FDOT DISTRICT 7

US 41 (SR 45)

From Kracker Avenue to South of SR 676 (Causeway Boulevard)
Project Development and Environment (PD&E) Study

Draft Preliminary Engineering Report

This Draft Preliminary Engineering Report contains detailed engineering information that fulfills the purpose and need for the proposed widening of US 41 (SR 45) from Kracker Avenue to south of SR 676 (Causeway Boulevard) in Hillsborough County Florida.

December 2015

Florida Department of Transportation
District Seven

Work Program Item Segment No. 430056-1
ETDM Project No. 5180
Hillsborough County

US 41 (SR 45)

From Kracker Avenue to South of SR 676 (Causeway Boulevard)

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Work Program Item Segment No. 430056-1
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Hillsborough County

Prepared for:

Florida Department of Transportation
District Seven

Prepared by:
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This Draft Preliminary Engineering Report contains detailed engineering information that fulfills the purpose and need for the proposed widening of US 41 (SR 45) from Kracker Avenue to south of SR 676 (Causeway Boulevard) in Hillsborough County Florida.

P.E. Certification

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FL PE # 51083

December 2015

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study to evaluate alternative improvements for US 41 (SR 45) from Kracker Avenue (milepoint 15.784) to south of SR 676 (Causeway Boulevard – milepoint 22.791) in Hillsborough County (**Figure 1-1)**, a distance of approximately 7.0 miles. Study objectives include: determine proposed typical sections and develop preliminary conceptual design plans for proposed improvements, while minimizing impacts to the environment; consider agency and public comments; and ensure project compliance with all applicable federal and state laws. Improvement alternatives will be identified which will improve safety and satisfy future transportation demand. A *Draft State Environmental Impact Report* (SEIR) is being prepared for this study.

Purpose and Need – The purpose of the proposed project is to accommodate future traffic demands on US 41 due to growth within the project limits and surrounding areas. This corridor is projected to operate at level of service (LOS) F in the design year (2040) if no increase in capacity is provided. Other factors which support the need for the project include: regional connectivity, safety, plan consistency, emergency evacuation, and modal interrelationships.

Existing Conditions – The existing highway is an urban principal arterial with access management classification 3 in most areas. Some areas within Gibsonton have median opening spacing that is much closer than class 3 standards. The existing highway has four-lane rural typical sections with 40-foot medians south of Palm Avenue and north of the Alafia River and four-lane urban typical sections with varying median widths between these two locations (**Figure 4-2**). The typical section between Gibsonton Drive and the Alafia River includes a ditch on the east side which is shared with the CSX railroad. Existing right of way (ROW) is 182 feet wide south of Palm Avenue and north of the Alafia River and varies from 100 to 117 feet between these two locations. The posted speed limit is 55 miles per hour (mph) south of Symmes Road and north of Riverview Drive and 50 mph between these two locations. There are a total of six signalized intersections within the study limits (excluding the intersection at Causeway Boulevard). Sidewalks and bicycle accommodations are nonexistent in some areas. The existing horizontal and vertical alignment generally meets existing design standards. The bridges over the Alafia River provide about 29 feet of vertical navigational clearance. In the rural typical section areas, drainage is provided by a system of swales and ditches. Within the urban typical section area ("north Gibsonton"), stormwater runoff from US 41 is collected by a system of underground inlets and pipes. The entire project study limits are located within FEMA 100-year Flood Zone AE ("base flood elevations determined" – **Figure 4-9**).

There are numerous utilities within the study area, including an ammonia pipeline which runs along the west side of US 41 and a Florida Gas Transmission gas pipeline which crosses US 41 at Riverview Drive.

The existing bridges over Bullfrog Creek use reinforced concrete slabs supported by pile bents and were built in 1945 and 1960; they are classified as functionally obsolete and one of them is scour critical. There are also two bridges over the Alafia River: the northbound bridge was constructed in

1952 using continuous steel I-beams. The southbound bridge was built in 1959 using AASHTO Type II beams with the 78' main span beam using post tensioning. Both of these bridges are also classified as functionally obsolete. The CSX railroad crosses the river directly east of the highway bridges on a low level bridge which includes a swing-span bridge in the middle.

Planning Phase/Corridor Analysis – Prior to the beginning of the PD&E study phase, the project was entered into the FDOT's Efficient Transportation Decision Making (ETDM) system. An ETDM *Final Programming Screen Summary Report* was published on April 10, 2013 as ETDM Project number 5180. A separate corridor analysis was not conducted as part of this study since the purpose of this PD&E study was to identify concepts for widening the existing highway (within the existing corridor) consistent with the Hillsborough County MPO's 2040 Long-Range Transportation Plan.

Design Criteria – **Section 6** of this report includes tables showing the proposed roadway design criteria and FDOT's standards for access management.

Traffic Data – Existing annual average daily traffic (AADT) ranges from 23,400 vehicles per day (VPD) to 32,500 VPD; by design year 2040, AADTs are expected to range from 38,800 VPD to 61,000 VPD within the study limits. Two intersections currently operate at level of service (LOS) D during peak hours; by 2040, if no improvements are made, six intersections are expected to operate at LOS E or F. With the recommended intersection improvements, in year 2040, all signalized intersections would operate at LOS D or better if Hillsborough County also widens the county road approaches at these locations. Without the county's participation, the signalized intersections will operate at LOS E or F during at least one peak period.

Alternatives Analysis – For the Build Alternatives evaluation, alternative six-lane suburban typical sections were evaluated for the areas with the existing 182-foot ROW since these can be constructed within the existing ROW. A 30-foot median was recommended instead of a 40-foot median in order to eliminate the need for a design variation for border width. Alternatives were considered that both use and don't use the existing pavement (**Figure 8-1**). The use-existing-pavement alternative was found to be the best from a construction staging standpoint. For the north Gibsonton area where the ROW is much narrower, a six-lane urban typical section is the only practical option; alternative alignments studied included west-shifted, centered, and east-shifted. The estimated ROW costs were summarized in an evaluation matrix (**Table 8-1**), and the recommended alignment is based on a combination of lower ROW costs as well as FDOT's goal to minimize or avoid the need to acquire ROW from CSX Transportation. The resulting recommended alignment in the north Gibsonton area is east-shifted south of Gibsonton Drive, transitioning to a west-shifted alignment between Gibsonton Drive and the Alafia River.

Recommended Build Alternative – The recommended urban typical sections for the north Gibsonton area are shown in **Figure 8-2**, and the recommended suburban typical sections for the other areas are shown in **Figure 8-3**. **Appendix G** includes preliminary conceptual design plans showing the recommended build alternative. Recommended pond sites for stormwater management and floodplain compensation will be determined during the future design phase.

Recommended typical sections for the replacement bridges at Bullfrog Creek and the Alafia River are shown in **Figure 9-4**. These include a 12-foot shared use path on the west side to accommodate the future South Coast Greenway which is being planned by Hillsborough County (**Figures 9-1** and **9-2**). Preliminary estimated project costs are shown below:

Component	Estimated Cost ($millions)
Construction of Roadway, Bridges and Ponds	110
Right of Way for Roadway Only	14
Right of Way for Stormwater Ponds and Floodplain Compensation Sites	17
Wetlands Mitigation	1.0 +/-
Design & Construction Inspection (20%)	$22
Totals	$164

Section 9.19 of this report includes **Table 9-6** which summarizes the recommended changes in median openings and median opening spacing, to better meet the requirements for Access Class 3. Numerous median openings are either proposed to be closed or converted to directional median openings to provide a safer transportation facility. No changes in the access management classification are proposed. A public hearing is planned to be held later in the PD&E study process.

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Appendices

List of Figures and Tables

SECTION 1 SUMMARY OF PROJECT

1.1 SUMMARY STATEMENT

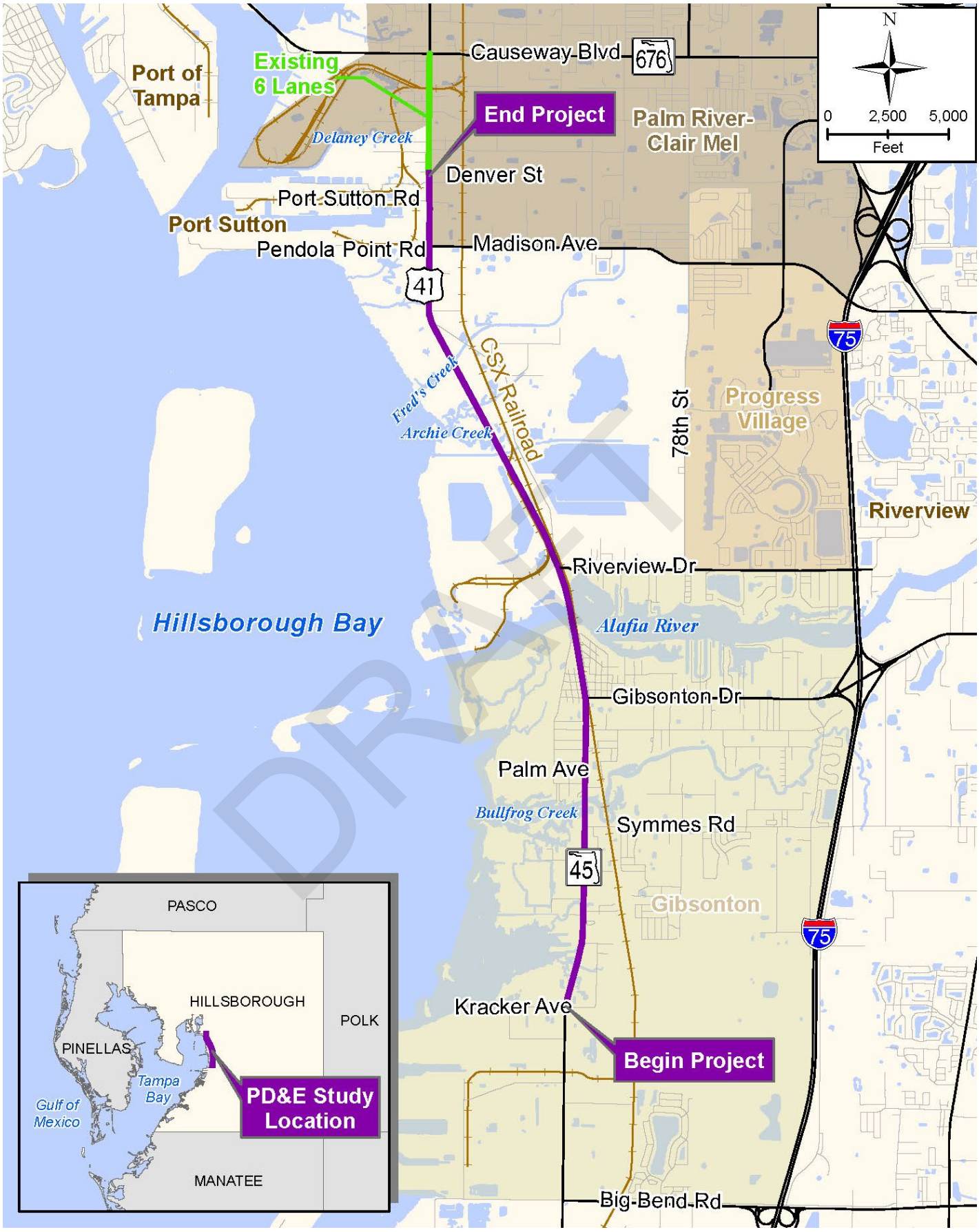
This *Draft Preliminary Engineering Report* contains detailed engineering information that fulfills the purpose and need for the proposed widening of US 41 (SR 45) between Kracker Avenue and SR 676 (Causeway Boulevard) in Hillsborough County Florida (**Figure 1-1**).

1.2 COMMITMENTS AND RECOMMENDATIONS

To be included in the final edition of this report, following the public hearing.

1.3 DESCRIPTION OF PROPOSED ACTION

The proposed Florida Department of Transportation (FDOT) project involves the widening of US 41 (SR 45) from Kracker Avenue (milepoint 15.784) to south of SR 676 (Causeway Boulevard - milepoint 22.791), in Hillsborough County. The study limits length is approximately 7.0 miles. US 41 is already six lanes to the north of the current study limits. The highway is proposed to be widened/reconstructed from an existing, four-lane divided rural and urban facility to a six-lane divided facility, with suburban typical sections in the areas with the existing 182-foot right of way (ROW) and an urban typical section in the north Gibsonton area where the ROW is much narrower. In addition, the bridges over Bullfrog Creek and the Alafia River are proposed to be replaced and include space for the future South Coast Greenway, which will run parallel to US 41 in several areas. The proposed improvements will include construction of stormwater management facilities and floodplain compensation sites and improvements at major intersections, in addition to inclusion of multimodal facilities (trail, pedestrian, bicycle and transit accommodations).



US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676 (Causeway Blvd)
WPI Segment No. 430056-1 Hillsborough County

Location and Study Area Map

Figure 1-1

SECTION 2 INTRODUCTION

2.1 PROJECT DEVELOPMENT AND ENVIRONMENT STUDY PROCESS

The objective of the Project Development and Environment (PD&E) study is to help the FDOT and any federal agencies reach a decision on the type, location, and conceptual design of the necessary improvements to US 41 to safely and efficiently accommodate future travel demand. Factors considered include transportation needs, socioeconomic and environmental impacts, engineering requirements and cost estimates. In general terms, the process involves the following steps:

1. Verifying the project purpose and need developed during the ETDM screening process
2. the gathering and analysis of detailed information regarding the natural and cultural features of the study area in addition to engineering data
3. the development and evaluation of alternatives for meeting the project need
4. the selection of a Preferred Alternative, and
5. documenting the entire process in a series of reports

During the process, communication with the affected public is accomplished directly, through small-group meetings and a public hearing, and indirectly, through interaction with elected officials and agency representatives. The PD&E study process is designed to satisfy all applicable state and federal requirements, including (for federal documents) the National Environmental Policy Act (NEPA), in order for this project to qualify for federal-aid funding of subsequent project phases (design, right of way acquisition and construction) or to simply advance to subsequent phases in the case of a *State Environmental Impact Report* (SEIR). In addition to the Build Alternative, the No-Build Alternative is also considered as part of the study process.

2.2 PROJECT HISTORY AND BACKGROUND

Prior to the beginning of the PD&E study phase, the project was entered into the FDOT's Efficient Transportation Decision Making (ETDM) system. An ETDM *Final Programming Screen Summary Report* was published on April 10, 2013 as ETDM Project number 5180. A SEIR is being prepared as part of this study.

2.3 PURPOSE OF REPORT

The purpose of this report is to document all of the engineering-related aspects associated with the proposed widening of US 41. Separate reports are being prepared to document environmental effects and public involvement efforts (see **Section 10** for list).

SECTION 3 PURPOSE AND NEED FOR PROJECT

US 41 within the study area plays a significant role in connecting southern Hillsborough County to the Tampa Bay region. The purpose of the proposed project is to accommodate future traffic demands on US 41 due to growth within the project limits and surrounding areas. This corridor is projected to operate at level of service (LOS) F in the design year (2040) if no increase in capacity is provided. Factors which support the need for the project include:

Regional Connectivity - US 41 is a major north-south regional arterial that parallels I-75 and US 301 and connects south Hillsborough County to the Tampa Bay region. It provides connectivity between the communities of Apollo Beach, Riverview, and Gibsonton. US 41 is a "regional road" according to the West Central Florida Metropolitan Planning Organization's (MPO's) Chairs Coordinating Committee (CCC). US 41 also provides highway access to the Port of Tampa facilities at Pendola Point and Port Sutton.

Safety - With the additional capacity provided in the corridor by the widening of US 41 from four to six lanes, roadway congestion will be reduced, which will decrease potential conflicts with other vehicles and potentially increase safety. An analysis of traffic crash data for years 2008 thru 2012 revealed that the overall average crash rate within the study limits was lower than the statewide average crash rate for similar type facilities. While not structurally deficient, the bridges over both Bullfrog Creek and the Alafia River are classified as functionally obsolete due to substandard-width shoulders. In addition, the sidewalks on the bridges are very narrow and there are no provisions for bicyclists on the bridges.

Plan Consistency - This project is consistent with the Comprehensive Plan for Unincorporated Hillsborough County. The Hillsborough County *Imagine 2040 Long-Range Transportation Plan (LRTP)* indicates a need to widen US 41 to 6-lanes from 19th Avenue to north of Madison Avenue, "beyond 2040". In addition, a short segment between Madison Avenue and Causeway Boulevard is shown as 6 lanes in the Cost Feasible FDOT Strategic Intermodal System Projects, with design after year 2026.

Hillsborough County has designated US 41 between Madison Avenue and Palm River as a Constrained Road, as shown in **Figure 3-1**.

Emergency Evacuation - US 41 is listed as an evacuation route by the Hillsborough County Emergency Management and shown on the Florida Division of Emergency Management's evacuation route network. US 41 provides access to I-75 via interchanges with east-west connections on Gibsonton Drive, Big Bend Road (CR 672) and SR 60 in close proximity to the study limits.

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Constrained Roads Within the Study Area**	**Figure 3-1**

Current and Future Transportation Demand - Traffic in the corridor is expected to increase due to projected population and employment growth along the corridor. In 2013, the Annual Average Daily Traffic (AADT) ranged between 23,400 vehicles per day (VPD) (Level of Service [LOS] B) and 36,400 VPD (LOS B) within the study area according to the *Design Traffic Technical Memorandum*. With a maximum AADT of 32,350 VPD over the four lane section, US 41 is at 88 percent capacity for the adopted level of service standard of D. The current Tampa Bay Regional Planning Model (TBRPM) – Version 7.1 indicates that the AADTs in 2035 are expected to range between approximately 46,100 VPD and 72,750 VPD. The existing four lane cross section would result in a LOS F with the future projected traffic volume. The widening of this facility is also intended to provide relief to parallel facilities such as I-75 and US 301.

Modal Interrelationships – Expansion of the existing roadway would help improve mobility for the Hillsborough Area Regional Transit (HART) Authority local bus route 31 within the corridor. Bicycle and pedestrian accommodations will also be considered as part of the proposed improvements.

US 41 is part of the highway network that provides access to regional intermodal facilities such as the Port of Tampa and Port Manatee. The segment of US 41 between Madison Avenue/Pendola Point Road and SR 676 is designated as a *Strategic Intermodal System* (SIS) connector. The SIS is a statewide network of highways, railways, waterways, and transportation hubs that handle the bulk of Florida's passenger and freight traffic. Improvements to US 41 would enhance access to activity centers in the area and would improve movement for goods and freight in the Tampa Bay region and across the State.

SECTION 4 EXISTING CONDITIONS

4.1 EXISTING ROADWAY CHARACTERISTICS

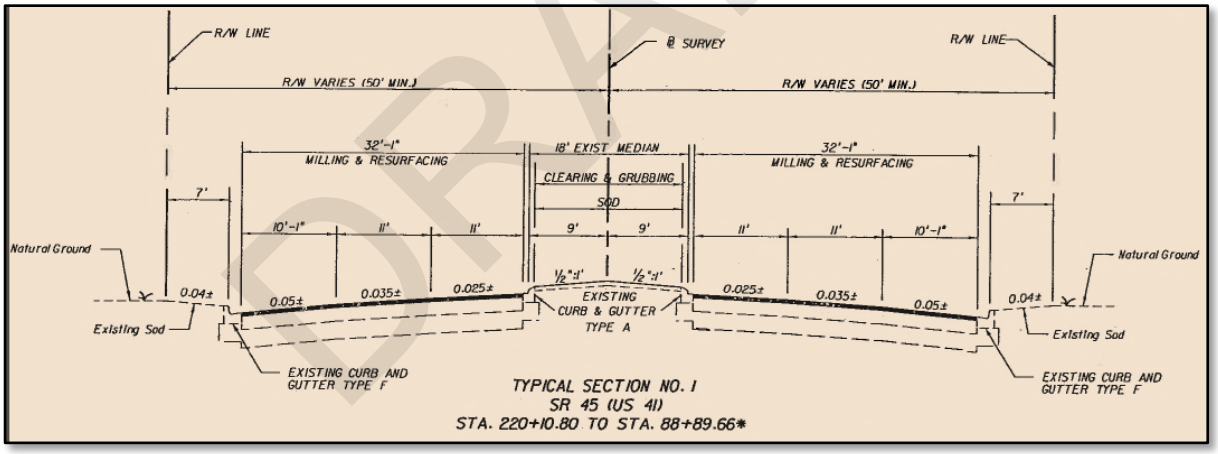
4.1.1 Roadway Classification and Access Management

The existing highway is functionally classified as an "urban principal arterial – other" within the study limits. The existing access management classification is mostly Class 3, which requires minimum 1/2 mile spacing for full median openings and traffic signals and 1/4 mile spacing for directional median openings. US 41 is Access Management Class 7 north of Port Sutton Road. There are several areas which currently do not meet the minimum spacing standards for full median openings – these are primarily in the north Gibsonton area, where the average full median opening spacing is as close as 1/10 mile. FDOT's standards for access management are included in **Section 6.**

4.1.2 Typical Sections and Posted/Design Speeds

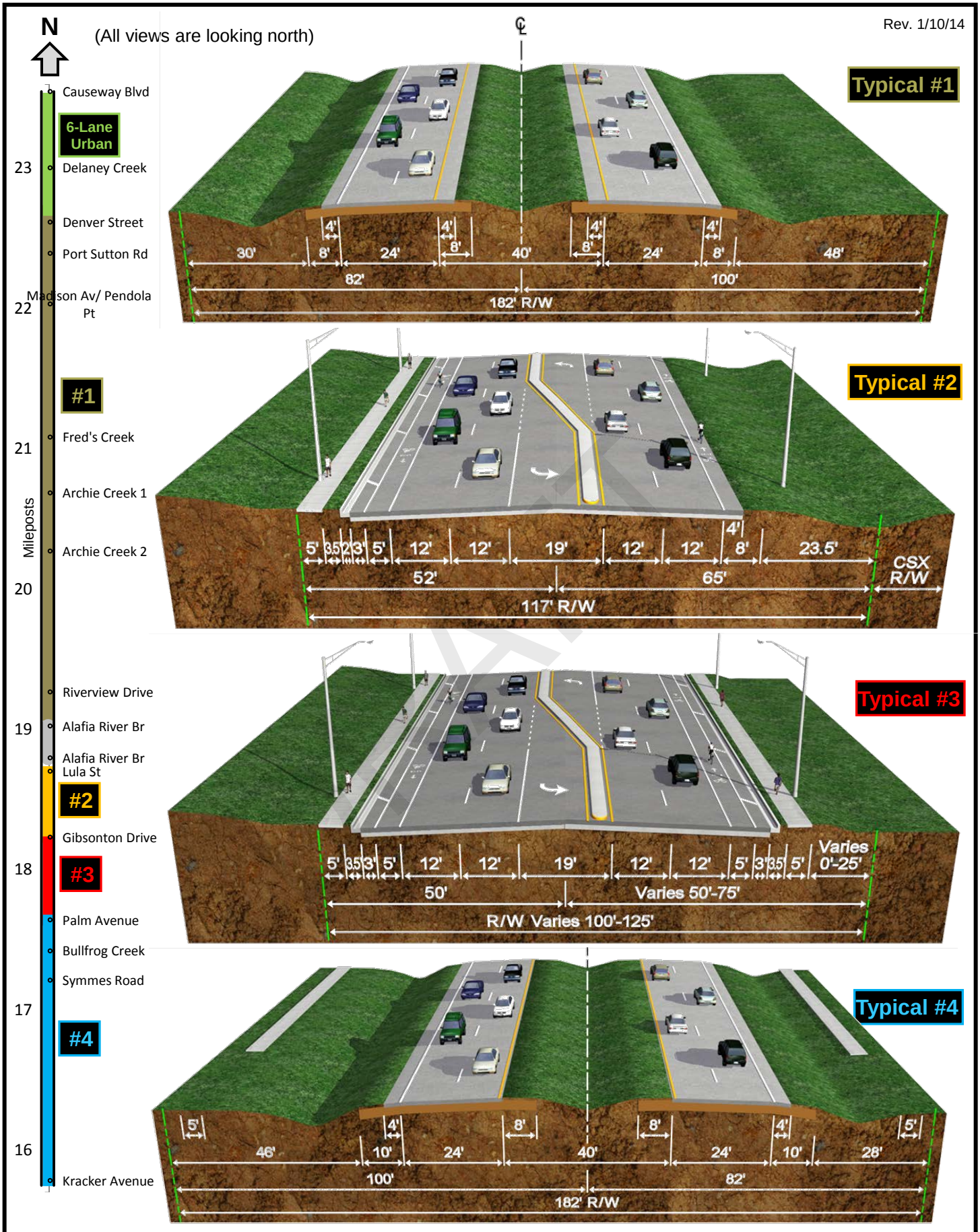
US 41 currently has both four-lane divided rural and urban typical sections. In addition, a 0.9-mile segment between Denver Street and Causeway Boulevard has already been widened to a six-lane urban section highway. The existing six-lane typical section is shown below in **Figure 4-1**.

Figure 4-1 Existing Six-Lane Typical Section North of Denver Street



Note that the existing outside lane widths in the six-lane segment are only 10-feet 1-inch wide according to the resurfacing as-built plans. In addition, the border widths are substandard in width, and there are no sidewalks or bicycle facilities in this segment.

The existing four-lane roadway typical sections are illustrated in **Figure 4-2**. Areas outside of the north Gibsonton area have four-lane rural typical sections with 40-foot medians which are asymmetrical within the existing 182-foot right of way (ROW). The north end (Typical number 1) has paved inside and outside shoulders while the south end only has paved outside shoulders; otherwise they are nearly identical.



FDOT **US 41(SR 45) PD&E Study** *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Existing Roadway Typical Sections**	**Figure 4-2**

Two different typical sections are representative within the north Gibsonton area. The section south of Gibsonton Drive is essentially symmetrical (except for the east-side ROW) and features a 19-foot median, 12-foot lanes and sidewalks and 5-foot bicycle lanes. The typical section north of Gibsonton Drive is similar except that a CSX railroad track runs parallel and adjacent to the ROW on the east side, resulting in an urban section on the west side and a rural-type typical section on the east side, with a drainage ditch shared between the roadway and the railroad. The bicycle lanes on either side vary slightly in width, and there is no sidewalk on the east side, next to the railroad.

The posted speed limit is 55 miles per hour (mph) south of Symmes Road and north of Riverview Drive and 50 mph between these two locations, in the north Gibsonton area, as shown in **Figure 4-3**. According to the as-built plans, the original design speeds were 55 to 60 mph in the rural typical section areas and 50 mph in the urban typical section area (north Gibsonton area).

4.1.3 Pedestrian and Bicycle Facilities

Sidewalks along US 41 currently begin south of Ohio Street and continue northward into north Gibsonton, on both sides south of Gibsonton Drive and on the west side only north of Gibsonton Drive, ending at Lula Street (near the south approach to the Alafia River bridges). In addition, the rural typical section areas include 4-foot paved shoulders which are designated as bicycle lanes, and the urban typical section area (in north Gibsonton) includes bicycle lanes which vary from 4 to 5 feet wide, as shown in the existing typical sections figure referenced above. Sidewalks on the Bullfrog Creek bridges vary in width from 3.6 feet to 4 feet, and sidewalks on the Alafia River bridges vary from 3.3 to 3.4 feet. None of the bridges have bicycle lanes, and the outside shoulder widths vary from approximately 1 to 2 feet at Bullfrog Creek and are 2 feet on the Alafia River bridges.

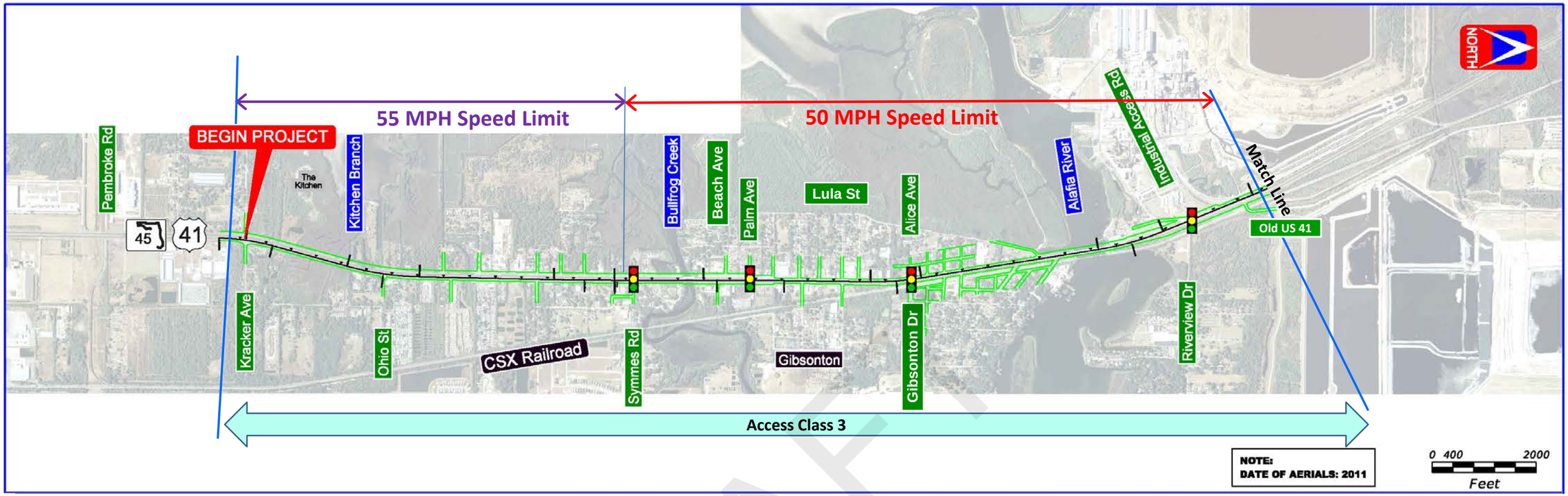
In addition, the following signalized intersections along US 41 include crosswalks and pedestrian pushbuttons and signal indications:

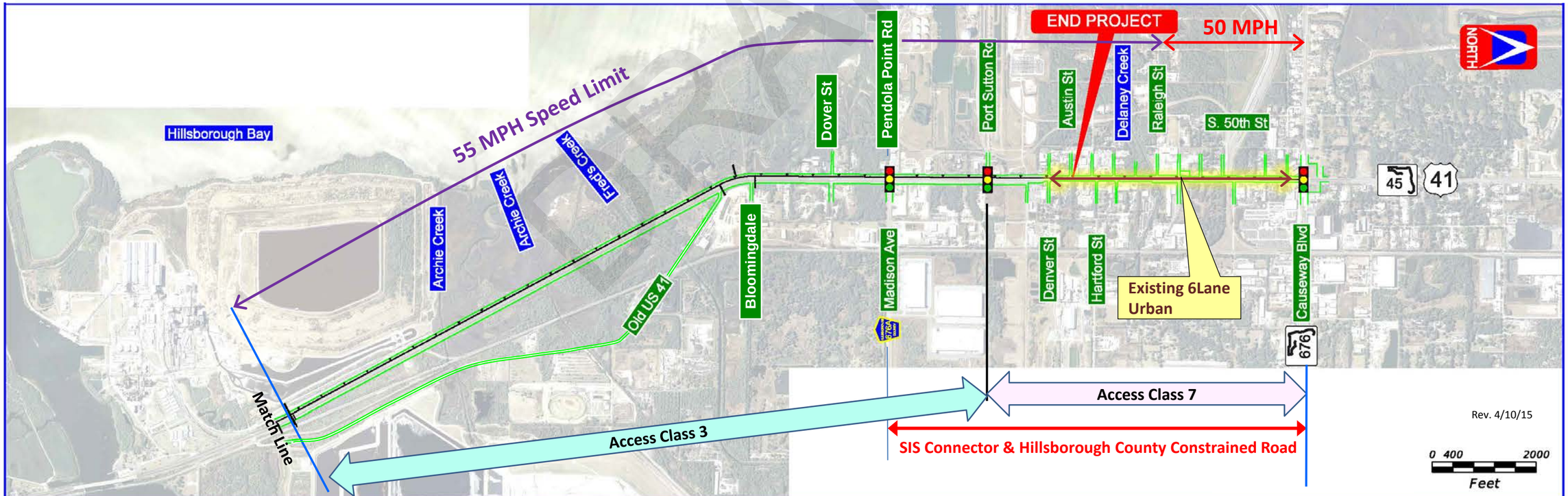
- At Symmes Road
- At Palm Avenue (shopping center entrance on east side)
- At Gibsonton Drive
- At Madison Avenue
- At Port Sutton Road

There are no pedestrian features at the signalized intersection of US 41 at Riverview Drive.

4.1.4 Right of Way

The ROW width varies from 100 to 117 feet in the north Gibsonton area to typically 182 feet in the rural typical section areas to the south and north. The existing ROW width is graphically illustrated in **Figure 4-4**. As shown on the existing typical sections figure, the highway is not centered within the existing ROW in most areas. At the south end the centerline of construction is offset by 9 feet to the right while the centerline is offset 9 feet to the left for the northern section.





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US41/SR45	HILLBOROUGH	

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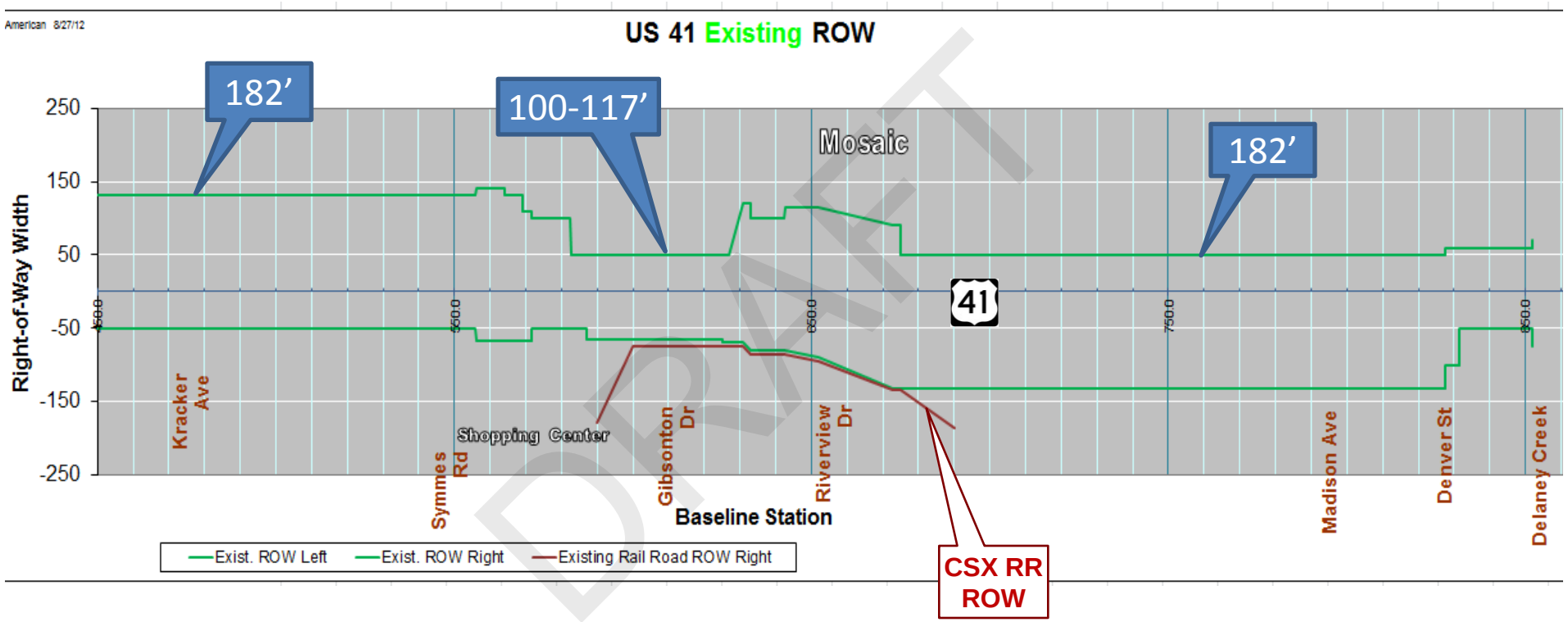
Existing Speed Limits and Access Classes

Figure 4-3



US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Graphical Summary of Existing ROW Widths**	**Figure 4-4**

4.1.5 Horizontal Alignment

The existing horizontal alignment was obtained from a combination of as-built plans and FDOT's straight line diagram (SLD) inventory. **Table 4-1** summarizes the existing horizontal alignment. There are nine horizontal curves within the study limits ranging from a 0 degree – 3 minute curve to a 4 degree curve located south of Bloomingdale Avenue. All of these curves meet current FDOT Plans Preparation Manual requirements for the design speeds shown in the table; however, the superelevation of the curve south of Bloomindale Avenue should be at least 8.3 percent instead of the existing 3 percent to meet current design standards.

4.1.6 Vertical Alignment

The roadway construction and 3R as-built plans were reviewed for existing vertical geometry; however, minimal vertical profile data was found in these plans. The roadway overall is very flat and low due to its location directly east of Tampa Bay. Elevations are estimated to range from about 5 feet to 10 feet throughout the project limits, except at the Alafia River bridges. Within the north Gibsonton area, ground elevations range from about 8 to 10 feet NGVD29, based on old as-built plans.

The existing roadway and bridge profiles at the Alafia River bridges were field surveyed in July 2014 due to conflicting information shown on the bridge and roadway as-built plans. The existing profile information for that location is summarized in **Table 4-2** and **Figures 4-5** and **4-6**. The existing vertical curves at these bridges appear to meet current design standards based on the estimated roadway design speeds, as shown in the table.

Table 4-1 Summary of Existing Horizontal Curves

(From South to North, based on Centerline of Construction)

#	Approximate Location	Curve Direction	Curve P.I. Location		Degree of Curve	Length (ft)	Radius (ft)	Est. Design Speed (mph)	Meet Criteria?	Superelevation		Meet Criteria?	Curve Data Source
			Milepoint	Station						Existing	Required		
1	At Kracker Ave.	Right	15.776	471+36.79	1° 23' 21"	1,047.74	4,124.56	55 +/-	yes	0.036	0.037	No	1
2	North of Kracker	Left	16.292	498+60.50	1° 00' 20"	1,407.24	5,697.58	55 +/-	yes	NC (-.02)	0.025	No	1
3	South of Symmes Rd	Left	17.136	537+28.71	0° 06' 00"	1,166.02	57,263.78	55 +/-	yes	NC (-.02)	NC	yes	1
	North of Palm Ave.	Right	17.642	928+98.26	0° 03' 00"	1,291.60	114,591.56	45	yes	NC (-.02)	NC	yes	2
4	South of Alice	Left	18.163	957+09.76	1° 00' 00"	981.99	5,729.58	45	yes	+0.02(RC)	NC	yes	2
5	South of Riverview Dr.	Left	19.134	1003+02.74	1° 00' 00"	1,300.41	5,729.58	45-50	yes	+0.02(RC)	RC-0.021	Y @ 45	2
6	North of Old US 41 S. Intersection	Left	19.565	1031+11.08	1° 00' 00"	602.00	5,729.58	55	yes*	+0.02(RC)	0.025	No	2
Station Equation: Sta. 1034 + 11.14 Back = Sta. 63 + 04.96 Ahead													
7	S. of Bloomindale Ave.	Right	21.464	160+38.10	4° 00' 00"	713.62	1,432.39	55	yes*	0.03	0.083	No	2
8	Transition area north	Left	22.414	210+54	3° 00' 00"	491.04	- -	50-45	yes*	unknown	.049-.057	unknown	3
9	of Port Sutton Rd	Right	22.507	215+45	3° 00' 00"	438.24	- -	50-45	yes*	unknown	.049-.057	unknown	3

Data Sources

1 3R plans for FPID 413399-1-52-01 (South of 15th to North of Symmes); mileposts are from the straight line diagram inventory

2 3R plans for FPID 411276-1-52-01 (Bullfrog Creek to Denver); mileposts are from the straight line diagram inventory

3 Straight Line Diagram (SLD) Inventory Only; no as-built plans were found for this area; therefore, stations are only approximate estimates.

NC = normal Crown RC = Reverse Crown

Notes *meets minimum 400 ft curve length but not 15V

Superelevation requirements based on 2014 Plans Preparation Manual Table 2.9.1 for design speeds ≥ 50 and Table 2.9.2 for 45 mph design speed

Table 4-2 Vertical Curves at the Alafia River Bridges

Bridge	Curve #	Curve	Grade In	Grade Out	Algebraic Difference A*	Estimated Curve Length (ft)	Existing Curve K Value*	Est. Roadway Design Speed (mph)	Minimum** Required K Value	Comments on Actual K Value
NB Bridge	1	Sag VC	0.879%	3.764%	2.885%	280	97	50 to 55	96 to 115	Meets 50 mph standard
SB Bridge	1	Sag VC	0.871%	3.756%	2.885%	280	97	50 to 55	96 to 115	Meets 50 mph standard
NB Bridge	2	Crest VC	3.764%	-3.503%	7.267%	1,180	162	50 to 55	136 to 185	Falls between 50 and 55 mph
SB Bridge	2	Crest VC	3.756%	-3.563%	7.319%	1,180	161	50 to 55	136 to 185	Falls between 50 and 55 mph
NB Bridge	3	Sag VC	-3.503%	-0.457%	3.046%	500	164	50 to 55	96 to 115	Meets 55 mph standard
SB Bridge	3	Sag VC	-3.563%	-0.524%	3.039%	500	165	50 to 55	96 to 115	Meets 55 mph standard

Vertical curve lengths and grades are based on a best fit from field survey conducted in July 2014.

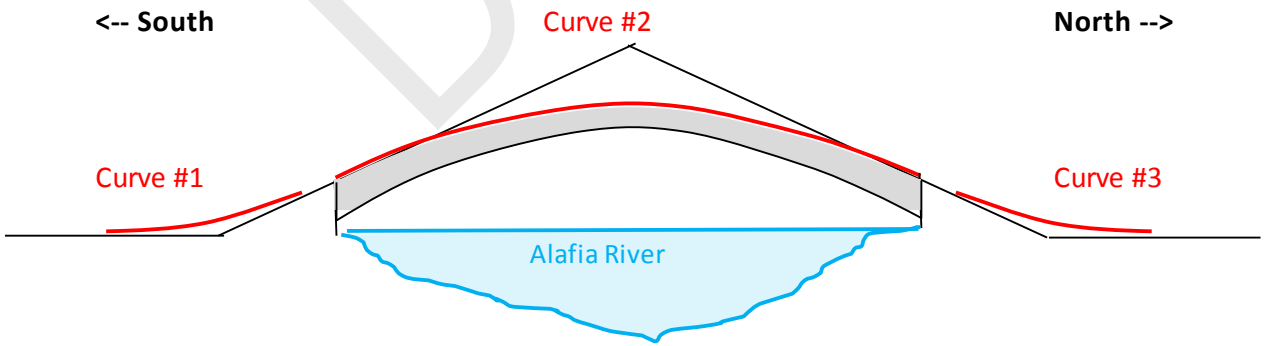
*K = L/A where L = Length of the curve in feet, and A = algebraic difference in grades (percent)

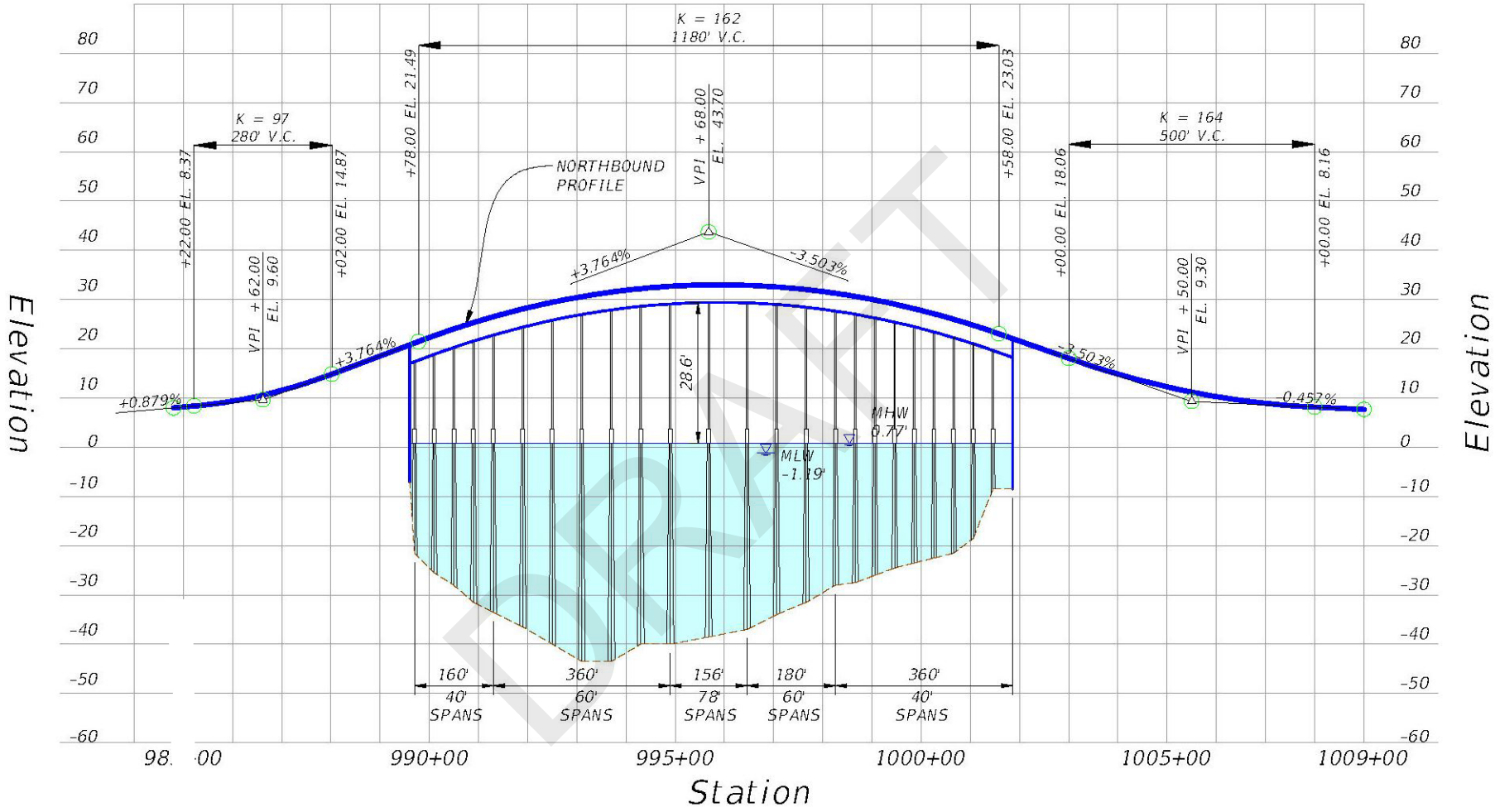
**Minimum K Values for Vertical Curves based on the following tables in FDOT's Plans Preparation Manual (PPM):

PPM Table 2.8.5 Minimum Lengths of Crest Vertical Curves Based on Stopping Sight Distance

PPM Table 2.8.6 Minimum Lengths of Sag Vertical Curves Based on Stopping Sight Distance

Based on an eye height of 3.5 feet and an object height of 6 inches.





Field survey conducted on 7/20/14

NOTES:
1.) Elevations are based on Field survey of the existing pavement.
2.) Vertical curve lengths and slopes shown are based on a best fit from the survey data.

US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676 (Causeway Blvd)
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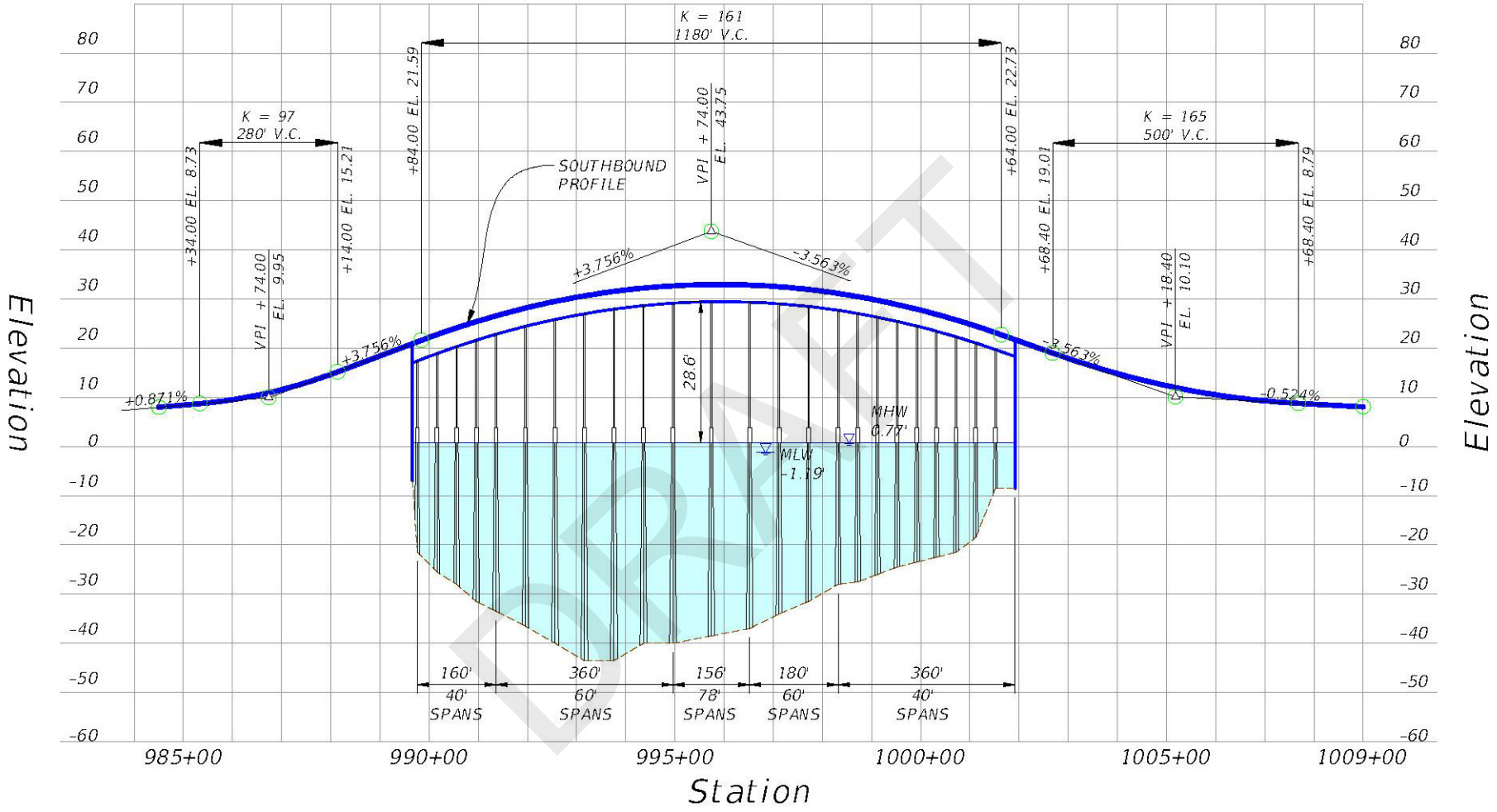
Existing Profile for Northbound US 41 Alafia River Bridge

Figure 4-5



Field survey conducted on 7/20/14

NOTES:
1.) Elevations are based on Field survey of the existing pavement.
2.) Vertical curve lengths and slopes shown are based on a best fit from the survey data.

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Existing Profile for Southbound US 41 Alafia River Bridge

Figure 4-6

4.1.7 Drainage and Floodplains

The study limits of the US 41 corridor fall within the Alafia River watershed. The proposed drainage areas are divided into 11 sub-basins which ultimately discharge to Tampa Bay. The basin limits are illustrated in **Figure 4-7.** The 11 sub-basins were further subdivided into 14 project basins (**Table 4-3**).

Table 4-3 Existing Drainage Basins

Regional Basins	Project Basin No.	Project Basin Boundaries	Project Basin Acreage (ac)	Outfall Location
Kitchen Branch	1	Sta 831+00 to Sta 848+90	7.48	Sta 844+41
	2	Sta 848+90 to Sta 869+91	8.78	Sta 848+90
Direct Runoff to Bay	3	Sta 869+91 to Sta 892+40	9.40	Sta 875+14
Bullfrog Creek	4	Sta 892+40 to Sta 917+37	10.43	Sta 917+37
	5	Sta 917+37 to Sta 946+99	12.38	Sta 917+37
Direct Runoff to Bay	6	Sta 946+99 to Sta 995+51	20.27	Sta 956+44
North Prong Alafia R	7	Sta 995+51 to Sta 96+75	30.21	Sta 1011+93
Archie Creek	8	Sta 96+75 to Sta 118+66	9.15	Sta 96+75
Unnamed Canal	9	Sta 118+66 to Sta 139+67	8.78	Sta 139+67
	10	Sta 139+67 to Sta 160+58	8.74	Sta 139+67
Black Point Channel	11	Sta 160+58 to Sta 189+78	12.20	Sta 176+36
Black Point Drain	12	Sta 189+78 to Sta 208+79	7.94	Sta 204+56
	13	Sta 208+79 to Sta 220+62	4.94	Sta 204+56
Delaney Creek	14	Sta 220+62 to Sta 241+00	8.52	Sta 241+00
		Total	**159.21**	

In the rural typical section areas, drainage is provided by a system of swales and ditches. Within the urban typical section area (north Gibsonton), stormwater runoff from US 41 is collected by an underground system of inlets and pipes, as described below.

Drainage for the north Gibsonton area (defined for this section as the area between Bullfrog Creek and the Alafia River) is provided by three different inlet and pipe systems, as shown in **Figure 4-8**. Beginning at Bullfrog Creek, a pipe and inlet system extends from Bullfrog Creek to approximately Shirley Avenue, with curb and gutter comprising the northern portion, north of Cedar Avenue. The northern portion of this system has a 30-inch pipe with catch basin inlets which connects to a 36-inch pipe near Cedar Avenue and continues to the south, with ditch-bottom and other storm drain inlets. The 36-inch pipe outfalls at Bullfrog Creek on the west side of US 41.

The second pipe and inlet system runs from about Lewis Avenue to Marilla Avenue, with an outfall to a transverse drainage ditch located on the west side of US 41 less than 400 feet south of Gibsonton Drive. This system is mostly served by an 18-inch trunk line. The outfall ditch is contained within a 50-foot easement which connects it to Hillsborough Bay.

FDOT **US 41(SR 45) PD&E Study** *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Existing Drainage Basins**	**Figure 4-7**

DRAINAGE MAP

Dist.	State	County	Route	Proj.	Sheet No.
3	Fla.	Hillsborough	45	F-011-3(42)	3

State Job No. 10060-3212

Contd. Below

END 2 LANE
BEGIN 4 LANE
STA. 918+42.50

SCALE: 1" = 200'

935+44.35 BK = EQUATION 935+44.13 AHD.

24" R.C.P.

44"x28" C.M.P. FL.E. 2.08 FL.W. 2.55

10'x2.6' Conc. Box Culvt. FL. Rt. 4.16 Lt. 4.12 FL.W. 6.2

DROP OUTFALL DITCH

24" Conc. P. FL. Rt. 4.47 Lt. 4.54

18" R.C.P. FL.E. 1.5, FL.W. 1.36

24" Conc. Pipe FL. N. 3.28, FL. S. 2.91

24" Conc. Pipe FL. N. 2.01, FL. S. 1.98

2-24" Conc. Pipes

2-36" Conc. P. FL. 3.94, FL. W. 6.9

BEGIN CURB & GUTTER

END 4-LANE END PROJECT STA. 984+84.50

STA. 985+44 CONST. ENDWALL LT. FL. EL (-1.0)

STA. 984+48 CONST. INLET LT. FL. EL. 1.6

Pl. STA. 981+60 FL. EL. 8.03

STA. 984+70 CONST. M.H. LT. FL. EL. (-0.8)

Pl. STA. 986+35 EL. 8.97

END 4-LANE END PROJECT STA. 984+84.50

1.3 Ac.

S-45

10060-3212 2 of 2

Drainage Map of the North Gibsonton Area - Figure 4-8

The third pipe and inlet system runs from south of Anna Avenue (located about 900 feet north of Gibsonton Drive) to just south of the Alafia River. The east side of US 41 between Gibsonton Drive and the Alafia River is drained by a ditch which is shared with the CSX Railroad; this ditch outfalls to the Alafia River next to the rail line which crosses the River. The west side of the road is drained by an enclosed drainage system with 18-inch to 24-inch pipes which outfall to a small "inlet" of the River on the west side of US 41, on property owned by Mosaic.

Floodplains

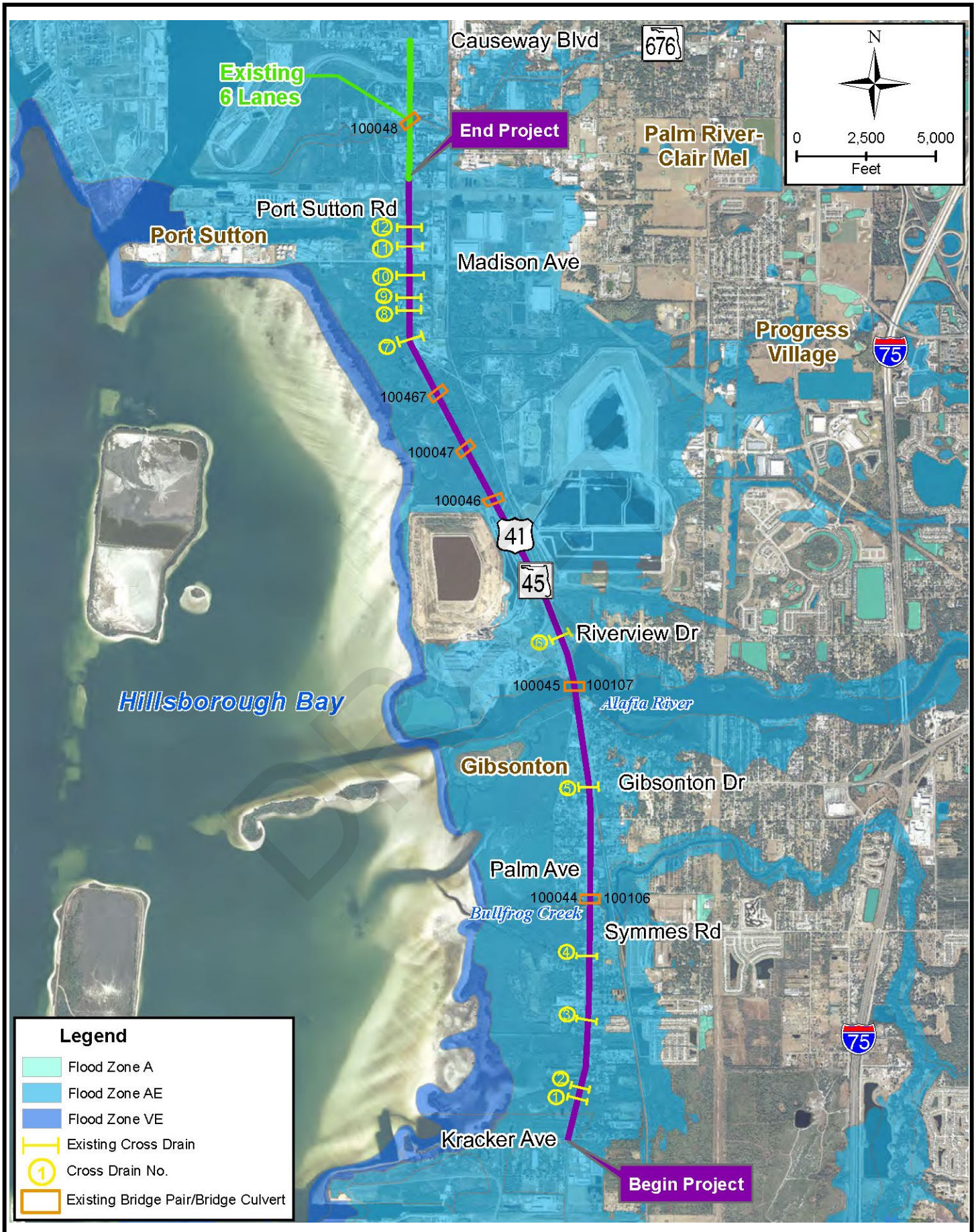
There are a total of 12 cross drains and 6 bridge pair/bridge culverts within the study limits. **Table 4-4** summarizes data for the existing cross drains and bridge culverts. Information on the existing bridges is included in **Section 4.2**. **Figure 4-9** shows the existing 100-year floodplain in addition to cross drain and bridge culvert locations. The condition of the bridge culverts is discussed in **Section 4.2.**

Table 4-4 Existing Cross Drains and Bridge Culverts

Cross Drain No./Br. Culvert #	Milepoint	Description
1	16.038	10'x5' CBC
2	16.123	10'x5' CBC
3	16.620	10'x8' CBC
4	16.989	36" CC
5	18.160	2-36" CC
6	19.211	30" CC
7	21.423	15" CC
8	21.727	36" CC
9	21.779	2-36" CC
10	21.968	2-36" CC
11	22.166	15" CC
12	22.313	10'x7' CBC
100046	20.271	36' Bridge Culvert (Archie Creek)
100047	20.686	31' Bridge Culvert (Archie Creek)
100467	21.084	26' Bridge Culvert (Fred's Creek)
100048*	23.003	36' Bridge Culvert (Delaney Creek)

*This bridge culvert is outside of the expected limits of construction

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) dated August 28, 2008: 12057C0484H, 12057C0482H, 12057C0369H and 12057C0367H indicate that the study limits are within Flood Zone AE (El 11.0 feet) from approximately Station 831+00 to Station 840+00 and Zone AE (10.0 feet) for the remainder of the study limits. FEMA Maps are included in Appendix A of the *Location Hydraulics Memorandum*. Per direction from the Southwest Florida Water Management District (SWFWMD), the FEMA elevations are based on storm surge conditions and base floodplain impacts should be assessed based on the lower riverine floodplain elevations.



