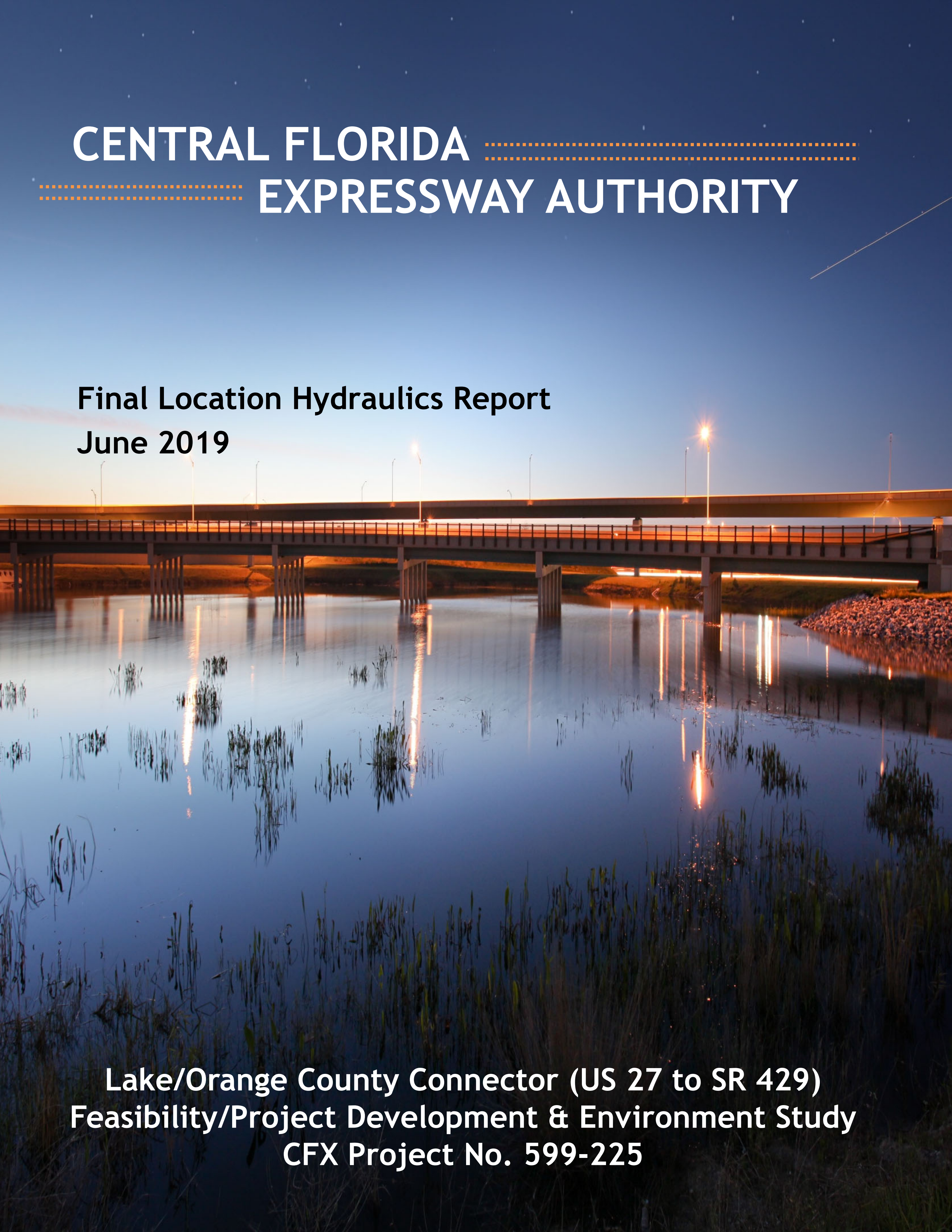
CENTRAL FLORIDA EXPRESSWAY AUTHORITY



Final Location Hydraulics Report

June 2019

Lake/Orange County Connector (US 27 to SR 429)
Feasibility/Project Development & Environment Study
CFX Project No. 599-225

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing engineering with Metric Engineering, Inc. and I have reviewed or approved the evaluation, findings, opinions and conclusions as reported for:

PROJECT: **Lake/Orange County Connector PD&E Study**

FINANCIAL PROJECT NUMBER: **CFX-Project No. 599-225**

LOCATION: **Lake and Orange Counties**

CLIENT: **Central Florida Expressway Authority**

This Location Hydraulics Report (LHR) provides the results of a summary of data collection efforts, and limited calculations for the proposed cross drains and floodplain evaluations prepared for the conceptual analyses for the Project Development and Environment Study for the Lake/Orange County Connector project. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of hydrologic analysis and hydraulic engineering as applied through professional judgment and experience. This document is for planning purposes only and is not to replace any effort required for the final design.

<u>Florida Registered Engineer:</u>

Name: Mark Scott, P.E.

Registration Number: FL # 70948

Signature:

Date:

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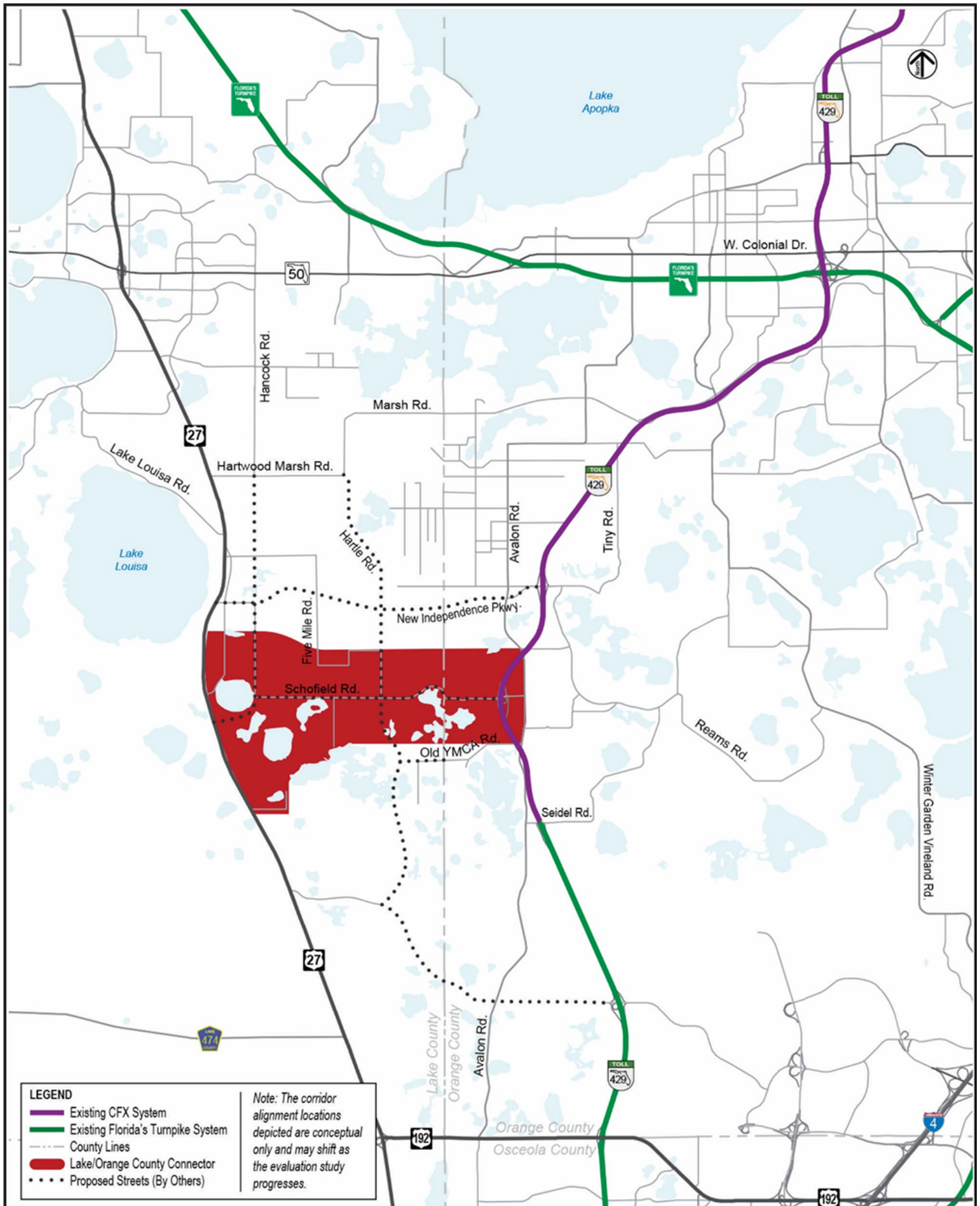
EXECUTIVE SUMMARY

The purpose of the Lake/Orange County Connector Feasibility/Project Development and Environment (PD&E) Study is to develop a proposed improvement strategy that is technically sound, environmentally sensitive and publicly acceptable. Emphasis has been placed on the development, evaluation and documentation of detailed engineering and environmental studies including data collection, conceptual design, environmental analyses, project documentation and the preparation of a Preliminary Engineering Report. This Location Hydraulics Report (LHR) has been prepared in support of the PD&E effort.

The proposed improvements include the construction of a limited-access facility that provides a new east-west connection from US 27 in south Lake County to SR 429 in west Orange County. (see **Figure 1-1** on the following page)

The purpose of this LHR is to identify and discuss the proposed cross drains throughout the project corridor, as well as to analyze the effects of extending/shortening the existing cross drains. There are twelve new cross drains identified for this project. The cross drains were sized appropriately using HY-8 program to minimize the impacts to flood elevations and floodplain limits, and to ensure that there would be no overtopping of the roadway due to the design storm event. All analysis will be in accordance with PD&E manual, part 2, section 13.2.2.1 thru 13.2.2.5 (begins page 978).

Modifications to existing structures included in this project (consisting of extending cross drains along US 27) will result in an insignificant change in their capacity to carry floodwater. These modifications will not cause increases in flood heights and flood limits, thus 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. Throughout the corridor, along the mainline alignment, cross drains have been designed to maintain hydraulic connectivity in areas in which the proposed roadway severs the floodplain. Therefore, it has been determined that this encroachment is not significant. In addition, the PGL has been set to maintain one full lane above the adjacent 100-year floodplain in each direction to provide continuous service during storm events.



Project Location **Figure 1-1**

1.0 INTRODUCTION

The purpose of this project is to provide a connection between south Lake County and west Orange County in order to accommodate the growth and influx of traffic within the region. The limits of this study generally extend from US 27 just south of Schofield Road and East to SR 429. The proposed Typical Sections are provided in **Appendix H**. The Lake/Orange County Connector will be a limited-access facility that allows for a more efficient way to travel between the two counties.

The Central Florida Expressway Authority (CFX) is presently evaluating the feasibility to provide a Lake/Orange County Connector, a strategic transportation investment aimed at supporting existing and future growth in south Lake and west Orange Counties. The primary objectives of this transportation improvement project are to expand regional system linkage and connectivity in Lake and Orange counties; enhance mobility between US 27 and SR 429; and accommodate the expected increase in traffic due to population and employment growth within the study area, while being consistent with accepted local and regional plans. As such, the proposed improvements include the construction of a limited-access facility that provides a new east-west connection from US 27 in south Lake County to SR 429 in west Orange County. The proposed five-mile corridor will also have intersections at Lake County's proposed CR 455 extension and a proposed connection to the extension of Valencia Parkway.

A multiphase alternative development evaluation and selection process was employed to properly assess all alternatives considered for the proposed Lake / Orange County Connector. After the comprehensive evaluation process, one alternative was selected as being the most effective option. This preferred alternative is illustrated on **Figure 2-2**.

This report discusses and analyzes proposed cross drains throughout the project corridor, as well as the extension of existing cross drains due to the widening and alteration of US 27. The proposed corridor impacts wetlands and floodplains; therefore, the placement of cross drains is crucial to maintain the natural flow. A description of each proposed cross drain is located in ***Section 4.1*** of this report. Exhibits showing proposed cross drains are in **Appendix A**.

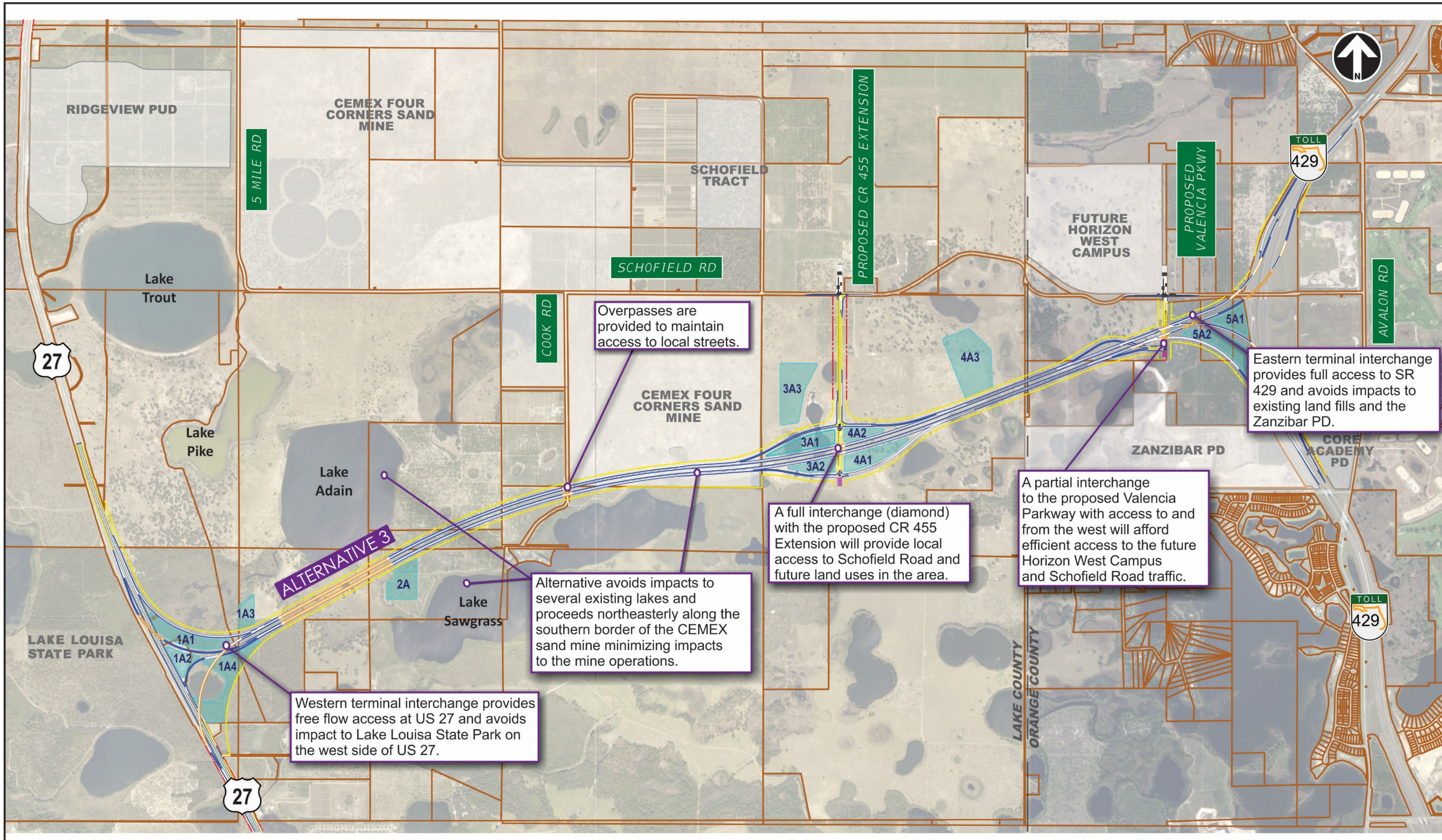


Figure 2-2 Preferred Alternative

2.0 CROSS DRAIN ANALYSIS METHODOLOGY AND DESIGN CRITERIA

Due to the proposed realignment and widening of US 27 as part of the preferred alternative, three existing cross drains (cross drains 2-4) will have to be relocated to lie under the new roadway footprint and analyzed in order to maintain the connectivity of the flow without causing any significant change in the flood elevations. These cross drains were analyzed using the existing data from St. John's River Water Management District (SJRWMD) permit #90260-2 (See **Appendix G**). The proposed project alignment is a new corridor. Cross drains 4A through 10 were located strategically along the proposed Lake/Orange County Connector to maintain flow connectivity within the impacted wetlands and floodplains. There is a total of twelve cross drains proposed along the new corridor and ramps. In accordance with the Florida Department of Transportation (FDOT) Drainage Design Guide for designing culverts, the Rational Method was used to conduct hydrologic analysis for cross drain 7. The Rational Method was used because the delineated drainage areas for each cross drain were less than 600 acres. Due to the varying elevations throughout the project and the probability that runoff would flow from one basin to another, it was necessary to model the remainder of the cross drains (cross drains 4, 4A, 4B, 4C, 5, 6, 6A, 6B, 6C, 8, 9, and 10) in ICPR in order to get the flow rates for each of these cross drains. Drainage areas were delineated by using a one foot LiDAR contour map.

2.1 Contributing Flow Determination

Rational Method

- The Rational Method procedures require calculating a peak basin flow rate from the basin characteristics.
- The composite runoff coefficient was calculated based on the percentage of land use for residential, commercial, flat lawns, and woods/wetland areas per the FDOT Hydrology Handbook.
- Time of concentration was calculated using the TR-55 Method.
- The intensity for each storm event was calculated from the FDOT Intensity-

Duration-Frequency (IDF) curve for Zone 7.

- The composite coefficient is designed for a storm period of 10 years. Storm frequency factors were used to adjust the composite runoff coefficient for 25, 50, and 100-year storm events.
- Frequency Factor for Return Period 500 year runoff coefficient is not provided in the FDOT Hydrology Handbook; therefore, a log-log graph was created in order to extrapolate the peak discharge.
- The Rational Method should only be used for areas up to 600 acres.

ICPR Method

- For each cross drain, a basin with a stage/area node was modeled based on the general boundaries formed by the contour elevations and ponds.
- A stage/area node was set downstream for each respective cross drain.
- Earthen weirs were modeled for the ridges which form the links between the depressional areas.
- Pipes were modeled as the cross drain that links the upstream depressional area or pond with the downstream depressional area or pond.
- Time of concentration for each basin was calculated using the TR-55 Method.
- An average time of concentration out of all of the basins in the model was used to get the rainfall intensity off of the FDOT IDF curve for Zone 7 for the 10, 25, 50, and 100-year storms. The rainfall amount used for each of the respective storms was based on a 1-hour duration.
- The resulting maximum inflow to each of the cross drain links were used as the design flow rates for HY-8 analysis.

2.2 Floodplains/Floodways Criteria

The following criteria was drawn from the 2019 FDOT Drainage Manual and SRJWMD Permit Information Manual. Floodplain information for this project is based on the Federal Emergency Management Agency's (FEMA) flood maps (**See Appendix B**).

- The proposed project may not cause a net reduction in flood storage within the 10-

year floodplain.

- Structures shall cause no more than one-tenth (0.1) of a flood increase in the 100-year flood elevation 500-feet upstream and no more than one foot of a flood increase in the 100-year flood elevation directly upstream.
- Proposed construction shall not cause a reduction in flood conveyance capabilities.
- Best Management Practices (BMP's) shall be employed to minimize velocity to avoid undue erosion.
- The design of encroachments shall be consistent with standards established by FEMA.

2.3 Culvert Design Criteria

The following criteria was drawn from the 2019 FDOT Drainage Manual. The following table provides the required storm events to be analyzed for each cross drain per the FDOT Drainage Manual and the FDOT Drainage Design Guide.

Table-1 Storm Frequency Criteria

Storm Event Frequency	Definitions
50-Year	Design Flood Event
100-Year	Base Flood Event
500-Year	Greatest Flood Event

- All cross drains, if applicable, shall be designed to have sufficient hydraulic capacity to convey the 50-year (Design Frequency) storm event. In accordance with the FDOT Drainage Manual, mainline interstate and high use road culverts should be designed for a frequency of 50 years. All culverts shall be analyzed for the base flood (100 year).
- Backwater shall not significantly change land use values unless flood rights are purchased.
- The headwater for design frequency conditions shall be kept at or below the travel

lanes.

- The highest tailwater elevation, which can reasonably be expected to occur coincident with the design storm event, shall be used (typically, crown of pipe is used at the outlet).
- The minimum culvert size is 18” or its equivalent size.
- The design of all cross culverts shall comply with the guidelines set forth in the FDOT Drainage Manual, Chapter 4.

The criteria listed above was collected from the following applicable sources:

- FDOT Drainage Design Guide – Culvert Design (January 2019)
- FDOT Drainage Manual (January 2019)
- FHWA Code of Federal Regulation 23 CFR 650A
- SJRWMD Management and Storage of Surface Waters (MSSW) Permit Information Manual (October 2013)

2.4 Culvert Sizing

All proposed cross drains were sized for a 50-year storm event. The calculated 100-year backwater stage elevation from the HY-8 analysis was compared with the existing 100-year flood stage. Proposed culvert sizes were initially set at 18” and used to perform an HY-8 analysis. While performing the overtopping analysis, the cross drains were appropriately sized to conform with the floodplain criteria in ***Section 2.2*** of this report.

Assumptions

- The pipe length was measured based on a 36’ clear zone requirement from the edge of pavement for each cross drain.
- The change in flow line elevation from upstream to downstream was based on the contour elevations at the ends of the cross drain length.
- Manning’s “n” value of 0.012 was used.

HY-8

- The culvert size was set at 18” for the initial HY-8 analysis.
- The culvert size was adjusted to maintain backwater stage elevations below the 100-year stage elevation.
- The 25-year flow was the minimum flow, 50-year flow was the design flow, and 100-year flow was the maximum flow.
- The crown of the pipe/top of box culvert or floodplain elevation (whichever is greater) or existing US 27 cross drain tailwater elevations were used as the constant tailwater elevations. In cases where cross drains run in succession of one another, the tailwater for the upstream cross drain was input as a rating curve based on the stage of the downstream node for each storm event in the ICPR analysis.

3.0 EXISTING CONDITIONS

3.1 Soil Data

The National Resources Conservation Service (NRCS) Soil Survey of Orange County published by the United States Department of Agriculture (USDA) has been reviewed for the project. The soil survey map and soil types found throughout the proposed corridor are shown in the complete NRCS USDA Soil Survey located in **Appendix C**. In general, the surficial soils consist of fine sands, muck and poorly drained soil. The groundwater ranges from 0' to greater than 6' below the existing ground. Refer to **Table-2** below for the most prevalent soils within the project area.

Table-2 USDA NRCS Soil Survey Information

Soil No.	USDA Soil Name	Depth to Water Table (inches)	Hydrologic Soil Group
Lake County Classification			
4	Anclote and Myakka soils	0	A/D
8	Candler Sand, 0 to 5% slopes	>80	A
9	Candler Sand, 5 to 12% slopes	>80	A
20	Immokalee sand	6 to 18	B/D
28	Myakka-Myakka, wet, sands, 0 to 2% slopes	6 to 18	A/D
40	Placid and Myakka sands, depressional	0	A/D
45	Tavares sand, 0 to 5% slopes	42 to 72	A
Orange County Classification			
3	Basinger fine sand, frequently ponded, 0 to 1% slopes	0 to 6	A/D
4	Candler Fine Sand, 0 to 5% slopes	>80	A
5	Candler Fine Sand, 5 to 12% slopes	>80	A

3.2 Land Use

The existing land use along the proposed Lake/Orange County Connector consists mostly of pasture/range, woods, grassed area, and water bodies.

3.3 Existing Cross Drains

There are four cross drains along US 27 that are within the project limits. Three of them will be impacted due to the realignment and widening of the existing roadway. CD-1 will remain unaffected by the changes. Refer to **Table-3** for existing US 27 cross drain information. The culvert size and tailwater elevations were obtained from the existing permit #90260-2. Data from the existing permit was input into HY-8 and analyzed for the existing conditions design elevations. Refer to **Appendix G** for the existing conditions cross drain analysis that the data was pulled from.

Table-3 Existing US 27 Cross Drain General Information

Cross Drain ID	Pipe Description	Tailwater EL (ft)	Action
CD-1	2-10'x4' CBC	111.6	None/Unaffected
CD-2	4'x3' CBC	109.82	Extended 25'
CD-3	30" RCP	107.74	Extended 5'
CD-4	5'x2' CBC	105.43	Extended 15'

All existing cross drains along SR 429 will remain unaffected by the proposed changes. There is an existing ditch outfall in the corner north of Schofield Road and west of SR 429 that will be cut off from receiving runoff from the ditch due to the proposed eastbound on-ramp for the Lake/Orange County Connector. While this does not give reason to provide an additional cross drain, it will require a connection to be provided during the design phase that includes collecting the runoff from the ditch on the north of the ramp via a ditch bottom inlet and conveying it to the downstream outfall through a closed storm sewer system. Refer to **Appendix G** for the drainage map and plan view of the existing ditch outfall from FDEP permit number ERP48-205102-002-EI, as well as a diagram showing the proposed ramp and how it will affect the ditch.

4.0 PROPOSED CONDITIONS

The project corridor will cross through floodplains, wetlands, wooded areas, and agricultural land. Cross drains were placed to allow runoff to continue to flow in its natural path and to reduce any impacts due to the proposed Lake/Orange County Connector. **Appendix A** contains exhibits showing locations and basin areas for each cross drain.

4.1 Proposed Cross Drains

Twelve cross drain locations were selected once the alignment and the most effective interchange layouts were identified for the Lake Orange Connector. The proposed cross drain locations were chosen based on the natural flow of the land from the surrounding floodplains and wetlands. The proposed Lake/Orange County Connector will have floodplain impacts along most of the corridor. These floodplain impacts will be mitigated by routing this volume to the project's proposed storm water management facilities and roadside swales. Refer to **Table-4** for calculated culvert size, flow direction, and floodplain status for each cross drain. Following the table is a description of each cross drain, including the three existing cross drains to be extended, and the results of the analysis. Refer to **Table-5** for flood data and **Table-6** for the 50-year design conditions. Refer to **Appendix D** for the rational method calculations, **Appendix F** for the ICPR analyses, and **Appendix E** for the HY-8 analyses.

Table-4 Proposed Lake/Orange County Connector Cross Drain General Information

Cross Drain ID	Pipe Description	Flow Direction	Receiving Water Body	Within Floodplain (Yes/No)
CD-4A	18” RCP	South	Unnamed wetland system	Yes (Zone A)
CD-4B	18” RCP	North	Pond 1A1	Yes (Zone A)
CD-4C	18” RCP	East	Unnamed wetland system	Yes (Zone A)
CD-5	18” RCP	South	Unnamed wetland system	Yes (Zone AE)
CD-6	42” RCP	West	Unnamed surface water	Yes (Zone A)
CD-6A	24” RCP	South	Pond 3A1	Yes (Zone AE)
CD-6B	30” RCP	South	Pond 3A2	Yes (Zone AE)
CD-6C	24” RCP	South	Unnamed wetland system	Yes (Zone AE)
CD-7	30” RCP	West	Unnamed surface water	Yes (Zone A)
CD-8	18” RCP	South	Unnamed wetland system	Yes (Zone AE)
CD-9	18” RCP	South	Unnamed wetland system flowing to Lake Needham	Yes (Zone AE)
CD-10	24” RCP	West	Unnamed wetland system flowing to Lake Needham	No

Table-5 Flood Data Summary Table

Struct. Number	Proposed Size		Design Flood 50-Yr Storm Event			Base Flood 100-Yr Storm Event			*Overtopping Flood		
	Size	Length (ft)	Discharge (cfs)	Exist. Stage (ft)	Prop. Stage (ft)	Discharge (cfs)	Exist. Stage (ft)	Prop. Stage (ft)	Discharge (cfs)	Stage (ft)	Storm Frequency
CD-2	4'x3x CBC	190	90.00	112.74	112.83	100.80	113.35	113.48	129.28	115.29	257 Yr
CD-3	30" RCP	195	36.80	111.36	111.44	41.20	112.10	112.19	64.80	117.00	>500 Yr
CD-4	5'x2' CBC	192	48.42	107.89	107.95	54.62	108.49	108.48	86.07	110.37	>500 Yr
CD-4A	18" RCP	100	3.31	-	106.73	4.15	-	106.89	28.74	119.50	>500 Yr
CD-4B	18" RCP	150	2.04	-	107.02	2.35	-	107.30	40.74	138.70	>500 Yr
CD-4C	18" RCP	95	5.94	-	106.94	7.36	-	107.19	37.23	125.95	>500 Yr
CD-5	18" RCP	270	2.56	-	106.45	3.10	-	106.47	38.10	116.63	>500 Yr
CD-6	42" RCP	160	107.05	-	110.22	113.99	-	110.89	119.83	111.48	170 Yr
CD-6A	24" RCP	150	3.90	-	106.79	5.92	-	107.18	24.34	109.88	>500 Yr
CD-6B	30" RCP	350	12.60	-	107.02	14.32	-	107.37	105.31	137.27	>500 Yr
CD-6C	24" RCP	130	22.72	-	107.23	24.82	-	107.51	24.00	107.50	77 Yr
CD-7	30" RCP	160	24.95	-	112.10	27.84	-	112.37	31.51	112.76	155 Yr
CD-8	18" RCP	290	3.25	-	106.31	3.70	-	106.41	12.88	110.93	>500 Yr
CD-9	18" RCP	340	3.15	-	106.33	3.44	-	106.40	23.75	124.94	>500 Yr
CD-10	24" RCP	165	28.02	-	116.64	28.02	-	116.64	32.54	116.91	>500 Yr

The flows and tailwater elevations used in this report are based on preliminary information. The culvert design shall be reviewed for flows and tailwater elevations during the final design.

*Overtopping frequency calculated based on log(flow) vs log(rainfall frequency) graphs. See **Appendix D** for overtopping frequency estimate calculations.

Table-6 Summary of Proposed Lake/Orange County Connector Cross Drains (HY-8 Analysis)

Cross Drain	HY-8 Cross Drain Size	50-Year Flow (cfs)	Tailwater EL (ft)	Proposed Roadway El (ft)	Backwater Stage Based on HY-8 (ft)
CD-2	4'x3x CBC	90.00	109.82	115.29	112.83
CD-3	30" RCP	36.80	107.74	117.00	111.44
CD-4	5'x2' CBC	48.42	106.95	110.37	107.95
CD-4A	18" RCP	3.31	105.42	119.50	106.73
CD-4B	18" RCP	2.04	106.95	138.70	107.02
CD-4C	18" RCP	5.94	105.43	125.95	106.94
CD-5	18" RCP	2.56	106.40	116.63	106.45
CD-6	42" RCP	107.05	105.50	111.48	110.22
CD-6A	24" RCP	3.90	106.72	109.88	106.79
CD-6B	30" RCP	12.60	106.42	137.27	107.02
CD-6C	24" RCP	22.72	104.90	107.50	107.23
CD-7	30" RCP	24.95	116.50	112.76	112.10
CD-8	18" RCP	3.25	106	110.93	106.31
CD-9	18" RCP	3.15	106	124.94	106.33
CD-10	24" RCP	28.02	115.50	116.91	116.64

* The flows and tailwater elevations used in this report are based on preliminary information. The culvert design will need to be reviewed for flows and tailwater elevations during the final design.

CD-2

CD-2 is an existing cross drain located along US 27. It connects the existing floodplain with Keene Lake on the west side of the road. The tailwater, flow rates, pipe information, and roadway information all come from the existing permit #90260-2 cross drain analysis. See **Appendix G** for excerpts from the permit. A pre-development and post-development analysis of this cross drain were performed in HY-8 to compare the 50-year design stage and the 100-year floodplain stage. The existing 165' cross drain will be extended to 190' in the post-development. The 50-year design stage increased by 0.09 ft due to the extension, and the 100-year stage also increased by 0.13 ft.

CD-3

CD-3 is an existing cross drain located along US 27. It connects the depression on the west side of the road with the wetland and floodplain on the east side that leads to Square Lake. The tailwater, flow rates, pipe information, and roadway information all come from the existing permit #90260-2 cross drain analysis. See **Appendix G** for excerpts from the permit. A pre-development and post-development analysis of this cross drain were performed in HY-8 to compare the 50-year design stage and the 100-year floodplain stage. The existing 190' cross drain will be extended on the East and shortened on the West to become 195' in the post-development. The 50-year design stage increased by 0.08 ft due to the extension, and the 100-year stage also increased by 0.09 ft.

CD-4

CD-4 is an existing cross drain located along US 27. It provides connectivity for the floodplains and wetlands on the east and west side of US 27. A pre-development and post-development analysis of this cross drain were performed in HY-8 to compare the 50-year design stage and the 100-year floodplain stage. The tailwater, flow rates, pipe information, and roadway information all come from the existing permit #90260-2 cross drain analysis for the pre-development analysis. See **Appendix G** for excerpts from the permit. The existing 177' cross drain will be extended on the East and shortened on the West to become 192' in the post-development. CD-4 will outfall into proposed Pond 1A1 that is used for floodplain compensation, which then discharges through CD-4C to the downstream floodplain. Since CD-4 will be a part of a series of depressional areas and ponds connected by cross drains in the post-development analysis, CD-4 was first modeled in ICPR (along with CD-4A, CD-4B, and CD-4C) to get accurate flow rates for HY-8. Since CD-4 is an existing cross drain, a pre-development ICPR model of CD-4 was created to ensure that the basin used to design CD-4 would accurately depict reality in the post-development. A 25-year storm was modeled for the pre-development conditions and the flow rate was checked with the permitted 25-year flow rate. Then, this model was added to in the post-development conditions by including the proposed ponds and additional cross drains. The flow rates obtained from this ICPR model for CD-4 were used as the flow inputs for the HY-8 analysis. The 25, 50, and 100-year flow rates of 43.71, 48.42, and 54.62 cfs, respectively, were calculated. The elevations from Pond 1A1 based on the ICPR results for each storm were used for the tailwater rating curve in HY-8. Please see **Appendix F** for the ICPR analyses and ***Section 2.1*** for an explanation on this methodology. The 50-year design stage increased by 0.06 ft due to the proposed modifications and extension, and the 100-year stage decreased by 0.01 ft.

CD-4A

CD-4A will provide connectivity between the existing lake that will be in the infield and the proposed floodplain compensation Pond 1A2. This will allow the lake to continue to be a part of the floodplain without any disruption. CD-4A was modeled in ICPR along with CD-4, CD-4B, and CD-4C to find the 25, 50, and 100-year flow rates of 2.66, 3.31, and 4.15 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevations from the lake based on the ICPR results for each storm were used for the tailwater rating curve. The calculated backwater stage of 106.73 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 119.50 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-4B

CD-4B will provide connectivity between the Pond 1A2 and Pond 1A1. This will allow these floodplain compensation ponds to continue to be a part of the floodplain without any disruption. CD-4B was modeled in ICPR along with CD-4, CD-4A, and CD-4C to find the 25, 50, and 100-year flow rates of 1.80, 2.04, and 2.35 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevations from Pond 1A1 based on the ICPR results for each storm were used for the tailwater rating curve. The calculated backwater stage of 107.02 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 138.70 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-4C

CD-4C will provide connectivity between Pond 1A1 and the downstream floodplain. This will allow the pond to continue to be a part of the floodplain without any disruption. CD-4C was modeled in ICPR along with CD-4, CD-4A, and CD-4B to find the 25, 50, and 100-year flow rates of 4.89, 5.94, and 7.36 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The tailwater elevation from existing SJRWMD permit #90260-2 for CD-4 was used as the tailwater for CD-4C, since it is now the downstream cross drain in the series. The calculated backwater stage of 106.94 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 125.95 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-5

CD-5 is a proposed cross drain that will cross the Lake/Orange County Connector mainline. CD-5 is proposed to maintain connectivity between a 57.2 acre depressional area located just north of the mainline, and the remainder of the floodplain to the south. This basin area contains within it 14.04 acres (Basin G1) which drains into a small depression first, before overtopping and flowing into the second depression (Basin G2) and rising until it flows into CD-5. Because of this, CD-5 was modeled in ICPR to find the 25, 50, and 100-year flow rates of 0.07, 2.56, and 3.10 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevation from floodplain (106.4’) was used as the tailwater. The calculated backwater stage of 106.45 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 116.63 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-6

CD-6 will be located on the proposed CR 455. It will convey runoff from a basin area of 42.4 acres on the east side of CR 455 to a depression located in a floodplain on the west. This basin area contains within it 8.1 acres (Basin E) which drains into a small depression first, before overtopping and flowing across a steep downhill slope into CD-6 (Basin F) and out to the floodplain on the west of CR 455. Since this floodplain is being bisected by the proposed Lake/Orange County Connector and ramps, three more cross drains were designed in succession to allow the runoff to continue flowing to the south. Because of this, CD-6 was modeled in ICPR along with CD-6A, CD-6B, and CD-6C to find the 25, 50, and 100-year flow rates of 99.48, 107.05, and 113.99 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevation from the crown of the pipe was used as the tailwater. The calculated backwater stage of 110.22 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 111.48 ft. The proposed cross drain size from the HY-8 analysis is a 42” pipe.

CD-6A

CD-6A will be located downstream of CD-6. It will convey runoff from a basin area of 41.8 acres on the north side of Ramp 6 and west side of CR 455 to a proposed pond (Pond 3A1) in the infield of the Lake/Orange County Connector. CD-6A was modeled in ICPR along with CD-6, CD-6B, and CD-6C to find the 25, 50, and 100-year flow rates of 2.14, 3.90, and 5.92 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevations from Pond 3A1 based on the ICPR results for each storm were used for the tailwater rating curve in HY-8. The calculated backwater stage of 106.79 ft for the 50-year design flow from HY-8 analysis is less than the proposed pond berm of 109.88 ft. The proposed cross drain size from the HY-8 analysis is a 24” pipe.

CD-6B

CD-6B will be located downstream of CD-6A. It will connect proposed Pond 3A1 in the northern infield of the Lake/Orange County Connector to proposed Pond 3A2 in the southern infield. Pond 3A1 is also connected to floodplain compensation Pond 4C1 by an equalized pipe. The basin for Pond 3A1 was delineated to only include the portion of Basin 4 (See Basin Exhibits in the Pond Siting Report) that could reasonably be expected to be conveyed to Pond 3A1 by the proposed ditches and storm sewer systems. This includes 50 acres of Basin 4. A calculation was done in the Pond Siting Report to confirm that the runoff draining to Pond 3A1 would be more than enough to provide the required treatment and attenuation for the entire basin. Pond 3A1 is designed to hold all required treatment and attenuation volume below the elevation of 105'. Therefore, CD-6B and the equalizer pipe were placed at elevation 105 so that any additional runoff from Pond 3A1 and Pond 4C1 would overflow into Pond 3A2 to the south, allowing for continuity of the floodplain flow. CD-6B was modeled in ICPR along with CD-6, CD-6A, and CD-6C to find the 25, 50, and 100-year flow rates of 9.53, 12.60, and 14.32 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevations from Pond 3A2 based on the ICPR results for each storm were used for the tailwater rating curve in HY-8. The calculated backwater stage of 107.02 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 137.27 ft. The proposed cross drain size from the HY-8 analysis is a 30" pipe.

CD-6C

CD-6C will be located downstream of CD-6B. It will connect proposed Pond 3A2 in the southern infield of the Lake/Orange County Connector to the floodplain to the south. Pond 3A2 is designed as a floodplain compensation pond. Therefore, CD-6C was placed at the bottom of the pond so that any runoff would flow directly into the floodplain to the south. CD-6C was modeled in ICPR along with CD-6, CD-6A, and CD-6B to find the 25, 50, and 100-year flow rates of 20.08, 22.72, and 24.82 cfs, respectively. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. The elevation from the crown of the pipe was used as the tailwater. The calculated backwater stage of 107.23 ft for the 50-year design flow from HY-8 analysis is less than the proposed pond berm elevation of 107.50 ft. The proposed cross drain size from the HY-8 analysis is a 24” pipe.

CD-7

CD-7 will convey runoff from 12.4 acres of land that flows from the east side of the proposed CR 455 to a depression on the west side. A time of concentration of 21.7 minutes was calculated for this basin area using the TR-55 method. The 25, 50, and 100-year flow rates of 20.91, 24.95, and 27.84 cfs, respectively, were calculated using the Rational Method. In the absence of substantial downstream storage, the elevation from the crown of the pipe was used as the tailwater. The calculated backwater stage of 112.10 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 112.76 ft. The proposed cross drain size from the HY-8 analysis is a 30” pipe.

CD-8

CD-8 will be located along the mainline of the Lake/Orange County Connector. The Lake/Orange County Connector transects a large Floodplain Zone AE with an elevation of 106 ft. CD-8, along with CD-9, will provide connectivity between the northern and southern limits of this floodplain that Lake/Orange County Connector will be cutting through. The floodplain in which these cross drains are located within contains many different depressions and ridges (**Appendix A**). For this reason, the floodplain was divided into three major areas (Basin A, B, and C) that were modeled in ICPR to obtain the design flow rates draining into each of the cross drain locations that would be used in the HY-8 analysis. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. For CD-8, the 25, 50, and 100-year flow rates are 2.59, 3.25, and 3.70 cfs, respectively. The elevation of the floodplain was used as the tailwater in the HY-8 analysis. The calculated backwater stage of 106.31 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 109.22 ft. The calculated backwater stage of 106.41 ft for the 100-year flow from the HY-8 analysis is less than a foot greater than the floodplain elevation of 106 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-9

CD-9 will be located along the mainline of the Lake/Orange County Connector. The Lake/Orange County Connector transects a large Floodplain Zone AE with an elevation of 106 ft. CD-9, along with CD-8, will provide connectivity between the northern and southern limits of this floodplain that Lake/Orange County Connector will be cutting through. The floodplain in which these cross drains are located within contains many different depressions and ridges (**Appendix A**). For this reason, the floodplain was divided into three major areas (Basin A, B, and C) that were modeled in ICPR to obtain the design flow rates draining into each of the cross drain locations that would be used in the HY-8 analysis. Please see **Appendix F** for the ICPR analysis and ***Section 2.1*** for an explanation on this methodology. For CD-9, the 25, 50, and 100-year flow rates are 2.71, 3.15, and 3.44 cfs, respectively. The elevation of the floodplain was used as the tailwater in the HY-8 analysis. The calculated backwater stage of 106.33 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 124.94 ft. The calculated backwater stage of 106.40 ft for the 100-year flow from the HY-8 analysis is less than a foot greater than the floodplain elevation of 106 ft. The proposed cross drain size from the HY-8 analysis is an 18” pipe.

CD-10

CD-10 will convey runoff from the land that flows from the east side of the proposed Valencia Road to the existing depression on the west side. The basin area is approximately 6.1 acres. A time of concentration of 37.4 minutes was calculated for this basin area using the TR-55 method. CD-10 was modeled in ICPR along with CD-8 and CD-9, since the downstream depression for CD-10 discharges into the basin for CD-8. The flow rate for the 25, 50, and 100 year storm was 28.02 cfs, due to the pipe flowing at full capacity for all storms. The elevation from the crown of the pipe was used as the tailwater. The calculated backwater stage of 116.64 ft for the 50-year design flow from HY-8 analysis is less than the proposed roadway elevation of 116.91 ft. The proposed cross drain size from the HY-8 analysis is a 24” pipe.

4.2 Floodplain Impacts

The project will impact the 100-year floodplain in three different ways:

1) Longitudinal roadway impacts resulting from filling the floodplain areas.
2) Impact due to proposed pond locations in floodplain.
3) Impact due to proposed cross drains in floodplain.

The longitudinal impact due to the recommended Lake/Orange County Connector alignment cannot be avoided. During the final design phase of the project, every effort should be taken to minimize floodplain impacts. During the design phase, floodplain impacts should be mitigated by routing to proposed stormwater management facilities and roadside swales.

The FEMA's Flood Insurance Rate Map (FIRM) shows that portions of the project lie within the 100-year floodplain areas Zone AE (100 year Base flood elevations are provided) and Zone A (100 year base flood elevations are not provided, areas with 1% change of flooding). FEMA Map No. 12069C0675E and 12095C0375F provide flood information for the project. Floodplain elevations within the corridor range from elevation 106 to 110.4. Floodplain impact will occur throughout the project corridor. Please refer to **Appendix B** for a FEMA Flood Insurance Rate Map.

It is determined that the floodplain impacts will all be minimized by including floodplain compensation storage in the design of the proposed ponds. Please refer to **Table 6** in the Pond Siting Report (under separate cover) for a summary of floodplain impacts and compensation. In addition, runoff within the corridor will be collected and conveyed to stormwater management facilities; therefore, reducing overall impacts to the remaining floodplain. Floodplain impacts due to the proposed corridor were calculated and documented in the Pond Siting Report.

4.3 Project Classification

The floodplain is in a medium density, semi-urbanized area and the encroachments are classified as "minimal". Minimal encroachment of a floodplain occurs when there is floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Normally, these minimal efforts to address the impacts will consist of applying the FDOT drainage design standards and following the SJRWMD and SFWMD procedures to achieve results that will not increase or significantly change the flood elevation and the floodplain limits.

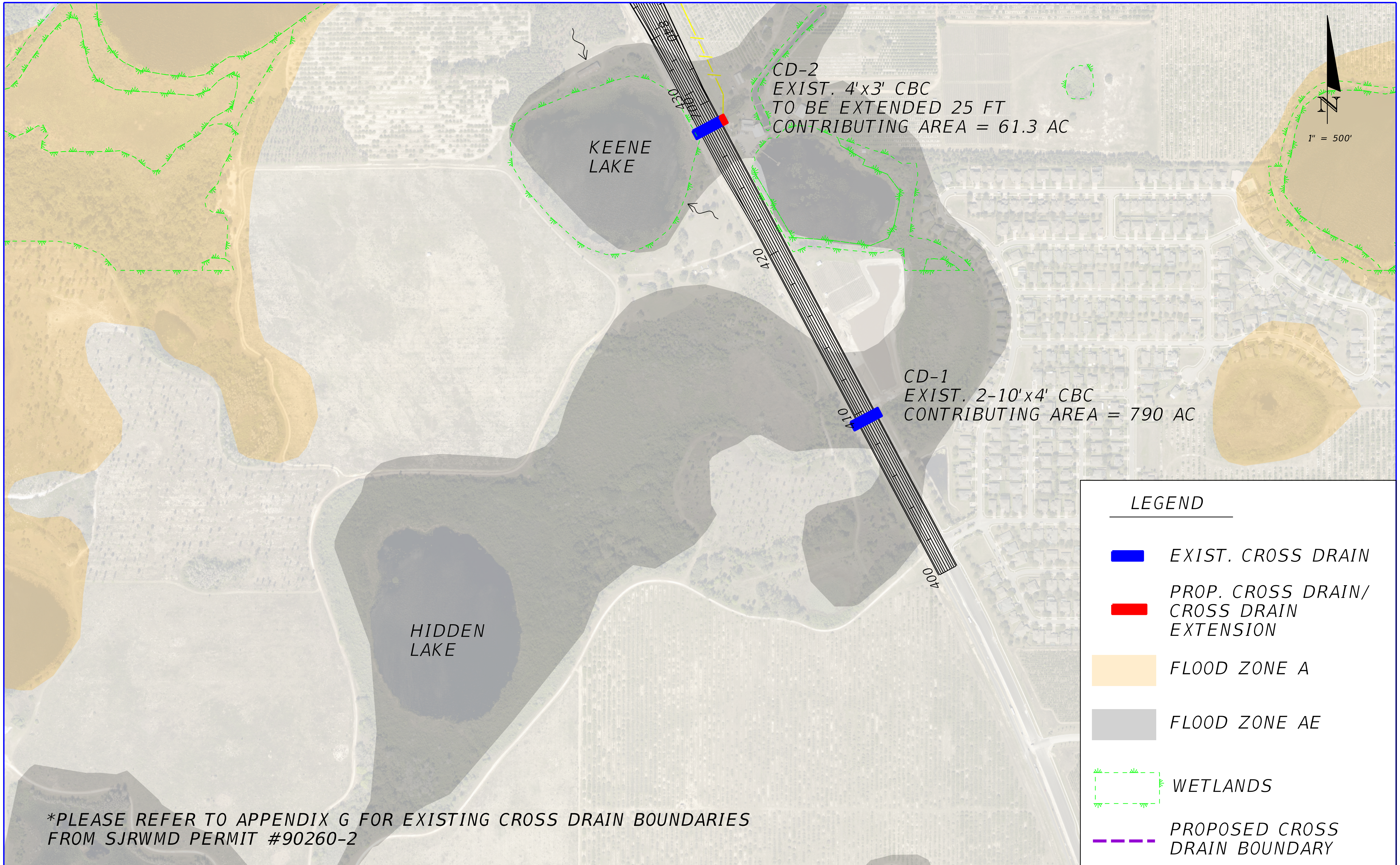
4.4 Flooding History and Maintenance Concern

Based on Environmental Look Around (ELA) meetings with the water management districts and the counties, there are no major flooding concerns within the region. Due to the project being located in a mostly rural area surrounded by floodplains and wetlands, any flooding within the area does not create any major risks. There was not any flooding history along the existing US 27 or SR 429 that was mentioned.

5.0 CONCLUSION

The purpose of this report was to provide detail regarding the design and analysis of cross drain locations required along the proposed Lake/Orange County Connector corridor to reduce impacts to floodplains and wetlands. The proposed alignment will cross through wetlands, agricultural land, and wooded areas. The proposed cross drain locations were chosen based on maintaining the natural flow of the land from the surrounding floodplains and wetlands. Twelve cross drains were selected and analyzed for this project, and three existing cross drains were analyzed for extension. The flow rates for cross drains 2, 3, and 4 (pre-development) were obtained from the existing permit #90260-2. The flow rates for cross drain 7 were determined through use of the Rational Method. Cross drains 4, 4A, 4B, 4C, 5, 6, 6A, 6B, 6C, 8, 9, and 10 were modeled in ICPR to determine the design flow rates. Each cross drain was designed for a 50-year storm event, and the 100-year elevation was also analyzed in order to compare the 100-year backwater elevation with the 100-year existing flood elevation. Proposed culverts were initially set at a size of 18”. The culvert sizes were then modified to avoid overtopping the 50-year roadway stage elevation, and to avoid significant impacts to the 100-year floodplain elevations. The floodplains will be impacted due to longitudinal roadway construction and proposed pond locations. By following FDOT design standards and water management procedures, the proposed cross drains will have minimal impacts on the existing floodplains and wetlands. The purpose is to achieve results which do not increase or significantly change existing flood elevations or floodplain limits. The proposed cross drains located within floodplains will have minor volumetric impacts, and insignificant impact to flood stage and flood limits. The final design team should verify the proposed culvert sizes and their locations, based on the final roadway geometry and profile.

