2	B
		PM	45.5	D	---	---	21.4	C	32.1	C	30.2	C

As shown in **Table 7.8 2047 Intersections Operational LOS Build Scenario**, all study intersections are expected to operate at acceptable LOS using the recommended geometries provided in Figure 7.9 Years 2037 & 2047 Recommended Intersection Geometry for the design year 2047. The side streets at the intersection of Avalon Road (CR545) and McKinney Road are expected to experience delays but the V/C ratios are below 1.0.

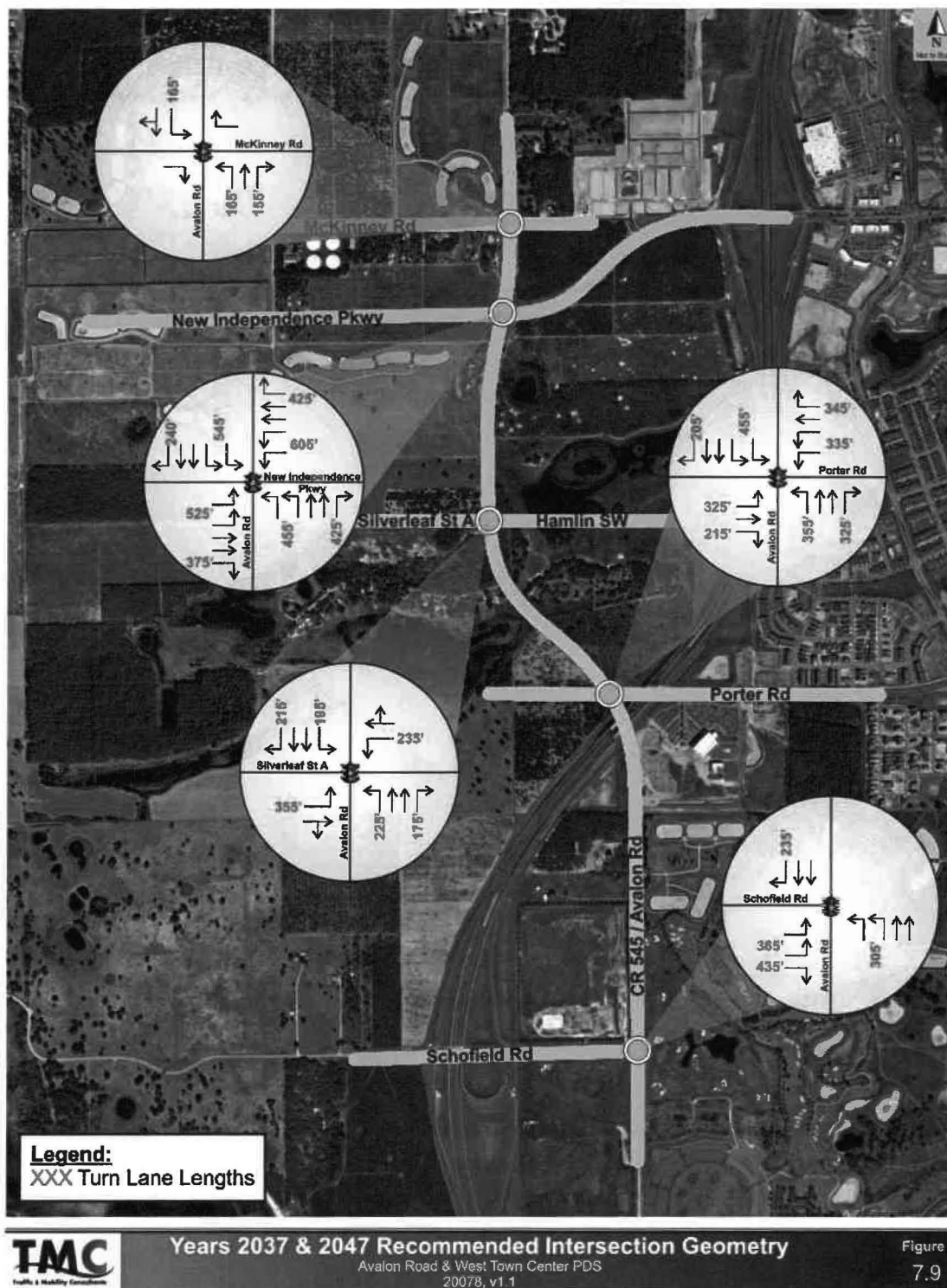


Figure 7.9 Years 2037 & 2047 Recommended Intersection Geometry

7.3.4 Signal Warrants

The results of the signal warrant analysis are summarized below (see Appendix H for full analysis):

1. A traffic signal is warranted for the intersection of Avalon Road and New Independence Parkway.
2. A traffic signal is warranted for the intersection of Avalon Road and Porter Road.
3. A traffic signal is warranted for the intersection of Avalon Road and Schofield Road.
4. All signalized study intersections are expected to operate at acceptable LOS under all future Build scenarios.

7.3.5 Pedestrian Safety

Pedestrian safety is provided with the inclusion of the sidewalk and multi-use trail along both sides of Avalon Road (CR545). Additionally, cross walks will be established at locations that are protected for safe pedestrian use such as at signalized intersections that include pedestrian signals. If mid-block crosswalks are included, they will be appropriately protected per the MUTCD.

