Florida Department of Transportation

DRAFT

US 17/92 PD&E Study

from Ivy Mist Lane to Avenue A in Osceola County, FL

Location Hydraulics Report

FDOT Office
District Five

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Date of Publication
JULY 2023

Financial Management No. 437200-2-22-01
ETDM No. 14365

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

Professional Engineer Certificate

I hereby certify that I am a registered professional engineer in the State of Florida practicing with VHB, Inc., a corporation, authorized to operate as an engineering business, Certificate of Authorization No. 3932, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Project:	US 17/92 from Ivy Mist Lane to Avenue A
FIN:	437200-2-22-01
FAP:	
Location:	Osceola County, Florida
Client:	FDOT – District Five

This Location Hydraulic Report includes a summary of data collection efforts and conceptual drainage analyses prepared for conceptual analyses for the widening of US 17/92. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of stormwater engineering and planning as applied through professional judgment and experience. This document is for planning purposes only and is not to replace any effort required for final design.

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Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
CARS	Crash Analysis Reporting System
CFX	Central Florida Expressway Authority
CR	County Road
CRPR	Contamination Risk Potential Rating
ERP	Environmental Resource Permit
ETDM	Efficient Transportation Decision Making
F.A.C.	Florida Administrative Code
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FFWCC	Florida Fish and Wildlife Conservation Commission
FHWA	Federal Highway Administration
FLUCFCS	Florida Land Use, Cover and Forms Classification System
GIS	Geographical Information System
ICPR	Interconnected Pond Routing
LOS	Level of Service
NAVD	North American Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
OFW	Outstanding Florida Waters
PSR	Pond Siting Report
PD&E	Project Development and Environment
ROW	Right-of-Way
SCS	Soil Conservation Service
SFWMD	South Florida Water Management District
SHGWT	Seasonal High Groundwater Table
SR	State Road
T & E	Threatened and Endangered
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Executive Summary

The Florida Department of Transportation (FDOT) District 5 is conducting a Project Development and Environment (PD&E) Study to evaluate alternatives to widen US 17/92 from the existing two-lane roadway to a four-lane divided roadway from Ivy Mist Lane to Avenue A, a distance of 3.8 miles, in Osceola County.

The proposed road widening intends to increase capacity and improve access management, which is anticipated to reduce congestion and conflict points. This project will also provide pedestrian and bicycle facilities to improve multimodal accommodations throughout the study corridor.

The project is located in Osceola County and within the jurisdiction of the South Florida Water Management District (SFWMD). The project drains to Reedy Creek Swamp and ultimately to Reedy Creek which flows from north to south. Reedy Creek is not an Outstanding Florida Water (OFW).

The corridor is located within the designated Northern Everglades and Estuaries Protection Program (NEEP) Watersheds - Lake Okeechobee Watershed. Lake Okeechobee is not an OFW. Lake Okeechobee is impaired for Total Phosporous and Reedy Creek is part of the Lake's Basin Management Action Plan (BMAP). The proposed widening of US 17/92 project boundaries is also within the Biscayne Aquifer Sole Source Aquifer (SSA) Streamflow and Recharge Source Zones.

The drainage system that serves this segment of US 17/92 is primarily composed of open swales, side drains and cross drains that eventually drain south to the Reedy Creek Swamp, and then to Reedy Creek. Within the project limits, there are some ponds which were permitted and constructed when the existing US 17/92 Bridge over Reedy Creek (Reedy Creek Bridge) was built. The Reedy Creek Bridge discharges directly to Reedy Creek.

There are seven (7) existing cross drains and two (2) parallel bridges along the project corridor. Two of the cross drains will be designed and constructed under other project scopes and one cross drain has already been extended. The Preferred Alternative includes restriping the existing Reedy Creek Bridge to serve as the eastbound bridge and replacing the Old Reedy Creek Bridge with a new structure to the north to serve as the westbound bridge.

This report documents the hydraulic analysis for the above-mentioned structures in both existing and proposed conditions. The proposed alignment has minimal impacts on the 100-year floodplain. This minimal impact was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in ponds, so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits. Modifications to drainage structures consist of the extension of the existing cross drains. As per the analysis carried out in this report, no impact is expected to the base flood elevation, likelihood of flood risk, overtopping and backwater conditions. Floodplain compensation for the impacts is provided in Pond Floodplain Compensation Area (FCA)2 as calculated and documented in the Pond Siting Report (PSR), under separate cover. Calculations for floodplain compensation and ponds are included in **Appendix C3**. By complying with regulatory criteria, the implementation of this project will not adversely affect the area adjacent to the corridor and meets the expectations of the stakeholders.

1.0 Introduction

The Florida Department of Transportation (FDOT) District 5 is conducting a Project Development and Environment (PD&E) Study to evaluate alternatives to widen US 17/92 from the existing two-lane roadway to a four-lane divided roadway from Ivy Mist Lane to Avenue A, a distance of 3.8 miles, in Osceola County. A prior Corridor Planning Study of US 17/92 from County Road (CR) 54 (Ronald Reagan Parkway) in Polk County to 1,900 feet west of Poinciana Boulevard at Avenue A in Osceola County was completed in 2018. This project traverses through the unincorporated communities of Poinciana and Intercession City.

Figure 1 shows the US 17/92 PD&E Study limits (shown in light green) and previous Corridor Planning Study limits (shown in blue), along with the limits of adjacent projects mentioned below.

Two related projects overlap the western end of this PD&E Study:

- The segment of US 17/92 from west of Parker Road in Polk County to Ivy Mist Lane in Osceola County is included in the Central Florida Expressway Authority's (CFX) State Road (SR) 538/ Poinciana Parkway Extension to CR 532 project, which is under design and anticipated to be complete in late 2022 with construction beginning in mid-2023. The SR 538/Poinciana Parkway Extension project will include the widening of US 17/92 within these limits, as well as a proposed diverging diamond interchange with US 17/92 southwest of Ivy Mist Lane as shown in teal (**Figure 1**).
- Adjacent to the western end of the PD&E Study (shown in dark green) is a CFX study evaluating widening CR 532/Osceola Polk Line Road from two to four lanes from Old Lake Wilson Road to US 17/92 (**Figure 1**). This study includes design and is anticipated to begin construction in 2024.

One ongoing project abuts the eastern limits of this PD&E Study. FDOT District 5 is widening US 17/92 from two to four lanes, with limits from 1,900 feet west of Poinciana Boulevard (Avenue A) to CR 535 (Ham Brown Road) in Kissimmee (FPID: 239714-1). This project, shown in purple on **Figure 1**, was already completed at the time of the site visit in December 2022.

1.1 Purpose and Need

The purpose of this project is to provide needed capacity through the design year 2045, enhance regional connectivity, and improve safety conditions along the study corridor. The project is needed to meet future traffic demand, provide satisfactory future traffic operations, improve corridor access management, and improve safety along the corridor.

The following sections describe the need for improvements based on transportation connectivity, future traffic demand, and existing crash data.

1.1.1 Transportation Connectivity

The US 17/92 study corridor is a vital east-west segment in the regional transportation network within western Osceola County and the primary thoroughfare through Intercession City. Regionally, the US 17/92 corridor serves as a major arterial connecting Kissimmee to the north and Polk County to the south. The study corridor will connect to the programmed SR 538/Poinciana Parkway Extension at the western end of the project, which will include an interchange connection to US 17/92 immediately southwest of Ivy Mist Lane. The SR 538/Poinciana Parkway Extension is planned to extend to I-4 in the vicinity of the SR 429 interchange providing enhanced connectivity from US 17/92 to Osceola and Orange Counties. This project would provide a continuous four-lane section between the Poinciana Parkway Extension and Avenue A. The programmed widening of CR 532 from US 17/92 to Lake Wilson Road will complete a continuous four-lane connection to I-4. The corridor is designated an evacuation route by the Florida Division of Emergency Management (FDEM).

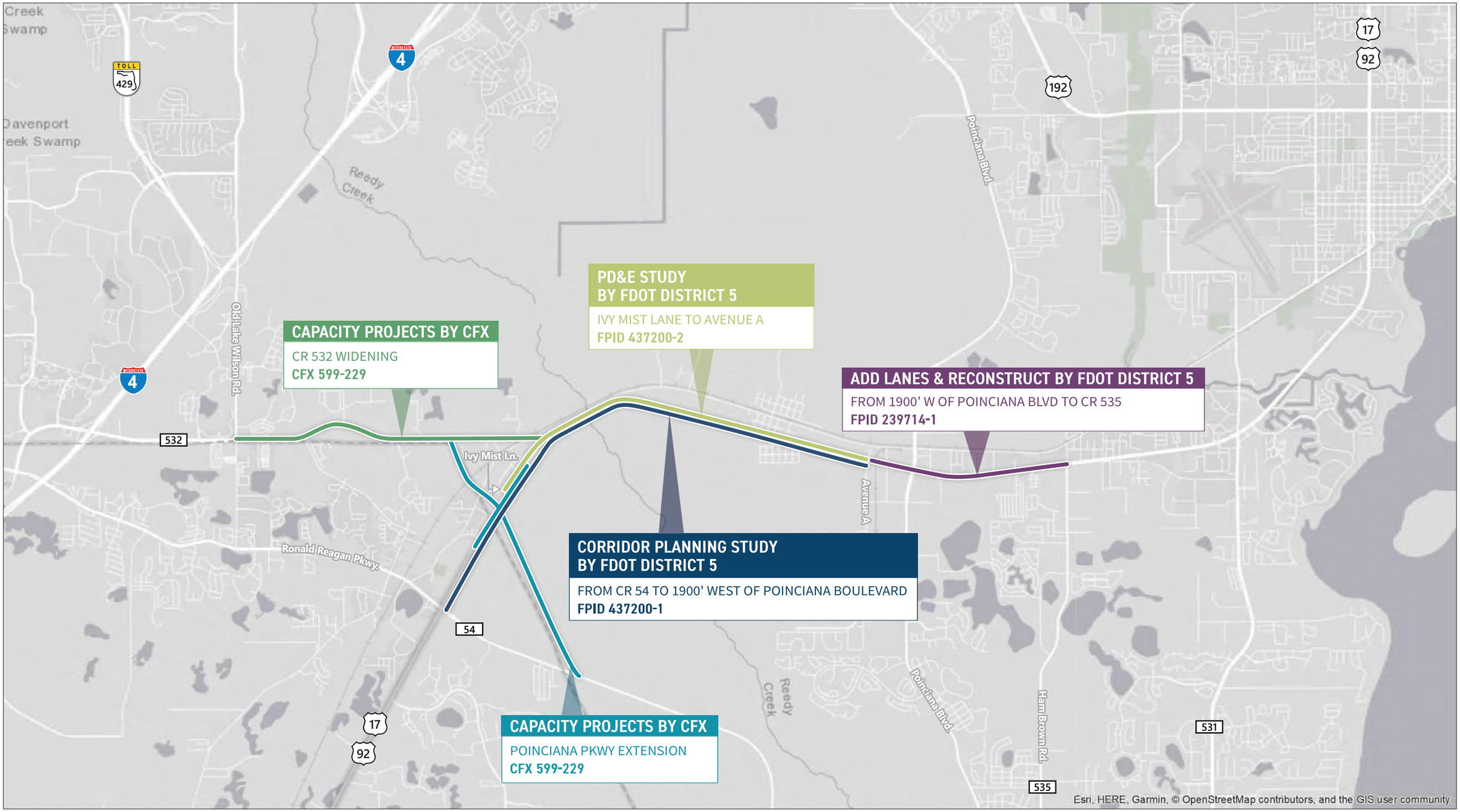

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Figure 1

Location Map
US 17/92 PD&E
FPID # 437200-2

1.1.2 Future Traffic Demand

Future traffic analyses were conducted for the US 17/92 study corridor for three analysis years (2025, 2035, and 2045). Based on the intersection operational analysis, by 2045 most of the study intersections are anticipated to experience very high delays. Specifically, the high delays start from 2025 for the majority of unsignalized intersections and the signalized intersection at US 17/92 and CR 532. Capacity improvements are needed to accommodate future traffic demand and provide satisfactory traffic operations.

Based on the arterial operational analysis, the US 17/92 study corridor is expected to operate at target Level of Service (LOS) D or better through the design year 2045, except for the northbound/eastbound approach south of CR 532, which is expected to fail in the 2035 and 2045 AM peak hour. These results are due to the lack of signalized intersections between CR 532 and Poinciana Boulevard and the existing high posted speed limit. However, the signalized intersection at CR 532 is expected to experience very high approach delays and extensive queueing along US 17/92, which will impact the arterial operations. Additionally, all of the future Annual Average Daily Traffic (AADT) along the study corridor will exceed the Maximum Service Volume of 18,590 for LOS D for a two-lane urbanized arterial starting in opening year 2025.

1.1.3 Safety

Crash data for a five-year period (2014-2018) obtained from FDOT Crash Analysis Reporting System (CARS) found a total of 161 crashes occurred along the study corridor. Of the 161 reported crashes, 91 involved injuries and two resulted in fatalities. The highest portion of crashes were rear-end (62.1%). The crash rates at the Shepherd Lane/Nocatee Street intersection and at the Avenue A intersection were found to be above the statewide crash rate. The crash rate at the CR 532 (Osceola Polk Line Road) intersection was not higher than the statewide crash rate but very close. This project intends to increase capacity and improve access management, which is anticipated to reduce congestion and conflict points. This project will also provide pedestrian and bicycle facilities to improve multimodal accommodations throughout the study corridor.

2.0 Project Alternatives

2.1 No-Build Alternative

The No-Build Alternative assumes no improvements such as additional traffic lanes or other improvements will be made within the study area, except for programmed improvements to nearby or adjacent facilities. For this project, the No-Build Alternative includes the ongoing widening of US 17/92 from Avenue A to CR 535 (FPID: 239714-1) to four lanes, the programmed SR 538/Poinciana Parkway Extension, and the CR 532 widening.

The No-Build Alternative serves as the baseline for comparing the Build Alternative and remains a viable option throughout the PD&E study process. Based on programmed improvements, the existing typical section assumed for the No-Build Alternative remains a two-lane undivided rural typical section. At the eastern end of the project at Avenue A, the corridor transitions to a four-lane typical section. For the majority of the study limits, the existing typical section along US 17/92 within the study limits is provided below in **Figure 2**. The existing bridge typical section is provided as **Figure 3**.

Figure 2: Existing Typical Section

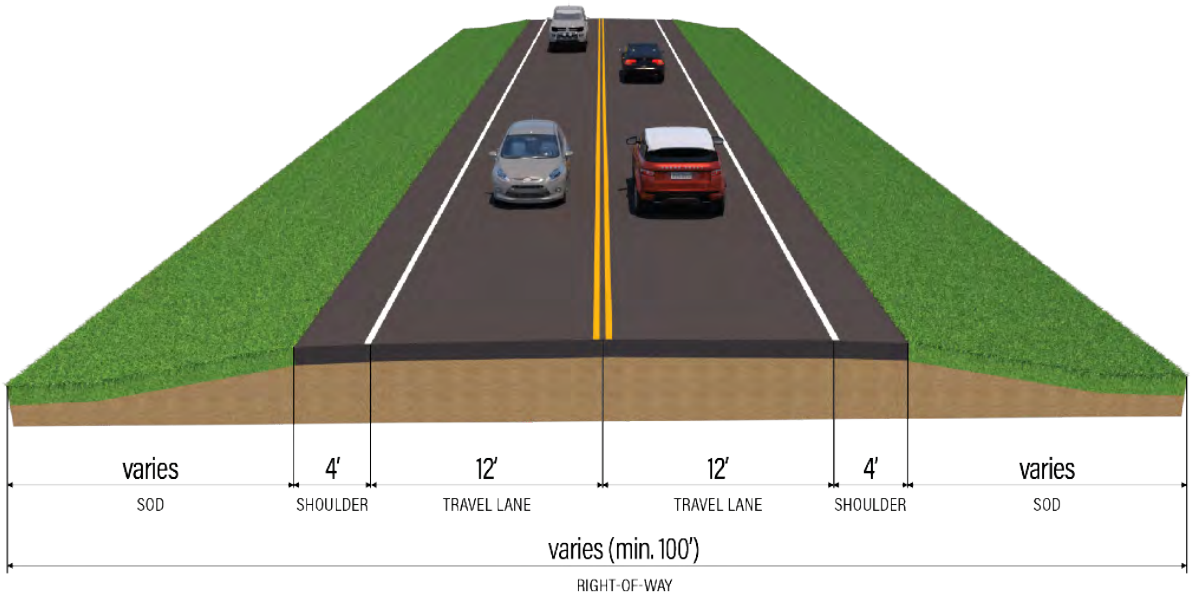
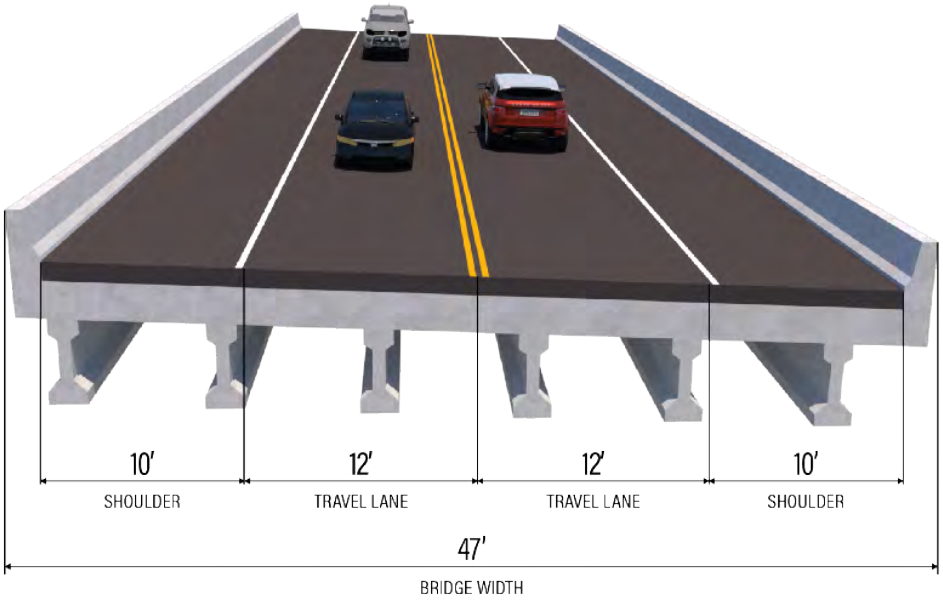


Figure 3: Existing Bridge Typical Section



2.2 Alternatives Considered

The Build Alternative widens US 17/92 to four lanes (two lanes per direction) throughout the study limits from Ivy Mist Lane to Avenue A. Due to alignment constraints from adjacent facilities and the existing bridge over Reedy Creek, the Build Alternative applied from Ivy Mist Lane to east of Old Tampa Highway is a best-fit alignment. From east of Old Tampa Highway to Avenue A, the study developed three alignments for alternatives comparison. The recommended alignment maximizes the existing Right-of-Way (ROW) and consists of widening to the south on the west end of the project corridor to align with the Poinciana Parkway Extension proposed improvements, then shifts to the south through the central portion of the project corridor to avoid the existing cemetery, widens to the north through Intercession City to avoid relocations, and aligns with the adjacent widening at the east end of the project corridor. The Preliminary Engineering Report (PER) prepared for the study summarizes the alternatives considered, the related analysis, and selection of the Preferred Alternative. The Preferred Alternative was developed to avoid and minimize environmental effects where feasible. Several stormwater treatment pond alternatives were evaluated, and the Pond Siting Report (PSR) discusses these alternatives and selection of the preferred pond sites.

2.3 Description of Preferred Alternative

The Preferred Alternative widens US 17/92 from Ivy Mist Lane to Avenue A from the existing two-lane rural facility to a four-lane divided facility. The Preferred Alternative includes access management modifications to improve safety. The Preferred Alternative adds continuous multimodal facilities along both sides of the roadway for the entire length of the study corridor, except at the Reedy Creek Bridge due to constraints along the existing bridge (proposed eastbound structure). A pedestrian crossing will be provided at the Osceola Polk Line Road and Old Tampa Highway intersections to provide pedestrians with a crossing over US 17/92 to the shared-use path.

The Preferred Alternative also involves the retention of the existing bridge over Reedy Creek to serve as the eastbound traffic lanes and the addition of a new bridge over Reedy Creek to serve as the westbound traffic lanes. The westbound bridge will have a 12-foot-wide shared use path for the use of pedestrians and bicyclists travelling in both directions. In addition to the widening and multimodal improvements

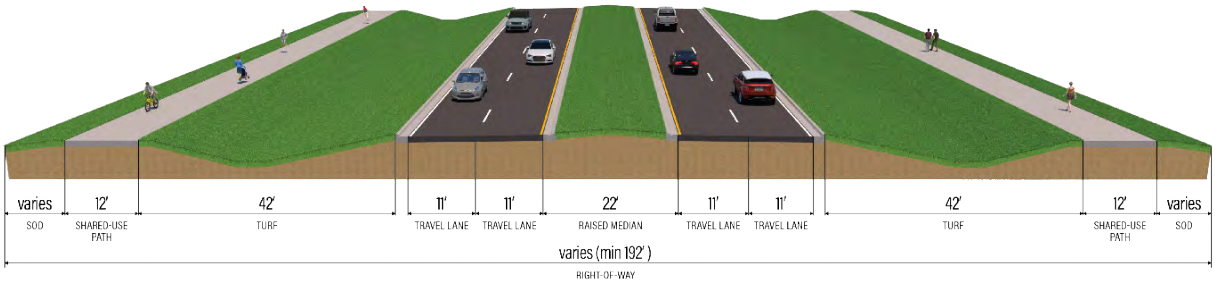
along US 17/92, this project includes intersection improvements at CR 532, Old Tampa Highway, and Avenue A. Five pond site locations have been recommended as part of the Preferred Alternative for a total of 22.74 acres of stormwater ponds.

The typical section for the Preferred Alternative is divided into six segments (shown in **Figure 6**).

Suburban Typical Section – Segments 1, 4, and 6

An urban roadway typical section with swales is proposed for Segments 1, 4, and 6. The typical section (depicted in **Figure 4**) includes a 22-foot raised median, two 11-foot travel lanes in each direction, and a 12-foot shared use path along both sides of the roadway. The shared use paths are both separated from the roadway by curb and gutter and 42-foot-wide drainage swales. The required ROW for the suburban roadway typical section varies with a minimum of 192 feet.

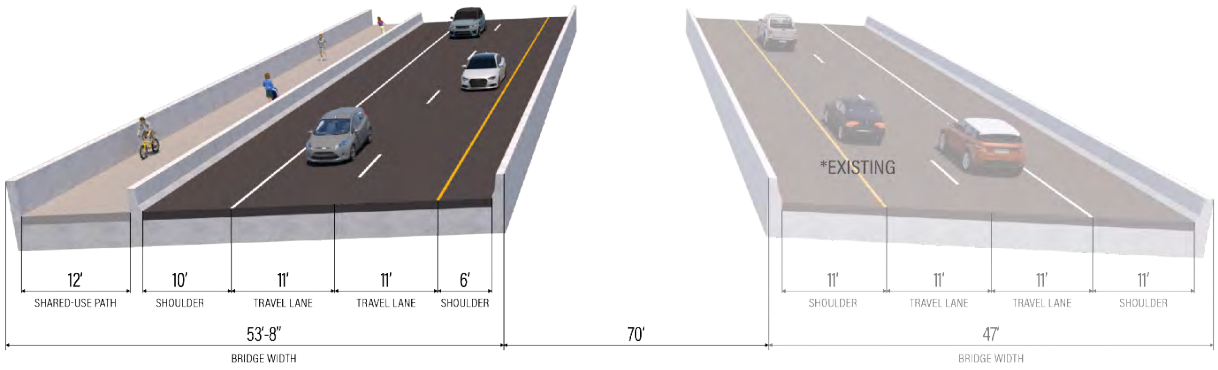
Figure 4: Suburban Typical Section (Segments 1, 4, and 6)



Bridge Typical Section – Segment 2

The typical section for the Reedy Creek Bridge, within Segment 2, includes two bridge structures (**Figure 5**). The existing bridge structure will serve eastbound traffic and a new bridge structure will serve the westbound traffic. The two bridge structures will be separated by a width of 70 feet. The existing eastbound bridge includes 11-foot inside and outside shoulders and two 11-foot travel lanes. The new westbound structure includes a six-foot inside shoulder, a 10-foot outside shoulder, two 11-foot travel lanes, and a 12-foot shared-use path separated from the roadway by a raised concrete barrier. The existing 244 feet ROW accommodates the proposed bridge structure. The existing eastbound bridge is located in a permanent easement on the south side of the FDOT ROW, which allows the new westbound bridge to be located fully within the existing ROW to the north.

Figure 5: Bridge Typical Section (Segment 2)



Reedy Creek Bridge to Old Tampa Highway

Reedy Creek Bridge

Ivy Mist Lane to Reedy Creek Bridge

Old Tampa Highway to Intercession City

Intercession City

Intercession City to Avenue A

Old Tampa Hwy.

Intercession City

532

Osceola Polk Line Rd.

Ivy Mist Ln.

Old Lake Wilson Rd.

Ronald Reagan Pkwy.

Loughman

54

Loughman Crossing Plaza

92

17

Osceola County
Polk County

Lee Jackson Hwy.

92

17

Poinciana Pkwy.

Ave. A

Ave. B

S. Poinciana Blvd.

92

17

N

N.T.S.

Project Limits

Poinciana Parkway Extension/Interstate 4 (I-4) Connector (in design)

U.S. 17/92 Widening (under construction)

Osceola Polk Line Road Widening (under construction)

FDOT

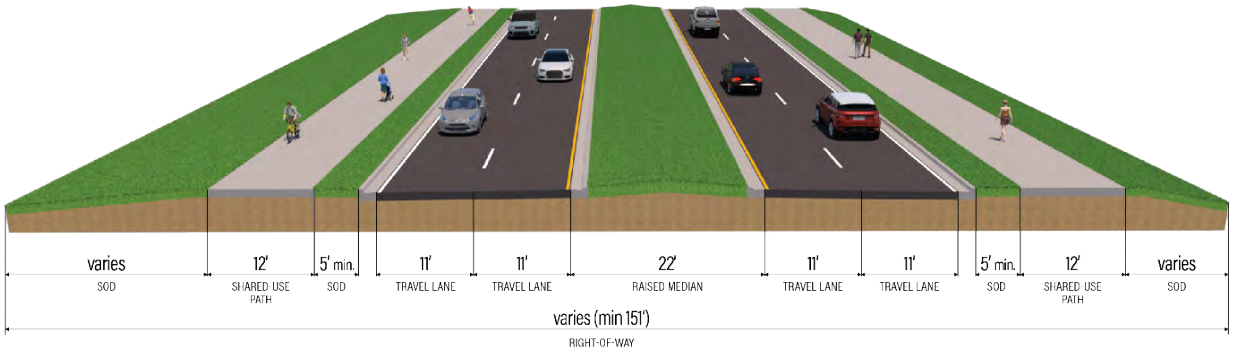
Figure 4

Study Segments
US 17/92 PD&E
FPID # 437200-2

Urban Typical Section – Segment 3

An urban typical section, as illustrated in **Figure 7**, is proposed for Segment 3 from the east end of the Reedy Creek Bridge to Old Tampa Highway. This typical section consists of two 11-foot travel lanes in each direction separated by a 22-foot raised median, and a 12-foot shared use path along both sides of the roadway. The shared use path is separated from the roadway by curb and gutter and a buffer varying in width with a minimum of five feet. The total ROW needed for this typical section varies with a minimum of 151 feet.

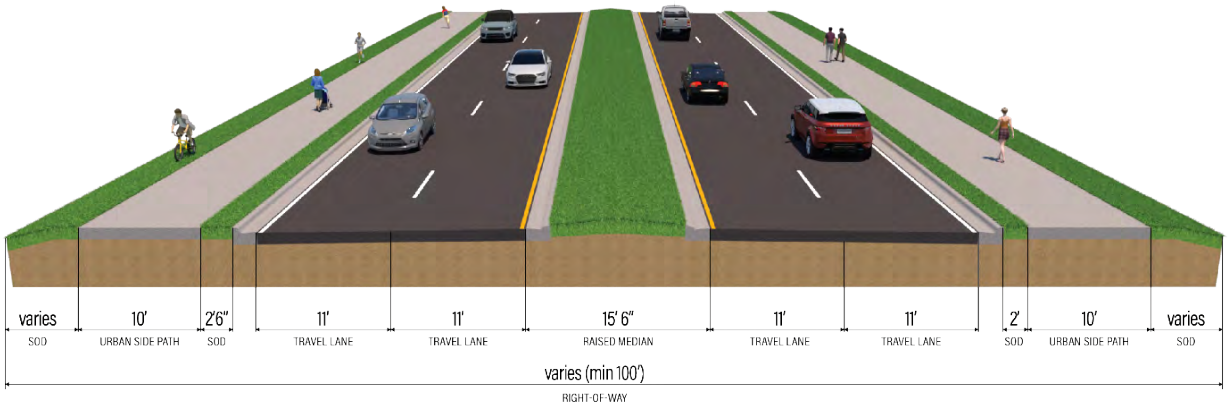
Figure 7: Urban Typical Section (Segment 3)



Urban Typical Section – Segment 5

An urban typical section is proposed for Segment 5 through Intercession City (**Figure 8**). This typical section includes a 15.5-foot raised median, two 11-foot travel lanes in each direction, and a 10-foot urban side path along both sides of the roadway. The urban side path is separated from the roadway by curb and gutter and a buffer with a width of two feet along the south side of the roadway and 2.5 feet along the north side of the roadway. The total ROW needed for this typical section varies with a minimum of 100 feet.

Figure 8: Urban Typical Section (Segment 5)



3.0 Purpose of Report

The purpose of this Location Hydraulic Report (LHR) is the hydraulic analysis of the cross drain structures along the corridor, for both existing and proposed conditions. In addition, the report addresses the base floodplain encroachment resulting from the proposed roadway improvements.

In accordance with FDOT regulations, floodplains must be protected. Therefore, this analysis ensures that all base floodplains are identified, encroachments are quantified and evaluated, and mitigation measures are provided. The FDOT drainage design standards and South Florida Water Management District (SFWMD) design criteria are followed to avoid or minimize highway encroachments within the 100-year (base) floodplains, and to avoid supporting land use development that is incompatible with floodplain values.

4.0 Methodology

The seven existing cross drains along the alignment of US 17/92 have been evaluated to determine if they are hydraulically adequate for the existing and proposed/extended conditions. All cross drains ultimately drain to Reedy Creek.

Per the FDOT Drainage Design Guide, the Rational Method was employed on this project to calculate discharge rates for the rainfall events as per design guidelines by the FDOT Drainage Manual. The intensities for each storm event were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Rainfall Data. Time of concentration was calculated for each basin, with times of concentration ranging from 39 minutes to 159 minutes. Rational formula runoff coefficient (C) values for areas within the ROW were determined by measuring the areas of impervious surface and grass surface. Rational formula C values for off-site areas were determined using aerial photography. Discharge rates for the 50-year, and 100-year events were computed using the Rational Method. The cross drains were evaluated for the 50-year storm event. **Table 1** provides the required storm events to be analyzed for each cross drain, per the FDOT Drainage Manual, January 2023 requirements.

Table 1: Storm Frequency Criteria

Facility	Frequency
Mainline Interstate	50 years
High Use or Essential: Projected 20-year AADT* > 1500,	50 years[1]
Other: Projected 20-year AADT* < 1500,	25 years
Roadside Ditch Culverts Pedestrian and Trail Bridges	10 years

[1] Design storm used for evaluation

Existing cross drains numbers 1, 2, 3, 4, 5 and 7 were evaluated for hydraulic performance using the HY-8 v7.60 (HY-8) software program. Cross drain 6 was evaluated using ICPR 3. The location, pipe length, and pipe inverts for each cross drain were obtained from the survey for the project. The overtopping elevation on US 17/92 at each cross drain was determined from the survey. The tailwater was determined using a rating curve developed from the stillwater elevations for Reedy Creek, which are reported in Table 5 of the Federal Emergency Management Agency (FEMA) Flood Insurance Study #12097CV000A for Osceola County, Florida, dated June 18, 2013.

The area contributing to cross drain 6 at station 1308+35 consists of several large wetlands and areas where runoff would stage. This cross drain was evaluated under the following assumptions due to limited survey and LiDAR data:

1. Areas assumed to be wetlands staged up to four inches (4”).
2. Areas that were undeveloped and appeared to be depressional staged up to one inch (1”).

Wetlands also exist (but to a lesser extent) in the watershed areas for all other cross drains. The storage in these wetlands was not considered in the analysis of the cross drain capacities as a conservative approach. For each cross drain watershed, the time of concentration was calculated based on LiDAR and topographic data. Values used were conservative representing the farthest path within the watershed, without considering the water potentially being stored in the existing wetlands. Wetland storage would result in smaller design flows than the actual flows considered in this analysis.

5.0 Existing Conditions

The study area is in Township 26 South, Range 28 East, Section 03 and 06 and Township 25 South, Range 28 East, Sections 32, 33 and 34. The project area consists of undeveloped forested land and a mixture of residential and commercial development.

The existing typical section for the project corridor was described previously in Chapter 1. Existing typical sections for roadway segments were obtained from as-built plans for the three following projects:

- Widening and Milling and Resurfacing project along US 17/92 in Polk County from milepost (M.P.) 9.511 to M.P. 10.256 by Osceola County Expressway Authority, FPID: 432294-1-58-01
- Milling and Resurfacing project along US 17/92 in Osceola County from M.P. 0.000 to M.P. 9.624 by FDOT, State Project No.: 413592-1-52-01
- Widening project along US 17/92 in Osceola County from M.P. 3.988 to M.P. 5.993 by FDOT, FPID: 239714-1-52-01
- The existing typical sections are provided in **Appendix A**. The roadway segment to which each typical section applies is listed below each figure.