Appendix A – Cross Drain Exhibits



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

CROSS DRAIN
EXHIBIT

SHEET NO.
A-1

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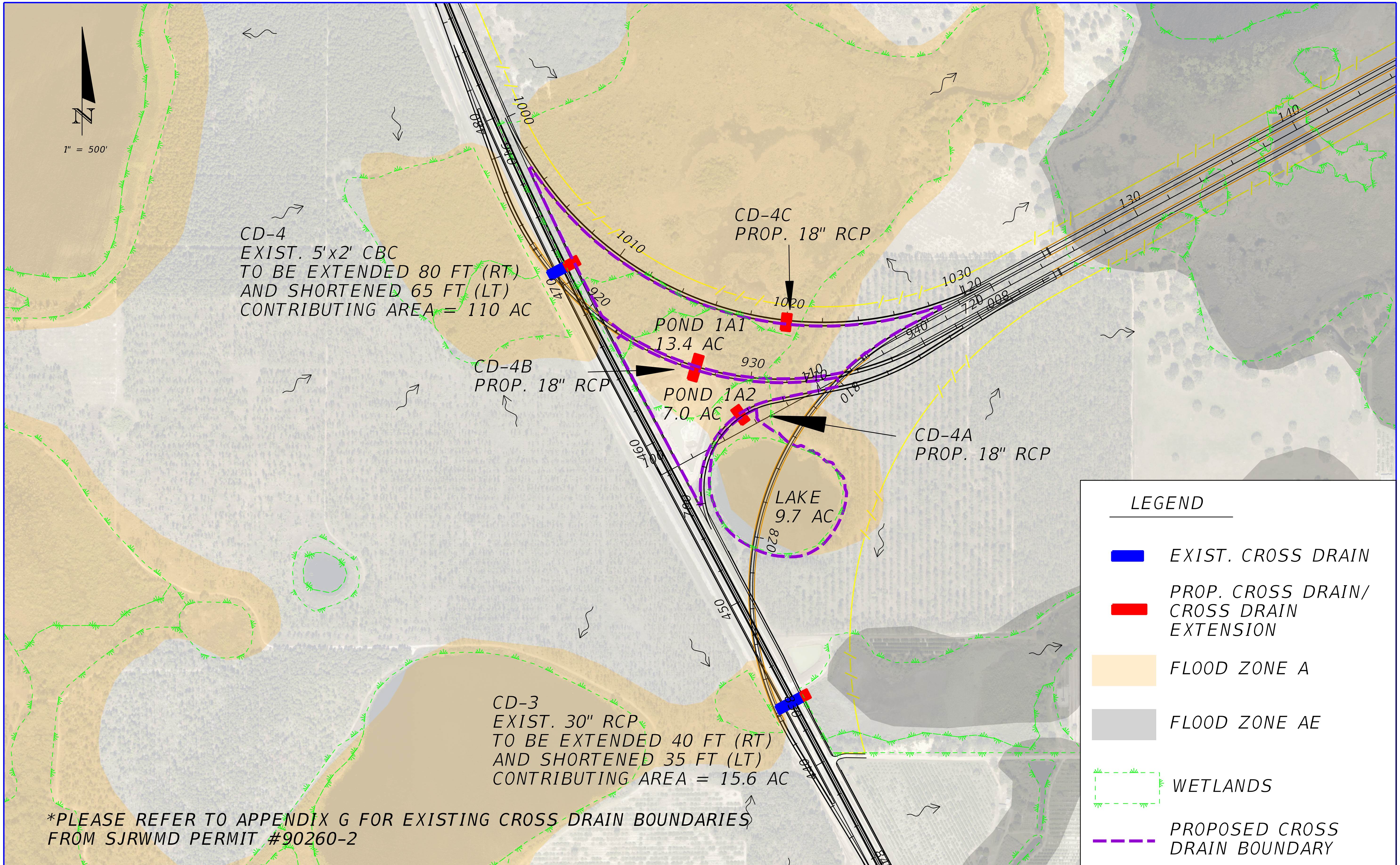


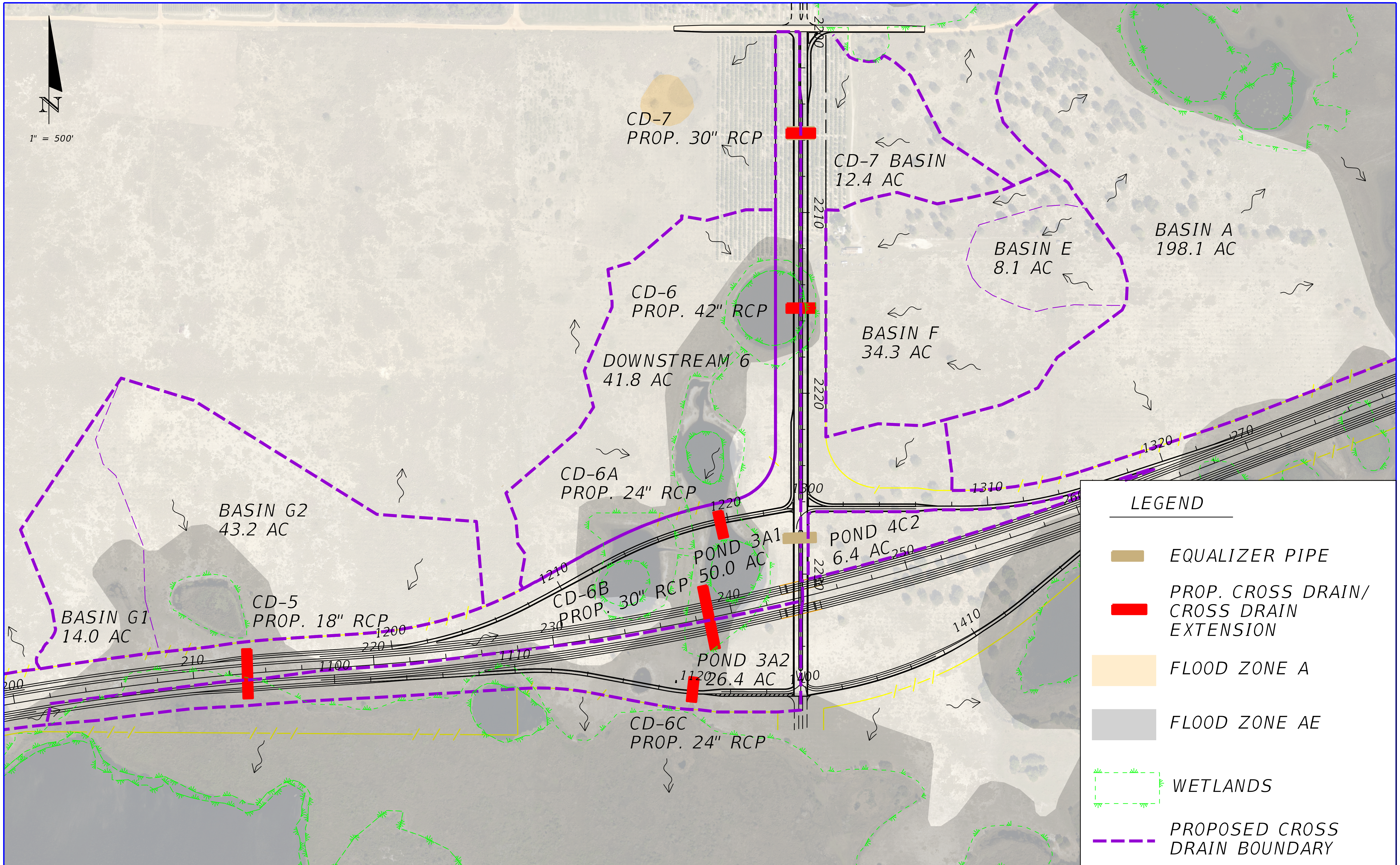
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

CROSS DRAIN
EXHIBIT

SHEET
NO.
A-2



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

CROSS DRAIN
EXHIBIT

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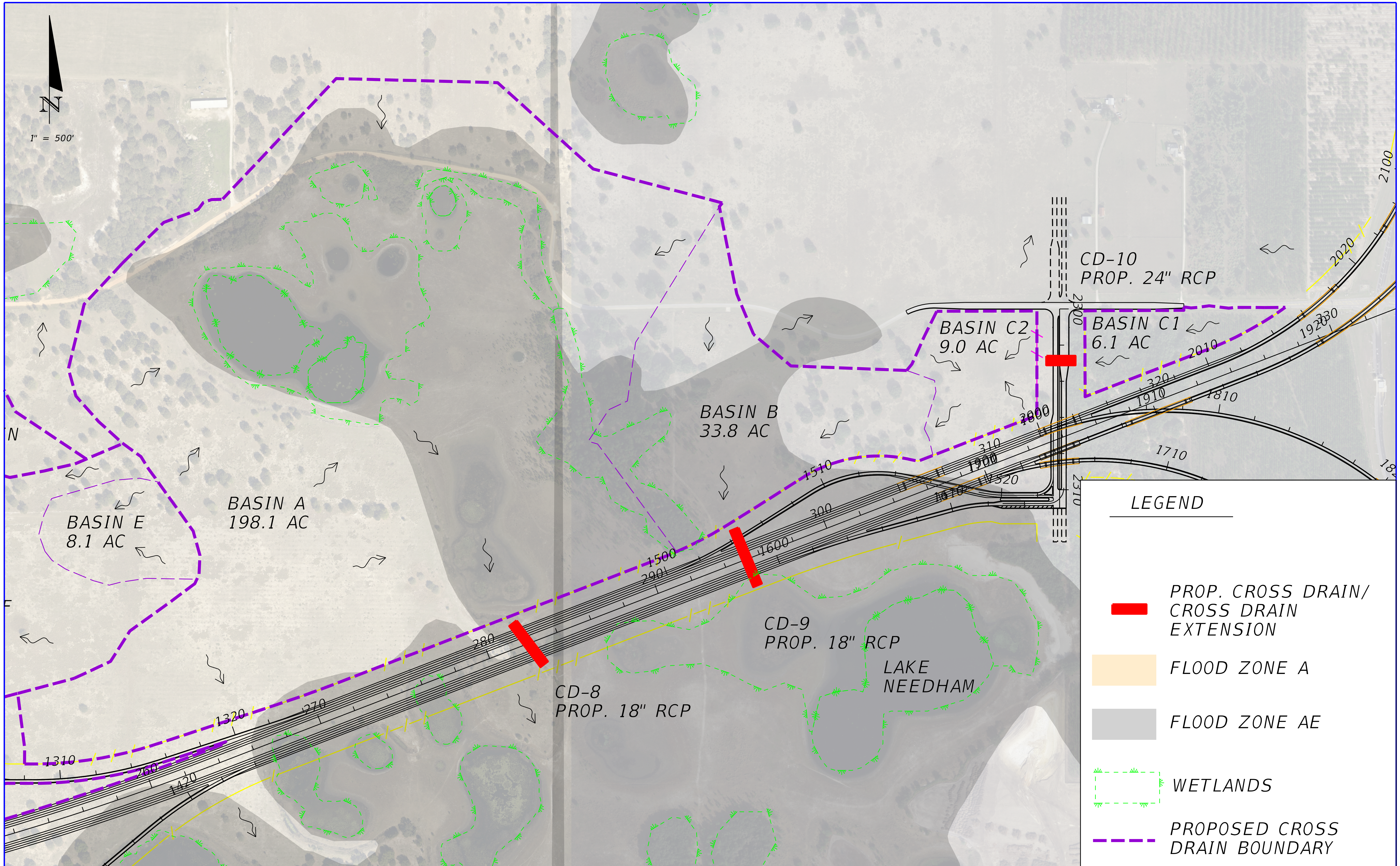
A-3



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

CROSS DRAIN EXHIBIT

SHEET NO.
A-4

PS972SM 10/18/2018 4:03:57 PM NoteBorderText C:\FDOTSS4\RESOURCES\Cell\Roadway.cel

Appendix B – FEMA Maps

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Transverse Mercator State Plane Florida East FIPS 0901. The **horizontal datum** was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Lake County and the Florida Geographic Data Library. Orthophotography was collected in 2009 by the Southwest Florida and St. Johns River Water Management District.

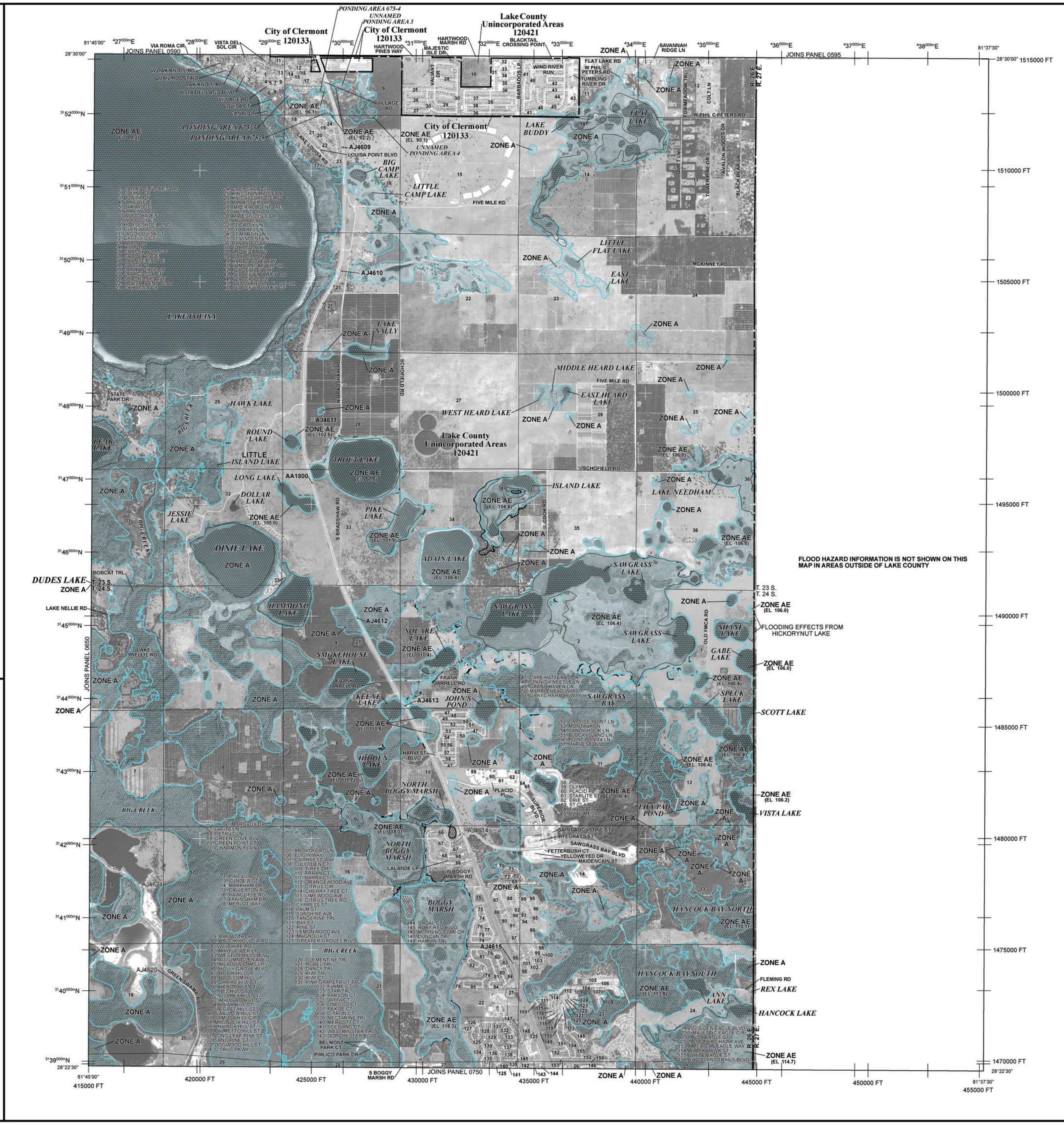
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the **FEMA Mapping Information eXchange** at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service website at http://www.msc.fema.gov/. Available products may include previously issued Letters of Map Change, a Flood Insurance Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

The **"profile base lines"** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line", in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4275000mE	1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT	5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 0901), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories List on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
July 3, 2002

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

December 18, 2012 - to update corporate limits, change Base Flood Elevations, add Base Flood Elevations, change Special Flood Hazard Areas, change zone designations, update roads and road names, incorporate previously issued Letters of Map Revision, and reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1,000 0 1,000 2,000 3,000 4,000 FEET
600 0 600 1,200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0675E

FIRM
FLOOD INSURANCE RATE MAP
LAKE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 675 OF 750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLERMONT, CITY OF	120133	0675	E
LAKE COUNTY	120421	0675	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12069C0675E

MAP REVISED
DECEMBER 18, 2012

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was State Plane Florida East FIPS Zone 0901. The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Orange County, Florida.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

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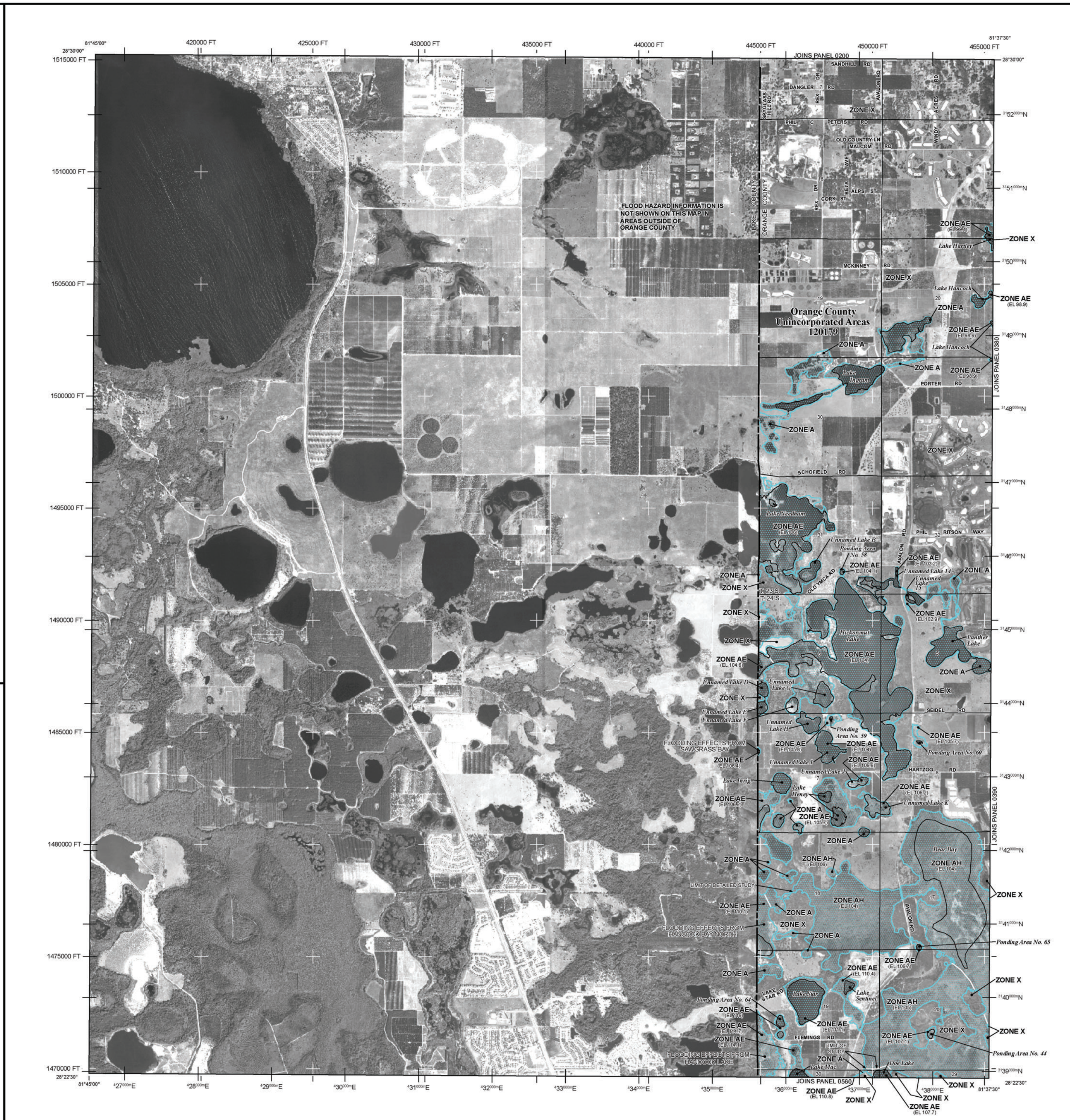
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

NGVD29 to NAVD88 Vertical Datum Conversion Table (feet)

Watershed Name	Minimum Conversion	Maximum Conversion	Average Conversion	Maximum Offset
Big Econlockhatchee River	-1.03	-1.15	-1.09	0.06
Boggy Creek	-0.91	-1.01	-0.96	0.05
Cypress Creek	-0.87	-0.91	-0.89	0.02
Howell Branch	-0.96	-1.05	-0.98	0.07
Lake Apopka	-0.87	-0.97	-0.91	0.06
Lake Hart	-0.97	-1.07	-1.02	0.05
Little Econlockhatchee River	-0.92	-1.07	-1.01	0.09
Little Wekiva River	-0.91	-1.02	-0.95	0.07
Reedy Creek	-0.86	-0.89	-0.88	0.02
Shingle Creek	-0.88	-0.95	-0.91	0.04
St. Johns River	-1.08	-1.33	-1.19	0.14
Wekiva River	-0.88	-1.01	-0.94	0.07



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A —— A	Cross section line
23 - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{42}75^{000m}$E	1000-meter Universal Transverse Mercator grid ticks, zone 17
6000000 FT	5000-foot grid values: Florida State Plane coordinate system, East Zone (FIPSZONE = 901), Transverse Mercator projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
DECEMBER 6, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

SEPTEMBER 25, 2009 - to update corporate limits, to change Base Flood Elevations, to add Base Flood Elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to delete Special Flood Hazard Areas, to update map format, to add roads and road names, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, and to incorporate previously issued Letters of Map Amendment.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'

1,000 0 1,000 2,000 3,000 4,000 FEET
600 0 600 1,200 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0375F

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, FLORIDA

AND INCORPORATED AREAS

PANEL 375 OF 750

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ORANGE COUNTY	120179	0375	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
12095C0375F

MAP REVISED
SEPTEMBER 25, 2009

Federal Emergency Management Agency

Appendix C – USDA Soil Survey

United States Department of Agriculture

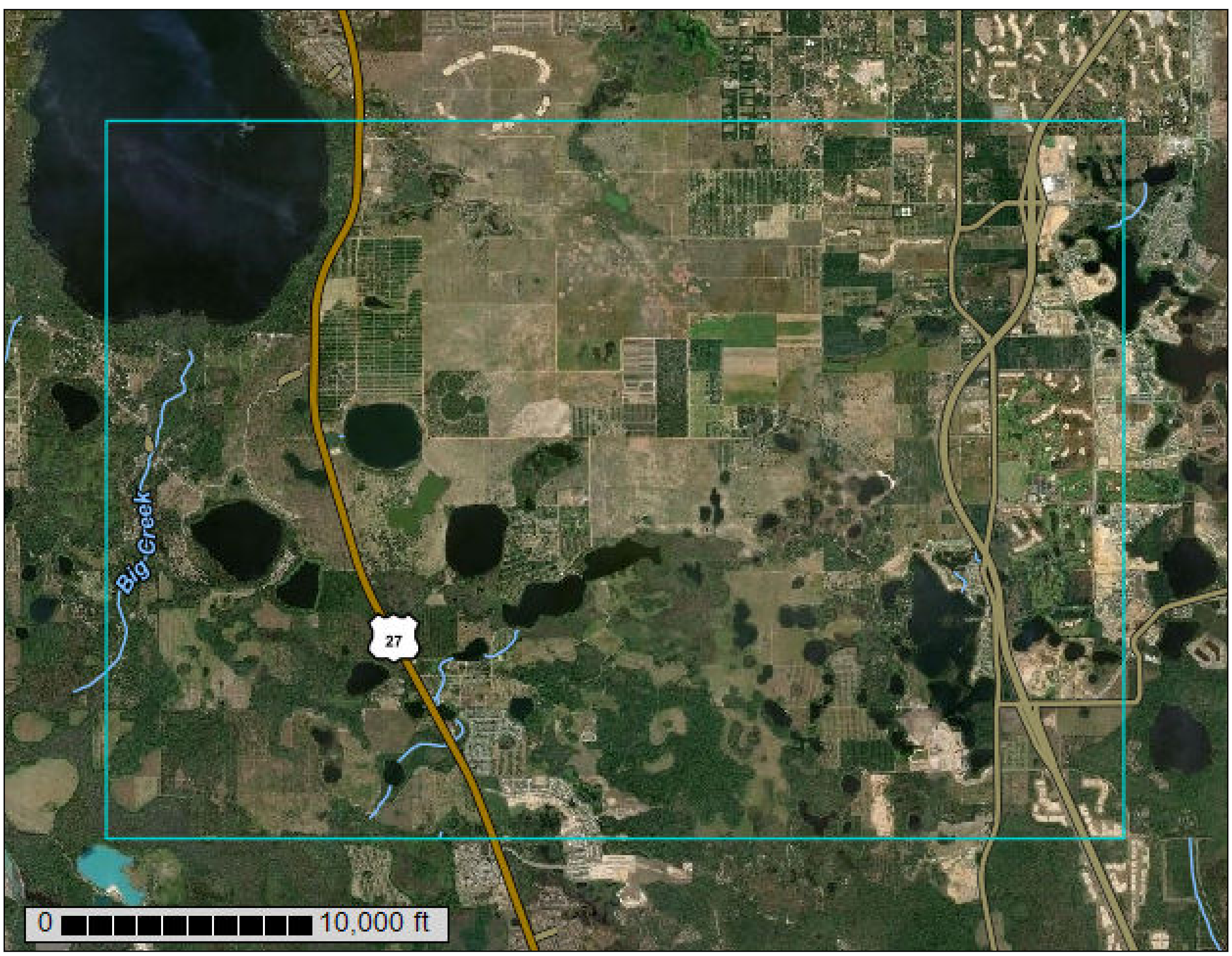
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Lake County Area, Florida, and Orange County, Florida



April 23, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

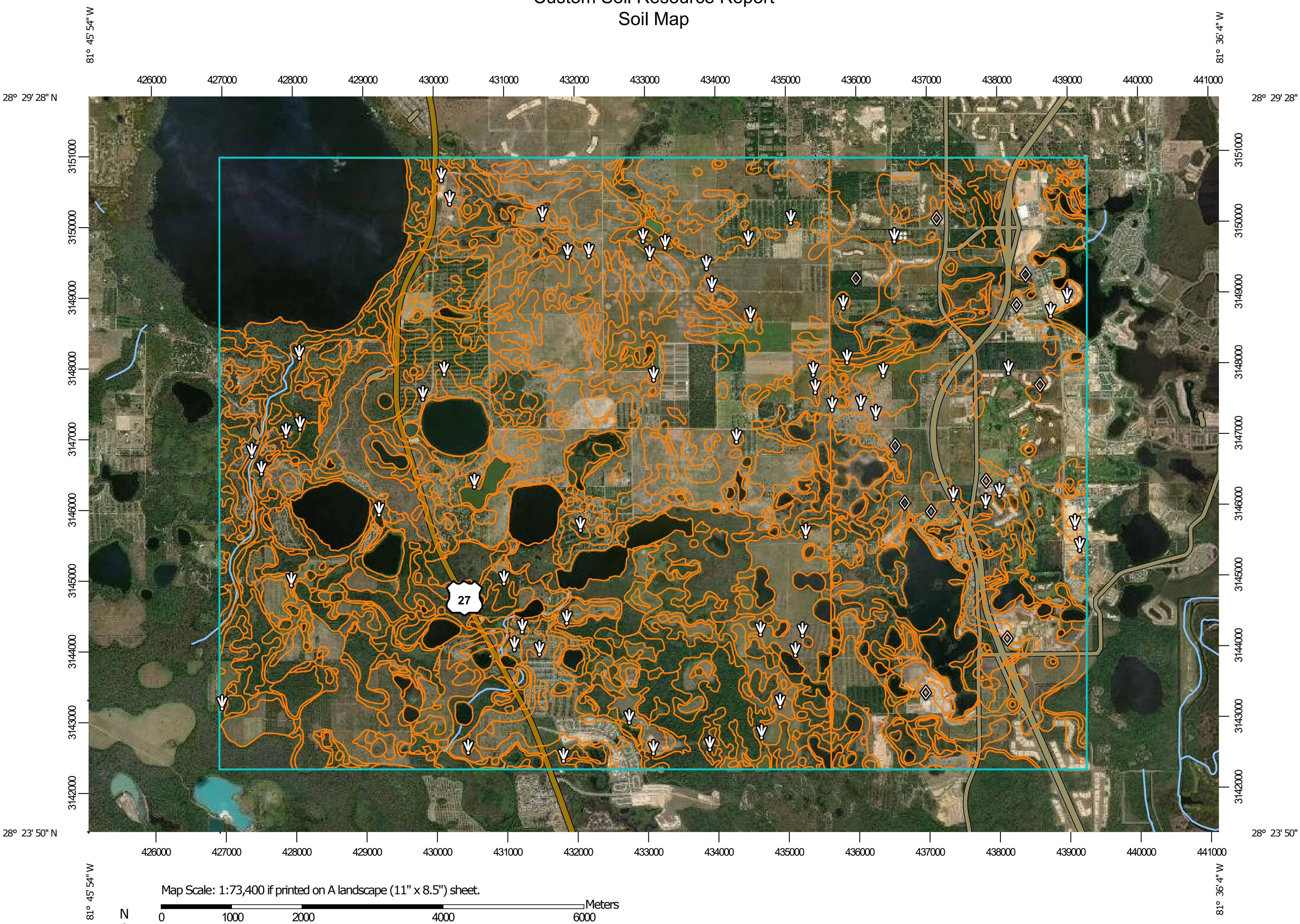
While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



Map Scale: 1:73,400 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 3500, 7000, 14000, 21000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County Area, Florida
Survey Area Data: Version 18, Sep 13, 2018

Soil Survey Area: Orange County, Florida
Survey Area Data: Version 15, Sep 13, 2018

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 8, 2010—Nov 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
4	Anclote and Myakka soils	738.3	2.8%
5	Apopka sand, 0 to 5 percent slopes	41.6	0.2%
6	Apopka sand, 5 to 12 percent slopes	41.4	0.2%
8	Candler sand, 0 to 5 percent slopes	5,851.8	22.1%
9	Candler sand, 5 to 12 percent slopes	2,822.8	10.7%
10	Candler sand, 12 to 40 percent slopes	261.4	1.0%
12	Cassia sand	45.0	0.2%
17	Arents	173.7	0.7%
20	Immokalee sand	647.4	2.4%
21	Lake sand, 0 to 5 percent slopes	341.5	1.3%
22	Lake sand, 5 to 12 percent slopes	182.4	0.7%
24	Kendrick sand, 0 to 5 percent slopes	36.5	0.1%
25	Kendrick sand, 5 to 8 percent slopes	16.2	0.1%
28	Myakka-Myakka, wet, sands, 0 to 2 percent slopes	977.5	3.7%
30	Lochloosa sand	7.3	0.0%
32	Oklawaha muck	446.8	1.7%
33	Ona-Ona, wet, fine sand, 0 to 2 percent slopes	7.5	0.0%
34	Orlando fine sand, 0 to 5 percent slopes	2.8	0.0%
35	Paola sand, 0 to 5 percent slopes	24.8	0.1%
37	Ellzey sand	6.5	0.0%
38	Placid sand, frequently ponded, 0 to 2 percent slopes	143.7	0.5%
39	Seffner sand	26.3	0.1%
40	Placid and Myakka sands, depressional	813.9	3.1%
41	Pomello sand, 0 to 5 percent slopes	279.8	1.1%
42	Pompano sand	55.1	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
43	St. Lucie sand, 0 to 8 percent slopes	39.9	0.2%
44	Swamp	935.6	3.5%
45	Tavares sand, 0 to 5 percent slopes	623.9	2.4%
46	Orsino sand	19.4	0.1%
50	Borrow Pits	7.6	0.0%
99	Water	3,002.4	11.4%
Subtotals for Soil Survey Area		**18,620.7**	**70.4%**
Totals for Area of Interest		**26,438.6**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Arents, nearly level	1.0	0.0%
3	Basinger fine sand, frequently ponded, 0 to 1 percent slopes	681.0	2.6%
4	Candler fine sand, 0 to 5 percent slopes	2,946.5	11.1%
5	Candler fine sand, 5 to 12 percent slopes	2,163.5	8.2%
6	Candler-Apopka fine sands, 5 to 12 percent slopes	69.2	0.3%
20	Immokalee fine sand	199.8	0.8%
33	Pits	2.1	0.0%
34	Pomello fine sand, 0 to 5 percent slopes	113.6	0.4%
37	St. Johns fine sand	44.2	0.2%
41	Samsula-Hontoon-Basinger association, depressional	98.5	0.4%
42	Sanibel muck	91.8	0.3%
43	Seffner fine sand, 0 to 2 percent slopes	2.7	0.0%
44	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	12.7	0.0%
46	Tavares fine sand, 0 to 5 percent slopes	202.0	0.8%
47	Tavares-Millhopper complex, 0 to 5 percent slopes	238.1	0.9%
99	Water	951.4	3.6%
Subtotals for Soil Survey Area		**7,818.0**	**29.6%**
Totals for Area of Interest		**26,438.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lake County Area, Florida

4—Anclote and Myakka soils

Map Unit Setting

National map unit symbol: 1qt5x
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Anclote and similar soils: 35 percent
Myakka and similar soils: 30 percent
Felda and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anclote

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
Cg - 12 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Description of Myakka

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 20 inches: sand
Bh - 20 to 36 inches: sand
C - 36 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Description of Felda

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 3 inches: fine sand
E - 3 to 25 inches: fine sand
Btg - 25 to 56 inches: sandy clay loam
Ckg - 56 to 60 inches: marly clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy over loamy soils on stream terraces, flood plains, or in depressions (G154XB245FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Minor Components

Brighton, depressional

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Oklawaha, freq. flooded

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Manatee, depressional

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

5—Apopka sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0q6
Elevation: 40 to 150 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 248 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Apopka and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Apopka

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 55 inches: sand
Bt - 55 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Sparr

Percent of map unit: 6 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Jumper

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Candler

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Jonesville

Percent of map unit: 4 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

6—Apopka sand, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1qt5z
Elevation: 40 to 150 feet

Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Apopka and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Apopka

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 55 inches: sand
Bt - 55 to 80 inches: sandy clay loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 7 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)

Hydric soil rating: No

Kendrick

Percent of map unit: 7 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Kendrick, thin subsurface

Percent of map unit: 6 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

8—Candler sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2t3z1
Elevation: 10 to 260 feet
Mean annual precipitation: 47 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 280 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 63 inches: sand
E and Bt - 63 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL), Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Tavares

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex, concave
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Millhopper

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

9—Candler sand, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: 2w0q4
Elevation: 30 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 67 inches: sand
E and Bt - 67 to 80 inches: sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Other vegetative classification: Sand Pine Scrub (R154XY001FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 6 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Kendrick

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex, linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 3 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Pompano

Percent of map unit: 1 percent
Landform: Flats on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear, convex
Hydric soil rating: Yes

10—Candler sand, 12 to 40 percent slopes

Map Unit Setting

National map unit symbol: 1nrvg
Elevation: 40 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Candler and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Hills on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 3 inches: sand
E - 3 to 67 inches: sand
E and Bt - 67 to 80 inches: sand

Properties and qualities

Slope: 12 to 40 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Other vegetative classification: Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

Minor Components

Kendrick

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Apopka

Percent of map unit: 5 percent

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

12—Cassia sand

Map Unit Setting

National map unit symbol: 1nrvj
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Cassia and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cassia

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: sand
E - 4 to 25 inches: sand
Bh - 25 to 37 inches: sand
C - 37 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 12 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Minor Components

Immokalee, non-hydric

Percent of map unit: 10 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

17—Arents

Map Unit Setting

National map unit symbol: 1qt6b
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

C - 0 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 1.98 in/hr)
Depth to water table: About 30 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.8 inches)

20—Immokalee sand

Map Unit Setting

National map unit symbol: 1nrvs
Elevation: 10 to 60 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee, non-hydric, and similar soils: 70 percent
Immokalee, hydric, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: sand
E - 4 to 38 inches: sand
Bh - 38 to 56 inches: sand
BC - 56 to 68 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Immokalee, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: sand
E - 4 to 38 inches: sand
Bh - 38 to 56 inches: sand
BC - 56 to 68 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Wabasso, hydric

Percent of map unit: 5 percent

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Placid, depressional
Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

21—Lake sand, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 1qt6g
Elevation: 30 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition
Lake and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lake

Setting
Landform: Ridges, hills, marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits or sandy fluvial or marine deposits

Typical profile
A - 0 to 7 inches: sand
C - 7 to 80 inches: sand

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 10 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Astatula

Percent of map unit: 10 percent
Landform: Ridges on marine terraces, hills on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Sand Pine Scrub (R154XY001FL)
Hydric soil rating: No

22—Lake sand, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: 1nrvv
Elevation: 40 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Lake and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lake

Setting

Landform: Ridges, hills, marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits or sandy fluvial or marine deposits

Typical profile

A - 0 to 5 inches: sand
C - 5 to 80 inches: sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G154XB113FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Lake, 0 to 5 percent

Percent of map unit: 5 percent
Landform: Ridges, hills, marine terraces

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

24—Kendrick sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1nrvx
Elevation: 40 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kendrick and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kendrick

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine and fluvial deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 32 inches: sand
Bt - 32 to 75 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 10 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

25—Kendrick sand, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1qt6l
Elevation: 40 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Kendrick and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kendrick

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine and fluvial deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 27 inches: sand
Bt - 27 to 75 inches: sandy clay loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy over loamy soils on knolls and ridges of mesic uplands (G154XB211FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Kendrick, thin subsurface

Percent of map unit: 10 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

28—Myakka-Myakka, wet, sands, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2twt1
Elevation: 10 to 130 feet
Mean annual precipitation: 43 to 62 inches
Mean annual air temperature: 64 to 75 degrees F
Frost-free period: 280 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Myakka and similar soils: 75 percent
Myakka, wet, and similar soils: 15 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myakka

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 20 inches: sand
Bh - 20 to 36 inches: sand
C - 36 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Description of Myakka, Wet

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 20 inches: sand
Bh - 20 to 36 inches: sand
C - 36 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Minor Components

Basinger

Percent of map unit: 5 percent
Landform: Drainageways on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear, convex
Across-slope shape: Concave, linear
Ecological site: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Eaugallie

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Placid, depressional

Percent of map unit: 1 percent
Landform: Depressions on marine terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave
Ecological site: Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

30—Lochloosa sand

Map Unit Setting

National map unit symbol: 1qt6r
Elevation: 40 to 160 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Lochloosa and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lochloosa

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 7 inches: sand
E - 7 to 33 inches: sand
Btg - 33 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 36 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B

Forage suitability group: Sandy over loamy soils on rises and knolls of mesic uplands (G154XB231FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Minor Components

Sparr

Percent of map unit: 10 percent
Landform: Rises on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Kendrick

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

32—Oklawaha muck

Map Unit Setting

National map unit symbol: 1nrw5
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Oklawaha, freq. flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oklawaha, Freq. Flooded

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over loamy and clayey marine deposits

Typical profile

Oa - 0 to 9 inches: muck

Oe - 9 to 25 inches: mucky peat
Cg1 - 25 to 31 inches: sandy loam
Cg2 - 31 to 54 inches: sandy clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Forage suitability group: Organic soils in depressions and on flood plains (G154XB645FL)
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Minor Components

Brighton, depressional

Percent of map unit: 10 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

33—Ona-Ona, wet, fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w4gx
Elevation: 10 to 130 feet
Mean annual precipitation: 46 to 56 inches
Mean annual air temperature: 66 to 77 degrees F
Frost-free period: 325 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ona and similar soils: 75 percent
Ona, wet, and similar soils: 12 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ona

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: fine sand
Bh - 9 to 16 inches: fine sand
C - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Ona, Wet

Setting

Landform: Sloughs on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 9 inches: fine sand
Bh - 9 to 16 inches: fine sand
C - 16 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Myakka

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Basinger, hydric

Percent of map unit: 4 percent
Landform: Drainageways on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Slough (R155XY011FL)
Hydric soil rating: Yes

Immokalee

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

34—Orlando fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ttld
Elevation: 50 to 150 feet
Mean annual precipitation: 48 to 56 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 324 to 354 days
Farmland classification: Not prime farmland

Map Unit Composition

Orlando and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orlando

Setting

Landform: Ridges, marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits over fluviomarine deposits

Typical profile

A - 0 to 20 inches: fine sand
C - 20 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL)
Hydric soil rating: No

Minor Components

Candler

Percent of map unit: 3 percent
Landform: Knolls, marine terraces, ridges
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Seffner

Percent of map unit: 2 percent
Landform: Flats, rises, marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

35—Paola sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tzwj
Elevation: 0 to 100 feet
Mean annual precipitation: 44 to 60 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Paola and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paola

Setting

Landform: Ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: sand
E - 6 to 55 inches: sand
B/E - 55 to 80 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 6 percent
Landform: Ridges on marine terraces, knolls on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Astatula

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, hills on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser, rise
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Pomello

Percent of map unit: 4 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Ecological site: Sand Pine Scrub (R155XY001FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

37—Ellzey sand

Map Unit Setting

National map unit symbol: 1qt6z
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Ellzey, non-hydric, and similar soils: 70 percent
Ellzey, hydric, and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ellzey, Non-hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 32 inches: sand
Btg - 32 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Ellzey, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: sand
E - 5 to 32 inches: sand
Btg - 32 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Wabasso, non-hydric

Percent of map unit: 5 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Wabasso, hydric

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

38—Placid sand, frequently ponded, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2ttln
Elevation: 10 to 120 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Placid and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Placid

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 18 inches: sand
C - 18 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Minor Components

Adamsville

Percent of map unit: 10 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Myakka, hydric

Percent of map unit: 10 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf
Down-slope shape: Concave
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

39—Seffner sand

Map Unit Setting

National map unit symbol: 1qt71
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Seffner and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Seffner

Setting

Landform: Flats on marine terraces, rises on marine terraces

Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A11 - 0 to 6 inches: sand
A12 - 6 to 19 inches: sand
C - 19 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Hydric soil rating: No

Minor Components

Felda

Percent of map unit: 10 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

40—Placid and Myakka sands, depressional

Map Unit Setting

National map unit symbol: 1nrwf
Elevation: 10 to 60 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F

Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Placid and similar soils: 55 percent
Myakka and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Placid

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 18 inches: sand
C - 18 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Description of Myakka

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: sand

E - 6 to 20 inches: sand
Bh - 20 to 36 inches: sand
C - 36 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G154XB145FL)
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

Minor Components

Wabasso, hydric

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Ellzey, hydric

Percent of map unit: 5 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

41—Pomello sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2sm5n
Elevation: 0 to 160 feet
Mean annual precipitation: 46 to 64 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomello and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: sand
E - 4 to 56 inches: sand
Bh - 56 to 62 inches: sand
Bw - 62 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Minor Components

Immokalee

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Tavares

Percent of map unit: 4 percent
Landform: Ridges on marine terraces, flatwoods on marine terraces, hills on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Side slope, interfluve, tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

St. lucie

Percent of map unit: 3 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Side slope, interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Satellite

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, rises on marine terraces, flatwoods on marine terraces
Landform position (three-dimensional): Tread, talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

42—Pompano sand

Map Unit Setting

National map unit symbol: 1nrwh
Elevation: 10 to 100 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pompano, non-hydric, and similar soils: 60 percent
Pompano, hydric, and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pompano, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: sand
C - 5 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)

Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Description of Pompano, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: sand
C - 5 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G154XB141FL)
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

Minor Components

Wabasso, non-hydric

Percent of map unit: 10 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Anclote

Percent of map unit: 10 percent
Landform: Flood plains on marine terraces, depressions on marine terraces, marshes on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave

Across-slope shape: Concave
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

43—St. Lucie sand, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tzwq
Elevation: 70 to 200 feet
Mean annual precipitation: 46 to 55 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

St. lucie and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Lucie

Setting

Landform: Ridges on marine terraces, knolls on marine terraces, dunes on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy eolian deposits and/or marine deposits

Typical profile

A - 0 to 6 inches: sand
C - 4 to 80 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 39.96 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G155XB111FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Minor Components

Pomello

Percent of map unit: 8 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Paola

Percent of map unit: 5 percent
Landform: Ridges on marine terraces, hills on marine terraces
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Orsino

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

44—Swamp

Map Unit Setting

National map unit symbol: 1nrwk
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Mineral soil: 50 percent
Organic soil: 50 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mineral Soil

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Interfluve, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

A - 0 to 18 inches: fine sand
C - 18 to 80 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

Description of Organic Soil

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile

Oe - 0 to 80 inches: mucky peat

Properties and qualities

Slope: 0 to 1 percent
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 0 inches

Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very high (about 13.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Other vegetative classification: Freshwater Marshes and Ponds (R154XY010FL)
Hydric soil rating: Yes

45—Tavares sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v173
Elevation: 0 to 180 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Tavares and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Ridges on marine terraces, knolls on marine terraces, flats on marine terraces
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve, base slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 7 inches: sand
C - 7 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 50.02 in/hr)

Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 6 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Shoulder, summit, footslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Candler

Percent of map unit: 4 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, interfluve, tread
Down-slope shape: Convex
Across-slope shape: Convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R155XY002FL), Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 3 percent
Landform: Knolls on flatwoods, rises on flatwoods
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, rise, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R155XY008FL), Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Zolfo

Percent of map unit: 2 percent
Landform: Flats on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex

Across-slope shape: Linear
Hydric soil rating: No

46—Orsino sand

Map Unit Setting

National map unit symbol: 1nrwm
Elevation: 20 to 150 feet
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 285 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Orsino and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orsino

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 3 inches: sand
E - 3 to 22 inches: sand
E and Bh - 22 to 80 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A

Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Hydric soil rating: No

Minor Components

Apopka

Percent of map unit: 10 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

50—Borrow Pits

Map Unit Setting

National map unit symbol: 1v082
Mean annual precipitation: 46 to 54 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 340 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Borrow pits: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Borrow Pits

Setting

Landform: Marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Altered marine deposits

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Forage suitability group: Forage suitability group not assigned (G154XB999FL)
Hydric soil rating: Unranked

Minor Components

Aquents

Percent of map unit: 30 percent
Landform: Depressions
Hydric soil rating: Yes

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Orange County, Florida

1—Arents, nearly level

Map Unit Setting

National map unit symbol: bv78
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

AC - 0 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 24 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: No

3—Basinger fine sand, frequently ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2v16v
Elevation: 0 to 70 feet
Mean annual precipitation: 43 to 55 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Basinger and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Basinger

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 14 inches: fine sand
Bh/E - 14 to 36 inches: fine sand
Cg - 36 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Smyrna

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (three-dimensional): Tread, talf
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Samsula

Percent of map unit: 3 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

Floridana

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Other vegetative classification: Freshwater Marshes and Ponds (R155XY010FL)
Hydric soil rating: Yes

4—Candler fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2shkf
Elevation: 10 to 260 feet
Mean annual precipitation: 47 to 56 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 280 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex, concave
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

Ap - 0 to 5 inches: fine sand
E - 5 to 74 inches: fine sand
E and Bt - 74 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G154XB111FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Tavares

Percent of map unit: 4 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave, convex
Across-slope shape: Concave, linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Adamsville

Percent of map unit: 3 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex, concave
Across-slope shape: Linear, concave

Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: No

Millhopper

Percent of map unit: 3 percent
Landform: Flats on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex, linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

5—Candler fine sand, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: bv8p
Elevation: 20 to 150 feet
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Candler and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 61 inches: fine sand
E and B - 61 to 80 inches: fine sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G155XB113FL)
Hydric soil rating: No

Minor Components

Millhopper

Percent of map unit: 2 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Tavares

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Apopka

Percent of map unit: 2 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

6—Candler-Apopka fine sands, 5 to 12 percent slopes

Map Unit Setting

National map unit symbol: bv8x
Elevation: 20 to 160 feet
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Candler and similar soils: 66 percent

Apopka and similar soils: 31 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Candler

Setting

Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 69 inches: fine sand
E and B - 69 to 80 inches: fine sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G155XB113FL)
Hydric soil rating: No

Description of Apopka

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian deposits and/or sandy and loamy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 69 inches: fine sand
Bt - 69 to 80 inches: sandy clay loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on strongly sloping to steep side slopes of xeric uplands (G155XB113FL)
Hydric soil rating: No

Minor Components

Lochloosa

Percent of map unit: 2 percent
Landform: Rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Tavares

Percent of map unit: 1 percent
Landform: Flats on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

20—Immokalee fine sand

Map Unit Setting

National map unit symbol: bv7n
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Immokalee, non-hydric, and similar soils: 82 percent

Immokalee, hydric, and similar soils: 10 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Immokalee, Non-hydric

Setting

Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 35 inches: fine sand
Bh - 35 to 67 inches: fine sand
C - 67 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of Immokalee, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
E - 5 to 35 inches: fine sand
Bh - 35 to 67 inches: fine sand
C - 67 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Wabasso

Percent of map unit: 4 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Pineda

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

33—Pits

Map Unit Setting

National map unit symbol: bv83
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, dip
Down-slope shape: Linear
Across-slope shape: Linear

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Forage suitability group: Forage suitability group not assigned (G155XB999FL)
Hydric soil rating: Unranked

Minor Components

Aquents

Percent of map unit: 30 percent
Landform: Depressions
Hydric soil rating: Yes

34—Pomello fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v16y
Elevation: 0 to 180 feet
Mean annual precipitation: 44 to 52 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 342 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Pomello and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pomello

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 47 inches: fine sand
Bh - 47 to 58 inches: fine sand
Bw - 58 to 65 inches: fine sand
C - 65 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G155XB131FL)
Other vegetative classification: Sand Pine Scrub (R155XY001FL)
Hydric soil rating: No

Minor Components

Smyrna

Percent of map unit: 3 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Tavares

Percent of map unit: 1 percent
Landform: Ridges on marine terraces, flats on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Bulow

Percent of map unit: 1 percent
Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear

Hydric soil rating: No

37—St. Johns fine sand

Map Unit Setting

National map unit symbol: bv87
Elevation: 30 to 150 feet
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

St. johns, non-hydric, and similar soils: 60 percent
St. johns, hydric, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of St. Johns, Non-hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
E - 12 to 24 inches: fine sand
Bh - 24 to 44 inches: fine sand
C - 44 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 6 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: No

Description of St. Johns, Hydric

Setting

Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
E - 12 to 24 inches: fine sand
Bh - 24 to 44 inches: fine sand
C - 44 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Hydric soil rating: Yes

Minor Components

Immokalee, non-hydric

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Wabasso

Percent of map unit: 5 percent
Landform: Flatwoods on marine terraces
Landform position (three-dimensional): Talf

Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

41—Samsula-Hontoon-Basinger association, depressional

Map Unit Setting

National map unit symbol: bv8d
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Samsula and similar soils: 47 percent
Hontoon and similar soils: 31 percent
Basinger and similar soils: 14 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Samsula

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material over sandy marine deposits

Typical profile

Oa - 0 to 34 inches: muck
C - 34 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Hontoon

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Herbaceous organic material

Typical profile

Oa - 0 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Basinger

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 25 inches: fine sand
B/E - 25 to 35 inches: fine sand
C - 35 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent

Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on stream terraces, flood plains, or in depressions (G155XB145FL)
Hydric soil rating: Yes

Minor Components

Holopaw

Percent of map unit: 4 percent
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Ona

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

42—Sanibel muck

Map Unit Setting

National map unit symbol: bv8f
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Sanibel, undrained, and similar soils: 65 percent
Sanibel, drained, and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sanibel, Undrained

Setting

Landform: Marshes on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Thin organic material over sandy marine deposits

Typical profile

Oa - 0 to 11 inches: muck
A - 11 to 15 inches: fine sand
C - 15 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Description of Sanibel, Drained

Setting

Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Thin organic material over sandy marine deposits

Typical profile

Oa - 0 to 11 inches: muck
A - 11 to 15 inches: fine sand
C - 15 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Organic soils in depressions and on flood plains (G155XB645FL)
Hydric soil rating: Yes

Minor Components

Hontoon, undrained

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Samsula

Percent of map unit: 5 percent
Landform: Depressions on marine terraces
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

43—Seffner fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2v17t
Elevation: 30 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 300 to 365 days

Farmland classification: Farmland of unique importance

Map Unit Composition

Seffner and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Seffner

Setting

Landform: Flats on marine terraces, rises on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 12 inches: fine sand
AC - 12 to 18 inches: fine sand
C - 18 to 33 inches: fine sand
Cg - 33 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on rises and knolls of mesic uplands (G154XB131FL)
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Minor Components

Ona, non-hydric

Percent of map unit: 4 percent
Landform: Flats on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)

Hydric soil rating: No

Sparr

Percent of map unit: 3 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Pompano, hydric

Percent of map unit: 3 percent
Landform: Flats on marine terraces, drainageways on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Slough (R154XY011FL)
Hydric soil rating: Yes

44—Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2v171
Elevation: 0 to 150 feet
Mean annual precipitation: 38 to 62 inches
Mean annual air temperature: 68 to 77 degrees F
Frost-free period: 300 to 365 days
Farmland classification: Not prime farmland

Map Unit Composition

Smyrna, non-hydric, and similar soils: 76 percent
Smyrna, hydric, and similar soils: 20 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smyrna, Non-hydric

Setting

Landform: Flats on marine terraces, flatwoods on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 17 inches: fine sand

Bh - 17 to 27 inches: loamy fine sand
C - 27 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: No

Description of Smyrna, Hydric

Setting

Landform: Flats on marine terraces, flatwoods on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 17 inches: fine sand
Bh - 17 to 27 inches: loamy fine sand
C - 27 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Forage suitability group: Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)
Other vegetative classification: South Florida Flatwoods (R155XY003FL)
Hydric soil rating: Yes

Minor Components

Basinger, depressional

Percent of map unit: 2 percent
Landform: Depressions on marine terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Pomona, non-hydric

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Eaugallie, hydric

Percent of map unit: 1 percent
Landform: Flatwoods on marine terraces, flats on marine terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: South Florida Flatwoods (R154XY003FL)
Hydric soil rating: Yes

46—Tavares fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w0pz
Elevation: 30 to 160 feet
Mean annual precipitation: 44 to 56 inches
Mean annual air temperature: 68 to 75 degrees F
Frost-free period: 290 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Tavares and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, tread, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 5 inches: fine sand
C - 5 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Minor Components

Candler

Percent of map unit: 5 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex, concave
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Apopka

Percent of map unit: 4 percent
Landform: Ridges on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit, shoulder, footslope
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

Narcoossee

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, rises on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Linear, convex
Across-slope shape: Linear
Other vegetative classification: Upland Hardwood Hammock (R154XY008FL)
Hydric soil rating: No

Zolfo

Percent of map unit: 3 percent
Landform: Rises on marine terraces, knolls on marine terraces
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex, linear
Across-slope shape: Linear
Other vegetative classification: North Florida Flatwoods (R154XY004FL)
Hydric soil rating: No

47—Tavares-Millhopper complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w4gz
Elevation: 20 to 150 feet
Mean annual precipitation: 45 to 53 inches
Mean annual air temperature: 70 to 77 degrees F
Frost-free period: 350 to 365 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Tavares and similar soils: 63 percent
Millhopper and similar soils: 32 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tavares

Setting

Landform: Flats on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve, rise

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 42 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Hydric soil rating: No

Description of Millhopper

Setting

Landform: Rises on marine terraces, knolls on marine terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, riser
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy and loamy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
E - 6 to 64 inches: fine sand
Bt - 64 to 76 inches: sandy loam
Btg - 76 to 80 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G154XB121FL)
Hydric soil rating: No

Minor Components

Candler

Percent of map unit: 3 percent
Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Astatula

Percent of map unit: 2 percent
Landform: Hills on marine terraces, ridges on marine terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R154XY002FL)
Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