8.0 Design Criteria

The design speed, design vehicle and typical section features for this section of CR545 (Avalon Road) are consistent with the section of **CR 545 (Avalon Road) Village H** to the south. The criteria are based on the 2018 Florida Greenbook, the 2021 FDOT Design Manual and the FY 2021-22 FDOT Standard Plans. If the proposed design does not meet the Design Criteria, then either a Design Exception or Design Variation may be needed. The design criteria for this project are shown in ***Table 8.1 Design Criteria***

Table 8.1 Design Criteria

DESIGN ELEMENT		CRITERIA	PROPOSED DESIGN	CRITERIA SOURCE	MEETS DESIGN CRITERIA (Y/N)
		CR 545 (Avalon Rd)	CR 545 (Avalon Rd)		
General Criteria	Functional Classification	Urban Collector	Urban Collector	Roadway Network Agreement	Y
	Context Classification	C4	C4	GB Chapter 1, Section B.2	Y
	Access Management Class	7	7	Rule 14-97.003	Y
	New Construction or RRR	New Construction	New Construction	FDM Section 114	Y
	Design vehicle	WB-62	WB-62	GB Chapter 3 Section C.2	Y
	Design Year	2047	2047	Orange County	Y
	Design Speed (mph)	30-50	40-45	GB Table 3-1	Y
Typical Section	Number of Lanes	4	4	Traffic Projections	Y
	Minimum Lane Width (feet)	11	11	GB Table 3-20	Y
	Turning Lane Width (feet)	11	11	GB Table 3-20	Y
	Bicycle Facility	See Multi-Use Path	See Multi-Use Path	GB Chapter 9	Y
	Min. Multi-Use Path Width (feet)	10	10	GB Chapter 9: C.1	Y
	Minimum Sidewalk Width (feet)	5	6	GB Chapter 8: B.1	Y
	Min. Median width (feet)	22	22	GB Table 3-23	Y
	Typical Section cross slopes	0.02 ft/ft	0.02 ft/ft	GB Ch 3: C.7.b.2	Y
	Clear Zone (feet)	16	25	GB Table 4-1	Y
	Lateral Offset (feet)	4 to face of curb	4 to face of curb	GB Table 4-2	Y
	Multi Use Path Separation Design Speed 45 mph	5' from face of curb		FDM 224.12	Y
	Pedestrian Channelization fence (design speed = 45 mph)	When separation can't be obtained		FDM 224.12	Y
	Crashworthy barrier (design speed greater than 45 mph)				Y

	Roadside Dropoffs	Less than 2' from back of sidewalk & vertical fall greater than 10"	2' flat space behind sidewalk	GB Chapter 8.F Figure 8-4	Y
	Roadside slopes	1:3	1:3	GB Section 4.B.1.a	Y
Horizontal alignment	Max. deflection w/o a curve	2° 00'	N/A	GB Section 3.C.4.b	N/A
	Minimum radius w/o super	2,083	N/A	GB Table 3-11	Y
	Max Degree of Curvature	8° 15'	4° 00'	GB Table 3-11	Y
	Minimum length of curve	400'	523.07'	GB Table 3-8	Y
	Maximum SE	0.05	0.05	GB Chapter 3 Section C.4.c.2	Y
	SE Transition Ratio	1:200	1:200	GB Table 3-13	Y
	Min. stopping sight distance (ft)	360 (<= 2% grades)	360 (<= 2% grades)	Greenbook Table 3-4	Y
	Connection Spacing (Access Classification 5)	125' minimum 330' dir. median 660' full median 1,320' Signal	125' minimum 330' dir. median 660' full median 1,320' Signal	Rule 14-97.003	Y
	Turning Lane Length (feet)	N/A	See DTTM	TMC Traffic Report	
	Intersection Sight Distance	525	TBD	GB Figure 3-17	
Vertical geometry	Minimum SSD (feet)	360 (Grades <= 2%)	Varies by Grade	GB Table 3-4	
	Min K crest vertical curve (design speed = 45 mph)	61	65	GB Table 3-18	Y
	Min K sag vertical curve (design speed = 45 mph)	79	79.2	GB Table 3-18	Y
	Maximum profile grade %	9	5.5	GB Table 3-16	Y
	Minimum profile grade %	0.3	0.3	GB Chapter 3: C.5.b	Y
	Min. length Crest VC (feet)	135	158.56	GB Figure 3-3	Y
	Max. grade change no VC %	0.7	0.7	GB Table 3-17	Y
	Min. Vert. Clearance (feet)	16.5	TBD	FDM Table 260.6.1	Y
	Min. Base Clearance (feet)	2	2	County	Y
	Max change in grade w/out V.C. Design Speed = 40 mph	0.80%	0.80%	GB Table 3-17	Y

	Max change in grade w/out V.C. Design Speed = 45 mph	0.70%	0.70%	GB Table 3-17	Y
	Min Pipe Cover 42" and greater	48"	48"	2021 Orange County Standards & specifications Manual Table 3114-3	Y
Misc.	Control Radius (feet)	60 (50)	50	FDOT Access Management Guidebook Table 13	Y
	Flush Shoulder Driveway Connections (1-way)	15' Min 25' Std 50' Max	15'	Table 214.3.1 Driveway Dimensions	Y
	Flush Shoulder Driveway Connections (2-way)	25' Min 50' Std 75' Max	25'	Table 214.3.1 Driveway Dimensions	Y
Drainage	Inlet Placement Super Elevation Transition (Feet)	10' Before Level Crown	10'	2021 FDOT Drainage Manual 3.7.1.1	Y
	Max Pipe Length 18" Pipe (Feet)	300	300	2021 FDOT Drainage Manual 3.10.1	Y
	Max Pipe Length 24"-36" Pipe (Feet)	400	400	2021 FDOT Drainage Manual 3.10.1	Y
	Max Pipe Length 42" Pipe (Feet)	500	500	2021 FDOT Drainage Manual 3.10.1	Y
	Spread Criteria (Design speed = 45 mph)	6'	6'	2021 FDOT Drainage Manual Table 3.9.1	Y

GB = Greenbook

FDM = FDOT Design Manual

Std Plans = FDOT Standard Plans

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9.0 Corridor Analysis

As stated in the Introduction of this report, the purpose of this PDS is to develop a recommended roadway alignment and recommended pond locations. The recommendations will be based on the evaluation of project costs, cooperation with major land owners for right-of-way location, conceptual drainage analysis, community (socio-economic) impact and environmental impact analysis. The following sections describe how the preliminary roadway alignments and right-of-way widths were determined.

9.1 Roadway Alignment Determination

The roadway study segments were previously identified in Section 1.2 and shown in **Figure 1.3 Roadway Segments**. The proposed alignment for the Project Roadway Network generally follows the existing alignment of Avalon Road (CR545). The alignment for all Segments was suggested in The Roadway Network Agreement².