5.1 Topography

The area generally flows from north to south draining towards Reedy Creek and the Reedy Creek swamp. The elevation at both ends of the project, intersection of US 17/92 and Avenue A and the intersection of US 17/92 and Ivy Mist Lane, is approximately 75 feet (NAVD 1988) and the road elevation in the vicinity of Reedy Creek is 70 feet (NAVD 1988), as shown in **Figure 9**. Runoff along US 17/92 is collected by roadside swales and ditches.

5.2 Drainage Characteristics

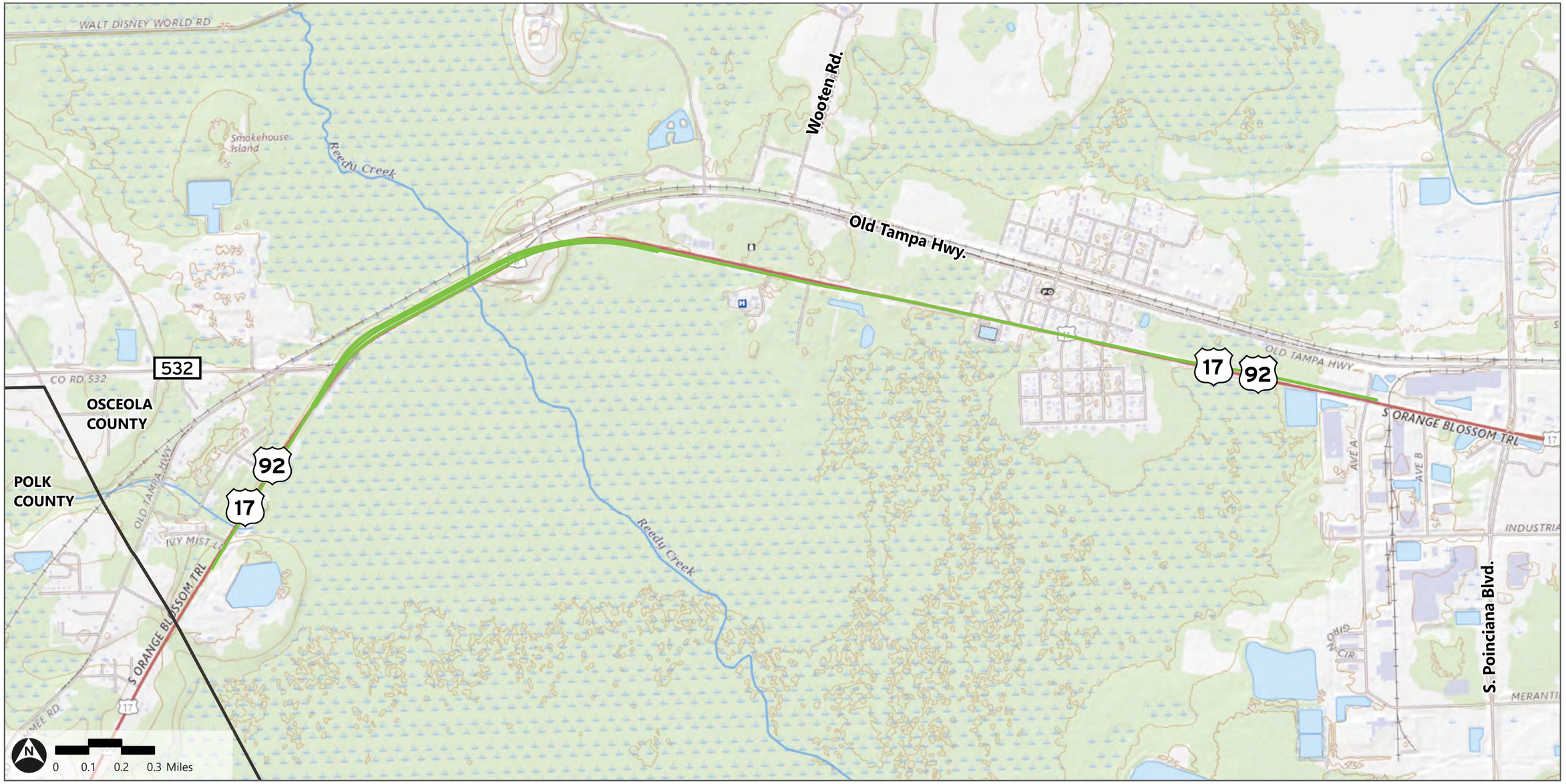
The project site is in the Reedy Creek drainage basin. Reedy Creek flows north to south into Lake Russell and is one of the northernmost water sources for the greater Everglades ecosystem. Reedy Creek, and the limits of this project, are within the jurisdiction of the SFWMD. The project has been divided into four basins. Basin 1 is located west of Reedy Creek, Basin 2 is located at Reedy Creek, and Basins 3 and 4 are east of Reedy Creek. See **Figure 10A** through **Figure 10D**, for the drainage map depicting these basins. Off-site flows adjacent to US 17/92 are discussed in section 5.2.1.

Basin 1 begins at Ivy Mist Lane (Approximately STA 1180+00) and ends at Osceola Polk Line Road/CR 532 (Approximately STA 1210+00). The drainage system that serves this segment of US 17/92 is composed of open swales, side drains and cross drains that eventually drain south to the Reedy Creek Swamp, and then to Reedy Creek.

Basin 2 begins at Osceola Polk Line Road/CR 532 (Approximately STA 1210+00) and ends approximately 500 feet west of Old Tampa Highway (Approximately STA 1244+00). The drainage system that serves this segment of US 17/92 is composed of open swales, side drains and cross drains that drain to Reedy Creek. This segment of US 17/92 crosses over Reedy Creek and includes the Reedy Creek Bridge, which discharges directly to Reedy Creek. The Reedy Creek Bridge is parallel to the Old Reedy Creek Bridge, which has been placed out of service but is still in place north of the Reedy Creek Bridge. The drainage system for Basin 2 also includes a dry retention pond which was permitted and constructed when the Reedy Creek Bridge was built. The pond is located on the north side of US 17/92 approximately 900 feet west of Old Tampa Highway (approximately STA 1241+00).

\\vhb.com\gbl\proj\Orlando\63316.11 US 1792 CR54 to Ave A\Graphics\FIGURES\LHR

Imagery source: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed August, 2021.



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Project Alignment

County Boundary

Figure 9

USGS Quadrangle Map
US17/92 from Ivy Mist Lane to Avenue A

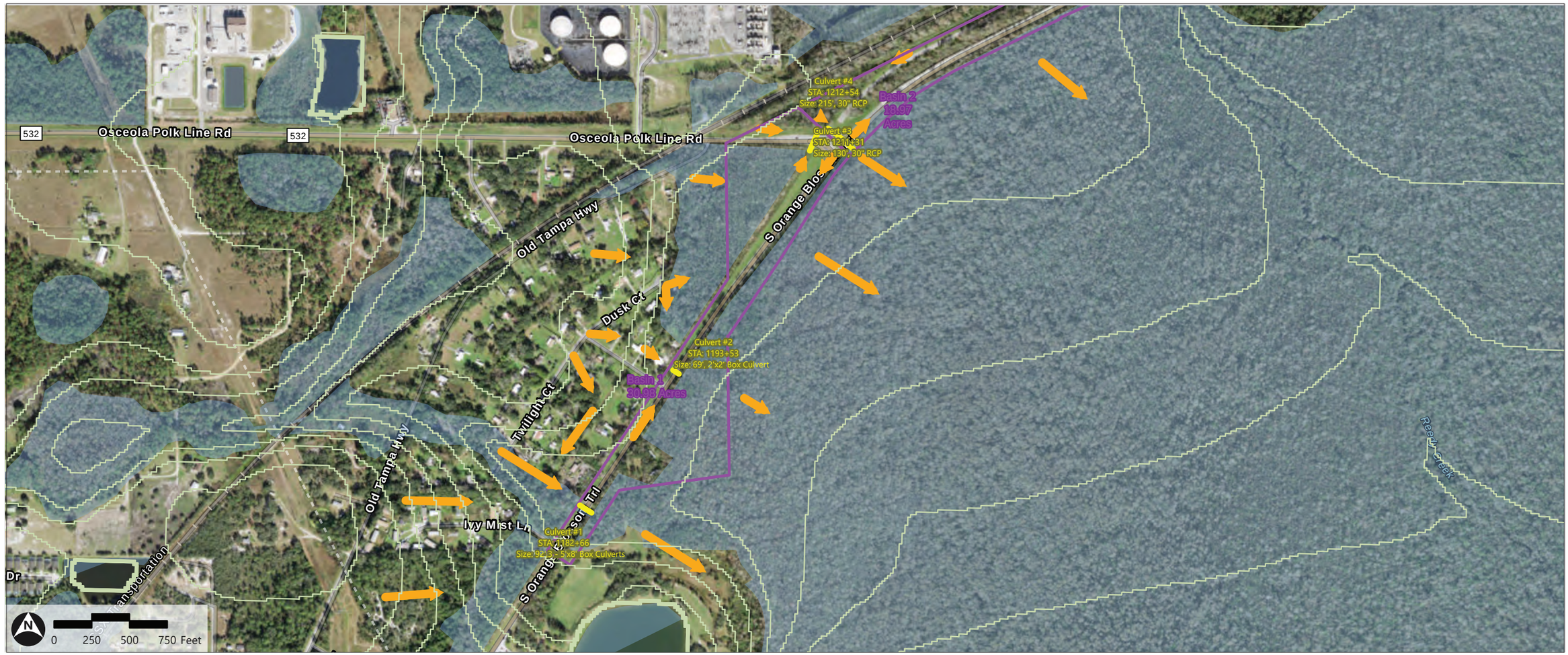
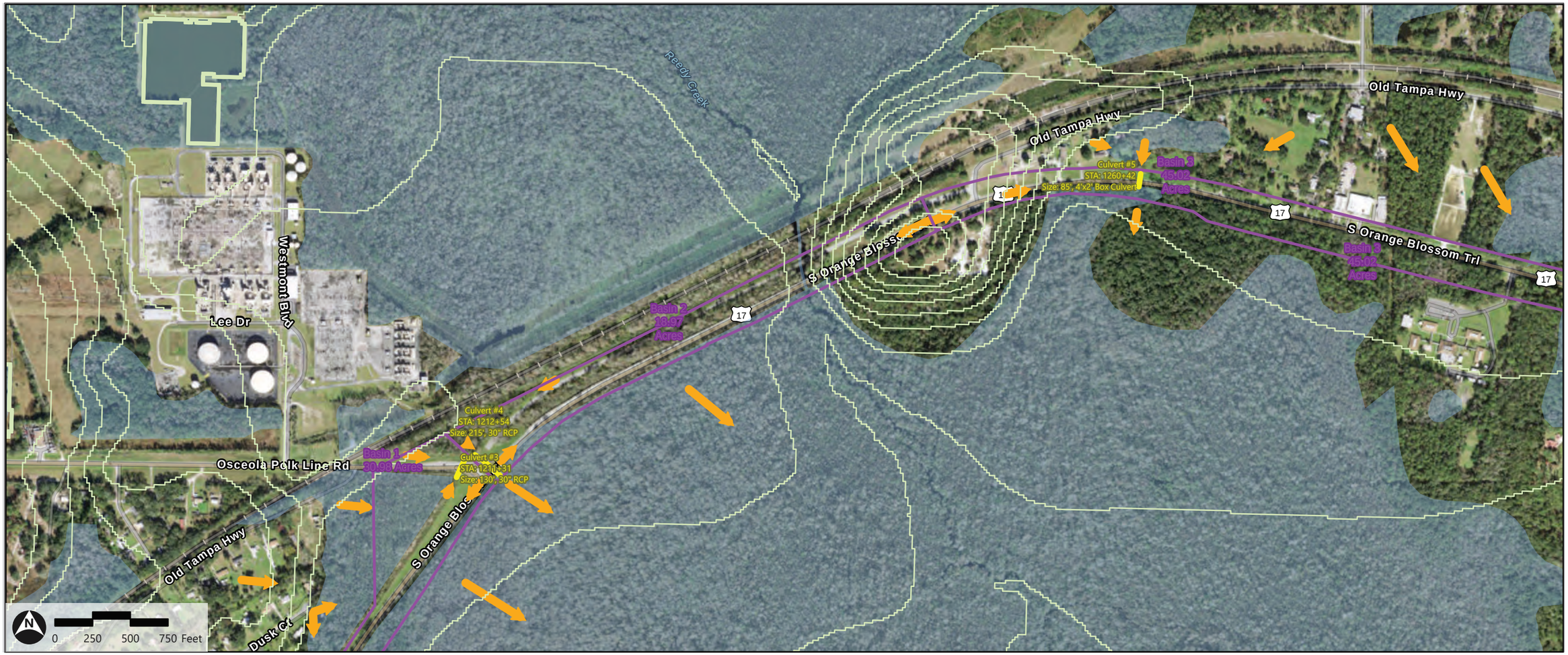


Figure 10A

Basin 1
US17/92 from Ivy Mist Lane to Avenue A



N.T.S.

- Basin Right-of-Way
- Culvert
- Contour 2 ft
- Flow Direction
- Wetland Areas

Figure 10B

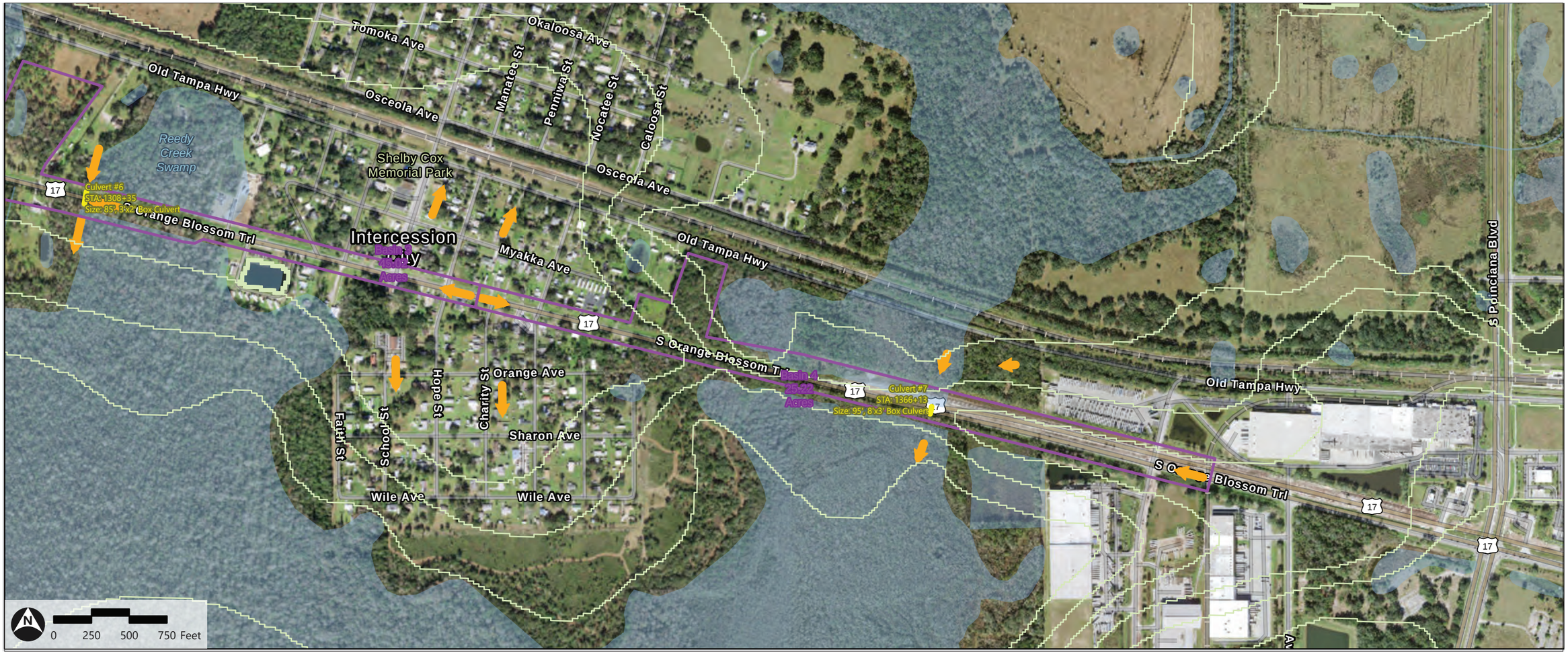
Basin 2
US17/92 from Ivy Mist Lane to Avenue A

N.T.S.

- Basin Right-of-Way
- Culvert
- Contour 2 ft
- Flow Direction
- Wetland Areas

Figure 10C

Basin 3
US17/92 from Ivy Mist Lane to Avenue A



N.T.S.

- Basin Right-of-Way
- Culvert
- Contour 2 ft
- Flow Direction
- Wetland Areas

Figure 10D

Basin 4
US17/92 from Ivy Mist Lane to Avenue A

Basin 3 begins approximately 500 feet west of Old Tampa Highway (Approximately STA 1244+00) and ends at Hope Street/ Manatee Street (Approximately STA 1333+00) within the Intersession City unincorporated community. The drainage system that serves this segment of US 17/92 is composed of open swales, side drains and cross drains that eventually drain to the Reedy Creek Swamp, and then to Reedy Creek. The drainage system for Basin 3 also includes a wet detention pond which was permitted and constructed when the Reedy Creek Bridge was built. The pond is located on the north side of US 17/92 approximately 900 feet east of Old Tampa Highway(approximately STA 1262+00).

Basin 4 begins at Hope Street/Manatee Street (Approximately STA 1333+00) and ends at Avenue A (Approximately STA 1383+00). The drainage system that serves this segment of US 17/92 is composed of open swales, side drains and cross drains that eventually drain to the Reedy Creek Swamp, and then to Reedy Creek.

5.2.1 Offsite Areas

VHB visited the site area in December 2022, to define the drainage patterns and identified potential offsite areas draining to the corridor. Observations made from that site visit include:

- There is a drainage canal in Basin 1 (from approximately STA 1180+00 to STA 1210+00) located at the back of the properties adjacent to the corridor between Ivy Mist Lane and Sundown Drive, that diverts runoff coming from those areas to the existing 3-8'x5' culvert structure that crosses US 17/92. Ultimately, the offsite flows from the culvert to the Reedy Creek Swamp and surrounding wetlands.
- Old Tampa Highway is lower than US 17/92 and in some sections lower than the surrounding wetlands. The CSX Railroad is at a higher elevation than Old Tampa Highway but still at a lower elevation than US 17/92. Any offsite runoff from the Old Tampa Highway and CSX Railroad is routed to wetlands and outside the ROW.
- Adjacent land uses to US 17/92 within Intercession City are very flat. Visual inspection and existing drainage structures along the properties between US 17/92 and Old Tampa Highway indicate that the drainage pattern is to Old Tampa Highway and wetlands to the east and west (north of US 17/92).
- There are numerous wetland areas on the north side of the corridor and pockets of wetlands in between properties in all four basins. Visual observation indicates that these wetlands are at a lower elevation than the corridor and represent a significant storage area. See **Figure 10A** to **Figure 10D** for drainage pattern and wetland areas.
- The existing ditches along each side of US 17/92 appear to be receiving runoff from only the road. This was confirmed from referenced as-built plans and permits reviewed for the project.
- The existing wet detention pond overflow drains to the south through cross drain 5 (EX-CD-5) at STA 1260+42.

Based on these observations, all offsite runoff from areas adjacent to the project are ultimately draining to the wetlands south of the US 17/92 corridor via the existing cross drains or directly to low-lying areas/wetlands to the north of US 17/92. This was taken in consideration in the analysis of the cross drain in this LHR.

5.3 Soils

Thirteen soil types occur within the study area, as listed in **Table 2** and depicted in **Figure 11**.

Table 2: Soil Types Within the Study Area

Soil ID	Description	Hydric	Hydrologic Soil Group
7	Candler Sand, 0 to 5 percent slopes	N	A
15	Hontoon Muck, frequently ponded, 0 to 1 percent slopes	Y	A/D
16	Immokalee Fine Sand, 0 to 2 percent slopes	N	B/D
22	Myakka Fine Sand, 0 to 2 percent slopes	N	A/D
23	Myakka-Urban land complex	N	A/D
25	Nittaw Muck	Y	C/D
29	Parkwood loamy fine sand, occasionally flooded	Y	A/D
36	Pompano fine sand, 0 to 2 percent slopes	Y	A/D
37	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	Y	D
38	Riviera fine sand, 0 to 2 percent slopes	Y	A/D
39	Riviera fine sand, frequently ponded, 0 to 1 percent slopes	Y	A/D
41	Satellite Sand, 0 to 2 percent slopes	N	A
45	Wabasso fine sand, 0 to 2 percent slopes	N	A/D

The soils within the study area have been mapped by the Natural Resources Conservation Service (NRCS) and classified as hydric or non-hydric. Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as “soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions” near the ground surface.

Most of the soil types within the study corridor are poorly drained soils, Hydrologic Soil Group (HSG) A/D, primarily Riviera Fine sand (**Table 3**).

Table 3: Hydrologic Soil Groups

Hydrological Soil Group (HSG)	Soil Textures
A	Sandy, Loamy Sand, Or Sandy Loam
B	Silt Loam Or Loam
C	Sandy Clay Loam
D	Clay Loam, Silty Clay Loam, Sandy Clay, Silty Clay, Or Clay

- Group A: Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. Consist of deep, well to excessively drained sand or gravel and have a high rate of water transmission.
- Group B: Soils that have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. Moderate rate of transmission.
- Group C: Soils that have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. Low rate of water transmission.
- Group D: Soils that have high runoff potential, very low infiltration rates when thoroughly wetted, and consist mainly of clay soils with a high swelling potential. Soils with a permanent high-water table, claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Low rate of water transmission.

Imagery source: State of Florida, Maxar

N
N.T.S.

Project Alignment

County Boundary

NRCS Soils (Name, Hydrologic Soils Group)

- ADAMSVILLE,A
- BASINGER,A/D
- CANDLER,A
- FLORIDANA,C/D
- HONTOON,A/D
- IMMOKALEE,B/D
- KALIGA,C/D
- MYAKKA,A/D
- NARCOOSSEE,A
- NITTAW,C/D
- ONA,B/D
- PARKWOOD,A/D
- PITS
- PLACID,A/D
- POMPANO,A/D
- RIVIERA,A/D
- SATELLITE,A
- SMYRNA,A/D
- WABASSO,A/D
- WATER
- WAUCHULA,A/D

FDOT

Figure 11

NRCS Soils
US17/92 from Ivy Mist Lane to Avenue A

- HSG B/D indicates that in the drained condition, the soil is in group B, and the undrained condition, the soil is in group D.

See geotechnical report (Preliminary Soil Survey Report, June 2, 2021) for soil characteristics.

5.4 Existing Cross Drains

There are seven existing cross drains, summarized in **Table 4**, six cross US 17/92 within the project corridor and one cross drain that crosses Osceola Polk Line Road, within the project limits. The cross drain culvert sizes were measured and invert elevations shot by the survey crew in September of 2020. Cross drain culverts were visually inspected during the site visit in December of 2022.

Table 4: Existing Cross Drains

Cross Drain	Roadway	Size	Length (ft)
EX-CD-1	US 17/92	3@ 8-ft X 5-ft Box Culvert	92
EX-CD-2	US 17/92	2-ft x 2-ft Box Culvert	69
EX-CD-3	Osceola Polk Line Road	30-inch RCP	130
EX-CD-4	US 17/92	30-inch RCP[1]	215
EX-CD-5	US 17/92	4-ft X 2-ft Box Culvert	85
EX-CD-6	US 17/92	30-inch RCP	85
EX-CD-7	US 17/92	8-ft X 3-ft Box Culvert	95

*[1]Drainage Map for SR-600, Financial Project ID 437200-1-22-01 (See **Appendix I**) shows this cross drain consists of two sections, a 36" section at the upstream side connecting to a 30" section on the downstream side.*

5.5 Floodplains and Floodways

The project corridor falls within FEMA Flood Insurance Rate Maps (FIRM) MAPS No. 12097C0045G and 12097C0065G for Osceola County, Florida dated June 18, 2013. Portions of the project corridor are in the 100-year floodplain zone, in designated Zones A and AE, which are respectively defined as having no base flood elevation determined and having a base flood elevation determined. The base flood elevation for this project corridor is elevation 67.0 ft.

The old existing Reedy Creek Bridge and the proposed Reedy Creek Bridge fall within the Reedy Creek Floodway, shown in **Figure 12**. In the existing condition, the Old Reedy Creek Bridge is channelized at three locations that line up from north to south with the location of the bridges, that allow Reedy Creek to flow under the railroad track. The three channelized areas at the Old Reedy Creek Bridge will be removed and the profile under the new westbound bridge is anticipated to be similar to Reedy Creek Bridge.

The existing upstream channel restrictions from the railroad track bridge will not be altered, and it is not anticipated that the dredging of the bridge will affect the floodway. However, a detailed hydraulic analysis is needed to confirm this assumption.

5.6 Existing Drainage Concerns

No drainage or flooding issues were identified for the US 17-92 corridor either during the Environmental Look Around (ELA) or from meetings with multiple agencies. Flooding was reported inside Intercession City on local streets as reported in the ELA (outside the project limits). In addition, FDOT Osceola Maintenance Office was contacted and they stated that there is no history of flooding or drainage issues for the culverts along the US 17-92 study section. See **Appendix H** for ELA Meeting Minutes and communication with FDOT Osceola Maintenance Office.

Imagery source: State of Florida, Maxar

N
N.T.S.

Project Alignment

County Boundary

1% Annual Chance Flood Hazard (FEMA 100yr floodplain)

0.2% Annual Chance Flood Hazard (FEMA 500yr floodplain)

Regulatory Floodway

FDOT

Figure 12

FEMA Floodplain Map
US17/92 from Ivy Mist Lane to Avenue A

6.0 Hydraulic Analysis

Roadway runoff will be conveyed through curb and gutter. On segments 1, 4 and 6 of the proposed corridor, swales will be used as conveyance ditches to route the runoff to the ponds. Open flumes are proposed in the curb section for connectivity. Offsite runoff will be managed by the existing cross drains with no impact to the ROW.

6.1 Cross Drains

There are seven (7) cross drains within the project corridor. Due to the proposed widening, the cross drains will need to be extended. The existing cross drains have been evaluated for headwater impacts to determine if replacement is necessary. Since no historical problems are present, Method 1 was used to analyze all cross drains, as per the Drainage Design Guide, Section 4.7. Result for this preliminary hydraulic analysis is as follows:

1. Cross drain 1 is being reconstructed and extended to accommodate the 4-lane widening along US 17/92 during the Poinciana Parkway Extension (CFX Project Number: 538-235). No change to this cross drain will be required.
2. Cross drain 2 has capacity to manage the runoff volume. It will be retained and extended. This cross drain discharges to the selected site for Pond 1. Therefore, cross drain 2 will need to be rerouted around Pond 1 during the design stage. The cross drain will be extended and piped below the shared path parallel to Pond 1 till the point of discharge. No additional ROW is needed.
3. Cross drain 3, located at the intersection of US 17/92 and Osceola Polk Line Road (CR 532), is under design as part of the CR 532 Widening by others. In the CR 532 Widening Drainage Design Report (June 2022), an 18-inch culvert is proposed to replace the existing culvert. Recent field survey data shows a 30-inch culvert is installed. Under the proposed improvements for this project, the intersection will be realigned, and the existing intersection and cross drain will be demolished. A new 30-inch cross drain will need to be constructed with a length of 165 feet.
4. The CR 532 Widening Drainage Design Report (June 2022) identifies this structure as a 24-inch culvert connecting to a 28-inch x 32-inch reinforced concrete pipe (RCP). The Drainage Map for SR-600, FPID 437200-1-22-01 shows that cross drain 4 consists of two sections, a 36-inch section at the upstream side connecting to a 30-inch section on the downstream side. The cross drain was analyzed as one 30-inch section as the more restrictive scenario. With this size, the cross drain has capacity to manage the runoff volume. It will be retained and extended.
5. Cross drain 5 has capacity to manage the runoff volume. It will be retained and extended.
6. Cross drain 6 has capacity to manage the runoff volume. It will be retained and extended.
7. Cross drain 7 was already evaluated and extended, by the widening project going on at the east end of the project (FPID: 239714-1). The extended cross drain will accommodate the widening of US 17/92, so no change is required.

All pipe sizes need to be verified before the detailed design stage.

The service life of the cross drains and the structural conditions shall be investigated by a structural engineer at the time of the detailed design. Depending on the condition of the structures and the recommendations of the structural engineer, the culverts might need to be replaced rather than extended.

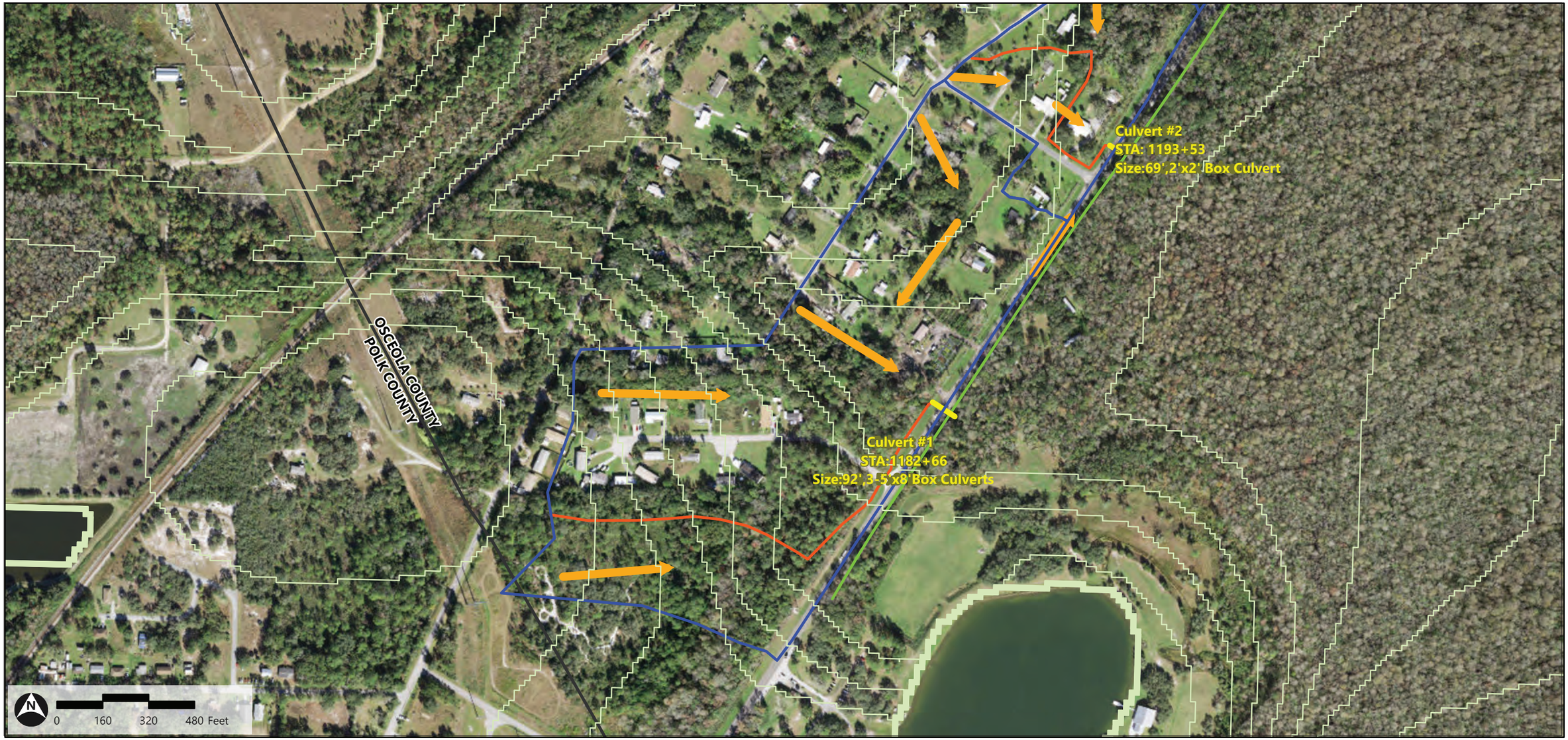
The cross drains preliminary proposed sizes and lengths are summarized in **Table 5**. The locations of the cross drains are shown in **Figures 13** through **19.** The culvert analysis is shown in **Appendix C1**.

Table 5: Cross Drains Extensions

Cross Drain #	Approx. STA	Existing Size	Existing Structure Adequate	Preliminary Proposed Size	Existing Length (ft.)	Proposed Length (ft.)	Comments
1	1182+66	3@ 8' x 5’ Box Culvert	Yes	--	92	130	Included in another project scope
2	1193+53	2' x 2' Box Culvert	Yes	Retain & extend	69	105	
3	1211+31	1- 30" RCP	Yes	Replace[1]	130	165	
4	1212+54	1- 30" RCP	Yes	Retain & extend	215	251	
5	1260+42	1- 4' x 2’ Box Culvert	Yes	Retain & extend	85	120	
6	1308+35	1- 30" RCP	Yes	Retain & extend	85	120	
7	1366+13	1- 8' x 3’ Box Culvert	Yes	--	--	95	Already extended in another project

[1]*Existing cross drain replaced due to intersection being realigned*

Imagery source: State of Florida, Maxar



N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 13

Culvert #1
US17/92 from Ivy Mist Lane to Avenue A

Imagery source: State of Florida, Maxar

N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 14

Culvert #2
US17/92 from Ivy Mist Lane to Avenue A

Imagery source: State of Florida, Maxar

N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 15

Culvert #3
US17/92 from Ivy Mist Lane to Avenue A

Imagery source: State of Florida, Maxar

N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 16

Culvert #4
US17/92 from Ivy Mist Lane to Avenue A

Imagery source: State of Florida, Maxar

N
N.T.S.