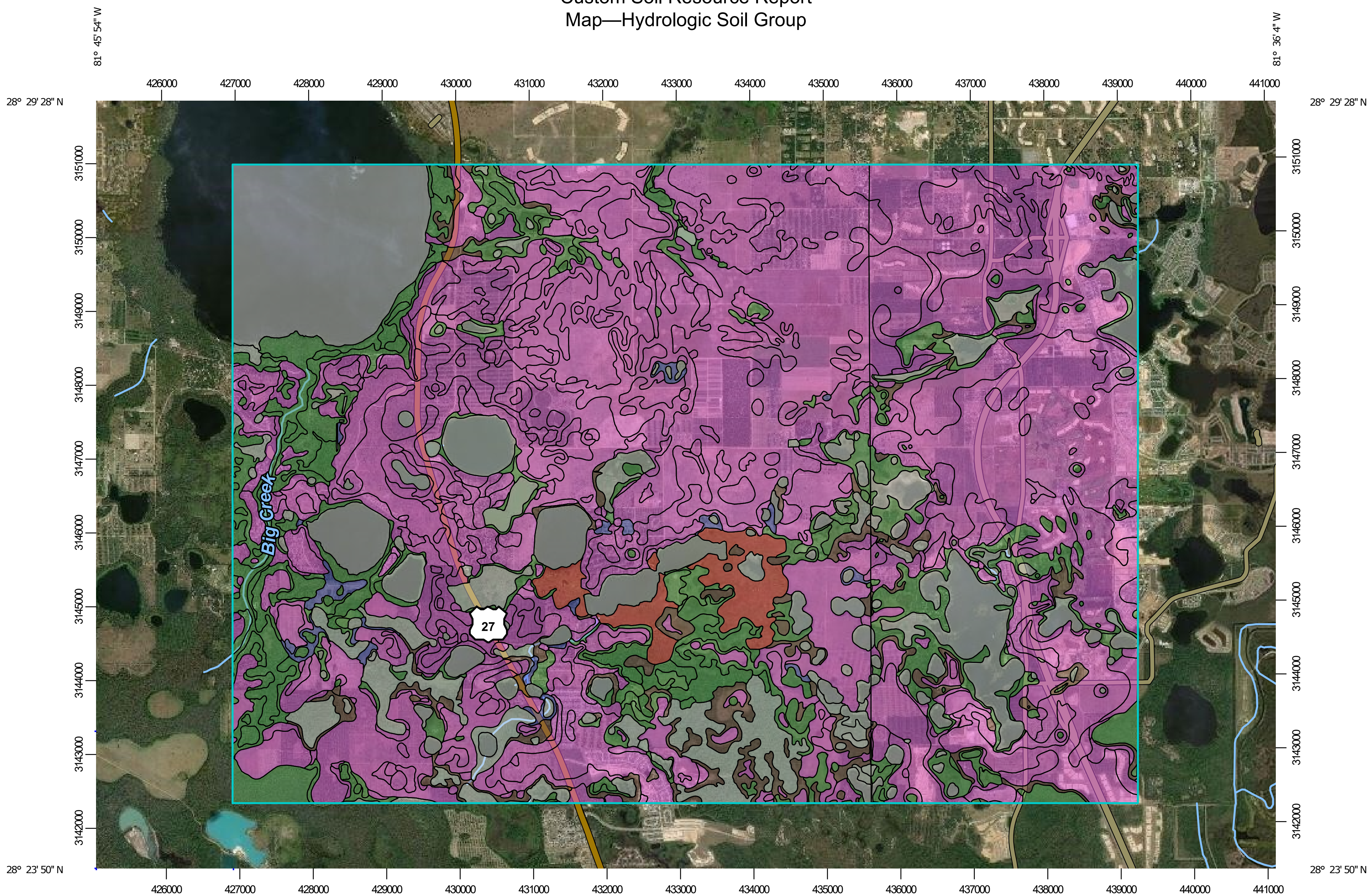
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group



Map Scale: 1:73,400 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 1000, 2000, 4000, 6000

Feet: 0, 3500, 7000, 14000, 21000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County Area, Florida
Survey Area Data: Version 18, Sep 13, 2018

Soil Survey Area: Orange County, Florida
Survey Area Data: Version 15, Sep 13, 2018

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 8, 2010—Nov 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
4	Anclote and Myakka soils	A/D	738.3	2.8%
5	Apopka sand, 0 to 5 percent slopes	A	41.6	0.2%
6	Apopka sand, 5 to 12 percent slopes	A	41.4	0.2%
8	Candler sand, 0 to 5 percent slopes	A	5,851.8	22.1%
9	Candler sand, 5 to 12 percent slopes	A	2,822.8	10.7%
10	Candler sand, 12 to 40 percent slopes	A	261.4	1.0%
12	Cassia sand	A/D	45.0	0.2%
17	Arents	B	173.7	0.7%
20	Immokalee sand	B/D	647.4	2.4%
21	Lake sand, 0 to 5 percent slopes	A	341.5	1.3%
22	Lake sand, 5 to 12 percent slopes	A	182.4	0.7%
24	Kendrick sand, 0 to 5 percent slopes	A	36.5	0.1%
25	Kendrick sand, 5 to 8 percent slopes	A	16.2	0.1%
28	Myakka-Myakka, wet, sands, 0 to 2 percent slopes	A/D	977.5	3.7%
30	Lochloosa sand	B	7.3	0.0%
32	Oklawaha muck	D	446.8	1.7%
33	Ona-Ona, wet, fine sand, 0 to 2 percent slopes	B/D	7.5	0.0%
34	Orlando fine sand, 0 to 5 percent slopes	A	2.8	0.0%
35	Paola sand, 0 to 5 percent slopes	A	24.8	0.1%
37	Ellzey sand	A/D	6.5	0.0%
38	Placid sand, frequently ponded, 0 to 2 percent slopes	A/D	143.7	0.5%
39	Seffner sand	A/D	26.3	0.1%
40	Placid and Myakka sands, depressional	A/D	813.9	3.1%
41	Pomello sand, 0 to 5 percent slopes	A	279.8	1.1%
42	Pompano sand	A/D	55.1	0.2%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
43	St. Lucie sand, 0 to 8 percent slopes	A	39.9	0.2%
44	Swamp		935.6	3.5%
45	Tavares sand, 0 to 5 percent slopes	A	623.9	2.4%
46	Orsino sand	A	19.4	0.1%
50	Borrow Pits		7.6	0.0%
99	Water		3,002.4	11.4%
Subtotals for Soil Survey Area			**18,620.7**	**70.4%**
Totals for Area of Interest			**26,438.6**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Arents, nearly level	A	1.0	0.0%
3	Basinger fine sand, frequently ponded, 0 to 1 percent slopes	A/D	681.0	2.6%
4	Candler fine sand, 0 to 5 percent slopes	A	2,946.5	11.1%
5	Candler fine sand, 5 to 12 percent slopes	A	2,163.5	8.2%
6	Candler-Apopka fine sands, 5 to 12 percent slopes	A	69.2	0.3%
20	Immokalee fine sand	B/D	199.8	0.8%
33	Pits		2.1	0.0%
34	Pomello fine sand, 0 to 5 percent slopes	A	113.6	0.4%
37	St. Johns fine sand	B/D	44.2	0.2%
41	Samsula-Hontoon-Basinger association, depressional	A/D	98.5	0.4%
42	Sanibel muck	A/D	91.8	0.3%
43	Seffner fine sand, 0 to 2 percent slopes	A/D	2.7	0.0%
44	Smyrna-Smyrna, wet, fine sand, 0 to 2 percent slopes	A/D	12.7	0.0%
46	Tavares fine sand, 0 to 5 percent slopes	A	202.0	0.8%
47	Tavares-Millhopper complex, 0 to 5 percent slopes	A	238.1	0.9%
99	Water		951.4	3.6%
Subtotals for Soil Survey Area			**7,818.0**	**29.6%**
Totals for Area of Interest			**26,438.6**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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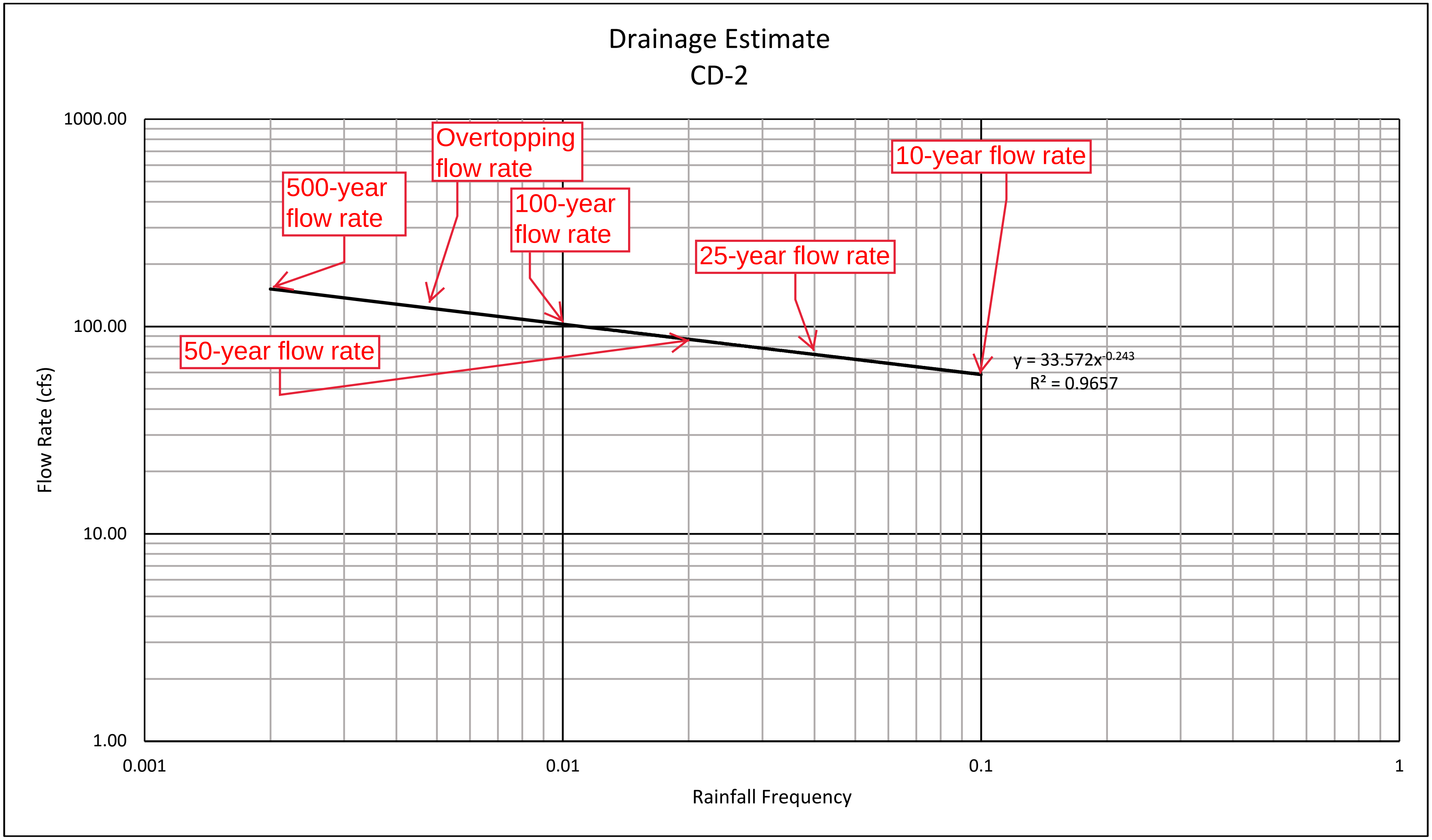
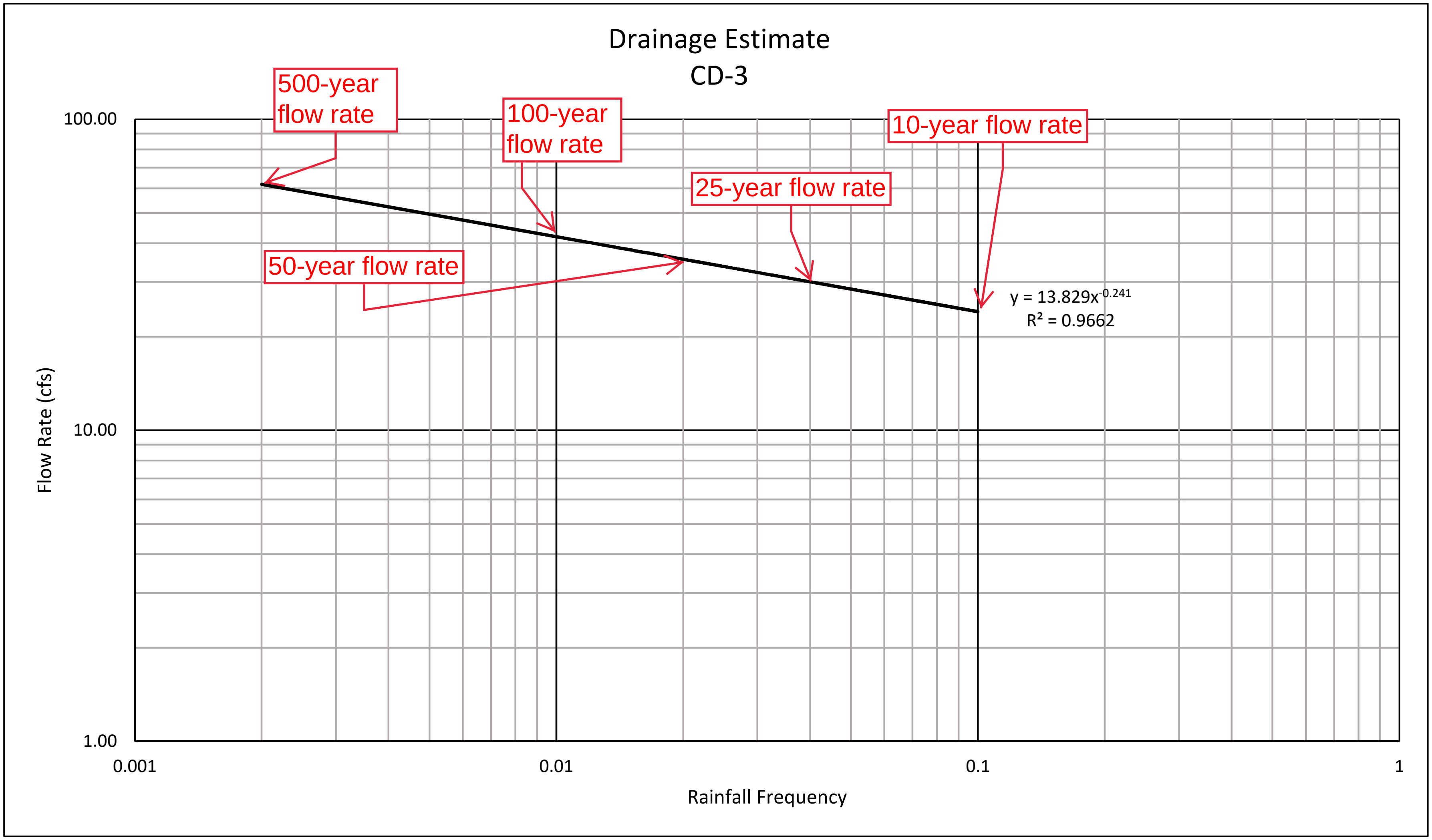
Appendix D – Cross Drain Rational Method Analysis



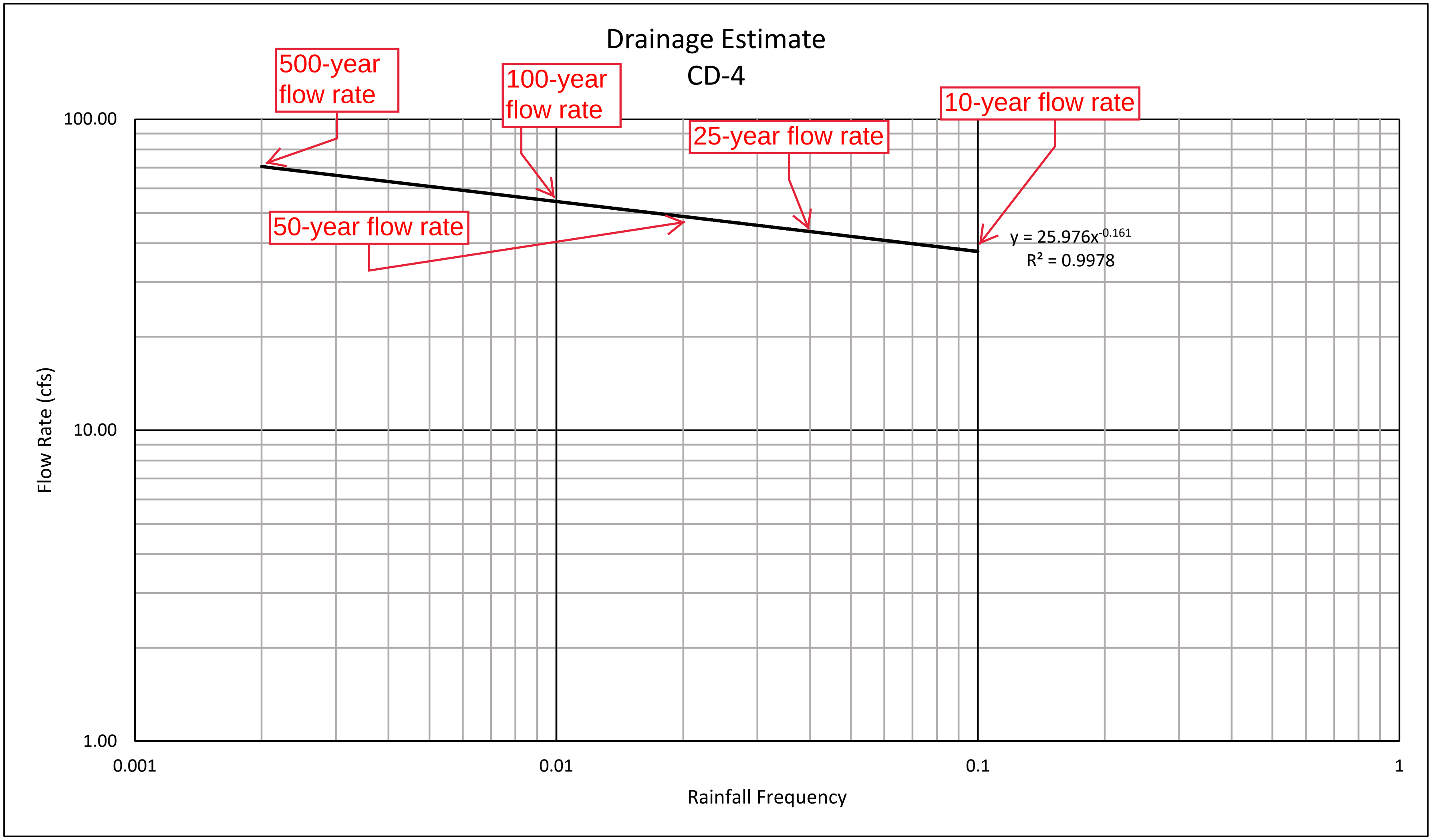
Flow Rate	Frequency
	0.1
72.00	0.04
90.00	0.02
100.80	0.01
129.28	0.003939
155.00	0.002

Overflow frequency calculated based on graph. (1/.003939 = 257 years)



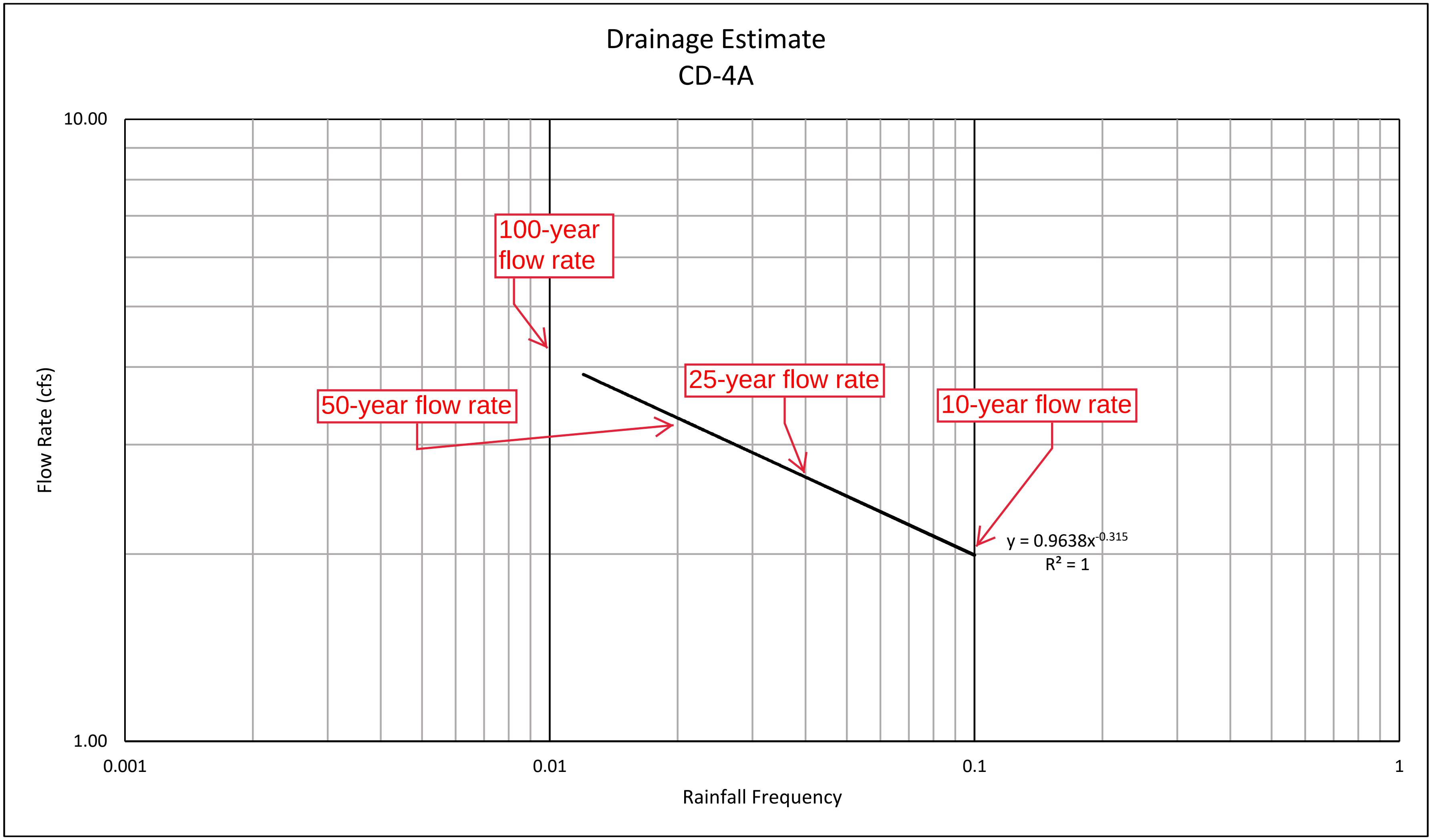
Flow Rate	Frequency
29.50	0.04
36.80	0.02
41.20	0.01
61.84	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 64.80 > 61.84)



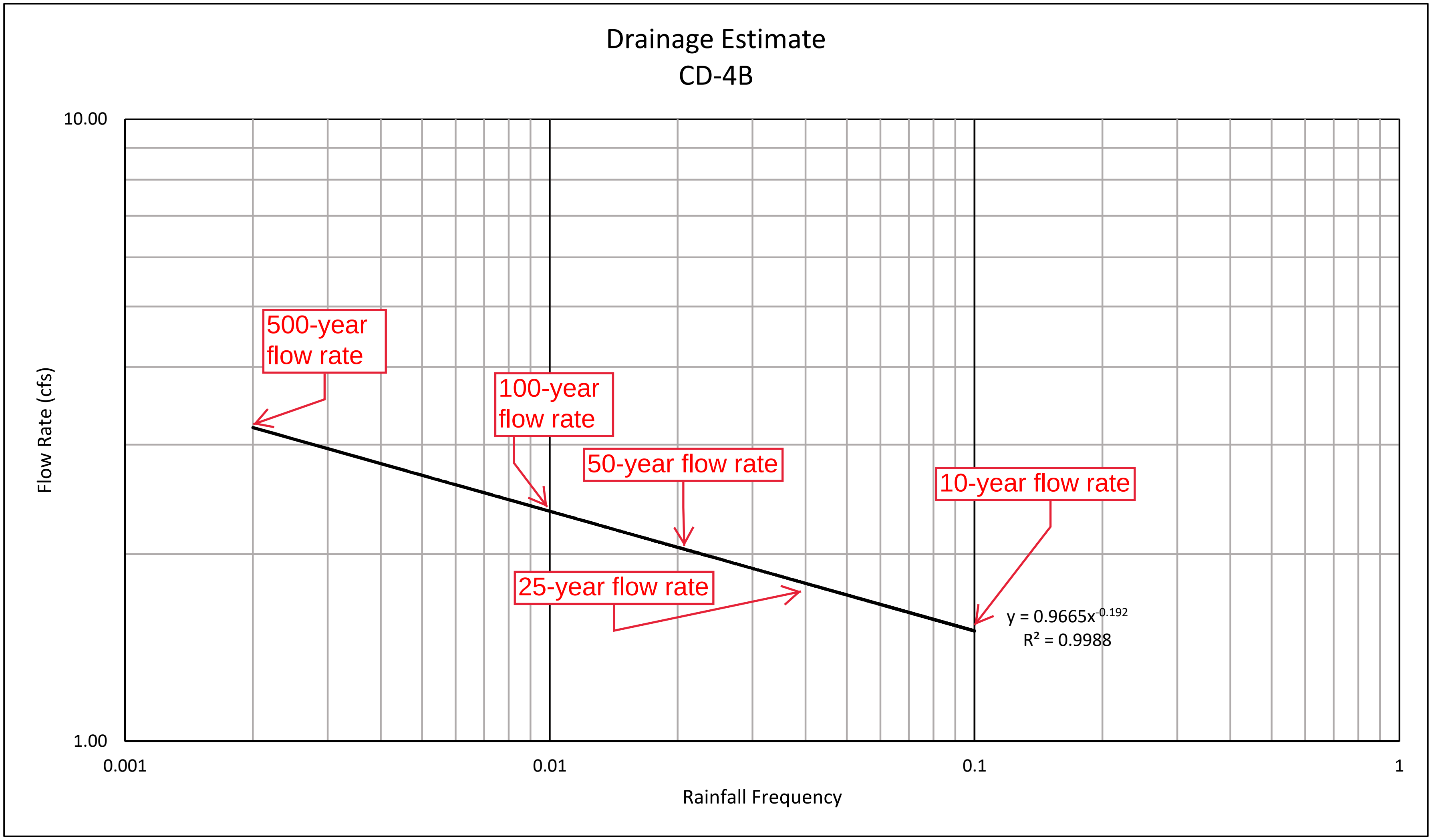
	0.1
43.71	0.04
48.42	0.02
54.62	0.01
70.65	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 86.07 > 70.65)



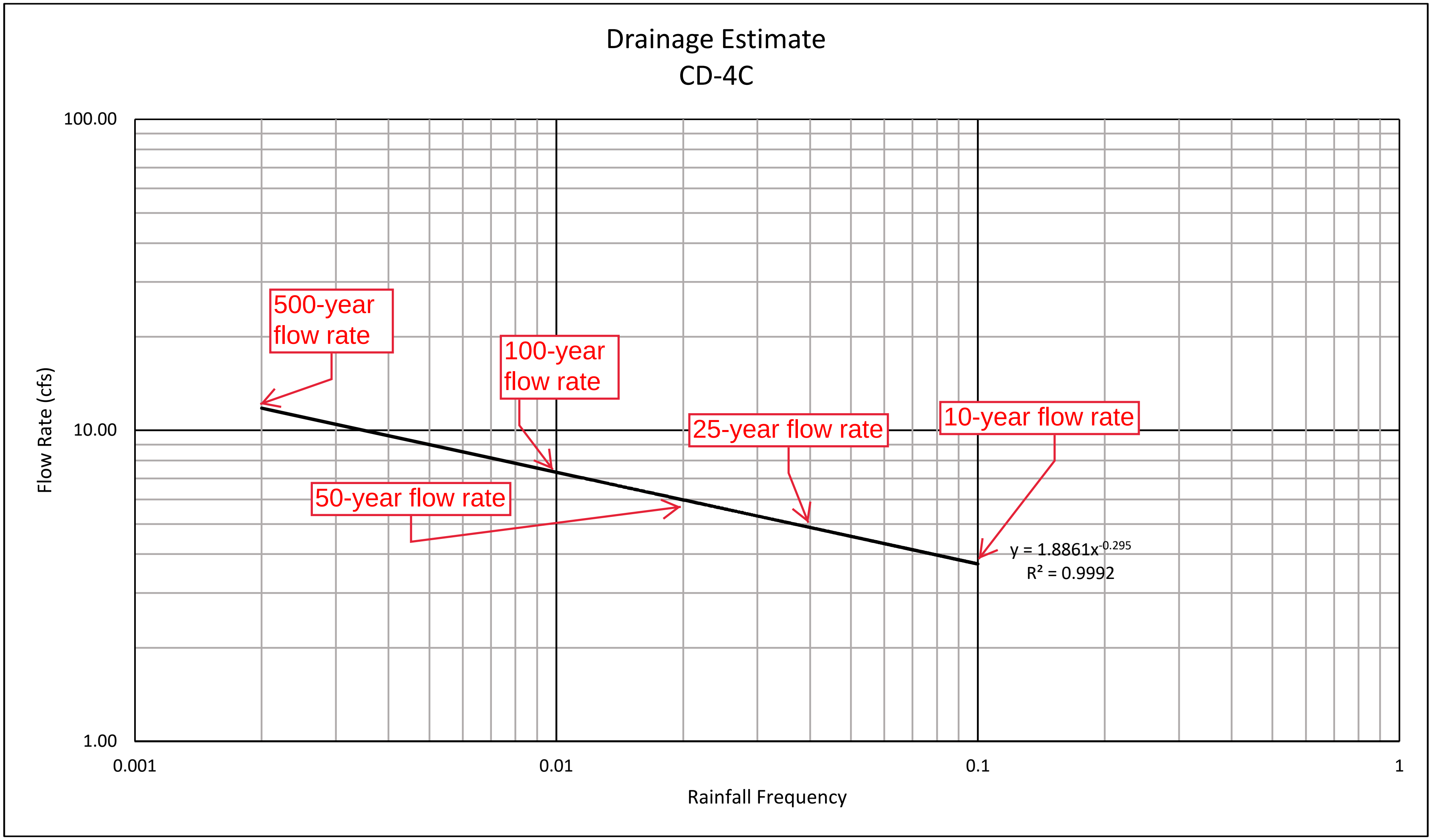
	0.1
2.66	0.04
3.31	0.02
4.15	0.01
6.83	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 28.74 > 6.83)



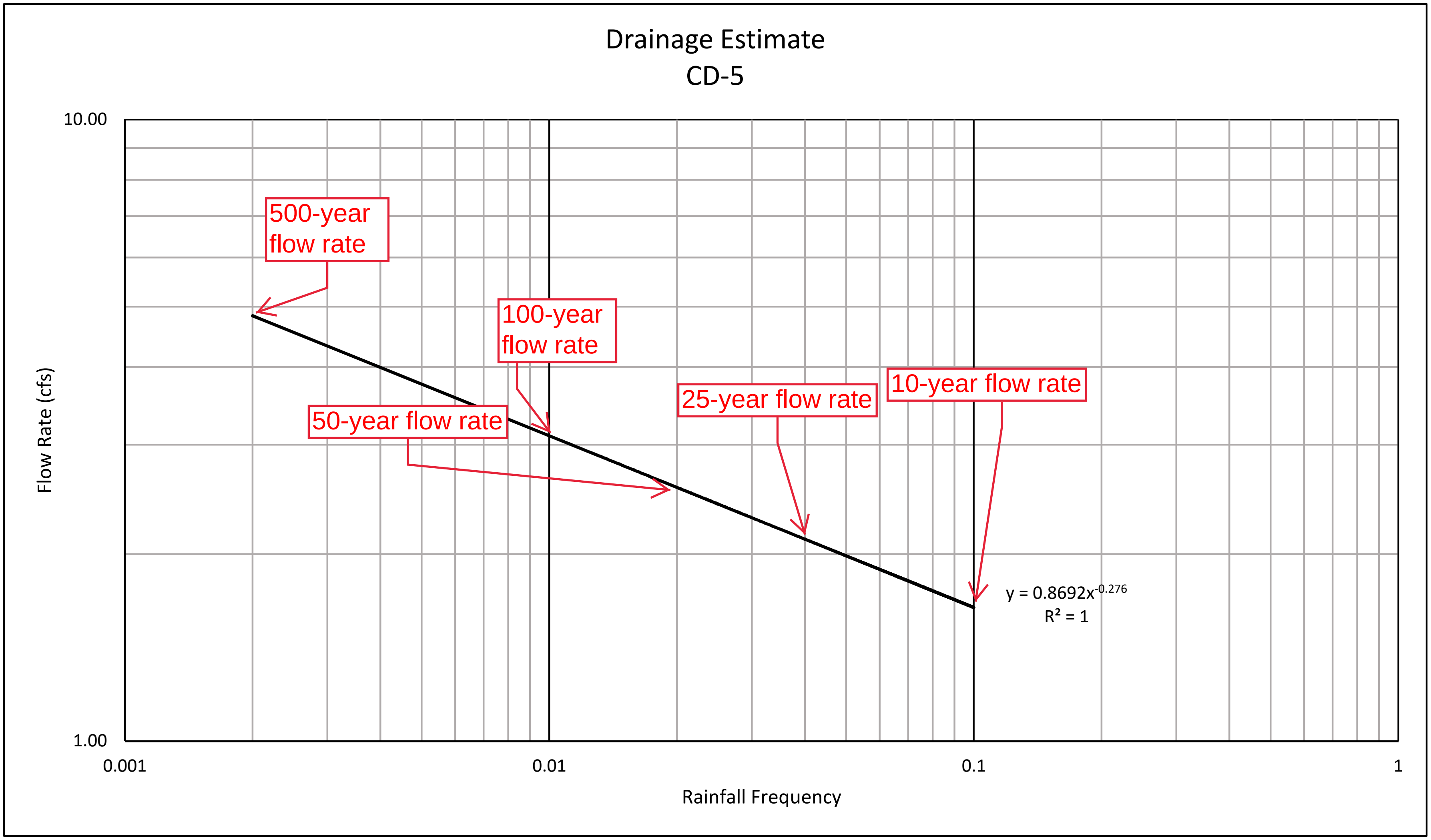
	0.1
1.80	0.04
2.04	0.02
2.35	0.01
3.29	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 40.74 > 3.29)



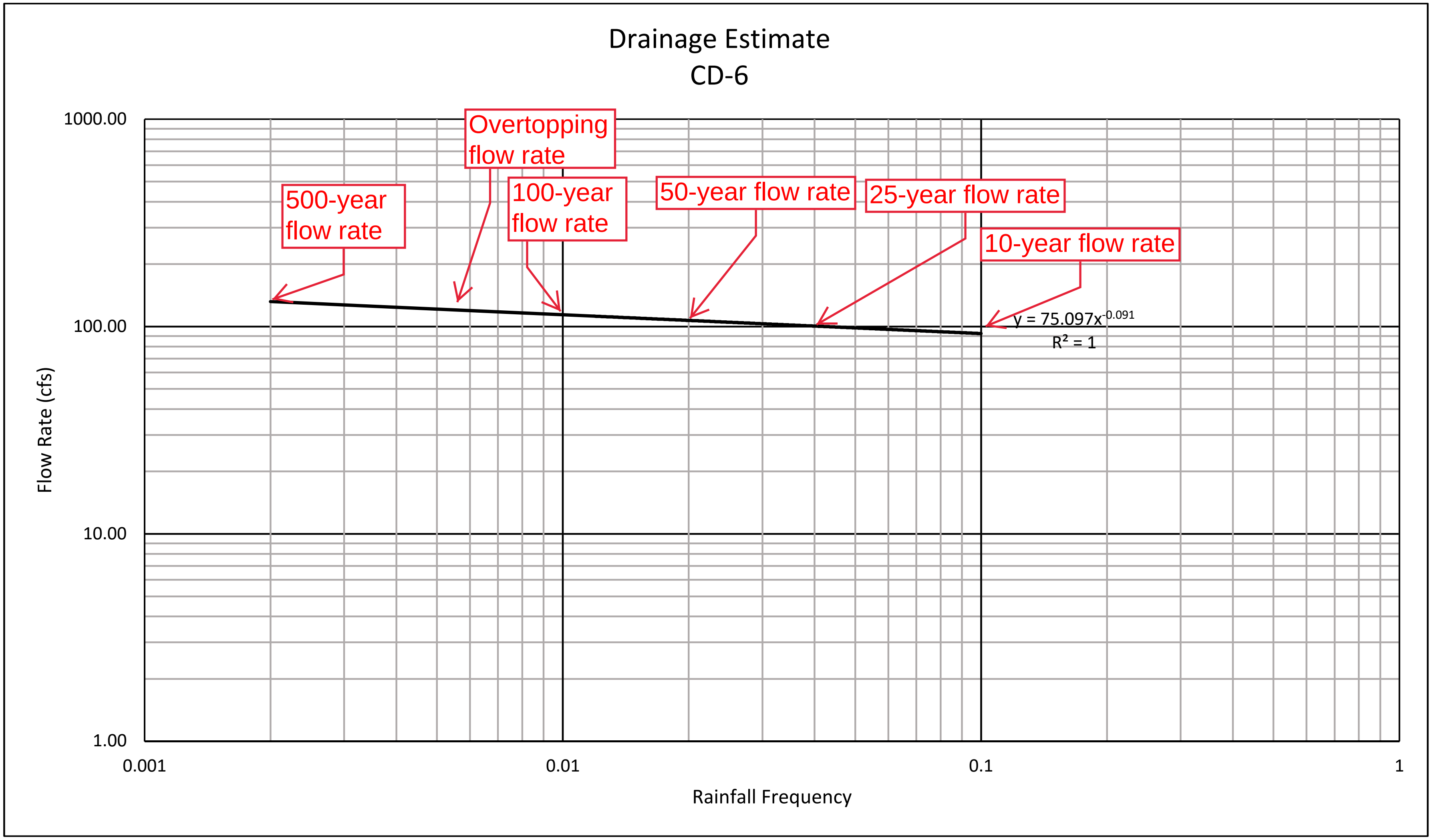
	0.1
4.89	0.04
5.94	0.02
7.36	0.01
11.80	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 37.23 > 11.80)



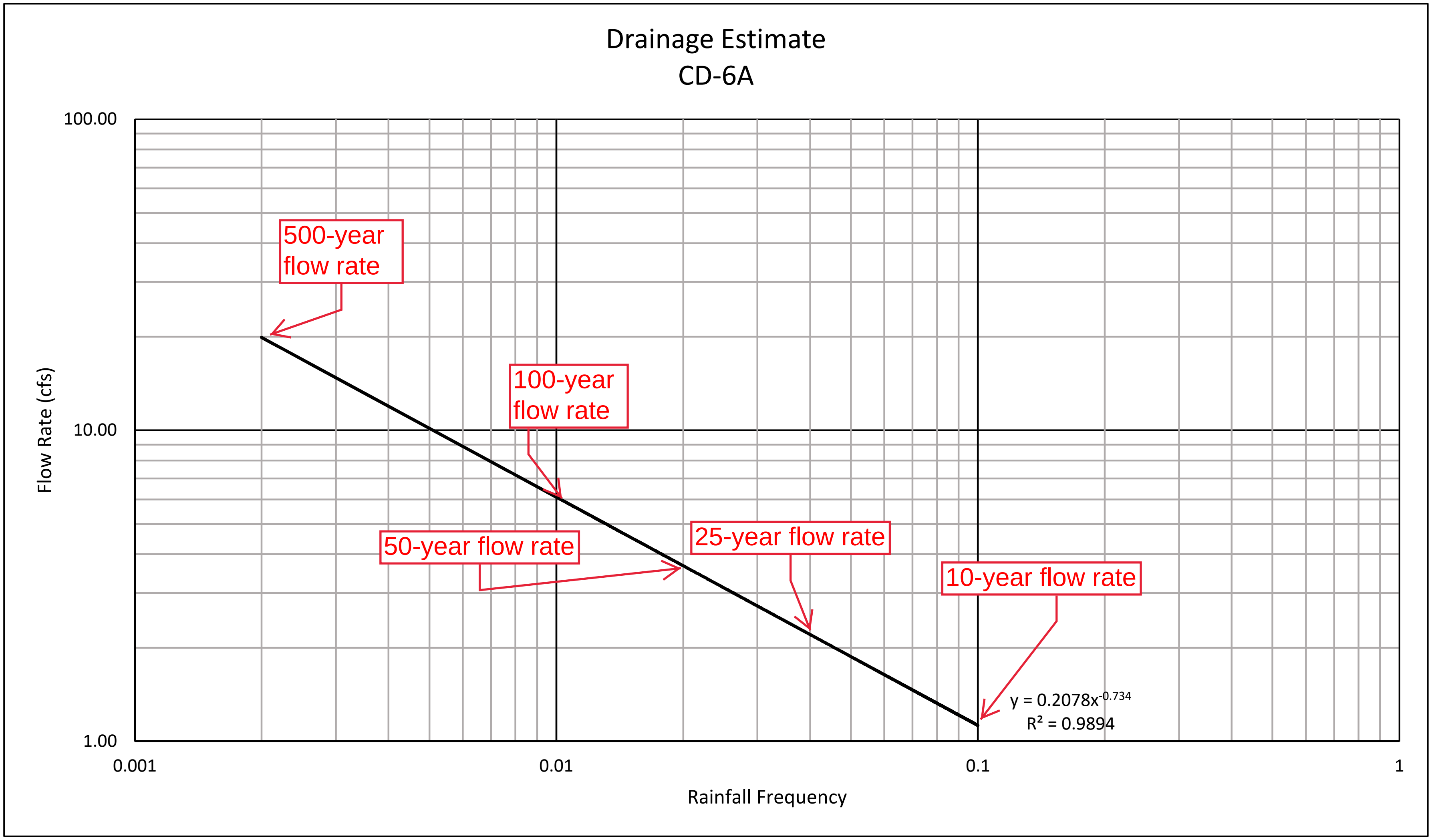
Flow Rate	Frequency
	0.1
	0.04
2.56	0.02
3.10	0.01
4.80	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 38.10 > 4.80)



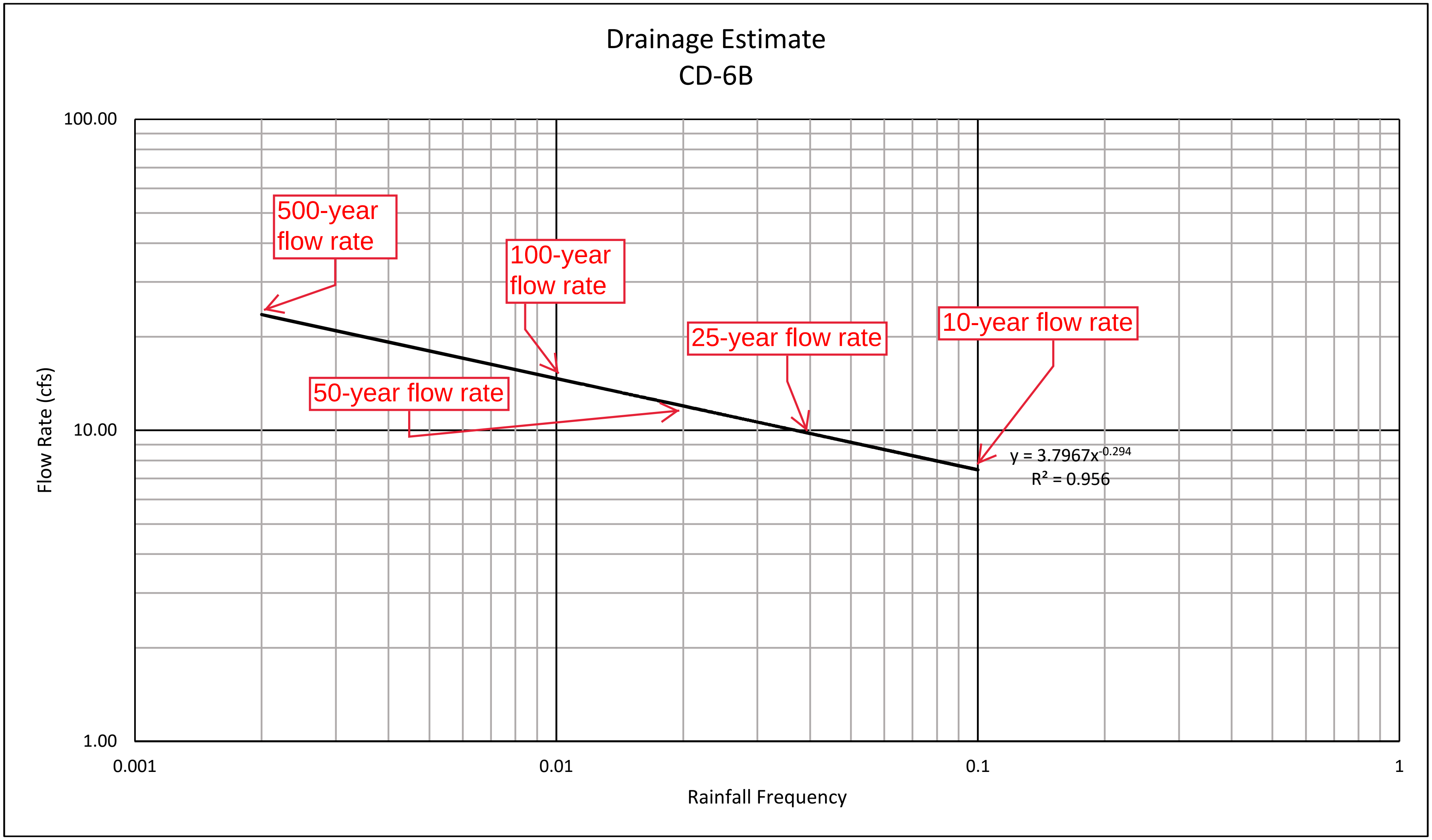
Flow Rate	Frequency
107.05	0.02
113.99	0.01
119.83	0.005886
132.20	0.002

Overflow frequency calculated based on graph. (1/.005886 = 170 years)



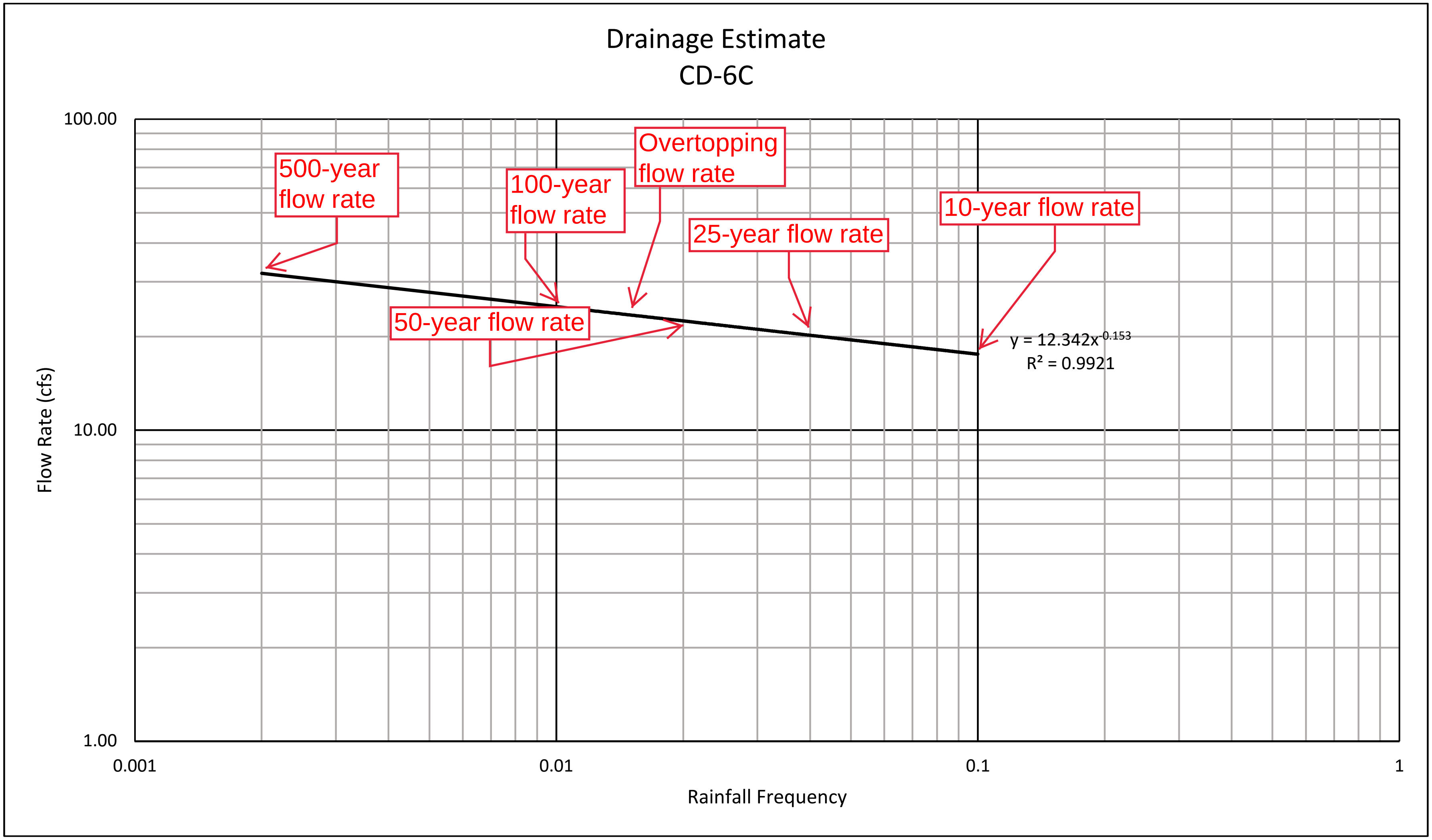
	0.1
2.14	0.04
3.90	0.02
5.92	0.01
19.89	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 24.34 > 19.89)



	0.1
9.53	0.04
12.60	0.02
14.32	0.01
23.60	0.002

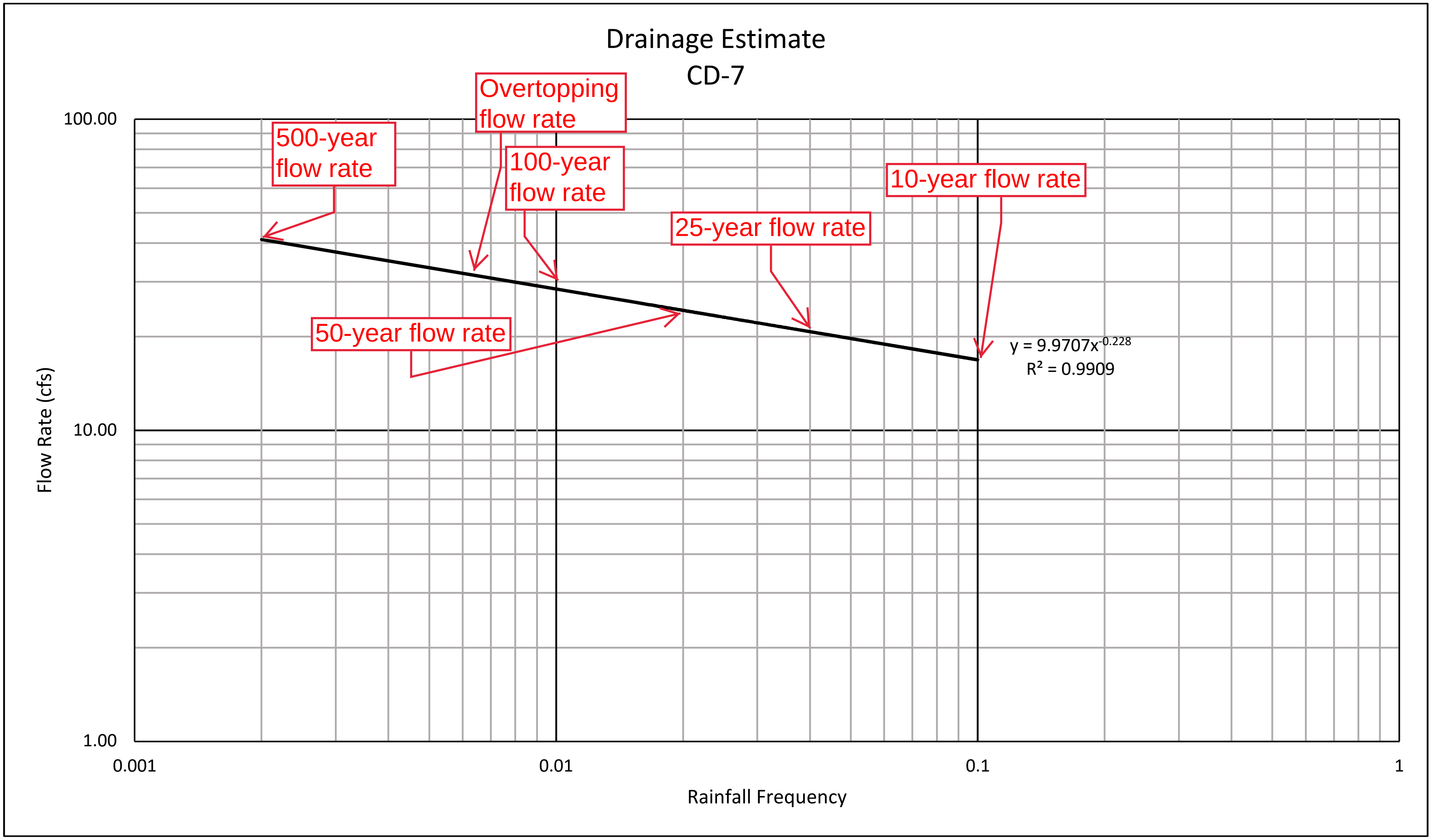
Overflow frequency is greater than 500 years. (Overflow discharge of 105.31 > 23.60)