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Floodplain and Drainage Structure Locations

Figure 4-9

Hillsborough County provided GIS data and the following studies that establish the base floodplain for the project limits:

- Bullfrog Creek/ Wolf Branch Watershed Management Plan, dated October 2000
- Countywide Master Plan Update for the Alafia River Watershed, dated November 2010
- Delany Creek Area Stormwater Master Plan Update, dated April 2007

Floodplain elevations for each project basin are identified in **Table 4-5**. Bullfrog Creek elevations are provided in NGVD 29; however, these elevations were converted to NAVD 88 based on a conversion factor of -0.9.

The project limits have been evaluated to determine potential impacts to the base floodplain. **Table 4-5** identifies estimated floodplain elevations. Cup for cup compensation will be provided for any fill placed within the floodplain. Approximate required floodplain compensation site area requirements are presented in **Section 9.16**.

Table 4-5 Preliminary Floodplain Elevations Estimate

Regional Basins	Project Basin No.	Project Basin Boundaries	Model Node ID	Zone AE-Hillsborough County 100 yr flood EL (ft – NAVD 88) ①
Kitchen Branch	1	Sta 831+00 to Sta 848+90	822100	2.8
	2	Sta 848+90 to Sta 869+91	822000	1.1
Kracker Ave	3	Sta 869+91 to Sta 892+40	821200	5.0
Bullfrog Creek	4	Sta 892+40 to Sta 917+37	810020,810110	5.1
	5	Sta 917+37 to Sta 946+99	810100	5.6
Gibsonton	6	Sta 946+99 to Sta 995+51	700050	1.8
North Prong Alafia R	7	Sta 995+51 to Sta 96+75	280015	3.9
Archie Creek	8	Sta 96+75 to Sta 118+66	260040	4.5
Palm River-Clair Mel	9	Sta 118+66 to Sta 139+67	240040	4.9
	10	Sta 139+67 to Sta 160+58	200305	7.4
Black Point Channel	11	Sta 160+58 to Sta 189+78	200300,200340	5.1
Black Point Drain	12	Sta 189+78 to Sta 208+79	200025	7.6
	13	Sta 208+79 to Sta 220+62	200080	5.5

①*The estimated 100-year elevations are taken from Bullfrog Creek/Wolf Branch Watershed Management Plan, Countywide Masterplan Update for the Alafia River Watershed, and the Delany Creek Area Stormwater Master Plan Update.*

Based on the evaluation of anticipated improvements, the applicable floodplain statement according to the FDOT PD&E Manual Part 2 Chapter 24 is Statement 4- PROJECTS ON EXISTING ALIGNMENT INVOLVING REPLACEMENT OF EXISTING DRAINAGE STRUCTURES WITH NO RECORD OF DRAINAGE PROBLEMS:

"The proposed drainage structures will perform hydraulically in a manner equal to or greater than the existing structures, and backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.

The project's drainage design will be consistent with local FEMA, FDOT, and Southwest Florida Water Management District (SWFWMD) design guidelines, which state that no net encroachment up to that, encompassed by the 100-year event, will be allowed, and that compensating storage shall be equivalently provided. Therefore, no significant changes in base flood elevations or limits will occur.

The FEMA FIRMs identify designated floodways associated with the Bullfrog Creek, Alafia River, and Delany Creek water bodies. During the design phase for this proposed project, Bridge Hydraulics Reports will be prepared for each bridge and a No-Rise certification will be performed for modifications to bridges associated with each regulated floodway.

4.1.8 Geotechnical Data

Based on a review of the U.S. Department of Agriculture (USDA) and the Natural Resources Conservation Service (NRCS) Soil Survey for Hillsborough County, Florida, the predominant soils within the study limits consist of Myakka fine sand, Malabar fine sand, Pinellas fine sand, and St. Johns fine sand. For the purpose of estimating the SCS runoff Curve Numbers, the Hydrologic Soil Group was retrieved from the South West Florida Water Management District (SWFWMD) Information System website. See **Table 4-6** for USDA soils and **Figures 4-10** and **4-11** for a soils map.

Table 4-6 Existing Soils in the Study Area

Map #	Soil Name	Hydrologic Group	Depth to High Water Table (ft)	Soil Type	Description
5	Basinger Fine Sand, Holopaw Sand, Samsula muck	D	+2-1.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-2%
15	Felda Fine Sand	B/D	0-1.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-1%
17	Floridana Sand	B/D	0-1.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-1%
24	Kesson Muck	D	0-0.5	Shell fragments and sandy marine sediment	Very poorly drained soil in tidal swamps, slopes 0-1%
27	Malabar Sand	B/D	0-1.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-2%
29	Myakka Sand	B/D	0-1.0	Sandy soil	Very poorly drained soil in flatwoods, slopes 0-8%
30	Myakka Sand, Frequently Flooded	B/D	0-1.0	Sandy soil	Very poorly drained soil in flatwoods, slopes 0-8%
38	Pinellas Fine Sand	B/D	0-1.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-2%
44	St. Augustine Fine Sand	C	1.5-3.0	Sandy and loamy soil	Very poorly drained soil in depressions, slopes 0-5%
46	St. Johns Sand	B/D	0-1.0	Sandy soil	Very poorly drained soil in broad areas, slopes 0-5%
57	Wabasso Fine Sand	B/D	0-1.0	Sandy and loamy soil	Very poorly drained soil in flatwoods, slopes 0-2%

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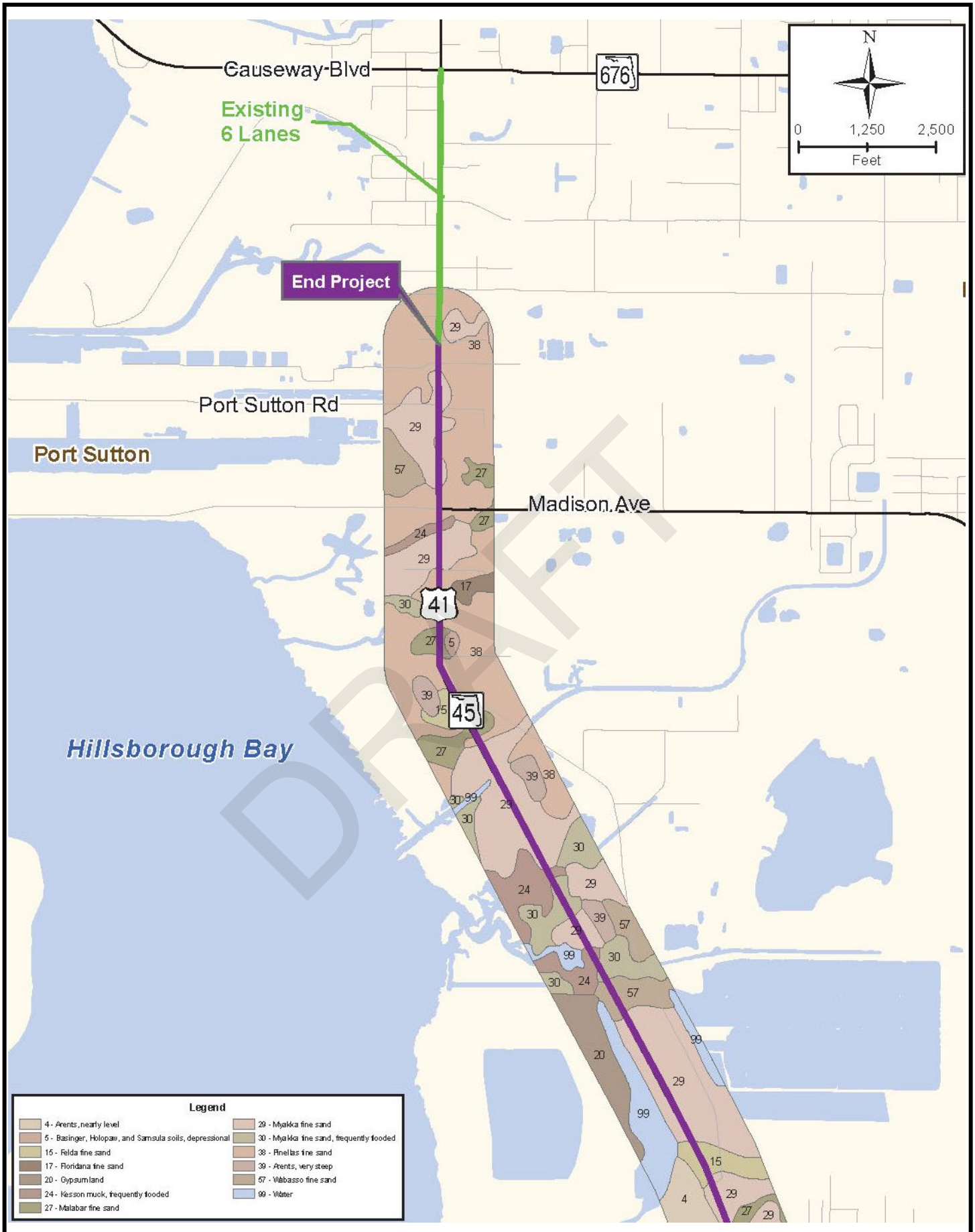
Soils Map – South Half

Figure 4-10



US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676 (Causeway Blvd)
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Soils Map – North Half

Figure 4-11

4.1.9 Crash Data and Safety Analysis

Crash data along US 41 within the project limits was obtained from the Florida Department of Transportation (FDOT) for the most recent 5-year (2008 through 2012) period. There were a total of 551 crashes reported within the project limits during the 5-year period which involved 408 injuries and 7 fatalities. **Table 4-7** below summarizes the 5-year crash history along the study corridor. As a part of the analysis, the number of crashes that occurred under wet conditions and the number of crashes that occurred at night were also summarized.

Table 4-7 Summary of Crash Analysis along US 41

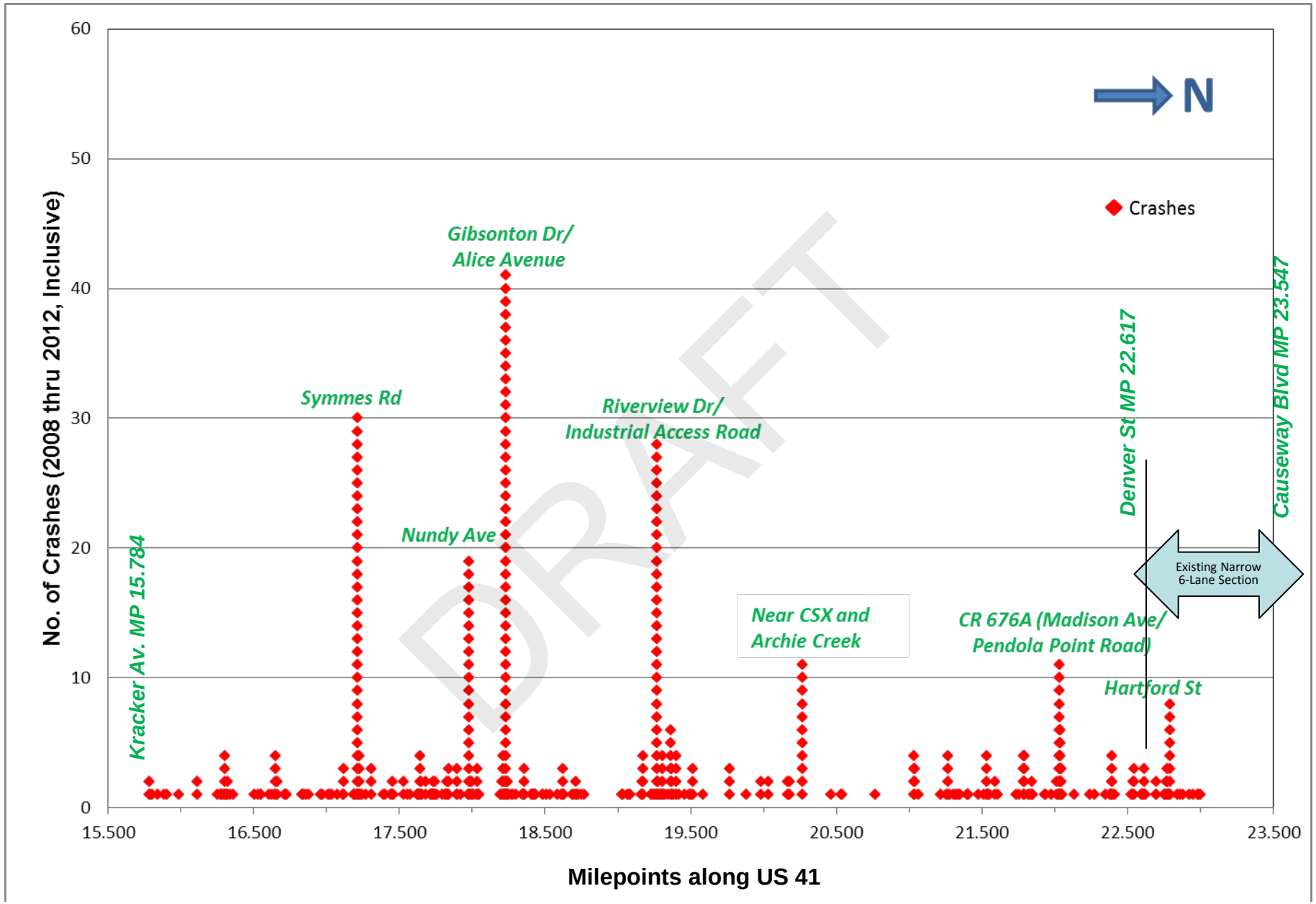
US 41 from Kracker Avenue (MP 15.784) to south of Causeway Boulevard (MP 23.003) in Hillsborough County	Year					Five Year Total
	2008	2009	2010	2011	2012	
No. of Fatal Crashes	3	1	0	0	3	7
No. of Injury Crashes	46	43	55	58	50	252
No. of Property Damage Only Crashes	72	58	59	45	58	292
Total Crashes	**121**	**102**	**114**	**103**	**111**	**551**
Wet weather crashes	1	1	1	4	5	12
Night-time crashes	43	36	33	44	42	198
Average Crash Rate with Average AADT of 27,250						*1.54*
*Statewide 5-Year Average Crash Rate for Urban Segments**						*2.39*

**Obtained from FDOT – District Seven*

The table above shows that the average crash rate over the study corridor of US 41 is 1.54 which is lower compared to the statewide 5-year average crash rate for 4-5 lanes two-way divided raised urban segments of 2.39.

The distribution of the crashes by milepoint is shown in **Figure 4-12**. The plot indicates that the majority of the crashes occurred at the intersections of Symmes Road, Nundy Avenue, Gibsonton Drive/Alice Avenue, Riverview Drive/Industrial Access Road, CR 676A (Madison Avenue/Pendola Point Road) and Hartford Street.

The breakdown of the total crashes within the study limits for the last available five years along US 41 by crash type were also determined and is shown in **Table 4-8** and **Figure 4-13**. Overall rear-end crashes accounted for 39 percent of the total crashes, angle crashes accounted for 20 percent, each of sideswipe crashes and left-turn crashes accounted for 3 percent and the remaining 35 percent of the crashes were the other crash types, mostly single-vehicle run-off-the-road , along with head-on and bike and ped crashes.



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Distribution of Crashes by Milepoint

Figure 4-12

Table 4-8 Summary of Crash Analysis along US 41 by Crash Types

Crash Type	Year					Total	Percentage	Average Per Year
	2008	2009	2010	2011	2012			
Rear-end	50	42	47	37	37	213	39%	42.6
Angle	21	24	23	20	23	111	20%	22.2
Sideswipe	7	5	6	0	0	18	3%	3.6
Left-Turn	7	4	3	0	1	15	3%	3.0
Head-On	3	0	0	1	0	4	1%	0.8
Pedestrian/Bicycle	6	0	0	4	8	18	3%	3.6
Other	27	27	35	41	42	172	31%	34.4
Total	**121**	**102**	**114**	**103**	**111**	**551**	**100%**	**110.2**

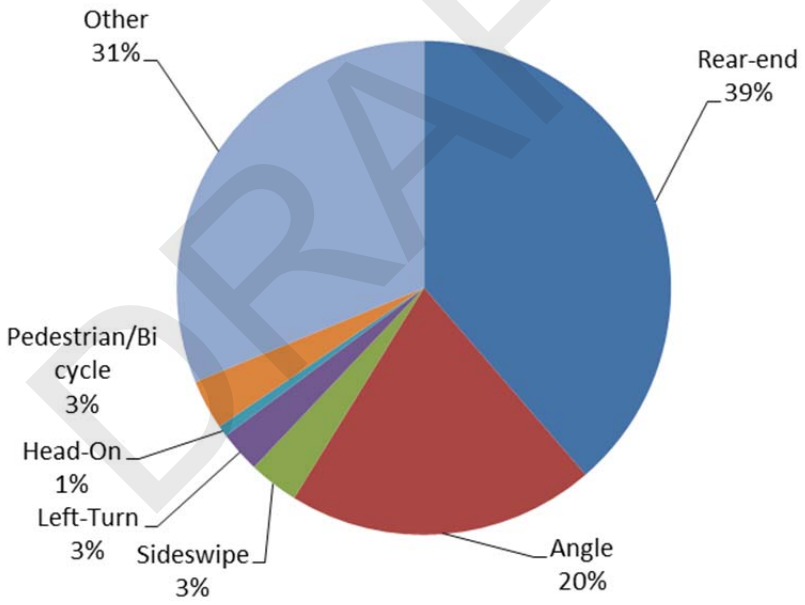


Figure 4-13 Crashes Types along US 41 from Kracker Avenue to South of SR 676

Sixteen (16) of the 18 pedestrian/bicycle crashes occurred along US 41 between Kracker Avenue and Gibsonton Drive. Of the 18 pedestrian/bicycle crashes, 15 involved injuries and 3 involved fatalities.

Since nighttime crashes accounted for approximately 36 percent of the overall crashes and only limited segments currently are lighted, the department is currently planning to add lighting between Denver Street and Riverview Drive as part of a 3R job, and the segment between Big Bend Road and Symmes Road is being studied for the potential need to add lighting.

4.1.10 Intersections and Signalization

Existing signalized intersection locations and major unsignalized intersection locations along with the existing intersection lane geometry are shown in **Figure 4-14.** There are presently six (6) signalized intersections within the study limits excluding the intersection at Causeway Boulevard.

4.1.11 Lighting

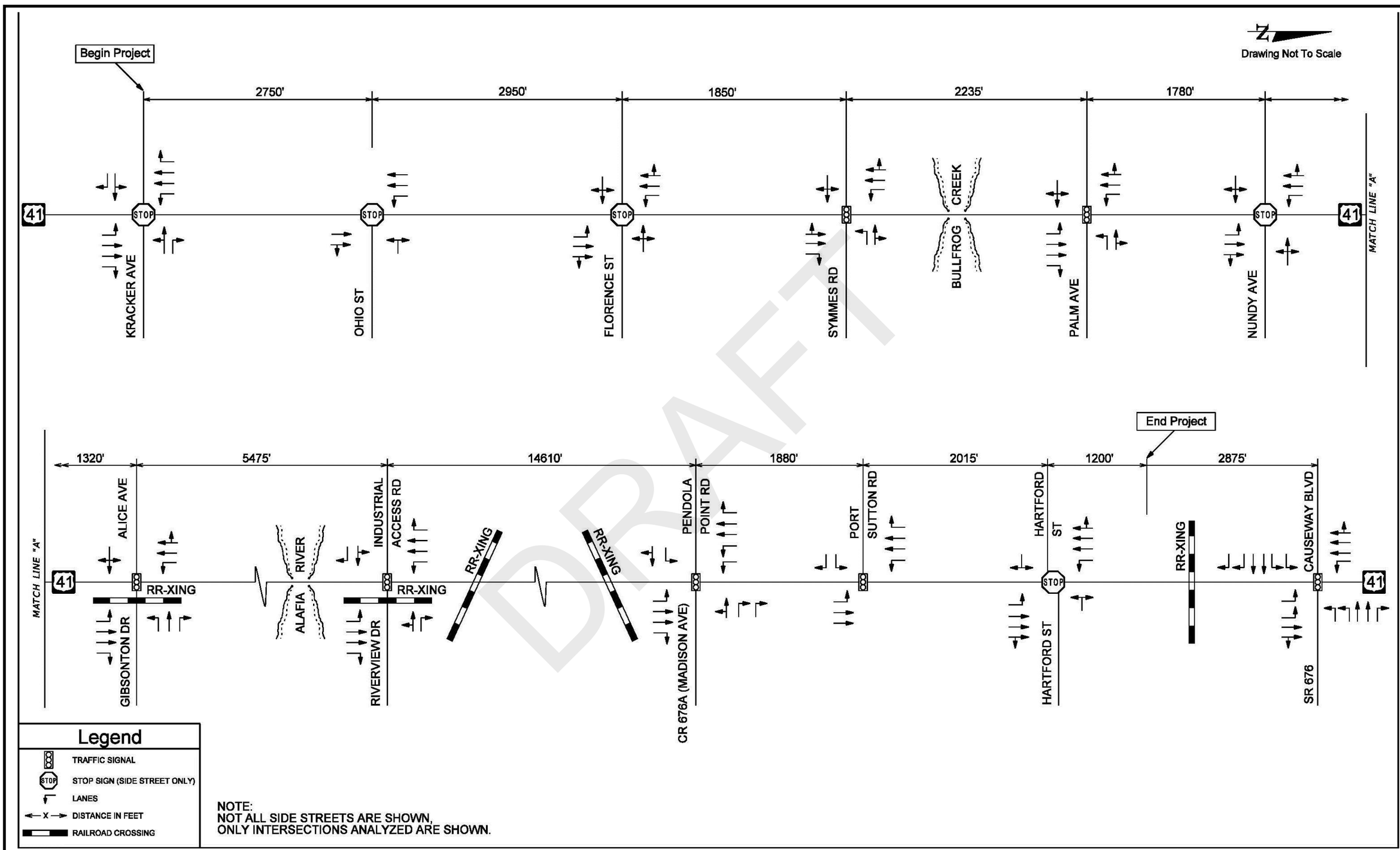
The existing roadway has street lighting between Symmes Road and Riverview Drive. The luminaires are mounted on aluminum poles with both same-side and staggered spacing in different areas. The lights are maintained by Tampa Electric Company (TECO).

4.1.12 Utilities, ITS and Railroads

There are numerous utilities throughout the study corridor, as shown in **Table 4-9**, based on the *Utility Assessment Package* prepared in February 2015. The study area includes a 4-inch ammonia pipeline that runs the entire length of the project on the west side of US 41; at the Alafia River, it reportedly runs about 40 feet beneath the river. In addition, Florida Gas Transmission (FGT) has a 6.625-inch gas line that crosses US 41 at the Riverview Drive intersection, as shown in **Figure 4-15**. The exact location and depth of the pipeline is unknown; further coordination with FGT will occur during future project phases.

Table 4-9 Existing Utilities in the Study Area

Utility Owner	Type of Facilities
Bright House Networks	Cable TV (mostly overhead lines)
Mosaic Fertilizer	20”-24” Water lines near Riverview Drive
Central FL Pipeline-Kinder Morgan	16” LP pipeline crosses at south side of Madison
Florida Gas Transmission	6.6” Gas Pipeline crosses at Riverview Drive
Verizon Florida	Cable/Fiber/Phone – both overhead and buried
Hillsborough County Traffic Services	Communications Cable, signals, conduit, etc.
Hillsborough County Water	Water & sewer; asbestos concrete pipe
Level 3 Communications	Fiber Optic on east side of roadway
TECO Peoples Gas	Gas lines north of Old US 41
TECO Peoples Gas Transmission	Natural Gas Lines
City of Tampa Water	Water lines north of Old US 41, various sizes
Tampa Bay Pipeline Corp.	Two 4” Ammonia Pipelines on west side of 41
Tampa Electric Company	13.2 kv power lines entire project length
TECO Fiber	Aerial FO entire length of project



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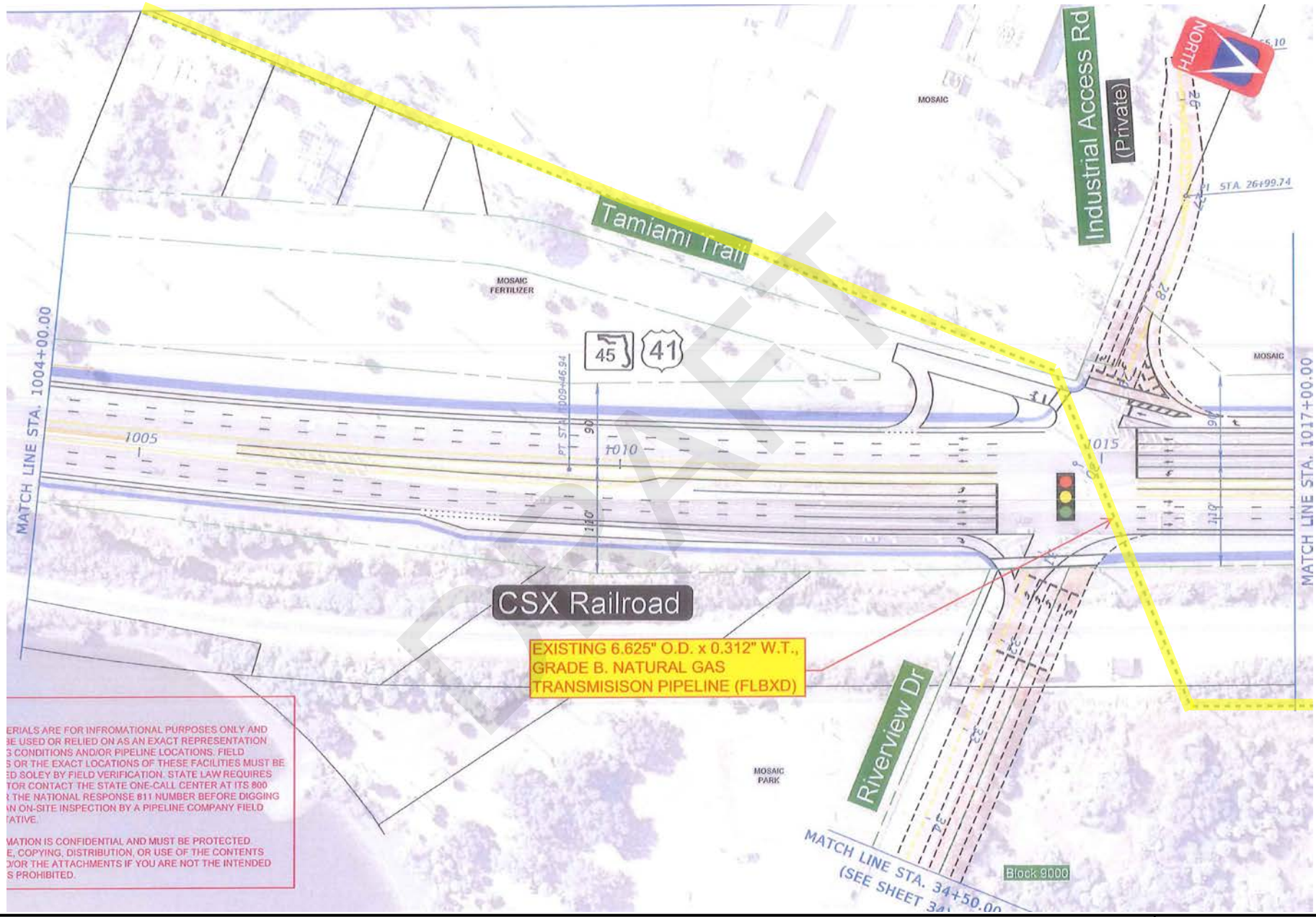
Existing Lane Geometry

Figure 4-14



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Florida Gas Transmission Facilities at Riverview Drive

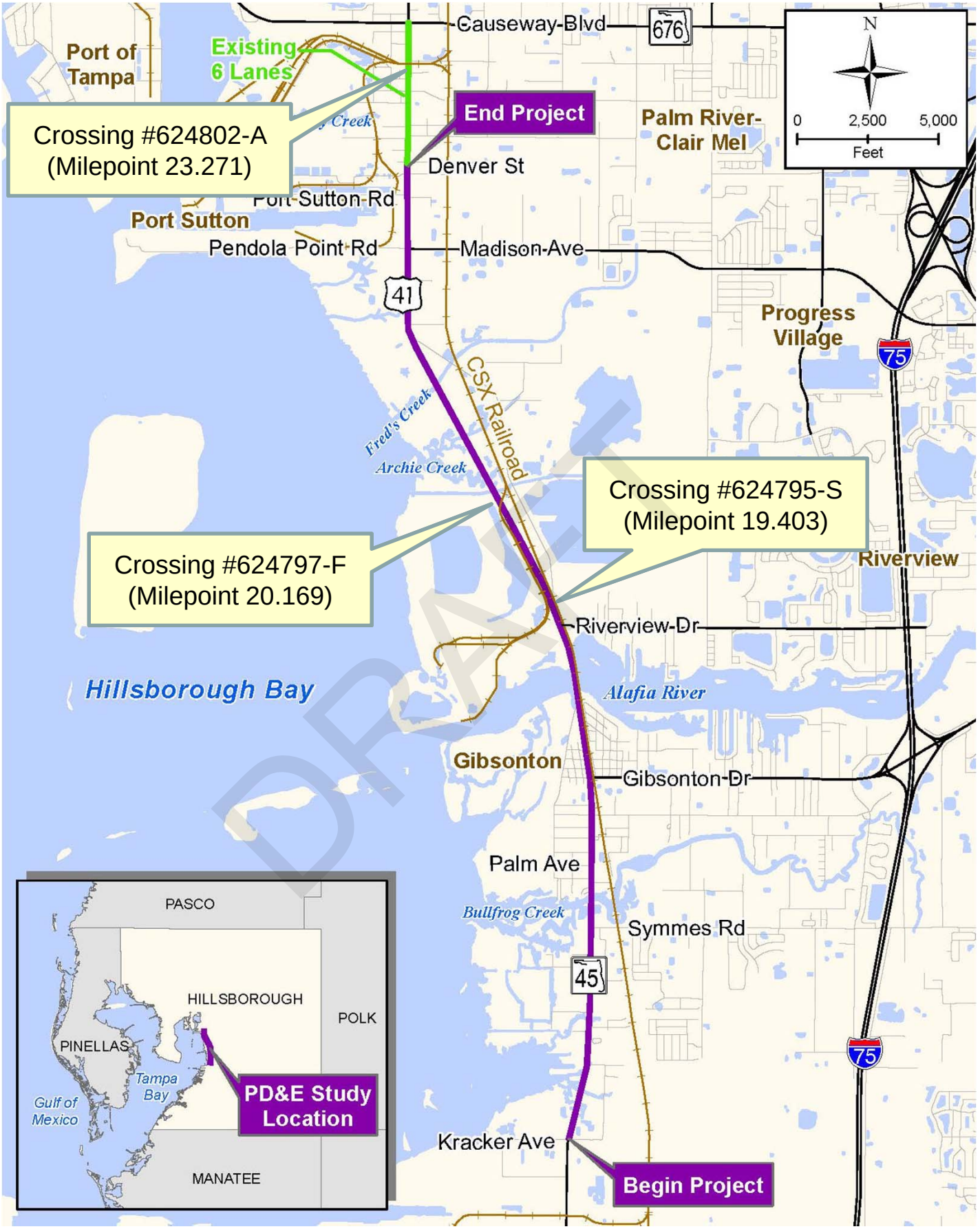
Figure 4-15

With respect to railroads, the CSX Transportation (CSXT) Tampa Terminal Subdivision and Palmetto Subdivision line runs east of and parallel to US 41 for the entire project limits. It is directly adjacent to US 41 from Gibsonton Drive to approximately River Drive. Based on a train count made on 5/1/2012 provided by the District Rail Coordinator, this railroad line has 4 daytime switching trains and 3 nighttime switching trains per day, for a total of 7 trains per day. These freight trains range from 35 to 40 miles per hour, with a maximum time table speed of 40 miles per hour.

There are three rail spur crossings on US 41 at the following locations (from north to south), as shown in **Figure 4-16**. One is located south of SR 676 (Causeway Boulevard) (624802-A CSX), the second is located south of Madison Avenue (624797-F CSX) and the third one is located north of Riverview Drive (624795-S CSX).

The following information was received from the District's Rail Section on these railroad crossings:

- 624802-A (Milepoint 23.271) - There are 22 train movements during a day on this track. The Rail Office completed a Feasibility Study in 2007 that considered relocating the crossing 500 feet further south so that a grade separation could be installed over the relocated rail.
- 624797-F (Milepoint 20.169) - There is no accurate information for this track. The future plan is to install a new crossing surface for this track. FDOT estimated about 8 movements a day with 5 to 10 minutes for each movement.
- 624795-S (Milepoint 19.403) - There are no train movements on this track. This is used only as an emergency exit if there is a problem at/on the crossing to the north (624797). The Rail Office has requested to eliminate the crossing (remove track from roadway).



US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**CSXT Railroad Crossing Locations**	**Figure 4-16**

4.1.13 Pavement Conditions

A flexible pavement condition survey was conducted by FDOT in 2014 for the project corridor. Each section of pavement was rated for cracking ride, and rutting on a 0-10 scale with 0 the worst and 10 the best. Any rating of 6.0 or less is considered deficient pavement and is marked with an asterisk. **Table 4-10** identifies the existing and projected pavement condition ratings for US 41. The existing pavement is generally in good condition.

Table 4-10 Pavement Condition Survey Results

Beginning Milepoint	Ending Milepoint	Side	Condition Category	Year 2014 Ratings	Year 2019 (Projected)	Year Finished Paving
15.778	17.376	RT	Cracking	10.0	7.5	2010
			Ride	7.8	7.3	
			Rutting	not provided	not provided	
17.376	22.617	RT	Cracking	9.0	7.0	2008
			Ride	7.4	7.2	
			Rutting	not provided	not provided	
22.617	23.009	RT	Cracking	10.0	9.0	2011
			Ride	7.9	7.7	
			Rutting	not provided	not provided	
15.778	17.376	LT	Cracking	10.0	8.5	2010
			Ride	7.9	7.6	
			Rutting	not provided	not provided	
17.376	22.617	LT	Cracking	6.5	3.0*	2008
			Ride	7.6	7.5	
			Rutting	not provided	not provided	
22.617	23.009	LT	Cracking	10.0	9.5	2011
			Ride	7.3	7.1	
			Rutting	not provided	not provided	

**Deficient Pavement Source: FDOT's All System Pavement Condition Forecast - extracted on 9/11/2014*

4.2 EXISTING STRUCTURES

There are a total of eight bridge structures along US 41 within the limits of this project; of the eight structures, four are bridge culverts.

4.2.1 Bridge Culverts

Features of the existing bridge culverts are summarized in **Table 4-11**. The first two box culverts convey flow from Archie Creek. The first box (Bridge No. 100046) at milepoint (MP) 20.271 consists of a double 10'x6' barrel structure while the second box (Bridge No. 100047) utilizes a triple 10'x6 barrel structure at MP 20.686. A double 10'x6' barrel bridge culvert (Bridge No. 100467) at MP 21.084 is used to carry US 41 traffic over Fred's Creek. All of these bridge culverts were originally

constructed in 1943 and were later extended in 1959. The culverts at Archie Creek were last inspected on March 21, 2013 and both were given sufficiency ratings of 74 with health indices of 82.34 and 75.13 for the culverts at MP 20.271 and 20.686 respectively. The culvert at Archie Creek was given a sufficiency rating of 74 as well and a health index of 48.79 after the last inspection on March 13, 2013.

The other bridge culvert (Bridge No. 100048) is located at Delaney Creek at MP 23.003. **This is located north of the expected limits of construction for this project.** This structure consists of triple 12'x8.25' barrels and was constructed in 1959 when the other bridge culverts were widened. This bridge culvert was last inspected on March 13, 2013 which resulted in the structure being given a sufficiency rating of 56.7 and a health index of 66.67. All of the box culverts have load ratings that exceed 1.0.

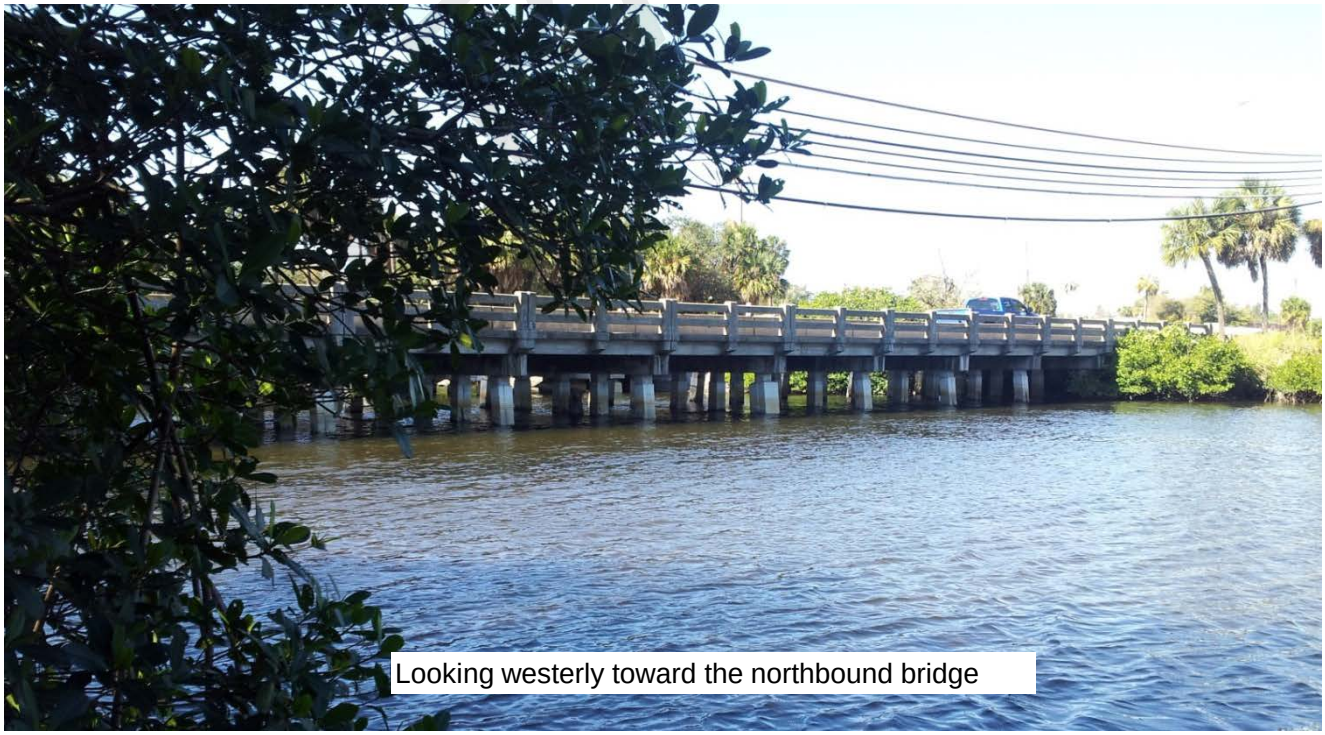
Table 4-11 Existing Bridge Culverts

Bridge Culvert No.	Year Built / Reconstructed	Sufficiency Rating	Health Index	NBI Rating	Last Inspection	Structure Type	Bridge Length	Load Rating	Span Length	Notes
US 41 over Archie Creek (MP 20.271)										
100046	1943 / 1959	74	82.34	N/A	3/21/2013	Double Barrel Culvert	33.9'	3.84 (H15)	10'x6'	Previously Widened
US 41 over Archie Creek North (MP 20.686)										
100047	1943 / 1959	74	75.13	N/A	3/21/2013	Triple Barrel Culvert	32'	4.62 (H15)	10'x6'	Previously Widened
US 41 over Fred's Creek (MP 21.084)										
100467	1943 / 1959	74	48.79	N/A	3/13/2013	Double Barrel Culvert	24'	1.11 (HL93)	10'x6'	Previously Widened
US 41 over Delaney Creek (MP 23.003) - Located north of expected limits of construction for this project										
100048	1959	56.7	66.67	N/A	3/13/2013	Triple Barrel Culvert	38.1'	1.53 (HS20)	12'x8.25'	

4.2.2 Bullfrog Creek Bridges

A pair of bridges crosses Bullfrog Creek at MP 17.422 (**Figure 4-17**). Both of these bridges use reinforced concrete slabs with pile bents. The southbound bridge (Bridge No. 100044) is approximately 203 feet long and was originally constructed in 1960 and was reconstructed in 1986. The northbound bridge (Bridge No. 100106) was constructed in 1945 and is slightly longer than the southbound bridge with a total length of approximately 211 feet. Both of these bridges carry two lanes that are slightly less than 12 feet wide with a 4-foot sidewalk on the outside of the northbound bridge and a 3 foot-7½ inch sidewalk on the southbound bridge (**Figure 4-18**). The northbound bridge has shoulders 6 inches to 1 foot wide between the curb and the lanes while the southbound bridge has a 2 foot-6 inch inside shoulder and a 2 foot outside shoulder. The outside railing on the northbound bridge has been retrofitted with a vertical face concrete railing with a bullet rail on top but the substandard post-and-rail barrier on the inside has not been replaced. The railings on the southbound bridge have both been upgraded using the vertical face concrete rail retrofit.

Aerial view of both bridges, looking east



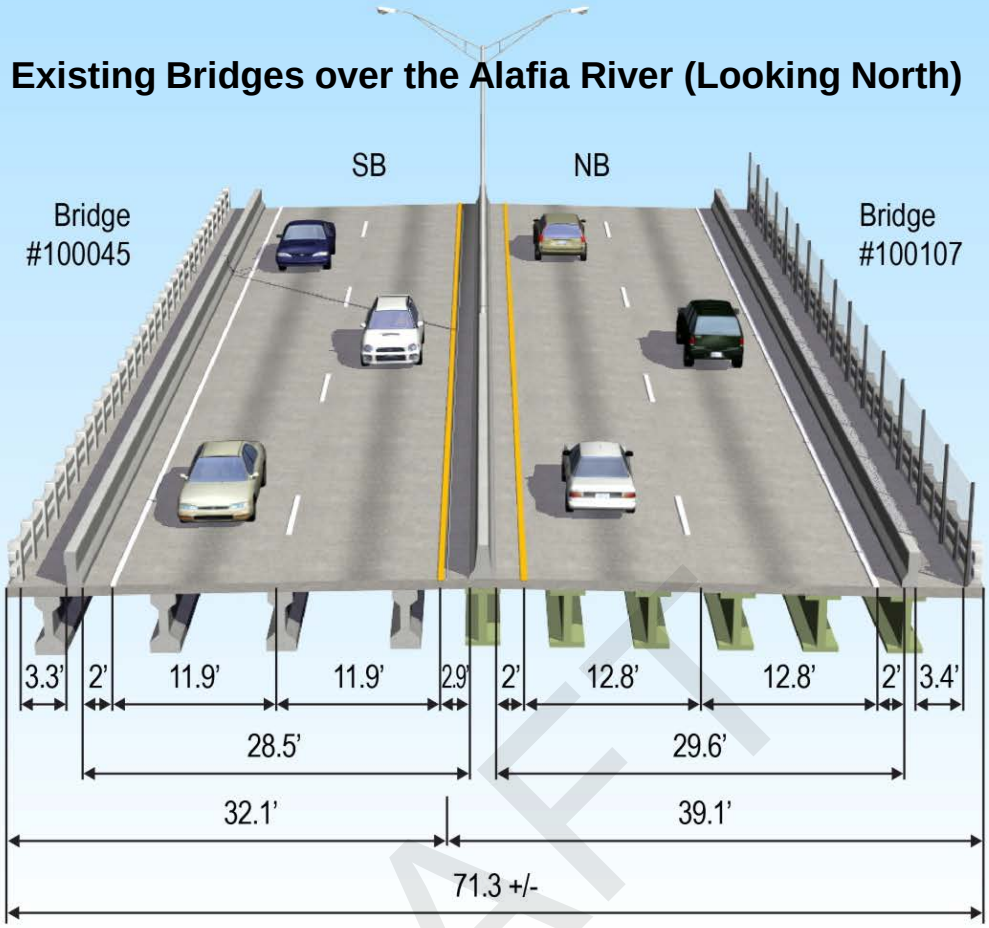
Looking westerly toward the northbound bridge

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Photos of Bullfrog Creek Bridges**	**Figure 4-17** **P. 1 of 2**

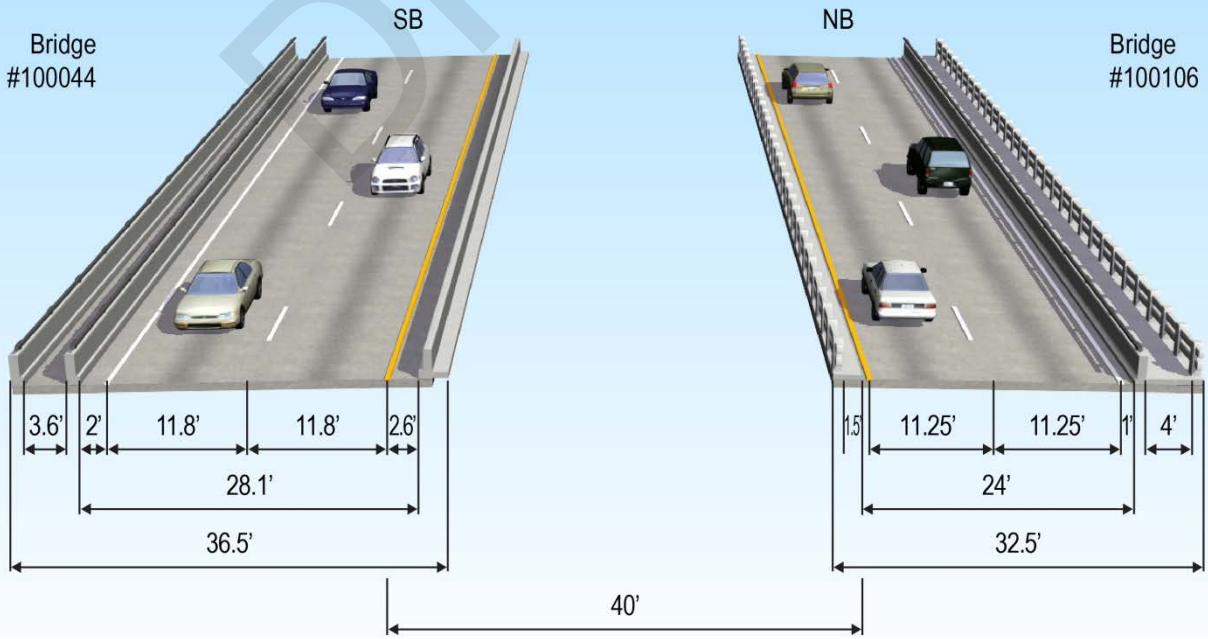
Looking north on northbound US 41 bridge over Bullfrog Creek

Looking north on southbound US 41 bridge over Bullfrog Creek

Existing Bridges over the Alafia River (Looking North)



Existing Bridges over Bullfrog Creek (Looking North)



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US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Existing Bridge Typical Sections**	**Figure 4-18**

The Bullfrog Creek bridges were last inspected on March 15, 2013 and were assigned sufficiency ratings of 77.2 for the southbound bridge and 75.2 for the northbound bridge. Their health indices are 87.65 and 89.6 for the southbound and the northbound bridges, respectively. Both bridges are classified as *functionally obsolete* and have load ratings greater than 1.0, and the northbound bridge has been designated as *scour critical*. **Table 4-12** summarizes characteristics of the existing bridges (FO = Functionally Obsolete). In April 2015, the US Coast Guard determined that a bridge permit would not be required for the proposed bridge replacement at Bullfrog Creek.

Table 4-12 Characteristics of the Existing Bridges

US 41 Bridges over Bullfrog Creek											
Bridge No. & Location		Year Built / Reconstructed	Sufficiency Rating	Health Index	NBI Rating	Last Inspection	Structure Type	Bridge Length	Load Rating	Span Length	Notes
100044	SB	1960 / 1986	77.2	87.65	FO	3/15/2013	Reinforced Slab	202.8'	1.91 (HS20)	23'	
100106	NB	1945	75.2	89.6	FO	3/15/2013	Reinforced Slab	211.1'	2.29 (HS20)	14.4'	Scour Critical

US 41 Bridges over Alafia River (Doyle E Carlton Bridge)											
Bridge No. & Location		Year Built / Reconstructed	Sufficiency Rating	Health Index	NBI Rating	Last Inspection	Structure Type	Bridge Length	Load Rating	Span Length	Notes
100045	SB	1959	78.9	87.64	FO	3/22/2013	AASHTO Type II Beam	1215.9'	1.66 (H20)	40'/60'/78'	Main Span Post Tensioned
100107	NB	1952	68	94.09	FO	3/22/2013	Steel I-Beam	1215.9'	1.86 (H20)	40'/60'/78'	Continous Girder

FO = Functionally Obsolete

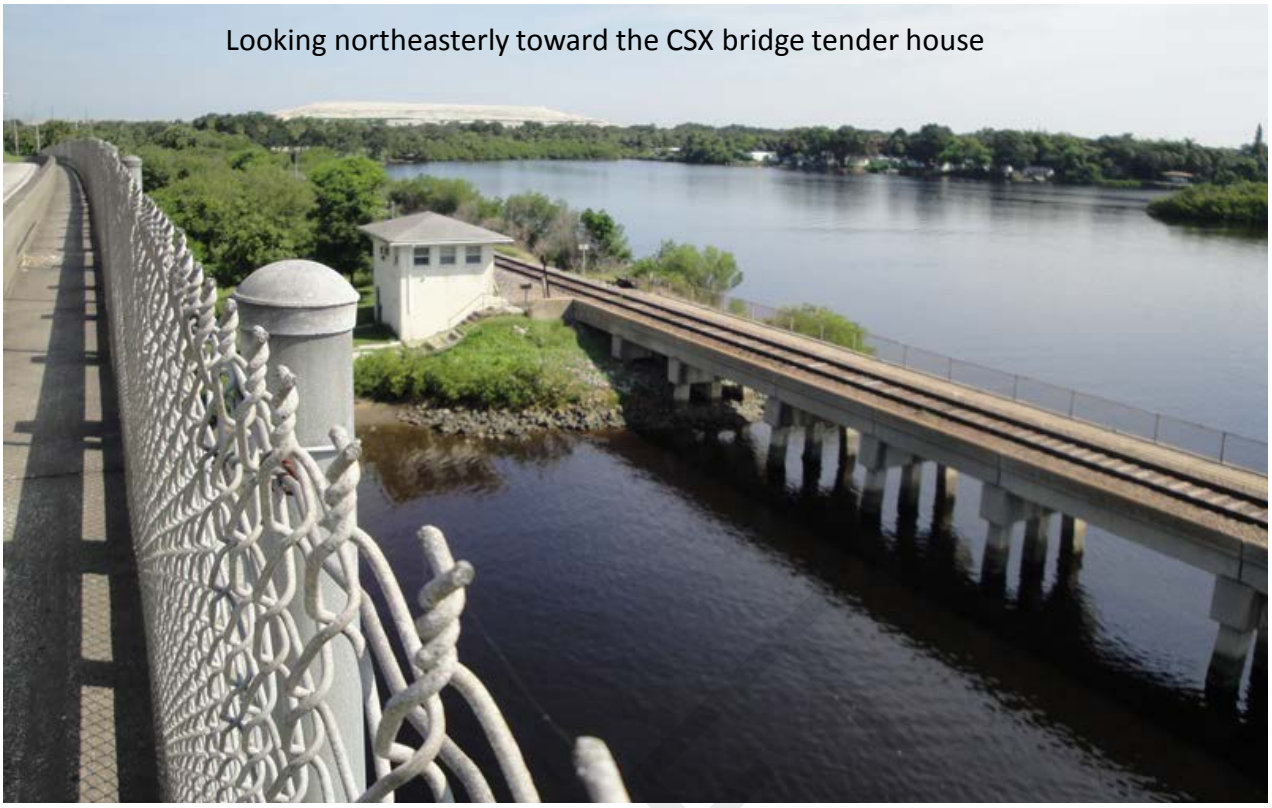
4.2.3 Alafia River Bridges

The second pair of bridges is about 1216 feet long and cross the Alafia River at MP 18.914 (**Figure 4-19**). The northbound bridge (Bridge No. 100107) was constructed in 1952 using continuous steel I-beams. The southbound bridge (Bridge No. 100045) was built in 1959 using AASHTO Type II beams with the 78-foot main span beam using post tensioning. This pair of bridges was built side-by-side and are actually separated by a longitudinal joint that is positioned just inside of the inside lane line of the southbound lanes so that the median barrier is located on the northbound bridge. Both the northbound and southbound bridges carry two lanes of traffic that range from 11 feet-11 inches to 12 feet-9 inches wide (**Figure 4-18**). Both shoulders on the northbound bridge and the outside shoulders on the southbound bridge are 2-foot wide while the inside shoulder of the southbound bridge is approximately 2 foot-10 inches. Both bridges use F-shaped barriers between the travel lanes and the sidewalks which are 3 feet-5 inches wide on the northbound bridge and 3 feet-4 inches wide on the southbound bridge. The original post-and-rail barrier is present on the outside of both sidewalks with a fence installed just inside of this barrier on just the northbound bridge. Dual arm light poles are mounted on the median barrier along the bridge.