Project Alignment
Time of Concentration Path
Culvert
County Boundary
Contour 2 ft

Figure 17

Culvert #5
US17/92 from Ivy Mist Lane to Avenue A

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Imagery source: State of Florida, Maxar

N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 18

Culvert #6
US17/92 from Ivy Mist Lane to Avenue A

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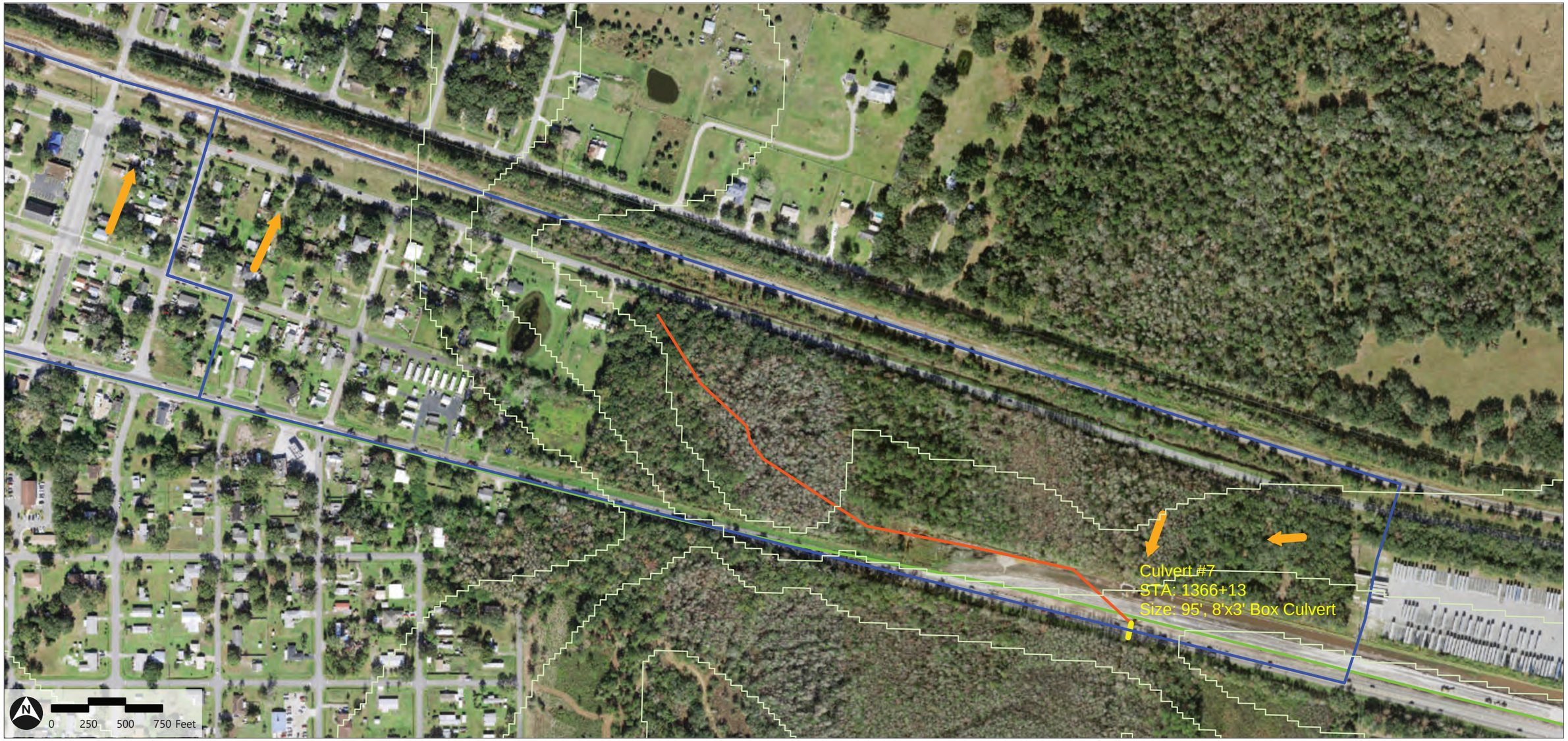
Imagery source: State of Florida, Maxar



N.T.S.

- Project Alignment
- Time of Concentration Path
- Culvert
- County Boundary
- Contour 2 ft

Figure 19

Culvert #7
US17/92 from Ivy Mist Lane to Avenue A

6.2 Bridge Structures

This segment of US 17/92 crosses over Reedy Creek and includes the Reedy Creek Bridge. The Reedy Creek Bridge is parallel to the Old Reedy Creek Bridge, which has been placed out of service but is still in place north of the Reedy Creek Bridge.

The Reedy Creek Bridge is currently a bi-directional bridge. This project will leave the Reedy Creek Bridge in place, and it will be used for eastbound traffic only. The Old Reedy Creek Bridge will be demolished, and, in its place, a new westbound bridge will be constructed. **Appendix E** shows plans for the existing Reedy Creek Bridge.

To analyze and compare the mean flow velocity under the existing and proposed bridges, the continuity equation was used ($Q=A_1V_1=A_2V_2$). The existing volumetric rates (Q), for the 1 and 0.2 percent-annual-chance flood events were obtained from the Osceola County, Flood Insurance Study, Revised June 18, 2013. The excerpts from FEMA are shown in **Appendix D.** The peak discharges are summarized in **Table 6.** The mean flow velocity (V_1) under the existing bridge was calculated using area (A_1). In the same manner, the mean flow velocity (V_2) under the proposed bridge was calculated using area (A_2). For this analysis, the profile under the existing eastbound bridge was used to calculate the mean velocities for both the eastbound and proposed westbound bridge.

Table 6: Summary of Discharges, Osceola County, Flood Insurance Study Number

Flooding Source and Location, Reedy Creek	Recurrence interval, years	Peak Discharge (cfs)	Max Flow Elevation (ft)
10-percent-annual-chance	10	800	66.7
2-percent-annual-chance	50	1,100	67.0
1-percent-annual-chance	100	1,100	67.1
0.2-percent-annual-chance	500	1,100	67.2

It was assumed that the westbound bridge will have a similar profile to the eastbound bridge. The Reedy Creek Bridge and the proposed westbound bridge are designed to sit on piles that are in the waterway. The Old Reedy Creek Bridge is made up of three bridges connected by embankments. In the existing condition, the Old Reedy Creek Bridge is channelized at three locations that line up from north to south with the location of the bridges that allow Reedy Creek to flow under the railroad track. The three channelized areas at the Old Reedy Creek Bridge will be removed and the profile under the new westbound bridge is anticipated to be similar to existing Reedy Creek Bridge. The existing upstream channel restrictions from the railroad track bridge will not be altered, and it is not anticipated that the dredging of the bridge will affect the floodway. However, a detailed hydraulic analysis during the design phase is needed to confirm this assumption. **Appendix F** and **Appendix G** show the bridge profile and bridge layout, respectively.

Table 7 is a summary of the anticipated velocities for the Eastbound (Reedy Creek Bridge) and the Westbound (Proposed Reedy Creek Bridge).

Table 7: Summary of Anticipated Velocities for the Eastbound and Westbound

Profile	100 yr. Discharge (cfs)	500 yr. Discharge (cfs)	Flow Area (sf)	100 yr. Mean Flow Velocity (fps)	500 yr. Mean Flow Velocity (fps)
Eastbound	1,100	1,100	4,478.63	0.25	0.25
Westbound	1,100	1,100	4,512.31	0.24	0.24

It is assumed that the proposed bridge will have similar parameters as the existing bridge. In summary, characteristics of the proposed bridge is as follows:

1. The conceptual bridge length is approximately 2,231 feet.
2. From **Table 7**, the velocity at the Westbound bridge is approximately 0.24 feet per second. This velocity can be used in the design stage to do the scour calculations.
3. The preliminary vertical and horizontal clearances are 2 feet and 90 feet, respectively.

Parameters for the existing bridge are provided in **Appendix E**. See **Appendix C2** for Bridge Calculations.

6.3 Floodplains and Floodways

Any impacts associated with the roadway widening will be compensated for in a proposed floodplain compensation pond. From the analysis in the PSR, the volume of floodplain impact was estimated to be 9.87 acre foot. Three proposed locations have been identified to compensate for the floodplain impacts and one preferred location (Pond Floodplain Compensation Area [FCA]2) with an area of 10.10 acres was chosen as per the PSR. See Floodplain Calculations in **Appendix C3**.

6.4 Project Classification

Floodplains are present within the study limits. Floodplain impacts are anticipated due to the proposed roadway widening. The old existing Reedy Creek Bridge and the proposed Reedy Creek Bridge fall within the Reedy Creek Floodway. However, it is not anticipated that the project will affect the floodway. Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. This minimal impact was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in a proposed pond (Pond FCA2), so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits. The floodplain encroachment is anticipated to be minimal. A No-Rise Certification for the bridge will be performed during the design stage.

6.5 Risk Evaluation

Floodplain encroachment for this project is the result of US 17/92 widening and the extension of the existing cross drains. The impact of the encroachment was analyzed in this report and the PSR (under separate cover) and floodplain compensation volumes were provided in a pond (Pond FCA2); therefore, the impact is found to be minimal (calculations for floodplain compensation and ponds are included in **Appendix C3**). This impact was addressed by following the FDOT drainage design standards and SFWMD design criteria. In addition, there is no history of flooding of the existing structures and with the proposed improvements no impact is expected to the base flood, likelihood of food risk, overtopping and backwater conditions.

In accordance with FDOT's PD&E Manual, Part 2, Chapter 13-Floodplain, Section 13-2.1, Figure 13.1 "Floodplain Statements", the proposed corridor has been evaluated to determine the impact of the proposed hydraulic modifications. Hydraulic improvements are grouped into six categories based upon the type of the hydraulic improvements and estimated floodplain impact. The proposed project can be best described in two categories:

Category 3: PROJECTS INVOLVING MODIFICATION TO EXISTING DRAINAGE STRUCTURES

Work under this type of project will not involve the replacement of any existing drainage structures or the construction of any new drainage structures. Work will only involve modification of existing structures

(e.g., extending cross drains, adding headwalls, or extending bridge piers). Projects that affect flood heights and flood limits, even minimally, may require further evaluation to support statements that emphasize the insignificance of the modifications.

Modifications to existing drainage structures (extending cross drains and adding headwalls) included in this project will result in an insignificant change in their capacity to carry floodwater. These modifications will cause minimal increases in flood heights and flood limits which will not result in any significant adverse impacts on the natural and beneficial floodplain values or any significant change in flood risks or damage. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes as the result of modifications to existing drainage structures. Therefore, it has been determined that this encroachment is not significant.

Category 4: PROJECTS ON EXISTING ALIGNMENT INVOLVING REPLACEMENT OF EXISTING DRAINAGE STRUCTURES WITH NO RECORD OF DRAINAGE PROBLEMS

This type of work excludes replacement activities that would increase the hydraulic performance of existing facilities. Also, there should be no record of drainage problems and no unresolved complaints from residents in the area.

The proposed structure will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. Thus, 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 potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant."

6.6 Summary of Project

Per the PD&E Manual, Section 13.2.2.5, items a through m are described below for the preferred alternative.

a. *General description of the project including location, length, existing and proposed typical sections, drainage basins, and cross drains*

   The proposed project consists of the widening of US 17/92 from the existing two-lane roadway to a four-lane divided roadway from Ivy Mist Lane to Avenue A, a distance of 3.8 miles, in Osceola County. The existing road is a two-lane undivided rural typical section and the widening intends to increase capacity and improve access management, which is needed to meet future traffic demand, provide satisfactory future traffic operations, improve corridor access management, and improve safety along the corridor. The Preferred Alternative also involves the retention of the existing bridge over Reedy Creek to serve as the eastbound traffic lanes and the addition of a new bridge over Reedy Creek to serve as the westbound traffic lanes.

   The project site is in the Reedy Creek drainage basin, within the jurisdiction of the SFWMD. The project basin is composed of areas at Reedy Creek and to the east and west of Reedy Creek. See Section 5.2.

   There are seven existing cross drains, six cross US 17/92 within the project corridor and one cross drain that crosses Osceola Polk Line Road, within the project limits. All cross drains will be retained and extended. See Sections 5.4 and 6.1.

   Existing typical sections are included in Appendix A. Proposed typical sections are shown in Sections 2.2 and 2.3.

b. *Determination of whether the proposed action is in the base floodplain*
Portions of the project corridor are in the 100-year floodplain zone. Impacts associated with the roadway widening will be compensated for, in a 10.10 acres proposed floodplain compensation pond (Pond FCA2 in the PSR). It is not anticipated that the project will affect the floodway. Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. See Section 5.5.

c. *The history of flooding of the existing facilities and/or measures to minimize any impacts due to the proposed improvements*
There is no history of flooding of the existing structures and with the proposed improvements no impact is expected to the base flood, likelihood of food risk, overtopping and backwater conditions. Minimal impact associated with the roadway widening was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in a proposed pond (Pond FCA2), so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits. See Section 5.6.

d. *Determination of whether the encroachment is longitudinal or transverse, and if it is a longitudinal encroachment, an evaluation and discussion of practicable avoidance alternatives*
Floodplain encroachment for this project is the result of US 17/92 widening and the extension of the existing cross drains. The impact of the encroachment was analyzed in this report and the PSR (under separate cover) and floodplain compensation volumes were provided in a pond (Pond FCA2); therefore, the impact is found to be minimal. See Section 6.5.

e. *The practicability of avoidance alternatives and/or measures to minimize impacts*
The Build Alternative widens US 17/92 to four lanes (two lanes per direction) throughout the study limits from Ivy Mist Lane to Avenue A. Due to alignment constraints from adjacent facilities and the existing bridge over Reedy Creek, the Build Alternative applied from Ivy Mist Lane to east of Old Tampa Highway is a best-fit alignment. From east of Old Tampa Highway to Avenue A, the study developed three alignments for alternatives comparison. The recommended alignment maximizes the existing Right-of-Way (ROW) and consists of widening to the south on the west end of the project corridor to align with the Poinciana Parkway Extension proposed improvements, then shifts to the south through the central portion of the project corridor to avoid the existing cemetery, widens to the north through Intercession City to avoid relocations, and aligns with the adjacent widening at the east end of the project corridor. See section 2.2.

f. *Impact of the project on emergency services and evacuation*
It is not anticipated that the project will affect the floodway. Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. See Section 6.4.

g. *Impacts of the project on the base flood, likelihood of flood risk, overtopping, location of overtopping, backwater*
Portions of the project corridor are in the 100-year floodplain zone. Impacts associated with the roadway widening will be compensated for, in a 10.10 acres proposed floodplain compensation pond

(Pond FCA2 in the PSR). It is not anticipated that the project will affect the floodway. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. With the proposed improvements no impact is expected to the base flood, likelihood of food risk, overtopping and backwater conditions. See Sections 6.3 and 6.5.

h. *Determination of the impact of the project on regulatory floodways, if any, and documentation of coordination with FEMA and local agencies to determine the requirements for the project to be developed consistent with the regulatory floodway*
Portions of the project corridor are in the 100-year floodplain zone. It is not anticipated that the project will affect the floodway. Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. See Section 6.3.

i. *The impacts on natural and beneficial floodplain values, and measures to restore and preserve these values (this information may also be addressed as part of the wetland impact evaluation and recommendations)*
Floodplain impacts are anticipated due to the proposed roadway widening. The old existing Reedy Creek Bridge and the proposed Reedy Creek Bridge fall within the Reedy Creek Floodway. However, it is not anticipated that the project will affect the floodway. This minimal impact was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in a proposed pond (Pond FCA2), so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits. The floodplain encroachment is anticipated to be minimal. See Section 6.4.

j. *Consistency of the project with the local floodplain development plan or the land use elements in the Local Government Comprehensive Plan (LGCP), and the potential of encouraging development in the base floodplain*
Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. See Section 6.4.

k. *Measures to minimize floodplain impacts associated with the project, and measures to restore and preserve the natural and beneficial flood-plain values impacted by the project*
Floodplain impacts are anticipated due to the proposed roadway widening. The old existing Reedy Creek Bridge and the proposed Reedy Creek Bridge fall within the Reedy Creek Floodway. However, it is not anticipated that the project will affect the floodway. This minimal impact was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in a proposed pond (Pond FCA2), so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits. The floodplain encroachment is anticipated to be minimal. See Section 6.4.

l. *A map showing project, location, and impacted floodplains. A FIRM Map should be used if available. If not, other maps (e.g., US Geological Survey (USGS), U.S. Army Corps of Engineers (USACE), Soil Conservation Service (SCS), Bureau of Land Management, U.S. Forest Service, or best available information from the WMDs) may be used. Copies of applicable maps should be included in the appendix*

Figure 1 US 17/92 PD&E Study Location Map shows project and location.

Figure 9 shows the USGS Quadrangle Map

Figure 11 shows the NRCS Soils Map

Figure 12 shows the FEMA Floodplain Map

m. Results of any risk assessments performed

Floodplain encroachment for this project is the result of US 17/92 widening and the extension of the existing cross drains. The impact of the encroachment was analyzed in this report and the PSR (under separate cover) and floodplain compensation volumes were provided in a pond (Pond FCA2); therefore, the impact is found to be minimal (calculations for floodplain compensation and ponds are included in **Appendix C3**). This impact was addressed by following the FDOT drainage design standards and SFWMD design criteria. In addition, there is no history of flooding of the existing structures and with the proposed improvements no impact is expected to the base flood, likelihood of food risk, overtopping and backwater conditions. See Section 6.5.

In accordance with FDOT's PD&E Manual, Part 2, Chapter 13-Floodplain, Section 13-2.1, Figure 13.1 "Floodplain Statements", the proposed corridor has been evaluated to determine the impact of the proposed hydraulic modifications. Hydraulic improvements are grouped into six categories based upon the type of the hydraulic improvements and estimated floodplain impact. The proposed project can be best described in two categories:

Category 3: PROJECTS INVOLVING MODIFICATION TO EXISTING DRAINAGE STRUCTURES
Category 4: PROJECTS ON EXISTING ALIGNMENT INVOLVING REPLACEMENT OF EXISTING DRAINAGE STRUCTURES WITH NO RECORD OF DRAINAGE PROBLEMS

7.0 Summary and Conclusions

The proposed widening of US 17/92 from a two-lane roadway to a four-lane divided roadway involves adding a new lane in each direction and providing stormwater management systems. All existing cross drains will necessitate culvert extensions. Cross drains 2, 4, 5 and 6 have adequate capacity, therefore will be retained and extended. Cross drain 1, proposed to be extended as part of another project, will accommodate the proposed US 17/92 widening with no further modifications. Cross drain 3 at the intersection with CR 532 is currently under design by others, but since this intersection will be improved with the US 17/92 widening, this culvert will be replaced. Cross drain 7 was already extended in another project and it will accommodate the proposed US 17/92 widening with no further modifications.

The service life of the cross drains and the structural conditions shall be investigated by a structural engineer at the time of the detailed design. Depending on the condition of the structures and the recommendations of the structural engineer, the culverts might need to be replaced rather than extended.

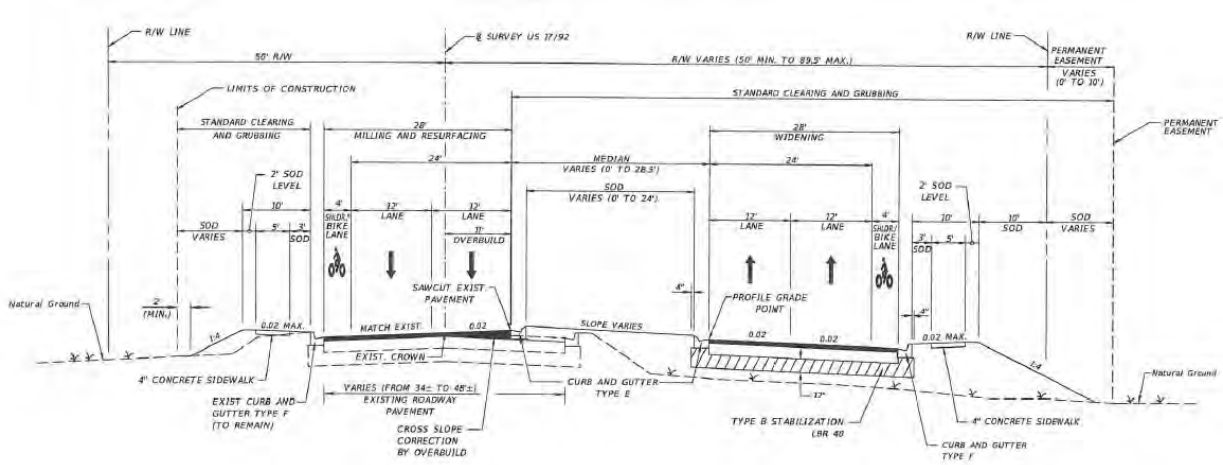
Floodplains are present within the study limits. Floodplain impacts are anticipated due to the proposed roadway widening. The old existing Reedy Creek Bridge and the proposed Reedy Creek Bridge fall within the Reedy Creek Floodway. However, it is not anticipated that the project will affect the floodway. Through consultation with local, state, and federal water resources agencies, the project will not support base floodplain development that is incompatible with existing floodplain management programs. Therefore, the floodplain involvement of this project has minimal impact to human life, transportation facilities and natural and beneficial floodplain values. This minimal impact was addressed by following the FDOT drainage design standards and SFWMD design criteria, and floodplain compensation volumes were provided in ponds (Pond FCA2) as documented in the PSR (under separate cover), so that the proposed improvements do not result in an increase in flood elevations or cause adverse effects to the floodplain limits.

Modifications to drainage structures consist of the extension of the existing cross drains and replacement of cross drain 3. As per the analysis carried out in this report, no impact is expected to the base flood, likelihood of flood risk, overtopping and backwater conditions. Floodplain fill volumes are found to be minimal. Final calculations will be provided during the design phase.

This report documents the hydraulic analysis for the above-mentioned structures in both existing and proposed conditions. The proposed alignment has minimal impacts on the 100-year floodplain. By complying with regulatory criteria, the implementation of this project will not adversely affect the area adjacent to the corridor and meets the expectations of the stakeholders.

Appendix A – Existing Typical Sections

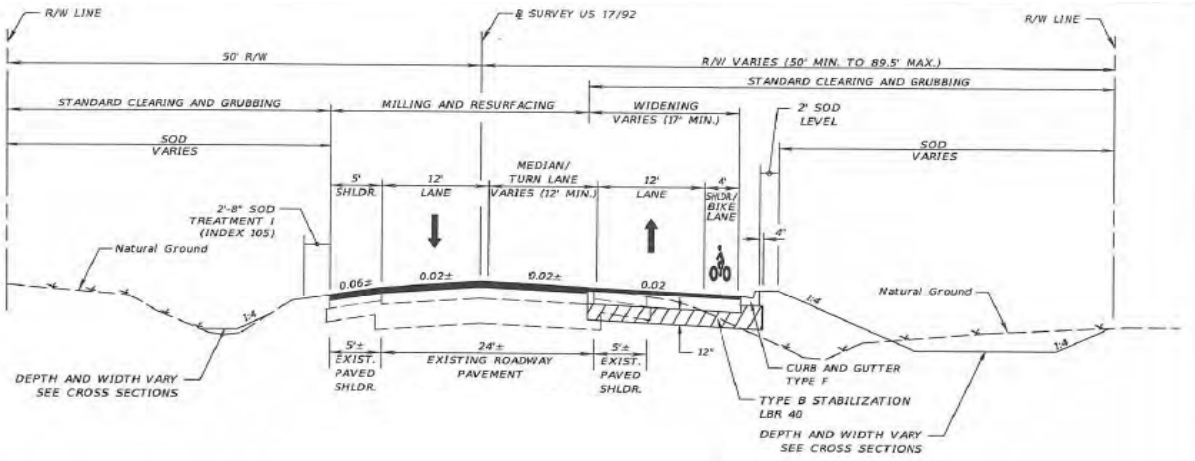
Existing US 17/92 Typical Section Ivy Mist Lane to Bridge



Roadway ID 16050000: M.P. 9.806 to M.P. 10.098

Design Speed: 45 mph

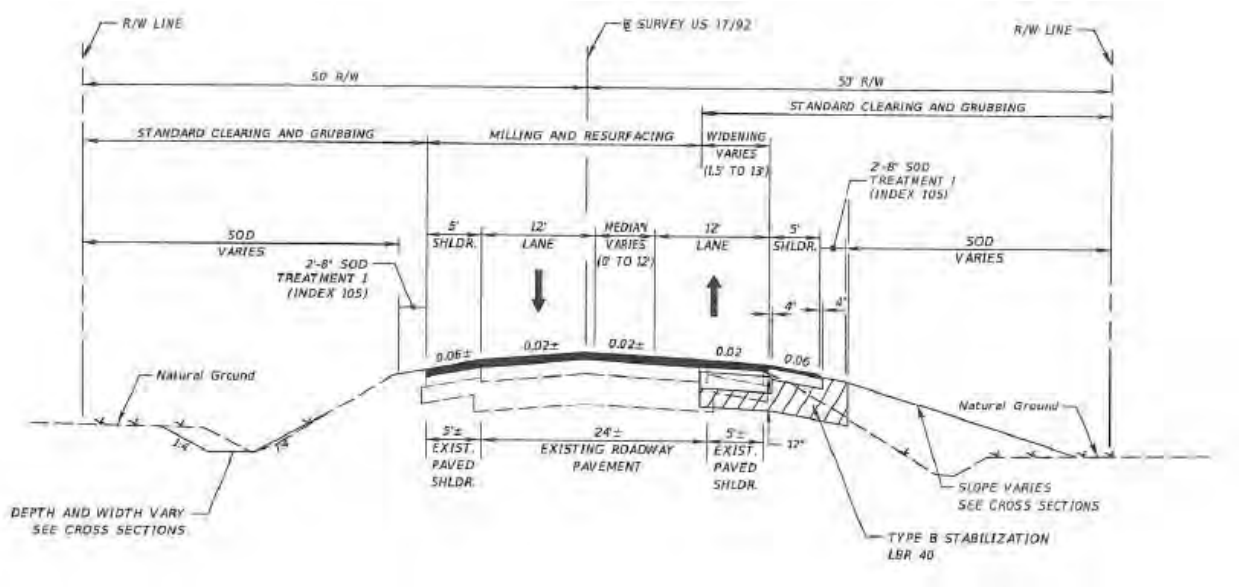
Typical Section #2



Roadway ID 16050000: M.P. 10.098 to M.P. 10.188

Design Speed: 45 mph

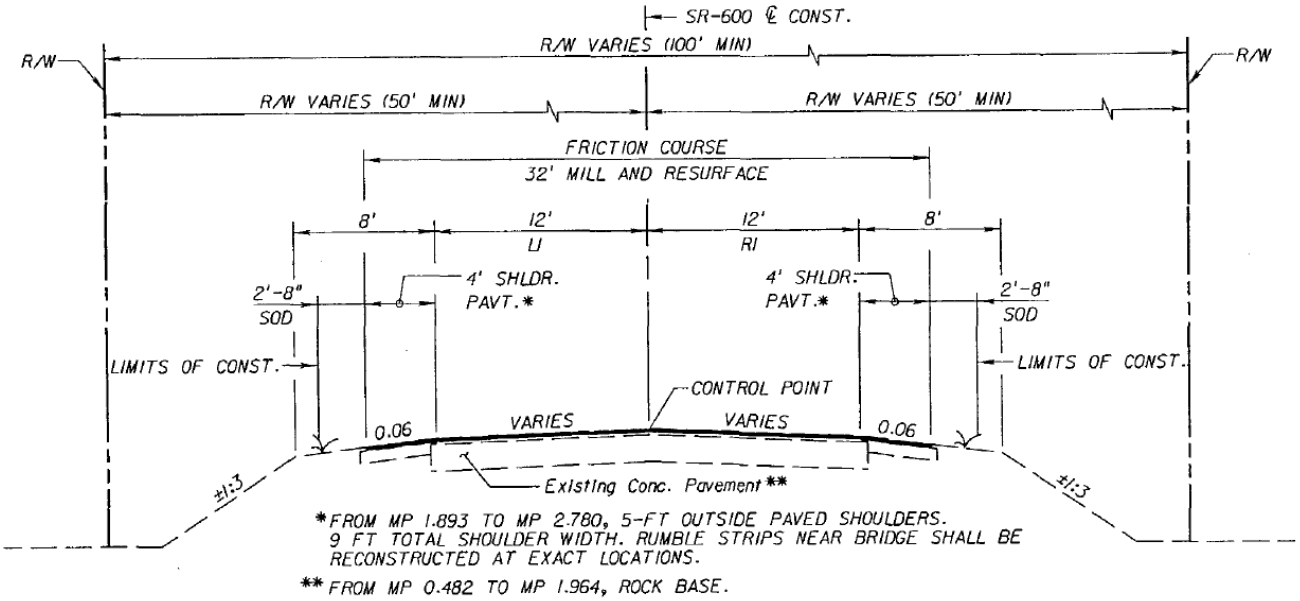
Typical Section #3



Roadway ID 16050000: M.P. 10.188 to M.P. 10.750

Design Speed: 45 mph

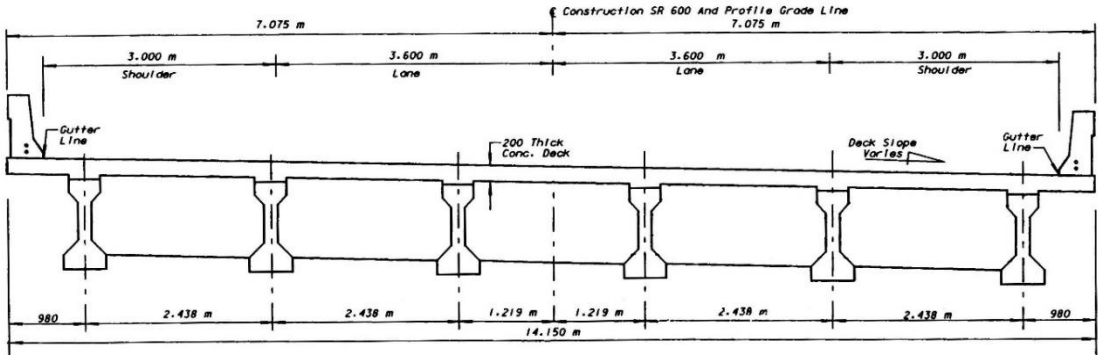
Typical Section #4



Roadway ID 92010000/92010100: M.P. 0.000 to M.P. 2.780 (excluding bridge)

Design Speed: 60 mph

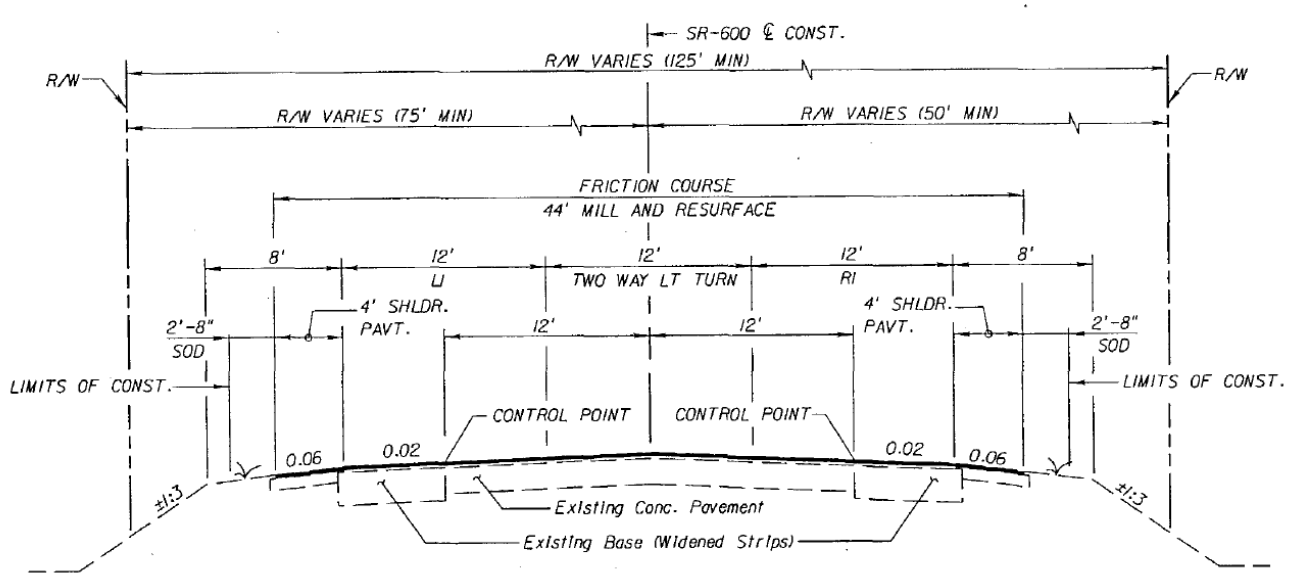
Typical Section #5



Roadway ID 92010100: M.P. 0.447 to M.P. 0.888 (bridge typical)