	0.1
20.08	0.04
22.72	0.02
24.00	0.012991
24.82	0.01
31.96	0.002

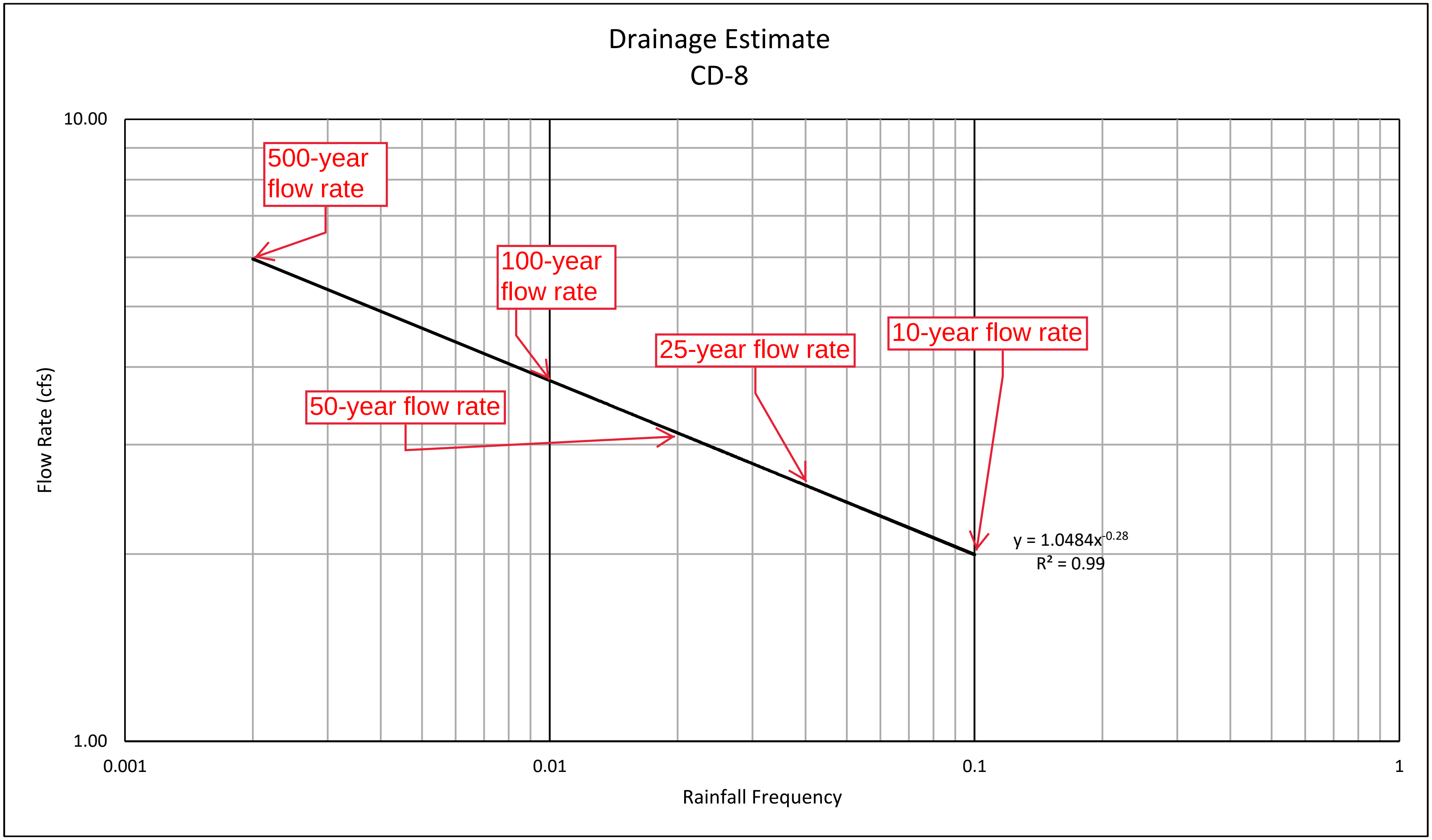
Overflow frequency calculated based on graph. (1/.012991 = 77 years)

CD-7 Rational Method					
Runoff Coefficient Calculations					
Land Use	Slope	Land Cover (%)	Runoff Coefficient	Area - A (acre)	Product
farmland	2-7%	79	0.25	9.80	2.45
woodlands	2-7%	21	0.2	2.60	0.52
			Total	12.40	2.97
			Composite Coefficient		0.24
Contributing Flow Rate for Various Storm Frequency					
Storm Frequency	Storm Frequency Factor	Rainfall Frequency	Intensity - I (in/hr)	Adjusted Runoff Coefficient - C	Runoff Rate (cfs) - Q
10-Year	1	0.1	5.6	0.24	16.63
25-Year	1.1	0.04	6.4	0.26	20.91
50-Year	1.2	0.02	7	0.29	24.95
100-Year	1.25	0.01	7.5	0.30	27.84
500-Year	-	0.002	-	-	41.12
Rational Formula					
$Q = CIA$					



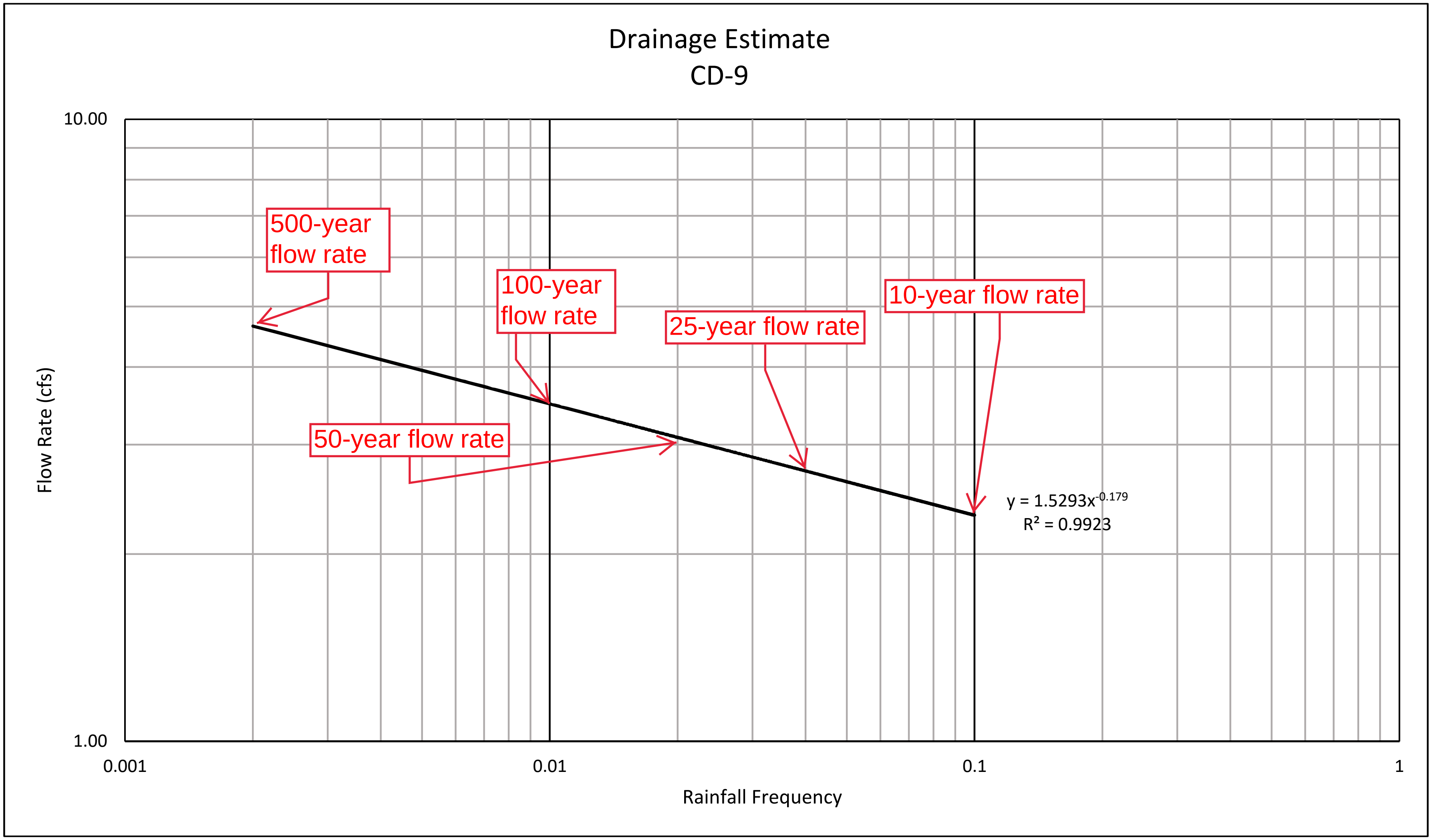
Flow Rate	Frequency
16.63	0.1
20.91	0.04
24.95	0.02
27.84	0.01
31.51	0.00643
41.12	0.002

Overflow frequency calculated based on graph. (1/.00643 = 155 years)



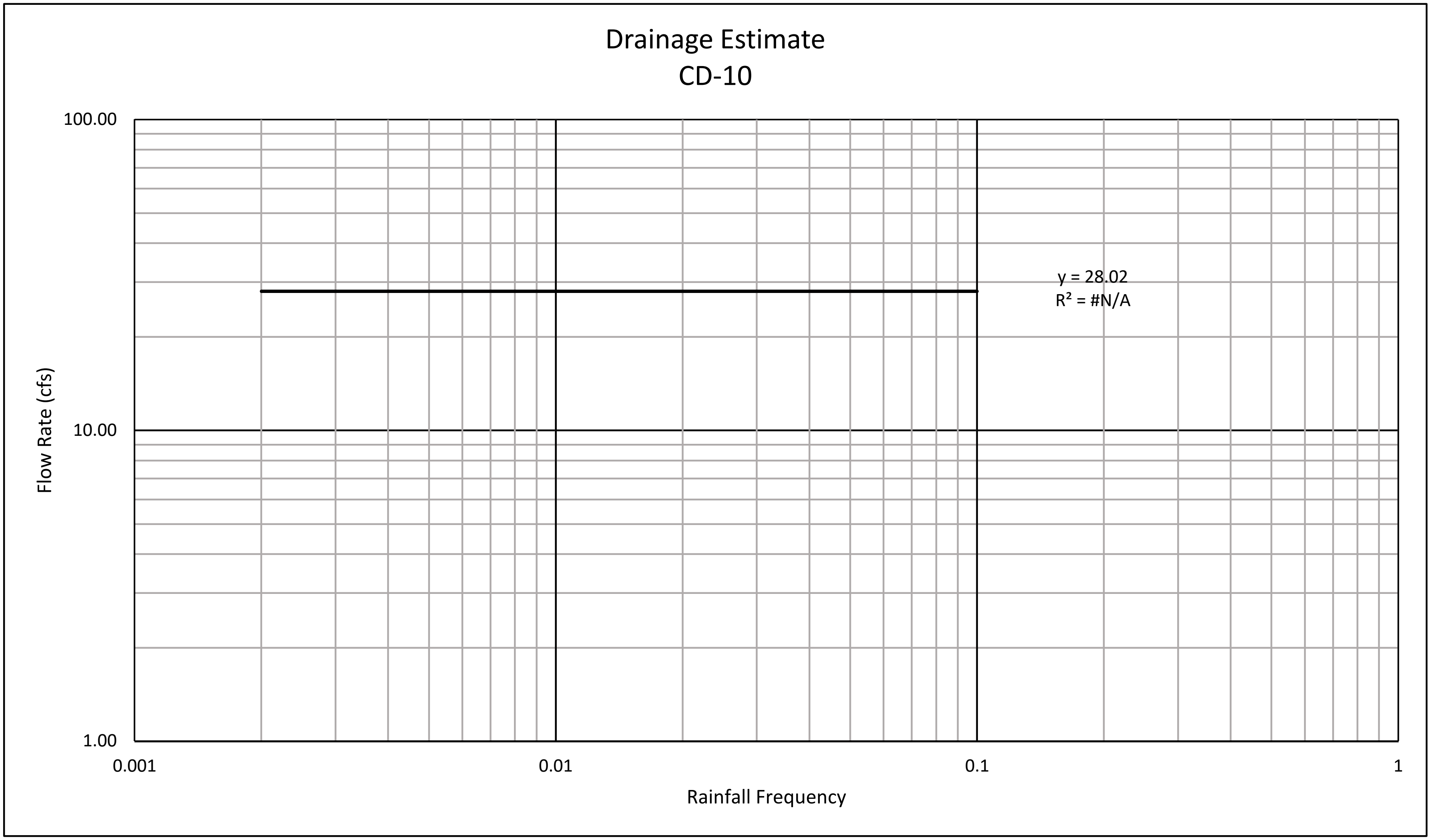
Flow Rate	Frequency
1.97	0.1
2.59	0.04
3.25	0.02
3.70	0.01
5.97	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 12.88 > 5.97)



Flow Rate	Frequency
2.30	0.1
2.71	0.04
3.15	0.02
3.44	0.01
4.65	0.002

Overflow frequency is greater than 500 years. (Overflow discharge of 23.75 > 4.65)



28.02	0.1
28.02	0.04
28.02	0.02
28.02	0.01
	0.002

Appendix E – HY-8 Analysis

HY-8 Culvert Analysis Report

CD-2
Pre-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01
(permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 72 cfs

Design Flow (50 year): 90 cfs

Maximum Flow (100 year): 100.8 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-2 Pre

Headwater Elevation (ft)	Total Discharge (cfs)	CD-2 Pre Discharge (cfs)	Roadway Discharge (cfs)	Iterations
111.80	72.00	72.00	0.00	1
111.90	74.88	74.88	0.00	1
112.05	77.76	77.76	0.00	1
112.22	80.64	80.64	0.00	1
112.38	83.52	83.52	0.00	1
112.53	86.40	86.40	0.00	1
112.69	89.28	89.28	0.00	1
112.74	90.00	90.00	0.00	1
113.02	95.04	95.04	0.00	1
113.19	97.92	97.92	0.00	1
113.35	100.80	100.80	0.00	1
115.29	132.47	132.47	0.00	Overtopping

Site Data - CD-2 Pre

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 108.00 ft

Outlet Station: 165.00 ft

Outlet Elevation: 107.85 ft

Number of Barrels: 1

Culvert Data Summary - CD-2 Pre

Barrel Shape: Concrete Box

Barrel Span: 4.00 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 Channel Data - CD-2 Pre

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 109.82 ft (From SJRWMD permit # 90260-2)

Roadway Data for Crossing: CD-2 Pre

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 115.29 ft

Roadway Surface: Paved

Roadway Top Width: 114.00 ft

CD-2
Post-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 72 cfs

Design Flow (50 year): 90 cfs

Maximum Flow (100 year): 100.8 cfs

Table 2 - Summary of Culvert Flows at Crossing: CD-2 Post

Headwater Elevation (ft)	Total Discharge (cfs)	CD-2 Post Discharge (cfs)	Roadway Discharge (cfs)	Iterations
111.82	72.00	72.00	0.00	1
111.96	74.88	74.88	0.00	1
112.12	77.76	77.76	0.00	1
112.29	80.64	80.64	0.00	1
112.45	83.52	83.52	0.00	1
112.62	86.40	86.40	0.00	1
112.78	89.28	89.28	0.00	1
112.83	90.00	90.00	0.00	1
113.13	95.04	95.04	0.00	1
113.30	97.92	97.92	0.00	1
113.48	100.80	100.80	0.00	1
115.29	129.28	129.28	0.00	Overtopping

Site Data - CD-2 Post

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 108.00 ft

Outlet Station: 190.00 ft

Outlet Elevation: 107.83 ft

Number of Barrels: 1

Culvert Data Summary - CD-2 Post

Barrel Shape: Concrete Box

Barrel Span: 4.00 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 Channel Data - CD-2 Post

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 109.82 ft (From SJRWMD permit # 90260-2)

Roadway Data for Crossing: CD-2 Post

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 200.00 ft

Crest Elevation: 115.29 ft

Roadway Surface: Paved

Roadway Top Width: 114.00 ft

CD-3
Pre-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 29.5 cfs

Design Flow (50 year): 36.8 cfs

Maximum Flow (100 year): 41.2 cfs

Table 3 - Summary of Culvert Flows at Crossing: CD-3 Pre

Headwater Elevation (ft)	Total Discharge (cfs)	CD-3 Pre Discharge (cfs)	Roadway Discharge (cfs)	Iterations
110.37	29.50	29.50	0.00	1
110.48	30.67	30.67	0.00	1
110.60	31.84	31.84	0.00	1
110.75	33.01	33.01	0.00	1
110.95	34.18	34.18	0.00	1
111.13	35.35	35.35	0.00	1
111.32	36.52	36.52	0.00	1
111.36	36.80	36.80	0.00	1
111.70	38.86	38.86	0.00	1
111.90	40.03	40.03	0.00	1
112.10	41.20	41.20	0.00	1
117.00	64.61	64.61	0.00	Overtopping

Site Data - CD-3 Pre

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 107.20 ft

Outlet Station: 190.00 ft

Outlet Elevation: 106.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-3 Pre

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 Channel Data - CD-3 Pre

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 107.74 ft (From SJRWMD permit # 90260-2)

Roadway Data for Crossing: CD-3 Pre

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 400.00 ft

Crest Elevation: 117.00 ft

Roadway Surface: Paved

Roadway Top Width: 114.00 ft

CD-3
Post-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 29.5 cfs

Design Flow (50 year): 36.8 cfs

Maximum Flow (100 year): 41.2 cfs

Table 4 - Summary of Culvert Flows at Crossing: CD-3 Post

Headwater Elevation (ft)	Total Discharge (cfs)	CD-3 Post Discharge (cfs)	Roadway Discharge (cfs)	Iterations
110.50	29.50	29.50	0.00	1
110.60	30.67	30.67	0.00	1
110.70	31.84	31.84	0.00	1
110.83	33.01	33.01	0.00	1
111.00	34.18	34.18	0.00	1
111.19	35.35	35.35	0.00	1
111.39	36.52	36.52	0.00	1
111.44	36.80	36.80	0.00	1
111.78	38.86	38.86	0.00	1
111.98	40.03	40.03	0.00	1
112.19	41.20	41.20	0.00	1
117.00	64.80	64.80	0.00	Overtopping

Site Data - CD-3 Post

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 107.35 ft

Outlet Station: 195.00 ft

Outlet Elevation: 106.55 ft

Number of Barrels: 1

Culvert Data Summary - CD-3 Post

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 Channel Data - CD-3 Post

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 107.74 ft (From Permit # 90260-2)

Roadway Data for Crossing: CD-3 Post

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 400.00 ft

Crest Elevation: 117.00 ft

Roadway Surface: Paved

Roadway Top Width: 102.00 ft

CD-4
Pre-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 60 cfs

Design Flow (50 year): 75 cfs

Maximum Flow (100 year): 84 cfs

Table 5 - Summary of Culvert Flows at Crossing: CD-4 Pre

Headwater Elevation (ft)	Total Discharge (cfs)	CD-4 Pre Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.91	60.00	60.00	0.00	1
107.02	62.40	62.40	0.00	1
107.19	64.80	64.80	0.00	1
107.36	67.20	67.20	0.00	1
107.52	69.60	69.60	0.00	1
107.68	72.00	72.00	0.00	1
107.85	74.40	74.40	0.00	1
107.89	75.00	75.00	0.00	1
108.17	79.20	79.20	0.00	1
108.33	81.60	81.60	0.00	1
108.49	84.00	84.00	0.00	1
110.37	107.74	107.74	0.00	Overtopping

Site Data - CD-4 Pre

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 103.90 ft

Outlet Station: 177.00 ft

Outlet Elevation: 103.58 ft

Number of Barrels: 1

Culvert Data Summary - CD-4 Pre

Barrel Shape: Concrete Box

Barrel Span: 5.00 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 Channel Data - CD-4 Pre

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 105.43 ft (From SJRWMD permit # 90260-2)

Roadway Data for Crossing: CD-4 Pre

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 110.37 ft

Roadway Surface: Paved

Roadway Top Width: 114.00 ft

CD-4
Post-Development

Note: Data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 43.71 cfs

Design Flow (50 year): 48.42 cfs

Maximum Flow (100 year): 54.62 cfs

Table 6 - Summary of Culvert Flows at Crossing: CD-4 Post

Headwater Elevation (ft)	Total Discharge (cfs)	CD-4 Post Discharge (cfs)	Roadway Discharge (cfs)	Iterations
107.59	43.71	43.71	0.00	1
107.67	44.80	44.80	0.00	1
107.75	45.89	45.89	0.00	1
107.84	46.98	46.98	0.00	1
107.93	48.07	48.07	0.00	1
107.95	48.42	48.42	0.00	1
108.10	50.26	50.26	0.00	1
108.20	51.35	51.35	0.00	1
108.29	52.44	52.44	0.00	1
108.38	53.53	53.53	0.00	1
108.48	54.62	54.62	0.00	1
110.37	86.07	86.07	0.00	Overtopping

Site Data - CD-4 Post

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 103.78 ft

Outlet Station: 192.00 ft

Outlet Elevation: 103.43 ft

Number of Barrels: 1

Culvert Data Summary - CD-4 Post

Barrel Shape: Concrete Box

Barrel Span: 5.00 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

Downstream Channel Rating Curve (Crossing: CD-4 Post)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
43.71	106.77	106.77	0.00
48.42	106.95	106.95	0.00
54.62	107.20	107.20	0.00

Tailwater Channel Data - CD-4 Post

Tailwater Channel Option: Enter Rating Curve (Based on ICPR Stages in Pond 1A1)

Channel Invert Elevation: 103.43 ft

Roadway Data for Crossing: CD-4 Post

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 110.37 ft

Roadway Surface: Paved

Roadway Top Width: 102.00 ft

CD-4A

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 2.66 cfs

Design Flow (50 year): 3.31 cfs

Maximum Flow (100 year): 4.15 cfs

Table 7 - Summary of Culvert Flows at Crossing: CD-4A

Headwater Elevation (ft)	Total Discharge (cfs)	CD-4A Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.60	2.66	2.66	0.00	1
106.63	2.81	2.81	0.00	1
106.66	2.96	2.96	0.00	1
106.69	3.11	3.11	0.00	1
106.72	3.26	3.26	0.00	1
106.73	3.31	3.31	0.00	1
106.78	3.55	3.55	0.00	1
106.81	3.70	3.70	0.00	1
106.84	3.85	3.85	0.00	1
106.87	4.00	4.00	0.00	1
106.89	4.15	4.15	0.00	1
119.50	28.74	28.74	0.00	Overtopping

Site Data - CD-4A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.60 ft

Outlet Station: 100.00 ft

Outlet Elevation: 105.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-4A

Barrel Shape: Circular

Barrel Diameter: 1.50 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

Downstream Channel Rating Curve (Crossing: CD-4A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
2.66	105.50	105.50	0.00
3.31	105.50	105.50	0.00
4.15	105.68	105.68	0.00

Tailwater Channel Data - CD-4A

Tailwater Channel Option: Enter Rating Curve (Based on ICPR Elevations in Lake)

Channel Invert Elevation: 105.50 ft

Roadway Data for Crossing: CD-4A

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 650.00 ft

Crest Elevation: 119.50 ft

Roadway Surface: Paved

Roadway Top Width: 21.00 ft

CD-4B

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 1.8 cfs

Design Flow (50 year): 2.04 cfs

Maximum Flow (100 year): 2.35 cfs

Table 8 - Summary of Culvert Flows at Crossing: CD-4B

Headwater Elevation (ft)	Total Discharge (cfs)	CD-4B Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.84	1.80	1.80	0.00	1
106.88	1.86	1.86	0.00	1
106.92	1.91	1.91	0.00	1
106.96	1.97	1.97	0.00	1
107.01	2.02	2.02	0.00	1
107.02	2.04	2.04	0.00	1
107.11	2.13	2.13	0.00	1
107.16	2.19	2.19	0.00	1
107.21	2.24	2.24	0.00	1
107.26	2.29	2.29	0.00	1
107.30	2.35	2.35	0.00	1
138.70	40.74	40.74	0.00	Overtopping

Site Data - CD-4B

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.60 ft

Outlet Station: 150.00 ft

Outlet Elevation: 105.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-4B

Barrel Shape: Circular

Barrel Diameter: 1.50 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

Downstream Channel Rating Curve (Crossing: CD-4B)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
1.80	106.77	106.77	0.00
2.04	106.95	106.95	0.00
2.35	107.20	107.20	0.00

Tailwater Channel Data - CD-4B

Tailwater Channel Option: Enter Rating Curve (Based on ICPR Elevations in Pond 1A1)

Channel Invert Elevation: 105.50 ft

Roadway Data for Crossing: CD-4B

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 138.70 ft

Roadway Surface: Paved

Roadway Top Width: 21.00 ft

CD-4C

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County and data from plans and permit for FPID No. 238422-1-52-01 (permit # 90260-2)

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 4.89 cfs

Design Flow (50 year): 5.94 cfs

Maximum Flow (100 year): 7.36 cfs

Table 9 - Summary of Culvert Flows at Crossing: CD-4C

Headwater Elevation (ft)	Total Discharge (cfs)	CD-4C Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.77	4.89	4.89	0.00	1
106.81	5.14	5.14	0.00	1
106.85	5.38	5.38	0.00	1
106.89	5.63	5.63	0.00	1
106.93	5.88	5.88	0.00	1
106.94	5.94	5.94	0.00	1
107.02	6.37	6.37	0.00	1
107.06	6.62	6.62	0.00	1
107.10	6.87	6.87	0.00	1
107.15	7.11	7.11	0.00	1
107.19	7.36	7.36	0.00	1
125.95	37.23	37.23	0.00	Overtopping

Site Data - CD-4C

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.50 ft

Outlet Station: 95.00 ft

Outlet Elevation: 104.00 ft

Number of Barrels: 1

Culvert Data Summary - CD-4C

Barrel Shape: Circular

Barrel Diameter: 1.50 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 Channel Data - CD-4C

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 105.43 ft (Based on Existing Permit for CD-4)

Roadway Data for Crossing: CD-4C

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 600.00 ft

Crest Elevation: 125.95 ft

Roadway Surface: Paved

Roadway Top Width: 23.00 ft

CD-5
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 0.07 cfs

Design Flow (50 year): 2.56 cfs

Maximum Flow (100 year): 3.1 cfs

Table 10 - Summary of Culvert Flows at Crossing: CD-5

Headwater Elevation (ft)	Total Discharge (cfs)	CD-5 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.40	0.07	0.07	0.00	1
106.40	0.37	0.37	0.00	1
106.40	0.68	0.68	0.00	1
106.41	0.98	0.98	0.00	1
106.41	1.28	1.28	0.00	1
106.42	1.59	1.59	0.00	1
106.43	1.89	1.89	0.00	1
106.43	2.19	2.19	0.00	1
106.44	2.49	2.49	0.00	1
106.45	2.56	2.56	0.00	1
106.47	3.10	3.10	0.00	1
116.63	38.10	38.10	0.00	Overtopping

Site Data - CD-5

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.00 ft

Outlet Station: 270.00 ft

Outlet Elevation: 103.00 ft

Number of Barrels: 2

Culvert Data Summary - CD-5

Barrel Shape: Circular

Barrel Diameter: 1.50 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 Channel Data - CD-5

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 106.40 ft (Floodplain Elevation)

Roadway Data for Crossing: CD-5

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1400.00 ft

Crest Elevation: 116.63 ft

Roadway Surface: Paved

Roadway Top Width: 197.10 ft

CD-6
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 99.48 cfs

Design Flow (50 year): 107.05 cfs

Maximum Flow (100 year): 113.99 cfs

Table 11 - Summary of Culvert Flows at Crossing: CD-6

Headwater Elevation (ft)	Total Discharge (cfs)	CD-6 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
109.55	99.48	99.48	0.00	1
109.67	100.93	100.93	0.00	1
109.80	102.38	102.38	0.00	1
109.93	103.83	103.83	0.00	1
110.06	105.28	105.28	0.00	1
110.19	106.74	106.74	0.00	1
110.22	107.05	107.05	0.00	1
110.46	109.64	109.64	0.00	1
110.60	111.09	111.09	0.00	1
110.74	112.54	112.54	0.00	1
110.89	113.99	113.99	0.00	1
111.48	119.83	119.83	0.00	Overtopping

Site Data - CD-6

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 103.00 ft

Outlet Station: 160.00 ft

Outlet Elevation: 102.00 ft

Number of Barrels: 1

Culvert Data Summary - CD-6

Barrel Shape: Circular

Barrel Diameter: 3.50 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 Channel Data - CD-6

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 105.50 ft (Crown of Pipe)

Roadway Data for Crossing: CD-6

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 800.00 ft

Crest Elevation: 111.48 ft

Roadway Surface: Paved

Roadway Top Width: 84.25 ft

CD-6A

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 2.14 cfs

Design Flow (50 year): 3.9 cfs

Maximum Flow (100 year): 5.92 cfs

Table 12 - Summary of Culvert Flows at Crossing: CD-6A

Headwater Elevation (ft)	Total Discharge (cfs)	CD-6A Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.48	2.14	2.14	0.00	1
106.55	2.52	2.52	0.00	1
106.61	2.90	2.90	0.00	1
106.68	3.27	3.27	0.00	1
106.75	3.65	3.65	0.00	1
106.79	3.90	3.90	0.00	1
106.88	4.41	4.41	0.00	1
106.95	4.79	4.79	0.00	1
107.03	5.16	5.16	0.00	1
107.10	5.54	5.54	0.00	1
107.18	5.92	5.92	0.00	1
109.88	24.34	24.34	0.00	Overtopping

Site Data - CD-6A

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.00 ft

Outlet Station: 150.00 ft

Outlet Elevation: 104.90 ft

Number of Barrels: 1

Culvert Data Summary - CD-6A

Barrel Shape: Circular

Barrel Diameter: 2.00 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

Downstream Channel Rating Curve (Crossing: CD-6A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
2.14	106.45	106.45	0.00
3.90	106.72	106.72	0.00
5.92	107.01	107.01	0.00

Tailwater Channel Data - CD-6A

Tailwater Channel Option: Enter Rating Curve (Based on ICPR elevations in Pond 3A1)

Channel Invert Elevation: 103.00 ft

Roadway Data for Crossing: CD-6A

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 600.00 ft

Crest Elevation: 109.88 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

CD-6B

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 9.53 cfs

Design Flow (50 year): 12.6 cfs

Maximum Flow (100 year): 14.32 cfs

Table 13 - Summary of Culvert Flows at Crossing: CD-6B

Headwater Elevation (ft)	Total Discharge (cfs)	CD-6B Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.65	9.53	9.53	0.00	1
106.71	10.01	10.01	0.00	1
106.76	10.49	10.49	0.00	1
106.82	10.97	10.97	0.00	1
106.88	11.45	11.45	0.00	1
106.94	11.93	11.93	0.00	1
107.00	12.40	12.40	0.00	1
107.02	12.60	12.60	0.00	1
107.16	13.36	13.36	0.00	1
107.26	13.84	13.84	0.00	1
107.37	14.32	14.32	0.00	1
137.27	105.31	105.31	0.00	Overtopping

Site Data - CD-6B

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.00 ft

Outlet Station: 350.00 ft

Outlet Elevation: 104.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-6B

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

Downstream Channel Rating Curve (Crossing: CD-6B)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
9.53	105.97	105.97	0.00
12.60	106.42	106.42	0.00
14.32	106.82	106.82	0.00

Tailwater Channel Data - CD-6B

Tailwater Channel Option: Enter Rating Curve (Based on ICPR Elevations in Pond 3A2)

Channel Invert Elevation: 103.00 ft

Roadway Data for Crossing: CD-6B

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1800.00 ft

Crest Elevation: 137.27 ft

Roadway Surface: Paved

Roadway Top Width: 30.00 ft

CD-6C

Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 20.08 cfs

Design Flow (50 year): 22.72 cfs

Maximum Flow (100 year): 24.82 cfs

Table 4 - Summary of Culvert Flows at Crossing: CD-6C

Headwater Elevation (ft)	Total Discharge (cfs)	CD-6C Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.72	20.08	20.08	0.00	1
106.81	20.55	20.55	0.00	1
106.90	21.03	21.03	0.00	1
106.99	21.50	21.50	0.00	1
107.08	21.98	21.98	0.00	1
107.17	22.45	22.45	0.00	1
107.23	22.72	22.72	0.00	1
107.37	23.40	23.40	0.00	1
107.47	23.87	23.87	0.00	1
107.50	24.35	24.01	0.15	26
107.51	24.82	24.03	0.59	4
107.50	24.00	24.00	0.00	Overtopping

Site Data - CD-6C

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 103.00 ft

Outlet Station: 130.00 ft

Outlet Elevation: 102.90 ft

Number of Barrels: 1

Culvert Data Summary - CD-6C

Barrel Shape: Circular

Barrel Diameter: 2.00 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 Channel Data - CD-6C

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 104.90 ft (Crown of Pipe)

Roadway Data for Crossing: CD-6C

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 107.50 ft

Roadway Surface: Paved

Roadway Top Width: 21.00 ft

CD-7
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 20.91 cfs

Design Flow (50 year): 24.95 cfs

Maximum Flow (100 year): 27.84 cfs

Table 15 - Summary of Culvert Flows at Crossing: CD-7

Headwater Elevation (ft)	Total Discharge (cfs)	CD-7 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
111.77	20.91	20.91	0.00	1
111.83	21.60	21.60	0.00	1
111.88	22.30	22.30	0.00	1
111.94	22.99	22.99	0.00	1
111.99	23.68	23.68	0.00	1
112.05	24.38	24.38	0.00	1
112.10	24.95	24.95	0.00	1
112.18	25.76	25.76	0.00	1
112.24	26.45	26.45	0.00	1
112.31	27.15	27.15	0.00	1
112.37	27.84	27.84	0.00	1
112.76	31.51	31.51	0.00	Overtopping

Site Data - CD-7

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 109.00 ft

Outlet Station: 160.00 ft

Outlet Elevation: 108.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-7

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 Channel Data - CD-7

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 111.00 ft (Crown of pipe)

Roadway Data for Crossing: CD-7

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 800.00 ft

Crest Elevation: 112.76 ft

Roadway Surface: Paved

Roadway Top Width: 82.50 ft

CD-8
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: (25 year) 2.59 cfs

Design Flow: (50 year) 3.25 cfs

Maximum Flow: (100 year) 3.7 cfs

Table 16 - Summary of Culvert Flows at Crossing: CD-8

Headwater Elevation (ft)	Total Discharge (cfs)	CD-8 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.20	2.59	2.59	0.00	1
106.22	2.70	2.70	0.00	1
106.24	2.81	2.81	0.00	1
106.25	2.92	2.92	0.00	1
106.27	3.03	3.03	0.00	1
106.29	3.15	3.15	0.00	1
106.31	3.25	3.25	0.00	1
106.34	3.37	3.37	0.00	1
106.36	3.48	3.48	0.00	1
106.38	3.59	3.59	0.00	1
106.41	3.70	3.70	0.00	1
110.93	12.88	12.88	0.00	Overtopping

Site Data - CD-8

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 102.00 ft

Outlet Station: 290.00 ft

Outlet Elevation: 101.50 ft

Number of Barrels: 1

Culvert Data Summary - CD-8

Barrel Shape: Circular

Barrel Diameter: 1.50 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 Channel Data - CD-8

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 106.00 ft (Floodplain Elevation)

Roadway Data for Crossing: CD-8

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2800.00 ft

Crest Elevation: 110.93 ft

Roadway Surface: Paved

Roadway Top Width: 198.00 ft

CD-9
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: (25 year) 2.71 cfs

Design Flow: (50 year) 3.15 cfs

Maximum Flow: (100 year) 3.44 cfs

Table 17 - Summary of Culvert Flows at Crossing: CD-9

Headwater Elevation (ft)	Total Discharge (cfs)	CD-9 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
106.25	2.71	2.71	0.00	1
106.26	2.78	2.78	0.00	1
106.27	2.86	2.86	0.00	1
106.29	2.93	2.93	0.00	1
106.30	3.00	3.00	0.00	1
106.32	3.08	3.08	0.00	1
106.33	3.15	3.15	0.00	1
106.33	3.15	3.15	0.00	1
106.36	3.29	3.29	0.00	1
106.38	3.37	3.37	0.00	1
106.40	3.44	3.44	0.00	1
124.94	23.75	23.75	0.00	Overtopping

Site Data - CD-9

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 103.50 ft

Outlet Station: 340.00 ft

Outlet Elevation: 103.00 ft

Number of Barrels: 1

Culvert Data Summary - CD-9

Barrel Shape: Circular

Barrel Diameter: 1.50 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 Channel Data - CD-9

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 106.00 ft (Floodplain elevation)

Roadway Data for Crossing: CD-9

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 124.94 ft

Roadway Surface: Paved

Roadway Top Width: 232.00 ft

CD-10
Post-Development

Note: Calculations based on LIDAR data obtained from Lake County and Orange County

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow (25 year): 28.02 cfs

Design Flow (50 year): 28.02 cfs

Maximum Flow (100 year): 28.02 cfs

Table 18 - Summary of Culvert Flows at Crossing: CD-10

Headwater Elevation (ft)	Total Discharge (cfs)	CD-10 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.64	28.02	28.02	0.00	1
116.91	32.54	32.54	0.00	Overtopping

Site Data - CD-10

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 114.50 ft

Outlet Station: 165.00 ft

Outlet Elevation: 113.50 ft

Number of Barrels: 2

Culvert Data Summary - CD-10

Barrel Shape: Circular

Barrel Diameter: 2.00 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 Channel Data - CD-10

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 115.50 ft (Crown of Pipe)

Roadway Data for Crossing: CD-10

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 300.00 ft

Crest Elevation: 116.91 ft

Roadway Surface: Paved

Roadway Top Width: 89.50 ft

Appendix F – ICPR Analysis

Manual Basin: CD-4 Upstream Basin

Scenario: Scenario1
Node: CD-4 Upstream
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 18.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
110.0000	2	2	

Comment:

Node: CD-4 Upstream

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 107.40 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	15.1100	658192
105.00	15.7600	686506
106.00	16.6900	727016
107.00	17.6300	767963
108.00	18.9900	827204
109.00	20.8600	908662

Comment:

Node: Downstream Floodplain

Scenario: Scenario1
Type: Time/Stage
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 108.00 ft
Boundary Stage:

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	105.43
0	0	0	999.0000	105.43

Comment: Tailwater set at CD-4 tailwater in HY-8 from existing permit

Pipe Link: CD-4		Upstream		Downstream	
Scenario:	Scenario1	Invert:	103.90 ft	Invert:	103.58 ft
From Node:	CD-4 Upstream	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Downstream Floodplain	Geometry: Rectangular		Geometry: Rectangular	
		Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Max Width:	5.00 ft	Max Width:	5.00 ft
Flow Direction:	Both	Fillet:	0.00 ft	Fillet:	0.00 ft
Damping:	0.0000 ft	Bottom Clip			
Length:	177.00 ft	Default:	0.00 ft	Default:	0.00 ft
FHWA Code:	1	Op Table:		Op Table:	
Entr Loss Coef:	0.00	Ref Node:		Ref Node:	
Exit Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Loss Coef:	0.00	Top Clip			
Bend Location:	0.00 ft	Default:	0.00 ft	Default:	0.00 ft
Energy Switch:	Energy	Op Table:		Op Table:	
		Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Simulation: 100yr	
Scenario:	Scenario1
Run Date/Time:	5/22/2019 12:04:07 PM
Program Version:	ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

Rainfall Amount: 8.00 in

Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Simulation: 10yr

Scenario: Scenario1

Run Date/Time: 5/22/2019 12:04:12 PM

Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

Hydrology [sec]	Surface Hydraulics

		[sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

Rainfall Amount: 5.90 in

Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Simulation: 25yr

Scenario:	Scenario1
Run Date/Time:	5/22/2019 12:04:16 PM
Program Version:	ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:	
Extern Hydrograph Set:	
Curve Number Set:	1
Green-Ampt Set:	
Vertical Layers Set:	
Impervious Set:	1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global

Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	6.80 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 50yr

Scenario: Scenario1
Run Date/Time: 5/22/2019 12:04:21 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Lookup Tables

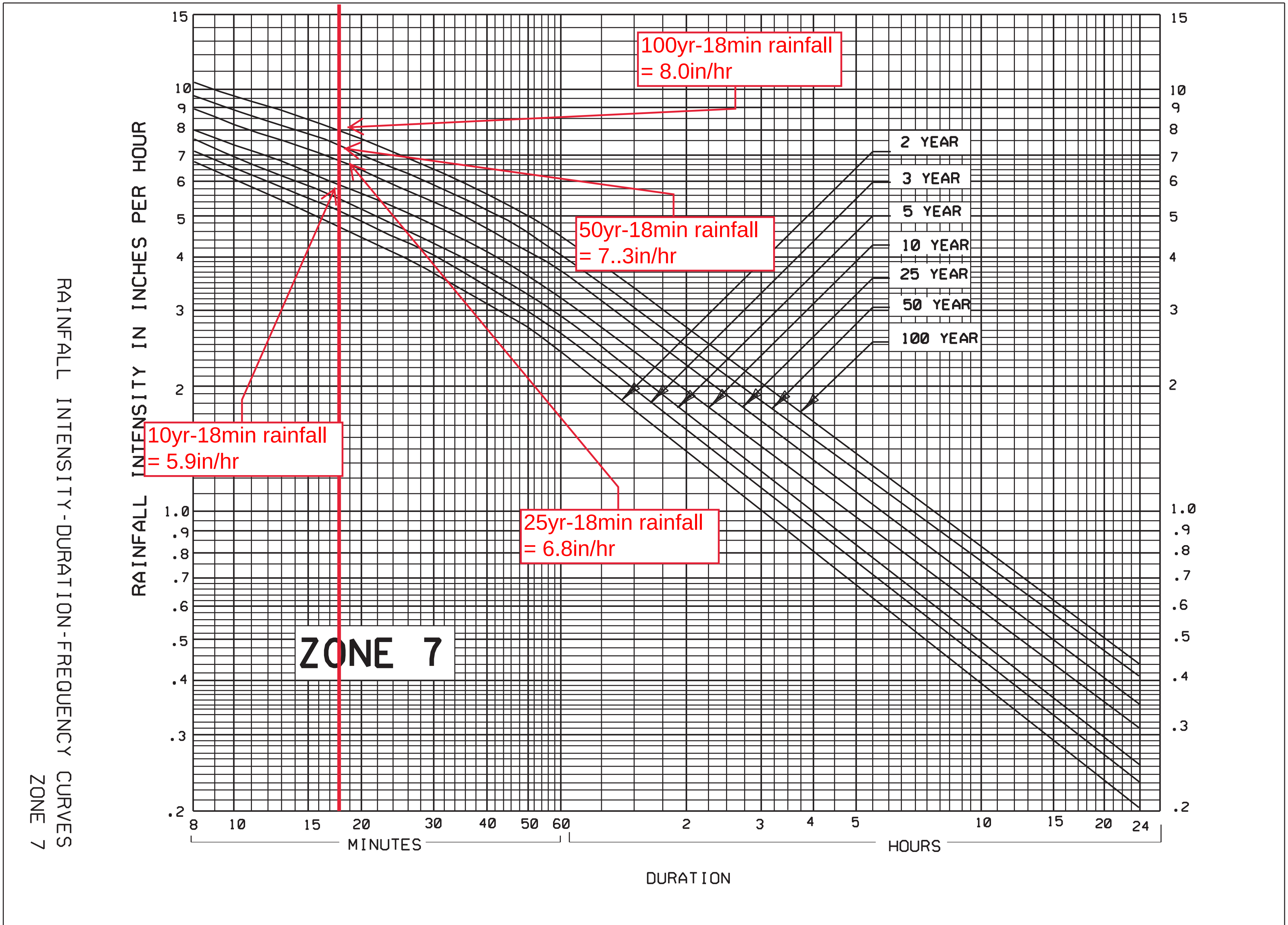
Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	1
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	7.30 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

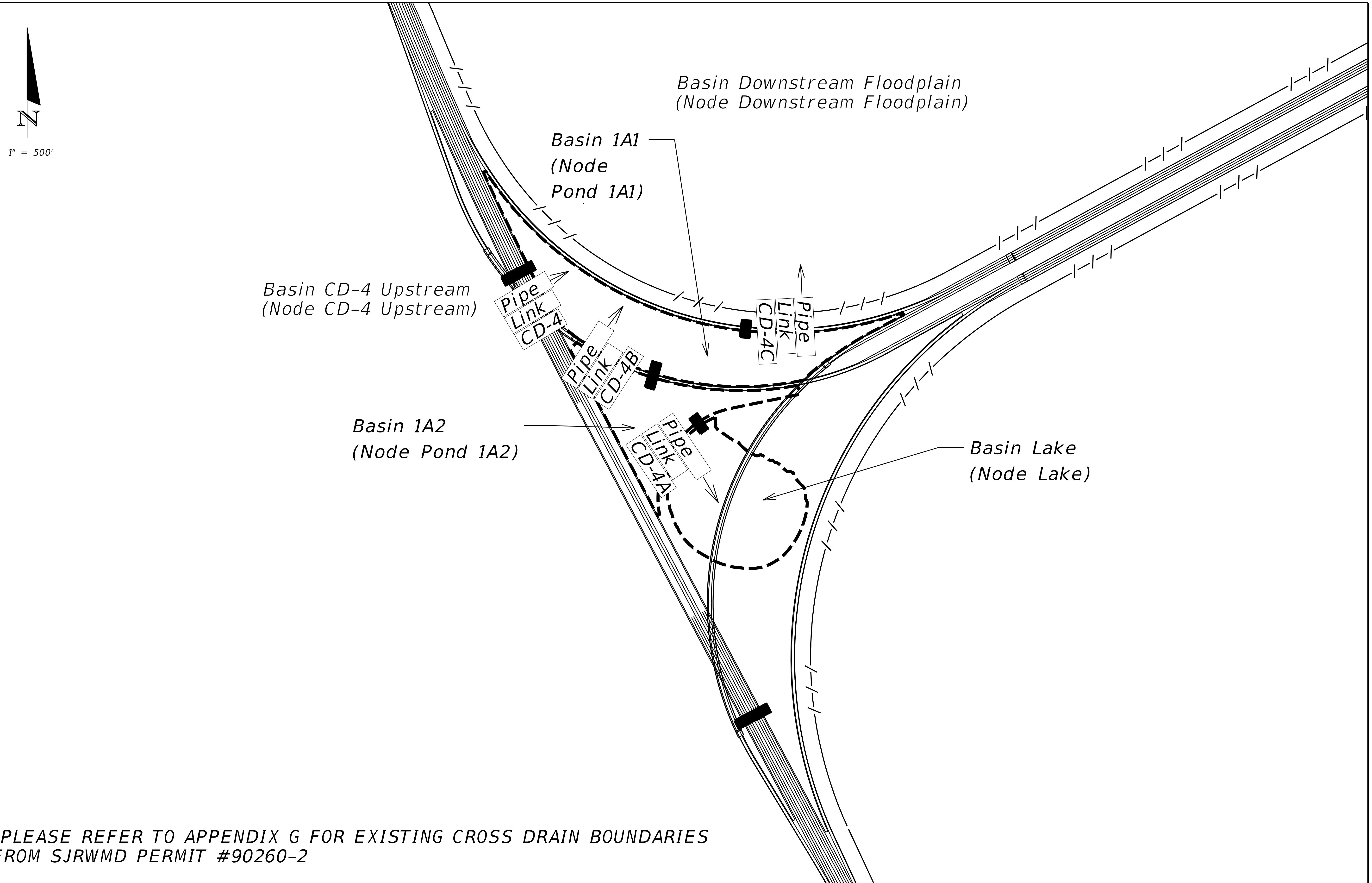
Cross Drains 8 and 9 Rainfall Amount used for ICPR



Node Max Conditions w/ Times [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]	Time to Max Stage [hr]	Time to Min/Max Delta Stage [hr]	Time to Max Total Inflow [hr]	Time to Max Total Outflow [hr]
CD-4 Upstream	25yr	107.40	106.75	0.0010	775.99	60.71	757839	1.9600	0.4491	0.7501	1.9541
Downstream Floodplain	25yr	108.00	105.43	0.0000	60.71	28.54	0	0.0000	0.0000	1.9541	0.7079

The maximum total flow through CD-4 during the 25-year storm is equal to the 60 CFS in the existing permit. Therefore, this basin model accurately portrays what was originally modeled and can be used to model CD-4 in the post-development.