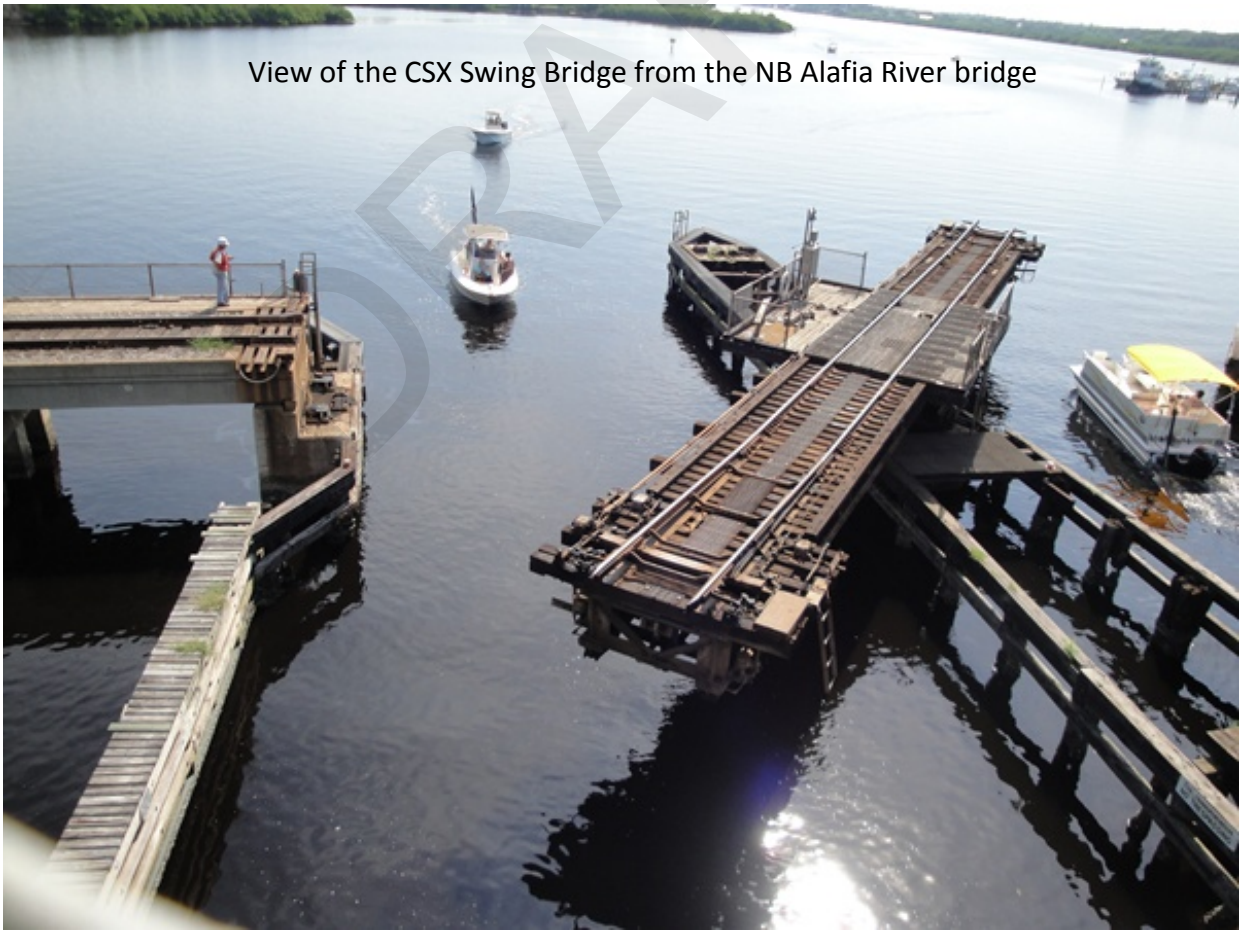
Looking north along US 41 at the top of the bridges – note the narrow sidewalks and lack of shoulders and bike lanes

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Photos of Alafia River Bridges P. 1 of 3**	**Figure 4-19**

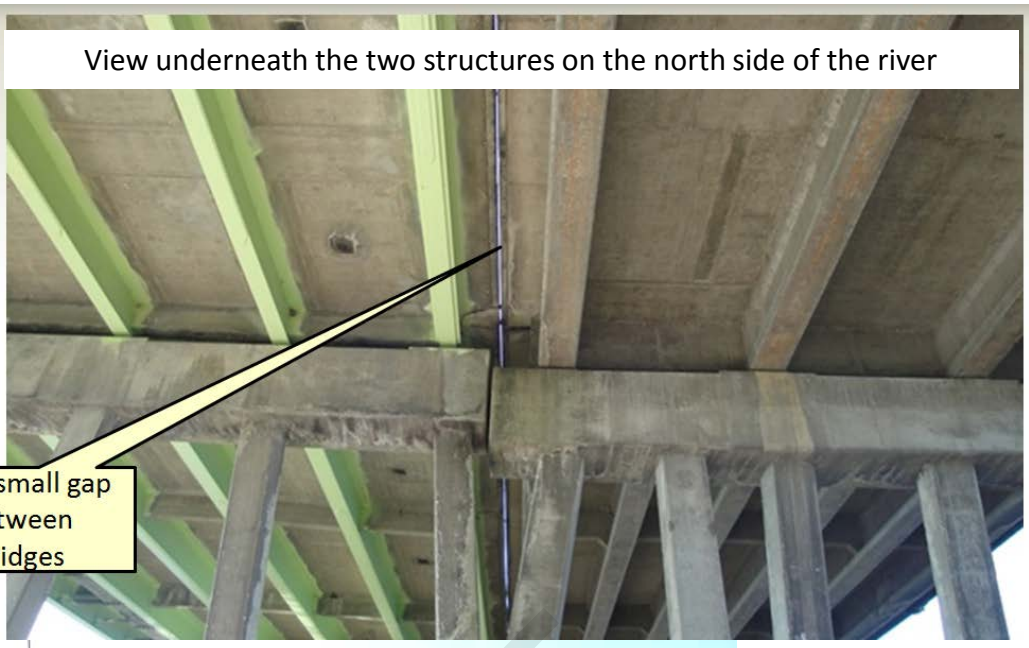
Looking northeasterly toward the CSX bridge tender house



View of the CSX Swing Bridge from the NB Alafia River bridge



View underneath the two structures on the north side of the river



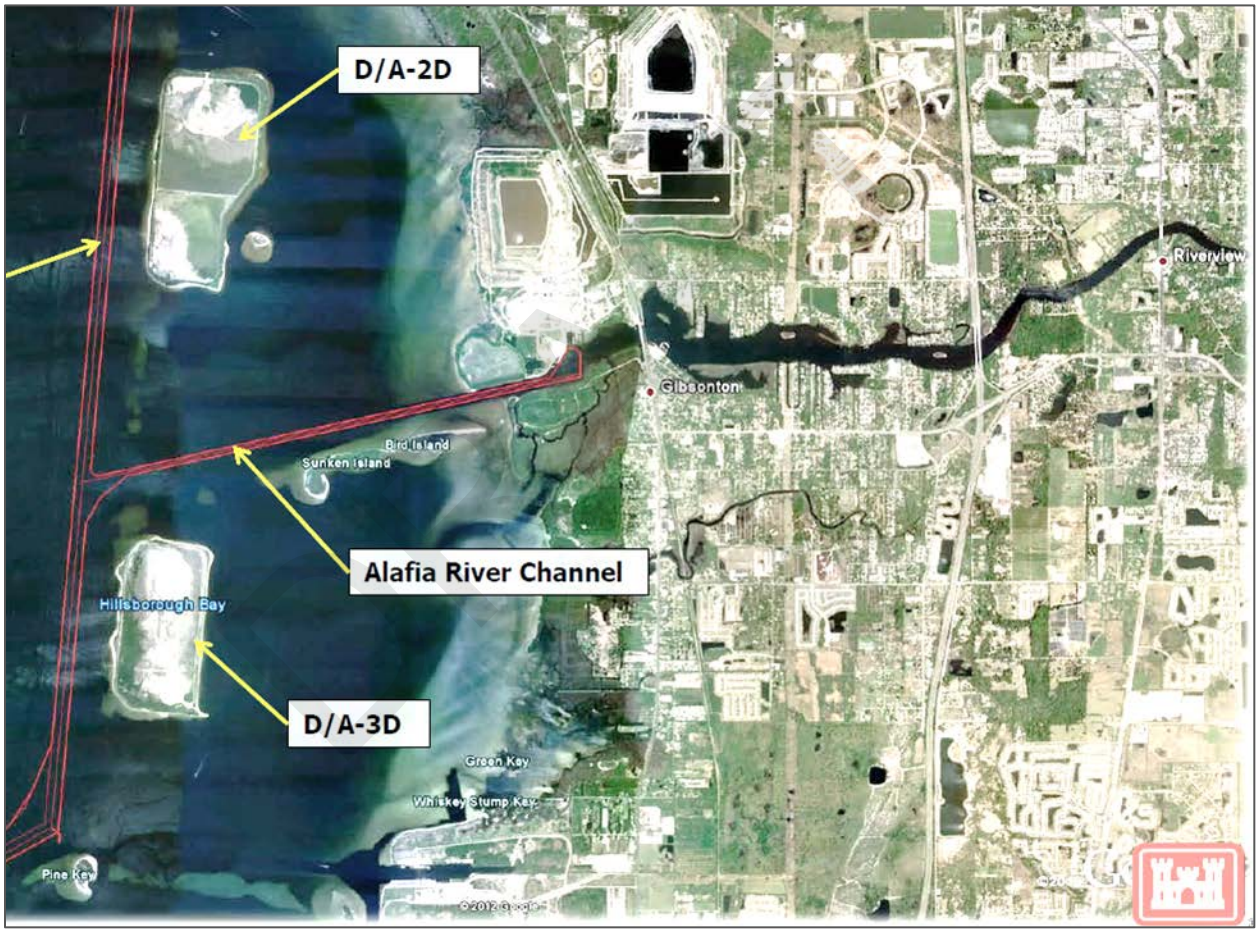
View of the two bridges from the Williams Park Boat Ramp area

View of the bridges from the fishing pier in Williams Park

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Photos of Alafia River Bridges P. 3 of 3**	**Figure 4-19**

The southbound bridge has a sufficiency rating of 78.9 and a health index of 87.64 while the sufficiency rating is 68 and the health index is 94.09 for the northbound bridge. These bridges were last inspected on March 22, 2013 and are both classified as *functionally obsolete* and have load ratings that exceed 1.0.

Based on FDOT's bridge comprehensive inventory data report, the existing bridges have vertical and horizontal navigational clearances of 29.8 feet and 48.8 feet, respectively. In addition, a field survey conducted on July 20, 2014 measured the vertical clearances above mean high water at 28.6 feet. These bridges span a navigable waterway and will require a US Coast Guard permit for any modifications. The Alafia River Channel provides access to private port facilities on the Alafia River, although the maintained channel ends west of the bridges, as shown in the graphic below.



SECTION 5 PLANNING PHASE/CORRIDOR ANALYSIS

A separate planning phase for this proposed project was not performed other than a screening in the FDOT's Efficient Transportation Decision Making (ETDM) system. A planning phase screen was not run for this proposed project in ETDM; however, a *Final Programming Screen Summary Report* was published on April 10, 2013 under ETDM Project Number 5180 for the proposed roadway improvements.

A separate corridor analysis was not conducted as part of this study since the purpose of this PD&E study was to identify concepts for widening the existing highway (within the existing corridor) consistent the MPO's Long-Range Transportation Plan.

SECTION 6 DESIGN CONTROLS AND STANDARDS

Proposed design controls, standards and criteria are shown below in **Table 6-1.**

Table 6-1 US 41 Design Controls and Criteria

Design Element	6-Lane Suburban	6-Lane Urban	Source/Comments
Functional Classification	Urban Principal Arterial	Urban Principal Arterial	FDOT SLD
Design Year	2040	2040	Traffic Report
Design Speed	50 mph	45 mph	(2) Sections 2.16.1, 1.9.1
Design Vehicle	WB-62FL	WB-62FL	(2) Section 1.12
Horizontal Alignment			
Maximum Superelevation	0.05	0.05	(2) Sections 2.16.10, 2.9
	(use 0.10 table)		
Maximum Curvature	8° 15'	8° 15'	(2) Table 2.8.3
Maximum Curvature w/o Superelevation	0° 30'	2° 45'	(2) Table 2.8.4
Max. Deflection w/o Horizontal Curve	0° 45' 00"	1° 00' 00"	(2) Table 2.8.1a
Minimum Length of Horizontal Curve	750' Desirable,	675' Desirable,	(2) Table 2.8.2a
	400' Minimum	400' Minimum	
Superelevation Rate	1 :160	1 :150	(2) Tables 2.9.3, 2.9.4
Vertical Alignment			
Maximum Grade	6.00%	6.00%	(2) Section 2.16.8, Table 2.6.1
Minimum Grade	0.30%	0.30%	(2) Table 2.6.4
Min. Distance Between VPI's	250 ft	250 ft	(2) Table 2.6.4
Min. K Value for Crest Vertical Curves	136	98	(2) Table 2.8.5
Min. K Value for Sag Vertical Curves	96	79	(2) Table 2.8.6
Minimum Curve Length	Crest: 300 ft Sag: 200 ft	Crest & Sag: 135 ft or KA	whichever is greater (2) Tables 2.8.5, 2.8.6
Max. Change In Grade w/o Vertical Curve	0.60%	0.70%	(2) Table 2.6.2
Clearance for the Roadway Base above the Base Clearance Water Elevation	3'	1'	(2) Table 2.6.3
Roadway Cross-Section			
Lane Widths	12'	12'	(2) Table 2.1.1
Cross Slopes (Roadway)	2% two inside lanes 3% outside lane	2% two inside lanes 3% outside lane	(2) Figure 2.1.1
Cross Slopes (Shoulder)	6% (Shoulder)	Not/App.	(2) Table 2.3.2
Median Width (Minimum)	30'	22'	(2) Section 2.16.4, Table 2.2.1
Shoulders: Outside	Full Width 12' Paved Width 5'	Not/App.	(2) Section 2.16.5
Shoulders: Median	Paved Width 6.5'	Not/App.	
Horizontal Clearance	24' from travel lane (outside of CZ)	4' from face of curb	(2) Table 2.11.11, Section 2.16.11, Table 2.11.9
Front Slopes	1 :6 to edge of CZ, then 1:3	1:2 or to suit property owner. Not flatter than 1:6	(2) Table 2.4.1
Back Slopes	1 :4 when R/W permits or 1:3	1:2 or to suit property owner. Not flatter than 1:6	(2) Table 2.4.1
Minimum Border Width	29'	12' with bike lanes; 14' without bike lanes	(2) Section 2.16.7, Table 2.5.2
Access Classification Existing	Class 5 & 7	Class 5 & 7	FDOT's Roadway Characteristics Inventory (RCI)
Proposed	Class 5 & 7	Class 5 & 7	
Minimum Level Of Service (Arterial)	D	D	(3) FDOT's LOS Standards
SOURCES			
(1) AASHTO "Policy On Geometric Design Of Highways And Streets" (2004)			
(2) FDOT Plans Preparation Manual, Volume I English (Revised 2014) (3) FDOT's 2013 QLOS Handbook			

FDOT's access management standards are shown below in **Table 6-2**. As noted previously, most of the existing study limits is designated as access management Class 3.

Table 6-2 FDOT's Access Management Standards

Access Class	Facility Design Features	Minimum Median Opening Spacing		Minimum Signal Spacing	Minimum Connection Spacing
	Median Treatment & Service Roads	Directional (Prohibits left turns from side streets)	Full		>45mph / ≤ 45 mph (posted speed)
2	Restrictive with Service Roads	1,320 ft	0.500 mi.	0.500 mi.	1,320/660 ft
3	Restrictive *	1320 ft	0.500 mi.	0.500 mi.	660/440 ft
4	Non-Restrictive	N/A	N/A	0.500 mi.	660/440 ft
5	Restrictive	660 ft	Over 45 mph / ≤ 45 mph 0.5/0.25 mi.	0.5/0.25 mi.	440/245 ft
6	Non-Restrictive	N/A	N/A	0.250 mi.	440/245 ft
7	Both Median Types	330 ft	0.125 mi.	0.250 mi.	125 ft

** Restrictive means medians which prevent vehicles from crossing due to curbs, grass, or other barriers.*
Source: Florida Department of State, Florida Administrative Code, FDOT Rule Chapter 14-97.

All roadway typical sections were updated in December 2014 to show 7-foot buffered bike lanes in compliance with new FDOT design standards for urbanized areas.

SECTION 7 TRAFFIC DATA

The information in this section has been extracted from the project's *Traffic Technical Memorandum* (TTM).

7.1 EXISTING TRAFFIC VOLUMES AND TRAFFIC CHARACTERISTICS

Traffic counts were made within the study area during January and March 2013. The traffic count data included 72-hour classification counts performed at three locations, 72-hour approach machine counts performed at approaches to major intersections, and 4-hour turning movement counts performed at twelve intersections along the study corridor. Additional turning movement counts were conducted between 9 am and 1 pm when truck traffic was observed to be the highest at US 41 intersections at Riverview Drive, Madison Avenue and Port Sutton Road, all of which provide direct access to Port facilities. These special counts were conducted in order to size the future turn lanes at these intersections so that they can accommodate high-volume truck movements made throughout an average day.

The intersection of US 41 and SR 676 (Causeway Boulevard) was not studied as a part of this project. This intersection has been evaluated for a potential future grade separation under Work Program Item Segment No. 255599-1 – Traffic Operations Analysis for SR 676 (Causeway Boulevard) from SR 45 (US 41) to SR 43 (US 301).

Existing Traffic Characteristics

Table 7-1 below shows the recommended design traffic factors for the US 41 corridor, which were approved by District Seven on June 4, 2013.

Table 7-1 Recommended K, D, T Factors along US 41

US 41 Segment	Standard K	D	Daily Truck (T_{24})	Design Hour Truck (DHT)
Kracker Avenue to Gibsonton Drive/Alice Avenue	9.00%	64.27%	9.0%	5.0%
Gibsonton Drive to CR 676A (Madison Avenue/Pendola Point Road)			9.0%	5.0%
CR 676A (Madison Avenue) to south of SR 676 (Causeway Boulevard)			11.0%	5.0%

The design hour traffic factors recommended for the US 41 PD&E study include a standard K factor of 9.0 percent per FDOT's 2012 *Project Traffic Forecasting Handbook* (PTFH). The K-factor (or Design Hour Factor) is the ratio of the Annual Average Daily Traffic (AADT) that occurs during the design hour for the design year. The recommended Directional (D) factor for the study corridor is 64.27

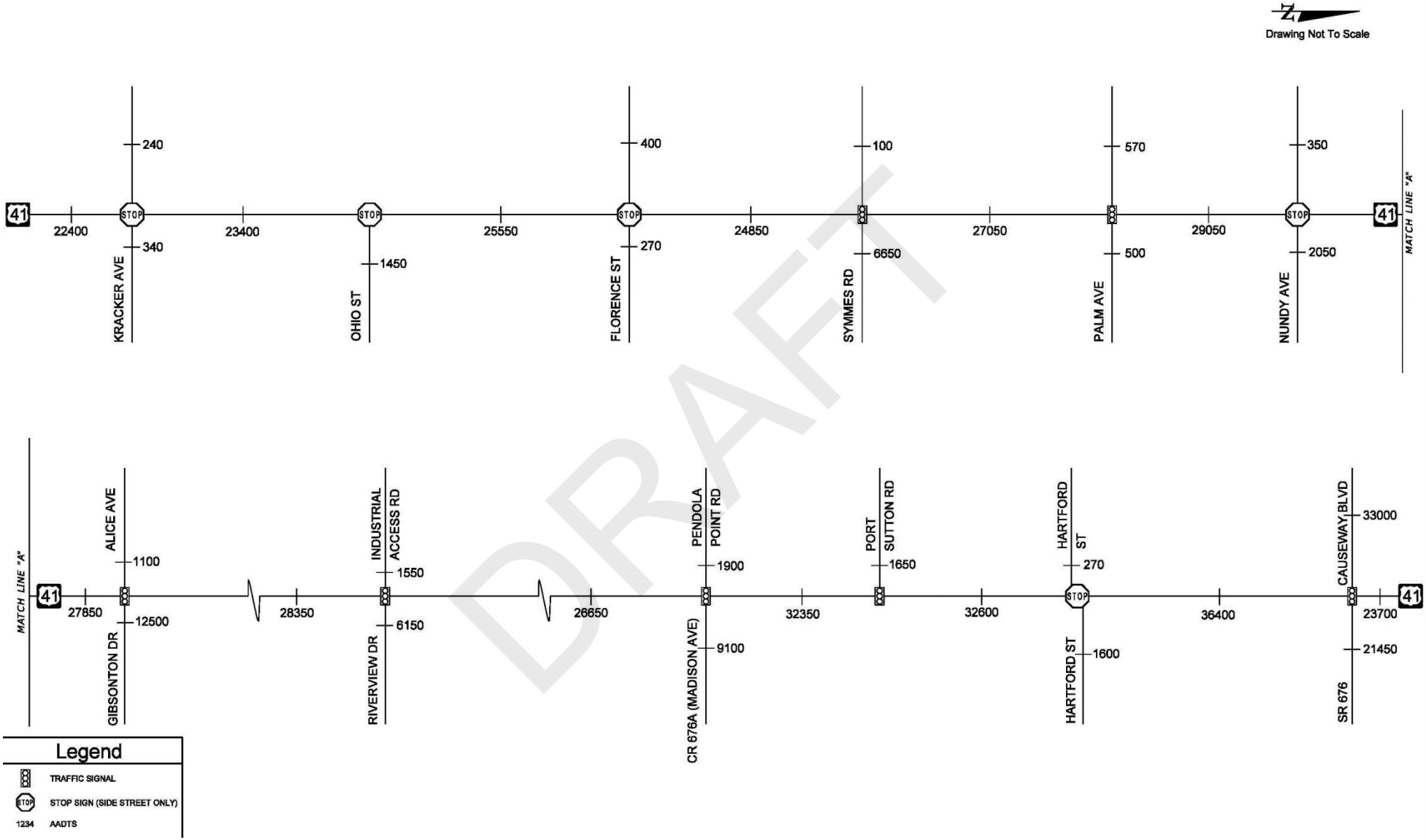
percent based on the average of the D factors obtained from the 72-hour classification counts and the D factor along the study corridor as identified in the 2011 Florida Transportation Information (FTI) DVD. The recommended D factor along US 41 is within the acceptable range identified in the PTFH. D factors for the side streets were estimated from the actual AM and PM peak-hour turning movement counts.

Recommended daily truck percentage (T_{24}) along the study corridor based on the 72-hour classification counts are 9.0 percent between Kracker Avenue and Gibsonton Drive/Alice Avenue and between Gibsonton Drive/Alice Avenue and CR 676A (Madison Avenue/Pendola Point Road); and, 11.0 percent between CR 676A (Madison Avenue/Pendola Point Road) and south of SR 676 (Causeway Boulevard). For the side streets, the design hour truck (DHT) factors were based on the AM and PM peak-hour turning movement counts. DHT for US 41 was assumed to be half of T_{24}, and was rounded up to the nearest percent.

Existing (2013) Traffic Volumes

The existing AADT volumes were obtained by applying a seasonal adjustment factor and axle adjustment factor to the raw average daily traffic (ADT) counts from the 72-hour approach counts. The adjustment factors were obtained from 2011 FTI DVD. These seasonally and axle adjusted existing AADT volumes are shown in **Figure 7-1**.

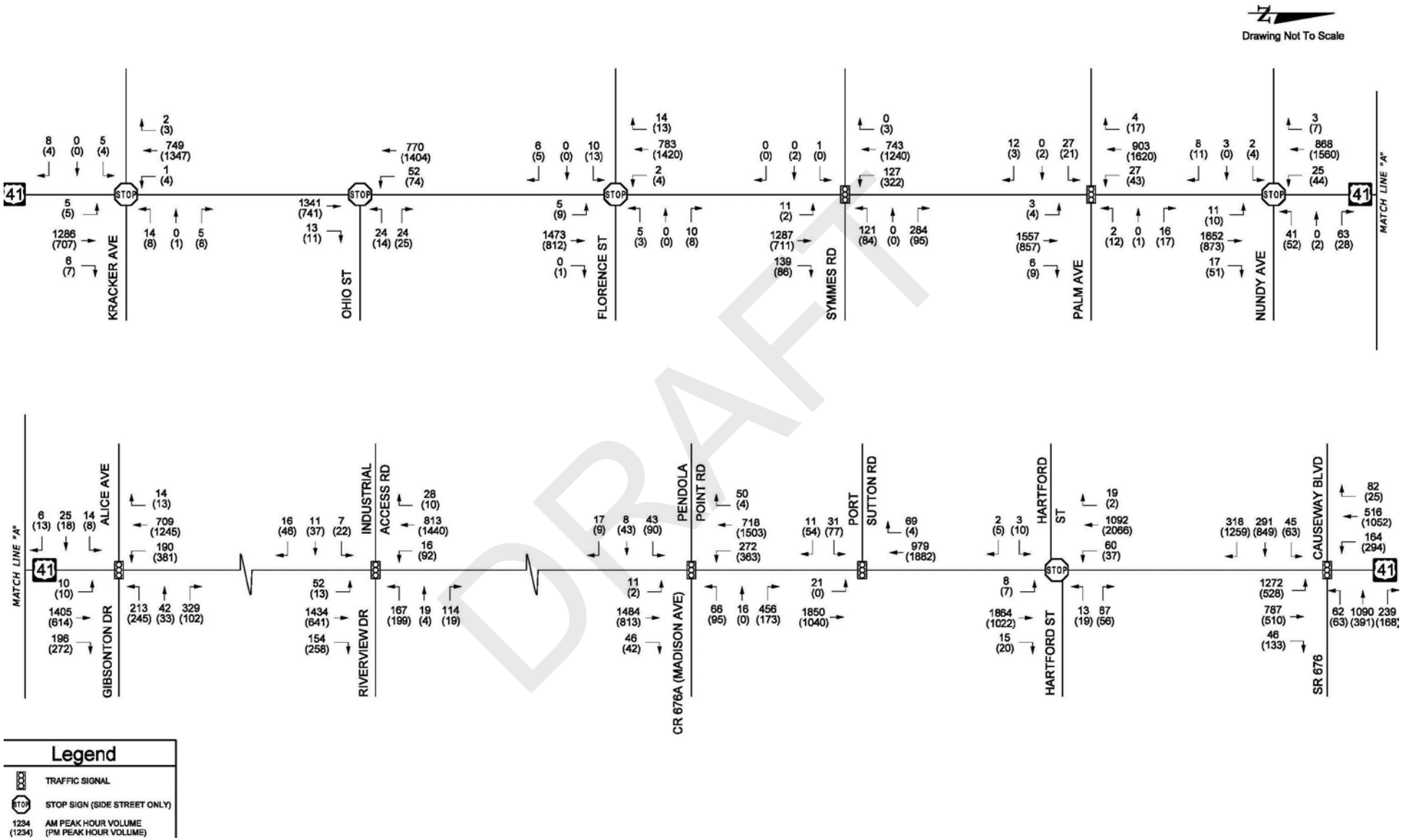
The "existing year" (2013) AM and PM peak hour directional design hour volumes (DDHV) were obtained by multiplying the existing AADT volumes by the recommended K and D factors of 9.0 percent and 64.27 percent, respectively. The AM and PM peak hour turning movement volumes were developed by multiplying the existing turning percentages with the DDHV estimated from AADTs. The existing turning percentages were obtained from the AM (proposed peak: 7:00 AM – 8:00 AM) and the PM (proposed peak: 4:45 PM – 5:45 PM) peak hour raw turning movement counts. Based on the traffic counts, southbound was considered to be the peak direction during the PM peak period and northbound was used as the AM peak direction. Peak directions for side streets were obtained from the existing traffic counts. The existing year (2013) AM and PM peak-hour volumes are shown in **Figure 7-2**.



US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676
(Causeway Blvd)
WPI Segment No. 430056 1 - Hillsborough County

Existing Annual Average Daily Traffic

Figure 7-1



US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676 (Causeway Blvd)
WPI Segment No. 430056 1 - Hillsborough County

Year 2013 AM and PM Traffic Volumes

Figure 7-2

7.2 EXISTING LEVELS OF SERVICE

The existing year (2013) lane geometry and approved existing AM and PM peak hour traffic volumes, along with signal timing plans obtained from Hillsborough County were used for the existing conditions analysis. The acceptable Level of Service (LOS) standard for the US 41 study corridor in the "FHWA urbanized area" from Kracker Avenue to south of SR 676 (Causeway Boulevard) is LOS D based on the Planning Boundaries for LOS standards map for Hillsborough County. SYNCHRO Version 7.0 (Build 759) was used as the analysis tool within the study limits. Signalized intersection LOS was estimated from the Highway Capacity Manual (HCM) module of the SYNCHRO software. The Highway Capacity Software (HCS+) Version 5.5 was used for the unsignalized intersections. The unsignalized intersection module of the HCS cannot analyze six lane roadways; in these cases, the unsignalized analysis is performed assuming two through lanes on each approach and using two-thirds of the through traffic volume. This approach for the analysis of the unsignalized intersections was discussed and agreed upon with FDOT. The existing year LOS and control delay results for the study intersections are summarized in **Table 7-2**.

Table 7-2 Existing Year (2013) AM/PM Intersection Delay and LOS Summary

Intersection Along US 41	Overall Average Delay (seconds/vehicle)	Overall Intersection V/C Ratio	Overall Intersection LOS
US 41 at Kracker Avenue* (un-signalized)	30.3/24.8	-	D/C
US 41 at Ohio Street* (un-signalized)	30.2/15.9	-	D/C
US 41 at Florence Street* (un-signalized)	24.6/36.8	-	C/E
US 41 at Symmes Road	28.6/13.4	0.83/0.58	C/B
US 41 at Palm Avenue	13.3/8.6	0.70/0.61	B/A
US 41 at Nundy Avenue* (un-signalized)	106.8/27.0	-	F/D
US 41 at Gibsonton Drive/Alice Avenue	52.6/33.7	0.93/0.81	D/C
US 41 at Riverview Drive/Industrial Access Road	13.9/14.4	0.70/0.72	B/B
US 41 at CR 676A (Madison Avenue/Pendola Point Road)	65.4/40.9	0.92/0.81	E/D
US 41 at Port Sutton Road	10.8/15.3	0.71/0.79	B/B
US 41 at Hartford Street* (un-signalized)	24.1/124.4	-	C/F

**Un-signalized Intersection – Delay/LOS along worst minor approach.*

Based on the existing analysis, with the exception of the intersections of US 41 at Florence Street, Nundy Avenue, CR 676A (Madison Avenue/Pendola Point Road) and Hartford Street, all the other study intersections operate at an acceptable level of service LOS D or better during both peak periods.

SYNCHRO Version 7.0 (Build 759) was used as the roadway segment analysis tool. The existing year (2013) roadway segment LOS analyses were conducted for US 41 using the existing year (2013) peak

hour volumes. For the roadway segment analysis, the free flow speed was assumed to be the posted speed limit which varies between 40 mph and 55 mph within the project limits. The arterial class for US 41 was established to be Class I by SYNCHRO software. The existing roadway segment LOS results for the northbound and southbound directions of US 41 are summarized in **Table 7-3**. These results are also graphically displayed in **Figure 7-3**.

Table 7-3 Existing Year (2013) AM/PM Roadway Segment Speed and LOS Summary

Roadway	Segment	Existing Condition		
		Distance (mi)	Arterial Speed (mph)	Roadway Segment LOS
US 41 NB	Southern Project Limit to Symmes Road	2.03	42.1/46.2	A/A
	Symmes Road to Palm Avenue	0.42	25.0/27.9	D/C
	Palm Avenue to Gibsonton Drive/Alice Avenue	0.59	19.8/28.0	E/C
	Gibsonton Drive/Alice Avenue to Riverview Drive/Industrial Access Road	1.03	41.4/44.2	B/A
	Riverview Drive/Industrial Access Road to CR 676A (Madison Avenue/Pendola Point Road)	2.77	41.0/44.8	B/A
	CR 676A (Madison Avenue/Pendola Point Road) to Port Sutton Road	0.36	30.1/33.0	C/C
	Port Sutton Road to south of SR 676 (Causeway Boulevard)	1.16	31.3/34.4	C/B
US 41 SB	South of SR 676 (Causeway Boulevard) to Port Sutton Road	1.16	45.7/41.1	A/B
	Port Sutton Road to CR 676A (Madison Avenue/Pendola Point Road)	0.36	23.2/20.6	D/E
	CR 676A (Madison Avenue/Pendola Point Road) to Riverview Drive/Industrial Access Road	2.77	52.0/50.5	A/A
	Riverview Drive/Industrial Access Road to Gibsonton Drive/Alice Avenue	1.03	40.1/37.5	B/B
	Gibsonton Drive/Alice Avenue to Palm Avenue	0.59	46.0/43.7	A/A
	Palm Avenue to Symmes Road	0.42	32.4/34.2	C/B

Based on these results, the existing analysis shows that the section of US 41 between Palm Avenue and Gibsonton Drive/Alice Avenue does not operate at an acceptable level of service in the northbound direction during the AM peak period. In addition, the segment between Port Sutton Road and CR 676A (Madison Avenue/Pendola Point Road) in the southbound direction does not operate at an acceptable level of service during the PM peak period.

Existing Worst-Case (AM or PM) **Segment** LOS

C = LOS C or Better

Existing Worst-Case (AM or PM) I**ntersection** LOS

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Existing Levels of Service Graphic Summary**	**Figure 7-3**

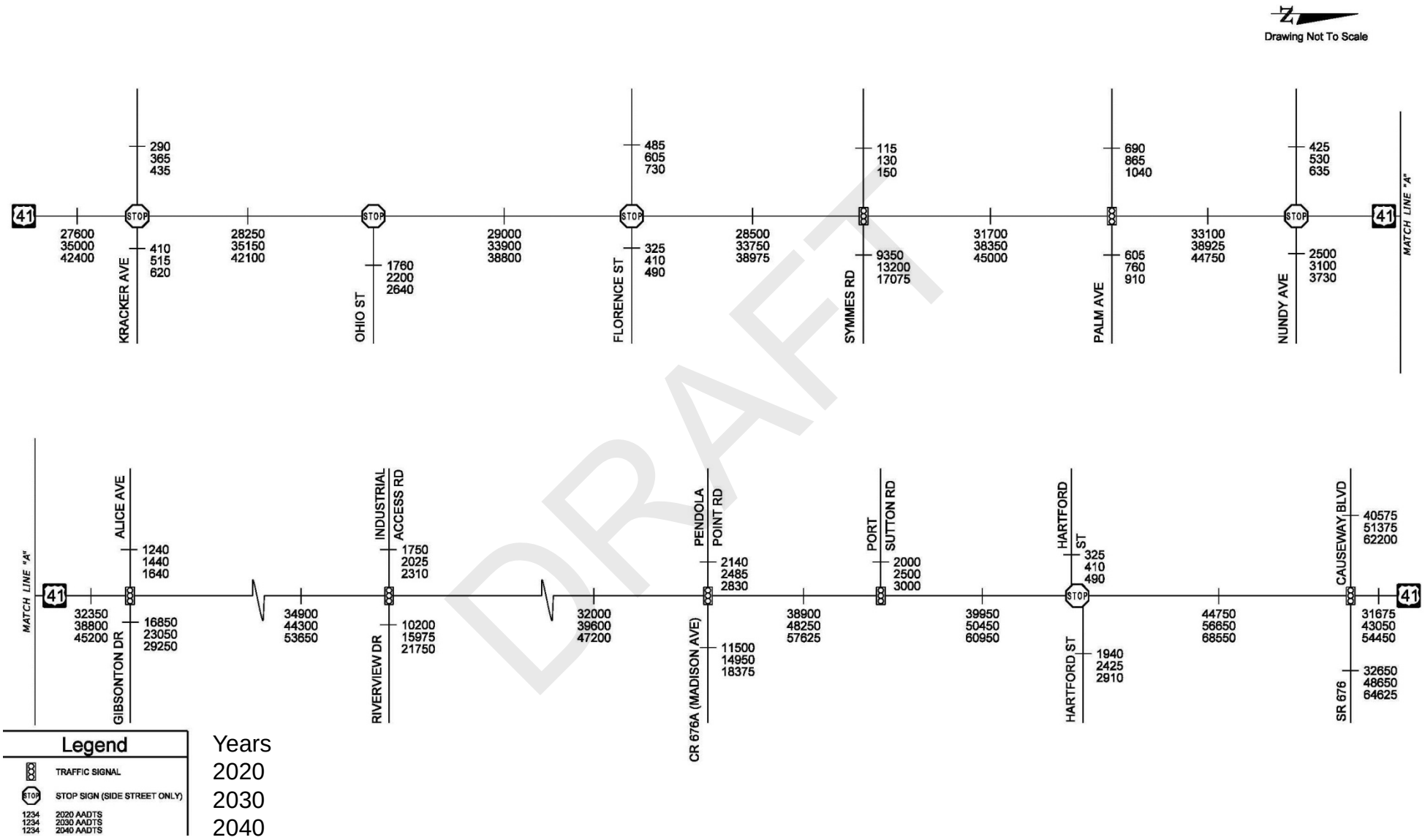
7.3 ASSUMPTIONS AND METHODOLOGY FOR FUTURE TRAFFIC PROJECTIONS

Per the traffic methodology approved by FDOT in January 2013, only one set of future traffic volumes were developed that were used for both the no-build and the build conditions. Future year traffic volumes were developed using the Tampa Bay Regional Planning Model (TBRPM) Version 7.1. A base year (2006) model validation (reasonableness check) was performed for the study area along US 41 from Kracker Avenue to Causeway Boulevard. Adjustments were made to the base year model to improve the accuracy levels of the model volumes. Details on subarea validation are included in the TTM Appendices. The process and results of subarea validation were coordinated and approved by FDOT on April 8, 2013. These subarea refinements including modifications to centroid connectors and facility types were applied to the future year 2035 model for the build scenario with six lanes along US 41. Based on the results of the subarea validation, FDOT recommended that NCHRP 255 adjustment techniques (Ratio and Difference Method) be applied to the future year 2035 model volumes along US 41 and along several major side streets. In addition, FDOT recommended using growth rates for several minor side streets and along minor approaches at major side streets. The growth rates used were based on a comparison of the socioeconomic data between the base year (2006) and future year (2035) for the traffic analysis zones adjacent to the individual side streets. Based on this approach, an annual growth rate of 3.04 percent was recommended for the minor side streets and an annual growth rate of 1.81 percent was recommended for the minor approaches for the major side streets. The NCHRP 255 adjusted model volumes and recommended growth rates were approved by FDOT on April 8, 2013 and May 16, 2013.

7.4 FUTURE TRAFFIC PROJECTIONS

The opening year (2020), interim year (2030) and design year (2040) AADT were obtained by interpolation and extrapolation between the existing (2013) AADT and the established 2035 future model volumes for the US 41 volumes and the major side streets within the project limits. For the minor side streets and the minor approaches at the major side streets, growth rates were used as described above. The future year no-build and build AADT are shown in **Figure 7-4**. A graphical comparison of existing and future AADTs is included in **Figure 7-5**.

The future year AM and PM peak Directional Design Hour Volumes (DDHV) were obtained by multiplying the future year AADTs by the recommended K and D factors, respectively. These estimated DDHV were then distributed at the study intersections by applying the existing turning percentages from the existing traffic counts. As in the existing year (2013), southbound is considered to be the peak direction along US 41 within the project limits during the PM peak period and northbound is considered to be the peak direction during the AM peak period. Peak directions for side streets were obtained from the existing traffic counts. The future no-build/build AM and PM peak hour volumes for the design year (2040) are shown in **Figure 7-6**; volumes for the opening and interim years are available in the TTM. Future traffic volumes were reviewed and approved by FDOT on June 4, 2013.



US 41(SR 45) PD&E Study
From Kracker Avenue to South of SR 676 (Causeway Blvd)
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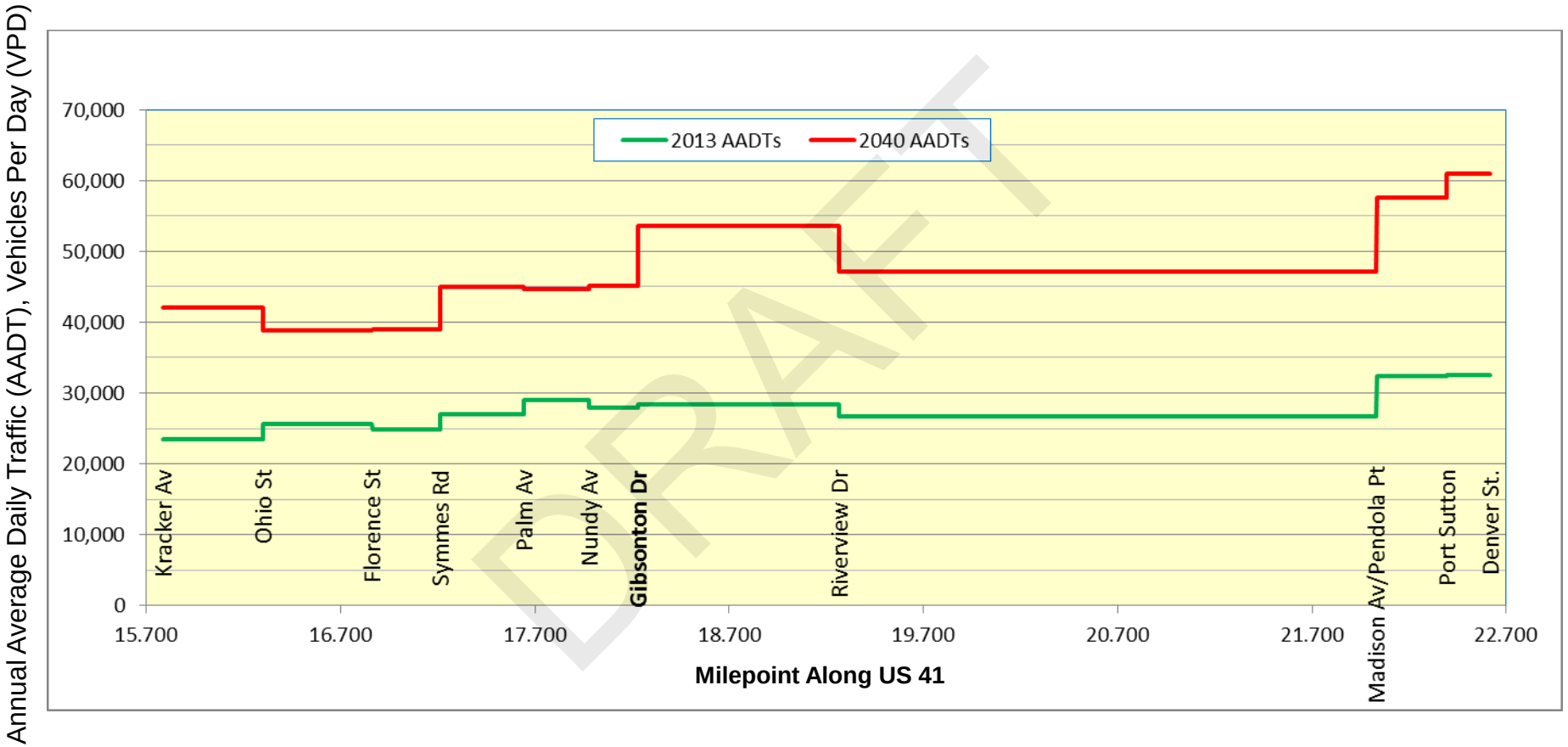
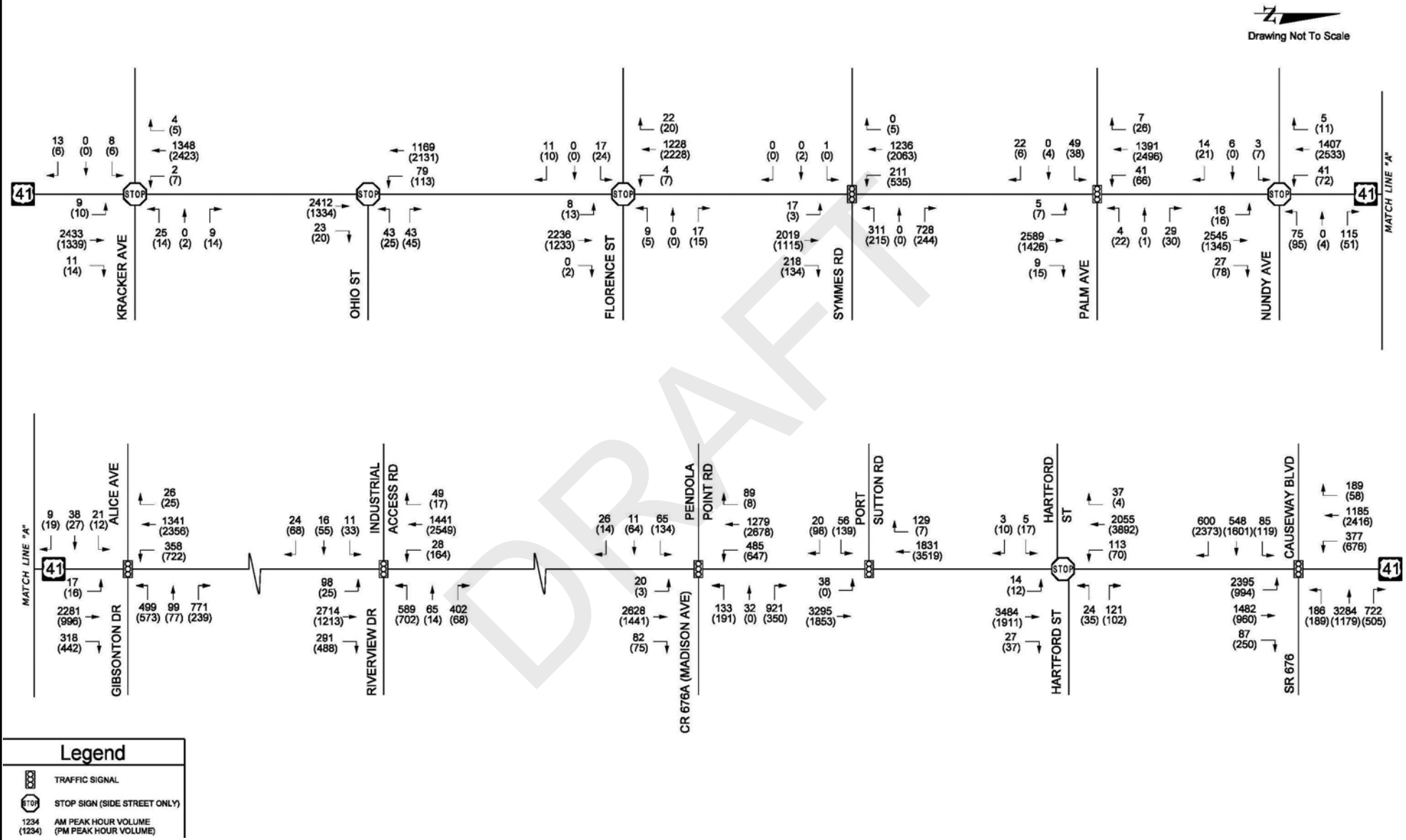
Future Year No-Build and Build AADTs

Figure 7-4



US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Graphical Comparison of Existing and Future AADTs**	**Figure 7-5**



US 41(SR 45) PD&E Study
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Design Year 2040 Directional Design Hour Volumes

Figure 7-6

7.5 SIGNAL WARRANT ANALYSES

In conducting the future traffic operational analysis, the potential for future signalization at unsignalized intersections was evaluated using a planning-level analysis. Based on the analysis, it appeared that some unsignalized intersections may need future traffic signals. However, the need for a traffic signal must be met by meeting specific warrants as established in the US DOT Manual on Uniform Traffic Control Devices (MUTCD) and FDOT's Manual on Uniform Traffic Studies (MUTS).

Planning-level evaluation of MUTCD signal warrant numbers 1 and 2 was conducted for the locations shown below in **Table 7-4**. Warrants were evaluated using the two peak hour – AM and PM volumes available for the future years.

Table 7-4 Planning Level Signal Warrant Evaluation at Unsignalized Intersections

Unsignalized Intersection	Signal Warrant*	Opening Year 2020	Interim Year 2030	Design Year 2040	Recommendation
US 41 @ Kracker Avenue	1	Not Satisfied	Not Satisfied	Not Satisfied	Traffic Signal not recommended due to low traffic volumes.
	2	Not Satisfied	Not Satisfied	Not Satisfied	
US 41 @ Ohio Street	1	Not Satisfied	Not Satisfied	Not Satisfied	Traffic Signal not recommended due to low traffic volumes.
	2	Not Satisfied	Not Satisfied	Not Satisfied	
US 41 @ Florence Street	1	Not Satisfied	Not Satisfied	Not Satisfied	Traffic Signal not recommended due to low traffic volumes. Also, Access Management Signal Spacing requirement of 2640 feet not available.
	2	Not Satisfied	Not Satisfied	Not Satisfied	
US 41 @ Nundy Avenue	1	Not Satisfied	Not Satisfied	Not Satisfied	Traffic Signal not recommended. Also, Access Management Signal Spacing requirement of 2640 feet not available.
	2	Not Satisfied	Not Satisfied	Not Satisfied	
US 41 @ Hartford Street	1	Not Satisfied	Not Satisfied	Not Satisfied	Traffic Signal not recommended due to low traffic volumes. Also, Access Management Signal Spacing requirement of 2640 feet not available.
	2	Not Satisfied	Not Satisfied	Not Satisfied	

**Only AM and PM peak hours.*

Exclusive right-turn lanes were considered as a part of the future lane geometry for the westbound approach at unsignalized locations of Ohio Street, Nundy Avenue and Hartford Street. This allows the considerably higher volume westbound right-turns at these intersections to experience lesser delays.

Based on the planning level evaluation of signal warrants 1 and 2, none of the unsignalized intersections along US 41 within the project limits are warranted for the installation of a traffic signal at this time.

7.6 FUTURE LEVELS OF SERVICE

All signalized, unsignalized intersections and roadway segments were evaluated for all analysis years for both the AM and PM peak conditions under both the no-build and the build scenarios to determine the future LOS. Only the results for the design year are included here; the full analysis results are included in the TTM. The same analysis tools were used as for the existing LOS analysis described earlier.

The no-build condition assumes the existing lane geometry is still in place with four lanes on US 41. The build scenario assumes US 41 to be widened to six lanes within the project limits. The proposed build condition assumes a 50 mph design speed with the exception of the segment between Symmes Road and Riverview Drive/Industrial Access Road where the proposed design speed is 45 mph. Posted speed limits were assumed to be 5 mph lower than the design speeds. The build analysis also considers additional side street improvements required for US 41 to operate at an acceptable LOS.

Design Year No-Build Alternative LOS

The 2040 no-build estimated LOS for signalized and unsignalized intersections within the study area is summarized in **Table 7-5**. Signal timings were optimized as a part of the future year analysis. Based on the 2040 no-build intersection analysis, all of the study intersections fail to operate at an acceptable level of service during one or both peak periods.

Table 7-5 Design Year (2040) No-Build AM/PM Intersection Delay and LOS Summary

Intersection	Overall Average Delay (seconds/vehicle)	Overall Intersection V/C Ratio	Overall Intersection LOS
US 41 at Kracker Avenue* (unsignalized)	358.6/116.4	-	F/F
US 41 at Ohio Street* (unsignalized)	596.3/39.5	-	F/E
US 41 at Florence Street* (unsignalized)	80.9/246.5	-	F/F
US 41 at Symmes Road	157.9/47.0	1.71/0.99	F/D
US 41 at Palm Avenue	61.0/26.7	1.07/0.91	E/C
US 41 at Nundy Avenue* (unsignalized)	-(1)/-(1)	-	F/F
US 41 at Gibsonton Drive/Alice Avenue	178.2/150.9	1.59/1.45	F/F
US 41 at Riverview Drive/Industrial Access Road	170.2/153.2	1.49/1.52	F/F
US 41 at CR 676A (Madison Avenue/Pendola Point Road)	205.9/161.1	1.51/1.34	F/F
US 41 at Port Sutton Road	116.4/174.9	1.24/1.44	F/F
US 41 at Hartford Street* (unsignalized)	-(1)/901.2	-	F/F

**Unsignalized Intersection – Delay/LOS along worst minor approach.*
(1) Delay exceeds software capacity.

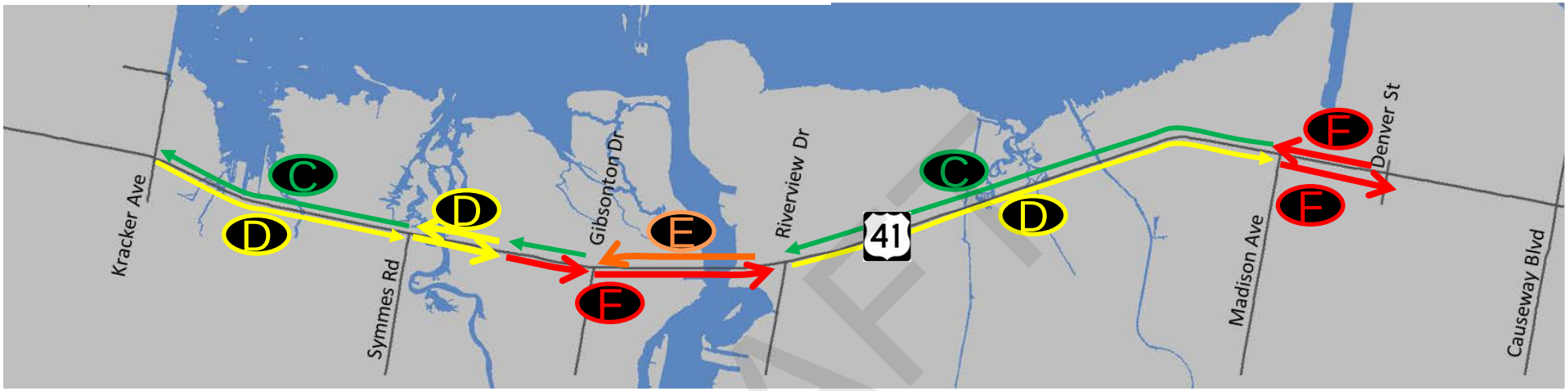
LOS analysis was also conducted for segments for the same no-build scenario; the results are shown in **Table 7-6**. Several segments operate at an acceptable level of service in either direction during one or both peak periods. **Figure 7-7** includes a simple graphic summary of the LOS results for the 2040 no-build condition for both signalized intersections and segments.

Table 7-6 Design Year (2040) No-Build AM/PM Roadway Segment Speed and LOS Summary

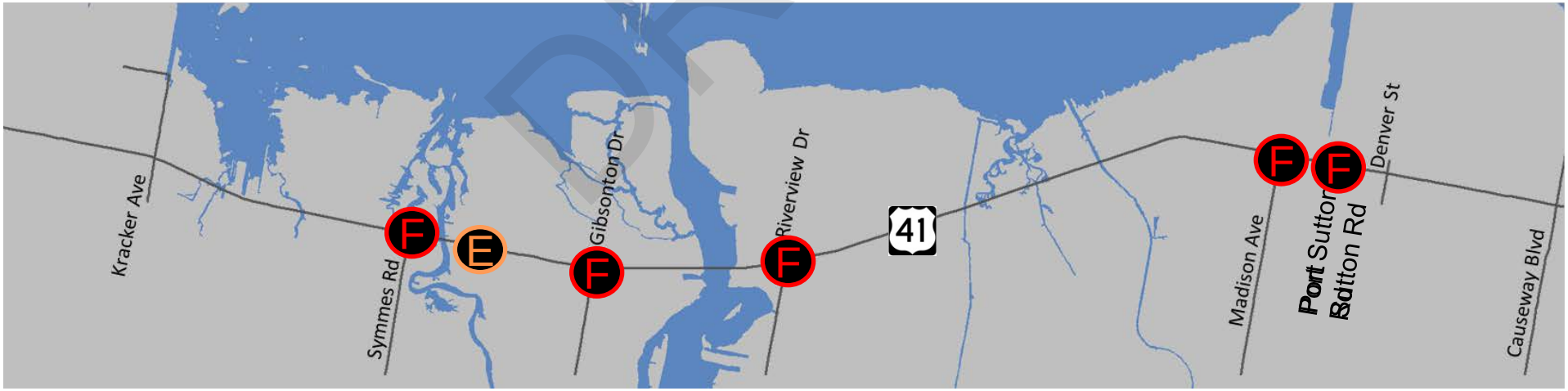
Roadway	Segment	No-Build Condition		
		Distance (mi)	Arterial Speed (mph)	Roadway Segment LOS
US 41 NB	Southern Project Limit to Symmes Road	2.03	26.0/37.7	D/B
	Symmes Road to Palm Avenue	0.42	11.2/18.5	F/E
	Palm Avenue to Gibsonton Drive/Alice Avenue	0.59	9.3/13.7	F/F
	Gibsonton Drive/Alice Avenue to Riverview Drive/Industrial Access Road	1.03	11.4/40.4	F/B
	Riverview Drive/Industrial Access Road to CR 676A (Madison Avenue/Pendola Point Road)	2.77	21.5/40.9	D/B
	CR 676A (Madison Avenue/Pendola Point Road) to Port Sutton Road	0.36	6.5/27.4	F/C
	Port Sutton Road to south of SR 676 (Causeway Boulevard)	1.16	15.3/14.8	F/F
US 41 SB	South of SR 676 (Causeway Boulevard) to Port Sutton Road	1.16	42.1/11.6	A/F
	Port Sutton Road to CR 676A (Madison Avenue/Pendola Point Road)	0.36	22.1/6.3	D/F
	CR 676A (Madison Avenue/Pendola Point Road) to Riverview Drive/Industrial Access Road	2.77	47.2/31.2	A/C
	Riverview Drive/Industrial Access Road to Gibsonton Drive/Alice Avenue	1.03	40.5/18.1	B/E
	Gibsonton Drive/Alice Avenue to Palm Avenue	0.59	44.2/33.3	A/C
	Palm Avenue to Symmes Road	0.42	28.1/25.0	C/D

Worst-Case (AM or PM) **Segment** LOS

C = LOS C or Better



Worst-Case (AM or PM) I**ntersection** LOS



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From Kracker Avenue to South of SR 676 (Causeway Blvd)
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Year 2040 No-Build Levels Of Service Graphic Summary

Figure 7-7

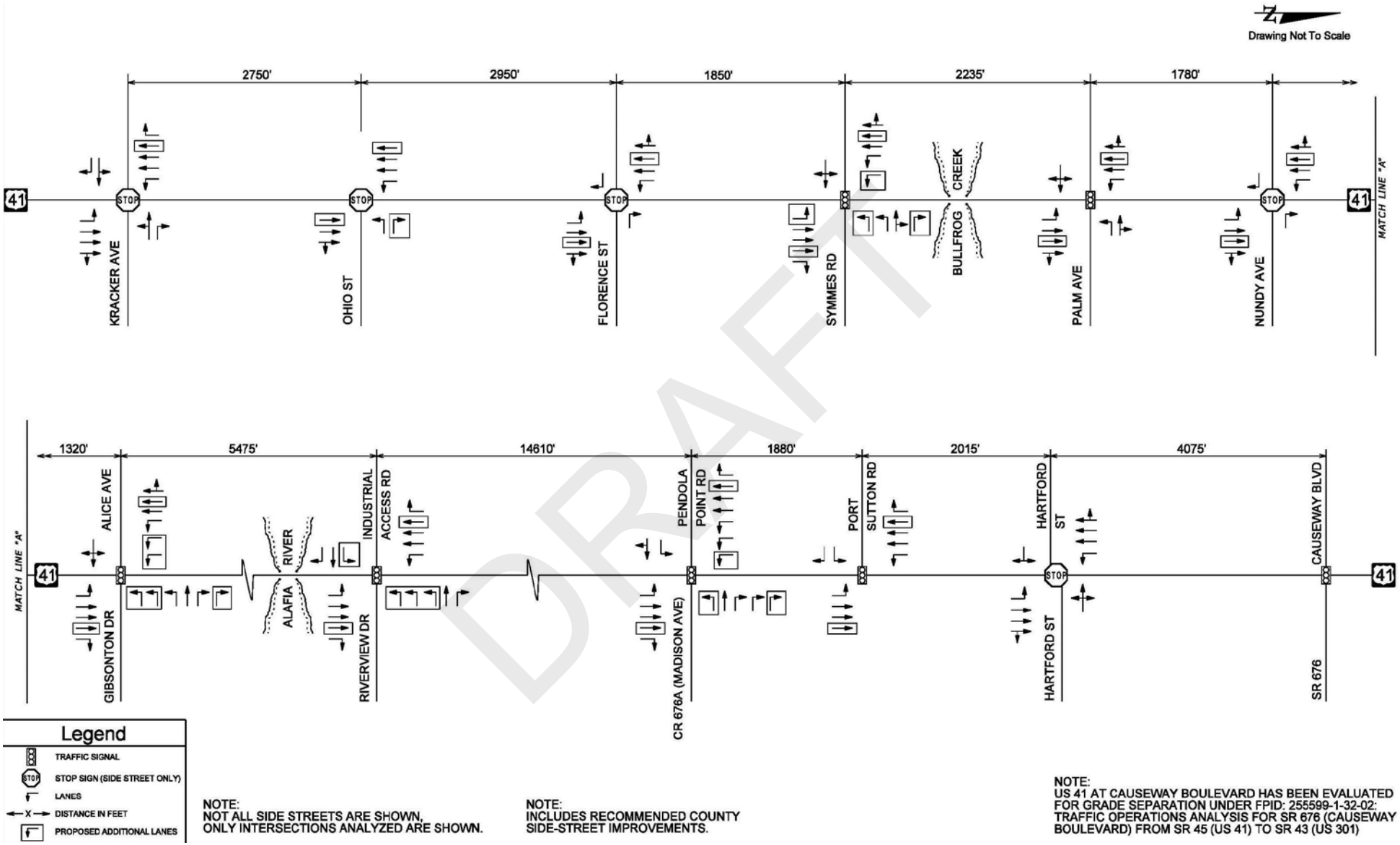
Design Year Build Alternative LOS

The 2040 build alternative recommended intersection geometry is shown in **Figure 7-8**. This includes the six-laning of US 41 with geometric improvements at major intersections. The 2040 build alternative estimated LOS for signalized and major unsignalized intersections is summarized in **Table 7-7**.