Design Speed: 60 mph

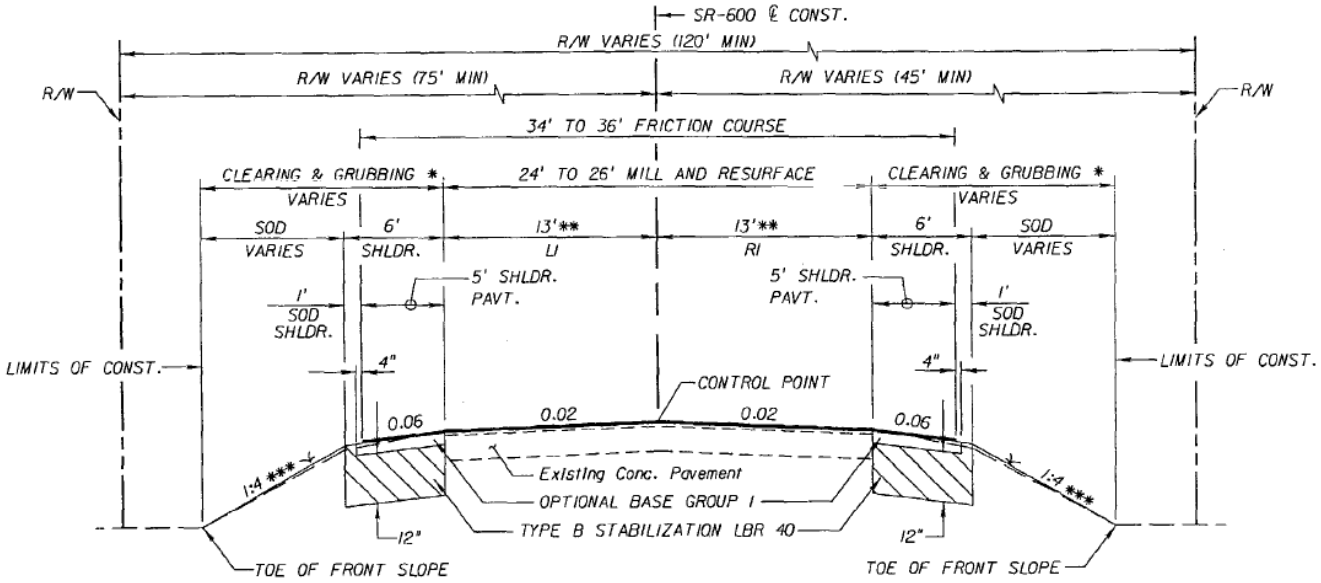
Typical Section #6



Roadway ID 92010000: M.P. 2.780 to M.P. 3.330

Design Speed: 50 mph

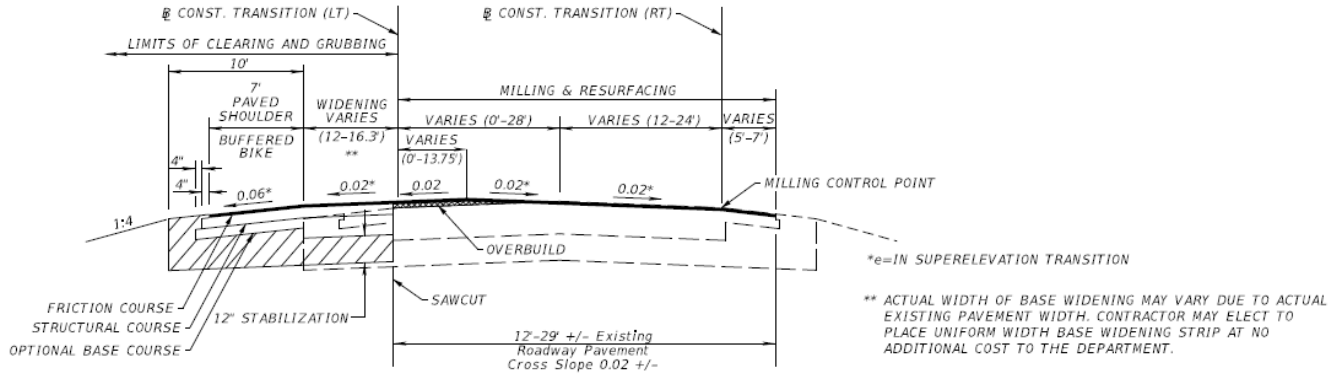
Typical Section #7



Roadway ID 92010000: M.P. 3.330 to M.P. 3.754

Design Speed: 60 mph

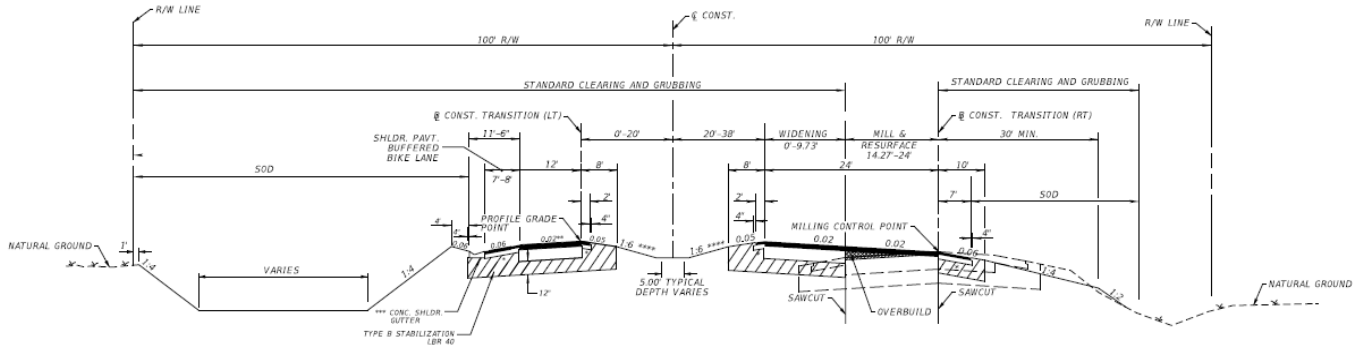
Typical Section #8



Roadway ID 92010000: M.P. 3.754 to M.P. 3.878

Design Speed: 55 mph

Figure 3I: Typical Section #9



Roadway ID 92010000: M.P. 3.878 to M.P. 4.117

Design Speed: 55 mph

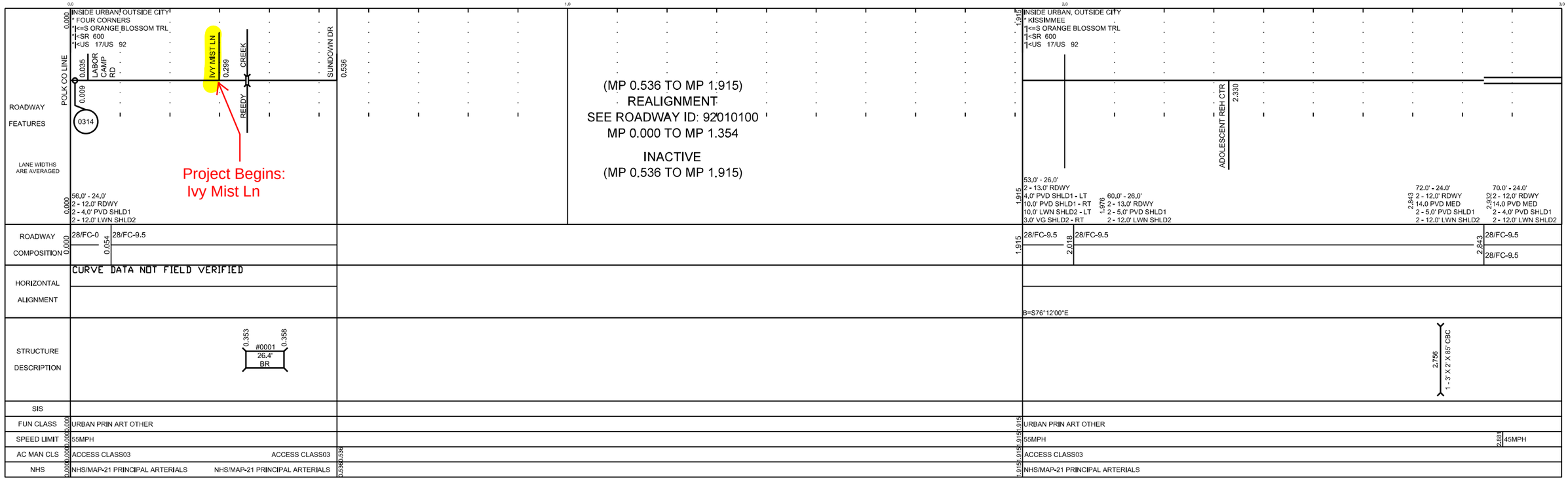
Appendix B – Straight Line Diagram of Roadway Inventory

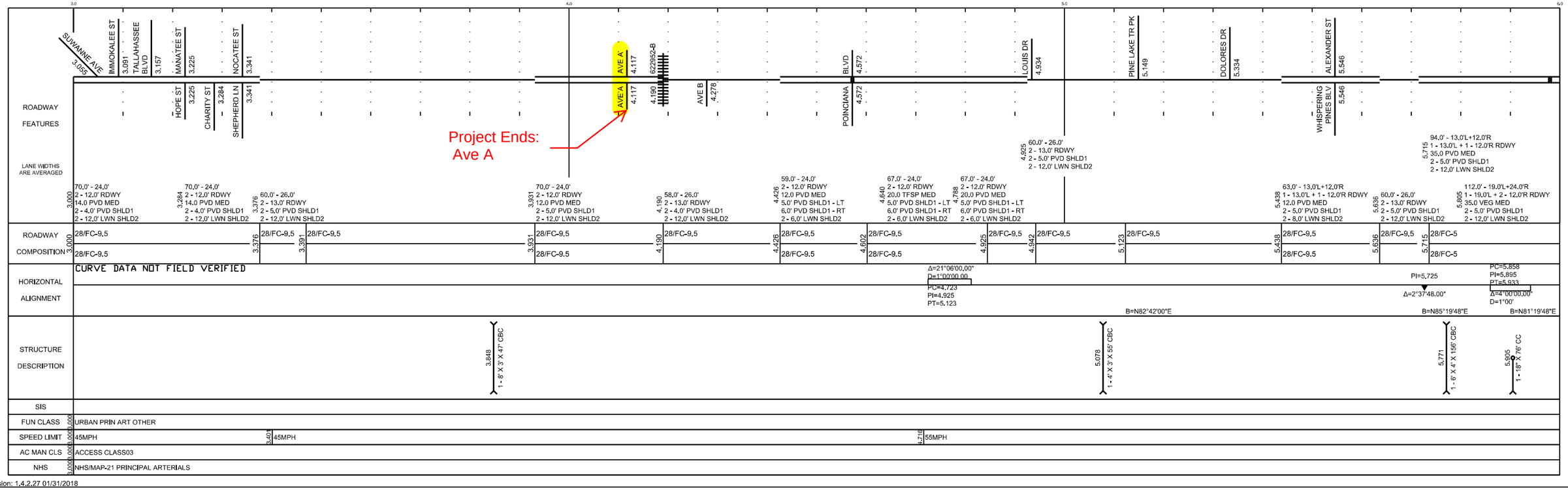
	5 YR INV	SLD REV	BMP	EMP	INV	SLD REV
DATE	01/24/2017	04/19/2017	000.000	014.750	01/29/2018 EN	01/31/2018 GD
BY	Elizabeth Nelson	Glen Dvorovy				

FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

SECTION STATUS	INT. or US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
12	US 92/US 17/US 441	SR 600/SR 500	OSCEOLA	05	92010000	1 OF 3





Version: 1.4.2.27 01/31/2018

Appendix C1 – Culvert Analysis

WORKSHEET 3: Time of Concentration (Tc) or Travel Time (Tt)

Project:	SR 600 (US 17-92)	By:	TP	Date:	12/23/2021
Location:	Osceola County	Checked:	OB	Date:	12/30/2021

Circle One: Present (Developed) Culvert #2

Circle One: (T_c) T_t through subarea

NOTES:

High Point el. = 74.0 ft
Low Point el. = 71.6 ft

Sheet flow (Applicable to T_c only)	Segment ID				
	A				
1. Surface Description (table 3-1.)	Grass				
2. Manning's roughness coeff., n (table3-1.)	0.15				
3. Flow length, L (total L <= 300 ft.) ft	300				
4. Two-yr 24-hr rainfall, P_2 in	4.36				
5. Land slope, s ft/ft	0.0080				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	0.49	+		=	0.49

Assume

Shallow concentrated flow	Segment ID				
	B				
7. Surface Description (paved or unpaved)	unpaved				
8. Flow length, L ft	769				
9. Watercourse slope, s ft/ft	0.0066				
10. Average velocity, V (figure 3-1) ft/s	1.31				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr	0.163	+		=	0.16

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) …… hr 0.65

Use : 39 minutes

WORKSHEET 3: Time of Concentration (Tc) or Travel Time (Tt)

Project:	SR 600 (US 17-92)	By:	TP	Date:	12/23/2021
Location:	Osceola County	Checked:	OB	Date:	12/30/2021

Circle One: Present (Developed) Culvert #3

Circle One: (T_c) T_t through subarea

NOTES:

High Point el. = 70.1 ft
Low Point el. = 67.0 ft

Sheet flow (Applicable to T_c only)	Segment ID				
	A				
1. Surface Description (table 3-1.)	Woods				
2. Manning's roughness coeff., n (table3-1.)	0.40				
3. Flow length, L (total L <= 300 ft.) ft	300				
4. Two-yr 24-hr rainfall, P_2 in	4.36				
5. Land slope, s ft/ft	0.0103				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	0.96	+		=	0.96

Assume

Shallow concentrated flow	Segment ID				
	B				
7. Surface Description (paved or unpaved)	unpaved				
8. Flow length, L ft	759				
9. Watercourse slope, s ft/ft	0.0025				
10. Average velocity, V (figure 3-1) ft/s	0.81				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr	0.262	+		=	0.26

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) …… hr 1.22

Use : 73 minutes

WORKSHEET 3: Time of Concentration (Tc) or Travel Time (Tt)

Project:	**SR 600 (US 17-92)**	By:	TP	Date:	12/23/2021
Location:	**Osceola County**	Checked:	OB	Date:	12/30/2021

Circle One: Present (Developed) Culvert #4

Circle One: (T_c) T_t through subarea

NOTES:

High Point el. = 70.0 ft
Low Point el. = 68.0 ft

Sheet flow (Applicable to T_c only)	Segment ID				
	A				
1. Surface Description (table 3-1.)	Grass				
2. Manning's roughness coeff., n (table3-1.)	0.15				
3. Flow length, L (total L <= 300 ft.) ft	300				
4. Two-yr 24-hr rainfall, P_2 in	4.36				
5. Land slope, s ft/ft	0.0067				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	Assume 0.52	+		=	0.52

Shallow concentrated flow	Segment ID				
	B				
7. Surface Description (paved or unpaved)	unpaved				
8. Flow length, L ft	676				
9. Watercourse slope, s ft/ft	0.0052				
10. Average velocity, V (figure 3-1) ft/s	1.16				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr	0.161	+		=	0.16

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) …… hr 0.68

Use : 41 minutes

WORKSHEET 3: Time of Concentration (Tc) or Travel Time (Tt)

Project:	SR 600 (US 17-92)	By:	TP	Date:	12/23/2021
Location:	Osceola County	Checked:	OB	Date:	12/30/2021

Circle One: Present (Developed) Culvert #5

Circle One: (T_c) T_t through subarea

NOTES:

High Point el. = 73.0 ft
Low Point el. = 72.0 ft

Sheet flow (Applicable to T_c only)	Segment ID				
	A				
1. Surface Description (table 3-1.)	Grass				
2. Manning's roughness coeff., n (table3-1.)	0.15				
3. Flow length, L (total L <= 300 ft.) ft	300				
4. Two-yr 24-hr rainfall, P_2 in	4.36				
5. Land slope, s ft/ft	0.0033				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	0.69	+	Assume	=	0.69

Shallow concentrated flow	Segment ID				
	B				
7. Surface Description (paved or unpaved)	unpaved				
8. Flow length, L ft	1369				
9. Watercourse slope, s ft/ft	0.0037				
10. Average velocity, V (figure 3-1) ft/s	0.98				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr	0.390	+		=	0.39

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) …… hr 1.08

Use : 65 minutes

WORKSHEET 3: Time of Concentration (Tc) or Travel Time (Tt)

Project:	SR 600 (US 17-92)	By:	TP	Date:	12/23/2021
Location:	Osceola County	Checked:	OB	Date:	12/30/2021

Circle One: Present (Developed) — Culvert #6

Circle One: (T_c) T_t through subarea

NOTES:

High Point el. = 71.0 ft
Low Point el. = 70.0 ft

Sheet flow (Applicable to T_c only)	Segment ID				
	A				
1. Surface Description (table 3-1.)	Woods				
2. Manning's roughness coeff., n (table3-1.)	0.40				
3. Flow length, L (total L <= 300 ft.) ft	300				
4. Two-yr 24-hr rainfall, P_2 in	4.36				
5. Land slope, s ft/ft	0.0033				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	1.51	+		=	1.51

Assume

Shallow concentrated flow	Segment ID				
	B				
7. Surface Description (paved or unpaved)	unpaved				
8. Flow length, L ft	3222				
9. Watercourse slope, s ft/ft	0.0016				
10. Average velocity, V (figure 3-1) ft/s	0.64				
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr	1.408	+		=	1.41

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) …… hr **2.92**

Use : 175 minutes

NOAA Atlas 14, Volume 9, Version 2
Location name: Davenport, Florida, USA*
Latitude: 28.2526°, Longitude: -81.5491°
Elevation: 75.9 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

Values used for interpolation of Rainfall Intensity Data

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	5.74 (4.75-6.92)	6.53 (5.40-7.88)	7.76 (6.41-9.42)	8.75 (7.18-10.7)	10.0 (7.87-12.6)	10.9 (8.40-14.1)	11.8 (8.72-15.7)	12.6 (8.92-17.4)	13.6 (9.23-19.5)	14.3 (9.47-21.0)
10-min	4.19 (3.48-5.06)	4.78 (3.96-5.78)	5.69 (4.69-6.90)	6.41 (5.26-7.82)	7.34 (5.76-9.22)	8.01 (6.15-10.3)	8.64 (6.39-11.5)	9.25 (6.53-12.7)	9.98 (6.76-14.3)	10.5 (6.93-15.4)
15-min	3.41	3.88	4.62	5.21	5.96	6.51	7.02	7.52	8.11	8.53
30-min	2.75 (2.28-3.32)	3.12 (2.58-3.77)	3.70 (3.05-4.48)	4.15 (3.40-5.07)	4.74 (3.73-5.96)	5.17 (3.97-6.64)	5.57 (4.12-7.40)	5.96 (4.21-8.20)	6.43 (4.35-9.18)	6.75 (4.46-9.92)
60-min	1.83 (1.51-2.20)	2.08 (1.72-2.51)	2.48 (2.05-3.01)	2.79 (2.29-3.41)	3.20 (2.52-4.03)	3.50 (2.69-4.49)	3.78 (2.79-5.01)	4.04 (2.86-5.56)	4.37 (2.96-6.24)	4.60 (3.04-6.75)
2-hr	1.14 (0.950-1.37)	1.30 (1.08-1.56)	1.55 (1.29-1.87)	1.75 (1.45-2.13)	2.02 (1.59-2.52)	2.20 (1.70-2.81)	2.38 (1.77-3.14)	2.55 (1.82-3.49)	2.76 (1.88-3.92)	2.91 (1.93-4.24)
3-hr	0.829 (0.694-0.990)	0.949 (0.795-1.14)	1.14 (0.951-1.37)	1.30 (1.07-1.56)	1.50 (1.19-1.87)	1.65 (1.28-2.11)	1.80 (1.35-2.37)	1.94 (1.39-2.65)	2.13 (1.46-3.01)	2.26 (1.51-3.28)
6-hr	0.484 (0.406-0.571)	0.549 (0.463-0.653)	0.664 (0.557-0.792)	0.763 (0.636-0.915)	0.903 (0.728-1.13)	1.01 (0.797-1.30)	1.12 (0.854-1.49)	1.25 (0.903-1.71)	1.41 (0.979-2.01)	1.51 (1.04-2.23)
12-hr	0.277 (0.235-0.327)	0.313 (0.266-0.370)	0.380 (0.321-0.450)	0.443 (0.372-0.527)	0.539 (0.442-0.682)	0.622 (0.495-0.799)	0.712 (0.545-0.944)	0.811 (0.593-1.11)	0.953 (0.667-1.35)	1.07 (0.723-1.54)
24-hr	0.160 (0.137-0.187)	0.181 (0.154-0.212)	0.221 (0.188-0.260)	0.261 (0.221-0.309)	0.326 (0.270-0.413)	0.383 (0.307-0.491)	0.446 (0.345-0.591)	0.517 (0.381-0.708)	0.621 (0.438-0.879)	0.707 (0.481-1.01)
2-day	0.091 (0.078-0.106)	0.104 (0.089-0.121)	0.129 (0.110-0.150)	0.153 (0.130-0.180)	0.192 (0.160-0.242)	0.227 (0.183-0.290)	0.265 (0.206-0.349)	0.308 (0.229-0.420)	0.371 (0.264-0.522)	0.424 (0.290-0.600)
3-day	0.066 (0.057-0.077)	0.075 (0.065-0.087)	0.093 (0.080-0.108)	0.110 (0.094-0.128)	0.137 (0.115-0.172)	0.161 (0.131-0.205)	0.188 (0.147-0.248)	0.218 (0.162-0.295)	0.261 (0.187-0.366)	0.298 (0.205-0.420)
4-day	0.054 (0.047-0.062)	0.060 (0.052-0.070)	0.073 (0.063-0.085)	0.086 (0.074-0.101)	0.107 (0.090-0.133)	0.125 (0.102-0.158)	0.145 (0.114-0.190)	0.168 (0.125-0.227)	0.201 (0.144-0.281)	0.229 (0.158-0.322)
7-day	0.037 (0.032-0.042)	0.041 (0.035-0.047)	0.048 (0.041-0.055)	0.055 (0.047-0.064)	0.066 (0.056-0.082)	0.077 (0.063-0.096)	0.088 (0.069-0.114)	0.101 (0.076-0.136)	0.120 (0.086-0.166)	0.136 (0.094-0.190)
10-day	0.030 (0.026-0.034)	0.032 (0.028-0.037)	0.037 (0.033-0.043)	0.042 (0.037-0.049)	0.051 (0.043-0.062)	0.058 (0.047-0.072)	0.066 (0.052-0.084)	0.074 (0.056-0.099)	0.087 (0.063-0.120)	0.098 (0.068-0.136)
20-day	0.020 (0.018-0.023)	0.022 (0.019-0.025)	0.025 (0.022-0.029)	0.028 (0.025-0.032)	0.033 (0.027-0.039)	0.036 (0.030-0.044)	0.040 (0.031-0.050)	0.044 (0.033-0.058)	0.049 (0.036-0.067)	0.054 (0.038-0.075)
30-day	0.017 (0.015-0.019)	0.018 (0.016-0.021)	0.021 (0.018-0.024)	0.023 (0.020-0.027)	0.026 (0.022-0.031)	0.029 (0.024-0.035)	0.031 (0.025-0.039)	0.034 (0.026-0.044)	0.037 (0.027-0.050)	0.040 (0.028-0.055)
45-day	0.014 (0.012-0.016)	0.015 (0.014-0.017)	0.018 (0.016-0.020)	0.020 (0.017-0.022)	0.022 (0.019-0.026)	0.024 (0.020-0.029)	0.025 (0.020-0.032)	0.027 (0.021-0.035)	0.029 (0.021-0.039)	0.031 (0.022-0.042)
60-day	0.012 (0.011-0.014)	0.014 (0.012-0.015)	0.016 (0.014-0.018)	0.017 (0.015-0.020)	0.019 (0.016-0.023)	0.021 (0.017-0.025)	0.022 (0.018-0.027)	0.024 (0.018-0.030)	0.025 (0.018-0.033)	0.026 (0.019-0.036)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Cross Drain Rainfall Intensity Interpolations

Project: SR 600 (US 17-92) **By:** AM Date: 9/14/2022

Location: Osceola County, FL **Checked:** AE Date: 9/14/2022

	Cross Drain 2	
	Sta 1193+53	
TC (minutes)	50 year	100 yr
30	5.17	5.57
39	**4.67**	**5.03**
60	3.50	3.78

	Cross Drain 3	
	Sta 1211+31	
TC (minutes)	50 year	100 yr
60	3.50	3.78
73	**3.22**	**3.48**
120	2.20	2.38

	Cross Drain 4	
	Sta 1212+54	
TC (minutes)	50 year	100 yr
30	5.17	5.57
41	**4.56**	**4.91**
60	3.50	3.78

	Cross Drain 5	
	Sta 1260+42	
TC (minutes)	50 year	100 yr
60	3.50	3.78
65	**3.39**	**3.66**
120	2.20	2.38

	Cross Drain 6	
	Sta 1308+35	
TC (minutes)	50 year	100 yr
120	2.20	2.38
175	**1.70**	**1.85**
180	1.65	1.80

Project: SR 600 (US 17-92) By: AM Date: 9/14/2022

Location: Osceola County Checked: AE Date: 9/14/2022

Culvert ID	Length	Inv. 1	Inv. 2	Slope	Size	Total Area (a)		Tc		i*		c	Q**	
										50-year	100-year		50-year	100-year
	feet	feet	feet	ft/ft		SF	ac	min	hr	in/hr	in/hr		cfs	cfs
2	69	68.25	67.89	0.005217	2'x2'	362022	8.31	39	0.65	4.67	5.03	0.423	16.43	17.70
3	130	65.93	65.73	0.001538	30"	994021	22.81958	73	1.22	3.22	3.48	0.254	18.67	20.18
4	215	64.48	64.64	-0.00074	30"	199569	4.58	41	0.68	4.56	4.91	0.187	3.91	4.21
4***	-	-	-	-	-	-	-	-	-	-	-		22.58	24.39
5	85	66	65.91	0.001059	4'x2'	1729888	39.71	65	1.08	3.39	3.66	0.365	49.17	53.08
6	85	64	63.91	0.001059	30"	6835995	156.93	175	2.92	1.7	1.85	0.379	101.08	110.00

* From National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Rainfall Data

** Rational equation: Q=CIA

*** Culvert 3 flows into Culvert 4, sum of both used in HY-8.

Note: See "HY-8 Assumptions and Workflows.xlsx" for information on how and where culvert values were found.

HY-8 Culvert Analysis Report

Cross Drain 1 STA 1182+66

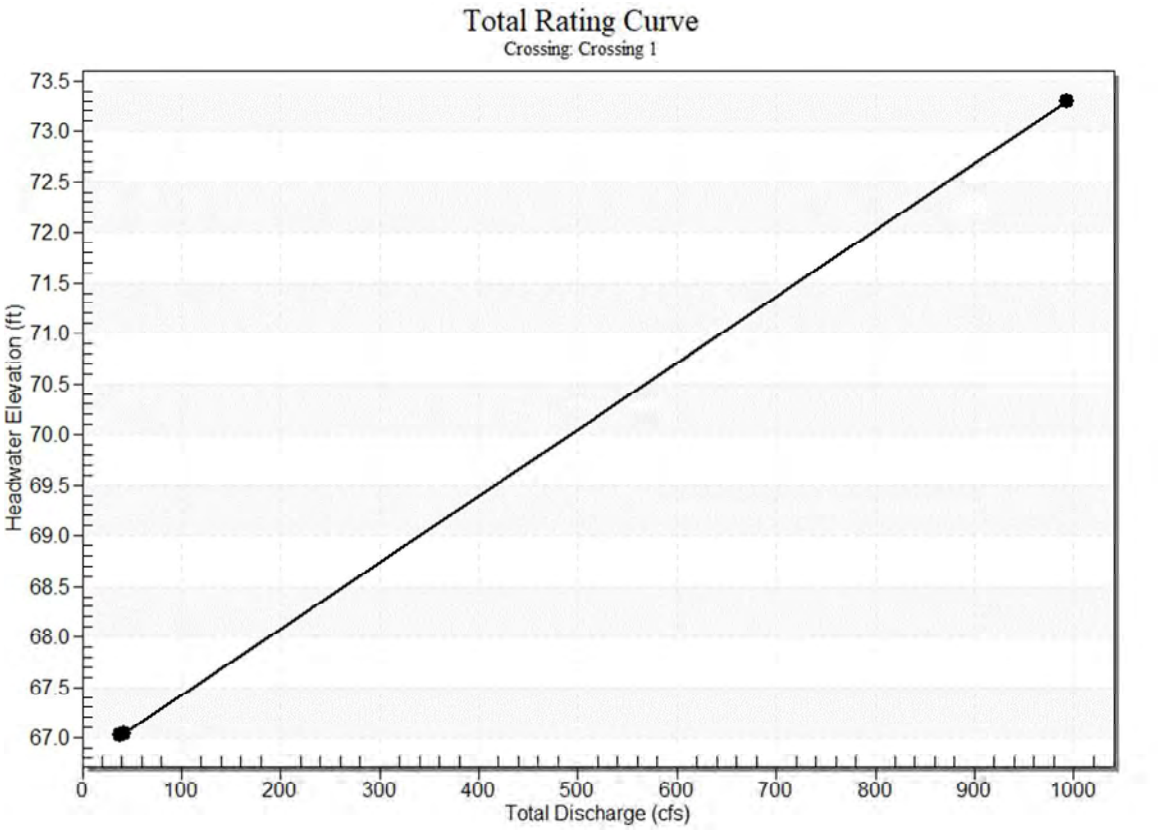
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 1 - Summary of Culvert Flows at Crossing: Crossing 1

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
67.03	50 year	38.03	38.03	0.00	1
67.03	100 year	41.36	41.36	0.00	1
73.00	Overtopping	919.27	919.27	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 1



Culvert Data: Culvert 1

Table 2 - Culvert Summary Table: Culvert 1

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	38.03 cfs	38.03 cfs	67.03	1.00	2.480	3-M1t	0.84	0.58	2.59	2.59	0.98	0.00
100 year	41.36 cfs	41.36 cfs	67.03	1.06	2.485	3-M1t	0.89	0.62	2.59	2.59	1.06	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

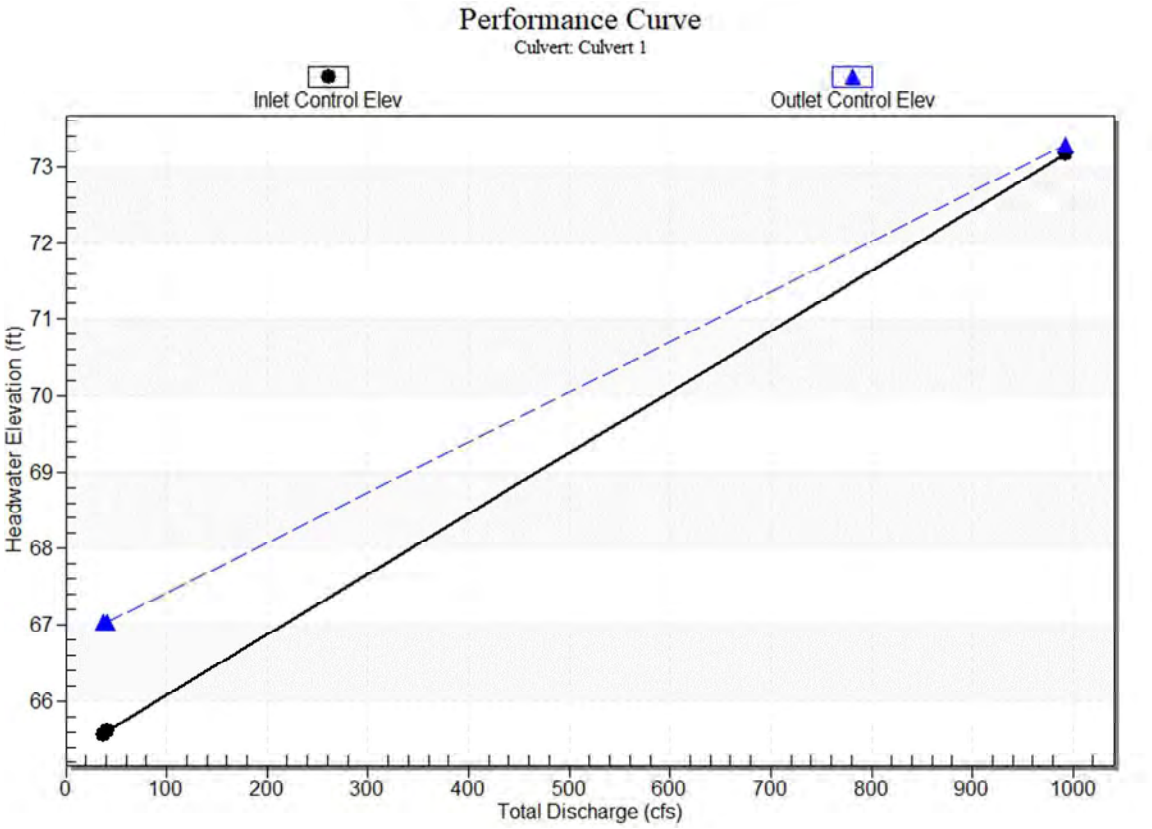
Inlet Elevation (invert): 64.55 ft,

Outlet Elevation (invert): 64.41 ft

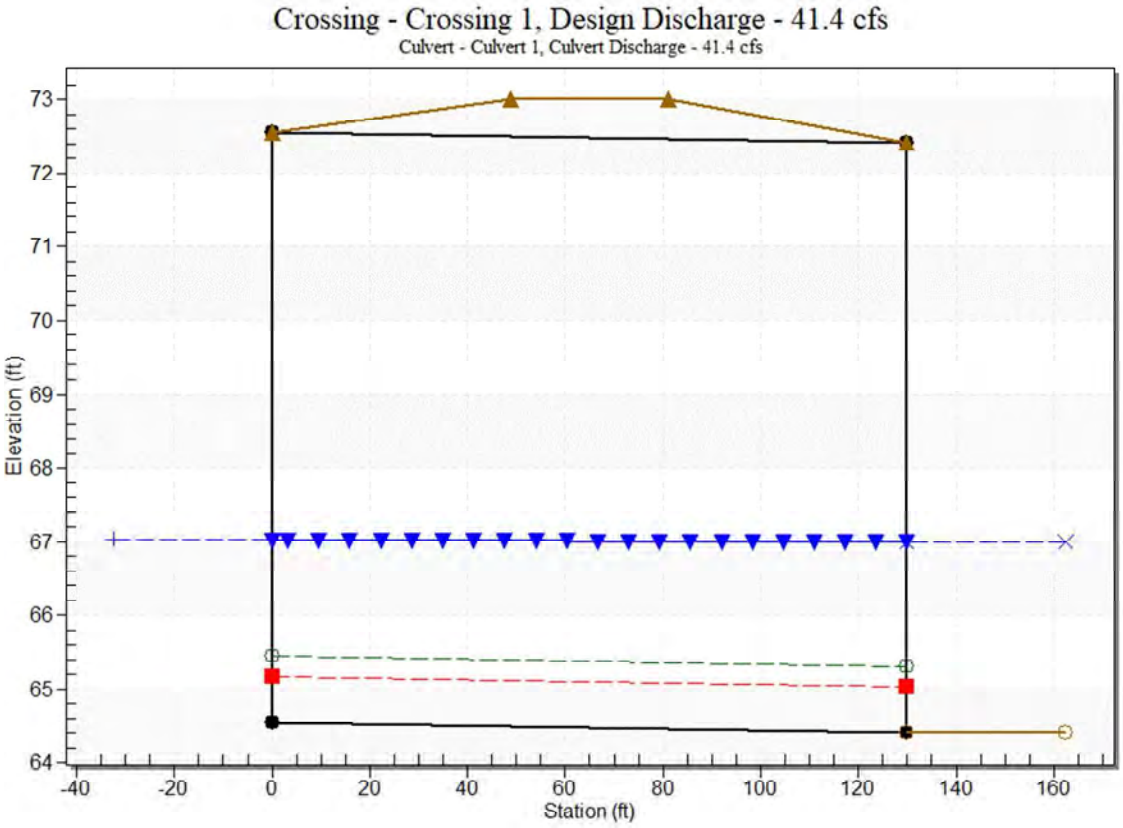
Culvert Length: 130.00 ft,

Culvert Slope: 0.0011

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 64.55 ft

Outlet Station: 130.00 ft

Outlet Elevation: 64.41 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 8.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Data for Crossing: Crossing 1