*PLEASE REFER TO APPENDIX G FOR EXISTING CROSS DRAIN BOUNDARIES
FROM SJRWMD PERMIT #90260-2

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

ICPR
EXHIBIT

SHEET NO.
F-10

Manual Basin: Basin 1A1

Scenario:	Scenario1
Node:	Pond 1A1
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
13.4000	3	3	

Comment:

Manual Basin: Basin 1A2

Scenario:	Scenario1
Node:	Pond 1A2
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
7.0000	3	3	

Comment:

Manual Basin: Basin Lake

Scenario:	Scenario1
Node:	Lake
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
9.7000	3	3	

Comment:

Manual Basin: CD-4 Downstream Basin

Scenario: Scenario1
Node: Downstream Floodplain
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 18.4000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
124.0000	1	1	

Comment:

Manual Basin: CD-4 Upstream Basin

Scenario: Scenario1
Node: CD-4 Upstream
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 18.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
110.0000	2	2	

Comment:

Node: CD-4 Upstream

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 109.00 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	15.1100	658192
105.00	15.7600	686506
106.00	16.6900	727016
107.00	17.6300	767963
108.00	18.9900	827204
109.00	20.8600	908662

Comment:

Node: Downstream Floodplain

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 108.00 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	70.8600	3086662
105.00	72.0000	3136320
106.00	73.0000	3179880
107.00	74.5000	3245220
108.00	76.0000	3310560

Comment:

Node: Lake

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 108.00 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	6.0000	261360
105.00	9.0000	392040
106.00	9.3500	407286
107.00	9.7000	422532

Comment:

Node: Pond 1A1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 105.50 ft
Warning Stage: 109.00 ft

Stage [ft]	Area [ac]	Area [ft2]
105.50	6.7500	294030

Stage [ft]	Area [ac]	Area [ft2]
106.00	6.9100	301000
107.00	7.2500	315810
108.00	7.6000	331056
109.00	7.9400	345866

Comment:

Node: Pond 1A2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 105.50 ft
Warning Stage: 108.00 ft

Stage [ft]	Area [ac]	Area [ft2]
105.50	3.4700	151153
106.00	3.5600	155074
107.00	3.7300	162479
108.00	3.9200	170755

Comment:

Pipe Link: CD-4		Upstream		Downstream	
Scenario:	Scenario1	Invert:	103.78 ft	Invert:	103.43 ft
From Node:	CD-4 Upstream	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 1A1	**Geometry: Rectangular**		**Geometry: Rectangular**	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Flow Direction:	Both	Max Width:	5.00 ft	Max Width:	5.00 ft
Damping:	0.0000 ft	Fillet:	0.00 ft	Fillet:	0.00 ft
Length:	192.00 ft	**Bottom Clip**			
FHWA Code:	1	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.00	Op Table:		Op Table:	
Exit Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 ft	**Top Clip**			
Energy Switch:	Energy	Default:	0.00 ft	Default:	0.00 ft
		Op Table:		Op Table:	
		Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: CD-4A		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.60 ft	Invert:	105.50 ft
From Node:	Lake	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 1A2	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	100.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: CD-4B		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.60 ft	Invert:	105.50 ft
From Node:	Pond 1A2	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 1A1	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	150.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: CD-4C		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.50 ft	Invert:	104.00 ft
From Node:	Pond 1A1	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Downstream Floodplain	Geometry: Circular		Geometry: Circular	
		Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	95.00 ft	Ref Node:		Ref Node:	
FHWA Code:	1	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			

Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Simulation: 100yr

Scenario: Scenario1
Run Date/Time: 5/22/2019 12:10:59 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1

Green-Ampt Set:
Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	8.00 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 10yr

Scenario: Scenario1
Run Date/Time: 5/22/2019 12:11:04 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global
Rainfall Name: ~FDOT-1
Rainfall Amount: 5.90 in
Storm Duration: 1.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 25yr

Scenario: Scenario1
Run Date/Time: 5/22/2019 12:11:12 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global
Rainfall Name: ~FDOT-1
Rainfall Amount: 6.80 in
Storm Duration: 1.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 50yr

Scenario: Scenario1
Run Date/Time: 5/22/2019 12:11:17 PM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global

Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	7.30 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

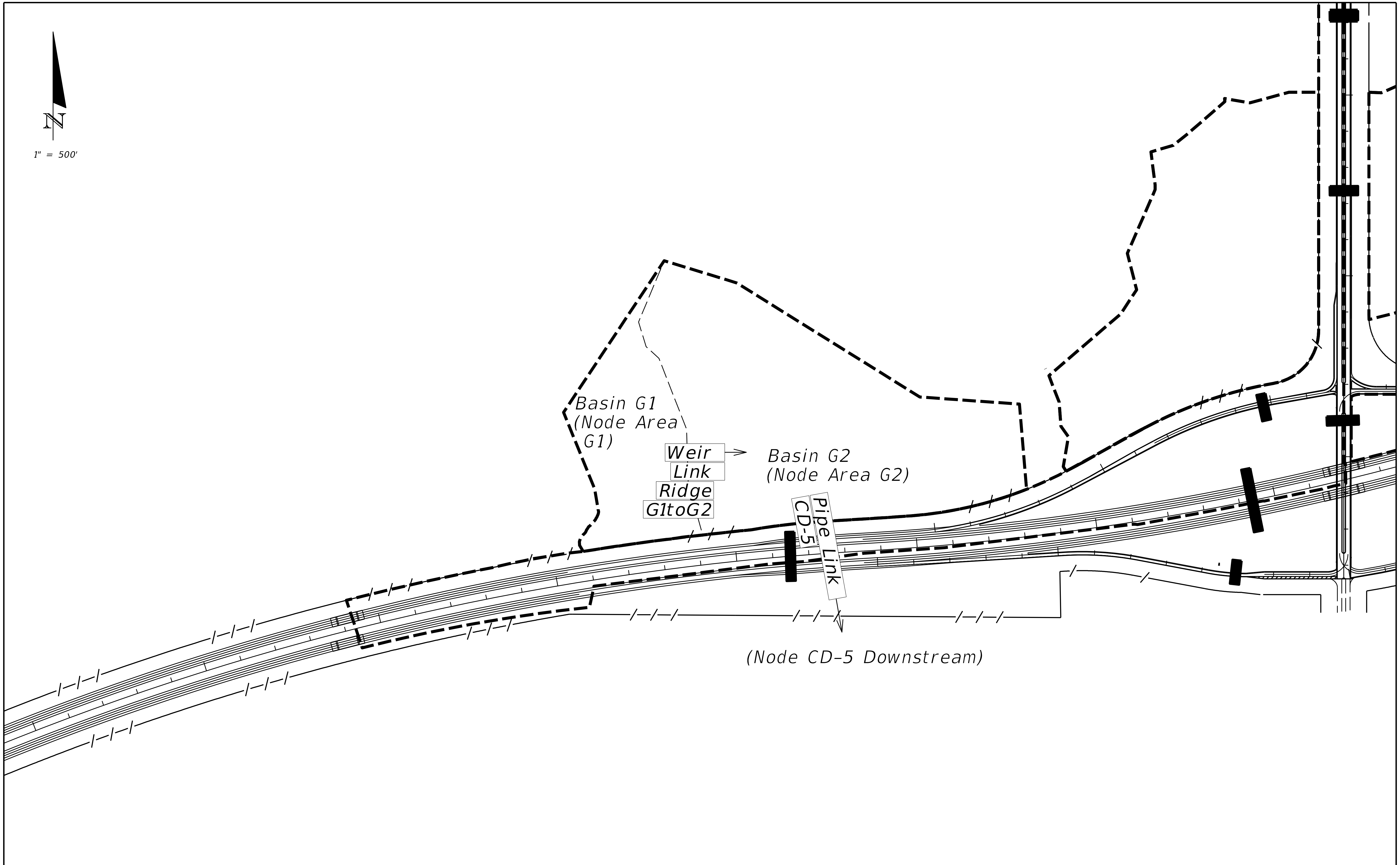
Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
CD-4 Upstream	100yr	109.00	107.38	0.0010	953.49	54.62	790694
Downstream Floodplain	100yr	108.00	104.92	0.0003	831.25	0.00	3132348
Lake	100yr	108.00	105.68	0.0005	110.34	0.00	402426
Pond 1A1	100yr	109.00	107.20	0.0074	152.47	44.88	318824
Pond 1A2	100yr	108.00	106.74	0.0007	79.47	5.22	160752
CD-4 Upstream	10yr	109.00	106.48	0.0010	667.20	34.92	746488
Downstream Floodplain	10yr	108.00	104.55	0.0003	537.05	0.00	3114051
Lake	10yr	108.00	104.93	0.0005	77.75	0.00	383555
Pond 1A1	10yr	109.00	106.43	0.0074	107.46	40.12	307553
Pond 1A2	10yr	108.00	106.24	0.0006	56.08	2.85	157063
CD-4 Upstream	25yr	109.00	106.86	0.0010	789.74	43.71	762420
Downstream Floodplain	25yr	108.00	104.71	0.0003	661.34	0.00	3121761
Lake	25yr	108.00	105.24	0.0005	91.74	0.00	395820
Pond 1A1	25yr	109.00	106.77	0.0074	126.73	42.25	312499
Pond 1A2	25yr	108.00	106.47	0.0007	66.11	3.97	158740
CD-4 Upstream	50yr	109.00	107.08	0.0010	858.00	48.42	772783
Downstream Floodplain	50yr	108.00	104.79	0.0003	731.49	0.00	3126137
Lake	50yr	108.00	105.42	0.0005	99.48	0.00	398585
Pond 1A1	50yr	109.00	106.95	0.0074	137.45	43.36	315135
Pond 1A2	50yr	108.00	106.59	0.0007	71.67	4.50	159634

Tailwater elevations used in HY-8 for CD-4A, CD-4B, and CD-4 Post

Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CD-4	100yr	54.62	-44.04	3.19	5.46	-6.36	5.46
CD-4A	100yr	4.15	0.00	1.42	2.88	4.91	3.90
CD-4B	100yr	2.35	-5.57	-0.09	-3.15	-4.37	-3.75
CD-4C	100yr	7.36	0.00	-0.01	4.17	8.15	6.16
CD-4	10yr	34.92	-39.70	2.01	-3.97	-6.24	-5.01
CD-4A	10yr	1.56	0.00	0.65	2.16	3.76	2.96
CD-4B	10yr	1.29	-1.89	-0.07	1.79	3.00	2.34
CD-4C	10yr	3.00	0.00	-0.01	2.61	6.40	4.50
CD-4	25yr	43.71	-41.65	2.71	4.37	-6.30	-5.09
CD-4A	25yr	2.66	0.00	1.09	2.50	4.37	3.43
CD-4B	25yr	1.80	-3.62	-0.10	-2.28	-3.79	-3.03
CD-4C	25yr	4.89	0.00	-0.01	3.07	7.33	5.20
CD-4	50yr	48.42	-42.66	2.92	4.84	-6.33	-5.13
CD-4A	50yr	3.31	0.00	1.23	2.67	4.63	3.65
CD-4B	50yr	2.04	-4.49	-0.09	-2.57	-4.12	-3.34
CD-4C	50yr	5.94	0.00	-0.01	3.40	7.72	5.56



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

ICPR
EXHIBIT

SHEET NO.
F-24

PS9725M 10/18/2018 4:03:57 PM NoteBorderText C:\FDOTSS4\RESOURCES\Cell\Roadway.cel

Manual Basin: Basin G1

Scenario: Scenario1
Node: Area G1
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 23.2000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
14.0400	1	1	

Comment:

Manual Basin: Basin G2

Scenario: Scenario1
Node: Area G2
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 49.2000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
43.1600	1	1	

Comment:

Node: Area G1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 102.00 ft
Warning Stage: 121.00 ft

Stage [ft]	Area [ac]	Area [ft2]
102.00	0.3300	14375
103.00	0.4000	17424
104.00	0.8000	34848
105.00	1.2900	56192
106.00	1.6800	73181
107.00	2.0000	87120
108.00	2.4100	104980

Stage [ft]	Area [ac]	Area [ft2]
109.00	2.8400	123710
110.00	3.1000	135036
111.00	3.3600	146362
112.00	4.3300	188615
113.00	4.5500	198198
114.00	4.8000	209088
115.00	4.9900	217364
116.00	5.1900	226076
117.00	5.4200	236095
118.00	5.6900	247856
119.00	5.9900	260924
120.00	6.3400	276170

Comment:

Node: Area G2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 102.00 ft
Warning Stage: 121.00 ft

Stage [ft]	Area [ac]	Area [ft2]
102.00	2.3300	101495
103.00	2.4400	106286
104.00	2.6800	116741
105.00	3.3500	145926
106.00	4.4000	191664
107.00	5.0000	217800
108.00	5.5700	242629
109.00	6.5000	283140
110.00	6.7500	294030
111.00	6.9800	304049
112.00	7.1900	313196
113.00	7.4000	322344
114.00	7.6000	331056
115.00	7.8500	341946
116.00	8.1000	352836
117.00	8.3700	364597
118.00	8.6500	376794
119.00	8.9500	389862
120.00	9.3000	405108

Comment:

Node: CD-5 downstream

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	103.00 ft
Warning Stage:	105.00 ft

Stage [ft]	Area [ac]	Area [ft2]
103.00	121.0000	5270760
104.00	200.0000	8712000

Comment:

Pipe Link: CD-5

		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.00 ft	Invert:	103.00 ft
From Node:	Area G2	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	CD-5 downstream	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	270.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Weir Link: RidgeG1toG2

Scenario:	Scenario1	Bottom Clip	
From Node:	Area G1	Default:	0.00 ft
To Node:	Area G2	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	Top Clip	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Rectangular	Ref Node:	
Invert:	105.00 ft	Discharge Coefficients	
Control Elevation:	105.00 ft	Weir Default:	2.800
Max Depth:	30.00 ft	Weir Table:	
Max Width:	95.00 ft	Orifice Default:	0.600
Fillet:	0.00 ft	Orifice Table:	

Comment:

Simulation: 100yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 10:55:37 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	2.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global

Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	7.00 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 10yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 10:55:38 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	2.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Lookup Tables

Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	1
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	5.20 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 25yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 10:55:39 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	2.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

Rainfall Amount: 5.60 in

Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Simulation: 50yr

Scenario: Scenario1

Run Date/Time: 5/29/2019 10:55:40 AM

Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	2.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

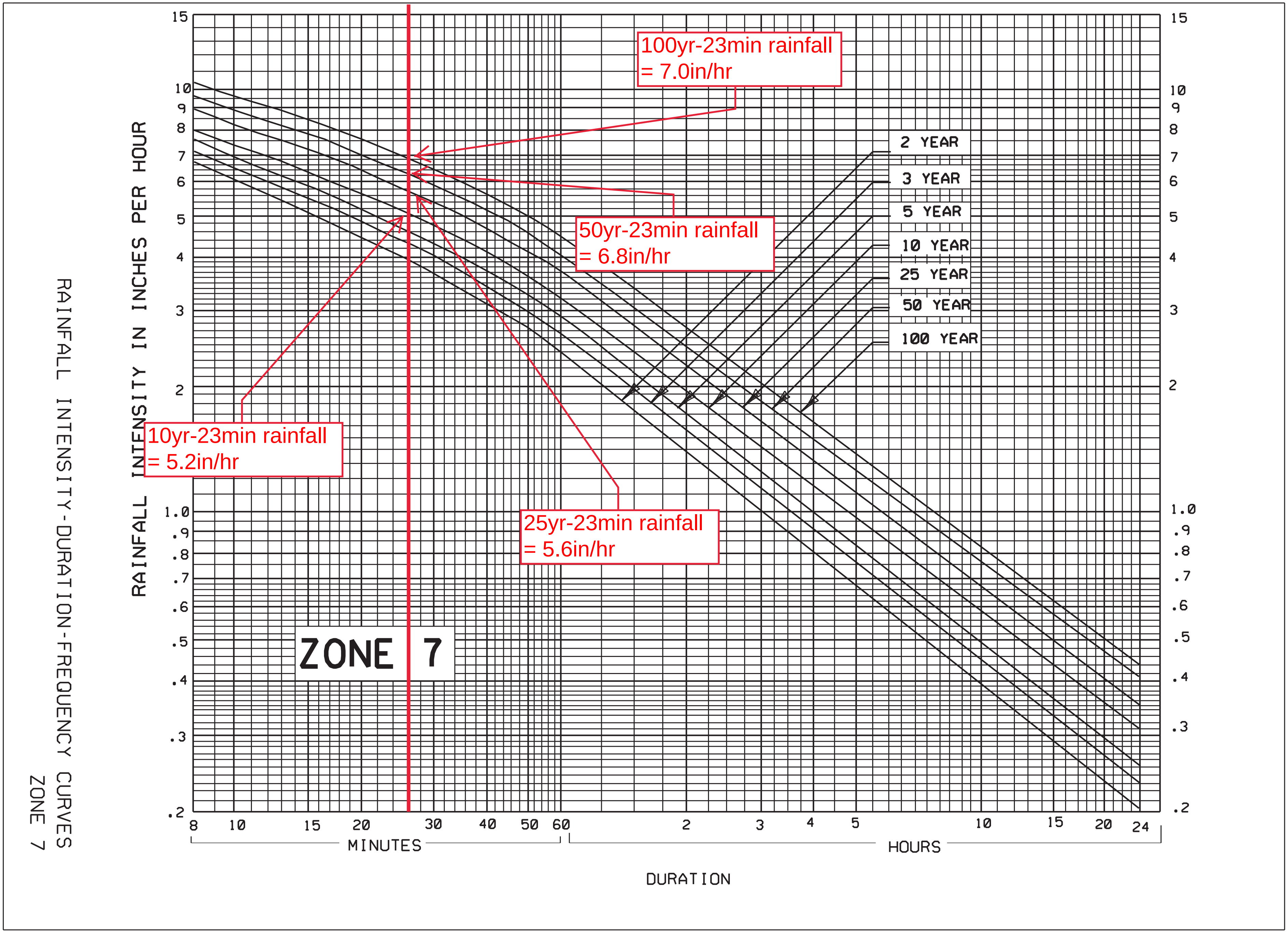
Rainfall Amount: 6.80 in

Storm Duration: 1.0000 hr

Dflt Damping (1D):	0.0050 ft
Min Node Srf Area (1D):	100 ft2
Energy Switch (1D):	Energy

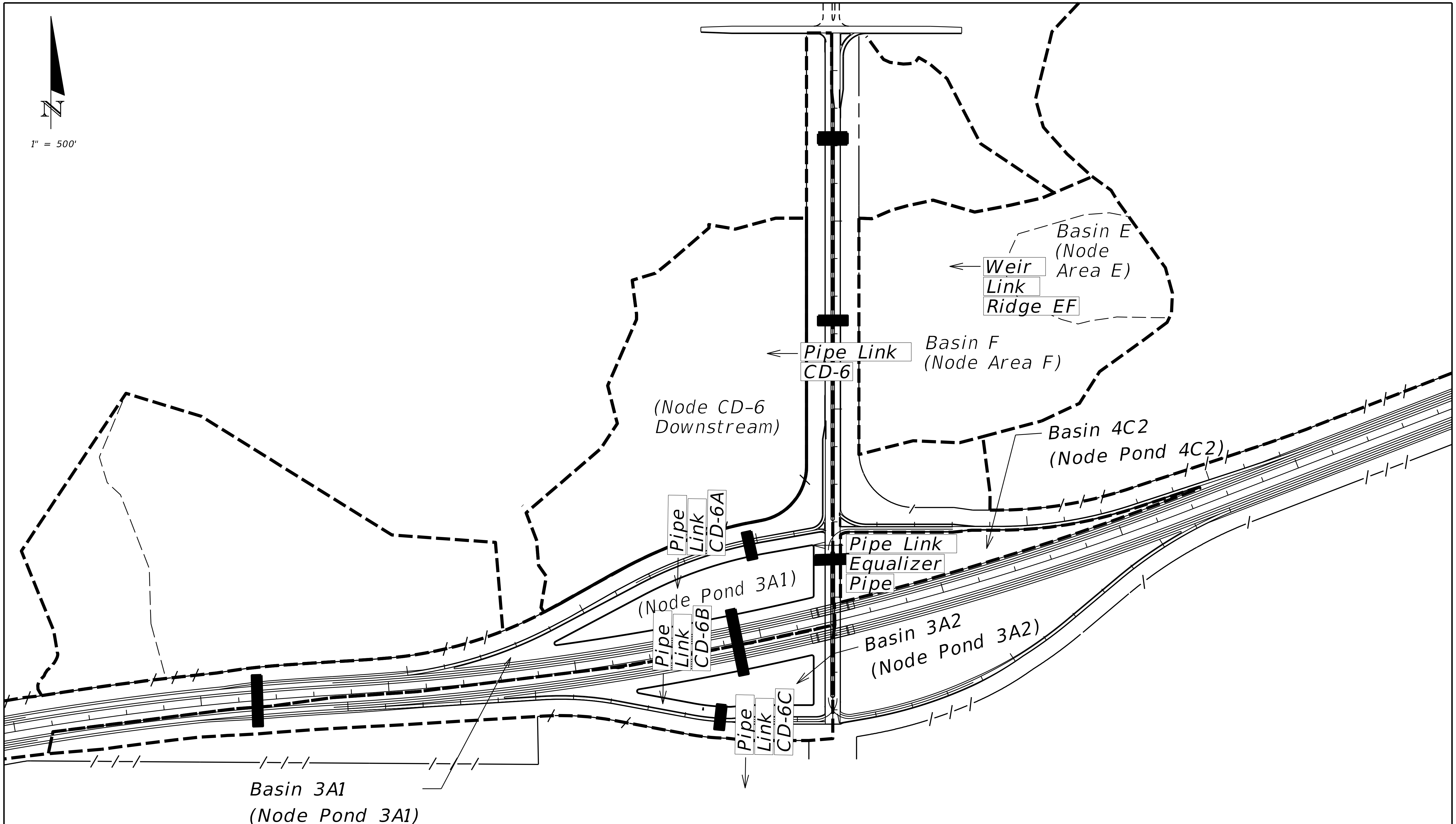
Comment:

Cross Drain 5 Rainfall Amount used for ICPR



Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Area G1	100yr	121.00	105.95	0.0010	69.85	48.88	72340
Area G2	100yr	121.00	105.95	0.0010	173.21	10.07	189753
CD-5 downstream	100yr	105.00	103.00	0.0000	3.10	0.00	5272966
Area G1	10yr	121.00	105.16	0.0010	45.11	17.76	58988
Area G2	10yr	121.00	104.85	0.0010	89.17	0.00	141597
CD-5 downstream	10yr	105.00	103.00	0.0000	0.00	0.00	5270760
Area G1	25yr	121.00	105.20	0.0010	50.50	24.33	59641
Area G2	25yr	121.00	105.18	0.0010	109.66	5.46	154188
CD-5 downstream	25yr	105.00	103.00	0.0000	0.07	0.00	5270878
Area G1	50yr	121.00	105.85	0.0010	67.05	45.32	70596
Area G2	50yr	121.00	105.85	0.0010	164.61	9.44	185064
CD-5 downstream	50yr	105.00	103.00	0.0000	2.56	0.00	5272450



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

ICPR
EXHIBIT

SHEET NO.
F-36

Manual Basin: Basin 3A1

Scenario:	Scenario1
Node:	Pond 3A1
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	38.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
50.0000	3	3	

Comment:

Manual Basin: Basin 3A2

Scenario:	Scenario1
Node:	Pond 3A2
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	38.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
26.3800	3	3	

Comment:

Manual Basin: Basin 4C2

Scenario:	Scenario1
Node:	Pond 4C2
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	10.0000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
6.4000	3	3	

Comment:

Manual Basin: Basin Downstream 6

Scenario:	Scenario1
Node:	CD-6 downstream
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	37.5000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
41.7700	2	2	

Comment:

Manual Basin: Basin E

Scenario:	Scenario1
Node:	Area E
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	11.9000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
8.0900	1	1	

Comment:

Manual Basin: Basin F

Scenario:	Scenario1
Node:	Area F
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	16.4000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
34.3000	1	1	

Comment:

Node: Area E

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	125.00 ft
Warning Stage:	132.00 ft

Stage [ft]	Area [ac]	Area [ft2]
125.00	0.3500	15246
126.00	1.5100	65776
127.00	2.6600	115870
128.00	3.7500	163350
129.00	4.5800	199505
130.00	5.9000	257004
131.00	7.4200	323215
132.00	8.0900	352400

Comment:

Node: Area F

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	103.00 ft
Warning Stage:	133.00 ft

Stage [ft]	Area [ac]	Area [ft2]
103.00	0.5900	25700
104.00	0.6900	30056
105.00	0.7900	34412
106.00	1.0100	43996
107.00	1.3100	57064
108.00	1.5500	67518
109.00	1.8800	81893
110.00	2.1500	93654
111.00	2.3600	102802
112.00	2.6000	113256
113.00	2.9100	126760
114.00	3.3500	145926
115.00	4.0000	174240
116.00	5.2000	226512
117.00	6.4600	281398
118.00	7.7500	337590
119.00	9.0500	394218
120.00	10.6400	463478
121.00	12.3300	537095
122.00	13.9100	605920

Stage [ft]	Area [ac]	Area [ft2]
123.00	15.4400	672566
124.00	17.3600	756202
125.00	19.5900	853340
126.00	22.1300	963983
127.00	25.2700	1100761
128.00	29.6700	1292425
129.00	31.7600	1383466
130.00	33.1800	1445321
131.00	33.8300	1473635
132.00	34.3000	1494108

Comment:

Node: CD-6 downstream

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 102.00 ft
Warning Stage: 107.40 ft

Stage [ft]	Area [ac]	Area [ft2]
102.00	0.1000	4356
103.00	8.8600	385942
104.00	9.1100	396832
105.00	9.8200	427759
106.00	13.1100	571072
107.00	15.9300	693911
108.00	17.5400	764042
109.00	19.2000	836352
110.00	21.1400	920858
111.00	23.2900	1014512
112.00	25.4400	1108166
113.00	27.4000	1193544

Comment:

Node: Downstream Floodplain

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 103.00 ft
Warning Stage: 105.00 ft

Stage [ft]	Area [ac]	Area [ft2]
103.00	121.0000	5270760
104.00	200.0000	8712000

Comment:

Node: Pond 3A1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 103.00 ft
Warning Stage: 109.88 ft

Stage [ft]	Area [ac]	Area [ft2]
103.00	4.3900	191228
104.00	4.6400	202118
105.00	4.9000	213444
106.00	5.1600	224770
107.00	5.4300	236531
108.00	5.7000	248292
109.88	6.7800	295337

Comment:

Node: Pond 3A2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 103.00 ft
Warning Stage: 108.00 ft

Stage [ft]	Area [ac]	Area [ft2]
103.00	2.4800	108029
104.00	2.6600	115870
105.00	2.8500	124146
106.00	3.0400	132422
107.00	3.2300	140699
108.00	3.4300	149411

Comment:

Node: Pond 4C2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 115.00 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	1.4100	61420
105.00	1.5500	67518
106.00	1.7000	74052
107.00	1.8500	80586
108.00	2.0100	87556
109.00	2.1800	94961
110.00	2.3500	102366
111.00	2.5200	109771
112.00	2.6900	117176
113.00	2.8600	124582
114.00	3.0400	132422
115.00	3.2200	140263

Comment:

Pipe Link: CD-6		Upstream		Downstream	
Scenario:	Scenario1	Invert:	103.00 ft	Invert:	102.00 ft
From Node:	Area F	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	CD-6 downstream	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	3.50 ft	Max Depth:	3.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	160.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000

Comment:

Pipe Link: CD-6A		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.00 ft	Invert:	104.90 ft
From Node:	CD-6 downstream	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 3A1	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Flow Direction:	Both	Bottom Clip			

Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	150.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: CD-6B		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.00 ft	Invert:	104.50 ft
From Node:	Pond 3A1	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 3A2	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.50 ft	Max Depth:	2.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	350.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: CD-6C		Upstream		Downstream	
Scenario:	Scenario1	Invert:	103.00 ft	Invert:	102.90 ft
From Node:	Pond 3A2	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Downstream Floodplain	Geometry: Circular		Geometry: Circular	
		Max Depth:	2.00 ft	Max Depth:	2.00 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	130.00 ft	Ref Node:		Ref Node:	
FHWA Code:	1	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: Equalizer Pipe		Upstream		Downstream	
Scenario:	Scenario1	Invert:	105.00 ft	Invert:	104.90 ft
From Node:	Pond 4C2	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Pond 3A1	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.50 ft	Max Depth:	2.50 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	180.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Weir Link: Ridge EF			
Scenario:	Scenario1	Bottom Clip	
From Node:	Area E	Default:	0.00 ft
To Node:	Area F	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	Top Clip	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Rectangular	Ref Node:	
Invert:	126.00 ft	Discharge Coefficients	
Control Elevation:	126.00 ft	Weir Default:	2.800
Max Depth:	30.00 ft	Weir Table:	
Max Width:	315.00 ft	Orifice Default:	0.600
Fillet:	0.00 ft	Orifice Table:	
Comment:			

Simulation: 100yr	
Scenario:	Scenario1
Run Date/Time:	5/29/2019 8:44:41 AM
Program Version:	ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global
Rainfall Name: ~FDOT-1
Rainfall Amount: 8.70 in
Storm Duration: 1.0000 hr
Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 10yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 8:44:47 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global

Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft
Edge Length Option: Automatic

Rainfall Name: ~FDOT-1
Rainfall Amount: 6.50 in
Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Simulation: 25yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 8:44:53 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Lookup Tables

Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	1
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	7.30 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 50yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 8:44:59 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	30.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1

Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

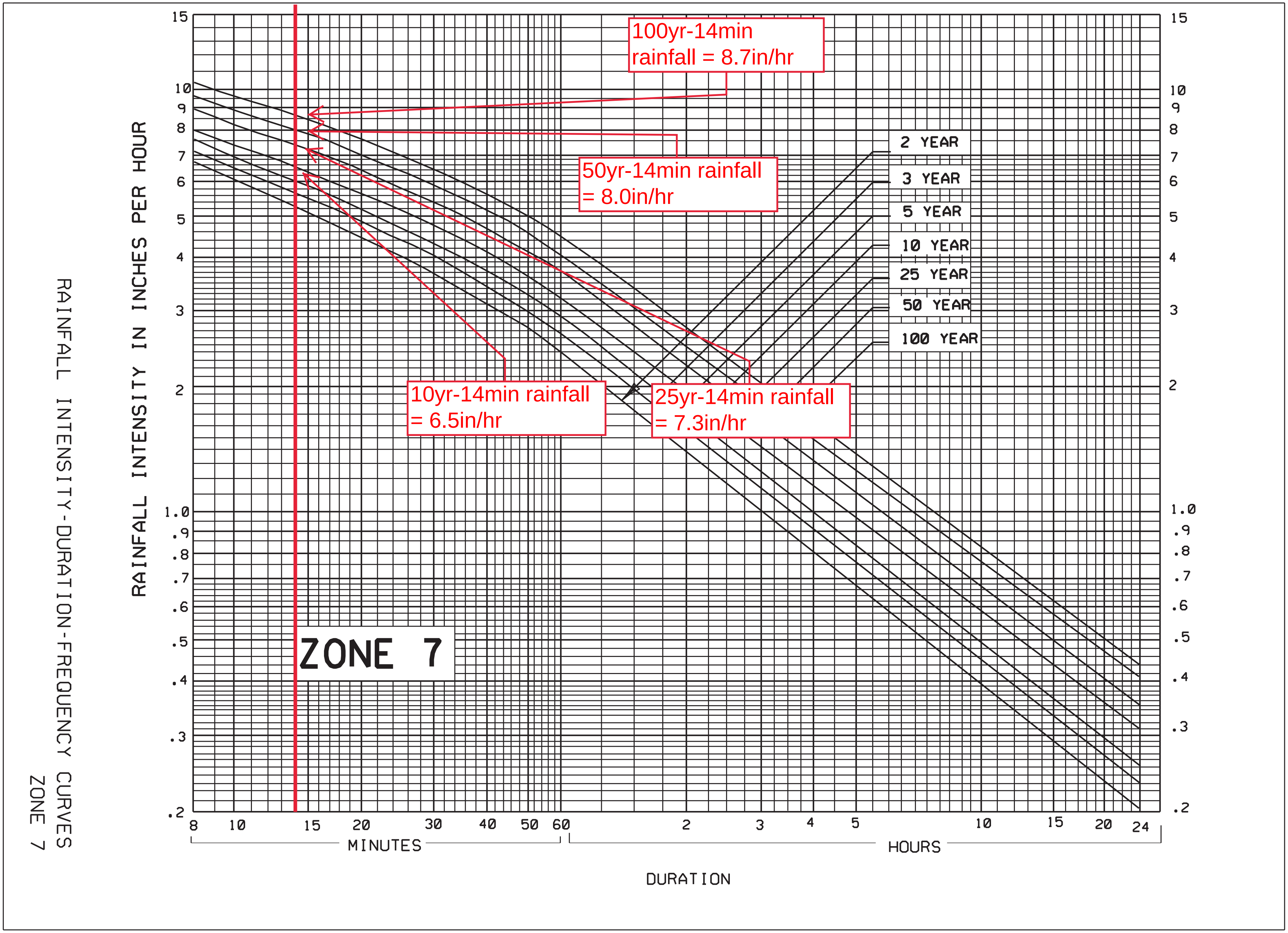
Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1
Rainfall Amount: 8.00 in
Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft
Min Node Srf Area (1D): 100 ft2
Energy Switch (1D): Energy

Comment:

Cross Drain 6 Rainfall Amount used for ICPR

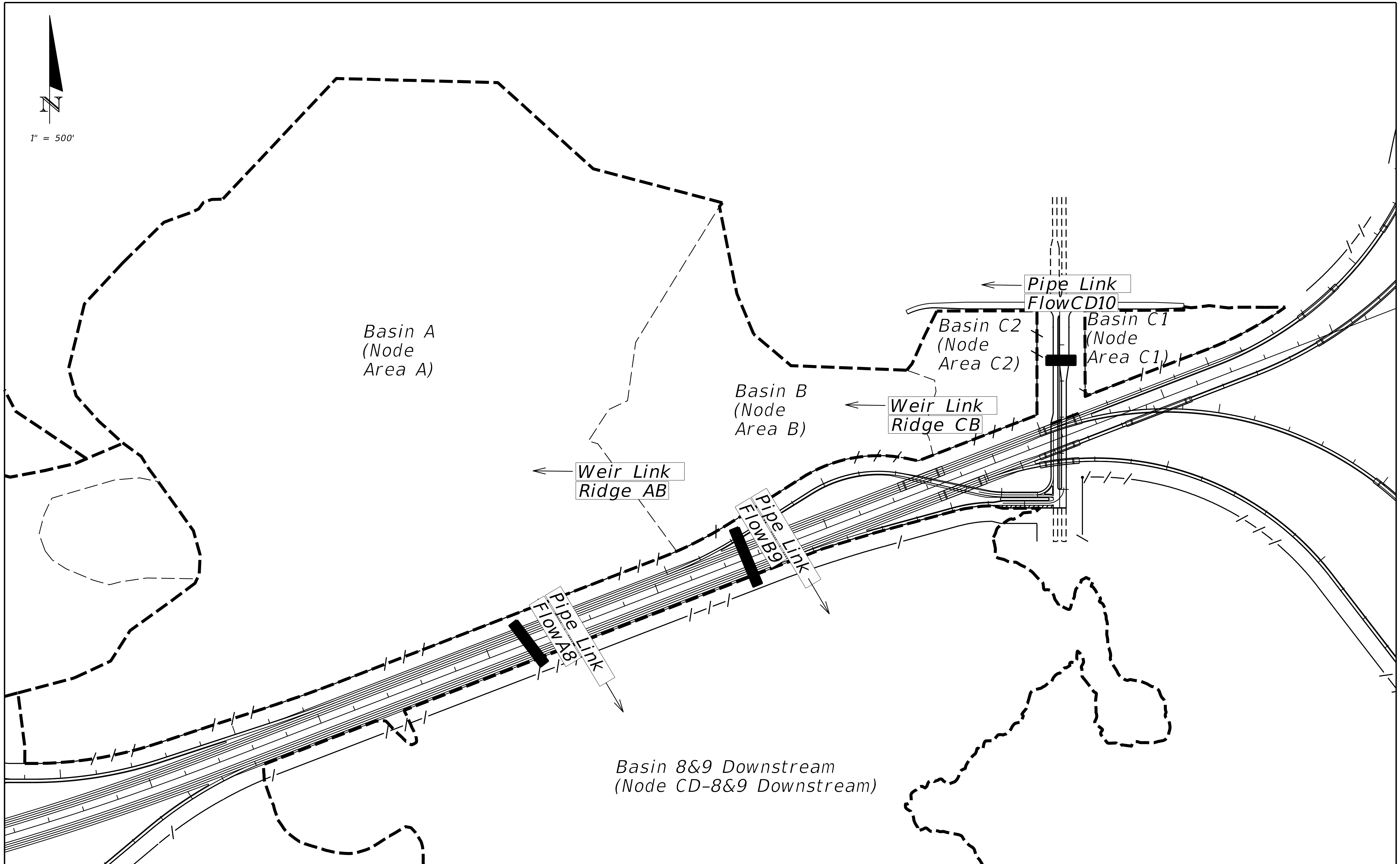


Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
CD-6	100yr	113.99	-3.30	-1.24	11.85	12.16	12.00
CD-6A	100yr	5.92	-12.08	0.27	-3.84	-5.77	-4.74
CD-6B	100yr	14.32	0.00	0.01	3.65	4.74	3.97
CD-6C	100yr	24.82	0.00	-0.01	7.90	8.12	8.01
Equalizer Pipe	100yr	4.94	-14.74	0.39	-3.42	-5.23	-4.26
Ridge EF	100yr	71.81	0.00	0.07	1.21	1.21	1.21
CD-6	10yr	89.75	-2.31	-5.53	9.33	10.13	9.45
CD-6A	10yr	0.62	-4.62	0.01	-2.26	-4.25	-3.26
CD-6B	10yr	6.19	0.00	0.01	2.85	4.00	3.34
CD-6C	10yr	16.75	0.00	-0.01	5.33	6.44	5.89
Equalizer Pipe	10yr	1.65	-5.28	0.19	-2.18	-4.20	-3.19
Ridge EF	10yr	43.30	0.00	0.06	1.03	1.03	1.03
CD-6	25yr	99.48	-2.75	-1.39	10.34	10.61	10.48
CD-6A	25yr	2.14	-7.34	0.06	-2.80	-4.91	-3.85
CD-6B	25yr	9.53	0.00	-0.01	3.22	4.14	3.45
CD-6C	25yr	20.08	0.00	-0.01	6.39	6.97	6.67
Equalizer Pipe	25yr	3.00	-8.59	0.32	-2.69	-4.78	-3.71
Ridge EF	25yr	53.92	0.00	0.06	1.10	1.10	1.10
CD-6	50yr	107.05	-3.02	-1.26	11.13	11.42	11.27
CD-6A	50yr	3.90	-9.73	0.15	-3.24	-5.40	-4.32
CD-6B	50yr	12.60	0.00	0.01	3.50	4.36	3.65
CD-6C	50yr	22.72	0.00	-0.01	7.23	7.55	7.39
Equalizer Pipe	50yr	4.10	-11.58	0.44	-3.06	-5.10	-4.01
Ridge EF	50yr	62.95	0.00	0.06	1.16	1.16	1.16

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Area E	100yr	132.00	126.19	0.0008	75.27	71.81	75186
Area F	100yr	133.00	110.92	0.0010	345.38	113.99	102081
CD-6 downstream	100yr	107.40	106.61	0.0010	333.15	5.92	645944
Downstream Floodplain	100yr	105.00	103.22	0.0001	24.82	0.00	6027009
Pond 3A1	100yr	109.88	107.01	0.0010	250.85	39.97	237170
Pond 3A2	100yr	108.00	106.82	0.0010	131.10	24.82	139498
Pond 4C2	100yr	115.00	106.99	0.0010	67.74	4.94	80730
Area E	10yr	132.00	126.13	0.0008	50.12	43.30	72492
Area F	10yr	133.00	108.80	0.0010	221.07	89.75	78985
CD-6 downstream	10yr	107.40	105.53	0.0010	240.80	2.31	504100
Downstream Floodplain	10yr	105.00	103.10	0.0000	16.75	0.00	5609070
Pond 3A1	10yr	109.88	106.14	0.0010	167.60	16.09	227203
Pond 3A2	10yr	108.00	105.47	0.0010	88.34	16.75	128475
Pond 4C2	10yr	115.00	105.98	0.0010	45.95	1.65	74156
Area E	25yr	132.00	126.16	0.0008	59.18	53.92	73550
Area F	25yr	133.00	109.59	0.0010	267.09	99.48	88827
CD-6 downstream	25yr	107.40	105.94	0.0010	275.16	2.75	562954
Downstream Floodplain	25yr	105.00	103.14	0.0001	20.08	0.00	5748358
Pond 3A1	25yr	109.88	106.45	0.0010	197.25	25.43	230905
Pond 3A2	25yr	108.00	105.97	0.0010	103.71	20.08	132573
Pond 4C2	25yr	115.00	106.36	0.0010	53.82	3.00	76622
Area E	50yr	132.00	126.17	0.0008	67.19	62.95	74395
Area F	50yr	133.00	110.26	0.0010	306.43	107.05	96046
CD-6 downstream	50yr	107.40	106.28	0.0010	304.43	3.90	605526
Downstream Floodplain	50yr	105.00	103.18	0.0001	22.72	0.00	5887262
Pond 3A1	50yr	109.88	106.72	0.0010	223.80	33.72	233952
Pond 3A2	50yr	108.00	106.42	0.0010	117.34	22.72	136294
Pond 4C2	50yr	115.00	106.67	0.0010	60.76	4.10	78625



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

ICPR
EXHIBIT

SHEET NO.
F-53

Manual Basin: Basin 8&9 Downstream

Scenario: Scenario1
Node: CD-8&9 Downstream
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 73.5000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
195.7500	A	A	

Comment:

Manual Basin: Basin A

Scenario: Scenario1
Node: Area A
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 53.0000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
198.0900	A	A	

Comment:

Manual Basin: Basin B

Scenario: Scenario1
Node: Area B
Hydrograph Method: NRCS Unit Hydrograph
Infiltration Method: Curve Number
Time of Concentration: 30.4000 min
Max Allowable Q: 0.00 cfs
Time Shift: 0.0000 hr
Unit Hydrograph: UH256
Peaking Factor: 256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
33.7700	B	B	

Comment:

Manual Basin: Basin C1

Scenario:	Scenario1
Node:	Area C1
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	37.4000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
6.0800	C	C	

Comment:

Manual Basin: Basin C2

Scenario:	Scenario1
Node:	Area C2
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	17.8000 min
Max Allowable Q:	0.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH256
Peaking Factor:	256.0

Area [ac]	Land Cover Zone	Soil Zone	Rainfall Name
8.9600	C	C	

Comment:

Node: Area A

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	102.00 ft
Warning Stage:	132.00 ft

Stage [ft]	Area [ac]	Area [ft2]
102.00	61.7500	2689830
103.00	72.5200	3158971
104.00	76.8100	3345844
105.00	80.6600	3513550
106.00	85.1600	3709570
107.00	93.1600	4058050
108.00	100.1600	4362970

Stage [ft]	Area [ac]	Area [ft2]
109.00	106.6600	4646110
110.00	114.1600	4972810
111.00	118.1600	5147050
112.00	123.0100	5358316
113.00	127.5100	5554336
114.00	130.5100	5685016
115.00	133.5100	5815696
116.00	136.5800	5949425
117.00	139.6400	6082718
118.00	142.7400	6217754
119.00	145.7600	6349306
120.00	149.2600	6501766
121.00	152.7600	6654226
122.00	156.0600	6797974
123.00	160.3600	6985282
124.00	164.9600	7185658
125.00	169.6600	7390390
126.00	174.4600	7599478
127.00	179.3600	7812922
128.00	184.1400	8021138
129.00	189.2000	8241552
130.00	194.0200	8451511
131.00	197.3100	8594824
132.00	198.0900	8628800

Comment:

Node: Area B

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 104.00 ft
Warning Stage: 114.00 ft

Stage [ft]	Area [ac]	Area [ft2]
104.00	13.0700	569329
105.00	15.1000	657756
106.00	16.7200	728323
107.00	18.9100	823720
108.00	21.1500	921294
109.00	23.0900	1005800
110.00	29.0900	1267160
111.00	30.9800	1349489
112.00	33.2300	1447499
113.00	33.7100	1468408
114.00	33.7700	1471021

Comment:

Node: Area C1

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 119.00 ft
Warning Stage: 143.00 ft

Stage [ft]	Area [ac]	Area [ft2]
119.00	0.2700	11761
120.00	1.0500	45738
121.00	1.5700	68389
122.00	2.2900	99752
123.00	3.2300	140699
124.00	3.8700	168577
125.00	4.1700	181645
126.00	4.5800	199505
127.00	4.7700	207781
128.00	4.9900	217364
129.00	5.1400	223898
130.00	5.2700	229561
131.00	5.4000	235224
132.00	5.5100	240016
133.00	5.6100	244372
134.00	5.7300	249599
135.00	5.8100	253084
136.00	5.8700	255697
137.00	5.9200	257875
138.00	5.9700	260053
139.00	6.0000	261360
140.00	6.0200	262231
141.00	6.0400	263102
142.00	6.0600	263974
143.00	6.0800	264845

Comment:

Node: Area C2

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 107.00 ft
Warning Stage: 119.00 ft

Stage [ft]	Area [ac]	Area [ft2]
107.00	0.0900	3920
108.00	0.7900	34412
109.00	1.9800	86249
110.00	4.2300	184259
111.00	5.6400	245678
112.00	7.2000	313632
113.00	7.5400	328442
114.00	7.9000	344124
115.00	8.2400	358934
116.00	8.4100	366340
117.00	8.6300	375923
118.00	8.8300	384635
119.00	8.9600	390298

Comment:

Node: CD-8&9 Downstream

Scenario: Scenario1
Type: Stage/Area
Base Flow: 0.00 cfs
Initial Stage: 102.00 ft
Warning Stage: 107.00 ft

Stage [ft]	Area [ac]	Area [ft2]
102.00	72.4800	3157229
103.00	172.2300	7502339
104.00	175.1300	7628663
105.00	184.9500	8056422
106.00	195.7500	8526870

Comment:

Pipe Link: FlowA8		Upstream		Downstream	
Scenario:	Scenario1	Invert:	102.00 ft	Invert:	101.50 ft
From Node:	Area A	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	CD-8&9 Downstream	Geometry: Circular		Geometry: Circular	
		Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	290.00 ft	Ref Node:		Ref Node:	
FHWA Code:	1	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			

Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: FlowB9		Upstream		Downstream	
Scenario:	Scenario1	Invert:	103.50 ft	Invert:	103.00 ft
From Node:	Area B	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	CD-8&9	Geometry: Circular		Geometry: Circular	
	Downstream	Max Depth:	1.50 ft	Max Depth:	1.50 ft
Link Count:	1	Bottom Clip			
Flow Direction:	Both	Default:	0.00 ft	Default:	0.00 ft
Damping:	0.0000 ft	Op Table:		Op Table:	
Length:	340.00 ft	Ref Node:		Ref Node:	
FHWA Code:	1	Manning's N:	0.0000	Manning's N:	0.0000
Entr Loss Coef:	0.00	Top Clip			
Exit Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Loss Coef:	0.00	Op Table:		Op Table:	
Bend Location:	0.00 ft	Ref Node:		Ref Node:	
Energy Switch:	Energy	Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Pipe Link: FlowCD10		Upstream		Downstream	
Scenario:	Scenario1	Invert:	114.50 ft	Invert:	113.50 ft
From Node:	Area C1	Manning's N:	0.0120	Manning's N:	0.0120
To Node:	Area C2	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	2.00 ft	Max Depth:	2.00 ft
Flow Direction:	Both	Bottom Clip			
Damping:	0.0000 ft	Default:	0.00 ft	Default:	0.00 ft
Length:	165.00 ft	Op Table:		Op Table:	
FHWA Code:	1	Ref Node:		Ref Node:	
Entr Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Exit Loss Coef:	0.00	Top Clip			
Bend Loss Coef:	0.00	Default:	0.00 ft	Default:	0.00 ft
Bend Location:	0.00 ft	Op Table:		Op Table:	
Energy Switch:	Energy	Ref Node:		Ref Node:	
		Manning's N:	0.0000	Manning's N:	0.0000
Comment:					

Weir Link: Ridge AB		
Scenario:	Scenario1	Bottom Clip

From Node:	Area A		
To Node:	Area B	Default:	0.00 ft
Link Count:	1	Op Table:	
Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	**Top Clip**	
Weir Type:	Broad Crested Vertical	Default:	0.00 ft
Geometry Type:	Rectangular	Op Table:	
Invert:	105.00 ft	Ref Node:	
Control Elevation:	105.00 ft	**Discharge Coefficients**	
Max Depth:	30.00 ft	Weir Default:	2.800
Max Width:	738.00 ft	Weir Table:	
Fillet:	0.00 ft	Orifice Default:	0.600
		Orifice Table:	

Comment:

Weir Link: Ridge CB

Scenario:	Scenario1	**Bottom Clip**	
From Node:	Area C2	Default:	0.00 ft
To Node:	Area B	Op Table:	
Link Count:	1	Ref Node:	
Flow Direction:	Both	**Top Clip**	
Damping:	0.0000 ft	Default:	0.00 ft
Weir Type:	Broad Crested Vertical	Op Table:	
Geometry Type:	Rectangular	Ref Node:	
Invert:	110.00 ft	**Discharge Coefficients**	
Control Elevation:	110.00 ft	Weir Default:	2.800
Max Depth:	30.00 ft	Weir Table:	
Max Width:	270.00 ft	Orifice Default:	0.600
Fillet:	0.00 ft	Orifice Table:	

Comment:

Simulation: 100yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 9:14:49 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	10.0000

Hydrology [sec]	Surface Hydraulics [sec]

Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

Rainfall Amount: 6.40 in

Storm Duration: 1.0000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Simulation: 10yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 9:14:51 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	10.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set: 1
Green-Ampt Set:
Vertical Layers Set:
Impervious Set: 1

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft

IA Recovery Time: 24.0000 hr
Manual Basin Rain Opt: Global

Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	4.80 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 25yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 9:14:53 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	10.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Lookup Tables

Rainfall Folder:		Boundary Stage Set:	
		Extern Hydrograph Set:	
Unit Hydrograph Folder:		Curve Number Set:	1
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	1

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec		
dZ Tolerance:	0.0010 ft	Manual Basin Rain Opt:	Global
Max dZ:	1.0000 ft		
Link Optimizer Tol:	0.0001 ft	Rainfall Name:	~FDOT-1
		Rainfall Amount:	5.40 in
Edge Length Option:	Automatic	Storm Duration:	1.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 50yr

Scenario: Scenario1
Run Date/Time: 5/29/2019 9:14:55 AM
Program Version: ICPR4 4.03.02.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	10.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set: 1

Green-Ampt Set:

Vertical Layers Set:

Impervious Set: 1

Tolerances & Options

Time Marching: SAOR

Max Iterations: 6

Over-Relax Weight Fact: 0.5 dec

dZ Tolerance: 0.0010 ft

Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

Edge Length Option: Automatic

IA Recovery Time: 24.0000 hr

Manual Basin Rain Opt: Global

Rainfall Name: ~FDOT-1

Rainfall Amount: 6.00 in

Storm Duration: 1.0000 hr

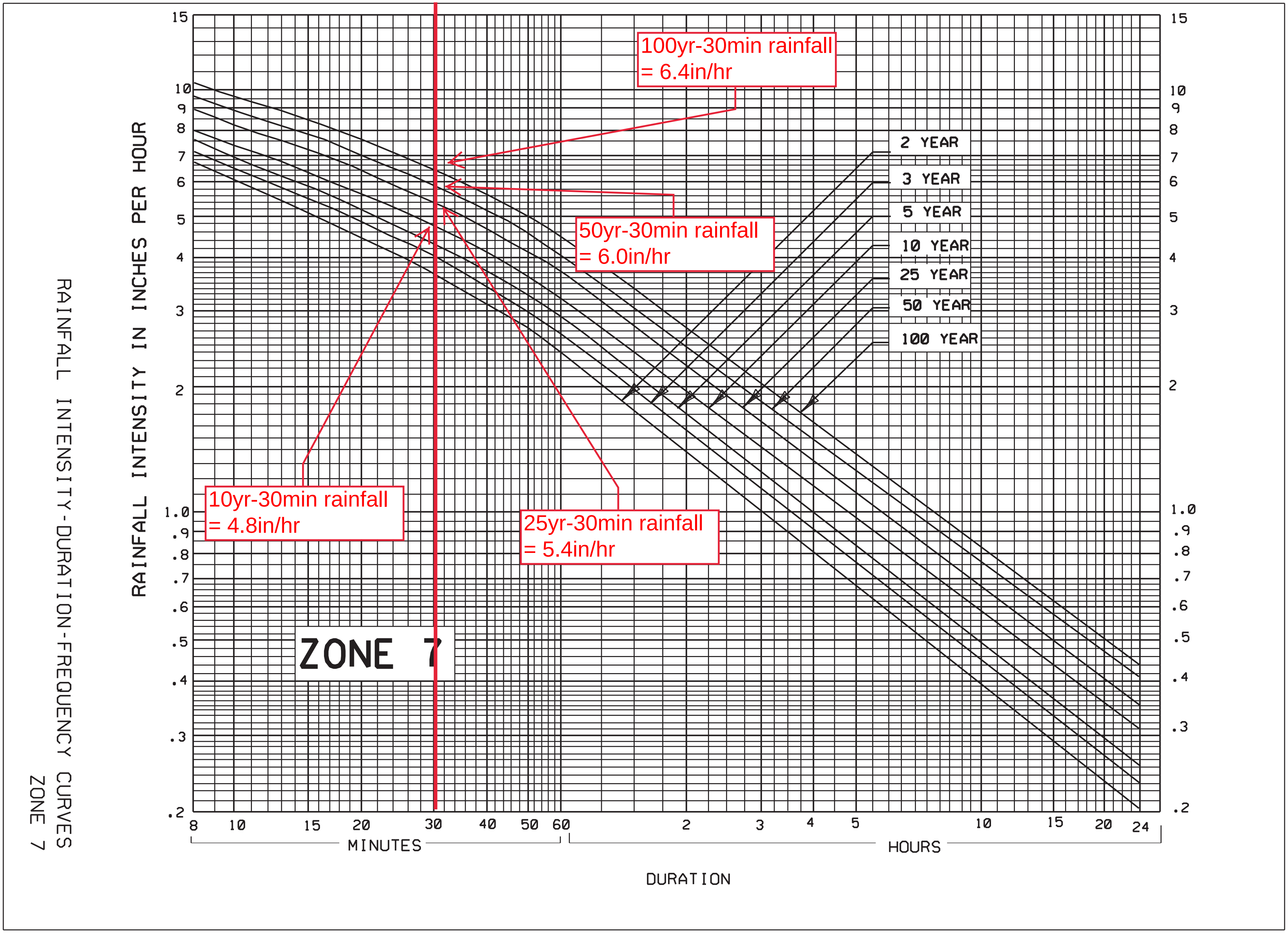
Dflt Damping (1D): 0.0050 ft

Min Node Srf Area (1D): 100 ft2

Energy Switch (1D): Energy

Comment:

Cross Drains 8 and 9 Rainfall Amount used for ICPR



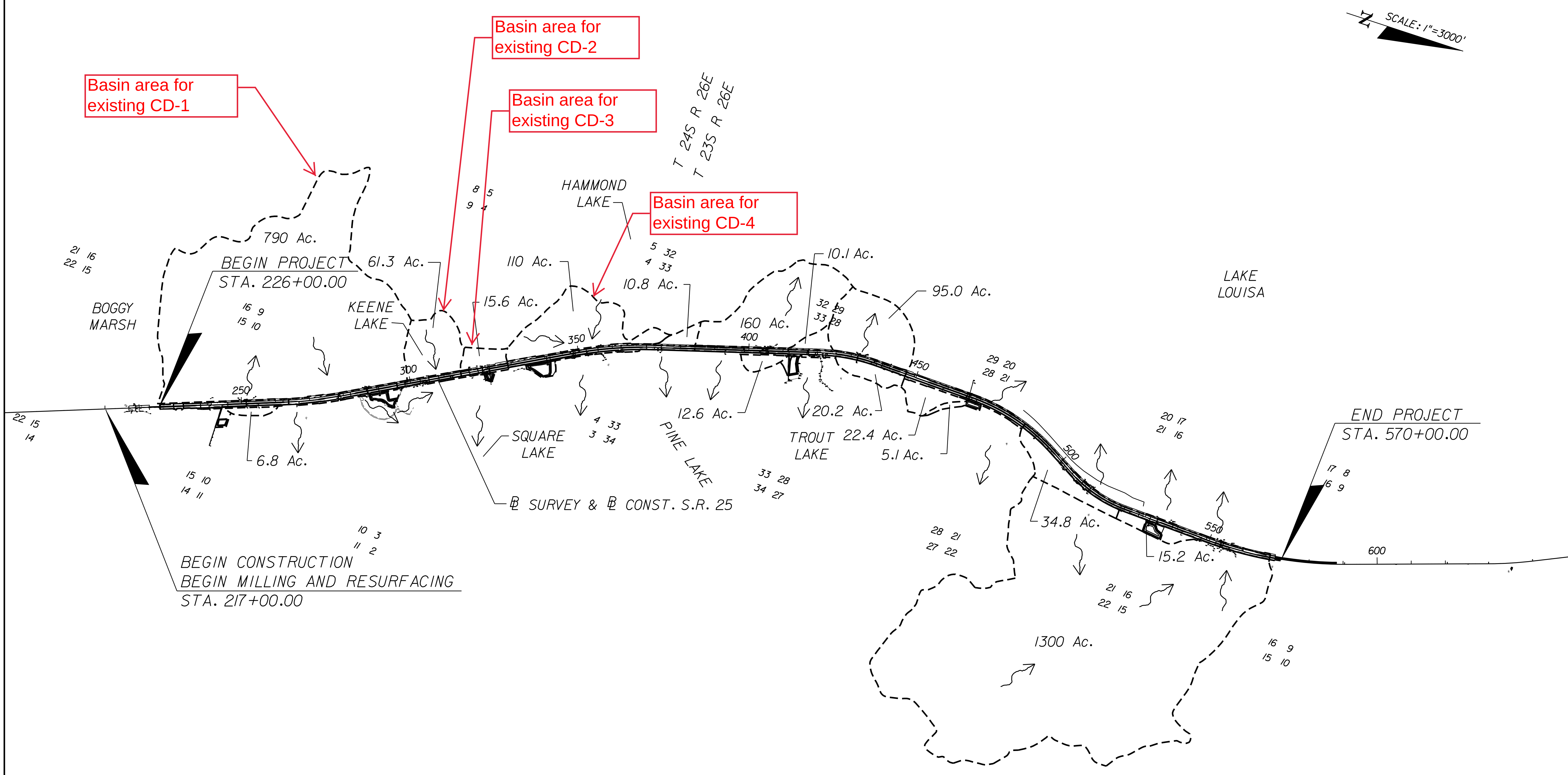
Link Min/Max Conditions [Scenario1]

Link Name	Sim Name	Max Flow [cfs]	Min Flow [cfs]	Min/Max Delta Flow [cfs]	Max Us Velocity [fps]	Max Ds Velocity [fps]	Max Avg Velocity [fps]
FlowA8	100yr	3.70	0.00	0.00	2.76	2.52	2.63
FlowB9	100yr	3.44	0.00	-0.01	2.59	4.18	3.38
FlowCD10	100yr	28.02	0.00	-0.18	8.92	9.16	9.04
Ridge AB	100yr	0.00	0.00	0.00	0.00	0.00	0.00
Ridge CB	100yr	0.00	0.00	0.00	0.00	0.00	0.00
FlowA8	10yr	1.97	0.00	0.00	2.29	1.60	1.94
FlowB9	10yr	2.30	0.00	0.00	2.29	3.72	3.01
FlowCD10	10yr	28.02	0.00	-0.18	8.92	9.16	9.04
Ridge AB	10yr	0.00	0.00	0.00	0.00	0.00	0.00
Ridge CB	10yr	0.00	0.00	0.00	0.00	0.00	0.00
FlowA8	25yr	2.59	0.00	0.00	2.47	1.95	2.21
FlowB9	25yr	2.71	0.00	0.00	2.41	3.87	3.14
FlowCD10	25yr	28.02	0.00	-0.18	8.92	9.16	9.04
Ridge AB	25yr	0.00	0.00	0.00	0.00	0.00	0.00
Ridge CB	25yr	0.00	0.00	0.00	0.00	0.00	0.00
FlowA8	50yr	3.25	0.00	0.00	2.65	2.29	2.47
FlowB9	50yr	3.15	0.00	0.01	2.52	4.05	3.29
FlowCD10	50yr	28.02	0.00	-0.18	8.92	9.16	9.04
Ridge AB	50yr	0.00	0.00	0.00	0.00	0.00	0.00
Ridge CB	50yr	0.00	0.00	0.00	0.00	0.00	0.00

Node Max Conditions [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
Area A	100yr	132.00	103.06	0.0005	541.11	3.70	3171299
Area B	100yr	114.00	104.55	0.0010	96.11	3.44	618895
Area C1	100yr	143.00	119.00	0.0280	18.68	28.02	285
Area C2	100yr	119.00	109.94	0.0010	59.58	0.00	178413
CD-8&9 Downstream	100yr	107.00	102.71	0.0004	404.32	0.00	6248605
Area A	10yr	132.00	102.73	0.0005	363.20	1.97	3034301
Area B	10yr	114.00	104.33	0.0010	57.61	2.30	598969
Area C1	10yr	143.00	119.00	0.0280	11.97	28.02	285
Area C2	10yr	119.00	109.46	0.0010	38.18	0.00	131584
CD-8&9 Downstream	10yr	107.00	102.52	0.0004	270.89	0.00	5412400
Area A	25yr	132.00	102.86	0.0005	429.07	2.59	3092729
Area B	25yr	114.00	104.41	0.0010	71.55	2.71	606228
Area C1	25yr	143.00	119.00	0.0280	14.43	28.02	285
Area C2	25yr	119.00	109.65	0.0010	46.05	0.00	150451
CD-8&9 Downstream	25yr	107.00	102.59	0.0004	320.30	0.00	5735215
Area A	50yr	132.00	102.98	0.0005	496.02	3.25	3150941
Area B	50yr	114.00	104.50	0.0010	86.10	3.15	613753
Area C1	50yr	143.00	119.00	0.0280	16.97	28.02	285
Area C2	50yr	119.00	109.83	0.0010	54.15	0.00	167663
CD-8&9 Downstream	50yr	107.00	102.67	0.0004	370.49	0.00	6046961

Appendix G – Existing Permits



DRAINAGE MAP NOTE:
DO NOT USE THE INFORMATION ON THIS SHEET FOR CONSTRUCTION PURPOSES. THIS SHEET IS IN THE PLANS FOR DOCUMENTATION AND TO ASSIST CONSTRUCTION PERSONNEL WITH DRAINAGE CONCERNS.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

FRANK, FU, P.E.
P.E. LICENSE NUMBER 49940
HDR Engineering, Inc.
315 E. ROBINDON STREET, SUITE 400
ORLANDO, FL. 32801-1949
CERTIFICATE OF AUTHORIZATION 4213

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
S.R. 25	LAKE	238422-1-52-01

DRAINAGE MAP

SHEET NO. 5

NOTICE: THE OFFICAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

HDR ONE COMPANY | Many Solutions

March 30, 2005

St. Johns River Water Management District
ERP Permitting
975 Keller Road
Altamonte Springs, FL 32714

Existing cross drain 1-4 information used for the HY-8 existing conditions analysis

RE: SR 25 (US 27) Widening
From Boggy Marsh Road to 1000 ft North Lake Louisa Road
Lake County
ERP Permit Application – Individual Permit
(Cross Drain Calculations)

To Whom It May Concern:

Please find enclosed the following information pertaining to the referenced project:

- Five (5) Signed And Sealed Cross Drain Calculations

The above calculations are to supplement the permit application package submitted on March 28, 2005.