Table 7-7 Design Year (2040) Build AM/PM Intersection Delay and LOS Summary

Intersection	Overall Average Delay (seconds/vehicle)	Overall Intersection V/C Ratio	Overall Intersection LOS	With No-Build on Side Streets
US 41 at Kracker Avenue* (unsignalized)	58.9/35.4	-	F/E	- -
US 41 at Ohio Street* (unsignalized)	51.8/18.7	-	F/C	- -
US 41 at Florence Street** (unsignalized)	- -	-	- -	- -
US 41 at Symmes Road	38.1/24.2	1.07/0.75	D/C	F/D
US 41 at Palm Avenue	16.7/16.2	0.75/0.73	B/B	- -
US 41 at Nundy Avenue** (unsignalized)	- -	-	- -	- -
US 41 at Gibsonton Drive/Alice Avenue	50.0/48.8	0.89/0.91	D/D	F/F
US 41 at Riverview Drive/Industrial Access Road	50.7/42.1	1.01/0.93	D/D	F/F
US 41 at CR 676A (Madison Avenue/Pendola Point Road)	54.8/37.7	1.02/0.90	D/D	E/D
US 41 at Port Sutton Road	19.5/33.9	0.91/1.04	B/C	- -

**Unsignalized Intersection – Delay/LOS along worst minor approach.*
***Unsignalized Intersection – Side street approaches will be right turns only due to access management changes.*



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From Kracker Avenue to South of SR 676 (Causeway Blvd)
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Design Year 2040 Proposed Lane Geometry

Figure 7-8

Based on the results of the 2040 build intersection analysis shown in the table above, all intersections would operate at an acceptable level of service except the minor approaches of the unsignalized intersections which would not operate at an acceptable level of service during AM peak or PM peak or both. If major county road "side streets" are not widened ("side street no build" case) the intersection levels of service would worsen as shown in the last column of the table.

The 2040 build alternative estimated LOS for roadway segments within the study area is summarized in **Table 7-8** below.

Table 7-8 Design Year (2040) Build AM/PM Roadway Segment Speed and LOS Summary

Roadway	Segment	Build Condition		
		Distance (mi)	Arterial Speed (mph)	Roadway Segment LOS
US 41 NB	Southern Project Limit to Symmes Road	2.03	36.2/38.9	A/A
	Symmes Road to Palm Avenue	0.42	25.7/29.1	C/B
	Palm Avenue to Gibsonton Drive/Alice Avenue	0.59	18.9/22.1	D/C
	Gibsonton Drive/Alice Avenue to Riverview Drive/Industrial Access Road	1.03	26.3/30.1	C/B
	Riverview Drive/Industrial Access Road to CR 676A (Madison Avenue/Pendola Point Road)	2.77	35.6/38.7	A/A
	CR 676A (Madison Avenue/Pendola Point Road) to Port Sutton Road	0.36	23.7/31.4	C/B
US 41 SB	Northern Project Limit to Port Sutton Road	1.16	40.0/29.3	A/B
	Port Sutton Road to CR 676A (Madison Avenue/Pendola Point Road)	0.36	26.7/21.6	C/D
	CR 676A (Madison Avenue/Pendola Point Road) to Riverview Drive/Industrial Access Road	2.77	39.8/38.3	A/A
	Riverview Drive/Industrial Access Road to Gibsonton Drive/Alice Avenue	1.03	33.1/28.5	B/B
	Gibsonton Drive/Alice Avenue to Palm Avenue	0.59	32.8/28.9	B/B
	Palm Avenue to Symmes Road	0.42	27.7/28.5	C/B

Based on the results of the 2040 build roadway segment analysis, all the segments along US 41 would operate at an acceptable level of service during both peak periods in both the northbound and the southbound directions.

7.7 RECOMMENDED INTERSECTION IMPROVEMENTS

Figure 7-8 shows the proposed 2040 build geometry along US 41 with the intersection improvements that are needed to operate at an acceptable LOS D with several triple left and right turn lanes along US 41 and the side-streets. Triple left turn lanes are recommended along the westbound and southbound approach at Gibsonton Drive/Alice Avenue, westbound approach at Riverview Drive/Industrial Access Road and southbound approach at CR 676A (Madison Avenue/Pendola Point Road). Triple right turn lanes are recommended along the westbound approach at CR 676A (Madison Avenue/Pendola Point Road). Recommended lengths for auxiliary left- and right-turn lanes are included in Section 9 of this report.

Additional analysis was performed at the intersections of US 41 at Symmes Road, Gibsonton Drive/Alice Avenue, Riverview Drive/Industrial Access Road and CR 676A (Madison Avenue/Pendola Point Road) with no-build conditions along side streets with six-laning of US 41. This was based on a meeting with Hillsborough County held on October 31, 2013 as the county has no plans for widening the side streets with the exception of CR 676A (Madison Avenue/Pendola Point Road). Hillsborough County MPO's 2035 Highway Needs Plan shows widening of CR 676A (Madison Avenue/Pendola Point Road) to four lanes. The results of this additional analysis are shown in **Table 7-7**. The results of the analysis indicate that these intersections will not operate at an acceptable LOS D with dual left- and right-turn lanes only.

SECTION 8 ALTERNATIVES ANALYSIS

8.1 NO-BUILD/REHABILITATION/REPAIR ALTERNATIVE

The No-Build Alternative would not construct the US 41 improvements. Rather, it would leave the existing roadway in its current configuration, except for other intersection or safety improvements planned in the future. The No-Build Alternative requires no additional expenditure of funds and has no environmental impacts. However, the No-Build Alternative fails to fulfill the project's purpose and need and fails to meet the goals of the MPO's LRTP. The No-Build Alternative will remain a viable alternative throughout the study process and serve as the basis of comparison for the Build Alternatives.

8.2 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSM&O)

The objective of Transportation System Management & Operations (TSM&O) is to identify strategies that reduce existing traffic congestion and prevent its occurrence in areas that are currently congested. These strategies are designed to modify travel behavior and increase system efficiency without costly infrastructure improvements. TSM&O strategies are implemented when one or more of the following occurs:

- Insufficient funds available to meet system improvement needs,
- Increased construction costs for new roadways and transit facilities,
- Increased need to improve operational efficiency, and/or changes in travel patterns.

TSM&O options generally include traffic signal and intersection improvements, access management, and transit improvements. For this proposed project, it was determined that the additional capacity required to meet the projected traffic volumes along US 41 in the design year cannot be provided solely through the implementation of TSM&O improvements.

8.3 MULTIMODAL FACILITIES

The Hillsborough Area Regional Transit (HART) Authority currently operates local bus route no. 31 on US 41 south of Gibsonton Drive and on Gibsonton Drive east of US 41. They also operate limited express route no. 47LX in the same location. According to HART's *Transit Development Plan Update for Fiscal Years 2015 thru 2024*, HART has no plans to extend bus service on US 41 to the north of Gibsonton Drive. Expansion of the existing roadway would help improve mobility for these existing bus routes within the study limits. Bicycle and pedestrian accommodations will also be included as part of the proposed improvements, including bridge crossings for the future South Coast Greenway.

US 41 is part of the highway network that provides access to regional intermodal facilities such as the Port of Tampa and Port Manatee. Improvements to US 41 would enhance access to activity centers in the area and would improve movement for freight in the Tampa Bay region and across the state.

While the multimodal and transit alternatives have the potential to improve traffic operations along the corridor, these alternatives fail to fulfill the purpose and need for the proposed project on their own within the study area. Therefore, multimodal/transit alternatives were not considered as stand-alone solutions for the existing and expected transportation demand deficiencies within the study area.

8.4 BUILD ALTERNATIVES

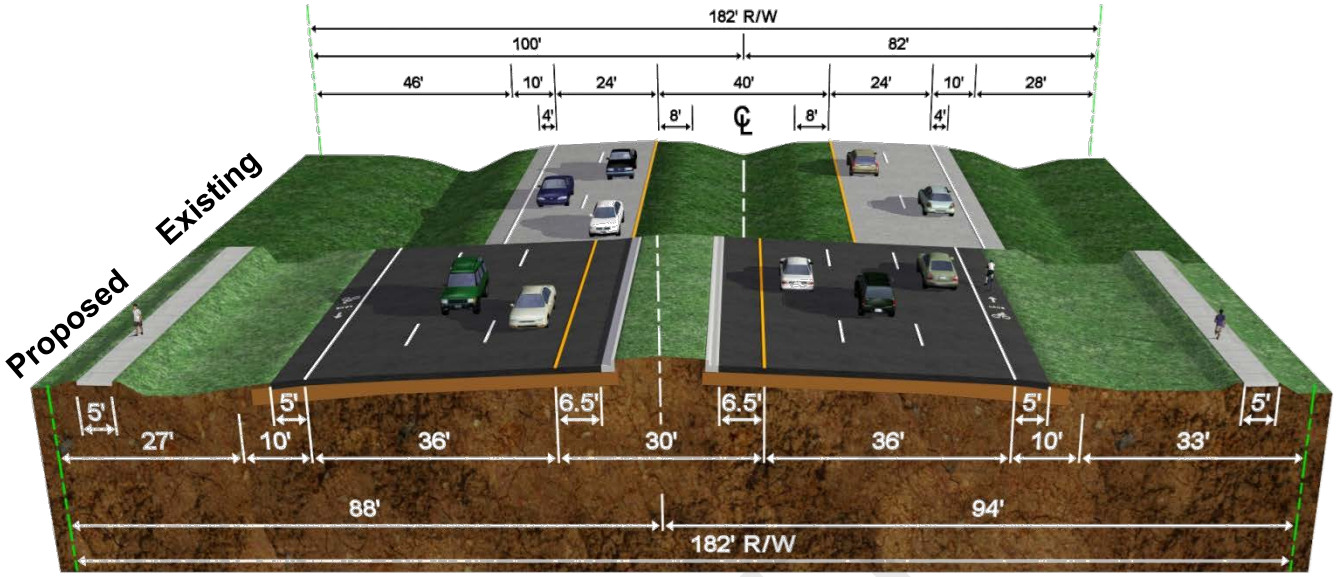
The following steps were utilized to develop and evaluate viable alternatives:

- Base concept plans were prepared using all available data, including county GIS data, as-built plans, FDOT ROW maps, and subdivision plats
- The project was divided into three major segments to facilitate evaluation
- The required number of through lanes and major intersection geometry was determined based on the traffic analysis summarized in Section 7
- Typical sections were developed based on FDOT's standard design criteria
- Alternative alignments were developed for the north Gibsonton area to minimize ROW costs and environmental impacts
- The Build Alternatives were evaluated using an evaluation matrix.
- A Recommended Build Alternative was selected

8.4.1 Typical Sections

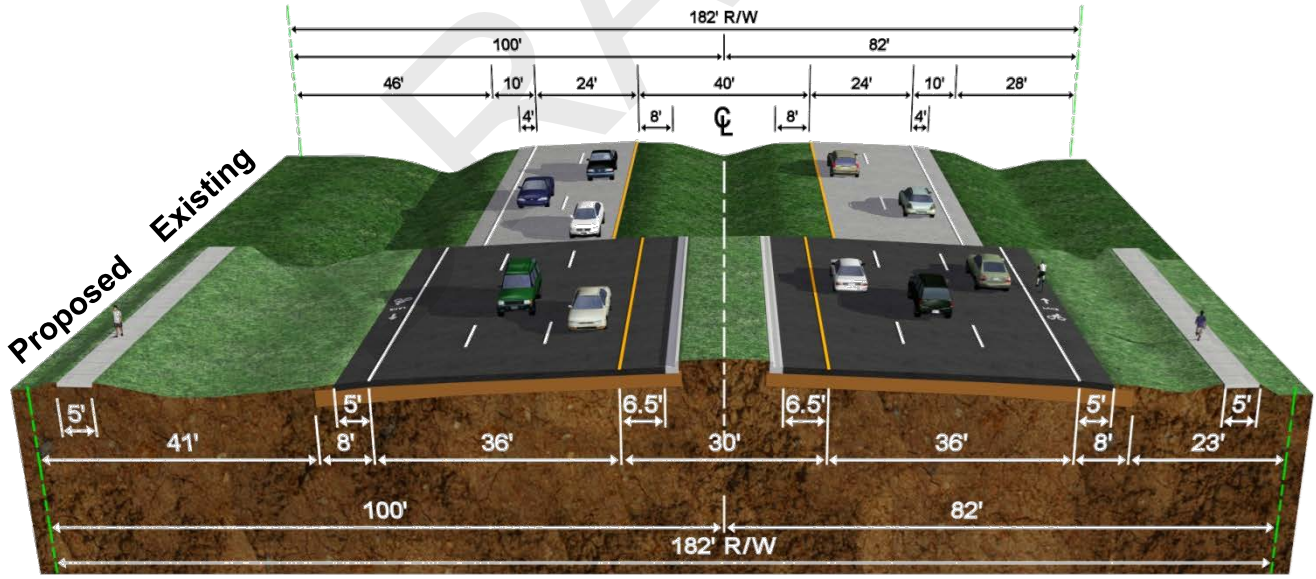
For the areas outside of the north Gibsonton area, which are more "rural" in nature (even though they fall within the FHWA urban area boundary), only six-lane suburban typical sections were considered since six-lane rural typical sections would have required ROW acquisition. For most of these areas, the existing ROW is 182 feet in width, with the centerline of the existing four-lane rural highway offset by 9 feet within the ROW. Initially, suburban typical sections with 40-foot medians were considered; however, it was determined that these would have required a design variation for the border width, so a suburban typical section with a 30-foot median was developed. For the suburban typical section alternatives, two different alignments were considered within the existing ROW, as shown in **Figure 8-1**. All of these include 6.5-foot inside shoulders, 5-foot paved outside shoulders/bike lanes and sidewalks on both sides. Based on a review of the temporary traffic control plans for each alternative (**Appendix A**), it was determined that the suburban typical sections that utilize the existing pavement are the best option.

Alternatives Between Kracker Ave. & Palm Ave.
(Near the South End of the Project)



"West-Shifted Suburban" Typical Section Alternative

- Provides 50 mph design speed
- No design variation for border width required
- Construction cost is higher than for the alternative shown below
- No additional ROW required



Suburban Alternative Utilizing the Existing Pavement

- Provides 50 mph design speed
- No design variation for border width required
- No additional ROW required

(All views are looking north)

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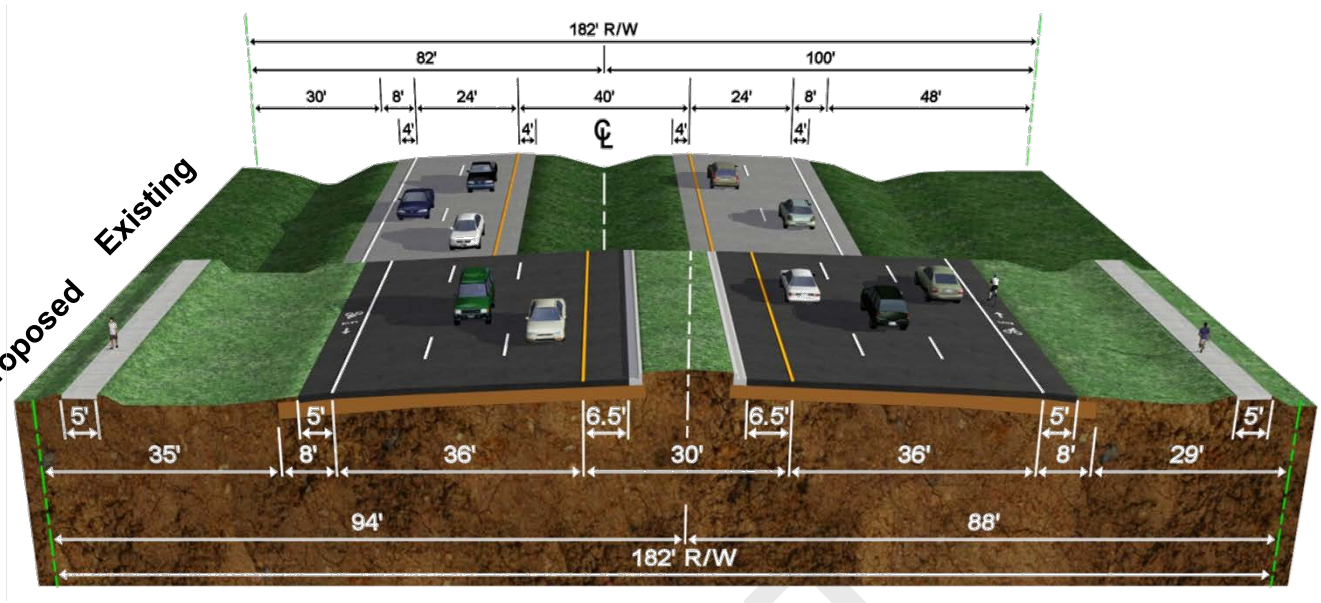
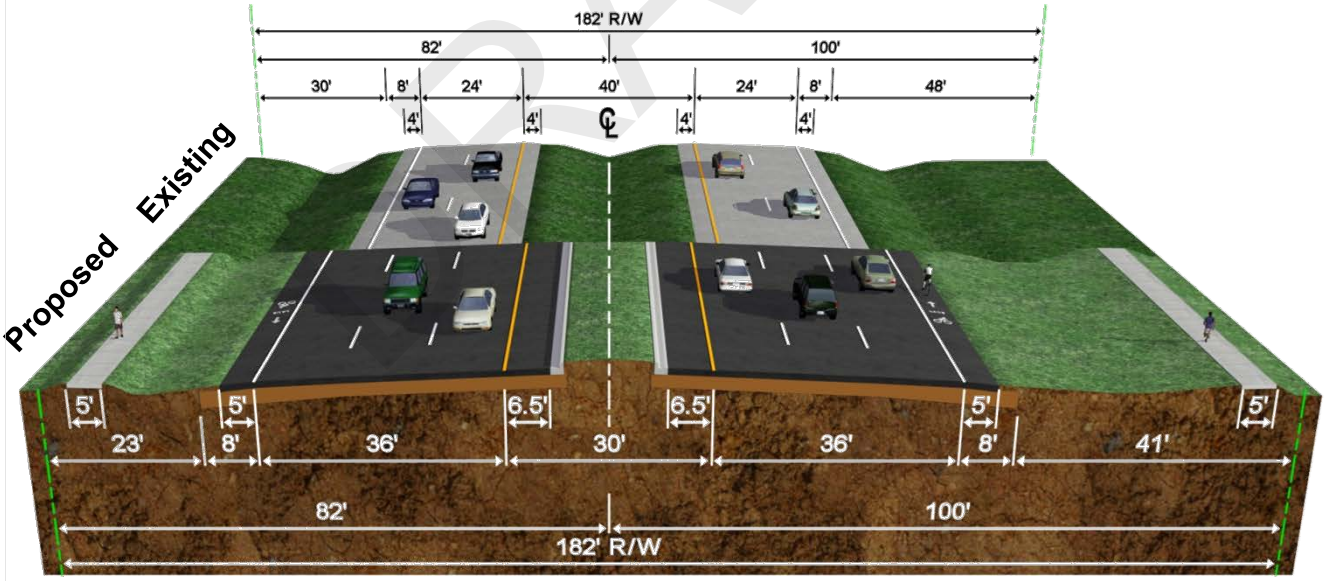
Alternatives Between Alafia River Bridge & Denver Street (Near the North End of the Project)



"East-Shifted Suburban" Typical Section Alternative

- Provides 50 mph design speed (required for SIS Connector Segment north of Pendola Point)
- No design variation for border width required
- Construction cost is higher than for the alternative shown below
- No additional ROW required



Suburban Alternative Utilizing the Existing Pavement

- Provides 50 mph design speed (required for SIS Connector Segment north of Pendola Point)
- No design variation for border width required
- No additional ROW required

(All views are looking north)

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FDOT **US 41(SR 45) PD&E Study** ***From Kracker Avenue to South of SR 676 (Causeway Blvd)*** WPI Segment No. 430056 1 - Hillsborough County	**Alternative Suburban Typical Sections**	**Figure 8-1** Page 2 of 2

For the north Gibsonton area, where the existing ROW is much narrower, urban typical sections are the only reasonable alternatives to consider. Basic six-lane urban typical sections are shown in **Figure 8-2**. The proposed median width varies considerably due to the need to tie in to the future bridge typical section at the Alafia River and the need for future triple left turn lanes at the Gibsonton Drive intersection. Both typical sections include 12-foot lanes (these could be reduced during the design phase, if necessary), 4-foot bicycle lanes, and 6-foot sidewalks adjacent to the curb and gutter. The recommended typical section north of Gibsonton Drive would maintain the existing joint-use ditch on the east side (to the maximum extent possible) which conveys runoff from both US 41 and the CSX railroad line which runs adjacent to US 41 between Gibsonton Drive and the Alafia River. Any alterations to this ditch would likely require either a temporary construction easement (TCE) or license agreement from CSX.

8.4.2 Alternative Alignments

Alternative alignments were evaluated for the north Gibsonton area, since ROW acquisition will be required for expanding the existing highway to six thru lanes. Alternatives evaluated are summarized in **Table 8-1**. Segments 2 and 3 in the table encompass the north Gibsonton area, for which centered, left- and right-shifted alignments were considered. The other locations/segments in the table summarize ROW cost estimates made for the other locations for which additional ROW will be needed. The comments in the table explain the rationale for the recommendations.

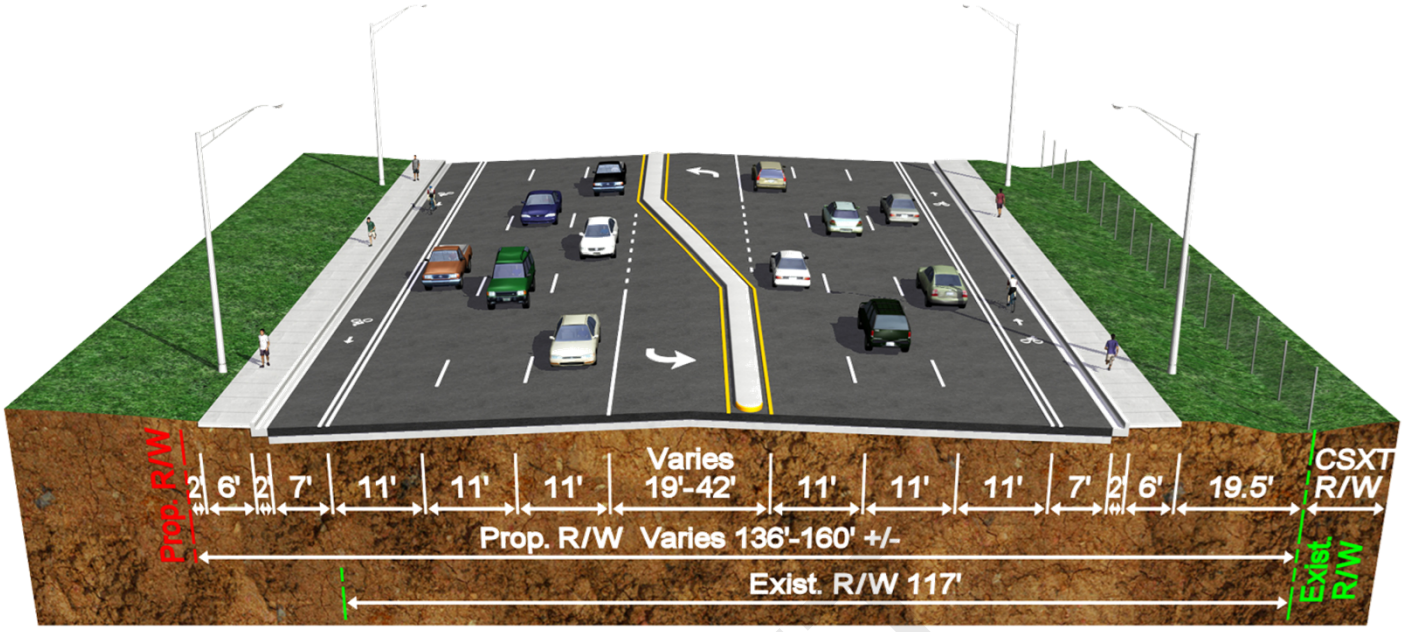
8.5 EVALUATION MATRIX

See **Section 8.4.2** above.

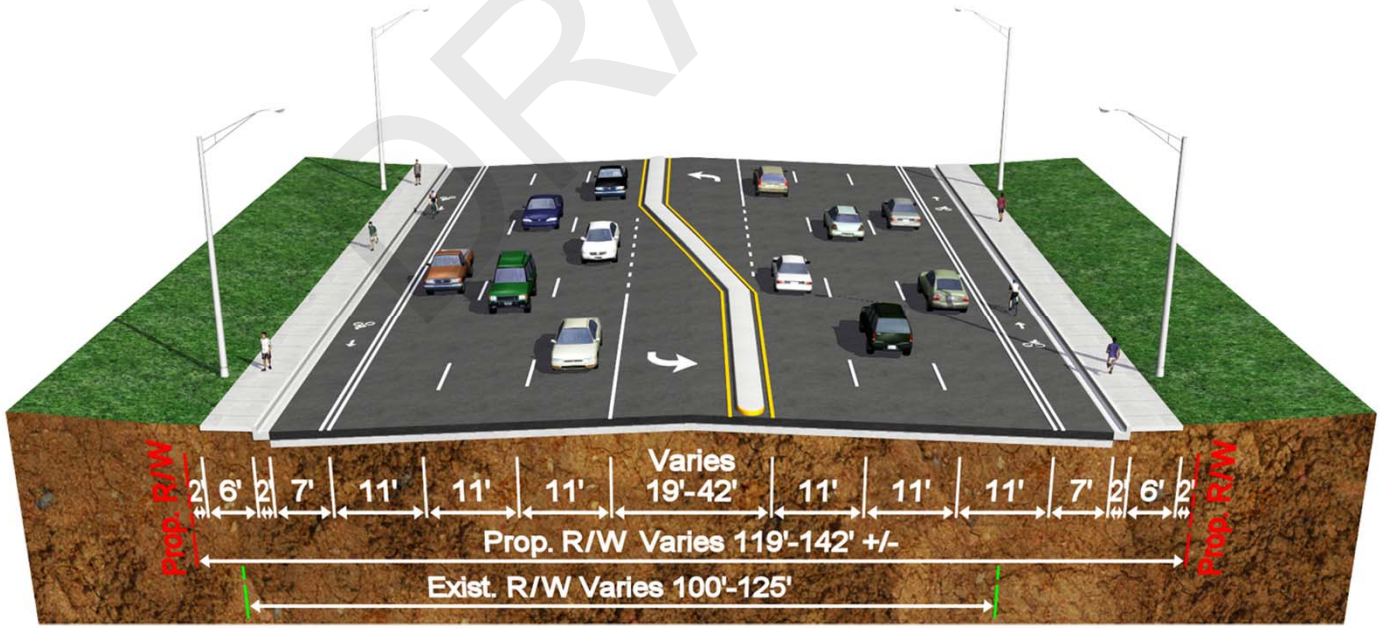
8.6 RECOMMENDED ALTERNATIVE

The recommended Build Alternative for the areas outside of north Gibsonton (where the existing ROW is 182 feet wide) is the suburban typical section with a 30-foot median aligned to utilize the existing pavement to the maximum extent possible (**Figure 8-3**). For the north Gibsonton area, the recommended alternative is the six-lane urban typical section with varying median width, following the alignment indicated in the evaluation matrix and as shown on the conceptual design plans included in **Appendix G.** All recommended typical sections were updated in December 2014 to show minimum 7-foot buffered bike lanes in compliance with new FDOT policy and design standards for urbanized areas.

(All views are looking north)



From Gibsonton Drive to Lula Street



From Palm Avenue to Gibsonton Drive

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US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Recommended Urban Typical Sections**	**Figure 8-2**

Table 8-1 Alignment Evaluation Matrix with ROW Cost Summary

Recommended Alignment

Rev. 9/10/2014

Segment No. (S. to N.) / Length (mi.)	Description of Segment or Area	Plan Sht.# From / To	Nearest Street From / To	Plans Station # From / To	"West-Shifted" Alignment Est. ROW Cost / Est. Acres of ROW	* No. of Relo-cations	"Centered" Alignment Est. ROW Cost / Est. Acres of ROW	*No. of Relo-cations	"East-Shifted" Alignment Est. ROW Cost / Est. Acres of ROW	*No. of Relo-cations	Comments
1	South approach to Bullfrog Creek Bridges	7	- -	909	$0	0			$162,500	0	West-shifted alignment recommended to reducte ROW costs and impacts to utilities on the east side of the bridge. A centered alignment is not preferred due to bridge stage construction available options.
0.21		7		920	0				0.147		
2	Gibsonton area, from Palm Avenue to Gibsonton Drive	8	Cedar Avenue	933+50	$8,776,200	4 B	$9,460,100	3 B	$8,414,100	3 B	East alignment has newer developments and more potential contamination sites. However, older properties on west side are more likely to be redeveloped in the future, increasing the ROW costs for that side.
0.50		10	Gibsonton Dr.	960	2.111		1.66		2.01		
3	Extends from Gibsonton Drive to Alafia River Bridges in Gibsonton	10	Gibsonton Dr.	960	$4,055,400	2B, 2R	$3,862,100	2B,1R			West shift is necessary to avoid the need for ROW from CSX at Gibsonton Drive and at at Estelle Ave. It may also avoid the need for a license agreement/TCE from CSX.
0.47		12	Lula St.	985	1.837		1.113				
4	Southeast corner at US 41 and Riverview Drive (small corner clip)	14	Riverview Dr.	1013+75	$0	0	$132,900	0			Recommended alignment avoids a small corner clip from CSX on the east side of US 41.
N/App		- -	- -	- -	0		0.002				
5	From North of Riverview Drive to the north end of project	15	The Road to Quality S	1021**			$1,525,900	0			Only one "centered" alignment alternative for this segment; most of the acquisition consists of small corner clips and narrow strips at the transition at the north end.
3.32		27	Austin St.	225**			0.434				

Totals for Recommended Alignment Alternative	
Est. ROW Cost:	$14.0 million
No. Relocations:	5 Bus. & 2 Residences
Acres of ROW:	4.28

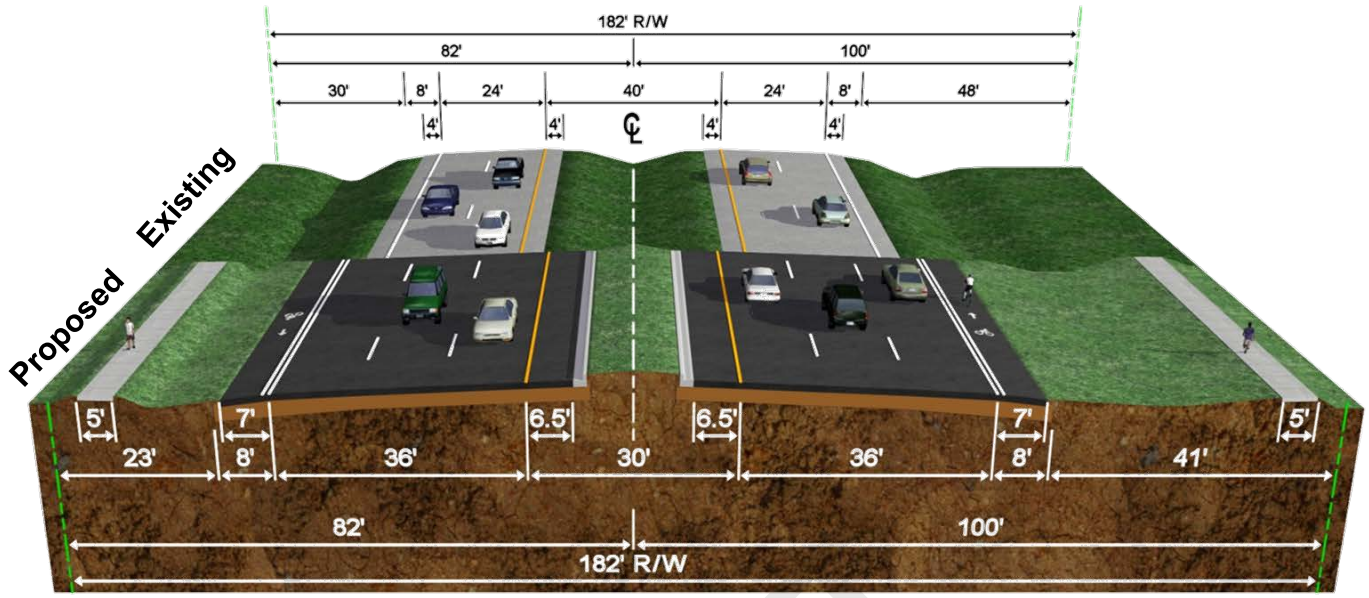
*B=Business Relocations; R=Residential Relocations TCE=Temporary Construction Easement

**Station equation between these two points

ROW costs do not include stormwater management facilities (ponds) or floodplain compensation sites.

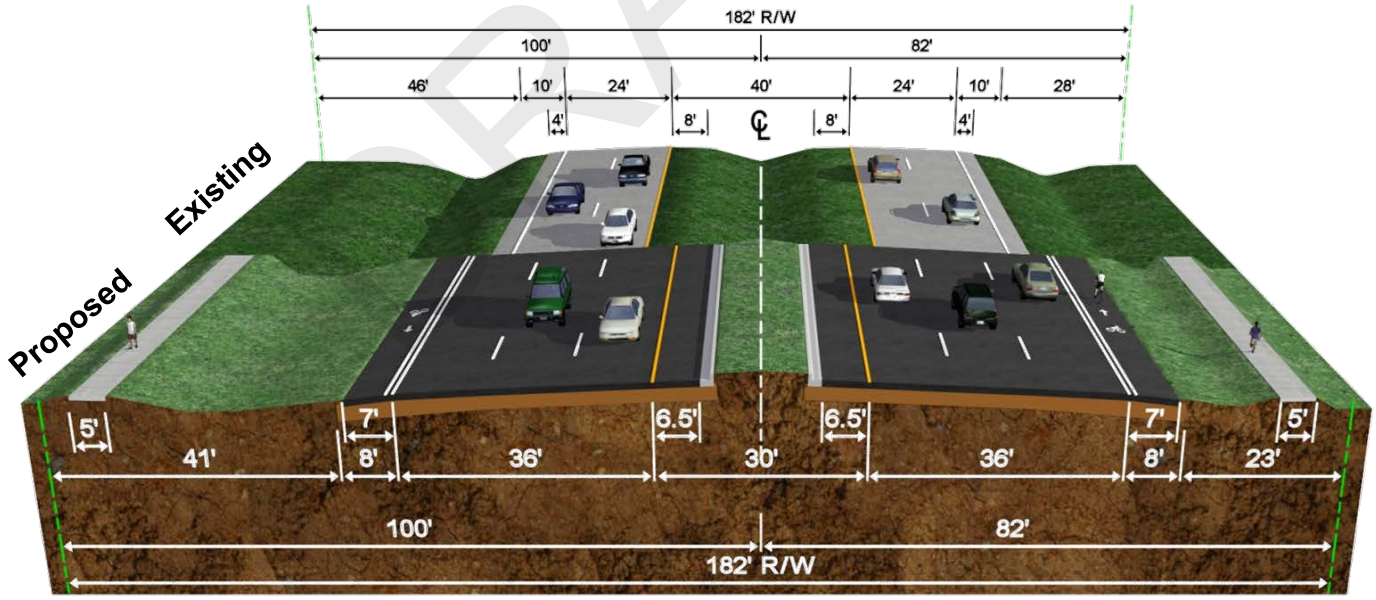
Note: the above segments are the only ones that require ROW acquisition; there are additional segments (not included above) that do not require additonal ROW.

Suburban Alternatives Utilizing the Existing Pavement



- Provides 50 mph design speed (required for SIS Connector Segment north of Pendola Point)
- No design variation for border width required
- No additional ROW required

Between Alafia River Bridge & Denver Street (Near the North End of the Project)



- Provides 50 mph design speed
- No design variation for border width required
- No additional ROW required

Between Kracker Ave. & Palm Ave. (Near the South End of the Project)

(All views are looking north)

Rev. 12/12/14

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Recommended Suburban Typical Sections**	**Figure 8-3**

SECTION 9 DESIGN DETAILS OF RECOMMENDED ALTERNATIVE

9.1 DESIGN TRAFFIC VOLUMES

Design year (2040) AADTs was previously shown in **Figure 7-4**, and year 2040 directional design hour volumes were previously shown in **Figure 7-6**.

9.2 TYPICAL SECTIONS AND DESIGN SPEED

Recommended typical sections for the areas to the south and north of north Gibsonton were previously shown in **Figure 8-3,** and recommended urban typical sections for the north Gibsonton area were previously shown in **Figure 8-2**. The proposed design speed for the urban typical sections is 45 mph and the proposed design speed for the suburban typical sections is 50 mph.

The value engineering study recommended use of 11-foot interior lanes for the suburban typical section areas. This would require a design variation, and it will be considered further during the future final design phase.

9.3 INTERSECTION CONCEPTS AND SIGNAL ANALYSIS

Recommended geometry (laneage) for major intersections was previously shown in **Figure 7-8**. The intersection storage lengths for the signalized intersections were calculated for the design year 2040 build conditions based on the Institute of Transportation Engineers (ITE) "red-time" formula. The recommended turn lane lengths were rounded to the nearest 25 feet increment and are shown in **Table 9-1**. At the intersections of Riverview Drive/Industrial Access Road, CR 676A (Madison Avenue/Pendola Point Road) and Port Sutton Road which provide direct access to the Port of Tampa, storage lane lengths have also been estimated using truck percentages from the special turning movement counts that were conducted during the hours when truck traffic was observed to be highest so that the proposed turn lane can accommodate the truck volumes. The detailed calculation for the queue lengths and the turn lane lengths are included in Appendix I of the *Traffic Technical Memorandum*.

Also, the left-turn lane and the right-turn storage lane lengths along US 41 at the unsignalized intersections were estimated for the 2040 build conditions based on *Figure 3-15 of the Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Green Book), May 2011*.

Based on recommendations included in the value engineering study, concrete pavement should be considered for the approach lanes at the following intersections due to heavy truck traffic:

- US 41 at Madison Avenue
- US 41 at Port Sutton Road
- US 41 at Riverview Drive

To facilitate pedestrian crossings on US 41 at Gibsonton Drive and Madison Avenue, two-stage crossings utilizing the median for refuge may be needed due to the proposed width of US 41.

9.4 HORIZONTAL AND VERTICAL ALIGNMENT

The proposed design concept generally follows the existing horizontal and vertical alignment due to ROW constraints. A proposed profile grade will be determined during the future design phase when survey data is available.

Table 9-1 Design Year (2040) Build Recommended Turn Lane Lengths

US 41 Intersections	Approach	Movement	Recommended Turn Lane Length (feet)
Kracker Avenue* (un-signalized)	Northbound	Left	275
		Thru-Right	
	Southbound	Left	275
		Thru-Right	
Ohio Street* (un-signalized)	Northbound	Thru-Right	
	Southbound	Left	350
Florence Street* (un-signalized)	Northbound	Left	275
		Thru-Right	
	Southbound	Left	275
		Thru-Right	
Symmes Road	Eastbound	Left-Thru-Right	
	Westbound	Left	350
		Right	475
	Northbound	Left	550 (1)
		Right	550 (1)
	Southbound	Left	475
		Thru-Right	
Palm Avenue	Eastbound	Left-Thru-Right	
	Westbound	Left	175
		Thru-Right	
	Northbound	Left	425 (1)
		Thru-Right	
	Southbound	Left	425 (1)
		Thru-Right	
Nundy Avenue* (un-signalized)	Northbound	Left	225
		Thru-Right	
	Southbound	Left	300
		Thru-Right	

Table 9-1 Design Year (2040) Build Recommended Turn Lane Lengths (Cont'd)

US 41 Intersections	Approach	Movement	Recommended Turn Lane Length (feet)
Gibsonton Drive/Alice Avenue	Eastbound	Left-Thru-Right	
	Westbound	Left	575
		Right	725
	Northbound	Left	825 (1)
		Right	825 (1)
	Southbound	Left	750 (1)
		Thru-Right	
Riverview Drive/Industrial Access Road	Eastbound	Left	225
		Right	300
	Westbound	Left	575
		Right	825
	Northbound	Left	950 (1)
		Right	950 (1)
	Southbound	Left	850 (1)
		Right	850 (1)
CR 676A (Madison Avenue/Pendola Point Road)	Eastbound	Left	450
		Thru-Right	
	Westbound	Left	600
		Right	850
	Northbound	Left	925 (1)
		Right	925 (1)
	Southbound	Left	750 (1)
		Right	750 (1)
Port Sutton Road	Eastbound	Left	550
		Right	425
	Northbound	Left	850 (1)
	Southbound	Left	775 (1)
		Right	775 (1)

* For un-signalized intersections, turn lane lengths along US 41 estimated from *Figure 3-15 Florida Green Book, May 2011.*

(1) Based on thru lane queue as thru lane queue exceeds storage length for turn lanes.

9.5 RIGHT OF WAY NEEDS AND RELOCATIONS

Proposed locations and acreages of ROW to be acquired are summarized in **Table 8-1** in **Section 8.** In addition, specific locations for proposed ROW acquisition are shown on the preliminary conceptual design plans included in **Appendix G**. In addition to ROW for the roadway and intersection improvements, approximately 26 acres of ROW would be needed for storm water treatment facilities (mostly ponds) and 14.2 acres would be needed for floodplain impact compensation sites, as shown later in **Section 9.16**. Based on the preliminary conceptual design plans, an estimated 5 business and 2 residential relocations are expected (in the north Gibsonton area) as a result of construction of the recommended Build Alternative. This number is expected to change as businesses in Gibsonton come and go over time.

9.6 COST ESTIMATES

Preliminary cost estimates for the Build Alternative are included in **Table 9-2**. Estimated construction costs, as summarized in **Table 9-3**, are based on FDOT's Long Range Estimate (LRE) cost estimating system, and include temporary traffic control, mobilization and an initial contingency. Bridge replacements at Bullfrog Creek and the Alafia River account for approximately 37 percent of the construction cost estimate.

Table 9-2 Estimated Costs for the Build Alternative

Component	Estimated Cost ($millions)
Construction of Roadway, Bridges and Ponds[1]	110
Right of Way for Roadway Only	14
Right of Way for Stormwater Ponds and Floodplain Compensation Sites	17
Wetlands Mitigation	1.0 +/-
Design & Construction Inspection (20%)	$22
Totals	$164

[1]Based on LRE run on September 22, 2015.

9.7 RECYCLING AND SALVAGEABLE MATERIALS

During construction of the project, recycling of reusable materials will occur to the greatest extent possible. Where feasible, removal and recycling of the existing pavement and base material for use in the new pavement will be considered. This will help reduce the volume of the materials that need to hauled away and disposed of potentially reduce the cost of purchasing new materials for construction. Other materials such as signs, drainage pipes, etc., will also be salvaged and reused for regular maintenance operations if they are deemed to be in acceptable condition.

Table 9-3 Summary of LRE Construction Cost Estimate for US 41

US 41, from Kracker Avenue to South of Causeway Blvd — Based on 9/22/15 LRE update.

LRE Sequence --->	1 NDS	2 NDU	3 MIS	4 MIS	5 NUU	6 NDS		
	New, Divided, Suburban	New Construction, Divided, Urban	Misc. Const.	Drainage Ponds & Culvert Extensions	Additional Left Turns for Median Openings	Concrete pavement at 3 intersections	Subtotals	Total Length less Bridges (mi)
Length (mi)	4.917	1.41	0.27	N/app	N/app	0.588	7.185	6.915
Description	Suburban Reconstruction	Urban Reconstruction	Bridges at Bullfrog Ck & Alafia River	7 culvert extensions and 12 ponds		At Riverview Dr, Madison Av & Pt Sutton Rd		
From/To	Kracker to Palm & Alafia Riv Br to Austin St	From Palm Ave to S of Alafia River Bridges						
Component								Component
Earthwork	$ 10,279,557	$ 3,286,797	--	--	$ 417,619	$ 1,214,154	$ 15,198,127	Earthwork
Roadway	10,483,569	2,709,059	--	--	621,377	4,425,365	18,239,370	Roadway
Shoulders	929,262	610,361	--	--	24,321	111,984	1,675,928	Shoulders
Median	947,143	497,040	--	--	--	113,303	1,557,486	Median
Drainage	653,670	1,578,353	--	--	--	80,246	2,312,269	Drainage
Intersections	1,554,769	425,754	--	--	--	--	1,980,523	Intersections
Signing	136,813	55,419	--	--	--	24,939	217,171	Signing
Signalization	1,581,288	527,096	--	--	--	--	2,108,384	Signalization
Lighting	--	418,338	--	--	--	--	418,338	Lighting
Bullfrog Creek Br.	--	--	4,353,206	--	--	--	4,353,206	Bullfrog Creek Br.
Alafia River Br.	--	--	24,500,271	--	--	--	24,500,271	Alafia River Br.
Ponds, Culvert Ext.				6,289,004			6,289,004	Ponds, Culvert Ext.
Subtotals	26,566,071	10,108,218	28,853,477	6,289,004	1,063,317	5,969,990	78,850,078	Seq. Subtotal
							7,885,008	MOT (10%)
Cost per Mile	5,402,902	7,168,949	106,864,731	N/App	N/App	10,153,045	8,673,509	Mobil. ("10%")
Cost per signal	316,258	--	--	--	--	--	95,408,594	Seq. Total
							14,311,289	Proj. Unknowns (15%)
							150,000	Initial Contingency
							$ 109,869,883	Overall Project
							(Say $110 million)	
FPN: 430056-1-52-01							$ 15,888,631	Overall Cost/Mile

9.8 USER BENEFITS (SAFETY, ETC.)

The public will realize benefits after the proposed improvements are constructed. Savings in travel time, reduced vehicle operating costs, reduced traffic crash related costs and reduced emergency response times are the primary benefits. The proposed accommodations for the future South Coast Greenway trail at several locations will provide a safe facility for transportation and recreational opportunities for walkers and joggers, in-line skaters, bicyclists, and other non-motorized users. Pedestrian and bicycle safety will be enhanced by providing sidewalks and bike lanes along the entire project corridor. Pedestrian crosswalks, curb ramps, and pedestrian signals will be provided as a part of the recommended design. These will help to improve safety for pedestrians and bicyclists.

9.9 MULTIMODAL CONSIDERATIONS

No expansion of the current local and limited express bus services on US 41 south of Gibsonton Drive is currently planned by HART. Coordination with HART will occur during the design phase to potentially include bus bays/turnouts at selected bus stop locations.

9.10 ECONOMIC AND COMMUNITY DEVELOPMENT

As previously discussed in **Section 3.2**, traffic demand is expected to steadily increase in the coming years due to the many planned developments in southern Hillsborough County and the Brandon area. Expanding the capacity of this highway facility will help facilitate economic growth within southern Hillsborough County, improve mobility, and provide safer access to the many businesses and residences located along the project.

9.11 TEMPORARY TRAFFIC CONTROL PLAN

Three different temporary traffic control plan concepts were evaluated for the recommended suburban typical section, as shown in **Appendix A**. It was determined that utilizing the existing pavement and widening to the median first would be the best alternative, for these reasons:

- There is one less construction phase compared to the other two alternatives
- Less temporary barrier wall would be required, and
- Less temporary overbuild pavement would be required

The construction zone traffic speed would have to be reduced to 45 mph to reduce the offset distance required to the temporary barrier wall.

US 41 provides access to many businesses along this corridor. Due to its importance, the existing four travel lanes should be maintained to the maximum extent possible during construction. Lane closures, if necessary, should occur during night or other off-peak hours.

The following conceptual construction sequence will help maintain traffic operations along US 41:

- Relocate existing utilities within the newly-expanded ROW in north Gibsonton; elsewhere, relocate them within the existing ROW as required.

- Construct ponds and new/modified underground stormwater collection system in north Gibsonton
- Construct temporary pavement as necessary to maintain existing two-way traffic (see **Appendix A**).
- Construct and/or widen the northbound or southbound lanes (travel lanes, shoulders or curb and gutter, and sidewalks) while maintaining existing traffic on a combination of existing pavement and newly constructed or temporary pavement.
- Shift traffic to the newly-completed sections of pavement
- Remove temporary pavement where applicable and construct remaining raised medians

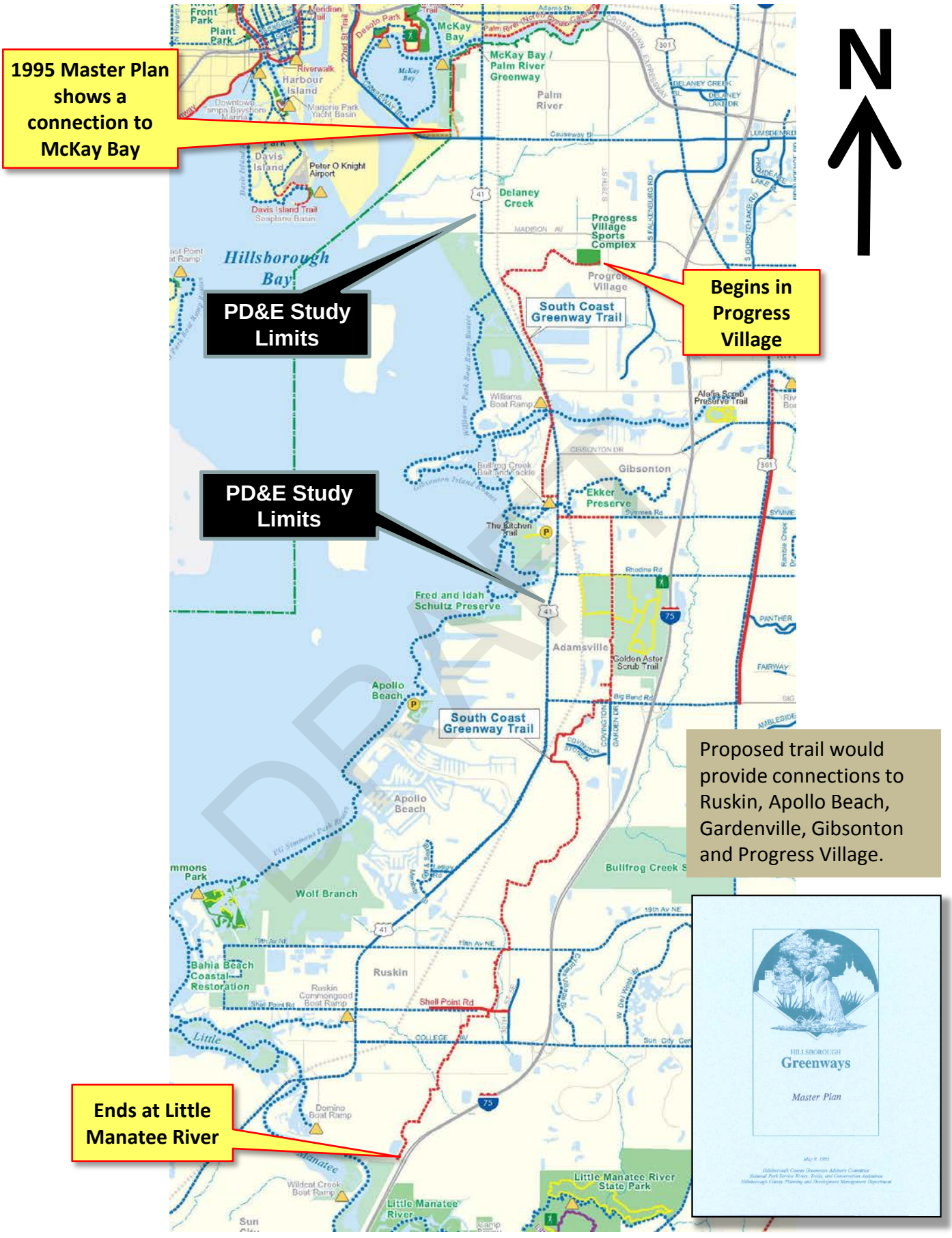
9.12 BICYCLE AND PEDESTRIAN FACILITIES

Sidewalks are included as part of the recommended typical sections. In addition, designated bicycle lanes are included on all recommended roadway and bridge typical sections. All signalized intersections will include pedestrian features such as crosswalks, pushbuttons and pedestrian signal indications.

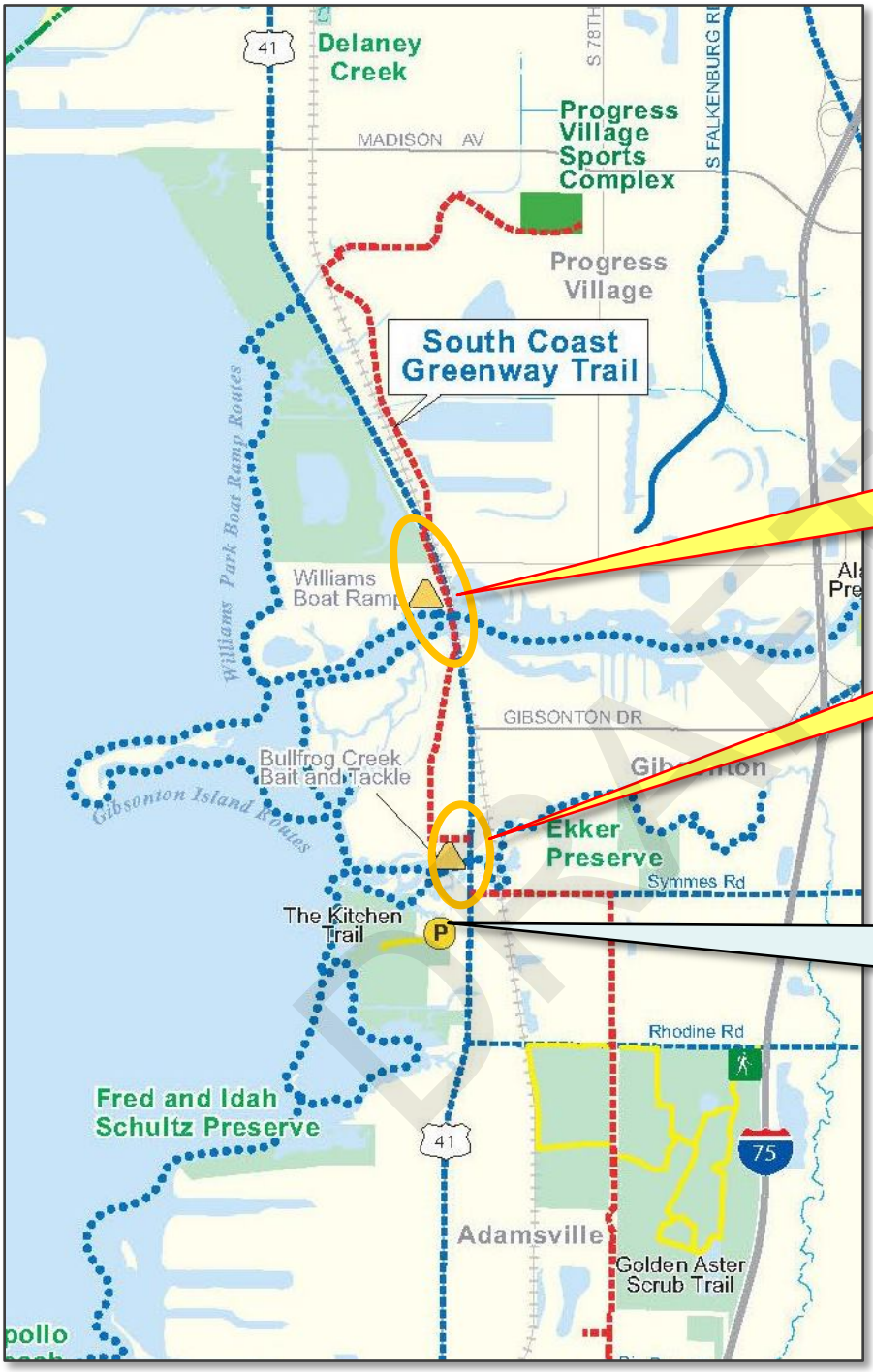
The future South Coast Greenway is proposed to enter the US 41 corridor at two separate locations in order to cross the Alafia River and Bullfrog Creek, based on the 1995 *Hillsborough Greenways Master Plan.* The overall South Coast greenway route is shown in **Figure 9-1**, and **Figure 9-2** shows the areas where the future trail could run along US 41, within the roadway's ROW. The conceptual design plans in **Appendix G** show potential routes and crossing locations for the future trail near Bullfrog Creek and the Alafia River. The recommended bridge typical sections include a 12-foot shared-use path (trail) on the west side to accommodate the future trail, in addition to sidewalks on the east side.

At the Alafia River location, going from north to south, the trail is currently proposed to run along the east side of US 41 to the river, where it would cross underneath the north end of the new bridge over the river, as shown in **Figure 9-3** and on concept plan sheets 13 and 14 in **Appendix G.** On the west side of the bridge it would connect to Williams Park and also continue northerly along the west side to US 41 to a "switchback" where it would continue to the south, crossing the river on the west side of the new bridge. This proposed trail alignment concept has received tentative approval by county parks department staff at this planning stage. Hillsborough County plans to conduct a separate PD&E study for the South Coast Greenway to evaluate alternative routes between Symmes Road and the northern end of the greenway. South of Symmes Road, several of the greenway's phases are in various stages of design and construction. A maintenance agreement between the county and FDOT will be required before the trail portions within FDOT ROW are designed.

Where new sidewalks are proposed which would cross creeks and streams, the existing pipe, box or bridge culverts will be either extended or replaced (depending on the condition and hydraulic adequacy) in such a manner to allow the sidewalks to cross the creeks and streams on the lengthened (or new) culverts. Another option would be the use of concrete boardwalk.



US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Proposed South Coast Greenway**	**Figure 9-1**



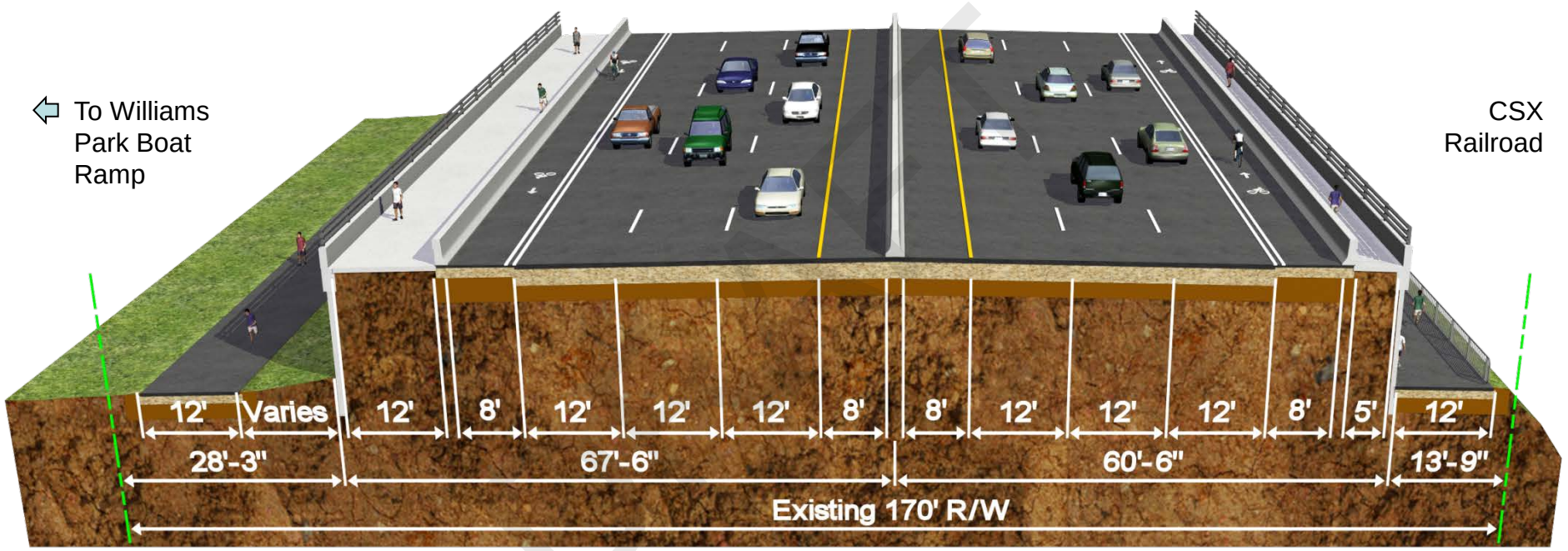
The proposed trail is on or adjacent to US 41 at two locations:

Near Alafia River and Williams Park Boat Ramp

Near Bullfrog Creek

Trail would provide access to hiking trails in the Kitchen

FDOT **US 41(SR 45) PD&E Study** *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**South Coast Greenway in the Project Vicinity**	**Figure 9-2**



(North approach to the bridge, looking north along US 41)

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US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Proposed Typical Section North of Alafia River Bridge**	**Figure 9-3**

9.13 UTILITY AND RAILROAD IMPACTS

Existing utilities are described in **Section 4.1.12**. Depending on the location and depth of the utilities, construction of the proposed project will likely require adjustments or relocation of some facilities. Cost for utility adjustments are not included in the total estimated project costs presented in **Section 9.6**, since they will be incurred by the utility owners in many cases. Determination of any utility relocation reimbursement costs will be made by FDOT's legal department during the future design phase. Separate coordination and negotiations with Florida Gas Transmission will likely be required during future phases. Coordination with utility owners will be ongoing throughout the study process.