Table 3 - Downstream Channel Rating Curve (Crossing: Crossing 1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
38.03	67.00	2.59
41.36	67.00	2.59

Tailwater Channel Data - Crossing 1

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 54.00 ft

Crest Elevation: 73.00 ft

Roadway Surface: Paved

Roadway Top Width: 32.00 ft

Cross Drain 2 STA 1193+53

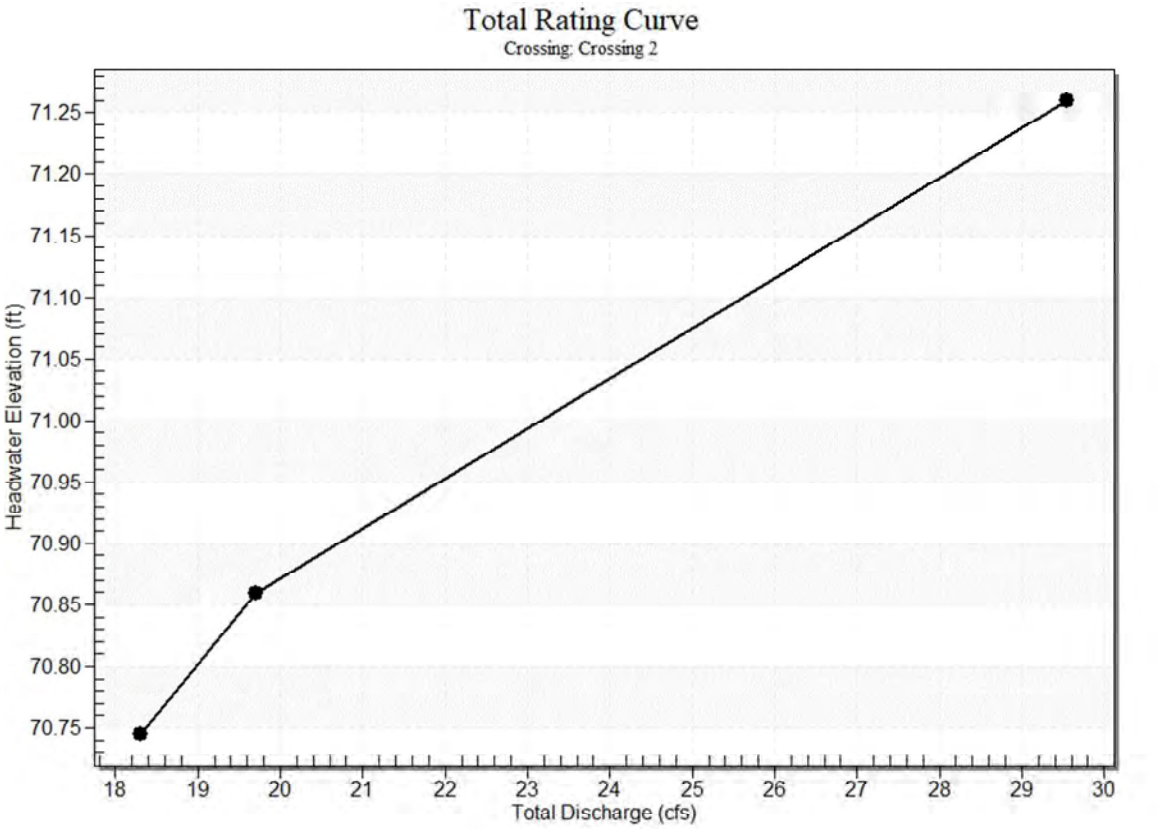
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 4 - Summary of Culvert Flows at Crossing: Crossing 2

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
70.75	50 year	18.30	18.30	0.00	1
70.86	100 year	19.70	19.70	0.00	1
71.00	Overtopping	21.47	21.47	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 2



Culvert Data: Culvert 2

Table 5 - Culvert Summary Table: Culvert 2

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	18.30 cfs	18.30 cfs	70.75	2.16	2.315	7-M2c	1.46	1.38	1.38	-0.89	6.65	0.00
100 year	19.70 cfs	19.70 cfs	70.86	2.30	2.429	7-M2c	1.54	1.44	1.44	-0.89	6.82	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

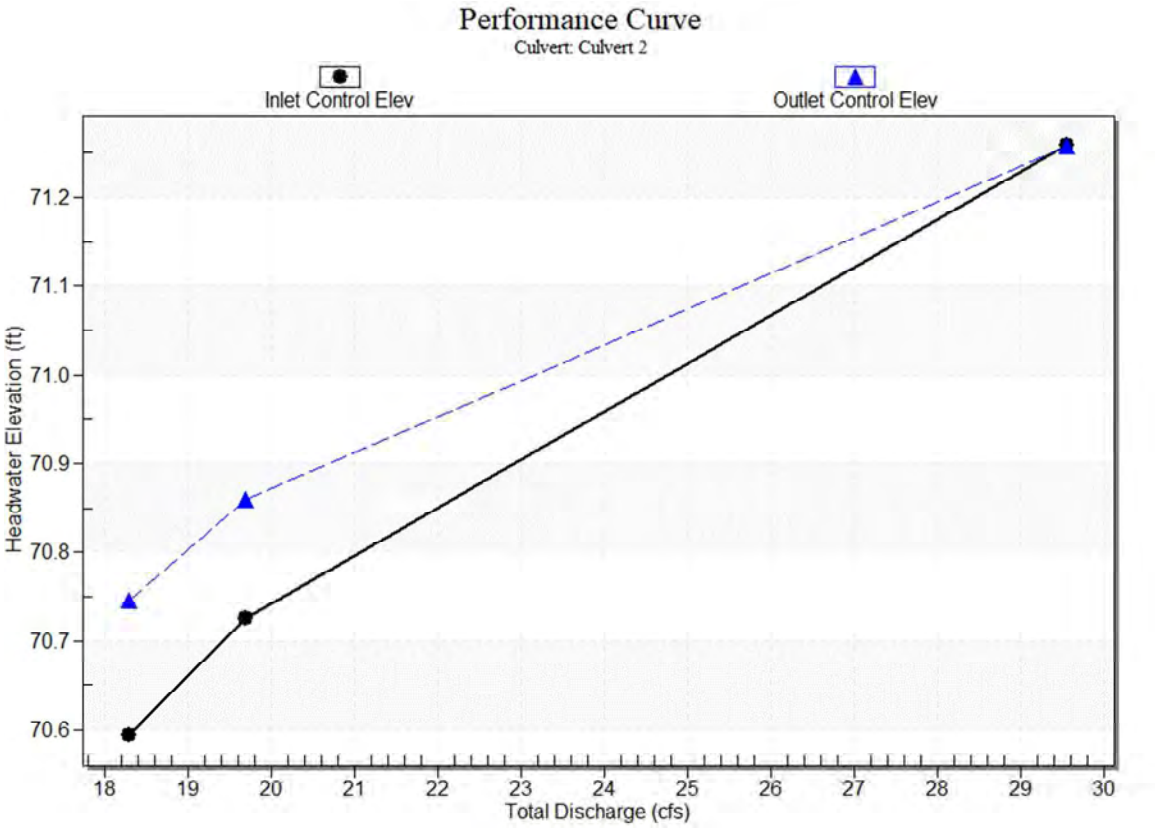
Inlet Elevation (invert): 68.43 ft,

Outlet Elevation (invert): 67.89 ft

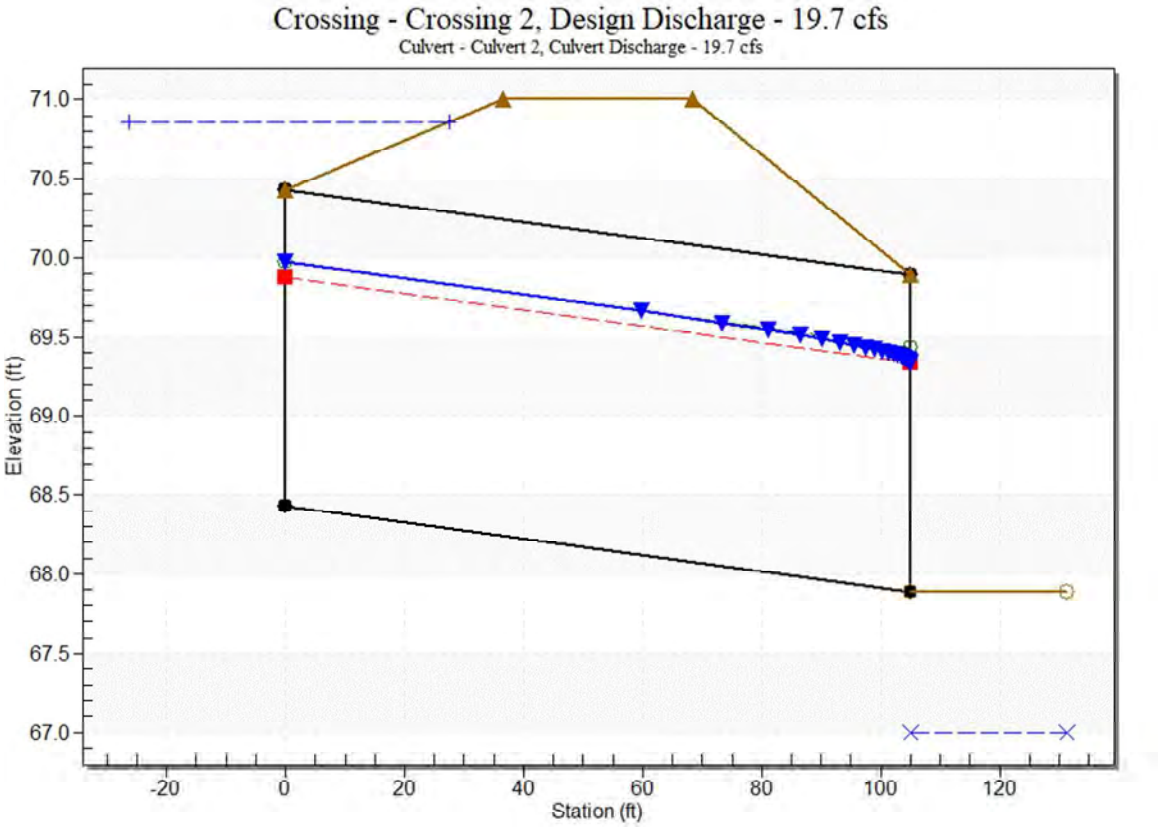
Culvert Length: 105.00 ft,

Culvert Slope: 0.0051

Culvert Performance Curve Plot: Culvert 2



Water Surface Profile Plot for Culvert: Culvert 2



Site Data - Culvert 2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 68.43 ft

Outlet Station: 105.00 ft

Outlet Elevation: 67.89 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 2

Barrel Shape: Concrete Box

Barrel Span: 2.00 ft

Barrel Rise: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75º flare) Wingwall

Inlet Depression: None

Tailwater Data for Crossing: Crossing 2

Table 6 - Downstream Channel Rating Curve (Crossing: Crossing 2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
18.30	67.00	-0.89
19.70	67.00	-0.89

Tailwater Channel Data - Crossing 2

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 12.00 ft

Crest Elevation: 71.00 ft

Roadway Surface: Paved

Roadway Top Width: 32.00 ft

Cross Drain 3 STA 1211+31

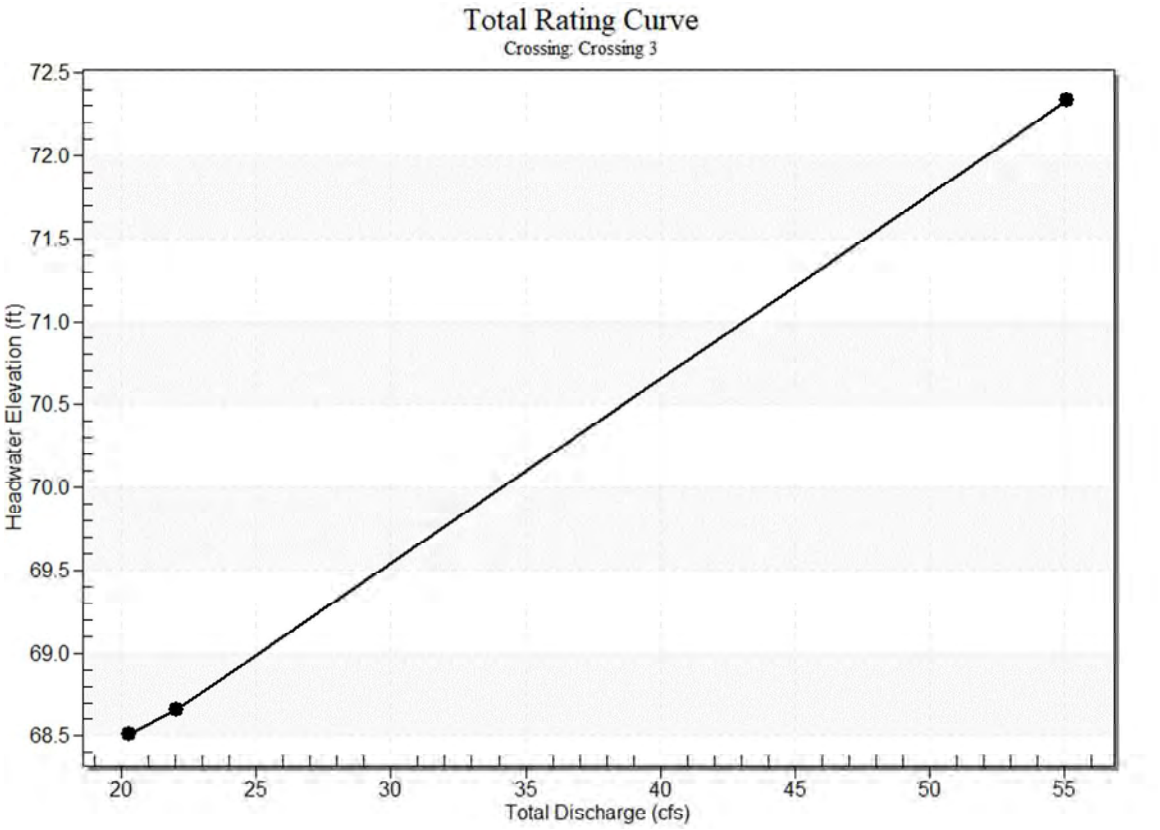
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 7 - Summary of Culvert Flows at Crossing: Crossing 3

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
68.51	50 year	20.29	20.29	0.00	1
68.66	100 year	22.03	22.03	0.00	1
72.00	Overtopping	46.41	46.41	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 3



Culvert Data: Culvert 3

Table 8 - Culvert Summary Table: Culvert 3

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	20.29 cfs	20.29 cfs	68.51	2.35	2.543	7-M2c	2.50	1.53	1.53	1.27	6.45	0.00
100 year	22.03 cfs	22.03 cfs	68.66	2.48	2.691	7-M2c	2.50	1.60	1.60	1.27	6.66	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

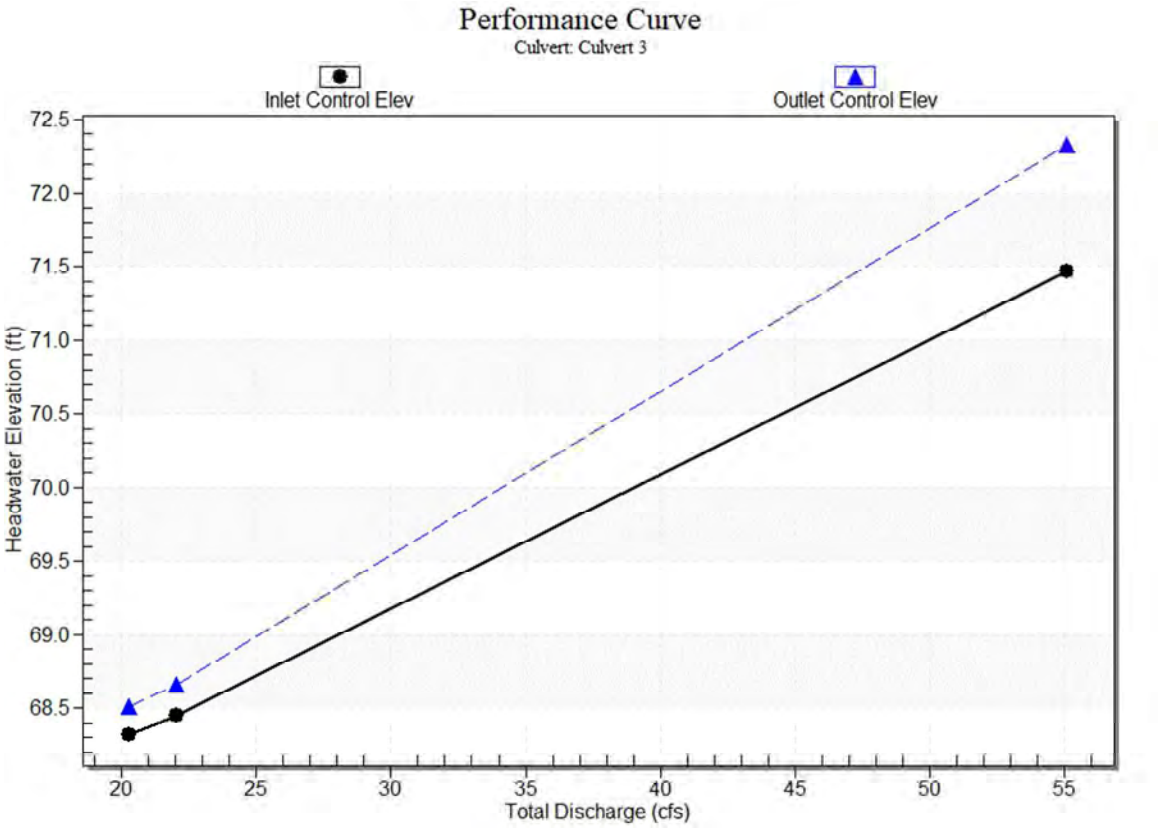
Inlet Elevation (invert): 65.97 ft,

Outlet Elevation (invert): 65.73 ft

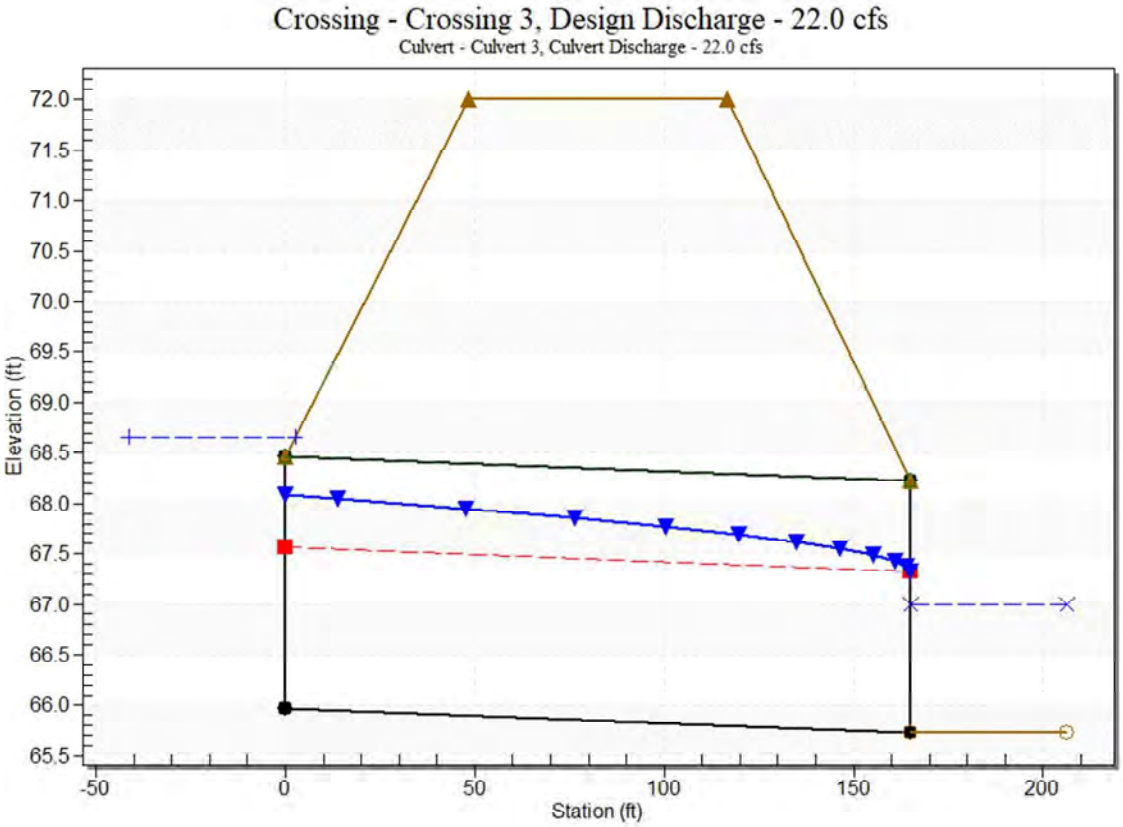
Culvert Length: 165.00 ft,

Culvert Slope: 0.0015

Culvert Performance Curve Plot: Culvert 3



Water Surface Profile Plot for Culvert: Culvert 3



Site Data - Culvert 3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 65.97 ft

Outlet Station: 165.00 ft

Outlet Elevation: 65.73 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 3

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Tailwater Data for Crossing: Crossing 3

Table 9 - Downstream Channel Rating Curve (Crossing: Crossing 3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
20.29	67.00	1.27
22.03	67.00	1.27

Tailwater Channel Data - Crossing 3

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 12.00 ft

Crest Elevation: 72.00 ft

Roadway Surface: Paved

Roadway Top Width: 68.00 ft

Cross Drain 4 STA 1212+54

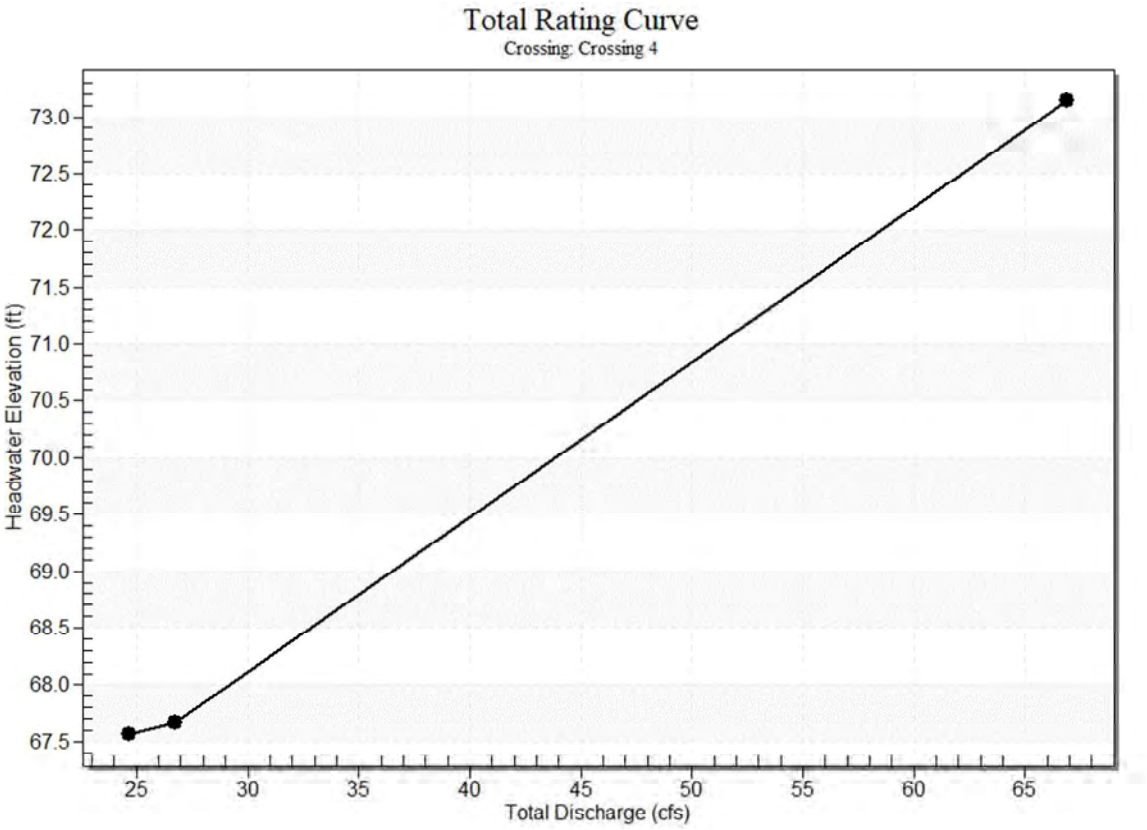
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 10 - Summary of Culvert Flows at Crossing: Crossing 4

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
67.57	50 year	24.67	24.67	0.00	1
67.67	100 year	26.75	26.75	0.00	1
73.00	Overtopping	64.10	64.10	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 4



Culvert Data: Culvert 4

Table 11 - Culvert Summary Table: Culvert 4

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	24.67 cfs	24.67 cfs	67.57	2.70	3.089	7-A2t	-1.00	1.69	2.36	2.36	5.14	0.00
100 year	26.75 cfs	26.75 cfs	67.67	2.87	3.192	7-A2t	-1.00	1.76	2.36	2.36	5.57	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

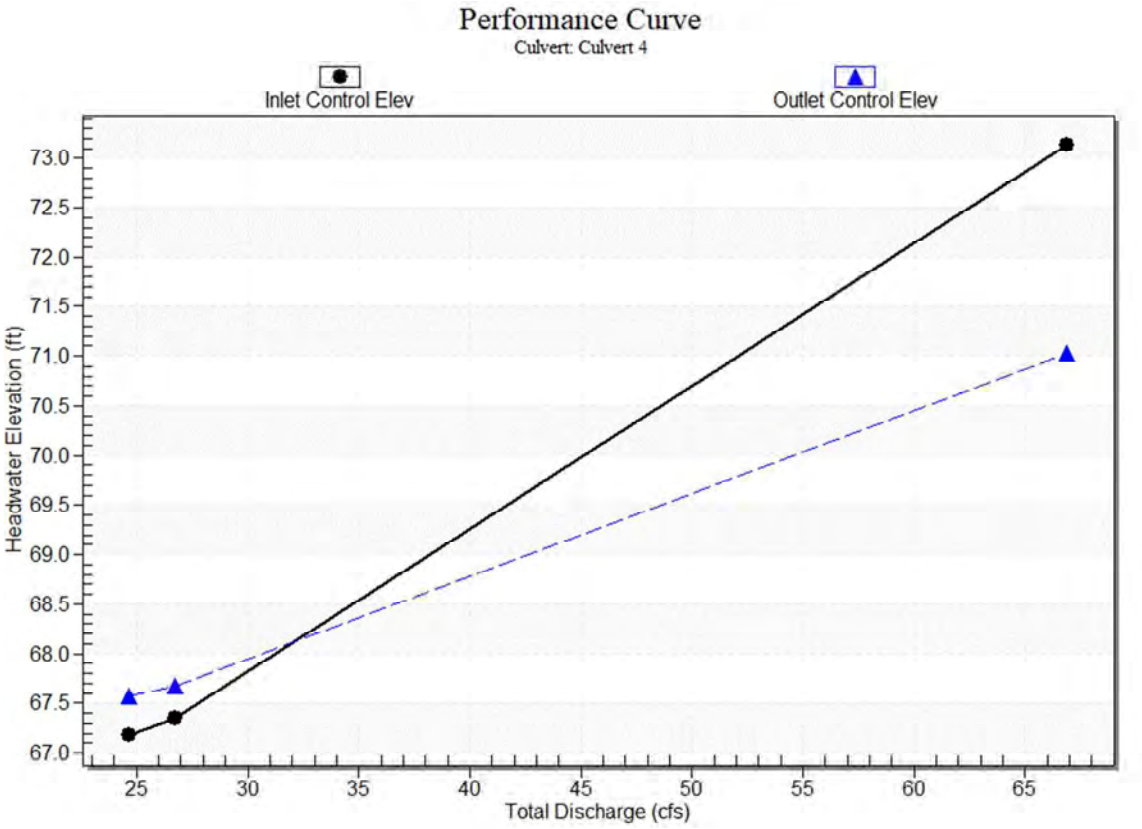
Inlet Elevation (invert): 64.48 ft,

Outlet Elevation (invert): 64.64 ft

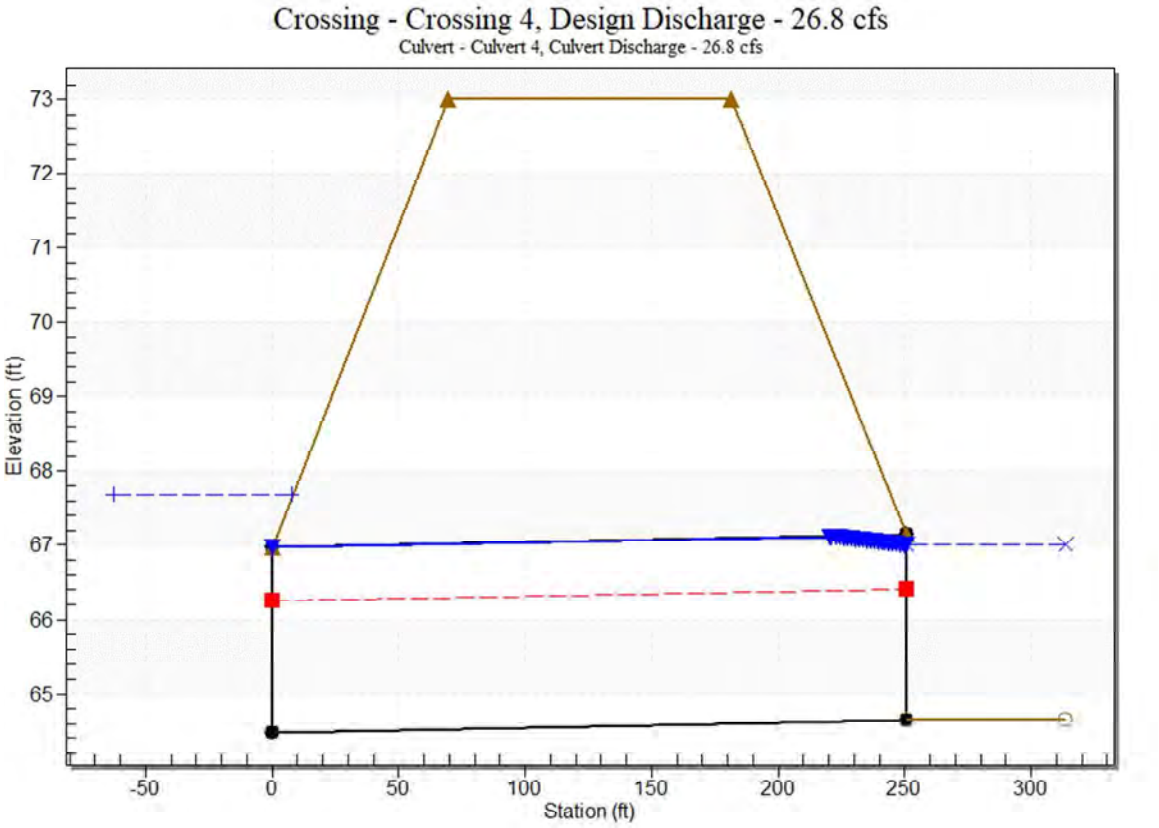
Culvert Length: 251.00 ft,

Culvert Slope: -0.0006

Culvert Performance Curve Plot: Culvert 4



Water Surface Profile Plot for Culvert: Culvert 4



Site Data - Culvert 4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 64.48 ft

Outlet Station: 251.00 ft

Outlet Elevation: 64.64 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 4

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: Crossing 4

Table 12 - Downstream Channel Rating Curve (Crossing: Crossing 4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
24.67	67.00	2.36
26.75	67.00	2.36