9.2 Right of Way Width Determination

Based on the anticipated future traffic demand in the study area, all Segments of CR545 are proposed to be a four-lane divided typical section with 11-foot wide travel lanes, a 22-foot wide median (edge of pavement to edge of pavement) and 120 feet of right-of-way. The section includes a 10-foot wide multi-purpose path on the west side, and on the east side includes a six-foot wide sidewalk from Schofield Road to Porter Road and a 10-foot wide sidewalk from Porter Road to McKinney Road; all within the proposed right-of-way. Additional typical section details are presented in Section 10 of this report.

9.3 Design Speed Determination

As previously stated in Section 3.1, existing posted speed limit signs include 45 mph north of Schofield, 55 mph south of SR429 and 1,250 feet south of New Independence Parkway and northbound 45 mph south of Lake Ingram Road and 1,250 feet south of New Independence Parkway. The proposed typical section is designed as a curb and gutter typical section. The Florida Greenbook allows a Design Speed for Urban Collectors of 30-50 mph. The recommended design speed is 40 mph (FDOT Greenbook prohibits design speeds of >45 mph on facilities with curb and gutter). These recommended Design Speeds are within the Greenbook range.

9.4 Community Needs and Preferences

This section will be completed once the Public Involvement activities have been completed.

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10.0 Preliminary Design Analysis

10.1 No-Build Concept

The “No-Build” Alternative assumes no improvements will be made to the existing roadways of the Project Roadway Network. The existing alignment and rural, two-lane configuration will remain. Improvements such as Transportation System Management (TSM) will be considered for this alternative. The TSM approach is to mitigate congestion by identifying improvements of an operational nature to enhance the existing system such as signal improvements, roundabouts, lighting and signing. The “No-Build” Alternative will result in decreased safety and roadway levels of service (LOS) and increased traffic congestion. This deterioration of operating conditions can be attributed primarily to rapid development throughout the Horizon West area, as previously stated in Section 2. Currently, the majority of the land in the vicinity of the study roadway is undeveloped or beginning to be developed.

Advantages to the “No-Build” Alternative include:

1. No final design, right-of-way acquisition, permitting, or construction costs.
2. No environmental impacts related to roadway construction.
3. No utility relocation costs related to roadway construction.
4. No impacts to local residents related to roadway construction.
5. No disruption to existing traffic related to roadway construction.

Disadvantages of the “No-Build” Alternative are:

1. LOS and user safety will decrease.
2. Congestion and travel time delays will increase.
3. Inconsistent with the Village Land Use Classification, Horizon West planning area objectives, and the Village H SAP¹.
4. Inconsistent with the METROPLAN ORLANDO LRTP.
5. Inconsistent with the CP.
6. Air quality will decrease.
7. Emergency vehicle response time will increase.

10.2 Improvement Alternatives Development

In addition to the “No-Build” Alternative, the improvement concepts considered for the Project Roadway Network include TSM and widening of the existing roadway. Within this concept details include four-lane typical sections, raised landscaped medians, a closed stormwater management system, curb and gutter, a six-foot wide sidewalk on one side of the roadway and a 10-foot-wide multi-use path on the other side of the roadway and any other improvements we consider along the way. Consideration will

also be given to providing for crossings for bicyclists and pedestrian crossings between the park/school across Avalon Road (CR545).

Per FDOT, an Intersection Control Evaluation (ICE) is required when new signalization is proposed. The ICE activities consist of three stages: Stage 1 Screening, Stage 2 Preliminary Control Strategy Assessment and Stage 3 Detailed Control Strategy Assessment.

Stage 1 uses FHWA's Capacity Analysis for Planning of Junctions to evaluate selected types of innovative intersection designs. The purpose is to establish a list of viable traffic control strategies. The screening considers and evaluates many potential intersection control strategies. These strategies include Roundabouts.

Stage 2 is an operational analysis that is completed when more detailed information is available.

Stage 3 requires a more in-depth analysis and/or public vetting of control strategy options. This may involve traffic analysis, cost estimating, right-of-way need determination, environmental impacts, public engagement and any other activities necessary to identify the preferred control strategy.

10.3 Alternative Typical Section

Per the approved Roadway Network Agreement², typical sections for Avalon Road (CR545) were approved and utilized for this PDS. No other typical section is applicable for either roadway.

10.4 Proposed Typical Section

The proposed urban typical section for **Avalon Road (CR545)** consists of the following characteristics:

1. Four 11-foot travel lanes (2 in each direction)
2. 22-foot (edge of pavement to edge of pavement) raised grassed median
3. Curb and gutter on outside edge of roadway
4. Six-foot wide concrete sidewalk on the east side of roadway (2% maximum cross slope) (Schofield Road to Porter Road)
5. Ten-foot wide concrete sidewalk on the east side of roadway (2% maximum cross slope) (Porter Road to McKinney Road)
6. 10-foot asphalt multi-use path west side of roadway (2% maximum cross slope)
7. 120-foot-wide right-of-way.

The proposed typical section is shown in **Figure 10.1 Proposed CR545 Typical Section**

A critical component of the proposed typical section is the number of lanes. The Orange County Comprehensive Plan requires that all Adequate Public Facilities (APF) within Town Center West must be designed to accommodate future traffic impacts. The Design Traffic Technical Memorandum evaluated the future year scenario and determined that a four-lane roadway typical section would be required for Avalon Road (CR545).

A unique design aspect for Avalon Road (CR545) is the integration of pedestrian paths as found in the Town Center West comprehensive plan requirements. The proposed typical sections reflect the goal of providing such multimodal connectivity within Town Center West and Horizon West as a whole. As detailed in **Figure 10.1 Proposed CR545 Typical Section**, both a six- and ten-foot-wide pedestrian sidewalk and a 10-foot multi-use path are proposed along Avalon Road (CR545). Additionally, Speed Management measures such as Dynamic Speed Feedback Signs will be considered to control speeds in the areas of parks, schools and the higher density residential and commercial areas to increase safety for pedestrians traveling between these locations.

