



**SR 400 (I-4) Project Development and Environment (PD&E) Study**  
FM No.: 432100-1-22-01



## **Location Hydraulic Report**

**Segment 1: State Road 400 (SR 400)/Interstate 4 (I-4) from West of CR 532 (Osceola/Polk County Line) to West of SR 528 (Beachline Expressway)**

**Osceola County (92130) and Orange County (75280)**

**September 2016**

**HNTB Corporation**  
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## Professional Engineer Certificate

I hereby certify that I am a registered professional engineer in the State of Florida practicing with HNTB Corporation, Inc., a corporation authorized to operate as an engineering business, EB#6500, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for SR 400 (I-4) Project Development and Environment Study for the Florida Department of Transportation in Osceola and Orange County, Florida.

This Location Hydraulic Report (LHR) includes a summary of data collection efforts, floodplain impact estimates, limited cross drain evaluations, and an overall drainage review prepared for the conceptual analyses for the SR 400 (I-4) widening and extension from west of the Polk/Osceola County Line in Polk County to west of SR 528 in Orange County.

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering and planning as applied through professional judgments and experience. This document is for planning purposes only and is not to replace any effort required for final design.

**SIGNATURE:** \_\_\_\_\_

**NAME:** Sanam Rai, P.E.

**FIRM:** HNTB Corporation

**P.E. No.:** 69089

**DATE:** September 2016

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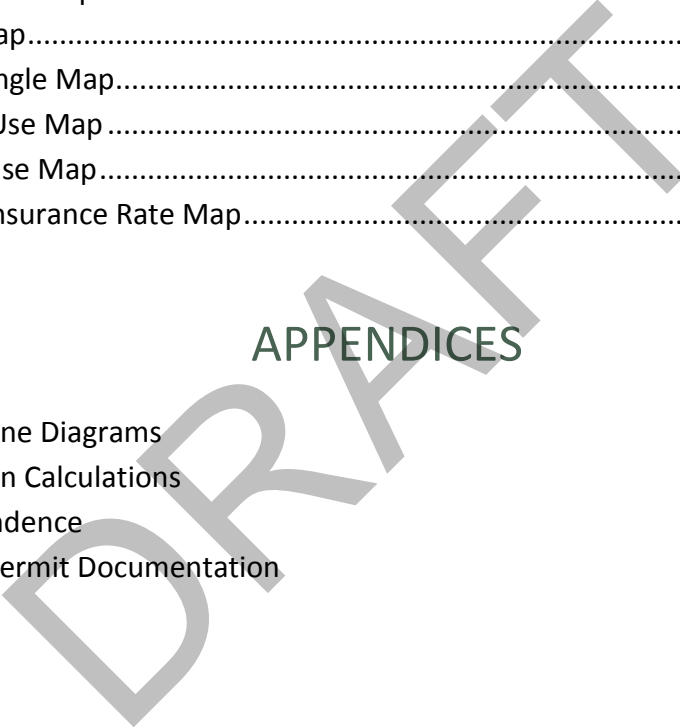
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## 1.0 Introduction

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway in order to improve traffic operations, enhance connectivity and improve mobility by providing travel choices to the motoring public. I-4 is an east-west limited access freeway which links the west and east coasts of Florida, from I-275 in Tampa to I-95 in Daytona Beach. I-4 spans across six counties in Central Florida, traversing through many cities including Lakeland, Celebration, Orlando, Altamonte Springs, Sanford and DeLand. I-4 is a critical component of Florida's Strategic Intermodal System (SIS) which links seaports, rail, airports and other intermodal facilities. This aspect of I-4's significance is evidenced through connectivity provided by major junctions with I-275, I-75, SR 429 (Daniel Webster Western Beltway), SR 417 (Southern Connector/Central Florida Greenway/Seminole Expressway), SR 528 (Martin Andersen Beachline Expressway), SR 91 (Florida's Turnpike), SR 408 (Spessard Lindsay Holland East-West Expressway) and I-95.

I-4 serves as the primary corridor in the movement of people and freight between major population, employment and activity centers in the Central Florida region. When the entire Interstate was fully opened in the early 1960's, it was designed to serve intrastate and interstate travel by providing a critical link between the east and west coasts of Central Florida. Although this role continues to be a crucial transportation function of I-4, the highway also serves large volumes of local and commuter traffic with shorter trip distances. Today, the highway serves as the primary link between hotel/resort complexes and tourist attractions such as Walt Disney World, Universal Studios, Sea World, the International Drive Resort Area and downtown Orlando. Since I-4 is the only north-south limited access facility that is centrally located between the predominant employment centers and the major suburbs to the north, it has become the primary commuting corridor in the Central Florida metropolitan area.

Growth in Central Florida over the past decades has made it difficult for the transportation system to accommodate travel demand. Traffic congestion and crash incidents have resulted in major delays on the Interstate as well as other arterials surrounding the corridor. Increased congestion levels are experienced outside of the typical morning and afternoon rush-hour periods, affecting mobility levels for more hours of the day and impacting other non-commuter/non-weekday travel. The congestion on I-4 is further evidenced by the less than desirable levels of service on the Interstate as well as the crossroads.

Projections of future population and employment in the region indicate that travel demand will continue to increase well into the future. The ability to accommodate the new travel patterns resulting from growth must be provided to sustain the region's economy. Without the improvements, extremely congested conditions are expected to occur for extended periods of time in both the morning and evening peak periods. Due to these congested conditions, user travel times will continue to increase, the movement of goods through the urban area will be slower, and the deliveries of goods within the urban area will be forced to other times throughout the day. The need for improvements to I-4 is illustrated by the important transportation roles I-4 serves to the Central Florida region and the State of Florida. If no improvements are made to the Interstate, a loss in mobility for the area's residents, visitors, and commuters can be expected, resulting in a severe threat to the continued viability of the economy and the quality of life.

This reevaluation involves revising the original design concept showing 6 GUL + 4 SUL from CR 532 to southwest of World Drive , 6 GUL + 2 HOV lanes from southwest of World Drive to northeast of Lake Avenue and 6 GUL + 4 HOV lanes from northeast of Lake Avenue to SR 528, as recommended in the FONSI for SR 400 (I-4) from CR 532 (Polk/Osceola County Line to West of SR 528 (Beachline Expressway) (December 23, 1999), to the current proposed

design of four (4) Express Lanes. The Express Lanes are tolled lanes and will extend the full length of the project. The access to/from the tolled lanes will be evaluated as part of this effort to determine if changes are needed from the previously approved concept for access to/from the SUL/HOV Lanes. The original I-4 PD&E Studies involved physical separation between the general use lanes and the SUL/HOV lanes on I-4, with demand management in the HOV lanes. The original demand management strategy was to control the use of the HOV lanes by requiring a minimum number of occupants per vehicle to maintain an acceptable level of service (Level of Service D).

This reevaluation also addresses revising the demand management tool to convert the HOV lanes to tolled express lanes. The express lanes will be separated from the general use travel lanes by two shoulders with a barrier wall between the shoulders. A variable pricing tolling plan is proposed for the express lanes. The tolls will vary by time of day and day of week to maintain acceptable levels of service in the express lanes. The tolls will be collected electronically through existing E-Pass, SunPass and other systems currently in place in the Orlando metropolitan area. The conversion to Express Lanes will maintain the same right of way limits as documented previously and will not change the impacts to the social, natural or physical environment. An update to the Systems Access Modification Report (SAMR) prepared in January, 2013 is being completed in conjunction with this effort. The primary objective of this Location Hydraulic Report (LHR) is to evaluate the hydraulic conditions along the proposed corridor in the existing and proposed conditions. This evaluation shall be accomplished by assessing and quantifying all floodplain impacts and providing recommendations to offset any impacts. The results of this evaluation will provide FDOT with the information necessary to reach a decision on the type, design, and location of improvements that are required for the widening of SR 400 (I-4).

This report has been prepared in accordance with the requirements set forth in Executive Order 11988, "Floodplain Management", US DOT Order 5650.2, "Floodplain Management and Protection", and Federal-Aid Policy Guide 23 CFR 650A. The intent of these regulations is to avoid or minimize roadway encroachments within the 100-year (base) floodplain, where practicable, and to avoid supporting land use development, which is incompatible with floodplain values. This report provides preliminary information on designated floodplains, cross drains and potential floodplain impacts of the project on these areas.

General information regarding basin delineation, cross drain locations and culvert parameters used in the preparation of this report include the following:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Osceola County No. 12097C0035F and 12097C20040F and Orange County No. 12095C0395F, 12095C0405F, 12095C0415F and 12095C0585F (Figures 6 & 7).
- US Department of Agriculture (USDA) Soils Conservation Service (SCS) Soils Survey for Polk, Osceola and Orange County (Figure 2)
- US Geological Survey (USGS) Quadrangle Map (Figure 3)
- Florida Department of Transportation (FDOT) PD&E Manual, Part 2, Chapter 24 (revised January 2008)
- FDOT Drainage Manual (2015)
- 2012 SFWMD Basis of Review for Environmental Resource (ERP BOR)
- Existing Construction Plans
- Various Existing Permits
- Site Investigation

## 2.0 Project Description and Purpose

The Florida Department of Transportation (FDOT) is proposing to reconstruct and widen I-4 as part of the I-4 Ultimate concept. This involves the build-out of I-4 to its ultimate condition through Central Florida, including segments in Polk, Osceola, Orange, Seminole, and Volusia Counties. The concept design proposes the addition of two (2) new express lanes in each direction, resulting in a total of ten (10) dedicated lanes. The study area in this section from the Polk County/Osceola County Line to west of SR 528 includes the following interchanges: CR 532, SR 429, World Drive, SR 417, US 192/SR 530, W. Osceola Parkway, SR 536, SR 535, Daryl Carter Parkway and Central Florida Parkway, and provides for the required stormwater treatment with eighty-nine (89) potential pond sites along the corridor (See Figure 1: Project Location Map). The typical section will ensure that the design will be contained within the existing right-of-way with the exception of the pond sites. This alignment serves as the basis for the development of the proposed improvements outlined in the Location Hydraulic Report.

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Figure 1: Project Location Map



## 2.1 Proposed Recommended Typical Section

The proposed improvements to I-4 include widening the existing six lane divided urban interstate to a ten lane divided highway. The typical section throughout Segment 1 will have three 12-foot general use travel lanes with 10-foot inside and 12-foot outside shoulders and two 12-foot express lanes with 4-foot inside and 10-foot outside shoulders in each direction. A barrier wall between the adjacent shoulders will separate the express lanes from the general use lanes. Twelve-foot auxiliary lanes will be provided in some areas in both the eastbound and westbound directions. The typical section includes a minimum 44-foot rail envelope in the median within a minimum 300 foot right of way.

While the overall typical section remains consistent throughout Segment 1, there are some areas along the Segment 1 corridor that will have special sections. Special cross sections were developed to meet the needs of the project due to right of way constraints, existing utility easements or other design considerations along the corridor. These special sections may include C-D roads, braided ramp systems, elevated express lanes or elevated general use lanes. Additionally, the median width may vary in certain locations to accommodate changes in the horizontal alignment due to crossroad support structures, water crossings or other features. In the area between World Drive and SR 417, the median is considerably wider than 44 feet to accommodate a future high speed rail station. The special sections along the Segment 1 corridor are identified as follows:

- I-4 Eastbound elevated express lanes between E. of SR 429 and W. of World Drive
- C-D system (Eastbound and Westbound) between World Drive and SR 417
- I-4 Eastbound elevated general use lanes with at grade C-D Road between SR 536 and SR 535
- I-4 Westbound elevated general use lanes between SR 536 and E. of Daryl Carter Parkway with at grade C-D Road between SR 536 and Central Florida Parkway

## 3.0 Design Criteria

The design of stormwater management facilities for this project is governed by the rules and criteria set forth by the South Florida Water Management District (SFWMD) and the FDOT. These criteria were drawn from the 2012 SFWMD Basis of Review for Environmental Resource (ERP BOR) and the 2015 FDOT Drainage Manual.

### 3.1 Culvert Design

- All cross drains, if applicable, shall be designed to have sufficient hydraulic capacity to convey the 50-year (Design Frequency) storm event. 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 in compliance with the FDOT Drainage Manual.
- The highest tailwater elevation, which can be reasonably expected to occur coincident with the design storm event, shall be used (typically, crown of pipe is used).

- 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.

### 3.2 Floodplains/Floodways

- The proposed project may not cause a net reduction in flood storage within the 10-year floodplain.
- Structures shall cause no more than a one-tenth (0.1) of a foot increase in the 100-year flood elevation 500-feet 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.

## 4.0 Site Conditions

This project lies within FDOT District 5, Southwest Florida Water Management District (SWFWMD), South Florida Water Management District (SFWMD) and the Reedy Creek Improvement District (RCID). Wetlands, wildlife, soils conditions, land use, cross drains, and floodplains describe the site conditions present within the limits of this study. Involvement within wetlands and impact of wildlife are specifically addressed in two separate reports, "*Wetlands Evaluation Report*" and "*Endangered Species Biological Assessment*" prepared as part of this PD&E Study.

### 4.1 Soils

The Soil Survey of Polk, Osceola and Orange County, Florida, published by the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) has been reviewed for the project vicinity. There are forty-one (41) different soil types located in the project area. Table 1 lists these soil types and their hydraulic properties. The Soil Survey Map for the project is illustrated in Figure 2.

**Table 1: SCS Soil Survey Information**

<b>Soil Type</b>	<b>Hydrologic Soil Group</b>
Adamsville sand (1)	A
Arents (4)	A
Archbold fine sand (2)	A
Basinger fine sands (3, 5, 6, 36)	A/D
Candler sand (4, 7, 8)	A
Hontoon muck (15)	A/D
Immokalee fine sands (16, 20)	A/D
Myakka fine sand (22, 25)	A/D
Ona fine sand (26, 27)	B/D
Placid fine sand (33)	A/D
Placid and Myakka fine sand (25)	A/D
Pits (31, 33)	N/A
Pomello fine sand (34)	A
Pompano fine sand (37)	A/D
Riviera fine sand (38)	C/D
Samsula muck (13, 40)	A/D
Sanibel muck (42)	A/D
Seffner fine sand (43)	A/D
Smyrna fine sand (42, 44)	A/D
Smyrna and Myakka fine sand (17)	A/D
St. Johns fine sand (37)	B/D
St. Lucie fine sand (38)	A
Tavares fine sand (15, 44, 46)	A
Tavares-Millhopper fine sands (47)	A
Urban land (50)	N/A
Vero fine sand (45)	N/A
Wauchula fine sand (46)	A/D
Zolfo fine sand (54)	A

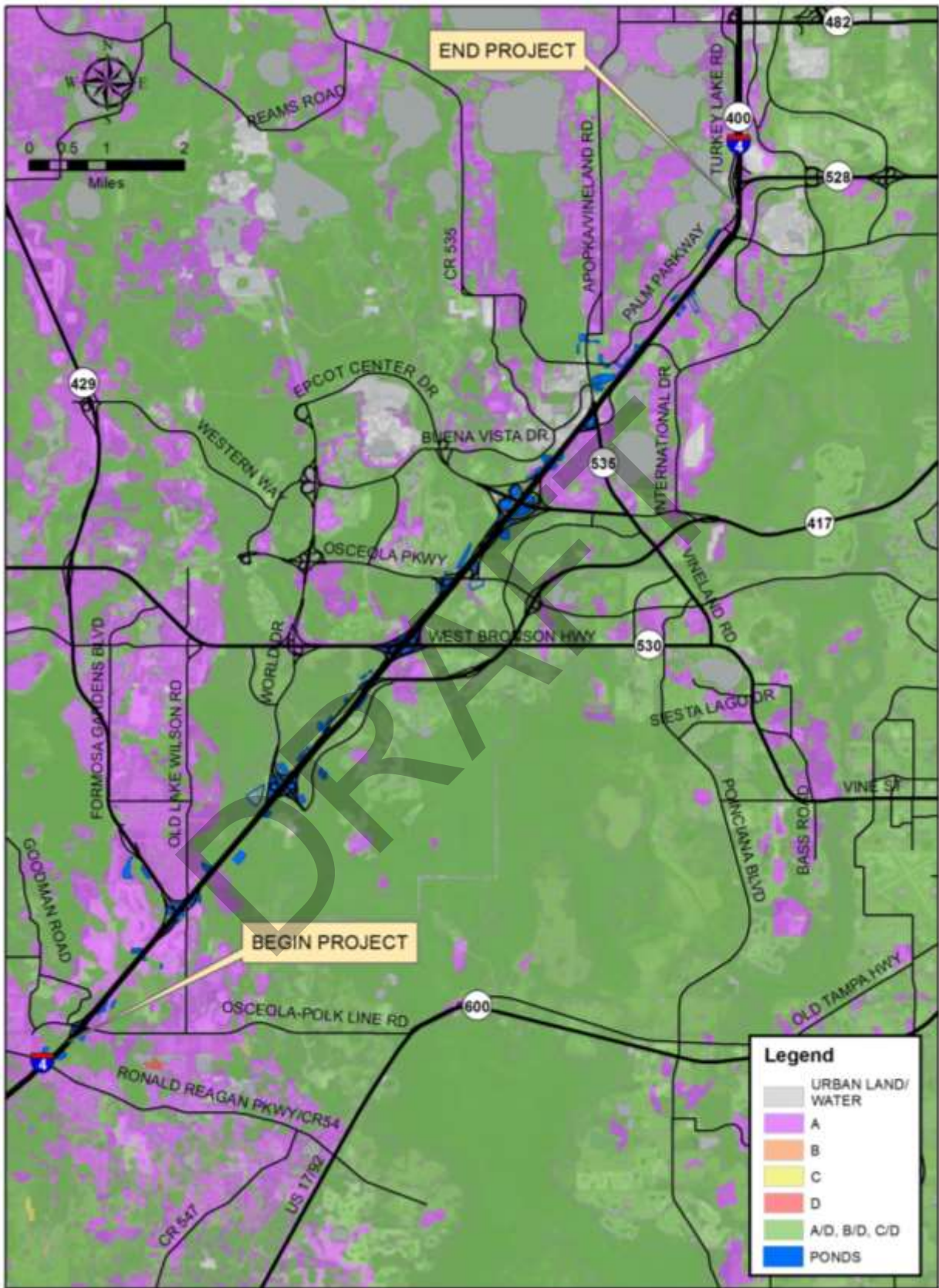


Figure 2: Soil Survey Map

Based on a review of the Polk, Osceola and Orange County Florida United States Geographical Survey (USGS) quadrangle map, the existing ground surface elevations along the project alignment vary approximately from +75 to +125 feet NAVD. A reproduction of the USGS quadrangle map for the project vicinity is shown in Figure 3.



Figure 3: USGS Quadrangle Map

## 4.2 Land Use

### 4.2.1 Existing Land Use

Existing land use information within the SR 400 (I-4) PD&E Study is based on the existing land use map. The I-4 corridor varies with a mixture of uses. The southern half of the corridor is characterized by large portions of agricultural and recreational land uses on each side of the interstate. Along the southern end of the corridor, undeveloped parcels are designated for retail/office or non-residential use, non-agriculture acreage and residential land uses. The northern portion of the corridor consists largely of retail/office land uses intermixed with some vacant nonresidential parcels and agricultural use. Figure 4 illustrates the existing land use within the project area.

### 4.2.2 Future Land Use

Future land use along the I-4 corridor also varies greatly with a mixture of uses. The southern portion of I-4, through Polk County, consists of activity center, medium density residential, preservation and employment center uses. The southern portion of the corridor through Osceola County consists of commercial, planned development and conservation land uses. The northern portion of the I-4, through Orange County, is surrounded predominantly by mixed use parcels with some commercial and office use. The widening of I-4 will not alter the existing or future land uses in the area. Figure 5 illustrates the future land use within the project area.

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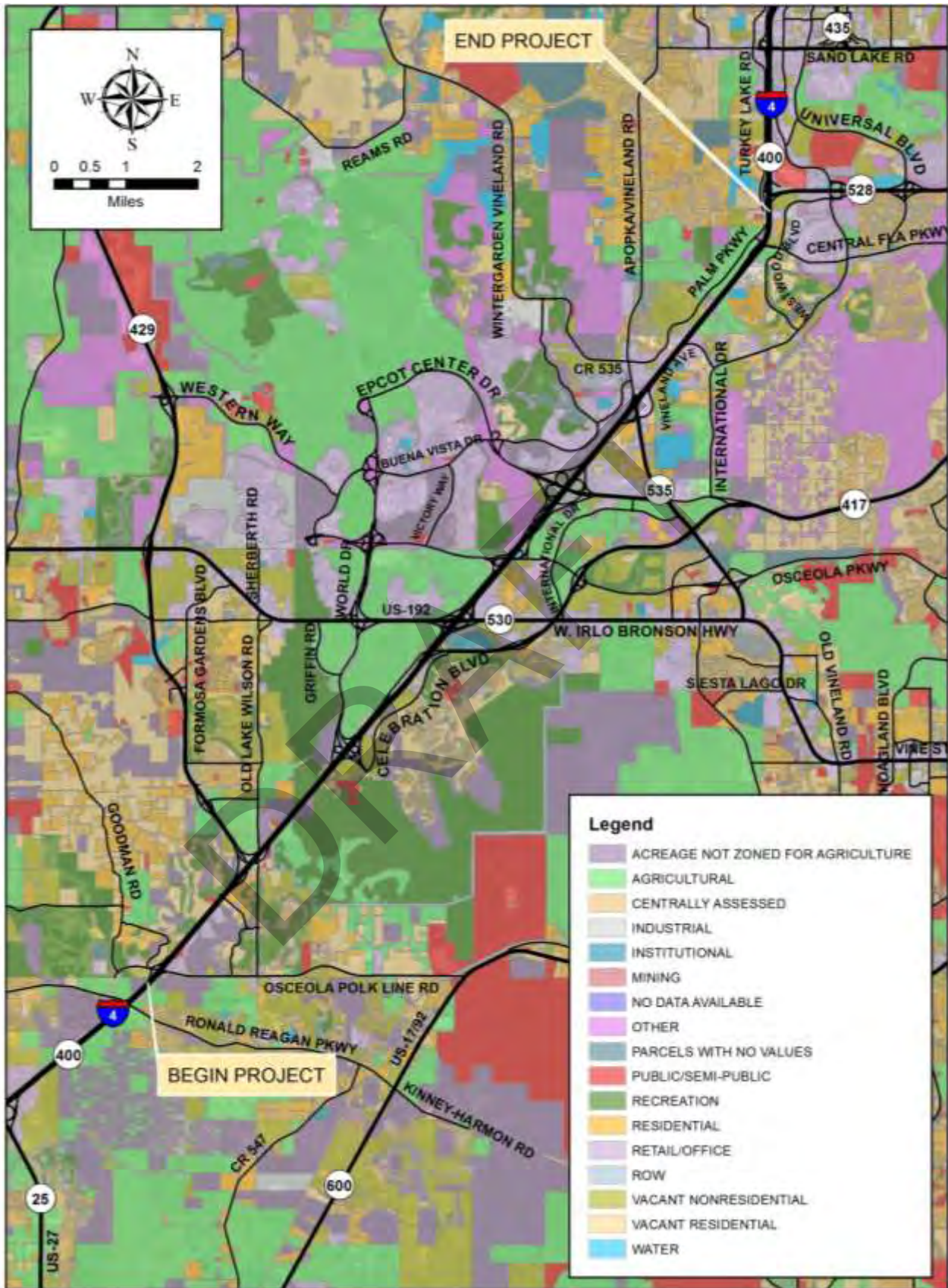


Figure 4: Existing Land Use Map

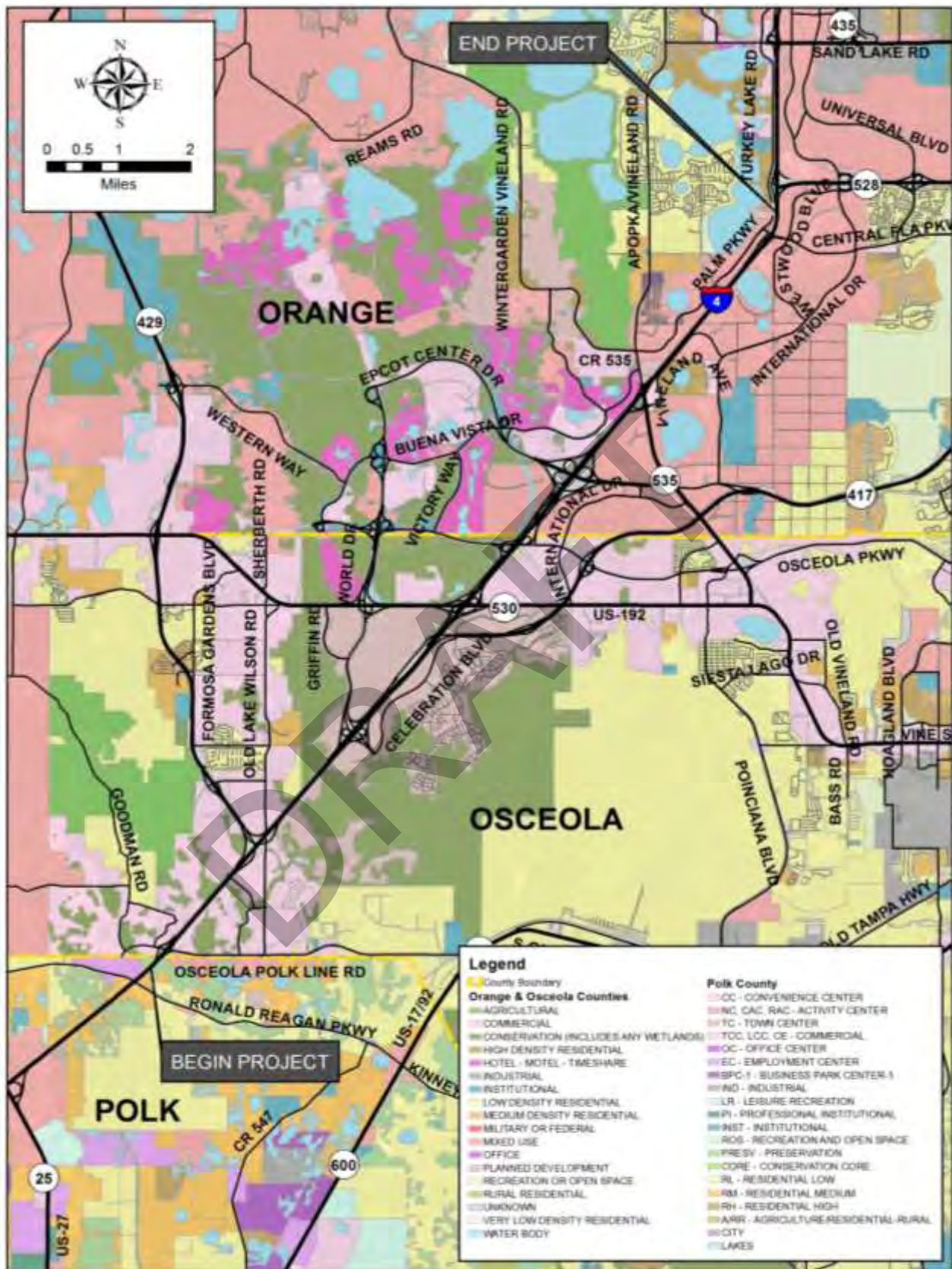


Figure 5: Future Land Use Map



## 4.3 Cross Drains

### 4.3.1 Existing Conditions

There are fifteen (15) existing structures which act as cross drains within the study area. Table 2 depicts the existing cross culvert data obtained from the Straight Line Diagram of Road Inventory (Appendix A) pertinent to the project study area, as well as, existing permits and original construction plans. In the case where original construction plans were not found, cross drain invert elevations were obtained from existing permits and the original PD&E study. Some of the existing construction plans were in 1929 NGVD datum. A conversion of (-) 0.85 ft. was used to convert to the NAVD datum. During the design phase, survey and field verification will be necessary to determine the actual pipe lengths and culvert flow lines.

**Table 2: Existing Cross Drains**

CD No.	Station	Description from Original Construction Plans						
		Count	Span (in)	Rise (in)	Type	*Length (Ft)	*Elevation (Ft NAVD)	
							US	DS
CD-1	614+12.71	2	36	36	RCP	213	111.36	111.25
CD-2	664+22.84	2	48	48	RCP	256	102.58	102.48
CD-3	680+00.00	2	108	84	CBC	262	92.11	91.77
CD-4	692+20.31	1	36	36	RCP	261	90.34	88.25
CD-5	698+00.00	4	144	96	CBC	260	84.27	83.56
CD-6	732+50.00	2	84	48	CBC	310	90.72	90.50
CD-7	761+00.00	1	42	42	RCP	227	84.42	82.97
CD-8	785+16.00	2	42	42	RCP	248	74.18	73.03
CD-9	863+00.00	2	84	48	CBC	583	75.70	75.50
CD-10	914+00.00	2	84	48	CBC	250	79.50	79.25
CD-11	984+00.00	2	84	60	CBC	477	82.45	81.65
CD-12	1083+18.65	2	36	36	RCP	415	83.44	82.45
CD-13	1138+19.00	2	30	30	RCP	247	96.10	94.85
CD-14	1202+15.00	1	48	48	RCP	241	99.57	98.35
**CD-15	1333+10.00							

Abbreviations: RCP – Reinforced Concrete Pipe, CBC – Concrete Box Culvert

\*Field Verify.

\*\* Existing information not found.

Based on hydraulic calculations, cross drains CD-9 and CD-11 do not have the sufficient hydraulic capacity to convey the 100-year storm event in the existing condition. The 100 year headwater stage is shown as the critical elevation (roadway elevation) for the purposes of this report. Please refer to Appendix B for additional information.

### 4.3.2 Proposed Conditions

Due to the proposed roadway widening, all of the cross drains will require total replacement. Through hydraulic analysis, it was determined that four (4) cross drains need to be upsized: CD-7, 8, 12, and 13. The remaining cross drains will require a change in slope to function adequately. All cross drains were analyzed using HY8 (Version 7.3) software. Table 3 depicts the results of the hydraulic analysis.

**Table 3: Proposed Cross Drains**

CD No.	Station	Description from Original Construction Plans						
		Count	Span (in)	Rise (in)	Type	Length (Ft)	Elevation (Ft NAVD)	
							US	DS
CD-1	614+12.71	2	36	36	RCP	328	111.80	110.80
CD-2	664+22.84	2	48	48	RCP	300	102.58	102.18
CD-3	680+00.00	2	108	84	CBC	353	92.11	91.77
CD-4	692+20.31	1	36	36	RCP	300	90.34	88.25
CD-5	698+00.00	4	144	96	CBC	392	84.27	83.16
CD-6	732+50.00	2	84	48	CBC	460	90.72	90.10
CD-7	761+00.00	1	48	48	RCP	404	84.42	82.97
CD-8	785+16.00	2	48	48	RCP	308	74.18	73.03
CD-9	863+00.00	2	84	48	CBC	583	75.70	75.20
CD-10	914+00.00	2	84	48	CBC	558	79.50	78.70
CD-11	984+00.00	2	84	60	CBC	581	82.00	80.90
CD-12	1083+18.65	2	42	42	RCP	612	83.44	82.45
CD-13	1138+19.00	2	36	36	RCP	356	96.10	94.85
CD-14	1202+15.00	1	48	48	RCP	372	99.57	98.20
**CD-15	1333+10.00							

Abbreviations: RCP – Reinforced Concrete Pipe, CBC – Concrete Box Culvert

\*\* Existing information not found.

## 4.4 Bridge Structures

### 4.4.1 Existing Condition

There are twenty nine (29) existing bridges located within the project corridor. Table 4 depicts the location and attributes of the existing bridges. Structure conditions and year of construction was provided in the original I-4 PD&E Study.

**Table 4: Existing Bridges**

Structure No.	Station	Description
B-1	634+00	I-4 WB over CR 532
B-2	634+00	I-4 EB over CR 532
B-3	706+00	Sinclair Road over I-4
B-4	735+50	SR 429 Ramp from EB I-4
B-5	738+50	SR 429 Ramp to EB I-4
B-6	748+00	Old Lake Wilson Road over I-4
*B-7	813+00	I-4 WB over Reedy Creek
*B-8	813+00	I-4 EB over Reedy Creek
B-9	847+00	World Drive EB over I-4
B-10	851+00	World Drive WB over I-4
B-11	945+00	SR 417 WB Ramp over I-4
B-12	967+00	I-4 EB Ramp from SR 530 over I-4
B-13	973+00	SR 530 SB over I-4
B-14	975+00	SR 530 NB over I-4
B-15	976+50	I-4 WB Ramp from SR 530 over I-4
B-16	978+00	I-4 EB Ramp to SR 530 over I-4
B-17	1034+50	Osceola Parkway SB over I-4
B-18	1036+00	Osceola Parkway NB over I-4
B-19	1060+00	I-4 EB CD Road
B-20	1066+00	I-4 WB CD Road
B-21	1088+00	SR 536 EB Ramp over I-4
B-22	1101+00	SR 536 SB over I-4
B-23	1102+00	SR 536 NB over I-4
B-24	1184+00	I-4 WB over SR 535
B-25	1184+00	I-4 EB over SR 535
B-26	1272+00	Daryl Carter Parkway (Fenton St.) over I-4
B-27	1332+00	Central Florida Parkway WB Ramp over I-4
B-28	1335+00	I-4 EB over Central Florida Parkway
B-29	1335+00	I-4 EB over Central Florida Parkway

\* Bridge crossing over Reedy Creek.

#### 4.4.2 Proposed Condition

In the proposed condition, the existing bridges will be either widened or replaced to accommodate the widening of I-4 to its ultimate condition. Please refer to the Preliminary Engineering Report (PER) for additional information.

#### 4.5 Floodplain/Floodways

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRM) for Polk, Osceola and Orange County. According to FEMA Map Numbers 12105C0125F, 12097C0040F, 12097C0035F, 12095C0585F, 12095C0395F, and 12095C0415F, portions of the roadway are located within the 100-year floodplain. Based on the FEMA floodplain lines, the roadway widening will impact the floodplain on both sides of the roadway. The FEMA Flood Insurance Rate Maps for the project is provided in Figure 6.

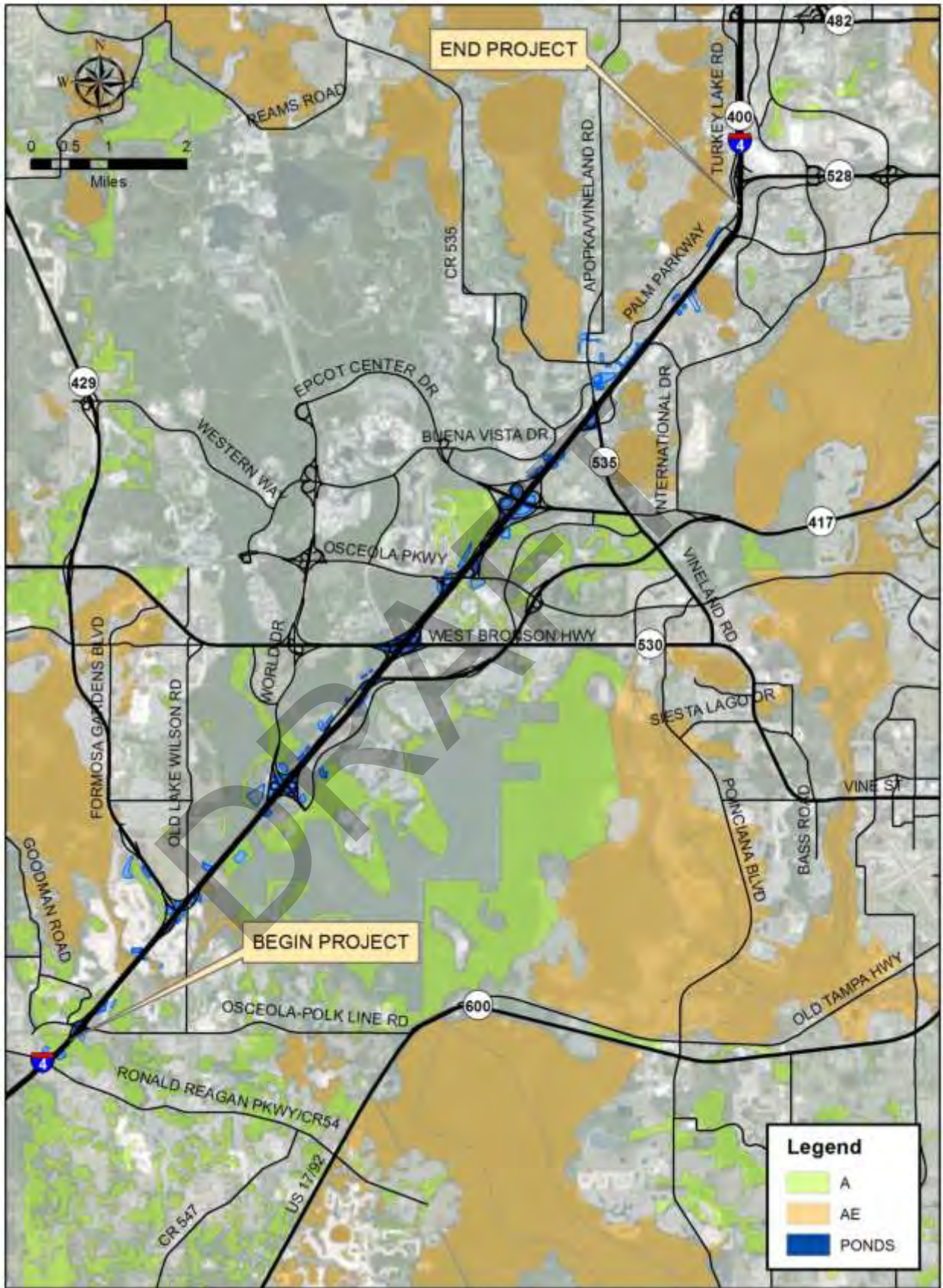


Figure 6: FEMA Flood Insurance Rate Map

## 5.0 Recommendations and Conclusions

### 5.1 Cross Drains

There are fifteen (15) cross drains within the study area. Due to the proposed widening, the cross drains will require total replacement. The existing cross drains have been evaluated for headwater impacts to see if replacement is necessary. Through hydraulic analysis, it was determined that four (4) cross drains need to be upsized: CD-7, 8, 12, and 13.

### 5.2 Bridge Structures

There are twenty nine (29) existing bridges which will require expansion or widening to accommodate the widening of I-4 to its ultimate condition. Additional study will be required during the design and construction phase to determine the resultant scour for the bridges (B-7 & B-8) located at Reedy Creek. Please refer to the Preliminary Engineering Report (PER) for additional information.

### 5.3 Floodplains and Floodways

Floodplains are present along the project corridor and adjacent to some proposed ponds within the study limits; however, no floodways are located within the project area. Any impacts associated with the roadway widening will be compensated for in existing pond sites and/or proposed floodplain compensation ponds. Please refer to the Pond Siting Report (PSR) for additional information.

### 5.4 Project Classification

In accordance with FDOT's PD&E Manual, Part 2, Chapter 24, Section 24-2.1, Figure 24.1 "Floodplain" Statements, the proposed corridor has been evaluated to determine the impact of the proposed hydraulic modifications. Hydraulic improvements are grouped into six categories based upon the type of the hydraulic improvements and estimated floodplain impact. The proposed project can be best described in two (2) categories:

Category 3: Projects involving modification to existing drainage structures. The proposed project does not involve the replacement of any existing drainage structures or the construction of any new drainage structures. Projects that affect flood heights and flood limits, even minimally, may require further evaluation to support statements that emphasize the insignificance of the modifications (FDOT PD&E Manual, Part 1, Chapter 24). "The modifications to drainage structures included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. These minimal increases 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 not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant."

Category 4: Projects on existing alignment involving replacement of existing drainage structures with no record of drainage problems. The proposed project does not involve replacement activities that would reduce the hydraulic performance of existing facilities. Also, there should be no record of

drainage problems and no unresolved complaints from residents in the area (FDOT PD&E Manual, Part 1, Chapter 24). “The proposed structure will perform hydraulically in a manner equal to or greater than the existing structure, and backwater surface elevations are not expected to increase. As a result, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant.”

## 5.5 Project Summary

The proposed reconstruction and widening of SR 400 (I-4) involves adding two new lanes in each direction and providing stormwater management systems. There are fifteen (15) existing cross drains which will necessitate culvert replacement. There are twenty nine (29) bridges within the corridor, which may need to be replaced to meet the proposed geometry. The proposed alignment does impact the 100-year floodplain, as well as several existing pond sites. Any impacts associated with the roadway widening will be compensated for in existing pond sites and/or proposed floodplain compensation ponds. By complying with regulatory criteria, the implementation of this project will not adversely affect the area adjacent to the corridor and meets the expectations of the stakeholders.