Should you have any questions, please contact me at (407) 420-4215 or via email at Glen.Partlow@hdrinc.com.

Sincerely,
HDR Engineering, Inc.

Glen Partlow, PE
Drainage Engineer

cc: Todd Long, FDOT
Amy Sirmans, FDOT
Mike Hill, FDOT
Andy Lauzier, HDR
File

90260-2

RECEIVED
MAR 30 2005
RDS
ALTAMONTE SVC. CTR

Drainage Design Documentation
for

SR 25 (US 27)

From Boggy Marsh Road to 1000 ft. North of Lake Louisa Road

SJRWMD Permit Submittal
(Cross Drains)

Financial Project ID. 238422-1-32-02

90260-2

Prepared by:
HDR
HDR Engineering, Inc
315 E. Robinson St., Suite 400
Orlando, FL 32801

March 2005

FL PE # 58725
3-30-2005

Crossdrain Analysis

SECTION 15 CROSS DRAINS

15.1 Pre Development Analysis:

Six cross drains were identified within the project limits. The cross drains are identified on the following table:

ID	Station	Size	Action
CD 1	287+13	(2) 10'x4' CBC	Extend
CD 2	305+50	4'x3' CBC	Extend
CD 3	321+48	2'x2' CBC + 30" RCP	Replace
CD 4	348+48	5'x2' CBC	Extend
CD 5	511+72	4'x3' CBC	Extend
CD 6	553+53	(3) 6'x5' CBC	Extend

CD 3 and CD 5 originally were 2'x2' concrete box culverts that had been extended with 30" round RCP. The FDOT has requested that these cross drains be replaced with new cross drain pipes. All other cross drains, 30" and larger, will be extended if possible.

A hydrologic analysis was conducted to estimate the discharges for the design year frequency, the base flood and the greatest flood. A design frequency of 50 years was determined as the minimum for this roadway. The base flood and the greatest flood used frequencies of 100 years and 500 years, respectively.

Discharge rates for cross drains 48" and smaller were estimated using recommended design procedures found in the FDOT Cross Drain Handbook, dated August 1996. This design procedure is for culvert extensions and replacements in areas with no known historical problems. Using the methodologies suggested in the handbook the 25 year discharge (Q_{25}) was estimated taking the cross sectional area of the pipe and multiplying it by a velocity of 6 feet per second. The 50 year discharge, (Q_{50}) was estimated by multiplying Q_{25} by 1.25, the 100 year discharge, (Q_{100}) was estimated by multiplying Q_{25} by 1.4 and the 500 year discharge (Q_{500}) was estimated by multiplying (Q_{100}) by 1.7.

The rational method (Q=CIA) was used to determine Q_{50} and Q_{100} for cross drains greater than 48" and less than 20' bridge. Please see the attached calculation to see applicable drainage areas, run-off coefficients, rainfall intensities and time of concentrations. Q_{500} was estimated by plotting Q_{50} and Q_{100} flow rates on log probability paper and projecting a line to the 500 year probability. The discharged determined using the rational method were compared to the discharges determined in the Location Hydraulics Report for SR 25 prepared by FDOT District 5, updated February 1999. The two methods produced comparable results and the discharges determined using the rational method were chosen for comparison since they were slightly higher.

After the flow rates were determined, a hydraulic analysis using FHWA Culvert Analysis HY-8, Version 6.1 was conducted. Using the design (Q_{50}), base (Q_{100}) and greatest (Q_{500}) discharges the pre-developed conditions were modeled to determine the water surface elevation for each design event. The tailwater elevations used for the HY-8 analysis are consistent with the elevations found the SR 25 Design High Water Report prepared by HDR Engineering, dated December 2003.

15.2 Post Development Analysis

A hydraulic analysis using FHWA Culvert Analysis HY-8, Version 6.1 for the post-developed conditions was conducted using the same discharge rates and tailwater condition as the pre-developed condition. The pre-development and post-development water surface elevations for the 50 year storm and overtopping frequencies are summarized in the following table. The largest post-development water surface elevation stage increase was 0.15 ft and the road is not overtopped during the design event.

ID	50 year Pre Elevation (ft)	50 year Post Elevation (ft)	Overtopping Elevation (ft)	Overtopping Frequency (year)
CD 1	112.59	112.59	115.60	>500
CD 2	112.71	112.76	155.29	229
CD 3	112.60	112.07	117.00	388
CD 4	107.75	107.90	110.37	213
CD 5	101.60	101.60	103.34	168
CD 6	98.34	9835	103.39	>500

15.3 Scour:

Only one existing crossdrain, CD 2, showed signs of scour during the project field review. A scour hole approximately 13.5" deep was observed on the downstream end of the crossdrain. Since the crossdrain is to be extend and that the scour hole is small and localized, it was determined that a blanket of rubble rip-rap would be sufficient on the downstream side of the proposed extension

Designed by: GTP
Checked by: CJL

****

Financial Project ID : 238422-1-52-01
Date : 10/13/2004

****

STRUCTURE No.	STATION	DESIGN FLOOD		BASE FLOOD		OVERTOPPING FLOOD				GREATEST FLOOD			
		2 % Prob.	50 yr Freq.	1 % Prob.	100 yr Freq.			Prob.	Freq.			Prob.	Freq.
		Discharge	Stage	Discharge	Stage	Discharge	Stage	%	yr	Discharge	Stage	%	yr
S-213	287+13	285.8	112.59	344.1	113.00					470	113.83	0.2	500
S-235	305+50	90.0	112.76	100.8	113.38	132.4	115.29	0.44	229				
S-307	321+35	36.8	111.19	41.2	112.07	64.5	117.00	0.26	388				
S-419	348+48	75.0	107.90	84.0	108.49	107.7	110.37	0.47	213				
S-726	511+72	90.0	101.60	100.8	102.18	119.6	103.34	0.60	168				
S-765	553+53	273.4	98.35	314.7	98.58					420	99.17	0.2	500

NOTE : The hydraulic data is shown for informational purposes only, to indicate the flood discharges and water surface elevations which may be anticipated in any given year. This data was generated using highly variable factors determined by a study of the watershed. Many judgements and assumptions assumptions are required to establish these factors. The resultant hydraulic data is sensitive to changes, particularly of antecedent conditions, urbanization, channelization, and land use. Users of this data are cautioned against the assumption of precision which can not be attained. Discharges are in cubic feet per second (cfs) and stages are in feet (ft), NAVD, 1988.

DEFINITIONS:

Design Flood : The flood selected by the FDOT to be utilized to assure a standard level of hydraulic performance.
Base Flood : The flood having a 1 % chance of being exceeded in any year. (100 yr frequency)
Overtopping Flood : The flood where flow occurs (A) over the highway, (B) over a watershed divide or (C) thru emergency relief structures.
Greatest Flood : The most severe flood which can be predicted where overtopping is not practicable, normally one with a 0.2 % chance of being exceeded in any year. (500 yr frequency)

Data adapted from : N/A

Prepared By : Glen T. Partlow, P.E.
Date : October 13, 2004

Approved for use
on this project By : ________________
Date : _________

Structure No.	Existing Culverts			FLOW RATES, cfs							FLOOD STAGES, ft						
	No. of barrels	Dia. inch	Flow area sq ft	Q 25	Q 50	Q 100	Overtopping Flow	Overtopping % Prob.	Overtopping Freq yr	Q 500	Fl	i yr	25 yr	50 yr	100 yr	Overtop stage	500 yr
S-213	2	10 x 4	80.0	N/A	285.8	344.1	698	0.03	3856	470.0		-	-	112.59	113.00	115.60	113.83
S-235	1	4 x 3	12.0	72.0	90.0	100.8	132.4	0.44	229	171.4		-	-	112.76	113.38	115.29	-
S-307	1	30	4.9	29.5	36.8	41.2	64.5	0.26	388	70.1		-	-	111.19	112.07	117.00	-
S-419	1	5 x 2	10.0	60.0	75.0	84.0	107.7	0.47	213	142.8		-	-	107.90	108.49	110.37	-
S-726	1	4 x 3	12.0	72.0	90.0	100.8	119.6	0.60	168	171.4		-	-	101.60	102.18	103.34	-
S-765	3	6 x 5	90.0	N/A	273.4	314.7	979	0.00	55989	420.0		-	-	98.35	98.58	103.18	99.17

% Probalility : 4.0 2.0 1.0 0.2
Log of prob. : 0.6021 0.301 0 -0.69897

$Q_{25} = A\ V$, $V = 6.0$ fps
$Q_{50} = Q_{25}*1.25$
$Q_{100} = Q_{25}*1.4$
$Q_{500} = Q_{100}*1.7$

Was Determined from LOG(flow) vers LOG(prob.) ratios

Was determined from stage vers flow ratios

Flow rate in CD-4 Pre-development model in ICPR for the 25-year storm is equal to 60 CFS.

CURRENT DATE: 10-02-2004
CURRENT TIME: 12:46:00

FILE DATE: 10-02-2004
FILE NAME: 28713EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA: INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	109.41	109.20	150.00	2 RCB	10.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 28713EX DATE: 10-02-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
112.59 50YR	285.8	285.8	0.0	0.0	0.0	0.0	0.0	0.00	1
112.72	304.2	304.2	0.0	0.0	0.0	0.0	0.0	0.00	1
112.86	322.6	322.6	0.0	0.0	0.0	0.0	0.0	0.00	1
112.99	341.1	341.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.01 100YR	344.1	344.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.24	377.9	377.9	0.0	0.0	0.0	0.0	0.0	0.00	1
113.36	396.3	396.3	0.0	0.0	0.0	0.0	0.0	0.00	1
113.48	414.7	414.7	0.0	0.0	0.0	0.0	0.0	0.00	1
113.60	433.2	433.2	0.0	0.0	0.0	0.0	0.0	0.00	1
113.72	451.6	451.6	0.0	0.0	0.0	0.0	0.0	0.00	1
113.84 500YR	470.0	470.0	0.0	0.0	0.0	0.0	0.0	0.00	1
115.60	698.2	698.2	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 28713EX DATE: 10-02-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
112.59	0.000	285.80	0.00	0.00
112.72	0.000	304.22	0.00	0.00
112.86	0.000	322.64	0.00	0.00
112.99	0.000	341.06	0.00	0.00
113.01	0.000	344.10	0.00	0.00
113.24	0.000	377.90	0.00	0.00
113.36	0.000	396.32	0.00	0.00
113.48	0.000	414.74	0.00	0.00
113.60	0.000	433.16	0.00	0.00
113.72	0.000	451.58	0.00	0.00
113.84	0.000	470.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-6

URRENT DATE: 10-02-2004
‾RRENT TIME: 12:46:00

FILE DATE: 10-02-2004
FILE NAME: 28713EX

PERFORMANCE CURVE FOR CULVERT 1 - 2(10.00 (ft) BY 4.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
285.80	112.59	3.13	3.18	3-M2t	2.28	1.85	1.86	1.86	7.68	0.00
304.22	112.72	3.26	3.31	2-M2c	2.38	1.93	1.93	1.86	7.87	0.00
322.64	112.86	3.39	3.45	2-M2c	2.48	2.01	2.01	1.86	8.02	0.00
341.06	112.99	3.52	3.58	2-M2c	2.58	2.09	2.09	1.86	8.17	0.00
344.10	113.01	3.54	3.60	2-M2c	2.59	2.10	2.10	1.86	8.20	0.00
377.90	113.24	3.77	3.83	2-M2c	2.77	2.23	2.23	1.86	8.46	0.00
396.32	113.36	3.90	3.95	2-M2c	2.86	2.31	2.31	1.86	8.59	0.00
414.74	113.48	4.03	4.07	2-M2c	2.95	2.38	2.38	1.86	8.72	0.00
433.16	113.60	4.15	4.19	2-M2c	3.05	2.45	2.45	1.86	8.85	0.00
451.58	113.72	4.28	4.31	2-M2c	3.14	2.52	2.52	1.86	8.97	0.00
470.00	113.84	4.41	4.43	2-M2c	3.23	2.58	2.58	1.86	9.09	0.00

El. inlet face invert 109.41 ft El. outlet invert 109.20 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	109.41 ft
OUTLET STATION	150.00 ft
OUTLET ELEVATION	109.20 ft
NUMBER OF BARRELS	2
SLOPE (V/H)	0.0014
CULVERT LENGTH ALONG SLOPE	150.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	10.00 ft
BARREL RISE	4.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-7

'URRENT DATE: 10-02-2004
'¨RRENT TIME: 12:46:00

FILE DATE: 10-02-2004
FILE NAME: 28713EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
111.06

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	115.60 ft

CURRENT DATE: 10-02-2004
CURRENT TIME: 12:47:21

FILE DATE: 10-02-2004
FILE NAME: 28713PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	109.40	109.20	170.00	2 RCB	10.00	4.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 28713PR DATE: 10-02-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
112.59 50YR	285.8	285.8	0.0	0.0	0.0	0.0	0.0	0.00	1
112.72	304.2	304.2	0.0	0.0	0.0	0.0	0.0	0.00	1
112.85	322.6	322.6	0.0	0.0	0.0	0.0	0.0	0.00	1
112.98	341.1	341.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.00 100YR	344.1	344.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.23	377.9	377.9	0.0	0.0	0.0	0.0	0.0	0.00	1
113.36	396.3	396.3	0.0	0.0	0.0	0.0	0.0	0.00	1
113.48	414.7	414.7	0.0	0.0	0.0	0.0	0.0	0.00	1
113.60	433.2	433.2	0.0	0.0	0.0	0.0	0.0	0.00	1
113.72	451.6	451.6	0.0	0.0	0.0	0.0	0.0	0.00	1
113.83 500YR	470.0	470.0	0.0	0.0	0.0	0.0	0.0	0.00	1
116.50	795.7	795.7	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 28713PR DATE: 10-02-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
112.59	0.000	285.80	0.00	0.00
112.72	0.000	304.22	0.00	0.00
112.85	0.000	322.64	0.00	0.00
112.98	0.000	341.06	0.00	0.00
113.00	0.000	344.10	0.00	0.00
113.23	0.000	377.90	0.00	0.00
113.36	0.000	396.32	0.00	0.00
113.48	0.000	414.74	0.00	0.00
113.60	0.000	433.16	0.00	0.00
113.72	0.000	451.58	0.00	0.00
113.83	0.000	470.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010   <2> TOLERANCE (%) = 1.000

15-9

:URRENT DATE: 10-02-2004
·‾‾RRENT TIME: 12:47:21

FILE DATE: 10-02-2004
FILE NAME: 28713PR

PERFORMANCE CURVE FOR CULVERT 1 - 2(10.00 (ft) BY 4.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
285.80	112.59	3.13	3.19	3-M2t	2.41	1.85	1.86	1.86	7.68	0.00
304.22	112.72	3.26	3.32	2-M2c	2.51	1.93	1.93	1.86	7.87	0.00
322.64	112.85	3.39	3.45	2-M2c	2.61	2.01	2.01	1.86	8.02	0.00
341.06	112.98	3.52	3.58	2-M2c	2.72	2.09	2.09	1.86	8.17	0.00
344.10	113.00	3.54	3.60	2-M2c	2.74	2.10	2.10	1.86	8.20	0.00
377.90	113.23	3.77	3.83	2-M2c	2.92	2.23	2.23	1.86	8.46	0.00
396.32	113.36	3.90	3.96	2-M2c	3.02	2.31	2.31	1.86	8.59	0.00
414.74	113.48	4.03	4.08	2-M2c	3.12	2.38	2.38	1.86	8.72	0.00
433.16	113.60	4.15	4.20	2-M2c	3.22	2.45	2.45	1.86	8.85	0.00
451.58	113.72	4.28	4.32	2-M2c	3.31	2.52	2.52	1.86	8.97	0.00
470.00	113.83	4.41	4.43	2-M2c	3.41	2.58	2.58	1.86	9.09	0.00

El. inlet face invert 109.40 ft El. outlet invert 109.20 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	109.40 ft
OUTLET STATION	170.00 ft
OUTLET ELEVATION	109.20 ft
NUMBER OF BARRELS	2
SLOPE (V/H)	0.0012
CULVERT LENGTH ALONG SLOPE	170.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	10.00 ft
BARREL RISE	4.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-10

'URRENT DATE: 10-02-2004 FILE DATE: 10-02-2004
'''RRENT TIME: 12:47:21 FILE NAME: 28713PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
111.06

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	116.50 ft

15-11

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:43:08

FILE DATE: 09-08-2004
FILE NAME: 30550EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA: INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	107.93	107.85	150.00	1 RCB	4.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 30550EX DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
112.71 50YR	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
113.14	98.1	98.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.30 100YR	100.8	100.8	0.0	0.0	0.0	0.0	0.0	0.00	1
114.05	114.4	114.4	0.0	0.0	0.0	0.0	0.0	0.00	1
114.33	122.6	119.1	0.0	0.0	0.0	0.0	0.0	2.31	26
114.37	130.7	119.8	0.0	0.0	0.0	0.0	0.0	10.02	7
114.40	138.8	120.3	0.0	0.0	0.0	0.0	0.0	17.33	5
114.42	147.0	120.8	0.0	0.0	0.0	0.0	0.0	25.28	5
114.45	155.1	121.2	0.0	0.0	0.0	0.0	0.0	32.62	4
114.47	163.3	121.6	0.0	0.0	0.0	0.0	0.0	40.46	4
114.49 500YR	171.4	121.9	0.0	0.0	0.0	0.0	0.0	48.41	4
114.30	118.7	118.7	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 30550EX DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
112.71	0.000	90.00	0.00	0.00
113.14	0.000	98.14	0.00	0.00
113.30	0.000	100.80	0.00	0.00
114.05	0.000	114.42	0.00	0.00
114.33	-0.003	122.56	1.15	0.94
114.37	-0.002	130.70	0.86	0.66
114.40	-0.003	138.84	1.20	0.86
114.42	-0.002	146.98	0.91	0.62
114.45	-0.004	155.12	1.33	0.86
114.47	-0.004	163.26	1.25	0.77
114.49	-0.003	171.40	1.07	0.62

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-12

URRENT DATE: 09-08-2004 FILE DATE: 09-08-2004
RRENT TIME: 10:43:08 FILE NAME: 30550EX

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.00 (ft) BY 3.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
90.00	112.71	4.60	4.78	2-M2c	3.00	2.51	2.51	1.97	8.96	0.00
98.14	113.14	5.03	5.21	2-M2c	3.00	2.66	2.66	1.97	9.22	0.00
100.80	113.30	5.18	5.37	2-M2c	3.00	2.71	2.71	1.97	9.31	0.00
114.42	114.05	6.00	6.12	2-M2c	3.00	2.95	2.95	1.97	9.71	0.00
119.10	114.32	6.31	6.39	6-FFc	3.00	3.00	3.00	1.97	9.93	0.00
119.82	114.36	6.36	6.43	6-FFc	3.00	3.00	3.00	1.97	9.98	0.00
120.32	114.39	6.39	6.46	6-FFc	3.00	3.00	3.00	1.97	10.03	0.00
120.78	114.42	6.42	6.49	6-FFc	3.00	3.00	3.00	1.97	10.07	0.00
121.17	114.44	6.45	6.51	6-FFc	3.00	3.00	3.00	1.97	10.10	0.00
121.55	114.47	6.47	6.54	6-FFc	3.00	3.00	3.00	1.97	10.13	0.00
121.92	114.49	6.50	6.56	6-FFc	3.00	3.00	3.00	1.97	10.16	0.00

El. inlet face invert 107.93 ft El. outlet invert 107.85 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	107.93 ft
OUTLET STATION	150.00 ft
OUTLET ELEVATION	107.85 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0005
CULVERT LENGTH ALONG SLOPE	150.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	4.00 ft
BARREL RISE	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-13

:URRENT DATE: 09-08-2004
¨RRENT TIME: 10:43:08

FILE DATE: 09-08-2004
FILE NAME: 30550EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
109.82

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	114.30 ft

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:44:10

FILE DATE: 09-08-2004
FILE NAME: 30550PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C U L V NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	108.00	107.85	165.00	1 RCB	4.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs)   FILE: 30550PR   DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
112.76 50YR	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
113.21	98.1	98.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.38 100YR	100.8	100.8	0.0	0.0	0.0	0.0	0.0	0.00	1
114.16	114.4	114.4	0.0	0.0	0.0	0.0	0.0	0.00	1
114.65	122.6	122.6	0.0	0.0	0.0	0.0	0.0	0.00	1
115.17	130.7	130.7	0.0	0.0	0.0	0.0	0.0	0.00	1
115.33	138.8	133.1	0.0	0.0	0.0	0.0	0.0	4.77	16
115.37	147.0	133.6	0.0	0.0	0.0	0.0	0.0	12.34	6
115.40	155.1	134.0	0.0	0.0	0.0	0.0	0.0	19.99	5
115.42	163.3	134.4	0.0	0.0	0.0	0.0	0.0	27.31	4
115.44 500YR	171.4	134.7	0.0	0.0	0.0	0.0	0.0	35.24	4
115.29	132.4	132.4	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS   FILE: 30550PR   DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
112.76	0.000	90.00	0.00	0.00
113.21	0.000	98.14	0.00	0.00
113.38	0.000	100.80	0.00	0.00
114.16	0.000	114.42	0.00	0.00
114.65	0.000	122.56	0.00	0.00
115.17	0.000	130.70	0.00	0.00
115.33	-0.002	138.84	1.00	0.72
115.37	-0.003	146.98	1.05	0.71
115.40	-0.003	155.12	1.11	0.72
115.42	-0.004	163.26	1.59	0.97
115.44	-0.004	171.40	1.45	0.85

<1> TOLERANCE (ft) = 0.010   <2> TOLERANCE (%) = 1.000

15-15

'URRENT DATE: 09-08-2004
'''RRENT TIME: 10:44:10

FILE DATE: 09-08-2004
FILE NAME: 30550PR

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.00 (ft) BY 3.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
90.00	112.76	4.60	4.76	2-M2c	3.00	2.51	2.51	1.97	8.96	0.00
98.14	113.21	5.03	5.21	2-M2c	3.00	2.66	2.66	1.97	9.22	0.00
100.80	113.38	5.18	5.38	2-M2c	3.00	2.71	2.71	1.97	9.31	0.00
114.42	114.16	6.00	6.16	2-M2c	3.00	2.95	2.95	1.97	9.71	0.00
122.56	114.65	6.54	6.65	6-FFc	3.00	3.00	3.00	1.97	10.21	0.00
130.70	115.17	7.13	7.17	6-FFc	3.00	3.00	3.00	1.97	10.89	0.00
133.07	115.33	7.31	7.33	6-FFc	3.00	3.00	3.00	1.97	11.09	0.00
133.59	115.37	7.35	7.37	6-FFc	3.00	3.00	3.00	1.97	11.13	0.00
134.01	115.39	7.38	7.39	6-FFc	3.00	3.00	3.00	1.97	11.17	0.00
134.37	115.42	7.40	7.42	6-FFc	3.00	3.00	3.00	1.97	11.20	0.00
134.71	115.44	7.43	7.44	6-FFc	3.00	3.00	3.00	1.97	11.23	0.00

El. inlet face invert 108.00 ft El. outlet invert 107.85 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	108.00 ft
OUTLET STATION	165.00 ft
OUTLET ELEVATION	107.85 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0009
CULVERT LENGTH ALONG SLOPE	165.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	4.00 ft
BARREL RISE	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

URRENT DATE: 09-08-2004
‾RRENT TIME: 10:44:10

FILE DATE: 09-08-2004
FILE NAME: 30550PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
109.82

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	115.29 ft

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:48:20

FILE DATE: 09-08-2004
FILE NAME: 32148EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C U L V NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	107.18	106.21	175.00	1 RCB	2.00	2.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs)   FILE: 32148EX   DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
112.60 50YR	36.8	36.8	0.0	0.0	0.0	0.0	0.0	0.00	1
113.43	40.1	40.1	0.0	0.0	0.0	0.0	0.0	0.00	1
113.71 100YR	41.2	41.2	0.0	0.0	0.0	0.0	0.0	0.00	1
115.31	46.8	46.8	0.0	0.0	0.0	0.0	0.0	0.00	1
116.31	50.1	50.0	0.0	0.0	0.0	0.0	0.0	0.00	3
116.37	53.5	50.2	0.0	0.0	0.0	0.0	0.0	2.77	26
116.38	56.8	50.2	0.0	0.0	0.0	0.0	0.0	6.07	9
116.39	60.1	50.2	0.0	0.0	0.0	0.0	0.0	9.43	8
116.40	63.4	50.3	0.0	0.0	0.0	0.0	0.0	12.70	7
116.41	66.8	50.3	0.0	0.0	0.0	0.0	0.0	15.90	6
116.41 500YR	70.1	50.3	0.0	0.0	0.0	0.0	0.0	19.26	6
116.35	50.1	50.1	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS   FILE: 32148EX   DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
112.60	0.000	36.80	0.00	0.00
113.43	0.000	40.13	0.00	0.00
113.71	0.000	41.20	0.00	0.00
115.31	0.000	46.79	0.00	0.00
116.31	1.000	50.12	0.15	0.30
116.37	-0.001	53.45	0.52	0.97
116.38	-0.001	56.78	0.52	0.92
116.39	-0.001	60.11	0.46	0.77
116.40	-0.001	63.44	0.49	0.77
116.41	-0.001	66.77	0.60	0.90
116.41	-0.001	70.10	0.54	0.77

<1> TOLERANCE (ft) = 0.010   <2> TOLERANCE (%) = 1.000

15-18

'URRENT DATE: 09-08-2004
'RRENT TIME: 10:48:20

FILE DATE: 09-08-2004
FILE NAME: 32148EX

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
36.80	112.60	4.98	5.42	6-FFc	2.00	2.00	2.00	1.53	9.20	0.00
40.13	113.43	5.64	6.25	6-FFc	2.00	2.00	2.00	1.53	10.03	0.00
41.20	113.71	5.86	6.53	6-FFc	2.00	2.00	2.00	1.53	10.30	0.00
46.79	115.31	7.25	8.13	6-FFc	2.00	2.00	2.00	1.53	11.70	0.00
49.97	116.31	8.13	9.13	6-FFc	2.00	2.00	2.00	1.53	12.49	0.00
50.15	116.37	8.18	9.19	6-FFc	2.00	2.00	2.00	1.53	12.54	0.00
50.19	116.38	8.19	9.20	6-FFc	2.00	2.00	2.00	1.53	12.55	0.00
50.22	116.39	8.20	9.21	6-FFc	2.00	2.00	2.00	1.53	12.56	0.00
50.25	116.40	8.21	9.22	6-FFc	2.00	2.00	2.00	1.53	12.56	0.00
50.27	116.41	8.22	9.23	6-FFc	2.00	2.00	2.00	1.53	12.57	0.00
50.29	116.41	8.22	9.23	6-FFc	2.00	2.00	2.00	1.53	12.57	0.00

El. inlet face invert 107.18 ft El. outlet invert 106.21 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	107.18 ft
OUTLET STATION	175.00 ft
OUTLET ELEVATION	106.21 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0055
CULVERT LENGTH ALONG SLOPE	175.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	2.00 ft
BARREL RISE	2.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-19

:URRENT DATE: 09-08-2004
"RRENT TIME: 10:48:20

FILE DATE: 09-08-2004
FILE NAME: 32148EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
107.74

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	400.00 ft
OVERTOPPING CREST ELEVATION	116.35 ft

15-20

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:49:20

FILE DATE: 09-08-2004
FILE NAME: 32148PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C U L V NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	107.20	106.50	190.00	1 RCP	2.50	2.50	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 32148PR DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
111.19 50YR	36.8	36.8	0.0	0.0	0.0	0.0	0.0	0.00	1
111.90	40.1	40.1	0.0	0.0	0.0	0.0	0.0	0.00	1
112.07 100YR	41.2	41.2	0.0	0.0	0.0	0.0	0.0	0.00	1
113.09	46.8	46.8	0.0	0.0	0.0	0.0	0.0	0.00	1
113.79	50.1	50.1	0.0	0.0	0.0	0.0	0.0	0.00	1
114.47	53.5	53.5	0.0	0.0	0.0	0.0	0.0	0.00	1
115.20	56.8	56.8	0.0	0.0	0.0	0.0	0.0	0.00	1
115.95	60.1	60.1	0.0	0.0	0.0	0.0	0.0	0.00	1
116.74	63.4	63.4	0.0	0.0	0.0	0.0	0.0	0.00	1
116.85	66.8	63.9	0.0	0.0	0.0	0.0	0.0	0.00	30
117.01 500YR	70.1	64.5	0.0	0.0	0.0	0.0	0.0	0.51	30
117.00	64.5	64.5	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 32148PR DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
111.19	0.000	36.80	0.00	0.00
111.90	0.000	40.13	0.00	0.00
112.07	0.000	41.20	0.00	0.00
113.09	0.000	46.79	0.00	0.00
113.79	0.000	50.12	0.00	0.00
114.47	0.000	53.45	0.00	0.00
115.20	0.000	56.78	0.00	0.00
115.95	0.000	60.11	0.00	0.00
116.74	0.000	63.44	0.00	0.00
116.85	-0.003	66.77	2.91	4.36
117.01	-0.005	70.10	5.09	7.26

<1> TOLERANCE (ft) = 0.010   <2> TOLERANCE (%) = 1.000

15-21

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:49:20

FILE DATE: 09-08-2004
FILE NAME: 32148PR

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.50 (ft) BY 2.50 (ft)) RCP

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
36.80	111.19	3.89	3.99	2-M2c	2.50	2.05	2.05	1.24	8.54	0.00
40.13	111.90	4.31	4.70	2-M2c	2.50	2.12	2.12	1.24	9.09	0.00
41.20	112.07	4.45	4.87	2-M2c	2.50	2.14	2.14	1.24	9.25	0.00
46.79	113.09	5.26	5.89	2-M2c	2.50	2.26	2.26	1.24	10.03	0.00
50.12	113.79	5.80	6.59	2-M2c	2.50	2.33	2.33	1.24	10.59	0.00
53.45	114.47	6.37	7.27	2-M2c	2.50	2.40	2.40	1.24	11.13	0.00
56.78	115.20	6.98	8.00	2-M2c	2.50	2.47	2.47	1.24	11.65	0.00
60.11	115.95	7.63	8.75	6-FFc	2.50	2.50	2.50	1.24	12.25	0.00
63.44	116.74	8.31	9.54	6-FFc	2.50	2.50	2.50	1.24	12.92	0.00
63.86	116.85	8.40	9.65	6-FFc	2.50	2.50	2.50	1.24	13.01	0.00
64.50	117.00	8.53	9.80	6-FFc	2.50	2.50	2.50	1.24	13.14	0.00

El. inlet face invert 107.20 ft El. outlet invert 106.50 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	107.20 ft
OUTLET STATION	190.00 ft
OUTLET ELEVATION	106.50 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0037
CULVERT LENGTH ALONG SLOPE	190.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.50 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:49:20

FILE DATE: 09-08-2004
FILE NAME: 32148PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
107.74

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	400.00 ft
OVERTOPPING CREST ELEVATION	117.00 ft

15-23

CURRENT DATE: 09-08-2004 FILE DATE: 09-08-2004
CURRENT TIME: 10:55:24 FILE NAME: 34848EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	103.88	103.58	150.00	1 RCB	5.00	2.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 34848EX DATE: 09-08-2004

ELEV (ft)		TOTAL	1	2	3	4	5	6	ROADWAY	ITR
107.75	50YR	75.0	75.0	0.0	0.0	0.0	0.0	0.0	0.00	1
108.16		81.8	81.8	0.0	0.0	0.0	0.0	0.0	0.00	1
108.30	100YR	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.00	1
109.12		95.3	95.3	0.0	0.0	0.0	0.0	0.0	0.00	1
109.28		102.1	97.3	0.0	0.0	0.0	0.0	0.0	4.02	27
109.30		108.9	97.6	0.0	0.0	0.0	0.0	0.0	10.33	7
109.32		115.7	97.9	0.0	0.0	0.0	0.0	0.0	16.88	6
109.34		122.5	98.1	0.0	0.0	0.0	0.0	0.0	23.24	5
109.36		129.2	98.3	0.0	0.0	0.0	0.0	0.0	29.99	5
109.37		136.0	98.4	0.0	0.0	0.0	0.0	0.0	36.77	5
109.38	500YR	142.8	98.6	0.0	0.0	0.0	0.0	0.0	42.94	4
109.25		97.0	97.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 34848EX DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
107.75	0.000	75.00	0.00	0.00
108.16	0.000	81.78	0.00	0.00
108.30	0.000	84.00	0.00	0.00
109.12	0.000	95.34	0.00	0.00
109.28	-0.001	102.12	0.78	0.76
109.30	-0.001	108.90	0.96	0.88
109.32	-0.001	115.68	0.94	0.81
109.34	-0.002	122.46	1.15	0.94
109.36	-0.002	129.24	0.98	0.76
109.37	-0.001	136.02	0.80	0.59
109.38	-0.002	142.80	1.26	0.88

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-24

:URRENT DATE: 09-08-2004
"'IRRENT TIME: 10:55:24

FILE DATE: 09-08-2004
FILE NAME: 34848EX

PERFORMANCE CURVE FOR CULVERT 1 - 1(5.00 (ft) BY 2.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
75.00	107.75	3.82	3.87	2-M2c	2.00	1.92	1.92	1.85	7.83	0.00
81.78	108.16	4.25	4.28	6-FFc	2.00	2.00	2.00	1.85	8.18	0.00
84.00	108.30	4.40	4.42	6-FFc	2.00	2.00	2.00	1.85	8.40	0.00
95.34	109.12	5.24	5.20	6-S2n	2.00	2.00	1.90	1.85	10.04	0.00
97.32	109.27	5.39	5.35	6-S2n	2.00	2.00	1.90	1.85	10.24	0.00
97.61	109.30	5.42	5.37	6-S2n	2.00	2.00	1.90	1.85	10.28	0.00
97.86	109.32	5.44	5.39	6-S2n	2.00	2.00	1.90	1.85	10.30	0.00
98.07	109.33	5.45	5.40	6-S2n	2.00	2.00	1.90	1.85	10.32	0.00
98.26	109.35	5.47	5.42	6-S2n	2.00	2.00	1.90	1.85	10.34	0.00
98.45	109.37	5.49	5.43	6-S2n	2.00	2.00	1.90	1.85	10.36	0.00
98.61	109.38	5.50	5.45	6-S2n	2.00	2.00	1.90	1.85	10.38	0.00

El. inlet face invert 103.88 ft El. outlet invert 103.58 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	103.88 ft
OUTLET STATION	150.00 ft
OUTLET ELEVATION	103.58 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0020
CULVERT LENGTH ALONG SLOPE	150.00 ft

:**** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	5.00 ft
BARREL RISE	2.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-25

:URRENT DATE: 09-08-2004
"IRRENT TIME: 10:55:24

FILE DATE: 09-08-2004
FILE NAME: 34848EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
105.43

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	300.00 ft
OVERTOPPING CREST ELEVATION	109.25 ft

CURRENT DATE: 09-08-2004
CURRENT TIME: 10:56:28

FILE DATE: 09-08-2004
FILE NAME: 34848PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	103.90	103.58	177.00	1 RCB	5.00	2.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs)   FILE: 34848PR   DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
107.90 50 YR	75.0	75.0	0.0	0.0	0.0	0.0	0.0	0.00	1
108.34	81.8	81.8	0.0	0.0	0.0	0.0	0.0	0.00	1
108.49 100 YR	84.0	84.0	0.0	0.0	0.0	0.0	0.0	0.00	1
109.33	95.3	95.3	0.0	0.0	0.0	0.0	0.0	0.00	1
109.88	102.1	102.1	0.0	0.0	0.0	0.0	0.0	0.00	1
110.20	108.9	105.8	0.0	0.0	0.0	0.0	0.0	0.00	30
110.41	115.7	108.2	0.0	0.0	0.0	0.0	0.0	6.54	23
110.43	122.5	108.4	0.0	0.0	0.0	0.0	0.0	12.87	6
110.45	129.2	108.6	0.0	0.0	0.0	0.0	0.0	19.76	6
110.47	136.0	108.8	0.0	0.0	0.0	0.0	0.0	26.17	5
110.48 500 YR	142.8	109.0	0.0	0.0	0.0	0.0	0.0	32.92	5
110.37	107.7	107.7	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS   FILE: 34848PR   DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
107.90	0.000	75.00	0.00	0.00
108.34	0.000	81.78	0.00	0.00
108.49	0.000	84.00	0.00	0.00
109.33	0.000	95.34	0.00	0.00
109.88	0.000	102.12	0.00	0.00
110.20	-0.006	108.90	3.12	2.87
110.41	-0.002	115.68	0.99	0.86
110.43	-0.002	122.46	1.20	0.98
110.45	-0.001	129.24	0.86	0.67
110.47	-0.002	136.02	1.04	0.76
110.48	-0.002	142.80	0.90	0.63

<1> TOLERANCE (ft) = 0.010   <2> TOLERANCE (%) = 1.000

15-27

'URRENT DATE: 09-08-2004
'`RRENT TIME: 10:56:28

FILE DATE: 09-08-2004
FILE NAME: 34848PR

PERFORMANCE CURVE FOR CULVERT 1 - 1(5.00 (ft) BY 2.00 (ft)) RCB

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
75.00	107.90	3.82	4.00	2-M2c	2.00	1.92	1.92	1.85	7.83	0.00
81.78	108.34	4.25	4.44	6-FFc	2.00	2.00	2.00	1.85	8.18	0.00
84.00	108.49	4.40	4.59	6-FFc	2.00	2.00	2.00	1.85	8.40	0.00
95.34	109.33	5.24	5.43	6-FFc	2.00	2.00	2.00	1.85	9.53	0.00
102.12	109.88	5.79	5.98	6-FFc	2.00	2.00	2.00	1.85	10.21	0.00
105.78	110.20	6.12	6.30	6-FFc	2.00	2.00	2.00	1.85	10.58	0.00
108.15	110.41	6.35	6.51	6-FFc	2.00	2.00	2.00	1.85	10.81	0.00
108.40	110.43	6.37	6.53	6-FFc	2.00	2.00	2.00	1.85	10.84	0.00
108.62	110.45	6.40	6.55	6-FFc	2.00	2.00	2.00	1.85	10.86	0.00
108.81	110.47	6.41	6.57	6-FFc	2.00	2.00	2.00	1.85	10.88	0.00
108.98	110.48	6.43	6.58	6-FFc	2.00	2.00	2.00	1.85	10.90	0.00

El. inlet face invert 103.90 ft El. outlet invert 103.58 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	103.90 ft
OUTLET STATION	177.00 ft
OUTLET ELEVATION	103.58 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0018
CULVERT LENGTH ALONG SLOPE	177.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	5.00 ft
BARREL RISE	2.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

:URRENT DATE: 09-08-2004
'RRENT TIME: 10:56:28

FILE DATE: 09-08-2004
FILE NAME: 34848PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
105.43

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	300.00 ft
OVERTOPPING CREST ELEVATION	110.37 ft

CURRENT DATE: 09-08-2004
CURRENT TIME: 11:02:41

FILE DATE: 09-08-2004
FILE NAME: 51172EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	97.00	96.61	150.00	1 RCB	4.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 51172EX DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
101.60 50YR	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
102.03	98.1	98.1	0.0	0.0	0.0	0.0	0.0	0.00	1
102.18 100YR	100.8	100.8	0.0	0.0	0.0	0.0	0.0	0.00	1
102.77	114.4	110.8	0.0	0.0	0.0	0.0	0.0	0.00	30
102.85	122.6	112.0	0.0	0.0	0.0	0.0	0.0	9.41	11
102.87	130.7	112.4	0.0	0.0	0.0	0.0	0.0	17.22	6
102.89	138.8	112.7	0.0	0.0	0.0	0.0	0.0	24.84	5
102.91	147.0	113.0	0.0	0.0	0.0	0.0	0.0	32.90	5
102.93	155.1	113.3	0.0	0.0	0.0	0.0	0.0	40.98	5
102.94	163.3	113.5	0.0	0.0	0.0	0.0	0.0	48.37	4
102.96 500YR	171.4	113.8	0.0	0.0	0.0	0.0	0.0	56.26	4
102.80	111.2	111.2	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 51172EX DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
101.60	0.000	90.00	0.00	0.00
102.03	0.000	98.14	0.00	0.00
102.18	0.000	100.80	0.00	0.00
102.77	-0.007	114.42	3.58	3.13
102.85	-0.002	122.56	1.19	0.97
102.87	-0.002	130.70	1.12	0.86
102.89	-0.002	138.84	1.30	0.94
102.91	-0.002	146.98	1.07	0.73
102.93	-0.002	155.12	0.85	0.55
102.94	-0.002	163.26	1.34	0.82
102.96	-0.003	171.40	1.34	0.78

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

:URRENT DATE: 09-08-2004 FILE DATE: 09-08-2004
‥RRENT TIME: 11:02:41 FILE NAME: 51172EX

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.00 (ft) BY 3.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
90.00	101.60	4.60	4.17	2-M2c	3.00	2.51	2.51	0.88	8.96	0.00
98.14	102.03	5.03	4.77	2-M2c	3.00	2.66	2.66	0.88	9.22	0.00
100.80	102.18	5.18	5.02	2-M2c	3.00	2.71	2.71	0.88	9.31	0.00
110.84	102.77	5.77	5.60	2-M2c	3.00	2.88	2.88	0.88	9.61	0.00
111.96	102.84	5.84	5.68	2-M2c	3.00	2.90	2.90	0.88	9.64	0.00
112.36	102.87	5.87	5.70	2-M2c	3.00	2.91	2.91	0.88	9.65	0.00
112.70	102.89	5.89	5.72	2-M2c	3.00	2.92	2.92	0.88	9.66	0.00
113.01	102.91	5.91	5.74	2-M2c	3.00	2.92	2.92	0.88	9.67	0.00
113.30	102.93	5.93	5.75	2-M2c	3.00	2.93	2.93	0.88	9.68	0.00
113.54	102.94	5.94	5.76	2-M2c	3.00	2.93	2.93	0.88	9.68	0.00
113.80	102.96	5.96	5.78	2-M2c	3.00	2.94	2.94	0.88	9.69	0.00

El. inlet face invert 97.00 ft El. outlet invert 96.61 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	97.00 ft
OUTLET STATION	150.00 ft
OUTLET ELEVATION	96.61 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0026
CULVERT LENGTH ALONG SLOPE	150.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	4.00 ft
BARREL RISE	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

:URRENT DATE: 09-08-2004
·‾RRENT TIME: 11:02:41

FILE DATE: 09-08-2004
FILE NAME: 51172EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
97.49

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	300.00 ft
OVERTOPPING CREST ELEVATION	102.80 ft

CURRENT DATE: 09-08-2004
CURRENT TIME: 11:03:58

FILE DATE: 09-08-2004
FILE NAME: 51172PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C U L V NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	97.00	96.60	170.00	1 RCB	4.00	3.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 51172PR DATE: 09-08-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
101.60 50 YR	90.0	90.0	0.0	0.0	0.0	0.0	0.0	0.00	1
102.03	98.1	98.1	0.0	0.0	0.0	0.0	0.0	0.00	1
102.18 100 YR	100.8	100.8	0.0	0.0	0.0	0.0	0.0	0.00	1
103.00	114.4	114.4	0.0	0.0	0.0	0.0	0.0	0.00	1
103.28	122.6	118.6	0.0	0.0	0.0	0.0	0.0	0.00	30
103.39	130.7	120.3	0.0	0.0	0.0	0.0	0.0	9.50	14
103.41	138.8	120.6	0.0	0.0	0.0	0.0	0.0	17.12	6
103.43	147.0	120.9	0.0	0.0	0.0	0.0	0.0	24.73	5
103.45	155.1	121.2	0.0	0.0	0.0	0.0	0.0	32.82	5
103.47	163.3	121.5	0.0	0.0	0.0	0.0	0.0	40.19	4
103.48 500 YR	171.4	121.7	0.0	0.0	0.0	0.0	0.0	48.13	4
103.34	119.6	119.6	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 51172PR DATE: 09-08-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
101.60	0.000	90.00	0.00	0.00
102.03	0.000	98.14	0.00	0.00
102.18	0.000	100.80	0.00	0.00
103.00	0.000	114.42	0.00	0.00
103.28	-0.006	122.56	3.96	3.23
103.39	-0.001	130.70	0.91	0.70
103.41	-0.002	138.84	1.08	0.78
103.43	-0.002	146.98	1.31	0.89
103.45	-0.002	155.12	1.08	0.70
103.47	-0.003	163.26	1.61	0.99
103.48	-0.003	171.40	1.56	0.91

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-33

CURRENT DATE: 09-08-2004 FILE DATE: 09-08-2004
CURRENT TIME: 11:03:58 FILE NAME: 51172PR

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.00 (ft) BY 3.00 (ft)) RCB

DIS- CHARGE FLOW (cfs)	HEAD- WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
90.00	101.60	4.60	4.34	2-M2c	3.00	2.51	2.51	0.89	8.96	0.00
98.14	102.03	5.03	4.90	2-M2c	3.00	2.66	2.66	0.89	9.22	0.00
100.80	102.18	5.18	5.13	2-M2c	3.00	2.71	2.71	0.89	9.31	0.00
114.42	103.00	6.00	5.95	2-M2c	3.00	2.95	2.95	0.89	9.71	0.00
118.60	103.27	6.27	6.20	6-S2n	3.00	3.00	2.90	0.89	10.22	0.00
120.29	103.39	6.39	6.30	6-S2n	3.00	3.00	2.90	0.89	10.37	0.00
120.64	103.41	6.41	6.32	6-S2n	3.00	3.00	2.90	0.89	10.40	0.00
120.94	103.43	6.43	6.34	6-S2n	3.00	3.00	2.90	0.89	10.43	0.00
121.22	103.45	6.45	6.36	6-S2n	3.00	3.00	2.90	0.89	10.45	0.00
121.46	103.47	6.47	6.37	6-S2n	3.00	3.00	2.90	0.89	10.47	0.00
121.70	103.48	6.48	6.39	6-S2n	3.00	3.00	2.90	0.89	10.49	0.00

El. inlet face invert 97.00 ft El. outlet invert 96.60 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	97.00 ft
OUTLET STATION	170.00 ft
OUTLET ELEVATION	96.60 ft
NUMBER OF BARRELS	1
SLOPE (V/H)	0.0024
CULVERT LENGTH ALONG SLOPE	170.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	4.00 ft
BARREL RISE	3.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-34

:URRENT DATE: 09-08-2004
"'RRENT TIME: 11:03:58

FILE DATE: 09-08-2004
FILE NAME: 51172PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
97.49

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	300.00 ft
OVERTOPPING CREST ELEVATION	103.34 ft

CURRENT DATE: 10-13-2004
CURRENT TIME: 14:34:12

FILE DATE: 10-13-2004
FILE NAME: 55353EX

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA: INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	94.81	94.80	150.00	3 RCB	6.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 55353EX DATE: 10-13-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
98.34 50 YR	273.4	273.4	0.0	0.0	0.0	0.0	0.0	0.00	1
98.43	288.1	288.1	0.0	0.0	0.0	0.0	0.0	0.00	1
98.52	302.7	302.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.60 100 YR	314.7	314.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.71	332.0	332.0	0.0	0.0	0.0	0.0	0.0	0.00	1
98.81	346.7	346.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.91	361.4	361.4	0.0	0.0	0.0	0.0	0.0	0.00	1
99.01	376.0	376.0	0.0	0.0	0.0	0.0	0.0	0.00	1
99.11	390.7	390.7	0.0	0.0	0.0	0.0	0.0	0.00	1
99.18	405.3	405.3	0.0	0.0	0.0	0.0	0.0	0.00	1
99.31 500 YR	420.0	420.0	0.0	0.0	0.0	0.0	0.0	0.00	1
103.18	948.4	948.4	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 55353EX DATE: 10-13-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
98.34	0.000	273.40	0.00	0.00
98.43	0.000	288.06	0.00	0.00
98.52	0.000	302.72	0.00	0.00
98.60	0.000	314.70	0.00	0.00
98.71	0.000	332.04	0.00	0.00
98.81	0.000	346.70	0.00	0.00
98.91	0.000	361.36	0.00	0.00
99.01	0.000	376.02	0.00	0.00
99.11	0.000	390.68	0.00	0.00
99.18	0.000	405.34	0.00	0.00
99.31	0.000	420.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-36

:URRENT DATE: 10-13-2004 FILE DATE: 10-13-2004
‾‾RRENT TIME: 14:34:12 FILE NAME: 55353EX

PERFORMANCE CURVE FOR CULVERT 1 - 3(6.00 (ft) BY 5.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
273.40	98.34	3.28	3.53	3-M2t	5.00	1.93	2.65	2.65	5.73	0.00
288.06	98.43	3.39	3.62	3-M2t	5.00	2.00	2.65	2.65	6.04	0.00
302.72	98.52	3.50	3.71	3-M2t	5.00	2.07	2.65	2.65	6.35	0.00
314.70	98.60	3.59	3.79	3-M2t	5.00	2.12	2.65	2.65	6.60	0.00
332.04	98.71	3.72	3.90	3-M2t	5.00	2.20	2.65	2.65	6.96	0.00
346.70	98.81	3.83	4.00	3-M2t	5.00	2.26	2.65	2.65	7.27	0.00
361.36	98.91	3.93	4.10	3-M2t	5.00	2.33	2.65	2.65	7.58	0.00
376.02	99.01	4.04	4.20	3-M2t	5.00	2.39	2.65	2.65	7.88	0.00
390.68	99.11	4.14	4.30	3-M2t	5.00	2.45	2.65	2.65	8.19	0.00
405.34	99.18	4.24	4.37	3-M2t	5.00	2.51	2.65	2.65	8.50	0.00
420.00	99.31	4.34	4.50	3-M2t	5.00	2.57	2.65	2.65	8.81	0.00