Tailwater Channel Data - Crossing 4

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 14.00 ft

Crest Elevation: 73.00 ft

Roadway Surface: Paved

Roadway Top Width: 112.00 ft

Cross Drain 5 STA 1260+42

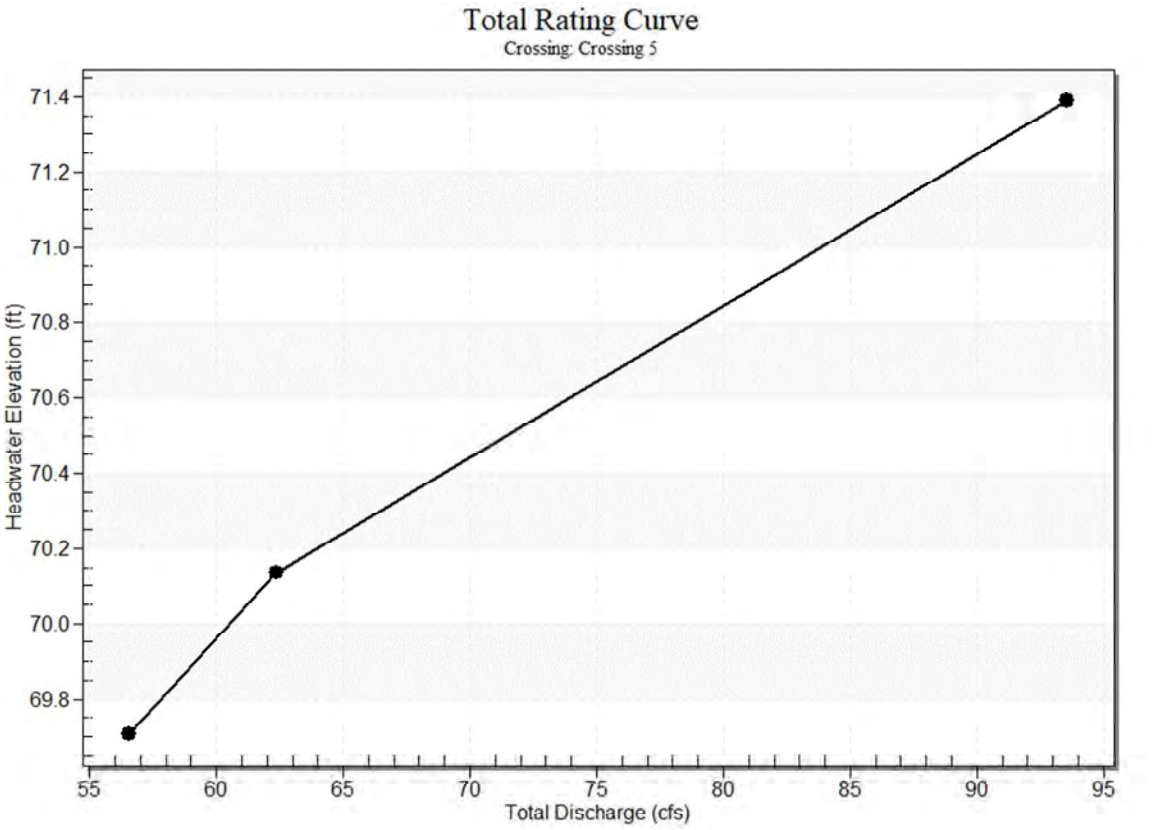
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 13 - Summary of Culvert Flows at Crossing: Crossing 5

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 5 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
69.71	50 year	56.56	56.56	0.00	1
70.14	100 year	62.36	62.36	0.00	1
71.00	Overtopping	73.39	73.39	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 5



Culvert Data: Culvert 5

Table 14 - Culvert Summary Table: Culvert 5

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	56.56 cfs	56.56 cfs	69.71	3.57	3.668	7-M2c	2.00	1.84	1.84	1.01	7.69	0.00
100 year	62.36 cfs	62.36 cfs	70.14	4.01	4.095	7-M2c	2.00	1.96	1.96	1.01	7.95	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

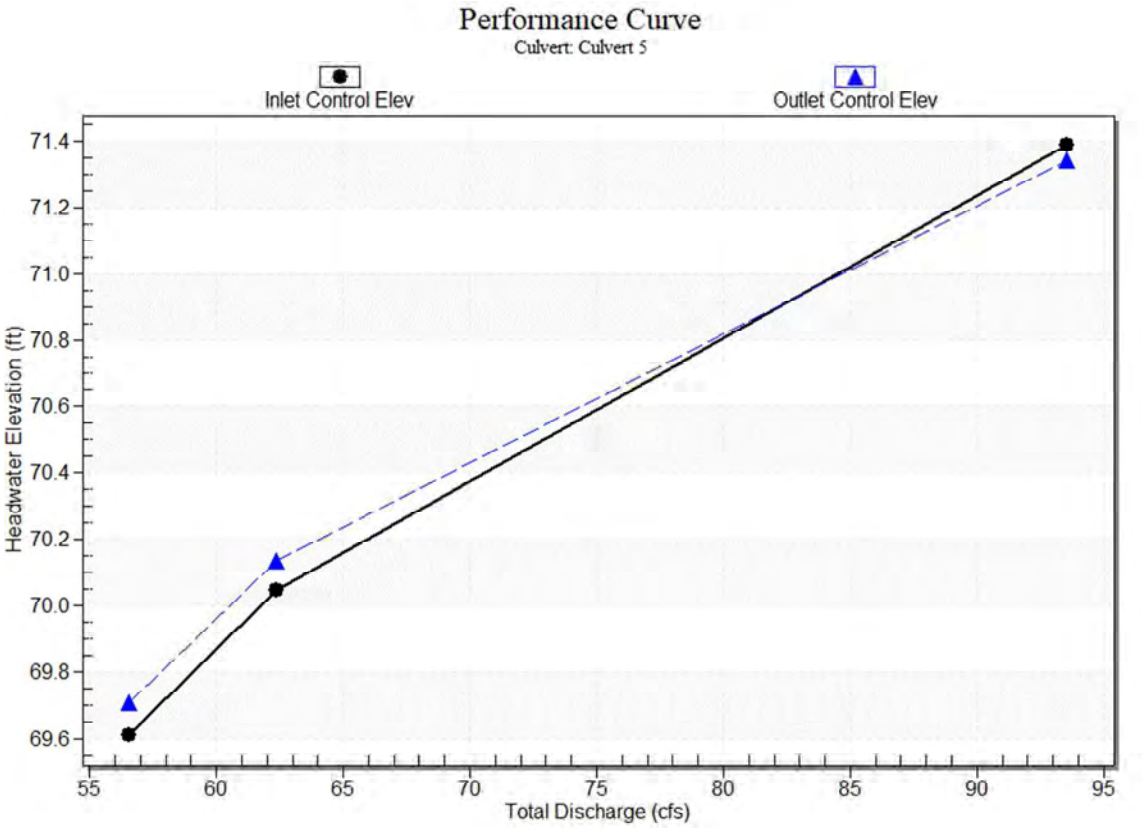
Inlet Elevation (invert): 66.04 ft,

Outlet Elevation (invert): 65.91 ft

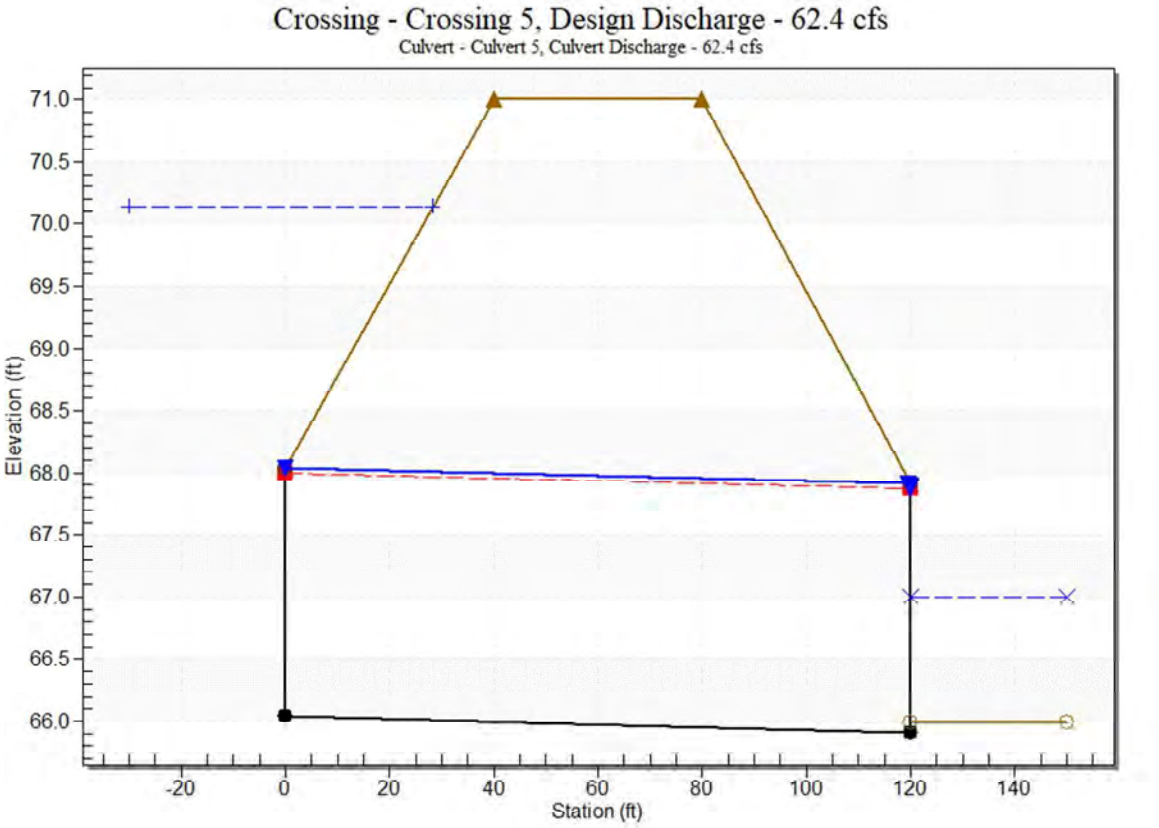
Culvert Length: 120.00 ft,

Culvert Slope: 0.0011

Culvert Performance Curve Plot: Culvert 5



Water Surface Profile Plot for Culvert: Culvert 5



Site Data - Culvert 5

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 66.04 ft

Outlet Station: 120.00 ft

Outlet Elevation: 65.91 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 5

Barrel Shape: Concrete Box

Barrel Span: 4.00 ft

Barrel Rise: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Data for Crossing: Crossing 5

Table 15 - Downstream Channel Rating Curve (Crossing: Crossing 5)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
56.56	67.00	1.01
62.36	67.00	1.01

Tailwater Channel Data - Crossing 5

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 5

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 22.00 ft

Crest Elevation: 71.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Cross Drain 7 STA 1366+13

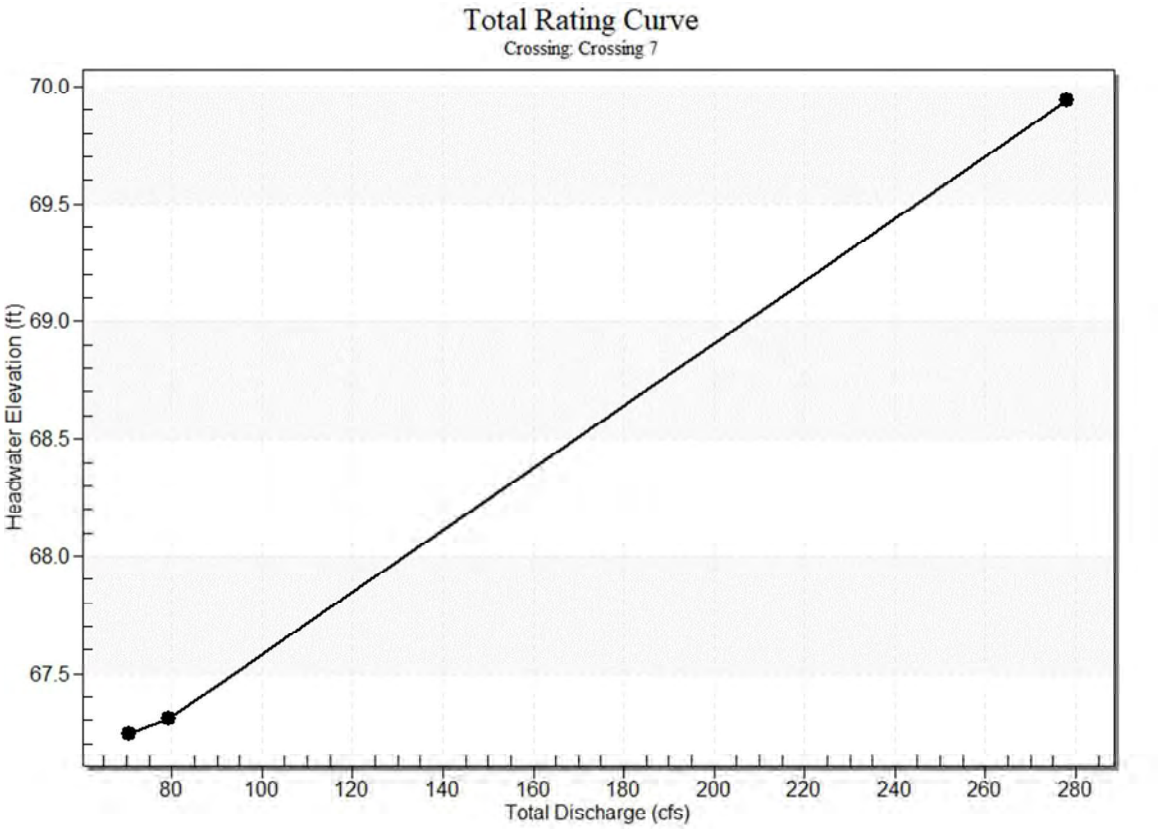
Crossing Discharge Data

Discharge Selection Method: Recurrence

Table 19 - Summary of Culvert Flows at Crossing: Crossing 7

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	Culvert 7 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
67.24	50 year	70.60	70.60	0.00	1
67.31	100 year	79.43	79.43	0.00	1
69.00	Overtopping	202.16	202.16	0.00	Overtopping

Rating Curve Plot for Crossing: Crossing 7



Culvert Data: Culvert 7

Table 20 - Culvert Summary Table: Culvert 7

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
50 year	70.60 cfs	70.60 cfs	67.24	2.27	4.204	4-FFf	1.86	1.34	3.00	4.05	2.94	0.00
100 year	79.43 cfs	79.43 cfs	67.31	2.46	4.269	4-FFf	2.02	1.45	3.00	4.05	3.31	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

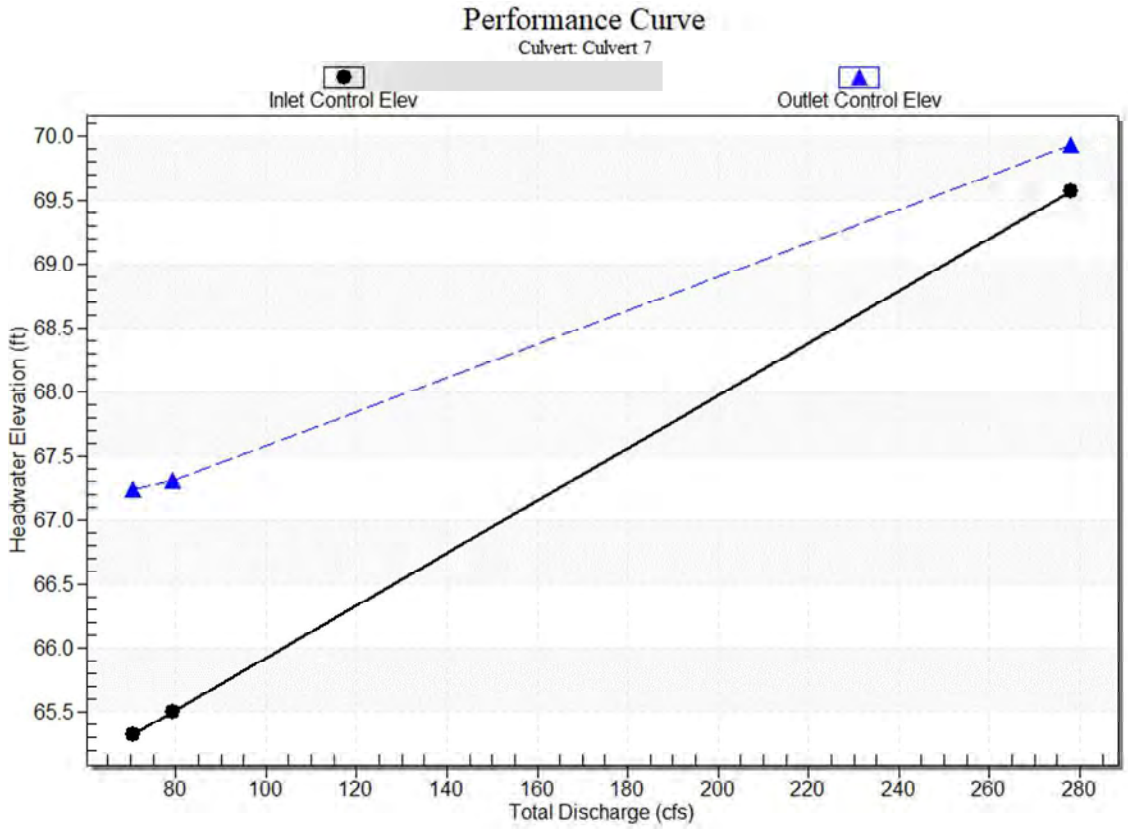
Inlet Elevation (invert): 63.04 ft,

Outlet Elevation (invert): 62.95 ft

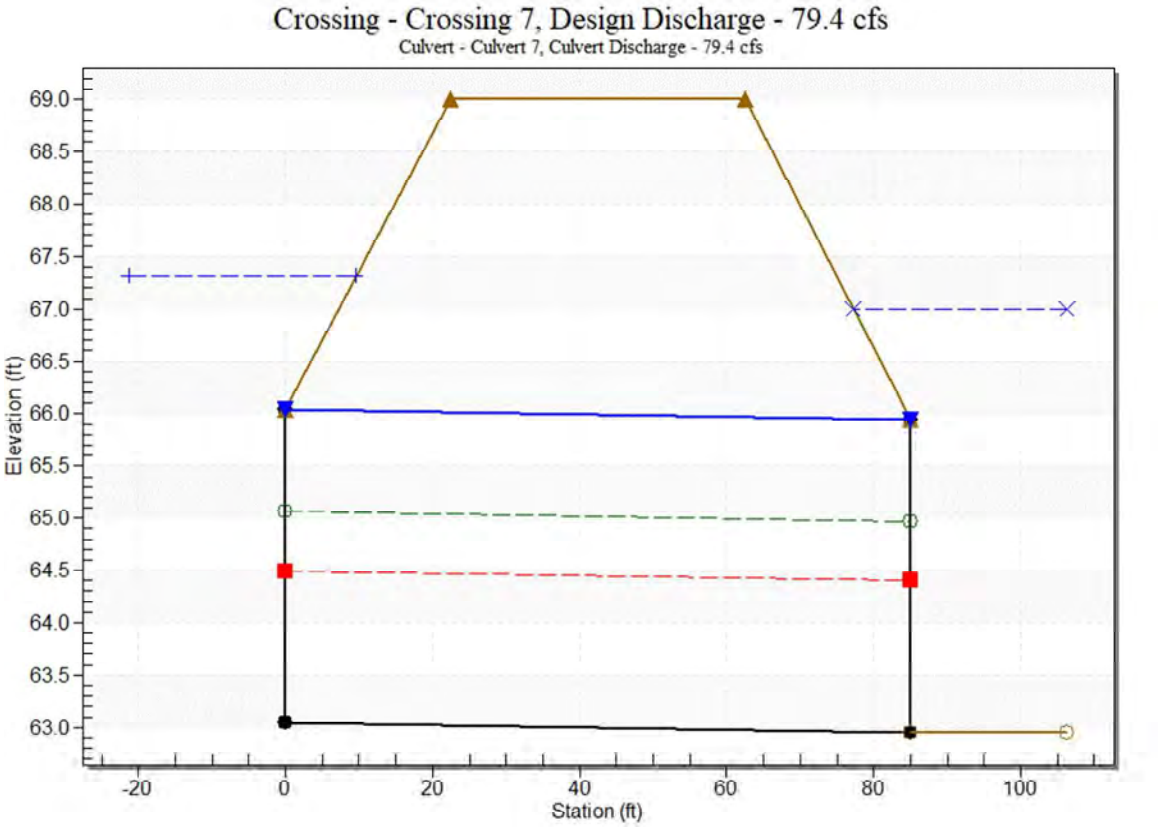
Culvert Length: 85.00 ft,

Culvert Slope: 0.0011

Culvert Performance Curve Plot: Culvert 7



Water Surface Profile Plot for Culvert: Culvert 7



Site Data - Culvert 7

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 63.04 ft

Outlet Station: 85.00 ft

Outlet Elevation: 62.95 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 7

Barrel Shape: Concrete Box

Barrel Span: 8.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Tailwater Data for Crossing: Crossing 7

Table 42 - Downstream Channel Rating Curve (Crossing: Crossing 7)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
70.60	67.00	4.05
79.43	67.00	4.05

Tailwater Channel Data - Crossing 7

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 67.00 ft

Roadway Data for Crossing: Crossing 7

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 12.00 ft

Crest Elevation: 69.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

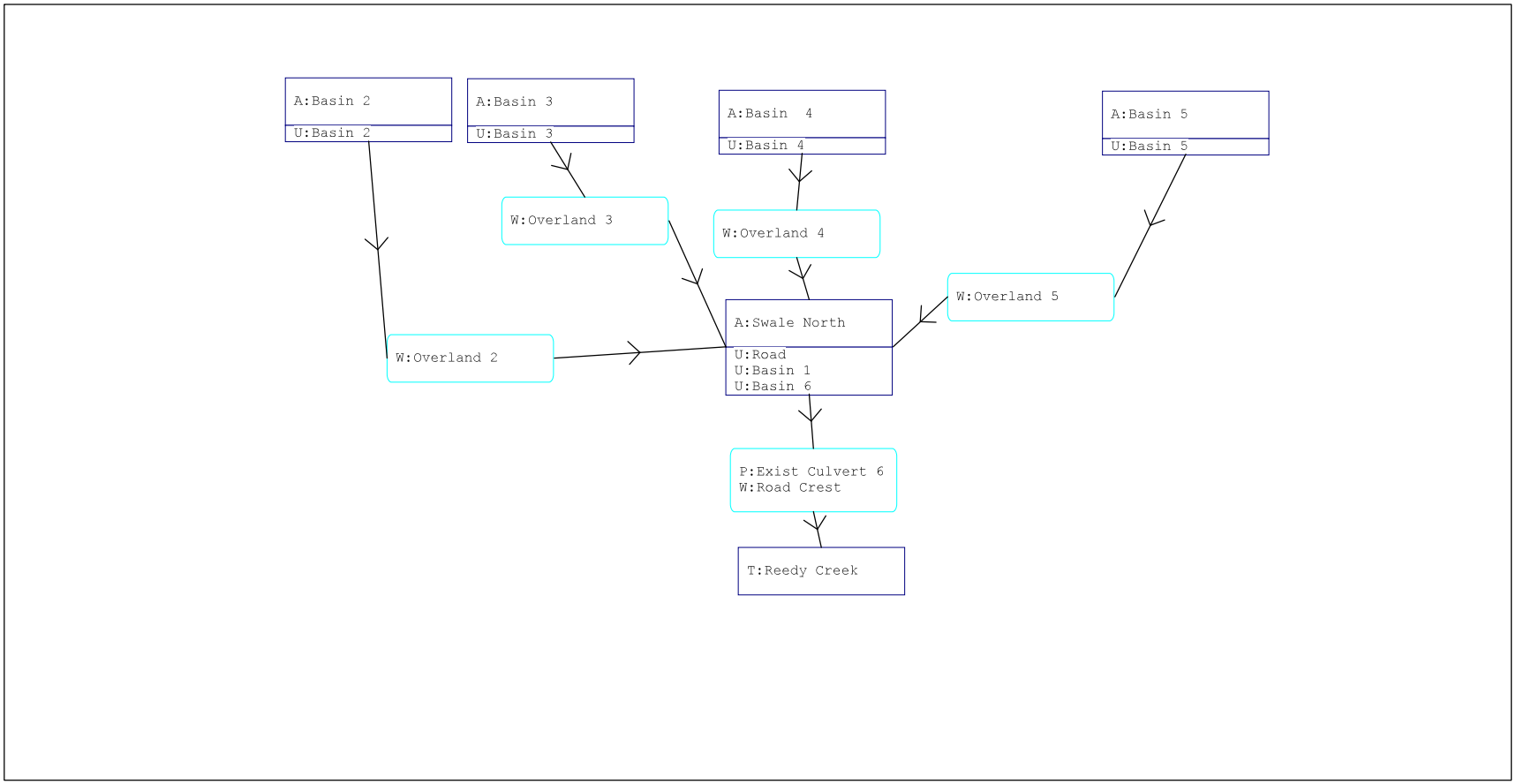
ICPR3 Culvert Analysis for

Cross Drain 6 at STA 1308+35

Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



```
================================================================================
==== Basins ====================================================================
================================================================================

        Name: Basin 1                Node: Swale North           Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 175.00
              Area(ac): 6.110                Time Shift(hrs): 0.00
          Curve Number: 85.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin 2                Node: Basin 2               Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 175.00
              Area(ac): 11.530               Time Shift(hrs): 0.00
          Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin 3                Node: Basin 3               Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 109.00
              Area(ac): 31.290               Time Shift(hrs): 0.00
          Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin 4                Node: Basin  4              Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 83.00
              Area(ac): 39.440               Time Shift(hrs): 0.00
          Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin 5                Node: Basin 5               Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 111.00
              Area(ac): 22.730               Time Shift(hrs): 0.00
          Curve Number: 80.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Basin 6                Node: Swale North           Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 58.00
              Area(ac): 34.510               Time Shift(hrs): 0.00
          Curve Number: 85.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00


--------------------------------------------------------------------------------
        Name: Road                   Node: Swale North           Status: Onsite
       Group: BASE                   Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh323                  Peaking Factor: 323.0
         Rainfall File:                  Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000             Time of Conc(min): 10.00
              Area(ac): 12.140               Time Shift(hrs): 0.00
```

Curve Number: 91.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ==========
==========

Name: Basin 4 Base Flow(cfs): 0.000 Init Stage(ft): 64.000
Group: BASE Warn Stage(ft): 65.000
Type: Stage/Area

3" of storage in wetland. 1" in overall basin.

Stage(ft)	Area(ac)
64.000	9.0500
64.250	9.0500
64.330	39.4400

Name: Basin 2 Base Flow(cfs): 0.000 Init Stage(ft): 64.000
Group: BASE Warn Stage(ft): 65.000
Type: Stage/Area

Stage(ft)	Area(ac)
64.000	7.7700
64.080	7.7700

Name: Basin 3 Base Flow(cfs): 0.000 Init Stage(ft): 64.000
Group: BASE Warn Stage(ft): 65.000
Type: Stage/Area

3" of storage in wetland. 1" in overall basin.

Stage(ft)	Area(ac)
64.000	8.6500
64.250	8.6500
64.330	31.2900

Name: Basin 5 Base Flow(cfs): 0.000 Init Stage(ft): 64.000
Group: BASE Warn Stage(ft): 65.000
Type: Stage/Area

3" of storage in wetland. 1" in overall basin.

Stage(ft)	Area(ac)
64.000	9.9200
64.250	9.9200
64.330	22.7300

Name: Reedy Creek Base Flow(cfs): 0.000 Init Stage(ft): 67.010
Group: BASE Warn Stage(ft): 68.000
Type: Time/Stage

Time Stage Node
Use stages from FEMA Flood Insurance Study
50 yr (2%) : 67.01
100yr (1%) : 67.01

Time(hrs)	Stage(ft)
0.00	67.010
100.00	67.010

Name: Swale North Base Flow(cfs): 0.000 Init Stage(ft): 64.000
Group: BASE Warn Stage(ft): 69.000
Type: Stage/Area

Assume area in swale. Bottom 1 foot wide. Length 6000 Ft

Stage(ft)	Area(ac)
64.000	0.1400
65.000	0.1400
66.000	0.1400

==========
==== Pipes ==========
==========

```
        Name: Exist Culvert 6     From Node: Swale North        Length(ft): 85.00
       Group: BASE                  To Node: Reedy Creek            Count: 1
                                                    Friction Equation: Automatic
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Most Restrictive
    Geometry: Circular       Circular                           Flow: Both
    Span(in): 30.00          30.00                    Entrance Loss Coef: 0.00
    Rise(in): 30.00          30.00                        Exit Loss Coef: 1.00
   Invert(ft): 64.000        63.910                       Bend Loss Coef: 0.00
  Manning's N: 0.012000      0.012000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                       Inlet Ctrl Spec: Use dc
 Bot Clip(in): 0.000         0.000                    Stabilizer Option: None


Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall



================================================================================================
==== Weirs =====================================================================================
================================================================================================

        Name: Overland 2          From Node: Basin 2
       Group: BASE                  To Node: Swale North
        Flow: Both                    Count: 1
        Type: Horizontal           Geometry: Rectangular

                  Span(in): 3600.00
                  Rise(in): 999.00
                Invert(ft): 64.080
      Control Elevation(ft): 64.080
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

300 * (12"/1') = 3,600"

------------------------------------------------------------------------------------------------
        Name: Overland 3          From Node: Basin 3
       Group: BASE                  To Node: Swale North
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

                  Span(in): 3444.00
                  Rise(in): 999.00
                Invert(ft): 64.330
      Control Elevation(ft): 64.330
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

287' * (12"/1') = 3,444"

------------------------------------------------------------------------------------------------
        Name: Overland 4          From Node: Basin  4
       Group: BASE                  To Node: Swale North
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

                  Span(in): 6732.00
                  Rise(in): 999.00
                Invert(ft): 64.330
      Control Elevation(ft): 64.330
                                          TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
        Weir Discharge Coef: 3.200
     Orifice Discharge Coef: 0.600

561' * (12"/1') = 6,732"

------------------------------------------------------------------------------------------------
        Name: Overland 5          From Node: Basin 5
       Group: BASE                  To Node: Swale North
        Flow: Both                    Count: 1
        Type: Vertical: Mavis      Geometry: Rectangular

                  Span(in): 9240.00
                  Rise(in): 999.00
                Invert(ft): 64.330
      Control Elevation(ft): 64.330
```

```
                                        TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
       Orifice Discharge Coef: 0.600

785' * (12"/1') = 9,240"

-----------------------------------------------------------------------------------------------
         Name: Road Crest          From Node: Swale North
        Group: BASE                  To Node: Reedy Creek
         Flow: Both                    Count: 1
         Type: Vertical: Paved      Geometry: Rectangular

                   Span(in): 225.00
                   Rise(in): 999.00
                 Invert(ft): 69.000
       Control Elevation(ft): 69.000
                                        TABLE
            Bottom Clip(in): 0.000
               Top Clip(in): 0.000
          Weir Discharge Coef: 3.200
       Orifice Discharge Coef: 0.600



===============================================================================
==== Hydrology Simulations ====================================================
===============================================================================

         Name: 100yr-24 hr
     Filename: \\VHB.COM\GBL\PROJ\ORLANDO\63316.11 US 1792 CR54 TO AVE A\TECH\ENGINEERING\ICPR\100yr-24 hr.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 9.00

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

-----------------------------------------------------------------------------------------------
         Name: 50yr-24 hr
     Filename: \\VHB.COM\GBL\PROJ\ORLANDO\63316.11 US 1792 CR54 TO AVE A\TECH\ENGINEERING\ICPR\50yr-24 hr.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Sfwmd72
    Rainfall Amount(in): 8.50

Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.00

===============================================================================
==== Routing Simulations ======================================================
===============================================================================

         Name: 100yr-24 hr         Hydrology Sim: 100yr-24 hr
     Filename: \\VHB.COM\GBL\PROJ\ORLANDO\63316.11 US 1792 CR54 TO AVE A\TECH\ENGINEERING\ICPR\100yr-24 hr.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                         Boundary Flows:



Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes


-----------------------------------------------------------------------------------------------
         Name: 50yr-24 hr          Hydrology Sim: 50yr-24 hr
     Filename: \\vhb.com\gbl\proj\Orlando\63316.11 US 1792 CR54 to Ave A\tech\ENGINEERING\ICPR\50yr-24 hr.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

        Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
```

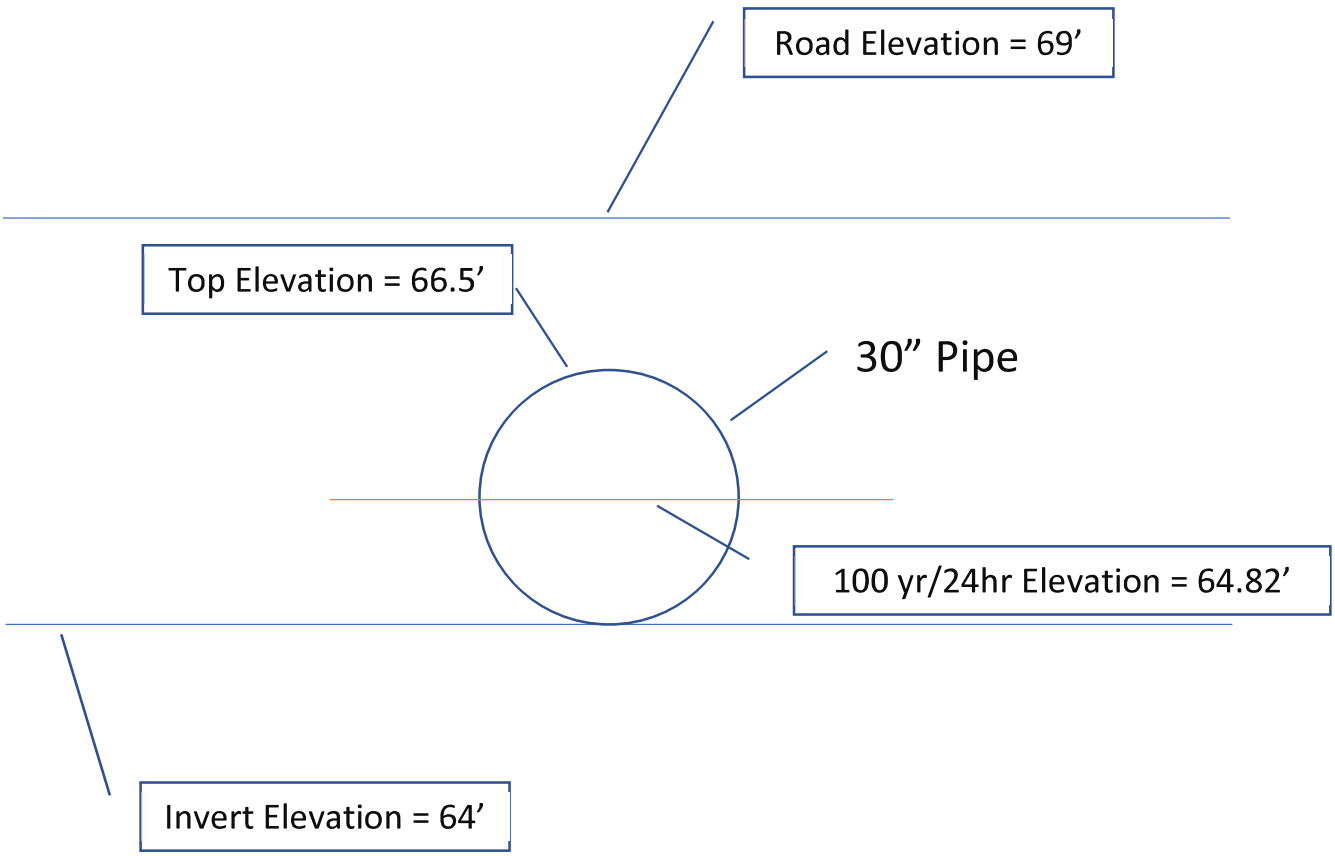
```
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 36.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
999.000         15.000

Group           Run
--------------- -----
BASE            Yes
```

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs
Basin 4	BASE	100yr-24 hr	36.00	64.81	65.00	0.0001	9664238	20.92	76.79	30.38
Basin 2	BASE	100yr-24 hr	36.00	64.81	65.00	0.0026	338461	22.00	13.04	30.17
Basin 3	BASE	100yr-24 hr	36.00	64.81	65.00	0.0001	7275008	21.17	50.05	30.38
Basin 5	BASE	100yr-24 hr	36.00	64.81	65.00	0.0001	4345801	21.25	35.86	30.17
Swale North	BASE	100yr-24 hr	35.70	64.82	69.00	-0.0063	6176	30.17	178.41	0.00
Basin 4	BASE	50yr-24 hr	36.00	64.80	65.00	0.0001	9453605	20.92	71.68	32.90
Basin 2	BASE	50yr-24 hr	36.00	64.80	65.00	0.0026	338461	22.00	12.16	32.90
Basin 3	BASE	50yr-24 hr	36.00	64.80	65.00	0.0001	7117974	21.17	46.71	32.90
Basin 5	BASE	50yr-24 hr	36.00	64.80	65.00	0.0001	4257088	21.25	33.47	32.90
Swale North	BASE	50yr-24 hr	35.95	64.80	69.00	0.0063	6176	32.90	179.96	0.00

Culvert Analysis for Cross Drain 6 at STA 1308+35



N.T.S.