DRAFT

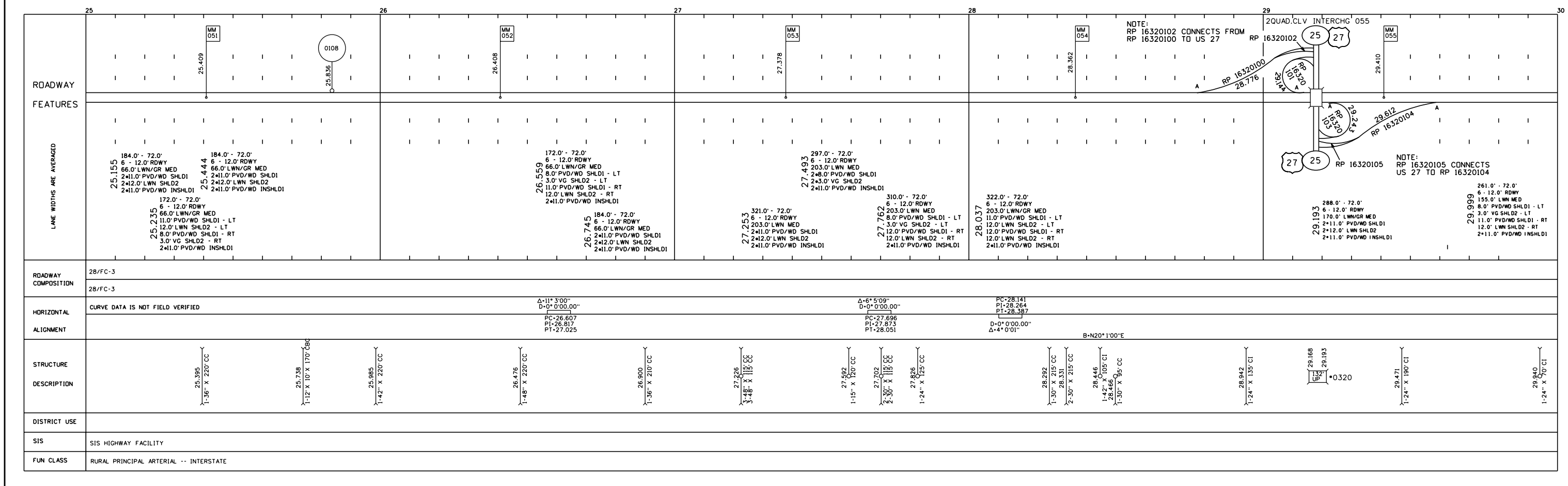
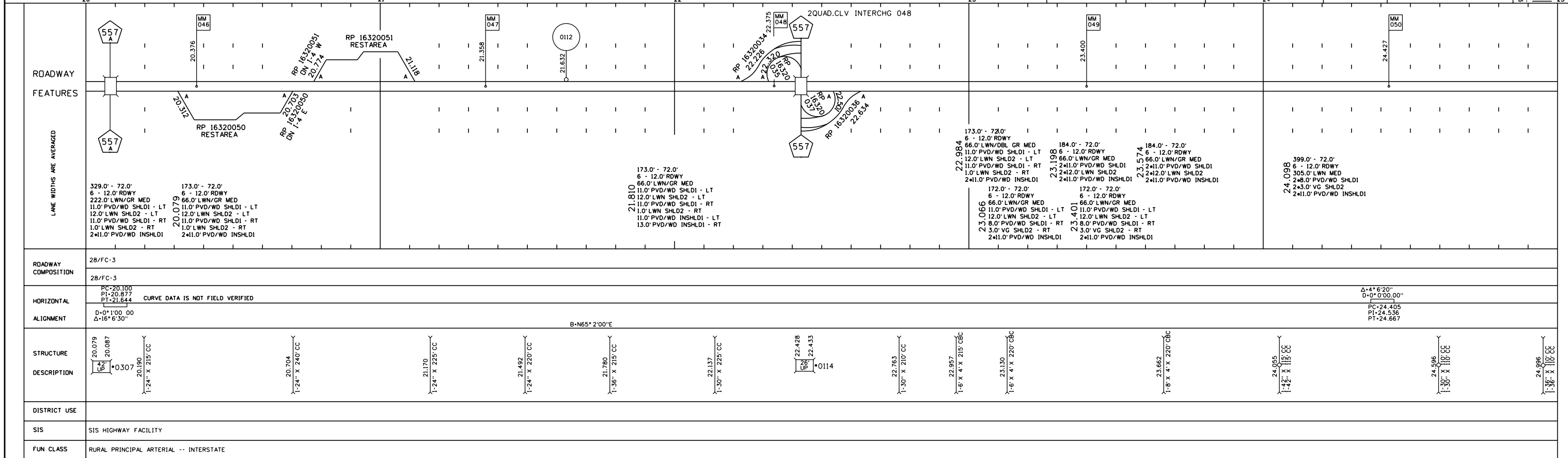
# APPENDIX A – STRAIGHT LINE DIAGRAMS

# STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT ONE MAINTENANCE STATISTICS OFFICE

DATE BY	5 YR INV URS	SLD REV URS	BMP	EMP	INTERIM REVISIONS INV	SLD REV
05/18/11		06/14/11				

INT. of US ROUTE NO	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO.
I 4	SR 400	POLK	1	16320000	3





DATE BY	5 YR INV	SLD REV	BMP	EMP	INTERIM REVISIONS INV	SLD REV
	05/18/11	06/14/11				
	URS	URS				

## STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT ONE MAINTENANCE STATISTICS OFFICE

INT. or US ROUTE NO	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO.
I 4	SR 400	POLK	1	16320000	4
					OF 4

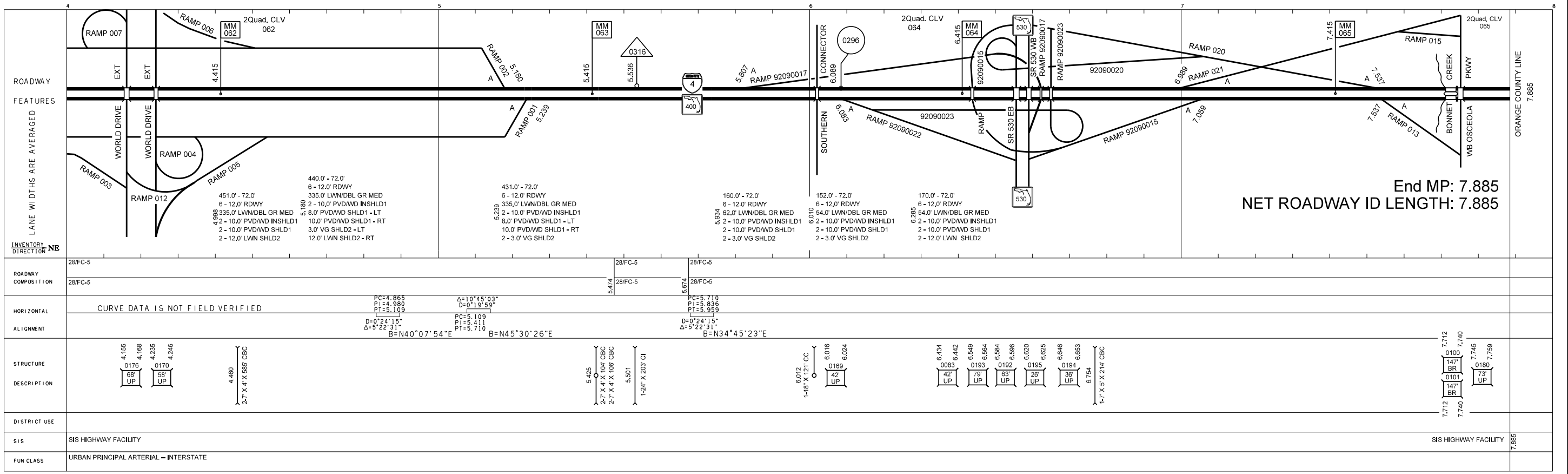
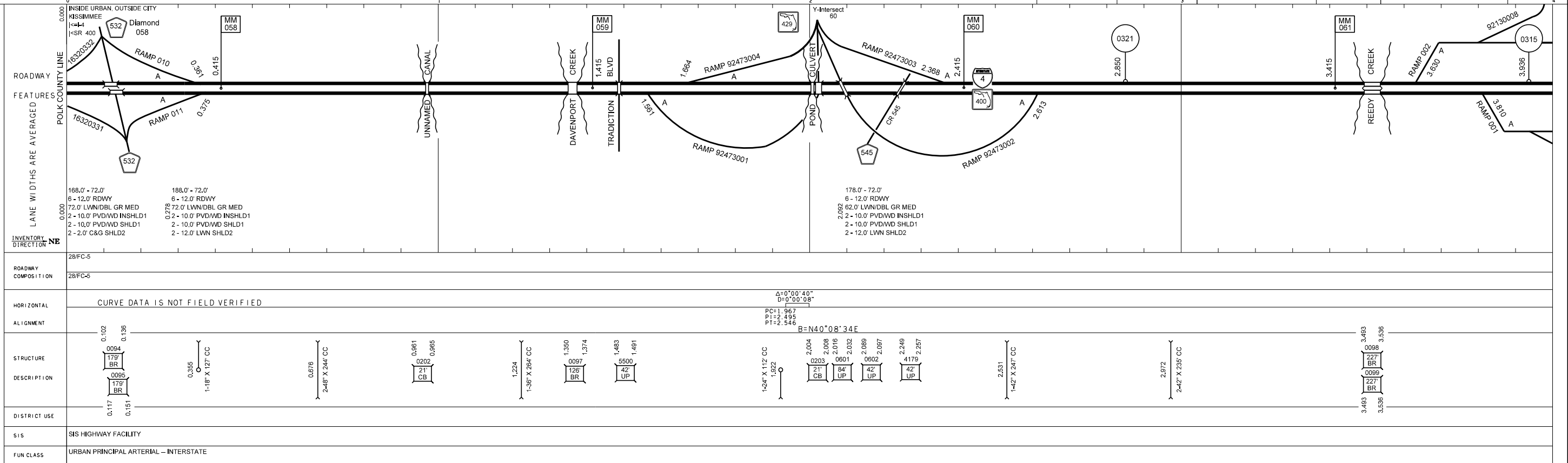
ROADWAY FEATURES		NET ROADWAY ID LENGTH: 32.022
LANE WIDTHS ARE AVERAGED	<p>261.0' - 72.0' 6 - 12.0' RDWY 155.0' LWN MED 8.0' PVD/WO SHLD1 - LT 3.0' VG SHLD2 - LT 11.0' PVD/WO SHLD1 - RT 12.0' LWN SHLD2 - RT 2+11.0' PVD/WO INSHLD1</p> <p>31.025 261.0' - 72.0' 6 - 12.0' RDWY 155.0' LWN MED 8.0' PVD/WO SHLD1 - LT 3.0' VG SHLD2 - LT 11.0' PVD/WO SHLD1 - RT 12.0' LWN SHLD2 - RT 2+11.0' PVD/WO INSHLD1</p> <p>31.518 184.0' - 72.0' 6 - 12.0' RDWY 155.0' LWN MED 8.0' PVD/WO SHLD1 - LT 3.0' VG SHLD2 - LT 11.0' PVD/WO SHLD1 - RT 12.0' LWN SHLD2 - RT 2+11.0' PVD/WO INSHLD1</p>	
ROADWAY COMPOSITION	28/FC-3	
HORIZONTAL ALIGNMENT	CURVE DATA IS NOT FIELD VERIFIED	$\Delta=10^{\circ}0'20''$ $D=0^{\circ}0'00.00''$ PC=31.591 PI=31.787 PT=31.982 B-S69° 7'59" E
STRUCTURE DESCRIPTION	<p>30.178 1-24" X 110' CC</p> <p>30.311 1-30" X 115' CC</p> <p>30.501 1-24" X 95' CC</p> <p>30.540 1-24" X 110' CC</p> <p>30.674 1-24" X 105' CC</p> <p>30.846 1-24" X 105' CC</p> <p>30.879 2-36" X 105' CC</p> <p>31.229 1-18" X 105' CC</p> <p>31.402 1-18" X 140' CM</p> <p>31.500 0.332</p> <p>31.510 0.331</p> <p>31.518 0.331</p> <p>31.528 0.331</p> <p>31.682 1-30" X 120' CC</p>	
DISTRICT USE		
SIS	SIS HIGHWAY FACILITY	SIS HIGHWAY FACILITY
FUN CLASS	RURAL PRINCIPAL ARTERIAL -- INTERSTATE	

# STRAIGHT LINE DIAGRAM OF ROAD INVENTORY

FLORIDA DEPARTMENT OF TRANSPORTATION

INT. or US ROUTE NO. <b>I-4</b>	STATE ROAD NO. <b>SR 400</b>	COUNTY <b>OSCEOLA</b>	DISTRICT <b>5</b>	ROADWAY ID <b>92 130 000</b>	SHEET NO.: <b>1 of 1</b>
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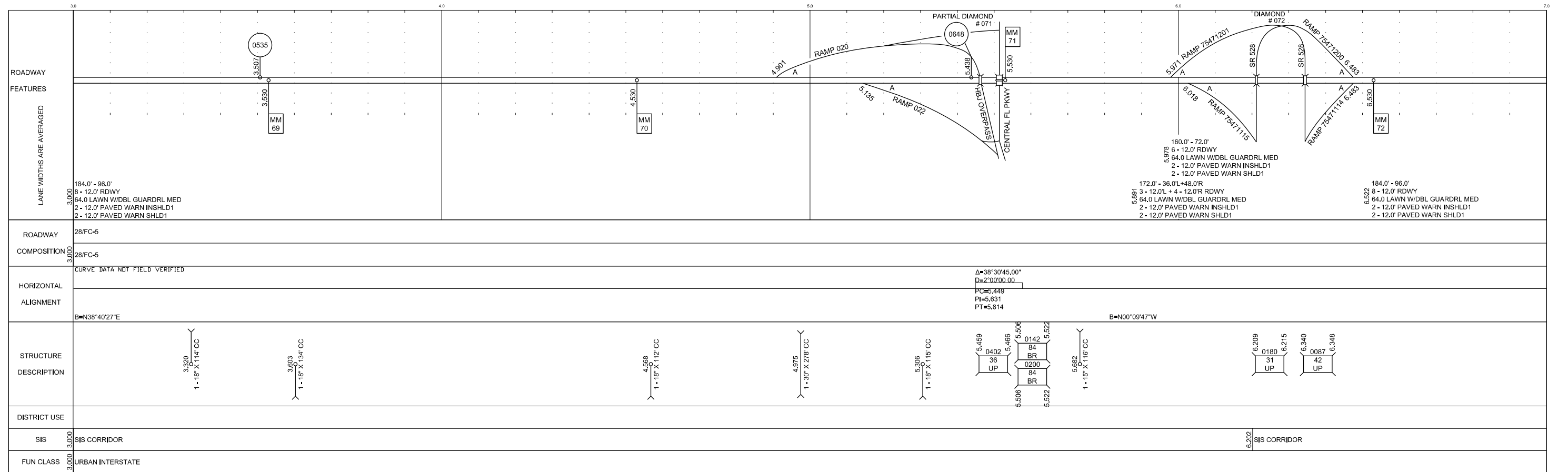
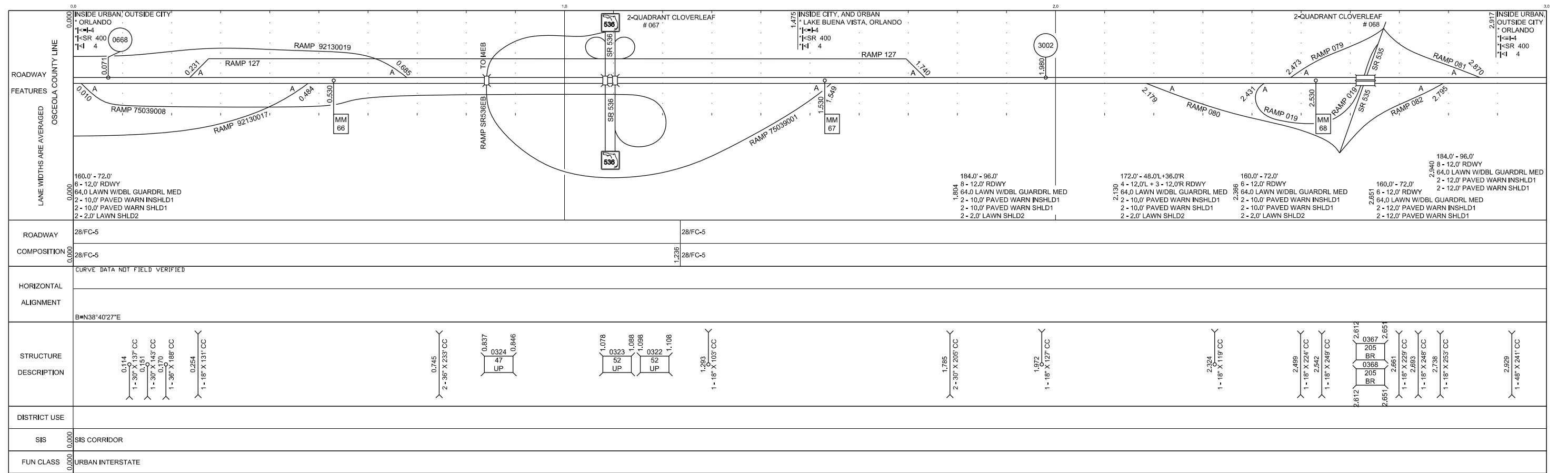
		5 YR INV		SLD REV		BMP		EMP		INTERM REVISIONS		
DATE	BY	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	
07/15/09	URS	08/06/09	000.000	007.885	08/24/11	DD	09/14/11	MR	11/12/09	EN	12/01/09	MR



FLORIDA DEPARTMENT OF TRANSPORTATION  
**STRAIGHT LINE DIAGRAM OF ROAD INVENTORY**

DATE	5 YR INV	SLD REV	BMP	INTERIM REVISIONS			SLD REV
	06/23/2011	08/17/2011		EMP	INV	EN	MR
BY	ENIKA	URS	000,000	024,673	01/17/2013		03/13/2013

SECTION STATUS	INT. OR US ROUTE NO.	STATE ROAD NO.	COUNTY	DISTRICT	ROADWAY ID	SHEET NO:
02	I 4	SR 400	ORANGE	05	75280000	1 OF 5



# APPENDIX B – CROSS DRAIN CALCULATIONS

**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO.		CD-1	
		Existing	Proposed
LOCATION	STA.	614+12.71	614+12.71
WIDTH		3.00 FT	3.00 FT
HEIGHT		3.00 FT	3.00 FT
BARRELS		2	2
DIAMETER		3.00 FT	3.00 FT
LENGTH		213.0 FT	328.0 FT
TOTAL CROSS-SECTIONAL AREA		14.14 SF	14.14 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		111.36 FT	111.80 FT
DOWNSTREAM INVERT		111.25 FT	110.80 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		119.00 FT	119.00 FT
TAILWATER (CROWN OF PIPE)		114.25 FT	113.80 FT
<b>DETERMINE FLOWRATES (Q):</b>			
* VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	85 CFS	115.82 FT	115.77 FT
Q (50 YR) = 1.25 * Q (25 YR)	106 CFS	116.70 FT	116.86 FT
Q (100 YR) = 1.40 * Q (25 YR)	119 CFS	117.34 FT	117.66 FT

\* *Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-1 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 85 cfs

Design Flow: 106 cfs

Maximum Flow: 119 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-1E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
115.82	85.00	85.00	0.00	1
115.95	88.40	88.40	0.00	1
116.09	91.80	91.80	0.00	1
116.23	95.20	95.20	0.00	1
116.37	98.60	98.60	0.00	1
116.52	102.00	102.00	0.00	1
116.67	105.40	105.40	0.00	1
116.70	106.00	106.00	0.00	1
116.99	112.20	112.20	0.00	1
117.16	115.60	115.60	0.00	1
117.34	119.00	119.00	0.00	1
119.00	147.62	147.62	0.00	Overtopping



**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
85.00	85.00	115.82	3.464	4.465	4-FFf	3.000	2.121	3.000	3.000	6.013	0.000
88.40	88.40	115.95	3.579	4.593	4-FFf	3.000	2.163	3.000	3.000	6.253	0.000
91.80	91.80	116.09	3.698	4.727	4-FFf	3.000	2.204	3.000	3.000	6.494	0.000
95.20	95.20	116.23	3.820	4.865	4-FFf	3.000	2.244	3.000	3.000	6.734	0.000
98.60	98.60	116.37	3.947	5.009	4-FFf	3.000	2.283	3.000	3.000	6.975	0.000
102.00	102.00	116.52	4.078	5.158	4-FFf	3.000	2.320	3.000	3.000	7.215	0.000
105.40	105.40	116.67	4.214	5.311	4-FFf	3.000	2.357	3.000	3.000	7.456	0.000
106.00	106.00	116.70	4.238	5.339	4-FFf	3.000	2.363	3.000	3.000	7.498	0.000
112.20	112.20	116.99	4.500	5.634	4-FFf	3.000	2.426	3.000	3.000	7.937	0.000
115.60	115.60	117.16	4.650	5.803	4-FFf	3.000	2.459	3.000	3.000	8.177	0.000
119.00	119.00	117.34	4.805	5.977	4-FFf	3.000	2.491	3.000	3.000	8.418	0.000

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Straight Culvert

Inlet Elevation (invert): 111.36 ft,    Outlet Elevation (invert): 111.25 ft

Culvert Length: 213.00 ft,    Culvert Slope: 0.0005

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**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 111.36 ft

Outlet Station: 213.00 ft

Outlet Elevation: 111.25 ft

Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Circular

Barrel Diameter: 3.00 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

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
85.00	114.25	3.00
88.40	114.25	3.00
91.80	114.25	3.00
95.20	114.25	3.00
98.60	114.25	3.00
102.00	114.25	3.00
105.40	114.25	3.00
106.00	114.25	3.00
112.20	114.25	3.00
115.60	114.25	3.00
119.00	114.25	3.00

**Tailwater Channel Data - CD-1E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 114.25 ft

**Roadway Data for Crossing: CD-1E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 119.00 ft

Roadway Surface: Paved

Roadway Top Width: 154.00 ft

**CD-1 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 85 cfs

Design Flow: 106 cfs

Maximum Flow: 119 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-1P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
115.77	85.00	85.00	0.00	1
115.93	88.40	88.40	0.00	1
116.10	91.80	91.80	0.00	1
116.27	95.20	95.20	0.00	1
116.45	98.60	98.60	0.00	1
116.64	102.00	102.00	0.00	1
116.83	105.40	105.40	0.00	1
116.86	106.00	106.00	0.00	1
117.23	112.20	112.20	0.00	1
117.44	115.60	115.60	0.00	1
117.66	119.00	119.00	0.00	1
119.00	138.08	138.08	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
85.00	85.00	115.77	3.460	3.970	4-FFf	2.702	2.121	3.000	3.000	6.013	0.000
88.40	88.40	115.93	3.575	4.131	4-FFf	3.000	2.163	3.000	3.000	6.253	0.000
91.80	91.80	116.10	3.694	4.298	4-FFf	3.000	2.204	3.000	3.000	6.494	0.000
95.20	95.20	116.27	3.816	4.472	4-FFf	3.000	2.244	3.000	3.000	6.734	0.000
98.60	98.60	116.45	3.943	4.651	4-FFf	3.000	2.283	3.000	3.000	6.975	0.000
102.00	102.00	116.64	4.074	4.837	4-FFf	3.000	2.320	3.000	3.000	7.215	0.000
105.40	105.40	116.83	4.210	5.030	4-FFf	3.000	2.357	3.000	3.000	7.456	0.000
106.00	106.00	116.86	4.234	5.064	4-FFf	3.000	2.363	3.000	3.000	7.498	0.000
112.20	112.20	117.23	4.496	5.433	4-FFf	3.000	2.426	3.000	3.000	7.937	0.000
115.60	115.60	117.44	4.646	5.644	4-FFf	3.000	2.459	3.000	3.000	8.177	0.000
119.00	119.00	117.66	4.801	5.862	4-FFf	3.000	2.491	3.000	3.000	8.418	0.000

.....

Straight Culvert

Inlet Elevation (invert): 111.80 ft,    Outlet Elevation (invert): 110.80 ft

Culvert Length: 328.00 ft,    Culvert Slope: 0.0030

.....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 111.80 ft

Outlet Station: 328.00 ft

Outlet Elevation: 110.80 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 3.00 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

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
85.00	113.80	3.00
88.40	113.80	3.00
91.80	113.80	3.00
95.20	113.80	3.00
98.60	113.80	3.00
102.00	113.80	3.00
105.40	113.80	3.00
106.00	113.80	3.00
112.20	113.80	3.00
115.60	113.80	3.00
119.00	113.80	3.00

**Tailwater Channel Data - CD-1P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 113.80 ft

**Roadway Data for Crossing: CD-1P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 119.00 ft

Roadway Surface: Paved

Roadway Top Width: 280.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-2</b>	
LOCATION	STA.	<b>Existing</b>	<b>Proposed</b>
		664+22.84	664+22.84
WIDTH		4.00 FT	4.00 FT
HEIGHT		4.00 FT	4.00 FT
BARRELS		2	2
DIAMETER		4.00 FT	4.00 FT
LENGTH		256.0 FT	300.0 FT
TOTAL CROSS-SECTIONAL AREA		25.13 SF	25.13 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		102.58 FT	102.58 FT
DOWNSTREAM INVERT		102.48 FT	102.18 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		113.00 FT	113.00 FT
TAILWATER (CROWN OF PIPE)		106.48 FT	106.18 FT
<b><u>DETERMINE FLOWRATES (Q):</u></b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	151 CFS	107.92 FT	107.72 FT
Q (50 YR) = 1.25 * Q (25 YR)	188 CFS	108.71 FT	108.57 FT
Q (100 YR) = 1.40 * Q (25 YR)	211 CFS	109.29 FT	109.19 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)*



**CD-2 EXISTING  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 151 cfs

Design Flow: 188 cfs

Maximum Flow: 211 cfs

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

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
107.92	151.00	151.00	0.00	1
108.04	157.00	157.00	0.00	1
108.16	163.00	163.00	0.00	1
108.28	169.00	169.00	0.00	1
108.41	175.00	175.00	0.00	1
108.55	181.00	181.00	0.00	1
108.69	187.00	187.00	0.00	1
108.71	188.00	188.00	0.00	1
108.98	199.00	199.00	0.00	1
109.13	205.00	205.00	0.00	1
109.29	211.00	211.00	0.00	1
113.00	321.30	321.30	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
151.00	151.00	107.92	4.135	5.340	4-FFf	4.000	2.628	4.000	4.000	6.008	0.000
157.00	157.00	108.04	4.255	5.457	4-FFf	4.000	2.681	4.000	4.000	6.247	0.000
163.00	163.00	108.16	4.377	5.578	4-FFf	4.000	2.732	4.000	4.000	6.486	0.000
169.00	169.00	108.28	4.502	5.704	4-FFf	4.000	2.783	4.000	4.000	6.724	0.000
175.00	175.00	108.41	4.630	5.834	4-FFf	4.000	2.832	4.000	4.000	6.963	0.000
181.00	181.00	108.55	4.762	5.969	4-FFf	4.000	2.881	4.000	4.000	7.202	0.000
187.00	187.00	108.69	4.897	6.108	4-FFf	4.000	2.928	4.000	4.000	7.440	0.000
188.00	188.00	108.71	4.920	6.132	4-FFf	4.000	2.936	4.000	4.000	7.480	0.000
199.00	199.00	108.98	5.180	6.401	4-FFf	4.000	3.019	4.000	4.000	7.918	0.000
205.00	205.00	109.13	5.327	6.554	4-FFf	4.000	3.063	4.000	4.000	8.157	0.000
211.00	211.00	109.29	5.479	6.712	4-FFf	4.000	3.105	4.000	4.000	8.395	0.000

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Straight Culvert

Inlet Elevation (invert): 102.58 ft,    Outlet Elevation (invert): 102.48 ft

Culvert Length: 256.00 ft,    Culvert Slope: 0.0004

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 102.58 ft

Outlet Station: 256.00 ft

Outlet Elevation: 102.48 ft

Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Circular

Barrel Diameter: 4.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-2E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
151.00	106.48	4.00
157.00	106.48	4.00
163.00	106.48	4.00
169.00	106.48	4.00
175.00	106.48	4.00
181.00	106.48	4.00
187.00	106.48	4.00
188.00	106.48	4.00
199.00	106.48	4.00
205.00	106.48	4.00
211.00	106.48	4.00

**Tailwater Channel Data - CD-2E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 106.48 ft

**Roadway Data for Crossing: CD-2E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 113.00 ft

Roadway Surface: Paved

Roadway Top Width: 175.00 ft

**CD-2 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 151 cfs

Design Flow: 188 cfs

Maximum Flow: 211 cfs

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

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
107.72	151.00	151.00	0.00	1
107.85	157.00	157.00	0.00	1
107.98	163.00	163.00	0.00	1
108.11	169.00	169.00	0.00	1
108.25	175.00	175.00	0.00	1
108.40	181.00	181.00	0.00	1
108.55	187.00	187.00	0.00	1
108.57	188.00	188.00	0.00	1
108.86	199.00	199.00	0.00	1
109.02	205.00	205.00	0.00	1
109.19	211.00	211.00	0.00	1
113.00	317.44	317.44	0.00	Overtopping



**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
151.00	151.00	107.72	4.133	5.143	4-FFf	4.000	2.628	4.000	3.700	6.008	0.000
157.00	157.00	107.85	4.253	5.268	4-FFf	4.000	2.681	4.000	3.700	6.247	0.000
163.00	163.00	107.98	4.375	5.398	4-FFf	4.000	2.732	4.000	3.700	6.486	0.000
169.00	169.00	108.11	4.500	5.533	4-FFf	4.000	2.783	4.000	3.700	6.724	0.000
175.00	175.00	108.25	4.628	5.672	4-FFf	4.000	2.832	4.000	3.700	6.963	0.000
181.00	181.00	108.40	4.760	5.817	4-FFf	4.000	2.881	4.000	3.700	7.202	0.000
187.00	187.00	108.55	4.895	5.966	4-FFf	4.000	2.928	4.000	3.700	7.440	0.000
188.00	188.00	108.57	4.918	5.992	4-FFf	4.000	2.936	4.000	3.700	7.480	0.000
199.00	199.00	108.86	5.178	6.280	4-FFf	4.000	3.019	4.000	3.700	7.918	0.000
205.00	205.00	109.02	5.325	6.444	4-FFf	4.000	3.063	4.000	3.700	8.157	0.000
211.00	211.00	109.19	5.477	6.613	4-FFf	4.000	3.105	4.000	3.700	8.395	0.000

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Straight Culvert

Inlet Elevation (invert): 102.58 ft,    Outlet Elevation (invert): 102.18 ft

Culvert Length: 300.00 ft,    Culvert Slope: 0.0013

.....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 102.58 ft

Outlet Station: 300.00 ft

Outlet Elevation: 102.18 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 4.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-2P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
151.00	106.18	3.70
157.00	106.18	3.70
163.00	106.18	3.70
169.00	106.18	3.70
175.00	106.18	3.70
181.00	106.18	3.70
187.00	106.18	3.70
188.00	106.18	3.70
199.00	106.18	3.70
205.00	106.18	3.70
211.00	106.18	3.70

**Tailwater Channel Data - CD-2P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 106.18 ft

**Roadway Data for Crossing: CD-2P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 113.00 ft

Roadway Surface: Paved

Roadway Top Width: 272.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-3</b>	
LOCATION	STA.	<b>Existing</b>	<b>Proposed</b>
		680+00.00	680+00.00
WIDTH		9.00 FT	9.00 FT
HEIGHT		7.00 FT	7.00 FT
BARRELS		2	2
DIAMETER		FT	9.00 FT
LENGTH		262.0 FT	353.0 FT
TOTAL CROSS-SECTIONAL AREA		126.00 SF	127.23 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		92.11 FT	92.11 FT
DOWNSTREAM INVERT		91.77 FT	91.77 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		105.50 FT	105.50 FT
TAILWATER (CROWN OF PIPE)		98.77 FT	98.77 FT
<b><u>DETERMINE FLOWRATES (Q):</u></b>		Headwater Elevation	Headwater Elevation
ASSUMED VELOCITY (25 YR)	6.00 FT/S		
Q (25 YR) = V (25 YR) * TOTAL AREA	756 CFS	99.86 FT	99.94 FT
Q (50 YR) = 1.25 * Q (25 YR)	945 CFS	100.47 FT	100.60 FT
Q (100 YR) = 1.40 * Q (25 YR)	1058 CFS	100.90 FT	101.07 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-3 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 756 cfs

Design Flow: 945 cfs

Maximum Flow: 1058 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-3E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
99.86	756.00	756.00	0.00	1
99.94	786.20	786.20	0.00	1
100.04	816.40	816.40	0.00	1
100.13	846.60	846.60	0.00	1
100.23	876.80	876.80	0.00	1
100.33	907.00	907.00	0.00	1
100.44	937.20	937.20	0.00	1
100.47	945.00	945.00	0.00	1
100.66	997.60	997.60	0.00	1
100.78	1027.80	1027.80	0.00	1
100.90	1058.00	1058.00	0.00	1
105.50	1769.00	1769.00	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
756.00	756.00	99.86	6.424	7.746	4-FFf	5.217	3.798	7.000	7.000	6.000	0.000
786.20	786.20	99.94	6.597	7.835	4-FFf	5.375	3.898	7.000	7.000	6.240	0.000
816.40	816.40	100.04	6.771	7.927	4-FFf	5.534	3.998	7.000	7.000	6.479	0.000
846.60	846.60	100.13	6.944	8.022	4-FFf	5.692	4.096	7.000	7.000	6.719	0.000
876.80	876.80	100.23	7.118	8.121	4-FFf	5.848	4.192	7.000	7.000	6.959	0.000
907.00	907.00	100.33	7.292	8.224	4-FFf	6.003	4.288	7.000	7.000	7.198	0.000
937.20	937.20	100.44	7.468	8.330	4-FFf	6.159	4.383	7.000	7.000	7.438	0.000
945.00	945.00	100.47	7.513	8.357	4-FFf	6.199	4.407	7.000	7.000	7.500	0.000
997.60	997.60	100.66	7.821	8.552	4-FFf	7.000	4.569	7.000	7.000	7.917	0.000
1027.80	1027.80	100.78	8.001	8.668	4-FFf	7.000	4.661	7.000	7.000	8.157	0.000
1058.00	1058.00	100.90	8.182	8.788	4-FFf	7.000	4.752	7.000	7.000	8.397	0.000

.....  
 Straight Culvert  
 Inlet Elevation (invert): 92.11 ft, Outlet Elevation (invert): 91.77 ft  
 Culvert Length: 262.00 ft, Culvert Slope: 0.0013  
 .....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 92.11 ft  
 Outlet Station: 262.00 ft  
 Outlet Elevation: 91.77 ft  
 Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box  
 Barrel Span: 9.00 ft  
 Barrel Rise: 7.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-3E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
756.00	98.77	7.00
786.20	98.77	7.00
816.40	98.77	7.00
846.60	98.77	7.00
876.80	98.77	7.00
907.00	98.77	7.00
937.20	98.77	7.00
945.00	98.77	7.00
997.60	98.77	7.00
1027.80	98.77	7.00
1058.00	98.77	7.00

**Tailwater Channel Data - CD-3E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 98.77 ft

**Roadway Data for Crossing: CD-3E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 105.50 ft

Roadway Surface: Paved

Roadway Top Width: 170.00 ft



**CD-3 PROPOSED  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 756 cfs

Design Flow: 945 cfs

Maximum Flow: 1058 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-3P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
99.94	756.00	756.00	0.00	1
100.04	786.20	786.20	0.00	1
100.14	816.40	816.40	0.00	1
100.24	846.60	846.60	0.00	1
100.35	876.80	876.80	0.00	1
100.46	907.00	907.00	0.00	1
100.57	937.20	937.20	0.00	1
100.60	945.00	945.00	0.00	1
100.81	997.60	997.60	0.00	1
100.94	1027.80	1027.80	0.00	1
101.07	1058.00	1058.00	0.00	1
105.50	1768.86	1768.86	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
756.00	756.00	99.94	6.425	7.832	4-FFf	5.852	3.798	7.000	7.000	6.000	0.000
786.20	786.20	100.04	6.598	7.928	4-FFf	6.032	3.898	7.000	7.000	6.240	0.000
816.40	816.40	100.14	6.772	8.027	4-FFf	6.212	3.998	7.000	7.000	6.479	0.000
846.60	846.60	100.24	6.945	8.130	4-FFf	7.000	4.096	7.000	7.000	6.719	0.000
876.80	876.80	100.35	7.119	8.237	4-FFf	7.000	4.192	7.000	7.000	6.959	0.000
907.00	907.00	100.46	7.294	8.348	4-FFf	7.000	4.288	7.000	7.000	7.198	0.000
937.20	937.20	100.57	7.469	8.462	4-FFf	7.000	4.383	7.000	7.000	7.438	0.000
945.00	945.00	100.60	7.514	8.492	4-FFf	7.000	4.407	7.000	7.000	7.500	0.000
997.60	997.60	100.81	7.823	8.702	4-FFf	7.000	4.569	7.000	7.000	7.917	0.000
1027.80	1027.80	100.94	8.002	8.827	4-FFf	7.000	4.661	7.000	7.000	8.157	0.000
1058.00	1058.00	101.07	8.183	8.956	4-FFf	7.000	4.752	7.000	7.000	8.397	0.000

\*\*\*\*\*  
 Straight Culvert

Inlet Elevation (invert): 92.11 ft, Outlet Elevation (invert): 91.77 ft

Culvert Length: 353.00 ft, Culvert Slope: 0.0010  
 \*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 92.11 ft

Outlet Station: 353.00 ft

Outlet Elevation: 91.77 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box

Barrel Span: 9.00 ft

Barrel Rise: 7.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-3P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
756.00	98.77	7.00
786.20	98.77	7.00
816.40	98.77	7.00
846.60	98.77	7.00
876.80	98.77	7.00
907.00	98.77	7.00
937.20	98.77	7.00
945.00	98.77	7.00
997.60	98.77	7.00
1027.80	98.77	7.00
1058.00	98.77	7.00

**Tailwater Channel Data - CD-3P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 98.77 ft

**Roadway Data for Crossing: CD-3P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 105.50 ft

Roadway Surface: Paved

Roadway Top Width: 272.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		CD-4	
		Existing	Proposed
LOCATION	STA.	692+20.31	692+20.31
WIDTH		3.00 FT	3.00 FT
HEIGHT		3.00 FT	3.00 FT
BARRELS		1	1
DIAMETER		3.00 FT	3.00 FT
LENGTH		261.0 FT	300.0 FT
TOTAL CROSS-SECTIONAL AREA		7.07 SF	7.07 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		90.34 FT	90.34 FT
DOWNSTREAM INVERT		88.25 FT	88.25 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		98.00 FT	98.00 FT
TAILWATER (CROWN OF PIPE)		91.25 FT	91.25 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	42 CFS	93.76 FT	93.76 FT
Q (50 YR) = 1.25 * Q (25 YR)	53 CFS	94.57 FT	94.57 FT
Q (100 YR) = 1.40 * Q (25 YR)	59 CFS	95.09 FT	95.09 FT

\* *Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-4 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 42 cfs

Design Flow: 53 cfs

Maximum Flow: 59 cfs



**Table 1 - Summary of Culvert Flows at Crossing: CD-4E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
93.76	42.00	42.00	0.00	1
93.87	43.70	43.70	0.00	1
93.99	45.40	45.40	0.00	1
94.11	47.10	47.10	0.00	1
94.24	48.80	48.80	0.00	1
94.37	50.50	50.50	0.00	1
94.50	52.20	52.20	0.00	1
94.57	53.00	53.00	0.00	1
94.79	55.60	55.60	0.00	1
94.93	57.30	57.30	0.00	1
95.09	59.00	59.00	0.00	1
98.00	83.71	83.71	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
42.00	42.00	93.76	3.420	2.609	5-JS1f	1.760	2.109	3.000	3.000	6.223	0.000
43.70	43.70	93.87	3.534	2.749	5-JS1f	1.806	2.151	3.000	3.000	6.475	0.000
45.40	45.40	93.99	3.651	2.895	5-JS1f	1.851	2.192	3.000	3.000	6.727	0.000
47.10	47.10	94.11	3.772	3.047	5-JS1f	1.897	2.233	3.000	3.000	6.979	0.000
48.80	48.80	94.24	3.898	3.204	5-JS1f	1.946	2.272	3.000	3.000	7.231	0.000
50.50	50.50	94.37	4.028	3.367	5-JS1f	1.995	2.309	3.000	3.000	7.483	0.000
52.20	52.20	94.50	4.162	3.535	5-JS1f	2.044	2.346	3.000	3.000	7.735	0.000
53.00	53.00	94.57	4.227	3.616	5-JS1f	2.068	2.363	3.000	3.000	7.853	0.000
55.60	55.60	94.79	4.445	3.888	5-JS1f	2.143	2.416	3.000	3.000	8.239	0.000
57.30	57.30	94.93	4.594	4.073	5-JS1f	2.194	2.449	3.000	3.000	8.490	0.000
59.00	59.00	95.09	4.748	4.263	5-JS1f	2.254	2.481	3.000	3.000	8.742	0.000

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Straight Culvert

Inlet Elevation (invert): 90.34 ft,    Outlet Elevation (invert): 88.25 ft

Culvert Length: 261.01 ft,    Culvert Slope: 0.0080

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 90.34 ft

Outlet Station: 261.00 ft

Outlet Elevation: 88.25 ft

Number of Barrels: 1

**Culvert Data Summary - EXIST**

Barrel Shape: Circular

Barrel Diameter: 3.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-4E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
42.00	91.25	3.00
43.70	91.25	3.00
45.40	91.25	3.00
47.10	91.25	3.00
48.80	91.25	3.00
50.50	91.25	3.00
52.20	91.25	3.00
53.00	91.25	3.00
55.60	91.25	3.00
57.30	91.25	3.00
59.00	91.25	3.00

**Tailwater Channel Data - CD-4E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 91.25 ft

**Roadway Data for Crossing: CD-4E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 98.00 ft

Roadway Surface: Paved

Roadway Top Width: 167.00 ft

**CD-4 PROPOSED  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 42 cfs

Design Flow: 53 cfs

Maximum Flow: 59 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-4P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
93.76	42.00	42.00	0.00	1
93.88	43.70	43.70	0.00	1
93.99	45.40	45.40	0.00	1
94.11	47.10	47.10	0.00	1
94.24	48.80	48.80	0.00	1
94.37	50.50	50.50	0.00	1
94.50	52.20	52.20	0.00	1
94.57	53.00	53.00	0.00	1
94.79	55.60	55.60	0.00	1
94.94	57.30	57.30	0.00	1
95.09	59.00	59.00	0.00	1
98.00	80.66	80.66	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
42.00	42.00	93.76	3.421	2.740	5-JS1f	1.841	2.109	3.000	3.000	6.223	0.000
43.70	43.70	93.88	3.535	2.891	5-JS1f	1.891	2.151	3.000	3.000	6.475	0.000
45.40	45.40	93.99	3.653	3.049	5-JS1f	1.942	2.192	3.000	3.000	6.727	0.000
47.10	47.10	94.11	3.774	3.212	5-JS1f	1.995	2.233	3.000	3.000	6.979	0.000
48.80	48.80	94.24	3.900	3.381	5-JS1f	2.048	2.272	3.000	3.000	7.231	0.000
50.50	50.50	94.37	4.029	3.556	5-JS1f	2.101	2.309	3.000	3.000	7.483	0.000
52.20	52.20	94.50	4.164	3.737	5-JS1f	2.153	2.346	3.000	3.000	7.735	0.000
53.00	53.00	94.57	4.229	3.824	5-JS1f	2.178	2.363	3.000	3.000	7.853	0.000
55.60	55.60	94.79	4.447	4.117	5-JS1f	2.276	2.416	3.000	3.000	8.239	0.000
57.30	57.30	94.94	4.595	4.317	5-JS1f	2.340	2.449	3.000	3.000	8.490	0.000
59.00	59.00	95.09	4.749	4.522	5-S2n	2.404	2.481	2.404	3.000	9.729	0.000