El. inlet face invert 94.81 ft El. outlet invert 94.80 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	94.81 ft
OUTLET STATION	150.00 ft
OUTLET ELEVATION	94.80 ft
NUMBER OF BARRELS	3
SLOPE (V/H)	0.0001
CULVERT LENGTH ALONG SLOPE	150.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	6.00 ft
BARREL RISE	5.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

15-37

URRENT DATE: 10-13-2004
"RRENT TIME: 14:34:12

FILE DATE: 10-13-2004
FILE NAME: 55353EX

TAILWATER

CONSTANT WATER SURFACE ELEVATION
97.45

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	92.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	103.18 ft

CURRENT DATE: 10-13-2004
CURRENT TIME: 14:50:03

FILE DATE: 10-13-2004
FILE NAME: 55353PR

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

CULV NO.	SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
	INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	94.81	94.80	172.00	3 RCB	6.00	5.00	.012	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: 55353PR DATE: 10-13-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
98.35 50 YR	273.4	273.4	0.0	0.0	0.0	0.0	0.0	0.00	1
98.45	288.1	288.1	0.0	0.0	0.0	0.0	0.0	0.00	1
98.54	302.7	302.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.58 100 YR	314.7	314.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.73	332.0	332.0	0.0	0.0	0.0	0.0	0.0	0.00	1
98.79	346.7	346.7	0.0	0.0	0.0	0.0	0.0	0.00	1
98.93	361.4	361.4	0.0	0.0	0.0	0.0	0.0	0.00	1
99.03	376.0	376.0	0.0	0.0	0.0	0.0	0.0	0.00	1
99.10	390.7	390.7	0.0	0.0	0.0	0.0	0.0	0.00	1
99.23	405.3	405.3	0.0	0.0	0.0	0.0	0.0	0.00	1
99.33 500 YR	420.0	420.0	0.0	0.0	0.0	0.0	0.0	0.00	1
103.39	969.6	969.6	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: 55353PR DATE: 10-13-2004

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
98.35	0.000	273.40	0.00	0.00
98.45	0.000	288.06	0.00	0.00
98.54	0.000	302.72	0.00	0.00
98.58	0.000	314.70	0.00	0.00
98.73	0.000	332.04	0.00	0.00
98.79	0.000	346.70	0.00	0.00
98.93	0.000	361.36	0.00	0.00
99.03	0.000	376.02	0.00	0.00
99.10	0.000	390.68	0.00	0.00
99.23	0.000	405.34	0.00	0.00
99.33	0.000	420.00	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

15-39

'URRENT DATE: 10-13-2004
'¯¯RRENT TIME: 14:50:03

FILE DATE: 10-13-2004
FILE NAME: 55353PR

PERFORMANCE CURVE FOR CULVERT 1 - 3(6.00 (ft) BY 5.00 (ft)) RCB

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
273.40	98.35	3.28	3.54	3-M2t	5.00	1.93	2.65	2.65	5.73	0.00
288.06	98.45	3.39	3.64	3-M2t	5.00	2.00	2.65	2.65	6.04	0.00
302.72	98.54	3.50	3.73	3-M2t	5.00	2.07	2.65	2.65	6.35	0.00
314.70	98.58	3.59	3.77	3-M2t	5.00	2.12	2.65	2.65	6.60	0.00
332.04	98.73	3.72	3.92	3-M2t	5.00	2.20	2.65	2.65	6.96	0.00
346.70	98.79	3.83	3.98	3-M2t	5.00	2.26	2.65	2.65	7.27	0.00
361.36	98.93	3.93	4.12	3-M2t	5.00	2.33	2.65	2.65	7.58	0.00
376.02	99.03	4.04	4.22	3-M2t	5.00	2.39	2.65	2.65	7.88	0.00
390.68	99.10	4.14	4.29	3-M2t	5.00	2.45	2.65	2.65	8.19	0.00
405.34	99.23	4.24	4.42	3-M2t	5.00	2.51	2.65	2.65	8.50	0.00
420.00	99.33	4.34	4.52	3-M2t	5.00	2.57	2.65	2.65	8.81	0.00

El. inlet face invert 94.81 ft El. outlet invert 94.80 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

***** SITE DATA ***** CULVERT INVERT **************

INLET STATION	0.00 ft
INLET ELEVATION	94.81 ft
OUTLET STATION	172.00 ft
OUTLET ELEVATION	94.80 ft
NUMBER OF BARRELS	3
SLOPE (V/H)	0.0001
CULVERT LENGTH ALONG SLOPE	172.00 ft

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	BOX
BARREL SPAN	6.00 ft
BARREL RISE	5.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.012
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE (90-45 DEG.)
INLET DEPRESSION	NONE

URRENT DATE: 10-13-2004
RRENT TIME: 14:50:03

FILE DATE: 10-13-2004
FILE NAME: 55353PR

TAILWATER

CONSTANT WATER SURFACE ELEVATION
97.45

ROADWAY OVERTOPPING DATA

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	114.00 ft
CREST LENGTH	200.00 ft
OVERTOPPING CREST ELEVATION	103.39 ft

Rational Method: Peak Runoff Calculations

Project: SR 25/ US 27
Location: Lake County

By: BD Date: 9/7/04
Checked: Date:

Station	Size	Total Area (ft^2)	Total Area (acres)	Runoff C Pervious	Onsite Area (acres)	Impervious Area (acres)	Runoff C Impervious	TOC (min)	Zone 7 50 yr Rainfall Int. (in/hr)	Zone 7 100 yr Rainfall Int. (in/hr)	50 yr Peak Runoff, Q (ft^3/sec)	100 yr Peak Runoff, Q (ft^3/sec)	500 yr Peak Runoff, Q (ft^3/sec)
287+13	(2) 10' x 4' CBC	34,263,721	786.58	0.10	7.51	2.02	0.95	95.18	3.0	3.5	285.79	344.13	470
553+53	(3) 6' x 5' CBC	57,709,487	1324.82	0.10	6.15	1.58	0.95	193.36	1.7	1.9	273.39	314.65	420

Rational Equation Q = CIA

15-42

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

Project: **SR 25/ US 27** By: B.D. Date: 3/3/04
Location: Lake County Checked: Date:

Circle One: **Present** | **Developed** | CD 287+13

Circle One: T_c | T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Segment ID				
1. Surface Description (table 3-1.)					
2. Manning's roughness coeff., n (table3-1.)					
3. Flow length, L (total L <= 300 ft.) ft					
4. Two-yr 24-hr rainfall, P_2 in		4.7			
5. Land slope, s ft/ft					
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T…hr	Assume	0.58	+		= 0.58

**Based on CD 1 Tc

Shallow concentrated flow	Segment ID				
		BC			
7. Surface Description (paved or unpaved)		unpaved			
8. Flow length, L ft		3340			
9. Watercourse slope, s ft/ft		0.0033			
10. Average velocity, V (figure 3-1) ft/s		0.93		0.00	
11. $T_t = \frac{L}{3600\ V}$ Compute T_t …..hr		1.002	+		= 1.00

Channel flow	Segment ID				
12. Cross sectional flow area, a ft^2					
13. Wetted perimeter, P_w ft/ft					
14. Hydraulic radius, $r = a/P_w$ Compute r ft					
15. Channel slope, s ft/ft					
16. Manning's roughness coeff., n					
17. $V = 1.49\ r^{2/3}\ s^{1/2}/n$ Compute V ft/s					
18. Flow length, L ft					
19. $T_t = L / 3600\ V$ Compute T hr			+		= 0.00
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) hr					1.59

95 minutes

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

Project: SR 25/ US 27 By: B.D. Date: 3/3/04
Location: Lake County Checked: Date:

Circle One: Present | Developed | CD 553+53

Circle One: T_c | T_t through subarea

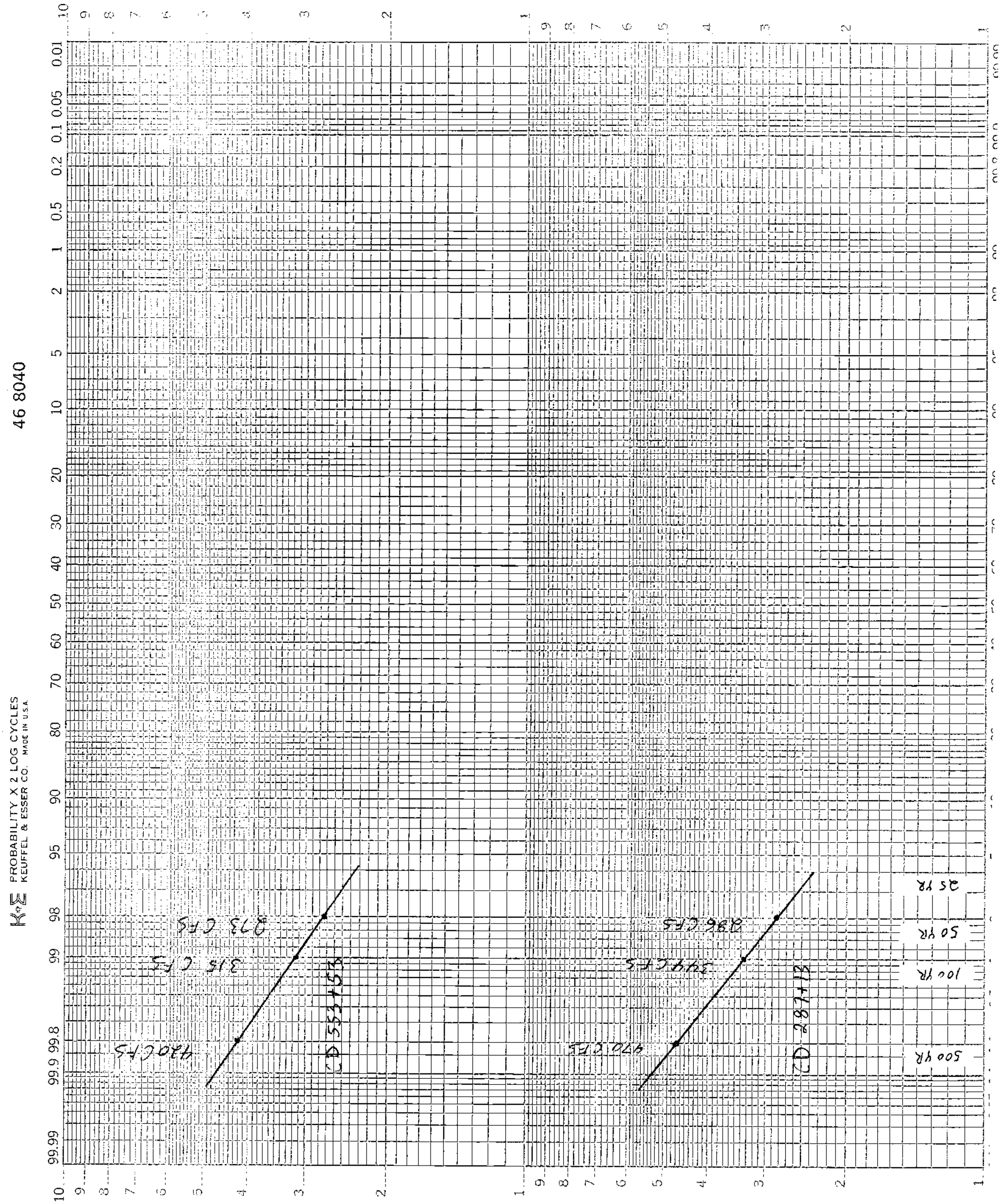
NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Segment ID	AB				
1. Surface Description (table 3-1.)		Dense Underbrush				
2. Manning's roughness coeff., n (table3-1.)		0.80				
3. Flow length, L (total L <= 300 ft.)	ft	300				
4. Two-yr 24-hr rainfall, P_2	in	4.7				
5. Land slope, s	ft/ft	0.0500				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T...	hr Assume	0.86	+		=	0.86

Shallow concentrated flow	Segment ID	BC				
7. Surface Description (paved or unpaved)		unpaved				
8. Flow length, L	ft	10970				
9. Watercourse slope, s	ft/ft	0.0064				
10. Average velocity, V (figure 3-1)	ft/s	1.29		0.00		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	2.364	+		=	2.36

Channel flow	Segment ID					
12. Cross sectional flow area, a	ft^2					
13. Wetted perimeter, P_w	ft/ft					
14. Hydraulic radius, $r = a/P_w$ Compute r	ft					
15. Channel slope, s	ft/ft					
16. Manning's roughness coeff., n						
17. $V = 1.49\ r^{2/3}\ s^{1/2}/n$ Compute V	ft/s					
18. Flow length, L	ft					
19. $T_t = L / 3600\ V$ Compute T	hr		+		=	0.00
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					3.22

193 minutes



46 8040
K+E PROBABILITY X 2 LOG CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
273 CFS
315 CFS
420 CFS
CD 553+53
286 CFS
344 CFS
470 CFS
CD 287+13
25 YR
50 YR
100 YR
500 YR

15-45

LOCATION HYDRAULIC REPORT

SR 25/US27

FROM POLK COUNTY LINE (US 192)

TO NEW FLORIDA'S TURNPIKE INTERCHANGE (SR 91)

STATE PROJECT NO. 11200-1501

WORK PROGRAM ITEM NO. 5112884

LAKE COUNTY

PREPARED BY:

MICHAEL H. HILL, P.E.

FDOT DISTRICT 5 DRAINAGE DESIGN

AUGUST 1997

UPDATED: FEBRUARY 1999

All units in English measure except stationing.

STATE PROJECT NO. 11200-1501 SHEET OF
F.A. PROJECT NO. —
W.P.I. NO. 5112884
DATE: 8/ /97

SR25/US27
From Polk Co Line
to FL TP SR91

STRUCTURE NO.	STATION meters	X-Drain size	DESIGN FLOOD (CFS) 2% PROB. DISCHARGE	50 YR. FREQ. STAGE	BASE FLOOD (CFS) 1% PROB. DISCHARGE	100 YR. FREQ. STAGE	OVERTOPPING FLOOD Rd. TP	STAGE	PROB. %	FREQ. YR.	GREATEST FLOOD DISCHARGE	STAGE	PROB. % (0.2)	FREQ. YR. (500)
5-3	11+70	4'x3' CBC	43	128.6	50	128.9	131.8	N/A			63	129.2	0.2	500
5-6	20+85	30"	31	137.5	36	138.0	139.4				45	139.1		
5-9	26+30	30"	31	133.8	35	134.3	137.3				44	135.4		
5-13	43+25	3'x5' CBC	87	119.5	99	119.9	123.5				126	120.8		
5-15	52+25	2'x2'+30"	18	137.8	20	138.0	141.3				25	136.7		
5-19	61+00	2x2+30"	24	116.1	27	118.5	121.2				35	119.6		
D1 5-21	70+90	2x2+30"	15	125.9	17	126.1	129.7				21	126.4		
2 5-24	81+75	2-10'x4'	255	114.3	292	114.4	118.3	CD 287+13			370	114.6	12	
3 5-27	87+30	4'x8' CBC	36	112.1	41	112.2	115.7				52	112.4		
4 28	92+20	2x2+30"	20	110.1	23	110.7	117.7				29	111.1		
5 30	100+40	5'x2'	55	107.6	63	108.0	110.9				60	108.9		
6 26	117+75	2x2+30+24	17	112.1	20	112.4	117.5				25	113.0		
7 27	121+35	2x2+30+24	16	111.5	18	111.7	115.6				23	112.2		
8 39	125+85	2x2+30	26	111.9	30	112.5	117.1				37	114.1		
D9 44	136+40	30"	33	118.2	37	118.6	122.5				47	119.5		
D10 47	149+60	4'x8'	41	101.0	47	101.1	104.5				60	101.4		
D11 48	156+85	2x2+30"	17	99.9	20	100.1	103.8				25	100.6		
50	162+90	3-6'x5'	216	100.9	247	101.0	104.3	CD 553+53			313	101.1		
53	172+00	10'x5'	80	98.4	92	98.4	104.3				117	98.4		
61	188+90	4x2	64	164.5	74	165.6	166.5	168.2	0.2	500	93	168.2		

NOTE: THE HYDRAULIC DATA IS SHOWN FOR INFORMATIONAL PURPOSES ONLY, TO INDICATE THE FLOOD DISCHARGES AND WATER SURFACE ELEVATIONS WHICH MAY BE ANTICIPATED IN ANY GIVEN YEAR. THIS DATA WAS GENERATED USING HIGHLY VARIABLE FACTORS DETERMINED BY A STUDY OF THE WATERSHED. MANY JUDGEMENTS AND ASSUMPTIONS ARE REQUIRED TO ESTABLISH THESE FACTORS. THE RESULTANT HYDRAULIC DATA IS SENSITIVE TO CHANGES, PARTICULARLY OF ANTECEDENT CONDITIONS, URBANIZATION, CHANNELIZATION, AND LAND USE. USERS OF THIS DATA ARE CAUTIONED AGAINST THE ASSUMPTION OF PRECISION WHICH CAN NOT BE ATTAINED. DISCHARGES ARE IN CUBIC FEET PER SECOND AND STAGES ARE IN FEET, NGVD, 1929.

RECEIVED MAR 0 2005 FDS STATE SVC. CTR.

90260-2

DEFINITIONS:

DESIGN FLOOD: THE FLOOD SELECTED BY F.D.O.T. TO BE UTILIZED TO ASSURE A STANDARD LEVEL OF HYDRAULIC PERFORMANCE.

BASE FLOOD: THE FLOOD HAVING A 1% CHANCE OF BEING EXCEEDED IN ANY YEAR. (100 YR. FREQUENCY)

OVERTOPPING FLOOD: THE FLOOD WHERE FLOW OCCURS (A) OVER THE HIGHWAY (B) OVER A WATERSHED DIVIDE OR (C) THRU EMERGENCY RELIEF STRUCTURES.

GREATEST FLOOD: THE MOST SEVERE FLOOD WHICH CAN BE PREDICTED WHERE OVERTOPPING IS NOT

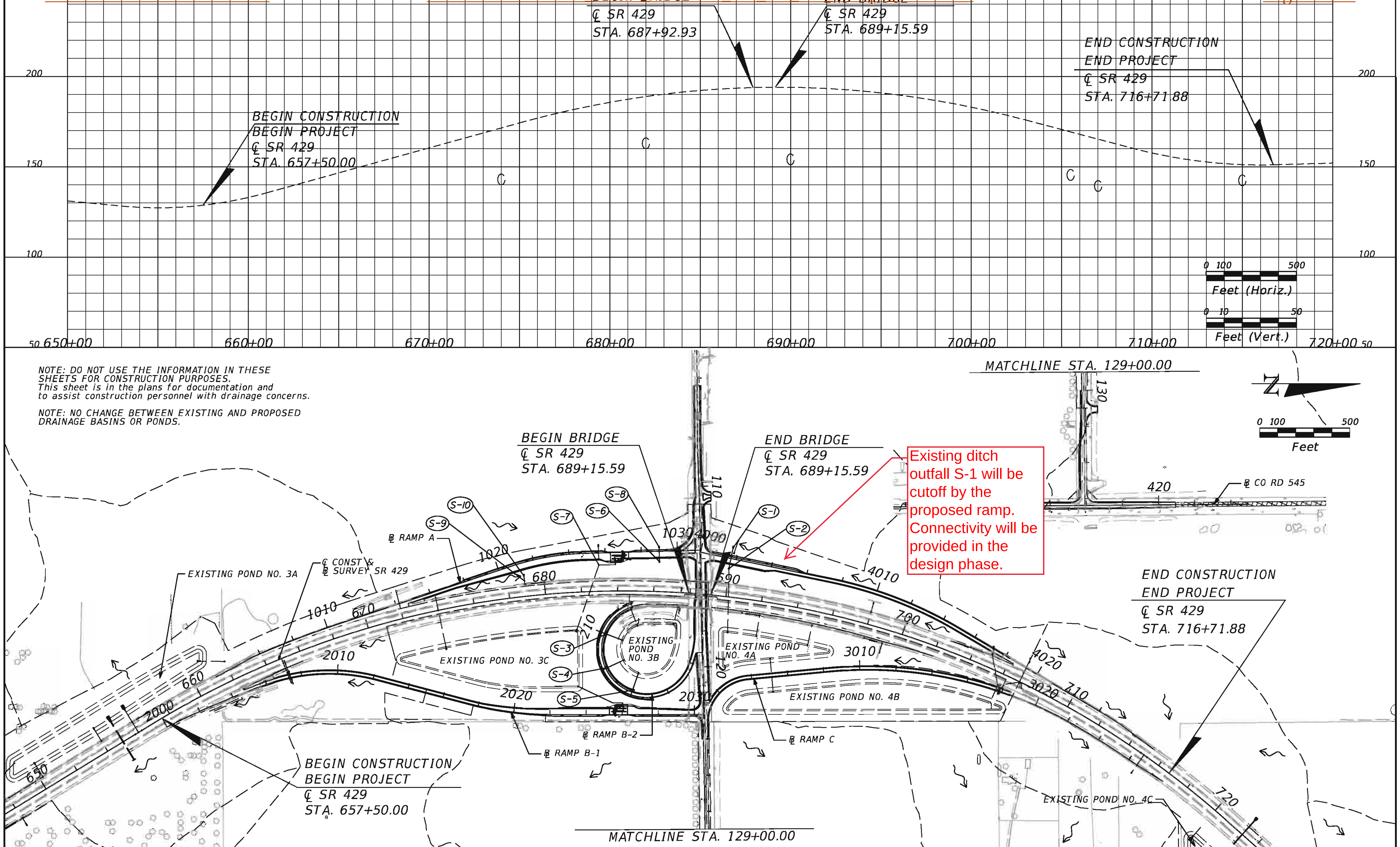
DATA ADAPTED FROM: Std. Rational Method & HEC5 Crowns Hall for TW depth.

PREPARED BY: Bill Deese

DATE: 9/92

APPROVED FOR USE

1547



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TROY W. VARGAS, P.E. LICENSE NO. 57621

WBQ Design & Engineering Inc. 201 N. Magnolia Ave. Suite 200 Orlando Fl. 32801 Phone 407.839.4300 Fax 407.839.1621

CERTIFICATE OF AUTHORIZATION NO. 6796

OOCEA PROJ. NO. 429-305

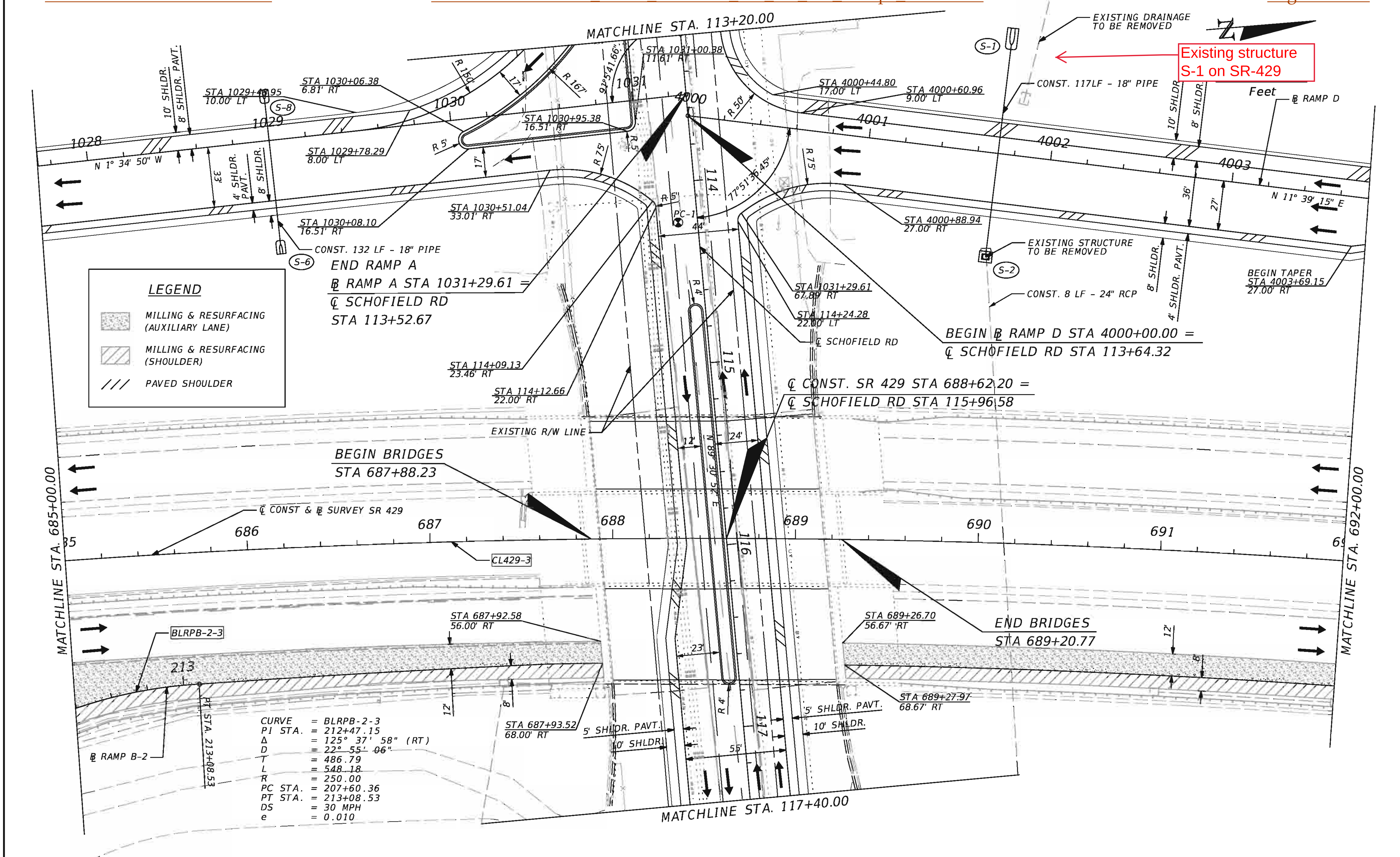
EXPRESSWAY AUTHORITY

PROPOSED DRAINAGE MAP

G-52

SHEET NO. 4

msuarez 5/14/2012 7:29:25 PM P:\1100CEA.MISC-SCH\429-305\drainage\drmprd02.dgn



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TROY W. VARGAS, P.E. LICENSE NO. 57621

WBQ Design & Engineering Inc. 201 N. Magnolia Ave. Suite 200 Orlando Fl. 32801 Phone 407.839.4300 Fax 407.839.1621

CERTIFICATE OF AUTHORIZATION NO. 6796

OOCEA PROJ. NO. 429-305

EXPRESSWAY AUTHORITY

ROADWAY PLAN SHEET (5)

STA. 685+00 TO 692+00

G-53

SHEET NO. 28

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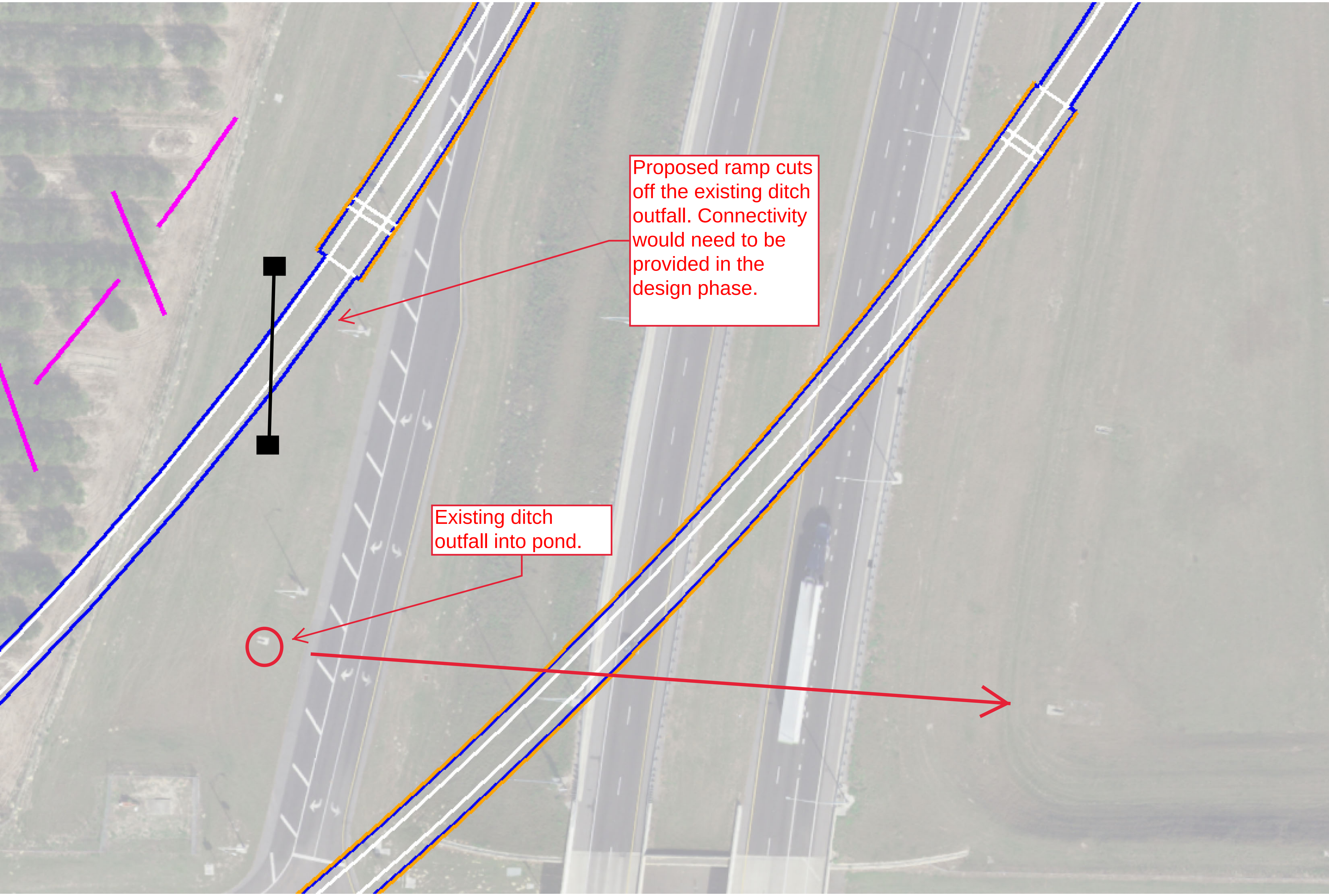

Proposed ramp cuts off the existing ditch outfall. Connectivity would need to be provided in the design phase.
Existing ditch outfall into pond.

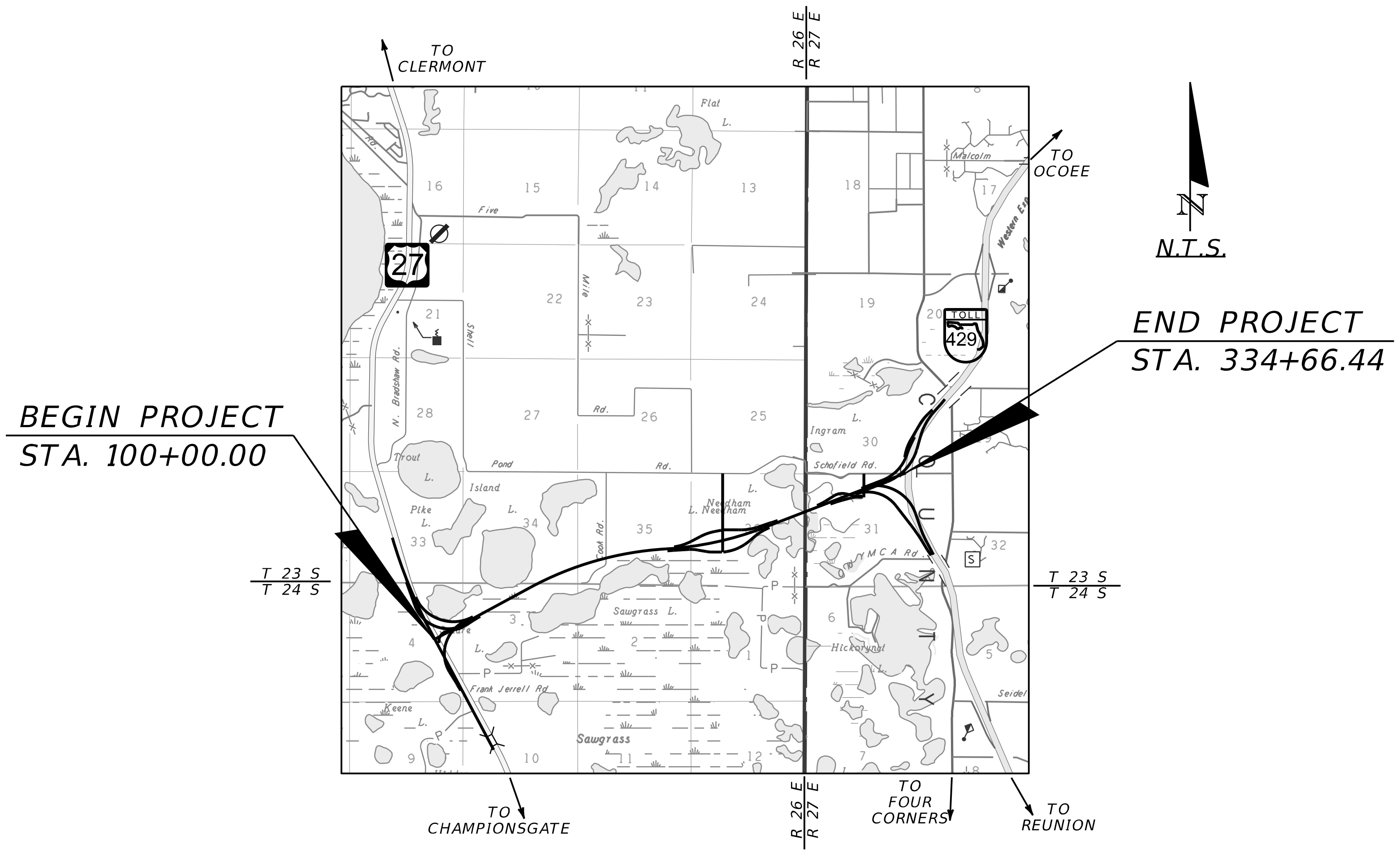
Appendix H – Proposed Typical Sections

CENTRAL FLORIDA EXPRESSWAY AUTHORITY (CFX)

TYPICAL SECTION PACKAGE

LAKE/ORANGE COUNTY CONNECTOR FEASIBILITY/PD&E STUDY
FROM US 27 TO SR 429
CFX PROJECT NUMBER 599-225

LAKE COUNTY & ORANGE COUNTY



JAMISON R. EDWARDS
LICENSE
No 76095
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY:

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED. THE SIGNATURE MUST BE VERIFIED ON THE ELECTRONIC DOCUMENTS.

METRIC ENGINEERING, INC.
525 TECHNOLOGY PARKWAY, SUITE 153
LAKE MARY, FLORIDA 32746
TEL. (407) 644-1898
FAX. (407) 644-2376
CERTIFICATE OF AUTHORIZATION 2294
VENDOR NO. F-59-1685550
JAMISON R. EDWARDS, P.E. NO. 76095

THE ABOVE NAMED PROFESSIONAL ENGINEER SHALL BE RESPONSIBLE FOR THE FOLLOWING SHEETS IN ACCORDANCE WITH RULE 61G15-23.004 F.A.C.

TYPICAL SECTION PACKAGE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

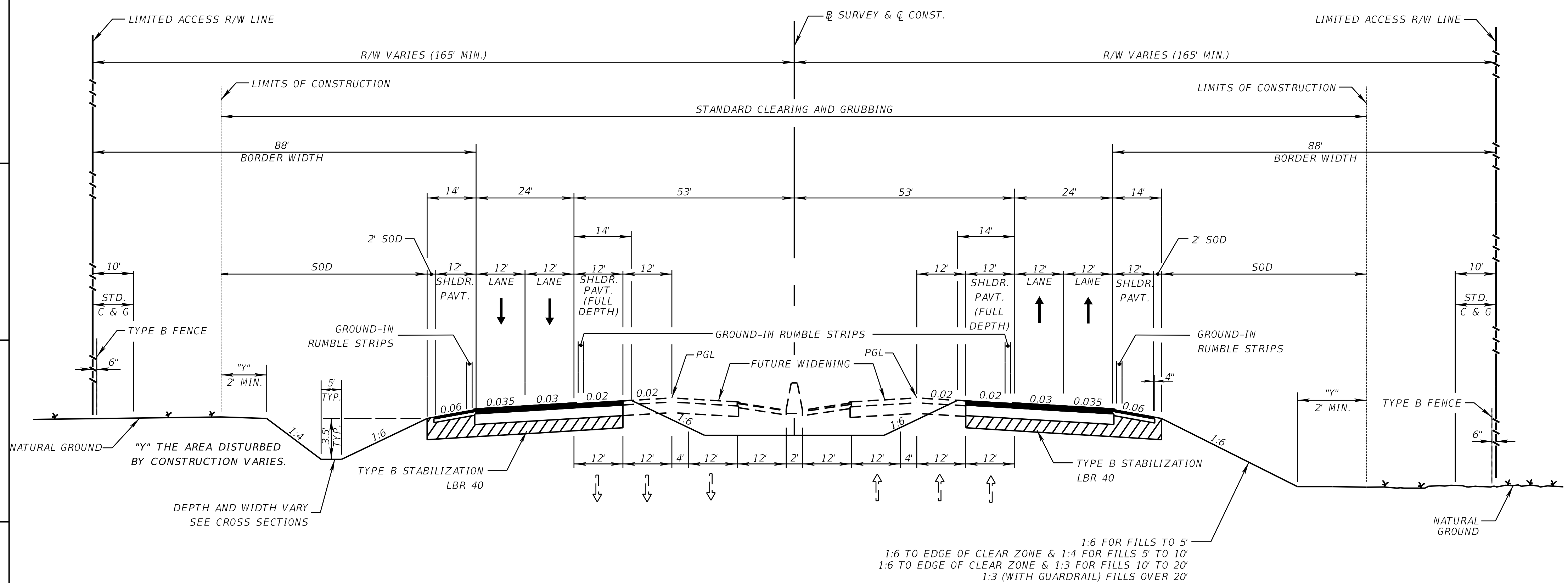
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

TYPICAL SECTION No. 1



TYPICAL SECTION
LAKE/ORANGE COUNTY CONNECTOR

STA. 124+06.28 TO STA. 124+70.04
STA. 149+37.04 TO STA. 187+42.31
STA. 188+98.37 TO STA. 242+96.46
STA. 244+86.16 TO STA. 304+82.71
STA. 308+86.36 TO STA. 312+51.19
STA. 314+97.38 TO STA. 317+81.95
STA. 321+08.54 TO STA. 334+66.44

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

NOT TO SCALE

SHEET NO. H- 2

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
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( ) 7 - BOTH MEDIAN TYPES

CRITERIA

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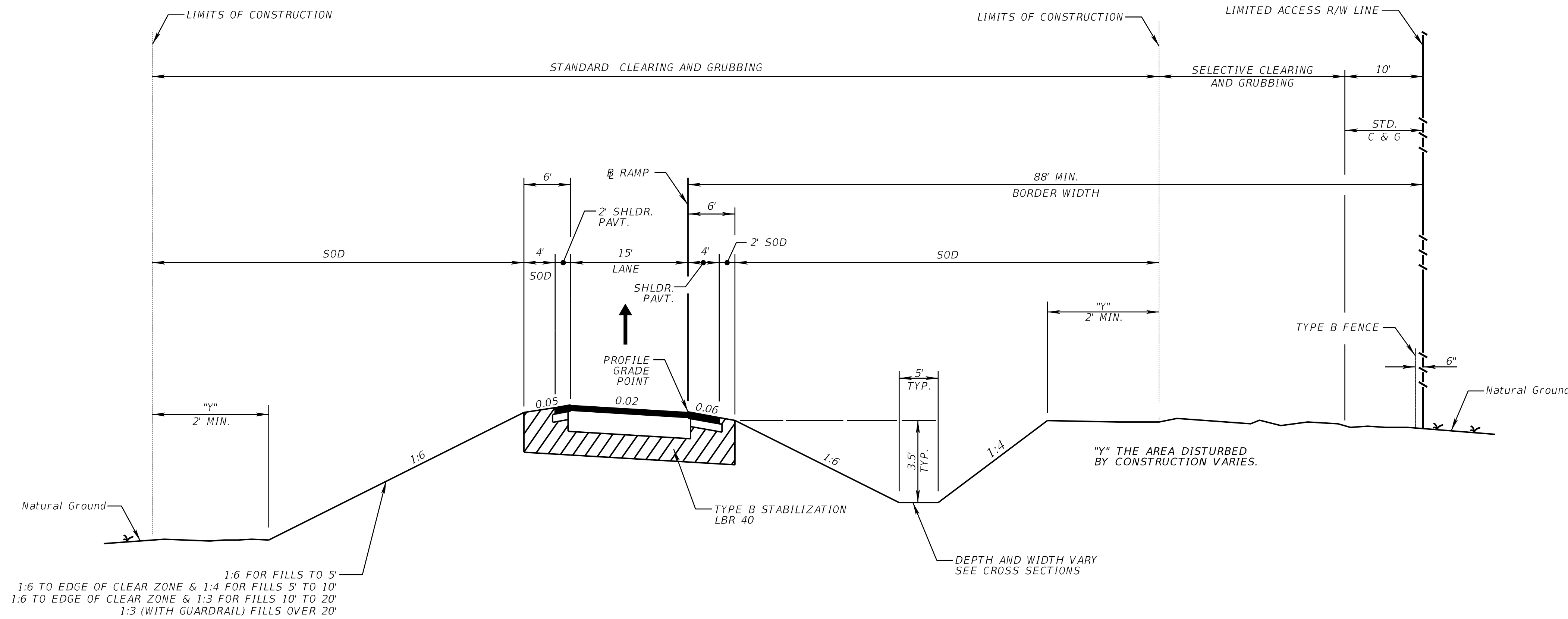
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

TYPICAL SECTION No. 2



TYPICAL SECTION
SINGLE LANE RAMP

RAMP 01
RAMP 02
RAMP 03
RAMP 04
RAMP 05
RAMP 06
RAMP 07
RAMP 08
RAMP 09
RAMP 10
RAMP 11
RAMP 12
RAMP 13
RAMP 14
RAMP 15

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. H- 3

5/17/2019 1:24:47 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
( ) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
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( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
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( ) 7 - BOTH MEDIAN TYPES

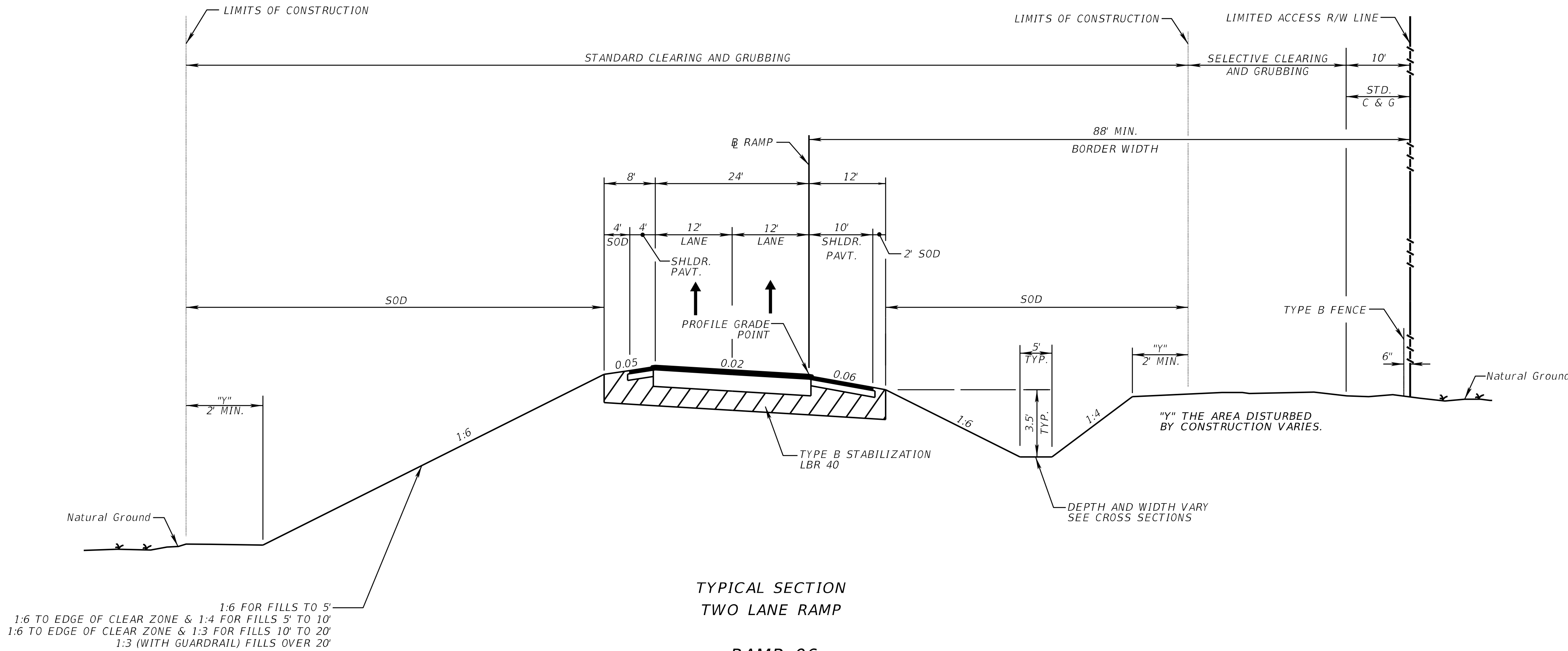
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

BORDER WIDTH

TYPICAL SECTION No. 3



TYPICAL SECTION
TWO LANE RAMP

RAMP 06
RAMP 08
RAMP 09

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

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( ) 7 - BOTH MEDIAN TYPES

CRITERIA

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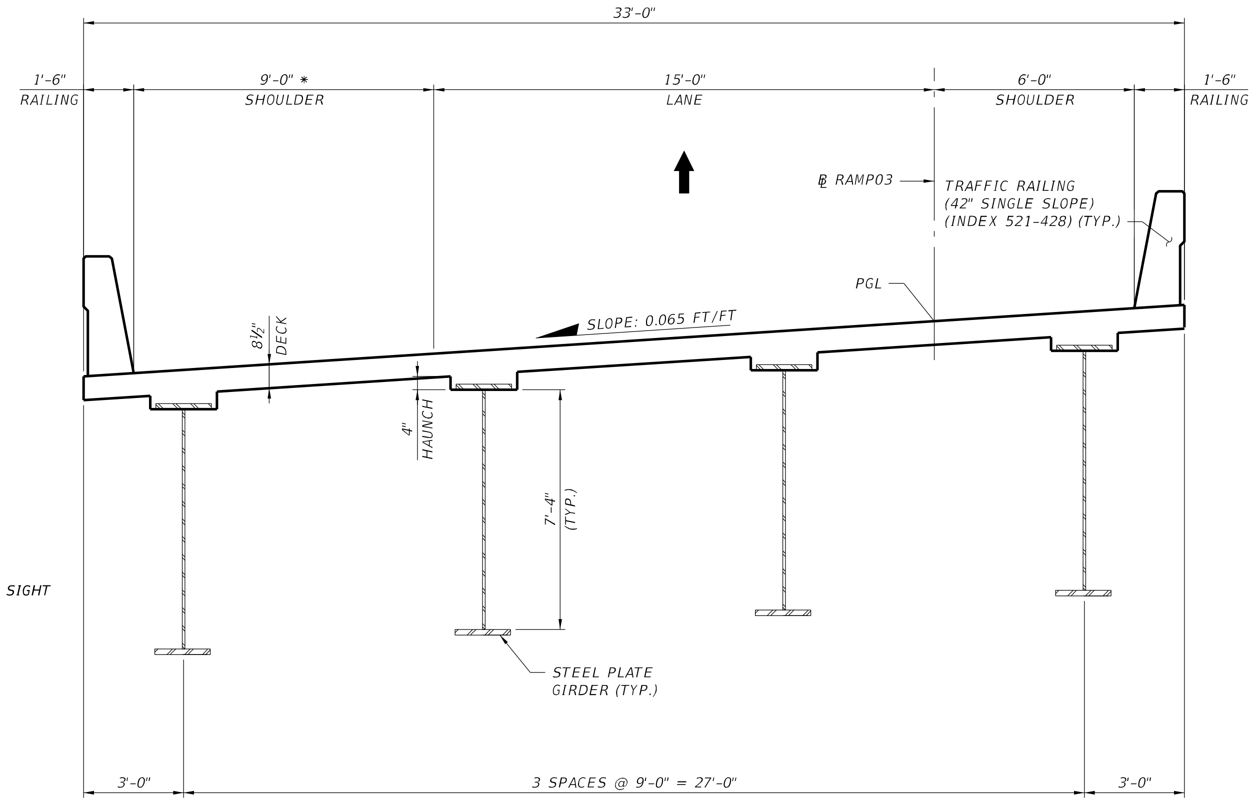
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 4



* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 01
RAMP 3 OVER US 27
STA. 915+50.45 TO STA. 922+01.56

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. H- 5

5/17/2019 1:24:48 PM

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

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( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

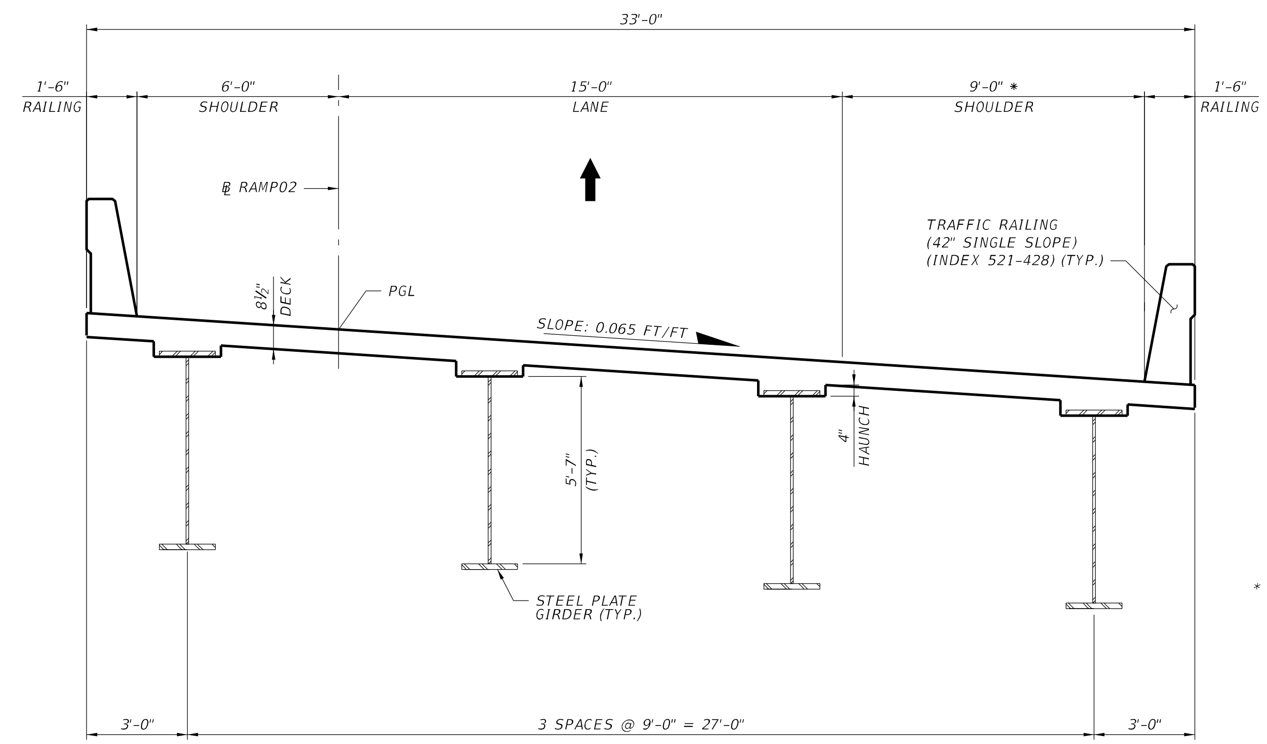
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 5



* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 02
RAMP 2 OVER US 27 AND RAMP 3
STA. 808+16.21 TO STA. 830+20.65