Appendix C2 – Bridge Calculations

Pile Area (Eastbound Profile)

Project: **CR54 to Ave A (US 17-92)** By: AG Date: 2/24/2022

Location: **Osceola County** Checked: OB Date: 2/25/2022

Pile Section	Width of Pile (ft)	Height (ft)	Area (sf)
1	2	1.98	3.96
2	2	1.825	3.65
3	2	2.021	4.042
4	2	2.125	4.25
5	2	2.35	4.7
6	2	2.125	4.25
7	2	2.1	4.2
8	2	2.2	4.4
9	2	2.625	5.25
10	2	2.475	4.95
11	2	2.625	5.25
12	2	2.75	5.5
13	2	2.3	4.6
14	2	2.275	4.55
15	2	2.075	4.15
16	2	2.05	4.1
17	2	2.25	4.5
18	2	2.875	5.75
19	2	2.4	4.8
20	2	2.3	4.6
21	2	2.025	4.05
22	2	1.98	3.96
23	2	2	4
24	2	3.025	6.05
25	2	1.98	3.96
26	2	2.475	4.95
27	2	3.625	7.25
28	2	3.075	6.15
29	2	4.825	9.65
30	2	1.75	3.5

Total Pile Area (sf)	144.97

Pile Area (Westbound Profile)

Project: **CR54 to Ave A (US 17-92)** By: AG Date: 2/24/2022

Location: **Osceola County** Checked: OB Date: 2/25/2022

Pile Section	Width of Pile (ft)	Height (ft)	Area (sf)
1	2	2	4
2	2	1.725	3.45
3	2	2.05	4.1
4	2	2.3	4.6
5	2	2.25	4.5
6	2	2.1	4.2
7	2	2.225	4.45
8	2	2.55	5.1
9	2	2.6	5.2
10	2	2.45	4.9
11	2	2.55	5.1
12	2	2	4
13	2	2	4
14	2	2.65	5.3
15	2	2.175	4.35
16	2	2.25	4.5
17	2	1.89	3.78
18	2	2.05	4.1
19	2	2.375	4.75
20	2	1.98	3.96
21	2	2.625	5.25
22	2	2.875	5.75
23	2	4.475	8.95
24	2	1.5	3

Total Pile Area (sf)	111.29

Bridge Hydraulic Calculations

Project:	**CR54 to Ave A (US 17-92)**	By:	AG	Date:	2/24/2022
Location:	**Osceola County**	Checked:	OB	Date:	2/25/2022

Bridge	Area (sf)	Horizontal Clearance (ft)	Pile Width (ft)	Area of pile in water (sf)	Flow Area (sf)
Eastbound Profile	4,623.60	70.77	2	144.97	4478.63
Westbound Profile	4,623.60	90	2	111.29	4512.31

Mean Flow Velocity

Project:	**CR54 to Ave A (US 17-92)**	By:	AG	Date:	2/24/2022
Location:	**Osceola County**	Checked:	OB	Date:	2/25/2022

Profile	Recurrence Interval (yrs.)	100 yr. Peak Discharge (cfs)	500 yr. Peak Discharge (cfs)	Flow Area (sf)	Mean Flow Velocity (fps)
Eastbound	100	1,100	1,100	4478.63	0.25
Westbound	500	1,100	1,100	4512.31	0.24

Appendix C3 – Floodplain Calculations

Project: SR 600 (US 17-92) **Designed by:** AM **Date:** 5/15/2023

County: Osceola **Checked by:** AE **Date:** 5/15/2023

FLOODPLAIN ANALYSIS 1236+31.80 to 1236+97.10						
LOCATION	LENGTH	CROSS-SECTION FILL		AVG. FILL	FLOODPLAIN IMPACT	
STATION	(FT)	2 x SF	SF	SF	FT^3	ACRE-FT
1236+31.80		0.00	0.00			
	18.20			79.075	1439.16	0.03
1236+50.00		316.30	158.15			
	47.10			79.075	3724.43	0.09
1236+97.10		0.00	0.00			
					TOTAL	0.12

Project: SR 600 (US 17-92) **Designed by:** AM **Date:** 5/15/2023

County: Osceola **Checked by:** AE **Date:** 5/15/2023

FLOODPLAIN ANALYSIS 1343+61.90 to 1346+84.70						
LOCATION	**LENGTH**	**CROSS-SECTION FILL**		**AVG. FILL**	**FLOODPLAIN IMPACT**	
STATION	**(FT)**	**2 x SF**	**SF**	**SF**	**FT^3**	**ACRE-FT**
1343+61.90		0.00	0.00			
	38.10			0.655	24.96	0.00
1344+00.00		2.62	1.31			
	100.00			1.3775	137.75	0.00
1345+00.00		2.89	1.45			
	100.00			9.3725	937.25	0.02
1346+00.00		34.60	17.30			
	84.70			8.65	732.66	0.02
1346+84.70		0.00	0.00			
					TOTAL	**0.04**

Project: SR 600 (US 17-92) **Designed by:** AM **Date:** 5/15/2023

County: Osceola **Checked by:** AE **Date:** 5/15/2023

FLOODPLAIN ANALYSIS 1346+84.70 to 1380+76.80						
LOCATION	LENGTH	CROSS-SECTION FILL		AVG. FILL	FLOODPLAIN IMPACT	
STATION	(FT)	2 x SF	SF	SF	FT^3	ACRE-FT
1346+84.70		0.00	0.00			
	15.30			24.035	367.74	0.01
1347+00.00		96.14	48.07			
	100.00			46.9875	4698.75	0.11
1348+00.00		91.81	45.91			
	100.00			63.145	6314.50	0.14
1349+00.00		160.77	80.39			
	100.00			83.055	8305.50	0.19
1350+00.00		171.45	85.73			
	100.00			82.2025	8220.25	0.19
1351+00.00		157.36	78.68			
	100.00			95.3425	9534.25	0.22
1352+00.00		224.01	112.01			
	100.00			117.9525	11795.25	0.27
1353+00.00		247.80	123.90			
	100.00			130.7025	13070.25	0.30
1354+00.00		275.01	137.51			
	100.00			137.5025	13750.25	0.32
1355+00.00		275.00	137.50			
	100.00			130.4175	13041.75	0.30
1356+00.00		246.67	123.34			
	100.00			116.2325	11623.25	0.27
1357+00.00		218.26	109.13			
	100.00			102.9475	10294.75	0.24
1358+00.00		193.53	96.77			
	100.00			110.81	11081.00	0.25
1359+00.00		249.71	124.86			
	100.00			121.9275	12192.75	0.28
1360+00.00		238.00	119.00			
	100.00			125.215	12521.50	0.29
1361+00.00		262.86	131.43			
	100.00			129.275	12927.50	0.30
1362+00.00		254.24	127.12			
	100.00			128.715	12871.50	0.30
1363+00.00		260.62	130.31			
	100.00			133.59	13359.00	0.31
1364+00.00		273.74	136.87			
	100.00			136.99	13699.00	0.31
1365+00.00		274.22	137.11			
	100.00			180.135	18013.50	0.41
1366+00.00		446.32	223.16			
	100.00			176.355	17635.50	0.40
1367+00.00		259.10	129.55			

	100.00			124.5425	12454.25	0.29
1368+00.00		239.07	119.54			
	100.00			114.6575	11465.75	0.26
1369+00.00		219.56	109.78			
	100.00			101.9	10190.00	0.23
1370+00.00		188.04	94.02			
	100.00			90.0675	9006.75	0.21
1371+00.00		172.23	86.12			
	100.00			91.7575	9175.75	0.21
1372+00.00		194.80	97.40			
	100.00			89.535	8953.50	0.21
1373+00.00		163.34	81.67			
	100.00			97.1975	9719.75	0.22
1374+00.00		225.45	112.73			
	100.00			114.0975	11409.75	0.26
1375+00.00		230.94	115.47			
	100.00			109.21	10921.00	0.25
1376+00.00		205.90	102.95			
	100.00			100.5725	10057.25	0.23
1377+00.00		196.39	98.20			
	100.00			95.7475	9574.75	0.22
1378+00.00		186.60	93.30			
	100.00			100.3	10030.00	0.23
1379+00.00		214.60	107.30			
	100.00			106.845	10684.50	0.25
1380+00.00		212.78	106.39			
	76.80			53.195	4085.38	0.09
1380+76.80		0.00	0.00			
					TOTAL	**8.56**

Project: SR 600 (US 17-92) **Designed by:** AM **Date:** 5/15/2023

County: Polk/Osceola **Checked by:** AE **Date:** 5/15/2023

FLOODPLAIN ANALYSIS 1380+76.80 to 1385+00.00						
LOCATION	LENGTH	CROSS-SECTION FILL		AVG. FILL	FLOODPLAIN IMPACT	
STATION	(FT)	2 x SF	SF	SF	FT^3	ACRE-FT
1380+76.80		0.00	0.00			
	23.20			0	0.00	0.00
1381+00.00		0.00	0.00			
	100.00			42.9275	4292.75	0.10
1382+00.00		171.71	85.86			
	100.00			71.115	7111.50	0.16
1383+00.00		112.75	56.38			
	100.00			54.365	5436.50	0.12
1384+00.00		104.71	52.36			
	100.00			26.1775	2617.75	0.06
1385+00.00		0.00	0.00			
					TOTAL	0.45

Project: SR 600 (US 17-92) **Designed by:** OB **Date:** 5/15/2023
County: Polk/Osceola **Checked by:** MK **Date:** 5/15/2023

FLOODPLAIN ANALYSIS BASIN 4 POND 1				
NOTES	POND CONTOUR EL.	CONTOUR AREA	EL. DIFFERENCE	FLOODPLAIN IMPACT
	FT	ACRES	FT	ACRE-FT
BOTTOM	59.75	2.21		
			1.00	
	60.75	2.32		
			1.00	
	61.75	2.44		
			1.00	
	62.75	2.56		
			1.00	
CONTROL	63.75	2.69		
			1.00	
EXISTING GROUND	64.75	2.81		
			1.00	0.07
FLOODPLAIN EL.	65.75	2.94		
			1.00	0.13
BERM EL.	66.75	3.08		
			0.25	-0.06
1:4 TIE DOWN	67.00	3.33		
|			-1.00	0.09
v	66.00	3.51		
			TOTAL	**0.22**

Project:	SR 600 (US 17-92)	AM	**Designed by:**	5/15/2023	**Date:** 5/3/2023
County:	Polk/Osceola	AE	**Checked by:**	5/15/2023	**Date:** 5/3/2023

Floodplain Compensation Area 1

PRELIMINARY FLOODPLAIN COMPENSATION AREA :
STAGE-STORAGE RELATIONSHIP :

Below are the Stage - Storage calculations for the preliminary floodplain compensation area

Soil Type Smyrna Fine Sand, 0-2% Slopes

Depth to water Table 6"-18"

Floodplain Elevation (ft) = 66.0

Existing Ground Elevation (ft) = 65.0

SHWT Elevation (ft) = 64.0

	STAGE ELEVATION (ft)	SURFACE AREA (sq-ft)	SURFACE AREA (ac)	TOTAL STORAGE (ac-ft)
SHWT	64.0	529690	12.16	0.00
Berm	65.0	535352	12.29	12.23

Notes:
1. Floodplain Elevations from FEMA Floodplain Map
2. SHWT estimated from geotechnical report (Preliminary Soil Survey Report, June 2, 2021)
3. Slope between compensation contours estimated to be 1:4

Project:	SR 600 (US 17-92)	AM	**Designed by:**	5/15/2023	**Date:** 5/3/2023
County:	Polk/Osceola	AE	**Checked by:**	5/15/2023	**Date:** 5/3/2023

Floodplain Compensation Area 2

PRELIMINARY FLOODPLAIN COMPENSATION AREA :
STAGE-STORAGE RELATIONSHIP :

Below are the Stage - Storage calculations for the preliminary floodplain compensation area

Soil Type Ona Fine Sand, 0-2% Slopes

Depth to water Table 6"-18"

Floodplain Elevation (ft) = 67.0

Existing Ground Elevation (ft) = 65.0

SHWT Elevation (ft) = 64.0

	STAGE ELEVATION (ft)	SURFACE AREA (sq-ft)	SURFACE AREA (ac)	TOTAL STORAGE (ac-ft)
SHWT	64.0	478289	10.98	0.00
Berm	65.0	483952	11.11	11.05

Notes:
1. Floodplain Elevations from FEMA Floodplain Map
2. SHWT estimated from geotechnical report (Preliminary Soil Survey Report, June 2, 2021)
3. Slope between compensation contours estimated to be 1:4

Project:	SR 600 (US 17-92)	AM	**Designed by:**	5/15/2023	**Date:** 5/3/2023
County:	Polk/Osceola	AE	**Checked by:**	5/15/2023	**Date:** 5/3/2023

Floodplain Compensation Area 3

PRELIMINARY FLOODPLAIN COMPENSATION AREA :
STAGE-STORAGE RELATIONSHIP :

Below are the Stage - Storage calculations for the preliminary floodplain compensation area

Soil Type: Myakka/ Immokalee Fine Sand, 0-2% Slopes
Depth to water Table: 6"-18"
Floodplain Elevation (ft) = 67.0
Existing Ground Elevation (ft) = 65.0
SHWT Elevation (ft) = 64.0

	STAGE ELEVATION (ft)	SURFACE AREA (sq-ft)	SURFACE AREA (ac)	TOTAL STORAGE (ac-ft)
SHWT	64.0	501811	11.52	0.00
Berm	65.0	507474	11.65	11.59

Notes:
1. Floodplain Elevations from FEMA Floodplain Map
2. SHWT estimated from geotechnical report (Preliminary Soil Survey Report, June 2, 2021)
3. Slope between compensation contours estimated to be 1:4

Station Range	Floodplain Zone	Floodplain Elevation (ft)[1]	Lowest Existing PGL (ft)	Volume of Fill (ac-ft)
1236+31.80 to 1236+97.10	AE (Floodway)	67	66[2]	0.12
1236+97.10 to 1343+61.90	X	N/A	N/A	N/A
1343+61.90 to 1346+84.70	A	67	68[3]	0.04
1346+84.70 to 1380+76.80	A/AE	67/67	65	8.56
1380+76.80 to 1385+00.00	A	67	65	0.45
Basin 4 Pond 1	A	67	66	0.22
			TOTAL	9.40

Notes:

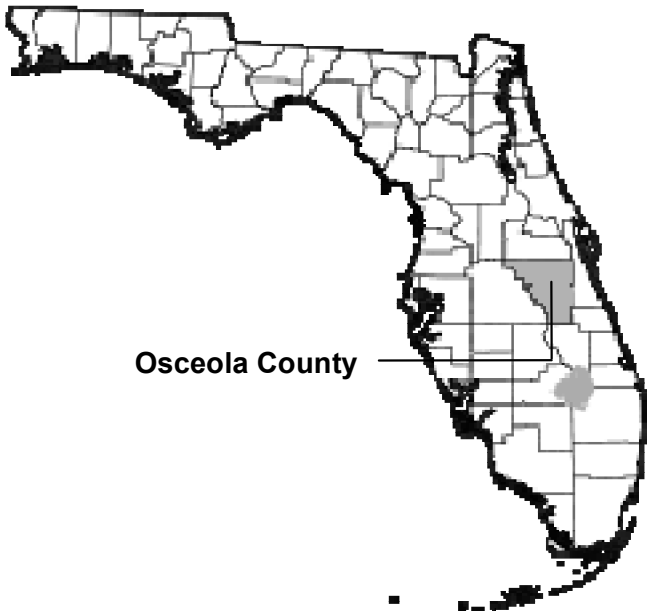
1. Zone A elevations are estimated from LiDAR Data
2. Existing ground elevation below existing bridge (extending bridge)
3. Although Lowest PGL is higher than floodplain, impact occurs in roadside swales

Appendix D – Excerpts from FEMA Flood Insurance Study, Osceola County, Florida.

FLOOD INSURANCE STUDY

OSCEOLA COUNTY, FLORIDA
AND INCORPORATED AREAS

Community Name	Community Number
KISSIMMEE, CITY OF	120190
OSCEOLA COUNTY (UNINCORPORATED AREAS)	120189
REEDY CREEK IMPROVEMENT DISTRICT	120577
ST. CLOUD, CITY OF	120191



REVISED
June 18, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12097CV000A

Table 5: Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharge (Cubic Feet per Second) 10-percent-annual-chance	2-percent-annual-chance	1-percent-annual-chance	0.2-percent-annual-chance
DAVENPORT CREEK TRIBUTARY NO. 2					
Approximately 0.9 mile upstream of mouth	1.56	679	1,066	1,239	1,626
EAST CITY CANAL[1]					
At mouth	6.37	1,128	1,531	1,661	2,018
EAST CITY CANAL TRIBUTARY 1					
At confluence with East City Canal	0.9	375	575	687	932
MILL SLOUGH					
At U.S. Route 441	11.6	710	1,040	1,360	2,050
At Mill Slough Road	10.7	660	970	1,300	1,900
PEG HORN SLOUGH					
At mouth	2.28	714	1,003	1,090	1,258
At Neptune Road	2.01	612	840	896	1,008
At Old Landfill entrance road	1.19	351	416	420	427
At Canoe Creek Road	0.46	209	398	465	508
REEDY CREEK					
At Cypress Lake	282.0	3,300	5,000	5,700	6,350
At Lake Russell	264.0	2,700	4,000	4,500	5,100
At U.S. Route 92 bridge	209.0	800	1,100	1,100	1,100

[1]Peak discharges computed with UNET (Reference 25)

ELEVATION IN FEET (NAVD)

85
80
75
70
65
60
55
50
45
40

CONFLUENCE OF REEDY CREEK TRIBUTARY NO. 1

ORANGE BLOSSOM TR

LIMIT OF DETAILED STUDY

67.01

J K L M N O P Q R

12 13 14 15 16 17 18 19 20 21 22 23 24 25

STREAM DISTANCE IN MILES ABOVE CONFLUENCE WITH CYPRESS LAKE

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

REEDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

OSCEOLA COUNTY, FL
AND INCORPORATED AREAS

24P

GENERAL NOTES

A. GENERAL SPECIFICATIONS

Florida Department Of Transportation Standard Specifications For Road And Bridge Construction, (1999 Edition) And Supplements Thereto.

B. DESIGN SPECIFICATIONS:

AASHTO Standard Specifications For Highway Bridges, (1996 Edition) And Applicable Interims.
Florida Department Of Transportation Structures Design Guidelines, (July 1997).

C. DESIGN LOADING:

MS18 Modified For Military Loading As Required, (Prestressed Beams Designed For An Additional 5% Live Load).

D. DISTRIBUTION VALUES:

	Interior Beam	Exterior Beam
Live Load (As Function Of Beam Spacing, S)	S/1.676	S/1.676
Traffic Barrier	1210 N/m	4270 N/m

E. FUTURE WEARING SURFACE:

Design Includes Allowance For 720 N/m²

F. STAY-IN-PLACE METAL FORMS:

Design Includes Allowance For 960 N/m² Over The Projected Plan Area Of The Metal Forms For The Unit Weight Of Metal Forms And Concrete Required To Fill The Form Flutes.

G. PILE LOAD:

Intermediate Bent Piles For Bents 13 Through 20 Shall Be Driven To A Design Service Load Of 690 kN. Piles At All Other Intermediate Bents Shall Be Driven To 964 kN.
All End Bent Piles Shall Be Driven To A Design Service Load Of 667 kN.

H. PILES:

Piles Shall Be 610 ø Steel Pipe Piles, With A Closed End And A Minimum Wall Thickness Of 13 mm; Piles Shall Be In Accordance With ASTM A-252, Gr. 3. See Pile Details For Splice Information. See Pile Installation Table Sheet For Special Test Pile Notes.

I. CONCRETE:

All Concrete Shall Be In Accordance With Section 346.

Class	Minimum 28-Day Compressive Strength	Location Of Concrete In Structure
II	f'c = 23 MPa.	C.I.P. Barriers
IV	f'c = 38 MPa.	Substructure
V	f'c = 45 MPa.	Prestressed Beams
II (Bridge Deck)	f'c = 31 MPa.	C.I.P. Bridge Deck, Approach Slabs
IV (Drilled Shaft)	f'c = 28 MPa.	Pile (Drilled Shaft Conc.)

J. REINFORCING STEEL:

All Reinforcing Steel Shall Be ASTM A615/A615M-92b, Grade 400.
See Standard Drawings For Additional Requirements.

K. CONSTRUCTION ACCESS:

Temporary Haul Roads (Earth Fill) Will Not Be Permitted As A Construction Method. Special Access Conditions Apply. See Sheet B-70 For Conditions And For A Potential Construction Technique.

L. CONCRETE COVER:

Concrete Cover Shown In The Plans Does Not Include Placement And Fabrication Tolerances Unless Shown As "Minimum Cover". See FDOT Standard Specifications For Allowable Placement Tolerances.
Cover For Reinforcing Steel Shown In The Bridge Plan Details Will Produce The Following Minimum Clearances Not Including Placement And Fabrication Tolerances As Shown Below:

Substructure Concrete: 100 Minimum Clearance (Excluding Pedestals And Seismic Blocks)
Pedestals And Seismic Blocks: 50 Minimum Clearance
Substructure Cast Against Earth: 115 Minimum Clearance
C.I.P. Superstructure Concrete: 50 Minimum Clearance

For Fabrication Tolerances See CRSI Manual Of Standard Practice.

M. ENVIRONMENTAL CLASSIFICATION:

Superstructure: Slightly Aggressive.
Substructure: Concrete: Extremely Aggressive,
Steel: Extremely Aggressive
Resistivity = 400 ohm - cm,
Sulfate = 6972 ppm

N. SCREEDING DECK SLABS:

The Riding Surface Of Bridge Deck Shall Be Screeded To Finish Grade With No Allowance For Permanent Camber.

O. DESIGN METHOD:

Strength Design Method (Load Factor Design) Except That Prestressed Components And The Loads On Piles Have Been Designed For Service Loads.

P. UTILITIES:

See Roadway Plan & Profile Sheets For The Location Of Existing Utilities.

Q. SCOUR:

(See Foundation Layout Sheet For Pile Installation Table)
Scour Has Been Considered In The Design Of The Piles With Scour Elevations Of +19.5 As Shown On The Table. Under No Circumstance Shall The Piles Be Installed To Tip Elevations Above The Minimum Tip Elevations Shown In The Table.
Piles Shall Be Driven To The Design Loads Shown In The Table Times A Factor Of Safety In Accordance With Specification 455-5.11.2.

R. SURFACE FINISH:

A "Class V Applied Finish Coating" Shall Be Applied To The Following Exposed Surfaces
Deck Slab: Vertical Face
Traffic Railing : The Inside, Backside, And Top Of Traffic Railing Barrier
End Bents: All Exposed Bent Wingwalls And Coping Areas Below Handrails.
See Miscellaneous Detail Sheet For Details.

S. EARTHQUAKE:

Design Conforms With The Structures Design Guideline Requirements For Seismic Acceleration Coefficient Of 2.5 %.

T. DIMENSIONS:

All Dimensions Are In Millimeters. Unless Otherwise Noted.

U. WELDING:

Weld Details And The Welding Operation Shall Be In Accordance With The Current Edition Of The ANSI-AASHTO-AWS (D1.5-95) Bridge Welding Code. Welds Requiring Nondestructive Testing Shall Be Radiographically Inspected, Except Where The Geometry Of The Region Of The Weld Will Not Permit Satisfactory Information To Be Secured For Verification Of The Weld Quality. When Such Geometrical Conditions Exist, Other Inspection Procedures Or Combination Of Procedures Such As Ultrasonic Inspection, Dye Penetrant Inspection, And/Or Magnetic Particle Inspection Will Be Required.

W. EXISTING BRIDGES:

The Existing Bridges Are To Remain In Place.

INDEX OF BRIDGE PLANS

STATE	FLA.	PROJECT NO.	SHEET NO.
3			B-1

BID ITEM NOTES

1) For Summary Of Bridge Pay Items, See Print Of Computer (CES) Output.
2) Payment For Incidental Items Not Specifically Covered In The Individual Bid Items Shall Be Included In The Contract Prices For Bid Items.
3) The Following Number Of Standard Composite Neoprene Bearing Pads Are Required: 374 - Type III (Standard) Composite Pads. The Bearing Pads Shall Be Supplied By The Contractor.
4) Bid Item No. 2400-7 Includes 180.0 m² Of Approach Slab Grooving (Ea. Slab). The Area Of Bridge Floor Grooving Shall Be Determined By Measurement Of Area Bounded By The Gutter Lines And The Beginning And End Of The Approach Slabs. Bridge Floor Grooving Shall Be In Accordance With The Requirements Of Class IV Floor Finish In The Specifications.
5) Two Approach Slabs Will Be Required. Additional Details For Approach Slabs And Payment Are Included In The Plans.
6) All Material & Labor To Place The Sand, Reinforcing Steel Cage, And Class IV Concrete (Drilled Shaft) Is To Be Paid For Under Pay Item 2455-7-35.
7) The Cost Of The SIP Metal Forms The Concrete Required To Fill The Form Flutes, The Metal Form Attachments And Accessories And All Miscellaneous Items Required To Install The Forms Shall Be Included In The Contract Unit Price For Superstructure Concrete. Pay Item # 2400-2-4.
8) Include Cost Of Bridge Drains In Unit Cost For Superstructure Concrete (2400-2-4).
9) Pay Items 2455-7-35, 2455-8-35, 2455-140-14 And 2455-141-14 Are Associated With The 610 Dia. Steel Pipe Piles.

WPI #5115692

REVISIONS					
Date	By	Description	Date	By	Description
4/19/99	MCR	REVISED NOTE 9 - BID ITEM NOTES			

	Name	Date
Drawn by	MCR	9-96
Checked by	JEF	9-96
Designed by	MCR	9-96
Checked by	JEF	9-96
Approved by	JOHN E. FRAZIER	

ENGINEER OF RECORD:
JOHN E. FRAZIER, P.E. 37268
FRAZIER ENGINEERING, INC.
1682 N. HARBOR CITY BLVD.
MELBOURNE, FLORIDA 32935
(407)-253-8131

LOGO: FRAZIER ENGINEERING, INC. CONSULTING ENGINEERS

SEAL:

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
600	OSCEOLA	239635-1-52-01

SHEET TITLE: INDEX, GENERAL NOTES, BID ITEM NOTES
Drawing No.
PROJECT roads: S.R. 600
Index No.

Dgn: MCR 21 10:58 1998 GNNOTES

FED. ROAD NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.			B-8

Direction of Stationing

REEDY CREEK SWAMP

℄ Int. Bent No. 25
Sta. 21+50.080

℄ Int. Bent No. 27
Sta. 21+95.420

℄ Construction SR 600 And Profile Grade Line

℄ Int. Bent No. 29
Sta. 22+40.760

End Rip Rap
Sta. 22+96.000
20.705 m Lt

End Bridge
F.F.B.W.

End Bent No. 31
Sta. 22+86.100

Toe Of Slope

Begin Taper
Sta. 22+86.000,
3.600 m Lt

1:2

Guardrail (Typ.)

Match Line Sta. 21+27.410

Edge Of Shldr.

TB-22

N 63° 28' 52" E

BB-25

BB-26

BB-27

22

Bridge No. 920174

3.000 m Shoulder

TB-23

3.600 m Lane

3.600 m Lane

3.000 m Shoulder

7.200 m

14.150 m Out-Out

10.070 m

475 Barrier

475 Barrier

90° 00' 00" (Typ.)

BB-30

BB-31

23

TB-23A

55.240 m To R/W

20.000 m

1:2

450 Berm

3.000 m

℄ Int. Bent No. 24
Sta. 21+27.410

Proposed Right Of Way Line

℄ Int. Bent No. 26
Sta. 21+72.750

Floating Turbidity Barrier, Typ. Per FDOT Index 103

℄ Int. Bent No. 28
Sta. 22+18.090

℄ Int. Bent No. 30
Sta. 22+63.430

Begin Taper
Sta. 22+86.000,
3.600 m Rt

End Approach Slab
Sta. 22+92.100

Toe Of Slope

End Rip Rap
Sta. 22+96.000
19.817 m Rt

Limits Of Rip Rap

Proposed Right Of Way Line

PLAN

115.000 m V.C.

P.V.T. Sta. 16+00.000 El. 23.750

℄ Construction SR 600 And Profile Grade Line

0.000%

P.V.C. Sta. 22+02.500 El. 23.750

End Bridge Sta. 22+86.100

1.354%

P.V.T. Sta. 23+17.500 El. 24.529

Begin Bridge Sta. 16+06.000

P.V.I. Sta. 22+60.000 El. 23.750

PROFILE GRADE ALONG ℄ CONSTRUCTION SR 600

TRAFFIC DATA

Current - 9200 ADT
Post Construction - 14,900 ADT
Future (2020) - 29,900 ADT
K - 9.5%
D - 54.3%
T - 10.5%
Design Speed - 105km/hr

LEGEND:

Approximate Location Of Standard Penetration Test Boring

30 Spans @ 22.670 m - 680.100 m (Begin Bridge Sta. 16+06.000 to End Bridge Sta. 22+86.100)

Expansion Joint ℄ Int. Bent No. 26 — Along ℄ Of Bridge — Expansion Joint @ F.F.B.W.

Deck Unit 5 5 Spans @ 22.670 m - 113.350 m

Deck Unit 6 5 Spans @ 22.670 m - 113.350 m

Barrier Wall

End Bridge
Front Face Of Back Wall
Sta. 22+86.100

Guardrail

25

Match Line Sta. 21+27.410

20

= 70.77 ft

21.570 m Min., Typ. Horizontal Clearance

DHW - El. 21.280

= 69.82 ft

610 Min. = 2 ft Vertical Clearance

Existing Ground

1:2

1:1½

A-8 Removal Prior To Pile Driving. Refer To Roadway Plans

ELEVATION

BRIDGE NO. 920174

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	MCR	9-96
Checked by	JEF	9-96
Designed by	MCR	9-96
Checked by	JEF	9-96
Approved by	JOHN E. FRAZIER	

ENGINEER OF RECORD:
JOHN E. FRAZIER, P.E. 37268
FRAZIER ENGINEERING, INC.
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(407)-253-8131

LOGO: FRAZIER ENGINEERING, INC. CONSULTING ENGINEERS

SEAL

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
600	OSCEOLA	239635-1-52-01

SHEET TITLE: GENERAL PLAN & ELEVATION STA. 21+27.410 TO END BRIDGE

PROJECT NAME: S.R. 600

Drawing No.

Index No.

APR 9 1997

Appendix E – Reedy Creek Bridge Plans (S.R 600, 4/26/1999) – Prepared by Frazier Engineering, Inc.

GENERAL NOTES

A. GENERAL SPECIFICATIONS

Florida Department Of Transportation Standard Specifications For Road And Bridge Construction, (1999 Edition) And Supplements Thereto.