The proposed typical section for New Independence Parkway has two 12-ft travel lanes in each direction with a 22-ft wide raised median in 120 feet of right-of-way.

Figure 10.1 Proposed CR545 Typical Section

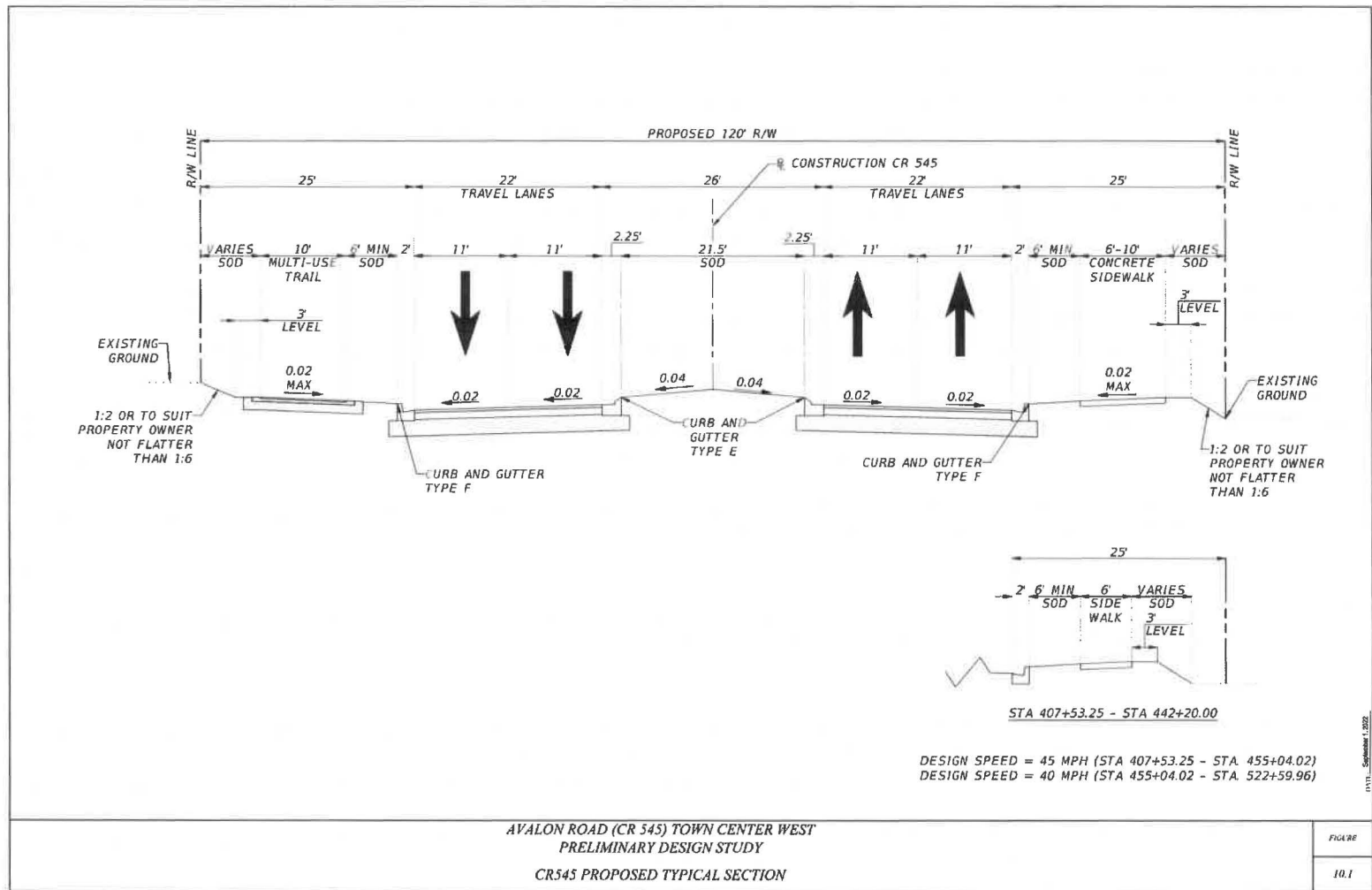
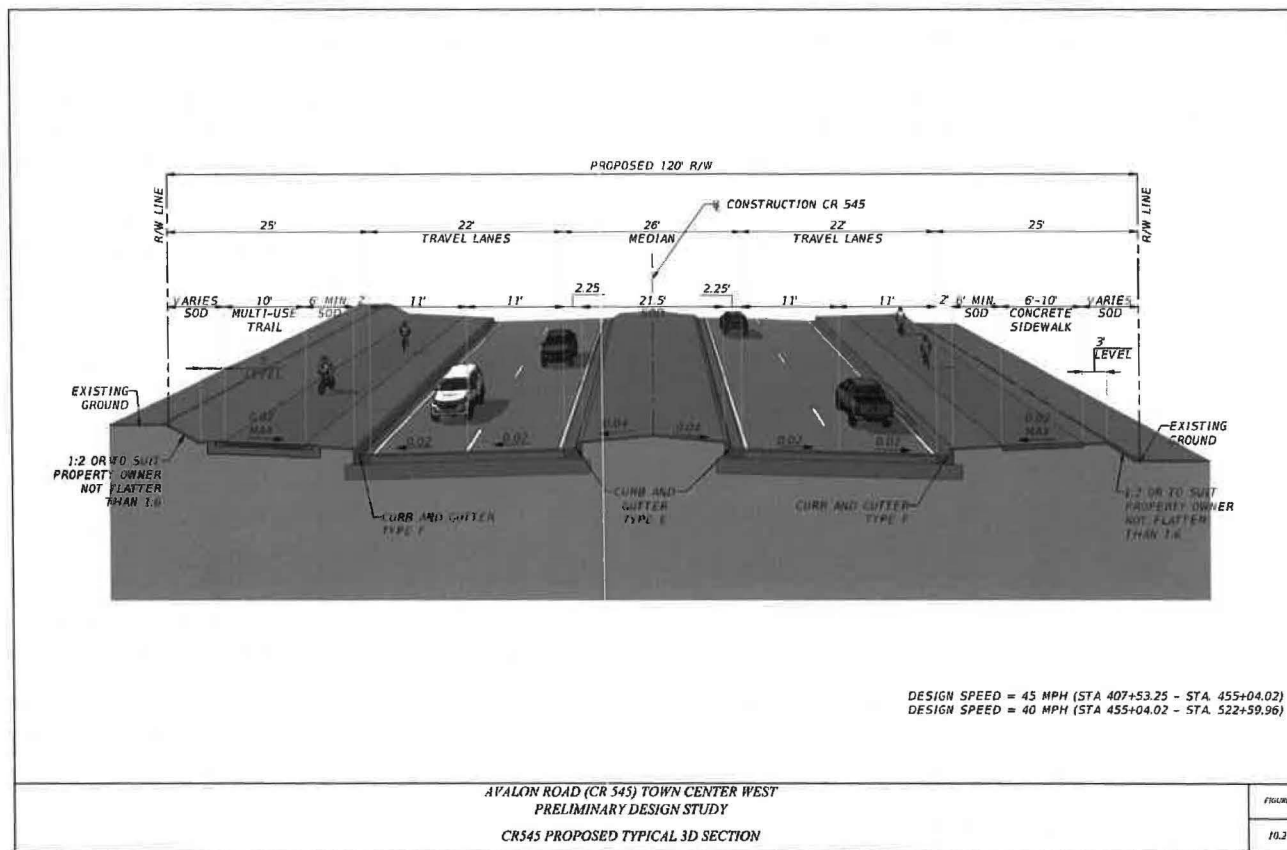