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

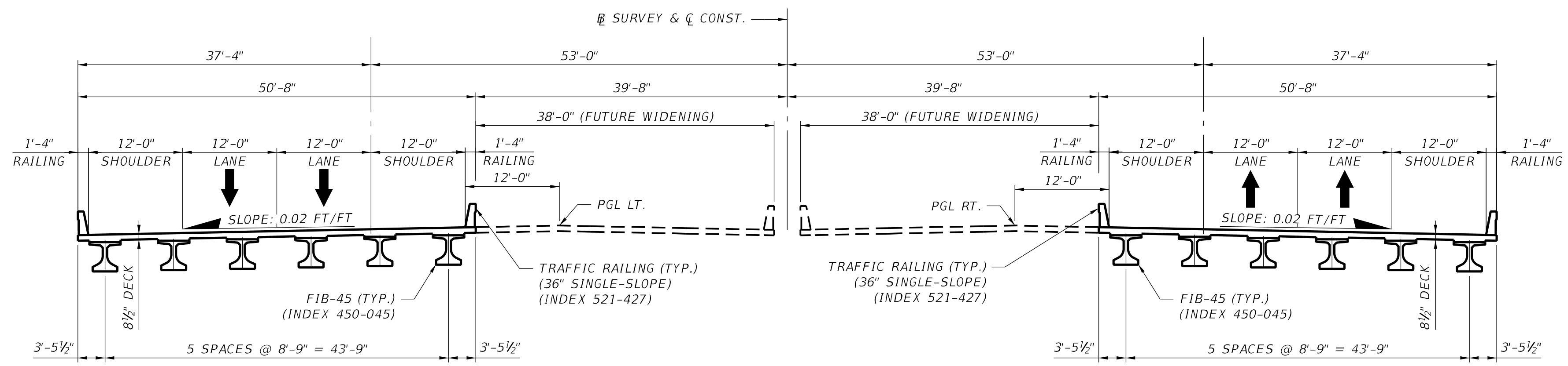
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 6



WESTBOUND
BRIDGE 3A

EASTBOUND
BRIDGE 3B

TYPICAL SECTION
BRIDGE 3A AND 3B
MAINLINE OVER EXISTING WETLANDS
STA. 124+70.08 TO STA. 149+37.08

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. H- 7

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

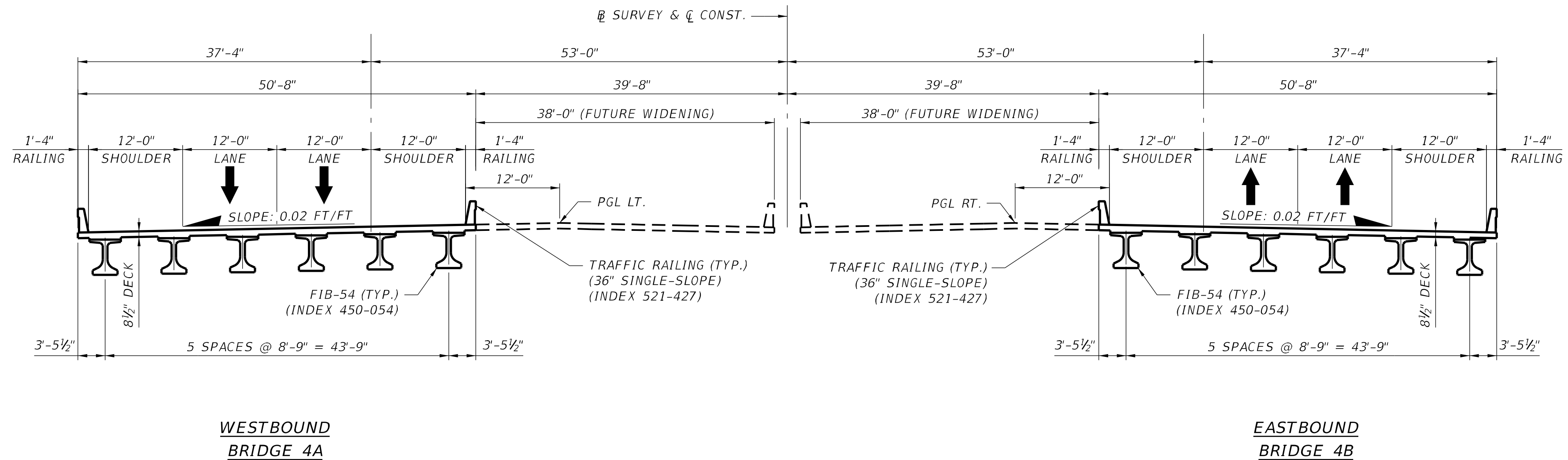
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 7



TYPICAL SECTION
BRIDGE 4A AND 4B
MAINLINE OVER COOK RD.
EB BRIDGE STA. 187+43.97 TO STA. 188+70.33
WB BRIDGE STA. 187+71.40 TO STA. 188+96.81

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

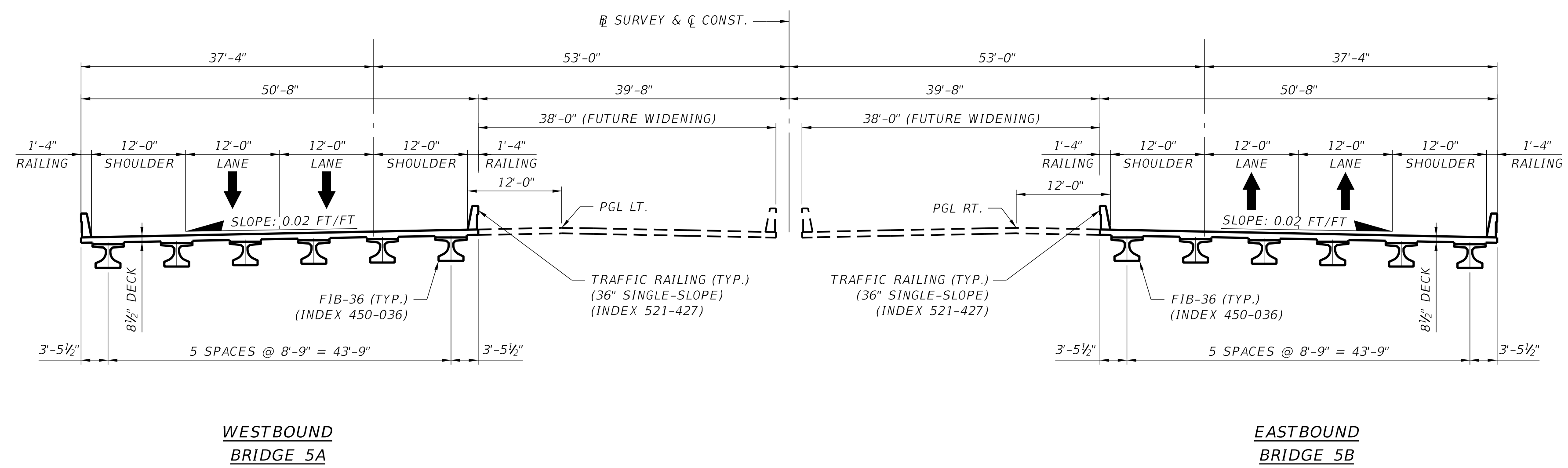
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 8



TYPICAL SECTION
BRIDGE 5A AND 5B
MAINLINE OVER CR 455
EB BRIDGE STA. 242+99.26 TO STA. 244+57.07
WB BRIDGE STA. 243+24.18 TO STA. 244+83.18

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. H- 9

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

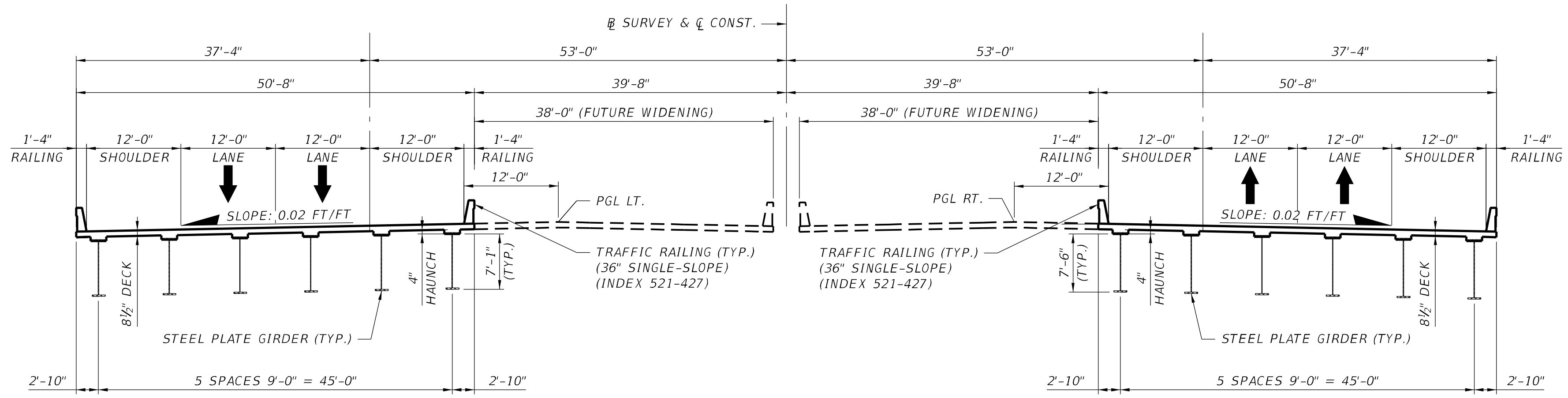
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 9



WESTBOUND
BRIDGE 6A

EASTBOUND
BRIDGE 6B

TYPICAL SECTION
BRIDGE 6A AND 6B
MAINLINE OVER RAMP 9
EB BRIDGE STA. 306+74.88 TO STA. 308+86.36
WB BRIDGE STA. 304+82.71 TO STA. 306+85.08

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 70 MPH
POSTED SPEED = 70 MPH

NOT TO SCALE

SHEET NO. H- 10

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

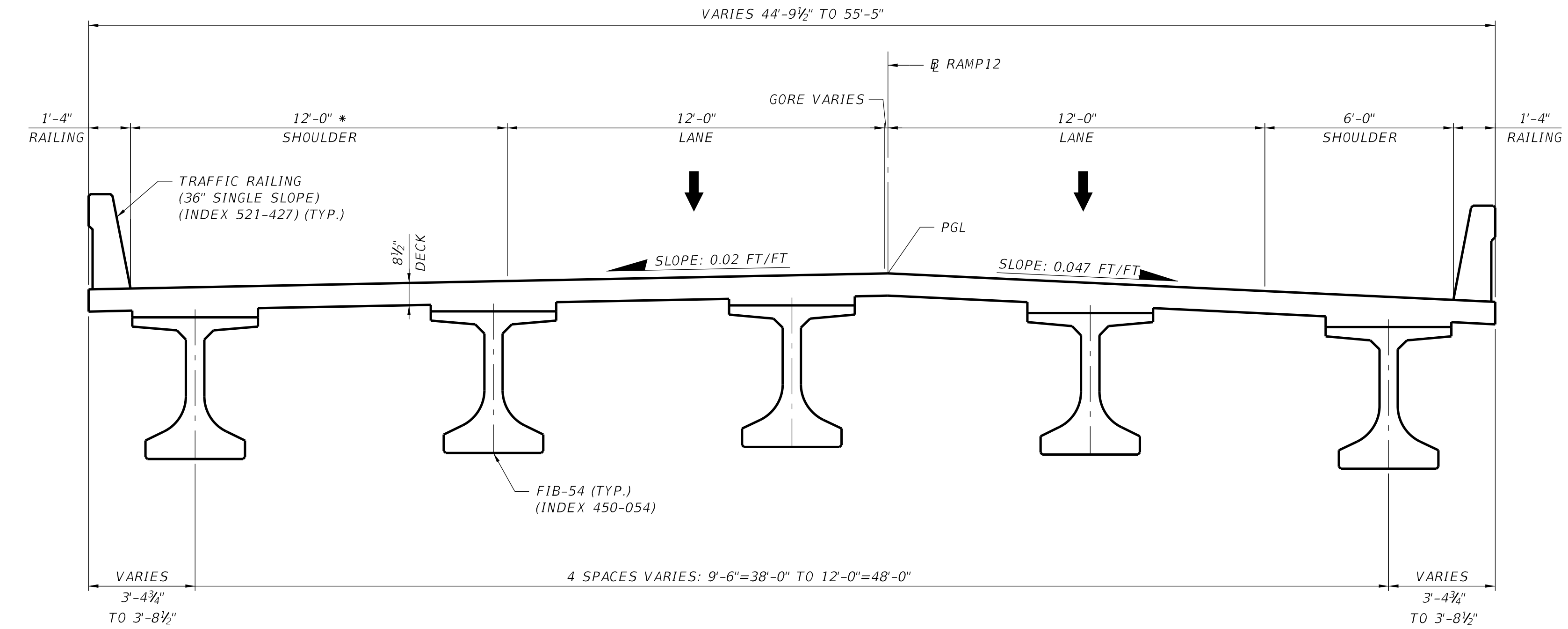
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 10



TYPICAL SECTION
BRIDGE 7A
MAINLINE OVER VALENCIA PARKWAY
STA. 313+22.95 TO STA. 314+84.80

* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

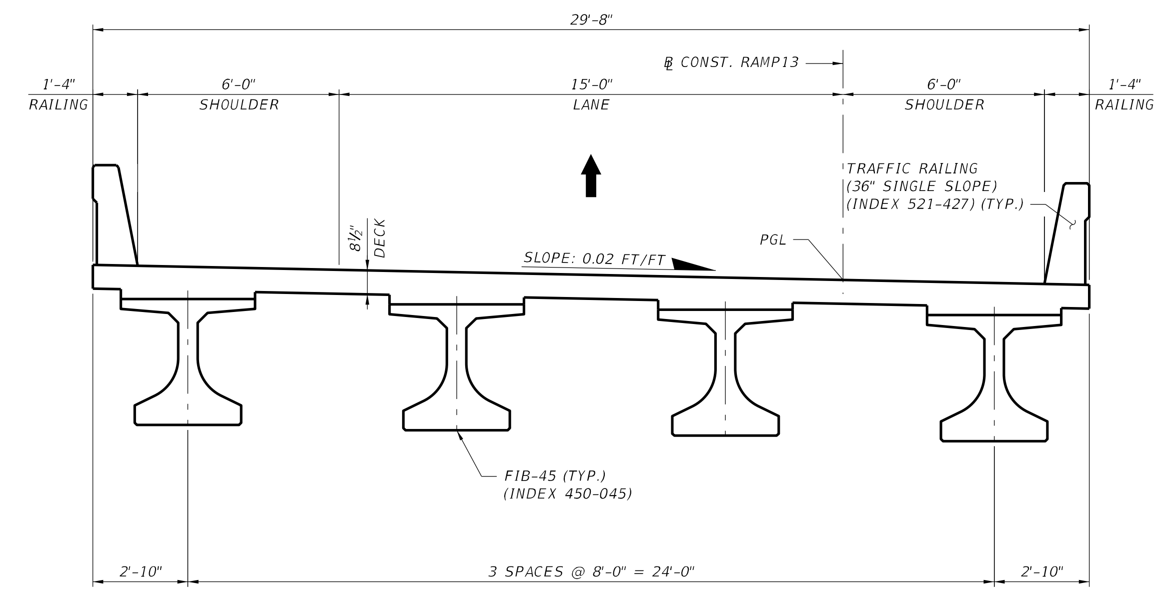
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 11



TYPICAL SECTION
BRIDGE 7B
MAINLINE OVER VALENCIA PARKWAY
STA. 1903+42.02 TO STA. 1905+07.10

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. H- 12

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

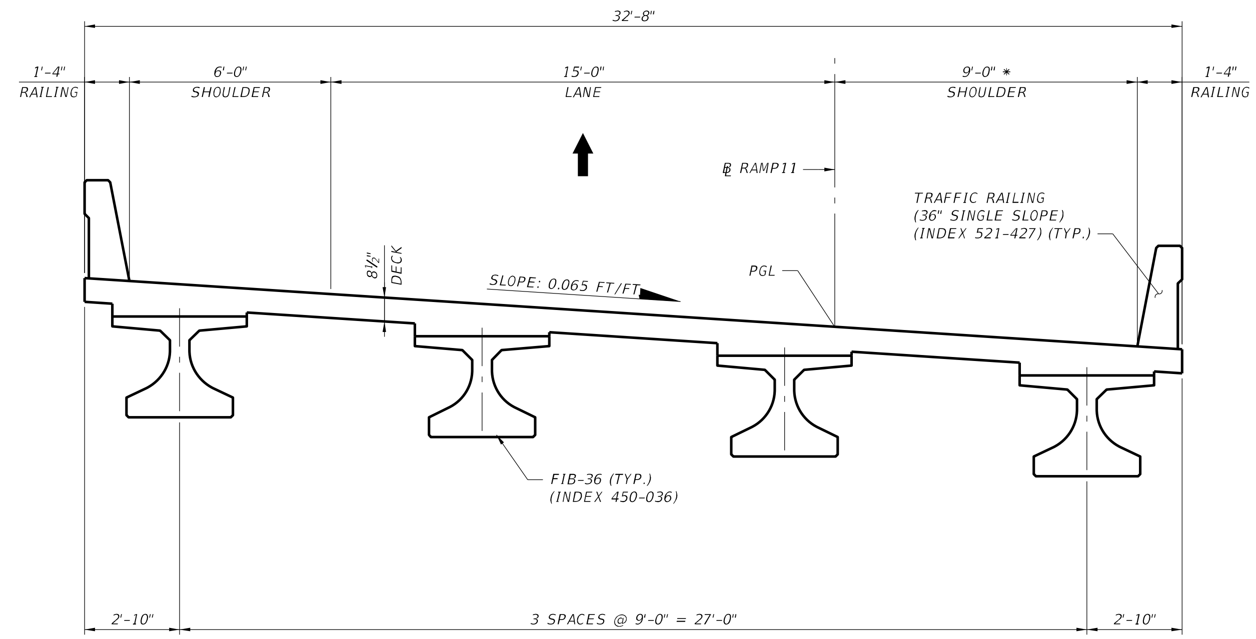
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 12



* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 7C
MAINLINE OVER VALENCIA PARKWAY
STA. 1703+27.25 TO STA. 1704+82.45

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

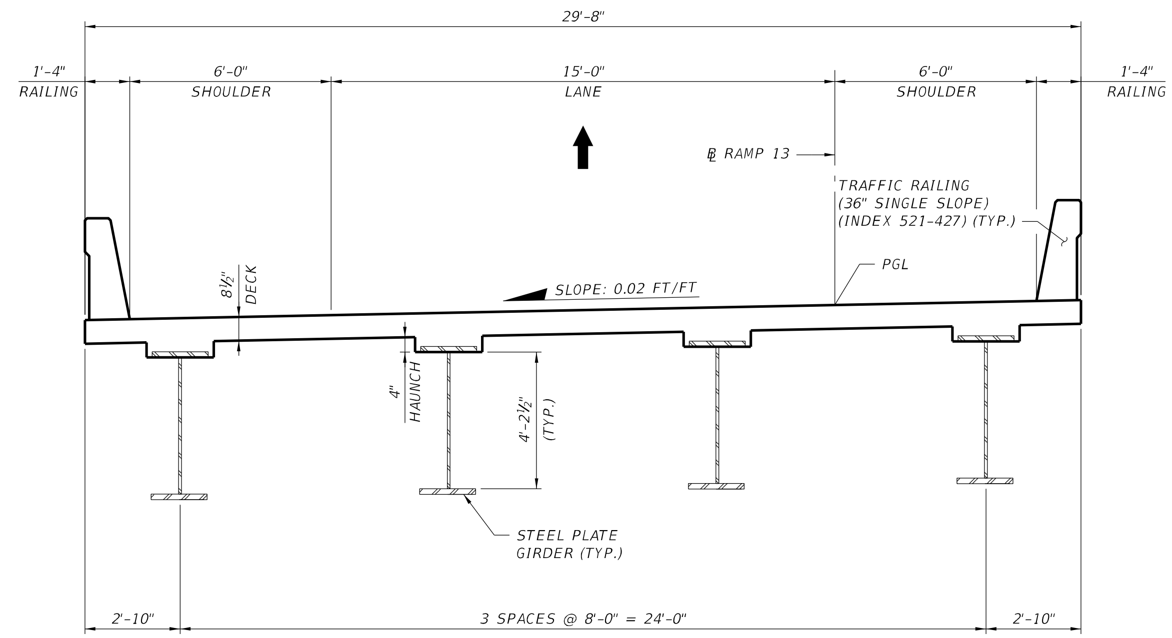
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 13



TYPICAL SECTION
BRIDGE 08
RAMP 13 OVER RAMP 12
STA. 1908+52.29 TO STA. 1911+78.88

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

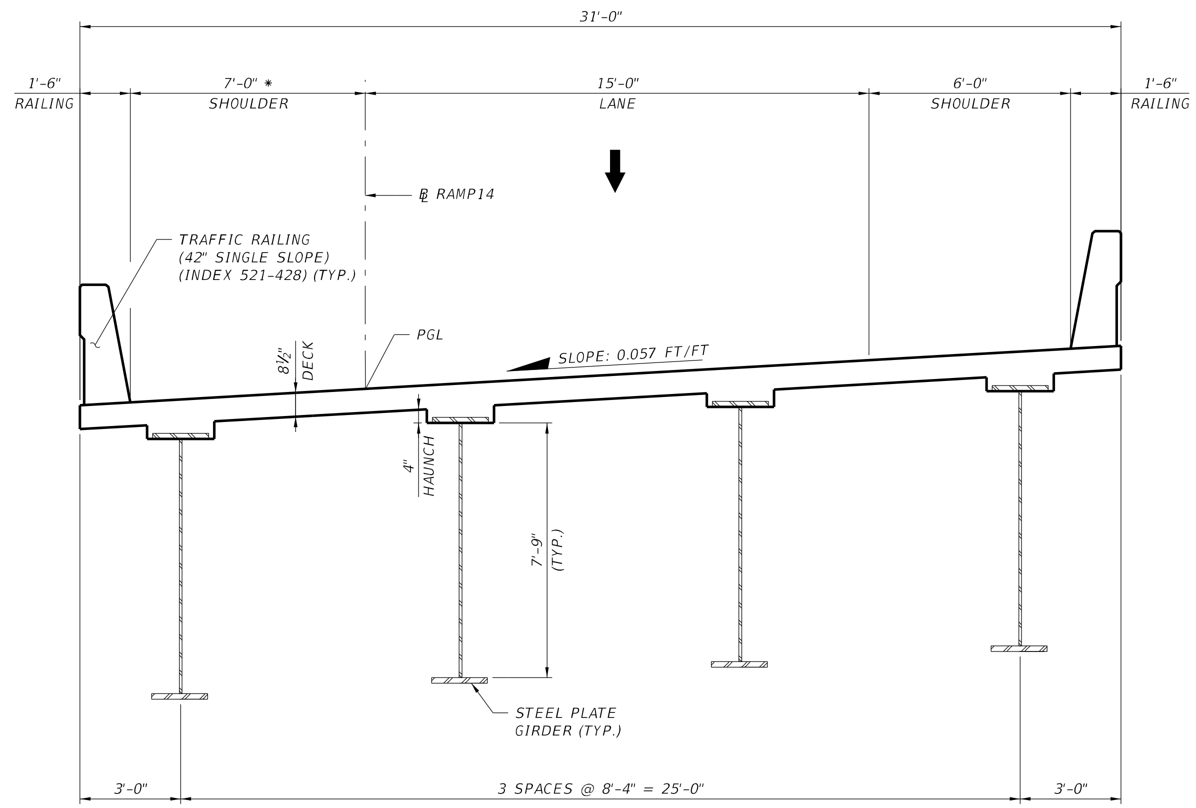
(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 14

* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS



TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

TYPICAL SECTION
BRIDGE 09
RAMP 14 OVER SCHOFIELD RD.
STA. 2015+92.20 STA. 2018+09.96

NOT TO SCALE

SHEET NO. H- 15

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

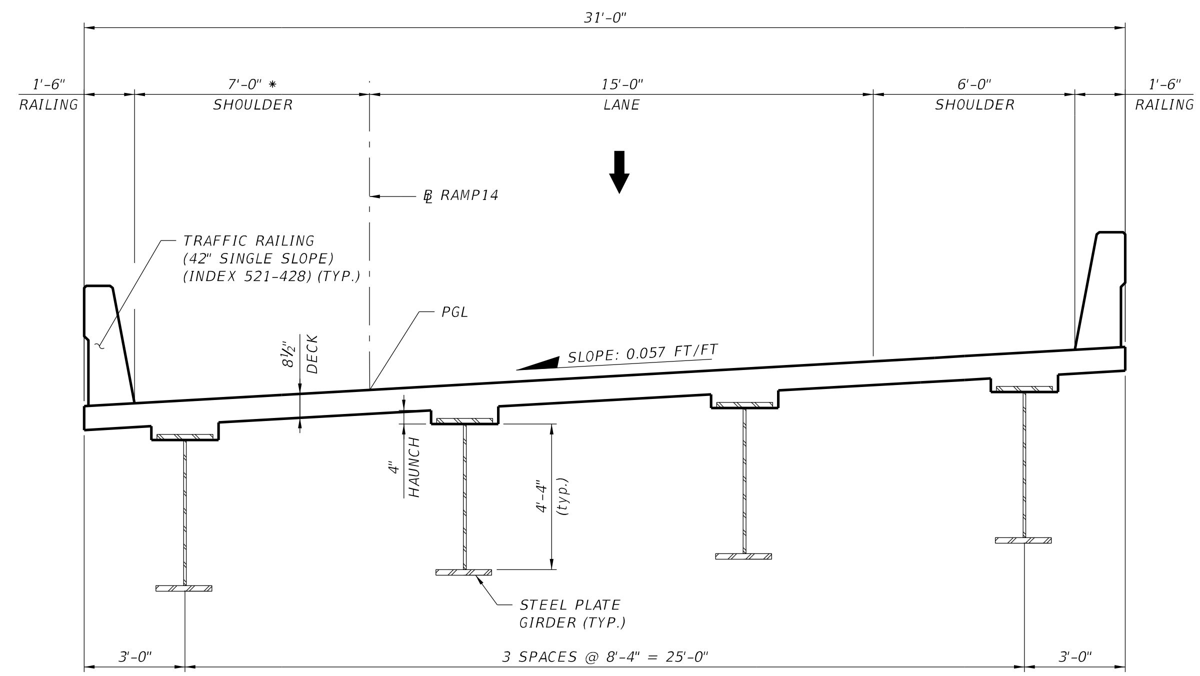
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 15



* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 10
RAMP 14 OVER RAMP 15
STA. 2022+60.99 TO STA. 2025+93.37

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

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SHEET NO. H- 16

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

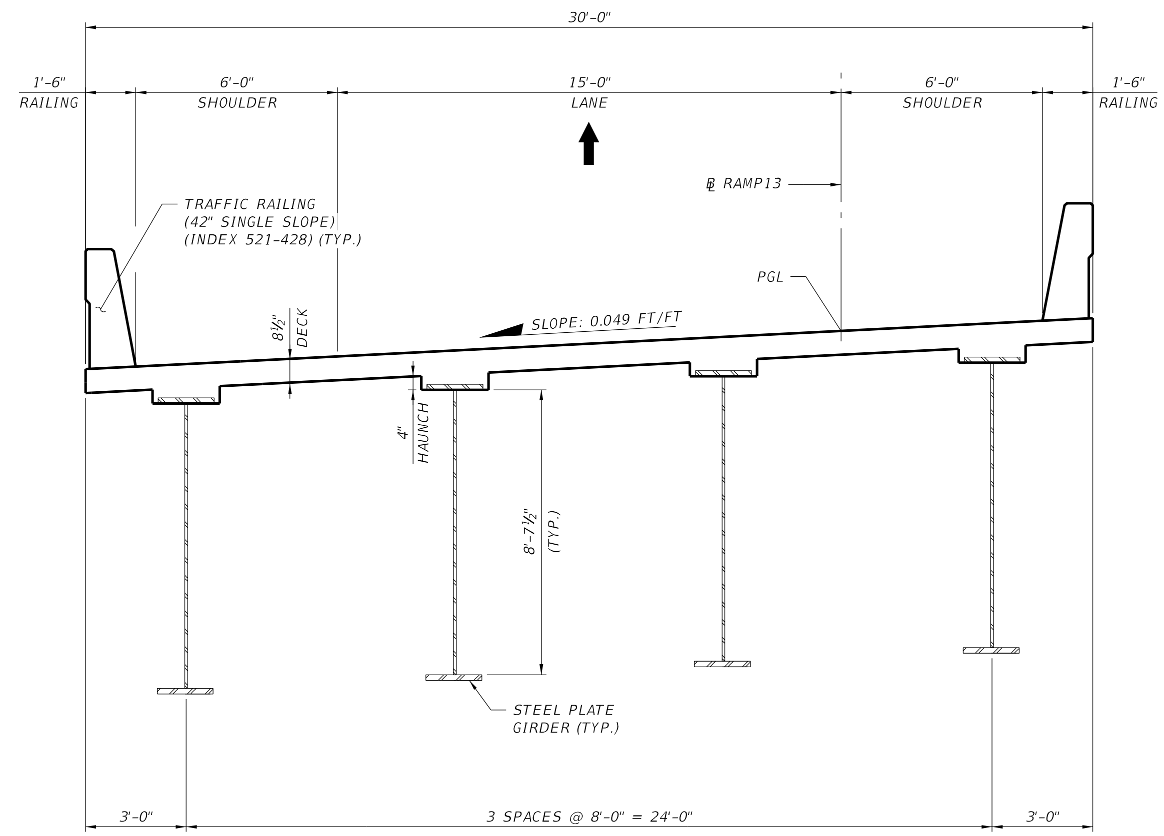
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 16



TYPICAL SECTION
BRIDGE 11
RAMP 13 OVER SR 429
STA. 1920+01.36 TO STA. 1930+07.89

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

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NOT TO SCALE

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PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

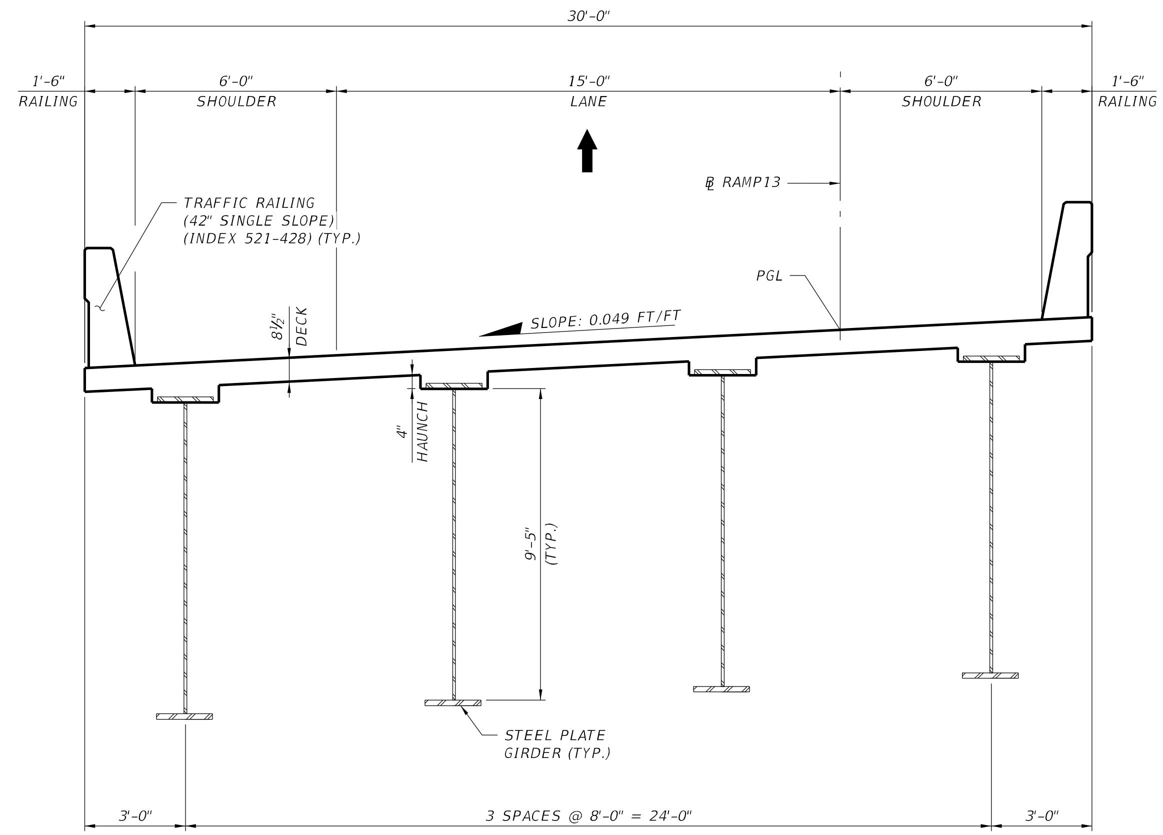
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 17



TYPICAL SECTION
BRIDGE 12
RAMP 13 OVER EXISTING SR 429 NB ON-RAMP
STA. 1933+86.94 TO STA. 1936+48.73

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

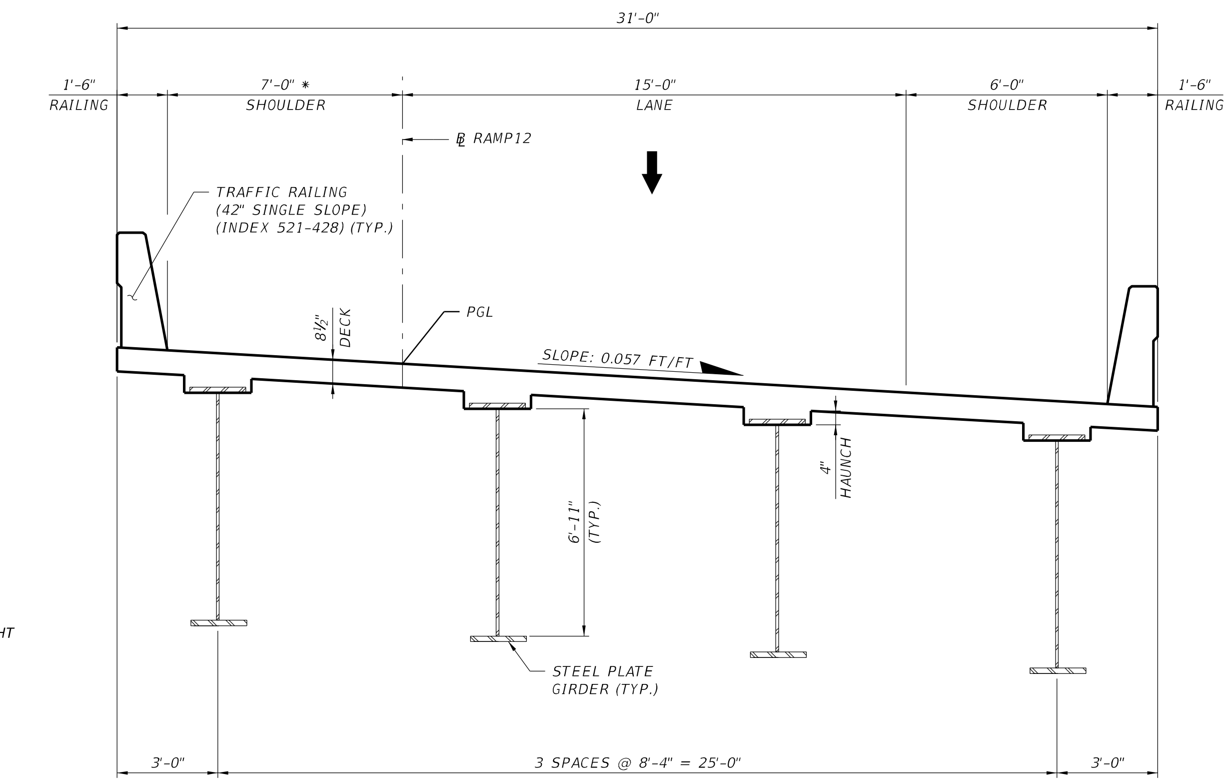
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 18



* NOTE: NON-TYPICAL SHOULDER WIDTH BASED ON SIGHT DISTANCE REQUIREMENTS

TYPICAL SECTION
BRIDGE 13
RAMP 12 OVER SR 429
STA. 1819+81.74 TO STA. 1826+01.97

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

5/17/2019 1:24:53 PM

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
( ) C3R : SUBURBAN RES.
(X) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
(X) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
(X) STATE HIGHWAY SYSTEM
( ) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

(X) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( ) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

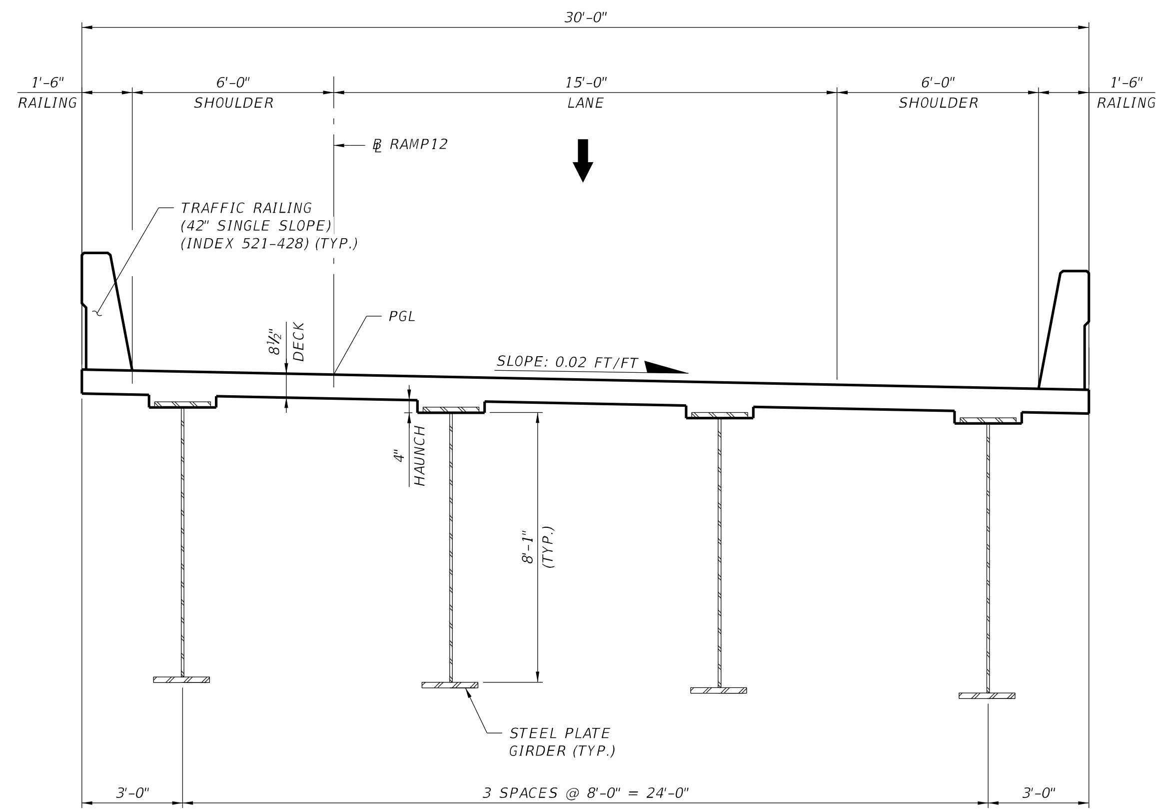
CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

N/A

TYPICAL SECTION No. 19



TYPICAL SECTION
BRIDGE 14
RAMP 12 OVER EXISTING SR 429 NB OFF-RAMP
STA. 1830+51.23 TO STA. 1832+77.86

TRAFFIC DATA

CURRENT YEAR = TBD AADT = TBD
ESTIMATED OPENING YEAR = TBD AADT = TBD
ESTIMATED DESIGN YEAR = TBD AADT = TBD
K = TBD% D = TBD % T = TBD % (24 HOUR)
DESIGN SPEED = 50 MPH
POSTED SPEED = 45 MPH

NOT TO SCALE

SHEET NO. H- 20

5/17/2019 1:24:53 PM

Appendix I – Time of Concentration

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-5

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Unit	Segment ID		
1) SURFACE DESCRIPTION (table 5-4)		Cultivated Soils		
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.060		
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300		
4) HIGH ELEVATION, [A]	ft	121.0		
5) LOW ELEVATION, [B]	ft	117.0		
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92		
7) LAND SLOPE, [s]	ft/ft	0.013		
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.179		0.179
			min =	10.8

SHALLOW CONCENTRATED FLOW

	Unit	Segment ID			
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	423			
11) HIGH ELEVATION, [C]		117.0			
12) LOW ELEVATION, [D]		108.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0213			
14) AVERAGE VELOCITY, [V] **	ft/sec	2.35			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.05	+	=	0.05
				min =	3.0

CHANNEL FLOW

	Unit	Segment ID		
16) DEPTH OF FLOW	ft			
17) FRONT SLOPE (Z:1)				
19) BACK SLOPE (Z:1)				
21) BOTTOM WIDTH	ft			
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00		
23) WETTED PERIMETER, [Pdw]	ft	0.00		
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!		
25) FLOW LENGTH, [L]	ft			
26) HIGH ELEVATION, [D]	ft			
27) LOW ELEVATION, [E]	ft			
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!		
29) MANNNING'S ROUGHNESS COEFF., [n]				
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec			
31) COMPUTE Tdt: Tdt = L / 3600*V	hr		=	
			min =	0.0

TOTAL TIME (hr)	**0.23**
TOTAL TIME (min)	**13.7**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE:	CFX Connector	NUMBER:	
LOCATION :	LAKE COUNTY	FILE:	
BASIN NAME:	CD-6 (Basin E)		

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		**Date**
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Unit	Segment ID			Total
1) SURFACE DESCRIPTION (table 5-4)		Fallow			
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050			
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300			
4) HIGH ELEVATION, [A]	ft	133.0			
5) LOW ELEVATION, [B]	ft	131.0			
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92			
7) LAND SLOPE, [s]	ft/ft	0.007			
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.204			0.204
				min =	12.3

SHALLOW CONCENTRATED FLOW

	Unit	Segment ID			Total
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	458			
11) HIGH ELEVATION, [C]		131.0			
12) LOW ELEVATION, [D]		125.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0131			
14) AVERAGE VELOCITY, [V] **	ft/sec	1.85			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.07	+	=	0.07
				min =	4.1

CHANNEL FLOW

	Unit	Segment ID			Total
16) DEPTH OF FLOW	ft				
17) FRONT SLOPE (Z:1)					
19) BACK SLOPE (Z:1)					
21) BOTTOM WIDTH	ft				
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00			
23) WETTED PERIMETER, [Pdw]	ft	0.00			
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!			
25) FLOW LENGTH, [L]	ft				
26) HIGH ELEVATION, [D]	ft				
27) LOW ELEVATION, [E]	ft				
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!			
29) MANNNING'S ROUGHNESS COEFF., [n]					
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec				
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=	
				min =	0.0

TOTAL TIME (hr)	**0.27**
TOTAL TIME (min)	**16.4**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-6 (Basin F)

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Unit	Segment ID		Total
1) SURFACE DESCRIPTION (table 5-4)		Fallow		
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050		
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300		
4) HIGH ELEVATION, [A]	ft	126.0		
5) LOW ELEVATION, [B]	ft	120.5		
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92		
7) LAND SLOPE, [s]	ft/ft	0.018		
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.136		0.136
			min =	8.2

SHALLOW CONCENTRATED FLOW

	Unit	Segment ID		Total
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2		
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	608		
11) HIGH ELEVATION, [C]		120.5		
12) LOW ELEVATION, [D]		103.0		
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0288		
14) AVERAGE VELOCITY, [V] **	ft/sec	2.74		
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.06 +	=	0.06
			min =	3.7

CHANNEL FLOW

	Unit	Segment ID		Total
16) DEPTH OF FLOW	ft			
17) FRONT SLOPE (Z:1)				
19) BACK SLOPE (Z:1)				
21) BOTTOM WIDTH	ft			
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00		
23) WETTED PERIMETER, [Pdw]	ft	0.00		
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!		
25) FLOW LENGTH, [L]	ft			
26) HIGH ELEVATION, [D]	ft			
27) LOW ELEVATION, [E]	ft			
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!		
29) MANNNING'S ROUGHNESS COEFF., [n]				
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec			
31) COMPUTE Tdt: Tdt = L / 3600*V	hr		=	
			min =	0.0

TOTAL TIME (hr)	**0.20**
TOTAL TIME (min)	**11.9**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-7

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Units	Segment ID			
1) SURFACE DESCRIPTION (table 5-4)		Fallow			
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050			
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300			
4) HIGH ELEVATION, [A]	ft	127.0			
5) LOW ELEVATION, [B]	ft	125.5			
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92			
7) LAND SLOPE, [s]	ft/ft	0.005			
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.229			0.229
				min =	13.8

SHALLOW CONCENTRATED FLOW

	Units	Segment ID			
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	855			
11) HIGH ELEVATION, [C]		125.5			
12) LOW ELEVATION, [D]		115.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0123			
14) AVERAGE VELOCITY, [V] **	ft/sec	1.79			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.13 +		=	0.13
				min =	8.0

CHANNEL FLOW

	Units	Segment ID			
16) DEPTH OF FLOW	ft				
17) FRONT SLOPE (Z:1)					
19) BACK SLOPE (Z:1)					
21) BOTTOM WIDTH	ft				
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00			
23) WETTED PERIMETER, [Pdw]	ft	0.00			
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!			
25) FLOW LENGTH, [L]	ft				
26) HIGH ELEVATION, [D]	ft				
27) LOW ELEVATION, [E]	ft				
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!			
29) MANNNING'S ROUGHNESS COEFF., [n]					
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec				
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=	
				min =	0.0

TOTAL TIME (hr)	**0.36**
TOTAL TIME (min)	**21.7**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-8 (Basin A)

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Unit	Segment ID			
1) SURFACE DESCRIPTION (table 5-4)		Fallow			
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050			
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300			
4) HIGH ELEVATION, [A]	ft	120.0			
5) LOW ELEVATION, [B]	ft	115.0			
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92			
7) LAND SLOPE, [s]	ft/ft	0.017			
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.142			0.142
				min =	8.5

SHALLOW CONCENTRATED FLOW

	Unit	Segment ID			
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	2888			
11) HIGH ELEVATION, [C]		115.0			
12) LOW ELEVATION, [D]		102.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0045			
14) AVERAGE VELOCITY, [V] **	ft/sec	1.08			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.74	+	=	0.74
				min =	44.5

CHANNEL FLOW

	Unit	Segment ID			
16) DEPTH OF FLOW	ft				
17) FRONT SLOPE (Z:1)					
19) BACK SLOPE (Z:1)					
21) BOTTOM WIDTH	ft				
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00			
23) WETTED PERIMETER, [Pdw]	ft	0.00			
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!			
25) FLOW LENGTH, [L]	ft				
26) HIGH ELEVATION, [D]	ft				
27) LOW ELEVATION, [E]	ft				
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!			
29) MANNNING'S ROUGHNESS COEFF., [n]					
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec				
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=	
				min =	0.0

TOTAL TIME (hr)	**0.88**
TOTAL TIME (min)	**53.0**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-9 (Basin B)

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Units	Segment ID			
1) SURFACE DESCRIPTION (table 5-4)		Fallow			
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050			
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300			
4) HIGH ELEVATION, [A]	ft	114.0			
5) LOW ELEVATION, [B]	ft	111.5			
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92			
7) LAND SLOPE, [s]	ft/ft	0.008			
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.187			0.187
				min =	11.2

SHALLOW CONCENTRATED FLOW

	Units	Segment ID			
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	1374			
11) HIGH ELEVATION, [C]		111.5			
12) LOW ELEVATION, [D]		104.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0055			
14) AVERAGE VELOCITY, [V] **	ft/sec	1.19			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.32 +		=	0.32
				min =	19.2

CHANNEL FLOW

	Units	Segment ID			
16) DEPTH OF FLOW	ft				
17) FRONT SLOPE (Z:1)					
19) BACK SLOPE (Z:1)					
21) BOTTOM WIDTH	ft				
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00			
23) WETTED PERIMETER, [Pdw]	ft	0.00			
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!			
25) FLOW LENGTH, [L]	ft				
26) HIGH ELEVATION, [D]	ft				
27) LOW ELEVATION, [E]	ft				
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!			
29) MANNNING'S ROUGHNESS COEFF., [n]					
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec				
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=	
				min =	0.0

TOTAL TIME (hr)	**0.51**
TOTAL TIME (min)	**30.4**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: CD-8&9 Downstream

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Units	Segment 1	Segment 2	Total
Segment ID				
1) SURFACE DESCRIPTION (table 5-4)		Fallow		
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050		
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300		
4) HIGH ELEVATION, [A]	ft	106.0		
5) LOW ELEVATION, [B]	ft	103.0		
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92		
7) LAND SLOPE, [s]	ft/ft	0.010		
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.174		0.174
			min =	10.4

SHALLOW CONCENTRATED FLOW

	Units	Segment 1	Segment 2	Total
Segment ID				
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2		
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	1550		
11) HIGH ELEVATION, [C]		103.0		
12) LOW ELEVATION, [D]		102.0		
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0006		
14) AVERAGE VELOCITY, [V] **	ft/sec	0.41		
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	1.05 +		= 1.05
			min =	63.0

CHANNEL FLOW

	Units	Segment 1	Segment 2	Total
Segment ID				
16) DEPTH OF FLOW	ft			
17) FRONT SLOPE (Z:1)				
19) BACK SLOPE (Z:1)				
21) BOTTOM WIDTH	ft			
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00		
23) WETTED PERIMETER, [Pdw]	ft	0.00		
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!		
25) FLOW LENGTH, [L]	ft			
26) HIGH ELEVATION, [D]	ft			
27) LOW ELEVATION, [E]	ft			
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!		
29) MANNNING'S ROUGHNESS COEFF., [n]				
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec			
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=
			min =	0.0

TOTAL TIME (hr)	**1.22**
TOTAL TIME (min)	**73.5**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector NUMBER:
LOCATION : LAKE COUNTY FILE:
BASIN NAME: CD-10 (Basin C1)

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Units	Segment ID			
1) SURFACE DESCRIPTION (table 5-4)		Woods, light underbrush			
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.400			
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300			
4) HIGH ELEVATION, [A]	ft	150.0			
5) LOW ELEVATION, [B]	ft	137.5			
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92			
7) LAND SLOPE, [s]	ft/ft	0.042			
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.518			0.518
				min =	31.1

SHALLOW CONCENTRATED FLOW

	Units	Segment ID			
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2			
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	896			
11) HIGH ELEVATION, [C]		137.5			
12) LOW ELEVATION, [D]		118.0			
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0218			
14) AVERAGE VELOCITY, [V] **	ft/sec	2.38			
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.10	+	=	0.10
				min =	6.3

CHANNEL FLOW

	Units	Segment ID			
16) DEPTH OF FLOW	ft				
17) FRONT SLOPE (Z:1)					
19) BACK SLOPE (Z:1)					
21) BOTTOM WIDTH	ft				
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00			
23) WETTED PERIMETER, [Pdw]	ft	0.00			
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!			
25) FLOW LENGTH, [L]	ft				
26) HIGH ELEVATION, [D]	ft				
27) LOW ELEVATION, [E]	ft				
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!			
29) MANNNING'S ROUGHNESS COEFF., [n]					
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec				
31) COMPUTE Tdt: Tdt = L / 3600*V	hr			=	
				min =	0.0

TOTAL TIME (hr)	**0.62**
TOTAL TIME (min)	**37.4**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.

TIME OF CONCENTRATION

PROJECT TITLE: CFX Connector
LOCATION : LAKE COUNTY
BASIN NAME: Basin C2

NUMBER:
FILE:

CONDITIONS	
Pre-Development	
Post-Development	X
Rainfall Zone:	7

COMPUTED VARIABLE	
Tdc	X
Tdt	
Frequency:	

Water Resources Group		Date
Computed By	LB	04/30/19
Checked By	MH	

SHEET FLOW (Applicable To Tdc Only)

	Units	Segment ID		
1) SURFACE DESCRIPTION (table 5-4)		fallow		
2) MANNNING'S ROUGHNESS COEFF., [n] (table 5-4)		0.050		
3) FLOW LENGTH, [L] (TOTAL L <= 300 ft)	ft	300		
4) HIGH ELEVATION, [A]	ft	116.0		
5) LOW ELEVATION, [B]	ft	108.0		
6) TWO YEAR 24-hr RAINFALL , [P]	in	4.92		
7) LAND SLOPE, [s]	ft/ft	0.027		
8) COMPUTE Tdt: Tdt = (.007*(n*L)^0.8)/(P^0.5 * s^0.4)	hr	0.117		0.117
			min =	7.0

SHALLOW CONCENTRATED FLOW

	Units	Segment ID		
9) SURFACE DESCRIPTION Enter 1 (Paved) or 2 (Unpaved)		2		
10) FLOW LENGTH, [L], (STA 670+00.48 - STA 681+00.28)	ft	477		
11) HIGH ELEVATION, [C]		109.0		
12) LOW ELEVATION, [D]		108.0		
13) WATERCOURSE SLOPE, [s]	ft/ft	0.0021		
14) AVERAGE VELOCITY, [V] **	ft/sec	0.74		
15) COMPUTE Tdt: Tdt = L / 3600*V	hr	0.18	+ =	0.18
			min =	10.8

CHANNEL FLOW

	Units	Segment ID		
16) DEPTH OF FLOW	ft			
17) FRONT SLOPE (Z:1)				
19) BACK SLOPE (Z:1)				
21) BOTTOM WIDTH	ft			
22) CROSS SECTIONAL FLOW AREA, [a]	ft^2	0.00		
23) WETTED PERIMETER, [Pdw]	ft	0.00		
24) HYDRAULIC RADIUS, [r] = a / Pdw	ft	#DIV/0!		
25) FLOW LENGTH, [L]	ft			
26) HIGH ELEVATION, [D]	ft			
27) LOW ELEVATION, [E]	ft			
28) CHANNEL SLOPE, [s]	ft/ft	#DIV/0!		
29) MANNNING'S ROUGHNESS COEFF., [n]				
30) COMPUTE V: V = (1.49*r^2/3 * s^1/2) / n	ft/sec			
31) COMPUTE Tdt: Tdt = L / 3600*V	hr		=	
			min =	0.0

TOTAL TIME (hr)	**0.30**
TOTAL TIME (min)	**17.8**

** Reference: FDOT Drainage Manual Chapter 5.5, TR-55 Chapter 3 & APP-F.