B. DESIGN SPECIFICATIONS:

AASHTO Standard Specifications For Highway Bridges, (1996 Edition) And Applicable Interims.
Florida Department Of Transportation Structures Design Guidelines, (July 1997).

C. DESIGN LOADING:

MS18 Modified For Military Loading As Required, (Prestressed Beams Designed For An Additional 5% Live Load).

D. DISTRIBUTION VALUES:

	Interior Beam	Exterior Beam
Live Load (As Function Of Beam Spacing, S)	S/1.676	S/1.676
Traffic Barrier	1210 N/m	4270 N/m

E. FUTURE WEARING SURFACE:

Design Includes Allowance For 720 N/m²

F. STAY-IN-PLACE METAL FORMS:

Design Includes Allowance For 960 N/m² Over The Projected Plan Area Of The Metal Forms For The Unit Weight Of Metal Forms And Concrete Required To Fill The Form Flutes.

G. PILE LOAD:

Intermediate Bent Piles For Bents 13 Through 20 Shall Be Driven To A Design Service Load Of 690 kN. Piles At All Other Intermediate Bents Shall Be Driven To 964 kN.
All End Bent Piles Shall Be Driven To A Design Service Load Of 667 kN.

H. PILES:

Piles Shall Be 610 ø Steel Pipe Piles, With A Closed End And A Minimum Wall Thickness Of 13 mm; Piles Shall Be In Accordance With ASTM A-252, Gr. 3. See Pile Details For Splice Information. See Pile Installation Table Sheet For Special Test Pile Notes.

I. CONCRETE:

All Concrete Shall Be In Accordance With Section 346.

Class	Minimum 28-Day Compressive Strength	Location Of Concrete In Structure
II	f'c = 23 MPa.	C.I.P. Barriers
IV	f'c = 38 MPa.	Substructure
V	f'c = 45 MPa.	Prestressed Beams
II (Bridge Deck)	f'c = 31 MPa.	C.I.P. Bridge Deck, Approach Slabs
IV (Drilled Shaft)	f'c = 28 MPa.	Pile (Drilled Shaft Conc.)

J. REINFORCING STEEL:

All Reinforcing Steel Shall Be ASTM A615/A615M-92b, Grade 400.
See Standard Drawings For Additional Requirements.

K. CONSTRUCTION ACCESS:

Temporary Haul Roads (Earth Fill) Will Not Be Permitted As A Construction Method. Special Access Conditions Apply. See Sheet B-70 For Conditions And For A Potential Construction Technique.

L. CONCRETE COVER:

Concrete Cover Shown In The Plans Does Not Include Placement And Fabrication Tolerances Unless Shown As "Minimum Cover". See FDOT Standard Specifications For Allowable Placement Tolerances.
Cover For Reinforcing Steel Shown In The Bridge Plan Details Will Produce The Following Minimum Clearances Not Including Placement And Fabrication Tolerances As Shown Below:

Substructure Concrete: 100 Minimum Clearance (Excluding Pedestals And Seismic Blocks)
Pedestals And Seismic Blocks: 50 Minimum Clearance
Substructure Cast Against Earth: 115 Minimum Clearance
C.I.P. Superstructure Concrete: 50 Minimum Clearance

For Fabrication Tolerances See CRSI Manual Of Standard Practice.

M. ENVIRONMENTAL CLASSIFICATION:

Superstructure: Slightly Aggressive.
Substructure: Concrete: Extremely Aggressive,
Steel: Extremely Aggressive
Resistivity = 400 ohm - cm,
Sulfate = 6972 ppm

N. SCREEDING DECK SLABS:

The Riding Surface Of Bridge Deck Shall Be Screeded To Finish Grade With No Allowance For Permanent Camber.

O. DESIGN METHOD:

Strength Design Method (Load Factor Design) Except That Prestressed Components And The Loads On Piles Have Been Designed For Service Loads.

P. UTILITIES:

See Roadway Plan & Profile Sheets For The Location Of Existing Utilities.

Q. SCOUR:

(See Foundation Layout Sheet For Pile Installation Table)
Scour Has Been Considered In The Design Of The Piles With Scour Elevations Of +19.5 As Shown On The Table. Under No Circumstance Shall The Piles Be Installed To Tip Elevations Above The Minimum Tip Elevations Shown In The Table.
Piles Shall Be Driven To The Design Loads Shown In The Table Times A Factor Of Safety In Accordance With Specification 455-5.11.2.

R. SURFACE FINISH:

A "Class V Applied Finish Coating" Shall Be Applied To The Following Exposed Surfaces
Deck Slab: Vertical Face
Traffic Railing : The Inside, Backside, And Top Of Traffic Railing Barrier
End Bents: All Exposed Bent Wingwalls And Coping Areas Below Handrails.
See Miscellaneous Detail Sheet For Details.

S. EARTHQUAKE:

Design Conforms With The Structures Design Guideline Requirements For Seismic Acceleration Coefficient Of 2.5 %.

T. DIMENSIONS:

All Dimensions Are In Millimeters. Unless Otherwise Noted.

U. WELDING:

Weld Details And The Welding Operation Shall Be In Accordance With The Current Edition Of The ANSI-AASHTO-AWS (D1.5-95) Bridge Welding Code. Welds Requiring Nondestructive Testing Shall Be Radiographically Inspected, Except Where The Geometry Of The Region Of The Weld Will Not Permit Satisfactory Information To Be Secured For Verification Of The Weld Quality. When Such Geometrical Conditions Exist, Other Inspection Procedures Or Combination Of Procedures Such As Ultrasonic Inspection, Dye Penetrant Inspection, And/Or Magnetic Particle Inspection Will Be Required.

W. EXISTING BRIDGES:

The Existing Bridges Are To Remain In Place.

INDEX OF BRIDGE PLANS

STATE	FLA.	PROJECT NO.	SHEET NO.
3			B-1

BID ITEM NOTES

1) For Summary Of Bridge Pay Items, See Print Of Computer (CES) Output.
2) Payment For Incidental Items Not Specifically Covered In The Individual Bid Items Shall Be Included In The Contract Prices For Bid Items.
3) The Following Number Of Standard Composite Neoprene Bearing Pads Are Required: 374 - Type III (Standard) Composite Pads. The Bearing Pads Shall Be Supplied By The Contractor.
4) Bid Item No. 2400-7 Includes 180.0 m² Of Approach Slab Grooving (Ea. Slab). The Area Of Bridge Floor Grooving Shall Be Determined By Measurement Of Area Bounded By The Gutter Lines And The Beginning And End Of The Approach Slabs. Bridge Floor Grooving Shall Be In Accordance With The Requirements Of Class IV Floor Finish In The Specifications.
5) Two Approach Slabs Will Be Required. Additional Details For Approach Slabs And Payment Are Included In The Plans.
6) All Material & Labor To Place The Sand, Reinforcing Steel Cage, And Class IV Concrete (Drilled Shaft) Is To Be Paid For Under Pay Item 2455-7-35.
7) The Cost Of The SIP Metal Forms The Concrete Required To Fill The Form Flutes, The Metal Form Attachments And Accessories And All Miscellaneous Items Required To Install The Forms Shall Be Included In The Contract Unit Price For Superstructure Concrete. Pay Item # 2400-2-4.
8) Include Cost Of Bridge Drains In Unit Cost For Superstructure Concrete (2400-2-4).
9) Pay Items 2455-7-35, 2455-8-35, 2455-140-14 And 2455-141-14 Are Associated With The 610 Dia. Steel Pipe Piles.

WPI #5115692

REVISIONS					
Date	By	Description	Date	By	Description
4/19/99	MCR	REVISED NOTE 9 - BID ITEM NOTES			

	Name	Date
Drawn by	MCR	9-96
Checked by	JEF	9-96
Designed by	MCR	9-96
Checked by	JEF	9-96
Approved by	JOHN E. FRAZIER	

ENGINEER OF RECORD:
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MELBOURNE, FLORIDA 32935
(407)-253-8131

LOGO: FRAZIER ENGINEERING, INC. CONSULTING ENGINEERS

SEAL:

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
600	OSCEOLA	239635-1-52-01

SHEET TITLE: INDEX, GENERAL NOTES, BID ITEM NOTES
Drawing No.
PROJECT roads: S.R. 600
Index No.

Dgn: MCR 21 10:58 1998 GNNOTES

FED. ROAD NO.	STATE	PROJECT NO.	FISCAL YEAR	SHEET NO.
3	FLA.			B-8

Direction of Stationing

REEDY CREEK SWAMP

℄ Int. Bent No. 25
Sta. 21+50.080

℄ Int. Bent No. 27
Sta. 21+95.420

℄ Construction SR 600 And Profile Grade Line

℄ Int. Bent No. 29
Sta. 22+40.760

End Rip Rap
Sta. 22+96.000
20.705 m Lt

End Bridge
F.F.B.W.

End Bent No. 31
Sta. 22+86.100

Toe Of Slope

Begin Taper
Sta. 22+86.000,
3.600 m Lt

1:2

Guardrail (Typ.)

Match Line Sta. 21+27.410

Edge Of Shldr.

TB-22

N 63° 28' 52" E

BB-25

BB-26

BB-27

22

Bridge No. 920174

3.000 m Shoulder

TB-23

3.600 m Lane

3.600 m Lane

3.000 m Shoulder

7.200 m

14.150 m Out-Out

10.070 m

475 Barrier

475 Barrier

90° 00' 00" (Typ.)

BB-30

BB-31

23

TB-23A

55.240 m To R/W

20.000 m

1:2

450 Berm

3.000 m

℄ Int. Bent No. 24
Sta. 21+27.410

Proposed Right Of Way Line

℄ Int. Bent No. 26
Sta. 21+72.750

Floating Turbidity Barrier, Typ. Per FDOT Index 103

℄ Int. Bent No. 28
Sta. 22+18.090

℄ Int. Bent No. 30
Sta. 22+63.430

Begin Taper
Sta. 22+86.000,
3.600 m Rt

End Approach Slab
Sta. 22+92.100

Toe Of Slope

End Rip Rap
Sta. 22+96.000
19.817 m Rt

Limits Of Rip Rap

Proposed Right Of Way Line

PLAN

115.000 m V.C.

P.V.T. Sta. 16+00.000 El. 23.750

℄ Construction SR 600 And Profile Grade Line

0.000%

P.V.C. Sta. 22+02.500 El. 23.750

End Bridge Sta. 22+86.100

1.354%

P.V.T. Sta. 23+17.500 El. 24.529

Begin Bridge Sta. 16+06.000

P.V.I. Sta. 22+60.000 El. 23.750

PROFILE GRADE ALONG ℄ CONSTRUCTION SR 600

TRAFFIC DATA

Current - 9200 ADT
Post Construction - 14,900 ADT
Future (2020) - 29,900 ADT
K - 9.5%
D - 54.3%
T - 10.5%
Design Speed - 105km/hr

LEGEND:

Approximate Location Of Standard Penetration Test Boring

30 Spans @ 22.670 m - 680.100 m (Begin Bridge Sta. 16+06.000 to End Bridge Sta. 22+86.100)

Expansion Joint ℄ Int. Bent No. 26 — Along ℄ Of Bridge — Expansion Joint @ F.F.B.W.

Deck Unit 5 5 Spans @ 22.670 m - 113.350 m

Deck Unit 6 5 Spans @ 22.670 m - 113.350 m

Barrier Wall

End Bridge
Front Face Of Back Wall
Sta. 22+86.100

Guardrail

25

Match Line Sta. 21+27.410

20

= 70.77 ft

21.570 m Min., Typ. Horizontal Clearance

DHW - El. 21.280

= 69.82 ft

610 Min. = 2 ft Vertical Clearance

Existing Ground

1:2

1:1½

A-8 Removal Prior To Pile Driving. Refer To Roadway Plans

ELEVATION

BRIDGE NO. 920174

REVISIONS					
Date	By	Description	Date	By	Description

	Name	Date
Drawn by	MCR	9-96
Checked by	JEF	9-96
Designed by	MCR	9-96
Checked by	JEF	9-96
Approved by	JOHN E. FRAZIER	

ENGINEER OF RECORD:
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SEAL

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
600	OSCEOLA	239635-1-52-01

SHEET TITLE: GENERAL PLAN & ELEVATION STA. 21+27.410 TO END BRIDGE

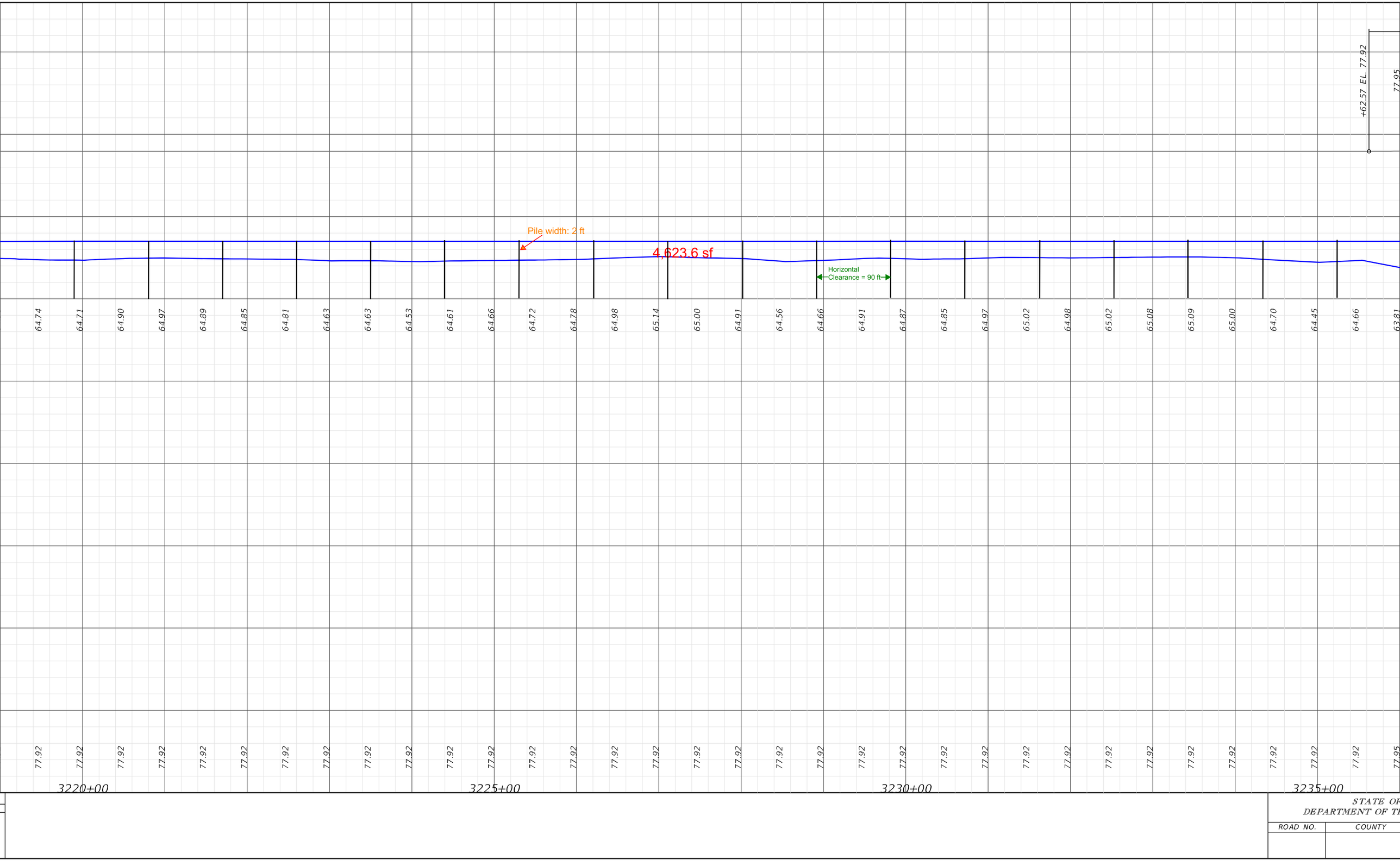
PROJECT NAME: S.R. 600

Drawing No.

Index No.

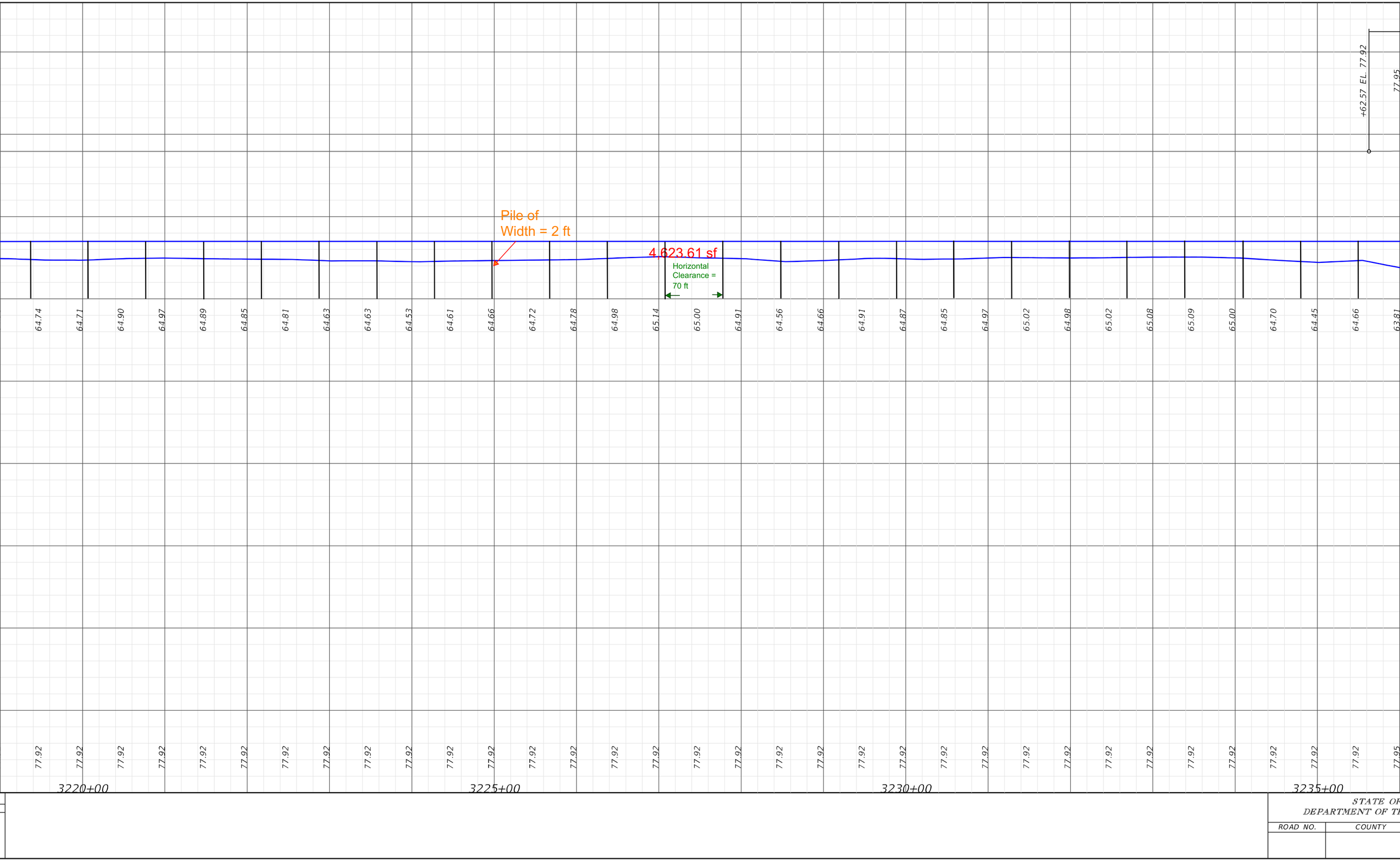
APR 9 1997

Appendix F – Bridge Profiles



STATE OF
DEPARTMENT OF TR

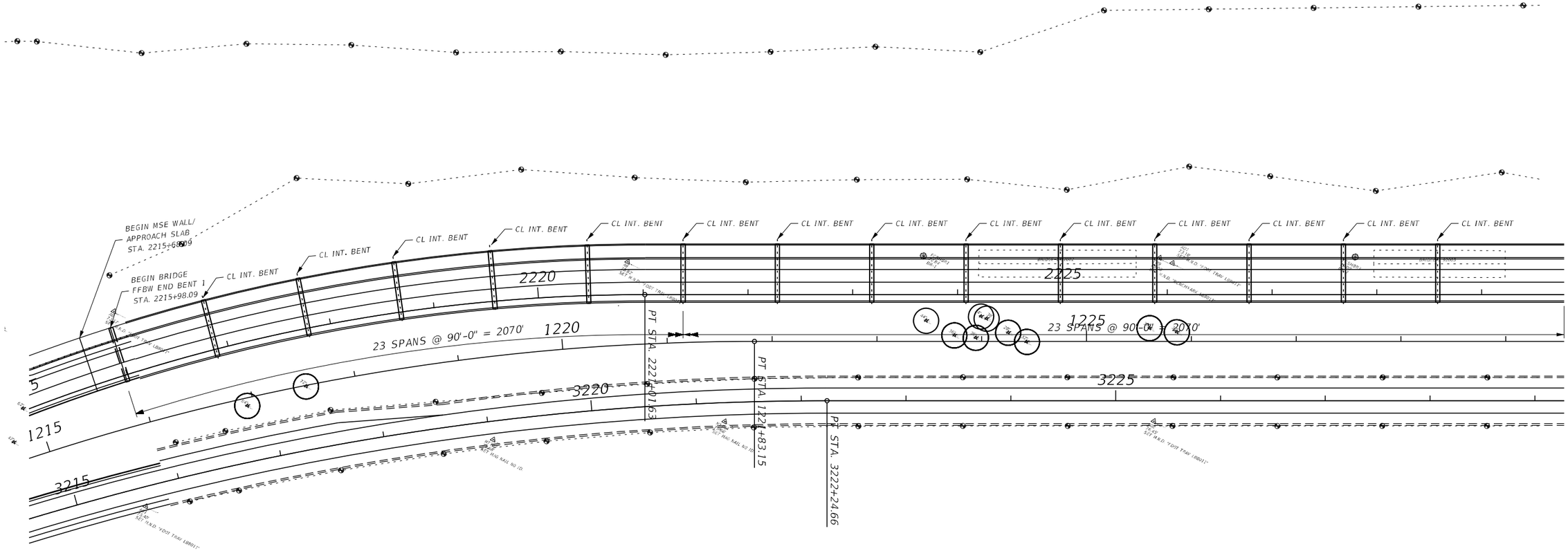
ROAD NO.	COUNTY



STATE OF
DEPARTMENT OF TR

ROAD NO.	COUNTY

Appendix G – Bridge Layout Plan



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

P.E. LICENSE NUMBER
VANASSE HANGEN BRUSTLIN, INC.
225 E. ROBINSON STREET
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CERTIFICATE OF AUTHORIZATION 3932

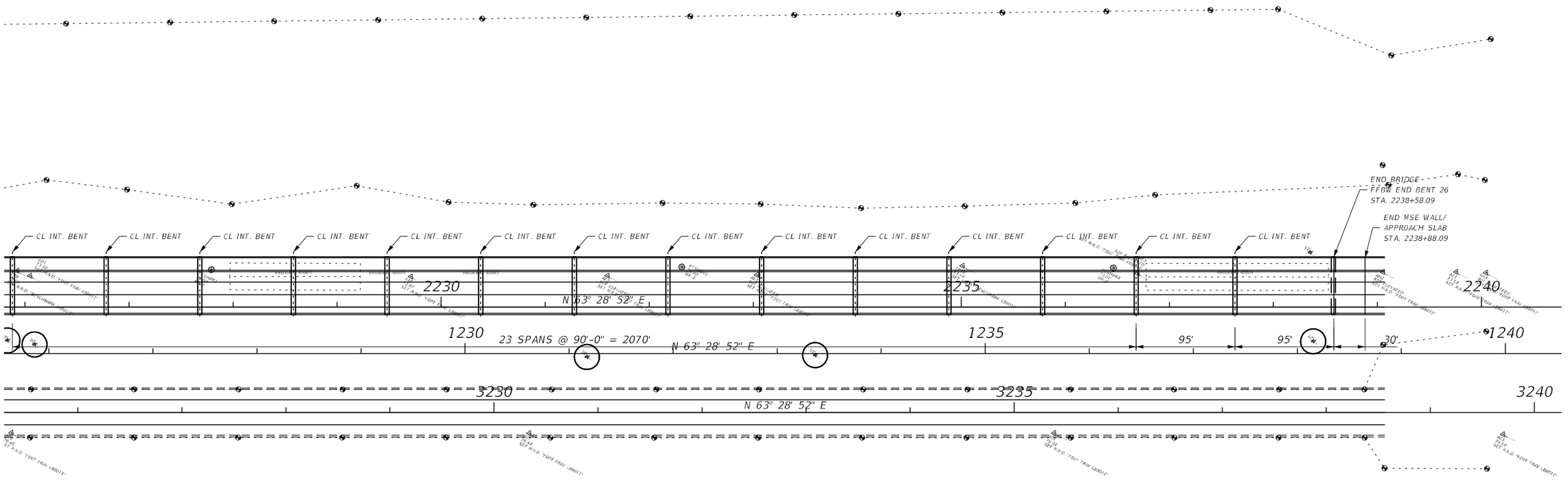
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	POLK/OSCEOLA	437200-1-22-01

BRIDGE PLAN LAYOUT
ALTERNATIVE 2

SHEET NO.

$USER$ $DATE$ $TIME$ $MODELNAME$ $FILE$



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

P.E. LICENSE NUMBER
VANASSE HANGEN BRUSTLIN, INC.
225 E. ROBINSON STREET
ORLANDO, FL 32801
CERTIFICATE OF AUTHORIZATION 3932

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	POLK/OSCEOLA	437200-1-22-01

BRIDGE PLAN LAYOUT
ALTERNATIVE 2

SHEET NO.

$USER$ $DATE$ $TIME$ $MODELNAME$ $FILE$

Appendix H – Environment Look Around (ELA) Meeting Minutes and FDOT Communication

SUMMARY MEMORANDUM

Meeting Date:	June 21, 2021 (Monday)	**Time**:	9:00 am –12:00 pm
Project:	US 17/92 Project Development & Environmental (PD&E) Study		
FPID:	437200-1-22-01		
Subject:	Environmental Look Around Meeting		

I. ATTENDEES

NAME	Agency
Ray Stangle	Osceola County
Linette Matheny	Osceola County
Josh DeVries	Osceola County
Susan Gosselin	Osceola County
Lorena Cucek	FDOT
Paul Yeargain	VHB
Cecily Mevorach	VHB
Kevin Freeman	VHB

II. INTRODUCTION / OBJECTIVE:

This in the field meeting was held to bring together different stakeholders to conduct an Environmental Look Around (ELA) for this Project. The purpose of an ELA is to discuss watershed-wide stormwater needs, regional treatment, and alternative permitting approaches. The ELA Team met on site and the study team provided an overview of the project and alternatives planned. Then talked through some of the preliminary pond area and other ponds planned by other adjacent projects.

III. DISCUSSION NOTES:

The following are notes of the open dialogue during the meeting:

- Intercession City has history been known to flood and the water generally flows south from Old Tampa Highway to US 17/92
- Osceola County staff suggest we talk with John Jeannin (JJ) the road and bridge director to get his thoughts on the Intercession City and the corridor
- There are a mixture of basins that flow through intercession City and it is subject to flooding in some areas. JJ will provide additional insight and information (see July 15 meeting below).
- The pond within the wetlands will be very hard to permit. The County recommended that we not propose new ponds along the corridor to avoid impacts to wetlands. Specifically, they commented on one of the ponds in Basin 1 (highlighted on the attached Exhibit).

- Osceola County staff provided two alternative suggestions for stormwater ponds:
    - Look at providing a pond outside of the corridor that could treat/attenuate other areas within the basin that currently do not have stormwater management facilities. This would compensate for the widening along 17-92. They agreed to review areas within the County and within the Reedy Creek Basin to provide recommendations.
    - Look at a stormwater pond/park in Intercession City that could treat/attenuate existing neighborhoods in lieu of a stormwater pond along the roadway. The location is shown on the attached Exhibit. The County indicated they would look to see if they have potential funds that could be used to construct a park associated with the pond. This would be a great benefit to the community.

IV. NEXT STEPS

- Discuss this project with JJ at Osceola County to get his thoughts
- Josh to check in with planning staff on latest status of BK Ranch
- Osceola County to provide input on the pond alternatives (meeting scheduled with County staff on July 15)

Person Contacted:	Lorraine Edwards		
Title:	Operations Program Engineer	VHB Rep:	Auristela Mueses
Company:	FDOT Maintenance Office	Project #	63316.11 US 17/92 PD&E Study
Telephone #:	(321)319-8107	Type of Call:	Existing Drainage Concerns in Culvert
Email Address:	Enter text.	Date:	May 9, 2023

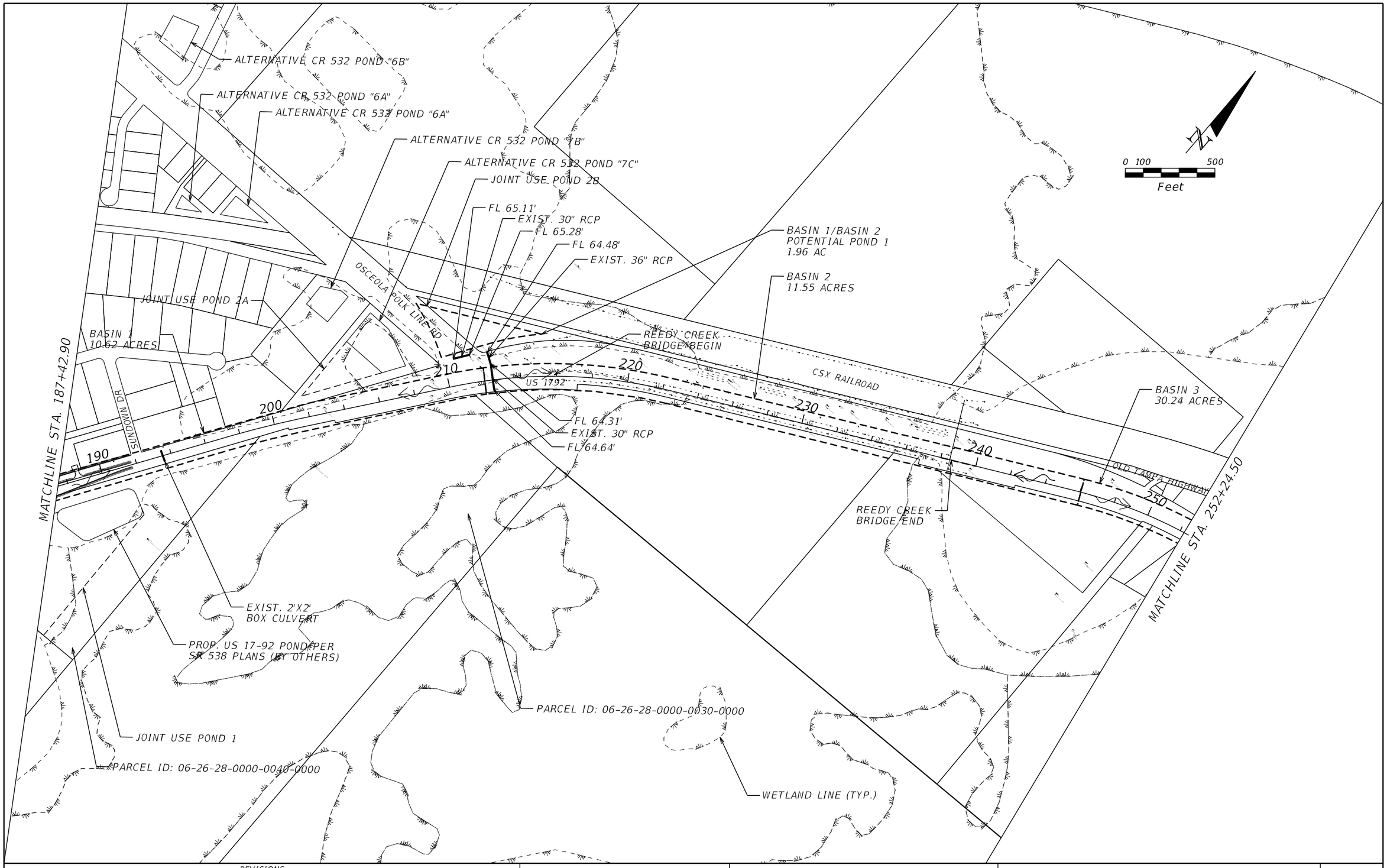
FDOT Maintenance Office was contacted by phone regarding existing drainage concerns in any of the culverts along the US17-92 corridor, from Ivy Mist Ln to Avenue A. From conversation with Lorraine Edwards, Operations Program Engineer for FDOT Maintenance Office, she expressed that she has no recollection of flooding or drainage issues for the culverts in that section of the corridor.

Auristela Mueses Perez

From: 13213198107 <+13213198107>
Sent: Tuesday, May 9, 2023 3:51 PM
To: Auristela Mueses Perez
Subject: [External] Voice Mail (43 seconds)
Attachments: audio.mp3

Hey, this is Lorraine with F dot Orlando operation. I was just returning your call in regards to 1792 between missed Lane and Ave. I might talk with our field crew and also our asset meaning contractor that maintains the area and we are not aware of any drainage issues within that area or any flooding problems. So just wanted to let you know that. Let me know if you need anything. My phone number is 321-319-8107. Thank you. Have a good.

Appendix I – Drainage Map SR-600, Financial Project ID 437200-1-22-01



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

PAUL W. YEARGAIN, P.E.
P.E. LICENSE NUMBER 50682
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ORLANDO, FL 32801
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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	POLK OSCEOLA	437200-1-22-01

DRAINAGE MAP 02

SHEET NO. A2

$USER$ $DATE$ $TIME$ $MODELNAME$ $FILE$