TECO Peoples Gas has advised that there are high pressure gas mains around the US 41 and Madison Avenue intersection. These facilities would be difficult and costly to relocate and may be impacted by the proposed US 41 project. In addition, Hillsborough County Water Resource Services has advised that there are asbestos concrete pipes in the project area. These materials may create a hazardous material work area and require disposal of hazardous materials, if encountered. Utility coordination during the design phase should be done to identify all asbestos concrete pipe locations and therefore help address all environment and safety regulations during construction.

It should be noted that several utilities are currently located under the existing pavement and would also be under the proposed improvements. The relocation costs could be reduced significantly if these utilities were permitted to remain within the travel way. Approval would need to come from both the utility owners and the FDOT. Impacts to existing utility facilities can also be reduced or eliminated if Subsurface Utility Engineering (SUE) is performed during the design phase at potential conflict locations (drainage facilities, traffic signals).

Coordination with CSX Transportation may be required at several locations due to the close proximity of their facilities to US 41, as described in **Section 4.1.12**. The CSX crossings at milepoints 19.403 and 20.169 will need to widened when US 41 is widened in the future. In addition, depending on whether or not Hillsborough County chooses to fund the widening of county road approaches to US 41, railroad crossing widening/reconstruction (including gates, signals and other railroad infrastructure) could be required at the following locations (from south to north):

1. On Symmes Road east of US 41
2. On Gibsonton Road east of US 41
3. On Riverview Drive east of US 41

The current conceptual roadway plans show retaining the existing joint-use ditch that the CSX railroad shares with US 41 on the east side of US 41 between Gibsonton Drive and the Alafia River. For this segment, the roadway widening is proposed to occur to the west side; the east side pavement would remain where it is with the addition of curb and gutter and new sidewalk behind the curb. This would avoid the need for either a temporary construction easement (TCE) or license agreement with CSX.

9.14 RESULTS OF PUBLIC INVOLVEMENT PROGRAM

A plan for the *Public Involvement Program* (PIP) was developed for this study to document the various outreach opportunities available for property owners, public officials, agencies, and other stakeholders and interested parties. The program included an Advance Notification (AN) Package, several newsletters, and will include a future public hearing. The results of the entire program will be summarized in a *Comments and Coordination Report* at the conclusion of the study.

Although no public meetings or workshops have been held to date, several presentations have been given to various agencies/groups, as listed in **Table 9-4**. Minutes of these meetings are available in the project files.

Table 9-4 Summary of Presentations to Agencies/Groups

Date	Agency/Group	Meeting/Presentation Purpose
10/16/13	MPO's Citizens Advisory Committee (CAC)	Kick off and study update
10/21/13	MPO's Technical Advisory Committee (TAC)	Kick off and study update
10/31/13	Hillsborough Co. Dept. of Public Works (DPW)	General project update and to review proposed intersection improvements
1/22/14	CSX Transportation	To discuss potential ROW impacts
1/22/14	SWFWMD	Pre-Application Meeting
4/1/14	Hillsborough Co. Parks Dept.	General project information and to discuss Williams Park and South Coast Greenway
4/30/14	Port Tampa Bay (FKA Tampa Port Authority)	General project update and review impacts to port facilities
5/30/14	Mosaic	General project information & discuss Riverview Drive intersection
8/8/14	Mosaic and Hills. Co. Parks and DPW Representatives	Project update and discussed Riverview Drive intersection and South Coast Greenway
8/19/15	SWFWMD	Second "pre-app" meeting

9.15 VALUE ENGINEERING RESULTS

A value engineering (VE) study was conducted as part of this PD&E study. It included a kick-off meeting and presentation on May 4, 2015 and a final presentation to FDOT management on September 6, 2015, with the final report and decision matrix received on October 12, 2015. A copy of the signed Decision Matrix is included as **Table 9-5**, and the executive summary from the final VE study report is included in **Appendix F**.

Table 9-5 Value Engineering Study Signed Decision Matrix

Value Engineering Study - Decision Matrix

US 41 (State Road 45); PD&E Phase
From Kracker Avenue
To South of SR 676 (Causeway Blvd.)

FINANCIAL MANAGEMENT NUMBER: 430056-1

STUDY NUMBER: 15-007-05

	Recommendations	Decision*	Comments**	Potential Cost Impact (-) VE Estimated Savings (+) Value Added
1.	Value Engineering Alternative No. 1A: Widen the existing roadway instead of total reconstruction and eliminate attenuation to tidal outfalls to reduce pond sizes.	Accepted	Value Engineering Alternative No. 1A is approved. Evaluate the possibility of all inside or all outside widening which is easier to construct than widening each roadway on both sides. Also, evaluate water table impacts to existing pavement. Try to design ditches to be dry.	(-) $ 24,100,000
2.	Value Engineering Alternative No. 4: Reduce the two inside lane widths to 11 feet and retain the 12 ft. outside lane from Kracker Avenue to Palm Avenue and from the south end of the Alafia River Bridge to the Madison Avenue intersection.	Accepted	Approved on the condition that further analysis is done in design to determine impacts and/or justify the required variation. Assume all 12 foot lanes for current estimates.	(-) $1, 930,496
3.	Value Engineering Alternative No. 5: Mill and resurface existing pavement and widen instead of total reconstruction.	Accepted	Evaluate the possibility of all inside or all outside widening which is easier to construct than widening each roadway on both sides. Also, evaluate water table impacts to existing pavement.	(-) $5,740,519
4.	Value ADDED Alternative No. 1: Consider concrete pavement at Madison Avenue and Port Sutton Road.	Accepted	Check with Brian Hunter for compatibility with district concrete pavement plan.	(+) $1,724,683

* Decision to accept, decline or accept with modifications

** Reason for declining or explanation of modification if required

Director's Signature Date 10/9/15

Several initial recommendations made by the VE study team were dropped from further consideration after additional analysis/input by others, for example, widening of the bridges at Bullfrog Creek and the Alafia River in lieu of bridge replacement.

The recommendation to use 11-foot interior lane widths for the suburban typical section areas (outside of the north Gibsonton area) would require a design variation and will be further evaluated during the future final design phase.

With respect to drainage-related issues, following the initial VE study findings, the PD&E study team held a second "pre-app" meeting with SWFWMD to review attenuation requirements for stormwater runoff at the preliminarily-selected SMF pond sites. It was determined that attenuation would not be required for many of the potential SMF pond sites where the outfall would directly connect to tidally-influenced water bodies. As a result, estimated sizes and costs of SMF ponds were reduced.

With respect to full roadway reconstruction verses widening with milling and resurfacing, this will need to be reviewed during the future design phase when geotech and survey data will be collected to help make the determination.

The LRE construction cost estimate was updated in September 2015 to include concrete pavement approaches at three intersections with heavier truck traffic, and it was also updated to reflect the smaller size SMF pond sites required.

9.16 DRAINAGE AND STORMWATER MANAGEMENT

The following information is from the *Draft Pond Sizing Report* prepared for this study.

Design Criteria for Attenuation - For basins with a positive outfall, and that do not discharge to an infinite basin, SWFWMD will require the proposed discharge rate from the basin be less than or equal to the existing discharge rate for the 25-yr/24-hr SWFWMD storm event. Additionally, FDOT Criteria requires Florida Administrative Code 14-86 evaluation for closed basins or basins with historical flooding.

The majority of the basins are considered to meet the infinite basin criteria based on conceptual pond outfall locations, as discussed with SWFWMD August 19, 2015, and are not anticipated to require any discharge attenuation. The project basins within Black Point Drain will require pre vs. post discharge attenuation.

Design Criteria for Water Quality

1. A wet detention treatment system shall treat one inch of runoff from the contributing area.
2. A manmade wet detention system shall include a minimum of 35 percent littoral zone, concentrated at the outfall, for biological assimilation of pollutants. The treatment volume shall be no greater than 18 inches above the control elevation (orifice elevation/SHWL).

3. The wet detention system's treatment volume shall be discharged in no less than 120 hours (5 days) with no more than one-half the total volume being discharged within the first 60 hours (2.5 days).

Criterion 1 was utilized to estimate the required water quality for the wet pond. Criteria 2 and 3 will be implemented in final design. Dry retention pond is provided as well for the following reason: due to the impaired status for many of the receiving water bodies it is necessary to demonstrate that the project will not contribute to the impairment through demonstration of no net increase in nutrient loading from the project (pre vs. post nutrient loading comparison). Based on the Nutrient Loading calculations, a wet pond would not be capable of meeting requirements for nutrient loading for some basins, therefore dry detention ponds have being considered in the estimation of pond sizing requirements.

Drainage Areas - The impervious drainage areas for each basin were determined as the basin length multiply by a typical impervious width. The pervious drainage areas were subtracted from the total drainage areas calculated as the basin length multiply by a typical ROW width of 182 feet. The calculations presented here are preliminary and help in estimating the preliminary size of the pond site facilities for each basin. The size requirements are preliminary based upon many assumptions and judgments. The results are tabulated on **Table 9-6**. Historical drainage maps from District 7 are included in **Appendix D**.

A combination of dry retention and wet detention ponds are recommended for providing stormwater management to serve the proposed US 41 improvements. **Table 9-6** classifies the stormwater management facility (SMF) size requirements per basin. **Table 9-7** shows the estimated floodplain encroachment area, estimated floodplain encroachment volume, and estimated floodplain compensation (FPC) site area.

Table 9-6 Required Estimated Pond Size Areas

Regional Basins	Project Basin No.	Project Basin Boundaries	Project Basin Acreage (ac)	SMF Total Area (ac)
Kitchen Branch	1	Sta 831+00 to Sta 848+90	7.48	1.2
	2	Sta 848+90 to Sta 869+91	8.78	1.5
Direct Runoff to Bay	3	Sta 869+91 to Sta 892+40	9.40	1.6
Bullfrog Creek	4	Sta 892+40 to Sta 917+37	10.43	1.7
	5	Sta 917+37 to Sta 946+99	12.38	2.1
Direct Runoff to Bay	6	Sta 946+99 to Sta 995+51	20.27	3.4
North Prong Alafia River	7	Sta 995+51 to Sta 96+75	30.21	5.0
Archie Creek	8	Sta 96+75 to Sta 118+66	9.15	1.5
Unnamed Canal	9	Sta 118+66 to Sta 139+67	8.78	1.5
	10	Sta 139+67 to Sta 160+58	8.74	1.5
Black Point Channel	11	Sta 160+58 to Sta 189+78	12.20	2.0
Black Point Drain	12	Sta 189+78 to Sta 208+79	7.94	2.0
	13	Sta 208+79 to Sta 220+62	4.94	1.3
		Total	**150.69**	**26.3**

Table 9-7 Estimated Floodplain Encroachment and Compensation Summary

Basin #/FPC Site No.	Project Basin Boundaries	Estimated Floodplain Encroachment Area (ac) ①	Estimated Floodplain Encroachment Volume (ac-ft) ②	Estimated Floodplain Compensation (FPC) site Area (ac) ③
1	Sta. 831+00.00 to Sta 848+90.00	Above 100 yr floodplain		
2	Sta 848+90.00 to Sta. 869+91.00	Above 100 yr floodplain		
3	Sta. 869+91.00 to Sta. 892+40.00	2.74	1.37	1.71
4	Sta. 892+40.00 to Sta. 917+37.00	0.56	0.28	0.35
5	Sta. 917+37.00 to Sta. 946+99.00	Above 100 yr floodplain		
6	Sta. 946+99.00 to Sta. 995+51.00	Above 100 yr floodplain		
7	Sta. 995+51.00 to Sta. 1034+11.00 Sta. 63+05.00 to Sta. 96+75.00	Above 100 yr floodplain		
8	Sta. 96+75.00 to Sta. 118+66.00	Above 100 yr floodplain		
9	Sta. 118+66.00 to Sta. 139+67.00	Above 100 yr floodplain		
10	Sta. 139+67.00 to Sta. 160+58.00	2.54	5.08	6.35
11	Sta. 160+58.00 to Sta. 189+78.00	3.13	1.57	1.96
12	Sta. 189+78.00 to Sta. 208+79.00	2.31	2.31	2.89
13	Sta. 208+79.00 to Sta. 220+62.00	1.44	0.72	0.90
	Totals	12.72		14.16

①*The estimated floodplain encroachment area is based on a 26.5 ft width per the length of encroachment per side.*
②*An estimated fill depth based on contour data and the average depth was estimated per basin.*
③*An estimated of 1.25 determined the FPC site area.*

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9.17 STRUCTURES

The proposed widening of US 41 will require the existing bridges and bridge culverts to either be widened or replaced.

Bridge Culverts

All three of the multi-celled 10'x6' bridge culverts currently have a sufficiency rating of 74 and load rating values that exceed 1.0 which would indicate that they are suitable for widening. It is much more cost effective to extend these bridge culverts rather than to replace them; however, these culverts were constructed in 1943 and then widened in 1959 so they are currently 71 years old. It is recommended that the condition of these culverts at MP 20.271, 20.686 and 21.084 be verified to confirm that the structural adequacy has not deteriorated prior to preparing the culvert extension plans during the future design phase.

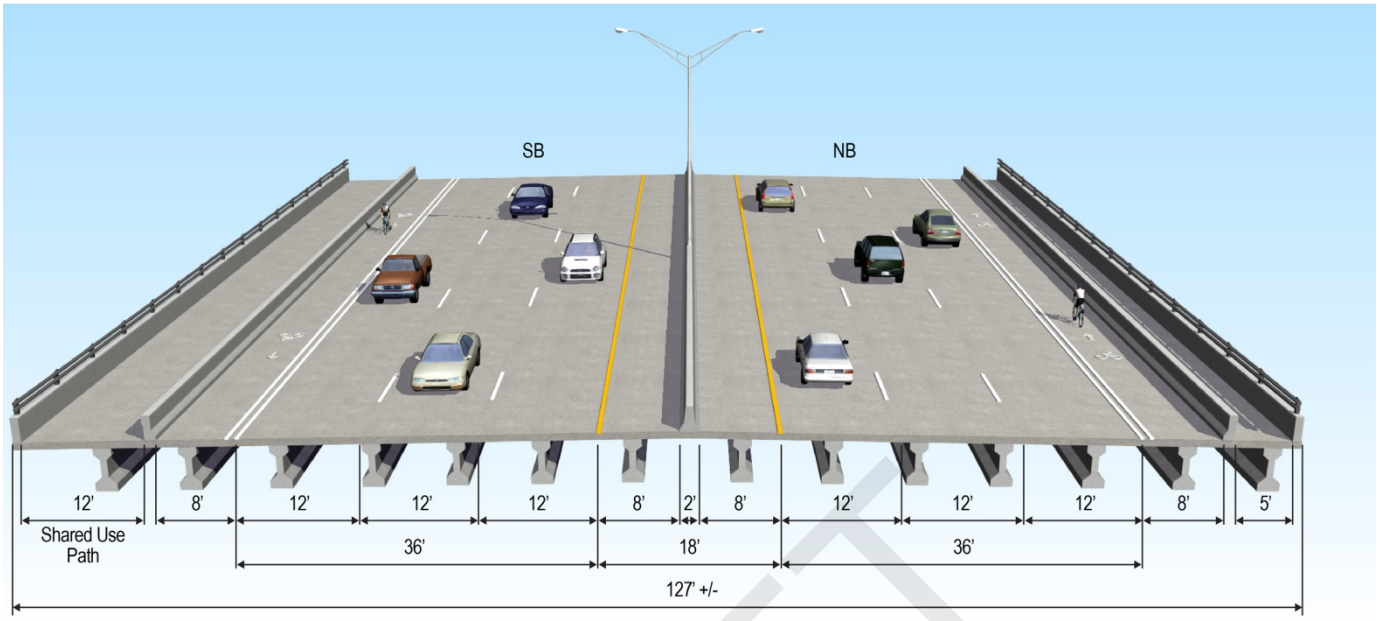
Although it is located north of the expected limits of construction for the proposed highway widening, the bridge culvert at MP 23.003 over Delaney Creek was constructed in 1959 and has a sufficiency rating of only 56.7. It is recommended to replace this triple 12'x8.25' bridge culvert.

Bullfrog Creek Bridges

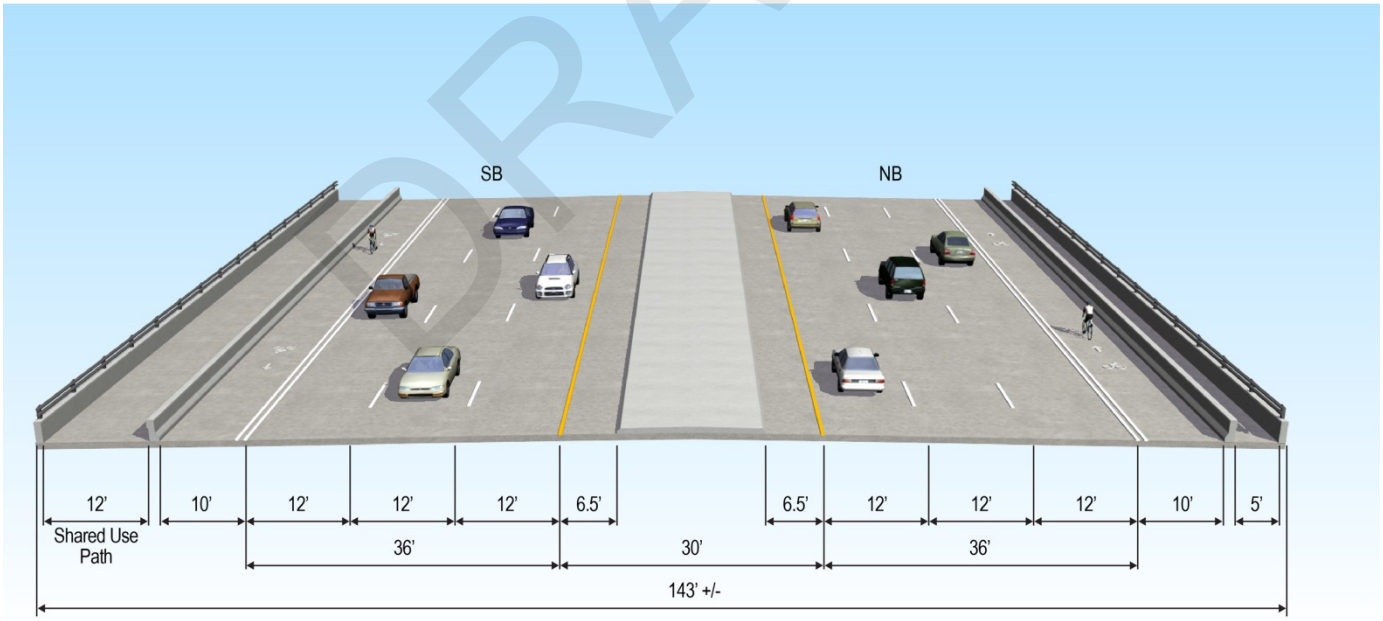
The bridges at Bullfrog Creek will need to be replaced to accommodate the additional lane of traffic in each direction. The configuration of the proposed bridge includes three 12-foot lanes in each direction with 6 foot-6 inch inside shoulders and 10-foot outside shoulders which would be designated as bike lanes (**Figure 9-4**). The cross section includes a 17-foot raised median between the inside shoulders and F-shaped barriers to protect the 5-foot sidewalk on the east side of the bridge and a 12-foot shared-use path on the west side to accommodate the future South Coast Greenway planned by Hillsborough County.

The alignment of the new bridge will need to be shifted either to the west or east due to the need to maintain four lanes of traffic during construction. For example, the bridge alignment could be shifted 11 feet-9 inches to the west from the center of the ROW in order to facilitate the maintenance of traffic. This allows the westernmost portion of the bridge to be constructed while southbound traffic remains on the existing bridge. The southbound pedestrian and vehicular traffic can then be shifted to this newly constructed portion of the proposed bridge permitting the existing southbound bridge to be removed and the center portion of the proposed bridge to be constructed. The northbound traffic could then be shifted to the center portion of the new bridge allowing the existing northbound bridge to be removed and the remaining portion of the new bridge to be constructed. Two alternative construction sequence plans are shown in **Appendix B.** Based on the need to minimize ROW costs, the west-shifted alignment alternative is recommended for this location and is shown on the concept plans.

(All views are looking north)



Bridge at Alafia River



Bridge at Bullfrog Creek

Rev. 12/12/14

US 41(SR 45) PD&E Study *From Kracker Avenue to South of SR 676 (Causeway Blvd)* WPI Segment No. 430056 1 - Hillsborough County	**Recommended Bridge Typical Sections**	**Figure 9-4**

The above construction sequence assumes that the bridges will be replaced due to their age, but if the bridges are widened, then a similar process could be used but instead of removing the existing bridges, the widened portions of the new bridge would simply be either doweled into the existing slab or else a portion of the existing bridges would be removed to allow the proposed transverse reinforcing to splice with the existing transverse reinforcing.

While widening the existing flab slab bridge is feasible, it would require the widening to use the same span arrangement as the existing bridges which is 14 spans for the 211-foot northbound bridge and 10 spans for the 203-foot southbound bridge. In addition, the northbound bridge is classified as *scour critical* so steps should be taken to strength the foundations and/or prevent scour for this bridge. Another obstacle to widening is that the low member of the proposed bridge would be at least 5¼ inches lower than the existing low member so the vertical clearance would be decreased. Final consideration is that the southbound bridge was built in 1960 so it is already 55 years old in 2015 while the northbound bridge is 70 years old since it was constructed in 1945. The sufficiency ratings for these bridges are 77.2 and 75.2 for the southbound and northbound bridge respectively but they are approaching their expected 75-year life span and it is reasonable to expect the costs for maintaining these bridges will increase at a faster rate as they age. Based on this information, replacing the bridges is expected to result in a lower lifecycle cost. A preliminary life-cycle cost analysis for all bridges is included in **Appendix C**.

Replacing the bridges would also allow a more economical span arrangement for these bridges that are approximately 210 feet in length. A three-span configuration using Florida-I beams (FIBs) that are 36-inch deep supported on prestressed, concrete pile bents are likely the most economical solution.

Alafia River Bridges

The proposed typical section for the bridge over the Alafia River is similar to the Bullfrog Creek typical in that both accommodate three 12-foot lanes in each direction with a 5-foot sidewalk on the east side of the bridge and a 12-foot shared-use path on the west side and F-shaped barriers to protect the pedestrians and trail users (**Figure 9-4**). The Alafia River Bridge would use 8-foot inside and outside shoulders with the outside shoulder designated as a bike lane. There is also a median barrier separating the southbound and northbound traffic.

The proposed alignment of the new bridge would be shifted approximately 10 feet to the west from the center of the ROW. As with the bridge at Bullfrog Creek, this shift allows the westernmost portion of the bridge to be constructed while southbound traffic remains on the existing bridge. The newly constructed portion of the proposed bridge can then be used to convey the southbound pedestrian and vehicular traffic allowing the existing southbound bridge to be removed and the center portion of the proposed bridge to be constructed. The center section of the bridge can then be used to carry the northbound traffic permitting the existing northbound bridge to be removed and the last portion of the proposed bridge to be constructed, as shown in **Appendix B.**

As with Bullfrog Creek, the construction sequence is based on replacing the bridge. A similar scheme could be used if the bridge is widened. However, the sufficiency rating of the northbound bridge is only 68 and the cost of maintaining the existing steel beams will continue to increase at a faster rate as this bridge ages beyond its current age 63 years old in 2015. The existing southbound bridge uses post-tensioned AASHTO Type II beams for the two 78-foot spans while the northbound bridge uses continuous steel-I beams requiring the widened bridges to use similar beams to maintain similar structural rigidity between the existing and proposed bridges. In addition, the existing bridge span configuration of 40 foot and 60-foot approach spans with 78-foot center spans results in a widening that would not be very efficient.

Based on the above information, replacing the existing bridges is expected to result in a lower life-cycle cost. The replacement bridge will likely use FIBs that are either a 36-inch or 45-inch depth that can easily span distances over 90 feet and 110 feet respectively. These longer spans can eliminate almost half of the foundations in the river improving the hydraulics of the river and resulting in a more aesthetically pleasing structure. It is assumed that the existing bridge fender system will either be extended or replaced in its current location, which aligns with the railroad swing bridge located immediately to the east of the Alafia River bridges.

Other - In addition to the bridge culverts mentioned above, other pipe and box culverts will be either extended or replaced to accommodate the wider roadway, depending on the condition and hydraulic adequacy at the time of the future design phase. Widening verses replacement of the existing bridge structures is also addressed in the *Final Value Engineering Study Report*.

9.18 SPECIAL FEATURES

FDOT may consider context sensitive solutions such as aesthetic features and landscaping during the design phase so that the project is in harmony with the community and preserves and/or enhances the natural, environmental, scenic and aesthetic values of the area. The placement and maintenance of any landscaping shall comply with the required clear zone and sight distance at intersections. No other provisions or commitments have been made yet regarding special aesthetic features, lighting, or noise walls.

9.19 ACCESS MANAGEMENT

A meeting was held with the FDOT's District Access Management Engineer in September 2014 to review the proposed access management plan for the proposed project. The existing access management classification is Class 3 for most areas of US 41. No change is recommended in the classification. The minimum spacing for full and directional median openings should ideally follow the standards for Access Class 3 shown in **Table 6-2**. Many of the existing openings, especially in the north Gibsonton area, do not meet Class 3 spacing standards.

Table 9-8 shows the proposed median opening locations for the recommended Build Alternative, and the conceptual design plans included in **Appendix G** show the locations of proposed directional and full median openings as depicted in the table. Some existing median openings are proposed for

closure, some full median openings will be changed to directional median openings to prevent certain turning movements, and the locations of several median openings are proposed to be shifted to better meet Access Class 3 spacing standards. For those proposed median opening locations that do not meet minimum Access Class 3 standards, the percent deviation from the standards is shown in the table. In general, the District Access Management Engineer provided verbal concurrence for the proposed access management plan.

Table 9-8 US 41 Access Management Review

US 41 PD&E Study - From Kracker Avenue to S. of Causeway Blvd - WPI # 430056 1

Rev. 10/31/2014

Mileposts with Exist./Prop. Median Opening Symbols

EXISTING CONDITIONS (Listed from North to South)				PROPOSED CONDITIONS					
					Directional		Full Openings		
West Side	East Side	Milepost	Type Opening	Type Opening	Dist. (ft)	% Dev.	Dist. (ft)	% Deviation	Comments
Austin St		22.695	Full	Full			412'	38%	Access Class 7 north of Port Sutton Rd & Class 3 south of Port Sutton Rd
Denver St	Denver St	22.617	Full	Full			422'	36%	
Santa Fe Rd	Santa Fe Rd	22.537	Full	Full			760'	Meets Std.	
Port Sutton Rd		22.393	Signal	Signal			1900'	28%	(Signal spacing is 1900' or 28% deviation)
Pendola Point Rd	Madison Ave	22.033	Signal	Signal					
					1125'	15%	5813'	Meets Std.	
Dover St	Dover St	21.820	Full	Directional					
		21.740	Full	Closed	1484'	Meets Std.			
	Bloomingdale Ave	21.539	Full	Mod. Direct.					Minor restrictions
					702'	47%			
	Old US 41	21.406	Full	Mod. Direct.					Minor restrictions
Fred's Creek		21.084			2502'	Meets Std.			
vacant land	vacant land	20.932	Full	Full					for U turns only
Archie Creek North		20.686					2191'	17%	
vacant land	vacant land	20.517	Full	Full					
Archie Creek South		20.271					2439'	7.6%	
CSX 624797-F	CSX 624797-F	20.169							
vacant land	vacant land	20.055	Full	Full			3020'	Meets Std.	
	Old US 41	19.483	Full	Mostly Full					
CSX 624795-S	CSX 624795-S	19.403					1140'	57%	
Mosaic's Plant Entrance		19.366	Full	Closed					
Industrial Access Rd	Riverview Dr	19.267	Signal	Signal					
Alafia River		18.914					3406'	Meets Std.	
Lula St		18.702	Full	Closed					
	Pennsylvania Ave	18.622	Full	Full					
East Bay Bus. Center		18.495	Full	Closed	1093	17%	2059	22%	
Anna Ave		18.415	Full	Directional					
Estelle Ave	Estelle Ave	18.350	Full	Closed	966	27%			
Alice Ave	Gibsonton Dr	18.232	Signal	Signal					
Lewis Ave		18.038	Full	Closed	1325'	Meets Std.			North Gibsonton Area
Nundy Ave	Nundy Ave	17.981	Full	Directional			3115	Meets Std.	
Shirley Ave		17.899	Full	Closed	803'	39%			
Cliff Ave	Mottie	17.829	Full	Directional					
Cedar Ave		17.725	Full	Closed	987'	25%			
Palm Ave	S/C Entr	17.642	Signal	Signal					
Beach Ave		17.553	Full	Closed			2270'	14%	
Bullfrog Creek	Bullfrog Creek	17.422							
	Symmes Rd	17.212	Signal	Signal					
Isabel Ave		16.947	Full	Closed	1848'	Meets Std.	2482	6%	
Florence St	Florence St	16.862	Full	Directional					
Mabrey Ave		16.650	Full	Full	1119'	15%			
	Palm Grove Trailer Pk	16.452	Full	Closed			1843'	30%	
	Ohio St	16.301	Full	Full					
Kitchen Branch	vacant land	16.124	Full	Closed	1362	Meets	2729'	Meets Std.	
vacant land	vacant land	16.043	- -	Directional					for U turns only
vacant land	vacant land	15.954	Full	Closed					
Kracker Ave	Kracker Ave	15.784	Full	Full	1367	Meets			

Notes: US 41 is Class 3 south of Port Sutton Rd

Class 3 Standards: Directional Openings: 1/4 mi (1320')
Full Openings/Signals: 1/2 mi (2640')

Class 7 Standards: Directional Openings: 330'
Full Openings: 660'
Traffic Signals: 1320' (1/4 mi)

9.20 POTENTIAL CONSTRUCTION SEGMENTS AND PHASING

Due to potential funding limitations at the time of construction, several options exist to segregate the proposed project into various construction segments. One option would be to segregate them based on the proposed typical sections. This would result in the following segments, excluding the Alafia River Bridge:

1. Kracker Avenue to Palm Avenue: 1.9 miles
2. Palm Avenue to Alafia River Bridge: 1.2 miles
3. Alafia River Bridge to Austin St: 3.7 miles

The Alafia River bridges replacement could be broken out as a separate project due to the high cost and the need for USCG approval and permit. Other segmenting options are available and these could consider other factors such as required utility relocations and variation in traffic congestion from segment to segment.,

Advance funding for ROW acquisition could include securing potential off-site pond areas, or negotiating with properties that become listed for sale by the property owners. As developments are submitted for approval to Hillsborough County, provisions for land dedications and accommodations of drainage, floodplain and wetland impacts should be considered in accordance with the County's Comprehensive Plan and Land Development Code.

9.21 WORK PROGRAM SCHEDULE

No future phases are currently programmed other than routine maintenance/resurfacing.

Table 9-9 shows other planned and recent past projects within or near the study area.

Table 9-9 Other Past and Planned Projects in the Study Area

Work Type	Description	WPI No.	Fiscal Year(s)	Total Budget
Planned Projects				
Railroad Crossing	US 41 from N of Old US 41A to S of Archie Creek	434029-1	2017 & 2018	$1.0 million
Resurfacing	US 41/SR 45 from S of Bullfrog Creek to Denver Street	434848-1	2018	$6,381,070
Add Lanes and Reconstruct	Madison Avenue from US 41 to 78th St	437002-1	2020	$7,000,000
Past Projects				
Rail Safety Project	US 41 (SR 45) AT NGCN: 624802-A RRMP: AEA-SPUR	416443-1	2011	$11,796
Intersection Improvement	US 41 NB at Towaway Avenue WB	433048-1	2012 thru 2014	$93,000
Intersection Improvement	US 42 NB at 34th Avenue WB	433049-1	2013 & 2014	$89,614
Intersection Improvement	US 41 Northbound at Hartford St (WB)	433046-1	2012 thru 2014	$110,907
Intersection Improvement	US 41 Northbound at Raleigh (Westbound)	433047-1	2012 thru 2014	$92,264
Resurfacing	US 41 (SR 45) from S Denver St to N St Paul St	416859-1	2009 thru 2011	$948,094
Rail Safety Project	US 41 (SR 45)@(NGCN) Natl Grade Crossing No 624797F Remove Cantilever	422565-1	2009 thru 2010	$26,707
Resurfacing	US 41 (Tamiami Trl) from 100' N of 15th Ave to Bull Frog Creek	413399-1	2009	$1,554,182

Source: FDOT's Tentative Work Program, 4/13/15 and past work program

SECTION 10 LIST OF TECHNICAL REPORTS

Engineering Items

- This Draft Preliminary Engineering Report (PER) with Conceptual Design Plans
- Traffic Technical Memorandum (TTM)
- Draft Pond Sizing Report (PSR)
- Draft Location Hydraulics Memorandum (LHM)
- Draft Typical Section Package
- Value Engineering Study Final Report

Environmental Items

- Draft Noise Study Report (NSR)
- Draft Air Quality Screening Memorandum
- Draft Contamination Screening Evaluation Report (CSER)
- Draft Wetlands Evaluation & Biological Assessment Report (WEBAR)
- Cultural Resource Assessment Survey (CRAS) Report
- Draft State Environmental Impact Report (SEIR)

Public Involvement Items

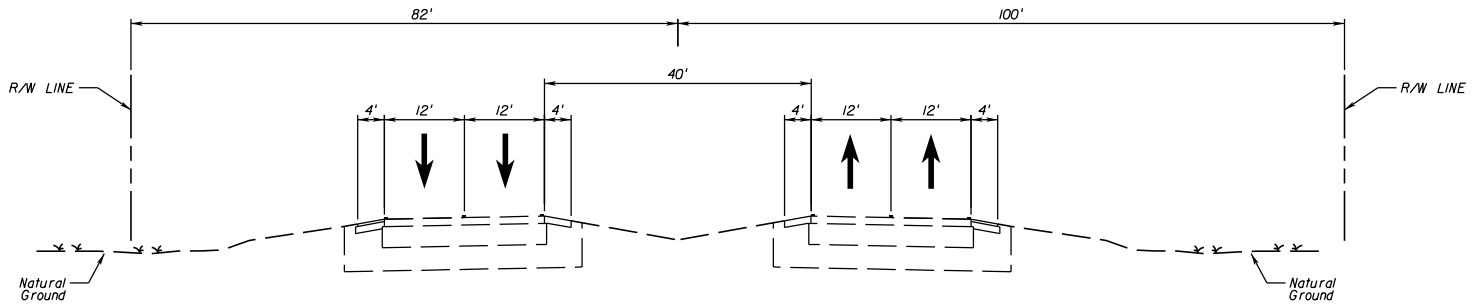
- Public Involvement Plan
- Public Hearing Scrapbook (after public hearing)
- Public Hearing Transcript (after public hearing)
- Comments and Coordination Report (after public hearing)

LIST OF APPENDICES

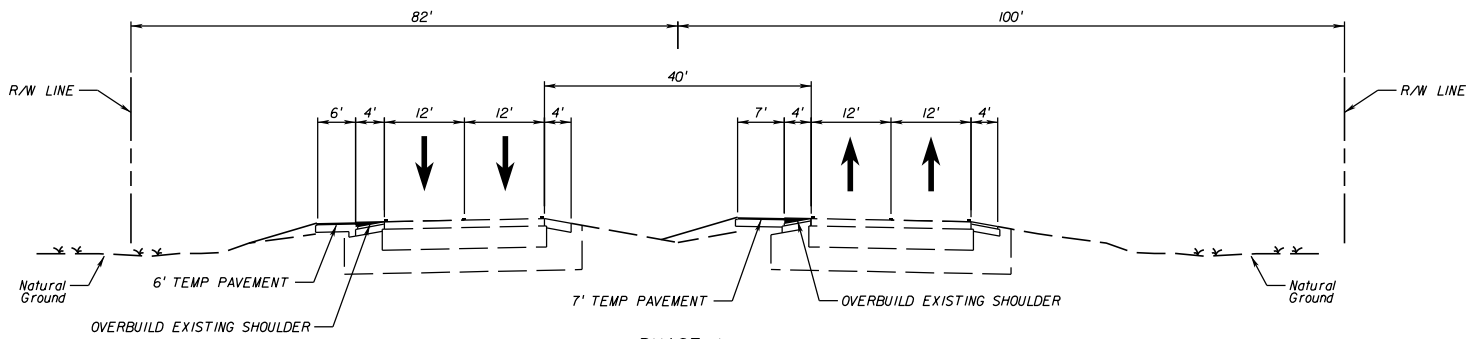
Appendix A
Temporary Traffic Control Plan Concepts

"EAST SHIFT SUBURBAN"

(ALL VIEWS LOOKING NORTH)

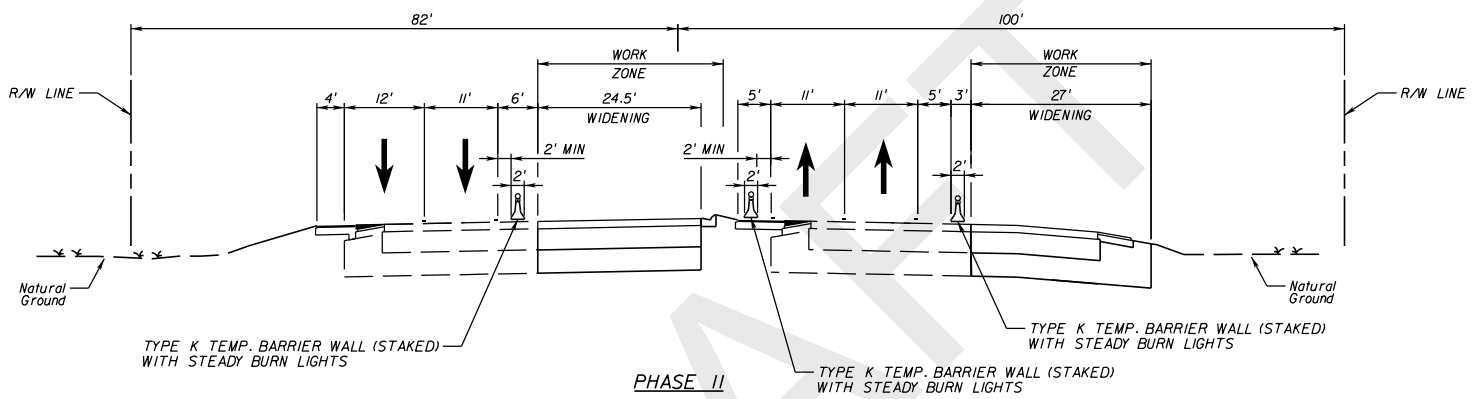


EXISTING TYPICAL SECTION



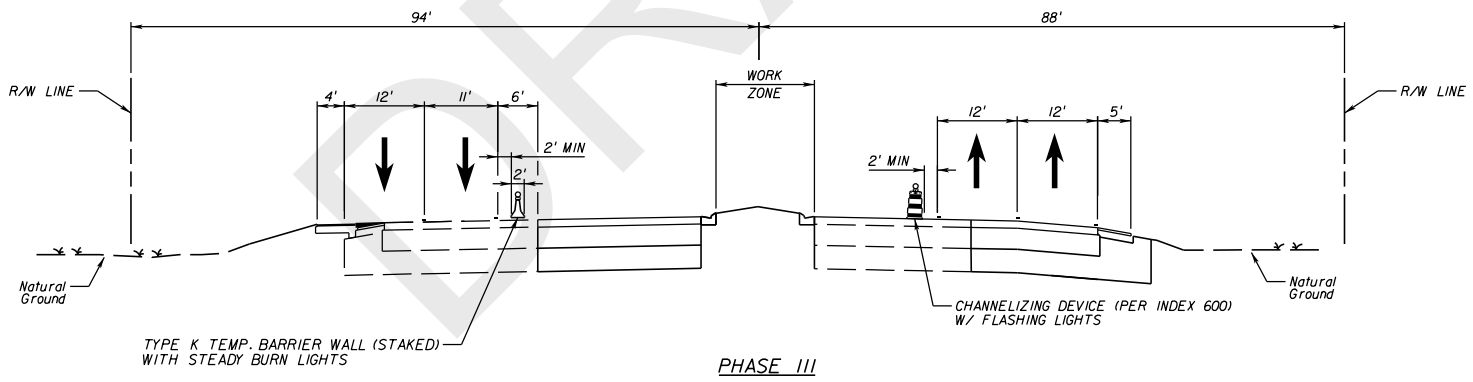
PHASE I

CONSTRUCT 7' OUTSIDE TEMP PAVEMENT NORTHBOUND
CONSTRUCT 6' INSIDE TEMP PAVEMENT SOUTHBOUND



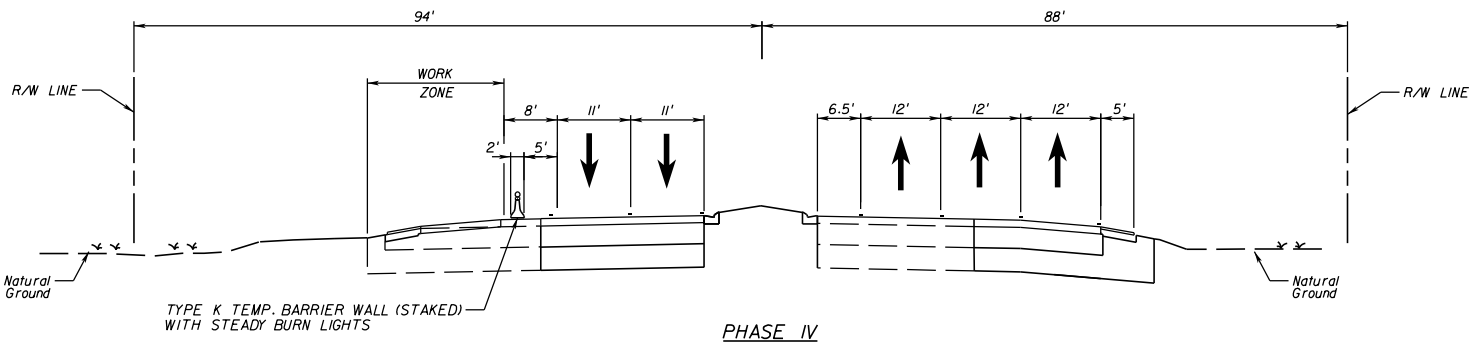
PHASE II

SHIFT NORTHBOUND TRAFFIC TO THE INSIDE AND BUILD OUTSIDE WIDENING
SHIFT SOUTHBOUND TRAFFIC TO THE OUTSIDE AND BUILD INSIDE WIDENING



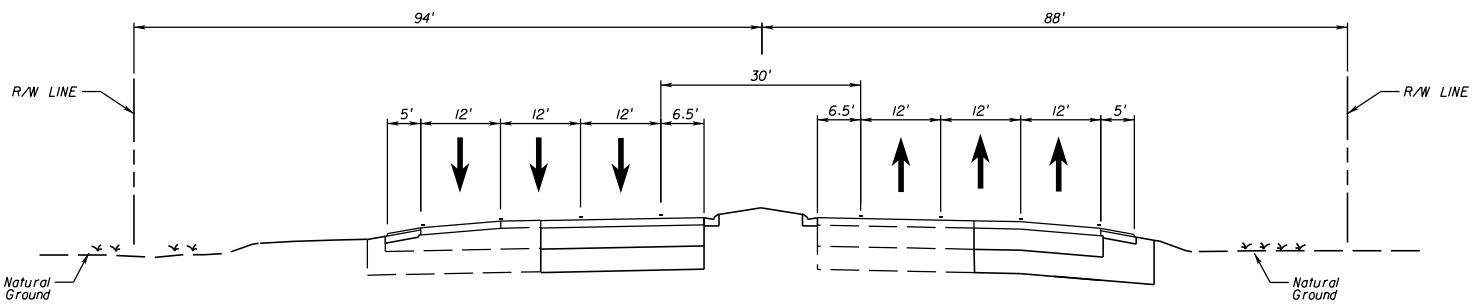
PHASE III

SHIFT NORTHBOUND TRAFFIC TO THE NEW OUTSIDE WIDENING AND AND COMPLETE MEDIAN WORK



PHASE IV

SHIFT SOUTHBOUND TRAFFIC TO THE NEW INSIDE WIDENING
MILL OUTSIDE LANE TO CORRECT SLOPE AND REBUILD SHOULDER



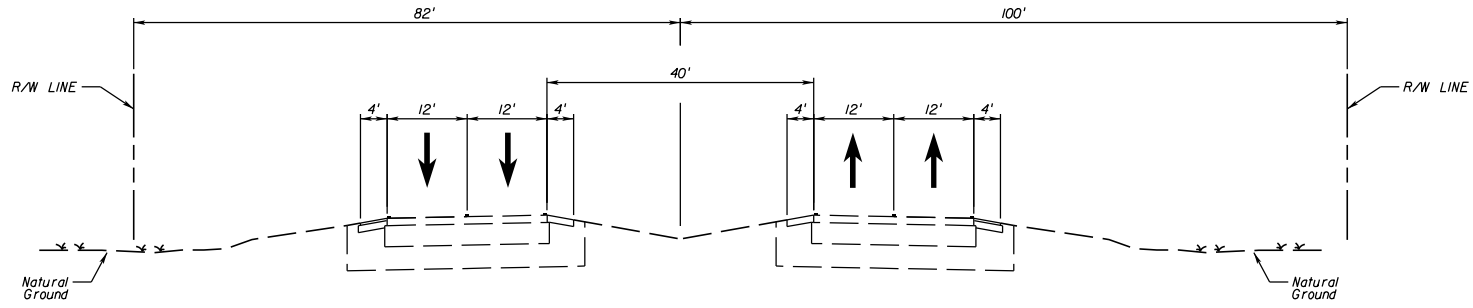
PHASE V

FINAL FC AND SIGNING AND PAVEMENT MARKINGS

"UTILIZING THE EXISTING PAVEMENT"

(MEDIAN IMPROVEMENTS FIRST)

(ALL VIEWS LOOKING NORTH)



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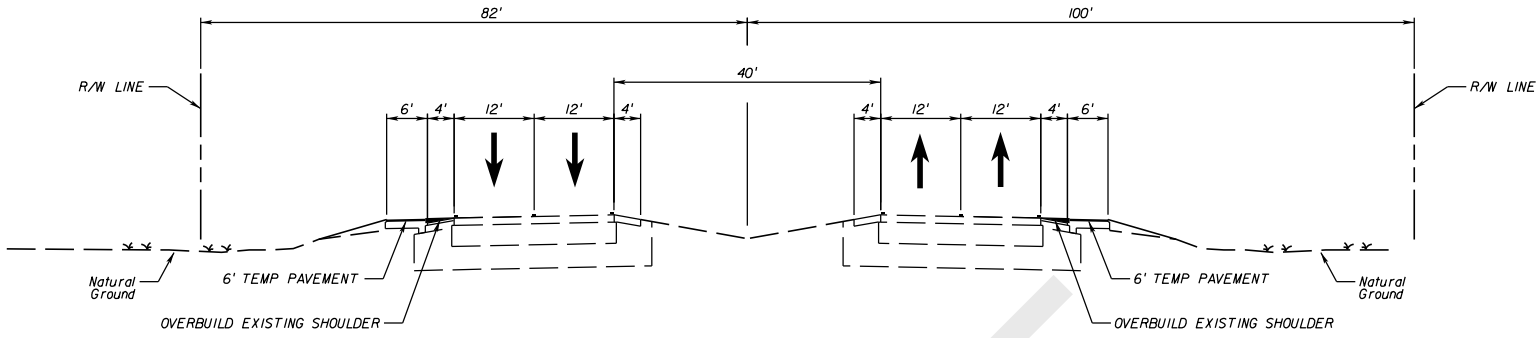
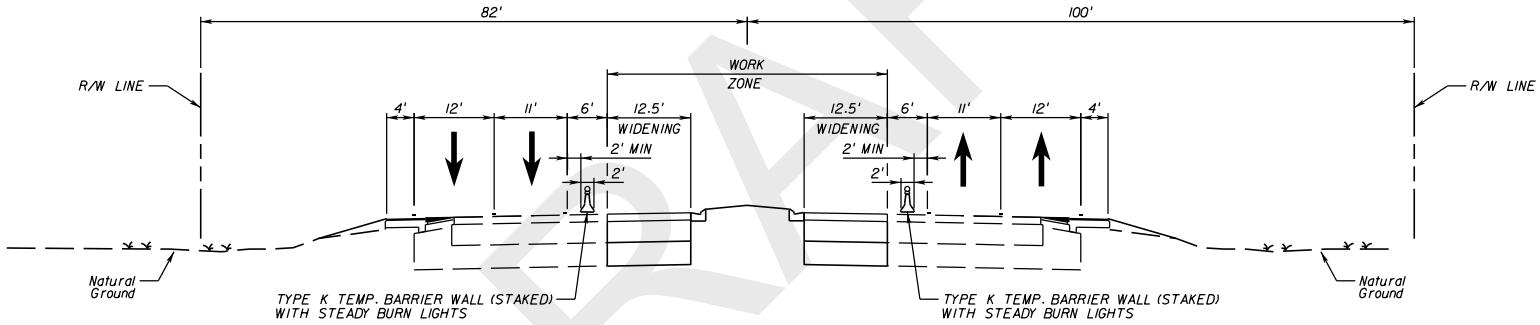
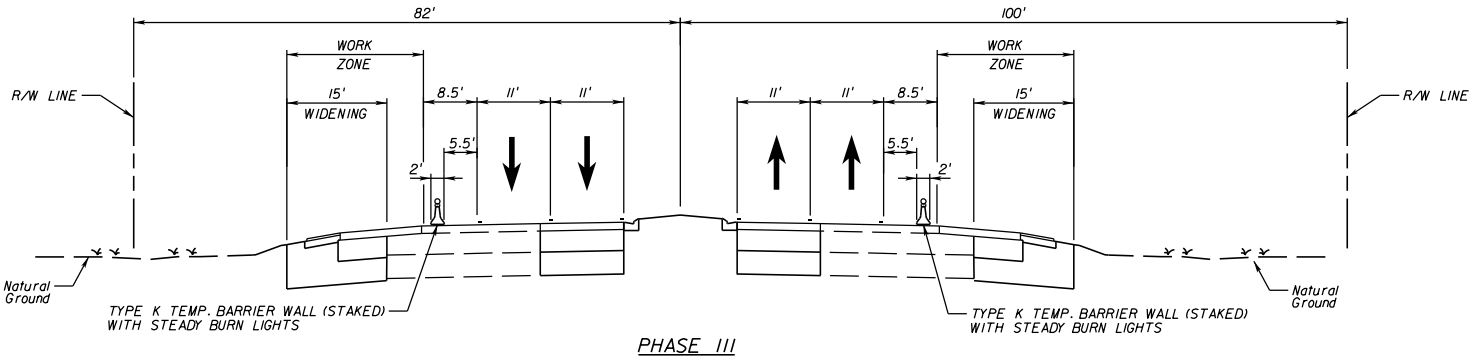


PHASE I - 6' OUTSIDE TEMP PAVEMENT



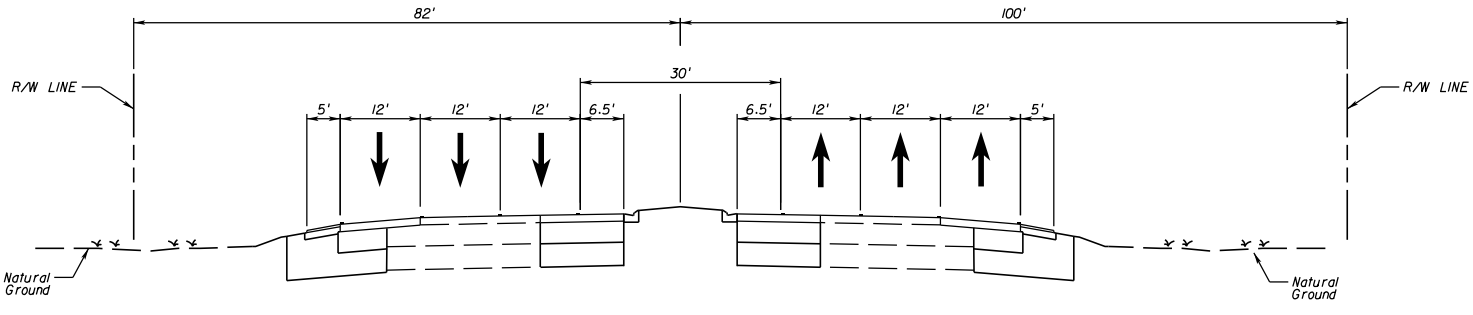
PHASE II

SHIFT TRAFFIC TO THE OUTSIDE AND BUILD INSIDE WIDENING AND MEDIAN IMPROVEMENTS



PHASE III

LOWER SPEED LIMIT TO 45 MPH IN CONSTRUCTION ZONE
SHIFT TRAFFIC TO THE INSIDE AND BUILD OUTSIDE WIDENING
MILL OUTSIDE OF EXISTING PAVEMENT TO MATCH SLOPE OF NEW OUTSIDE WIDENING.