\*\*\*\*\*  
 Straight Culvert  
 Inlet Elevation (invert): 90.34 ft, Outlet Elevation (invert): 88.25 ft  
 Culvert Length: 300.01 ft, Culvert Slope: 0.0070  
 \*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 90.34 ft  
 Outlet Station: 300.00 ft  
 Outlet Elevation: 88.25 ft  
 Number of Barrels: 1

**Culvert Data Summary - PROP**

Barrel Shape: Circular  
 Barrel Diameter: 3.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-4P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
42.00	91.25	3.00
43.70	91.25	3.00
45.40	91.25	3.00
47.10	91.25	3.00
48.80	91.25	3.00
50.50	91.25	3.00
52.20	91.25	3.00
53.00	91.25	3.00
55.60	91.25	3.00
57.30	91.25	3.00
59.00	91.25	3.00

**Tailwater Channel Data - CD-4P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 91.25 ft

**Roadway Data for Crossing: CD-4P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 98.00 ft

Roadway Surface: Paved

Roadway Top Width: 275.00 ft



HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		CD-5	
		Existing	Proposed
LOCATION	STA.	698+00.00	698+00.00
WIDTH		12.00 FT	12.00 FT
HEIGHT		8.00 FT	8.00 FT
BARRELS		4	4
DIAMETER		FT	12.00 FT
LENGTH		260.0 FT	392.0 FT
TOTAL CROSS-SECTIONAL AREA		384.00 SF	384.00 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		84.27 FT	84.27 FT
DOWNSTREAM INVERT		83.56 FT	83.16 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		96.00 FT	96.00 FT
TAILWATER (CROWN OF PIPE)		91.56 FT	91.16 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	2304 CFS	92.59 FT	92.31 FT
Q (50 YR) = 1.25 * Q (25 YR)	2880 CFS	93.16 FT	92.95 FT
Q (100 YR) = 1.40 * Q (25 YR)	3226 CFS	93.57 FT	93.40 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-5 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 2304 cfs

Design Flow: 2880 cfs

Maximum Flow: 3226 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-5E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
92.59	2304.00	2304.00	0.00	1
92.67	2396.20	2396.20	0.00	1
92.76	2488.40	2488.40	0.00	1
92.85	2580.60	2580.60	0.00	1
92.94	2672.80	2672.80	0.00	1
93.04	2765.00	2765.00	0.00	1
93.14	2857.20	2857.20	0.00	1
93.16	2880.00	2880.00	0.00	1
93.35	3041.60	3041.60	0.00	1
93.46	3133.80	3133.80	0.00	1
93.57	3226.00	3226.00	0.00	1
96.00	4492.48	4492.48	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2304.00	2304.00	92.59	7.013	8.319	1-S1f	4.088	4.152	8.000	8.000	6.000	0.000
2396.20	2396.20	92.67	7.200	8.403	1-S1f	4.206	4.262	8.000	8.000	6.240	0.000
2488.40	2488.40	92.76	7.387	8.490	1-S1f	4.324	4.370	8.000	8.000	6.480	0.000
2580.60	2580.60	92.85	7.573	8.580	1-S1f	4.439	4.477	8.000	8.000	6.720	0.000
2672.80	2672.80	92.94	7.758	8.673	1-S1f	4.552	4.584	8.000	8.000	6.960	0.000
2765.00	2765.00	93.04	7.944	8.770	1-S1f	4.665	4.688	8.000	8.000	7.201	0.000
2857.20	2857.20	93.14	8.130	8.870	1-S1f	4.777	4.792	8.000	8.000	7.441	0.000
2880.00	2880.00	93.16	8.176	8.895	1-S1f	4.805	4.817	8.000	8.000	7.500	0.000
3041.60	3041.60	93.35	8.504	9.081	4-FFf	5.003	4.996	8.000	8.000	7.921	0.000
3133.80	3133.80	93.46	8.693	9.191	4-FFf	5.115	5.096	8.000	8.000	8.161	0.000
3226.00	3226.00	93.57	8.883	9.304	4-FFf	5.224	5.196	8.000	8.000	8.401	0.000

.....  
 Straight Culvert  
 Inlet Elevation (invert): 84.27 ft, Outlet Elevation (invert): 83.56 ft  
 Culvert Length: 260.00 ft, Culvert Slope: 0.0027  
 .....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 84.27 ft  
 Outlet Station: 260.00 ft  
 Outlet Elevation: 83.56 ft  
 Number of Barrels: 4

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box  
 Barrel Span: 12.00 ft  
 Barrel Rise: 8.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-5E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
2304.00	91.56	8.00
2396.20	91.56	8.00
2488.40	91.56	8.00
2580.60	91.56	8.00
2672.80	91.56	8.00
2765.00	91.56	8.00
2857.20	91.56	8.00
2880.00	91.56	8.00
3041.60	91.56	8.00
3133.80	91.56	8.00
3226.00	91.56	8.00

**Tailwater Channel Data - CD-5E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 91.56 ft

**Roadway Data for Crossing: CD-5E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 96.00 ft

Roadway Surface: Paved

Roadway Top Width: 170.00 ft

**CD-5 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 2304 cfs

Design Flow: 2880 cfs

Maximum Flow: 3226 cfs



**Table 1 - Summary of Culvert Flows at Crossing: CD-5P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
92.31	2304.00	2304.00	0.00	1
92.40	2396.20	2396.20	0.00	1
92.50	2488.40	2488.40	0.00	1
92.60	2580.60	2580.60	0.00	1
92.71	2672.80	2672.80	0.00	1
92.81	2765.00	2765.00	0.00	1
92.93	2857.20	2857.20	0.00	1
92.95	2880.00	2880.00	0.00	1
93.16	3041.60	3041.60	0.00	1
93.28	3133.80	3133.80	0.00	1
93.40	3226.00	3226.00	0.00	1
96.00	4492.69	4492.69	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
2304.00	2304.00	92.31	7.012	8.041	1-S1f	4.035	4.152	8.000	8.000	6.000	0.000
2396.20	2396.20	92.40	7.200	8.135	1-S1f	4.151	4.262	8.000	8.000	6.240	0.000
2488.40	2488.40	92.50	7.386	8.232	1-S1f	4.267	4.370	8.000	8.000	6.480	0.000
2580.60	2580.60	92.60	7.572	8.332	1-S1f	4.382	4.477	8.000	8.000	6.720	0.000
2672.80	2672.80	92.71	7.758	8.436	1-S1f	4.493	4.584	8.000	8.000	6.960	0.000
2765.00	2765.00	92.81	7.944	8.544	1-S1f	4.604	4.688	8.000	8.000	7.201	0.000
2857.20	2857.20	92.93	8.130	8.655	1-S1f	4.715	4.792	8.000	8.000	7.441	0.000
2880.00	2880.00	92.95	8.176	8.683	1-S1f	4.742	4.817	8.000	8.000	7.500	0.000
3041.60	3041.60	93.16	8.504	8.888	1-S1f	4.936	4.996	8.000	8.000	7.921	0.000
3133.80	3133.80	93.28	8.693	9.010	1-S1f	5.047	5.096	8.000	8.000	8.161	0.000
3226.00	3226.00	93.40	8.882	9.134	1-S1f	5.156	5.196	8.000	8.000	8.401	0.000

\*\*\*\*\*  
 Straight Culvert  
 Inlet Elevation (invert): 84.27 ft, Outlet Elevation (invert): 83.16 ft  
 Culvert Length: 392.00 ft, Culvert Slope: 0.0028  
 \*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 84.27 ft  
 Outlet Station: 392.00 ft  
 Outlet Elevation: 83.16 ft  
 Number of Barrels: 4

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box  
 Barrel Span: 12.00 ft  
 Barrel Rise: 8.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-5P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
2304.00	91.16	8.00
2396.20	91.16	8.00
2488.40	91.16	8.00
2580.60	91.16	8.00
2672.80	91.16	8.00
2765.00	91.16	8.00
2857.20	91.16	8.00
2880.00	91.16	8.00
3041.60	91.16	8.00
3133.80	91.16	8.00
3226.00	91.16	8.00

**Tailwater Channel Data - CD-5P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 91.16 ft

**Roadway Data for Crossing: CD-5P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 96.00 ft

Roadway Surface: Paved

Roadway Top Width: 288.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		CD-6	
		Existing	Proposed
LOCATION	STA.	732+50.00	732+50.00
WIDTH		7.00 FT	7.00 FT
HEIGHT		4.00 FT	4.00 FT
BARRELS		2	2
DIAMETER		FT	7.00 FT
LENGTH		310.0 FT	460.0 FT
TOTAL CROSS-SECTIONAL AREA		56.00 SF	56.00 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		90.72 FT	90.72 FT
DOWNSTREAM INVERT		90.50 FT	90.10 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		97.50 FT	97.50 FT
TAILWATER (CROWN OF PIPE)		94.50 FT	94.10 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	336 CFS	95.86 FT	95.72 FT
Q (50 YR) = 1.25 * Q (25 YR)	420 CFS	96.63 FT	96.63 FT
Q (100 YR) = 1.40 * Q (25 YR)	470 CFS	97.17 FT	97.26 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-6 EXISTING  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-6E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
95.86	336.00	336.00	0.00	1
95.97	349.40	349.40	0.00	1
96.09	362.80	362.80	0.00	1
96.21	376.20	376.20	0.00	1
96.33	389.60	389.60	0.00	1
96.46	403.00	403.00	0.00	1
96.59	416.40	416.40	0.00	1
96.63	420.00	420.00	0.00	1
96.87	443.20	443.20	0.00	1
97.02	456.60	456.60	0.00	1
97.17	470.00	470.00	0.00	1
97.50	498.45	498.45	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	95.86	4.479	5.143	4-FFf	4.000	2.615	4.000	4.000	6.000	0.000
349.40	349.40	95.97	4.614	5.254	4-FFf	4.000	2.684	4.000	4.000	6.239	0.000
362.80	362.80	96.09	4.752	5.369	4-FFf	4.000	2.753	4.000	4.000	6.479	0.000
376.20	376.20	96.21	4.892	5.489	4-FFf	4.000	2.820	4.000	4.000	6.718	0.000
389.60	389.60	96.33	5.034	5.613	4-FFf	4.000	2.887	4.000	4.000	6.957	0.000
403.00	403.00	96.46	5.178	5.741	4-FFf	4.000	2.952	4.000	4.000	7.196	0.000
416.40	416.40	96.59	5.326	5.874	4-FFf	4.000	3.017	4.000	4.000	7.436	0.000
420.00	420.00	96.63	5.366	5.910	4-FFf	4.000	3.035	4.000	4.000	7.500	0.000
443.20	443.20	96.87	5.631	6.152	4-FFf	4.000	3.146	4.000	4.000	7.914	0.000
456.60	456.60	97.02	5.789	6.297	4-FFf	4.000	3.209	4.000	4.000	8.154	0.000
470.00	470.00	97.17	5.950	6.447	4-FFf	4.000	3.271	4.000	4.000	8.393	0.000

.....

Straight Culvert

Inlet Elevation (invert): 90.72 ft,    Outlet Elevation (invert): 90.50 ft

Culvert Length: 310.00 ft,    Culvert Slope: 0.0007

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 90.72 ft

Outlet Station: 310.00 ft

Outlet Elevation: 90.50 ft

Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE



**Table 3 - Downstream Channel Rating Curve (Crossing: CD-6E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	94.50	4.00
349.40	94.50	4.00
362.80	94.50	4.00
376.20	94.50	4.00
389.60	94.50	4.00
403.00	94.50	4.00
416.40	94.50	4.00
420.00	94.50	4.00
443.20	94.50	4.00
456.60	94.50	4.00
470.00	94.50	4.00

**Tailwater Channel Data - CD-6E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 94.50 ft

**Roadway Data for Crossing: CD-6E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 97.50 ft

Roadway Surface: Paved

Roadway Top Width: 170.00 ft

**CD-6 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-6P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
95.72	336.00	336.00	0.00	1
95.85	349.40	349.40	0.00	1
95.99	362.80	362.80	0.00	1
96.13	376.20	376.20	0.00	1
96.27	389.60	389.60	0.00	1
96.43	403.00	403.00	0.00	1
96.58	416.40	416.40	0.00	1
96.63	420.00	420.00	0.00	1
96.91	443.20	443.20	0.00	1
97.09	456.60	456.60	0.00	1
97.26	470.00	470.00	0.00	1
97.50	487.20	487.20	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	95.72	4.478	4.997	4-FFf	3.595	2.615	4.000	4.000	6.000	0.000
349.40	349.40	95.85	4.613	5.129	4-FFf	4.000	2.684	4.000	4.000	6.239	0.000
362.80	362.80	95.99	4.751	5.265	4-FFf	4.000	2.753	4.000	4.000	6.479	0.000
376.20	376.20	96.13	4.890	5.407	4-FFf	4.000	2.820	4.000	4.000	6.718	0.000
389.60	389.60	96.27	5.032	5.554	4-FFf	4.000	2.887	4.000	4.000	6.957	0.000
403.00	403.00	96.43	5.177	5.706	4-FFf	4.000	2.952	4.000	4.000	7.196	0.000
416.40	416.40	96.58	5.325	5.864	4-FFf	4.000	3.017	4.000	4.000	7.436	0.000
420.00	420.00	96.63	5.365	5.907	4-FFf	4.000	3.035	4.000	4.000	7.500	0.000
443.20	443.20	96.91	5.630	6.194	4-FFf	4.000	3.146	4.000	4.000	7.914	0.000
456.60	456.60	97.09	5.788	6.366	4-FFf	4.000	3.209	4.000	4.000	8.154	0.000
470.00	470.00	97.26	5.949	6.544	4-FFf	4.000	3.271	4.000	4.000	8.393	0.000

.....

Straight Culvert

Inlet Elevation (invert): 90.72 ft,    Outlet Elevation (invert): 90.10 ft

Culvert Length: 460.00 ft,    Culvert Slope: 0.0013

.....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 90.72 ft

Outlet Station: 460.00 ft

Outlet Elevation: 90.10 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-6P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	94.10	4.00
349.40	94.10	4.00
362.80	94.10	4.00
376.20	94.10	4.00
389.60	94.10	4.00
403.00	94.10	4.00
416.40	94.10	4.00
420.00	94.10	4.00
443.20	94.10	4.00
456.60	94.10	4.00
470.00	94.10	4.00

**Tailwater Channel Data - CD-6P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 94.10 ft

**Roadway Data for Crossing: CD-6P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 97.50 ft

Roadway Surface: Paved

Roadway Top Width: 277.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-7</b>	
LOCATION	STA.	<b>Existing</b>	<b>Proposed</b>
		761+00.00	761+00.00
WIDTH		3.50 FT	4.00 FT
HEIGHT		3.50 FT	4.00 FT
BARRELS		1	1
DIAMETER		3.50 FT	4.00 FT
LENGTH		227.0 FT	404.0 FT
TOTAL CROSS-SECTIONAL AREA		9.62 SF	12.57 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		84.42 FT	84.42 FT
DOWNSTREAM INVERT		82.97 FT	82.97 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		90.50 FT	90.50 FT
TAILWATER (CROWN OF PIPE)		86.47 FT	86.97 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	58 CFS	88.22 FT	88.13 FT
Q (50 YR) = 1.25 * Q (25 YR)	72 CFS	88.99 FT	89.00 FT
Q (100 YR) = 1.40 * Q (25 YR)	81 CFS	89.56 FT	89.03 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-7 EXISTING  
HY-8 Culvert Analysis Report**



**Crossing Discharge Data**

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

Minimum Flow: 58 cfs

Design Flow: 72 cfs

Maximum Flow: 81 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-7E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
88.22	58.00	58.00	0.00	1
88.34	60.30	60.30	0.00	1
88.46	62.60	62.60	0.00	1
88.58	64.90	64.90	0.00	1
88.71	67.20	67.20	0.00	1
88.84	69.50	69.50	0.00	1
88.97	71.80	71.80	0.00	1
88.99	72.00	72.00	0.00	1
89.26	76.40	76.40	0.00	1
89.41	78.70	78.70	0.00	1
89.56	81.00	81.00	0.00	1
90.50	93.79	93.79	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
58.00	58.00	88.22	3.801	3.536	5-JS1f	2.086	2.383	3.500	3.500	6.314	0.000
60.30	60.30	88.34	3.918	3.656	5-JS1f	2.140	2.431	3.500	3.500	6.564	0.000
62.60	62.60	88.46	4.038	3.781	5-JS1f	2.194	2.477	3.500	3.500	6.815	0.000
64.90	64.90	88.58	4.161	3.910	5-JS1f	2.249	2.522	3.500	3.500	7.065	0.000
67.20	67.20	88.71	4.288	4.044	5-JS1f	2.307	2.566	3.500	3.500	7.316	0.000
69.50	69.50	88.84	4.419	4.183	5-JS1f	2.364	2.609	3.500	3.500	7.566	0.000
71.80	71.80	88.97	4.554	4.327	5-JS1f	2.422	2.651	3.500	3.500	7.816	0.000
72.00	72.00	88.99	4.566	4.339	5-JS1f	2.427	2.655	3.500	3.500	7.838	0.000
76.40	76.40	89.26	4.837	4.628	5-JS1f	2.538	2.731	3.500	3.500	8.317	0.000
78.70	78.70	89.41	4.985	4.785	5-JS1f	2.606	2.770	3.500	3.500	8.568	0.000
81.00	81.00	89.56	5.138	4.948	5-JS1f	2.676	2.807	3.500	3.500	8.818	0.000

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Straight Culvert

Inlet Elevation (invert): 84.42 ft,    Outlet Elevation (invert): 82.97 ft

Culvert Length: 227.00 ft,    Culvert Slope: 0.0064

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 84.42 ft

Outlet Station: 227.00 ft

Outlet Elevation: 82.97 ft

Number of Barrels: 1

**Culvert Data Summary - EXIST**

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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-7E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
58.00	86.47	3.50
60.30	86.47	3.50
62.60	86.47	3.50
64.90	86.47	3.50
67.20	86.47	3.50
69.50	86.47	3.50
71.80	86.47	3.50
72.00	86.47	3.50
76.40	86.47	3.50
78.70	86.47	3.50
81.00	86.47	3.50

**Tailwater Channel Data - CD-7E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 86.47 ft

**Roadway Data for Crossing: CD-7E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 90.50 ft

Roadway Surface: Paved

Roadway Top Width: 170.00 ft

**CD-7 PROPOSED  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 58 cfs

Design Flow: 72 cfs

Maximum Flow: 81 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-7P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
88.13	58.00	58.00	0.00	1
88.42	60.30	60.30	0.00	1
88.52	62.60	62.60	0.00	1
88.63	64.90	64.90	0.00	1
88.74	67.20	67.20	0.00	1
88.86	69.50	69.50	0.00	1
88.98	71.80	71.80	0.00	1
89.00	72.00	72.00	0.00	1
89.25	76.40	76.40	0.00	1
88.91	78.70	78.70	0.00	1
89.03	81.00	81.00	0.00	1
90.50	106.12	106.12	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
58.00	58.00	88.13	3.460	3.714	1-S1f	2.282	2.288	4.000	4.000	4.834	0.000
60.30	60.30	88.42	3.546	3.995	3-M1f	2.340	2.334	4.000	4.000	4.799	0.000
62.60	62.60	88.52	3.633	4.099	3-M1f	2.397	2.383	4.000	4.000	4.982	0.000
64.90	64.90	88.63	3.720	4.207	3-M1f	2.455	2.428	4.000	4.000	5.165	0.000
67.20	67.20	88.74	3.807	4.320	3-M1f	2.512	2.472	4.000	4.000	5.348	0.000
69.50	69.50	88.86	3.895	4.438	3-M1f	2.571	2.515	4.000	4.000	5.531	0.000
71.80	71.80	88.98	3.984	4.564	3-M1f	2.633	2.557	4.000	4.000	5.714	0.000
72.00	72.00	89.00	3.991	4.575	3-M1f	2.638	2.561	4.000	4.000	5.730	0.000
76.40	76.40	89.25	4.164	4.831	3-M1f	2.756	2.644	4.000	4.000	6.080	0.000
78.70	78.70	88.91	4.256	4.491	4-FFf	2.818	2.684	4.000	4.000	6.263	0.000
81.00	81.00	89.03	4.350	4.606	4-FFf	2.880	2.724	4.000	4.000	6.446	0.000

\*\*\*\*\*  
 Straight Culvert

Inlet Elevation (invert): 84.42 ft, Outlet Elevation (invert): 82.97 ft

Culvert Length: 404.00 ft, Culvert Slope: 0.0036  
 \*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 84.42 ft

Outlet Station: 404.00 ft

Outlet Elevation: 82.97 ft

Number of Barrels: 1

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 4.00 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



**Table 3 - Downstream Channel Rating Curve (Crossing: CD-7P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
58.00	86.97	4.00
60.30	86.97	4.00
62.60	86.97	4.00
64.90	86.97	4.00
67.20	86.97	4.00
69.50	86.97	4.00
71.80	86.97	4.00
72.00	86.97	4.00
76.40	86.97	4.00
78.70	86.97	4.00
81.00	86.97	4.00

**Tailwater Channel Data - CD-7P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 86.97 ft

**Roadway Data for Crossing: CD-7P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 90.50 ft

Roadway Surface: Paved

Roadway Top Width: 365.00 ft

**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-15
checked by:	BJS	25-Jun-15
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO.		CD-8	
		Existing	Proposed
LOCATION	STA.	785+16.00	785+16.00
WIDTH		3.50 FT	4.00 FT
HEIGHT		3.50 FT	4.00 FT
BARRELS		2	2
DIAMETER		3.50 FT	4.00 FT
LENGTH		248.0 FT	308.0 FT
TOTAL CROSS-SECTIONAL AREA		19.24 SF	25.13 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		74.18 FT	74.18 FT
DOWNSTREAM INVERT		73.03 FT	73.03 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		81.00 FT	81.00 FT
TAILWATER (CROWN OF PIPE)		76.53 FT	77.03 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	115 CFS	78.11 FT	78.29 FT
Q (50 YR) = 1.25 * Q (25 YR)	144 CFS	78.91 FT	78.62 FT
Q (100 YR) = 1.40 * Q (25 YR)	162 CFS	79.54 FT	79.04 FT

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)**

**CD-8 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 115 cfs

Design Flow: 144 cfs

Maximum Flow: 162 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-8E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
78.11	115.00	115.00	0.00	1
78.21	119.70	119.70	0.00	1
78.32	124.40	124.40	0.00	1
78.44	129.10	129.10	0.00	1
78.59	133.80	133.80	0.00	1
78.73	138.50	138.50	0.00	1
78.88	143.20	143.20	0.00	1
78.91	144.00	144.00	0.00	1
79.20	152.60	152.60	0.00	1
79.37	157.30	157.30	0.00	1
79.54	162.00	162.00	0.00	1
81.00	197.30	197.30	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
115.00	115.00	78.11	3.779	3.925	1-S1f	2.314	2.373	3.500	3.500	6.260	0.000
119.70	119.70	78.21	3.898	4.032	1-S1f	2.383	2.421	3.500	3.500	6.515	0.000
124.40	124.40	78.32	4.020	4.142	1-S1f	2.452	2.469	3.500	3.500	6.771	0.000
129.10	129.10	78.44	4.145	4.263	4-FFf	2.521	2.515	3.500	3.500	6.709	0.000
133.80	133.80	78.59	4.274	4.405	4-FFf	2.600	2.561	3.500	3.500	6.953	0.000
138.50	138.50	78.73	4.407	4.552	4-FFf	2.685	2.605	3.500	3.500	7.198	0.000
143.20	143.20	78.88	4.545	4.704	4-FFf	2.769	2.648	3.500	3.500	7.442	0.000
144.00	144.00	78.91	4.569	4.731	4-FFf	2.783	2.655	3.500	3.500	7.484	0.000
152.60	152.60	79.20	4.834	5.023	4-FFf	2.986	2.730	3.500	3.500	7.930	0.000
157.30	157.30	79.37	4.985	5.191	4-FFf	3.127	2.769	3.500	3.500	8.175	0.000
162.00	162.00	79.54	5.141	5.363	4-FFf	3.500	2.807	3.500	3.500	8.419	0.000

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Straight Culvert

Inlet Elevation (invert): 74.18 ft,    Outlet Elevation (invert): 73.03 ft

Culvert Length: 248.00 ft,    Culvert Slope: 0.0046

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 74.18 ft

Outlet Station: 248.00 ft

Outlet Elevation: 73.03 ft

Number of Barrels: 2

**Culvert Data Summary - EXIST**

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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-8E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
115.00	76.53	3.50
119.70	76.53	3.50
124.40	76.53	3.50
129.10	76.53	3.50
133.80	76.53	3.50
138.50	76.53	3.50
143.20	76.53	3.50
144.00	76.53	3.50
152.60	76.53	3.50
157.30	76.53	3.50
162.00	76.53	3.50

**Tailwater Channel Data - CD-8E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 76.53 ft

**Roadway Data for Crossing: CD-8E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 81.00 ft

Roadway Surface: Paved

Roadway Top Width: 160.00 ft

**CD-8 PROPOSED  
HY-8 Culvert Analysis Report**



## **Crossing Discharge Data**

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

Minimum Flow: 115 cfs

Design Flow: 144 cfs

Maximum Flow: 162 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-8P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
77.98	115.00	115.00	0.00	1
78.06	119.70	119.70	0.00	1
78.13	124.40	124.40	0.00	1
78.21	129.10	129.10	0.00	1
78.61	133.80	133.80	0.00	1
78.73	138.50	138.50	0.00	1
78.84	143.20	143.20	0.00	1
78.86	144.00	144.00	0.00	1
78.62	152.60	152.60	0.00	1
78.72	157.30	157.30	0.00	1
78.83	162.00	162.00	0.00	1
81.00	240.75	240.75	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
115.00	115.00	77.98	3.440	3.804	1-S1f	2.242	2.278	4.000	4.000	4.793	0.000
119.70	119.70	78.06	3.529	3.877	1-S1f	2.299	2.325	4.000	4.000	4.988	0.000
124.40	124.40	78.13	3.618	3.952	1-S1f	2.357	2.375	4.000	4.000	5.184	0.000
129.10	129.10	78.21	3.706	4.028	1-S1f	2.414	2.421	4.000	4.000	5.380	0.000
133.80	133.80	78.61	3.795	4.432	3-M1f	2.472	2.466	4.000	4.000	5.324	0.000
138.50	138.50	78.73	3.885	4.545	3-M1f	2.530	2.510	4.000	4.000	5.511	0.000
143.20	143.20	78.84	3.975	4.664	3-M1f	2.590	2.554	4.000	4.000	5.698	0.000
144.00	144.00	78.86	3.991	4.684	3-M1f	2.601	2.561	4.000	4.000	5.730	0.000
152.60	152.60	78.62	4.160	4.445	4-FFf	2.714	2.642	4.000	4.000	6.072	0.000
157.30	157.30	78.72	4.254	4.545	4-FFf	2.775	2.683	4.000	4.000	6.259	0.000
162.00	162.00	78.83	4.350	4.648	4-FFf	2.837	2.724	4.000	4.000	6.446	0.000

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 74.18 ft, Outlet Elevation (invert): 73.03 ft

Culvert Length: 308.00 ft, Culvert Slope: 0.0037

\*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 74.18 ft

Outlet Station: 308.00 ft

Outlet Elevation: 73.03 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 4.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-8P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
115.00	77.03	4.00
119.70	77.03	4.00
124.40	77.03	4.00
129.10	77.03	4.00
133.80	77.03	4.00
138.50	77.03	4.00
143.20	77.03	4.00
144.00	77.03	4.00
152.60	77.03	4.00
157.30	77.03	4.00
162.00	77.03	4.00

**Tailwater Channel Data - CD-8P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 77.03 ft

**Roadway Data for Crossing: CD-8P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 81.00 ft

Roadway Surface: Paved

Roadway Top Width: 340.00 ft

**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-14
checked by:	BJS	25-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		CD-9	
		Existing	Proposed
LOCATION	STA.	863+00.00	863+00.00
WIDTH		7.00 FT	7.00 FT
HEIGHT		4.00 FT	4.00 FT
BARRELS		2	2
DIAMETER		FT	7.00 FT
LENGTH		583.0 FT	583.0 FT
TOTAL CROSS-SECTIONAL AREA		56.00 SF	56.00 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		75.70 FT	75.70 FT
DOWNSTREAM INVERT		75.50 FT	75.20 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		83.00 FT	83.00 FT
TAILWATER (CROWN OF PIPE)		79.50 FT	79.20 FT
<b>DETERMINE FLOWRATES (Q):</b>		Headwater Elevation	Headwater Elevation
ASSUMED VELOCITY (25 YR)	6.00 FT/S		
Q (25 YR) = V (25 YR) * TOTAL AREA	336 CFS	81.33 FT	81.03 FT
Q (50 YR) = 1.25 * Q (25 YR)	420 CFS	82.35 FT	82.05 FT
Q (100 YR) = 1.40 * Q (25 YR)	470 CFS	83.00 FT	82.77 FT

100 year headwater elevation exceeds the critical elevation

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)**

**CD-9 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-9E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
81.33	336.00	336.00	0.00	1
81.47	349.40	349.40	0.00	1
81.63	362.80	362.80	0.00	1
81.79	376.20	376.20	0.00	1
81.95	389.60	389.60	0.00	1
82.13	403.00	403.00	0.00	1
82.30	416.40	416.40	0.00	1
82.35	420.00	420.00	0.00	1
82.68	443.20	443.20	0.00	1
82.87	456.60	456.60	0.00	1
83.01	470.00	465.59	2.21	36
83.00	465.23	465.23	0.00	Overtopping



**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	81.33	4.480	5.625	4-FFf	4.000	2.615	4.000	4.000	6.000	0.000
349.40	349.40	81.47	4.615	5.774	4-FFf	4.000	2.684	4.000	4.000	6.239	0.000
362.80	362.80	81.63	4.753	5.928	4-FFf	4.000	2.753	4.000	4.000	6.479	0.000
376.20	376.20	81.79	4.892	6.088	4-FFf	4.000	2.820	4.000	4.000	6.718	0.000
389.60	389.60	81.95	5.034	6.254	4-FFf	4.000	2.887	4.000	4.000	6.957	0.000
403.00	403.00	82.13	5.179	6.426	4-FFf	4.000	2.952	4.000	4.000	7.196	0.000
416.40	416.40	82.30	5.327	6.603	4-FFf	4.000	3.017	4.000	4.000	7.436	0.000
420.00	420.00	82.35	5.367	6.652	4-FFf	4.000	3.035	4.000	4.000	7.500	0.000
443.20	443.20	82.68	5.632	6.976	4-FFf	4.000	3.146	4.000	4.000	7.914	0.000
456.60	456.60	82.87	5.790	7.171	4-FFf	4.000	3.209	4.000	4.000	8.154	0.000
470.00	465.59	83.01	5.898	7.305	4-FFf	4.000	3.251	4.000	4.000	8.314	0.000

.....  
 Straight Culvert  
 Inlet Elevation (invert): 75.70 ft, Outlet Elevation (invert): 75.50 ft  
 Culvert Length: 583.00 ft, Culvert Slope: 0.0003  
 .....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 75.70 ft  
 Outlet Station: 583.00 ft  
 Outlet Elevation: 75.50 ft  
 Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box  
 Barrel Span: 7.00 ft  
 Barrel Rise: 4.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	79.50	4.00
349.40	79.50	4.00
362.80	79.50	4.00
376.20	79.50	4.00
389.60	79.50	4.00
403.00	79.50	4.00
416.40	79.50	4.00
420.00	79.50	4.00
443.20	79.50	4.00
456.60	79.50	4.00
470.00	79.50	4.00

**Tailwater Channel Data - CD-9E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 79.50 ft

**Roadway Data for Crossing: CD-9E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 83.00 ft

Roadway Surface: Paved

Roadway Top Width: 490.00 ft

**CD-9 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-9P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
81.03	336.00	336.00	0.00	1
81.17	349.40	349.40	0.00	1
81.33	362.80	362.80	0.00	1
81.49	376.20	376.20	0.00	1
81.65	389.60	389.60	0.00	1
81.83	403.00	403.00	0.00	1
82.00	416.40	416.40	0.00	1
82.05	420.00	420.00	0.00	1
82.38	443.20	443.20	0.00	1
82.57	456.60	456.60	0.00	1
82.77	470.00	470.00	0.00	1
83.00	484.80	484.80	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	81.03	4.479	5.325	4-FFf	4.000	2.615	4.000	4.000	6.000	0.000
349.40	349.40	81.17	4.614	5.474	4-FFf	4.000	2.684	4.000	4.000	6.239	0.000
362.80	362.80	81.33	4.752	5.628	4-FFf	4.000	2.753	4.000	4.000	6.479	0.000
376.20	376.20	81.49	4.891	5.788	4-FFf	4.000	2.820	4.000	4.000	6.718	0.000
389.60	389.60	81.65	5.033	5.954	4-FFf	4.000	2.887	4.000	4.000	6.957	0.000
403.00	403.00	81.83	5.178	6.126	4-FFf	4.000	2.952	4.000	4.000	7.196	0.000
416.40	416.40	82.00	5.326	6.303	4-FFf	4.000	3.017	4.000	4.000	7.436	0.000
420.00	420.00	82.05	5.366	6.352	4-FFf	4.000	3.035	4.000	4.000	7.500	0.000
443.20	443.20	82.38	5.631	6.676	4-FFf	4.000	3.146	4.000	4.000	7.914	0.000
456.60	456.60	82.57	5.789	6.871	4-FFf	4.000	3.209	4.000	4.000	8.154	0.000
470.00	470.00	82.77	5.950	7.071	4-FFf	4.000	3.271	4.000	4.000	8.393	0.000

.....  
 Straight Culvert

Inlet Elevation (invert): 75.70 ft, Outlet Elevation (invert): 75.20 ft

Culvert Length: 583.00 ft, Culvert Slope: 0.0009  
 .....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 75.70 ft

Outlet Station: 583.00 ft

Outlet Elevation: 75.20 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	79.20	4.00
349.40	79.20	4.00
362.80	79.20	4.00
376.20	79.20	4.00
389.60	79.20	4.00
403.00	79.20	4.00
416.40	79.20	4.00
420.00	79.20	4.00
443.20	79.20	4.00
456.60	79.20	4.00
470.00	79.20	4.00

**Tailwater Channel Data - CD-9P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 79.20 ft

**Roadway Data for Crossing: CD-9P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 83.00 ft

Roadway Surface: Paved

Roadway Top Width: 490.00 ft

**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-15
checked by:	BJS	25-Jun-15
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		CD-10	
		Existing	Proposed
LOCATION	STA.	914+00.00	914+00.00
WIDTH		7.00 FT	7.00 FT
HEIGHT		4.00 FT	4.00 FT
BARRELS		2	2
DIAMETER		FT	7.00 FT
LENGTH		250.0 FT	558.0 FT
TOTAL CROSS-SECTIONAL AREA		56.00 SF	56.00 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		79.50 FT	79.50 FT
DOWNSTREAM INVERT		79.25 FT	78.70 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		87.50 FT	87.50 FT
TAILWATER (CROWN OF PIPE)		83.25 FT	82.70 FT
<b>DETERMINE FLOWRATES (Q):</b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	336 CFS	84.51 FT	84.21 FT
Q (50 YR) = 1.25 * Q (25 YR)	420 CFS	85.22 FT	85.17 FT
Q (100 YR) = 1.40 * Q (25 YR)	470 CFS	85.72 FT	85.85 FT

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)**



**CD-10 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-10E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
84.51	336.00	336.00	0.00	1
84.61	349.40	349.40	0.00	1
84.72	362.80	362.80	0.00	1
84.83	376.20	376.20	0.00	1
84.95	389.60	389.60	0.00	1
85.06	403.00	403.00	0.00	1
85.19	416.40	416.40	0.00	1
85.22	420.00	420.00	0.00	1
85.45	443.20	443.20	0.00	1
85.58	456.60	456.60	0.00	1
85.72	470.00	470.00	0.00	1
87.50	616.62	616.62	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	84.51	4.478	5.012	4-FFf	4.000	2.615	4.000	4.000	6.000	0.000
349.40	349.40	84.61	4.614	5.114	4-FFf	4.000	2.684	4.000	4.000	6.239	0.000
362.80	362.80	84.72	4.751	5.221	4-FFf	4.000	2.753	4.000	4.000	6.479	0.000
376.20	376.20	84.83	4.891	5.332	4-FFf	4.000	2.820	4.000	4.000	6.718	0.000
389.60	389.60	84.95	5.033	5.446	4-FFf	4.000	2.887	4.000	4.000	6.957	0.000
403.00	403.00	85.06	5.178	5.565	4-FFf	4.000	2.952	4.000	4.000	7.196	0.000
416.40	416.40	85.19	5.326	5.688	4-FFf	4.000	3.017	4.000	4.000	7.436	0.000
420.00	420.00	85.22	5.366	5.721	4-FFf	4.000	3.035	4.000	4.000	7.500	0.000
443.20	443.20	85.45	5.631	5.945	4-FFf	4.000	3.146	4.000	4.000	7.914	0.000
456.60	456.60	85.58	5.788	6.080	4-FFf	4.000	3.209	4.000	4.000	8.154	0.000
470.00	470.00	85.72	5.950	6.219	4-FFf	4.000	3.271	4.000	4.000	8.393	0.000

\*\*\*\*\*  
 Straight Culvert  
 Inlet Elevation (invert): 79.50 ft, Outlet Elevation (invert): 79.25 ft  
 Culvert Length: 250.00 ft, Culvert Slope: 0.0010  
 \*\*\*\*\*

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 79.50 ft  
 Outlet Station: 250.00 ft  
 Outlet Elevation: 79.25 ft  
 Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box  
 Barrel Span: 7.00 ft  
 Barrel Rise: 4.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-10E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	83.25	4.00
349.40	83.25	4.00
362.80	83.25	4.00
376.20	83.25	4.00
389.60	83.25	4.00
403.00	83.25	4.00
416.40	83.25	4.00
420.00	83.25	4.00
443.20	83.25	4.00
456.60	83.25	4.00
470.00	83.25	4.00

**Tailwater Channel Data - CD-10E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 83.25 ft

**Roadway Data for Crossing: CD-10E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 87.50 ft

Roadway Surface: Paved

Roadway Top Width: 165.00 ft

**CD-10 PROPOSED  
HY-8 Culvert Analysis Report**

## **Crossing Discharge Data**

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

Minimum Flow: 336 cfs

Design Flow: 420 cfs

Maximum Flow: 470 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-10P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
84.15	336.00	336.00	0.00	1
84.26	349.40	349.40	0.00	1
84.49	362.80	362.80	0.00	1
84.47	376.20	376.20	0.00	1
84.58	389.60	389.60	0.00	1
84.69	403.00	403.00	0.00	1
84.90	416.40	416.40	0.00	1
85.00	420.00	420.00	0.00	1
85.49	443.20	443.20	0.00	1
85.74	456.60	456.60	0.00	1
85.97	470.00	470.00	0.00	1
87.50	555.43	555.43	0.00	Overtopping



**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
336.00	336.00	84.15	4.477	4.653	7-M1t	3.512	2.615	3.800	4.000	6.316	0.000
349.40	349.40	84.26	4.613	4.759	7-M1t	3.618	2.684	3.800	4.000	6.568	0.000
362.80	362.80	84.49	4.750	4.987	7-M2t	4.000	2.753	3.800	4.000	6.820	0.000
376.20	376.20	84.47	4.890	4.973	3-M2t	4.000	2.820	3.800	4.000	7.071	0.000
389.60	389.60	84.58	5.032	5.080	3-M2t	4.000	2.887	3.800	4.000	7.323	0.000
403.00	403.00	84.69	5.177	5.188	3-M2t	4.000	2.952	3.800	4.000	7.575	0.000
416.40	416.40	84.90	5.325	5.400	7-M2t	4.000	3.017	3.800	4.000	7.827	0.000
420.00	420.00	85.00	5.365	5.499	7-M2t	4.000	3.035	3.800	4.000	7.895	0.000
443.20	443.20	85.49	5.630	5.992	7-M2t	4.000	3.146	3.800	4.000	8.331	0.000
456.60	456.60	85.74	5.787	6.235	7-M2t	4.000	3.209	3.800	4.000	8.583	0.000
470.00	470.00	85.97	5.949	6.470	7-M2t	4.000	3.271	3.800	4.000	8.835	0.000

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 79.50 ft,    Outlet Elevation (invert): 78.70 ft

Culvert Length: 558.00 ft,    Culvert Slope: 0.0014

\*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 79.50 ft

Outlet Station: 558.00 ft

Outlet Elevation: 78.70 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-10P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
336.00	82.50	4.00
349.40	82.50	4.00
362.80	82.50	4.00
376.20	82.50	4.00
389.60	82.50	4.00
403.00	82.50	4.00
416.40	82.50	4.00
420.00	82.50	4.00
443.20	82.50	4.00
456.60	82.50	4.00
470.00	82.50	4.00

**Tailwater Channel Data - CD-10P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 82.50 ft

**Roadway Data for Crossing: CD-10P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 87.50 ft

Roadway Surface: Paved

Roadway Top Width: 477.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-14
checked by:	BJS	25-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-11</b>	
LOCATION	STA.	Existing	Proposed
		984+00.00	984+00.00
WIDTH		7.00 FT	7.00 FT
HEIGHT		5.00 FT	5.00 FT
BARRELS		2	2
DIAMETER		FT	7.00 FT
LENGTH		477.0 FT	581.0 FT
TOTAL CROSS-SECTIONAL AREA		70.00 SF	70.00 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		82.45 FT	82.00 FT
DOWNSTREAM INVERT		81.65 FT	80.90 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		89.20 FT	89.20 FT
TAILWATER (CROWN OF PIPE)		86.65 FT	85.90 FT
<b><u>DETERMINE FLOWRATES (Q):</u></b>		Headwater Elevation	Headwater Elevation
ASSUMED VELOCITY (25 YR)	6.00 FT/S		
Q (25 YR) = V (25 YR) * TOTAL AREA	420 CFS	88.16 FT	87.80 FT
Q (50 YR) = 1.25 * Q (25 YR)	525 CFS	89.01 FT	88.49 FT
Q (100 YR) = 1.40 * Q (25 YR)	588 CFS	89.20 FT	89.15 FT

100 year headwater elevation exceeds the critical elevation

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions Analysis done with HY-8 Version 7.3 (April 2014)**

**CD-11 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 420 cfs

Design Flow: 525 cfs

Maximum Flow: 588 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-11E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
88.16	420.00	420.00	0.00	1
88.29	436.80	436.80	0.00	1
88.41	453.60	453.60	0.00	1
88.55	470.40	470.40	0.00	1
88.68	487.20	487.20	0.00	1
88.83	504.00	504.00	0.00	1
88.97	520.80	520.80	0.00	1
89.01	525.00	525.00	0.00	1
89.21	554.40	546.53	5.75	29
89.22	571.20	547.99	21.04	5
89.23	588.00	549.11	36.55	4
89.20	545.47	545.47	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
420.00	420.00	88.16	5.156	5.712	4-FFf	3.918	3.035	5.000	5.000	6.000	0.000
436.80	436.80	88.29	5.304	5.835	4-FFf	4.038	3.115	5.000	5.000	6.240	0.000
453.60	453.60	88.41	5.453	5.963	4-FFf	4.156	3.195	5.000	5.000	6.480	0.000
470.40	470.40	88.55	5.604	6.096	4-FFf	4.273	3.273	5.000	5.000	6.720	0.000
487.20	487.20	88.68	5.756	6.234	4-FFf	4.390	3.350	5.000	5.000	6.960	0.000
504.00	504.00	88.83	5.910	6.377	4-FFf	4.507	3.427	5.000	5.000	7.200	0.000
520.80	520.80	88.97	6.066	6.525	4-FFf	5.000	3.503	5.000	5.000	7.440	0.000
525.00	525.00	89.01	6.105	6.562	4-FFf	5.000	3.522	5.000	5.000	7.500	0.000
554.40	546.53	89.21	6.309	6.760	4-FFf	5.000	3.617	5.000	5.000	7.808	0.000
571.20	547.99	89.22	6.323	6.774	4-FFf	5.000	3.624	5.000	5.000	7.828	0.000
588.00	549.11	89.23	6.334	6.784	4-FFf	5.000	3.629	5.000	5.000	7.844	0.000

.....  
 Straight Culvert  
 Inlet Elevation (invert): 82.45 ft,    Outlet Elevation (invert): 81.65 ft  
 Culvert Length: 477.00 ft,    Culvert Slope: 0.0017  
 .....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 82.45 ft  
 Outlet Station: 477.00 ft  
 Outlet Elevation: 81.65 ft  
 Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Concrete Box  
 Barrel Span: 7.00 ft  
 Barrel Rise: 5.00 ft  
 Barrel Material: Concrete  
 Embedment: 0.00 in  
 Barrel Manning's n: 0.0120  
 Culvert Type: Straight  
 Inlet Configuration: Square Edge (90°) Headwall  
 Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-11E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
420.00	86.65	5.00
436.80	86.65	5.00
453.60	86.65	5.00
470.40	86.65	5.00
487.20	86.65	5.00
504.00	86.65	5.00
520.80	86.65	5.00
525.00	86.65	5.00
554.40	86.65	5.00
571.20	86.65	5.00
588.00	86.65	5.00

**Tailwater Channel Data - CD-11E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 86.65 ft

**Roadway Data for Crossing: CD-11E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 89.20 ft

Roadway Surface: Paved

Roadway Top Width: 470.00 ft



**CD-11 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 420 cfs

Design Flow: 525 cfs

Maximum Flow: 588 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-11P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
87.80	420.00	420.00	0.00	1
87.69	436.80	436.80	0.00	1
87.83	453.60	453.60	0.00	1
87.98	470.40	470.40	0.00	1
88.13	487.20	487.20	0.00	1
88.29	504.00	504.00	0.00	1
88.45	520.80	520.80	0.00	1
88.49	525.00	525.00	0.00	1
88.79	554.40	554.40	0.00	1
88.97	571.20	571.20	0.00	1
89.15	588.00	588.00	0.00	1
89.20	592.42	592.42	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
420.00	420.00	87.80	5.156	5.801	3-M1f	3.742	3.035	5.000	5.000	6.000	0.000
436.80	436.80	87.69	5.304	5.694	4-FFf	3.855	3.115	5.000	5.000	6.240	0.000
453.60	453.60	87.83	5.453	5.835	4-FFf	3.967	3.195	5.000	5.000	6.480	0.000
470.40	470.40	87.98	5.603	5.981	4-FFf	4.080	3.273	5.000	5.000	6.720	0.000
487.20	487.20	88.13	5.755	6.132	4-FFf	4.190	3.350	5.000	5.000	6.960	0.000
504.00	504.00	88.29	5.909	6.288	4-FFf	4.301	3.427	5.000	5.000	7.200	0.000
520.80	520.80	88.45	6.065	6.450	4-FFf	4.411	3.503	5.000	5.000	7.440	0.000
525.00	525.00	88.49	6.104	6.492	4-FFf	4.439	3.522	5.000	5.000	7.500	0.000
554.40	554.40	88.79	6.384	6.790	4-FFf	5.000	3.652	5.000	5.000	7.920	0.000
571.20	571.20	88.97	6.548	6.968	4-FFf	5.000	3.725	5.000	5.000	8.160	0.000
588.00	588.00	89.15	6.715	7.151	4-FFf	5.000	3.798	5.000	5.000	8.400	0.000

.....