Figure 10.2 Proposed 3D CR545 Typical Section



10.5 Improvement Concept and Map

The preferred roadway alignment is based on minimizing impacts to the existing right-of-way and meeting design criteria. traffic; improved access management and aesthetics; and minimizing environmental impacts, utility impacts, overall project cost, and community disruption during construction.

10.5.1 Preferred Alignment

The preferred alignment involves providing the alignment generally along the existing centerline of Avalon Road (CR545) and widening to either side. The total proposed right-of-way is 120 feet and the required additional width will vary (see [Appendix A](#)). Any right-of-way already dedicated for roadway improvements is not included as an impact. **Table 10.1 Summary of Impacts** lists the impacts for the preferred alignment.

Other factors considered for impact evaluation included: No. of Residences Impacted, No. of Businesses Impacted, Critical and Strategic Habitat, Wildlife Corridors, Threatened and Endangered Species, Archaeological and Historic Features and Contaminated Sites. See Executive Summary

Table ES 1.1 CR545 Evaluation Matrix for a full summary.

Table 10.1 Summary of Impacts

Impact	Segment 1	Segment 2	Segment 3	Total
Right-of-Way (ac)	.74	0.25	2.69	3.68
Wetland (ac)	0.00	0.16	0.00	0.16
Floodplain (ac)	0.00	0.25	0.00	0.25

Based on this analysis the center widening provides the least impacts to right-of-way and the east widening the least impacts to wetlands and essentially the same impacts for floodplains.

10.5.2 Screen Wall Policy

The Orange County Screen Wall Guidelines describe when construction of new screen walls or replacement/rehabilitation of existing screen walls is warranted when constructing or widening adjacent roadways.

The County will construct a new 6 feet high split-face concrete block screen wall for the section of a subdivision affected by the construction or widening of a roadway if all of the following conditions are met:

1. The subdivision has no existing screen wall adjacent to the roadway.

2. The proposed road right of way abuts the property line of the subdivision
3. A landscape buffer or other screening was not accepted by the County in lieu of a screen wall during the subdivision approval process
4. The Average Daily Traffic Volume of the roadway is projected to exceed 8,000 vehicles within 5 years of roadway construction
5. Access rights from all affected lots have been dedicated to Orange County.

If the effective height (height of the wall in comparison to the edge of the roadway) of the majority of an existing subdivision screen wall is reduced by 10% or less due to the construction of a roadway project, such an impact will be considered minor and no action is needed.

The County will construct a replacement screen wall for the section of a subdivision affected by the construction or widening of a roadway if such roadway construction results in the removal of an existing screen wall. The County will also construct a replacement screen wall if the construction work affects an existing screen wall in such a way that the effective height of the majority of the existing screen wall is reduced by 30% or more.

If the effective height of the majority of an existing subdivision screen wall is reduced by more than 10% but less than 30%, such impact will be mitigated by: 1) rehabilitate the affected portion of wall by restoring effective wall height to its pre-roadway construction condition or 2) the subdivision residents may choose replacing the entire section of wall abutting the roadway based on a 50/50 cost sharing with the County. The County will construct a replacement screen wall for the portion affected by the roadway project if the construction results in the removal of an existing screen wall or if the roadway construction affects an existing screen wall that the effective height of the majority of the existing screen wall is reduced by 30% or more.

The final design will coordinate with each development along this section of Avalon Road (CR545) to determine the need for a Screen Wall based on the criteria above. The area south of Lake Ingram Road on the west side of CR545 is an existing neighborhood and a screen wall is proposed here.

10.6 Right of Way Identification

The proposed typical sections and corresponding right-of-way width is based on the Design Traffic Technical Memorandum and Corridor Analysis Technical Memorandum, drainage considerations, transit and multimodal needs.

10.7 Access Management Alternatives

Avalon Road (CR545) is an **Access Management Class 7** Roadway. This is based on the definitions included in Chapter 14-97. This classification limits the spacing between connections (driveways) to a minimum of **125 feet**, the spacing between directional median openings to a minimum of **330 feet**, spacing between full access median

openings to a minimum of **660 feet** and spacing between Signals of **1,320 feet**. The following **Table 10.2 Proposed Access Management** summarizes the proposed access locations and spacing along Avalon Road (CR545). The access management also takes into account the Town Center West SAP¹ Policies. These policies include encouraging connectivity between internal land uses and allow connection of major streets to existing or planned streets outside the Village. Parcel specific connections will be determined and evaluated at the time of Preliminary Subdivision Plans and/or Development Plans based on the approved spacing requirements. The proposed access management was also analyzed in terms of traffic demand to ensure the connectivity required and allow for proposed travel demand.