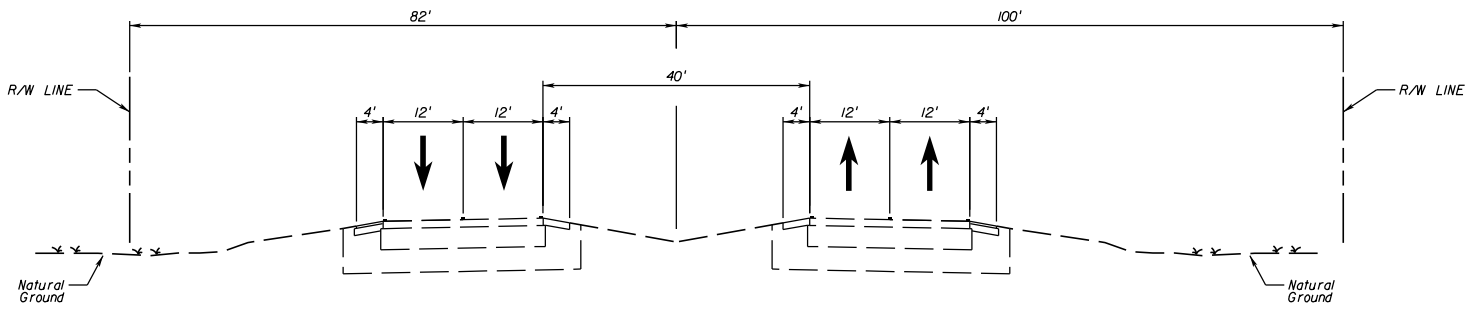
PHASE IV

FINAL FC AND SIGNING AND PAVEMENT MARKINGS

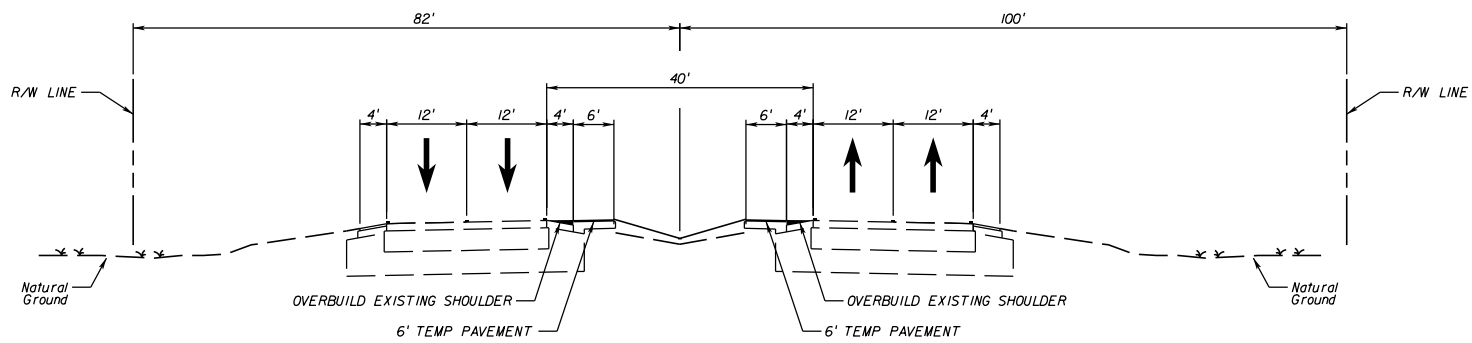
"UTILIZING THE EXISTING PAVEMENT"

(OUTSIDE WIDENING FIRST)

(ALL VIEWS LOOKING NORTH)

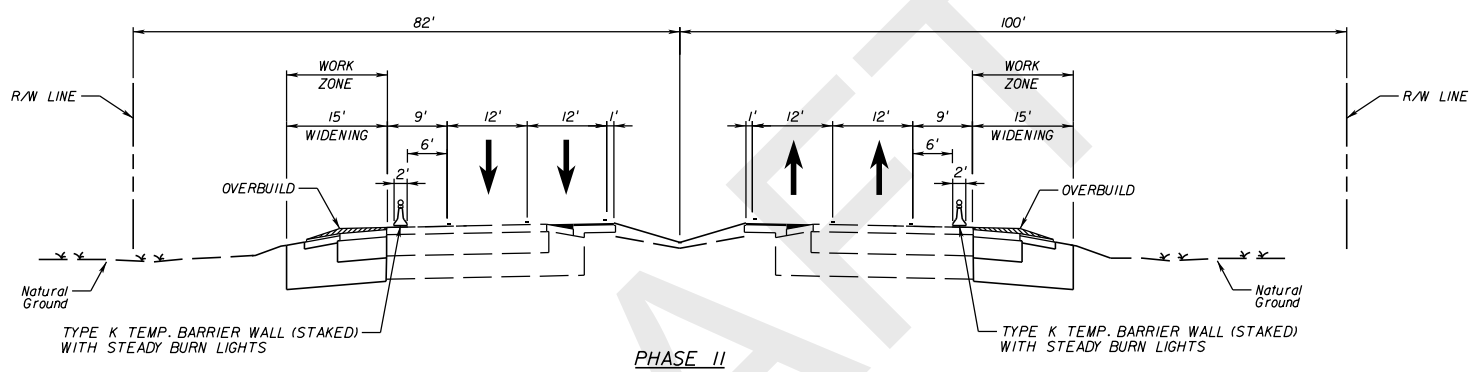


EXISTING TYPICAL SECTION



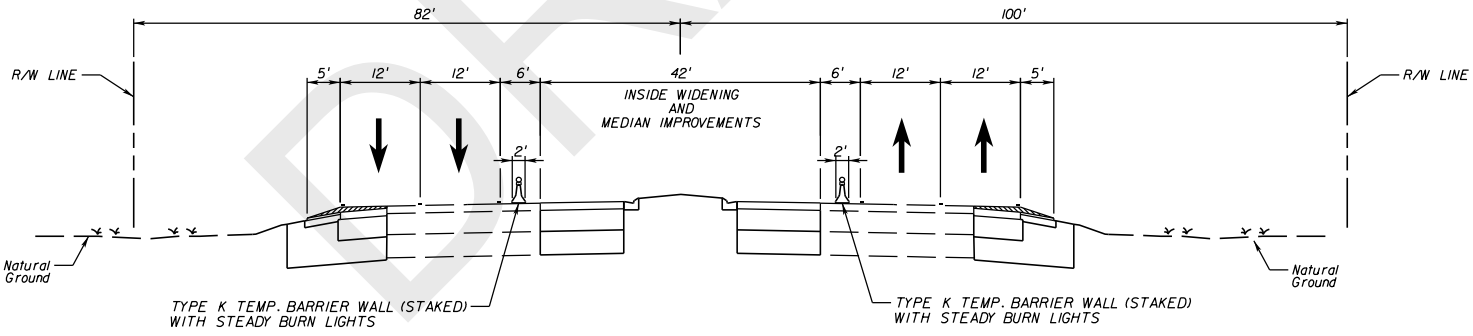
PHASE I

CONSTRUCT 6' TEMP PAVEMENT ON INSIDE LANES



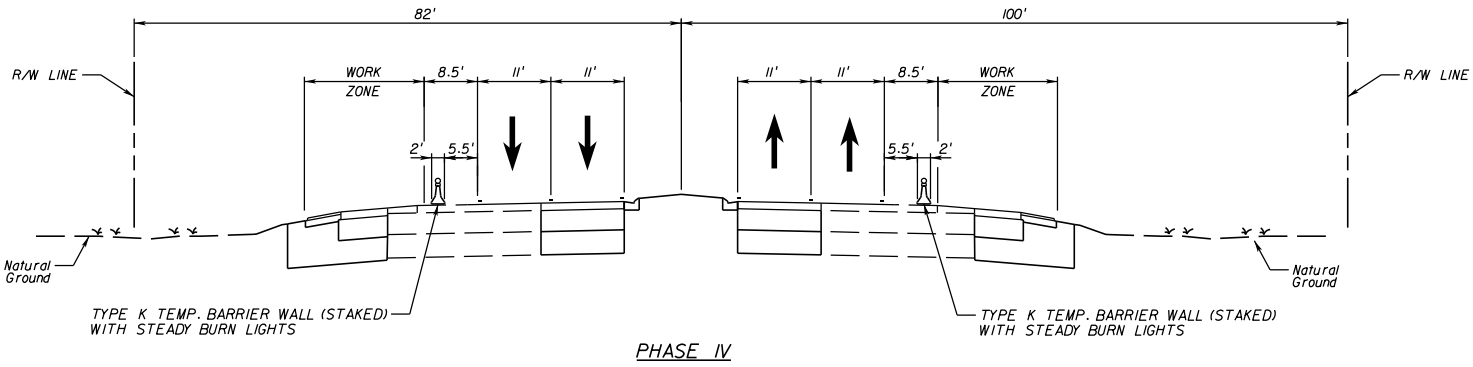
PHASE II

SHIFT TRAFFIC TO THE INSIDE AND BUILD OUTSIDE WIDENING
WITH OVERBUILD TO MATCH SLOPE OF EXISTING PAVEMENT



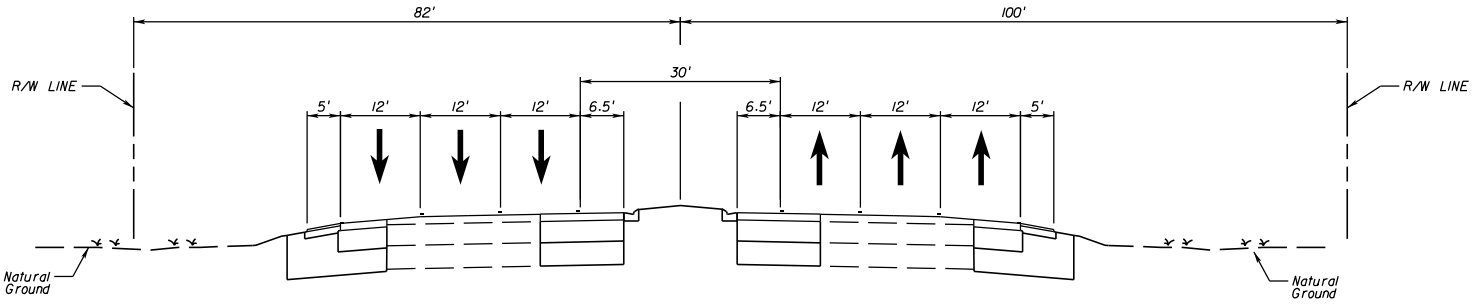
PHASE III

SHIFT TRAFFIC TO THE OUTSIDE AND BUILD INSIDE MEDIAN IMPROVEMENTS



PHASE IV

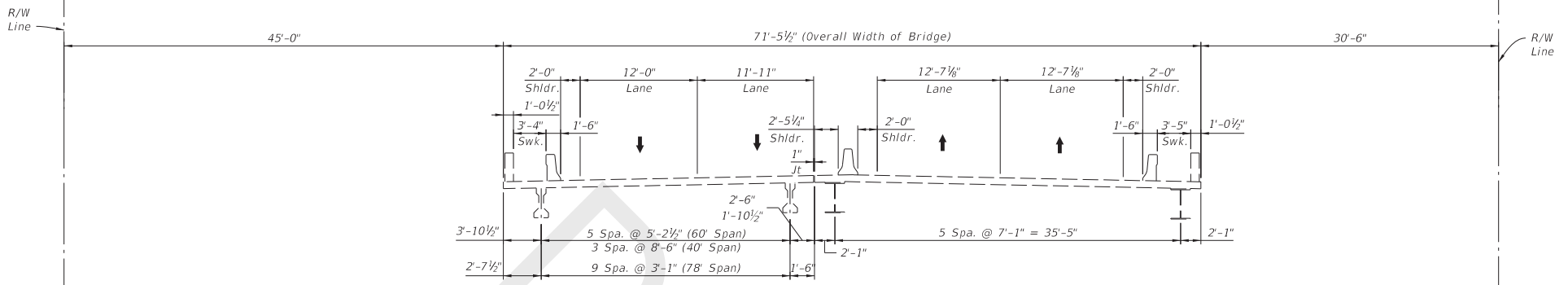
SHIFT TRAFFIC TO THE INSIDE AND REMOVE OVERBUILD ON OUTSIDE LANE WIDENING TO CORRECT SLOPE
MILL EXISTING PAVEMENT OF OUTSIDE LANE FOR SLOPE CORRECTION TO MATCH LANE WIDENING



PHASE V

FINAL FC AND SIGNING AND PAVEMENT MARKINGS

Appendix B
Bridge Construction Staging Concepts



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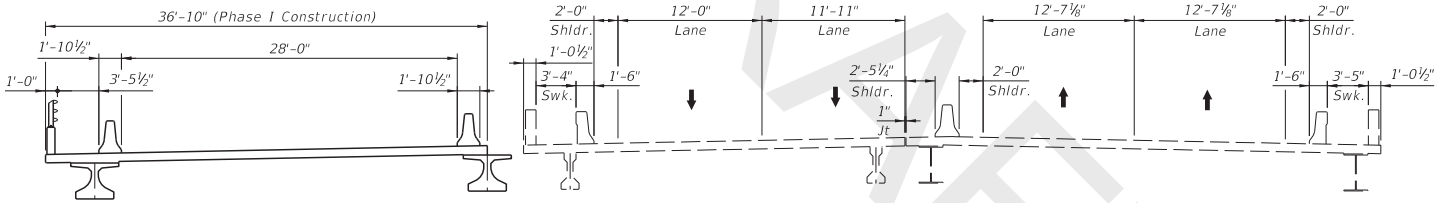

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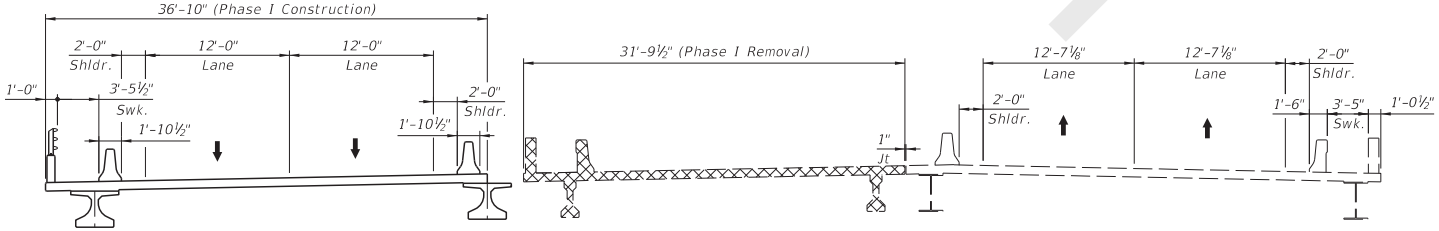

PHASE I REMOVAL

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, Florida 33544
Phone: (813) 435-2600 Fax: (813) 435-2601
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DESIGNED BY: RR 01/14
CHECKED BY: RH 01/14

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE: US 41 OVER ALAFIA RIVER
CONSTRUCTION SEQUENCE (1 OF 3)

REF. DWG. NO.

PROJECT NAME: US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

SHEET NO. B1-XX

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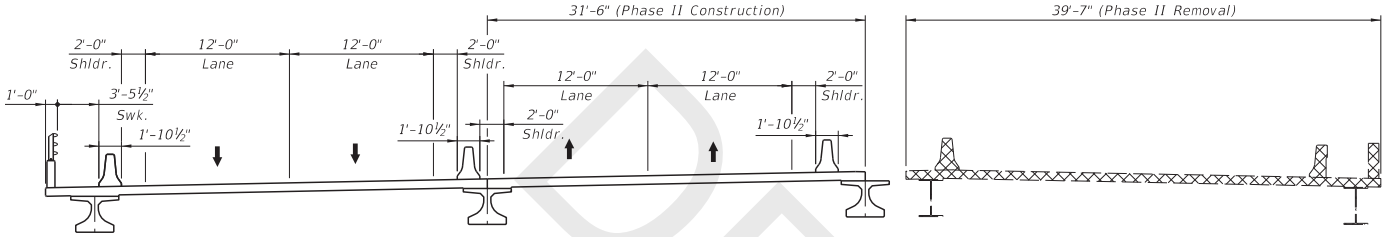

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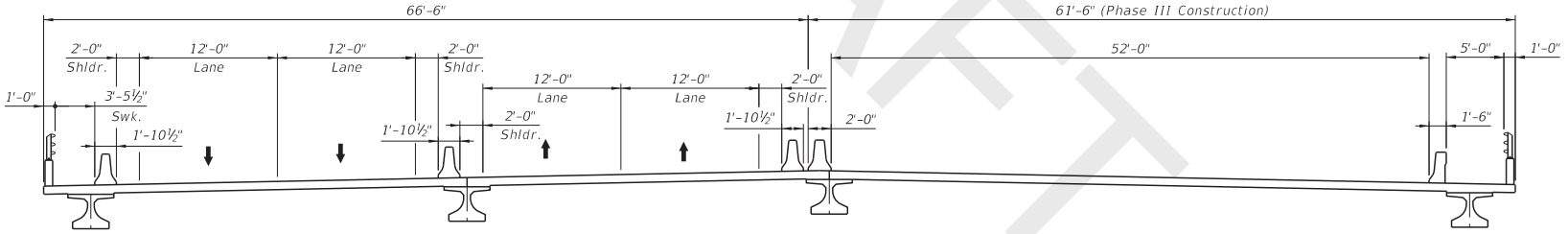

PHASE III CONSTRUCTION

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CONSULTING ENGINEERS OF FLORIDA, LLC
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Wesley Chapel, Florida 33544
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE:
US 41 OVER ALAFIA RIVER
CONSTRUCTION SEQUENCE (2 OF 3)

REF. DWG. NO.

PROJECT NAME:
US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

SHEET NO.
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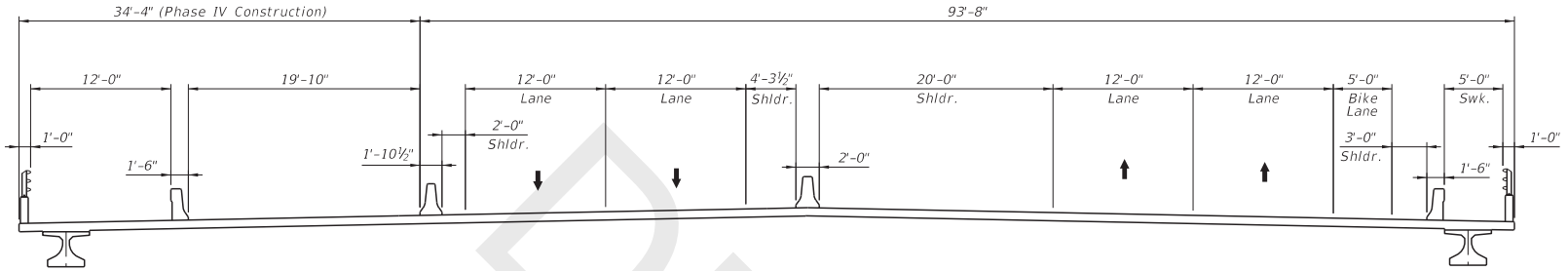

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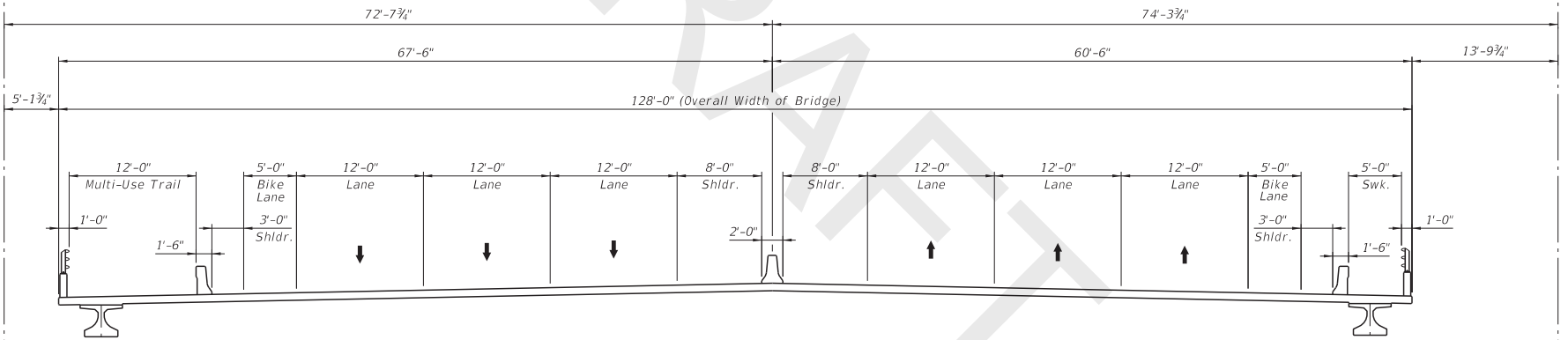

FINAL CONFIGURATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE: US 41 OVER ALAFIA RIVER
CONSTRUCTION SEQUENCE (3 OF 3)

REF. DWG. NO.

PROJECT NAME: US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

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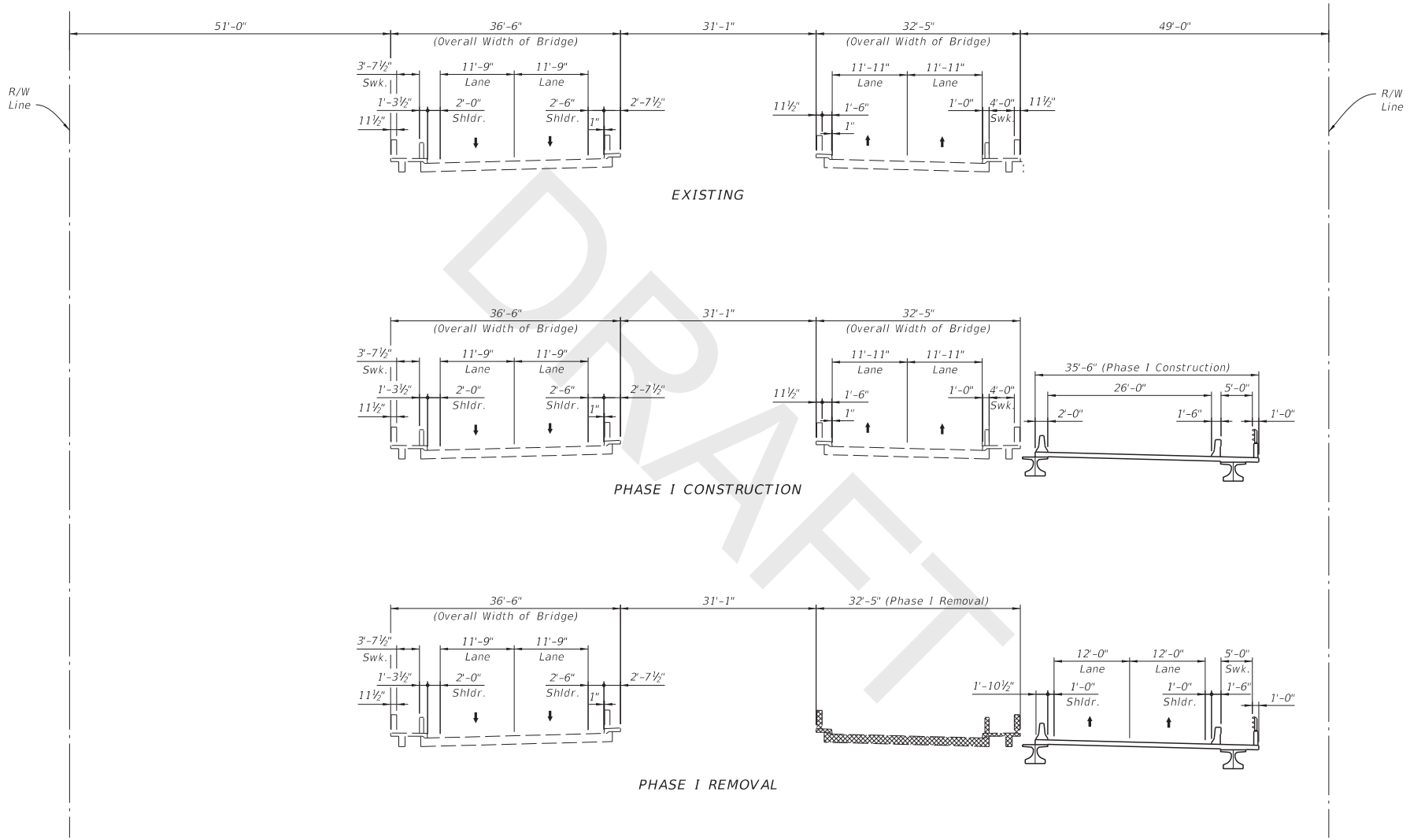

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AMERICAN
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE:
US 41 OVER BULLFROG CREEK
CONSTRUCTION SEQUENCE (1 OF 2)

REF. DWG. NO.

PROJECT NAME:
US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

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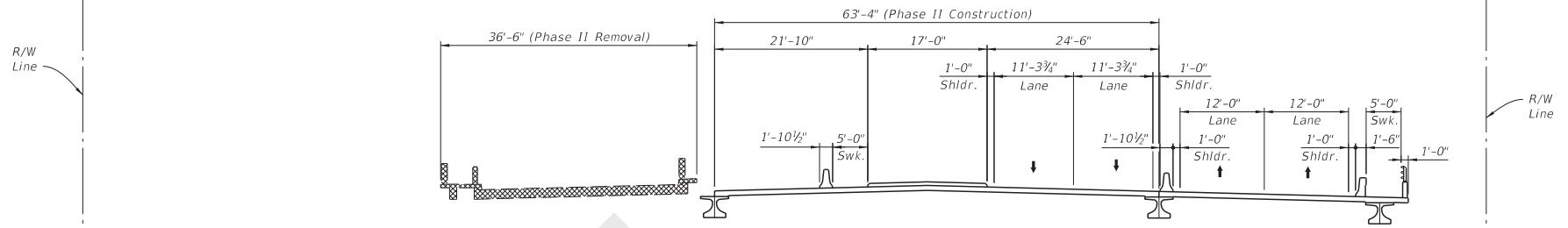

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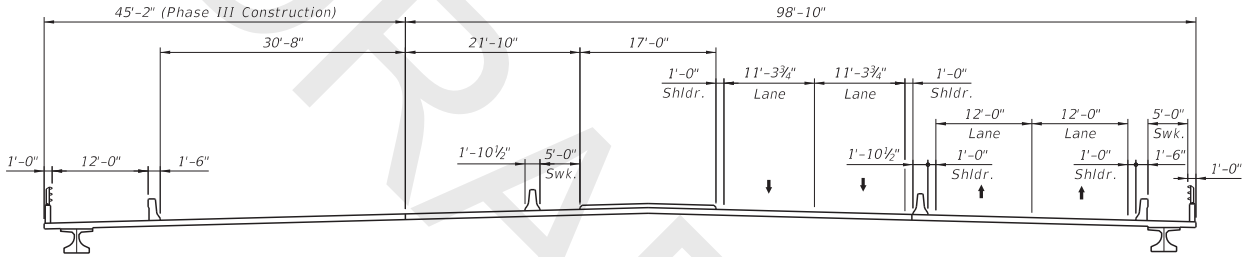

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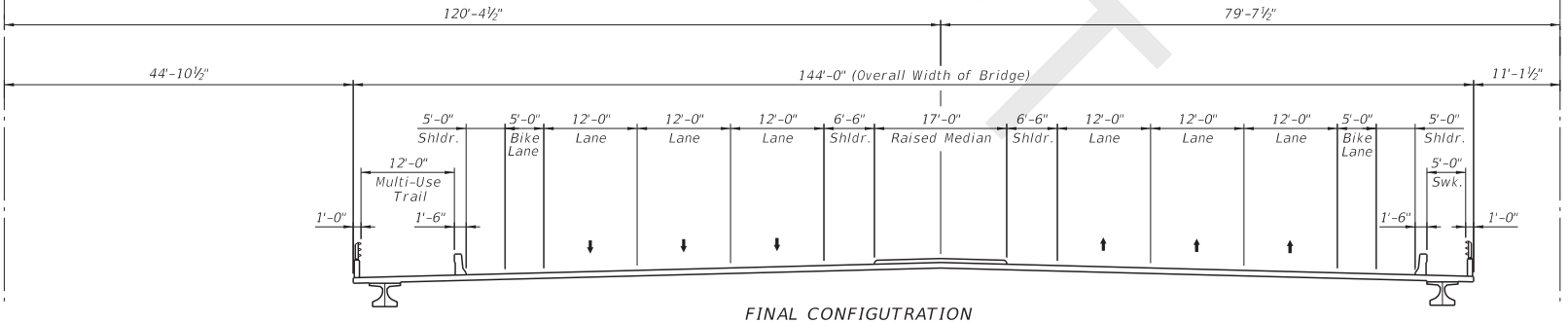

FINAL CONFIGUTRATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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2818 Cypress Ridge Blvd, Suite 200
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE: US 41 OVER BULLFROG CREEK CONSTRUCTION SEQUENCE (2 OF 2)

REF. DWG. NO.

PROJECT NAME: US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

SHEET NO. B2-XX

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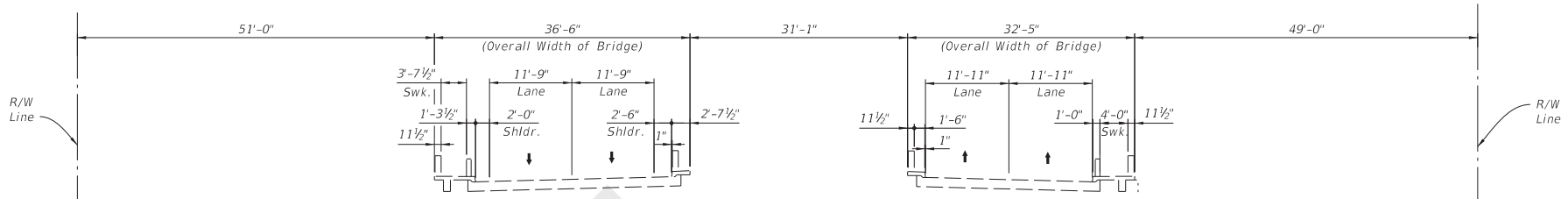

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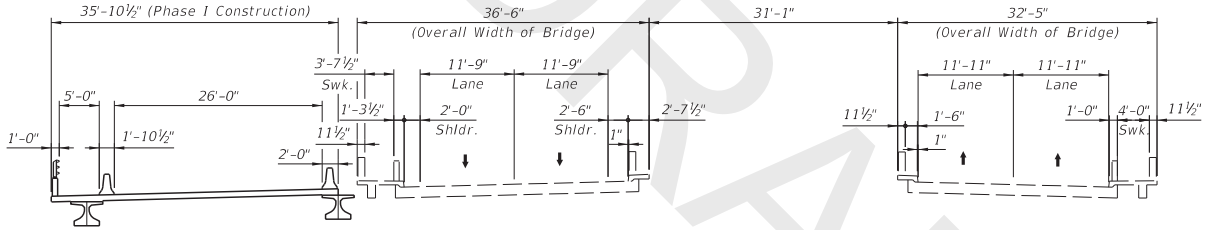

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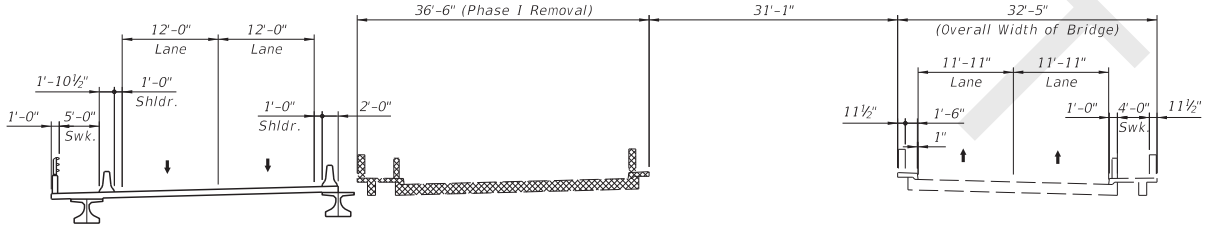

PHASE I REMOVAL

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, Florida 33544
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE: US 41 OVER BULLFROG CREEK CONSTRUCTION SEQUENCE (1 OF 2)

REF. DWG. NO.

PROJECT NAME: US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

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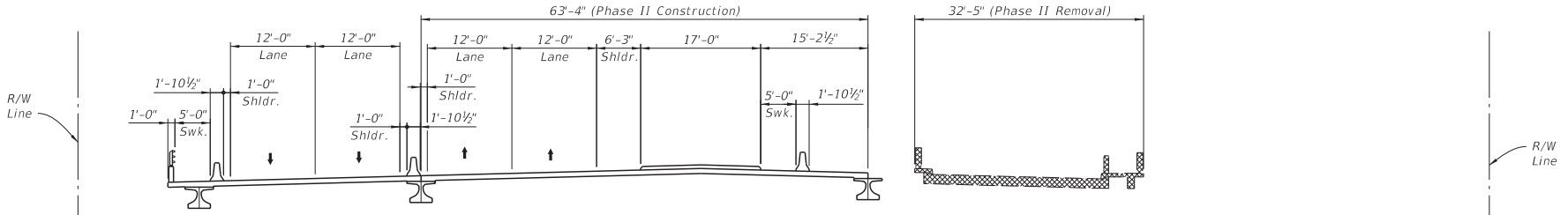

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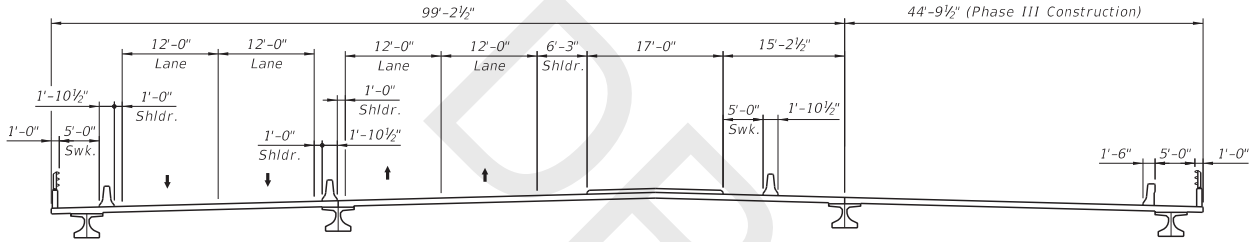

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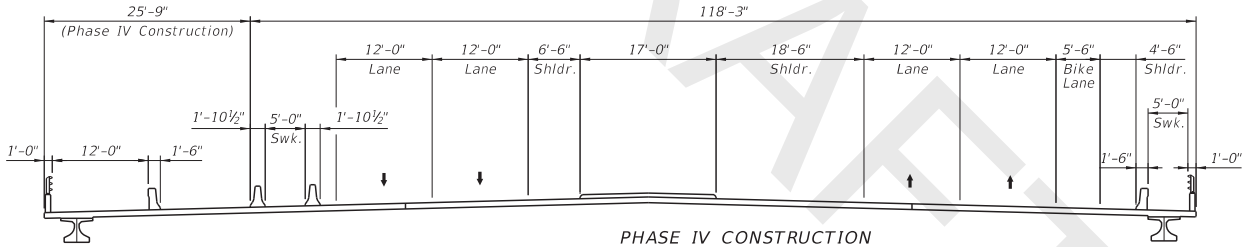

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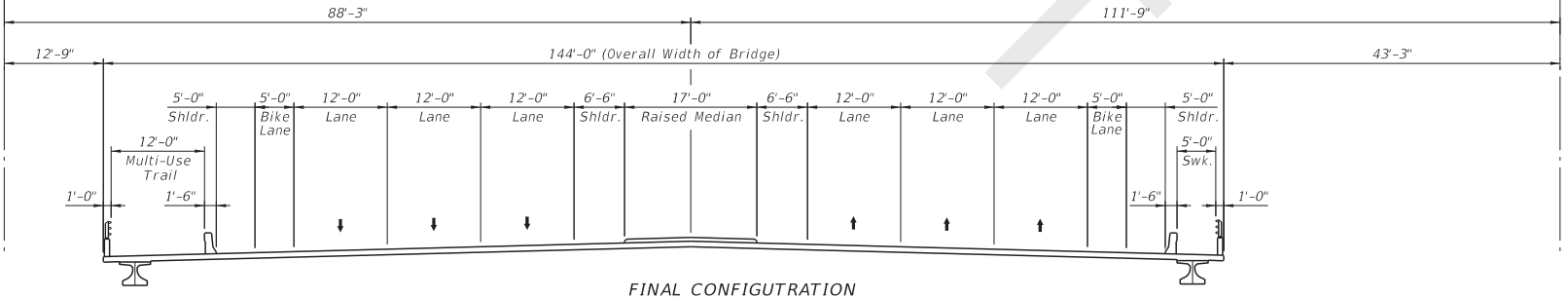

FINAL CONFIGUTRATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, Florida 33544
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 41	HILLSBOROUGH	430056-1-22-01

SHEET TITLE: US 41 OVER BULLFROG CREEK
CONSTRUCTION SEQUENCE (2 OF 2)

REF. DWG. NO.

PROJECT NAME: US 41 PD&E STUDY
KRACKER AVE. TO SOUTH OF CAUSEWAY BLVD (SR676)

SHEET NO. B2-XX

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Appendix C
Bridge Life Cycle Cost Analysis

Compare Rehabilitation Option vs Replacement Life Cycle Costs
US 41 NB and SB over Bullfrog Creek - Bridge Nos. 100106 & 100044

Retain 69 year old NB bridge (#100106 - SR = 75.2 & HI = 89.6) and 54 year old SB Bridge (#100044 - SR = 77.2 & HI = 87.65) versus replacement

PW=(1+f)^n/(1+i)^n where, interest rate, I = 5 % and inflation rate, f = 2 %

Notes:

	Proposed Width	Existing Width	Widening Width (+2' splices)							
Widen bridges cost ==>	143.00	68.92	78.08 '	wide	x	207 '	long	x	$140 /SF	= $2,262,855
Scour Protection cost ==>	68.92 '	wide	x	207.00 '	long	x	$35 /SF	=	$499,301	
Deck maintenance costs are estimated to be $30/SY for 0% of deck for 0-30 yrs, 5% of deck for 40-60 yrs, 10% of deck for 60+ yrs.										
Install/Repair 5' length of pile jackets on 40% of the piles at $210/LF after 20 '	long	x								
Bridge Replacement cost ==	143.00 '	wide	x	207.00 '	long	x	$110 /SF	=	$3,256,110	

Retain and Widen/Repair Existing Bridges (both bridges) + Replace when existing bridge reach average age of approximately 90 years:

Year	Average Bridge Age	PW Factor	Widening Cost	Spall and Crack Repair	Scour Protection	Pile Jackets	Total Maint	PW Maint	Total PW	
0	62	1.000	2,262,855	88,803	499,301	0	588,104	588,104	2,850,959	Widening Existing Bridges
10	72	0.748	0	88,803	0	0	88,803	66,456	66,456	
20	82	0.560	0	88,803	0	0	88,803	49,733	49,733	
30	0	0.419	3,256,110	0	0	43,680	43,680	18,307	1,382,969	
40	10	0.314	0	0	0	0	0	0	0	Replace Existing Bridges
50	20	0.235	0	0	0	0	0	0	0	
60	30	0.176	0	0	0	0	0	0	0	
70	40	0.131	0	44,402	0	0	44,402	5,837	5,837	
80	50	0.098	0	44,402	0	0	44,402	4,368	4,368	
90	60	0.074	0	44,402	0	0	44,402	3,269	3,269	
							Total Present Worth Cost =		$4,363,591	

Bridge Replacement (single bridge for both NB & SB traffic):

Year	Bridge Age	PW Factor	Replacement Cost	Spall and Crack Repair	Pile Jackets	Total Maint	PW Maint	Total PW	
0	0	1.000	3,256,110	0	0	0	0	3,256,110	Replace Existing Bridges
10	10	0.748	0	0	0	0	0	0	
20	20	0.560	0	0	0	0	0	0	
30	30	0.419	0	0	0	0	0	0	
40	40	0.314	0	44,402	0	44,402	13,926	13,926	
50	50	0.235	0	44,402	0	44,402	10,422	10,422	
60	60	0.176	0	44,402	43,680	88,082	15,472	15,472	
70	70	0.131	0	88,803	0	88,803	11,673	11,673	
80	80	0.098	0	88,803	0	88,803	8,736	8,736	
90	90	0.074	0	88,803	0	88,803	6,537	6,537	
						Total Present Worth Cost =		$3,322,876	

Recommendation: Based on the above Present Worth Cost analysis, a savings of $1,040,715 can be realized by using the bridge replacement option.

Compare Rehabilitation Option vs Replacement Life Cycle Costs
US 41 NB and SB over Alafia River - Bridge Nos. 100107 & 100045

Retain 62 year old NB bridge (#100107 - SR = 68 & HI = 94.09) and 55 year old SB Bridge (#100045 - SR = 78.9 & HI = 87.64) versus replacement
PW=(1+f)^n/(1+i)^n where, interest rate, I = 5 % and inflation rate, f = 2 %

Notes:

	Proposed Width	Existing Width	Widening Width (+2' splices)							
Widen bridges cost ==>	128.00	71.46	60.54 '	wide	x	1215.90 '	long	x	$150 /SF	= $11,041,892

Concrete maintenance costs are estimated to be $30/SY for 0% of deck for 0-30 yrs, 5% of deck for 40-60 yrs, 10% of deck for 60+ yrs.
Steel Girder Repainting costs are estimated to be $1,200 / TN x 109 TN = $130,800
Install/Repair 10' length of pile jackets on 40% of the piles at $210/LF after 20 years ' long x
Bridge Replacement cost == 128.00 ' wide x 1215.90 ' long x $110 /SF = $17,119,872

Retain and Widen/Repair Existing Bridges (both bridges) + Replace when existing bridge reach average age of approximately 90 years:

Year	Average Bridge Age	PW Factor	Widening/ Replacement Cost	Spall and Crack Repair	Steel Girder Repainting	Pile Jackets	Total Maint	PW Maint	Total PW	
0	59	1.000	11,041,892	233,453	130,800	35,700	399,953	399,953	11,441,845	Widening Existing Bridges
10	69	0.748	0	466,906		0	466,906	349,412	349,412	
20	79	0.560	0	466,906	130,800	0	597,706	334,738	334,738	
30	0	0.419	17,119,872	0		226,800	226,800	95,054	7,270,133	
40	10	0.314	0	0		0	0	0	0	Replace Existing Bridges
50	20	0.235	0	0		0	0	0	0	
60	30	0.176	0	233,453		0	233,453	41,006	41,006	
70	40	0.131	0	233,453		0	233,453	30,687	30,687	
80	50	0.098	0	233,453		0	233,453	22,965	22,965	
90	60	0.074	0	466,906		0	466,906	34,372	34,372	
							Total Present Worth Cost =		$19,525,158	

Bridge Replacement (single bridge for both NB & SB traffic):

Year	Bridge Age	PW Factor	Replacement Cost	Spall and Crack Repair	Pile Jackets	Total Maint	PW Maint	Total PW	
0	0	1.000	17,119,872	0	0	0	0	17,119,872	Replace Existing Bridges
10	10	0.748	0	0	0	0	0	0	
20	20	0.560	0	0	0	0	0	0	
30	30	0.419	0	233,453	0	233,453	97,842	97,842	
40	40	0.314	0	233,453	0	233,453	73,221	73,221	
50	50	0.235	0	233,453	0	233,453	54,795	54,795	
60	60	0.176	0	466,906	226,800	693,706	121,851	121,851	
70	70	0.131	0	466,906	0	466,906	61,375	61,375	
80	80	0.098	0	466,906	0	466,906	45,930	45,930	
90	90	0.074	0	466,906	0	466,906	34,372	34,372	
						Total Present Worth Cost =		$17,609,258	

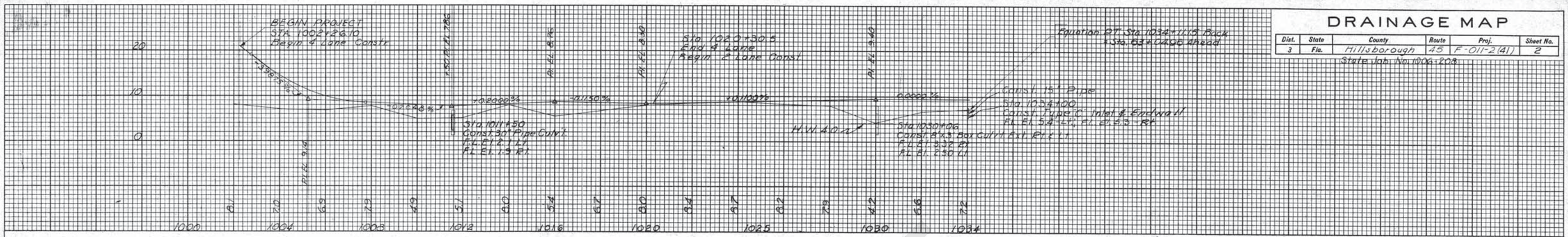
Recommendation: Based on the above Present Worth Cost analysis, a savings of $1,915,901 can be realized by using the bridge replacement option.

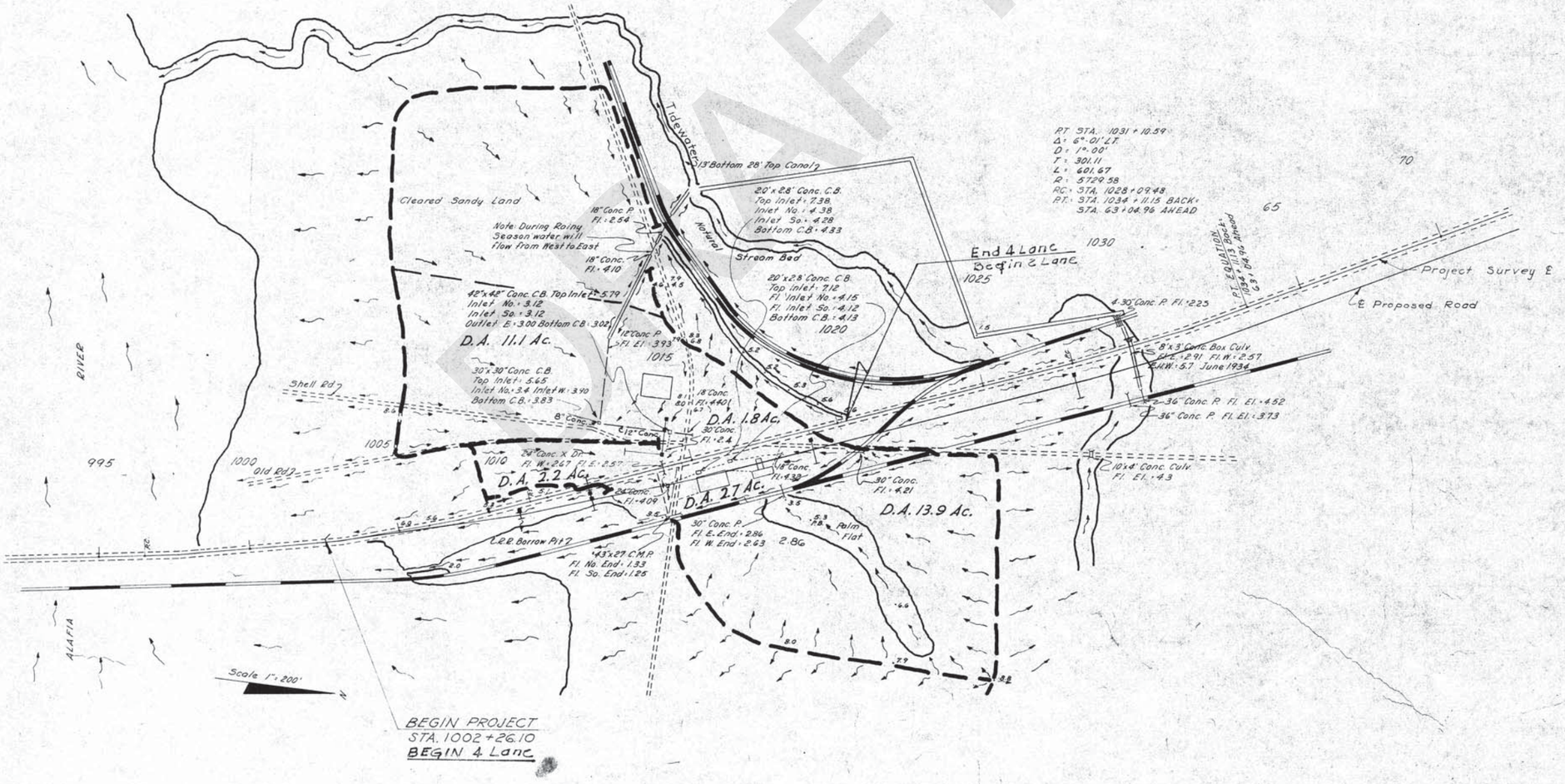
Appendix D
Drainage Maps

DRAINAGE MAP

Dist.	State	County	Route	Proj.	Sheet No.
3	Fla.	Hillsborough	45	F-011-2(41)	2

State Job No. 10060-1208





1/4

4-3

10060-1208 1of4

10060-208

DRAINAGE MAP

Dist.	State	County	Route	Proj.	Sheet No.
3	Fla.	Hillsborough	45	F-011-2(41)	3

State Job No. 10060-208

Equation PT Sta 1032+11.15 Back = Sta 63+04.96 Ahead

Sta 157+00 End 2 Lane Begin 4 Lane Const

Sta 96+53 Const Trip 10'x6' Box Culv't Ext Ef & Lt F.L. El.=1.54

Sta 118+46 Const Trip 10'x6' Box Culv't Ext Rt & Lt F.L. El.=1.54

Sta 138+73.71 Const Obl 10'x6' Box Culv't (30° Skew Lt) Ext Rt & Lt F.L. El.=1.00± F.L. El.=1.63±

MATCH LINE

Scale 1"=1000 Ft.

2'x2' Conc box Culv. Fl.=1.83 E. Fl.=1.25 W. E Road=8.99 N.H.W. 4.0 E.H.W. 6.8

Double 9.4'x5.0' box Culv. Fl.=1.27 E Road=9.14 PWL=0.51 10-22-56 N.H.W.=4.0 E.H.W.=6.0

3 Span Timber Trustle 64 Sq. Ft. Opening H.W. El.=5.7 June 1934 Fl.=2.5 Top Rail=7.76

3-10'x6' Conc. box Culv. Fl.=1.54 N.H.W.=4.0 E.H.W.=6.8

4 Span Timber Trustle Fl.=3.0 Top Rail=7.47 178 Sq. Ft. Opening N.H.W.=4.0 E.H.W.=6.0

3-10'x6' Conc. box Culv. Fl.=1.54 N.H.W.=4.0 E.H.W.=6.0

24" Conc. Fl. N.=4.15 Fl. S.=4.27

Note Equation PT Sta 1034+11.15 Back = Sta 63+04.96 Ahead

36" Pipe Fl. El.=2.72

U.S. Phosphoric Plant

D.A. 334 Ac.

Natural Stream Bed

Paved Road

RIVER

ALAFIA

10' Conc. Bridge 140 Sq. Ft. Opening Fl. El.=0.7

2-43"x27" CMP H.W. 12.0 Fl. El.=9.5

2-24" Pipe Fl. El.=10.1

5'x3' Culvert Fl. El.=10.1

2-36" Pipes Fl. El.=0.4

16' Timber Bridge 88 Sq. Ft. Opening Fl. El.=1.39

2-7'x5' Conc. Box Fl. El.=1.59 H.W. El.=6.7 June 1934

2-36" Conc. Pipes Fl. El.=3.52

10' Concrete Bridge 32 Sq. Ft. Opening Fl. El.=4.3

Grass Pond

Improved Pasture

Pine & Pal.

10 Ft. Concrete Bridge 70 Sq. Ft. Opening Fl. El.=1.59

Double 12'x5' Conc. Box Fl. El.=-0.54 120 Sq. Ft. Opening

3-48" Conc. Pipes Fl.=1.09 PWL 0.66 10-29-56 Top Rail=8.67 H.W.=6.0

Note: This canal will connect drainage areas at flood times

58"x36" CMP Arch P HW 12.3 Fl. El.=9.3

D.A. 1841 Ac.

D.A. 2874 Ac.

2-65"x40" CMP Arch P HW 10.8 Fl. El.=7.3

58"x36" CMP Arch P Fl. El.=11.0 H.W. 14.0

14"x10.5" CMP Arch P H.W. 17.6 Fl. El.=7.1

Note This canal will connect drainage areas at flood times.

D.A. 2481 Ac.

Range 19 East Range 20 East

Note This bridge will connect drainage areas at flood time

2-20' Span Conc. Bridge 160 Sq. Ft. Opening Fl. El.=2.5 H.W. 30.0

Cypress Pond

12' Conc. Bridge 84 Sq. Ft. Opening Fl. El.=21.9 HW 25.9

5'x3' Culvert Fl. El.=29.0

18" Conc. Pipe Fl. El.=31.5

2-24" Conc. Pipes Fl. El.=30.8

10'x3' Culvert Fl. El.=27.8

18" Pipe Fl. El.=33.5

18" Pipe Fl. El.=33.7

Improved Pasture Flatwoods Land

WW Area

W.W. Pond

Twp 29 South

Twp 30 South

2/4

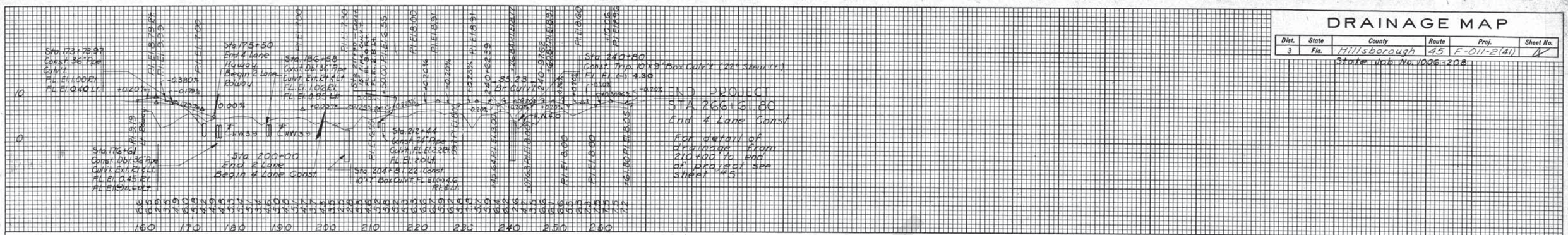
46

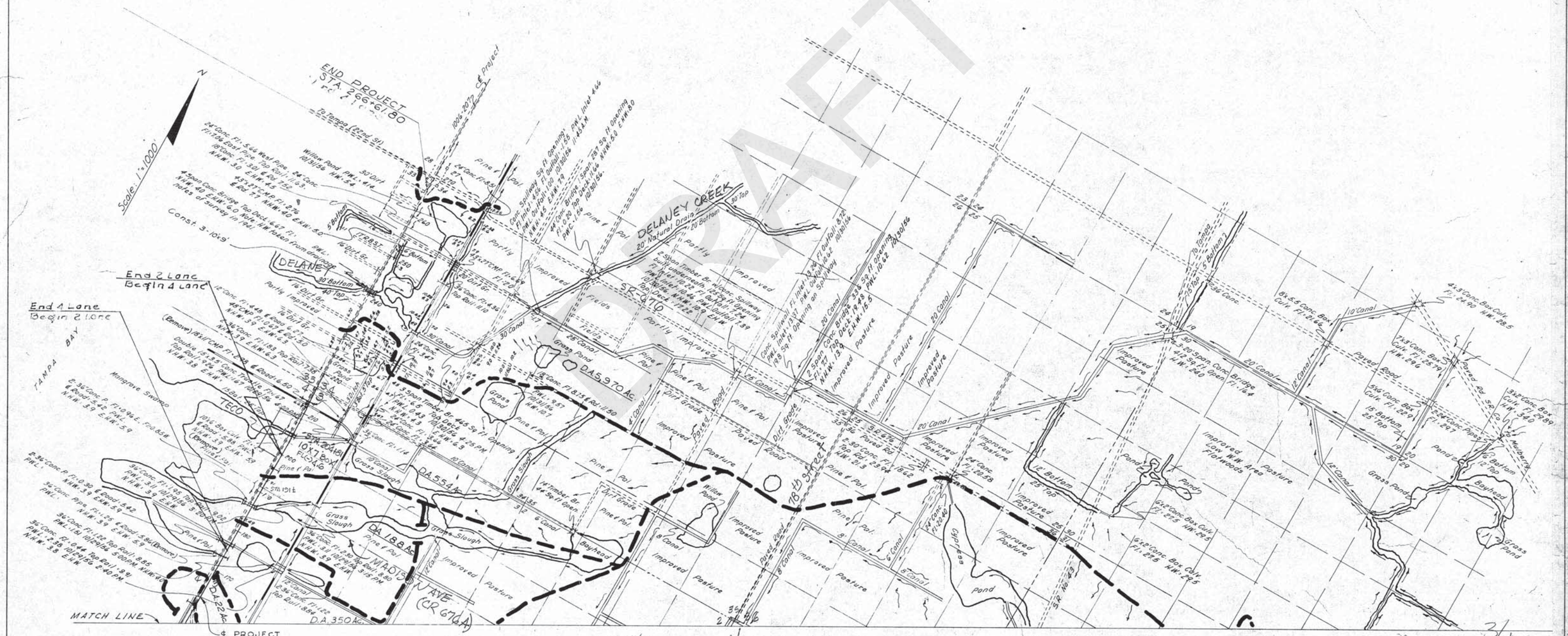
10060-1208 2 of 4

DRAINAGE MAP

Dist.	State	County	Route	Proj.	Sheet No.
3	Fla.	Hillsborough	45	F-011-2(41)	4

State Job No. 10060-1208

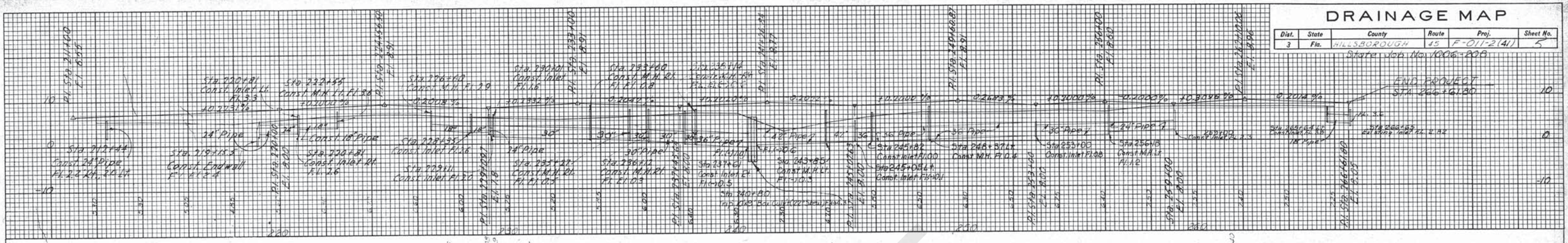


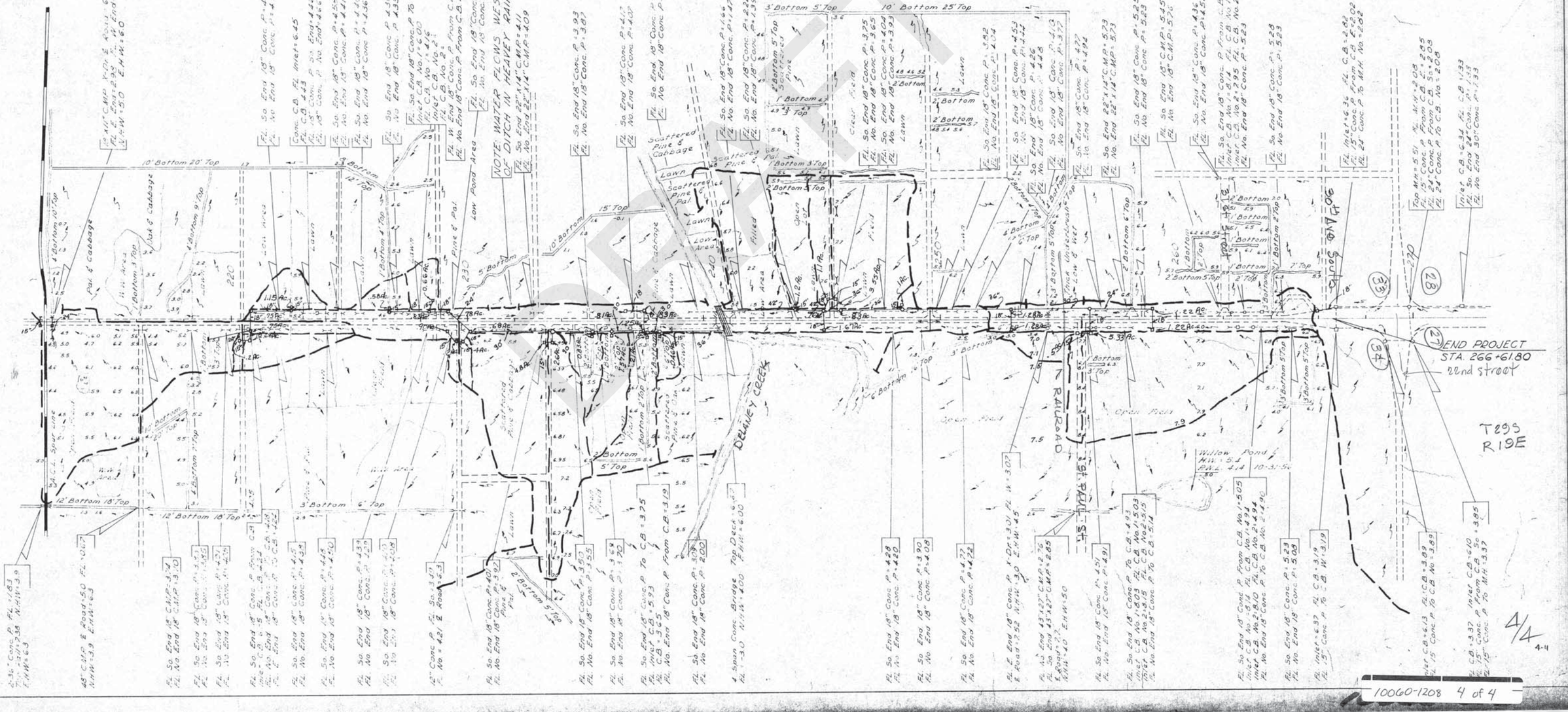


R.W.S
1956 (Oct.)