Straight Culvert

Inlet Elevation (invert): 82.00 ft,    Outlet Elevation (invert): 80.90 ft

Culvert Length: 581.00 ft,    Culvert Slope: 0.0019

.....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 82.00 ft

Outlet Station: 581.00 ft

Outlet Elevation: 80.90 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Concrete Box

Barrel Span: 7.00 ft

Barrel Rise: 5.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge (90°) Headwall

Inlet Depression: NONE

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-11P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
420.00	85.90	5.00
436.80	85.90	5.00
453.60	85.90	5.00
470.40	85.90	5.00
487.20	85.90	5.00
504.00	85.90	5.00
520.80	85.90	5.00
525.00	85.90	5.00
554.40	85.90	5.00
571.20	85.90	5.00
588.00	85.90	5.00

**Tailwater Channel Data - CD-11P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 85.90 ft

**Roadway Data for Crossing: CD-11P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 89.20 ft

Roadway Surface: Paved

Roadway Top Width: 535.00 ft

HNTB Corporation  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	24-Jun-14
checked by:	BJS	24-Jun-14
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-12</b>	
LOCATION	STA.	Existing	Proposed
		1083+19.00	1083+19.00
WIDTH		3.00 FT	3.50 FT
HEIGHT		3.00 FT	3.50 FT
BARRELS		2	2
DIAMETER		3.00 FT	3.50 FT
LENGTH		415.0 FT	612.0 FT
TOTAL CROSS-SECTIONAL AREA		14.14 SF	19.24 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		83.44 FT	83.44 FT
DOWNSTREAM INVERT		82.45 FT	82.45 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		91.00 FT	91.00 FT
TAILWATER (CROWN OF PIPE)		85.45 FT	85.95 FT
<b>DETERMINE FLOWRATES (Q):</b>		Headwater Elevation	Headwater Elevation
ASSUMED VELOCITY (25 YR)	6.00 FT/S		
Q (25 YR) = V (25 YR) * TOTAL AREA	85 CFS	87.72 FT	87.33 FT
Q (50 YR) = 1.25 * Q (25 YR)	106 CFS	88.98 FT	88.10 FT
Q (100 YR) = 1.40 * Q (25 YR)	119 CFS	89.90 FT	88.65 FT

*\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)*

**CD-12 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 85 cfs

Design Flow: 106 cfs

Maximum Flow: 119 cfs



**Table 1 - Summary of Culvert Flows at Crossing: CD-12E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
87.72	85.00	85.00	0.00	1
87.90	88.40	88.40	0.00	1
88.10	91.80	91.80	0.00	1
88.30	95.20	95.20	0.00	1
88.50	98.60	98.60	0.00	1
88.72	102.00	102.00	0.00	1
88.94	105.40	105.40	0.00	1
88.98	106.00	106.00	0.00	1
89.40	112.20	112.20	0.00	1
89.65	115.60	115.60	0.00	1
89.90	119.00	119.00	0.00	1
91.00	132.91	132.91	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
85.00	85.00	87.72	3.461	4.280	4-FFf	3.000	2.121	3.000	3.000	6.013	0.000
88.40	88.40	87.90	3.576	4.465	4-FFf	3.000	2.163	3.000	3.000	6.253	0.000
91.80	91.80	88.10	3.695	4.657	4-FFf	3.000	2.204	3.000	3.000	6.494	0.000
95.20	95.20	88.30	3.817	4.857	4-FFf	3.000	2.244	3.000	3.000	6.734	0.000
98.60	98.60	88.50	3.944	5.064	4-FFf	3.000	2.283	3.000	3.000	6.975	0.000
102.00	102.00	88.72	4.075	5.278	4-FFf	3.000	2.320	3.000	3.000	7.215	0.000
105.40	105.40	88.94	4.211	5.500	4-FFf	3.000	2.357	3.000	3.000	7.456	0.000
106.00	106.00	88.98	4.235	5.540	4-FFf	3.000	2.363	3.000	3.000	7.498	0.000
112.20	112.20	89.40	4.497	5.965	4-FFf	3.000	2.426	3.000	3.000	7.937	0.000
115.60	115.60	89.65	4.647	6.208	4-FFf	3.000	2.459	3.000	3.000	8.177	0.000
119.00	119.00	89.90	4.802	6.459	4-FFf	3.000	2.491	3.000	3.000	8.418	0.000

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Straight Culvert

Inlet Elevation (invert): 83.44 ft,    Outlet Elevation (invert): 82.45 ft

Culvert Length: 415.00 ft,    Culvert Slope: 0.0024

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**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 83.44 ft

Outlet Station: 415.00 ft

Outlet Elevation: 82.45 ft

Number of Barrels: 2

**Culvert Data Summary - EXIST**

Barrel Shape: Circular

Barrel Diameter: 3.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-12E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
85.00	85.45	3.00
88.40	85.45	3.00
91.80	85.45	3.00
95.20	85.45	3.00
98.60	85.45	3.00
102.00	85.45	3.00
105.40	85.45	3.00
106.00	85.45	3.00
112.20	85.45	3.00
115.60	85.45	3.00
119.00	85.45	3.00

**Tailwater Channel Data - CD-12E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 85.45 ft

**Roadway Data for Crossing: CD-12E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 91.00 ft

Roadway Surface: Paved

Roadway Top Width: 374.00 ft

**CD-12 PROPOSED  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 85 cfs

Design Flow: 106 cfs

Maximum Flow: 119 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-12P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
87.33	85.00	85.00	0.00	1
87.44	88.40	88.40	0.00	1
87.56	91.80	91.80	0.00	1
87.68	95.20	95.20	0.00	1
87.81	98.60	98.60	0.00	1
87.94	102.00	102.00	0.00	1
88.07	105.40	105.40	0.00	1
88.10	106.00	106.00	0.00	1
88.35	112.20	112.20	0.00	1
88.50	115.60	115.60	0.00	1
88.65	119.00	119.00	0.00	1
91.00	162.61	162.61	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
85.00	85.00	87.33	3.075	3.930	4-FFf	2.835	2.026	3.500	3.500	4.417	0.000
88.40	88.40	87.44	3.153	4.042	4-FFf	2.992	2.066	3.500	3.500	4.594	0.000
91.80	91.80	87.56	3.232	4.159	4-FFf	3.168	2.111	3.500	3.500	4.771	0.000
95.20	95.20	87.68	3.310	4.281	4-FFf	3.500	2.151	3.500	3.500	4.947	0.000
98.60	98.60	87.81	3.389	4.407	4-FFf	3.500	2.190	3.500	3.500	5.124	0.000
102.00	102.00	87.94	3.469	4.537	4-FFf	3.500	2.228	3.500	3.500	5.301	0.000
105.40	105.40	88.07	3.550	4.672	4-FFf	3.500	2.266	3.500	3.500	5.478	0.000
106.00	106.00	88.10	3.564	4.696	4-FFf	3.500	2.273	3.500	3.500	5.509	0.000
112.20	112.20	88.35	3.715	4.954	4-FFf	3.500	2.343	3.500	3.500	5.831	0.000
115.60	115.60	88.50	3.799	5.102	4-FFf	3.500	2.379	3.500	3.500	6.008	0.000
119.00	119.00	88.65	3.885	5.254	4-FFf	3.500	2.414	3.500	3.500	6.184	0.000

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Straight Culvert

Inlet Elevation (invert): 83.40 ft,    Outlet Elevation (invert): 82.45 ft

Culvert Length: 612.00 ft,    Culvert Slope: 0.0016

.....

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 83.40 ft

Outlet Station: 612.00 ft

Outlet Elevation: 82.45 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-12P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
85.00	85.95	3.50
88.40	85.95	3.50
91.80	85.95	3.50
95.20	85.95	3.50
98.60	85.95	3.50
102.00	85.95	3.50
105.40	85.95	3.50
106.00	85.95	3.50
112.20	85.95	3.50
115.60	85.95	3.50
119.00	85.95	3.50

**Tailwater Channel Data - CD-12P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 85.95 ft

**Roadway Data for Crossing: CD-12P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 91.00 ft

Roadway Surface: Paved

Roadway Top Width: 564.00 ft



**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-15
checked by:	BJS	25-Jun-15
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-13</b>	
LOCATION	STA.	Existing	Proposed
		1138+20.00	1138+20.00
WIDTH		2.50 FT	3.00 FT
HEIGHT		2.50 FT	3.00 FT
BARRELS		2	2
DIAMETER		2.50 FT	3.00 FT
LENGTH		247.0 FT	356.0 FT
TOTAL CROSS-SECTIONAL AREA		9.82 SF	14.14 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		96.10 FT	96.10 FT
DOWNSTREAM INVERT		94.85 FT	94.85 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		103.50 FT	103.50 FT
TAILWATER (CROWN OF PIPE)		97.35 FT	97.85 FT
<b><u>DETERMINE FLOWRATES (Q):</u></b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	59 CFS	99.27 FT	99.10 FT
Q (50 YR) = 1.25 * Q (25 YR)	74 CFS	100.38 FT	99.51 FT
Q (100 YR) = 1.40 * Q (25 YR)	82 CFS	101.07 FT	99.89 FT

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)**

**CD-13 EXISTING  
HY-8 Culvert Analysis Report**

**Crossing Discharge Data**

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

Minimum Flow: 59 cfs

Design Flow: 74 cfs

Maximum Flow: 82 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-13E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
99.27	59.00	59.00	0.00	1
99.43	61.30	61.30	0.00	1
99.59	63.60	63.60	0.00	1
99.75	65.90	65.90	0.00	1
99.92	68.20	68.20	0.00	1
100.10	70.50	70.50	0.00	1
100.28	72.80	72.80	0.00	1
100.38	74.00	74.00	0.00	1
100.66	77.40	77.40	0.00	1
100.86	79.70	79.70	0.00	1
101.07	82.00	82.00	0.00	1
103.50	105.49	105.49	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
59.00	59.00	99.27	3.113	3.174	4-FFf	1.918	1.849	2.500	2.500	6.010	0.000
61.30	61.30	99.43	3.224	3.327	4-FFf	1.987	1.884	2.500	2.500	6.244	0.000
63.60	63.60	99.59	3.338	3.485	4-FFf	2.063	1.918	2.500	2.500	6.478	0.000
65.90	65.90	99.75	3.457	3.650	4-FFf	2.179	1.951	2.500	2.500	6.713	0.000
68.20	68.20	99.92	3.580	3.820	4-FFf	2.500	1.983	2.500	2.500	6.947	0.000
70.50	70.50	100.10	3.708	3.997	4-FFf	2.500	2.014	2.500	2.500	7.181	0.000
72.80	72.80	100.28	3.841	4.179	4-FFf	2.500	2.043	2.500	2.500	7.415	0.000
74.00	74.00	100.38	3.912	4.276	4-FFf	2.500	2.058	2.500	2.500	7.538	0.000
77.40	77.40	100.66	4.120	4.561	4-FFf	2.500	2.099	2.500	2.500	7.884	0.000
79.70	79.70	100.86	4.267	4.760	4-FFf	2.500	2.125	2.500	2.500	8.118	0.000
82.00	82.00	101.07	4.419	4.966	4-FFf	2.500	2.149	2.500	2.500	8.352	0.000

.....  
 Straight Culvert  
 Inlet Elevation (invert): 96.10 ft,    Outlet Elevation (invert): 94.85 ft  
 Culvert Length: 247.00 ft,    Culvert Slope: 0.0051  
 .....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data  
 Inlet Station: 0.00 ft  
 Inlet Elevation: 96.10 ft  
 Outlet Station: 247.00 ft  
 Outlet Elevation: 94.85 ft  
 Number of Barrels: 2

**Culvert Data Summary - EXIST**

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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-13E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
59.00	97.35	2.50
61.30	97.35	2.50
63.60	97.35	2.50
65.90	97.35	2.50
68.20	97.35	2.50
70.50	97.35	2.50
72.80	97.35	2.50
74.00	97.35	2.50
77.40	97.35	2.50
79.70	97.35	2.50
82.00	97.35	2.50

**Tailwater Channel Data - CD-13E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 97.35 ft

**Roadway Data for Crossing: CD-13E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 103.50 ft

Roadway Surface: Paved

Roadway Top Width: 200.00 ft

**CD-13 PROPOSED  
HY-8 Culvert Analysis Report**

## **Crossing Discharge Data**

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

Minimum Flow: 59 cfs

Design Flow: 74 cfs

Maximum Flow: 82 cfs



**Table 1 - Summary of Culvert Flows at Crossing: CD-13P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
99.06	59.00	59.00	0.00	1
99.15	61.30	61.30	0.00	1
99.24	63.60	63.60	0.00	1
99.33	65.90	65.90	0.00	1
99.43	68.20	68.20	0.00	1
99.54	70.50	70.50	0.00	1
99.65	72.80	72.80	0.00	1
99.71	74.00	74.00	0.00	1
99.56	77.40	77.40	0.00	1
99.67	79.70	79.70	0.00	1
99.77	82.00	82.00	0.00	1
103.50	140.54	140.54	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
59.00	59.00	99.06	2.667	2.964	3-M1f	1.829	1.754	3.000	3.000	4.173	0.000
61.30	61.30	99.15	2.734	3.049	3-M1f	1.875	1.789	3.000	3.000	4.336	0.000
63.60	63.60	99.24	2.801	3.139	3-M1f	1.923	1.827	3.000	3.000	4.499	0.000
65.90	65.90	99.33	2.868	3.233	3-M1f	1.974	1.860	3.000	3.000	4.661	0.000
68.20	68.20	99.43	2.936	3.333	3-M1f	2.024	1.893	3.000	3.000	4.824	0.000
70.50	70.50	99.54	3.004	3.441	3-M1f	2.074	1.926	3.000	3.000	4.987	0.000
72.80	72.80	99.65	3.073	3.554	3-M1f	2.125	1.958	3.000	3.000	5.150	0.000
74.00	74.00	99.71	3.110	3.614	3-M1f	2.151	1.974	3.000	3.000	5.234	0.000
77.40	77.40	99.56	3.215	3.464	4-FFf	2.235	2.019	3.000	3.000	5.475	0.000
79.70	79.70	99.67	3.287	3.567	4-FFf	2.296	2.053	3.000	3.000	5.638	0.000
82.00	82.00	99.77	3.361	3.673	4-FFf	2.357	2.083	3.000	3.000	5.800	0.000

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 96.10 ft, Outlet Elevation (invert): 94.85 ft

Culvert Length: 356.00 ft, Culvert Slope: 0.0035

\*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 96.10 ft

Outlet Station: 356.00 ft

Outlet Elevation: 94.85 ft

Number of Barrels: 2

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 3.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-13P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
59.00	97.85	3.00
61.30	97.85	3.00
63.60	97.85	3.00
65.90	97.85	3.00
68.20	97.85	3.00
70.50	97.85	3.00
72.80	97.85	3.00
74.00	97.85	3.00
77.40	97.85	3.00
79.70	97.85	3.00
82.00	97.85	3.00

**Tailwater Channel Data - CD-13P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 97.85 ft

**Roadway Data for Crossing: CD-13P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 103.50 ft

Roadway Surface: Paved

Roadway Top Width: 365.00 ft

**HNTB Corporation**  
 610 Crescent Executive Court, Suite 400  
 Lake Mary, FL 32746

DATE

made by:	SR	25-Jun-15
checked by:	BJS	25-Jun-15
HNTB job #:	59219	

**PROJECT:** I-4 PD&E - Segment 1

CROSS DRAIN NO. _____		<b>CD-14</b>	
LOCATION	STA.	Existing	Proposed
		1202+15.00	1202+15.00
WIDTH		4.00 FT	4.00 FT
HEIGHT		4.00 FT	4.00 FT
BARRELS		1	1
DIAMETER		4.00 FT	4.00 FT
LENGTH		241.0 FT	372.0 FT
TOTAL CROSS-SECTIONAL AREA		12.57 SF	12.57 SF
MANNING'S ROUGHNESS		0.012	0.012
UPSTREAM INVERT		99.57 FT	99.57 FT
DOWNSTREAM INVERT		98.35 FT	98.20 FT
CRITICAL ELEVATION (ROADWAY SHOULDER EL)		108.00 FT	108.00 FT
TAILWATER (CROWN OF PIPE)		102.35 FT	102.20 FT
<b><u>DETERMINE FLOWRATES (Q):</u></b>			
ASSUMED VELOCITY (25 YR)	6.00 FT/S	Headwater Elevation	Headwater Elevation
Q (25 YR) = V (25 YR) * TOTAL AREA	75 CFS	103.86 FT	103.86 FT
Q (50 YR) = 1.25 * Q (25 YR)	94 CFS	104.55 FT	104.54 FT
Q (100 YR) = 1.40 * Q (25 YR)	106 CFS	105.12 FT	105.24 FT

**\* Culvert Design Drainage Handbook (2004), Chapter 8, Section 8.1. Culvert Extensions  
 Analysis done with HY-8 Version 7.3 (April 2014)**

**CD-14 EXISTING  
HY-8 Culvert Analysis Report**

### **Crossing Discharge Data**

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

Minimum Flow: 75 cfs

Design Flow: 94 cfs

Maximum Flow: 106 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-14E**

Headwater Elevation (ft)	Total Discharge (cfs)	EXIST Discharge (cfs)	Roadway Discharge (cfs)	Iterations
103.86	75.00	75.00	0.00	1
103.97	78.10	78.10	0.00	1
104.08	81.20	81.20	0.00	1
104.19	84.30	84.30	0.00	1
104.30	87.40	87.40	0.00	1
104.42	90.50	90.50	0.00	1
104.54	93.60	93.60	0.00	1
104.55	94.00	94.00	0.00	1
104.78	99.80	99.80	0.00	1
104.91	102.90	102.90	0.00	1
105.12	106.00	106.00	0.00	1
108.00	151.40	151.40	0.00	Overtopping

**Table 2 - Culvert Summary Table: EXIST**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
75.00	75.00	103.86	4.106	4.285	1-S1f	2.411	2.619	4.000	4.000	6.251	0.000
78.10	78.10	103.97	4.229	4.396	1-S1f	2.476	2.674	4.000	4.000	6.510	0.000
81.20	81.20	104.08	4.355	4.507	1-S1f	2.541	2.727	4.000	4.000	6.768	0.000
84.30	84.30	104.19	4.484	4.620	1-S1f	2.611	2.780	4.000	4.000	7.026	0.000
87.40	87.40	104.30	4.617	4.734	1-S1f	2.681	2.831	4.000	4.000	7.285	0.000
90.50	90.50	104.42	4.753	4.849	1-S1f	2.751	2.881	4.000	4.000	7.543	0.000
93.60	93.60	104.54	4.892	4.966	1-S1f	2.821	2.929	4.000	4.000	7.801	0.000
94.00	94.00	104.55	4.911	4.981	1-S1f	2.830	2.936	4.000	4.000	7.835	0.000
99.80	99.80	104.78	5.185	5.210	1-S1f	2.972	3.023	4.000	4.000	8.318	0.000
102.90	102.90	104.91	5.338	5.340	1-S1f	3.057	3.068	4.000	4.000	8.577	0.000
106.00	106.00	105.12	5.495	5.549	4-FFf	3.142	3.112	4.000	4.000	8.435	0.000

.....

Straight Culvert

Inlet Elevation (invert): 99.57 ft,    Outlet Elevation (invert): 98.35 ft

Culvert Length: 241.00 ft,    Culvert Slope: 0.0051

.....

**Site Data - EXIST**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 99.57 ft

Outlet Station: 241.00 ft

Outlet Elevation: 98.35 ft

Number of Barrels: 1

**Culvert Data Summary - EXIST**

Barrel Shape: Circular

Barrel Diameter: 4.00 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



**Table 3 - Downstream Channel Rating Curve (Crossing: CD-14E)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
75.00	102.35	4.00
78.10	102.35	4.00
81.20	102.35	4.00
84.30	102.35	4.00
87.40	102.35	4.00
90.50	102.35	4.00
93.60	102.35	4.00
94.00	102.35	4.00
99.80	102.35	4.00
102.90	102.35	4.00
106.00	102.35	4.00

**Tailwater Channel Data - CD-14E**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 102.35 ft

**Roadway Data for Crossing: CD-14E**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 108.00 ft

Roadway Surface: Paved

Roadway Top Width: 182.00 ft

**CD-14 PROPOSED  
HY-8 Culvert Analysis Report**

## **Crossing Discharge Data**

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

Minimum Flow: 75 cfs

Design Flow: 94 cfs

Maximum Flow: 106 cfs

**Table 1 - Summary of Culvert Flows at Crossing: CD-14P**

Headwater Elevation (ft)	Total Discharge (cfs)	PROP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
103.85	75.00	75.00	0.00	1
103.97	78.10	78.10	0.00	1
104.08	81.20	81.20	0.00	1
104.20	84.30	84.30	0.00	1
104.32	87.40	87.40	0.00	1
104.44	90.50	90.50	0.00	1
104.57	93.60	93.60	0.00	1
104.59	94.00	94.00	0.00	1
104.86	99.80	99.80	0.00	1
105.03	102.90	102.90	0.00	1
105.25	106.00	106.00	0.00	1
108.00	140.78	140.78	0.00	Overtopping

**Table 2 - Culvert Summary Table: PROP**

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
75.00	75.00	103.85	4.108	4.281	7-M1t	2.693	2.619	3.800	4.000	6.082	0.000
78.10	78.10	103.97	4.232	4.396	7-M1t	2.775	2.674	3.800	4.000	6.333	0.000
81.20	81.20	104.08	4.358	4.512	7-M1t	2.857	2.727	3.800	4.000	6.585	0.000
84.30	84.30	104.20	4.487	4.629	7-M1t	2.946	2.780	3.800	4.000	6.836	0.000
87.40	87.40	104.32	4.619	4.750	7-M1t	3.045	2.831	3.800	4.000	7.088	0.000
90.50	90.50	104.44	4.755	4.874	7-M1t	3.145	2.881	3.800	4.000	7.339	0.000
93.60	93.60	104.57	4.895	5.004	7-M1t	3.245	2.929	3.800	4.000	7.590	0.000
94.00	94.00	104.59	4.914	5.021	7-M1t	3.257	2.936	3.800	4.000	7.623	0.000
99.80	99.80	104.86	5.188	5.291	7-M1t	3.559	3.023	3.800	4.000	8.093	0.000
102.90	102.90	105.03	5.341	5.460	3-M2t	4.000	3.068	3.800	4.000	8.345	0.000
106.00	106.00	105.25	5.498	5.684	7-M2t	4.000	3.112	3.800	4.000	8.596	0.000

\*\*\*\*\*

Straight Culvert

Inlet Elevation (invert): 99.57 ft, Outlet Elevation (invert): 98.20 ft

Culvert Length: 372.00 ft, Culvert Slope: 0.0037

\*\*\*\*\*

**Site Data - PROP**

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 99.57 ft

Outlet Station: 372.00 ft

Outlet Elevation: 98.20 ft

Number of Barrels: 1

**Culvert Data Summary - PROP**

Barrel Shape: Circular

Barrel Diameter: 4.00 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

**Table 3 - Downstream Channel Rating Curve (Crossing: CD-14P)**

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
75.00	102.00	4.00
78.10	102.00	4.00
81.20	102.00	4.00
84.30	102.00	4.00
87.40	102.00	4.00
90.50	102.00	4.00
93.60	102.00	4.00
94.00	102.00	4.00
99.80	102.00	4.00
102.90	102.00	4.00
106.00	102.00	4.00

**Tailwater Channel Data - CD-14P**

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 102.00 ft

**Roadway Data for Crossing: CD-14P**

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 2000.00 ft

Crest Elevation: 108.00 ft

Roadway Surface: Paved

Roadway Top Width: 342.00 ft

# APPENDIX C – CORRESPONDENCE

## Sanam Rai

---

**From:** Sanam Rai  
**Sent:** Tuesday, August 05, 2014 8:35 AM  
**To:** 'Ortiz, Jose'  
**Cc:** Rivera, Efren  
**Subject:** RE: I-4 Segment 1 CrossDrain Information

Jose, thank you for the Straight Line Diagram. We do have them included in the Location Hydraulics Report.

Sanam

---

**From:** Ortiz, Jose [<mailto:Jose.Ortiz@dot.state.fl.us>]  
**Sent:** Monday, August 04, 2014 5:22 PM  
**To:** Sanam Rai  
**Cc:** Rivera, Efren  
**Subject:** RE: I-4 Segment 1 CrossDrain Information

Hi Sanam,

Please refer to the attached Straight Line Diagram of Road Inventory to identify and verify each of the cross drains within the corridor and locate milepost in your PG&E report.

If you have any questions call me.

Thanks,

**Jose M. Ortiz, PE**  
Permits Manager  
D5 - Orlando Operations Center  
Office: (407) 384-4600 & 384-4603  
Email: [jose.ortiz@dot.state.fl.us](mailto:jose.ortiz@dot.state.fl.us)



---

**From:** Sanam Rai [<mailto:sarai@HNTB.com>]  
**Sent:** Monday, August 04, 2014 2:20 PM  
**To:** Ortiz, Jose  
**Cc:** Luz Phillip  
**Subject:** I-4 Segment 1 CrossDrain Information

Jose,

Thanks for taking my call earlier regarding the I-4 segment 1 crossdrains. I understand that TME Enterprises is contracted to maintain the crossdrains along I-4. I will coordinate with them as well.

Do you know of any issues (flooding, scour, sedimentation) with any of the crossdrains along segment 1 of the I-4 PD&E project?



Thank you,

Sanam

**Sanam Rai, PE**

Project Engineer - Drainage

**HNTB Corporation**

610 Crescent Executive Court, Suite 400  
Lake Mary, FL 32746

Tel (407) 805-0355

Direct (407) 547-3025

Fax (407) 805-0227

[www.hntb.com](http://www.hntb.com)

---

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## Sanam Rai

---

**From:** Sanam Rai  
**Sent:** Tuesday, August 05, 2014 8:44 AM  
**To:** 'Jeremy Golloway'  
**Cc:** jose.ortiz@dot.state.fl.us; Luz Phillip; Efren.Rivera@dot.state.fl.us; Barry Switzer; 'Dave Jackson'  
**Subject:** RE: I-4 Segment 1 CrossDrain Information

Jeremy,

Thank you for your prompt feedback.

The project is currently in a Project Development and Environmental (PD&E) Study phase. I am not aware of the schedule for the design phase of the project.

Please visit the following website for more information regarding all segments of the I-4 PD&E project:  
<http://i4express.com/>

Thanks,

Sanam

---

**From:** Jeremy Golloway [<mailto:jeremy.golloway@tmeenterprises.com>]  
**Sent:** Monday, August 04, 2014 10:10 PM  
**To:** Sanam Rai  
**Cc:** jose.ortiz@dot.state.fl.us; Luz Phillip; Efren.Rivera@dot.state.fl.us; Barry Switzer; 'Dave Jackson'  
**Subject:** RE: I-4 Segment 1 CrossDrain Information

Sanam,

Thank you for the information you provided. To the best of my knowledge, I am not aware of any issues concerning the cross drains you referenced. When is this project slated to start ? Please let me know if you need any additional information. Thanks.

**Jeremy Golloway**  
**Regional Operations Manager - Florida**  
**Office – (407) 730-2232**  
**Cell – (407) 625-8812**  
**Fax – (407) 704-7642**  
**Email – [Jeremy.golloway@tmeenterprises.com](mailto:Jeremy.golloway@tmeenterprises.com)**

**TME ENTERPRISES**  
INCORPORATED  
RIGHT OF WAY MAINTENANCE

---

**From:** Sanam Rai [<mailto:sarai@HNTB.com>]  
**Sent:** Monday, August 04, 2014 2:53 PM  
**To:** 'jeremy.golloway@tmeenterprises.com'  
**Cc:** [jose.ortiz@dot.state.fl.us](mailto:jose.ortiz@dot.state.fl.us); Luz Phillip; [Efren.Rivera@dot.state.fl.us](mailto:Efren.Rivera@dot.state.fl.us); Barry Switzer  
**Subject:** I-4 Segment 1 CrossDrain Information

Jeremy,

I am sending you this email regarding the I-4 PD&E segment 1 (from west of CR 532 to west of SR 528) cross drains. I have included a project location map for reference.

I contacted Jose Ortiz at the FDOT maintenance office. He mentioned that TME Enterprises is contracted to maintain the cross drains along I-4 and you are the person of contact.

I am coordinating with you to find out any issues (flooding, scour, sedimentation) with the cross drains along segment 1 of the I-4 PD&E project. There are a total of 15 cross drains we have identified within the segment. I have included the draft Location Hydraulics Report (LHR) for your reference. It includes the existing cross drain information (culvert size, culvert type, culvert length).

Please feel free to call me if you like.

Thank you,

Sanam

**Sanam Rai, PE**  
Project Engineer - Drainage

**HNTB Corporation**  
610 Crescent Executive Court, Suite 400  
Lake Mary, FL 32746

Tel (407) 805-0355  
Direct (407) 547-3025  
Fax (407) 805-0227  
[www.hntb.com](http://www.hntb.com)

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APPENDIX D –  
BACK-UP PERMIT DOCUMENTATION

CO-1

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
CONTRACT PLANS

FINANCIAL PROJECT ID 201204-1-52-01  
(FEDERAL FUNDS)  
POLK COUNTY (16180)  
STATE ROAD NO. 400 (1-4)  
SEGMENT 7  
COMPONENT PLAN SET NO. 13

LATENT  
DEFICIENCY  
CORRECTIONS

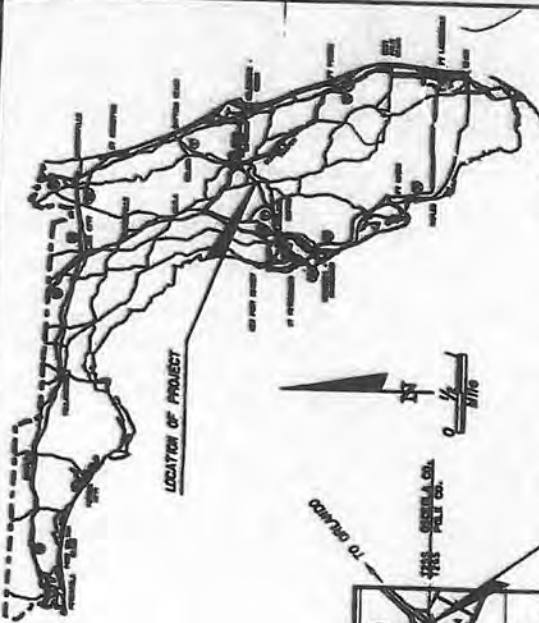
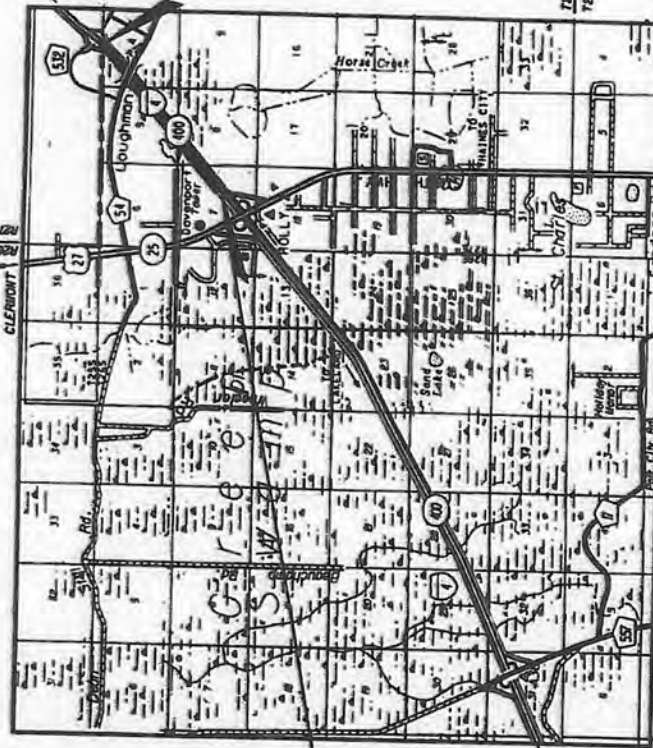
COMPONENTS OF CONTRACT PLANS SET  
ROADWAY PLANS  
STRUCTURE PLANS  
SIGNING AND PAVEMENT MARKING PLANS

INDEX OF ROADWAY PLANS

- SHEET NO. SHEET DESCRIPTION
- 1 KEY SHEET
- 2-4 TYPICAL SECTIONS
- 5 GENERAL NOTES
- 6-16 ROADWAY PLAN SHEETS
- 17-22 ROADWAY PROFILE SHEETS
- 23-35 DRAINAGE STRUCTURES
- 36-37 GRAVITY WALL
- 37A FOND DETAIL SHEETS
- 38 CROSS SECTION PATTERN SHEET
- 39 CROSS SECTIONS
- 40-180 ROADWAY SOILS SURVEY
- 121 TRAFFIC CONTROL PLANS
- 122-129 UTILITY ADJUSTMENTS
- 130-132

RECEIVED  
JAN 2 2004

Per.....



END SEGMENT 7  
PROJECT FPI 201204-1  
SURVEY SR 400 (1-4)  
STA. 250+00.05  
MP 31.581

DESIGNED BY RECORD  
**J Jacobs Civil Inc.**  
10000 N. W. 11th Ave.  
Miami, FL 33150  
TEL: 305-553-1100  
FAX: 305-553-1101

NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO MODIFICATION.

INSPECTION CONDUCTED BY DISTRICT

INSPECTION NOT CONDUCTED BY DISTRICT  
MIGHT BE REQUIRED FOR FUTURE INSPECTION

ASBUILT FILE OF RECORD  
4301896-027

DATE	REVISIONS

ROADWAY	LINEAR FEET	MILES
ROADWAY	10,908.00	2.066
BRIDGES	0.00	0.000
NET LENGTH OF PROJECT	10,908.00	2.066
EXCEPTIONS	0.00	0.000
GROSS LENGTH OF PROJECT	10,908.00	2.066

FOR THIS PLAN BY DISTRICT 4 PROJECT PLAN NO. 101  
DATE 1/21/04  
BY: [Signature]  
TITLE: [Title]  
PROJECT: [Project Name]

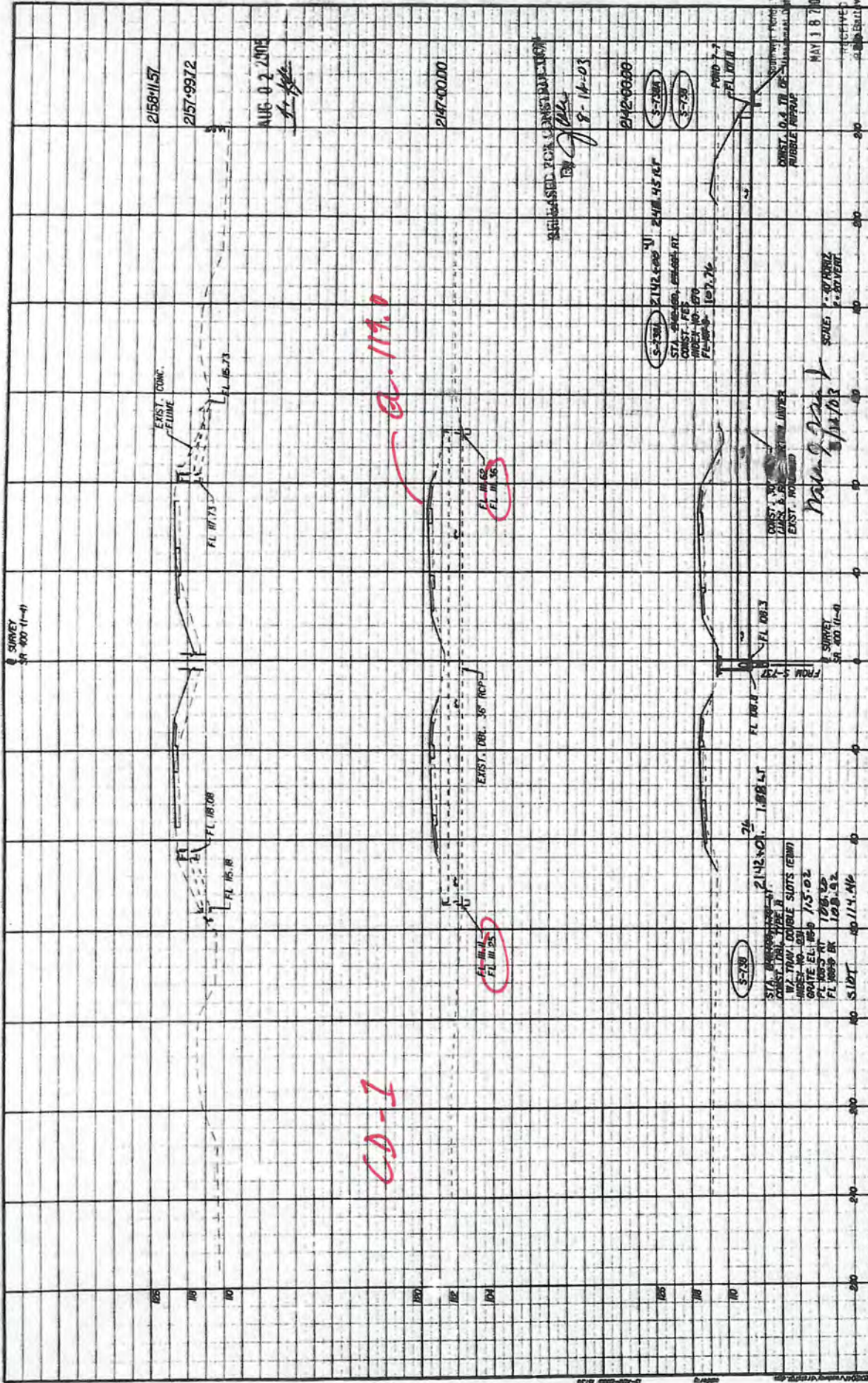
FOR THIS PLAN BY DISTRICT 4 PROJECT PLAN NO. 101  
DATE 1/21/04  
BY: [Signature]  
TITLE: [Title]  
PROJECT: [Project Name]

FOOT PROJECT MANAGER: AMY SHAFER, P.E.