Each of these openings will provide the required sight distance at final design.

Table 10.2 Proposed Access Management

Side Road	Location Sta/Side	Distance Between Openings (feet)	Proposed Median Access Type
CR 545 (Avalon Road)			
Begin Project Schofield Road	416+00/LT		Full (Signal)
		2,090	
Jaffers Entrance	436+90/LT		Full
		1,050	
Hospital Campus Entrance	447+40/RT		Full
		790	
Porter Road	455+30/Both		Full (Signal)
		820	
Hamlin South 1	463+50/Both		Full
		880	
Lake Ingram Road	472+30/Both		Full
		790	
Silverleaf Entrance (Street A)	480+20/Both		Full (Signal)
		785	
Hamlin South 2	488+05/RT		Full
		765	
Hamlin South 3	495+70/RT		Full
		780	
New Independence Parkway	503+50/Both		Full (Signal)
		980	
End Project McKinney Road	513+30/Both		Bi-Directional

10.8 Analysis and Comparison of Alternatives (Including Costs and Impacts)

The roadway study segments were previously identified in Section 1.2 and shown in **Figure 1.3 Roadway Segments**. The proposed alignment for the Project Roadway Network generally follows the existing alignment of Avalon Road (CR545). The proposed alignment including curve and tangent length data is included in **Appendix A**.

Segment 3 (CR 545): Schofield Road to Porter Road is a west widening. This alignment will require the total project acquisition of approximately 3.69 acres of right-of-way and impacts 0.00 acres of wetlands and 0.00 acres of floodplains. The design and construction of CR 545 from approximately STA. 777+80, just north of the hospital entrance, to STA. 462+10 will be completed by another engineer. Exact limits of this design and construction will be approved by Orange County. See Concept Plans in **Appendix A**.

Segment 2 (CR 545): Porter Road to the new Silverleaf Entrance is a west widening. This alignment will require the total project acquisition of approximately 0.27 acres of right-of-way and impacts approximately 0.16 acres of wetlands and 0.25 acres of floodplains. A portion of this segment of roadway will also be included in the construction and design by others. Porter Road is part of the design area not included in this study. See Concept Plans in **Appendix A**.

Segment 1 (CR 545): From the new Silverleaf Entrance to McKinney Road. This transition will increase the curve radius and eliminate the existing substandard curve. This alignment and right-of-way were anticipated by the development on the east side and will be dedicated to the County. This alignment will require the total project acquisition of approximately 0.71 acres of right-of-way and impacts approximately 0.00 acres of wetlands and 0.00 acres of floodplains. See Concept Plans in **Appendix A**.

The preferred alignment is based on the design criteria and standards, input received from the property owners, and discussions with Orange County staff. The Concept Plans are included in **Appendix A** and show the preferred roadway alignment, preliminary access management plan, and preliminary pond locations. **Figure 10.1 Proposed CR545 Typical Section** shows the proposed typical section for each of the roadway segments. **Figure 10.3 Proposed Drainage Map & Figure 10.4 Proposed Drainage Map**, show the potential right-of-way takes, wetland impacts, and costs for the preferred roadway and pond configuration.

Additional signing should be added in final design north of McKinney Road in the southbound direction to make motorists aware of the reduced speeds ahead. Additionally, the roadway will introduce curb and gutter that will tend to slow motorists as they approach McKinney Road southbound.

The horizontal alignment has been designed using a design speed of 40 mph for Avalon Road (CR545) to allow for a normal crown cross section for most of the corridor with the

exception of the southern curve in the reverse curves in the northern end of the alignment.

The recommended improvement shows preliminary intersections with the proposed APF roads within Town Center West. The final location of the intersections shown and additional future intersections will be provided with final construction plans and in accordance with the established design criteria.