3/4

4-12





DRAINAGE MAP

Dist.	State	County	Route	Proj.	Sheet No.
3	Fla.	HILLSBOROUGH	45	F-011-2(41)	5

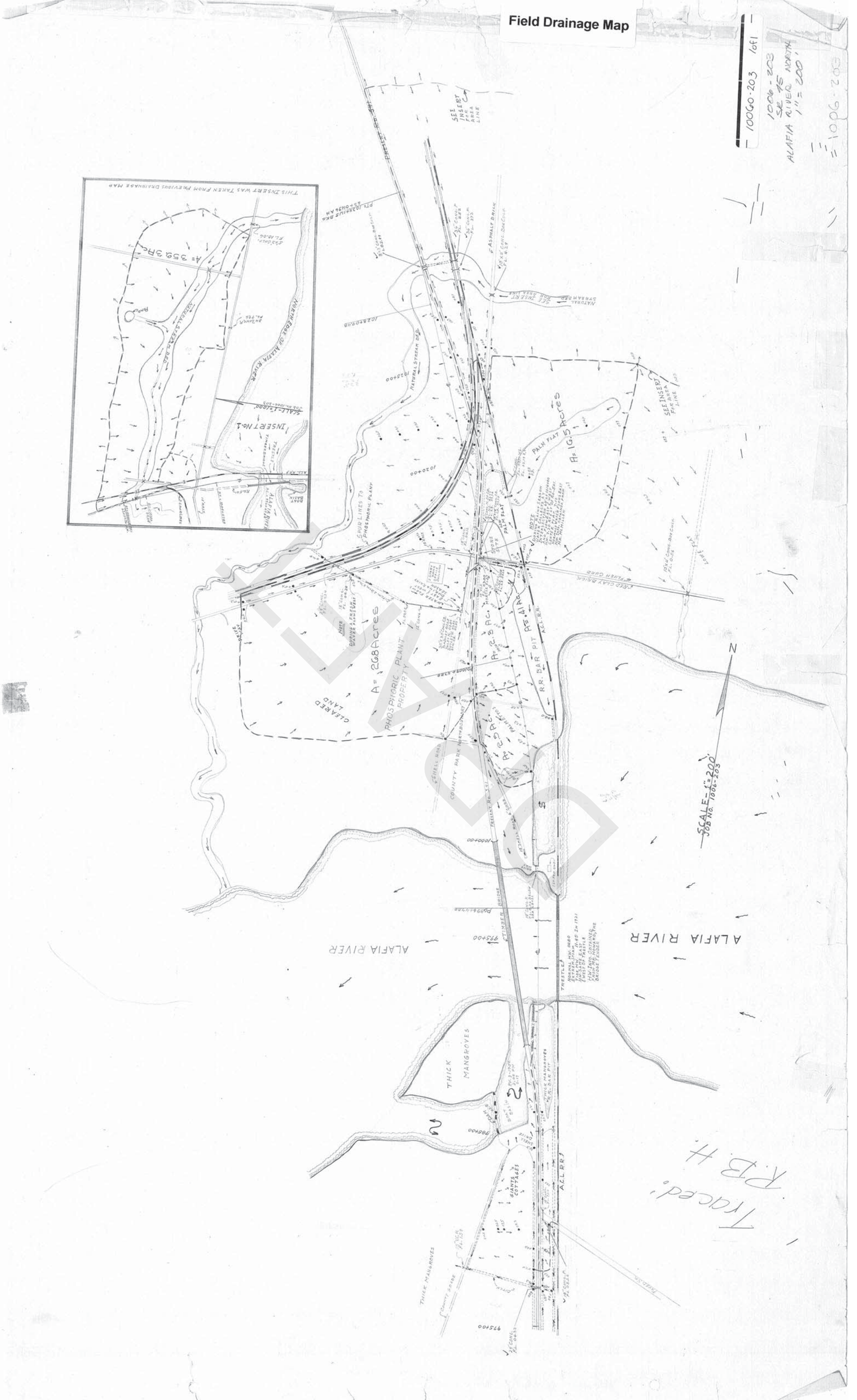
State Job No. 1006-208

4/4

4-11

10060-1208 4 of 4

Field Drainage Map



DRAINAGE MAP

Dist.	State	County	Route	Proj	Sheet No.
7	Fla.	Hillsborough	45	F-011-2(44)	2

State Job No 10060-3212

BEGIN 2-LANE HWY.
BEGIN PROJECT
STA. 737+05.21

BEGIN CONSTRUCTION
STA. 722+69.03

Sta. 725+14
CONST. DBL. 30" P.
F.L. El. Lt. 6.9; Rt. 7.1
(22° Skew Rt.)

Sta. 742+37
Const. 10'x4' Box Culv't. Ext.
F.L. El. 3.6

Sta. 755+59
Const. 36" Pipe Culv't.
F.L. El. Lt. 5.0; Rt. 5.2

Sta. 766+80
Const. 36" Pipe Culv't.
F.L. El. Lt. 3.7; Rt. 3.9

Sta. 782+65.5
Const. 36" Pipe Culv't.
F.L. El. Lt. 3.4; Rt. 3.6

Sta. 802+33
Const. 10'x4' Box Culv't. Ext.
F.L. El. Lt. 1.4

Sta. 844+26.5
Const. DBL. 10'x5' Box Culv't. Ext.
F.L. El. Lt. (-) 2.1

Sta. 848+37 Const.
10'x5' Box Culv't. Ext.
F.L. El. Lt. (-) 2.0

Sta. 874+10 Const. (22° Skew Rt.)
10'x8' Box Culv't.
F.L. El. Lt. & Rt. (-) 4.5

Sta. 894+51.3 Const.
36" Pipe Culvert
F.L. Lt. 2.4; Rt. 3.0

STA. 916+02.5
PROP. 202.50' CONC. BR.
STA. 918+05
END 2 LANE HWY.
BEGIN 4 LANE HWY.
STA. 918+42.50
8.82
E.H.W. 6.0
N.H.W. 4.0

SEE DRAINAGE MAP
SHEET NO. 3

END 4-LANE HWY.
END PROJECT
STA. 984+84.50

BEGIN 2 LANE HWY.
BEGIN PROJECT
STA. 737+05.21

BEGIN CONST.
STA. 722+69.03

1" = 1000'

Note: High Water Elevation Was Determined By Field Evidence And Information Received From Local Citizens, February 1958. Information on High Water Elev. on R.R. Structures Received from H.H. Smith, Section Foreman A.C.L. R.R. Palm River. 7-16-58 Latest H.W. Storm 1950

BR. CULV'T. SEE PROFILE

CURVE NO.1
P.I. 831+09.25
Δ = 14°33'-10" RT.
D = 1° 24'
T = 522.86
L = 1040.08
R = 4092.56
P.C. 825+86.39
P.T. 836+26.47

CURVE NO.2
P.I. 858+31.47
Δ = 14°09'05" LT.
D = 1° 00'
T = 711.19'
L = 1415.14'
R = 5729.58'
P.C. 851+20.28
P.T. 865+35.42

CURVE NO.3
P.I. 897+03.94
Δ = 1° 10' 00" LT.
D = 0°-06'
T = 583.35
L = 1166.67
R = 5729.58
P.C. 891+20.59
P.T. 902+87.26

CURVE NO.4
P.I. 928+98.30
Δ = 0°38'.45" RT.
D = 0°.03'
T = 645.84'
L = 1291.67
R = 11459.56
P.C. 922+52.46
P.T. 935+44.13

CURVE NO.5
P.I. 957+08.70
Δ = 9°49'20" LT.
D = 1° 00'
T = 492.32'
L = 982.22'
R = 5729.58'
P.C. 952+16.38
P.T. 961+98.60

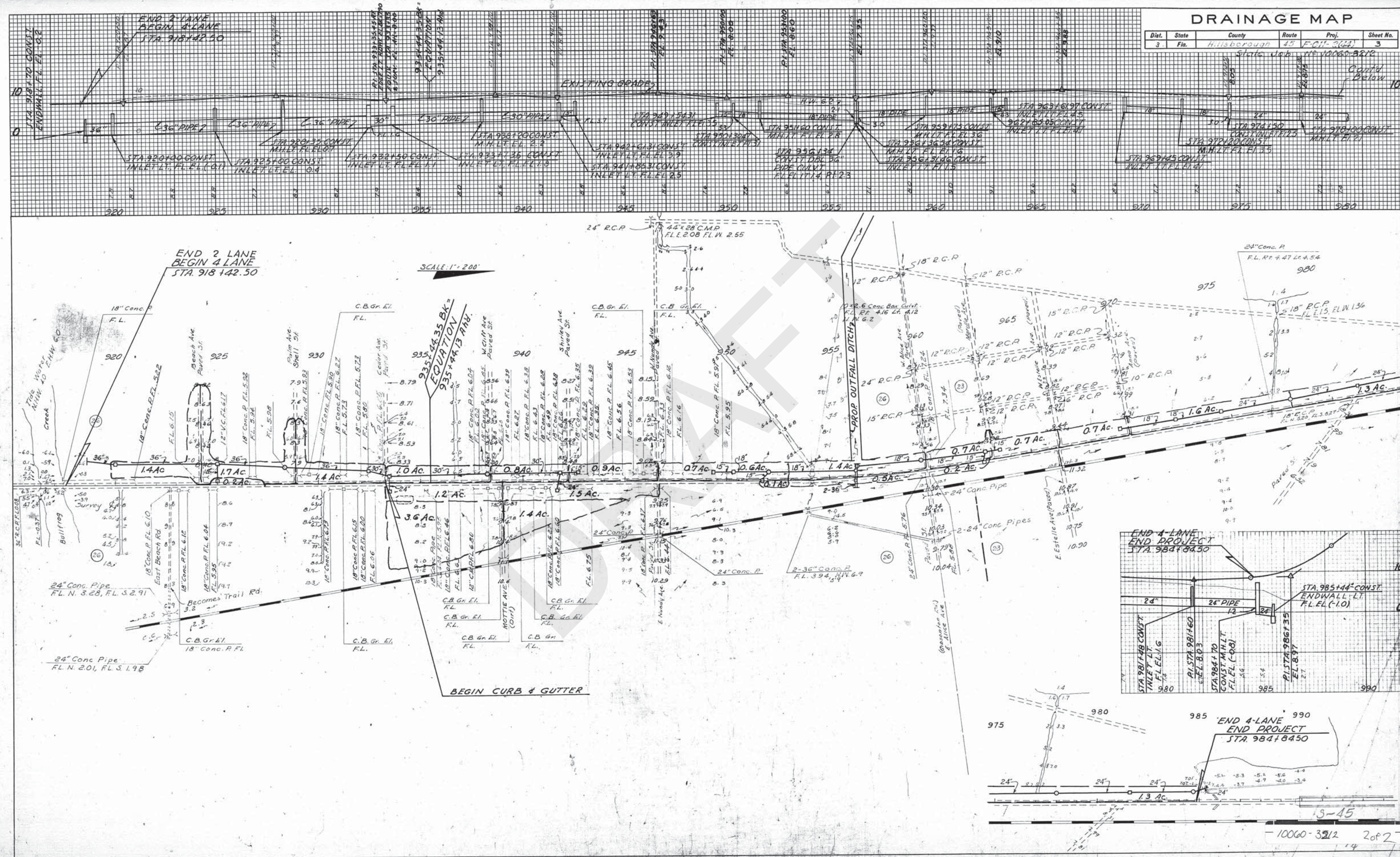
Consider a potential 425 Ac. overflow into Simms Branch

Drainage Divide

END 2 LANE HIGHWAY
BEGIN 4 LANE HIGHWAY
STA. 918+42.50

FOR DETAILS SEE DRAINAGE MAP SHEET NO. 3

10060-3212 1 of 2



DRAINAGE MAP
Dist. 3
State Fla.
County Hillsborough
Route 45
Sheet No. 3
END 2-LANE
BEGIN 4-LANE
STA. 918+42.50
EXISTING GRADE
SCALE: 1" = 200'
EQUATION
935+44.13 Ahd.
PROP. OUTFALL DITCH
BEGIN CURB & GUTTER
END 4-LANE
END PROJECT
STA. 984+84.50
Becomes Trail Rd.
East Beach Rd.
Tide Water
Creek
DRAFT
S-45
2 of 2

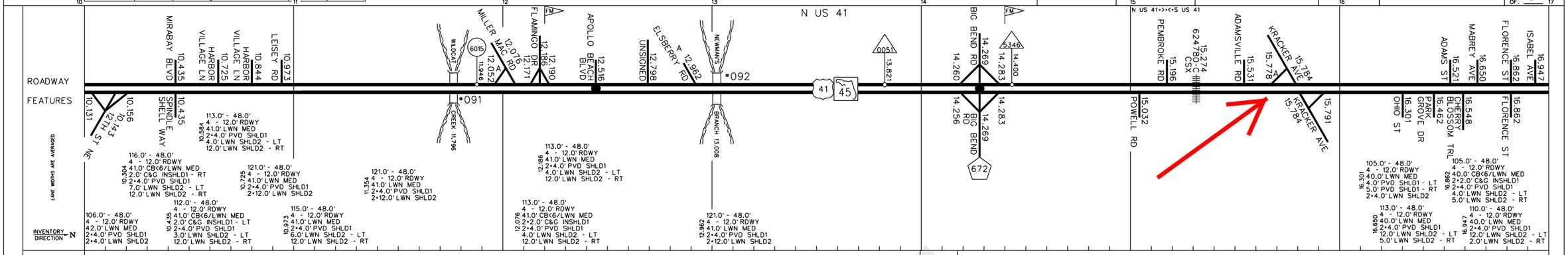
Appendix E
Straight Line Diagram (SLD)

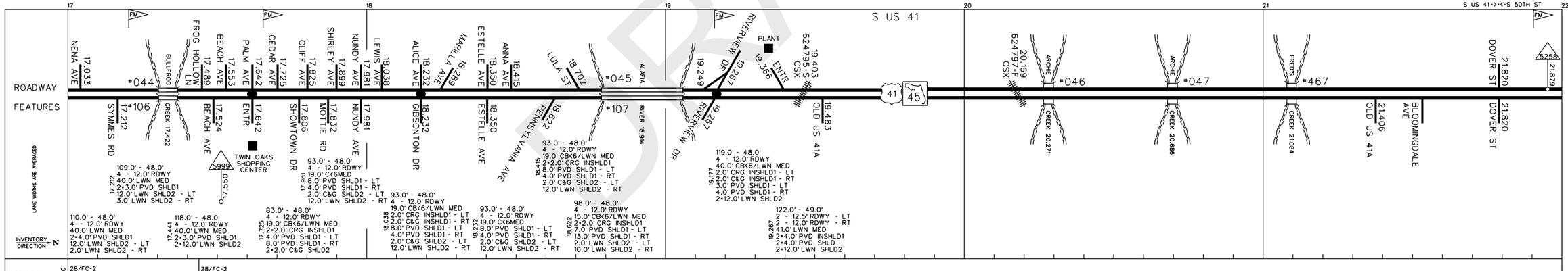
STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

FLORIDA DEPARTMENT OF TRANSPORTATION

INTERIM REVISIONS						
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	01/04/2010	03/16/2010	0.000	22.000		01/22/2014
BY	MEI/JM-KA	MEI/KA	COUNT STATION REVISION			

INT. or US ROUTE NO	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO. / OF.
US 41	SR 45	HILLSBOROUGH	7	10 060 000	2 / 6





STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

FLORIDA DEPARTMENT OF TRANSPORTATION

INTERIM REVISIONS					
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	01/04/2010	03/16/2010	22.617	23.291	03/31/2014	03/31/2014
BY	MEI/JM-KA	MEI/KA	CONSTRUCTION & MEDIAN REVISIONS	ACCEPT	FTE/JW-KA	FTE/KA

INT. or US ROUTE NO	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO.	OF.
US 41	SR 45, SR 599	HILLSBOROUGH	7	10 060 000	3	6

22 23 24 25

ROADWAY FEATURES

S 50TH ST

PENDOLA POINT RD A 22.033 | MADISON AVE A 22.033 | PORT SUTTON RD A 22.393 | MONTGOMERY ST O 22.383 | SANTA FE RD A 22.537 | SANTA FE RD A 22.537 | DENVER ST A 22.617 | DENVER ST A 22.617 | AUSTIN ST A 22.695 | HARTFORD ST A 22.775 | HARTFORD ST A 22.791 | TRENTON ST A 22.854 | TRENTON ST A 22.864 | *048 | DELANEY CREEK 23.003 | RALEIGH ST A 23.009 | TOWAWAY AVE A 23.095 | S 34TH AVE A 23.171 | CSX 624802-A 23.271 | S 31ST AVE A 23.354 | 0004 | S 30TH AVE A 23.483 | CAUSEWAY BLVD A 23.547 | CAUSEWAY BLVD 676 A | ST PAUL ST A 23.291 | 27TH AVE S A 23.632 | 0003 | 23RD AVE S A 23.750 | S 24TH AVE A 23.798 | HABERSHAM LN A 23.832 | DEO RD A 23.936 | S 21ST AVE A 23.982 | 20TH AVE S A 24.066 | S 17TH AVE A 24.197 | 16TH AVE S A 24.276 | S 16TH AVE A 24.301 | BRISTOL BAY WAY A 24.360 | 12TH AVE S A 24.520 | 12TH AVE S A 24.548 | S 10TH AVE A 24.801 | PALM RIVER RD A 24.924 | PALM RIVER RD A 24.924

BUS SR 45 A 41 <SR 599

41 45 | 41 599

LANE WIDTHS ARE APPROXIMATE

INVENTORY DIRECTION → N

120.0' - 48.0'
4 - 12.0' RDWY
40.0' C8<6/LWN MED
2•2.0' C&G INSHLD1
2•4.0' PVD SHLD
2•12.0' LWN SHLD2
20.033

122.0' - 49.0'
2 - 12.5' RDWY - LT
2 - 12.0' RDWY - RT
41.0' LWN MED
2•4.0' PVD INSHLD1
2•4.0' PVD SHLD
2•12.0' LWN SHLD2

89.0' - 66.0'
6 - 11.0' RDWY
19.0' TFSP MED
2•2.0' C&G SHLD1
22.619

89.0' - 66.0'
6 - 11.0' RDWY
19.0' C8&VEG MED
2•2.0' C&G INSHLD1
2•2.0' C&G SHLD1
22.940

88.0' - 55.0'
2 - 11.0' RDWY - LT
3 - 11.0' RDWY - RT
29.0' C<6 MED
2•2.0' C&G SHLD1
23.291

ROADWAY COMPOSITION

22.000 28/FC-2 | 28/FC-4 22.068
28/FC-2 | 28/FC-4

23.400 28/FC-4
28/FC-4

HORIZONTAL ALIGNMENT

CURVE DATA IS NOT FIELD VERIFIED

Δ=2° 27'11" D=3° 00' PC=22.368 PI=22.414 PT=22.461
PC=22.461 PI=22.507 PT=22.554 D=3° 00' Δ=2° 27'11"

B=N0° 19'12"E | B=N0° 19'12"E | Δ=0° 22'00" PI=23.707 | B=N0° 02'48"W | Δ=0° 36'00" PI=24.436 | B=N0° 33'12"E | Δ=1° 11'24" PI=24.976 | B=N1° 44'36"E

STRUCTURE DESCRIPTION

22.166 1-15" x 110'
22.313 1-10" x 7'-7" x 113' CBC
22.999 23.006 37" CB *048
24.869 1-18" x 90' CC
24.979 1-24" x 85' CC

DISTRICT USE

22.611 FM*416859-15201 (MP 22.611- MP 22.617) 2009-SIGNING & PAVEMENT MARKINGS
22.617 FM*416859-15201 (MP 22.617- MP 23.335) 2009-RESURFACING
23.152 FM*255604-15201 (MP 23.152-MP 23.860) 1997-ADD LANES & RECONSTRUCT
23.526 FM*255721-15201 (MP 23.526-MP 26.636) 1997-RESURFACING
22.730 FM*433046-15201 (MP 22.730- MP 22.775) 2014-MEDIAN/INTERCHANGE IMPROVEMENTS
22.970 FM*433046-15201 (MP 22.970- MP 23.009) 2014-MEDIAN/INTERCHANGE IMPROVEMENTS
23.050 FM*433046-15201 (MP 23.050- MP 23.095) 2014-MEDIAN/INTERCHANGE IMPROVEMENTS
23.580 FM*255456-15201 (MP 23.580-MP 27.550) 1985-STATE RESURFACE/ REPAVE

SIS

22.033 SIS CONNECTOR
SIS CONNECTOR 23.555

FUN CLASS

URBAN PRINCIPAL ARTERIAL -- OTHER

25 26 27 28

618A S 50TH ST→><←N 50TH ST

ROADWAY FEATURES

*049 | PALM RIVER 25.128 | WASHINGTON BLVD 25.302 | TOLLBOOTH 618 25.372 | SELMON EXPWY 25.401 | LEEROY SELMON EXPWY 25.428 | ADAMO DR 60 25.556 | E ACLINE RD 25.716 | CSX 624466-T 25.803 | R/R TRACK | DRAIN 25.808 | DISTRIBUTION DR 25.873 | *089 | UCETA RD 25.993 | N 50TH ST 26.000 | CSX 624368-C 26.068 | 7TH AVE 574 26.226 | BROADWAY AVE 574 26.226 | E 8TH AVE 26.274 | E 10TH AVE 26.314 | 5107 26.300 | ENTR 26.355 | COLUMBUS PLAZA | E COLUMBUS DR 26.442 | OLD COLUMBUS DR (UNSIGNED) 26.565 | 26.595

5222 25.010 | 5104 26.000 | 5107 26.300

INVENTORY DIRECTION → N

88.0' - 55.0'
2 - 11.0' RDWY - LT
3 - 11.0' RDWY - RT
29.0' C<6 MED
2•2.0' C&G SHLD1

132.0' - 72.0'
6 - 12.0' RDWY
28.0' C<6 MED
12.0' LWN SHLD1 - LT
8.0' PVD SHLD1 - RT
12.0' LWN SHLD2 - RT
25.302

127.0' - 72.0'
6 - 12.0' RDWY
29.0' C<6 MED
2•4.0' PVD SHLD1
12.0' LWN SHLD2 - LT
6.0' LWN SHLD2 - RT
25.428

106.0' - 72.0'
6 - 12.0' RDWY
30.0' CB>6/LWN MED
2•2.0' CRG INSHLD1
2•2.0' C&G SHLD1
25.556

92.0' - 72.0'
6 - 12.0' RDWY
16.0' CB/VEG MED
2•2.0' CRG INSHLD1
2•2.0' C&G SHLD1
25.716

107.0' - 72.0'
6 - 12.0' RDWY
23.0' CB>6/LWN MED
2•2.0' C&G INSHLD1
2•4.0' PVD SHLD1
2•2.0' C&G SHLD2
26.314

10060001
REALIGNMENT
(MP 26.565 TO MP 26.878)
REFERENCE RDWY ID 10060001
(MP 0.000 TO MP 0.367)

PHYSICALLY DELETED
(MP 26.565 TO MP 26.878)

MELBURNE BLVD

<US 41 <SR 599 | 3 AVE S 21ST 26.878 | N 48TH ST 26.878 | N 47TH ST 26.957 | N 44TH ST 27.263 | 40TH ST 27.604 | MELBURNE BLVD> US 41 SR 599> 569 | NET ROADWAY ID LENGTH: 27.291

5109 27.257

End MP: 27.604

57.0' - 24.0'
2 - 12.0' RDWY
4.0' PVD SHLD1 - LT
5.0' PVD SHLD1 - RT
2•12.0' LWN SHLD2
26.957

66.0' - 30.0'
1 - 14.0' RDWY - LT
1 - 16.0' RDWY - RT
12.0' CB>6/LWN MED
2•0.0' RC INSHLD1
2•5.0' PVD SHLD1
12.0' LWN SHLD2 - LT
2.0' LWN SHLD2 - RT
27.263

32.0' - 24.0'
2 - 12.0' RDWY
4.0' PVD SHLD1 - LT
2.0' C&G SHLD1 - RT
2.0' C&G SHLD2 - LT
26.878

60.0' - 45.0'
2 - 14.5' RDWY - LT
1 - 16.0' RDWY - RT
15.0' CB>6/LWN MED
2•0.0' RC INSHLD1
2•0.0' RC SHLD1
27.507

ROADWAY COMPOSITION

25.000 28/FC-4
28/FC-4

25.716 28/FC-4
28/FC-4

27.333 28/FC-2
28/FC-2

HORIZONTAL ALIGNMENT

CURVE DATA IS NOT FIELD VERIFIED

Δ=0° 53'47" PI=25.320 | Δ=0° 43'02" PI=25.556 | Δ=0° 07'29"E | Δ=0° 03'52" PI=26.205 | Δ=0° 02'13" PI=26.291 | Δ=0° 05'08" PI=26.542 | B=N1° 44'36"E | B=N0° 50'49"E | B=N0° 07'29"E | B=N0° 03'37"E | B=N0° 05'50"E | B=N0° 00'42"E

Δ=39° 30'00" D=5° 00' PC=26.939 PI=27.017 PT=27.089
PC=27.287 PI=27.379 PT=27.459 D=5° 30' Δ=50° 00'00"
B=N89° 59'18"W | B=N39° 59'18"W

STRUCTURE DESCRIPTION

25.058 25.196 729' BR *049
25.390 25.397 25.397 25.404 25.404 25.411 37' UP *454 37' UP *806 37' UP *453
25.805 25.810 26' CB *089
27.483 1-15" x 46' CC

DISTRICT USE

25.716 FM*429074-25201 (MP 25.716-MP 26.086) 2013-RAILROAD CROSSING/RESURFACING
25.781 FM*255799-15201 (MP 25.781-MP 25.796) 1997-RESURFACING
25.401 ACTUAL UP*806 MP (25.395-25.406)
25.434 FM*255674-15201 (MP 25.434-MP 25.534) 2002 - ADD TURN LANES
26.445 FM*255376-15201 (MP 26.445-MP 26.645) 1991-ADD TURN LANES
26.734 FM*255309-15201 (MP 26.734-MP 26.943) 1985-INTERSECTION (MAJOR)
26.957 FM*416848-15201 (MP 26.957-MP 27.604) 2010-RESURFACING / SIDEWALK / TRAFFIC SIGNAL

SIS

26.448 SIS CONNECTOR 26.565

FUN CLASS

URBAN PRINCIPAL ARTERIAL -- OTHER

Appendix F

Executive Summary from the Final Value Engineering Study Report

Executive Summary from:

VALUE ENGINEERING STUDY

OF

US 41 (SR 45) FROM KRACKER AVENUE TO SOUTH OF SR 676 (CAUSEWAY BLVD) (PD&E)

FINANCIAL PROJECT ID: 430056-1

STUDY NUMBER: 1500705

Tampa, Florida

MAY 4 - 7, 2015

FINAL REPORT

THE FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 7

VALUE ENGINEERING STUDY

OF

US 41 (SR 45) FROM KRACKER AVENUE TO SOUTH OF SR 676 (CAUSEWAY BLVD) (PD&E)

FINANCIAL PROJECT ID: 430056-1

STUDY NUMBER: 1500705

Tampa, Florida

MAY 4 - 7, 2015

FINAL REPORT

THE FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 7

This report includes a summary of data collection, alternative analysis, and Value Engineering recommendations. I acknowledge that the procedure and reference used to develop the results contained in the report are standard to the Professional Practice of Value Engineering, as applied through Professional Judgment and Experiences. I hereby certify that I am a Registered Professional Engineer in the State of Florida and that this study has been performed in the accordance with current applicable FDOT Value Engineering Procedures.

William F. Ventry, P.E., C.V.S. (LIFE)
Florida Registration No. 21235
C.V.S. Registration No. 840603 (LIFE)

DATE

TABLE OF CONTENTS

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

INTRODUCTION

This Value Engineering report summarizes the results of the Value Engineering Study performed by ***VE Group, L.L.C.*** for the Florida Department of Transportation District 7. The study was performed during the week of ***MAY 4-7, 2015.***

PROJECT DESCRIPTION

The proposed Florida Department of Transportation (FDOT) project involves the widening of US 41 (SR 45) from Kracker Avenue (milepoint 15.784) to south of SR 676 (Causeway Boulevard-milepoint 23.547 in Hillsborough County. The study limits length is approximately 7.7 miles. The proposed widening would end in the vicinity of Denver Street, where US 41 is already six lanes to the north. The highway is proposed to be widened/reconstructed from an existing, four-lane divided rural and urban facility to a six-lane divided facility, with suburban typical sections in the areas with the existing 182-foot right of way (ROW) and an urban typical section in the north Gibsonton area where the ROW is much narrower. In addition, the bridges over Bullfrog Creek and the Alafia River are proposed to be replaced and include space for the future South Coast Greenway, which will run parallel to US 41 in several areas. The proposed improvements will include construction of stormwater management facilities and floodplain compensation sites and improvements at major intersections, in addition to inclusion of multimodal facilities (trail, pedestrian, bicycle and transit accommodations).

Total estimated **Construction Cost** (from LRE provided to VE team): ***$105,985,756***.

Estimated **Right of Way** cost: ***$34,500,000***.

I. EXECUTIVE SUMMARY

METHODOLOGY

The Value Engineering Team followed the basic Value Engineering procedure for conducting this type of analysis.

This process included the following phases:

1. Information
2. Functional Analysis
3. Speculation
4. Evaluation
5. Development
6. Presentation
7. Report Preparation/Resolution

AREAS OF FOCUS

A Pareto Chart and a Functional Analysis Worksheet are tools of the Value Engineering Process and are only used for determining the areas that the Value Engineering Team may focus on for possible alternatives. After development of the Pareto Chart and Functional Analysis Worksheet, the Value Engineering Team focused on the following Areas of Focus:

A. PONDS

B. ALAFIA RIVER BRIDGES

C. PAVEMENT/TYPICAL SECTION

D. BULL FROG CREEK BRIDGES

E. INTERSECTIONS

I. EXECUTIVE SUMMARY

RESULTS – AREAS OF FOCUS

The following areas of focus were analyzed by the Value Engineering team and from these areas, the following Value Engineering alternatives were developed and are recommended for Implementation. It should also be understood that the calculated savings shown in this Value Engineering Report are *potential* cost savings and are the best projections based on the conceptual data available at this time. Actual savings would have to be based on detailed quantity calculations that could not be made unless final design plans, with detailed quantities, were to be developed for both the original concept and the VE concept. Once the VE concept is adopted, however, the cost estimate for the original concept is no longer updated which precludes a detailed comparison with the VE concept estimate. In addition, the cost estimate represents the amount needed to construct the project in present day cost. This does not necessarily mean that there are available funds for this amount and thus, any amount saved by a VE concept is not necessarily available for other projects.

RECOMMENDATION NUMBER 1: **PONDS**

The Value Engineering Team recommends that *Value Engineering Alternative No.1A* be implemented.

Value Engineering Alternative No. 1A: ***Widen the existing roadway instead of total reconstruction and eliminate attenuation to tidal outfalls to reduce pond sizes.***

If this recommendation can be implemented, there is a ***possible savings of $24,100,000.***

RECOMMENDATION NUMBER 2: **PAVEMENT/TYPICAL SECTION**

The Value Engineering Team recommends that *Value Engineering Alternative No. 4* be implemented.

Value Engineering Alternative No. 4: ***Reduce the two inside lane widths to 11 feet and retain the 12 ft. outside lane from Kracker Avenue to Palm Avenue and from the south end of the Alafia River Bridge to the Madison Avenue intersection.***

If this recommendation can be implemented, there is a ***possible savings of $1,930,496.***

If this recommendation can be implemented, there is a possible ***Life Cycle Cost savings of $1,930,496.***

I. EXECUTIVE SUMMARY

RESULTS – AREAS OF FOCUS - continued

RECOMMENDATION NUMBER 3: **PAVEMENT/TYPICAL SECTION**

The Value Engineering Team recommends that *Value Engineering Alternative No. 5* be implemented.

Value Engineering Alternative No. 5: ***Mill and resurface existing pavement and widen instead of total reconstruction.***

If this recommendation can be implemented, there is a ***possible savings of $5,740,519.***

If this recommendation can be implemented, there is a ***possible Life Cycle Cost savings of $5,740,519.***

RECOMMENDATION NUMBER 4: **INTERSECTIONS**

The Value Engineering Team recommends that Value Engineering Alternative No. 7 be implemented.

Value ADDED Alternative No. 1: ***Consider concrete pavement at Madison Avenue and Port Sutton Road.***

If this recommendation can be implemented, there is a possible ***INCREASE of $1,724,683.***

I. EXECUTIVE SUMMARY

RESOLUTION/FHWA CHART

The following Value Engineering Alternatives were developed and are recommended for Implementation:

VALUE ENGINEERING RECOMMENDATIONS	RECOMMEND ACCEPT	RECOMMEND REJECT	MODIFY STUDY FURTHER	FHWA CATEGORIES	
RECOMMENDATION NUMBER 1: ***PONDS*** ***<u>Value Engineering Alternative No.1A</u>:*** ***Widen the existing roadway instead of total reconstruction and eliminate attenuation to tidal outfalls to reduce pond sizes.*** *(See pg. **31** for details)* ***Possible savings of $24,100,000***	***ACCEPT – Pursue dry swales, if possible, further refining in design phase.***			**SAFETY: Recommendations that mitigate or reduce hazards on the facility.**	
				ENVIRONMENT: Recommendations that successfully avoid or mitigate impacts to natural and/or cultural resources.	**X**
				OPERATION: Recommendations that improve real-time service and/or local corridor or regional levels of service.	
				CONSTRUCTION: Recommendations that improve work zone conditions, or expedite the project delivery.	**X**
				OTHER: Recommendations not readily categorized by above performance indicators.	
RECOMMENDATION NUMBER 2: ***PAVEMENT/TYPICAL SECTION*** ***<u>Value Engineering Alternative No. 4</u>:*** ***Reduce the two inside lane widths to 11 feet and retain the 12 ft. outside lane from Kracker Avenue to Palm Avenue and from the south end of the Alafia River Bridge to the Madison Avenue intersection.*** *(See pg. **93** for details)* ***Possible savings of $1,930,496.*** ***Life Cycle Cost savings: $1,930,496.***	***ACCEPT With further review during the design phase.***			**SAFETY: Recommendations that mitigate or reduce hazards on the facility.**	
				ENVIRONMENT: Recommendations that successfully avoid or mitigate impacts to natural and/or cultural resources.	
				OPERATION: Recommendations that improve real-time service and/or local corridor or regional levels of service.	
				CONSTRUCTION: Recommendations that improve work zone conditions, or expedite the project delivery.	**X**
				OTHER: Recommendations not readily categorized by above performance indicators.	
RECOMMENDATION NUMBER 3: ***PAVEMENT/TYPICAL SECTION*** ***<u>Value Engineering Alternative No. 5</u>:*** ***Mill and resurface existing pavement and widen instead of total reconstruction.*** *(See pg. **98** for details)* ***Possible savings of $5,740,519.*** ***Life Cycle Cost savings: $5,740,519.*** ***(Continued)***	***ACCEPT With revaluation during design phase of left center or right alignment.***			**SAFETY: Recommendations that mitigate or reduce hazards on the facility.**	
				ENVIRONMENT: Recommendations that successfully avoid or mitigate impacts to natural and/or cultural resources.	
				OPERATION: Recommendations that improve real-time service and/or local corridor or regional levels of service.	
				CONSTRUCTION: Recommendations that improve work zone conditions, or expedite the project delivery.	**X**
				OTHER: Recommendations not readily categorized by above performance indicators.	

I. EXECUTIVE SUMMARY

RESOLUTION/FHWA CHART

VALUE ENGINEERING RECOMMENDATIONS	RECOMMEND ACCEPT	RECOMMEND REJECT	MODIFY STUDY FURTHER	FHWA CATEGORIES	
RECOMMENDATION NUMBER 4: ***INTERSECTIONS*** ***Value ADDED Alternative No. 1:*** ***Consider concrete pavement at Madison Avenue and Port Sutton Road.*** *(See pg.* ***105*** *for details)* ***Possible increase of $1,724,683.***	***ACCEPT With further development in design phase to include the possibility of adding the Riverview Drive Intersection.***			**SAFETY: Recommendations that mitigate or reduce hazards on the facility.**	
				ENVIRONMENT: Recommendations that successfully avoid or mitigate impacts to natural and/or cultural resources.	
				OPERATION: Recommendations that improve real-time service and/or local corridor or regional levels of service.	
				CONSTRUCTION: Recommendations that improve work zone conditions, or expedite the project delivery.	
				OTHER: Recommendations not readily categorized by above performance indicators.	**X**
TOTAL				**SAFETY**	
				ENVIRONMENT	**1**
				OPERATION	
				CONSTRUCTION	**3**
				OTHER	**1**

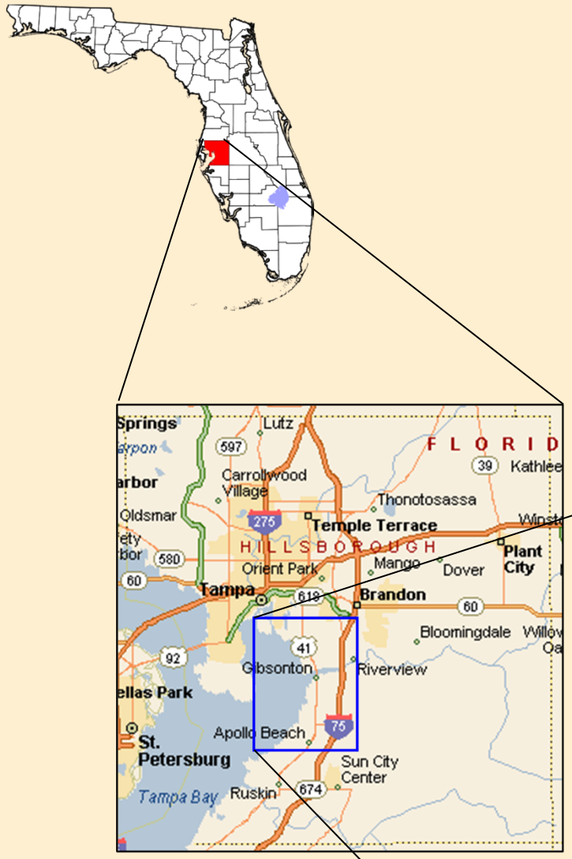
Appendix G
Preliminary Conceptual Design Plans

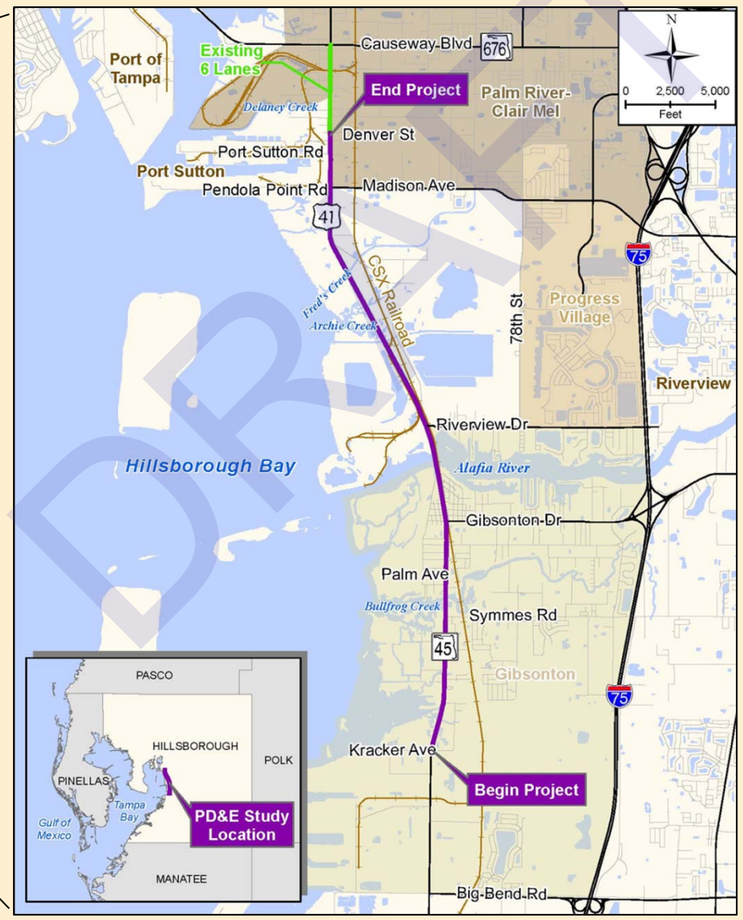
Preliminary
Conceptual Design Plans

US 41 (SR 45) PD&E STUDY

From Kracker Avenue to South of Causeway Blvd (SR 676)

WPI Segment Number 430056-1





Prepared For:

The Florida Department of Transportation District Seven Environmental Management Office

Prepared By:

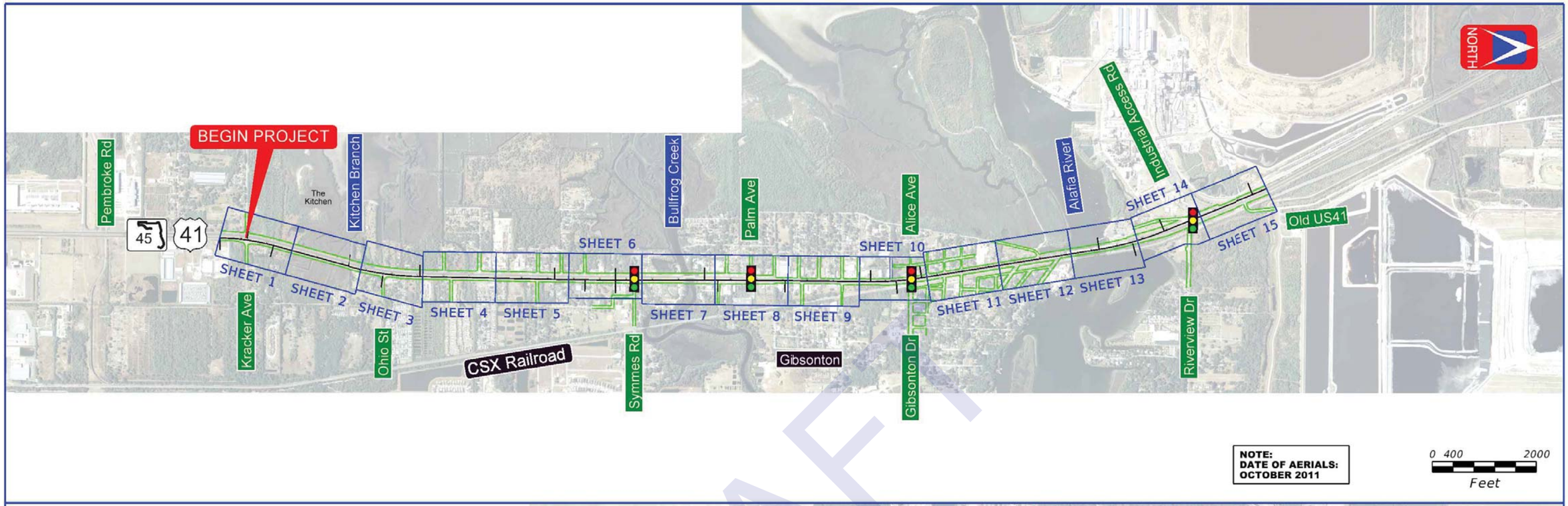
American Consulting Engineers of Florida, LLC

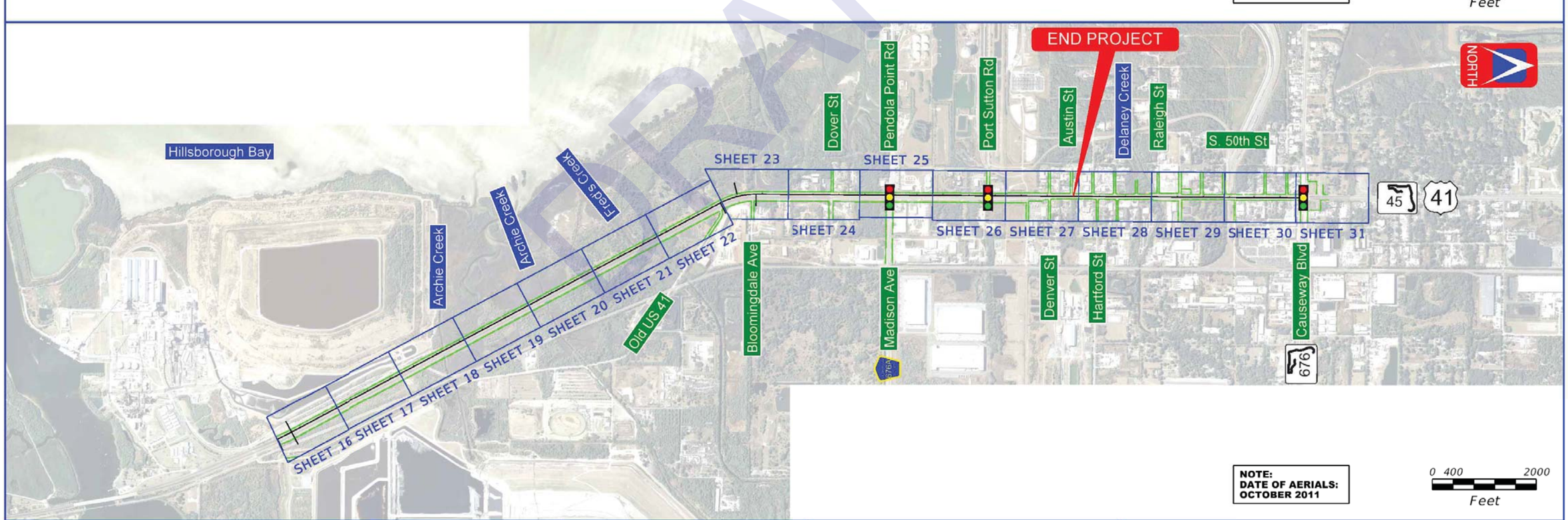
Wesley Chapel Florida

Planned Build Alternative

July 2016

FDOT Project Manager: Lilliam Escalera





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
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Wesley Chapel, Florida 33544
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Jeffrey S. Novotny, P.E. No. 51083

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US41/SR45	HILLBOROUGH	

US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Sheet Layout

SHEET NO. i

USER: 5greenb 7/21/2016 4:12:36 PM f:\project\5127041\43005412201\roadway\PLAYRD01.DGN

Block 12500

HOUSE

BEGIN PROJECT

NORTH

45 41

132'

830

835

132'

50'

PT STA. 836+34.16

MATCH LINE STA. 840+00.00

PC STA. 825+94.55

PER
PD&E STUDY
WPI No.: 421140-8

PROP. ROW BY OTHERS

PLANNED IMPROVEMENT BY OTHERS

Kracker Ave

SPEED LIMIT 55

MOBILE HOME PARK

PIRATES TREASURE COVE

CURVE DATA C112
PI STA. = 831+17.17
Δ = 14° 33' 16" (RT)
D = 1° 24' 00"
T = 522.62
L = 1,039.61
R = 4,092.56
PC STA. = 825+94.55
PT STA. = 836+34.16

BANNER SUPPLY CO

Block 12500

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL: OCTOBER 2011

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US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 1

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THE KITCHEN

Extend/Replace Culvert

Extend/Replace Culvert

45 41

NORTH

MATCH LINE STA. 840+00.00

MATCH LINE STA. 854+00.00

132'

50'

840

845

850

PC STA. 851+29.61

Kitchen Branch

LEGEND

WETLANDS OR OTHER SURFACE WATERS BOUNDARY

POTENTIAL BUSINESS RELOCATION
NUMBER OF RELOCATIONS WITHIN PARCEL

POTENTIAL RESIDENTIAL RELOCATION
NUMBER OF RELOCATIONS WITHIN PARCEL

PROPERTY LINES

EXISTING ROW

PROPOSED ROW TO BE ACQUIRED

POTENTIALLY CONTAMINATED SITE

PROPOSED BRIDGE/WALL CULVERT EXTENSION

PROPOSED ROADWAY

SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL:
OCTOBER 2011

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US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO.
2

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NORTH

45 41

MATCH LINE STA. 854+00.00

MATCH LINE STA. 866+00.00

855

860

865

132'

50'

30'

31'

32'

33'

34'

HOUSE

MOBILE HOME PARK

HOUSE

CIRCLE K

Ohio St

Eastwood Dr S

EASTWOOD ESTATES

Block 12000

CURVE DATA C212
PI STA. = 858+40.80
Δ = 14° 09' 05" (LT)
D = 1° 00' 00"
T = 711.19
L = 1,415.14
R = 5,729.58
PC STA. = 851+29.61
PT STA. = 865+44.75

PT STA. 865+44.75

132'

50'

POT

...47.10

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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US41 PD&E STUDY

Kracker Ave to South of Causway Blvd (SR676)

Concept Plans

WPI SEGMENT No.: 430056-1

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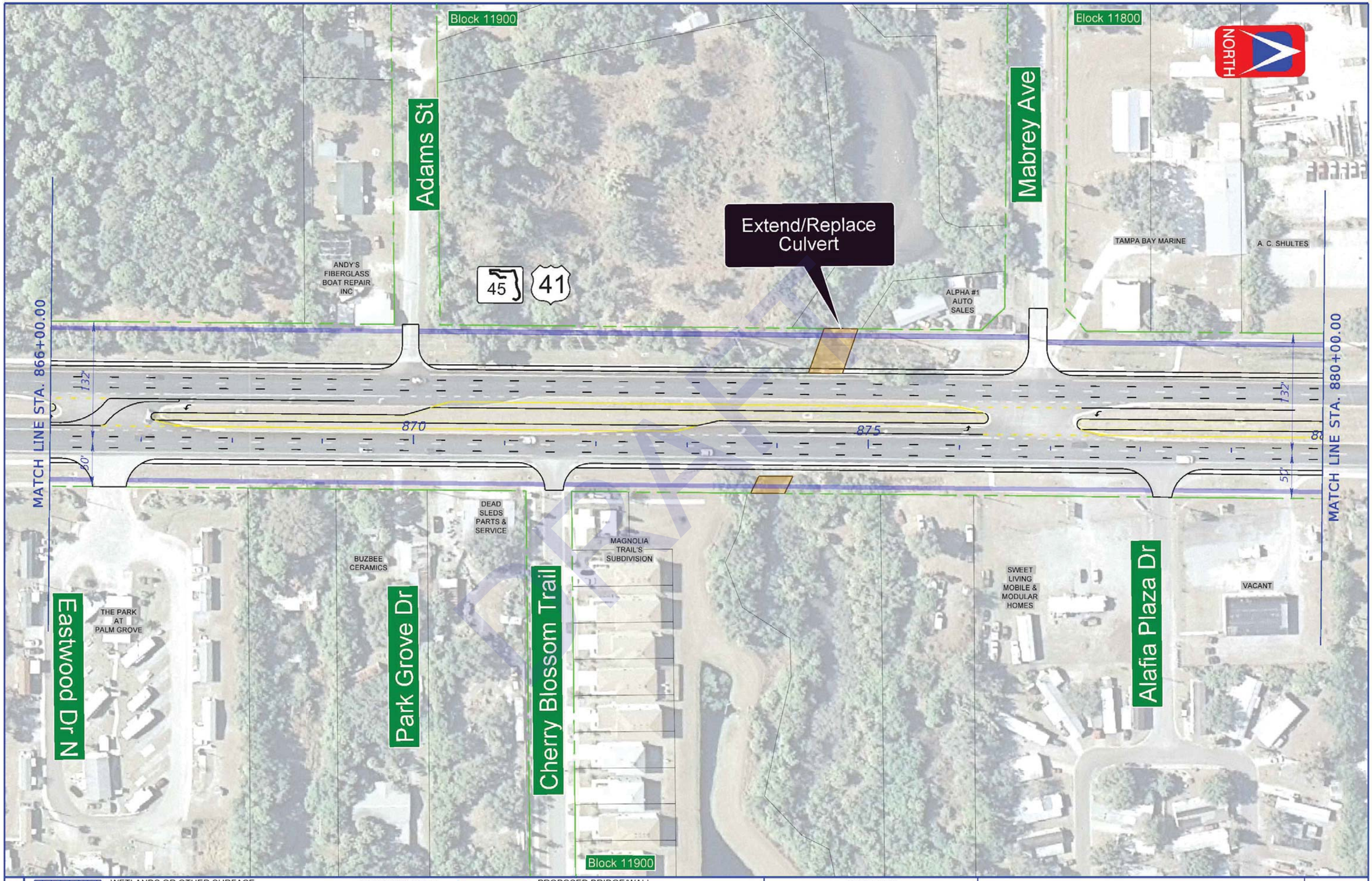

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (B) — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION (R) — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE (C)
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 4

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Block 11800

Block 11500

Florence St

Isabel Ave

NORTH

A. C. SHULTES

JOSS CONTRACTING

DUEALL CONSTRUCTION

DRIRITE

E-Z AUTO/ VAN RENTALS

MEGDYL AUTOMOTIVE

CREATIVE KIDS PRESCHOOL

D & D OUTLET

DARREL ADAMS ENVIRONMENTAL SERVICES

MATCH LINE STA. 880+00.00

132'

50'

885

890

PI STA. 891+19.92

MATCH LINE STA. 894+00.00

45 41

FLOWER GARDEN MOBILE HOME PARK

WALDEN'S USED CARS

Florence St

MOBILE HOME PARK

LEGAL SHRED

Block 11800

LEGEND

WETLANDS OR OTHER SURFACE WATERS BOUNDARY

POTENTIAL BUSINESS RELOCATION
NUMBER OF RELOCATIONS WITHIN PARCEL

POTENTIAL RESIDENTIAL RELOCATION
NUMBER OF RELOCATIONS WITHIN PARCEL

PROPERTY LINES

EXISTING ROW

PROPOSED ROW TO BE ACQUIRED

POTENTIALLY CONTAMINATED SITE

PROPOSED BRIDGE/WALL CULVERT EXTENSION

PROPOSED ROADWAY

SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL:
OCTOBER 2011

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US41 PD&E STUDY

Kracker Ave to South of Causway Blvd (SR676)

Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 5

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NORTH

Nena Ave

APOLLO ENVIRONMENTAL INC.

GIBTOWN MOTEL

GIBTOWN INN

KEN HOPE AIR CONDITIONING & HEATING

HOUSE

SPEED LIMIT 55

DOLLAR GENERAL

BULLFROG CREEK MARINE

MATCH LINE STA. 894+00.00

132'

895

900

905

PT STA. 902+96.59

EQUATION: Sta 902+96.59 BK = Sta 902+87.26 AH

POT STA. 25+41.59

132'

MATCH LINE STA. 908+00.00

50'

PI STA. 897+13.27

45

41

FISHERMAN'S ONE STOP

HOUSE

HOUSE

HOUSE

SPEED LIMIT 50

TROPICANA BAR

BAY AREA ENVIRONMENTAL SERVICES

MOBILE HOME PARK

RESIDENCE

Symmes Rd

27'

28'

Corwin St

Block 11500

CURVE DATA C312
PI STA. = 897+13.27
Δ = 1° 10' 00" (LT)
D = 0° 06' 00"
T = 583.35
L = 1,166.67
R = 57,295.78
PC STA. = 891+29.92
PT STA. = 902+96.59

A-FAB

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

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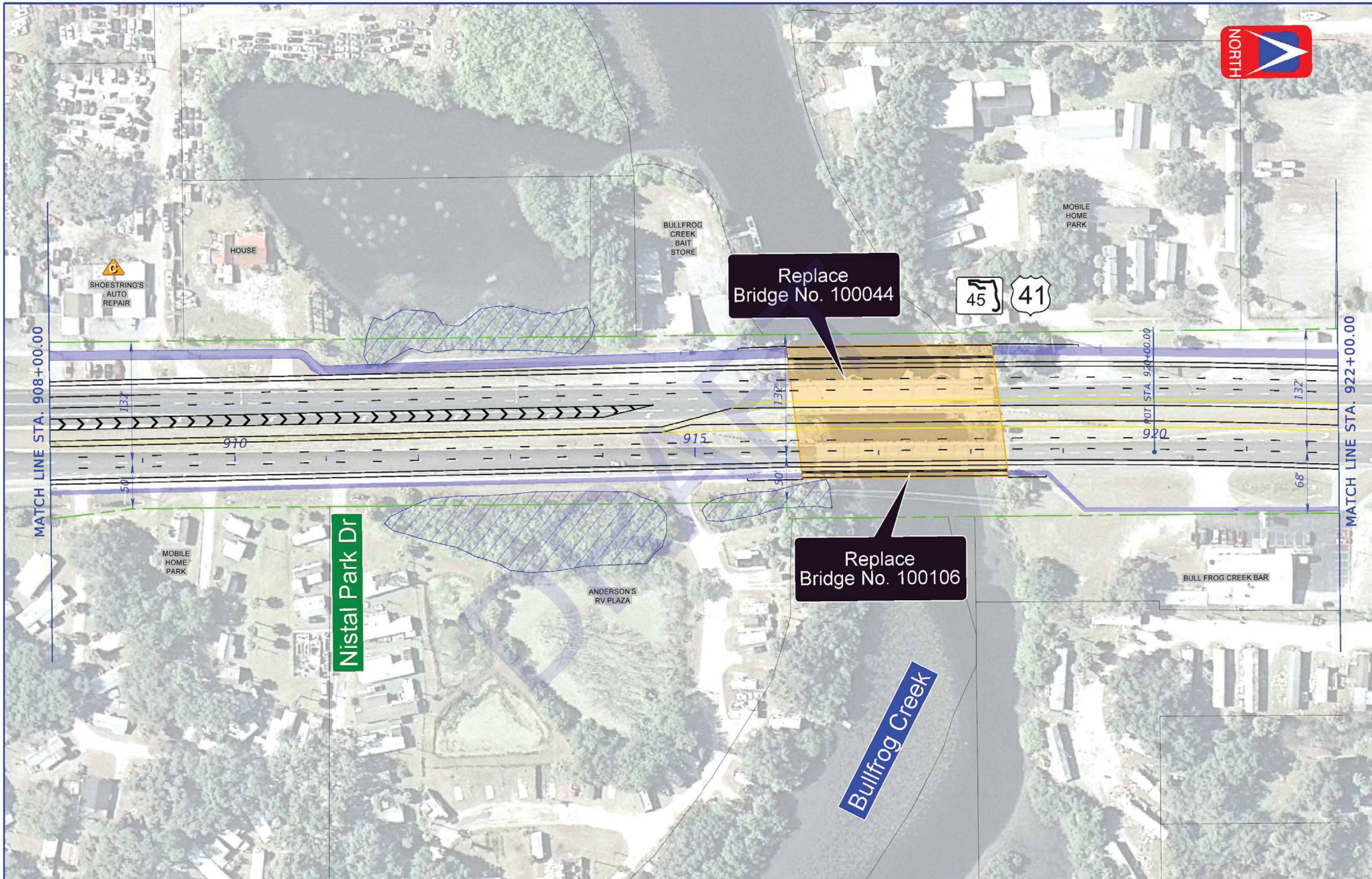

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)
- POTENTIAL RESIDENTIAL RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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US41 PD&E STUDY

Kracker Ave to South of Causway Blvd (SR676)

Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 7

Block 11000

Block 11000

Block 10900

Proposed South Coast Greenway Route

Beach Ave

Palm Ave

Cedar Ave

NORTH

SOUTHBAY TIRE

PLAZA

BAIT SHOP

THRIFT STORE

APPLIANCES

BAIT SHOP

LA FLOR DE HIDALGO

G & W TANK LINES INC.