FISCAL YEAR	02
SHEET NO.	0
TOTAL SHEETS	214

8 2006

DESIGNED BY RECORD: WILLIAM J. NEW, P.E.  
DATE: 1/20/04  
PROJECT: POLK COUNTY STATE ROAD 400



21581157

2157-9972

AUG 02 2016

2147-00100

RELEASED FOR CONSTRUCTION  
BY [Signature]  
8-14-16

2142-66660

S-730  
S-730

MAY 18 2016

SHEET NO. 32

DRAINAGE STRUCTURE SHEET ( 10 )

I-1

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
ROAD NO. SR 400  
COUNTY POLK  
PROJECT NO. 201204-1

JE Jacobs Civil Inc.  
1000 Highway 170, Suite 200  
Winter Park, FL 32789  
Professional Engineer  
No. 121597-304  
Exp. 12/31/16

DATE	BY	REVISIONS	DESCRIPTION

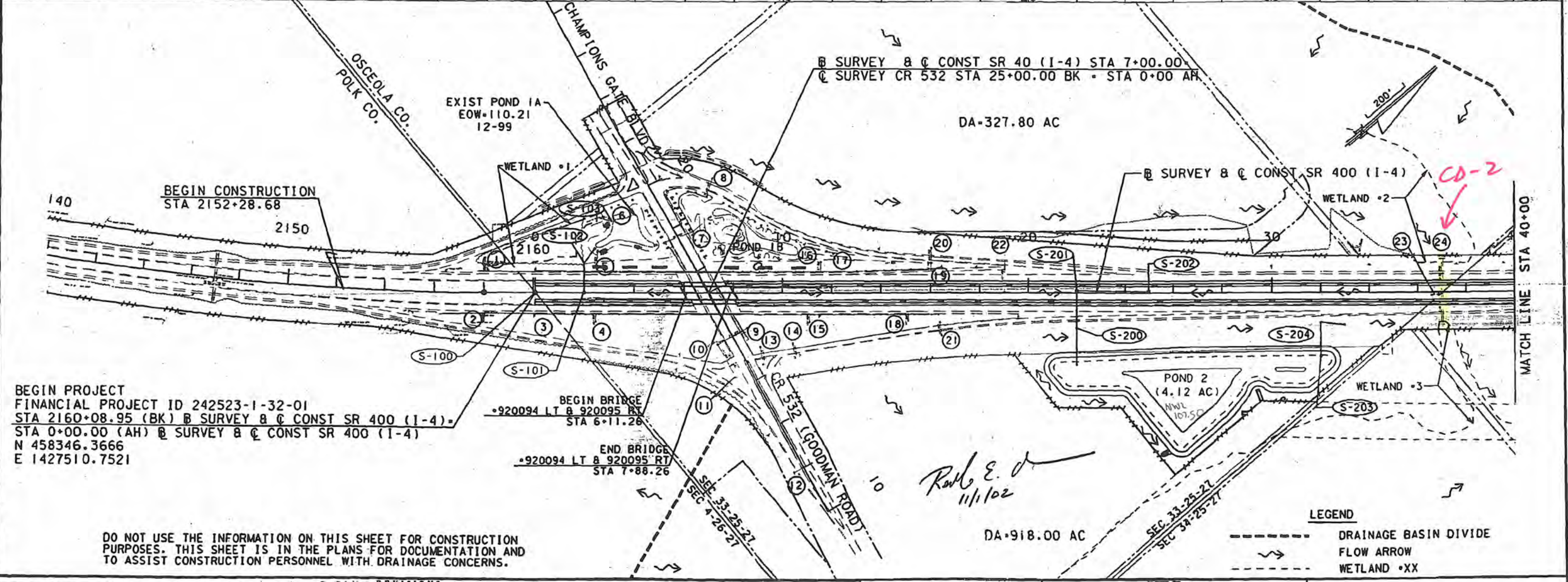
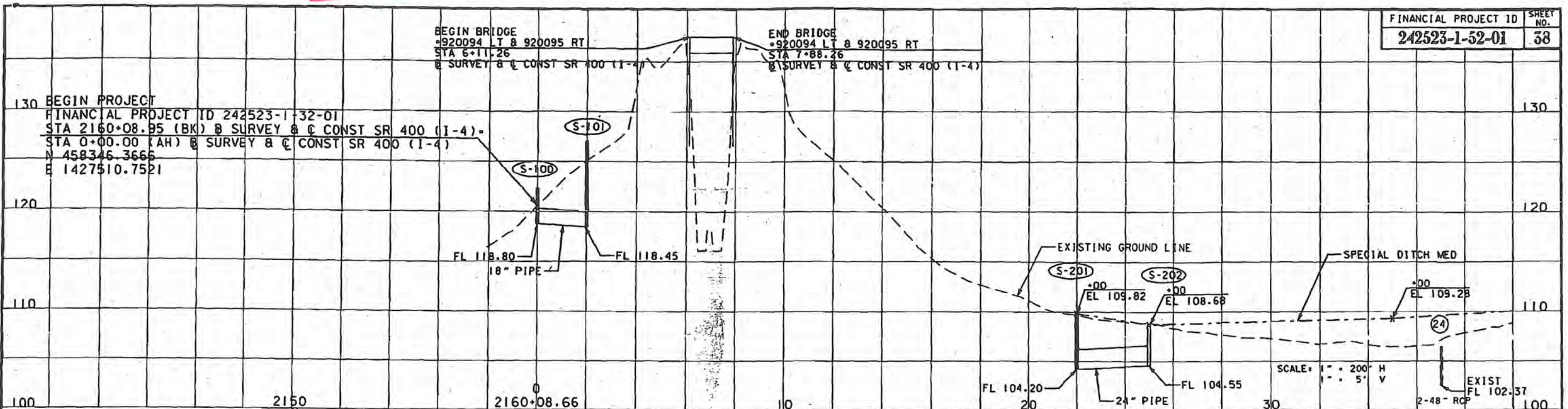
CD-1

119.1

Handwritten notes and signatures in the lower right quadrant of the drawing.

CD-2

FINANCIAL PROJECT ID 242523-1-52-01 SHEET NO. 38



BEGIN PROJECT  
 FINANCIAL PROJECT ID 242523-1-32-01  
 STA 2160+08.95 (BK) @ SURVEY & CONST SR 400 (1-4)  
 STA 0+00.00 (AH) @ SURVEY & CONST SR 400 (1-4)  
 N 458346.3666  
 E 1427510.7521

BEGIN BRIDGE  
 +920094 LT & 920095 RT  
 STA 6+11.26

END BRIDGE  
 +920094 LT & 920095 RT  
 STA 7+88.26

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.

LEGEND  
 - - - DRAINAGE BASIN DIVIDE  
 → FLOW ARROW  
 \*X WETLAND

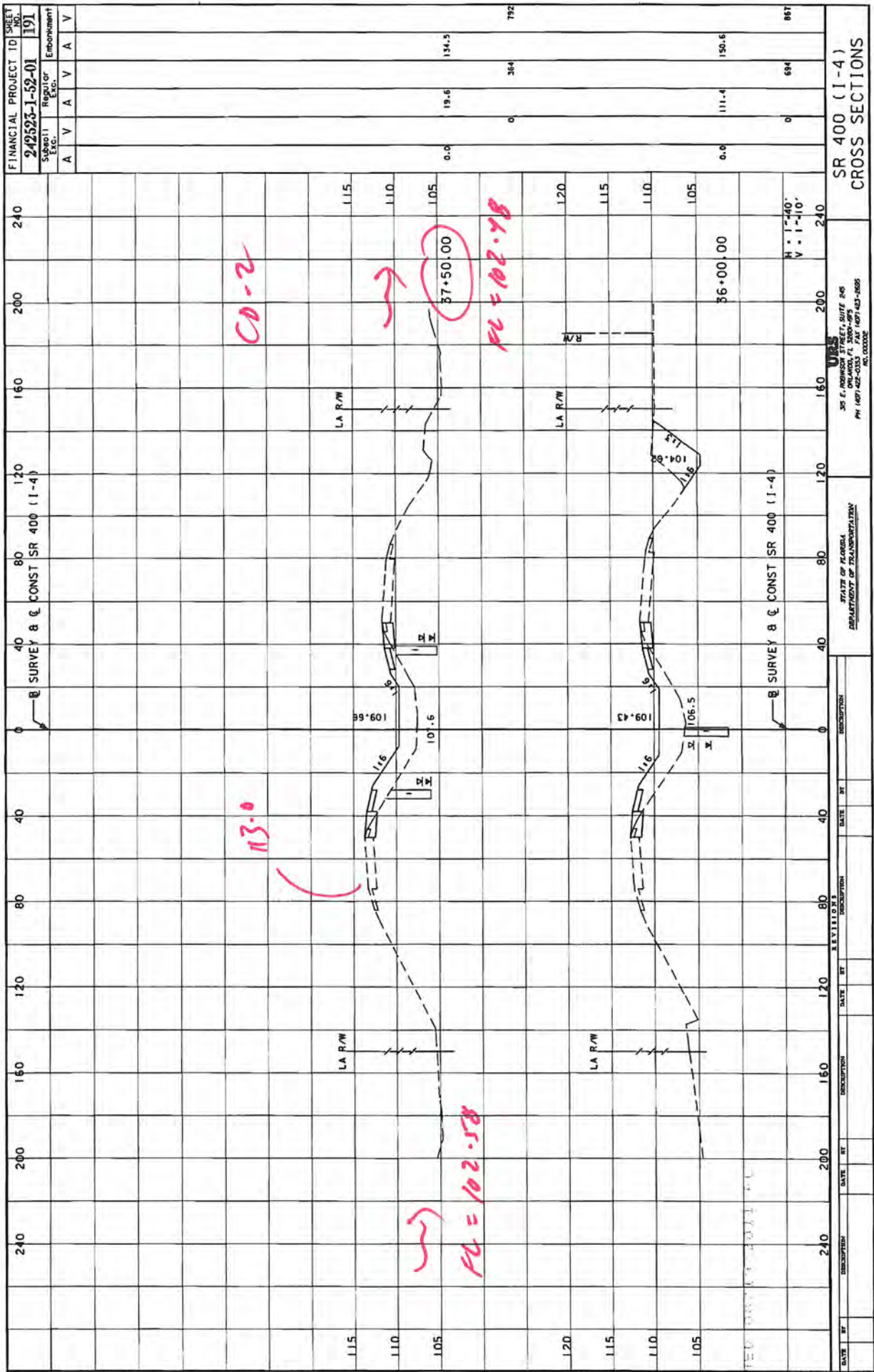
REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

URS  
 315 E. ROBINSON STREET, SUITE 245  
 ORLANDO, FL 32801-1975  
 PH (407) 422-0353 - FAX (407) 423-2695  
 NO. 000002

DRAINAGE MAP

JULY 29, 1999  
 H:\V1026403\DRAIN\DRMAPR1...JCN



DATE	DESCRIPTION	DATE	DESCRIPTION	DATE	DESCRIPTION	DATE	DESCRIPTION

SR 400 (I-4)  
CROSS SECTIONS

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

305 E. ROBINSON STREET, SUITE 245  
TALLAHASSEE, FL 32304-3000  
PH 904-437-2400 FAX 904-437-2408  
WWW.FDOT.COM

FINANCIAL PROJECT ID SHEET NO.  
242523-1-52-01 191  
Subcontractor: Regular Exc. Enrichment  
A V A V A V A V  
0.0 19.6 0.0 111.4 150.5  
0.0 384 792  
0.0 694 867

REVISED: 10/21/11  
DATE: 10/21/11  
DRAWN BY: J. J. JONES  
CHECKED BY: J. J. JONES  
SCALE: 1" = 40'  
VERTICAL SCALE: 1" = 10'



STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
FINAL "AS-BUILT" PLANS  
CONTRACT PLANS

FINANCIAL PROJECT ID 242523-1-52-01  
(FEDERAL FUNDS)  
OSCEOLA COUNTY (92130)  
STATE ROAD NO. 400

- COMPONENTS OF CONTRACT PLANS SET:
- ROADWAY PLANS
  - SCAFFOLDING AND PAVEMENT MARKING PLANS
  - ALIGNMENT PLANS
  - STRUCTURE PLANS
  - CHANGING PLANS

A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT

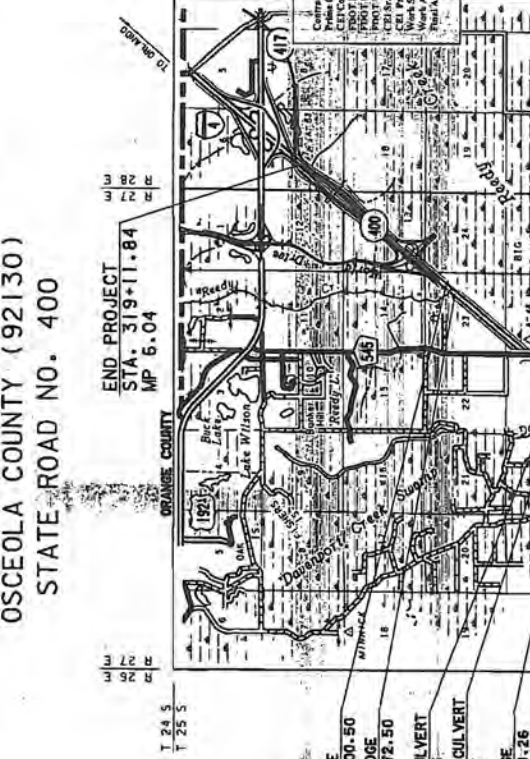
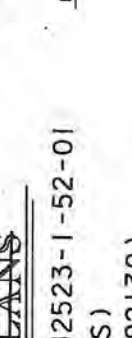
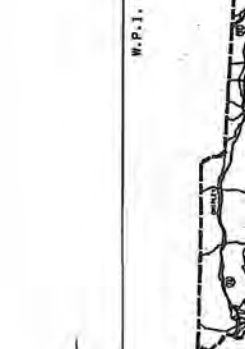
INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2-30	SUMMARY OF PLAN ITEMS
3-29	BOX-CULVERT DATA SHEETS
30-32	RECORD OF BORINGS FOR STRUCTURES
36-44	DRAINAGE MAP
45-46	EXISTING DRAINAGE STRUCTURES
47-51	TYPICAL SECTIONS
52	GENERAL NOTES AND PAY ITEM NOTES
53-54	SUMMARY OF BRIDGES
55-63	SUMMARY OF DRAINAGE STRUCTURES
64-66	OPTIONAL PIPE MATERIAL TABULATIONS
67-68	REFERENCE TABLES
69-89	ROADWAY PLANS
90-106	ROADWAY PROFILES
107-118	SPECIAL UTILITY PROFILES
119-125	RAMP TYPICAL DETAILS
126-130	POND DETAILS
131-132	TYPICAL DRAINAGE STRUCTURES
133	RAINAGE DETAILS
134-180	DRAINAGE STRUCTURE CROSS SECTIONS
181-183	POND OUT-ALL PLAN / PROFILE
184	ROADWAY ALIGNMENT
185-326	CROSS SECTIONS
327-372	POND CROSS SECTIONS
373	GENERAL PAVING NOTES
374-328	PAVING SCHEDULE
329-413	CORNER NUMBER SOLUTION PLAN NOTES
414-438	STRUCTURE CONSTRUCTION NOTES

GOVERNING STANDARDS AND SPECIFICATIONS:  
FLORIDA DEPARTMENT OF TRANSPORTATION,  
DESIGN STANDARDS DATED JANUARY 2002 AND  
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE  
AS AMENDED BY CONTRACT DOCUMENTS.

REVISONS

- FINANCIAL PROJECT ID 242523-1-52-01
- ROADWAY SHEETS 1, 2, 2A, B, 2B (REVISED 12-16-02)
- ROADWAY SHEETS B 2A (REVISED 3-1-03)
- SCAFFOLDING AND PAVEMENT MARKING SHEETS 5-3-8-9 (REVISED 4-23-04)
- PAVING AND PAVEMENT MARKING SHEETS 5-4-8-9 (REVISED 4-23-04)
- STRUCTURE SHEETS 81-84-88-89-91-94-96 (REVISED 6-28-04)
- ROADWAY SHEETS 1-47-48-49-53-54-57-THRU 95-189 THRU 231-233-THRU 259, 261 THRU 326 AND 372 (REVISED 2-12-04)
- ROADWAY SHEETS 54A-88-89-70-71-73-79-80-83-84 (REVISED 4-28-05)
- ALIGNMENT AND PAVEMENT MARKING SHEETS 5-3-8-9 (REVISED 12-16-02)
- SCAFFOLDING AND PAVEMENT MARKING SHEETS 5-4-8-9 (REVISED 4-23-04)



15000  
Ranger Construction Inc., Inc.  
H.W. Johnson, Inc.  
J.S. Anderson, Inc.  
J.M. Bledsoe, Inc.  
L.R. Bledsoe, Inc.  
L.M. Bledsoe, Inc.  
L.N. Bledsoe, Inc.  
L.O. Bledsoe, Inc.  
L.P. Bledsoe, Inc.  
L.Q. Bledsoe, Inc.  
L.R. Bledsoe, Inc.  
L.S. Bledsoe, Inc.  
L.T. Bledsoe, Inc.  
L.U. Bledsoe, Inc.  
L.V. Bledsoe, Inc.  
L.W. Bledsoe, Inc.  
L.X. Bledsoe, Inc.  
L.Y. Bledsoe, Inc.  
L.Z. Bledsoe, Inc.

ROADWAY SHOP DRAWINGS TO BE SUBMITTED TO:  
**URS**  
STEPHEN N. HOPPINGER, P.E.  
315 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-1949  
(407)422-0353  
(407)423-2895 (FAX)

PLANS PREPARED BY:  
**URS**  
315 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-1949  
(407)422-0353  
VENDOR NO. 53-2087895

NOTE: THIS PROJECT TO BE LET TO CONTRACT WITH FINANCIAL PROJECT ID 403497-5-52-01  
NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.  
APPROVED BY: [Signature] 8/18/05  
STEPHEN M. APPLINGER, P.E.  
P.E. NO. 33020

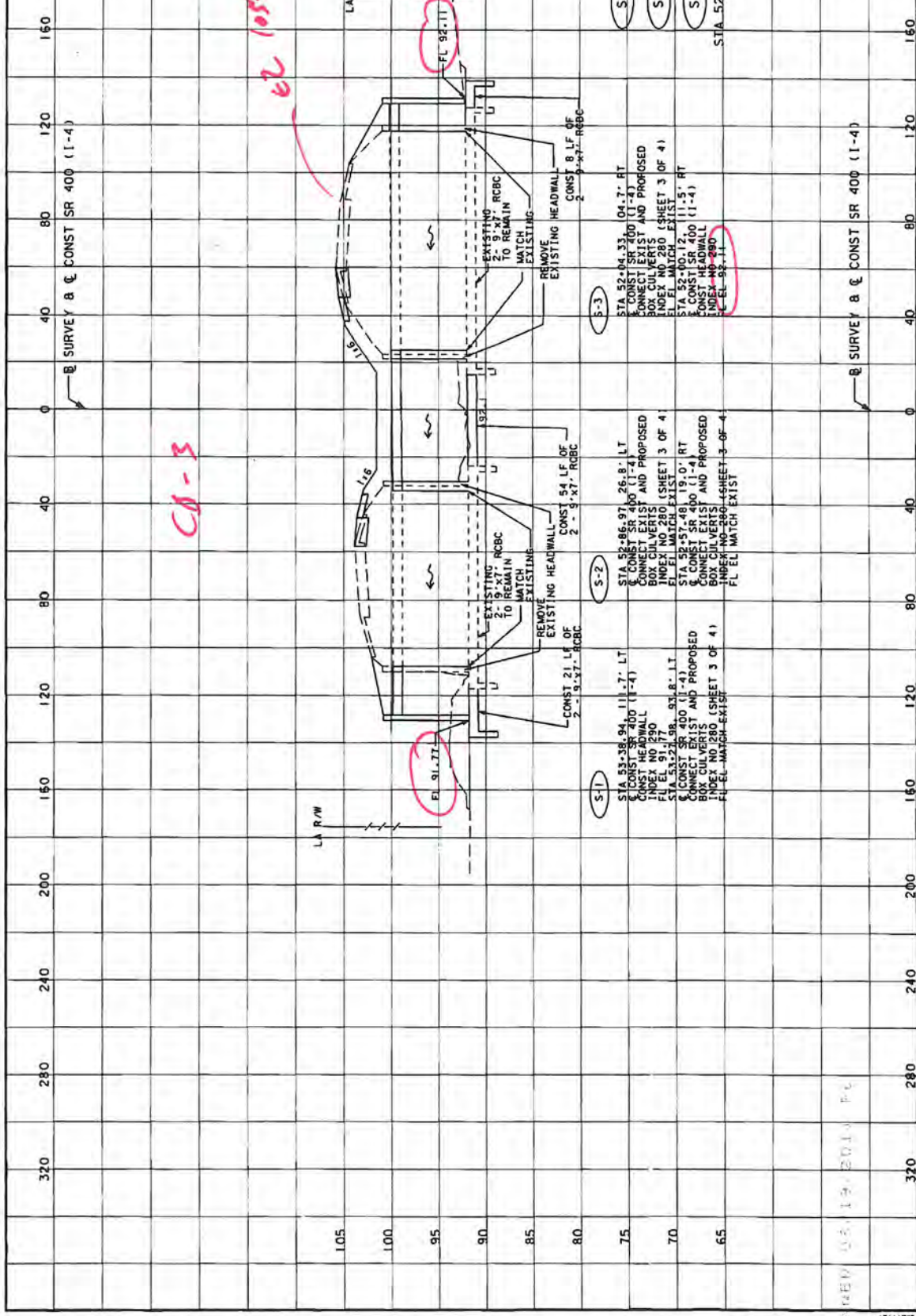
BEGIN PROJECT	FINANCIAL PROJECT ID	STA.	END PROJECT
MP-0+00.00	242523-1-52-01	0+00.00	11+84.04
	(BK) B. SURVEY 8 & C. CONST. SR. 400 (1-4)		

LENGTH OF PROJECT	LINEAR FT.	MILES
ROADWAY	311,506.84	5.967
BRIDGES	405.08	0.017
NET LENGTH OF PROJ.	311,911.92	6.084
EXCEPTIONS	0.000	0.000
GROSS LENGTH OF PROJ.	311,911.92	6.084

KEY SHEET REVISIONS

NO.	DATE	DESCRIPTION
1	8/18/05	ISSUED FOR BIDDING
2	8/18/05	ISSUED FOR BIDDING
3	8/18/05	ISSUED FOR BIDDING
4	8/18/05	ISSUED FOR BIDDING
5	8/18/05	ISSUED FOR BIDDING

FDOT PROJECT MANAGER : MR. ALAN LEDGERWOOD



**S-1**  
 STA 53-38.94, 111.7, LT  
 CONST SR 400 (I-4)  
 BOX CULVERTS AND PROPOSED  
 INDEX NO 280  
 FL EL 91.77

**S-2**  
 STA 52-86.97, 26.8, LT  
 CONST SR 400 (I-4)  
 BOX CULVERTS AND PROPOSED  
 INDEX NO 280 (SHEET 3 OF 4)  
 FL EL MATCH EXIST

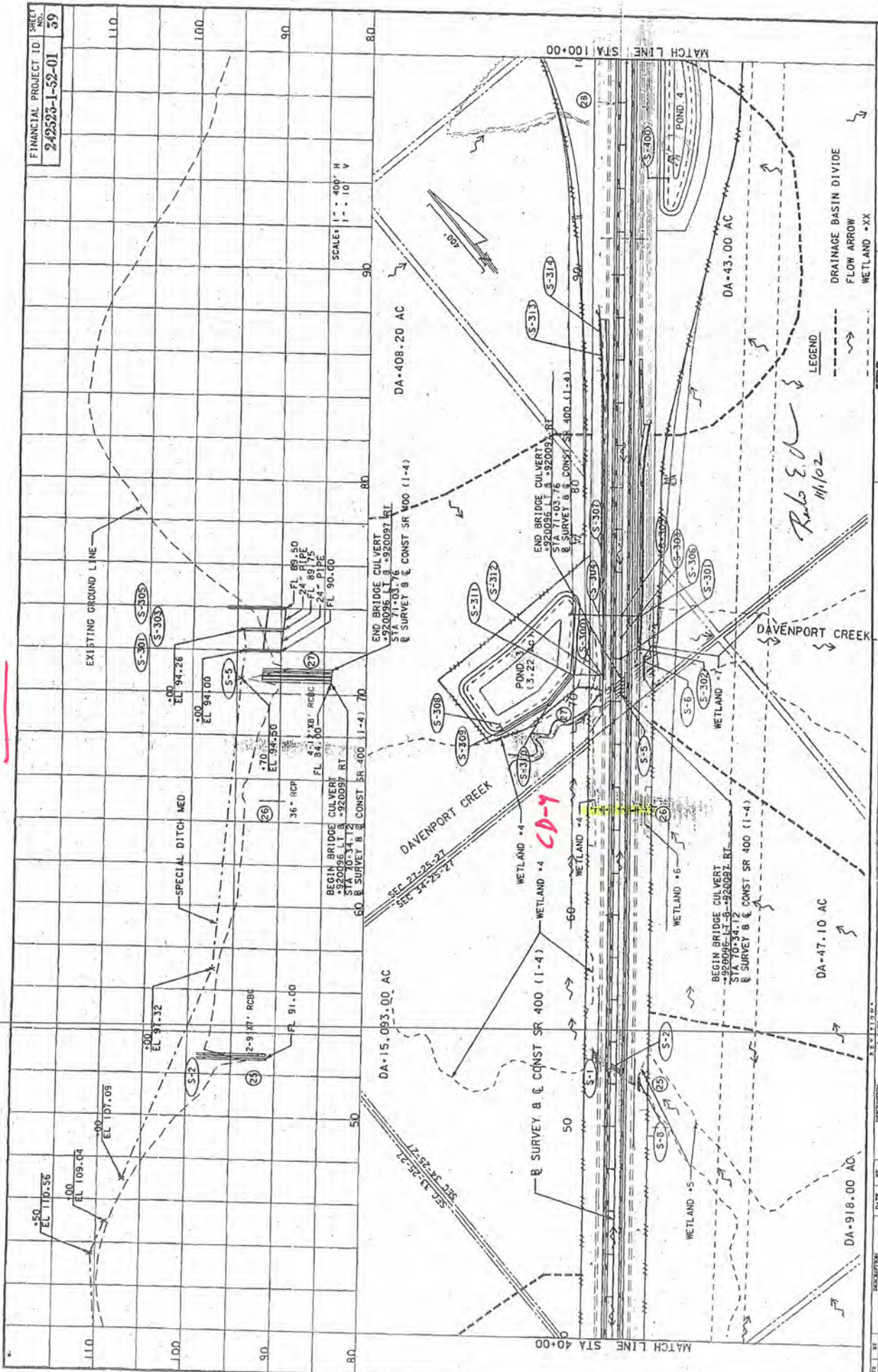
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 CONST SR 400 (I-4)  
 BOX CULVERTS AND PROPOSED  
 INDEX NO 280 (SHEET 3 OF 4)  
 FL EL MATCH EXIST

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

<b>STATE OF FLORIDA</b> <b>DEPARTMENT OF TRANSPORTATION</b>	<b>SR 400 (I-4)</b> <b>DRAINAGE STRUCTURE</b> <b>CROSS SECTIONS</b>
350 E. BRADFORD AVENUE, SUITE 240 ORLANDO, FL 32807-3500 PH (407) 422-0355 FAX (407) 422-2995 REL CODES	

FINANCIAL PROJECT ID  
 242523-1-52-01  
 SHEET NO.  
 59

*CD-4*



DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

STATES OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION  
 35 S. HOUSTON STREET, SUITE 245  
 ORLANDO, FL 32801-2700  
 PH: (407) 421-5500 FAX: (407) 421-3066  
 NO. 10000000

DRAINAGE MAP

240 200 160 120 80 40 0 40 80 120 160 200 240

SURVEY & C CONST SR 400 (1-4)

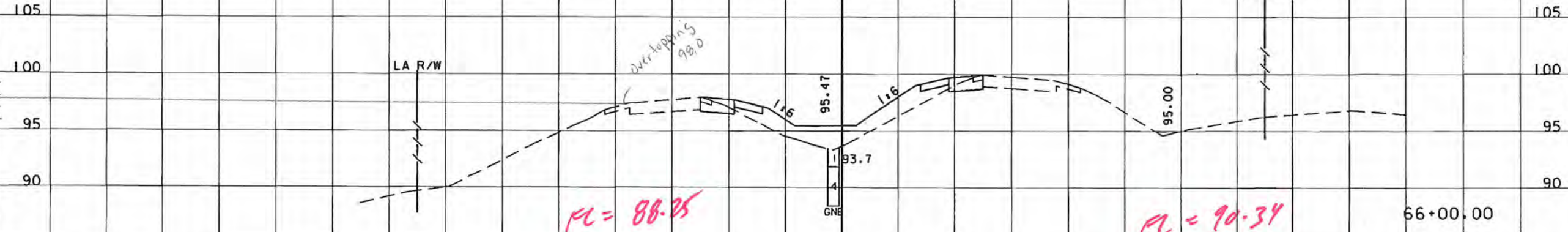
FINANCIAL PROJECT ID SHEET NO.

242523-1-52-01 203

Subsoil Exc. Regular Exc. Embankment

A V A V A V

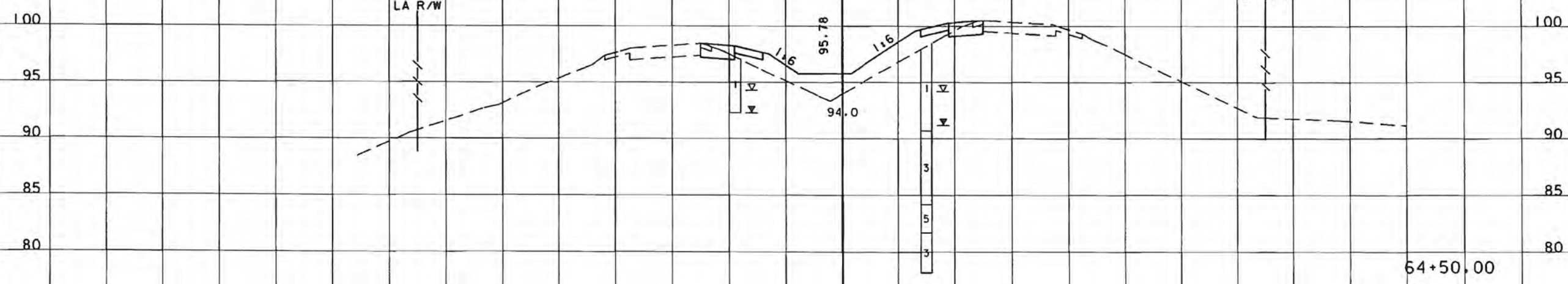
CD-4



PL = 90.34

66+00.00

0.0	21.0	103.1
-----	------	-------



64+50.00

0.0	20.9	107.7
-----	------	-------

0	118	625
---	-----	-----

H = 1"=40'  
V = 1"=10'

SURVEY & C CONST SR 400 (1-4)

240 200 160 120 80 40 0 40 80 120 160 200 240

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

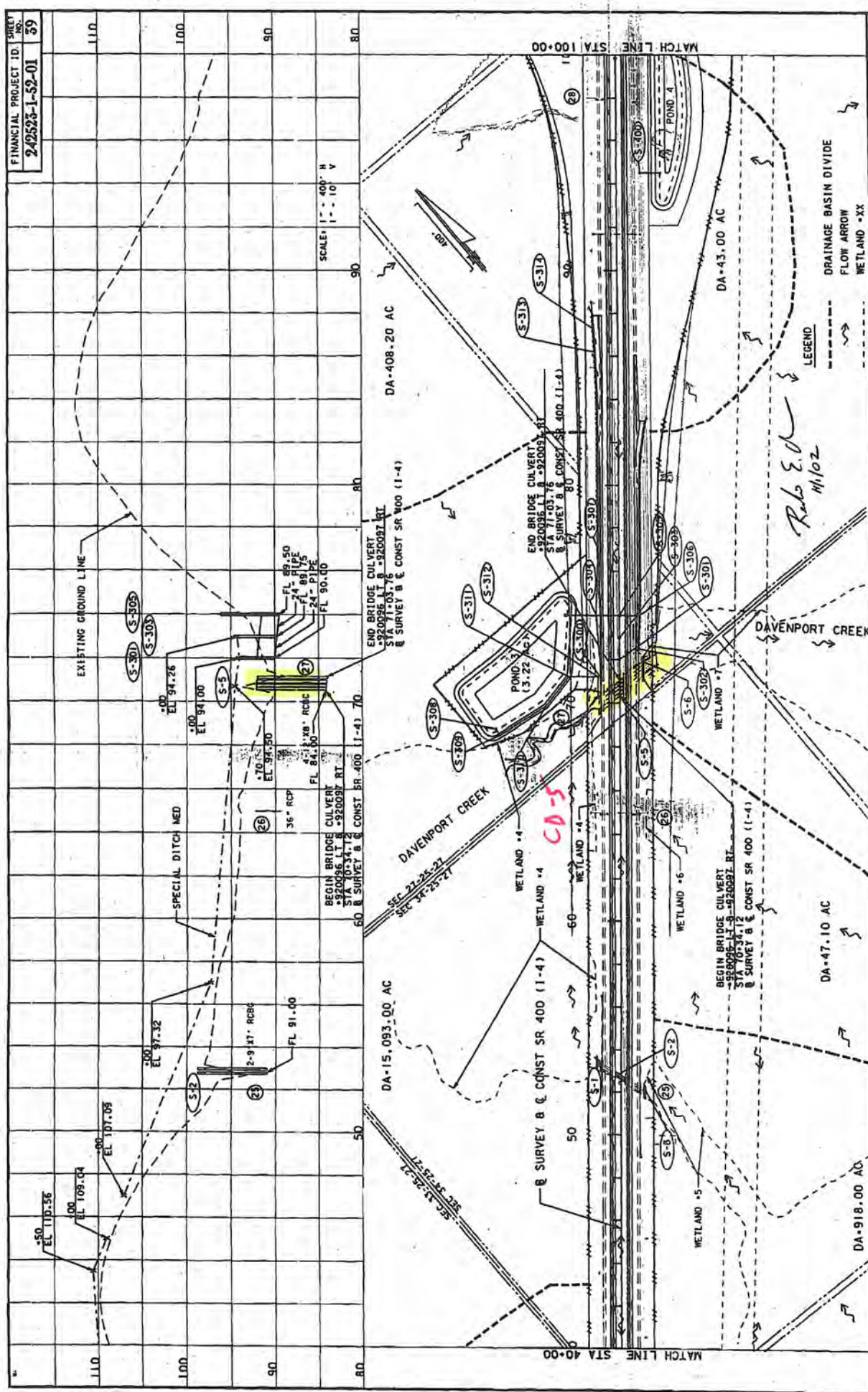
STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

URS  
315 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-1975  
PH (407) 422-0353 FAX (407) 423-2695  
NO. 000002

SR 400 (1-4)  
CROSS SECTIONS

Mon Oct 29 10:30:33  
H:\1026403\XSECT\01\01.dgn  
SAWD\_NTI\_SPOOL\_VL012\p01x0271.prf  
F:\TABLE\1\rdmet.tbl

FINANCIAL PROJECT ID: **242523-1-52-01**  
 SHEET NO: **59**



**LEGEND**

- DRAINAGE BASIN DIVIDE
- FLOW ARROW
- WETLAND \*XX

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]

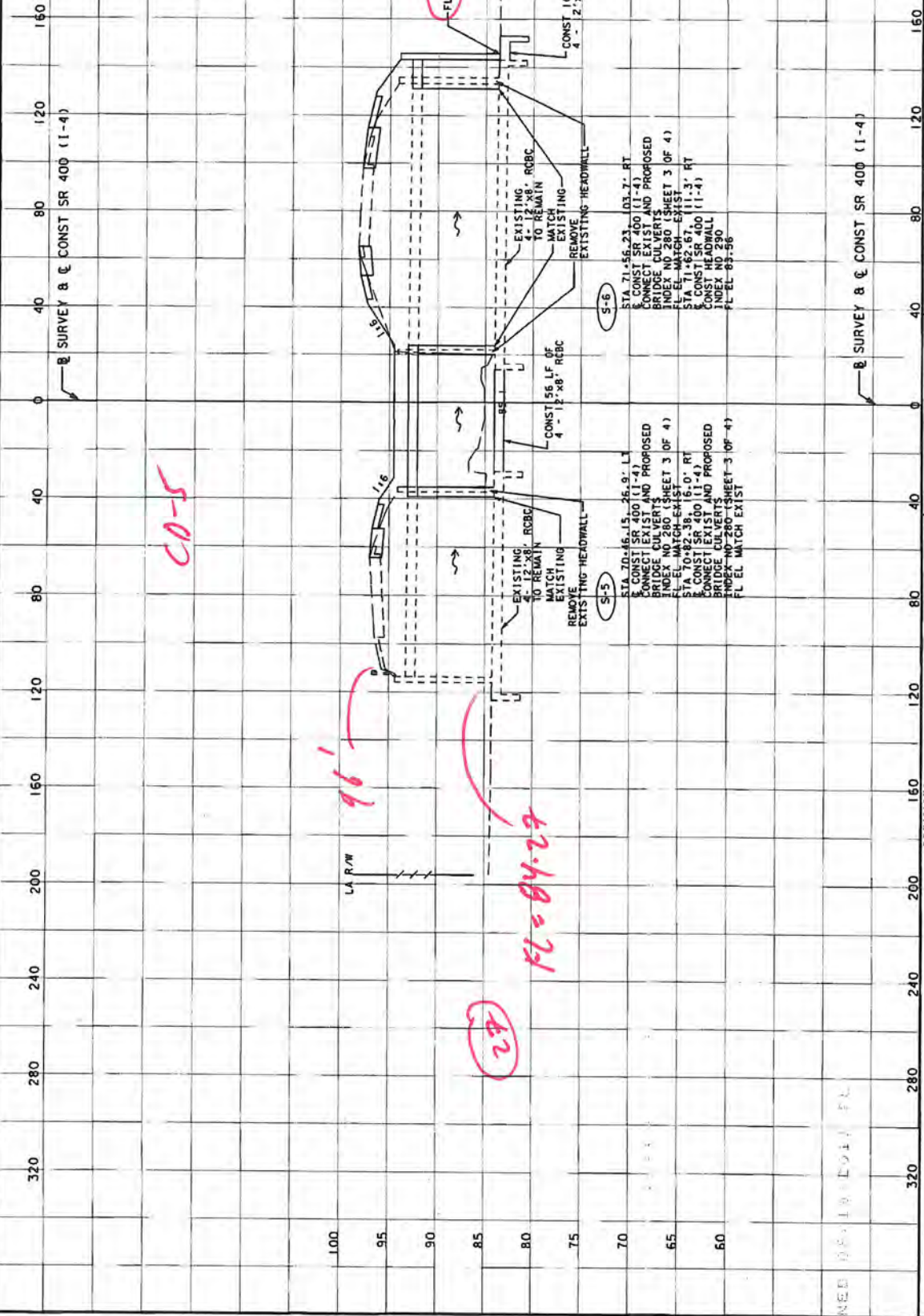
STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE: [ ] [ ] [ ]  
 DRAWN BY: [ ] [ ] [ ]  
 CHECKED BY: [ ] [ ] [ ]  
 DATE: [ ] [ ] [ ]





CO-5

96'

FL = 84.27

72

SR 400 (1-4)  
 DRAINAGE STRUCTURE  
 CROSS SECTIONS

30 E. ROBINSON STREET, SUITE 400  
 PH: (407) 622-0033 FAX: (407) 622-8895  
 WWW.CADDUCEUS.COM

STATE OF FLORIDA  
 DEPARTMENT OF TRANSPORTATION

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

H: 1" = 40'  
 V: 1" = 10'