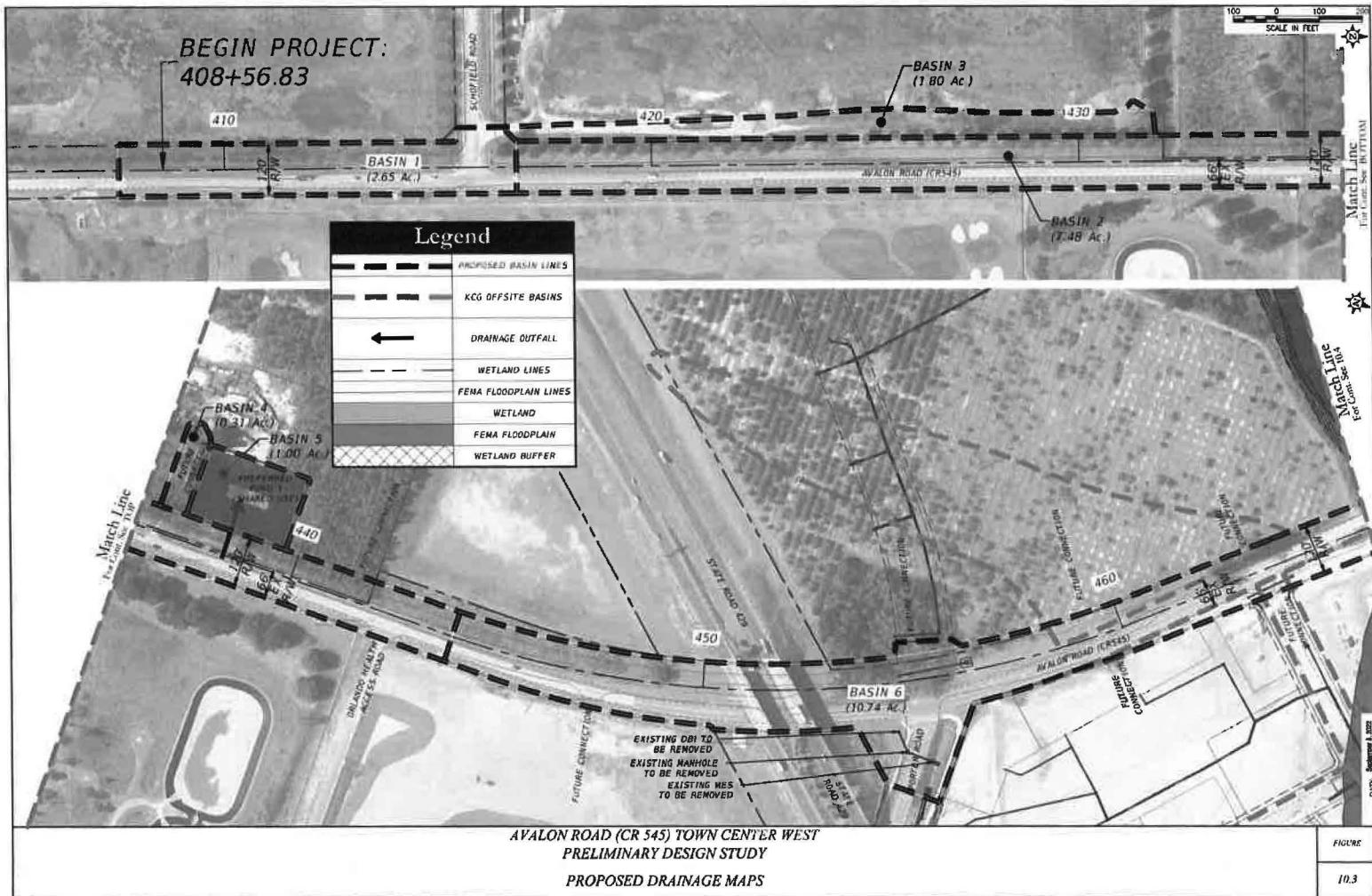
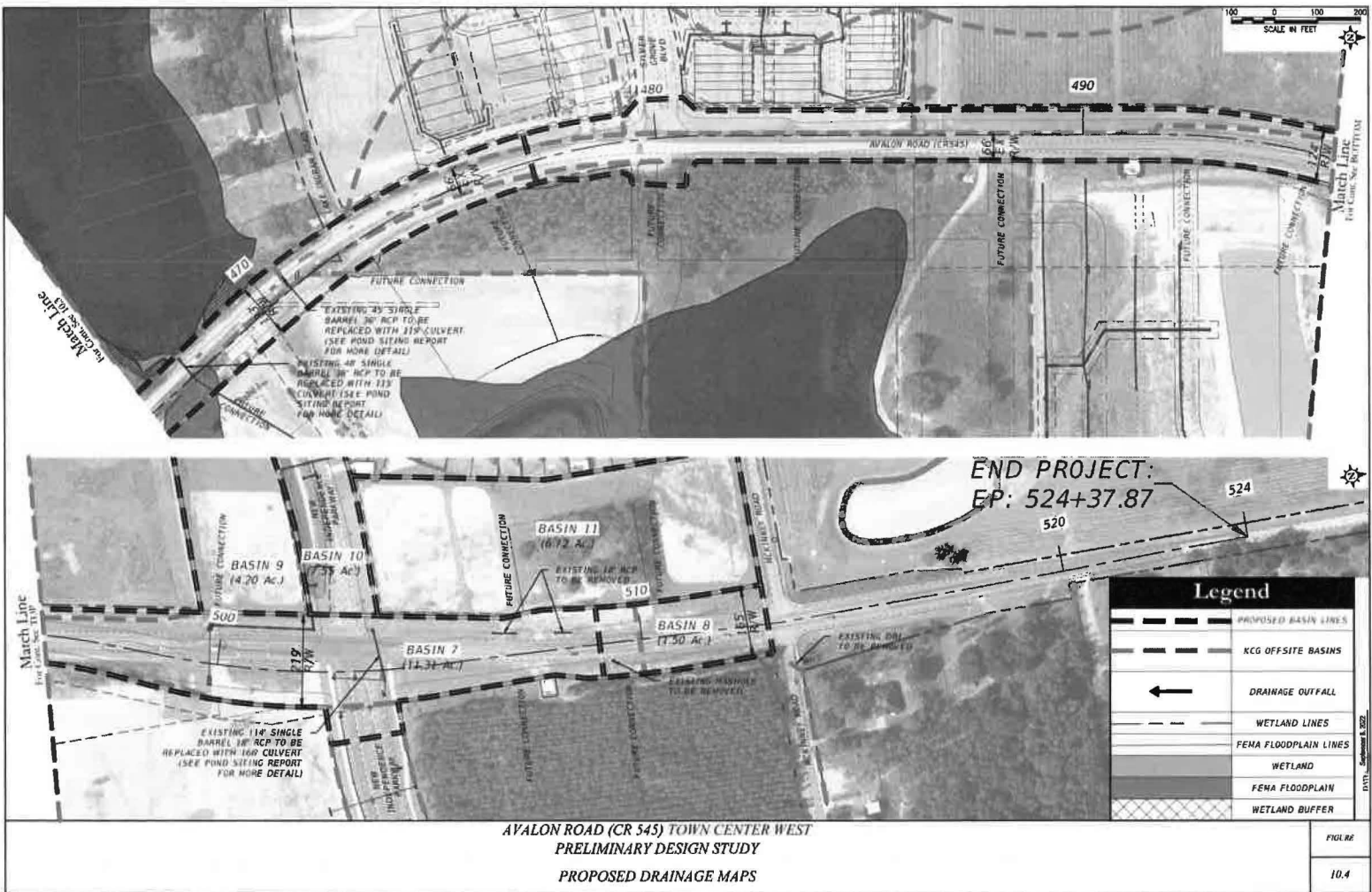


Figure 10.3 Proposed Drainage Map



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10.9 Preliminary Stormwater Analysis

10.9.1 Design Criteria

As discussed in Section 5, the project area is located within the SFWMD. In addition, the corridor lies within tributary drainage basins of Reedy Creek but is not within the jurisdiction of Reedy Creek Improvement District.