UHAUL

GAGER'S AUTO SALES

TORTILLERIA EL CHARRO

GIBSONTON DRIVE THRU BEVERAGE MART

DSD BUILDERS SUPPLIES (VACANT)

45

41

MATCH LINE STA. 922+00.00

132'

925

68'

PC STA. 922+52.46

100'

70'

930

100'

68'

935

50'

50'

PT STA. 935+44.13

MATCH LINE STA. 936+00.00

CURVE DATA C412
PI STA. = 928+98.30
Δ = 0° 38' 45" (RT)
D = 0° 03' 00"
T = 645.84
L = 1,291.67
R = 114,591.56
PC STA. = 922+52.46
PT STA. = 935+44.13

NEW LINE TRANSPORT

TWIN OAKS PLAZA

USED APPLIANCES

STEPP'S TOWING SERVICE

CHEVRON GAS STATION

Beach Ave

CSXT Railroad

DRAFT

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
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- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL: OCTOBER 2011

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US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 8

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Block 10900

Block 10800

Block 10800

Block 10700

NORTH

Cliff Ave

Shirley Ave

Nundy Ave

Lewis Ave

FORMER AUTO SALVAGE YARD

OFFICE

BARBER SHOP

VACANT

DON'S BOAT SALES

JUAN TIRE SERVICE

CAR WASH/EXHAUST SHOP

LINE STA. 936+00.00

940

945

LINE STA. 950+00.00

MATCH LINE

MATCH LINE

SHOWTOWN RESTAURANT & LOUNGE

ADVANCE AUTO PARTS

SUNOCO GAS STATION

MARATHON GAS JOY AMERICA FOOD

45

41

Mottie Rd

CSXT Railroad

Nundy Ave

LUMBER & FENCING PRODUCTS INC

Block 10900

Block 10800

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL: OCTOBER 2011

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, Florida 33544
Phone: (813) 435-2600 Fax: (813) 435-2601
Certificate of Authorization No. 9302
Jeffrey S. Novotny, P.E. No. 51083

US41 PD&E STUDY

Kracker Ave to South of Causway Blvd (SR676)

Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 9

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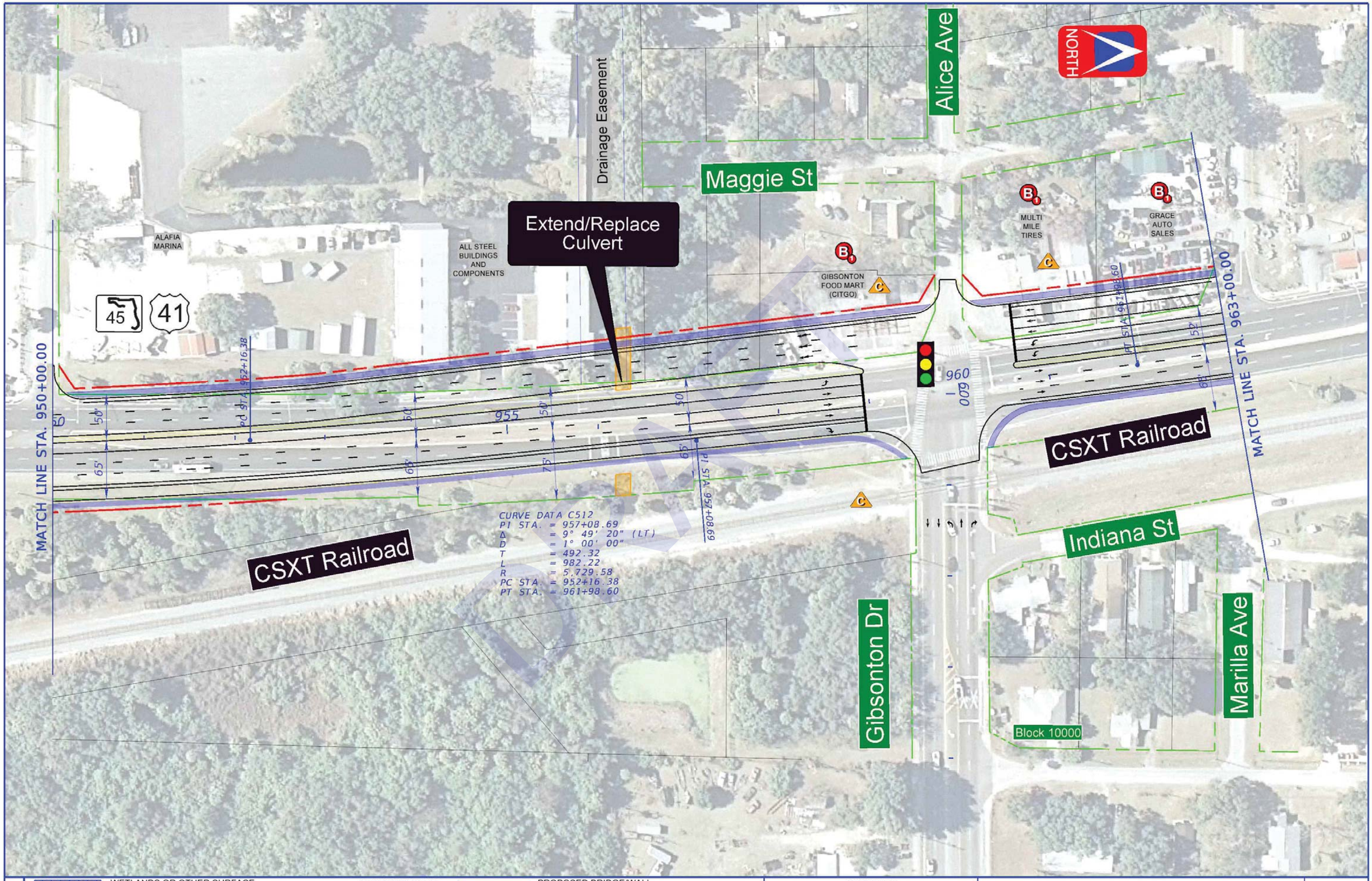

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)
- POTENTIAL RESIDENTIAL RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 10

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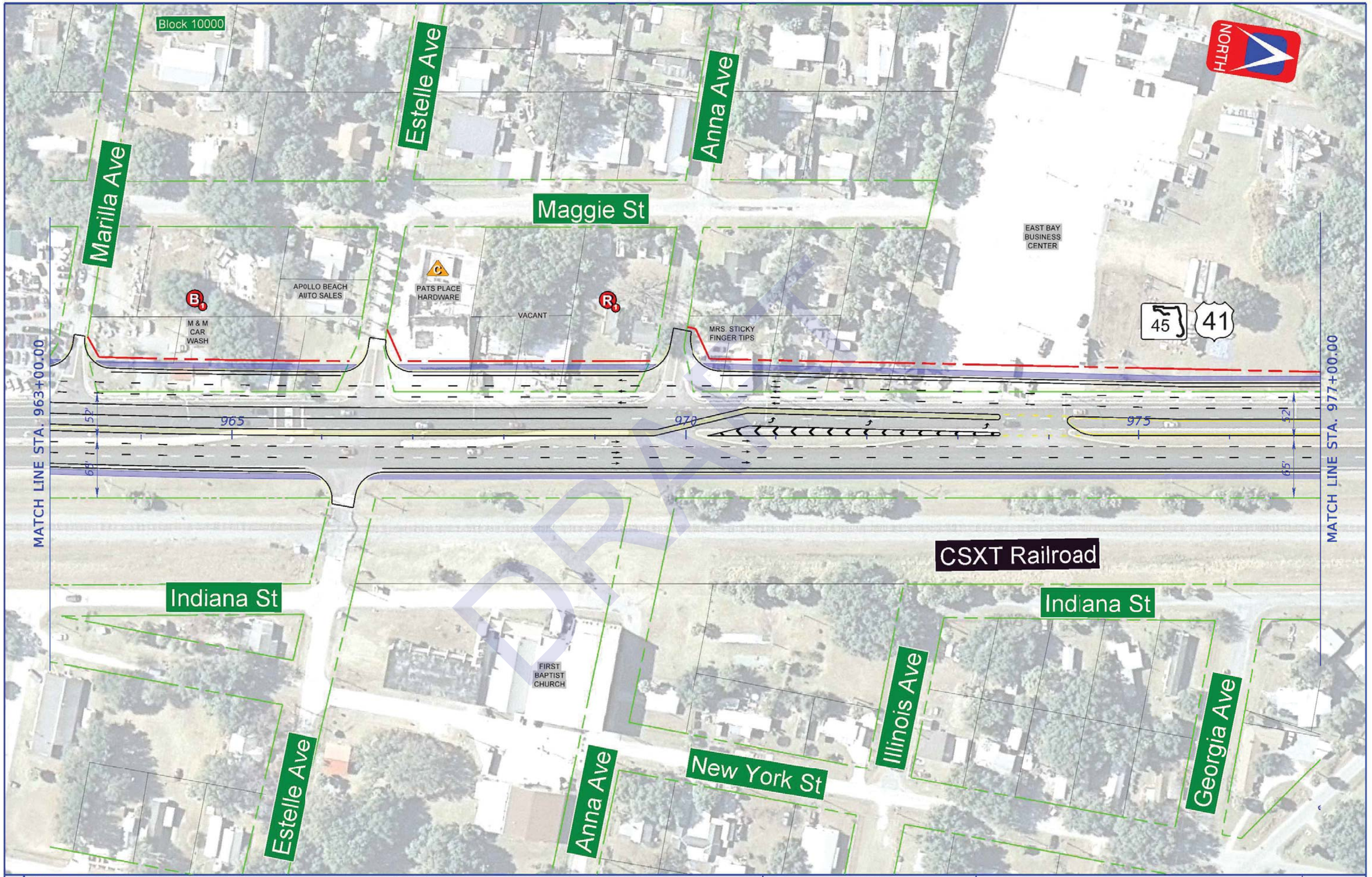

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 11

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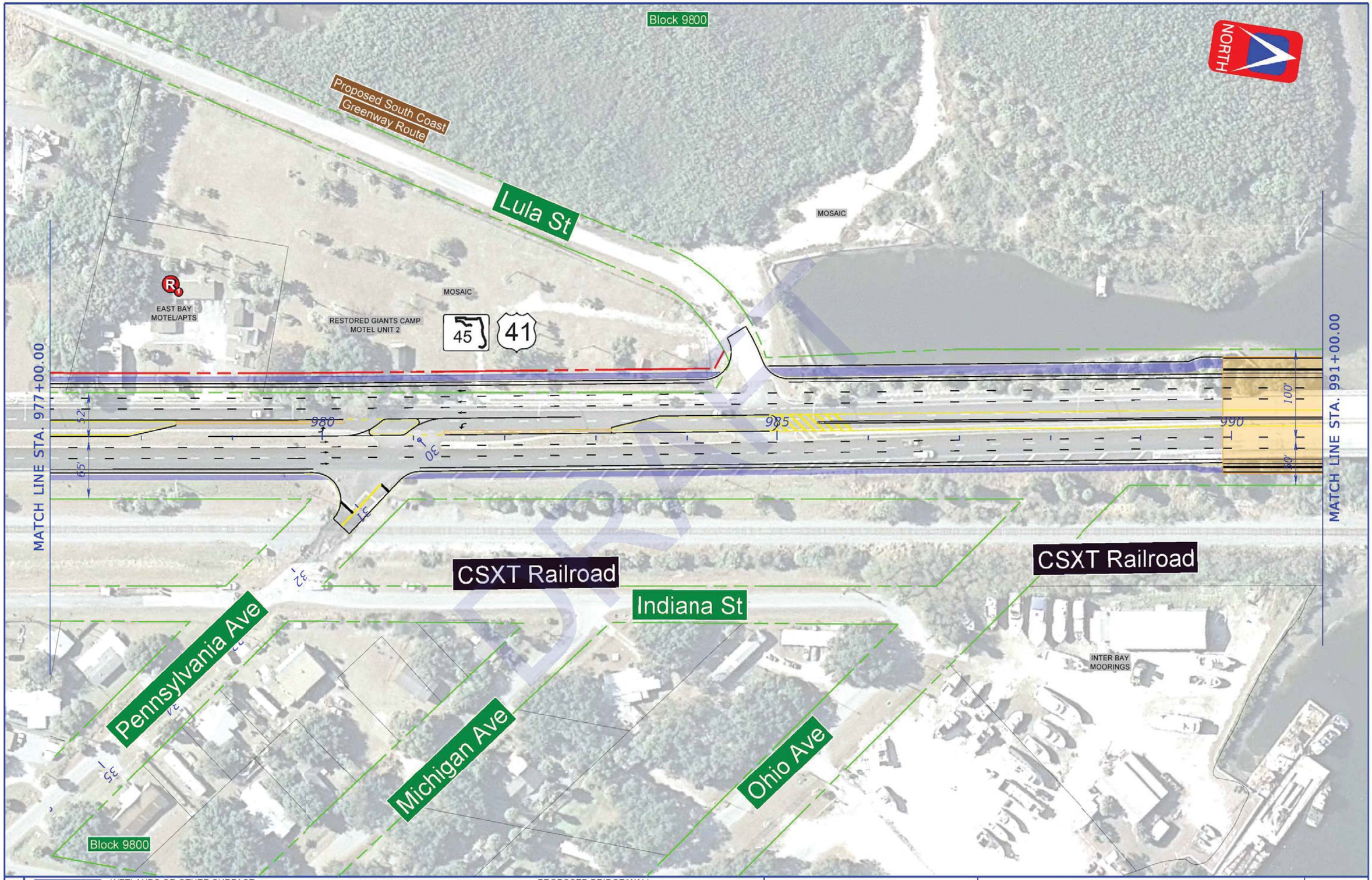

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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Kracker Ave to South of Causway Blvd (SR676)
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WPI SEGMENT No.: 430056-1

SHEET NO. 12

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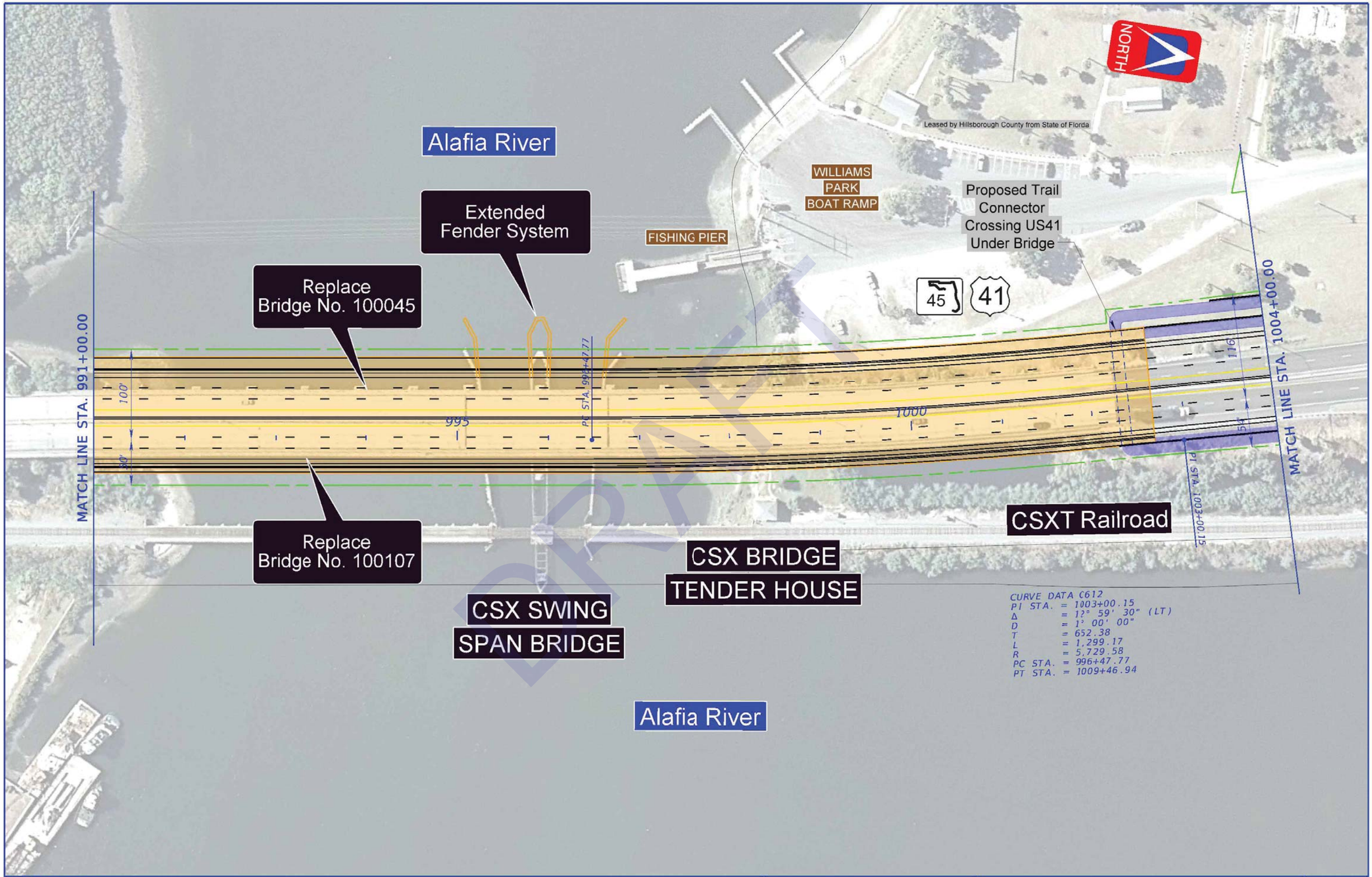

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL: OCTOBER 2011

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Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 13

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LEGEND

WETLANDS OR OTHER SURFACE WATERS BOUNDARY	PROPERTY LINES	PROPOSED BRIDGE/WALL CULVERT EXTENSION	0 20 100 Feet
POTENTIAL BUSINESS RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)	EXISTING ROW	PROPOSED ROADWAY	DATE OF AERIAL: OCTOBER 2011
POTENTIAL RESIDENTIAL RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)	PROPOSED ROW TO BE ACQUIRED	SIDEWALK / PATH	
	POTENTIALLY CONTAMINATED SITE		

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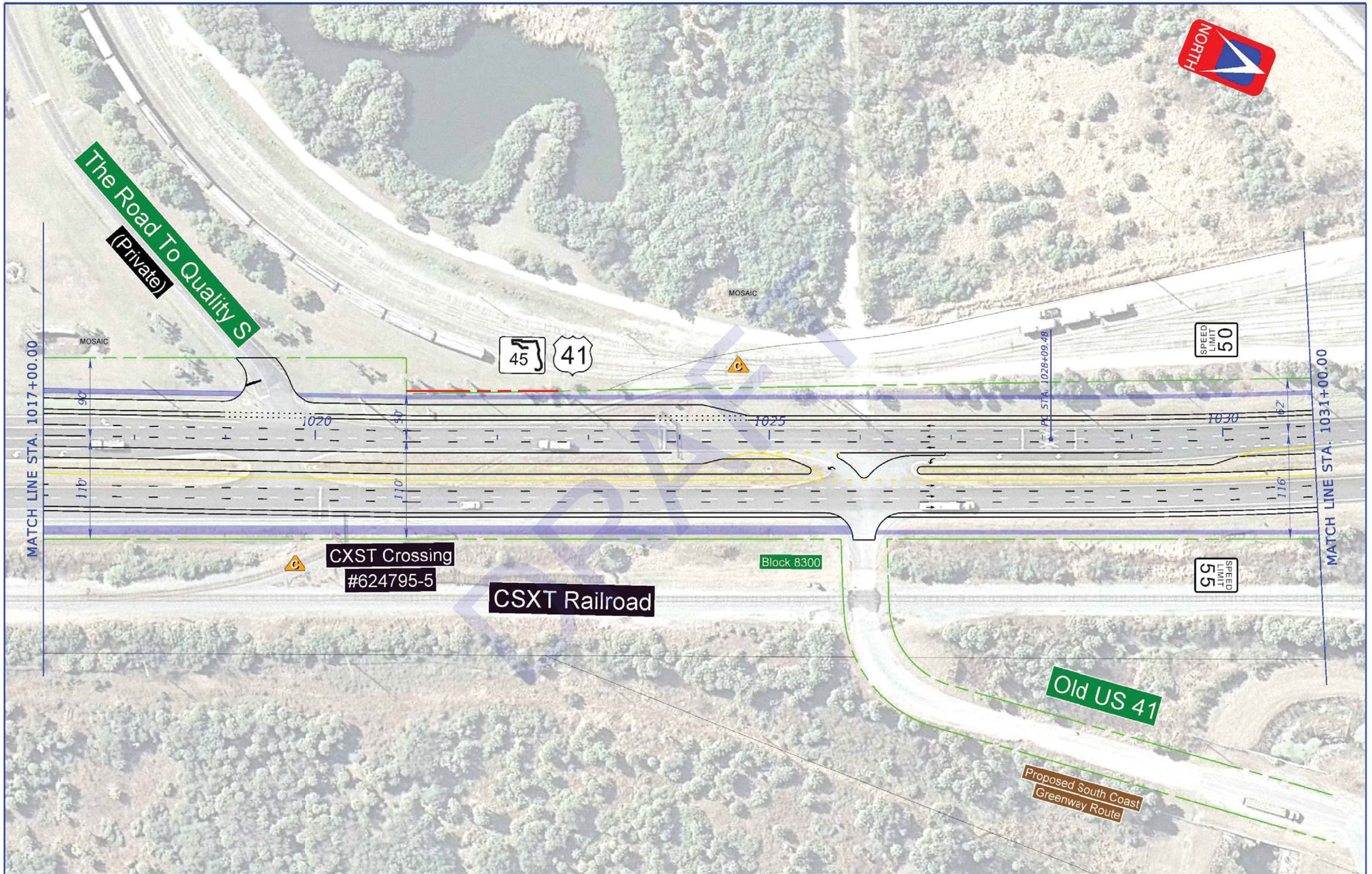
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 14



LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (B) — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION (R) — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE (C)
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 15

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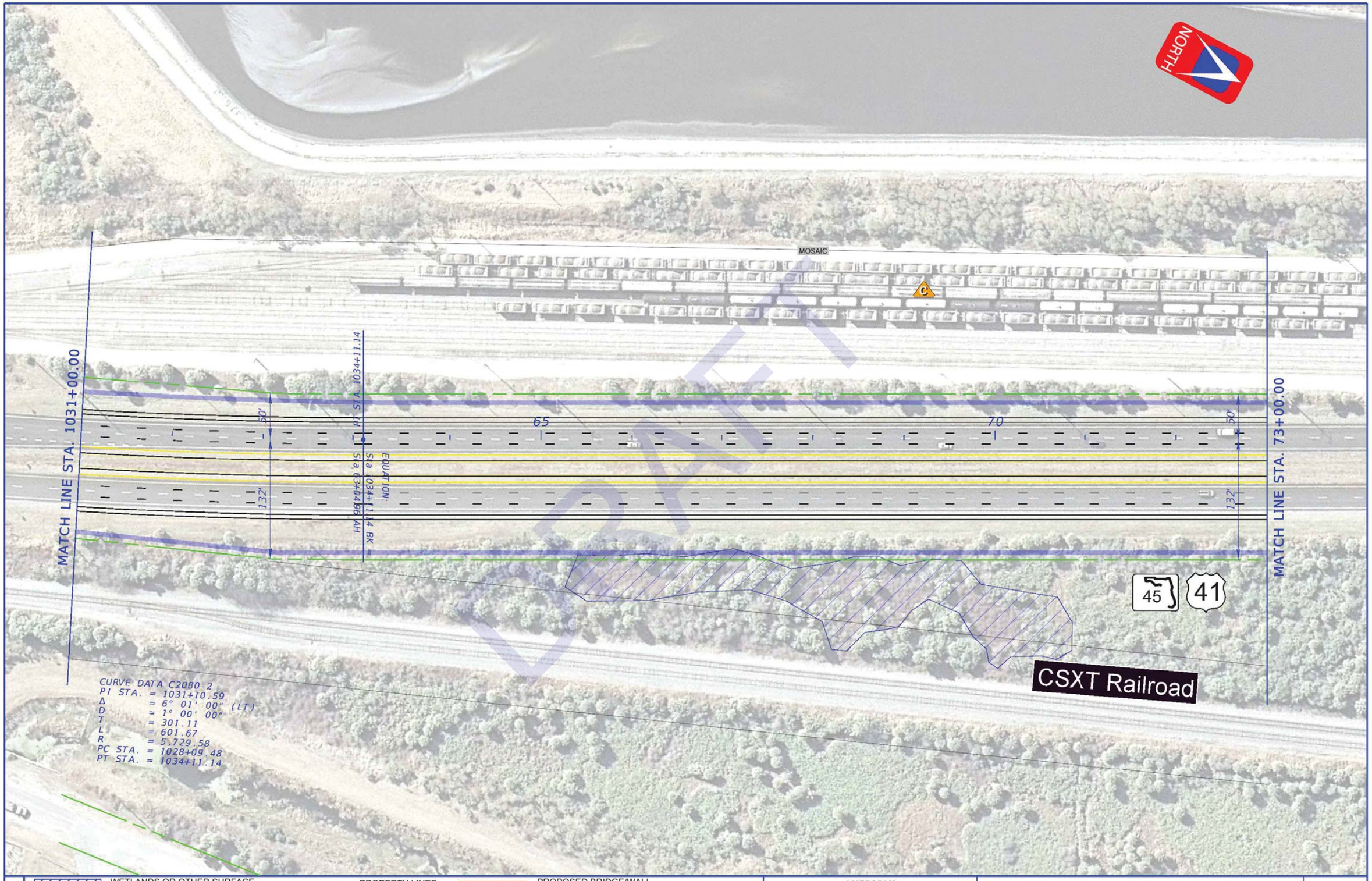

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
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- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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SHEET NO. 16

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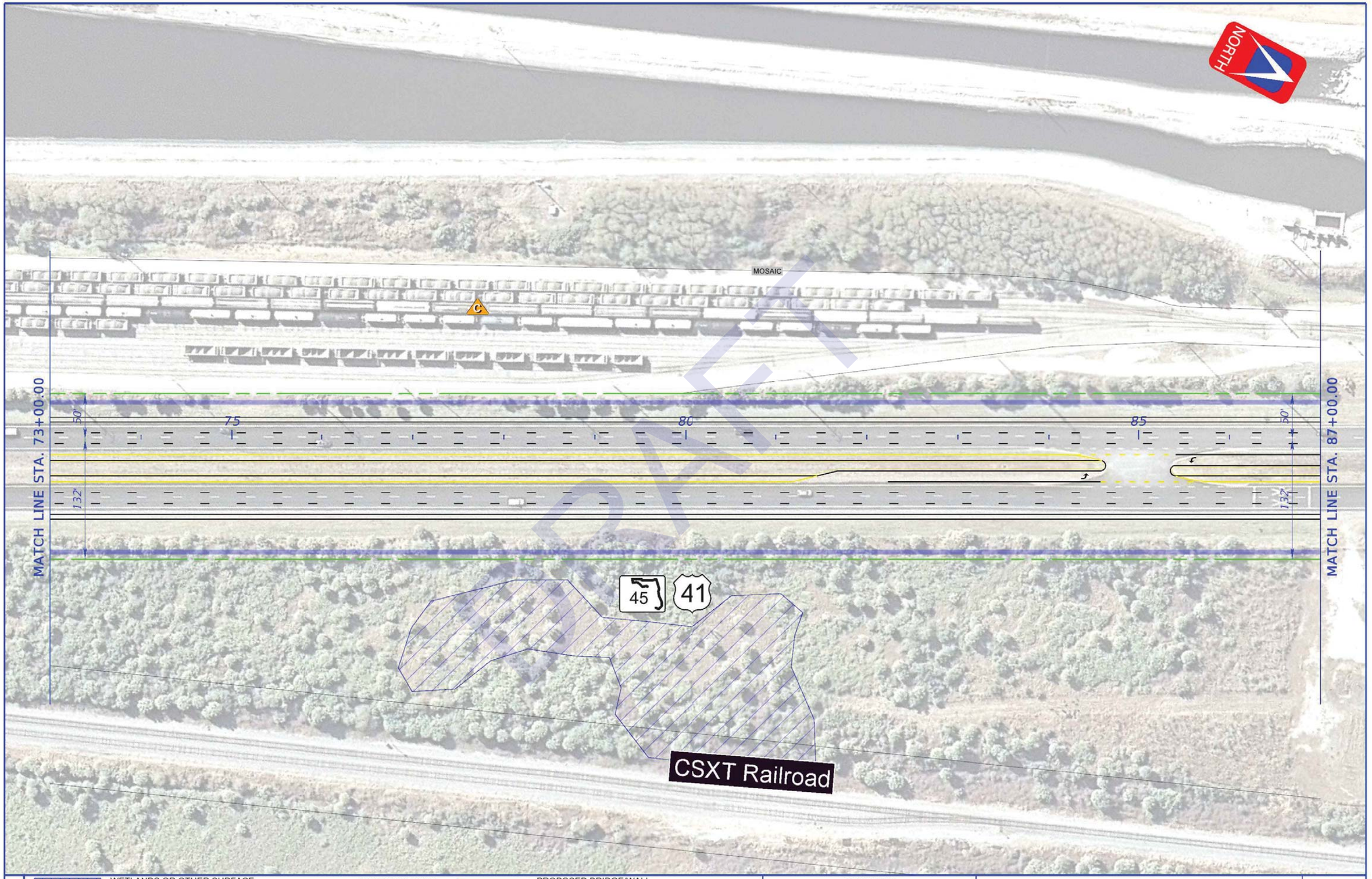

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (B) — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION (R) — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
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- POTENTIALLY CONTAMINATED SITE (C)
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

DATE OF AERIAL: OCTOBER 2011

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WPI SEGMENT No.: 430056-1

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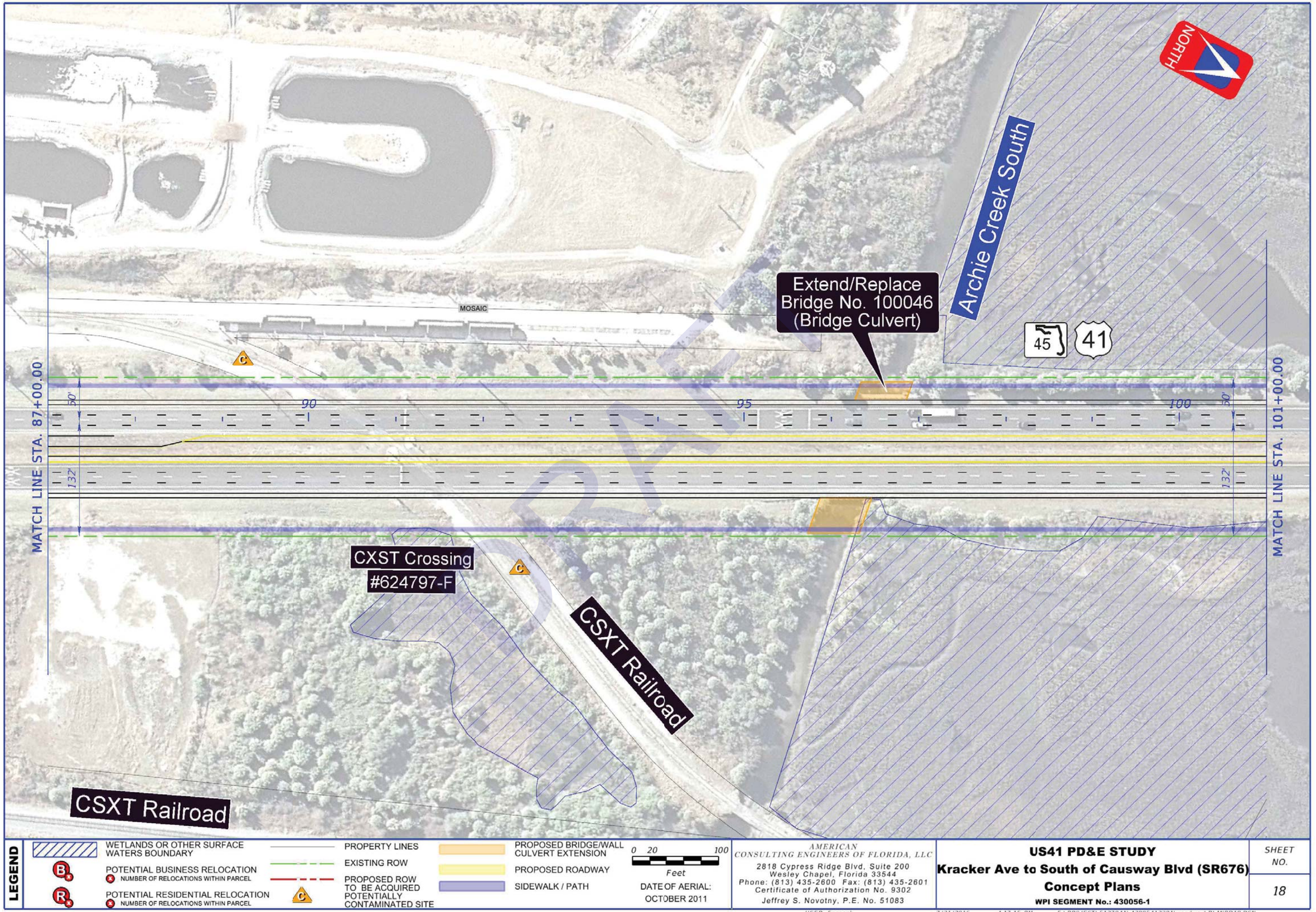

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
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- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 18

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LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (B) — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION (R) — NUMBER OF RELOCATIONS WITHIN PARCEL
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- EXISTING ROW
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- POTENTIALLY CONTAMINATED SITE (C)
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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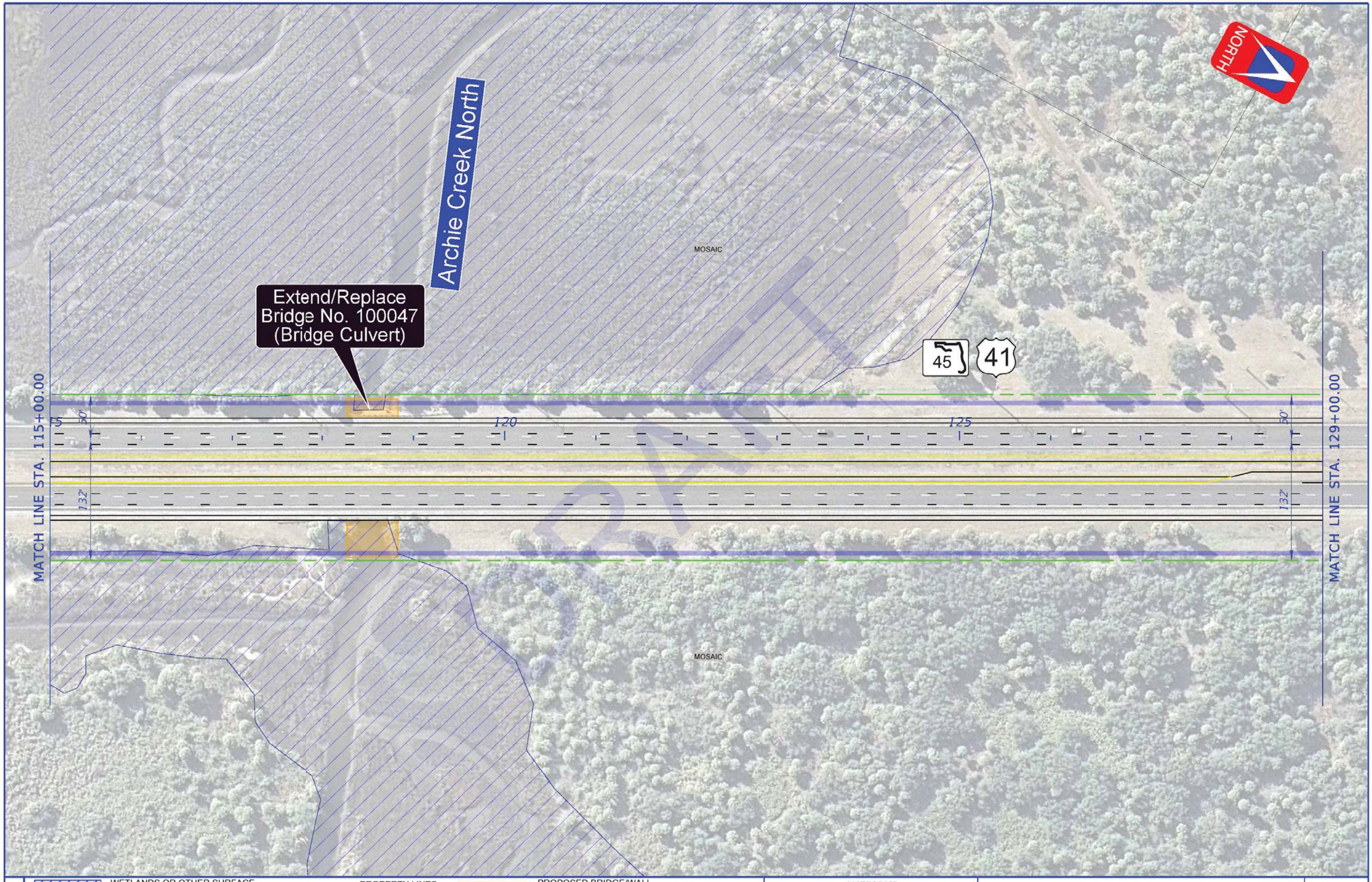

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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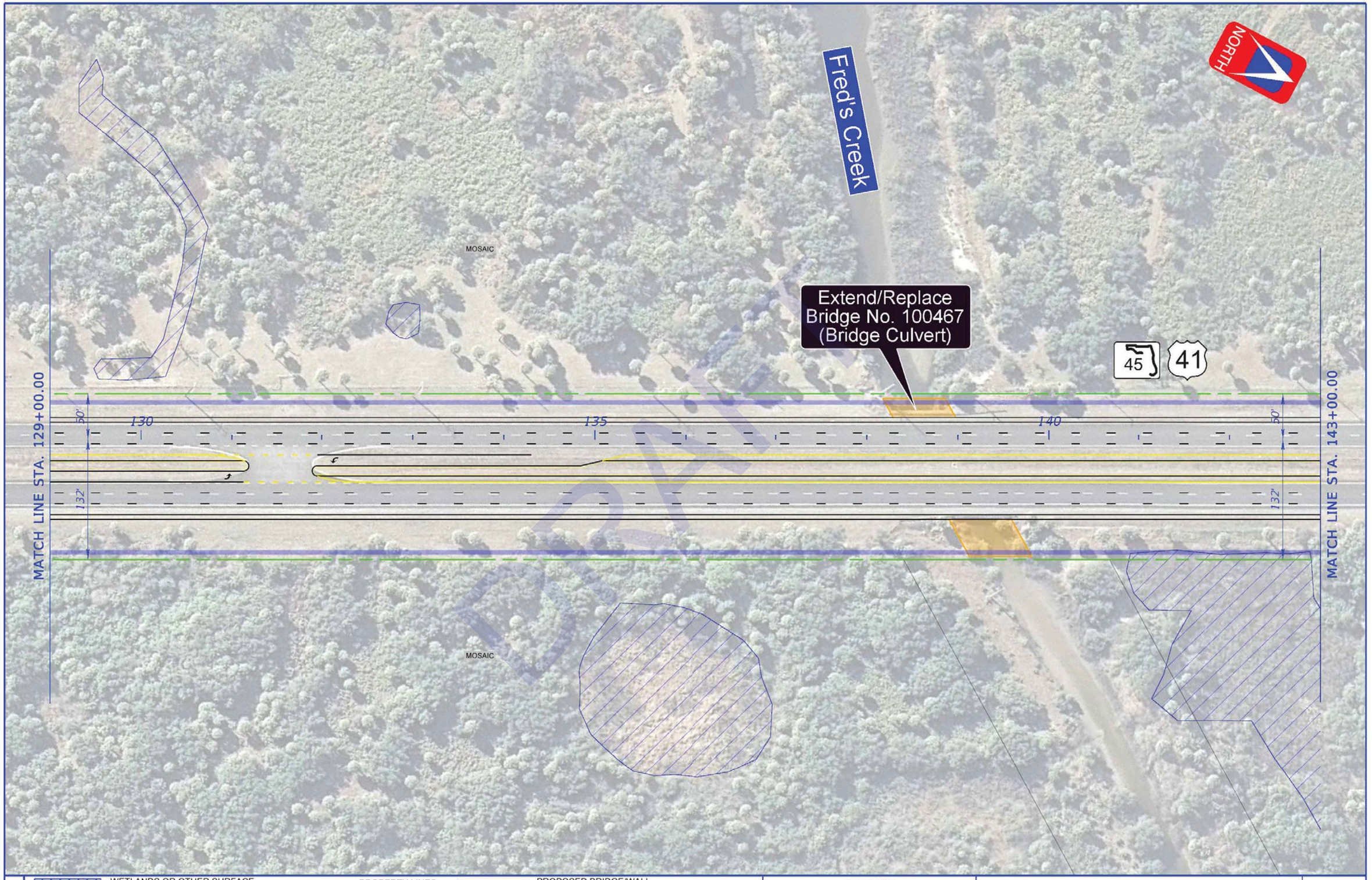
SHEET NO. 20



LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
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- PROPOSED ROADWAY
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0 20 100
Feet

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Concept Plans

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SHEET NO. 21

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NORTH

MOSAIC

45 41

MATCH LINE STA. 143+00.00

MATCH LINE STA. 157+00.00

145 150 155

50' 132' 132' 50'

Block 5300

Old US 41

MOSAIC

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
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- POTENTIALLY CONTAMINATED SITE
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 22

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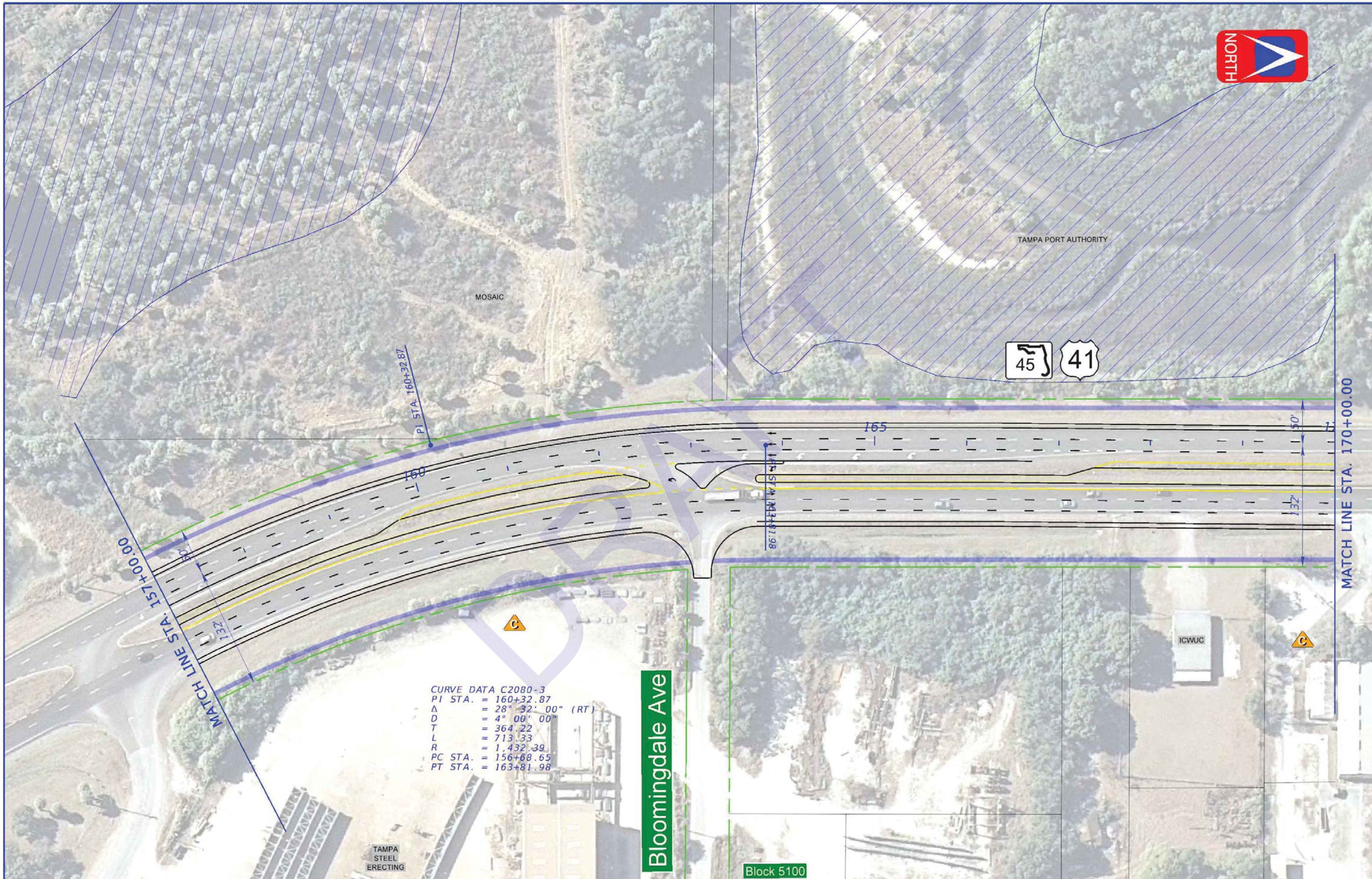

LEGEND

WETLANDS OR OTHER SURFACE WATERS BOUNDARY	PROPERTY LINES
POTENTIAL BUSINESS RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)	EXISTING ROW
POTENTIAL RESIDENTIAL RELOCATION (NUMBER OF RELOCATIONS WITHIN PARCEL)	PROPOSED ROW TO BE ACQUIRED
POTENTIALLY CONTAMINATED SITE	PROPOSED BRIDGE/WALL CULVERT EXTENSION
PROPOSED ROADWAY	SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

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US41 PD&E STUDY

Kracker Ave to South of Causway Blvd (SR676)

Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 23

Block 4800

NORTH

TAMPA LIQUIDATION CENTER

BODY SHOP

STARKEY'S LOUNGE

TAMPA TRUCK PANTING

Dover St

VACANT

J.R.C TRANSPORTATION

ONE USED AUTO PARTS

MATCH LINE STA. 170+00.00

175

180

MATCH LINE STA. 184+00.00

50'

132'

SCRAP KING

BLADES OF GREEN TREE SERVICE

45 41

S. 50th St

PROGRESSIVE WASTE SOLUTIONS OF FL, INC.

Dover St

TAMPA SCRAP PROCESSORS

Block 4800

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
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- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

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Concept Plans

WPI SEGMENT No.: 430056-1

SHEET NO. 24

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NORTH

Pendola Point Rd
(Private)

TECO

TAMPA PORT AUTHORITY

FLORIDA PLAYGROUND & STEEL CO. OUTDOOR LIVING

MARATHON ASPHALT PLANT

45 41
S. 50th St

MATCH LINE STA. 184+00.00

185

190

POT STA. 25+20.00

195

MATCH LINE STA. 198+00.00

50'

132'

26

27

28

29

PROGRESSIVE WASTE SOLUTIONS OF FL, INC.

HD SUPPLY HOLDINGS LLC

TAMPA 676A COUNTY

Madison Ave

Block 4600

CIRCLE K (SHELL)

DILLON TRANSPORT INC.

FUTURE TRILLIUM CNG STATION SITE

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RELOCATIONS WITHIN PARCEL
- C — POTENTIALLY CONTAMINATED SITE
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100
Feet

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SHEET NO. 25

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Block 4400

NORTH

CSXT Railroad

TMR (TRADEMARK METALS RECYCLING)

ONE STEEL

Port Sutton Rd

Extend/Replace Culvert

45 41 S. 50th St

M.E.B.A.

MATCH LINE STA. 198+00.00

MATCH LINE STA. 212+00.00

Montgomery St (Private)

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
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- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

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SHEET NO. 26

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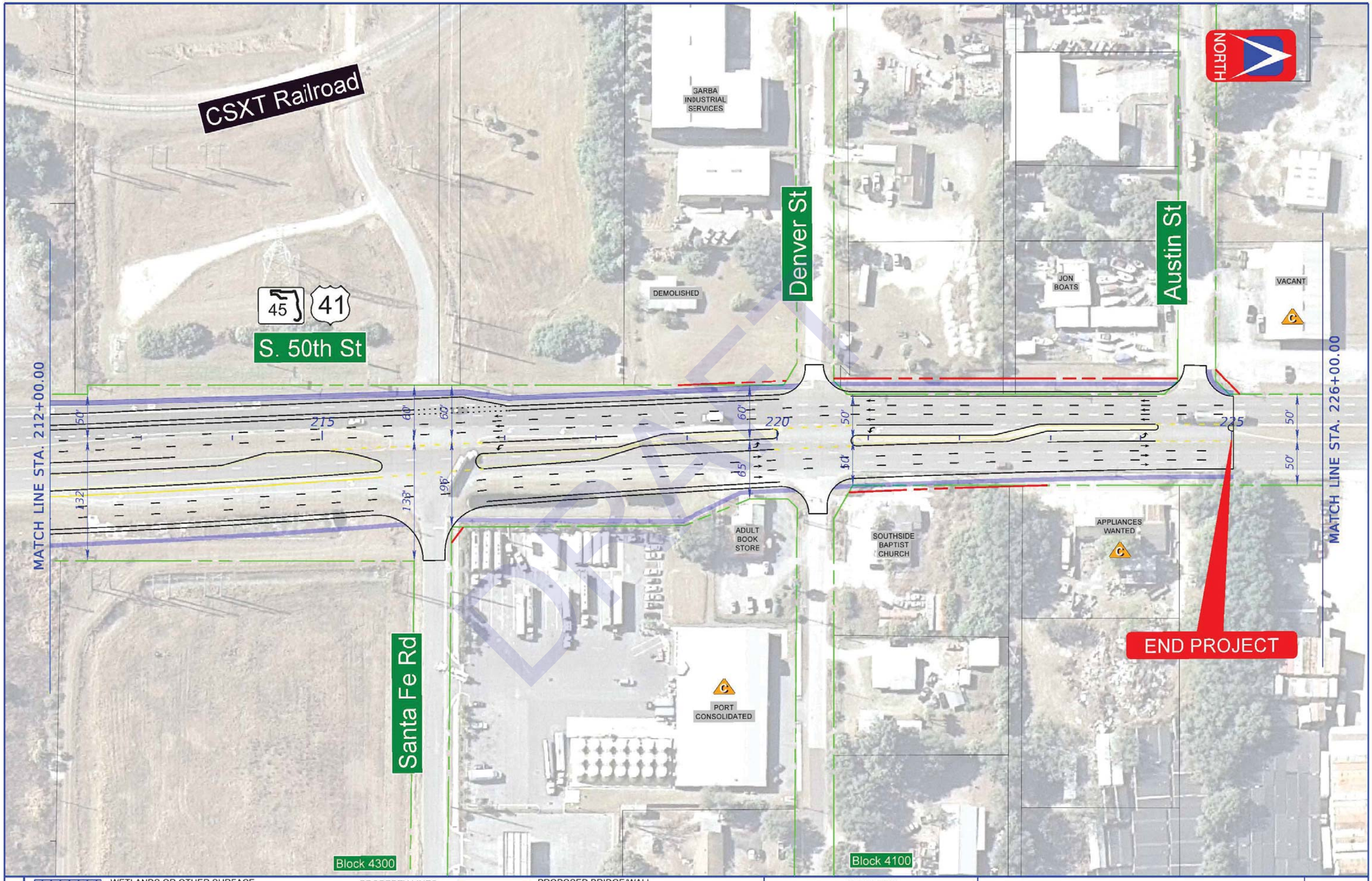

LEGEND

- WETLANDS OR OTHER SURFACE WATERS BOUNDARY
- POTENTIAL BUSINESS RELOCATION (B) — NUMBER OF RELOCATIONS WITHIN PARCEL
- POTENTIAL RESIDENTIAL RELOCATION (R) — NUMBER OF RELOCATIONS WITHIN PARCEL
- PROPERTY LINES
- EXISTING ROW
- PROPOSED ROW TO BE ACQUIRED
- POTENTIALLY CONTAMINATED SITE (C)
- PROPOSED BRIDGE/WALL CULVERT EXTENSION
- PROPOSED ROADWAY
- SIDEWALK / PATH

0 20 100 Feet

DATE OF AERIAL: OCTOBER 2011

AMERICAN CONSULTING ENGINEERS OF FLORIDA, LLC
2818 Cypress Ridge Blvd, Suite 200
Wesley Chapel, Florida 33544
Phone: (813) 435-2600 Fax: (813) 435-2601
Certificate of Authorization No. 9302
Jeffrey S. Novotny, P.E. No. 51083

US41 PD&E STUDY
Kracker Ave to South of Causway Blvd (SR676)
Concept Plans
WPI SEGMENT No.: 430056-1

SHEET NO. 27

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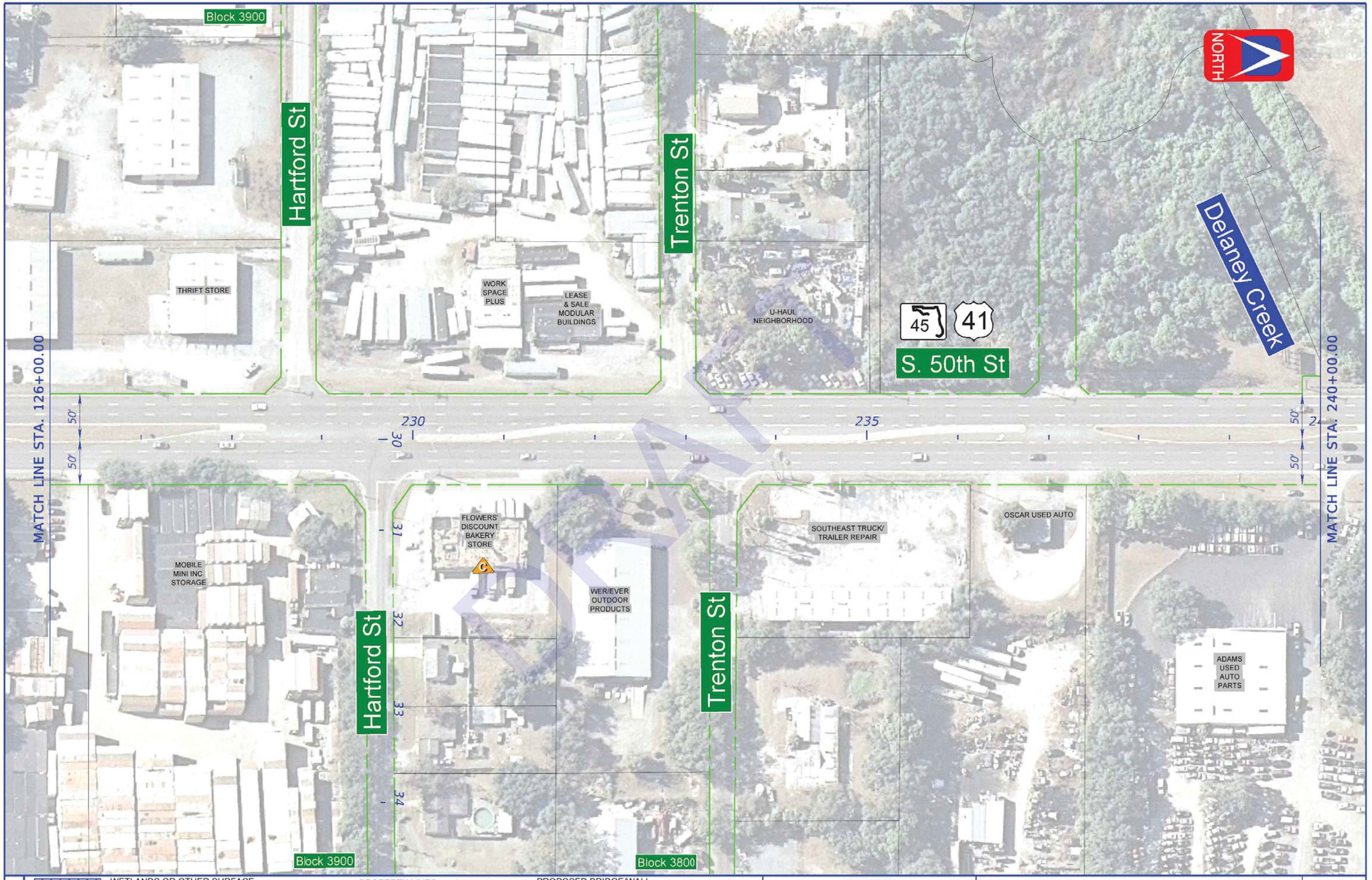

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Block 3500

Block 3500

Block 3300

NORTH

Raleigh St

Towaway Ave

S 34th Ave

SPEED LIMIT 55

FOY'S TRANSPORT TIRE SERVICES

MIDWEST TRANSPORT INC.

45 41

S. 50th St

MATCH LINE STA. 240+00.00

MATCH LINE STA. 254+00.00

10 75' 50' 245 70' 50' 50' 250 50' 50'

Bridge No. 100048
(Bridge Culvert)

SPEED LIMIT 50

DEMOLISHED BUILDING

S 36th Ave

EXIDE CORPORATION

SOUTH TAMPA PAINTBALL

DRAFT

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0 20 100 Feet

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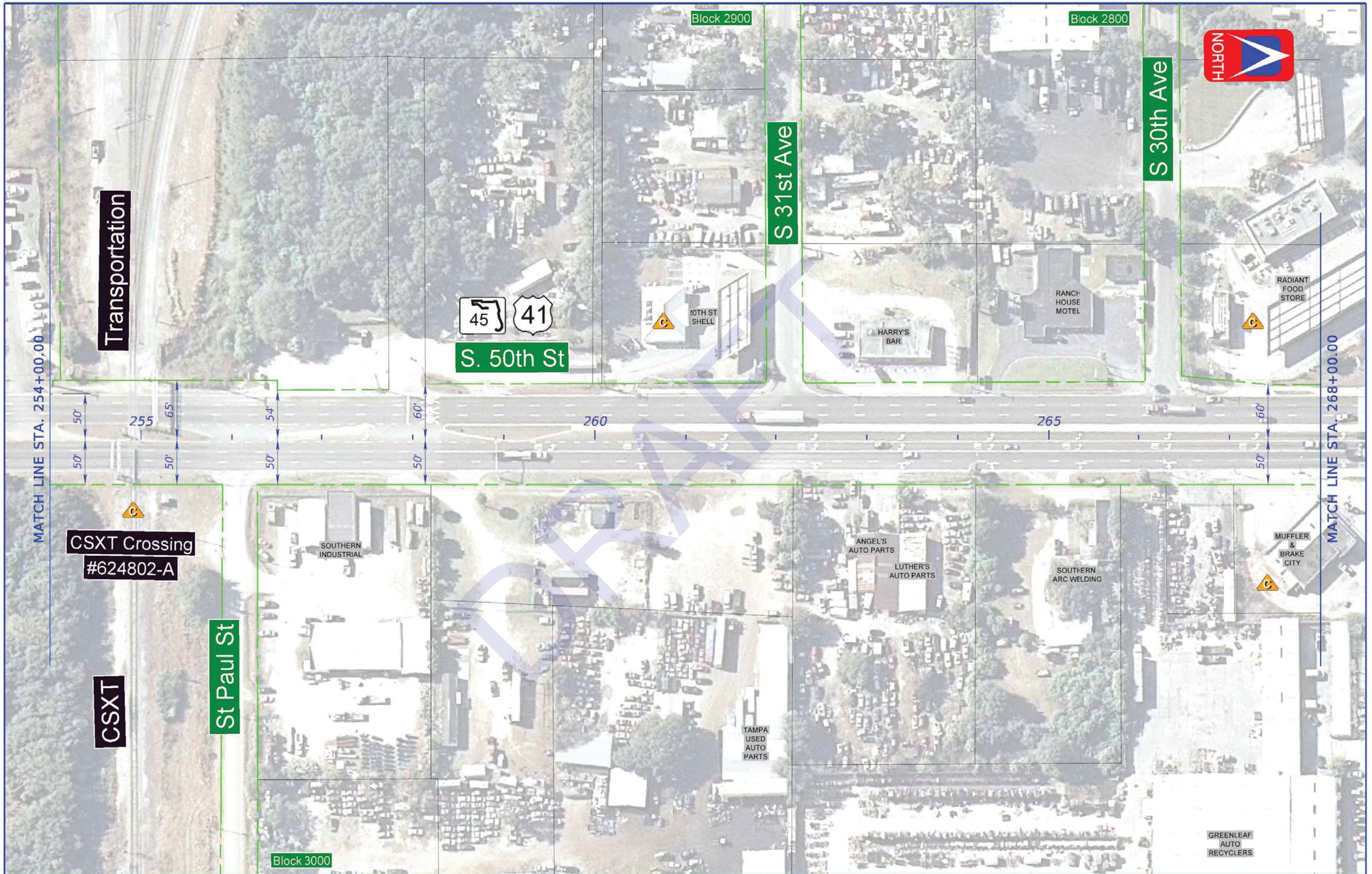

LEGEND

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LEGEND

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0 20 100
Feet

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