1	18" RCP N FL 114.75 S FL 117.19 INLET GRATE EL 121.05	17	18" RCP N FL 110.13 S FL 112.27 INLET GRATE EL 121.05	34	18" RCP N FL 109.86 S FL 112.91 INLET GRATE EL 132.10	51	24" RCP N FL 109.86 S FL 112.91 INLET GRATE EL 132.10	68	18" RCP N FL 109.86 S FL 112.91 INLET GRATE EL 132.10	85	18" RCP N FL 109.86 S FL 112.91 INLET GRATE EL 132.10
2	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37	18	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37	35	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37	52	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37	69	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37	86	18" RCP N FL 114.84 S FL 116.84 INLET GRATE EL 121.37
3	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55	19	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55	36	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55	53	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55	70	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55	87	18" RCP N FL 116.10 S FL 118.10 INLET GRATE EL 121.55
4	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05	20	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05	37	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05	54	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05	71	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05	88	18" RCP N FL 119.32 S FL 121.32 INLET GRATE EL 132.05
5	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10	21	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10	38	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10	55	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10	72	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10	89	18" RCP N FL 110.28 S FL 120.24 INLET GRATE EL 132.10
6	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95	22	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95	39	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95	56	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95	73	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95	90	24" RCP N FL 110.55 S FL 112.55 INLET GRATE EL 132.95
7	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95	23	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95	40	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95	57	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95	74	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95	91	18" RCP N FL 109.48 S FL 111.99 INLET GRATE EL 132.95
8	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61	24	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61	41	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61	58	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61	75	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61	92	24" RCP N FL 112.85 S FL 114.85 INLET GRATE EL 132.61
9	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45	25	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45	42	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45	59	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45	76	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45	93	24" RCP N FL 110.95 S FL 112.95 INLET GRATE EL 133.45
10	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22	26	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22	43	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22	60	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22	77	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22	94	18" RCP N FL 110.53 S FL 112.53 INLET GRATE EL 131.22
11	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22	27	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22	44	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22	61	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22	78	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22	95	18" RCP N FL 111.20 S FL 113.20 INLET GRATE EL 131.22
12	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22	28	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22	45	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22	62	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22	79	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22	96	18" RCP N FL 127.77 S FL 127.45 INLET GRATE EL 131.22
13	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12	29	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12	46	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12	63	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12	80	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12	97	18" RCP N FL 114.53 S FL 116.53 INLET GRATE EL 118.12
14	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12	30	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12	47	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12	64	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12	81	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12	98	18" RCP N FL 114.72 S FL 116.72 INLET GRATE EL 118.12
15	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07	31	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07	48	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07	65	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07	82	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07	99	18" RCP N FL 129.18 S FL 129.22 INLET GRATE EL 133.07
16	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00	32	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00	49	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00	66	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00	83	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00	100	18" RCP N FL 128.25 S FL 130.89 INLET GRATE EL 132.00

60-7

Rob E. H  
4/11/02

EXISTING DRAINAGE STRUCTURES

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

DATE: 4/11/02  
DRAWN BY: [blank]  
CHECKED BY: [blank]  
APPROVED BY: [blank]

PROJECT: [blank]  
SHEET NO: [blank]

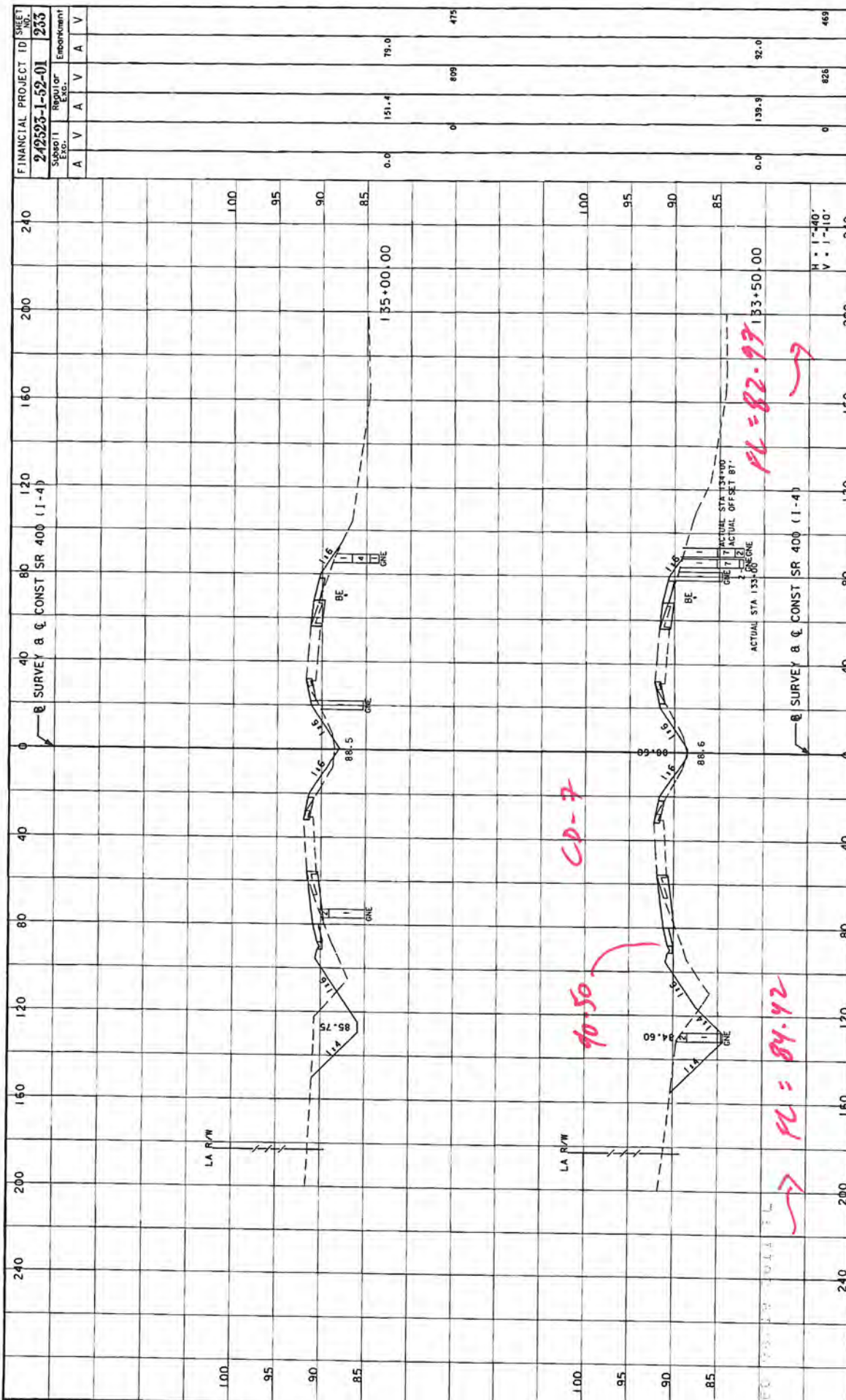
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DATE: [blank]

DATE: [blank]

DATE: [blank]

DATE: [blank]



DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

FINANCIAL PROJECT ID		SHEET NO.	
242523-1-52-01		233	
STATUS		REVISION	
EXD	BY	NO.	DATE
A	V	A	V
V	A	V	A
A	V	A	V
V	A	V	A

STATION	ELEVATION	REMARKS
0.0	151.4	79.0
0	0	809
0.0	138.9	92.0
0	0	826
0.0	0	475

DATE	BY	DESCRIPTION

DATE	BY	DESCRIPTION

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

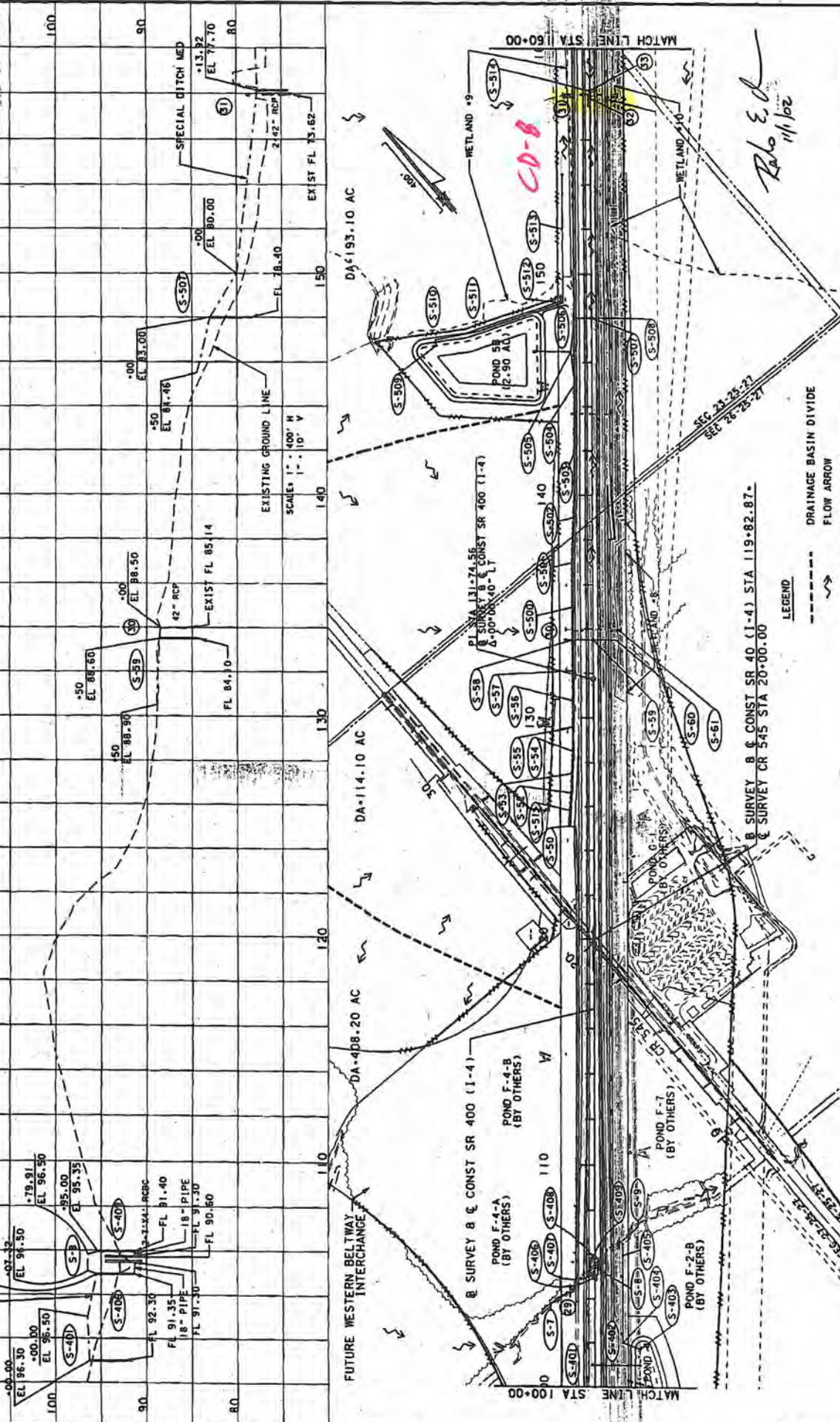
SR 400 (1-4)  
CROSS SECTIONS

305 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-9955  
PH 407-421-3000 FAX 407-421-3000

CD-8

FINANCIAL PROJECT ID  
242523-1-52-01

SHEET NO.	DATE	DESCRIPTION	BY	DATE	DESCRIPTION	BY	DATE	DESCRIPTION	BY
40									



**LEGEND**

- DRAINAGE BASIN DIVIDE
- FLOW ARROW
- WETLAND -XX

**UNIVERSITY OF ALABAMA**  
 DEPARTMENT OF TRANSPORTATION  
 356 S. UNIVERSITY BLVD., TUSCALOOSA, AL 35689-5971  
 PH 205-887-4200 FAX 205-887-4209

**DRAINAGE MAP**





CD-9

1734  
96



PLANS OF PROPOSED  
**WORLD DRIVE EXTENSION / I-4 INTERCHANGE**  
 STATE PROJECT NO. 92130-1426  
 CONSTRUCTION PACKAGE NO. 3  
 PROJECT NUMBER 3A  
 OSCEOLA COUNTY, FLORIDA

PREPARED FOR:  
 DISNEY DEVELOPMENT COMPANY



THIS CONTRACT PLAN SET INCLUDES:  
 ROADWAY PLANS  
 GRADING & MARKING PLANS  
 LIGHTING PLANS  
 STRUCTURAL PLANS

A DETAILED INDEX APPEARS ON THE KEY SHEET  
 OF EACH COMPONENT SET OF PLANS

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	SUMMARY OF PAY ITEMS
3	BOX CULVERT DATA SHEETS
4	SUPPLEMENTAL TO THE INDEX MAP
5	SECTIONAL DETAILS
6	SUMMARY OF QUANTITIES
7	SUMMARY OF STRUCTURES
8	PROJECT LAYOUT
9	REFERENCE TIES
10	PROFILES
11	INTERCHANGE LAYOUT
12	CURVE ORIGINAL DETAILS
13	TYPICAL ORNAMENT STRUCTURES
14	POND PLANS
15	SECTIONAL SHEETS
16	CROSS SECTION PATTERN SHEET
17	SOIL BORING LOCATION PLAN
18	STANDARD SPECIFICATIONS
19	STANDARD SPECIFICATIONS
20	STANDARD SPECIFICATIONS
21	STANDARD SPECIFICATIONS
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92	STANDARD SPECIFICATIONS
93	STANDARD SPECIFICATIONS
94	STANDARD SPECIFICATIONS
95	STANDARD SPECIFICATIONS
96	STANDARD SPECIFICATIONS

ISSUED FOR  
 CONSTRUCTION  
 3/11/96

THESE PLANS HAVE BEEN PREPARED  
 IN ACCORDANCE WITH THE SPECIFICATIONS  
 OF THE FLORIDA DEPARTMENT OF TRANSPORTATION  
 STANDARD SPECIFICATIONS FOR HIGHWAY  
 CONSTRUCTION, EDITION JANUARY, 1991.

\* LENGTH MEASURED ALONG  
 SB PD EXT.

LENGTH OF PROJECT

LINEAR FT.	MILES
4,865.13	9.365
0.017	0.017
0.842	0.842
5.070	0.009
5.974.00	0.112
5,974.00	0.112

PROJECT MANAGER: KAREN SNYDER, P.E.  
 DISNEY DEVELOPMENT COMPANY PROJECT MANAGER: DAVID R. LEWIS

ROADWAY PLANS  
 ENGINEER OF RECORD  
 (ROW) J. YASSI M. MYERS, P.E.  
 (ORRN) I. CHRIS LYNCH, P.E.

PLANS PREPARED BY  
 HOWARD J. YASSI M. MYERS & BERGENHOFF  
 ORLANDO, FLORIDA  
 100 LEE BOULEVARD  
 ORLANDO, FL. 32822  
 (407) 859-8380

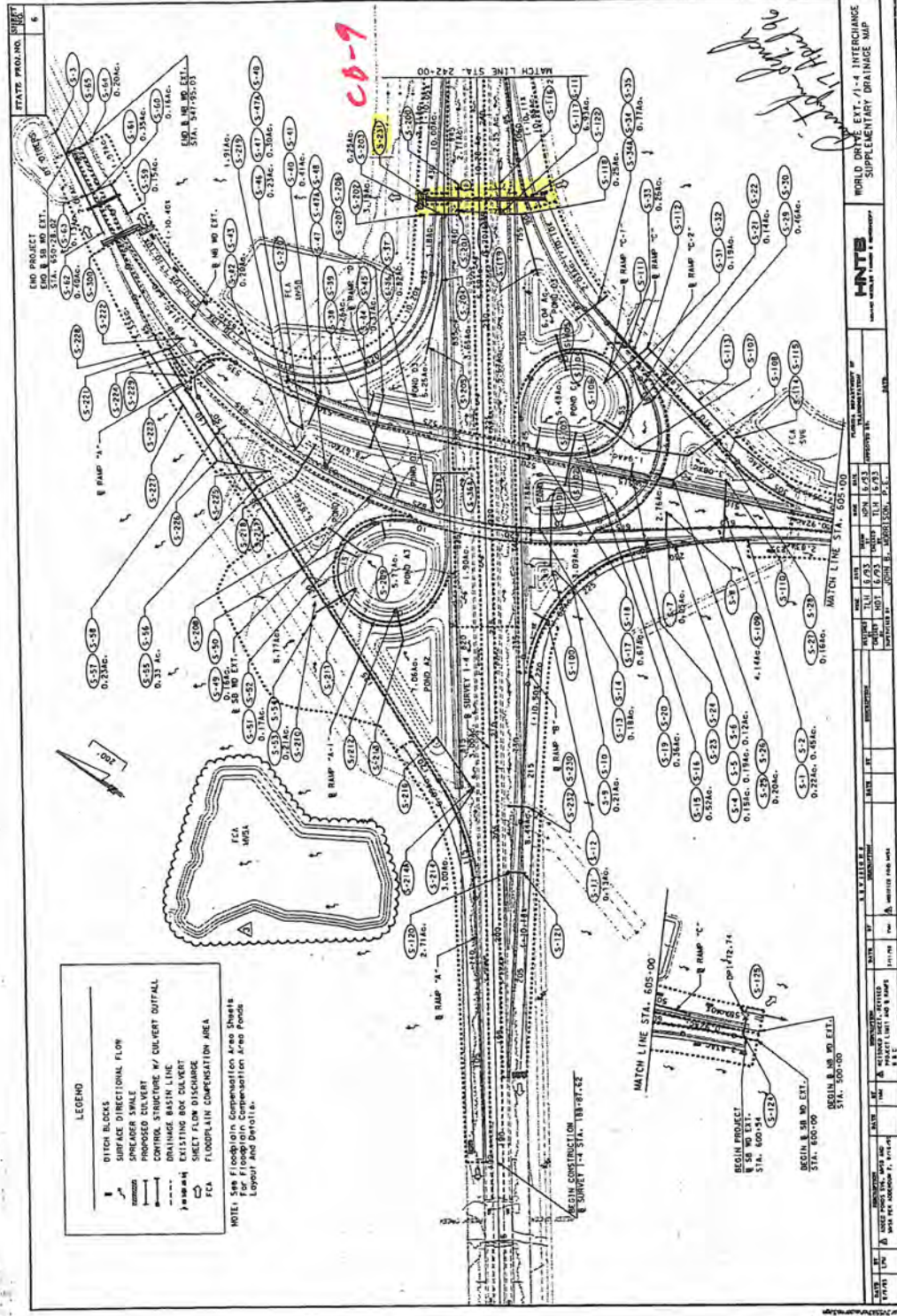
ATTENTION IS DIRECTED TO THE FACT THAT  
 THESE PLANS HAVE BEEN PREPARED IN  
 ACCORDANCE WITH THE SPECIFICATIONS  
 OF THE FLORIDA DEPARTMENT OF TRANSPORTATION  
 STANDARD SPECIFICATIONS FOR HIGHWAY  
 CONSTRUCTION, EDITION JANUARY, 1991.  
 SPECIAL PROVISIONS APPLY TO THIS PROJECT.

DATE: 12/22/95  
 PROJECT NO. 92130-1426  
 SHEET NO. 96

8/9/97







**LEGEND**

- DITCH BLOCKS
- PROPOSED DITCH
- CONTROL STRUCTURE W/ CULVERT OUTFALL
- DRAINAGE BASIN LINE
- EXISTING BOX CULVERT
- SHEET FLOW DISCHARGE
- FLOODPLAIN COMPENSATION AREA

NOTE: See Floodplain Compensation Area Sheets  
 For Floodplain Compensation Area Ponds  
 Layout And Details.

DATE: 10/1/82		SCALE: AS SHOWN		SHEET NO. 1 OF 3	
PROJECT: WORLD BRIDGE AT INTERCHANGE		DRAWN BY: J.H.		CHECKED BY: J.H.	
SUBJECT: SUPPLEMENTARY DRAINAGE MAP		DESIGNED BY: J.H.		APPROVED BY: J.H.	
DRAWN BY: J.H.		DESIGNED BY: J.H.		APPROVED BY: J.H.	
DATE: 10/1/82		SCALE: AS SHOWN		SHEET NO. 1 OF 3	
PROJECT: WORLD BRIDGE AT INTERCHANGE		DRAWN BY: J.H.		CHECKED BY: J.H.	
SUBJECT: SUPPLEMENTARY DRAINAGE MAP		DESIGNED BY: J.H.		APPROVED BY: J.H.	
DRAWN BY: J.H.		DESIGNED BY: J.H.		APPROVED BY: J.H.	



Table with columns: ITEM NO., DESCRIPTION, QTY, UNIT, PRICE, TOTAL. Includes items for concrete box culverts, manholes, and various pipe sections.

- 5-218 STA. 61+00 TO 61+50, 14' LT., 58" CONCR. MANHOLE, W/ITERED END SECTION...
- 5-219 STA. 61+50 TO 62+00, 14' LT., 58" CONCR. MANHOLE, W/ITERED END SECTION...
- 5-220 STA. 62+00 TO 62+50, 14' LT., 58" CONCR. MANHOLE, W/ITERED END SECTION...
- 5-221 STA. 62+50 TO 63+00, 14' LT., 58" CONCR. MANHOLE, W/ITERED END SECTION...

CONCRETE BOX CULVERT NOTES:  
1. ALL FOUNDATIONS SHALL BE CONSTRUCTED IN THE DRY. FOUNDATION SHALL BE OVER-EXCAVATED A MINIMUM OF TWO FEET GREATER IF A-4 IS ENCOUNTERED AND REPLACED WITH A MINIMUM OF TWO FEET OF SAND BERBERINS. ALL SAND BACKFILL SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 100 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY ASTM D-1557.

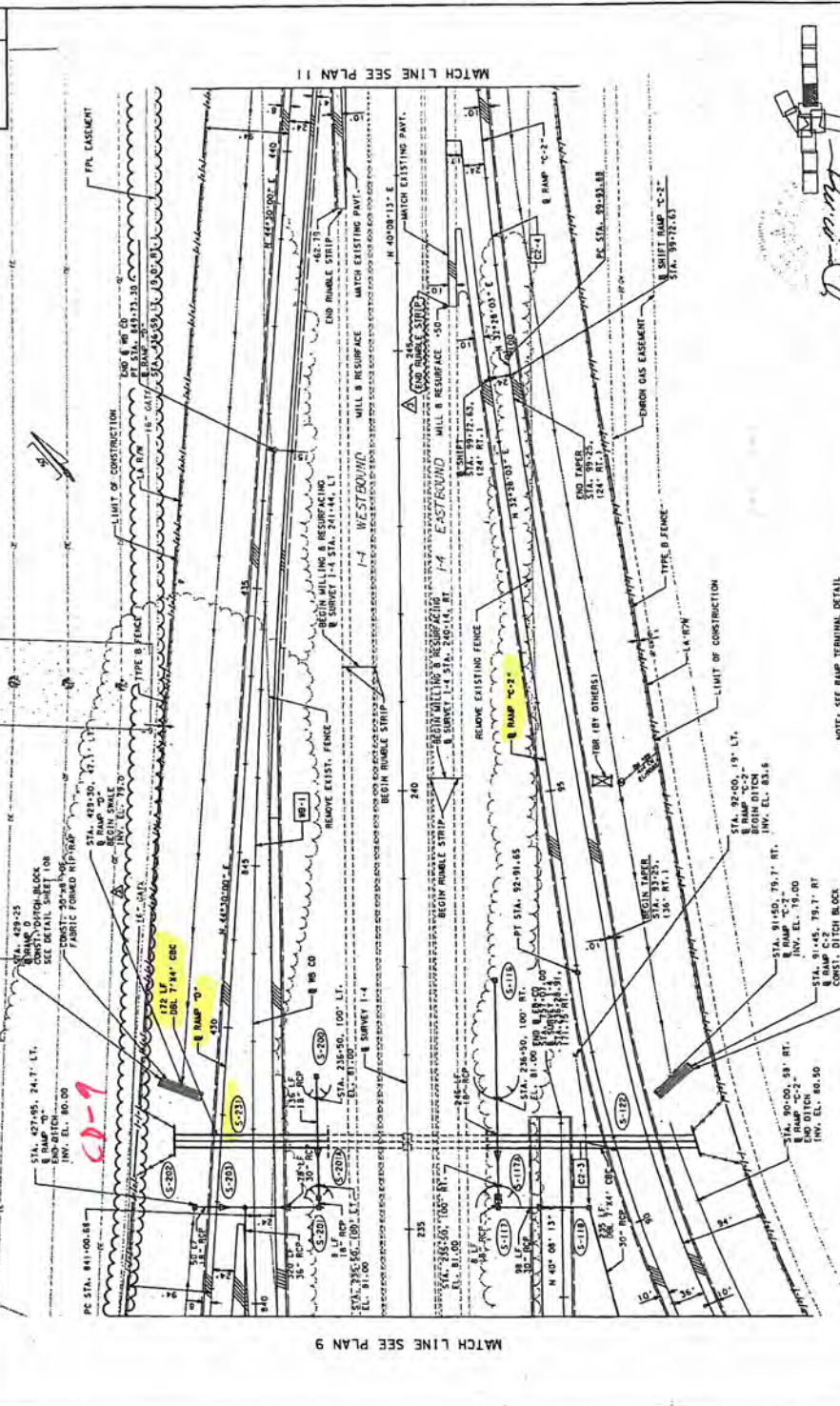
2. IT SHOULD BE ANTICIPATED THAT DETERIORING WILL BE REQUIRED AT THE BOX CULVERT LOCATION IN ORDER TO MAINTAIN THE WATER LEVEL. A MINIMUM OF ONE FOOT BELOW THE WATER LEVEL, THE FOUNDATION SHALL BE CONSTRUCTED TO BE CONTINUOUS UNTIL FOUNDATION CONSTRUCTION IS COMPLETE.

3. ALL BOX CULVERTS SIDE AND END JOINTS SHALL BE COMBED WITH TYPE D-3 WITH A.O.S.O. OF 70-100. OF UNDER 199, TYPE D-3 WITH A.O.S.O. OF 70-100.

WORLD DRIVE EXT. STRUCTURES  
DRAINAGE  
S-114 - 1400 - 5-300

Table with columns: DATE, TIME, DRAWN BY, CHECKED BY, APPROVED BY, TITLE, SHEET NO., SHEETS, etc. Includes a signature and project details.

STATE PROJ. NO.	STATE R.O. NO.
101-1-001	101-1-001



MATCH LINE SEE PLAN 9

MATCH LINE SEE PLAN 11

*D. M. W.*  
*O. A. 10/19*

DATE	BY	REVISION	SHEET	OF	TOTAL SHEETS
11/19/99	JM	ISSUED FOR PERMITS	1	1	1

DATE	BY	REVISION	SCALE	STATUS
11/19/99	JM	ISSUED FOR PERMITS	AS SHOWN	REVISED

NOTE: SEE RAMP TERMINAL DETAIL SHEETS FOR CURB AREAS.

DATE	BY	REVISION
11/19/99	JM	ISSUED FOR PERMITS

WORLD DRIVE EXT. 7-4 INTERCHANGE  
 PLAN 10  
 STA. 234+00 TO STA. 248+00

STATE PROJ. NO. 58



CD-9

WORLD DRIVE EXT. 1/4 LONG  
 WORLD DRIVE - RAMP C-2  
 STA. 79+00 TO 93+00  
 SCALE: 1" = 20' H.  
 DATE: 1/9/93

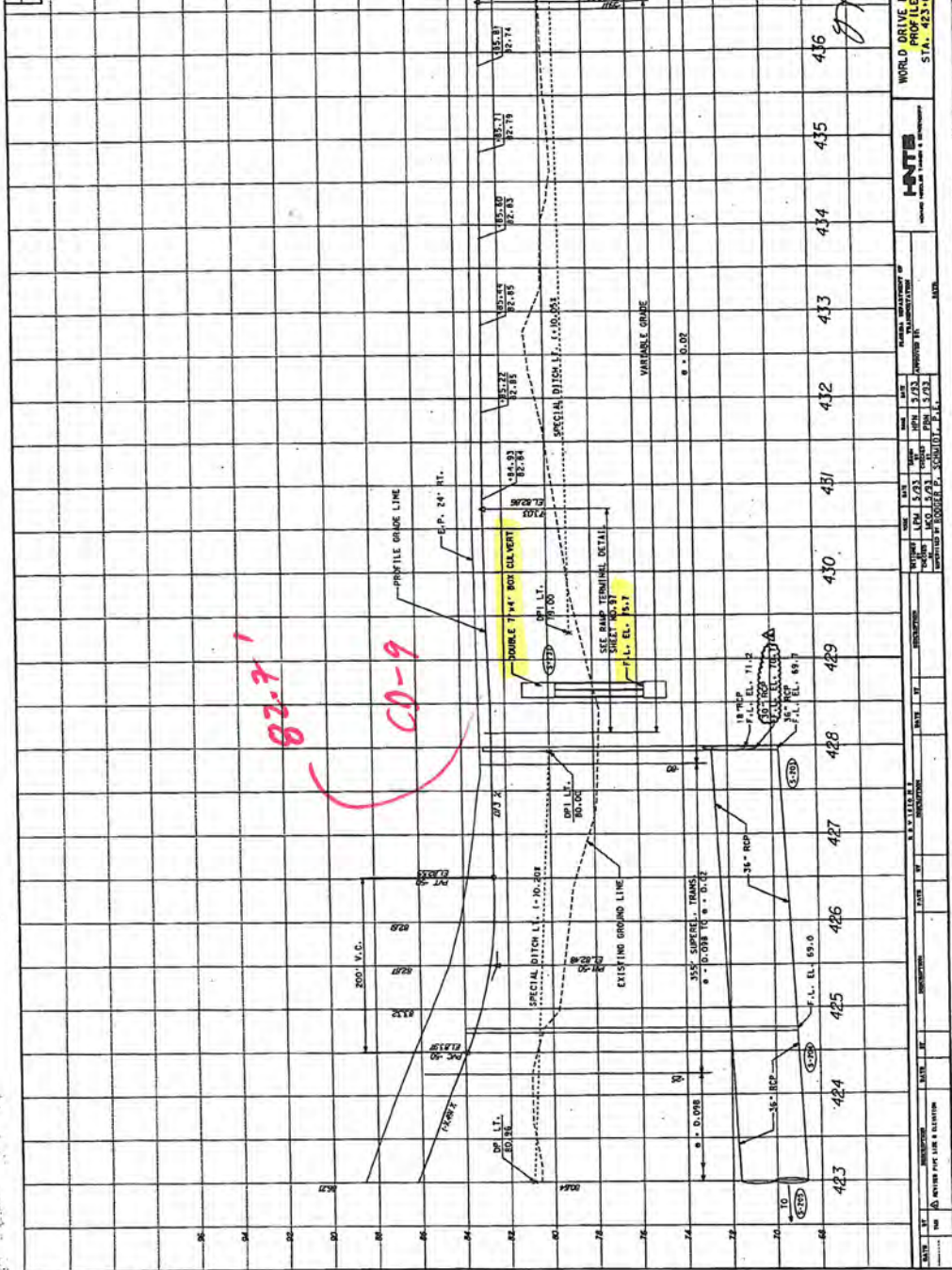
HNTB

STATE OF MISSISSIPPI  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 PROJECT NO. 58  
 SHEET NO. 58

DESIGNED BY: ROBERT P. SCHUBERT, P.E.  
 CHECKED BY: [Signature]  
 DATE: 1/9/93

DATE: 1/9/93  
 SHEET NO. 58  
 PROJECT NO. 58

STATE PROJECT NO. 71



82-71  
CO-9

WORLD DRIVE EXT. / I-4 ICHG  
PROFILE - RAMP D  
STA. 423+00 TO 437+00  
SCALE: 1" = 20' V.  
DATE: 11/11/82

STATION	DATE	BY	CHKD.	REVISION
423				
424				
425				
426				
427				
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431				
432				
433				
434				
435				
436				
437				

DATE: 11/11/82  
BY: [Signature]  
CHKD.: [Signature]

STATE PROJ. NO. 112

DATE: 11/1/73

SCALE: 1" = 20' V.

WORLD DRIVE EXT. / 1-4 ICHG

CROSS SECTIONS

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

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SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73



STATE PROJ. NO. 112

DATE: 11/1/73

SCALE: 1" = 20' V.

WORLD DRIVE EXT. / 1-4 ICHG

CROSS SECTIONS

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73

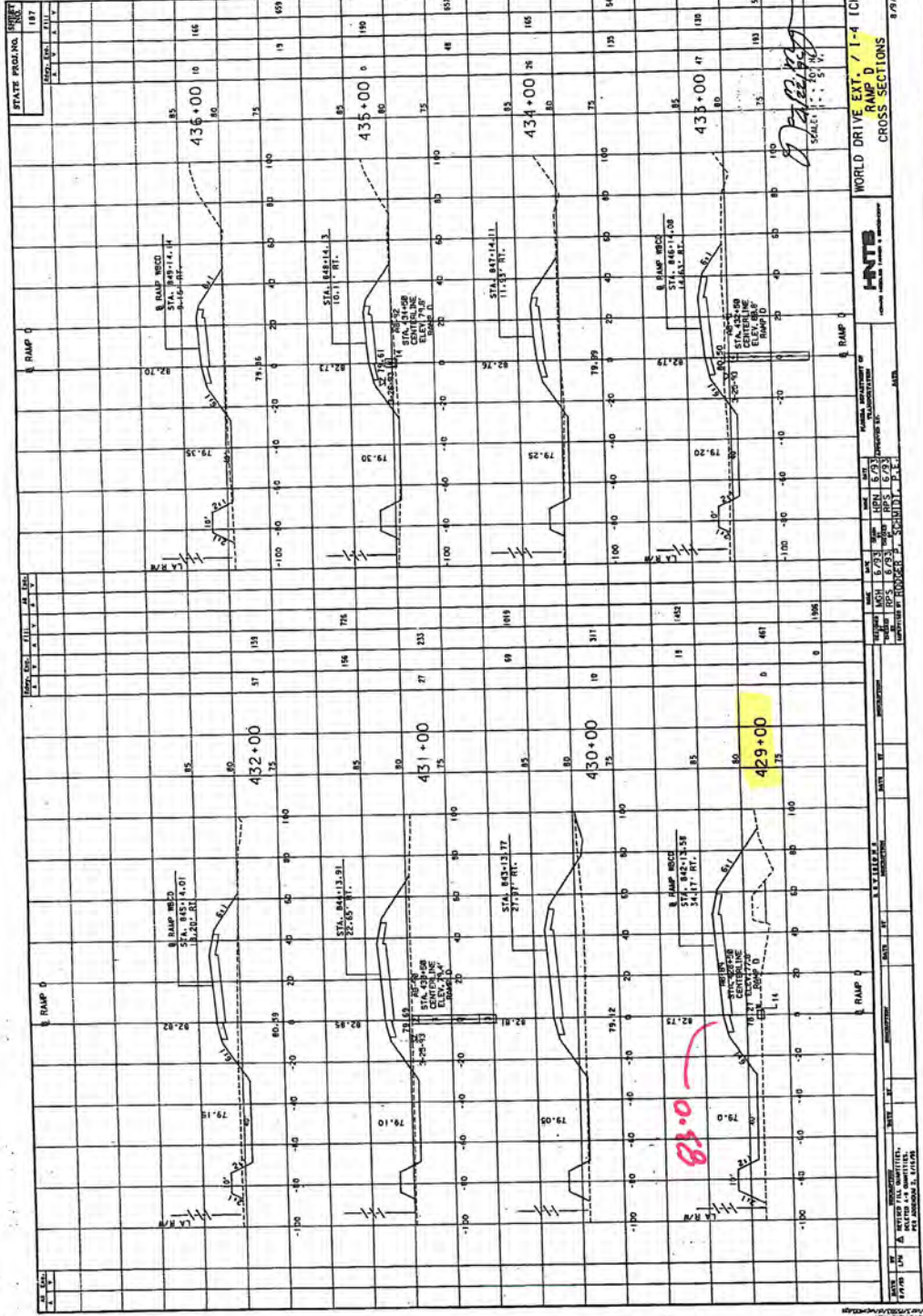
SCALE: 1" = 20' V.

DATE: 11/1/73

SCALE: 1" = 20' H.

DATE: 11/1/73





**REVISIONS:**

NO.	DATE	DESCRIPTION
1	10/1/70	AS SHOWN
2	10/1/70	REVISION
3	10/1/70	REVISION
4	10/1/70	REVISION

**DESIGNER:** W. J. HILL  
**CHECKER:** W. J. HILL  
**APPROVER:** W. J. HILL

**SCALE:** 1" = 20' HORIZ. 1" = 10' VERT.

**DATE:** 10/1/70

**PROJECT:** WORLD DRIVE EXT. - 71-4 ICHG

**LOCATION:** RAMP D

**CONTRACT NO.:** 71-4 ICHG

**DISTRICT:** 71-4

**SHEET NO.:** 1 OF 1

**TITLE:** CROSS SECTIONS

**CONTRACTOR:** HNTB

**SCALE:** 1" = 20' HORIZ. 1" = 10' VERT.

**DATE:** 10/1/70

**PROJECT:** WORLD DRIVE EXT. - 71-4 ICHG

**LOCATION:** RAMP D

**CONTRACT NO.:** 71-4 ICHG

**DISTRICT:** 71-4

**SHEET NO.:** 1 OF 1

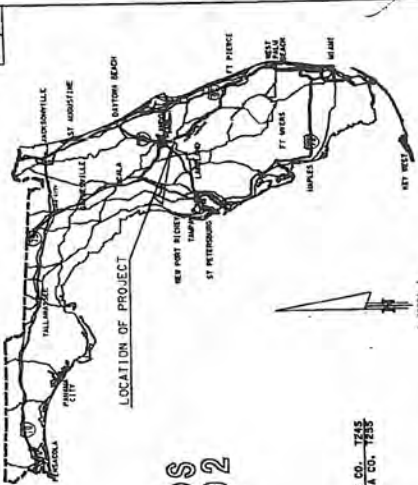
**TITLE:** CROSS SECTIONS

**CONTRACTOR:** HNTB

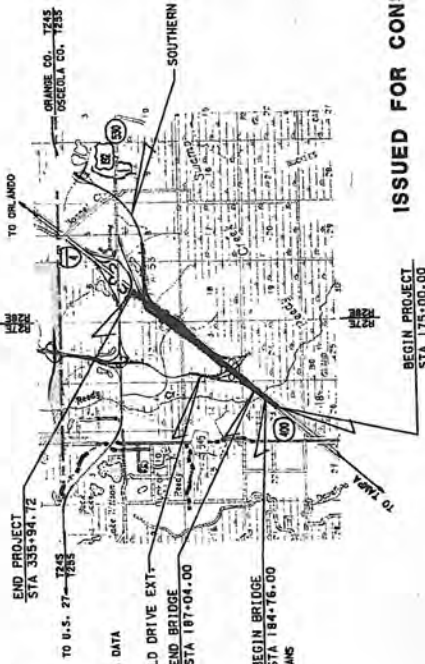
CP-10

**State Project No.**

**92130-3420**



STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
PLANS OF PROPOSED  
STATE HIGHWAY  
INTERSTATE 4  
COLLECTOR-DISTRIBUTOR ROADS  
FROM REEDY CREEK TO US 192  
STATE PROJECT NO. 92130-3420  
OSCEOLA COUNTY, FLORIDA



ROADWAY PLANS INDEXED OF RECORD  
ANDRE LAUBER, P.E., REG. NO. 37503  
PLANS PREPARED BY  
**Greiner**  
Greiner, Inc.  
Greiner Building  
Knoxville, Tennessee 37902  
407-422-0333

ATTENTION: THIS SET OF PLANS IS THE PROPERTY OF THE STATE OF FLORIDA. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFIC TO WHICH IT IS ISSUED. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE STATE OF FLORIDA. SPECIAL SPECIFICATIONS FOR THIS PROJECT ARE ATTACHED TO THESE PLANS.  
DATE BY: JAMES E. LINDSEY  
P.E. NO. 37333 2-12-77

ISSUED FOR CONSTRUCTION

NOV. 1, 1996

DATE	BY	DESCRIPTION
01/19/97	ACL	PER FOOT COMMENTS

LENGTH OF PROJECT	
ROADWAY	15,884.72 FT.
RIGHT-OF-WAY	248.00 FT.
NET LENGTH OF PROJ.	16,084.72 FT.
EXCEPTIONS	0.00 FT.
GROSS LENGTH OF PROJ.	16,084.72 FT.

FOOT PROJECT MANAGER: HEATHER BRADSHAW

THIS CONTRACT PLAN SET INCLUDES:  
ROADWAY PLANS  
UTILITY ADJUSTMENT PLANS  
STORMWATER POLLUTION PREVENTION PLANS  
STRUCTURE PLANS

A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT SET OF PLANS

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2	BOX CULVERT DATA SHEET
3-5	SUPPLEMENTAL DRAINAGE MAP
6-7	EXISTING DRAINAGE STRUCTURE DATA
8-11	EXISTING SECTIONS
12	SUMMARY OF QUANTITIES
13-24	SUMMARY OF DRAINAGE STRUCTURES
25	PROJECT LAYOUT
26	REFERENCE TIES
28-27	ROADWAY PROFILES
28-42	INTERCHANGE LAYOUT, CURVE & COORD. DATA
43-48	RAMP TERMINAL DETAIL
50-66	DRAINAGE STRUCTURES
67-73	TREATMENT PONDS
74-80	COMPENSATION FOR LOSS OF DETAIL
81-83	CONTROL STRUCTURE DETAILS
84	DRAINAGE DETAILS
86	CON-SPAN DETAILS
87-90	CROSS SECTION PATTERN SHEET
91-93	ROADWAY SECTIONS
94-99	TRAFFIC CONTROL PLAN
100-102	TRAFFIC CONTROL PLANS
103-144	STORMWATER POLLUTION PREVENTION PLANS
245-260	APPROACH SLABS
261-262	UTILITY ADJUSTMENT PLANS
263-271	UTILITY STANDARDS
272-279	

THESE PLANS HAVE BEEN PREPARED IN ACCORDANCE WITH AND ARE GOVERNED BY THE STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION, ROADWAY AND TRAFFIC DESIGN STANDARDS BOOKLET DATED JANUARY, 1994.