Stormwater runoff generated by the proposed roadway improvements will be conveyed, via a closed system, to one new stormwater management pond and one proposed stormwater management ponds designed and constructed by others. Please see **Figure 10.5 Proposed Drainage Map** for the proposed drainage patterns. These ponds will be designed to treat and attenuate runoff prior to discharging downstream in accordance with SFWMD and Orange County criteria. The preliminary pond sizing, based on the future four-laning of Avalon Road (CR545), provided the basis of determining pond right-of-way requirements. The preliminary pond locations are included in the **Concept Plans** in **Appendix A**.

Per guidance in the Comprehensive Plan, the pond sites will be reviewed to determine if ponds can be combined. Due to the rolling terrain along Avalon Road (CR545) this appears not to be feasible.

10.9.2 Alternative Drainage and Pond Concepts

The proposed ponds were sized for the areas within the right of way that will drain to each pond. Based on the criteria set forth by Orange County, the SFWMD treatment volumes, runoff volumes, and limiting discharges were established for each pond and corresponding contributory basins. Calculations are included in **Appendix I**.

A preliminary hydrologic/hydraulic model was developed using Advanced Interconnected Pond Routing (AdICPR).

The potential locations of the ponds are depicted on the Concept Plans in **Appendix A**. See the Pond Siting Report included in **Appendix I** for a detailed analysis of all pond sites. The following summarizes the approach to selecting the pond locations.

CR 545 South Pond 1 (Basin 1) – Jaffers Pond (Segment 1: Sta. 439+00 LT)

Pond 1 will provide water quality and attenuation and is landlocked on the west side of Avalon Road (CR545). See the Concept Plans in **Appendix A**. The pond location is based on proposed profile of the roadway (i.e., topography) and available land

CR 545 South Pond 2B (Basin 2) – Lake Ingram Outfall (Segment 2: Sta. 470+00 RT)

Pond 2B will provide water quality and attenuation and is located next to Lake Ingram. See the Concept Plans in **Appendix A**.

CR 545 South Pond 2A (Basin 3) – Lake Ingram Outfall (Segment 3: Sta. 470+00 RT)

Pond 2A will provide water quality and attenuation and is located next to Lake Ingram. See the Concept Plans in [Appendix A](#).

Table 10.3 Recommended Pond Sites

Pond Name	Basin Limits (Sta)		Total Basin Area ¹	WQ Volume Required	Pond Area ²
	Begin	End	ac.	ac-ft	ac
Pond 1	416+00	444+00	10.95	0.59	1.00
Pond 2B	444+00	479+70	103.66	23.87	11.25
Pond 2A	479+70	509+30	207.10	50.55	21.34

1. Basin area includes developments as needed
2. Pond Tract Area
3. Pond is shared with adjacent development

10.9.3 Existing Cross Drain Modifications

Maintaining existing hydrology will be required with the construction of the proposed roadway improvements. A summary of the existing culverts and proposed improvements is summarized below. Detailed hydrologic and hydraulic calculations for the culverts will be conducted at final engineering. The proposed culvert locations are shown in the **Concept Plans** in [Appendix A](#).

There are five existing cross drains observed within the study area. The proposed roadway alignment will impact these cross drains in terms of lengthening or replacement. The hydraulic effects of these modifications will be assessed at the time of final design. However, as a summary, **Table 10.4 Proposed Cross Drain Improvements** provides general information for the cross-drain modifications. The cross drains will accommodate and bypass offsite flows through the roadway drainage system.

Table 10.4 Proposed Cross Drain Improvements

Cross Drain ID	Location	Culvert Size	Culvert Modification	Description (Outfall)
1	467+54	36" RCP	Replace and Extend	Lake Ingram
2	470+61	36" RCP	Replace and Extend	Lake Ingram
3	503+71	18" RCP	Replace and Extend	Offsite Pond

10.10 Landscaping and Aesthetics

Landscaping and aesthetic improvements along the Project Roadway is proposed to conform to Orange County standards. Landscaping will typically be provided in the grassed median areas and in the grassed border areas adjacent to the travel lanes and sidewalks/paths. All landscaping improvements are recommended to conform to FDOT clear zone and sight distance criteria. A landscape budget of \$75,000/mile is anticipated, and is included in **Table 10.5 Total Cost Analysis for Preferred Alignment**

10.11 Public Involvement

Preliminary contact with Stakeholders was conducted in February 2021. The following agencies were contacted:

1. United States Fish & Wildlife Service
2. Florida Department of Environmental Protection
3. Florida Fish & Wildlife Conservation Commission
4. Orange County Environmental Protection Department
5. Orange County Utilities Department
6. Orange County Fire Rescue
7. Orange County Sheriff's Department
8. MetroPlan Orlando
9. Duke Energy
10. Lake County
11. Reedy Creek Improvement District
12. South Florida Water Management District
13. US Army Corps of Engineers
14. Orange County Public Schools

10.12 Estimated Opinion of Probable Cost

The estimate for the proposed alignment is provided in **Table 10.5 Total Cost Analysis for Preferred Alignment**

Table 10.5 Total Cost Analysis for Preferred Alignment

Alternative	R/W Cost*				Mitigation Cost*	Construction Cost**	Total Project Cost
	Participating		Non-Participating				
	Acres	Cost	Acres	Cost			
CR545 Preferred	5.79	\$130,275	1.28	\$232,051	\$395,920	\$23,622,000	\$24,380,246

Notes:

* R/W for Participating is \$22,500/acre. R/W for Non-Participating is \$181,290.00/acre and does not include the cost of condemnation/eminent domain taking. Mitigation Costs are \$56,000/acre.

**Construction Cost is based on FDOT LRE Project NDUAL-U-05-BB, July 2019 Prices of \$7.545 Million/mile plus \$75,000/mile landscape budget for CR 545.

10.13 Design and Construction Schedules

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Bibliography

SAP Transportation Element by GMB Engineers & Planners, Inc. Initially prepared on January 24, 2008 and Revised on June 10, 2008 by the Board of County Commissioners

Town Center West Road Network Agreement approved by BCC Meeting date September 1, 2020.