STATE PROJ. NO. 92130-520

1	INLET, 18" RCP GRATE EL. 79.20 E FL 74.0 W FL 76.50	16	MES FL 74.0	30	MES, 48" RCP W FL 74.0 E FL 74.0	45	INLET, 18" RCP GRATE EL. 80.00 S FL 75.50 N FL 75.40	60	MES FL 76.50	75	INLET, 18" RCP GRATE EL. 83.77 E FL 76.5 W FL 76.5	90	MES, 48" RCP W FL 74.0 E FL 74.0	105	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5
2	INLET, 24" RCP GRATE EL. 80.00 S FL 75.50 N FL 75.40	17	INLET, 24" RCP GRATE EL. 81.20 S FL 76.50 N FL 76.30	31	MES FL 74.0	46	INLET, 18" RCP GRATE EL. 80.00 S FL 75.50 N FL 75.40	61	INLET, 18" RCP GRATE EL. 82.70 E FL 76.5 W FL 76.5	76	INLET, 18" RCP GRATE EL. 85.77 E FL 76.5 W FL 76.5	91	MES, 48" RCP W FL 74.0 E FL 74.0	106	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5
3	INLET, 24" RCP GRATE EL. 80.00 S FL 75.40 N FL 74.0	17A	MES FL 76.3	32	INLET, 18" RCP GRATE EL. 89.40 W FL 74.0 E FL 74.0	47	INLET, 18" RCP GRATE EL. 80.00 S FL 75.50 N FL 75.40	62	MES FL 76.5	77	MES, 48" RCP W FL 74.0 E FL 74.0	92	MES FL 74.0	107	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5
4	MES FL 74.0	18	MES FL 68.0	33	MES FL 76.5	48	INLET, 18" RCP GRATE EL. 81.00 S FL 76.50 N FL 76.40	63	MES FL 76.5	78	MES FL 74.0	93	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	108	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5
5	MES, 36" RCP S FL 75.0 N FL 75.0	19	MANHOLE, 36" RCP TOP EL. 84.0 E FL 68.0 W FL 68.0	34	INLET, 18" RCP GRATE EL. 100.11 E FL 87.0 W FL 86.5	49	INLET, 18" RCP GRATE EL. 81.00 S FL 76.50 N FL 76.40	64	INLET, 18" RCP GRATE EL. 88.78 E FL 76.5 W FL 76.5	79	MANHOLE, 48" RCP TOP EL. 80.20 S FL 74.0 E FL 74.0	94	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	109	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
6	MES FL 75.0	20	INLET, 30" RCP GRATE EL. 78.0 N FL 70.7 E FL 70.7	35	MANHOLE, 18" RCP TOP EL. 100.80 W FL 76.5	50	INLET, 18" RCP GRATE EL. 97.84 S FL 76.5 N FL 76.5	65	MES FL 76.5	80	INLET, 18" RCP GRATE EL. 80.20 S FL 74.0 E FL 74.0	95	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50	110	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5
7	INLET, 18" RCP GRATE EL. 95.60 W FL 94.4 E FL 85.4	21	INLET, 18" RCP GRATE EL. 79.0 W FL 72.0 E FL 72.0	36	MES FL 76.5	51	U-TYPE ENDWALL W/O AFFLES FL 76.5	66	INLET, 18" RCP GRATE EL. 113.67 E FL 100.0 N FL 100.0	81	MES FL 74.0	96	INLET, 18" RCP GRATE EL. 80.00 E FL 77.40 W FL 77.40	111	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
8	MES FL 85.4	22	INLET, 18" RCP GRATE EL. 107.39 W FL 102.0 E FL 102.0	37	INLET, 18" RCP GRATE EL. 100.04 S FL 103.00 N FL 103.00	52	INLET, 18" RCP GRATE EL. 99.84 S FL 103.00 N FL 103.00	67	MES FL 76.5	82	INLET, 18" RCP GRATE EL. 78.20 E FL 72.30 W FL 71.90	97	INLET, 24" RCP TOP EL. 84.76 E FL 76.74 W FL 76.5	112	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
9	MES, 24" RCP S FL 76.0 E FL 76.0	23	MES FL 76.5	38	INLET, 18" RCP GRATE EL. 86.97 W FL 82.0 E FL 76.5	53	INLET, 18" RCP GRATE EL. 97.84 S FL 103.00 N FL 103.00	68	MES, 36" RCP W FL 75.0 E FL 75.0	83	INLET, 18" RCP GRATE EL. 78.50 E FL 71.30 W FL 71.30	98	MES FL 76.5	113	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
10	MES FL 76.0	24	INLET, 18" RCP GRATE EL. 109.25 W FL 103.5 E FL 103.5	39	MES FL 76.5	54	INLET, 18" RCP GRATE EL. 100.11 S FL 94.00 N FL 93.85	69	INLET, 18" RCP GRATE EL. 103.38 E FL 76.5 W FL 76.5	84	INLET, 30" RCP GRATE EL. 78.5 S FL 70.80 E FL 70.80	99	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	114	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
11	INLET, 18" RCP GRATE EL. 90.95 S FL 75.5 E FL 76.5	25	MES FL 76.5	40	INLET, 18" RCP GRATE EL. 88.33 W FL 82.50 E FL 76.5	55	INLET, 18" RCP GRATE EL. 101.57 S FL 101.00 E FL 101.00	70	MES FL 76.5	85	INLET, 30" RCP GRATE EL. 83.50 S FL 70.80 E FL 70.80	100	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	115	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
12	MES FL 76.5	26	INLET, 18" RCP GRATE EL. 75.0 W FL 72.10 E FL 72.10	41	MES FL 76.5	56	INLET, 18" RCP GRATE EL. 106.95 S FL 93.85 E FL 93.85	71	INLET, 18" RCP GRATE EL. 103.50 E FL 81.75 W FL 81.75	86	MES FL 70.20	101	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	116	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
13	INLET, 18" RCP GRATE EL. 88.88 S FL 93.5 E FL 76.5	27	CONCRETE BOX CULVERT CONV. TO 18" RCP E FL 75.70 W FL 75.50	42	INLET, 18" RCP GRATE EL. 93.33 S FL 87.0 E FL 87.0	57	INLET, 18" RCP GRATE EL. 93.85 S FL 93.85 E FL 93.85	72	MES FL 81.75	87	MANHOLE, 48" RCP TOP EL. 79.00 S FL 77.24 E FL 77.24	102	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	117	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
14	MES FL 76.5	28	MANHOLE, 36" RCP TOP EL. 83.50 E FL 68.7 W FL 68.0	43	INLET, 18" RCP GRATE EL. 76.1 W FL 74.5 E FL 74.5	58	INLET, 18" RCP GRATE EL. 101.57 S FL 101.00 E FL 101.00	73	MES FL 75.0	88	MANHOLE, 48" RCP TOP EL. 80.16 S FL 72.50 E FL 72.21	103	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	118	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50
15	MES, 48" RCP N FL 74.0 S FL 74.0	29	INLET, 18" RCP GRATE EL. 80.0 S FL 71.2 E FL 71.2	44	INLET, 18" RCP GRATE EL. 76.1 W FL 74.5 E FL 74.5	59	INLET, 18" RCP GRATE EL. 100.11 S FL 94.00 N FL 93.85	74	MES, 48" RCP W FL 74.0 E FL 74.0	89	INLET, 18" RCP GRATE EL. 80.16 S FL 72.50 E FL 72.21	104	INLET, 18" RCP GRATE EL. 81.75 E FL 76.5 W FL 76.5	119	CONCRETE BOX CULVERT E FL 75.50 W FL 75.50

60-10 (05)

*Stephen J. Hart*  
2-2-97

(120)	INLET, 24" RCP GRATE EL. 85.20 N FL 79.50 S FL 80.00 E FL 84.50	(121)	MANHOLE, 24" RCP RIM EL. 86.00 N FL 79.50 S FL 78.75 E FL 84.50	(122)	INLET, 18" RCP GRATE EL. 85.00 N FL 80.63 S FL 80.50 E FL 80.45	(123)	INLET, 24" RCP GRATE EL. 85.00 N FL 78.00 S FL 78.00 E FL 80.45	(124)	INLET, 24" RCP GRATE EL. 85.54 N FL 79.00 S FL 79.00 E FL 84.50	(125)	MES, 30" RCP GRATE EL. 86.47 N FL 81.16 S FL 82.25 E FL 82.25	(126)	INLET, 18" RCP RIM EL. 87.33 GRATE EL. 87.76 N FL 82.70 S FL 82.70 E FL 84.86	(127)	INLET, 18" RCP GRATE EL. 86.47 N FL 82.70 S FL 82.70 E FL 84.86	(128)	INLET, 18" RCP GRATE EL. 86.41 N FL 82.70 S FL 82.70 E FL 84.86	(129)	MANHOLE, 18" RCP RIM EL. 88.0 N FL 81.62 S FL 78.00 E FL 84.86	(130)	MANHOLE, 30" RCP GRATE EL. 85.50 N FL 80.50 S FL 75.50 E FL 80.00	(131)	INLET, 18" RCP GRATE EL. 80.83 N FL 86.00 S FL 86.00 E FL 86.00	(132)	INLET, 18" RCP, MES GRATE EL. 86.49 N FL 84.50 S FL 84.50 E FL 84.50	(133)	INLET, 18" RCP GRATE EL. 85.00 N FL 81.98 S FL 81.60 E FL 84.50	(134)	INLET, 18" RCP, MES GRATE EL. 103.03 N FL 80.63 S FL 84.50 E FL 84.50	(135)	INLET, 24" RCP, MES GRATE EL. 106.87 N FL 102.25 S FL 84.00 E FL 84.00	(136)	INLET, 18" RCP GRATE EL. 112.25 N FL 106.54 S FL 105.12 E FL 80.00	(137)	INLET, 18" RCP GRATE EL. 106.98 N FL 108.94 S FL 108.54 E FL 80.00	(138)	MANHOLE, 24" RCP RIM EL. 91.00 N FL 85.25 S FL 85.25 E FL 85.25	(139)	MES FL 85.25	(140)	MES FL 84.86	(141)	MANHOLE, 18" RCP GRATE EL. 85.41 N FL 84.86 S FL 84.86 E FL 84.86	(142)	INLET, 18" RCP GRATE EL. 88.49 N FL 85.41 S FL 85.41 E FL 85.41	(143)	INLET, 18" RCP, MES GRATE EL. 91.00 N FL 86.27 S FL 86.27 E FL 86.00	(144)	CONCRETE BOX CULVERT 12.7' x 21' CXC1 N FL 79.30 S FL 79.25 E FL 79.25	(145)	INLET, 24" RCP GRATE EL. 86.30 N FL 82.59 S FL 80.86 E FL 80.86	(146)	INLET, 18" RCP GRATE EL. 84.57 N FL 75.75 S FL 75.50 E FL 75.50	(147)	MES FL 75.50	(148)	INLET, 24" RCP GRATE EL. 84.53 N FL 78.90 S FL 78.90 E FL 78.90	(149)	INLET, 30" RCP GRATE EL. 84.64 N FL 78.90 S FL 78.90 E FL 78.90	(150)	INLET, 18" RCP, MES GRATE EL. 85.00 N FL 81.34 S FL 81.06 E FL 81.06	(151)	MES FL 79.50	(152)	INLET, 18" RCP, MES GRATE EL. 85.00 N FL 81.34 S FL 81.06 E FL 81.06	(153)	INLET, 30" RCP GRATE EL. 84.53 N FL 78.90 S FL 78.90 E FL 78.90	(154)	MANHOLE, 24" RCP RIM EL. 90.50 N FL 85.75 S FL 85.30 E FL 85.30	(155)	MANHOLE, 24" RCP RIM EL. 90.50 N FL 85.75 S FL 85.30 E FL 85.30	(156)	INLET, 18" RCP GRATE EL. 86.35 N FL 87.36 S FL 87.36 E FL 87.36	(157)	INLET, 18" RCP GRATE EL. 86.35 N FL 87.36 S FL 87.36 E FL 87.36	(158)	MES FL 84.86	(159)	CONTROL STR. INLET, 18" RCP, MES CONTROL EL. 91.00 N FL 86.27 S FL 86.27 E FL 86.27	(160)	CONTROL STR. INLET, 18" RCP, MES CONTROL EL. 89.00 N FL 81.80 S FL 81.80 E FL 81.80	(161)	GROSS DRAIN MES, 30" RCP, MES GRATE EL. 82.18 N FL 82.65 S FL 82.65 E FL 82.65	(162)	INLET, 18" RCP GRATE EL. 101.70 N FL 95.75 S FL 87.36 E FL 87.36	(163)	BLEED-DOWN STRUCTURE #1 N FL 10.16 S FL 105.00 E FL 105.00	(164)	BLEED-DOWN STRUCTURE #2 N FL 10.16 S FL 105.00 E FL 105.00	(165)	BLEED-DOWN STRUCTURE #3 N FL 10.16 S FL 105.00 E FL 105.00	(166)	BLEED-DOWN STRUCTURE #4 N FL 10.16 S FL 105.00 E FL 105.00	(167)	BLEED-DOWN STRUCTURE #5 N FL 10.16 S FL 105.00 E FL 105.00	(168)	INLET, 24" RCP GRATE EL. 84.61 N FL 80.15 S FL 80.15 E FL 80.15	(169)	INLET, 24" RCP GRATE EL. 84.36 N FL 80.15 S FL 80.15 E FL 80.15	(170)	MANHOLE, 30" RCP RIM EL. 86.05 N FL 79.21 S FL 79.21 E FL 79.21	(171)	MES, 30" RCP GRATE EL. 83.28 N FL 83.28 S FL 83.28 E FL 83.28	(172)	INLET, 18" RCP GRATE EL. 92.10 N FL 87.81 S FL 87.81 E FL 87.81	(173)	INLET, 18" RCP GRATE EL. 96.35 N FL 91.36 S FL 91.36 E FL 91.36	(174)	INLET, 18" RCP GRATE EL. 101.70 N FL 95.75 S FL 87.36 E FL 87.36	(175)	INLET, 24" RCP GRATE EL. 84.61 N FL 80.15 S FL 80.15 E FL 80.15	(176)	INLET, 24" RCP GRATE EL. 84.36 N FL 80.15 S FL 80.15 E FL 80.15	(177)	MANHOLE, 30" RCP RIM EL. 86.05 N FL 79.21 S FL 79.21 E FL 79.21	(178)	MES, 30" RCP GRATE EL. 83.28 N FL 83.28 S FL 83.28 E FL 83.28	(179)	INLET, 18" RCP GRATE EL. 100.18 N FL 105.93 S FL 105.93 E FL 105.93	(180)	INLET, 18" RCP GRATE EL. 88.49 N FL 85.41 S FL 85.41 E FL 85.41	(181)	MES, 24" RCP N FL 85.25 S FL 85.25 E FL 85.25	(182)	INLET, 24" RCP GRATE EL. 110.18 N FL 110.18 S FL 105.93 E FL 105.93	(183)	INLET, 18" RCP GRATE EL. 88.49 N FL 85.41 S FL 85.41 E FL 85.41	(184)	MANHOLE, 18" RCP, MES RIM EL. 90.00 N FL 84.86 S FL 84.86 E FL 84.86	(185)	MES S FL 84.86	(186)	CONTROL STR. INLET, 18" RCP, MES CONTROL EL. 91.00 N FL 86.27 S FL 86.27 E FL 86.27	(187)	CONTROL STR. INLET, 18" RCP, MES CONTROL EL. 89.00 N FL 81.80 S FL 81.80 E FL 81.80	(188)	GROSS DRAIN MES, 30" RCP, MES GRATE EL. 82.18 N FL 82.65 S FL 82.65 E FL 82.65	(189)	INLET, 18" RCP GRATE EL. 101.70 N FL 95.75 S FL 87.36 E FL 87.36
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*Steph...*  
2-62-97

EXISTING DRAINAGE STRUCTURE DATA

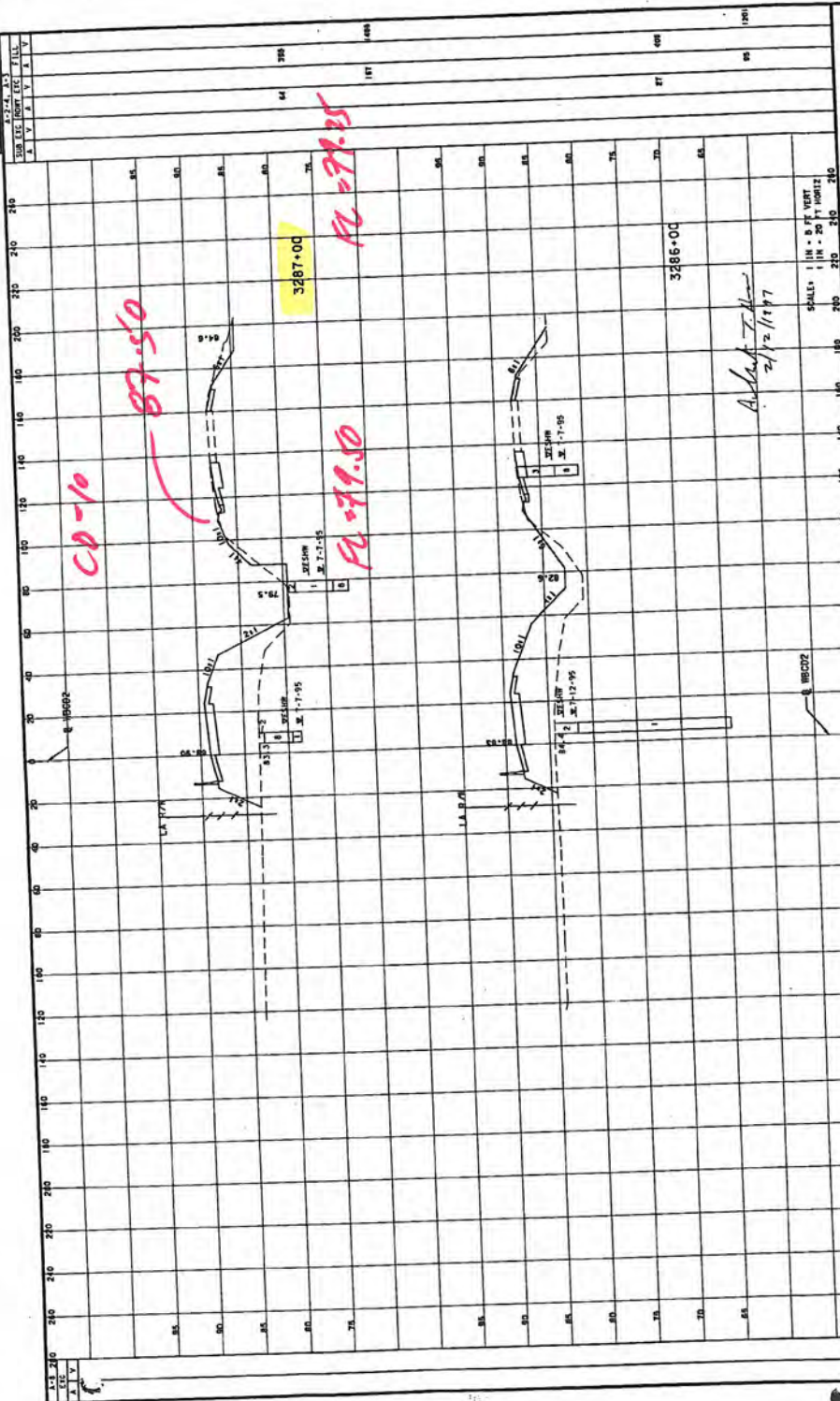
Greiner

FLUORIDA QUALITY OF TRANSPORTATION

CD-10 (05)



STATE PROJ. NO. 92130-3-20 195  
 DATE 10/24/95  
 DESIGNED BY JLL  
 CHECKED BY JLL  
 APPROVED BY JLL



SCALE: 1" = 5' VERT  
 1" = 20' HORIZ  
 Greiner  
 FLORIDA DEPARTMENT OF TRANSPORTATION  
 DATE: 10/24/95  
 DRAWN BY: JLL  
 CHECKED BY: JLL  
 APPROVED BY: JLL



CD-11

SET 1 OF 6  
FINAL "AS-BUILT" PLANS  
FIN: 242531-1-52-01  
FAPN: 00422251  
OSCEOLA COUNTY  
STATE ROAD NO. 400  
Roadway Plans  
(Sheets 1 thru 279)

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

# Final "As-Built" Plans

FINANCIAL PROJECT ID 242531-1-52-01  
(FEDERAL FUNDS)  
OSCEOLA COUNTY (92130)  
STATE ROAD NO. 400

Name of Contractor:  
H.W. Lochner, Inc.  
District Secretary:  
Norman Downs, P.E.  
Resident Engineer:  
Amy Scalen, P.E.  
Project Manager:  
Lynn Chaita, P.E.  
Senior Project Engineer:  
Murray Yates, P.E.  
Project Engineer:  
Robert Murphy, H.W. Lochner, Inc.  
01-03-2005  
09-20-2007

Name of Consultant:  
Granite Construction Co.  
Resident Engineer:  
H.W. Lochner, Inc.  
District Secretary:  
Norman Downs, P.E.  
Project Manager:  
Lynn Chaita, P.E.  
Senior Project Engineer:  
Murray Yates, P.E.  
Project Engineer:  
Robert Murphy, H.W. Lochner, Inc.  
01-03-2005  
09-20-2007

END PROJECT  
FINANCIAL PROJECT ID 242531-1-52-01  
STA. 402+6.68 @ SURVEY SR 400 (1-4)  
MP 7.617

BEGIN CONSTRUCTION  
@ SURVEY US 192 (SR 530)  
STA. 490+00.00

@ WB 1-4 (SR 400)  
STA. 2319+20.47 =  
@ SURVEY 1-4 (SR 400)  
STA. 319+11.84

BEGIN CONSTRUCTION  
@ WB 1-4 (SR 400)  
STA. 2259+00.00

BEGIN CONSTRUCTION  
@ EB 1-4 (SR 400)  
STA. 1289+50.00

@ EB 1-4 (SR 400)  
STA. 1319+20.47 =  
@ SURVEY 1-4 (SR 400)  
STA. 319+11.84

See sheet 1A for list of new plan sheets  
SHEETS 659, L-5  
SHEETS 10, 80, 81, 86, 87, 88, 82-94, 91, 121, 123, 128, 153, 154,  
173, 186, 201, 203, 204, 217, 259-264, 265, 248, 257, 263, 269, 705, STA. 319+11.84  
T-6, T-1, T-12, L-15, L-18, L-23, B-31, C-26, C-27

SHEETS 4, 7, 10, 11, 15, 32, 64, 67, 87, 89, 97, 112, 122, 127,  
129, 130, 151, 175, 185, 218, 265, 269A, 270A, 355-362, 364, 639,  
658-661, 663, 669, 701, 703, 710, 724, 742, 744, 752, 763, 765,  
793, 825, 827, 835, L-5, L-8, F-11, F-25-F-29, F-32, F-33  
SHEETS 87, 112, 115, 149, 154, 308-314, 439-441, 529, 550-552,  
L-1-L-14

SHEETS 34, 102, 119, 186, 241, 242, 257, 309-314, 635, 649, 651,  
T-3A, T-3B, T-7A, T-7B, T-9A, T-10A, T-31A, T-32A, T-33A,  
SHEETS 832-834, T-34

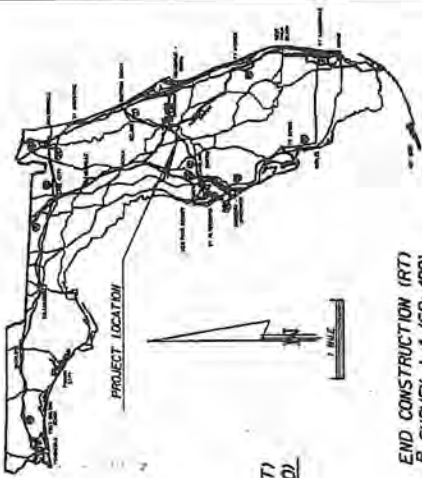
COMPONENTS OF CONTRACT PLANS SET

- ROADWAY PLANS
- SIGNING AND PAVEMENT MARKING PLANS
- SIGNALIZATION PLANS
- LIGHTING PLANS
- STRUCTURE PLANS
- A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT

INDEX OF ROADWAY PLANS

- SHEET NO. SHEET DESCRIPTION
- 2A-26 SUMMARY OF PW ITEMS
  - 3-7 DRAINAGE MAP
  - 8-16 INTERCHANGE DRAINAGE MAP
  - 17 FLOOD DATA
  - 18-19 EXISTING DRAINAGE STRUCTURES
  - 20-32 TYPICAL SECTIONS
  - 33-39 BOX CULVERT SPT BORINGS
  - 40-42 OPTIONAL PIPE MATERIAL TABULATIONS
  - 43-54 SUMMARY OF DRAINAGE STRUCTURES
  - 55 PROJECT LAYOUT
  - 56-67 REFERENCE POINTS
  - 68 COORDINATE AND CURVE DATA
  - 71-76 GENERAL NOTES
  - 77 PLAN SHEETS
  - 78-99 PROFILE SHEETS
  - 100-133 SPECIAL DITCH PROFILES
  - 134-136 INTERCHANGE LAYOUT
  - 137 RAMP TERMINAL DETAILS
  - 138-141 POND DETAIL SHEETS
  - 142-162 DRAINAGE DETAILS
  - 163 TYPICAL DRAINAGE STRUCTURES
  - 164-187 DRAINAGE STRUCTURES
  - 188-217 ROADWAY SOIL SURVEY
  - 218 CROSS SECTIONS
  - 219 POND CROSS SECTIONS
  - 220-598 STORMWATER POLLUTION PREVENTION PLAN NOTES
  - 599-635 TCP GENERAL NOTES
  - 636-638 TRAFFIC CONTROL PLANS
  - 639 UTILITY ADJUSTMENT PLANS
  - 639A-659 STRUCTURES STANDARDS (THREE BEAM RETROFIT)
  - 660-880 INTERIM STANDARDS
  - 881-965 GOVERNING STANDARDS AND SPECIFICATIONS:  
FLORIDA LEGISLATION DATED JANUARY 2002 AND  
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE  
CONSTRUCTION DATED 2004,  
AS AMENDED BY CONTRACT DOCUMENTS.
  - 966-962 REVISIONS

- 05/11/2004 SHEETS 659, L-5
- 09/03/2004 SHEET L-11
- 09/17/2004 SHEETS 10, 80, 81, 86, 87, 88, 82-94, 91, 121, 123, 128, 153, 154,  
173, 186, 201, 203, 204, 217, 259-264, 265, 248, 257, 263, 269, 705, STA. 319+11.84  
T-6, T-1, T-12, L-15, L-18, L-23, B-31, C-26, C-27
- 10/28/2005 SHEETS 4, 7, 10, 11, 15, 32, 64, 67, 87, 89, 97, 112, 122, 127,  
129, 130, 151, 175, 185, 218, 265, 269A, 270A, 355-362, 364, 639,  
658-661, 663, 669, 701, 703, 710, 724, 742, 744, 752, 763, 765,  
793, 825, 827, 835, L-5, L-8, F-11, F-25-F-29, F-32, F-33
- 03/10/2006 SHEETS 87, 112, 115, 149, 154, 308-314, 439-441, 529, 550-552,  
L-1-L-14
- 02/15/2007 SHEETS 34, 102, 119, 186, 241, 242, 257, 309-314, 635, 649, 651,  
T-3A, T-3B, T-7A, T-7B, T-9A, T-10A, T-31A, T-32A, T-33A,  
SHEETS 832-834, T-34
- 04/29/2007 SHEETS 832-834, T-34



END CONSTRUCTION (LT)  
@ SURVEY 1-4 (SR 400)  
STA. 429+90.89

END CONSTRUCTION (RT)  
@ SURVEY 1-4 (SR 400)  
STA. 416+15.71

END CONSTRUCTION (LT)  
@ SURVEY US 192 (SR 530)  
STA. 561+90.00

END CONSTRUCTION (RT)  
@ SURVEY US 192 (SR 530)  
STA. 561+60.00

BEGIN PROJECT  
FINANCIAL PROJECT ID 242531-1-52-01  
STA. 329+00.00 @ SURVEY SR 400, (1-4)  
MP 6.231

LENGTH OF PROJECT		MILES	
LINEAR FT.			
ROADWAY	7,306.68		1.386
BRIDGES	0.00		0.000
NET LENGTH OF PROJ.	7,306.68		1.386
EXCEPTIONS	0.00		0.000
GROSS LENGTH OF PROJ.	7,306.68		1.386

This Project was constructed in substantial compliance with those plans as provided by the engineer of record. These plans reflect "As-Built" conditions where indicated.

Murray Yates  
S.E. Project Engineer  
Resident Engineer  
Date: 10/28/07

ROADWAY SHOP DRAWINGS TO BE SUBMITTED TO:

URS  
YASSI M. MYERS, P.E.  
315 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-1946  
(407)422-0353  
(407)423-9855 (FAX)

PLANS PREPARED BY:

URS  
315 E. ROBINSON STREET, SUITE 245  
ORLANDO, FL 32801-1946  
(407)422-0353  
VENDOR NO. 59-2087895

CONTRACT NO. C-934  
CERTIFICATE OF AUTHORIZATION NO. 00000002  
NOTE: THE SCALE OF THESE PLANS MAY HAVE CHANGED DUE TO REPRODUCTION.

ISSUED FOR THE CONSTRUCTION OF ROADWAY SHOP DRAWINGS  
DATE: 10/28/07

#56129 4/24/07

FINANCIAL PROJECT ID 242531-1-52-01  
 W.P.I. NO. 5147335  
 DATE: 10/24/02

STRUCTURE NO.	STATION	DESIGN FLOOD			BASE FLOOD			OVERTOPPING FLOOD			GREATEST FLOOD						
		50 YR. FREQ.		STAGE	1% PROB.		STAGE	100 YR. FREQ.		DISCHARGE	STAGE	PROB. %	FREQ. YR.	DISCHARGE	STAGE	PROB. %	FREQ. YR.
		DISCHARGE	STAGE		DISCHARGE	STAGE		DISCHARGE	STAGE								
S-19	121+27.81	50.50	87.40	87.40	55.00	87.44	87.44		64.00	87.62	0.2	500					
S-25A	126+00.26	250.00	89.85	89.85	265.14	90.29	90.29		300.00	91.29	0.2	500					
S-24A	356+96.12	340.00	89.32	89.32	355.46	89.72	89.72		388.00	90.59	0.2	500					
S-24C	849+78.38	340.00	88.56	88.56	355.46	88.90	88.90		388.00	89.63	0.2	500					
S-2322	854+50.16	340.00	87.67	87.67	355.46	87.96	87.96		388.00	88.58	0.2	500					
S-22A	503+36.86	340.00	86.89	86.89	355.46	87.09	87.09		388.00	87.52	0.2	500					
S-21	502+17.40	340.00	86.06	86.06	355.46	86.20	86.20		388.00	86.49	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 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, NAVD, 1988.

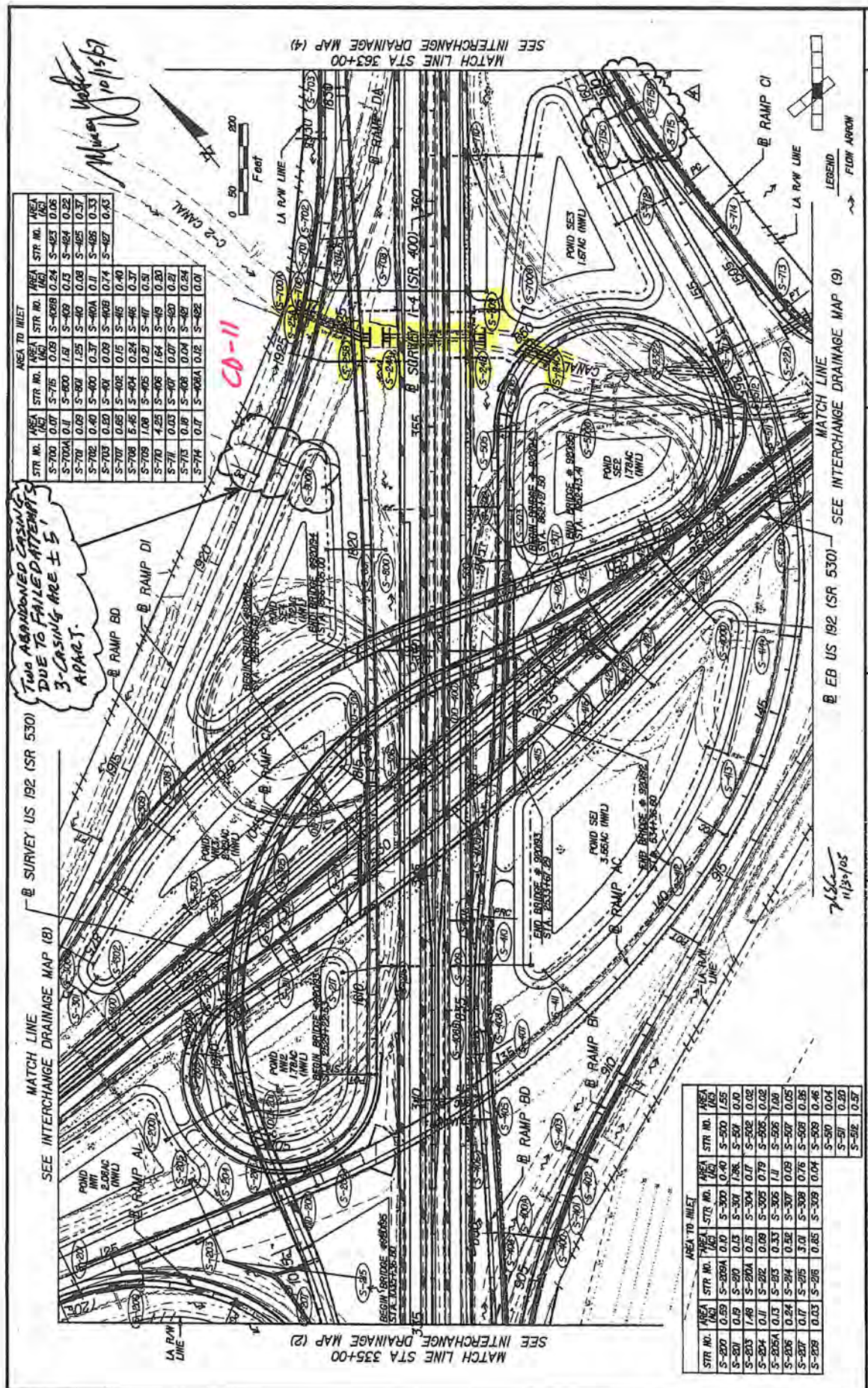
**DEFINITIONS:**

- 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 PRACTICABLE, NORMALLY ONE WITH A 0.2% CHANCE OF BEING EXCEEDED IN ANY YEAR. (500 YR. FREQUENCY)

PREPARED BY: REC  
 DATE: 10/02/02

*Ph. El.*  
 3/1/04

DATE		BY		REVISIONS		STATE OF FLORIDA		SHEET NO.	
DESCRIPTION		DATE		BY		DEPARTMENT OF TRANSPORTATION		FLOOD DATA	
REYNOLD E. CHOW		6080		JCS CORPORATION		FINANCIAL PROJECT ID		17	
305 E. ROBINSON STREET, SUITE 245		ORLANDO, FL 32804-8975		SR 400		OSCEOLA			
PH 407-425-0353 FAX 407-483-8895		PERMIT NO. 00000002		SR 400		242531-1-52-01			
JUL 20 01 11 16 AM '04									



AREA TO INLET			
STR. NO.	AREA (AC)	STR. NO.	AREA (AC)
S-700	0.07	S-715	0.08
S-700A	0.11	S-700	1.89
S-702	0.09	S-700	1.95
S-702	0.40	S-700	0.37
S-703	0.80	S-700	0.09
S-703	0.80	S-700	0.74
S-707	0.65	S-700	0.15
S-708	5.46	S-700	0.84
S-708	1.08	S-700	0.21
S-710	4.25	S-700	1.64
S-711	0.03	S-700	0.07
S-715	0.18	S-700	0.04
S-714	0.17	S-700A	0.02
		S-702	0.01

TWO ABANDONED CASING DUE TO FAILED DATUMS 3-CASING ARE ± 5' APART.

② SURVEY US 192 (SR 530)

SEE INTERCHANGE DRAINAGE MAP (8)

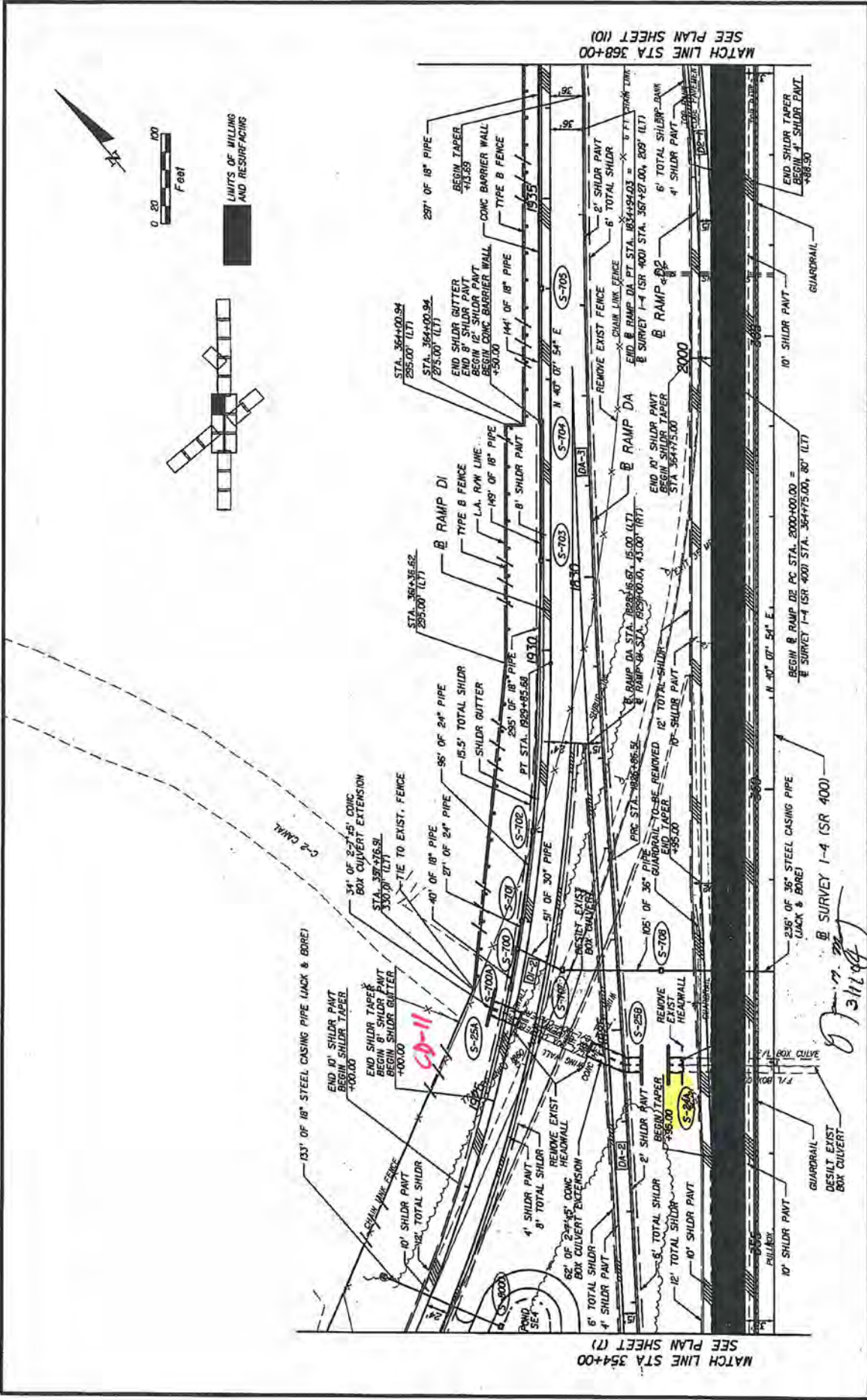
SEE INTERCHANGE DRAINAGE MAP (2)

MATCH LINE STA 363+00 SEE INTERCHANGE DRAINAGE MAP (4)

MATCH LINE STA 335+00 SEE INTERCHANGE DRAINAGE MAP (2)

AREA TO INLET			
STR. NO.	AREA (AC)	STR. NO.	AREA (AC)
S-200	0.59	S-200A	0.10
S-200	0.19	S-200	0.40
S-203	1.48	S-200	1.98
S-204	0.11	S-200	0.17
S-204	0.13	S-200	0.79
S-205	0.24	S-200	0.79
S-207	0.17	S-200	0.09
S-208	0.03	S-200	0.76
		S-209	0.46
		S-500	0.04
		S-501	0.50
		S-502	0.57

DATE	DESCRIPTION	BY	DATE	DESCRIPTION
9-17-04	REC DELETION OF S-48			
10-28-04	REC ADDITION OF S-715B, S-715C AND B1 PIPE			
STATE OF FLORIDA		DEPARTMENT OF TRANSPORTATION		SHEET NO. 10
ROAD NO. SR 400		COUNTY OSCEOLA		PROJECT NO. 242531-1-52-01
REMAN E. CHW P.E. LICENSE NO. 50680 305 E. ROBINSON STREET, SUITE 845 ORLANDO, FL 32807-8775 PH (407) 662-0323 CELL (407) 662-0323 E-MAIL: ECHW@FLDOT.COM		DRAWN BY: J. H. HARRIS DATE: 11/25/05		INTERCHANGE DRAINAGE MAP (3) STA 335+00 TO STA 365+00

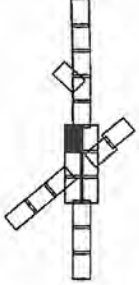


MATCH LINE STA 368+00  
SEE PLAN SHEET (10)

MATCH LINE STA 354+00  
SEE PLAN SHEET (7)



LIMITS OF MILLING  
AND RESURFACING



REVISIONS		STATE OF FLORIDA	
DATE	BY	DESCRIPTION	DEPARTMENT OF TRANSPORTATION

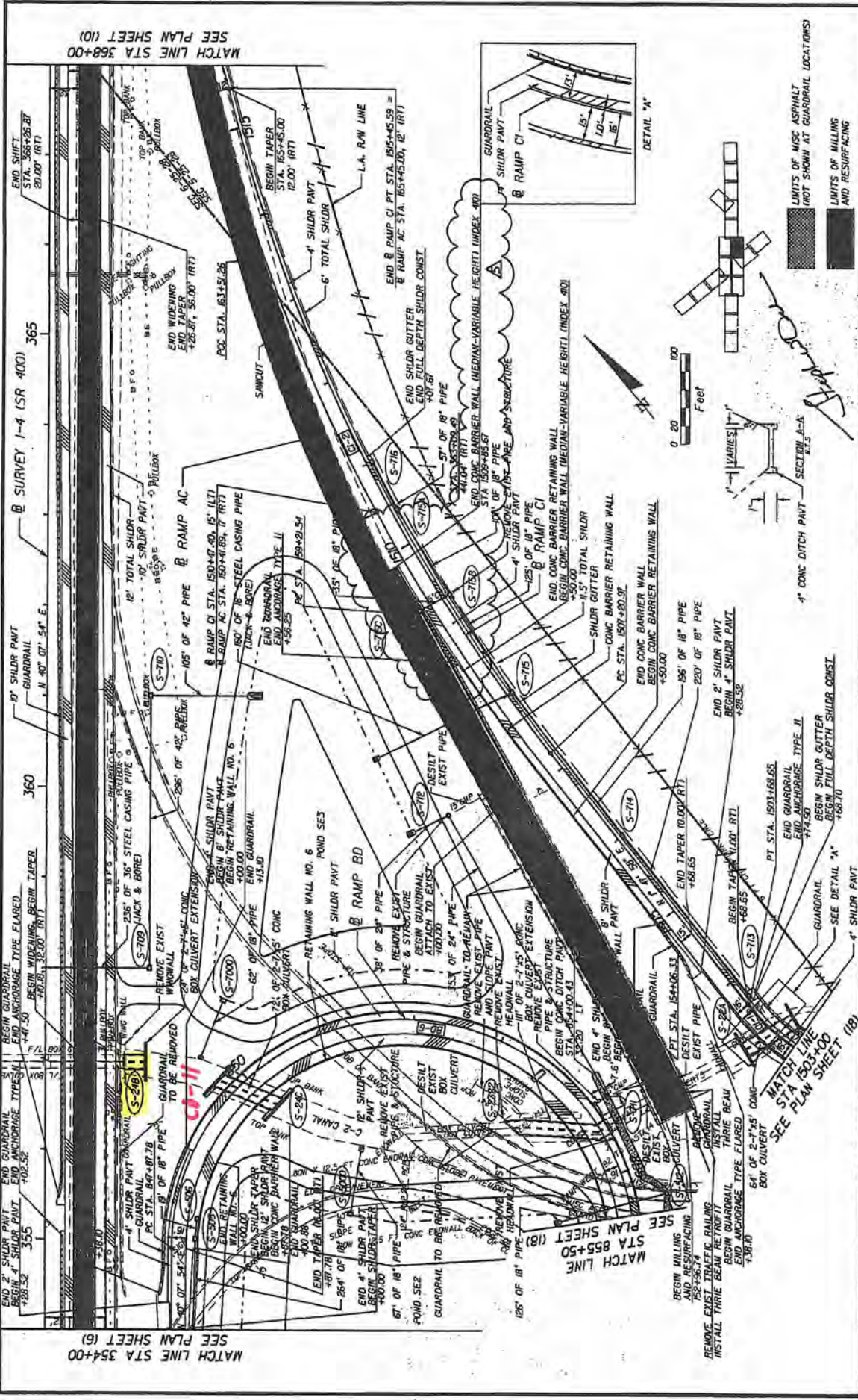
ROAD NO.	SR 400	COUNTY	OSCEOLA	FINANCIAL PROJECT ID	242531-1-52-01
STATE OF FLORIDA				DEPARTMENT OF TRANSPORTATION	

**PLANNING SHEET (9)**

YASSI HADERS  
P.E. LICENSE NO. 3884  
URS CORPORATION  
12340 N. CENTRAL AVENUE, SUITE 245  
ORLANDO, FL 32801-8975  
PH (407) 423-2855 FAX (407) 423-2855  
CERTIFICATE OF AUTHORIZATION NO. 00000002

DATE: JUN 27 13:25:58 2008

IN: V:\11\242531-1-52-01\11



MATCH LINE STA 354+00  
SEE PLAN SHEET (6)

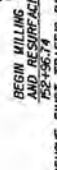
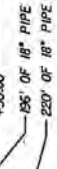
MATCH LINE STA 368+00  
SEE PLAN SHEET (10)

SR 400 SURVEY 1-4 (SR 400)

SR 400

SR 400

SR 400



LIMITS OF MISC ASPHALT  
(NOT SHOWN AT GUARDRAIL LOCATIONS)

LIMITS OF MILLING  
AND RESURFACING

DATE	BY	DESCRIPTION	REVISIONS	DATE	BY	DESCRIPTION
0-28-08	REC	ADDITION OF S-755A, S-755C, S-755D AND S-755E	5			EXTENDED CONC BARRIER WALL 18\"/>

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

PLANNING SECTION  
SECTION A-N  
SECTION A-N

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
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OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
COUNTY  
OSCEOLA  
SR 400  
242531-1-52-01



DATE	BY	DESCRIPTION	REVISIONS	DATE	BY	DESCRIPTION

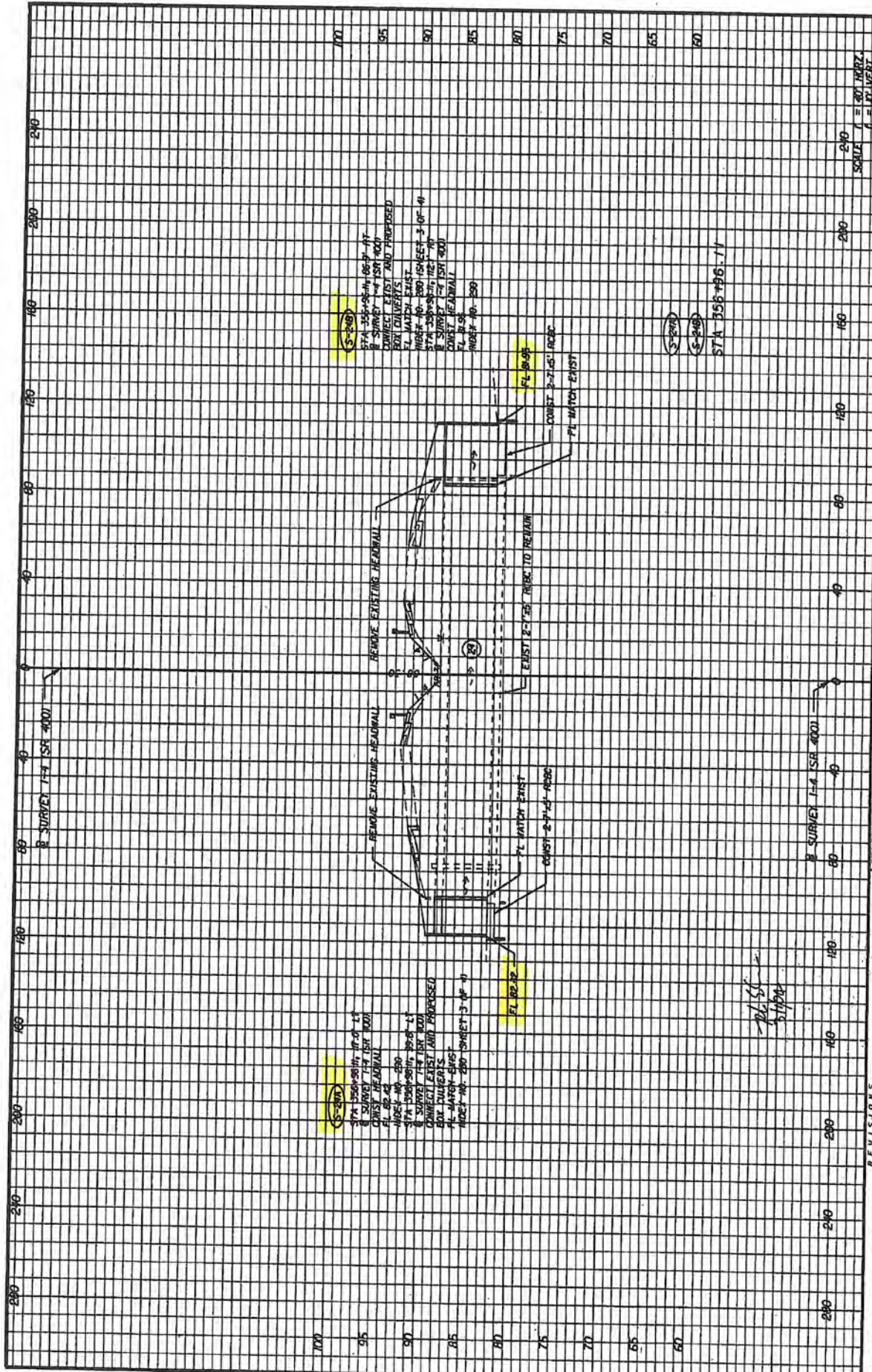
PENNY E CHAM P.L. LICENSE NO. 50050 URS CORPORATION 315 E. ROBINSON STREET, SUITE 205 ORLANDO, FL 32801-0975 CERTIFICATE OF AUTHORIZATION NO. 00000002	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. SR 400 COUNTY OSCEOLA FINANCIAL PROJECT ID 242531-1-52-01	SHEET NO. 270
---	--	---------------

SCALE 1" = 40' HORZ.  
1" = 10' VERT.

STA 1924+80.00 @ RAMP DA

STA 1925+99.41

STA 1924+80.00 @ RAMP DA



S-206  
STA 350+86.11 186' 5\"/>

S-208  
STA 355+86.11 186' 5\"/>

S-206  
STA 355+86.11  
S-208  
STA 355+86.11  
S-209

SURVEY 1-A (SR 400)

SURVEY 1-A (SR 400)

DATE	REV.	DESCRIPTION	DATE	REV.	DESCRIPTION

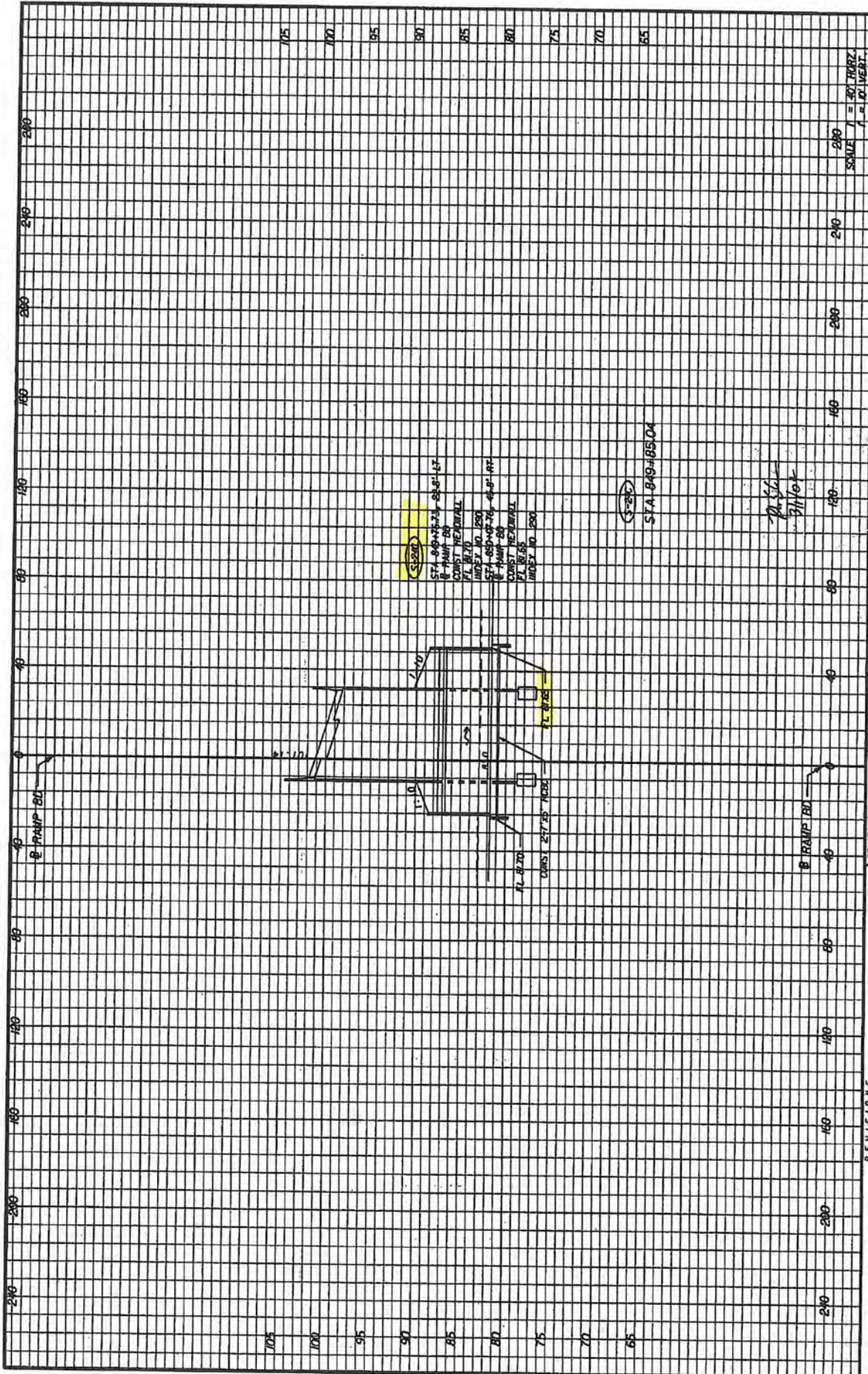
REVIATTO E. CHUN  
P.E. LICENSE NO. 50000  
305 E. ROBINSON STREET, SUITE 605  
ORLANDO, FL 32801-8775  
PH (407) 422-0553 FAX (407) 423-8895  
CERTIFICATE OF AUTHORIZATION NO. 00000002

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION  
ROAD NO. SR 400  
COUNTY OSCEOLA  
FINANCIAL PROJECT ID 242531-1-52-01

SURVEY 1-A (SR 400)  
DRAINAGE STRUCTURE SHEET  
SHEET NO. 197

DATE: FEB 21 11 21 AM '08  
DRAWN BY: [Signature]  
CHECKED BY: [Signature]





STA. 849+85.04 - 85.04 - LF  
 B RAMP BL  
 CONST. RETAIN WALL  
 INDEX NO. 290  
 STA. 850+85.76 - 85.76 - RT  
 B RAMP BL  
 CONST. RETAIN WALL  
 INDEX NO. 290

STA. 849+85.04  
 85.04

85.04  
 85.04

DATE	BY	DESCRIPTION	REVISIONS	DATE	BY	DESCRIPTION

REVATO E. CHW P.E. LICENSE NO. 50050 JRS CORPORATION 305 E. ROBINSON STREET, SUITE 2-5 TAMPA, FLORIDA 33604 PH (813) 442-3333 FAX (813) 442-9898 CERTIFICATE OF AUTHORIZATION NO. 00000002 HT 1979 STATE 242531 10/21/2004		STATES OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. SR 400 COUNTY OSCEOLA FINANCIAL PROJECT ID 242531-1-52-01	SHEET NO. 249
---	--	---	---------------

SCALE 1" = 30' HORZ.  
1" = 10' VERT.

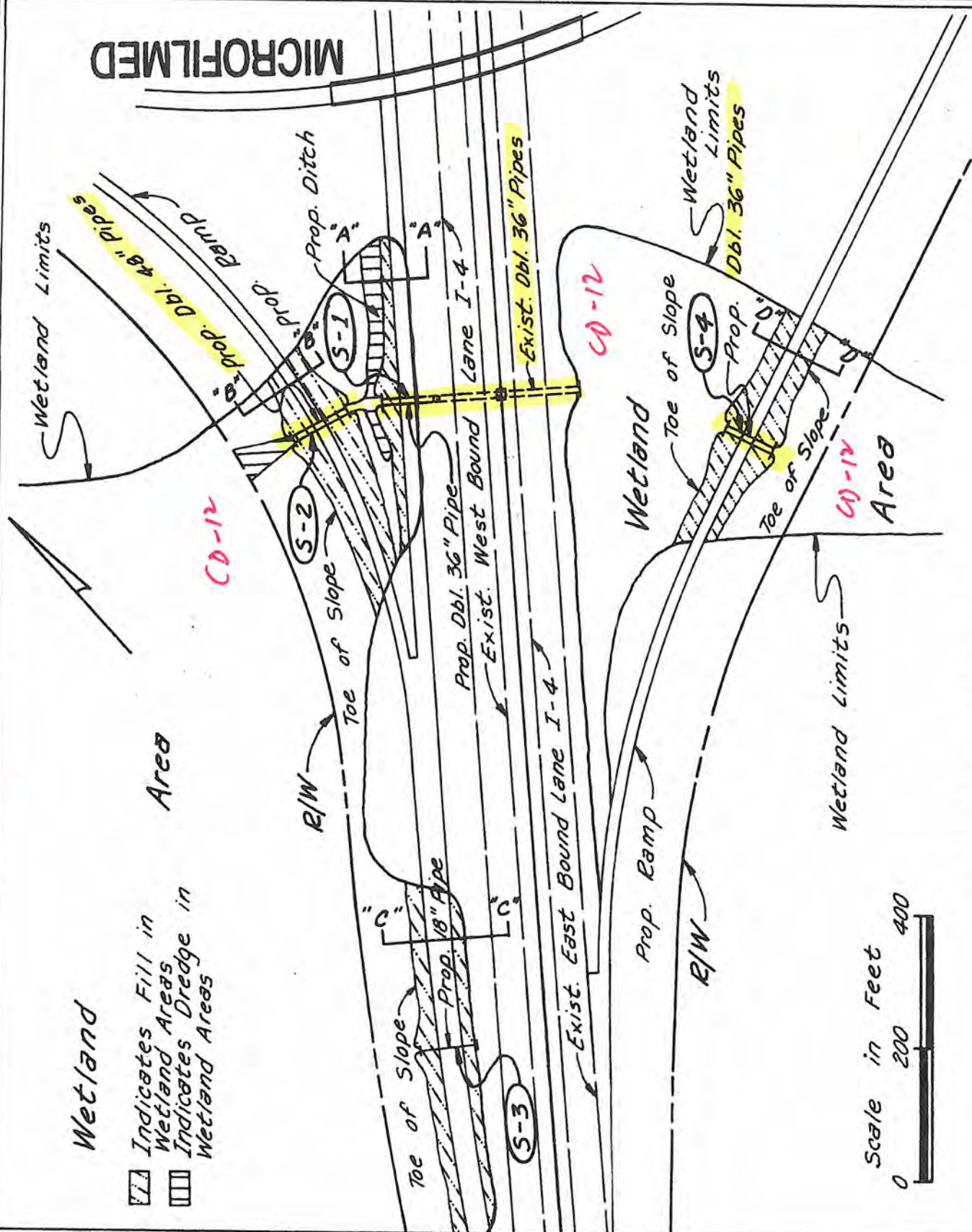
RAMP RD  
DRAINAGE STRUCTURE SHEET

FFI 108 21 14724185 2004



HT 1979 STATE 242531 10/21/2004

CD 12 & CD 13

MICROFILMED



Wetland

-  Indicates Fill in Wetland Areas
-  Indicates Dredge in Wetland Areas

Area

R/W

Toe of Slope

Toe of Slope

Prop. 18" Pipe

Prop. Dbl. 36" Pipe

Exist. West Bound Lane I-4

Exist. East Bound Lane I-4

Prop. Ramp

R/W

Wetland Limits

Scale in Feet  
0 200 400

PLAN VIEW

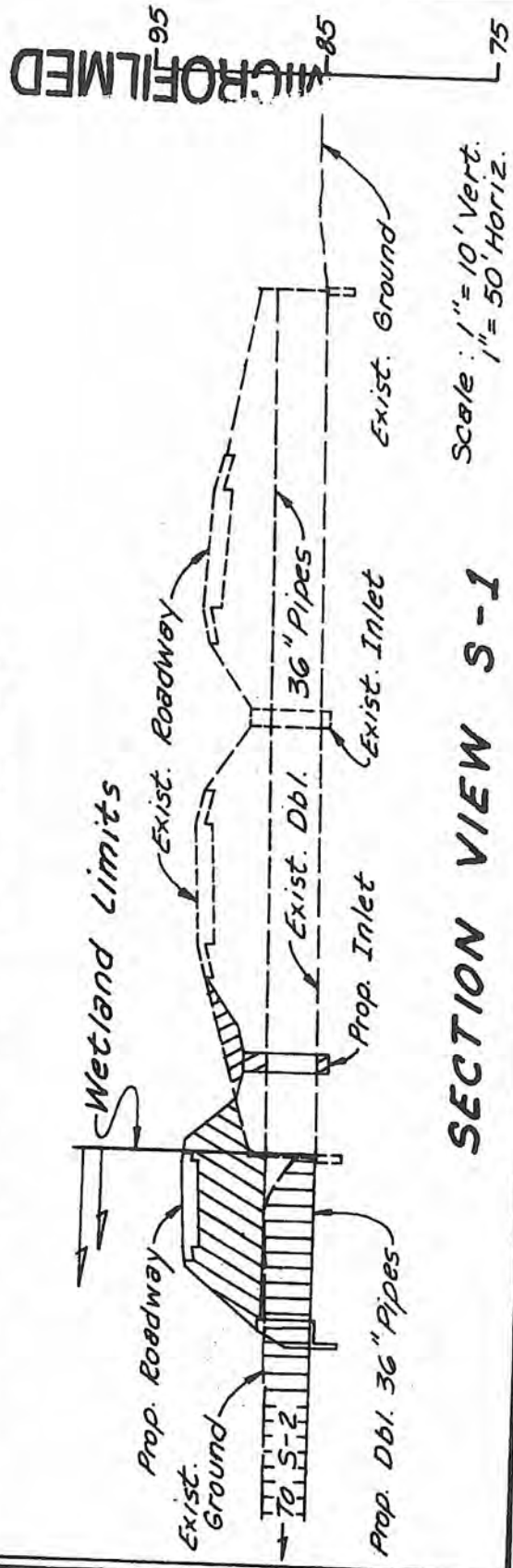
Date: 3/17/81

Sheet 2 of 7

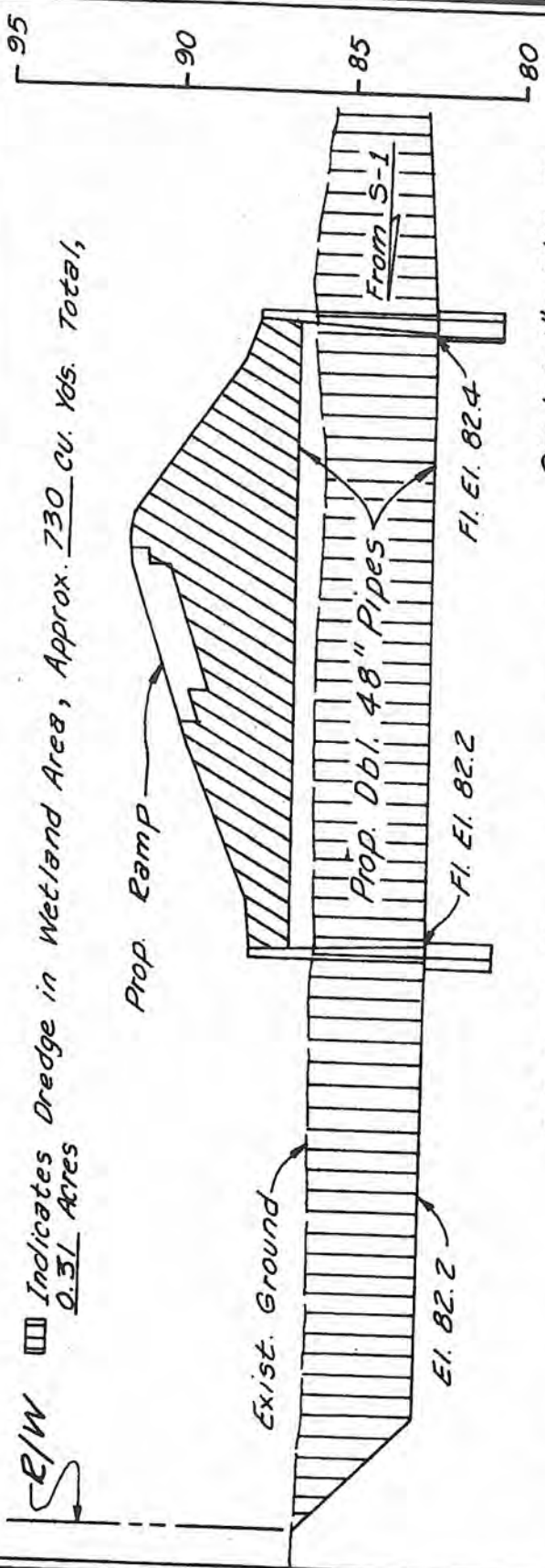
CD-12

▨ Indicates Deposit, Approx. 120 cu. Yds. Total

▩ Indicates Excavation, Approx. 640 cu. Yds. Total



SECTION VIEW S-1



SECTION VIEW S-2

Date: 3/17/81

Sheet 3 of 7

MICROFILMED

STATE PROJ. NO.	SHEET NO.
75000 - 3520	4

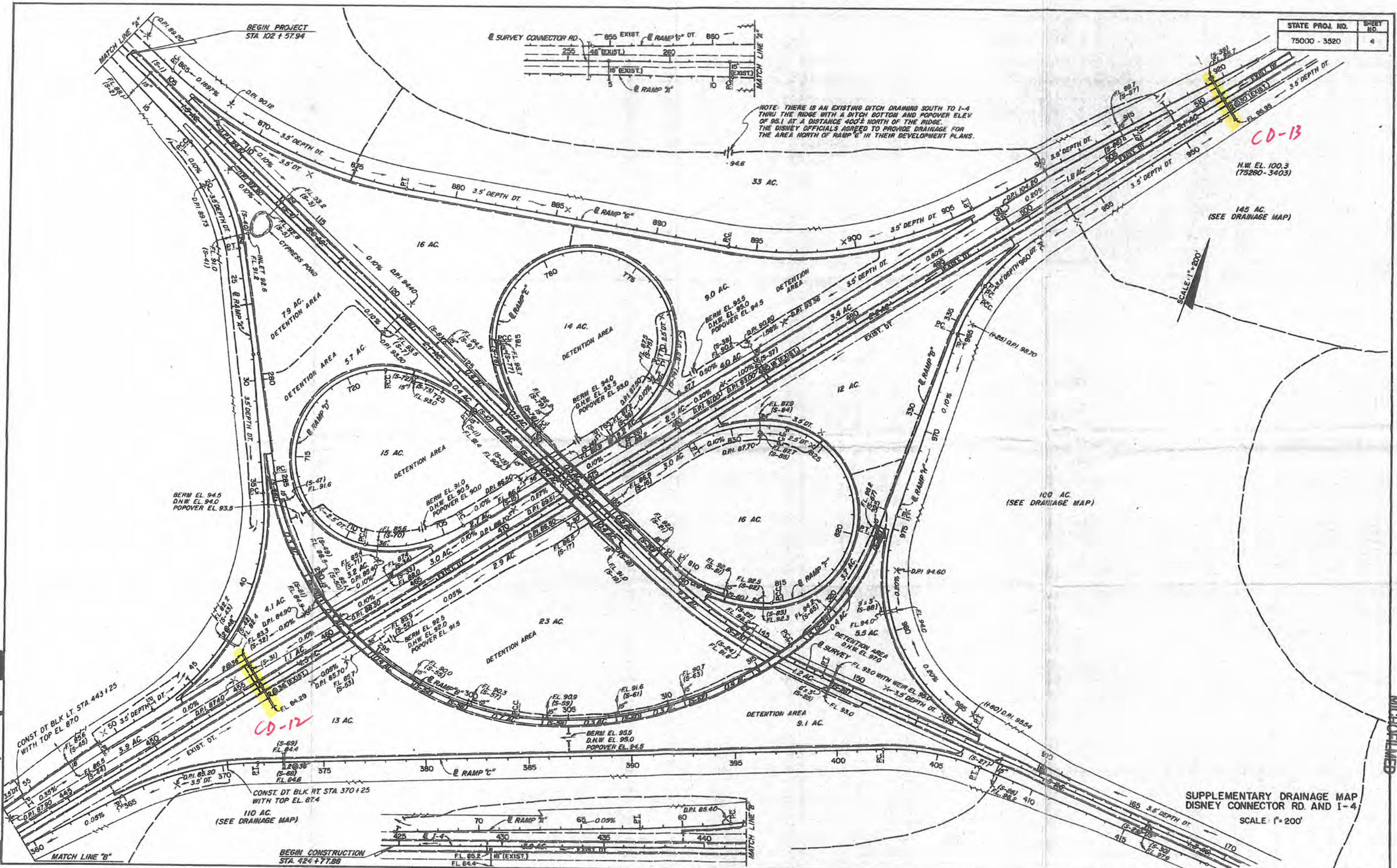
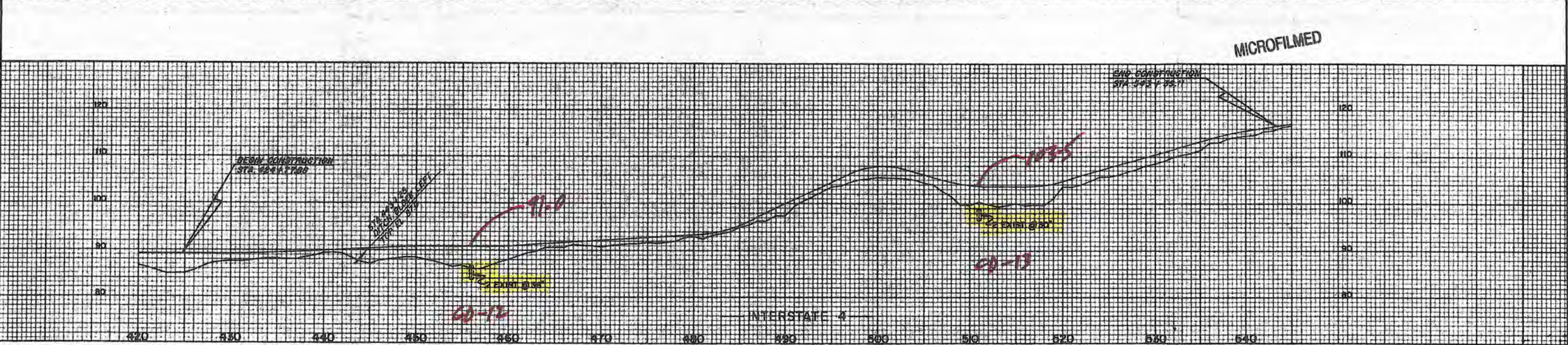
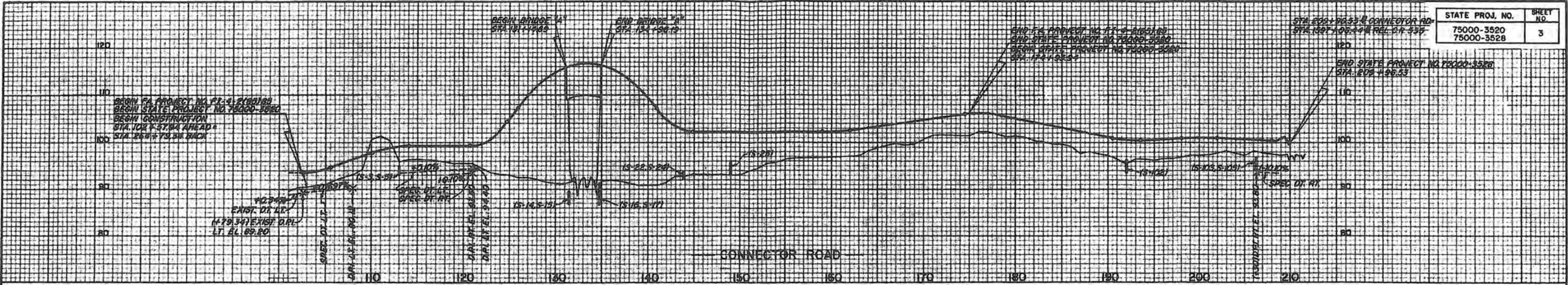
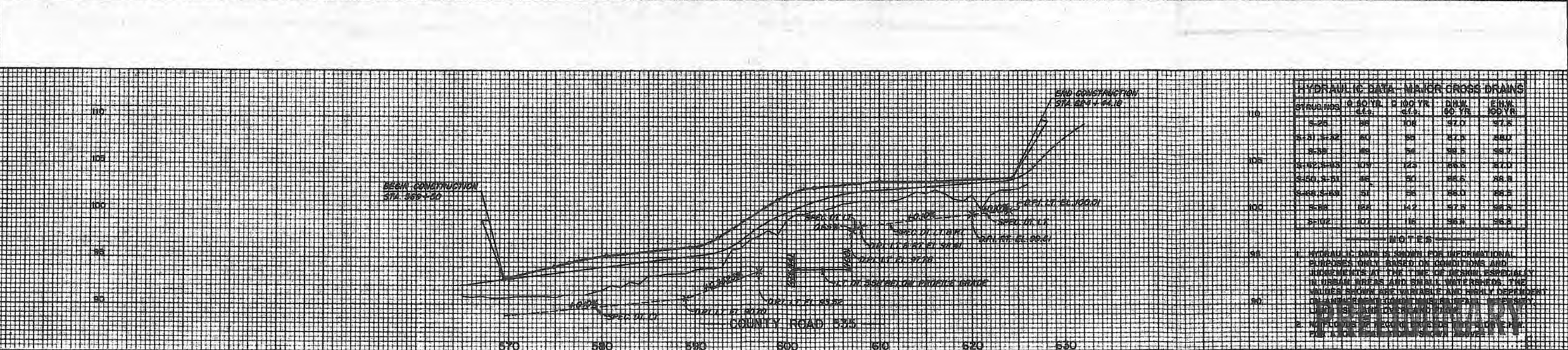


Exhibit 3

SUPPLEMENTARY DRAINAGE MAP  
DISNEY CONNECTOR RD. AND I-4  
SCALE: 1" = 200'



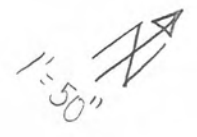
MICROFILMED



HYDRAULIC DATA - MAJOR CROSS DRAINS				
STATIONING	10 YR. F.T.	100 YR. F.T.	DNW. 100 YR.	ENW. 100 YR.
S-26	86	108	87.0	87.5
S-51 4+32	80	98	87.5	88.0
S-55	85	98	88.5	89.7
S-42 3+15	109	125	86.5	87.0
S-50 3+51	85	90	86.5	88.8
S-68 3+83	91	96	86.0	86.5
S-88	82	142	87.5	88.5
S-102	87	116	86.8	86.8

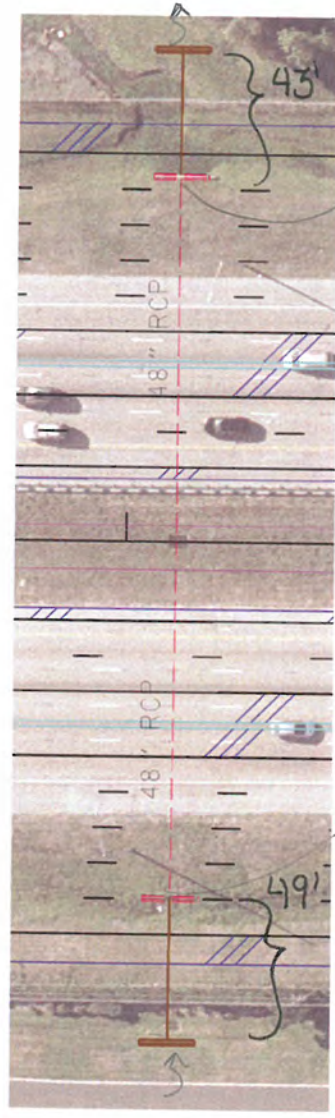
NOTES  
1. HYDRAULIC DATA IS SHOWN FOR INFORMATIONAL PURPOSES ONLY. BASED ON CONDITIONS AND SURVEYS AT THE TIME OF DESIGN, ESPECIALLY IN URBAN AREAS AND SHADY WATERWAYS. THE VALUES SHOWN ARE VARIABLE AND HIGHLY DEPENDENT ON FLOODING CONDITIONS. A FLOOD FLOW OF 100 CFS IS ASSUMED FOR THE DESIGN OF THE DRAINS.  
2. CONDITIONS OF DRAINAGE ARE SUBJECT TO CHANGE. SEE PLANS FOR DRAINAGE LOCATIONS.

MP 2.929



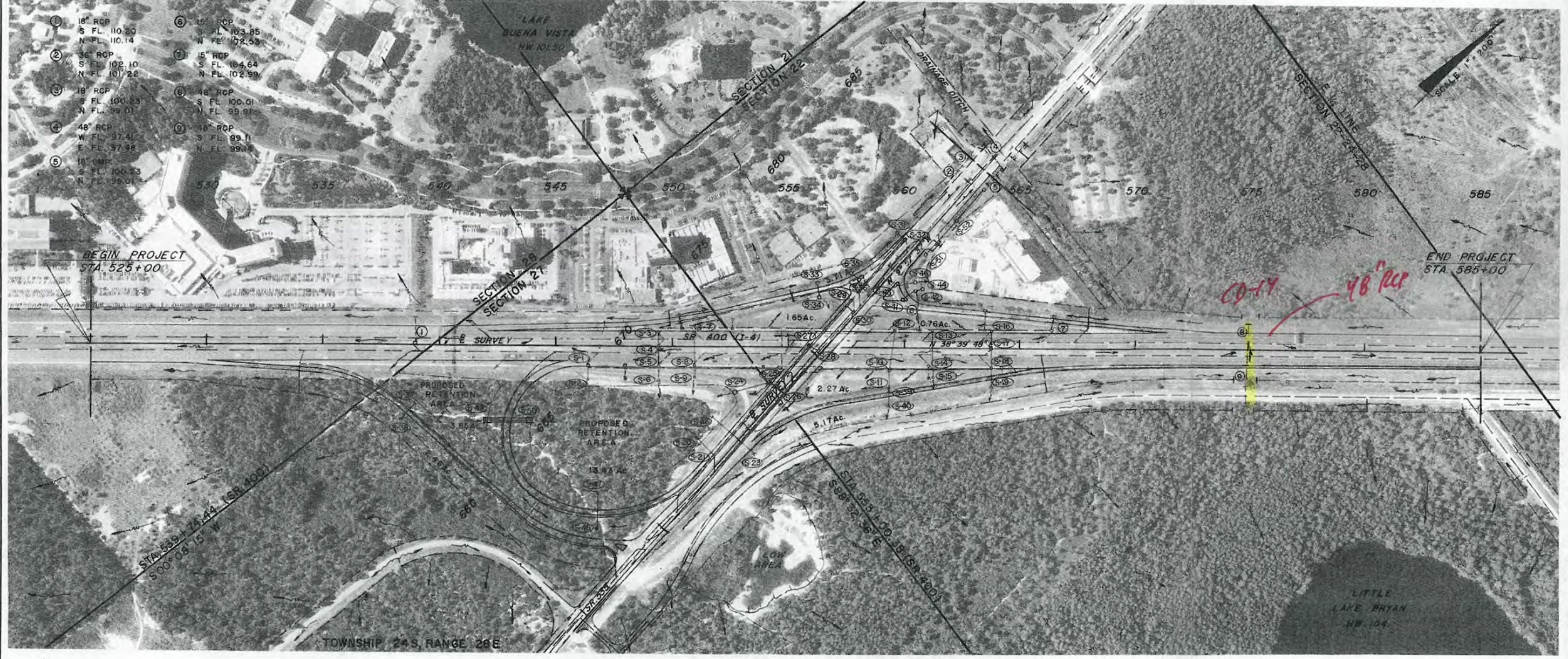
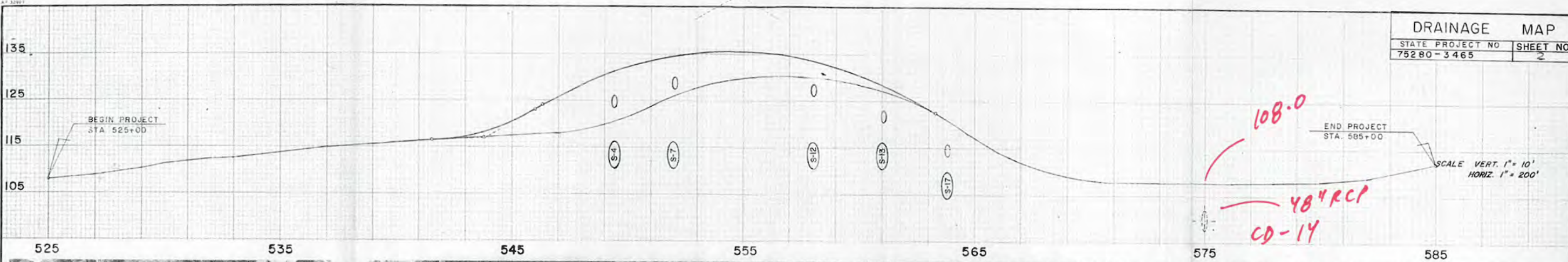
CD-17

S12535



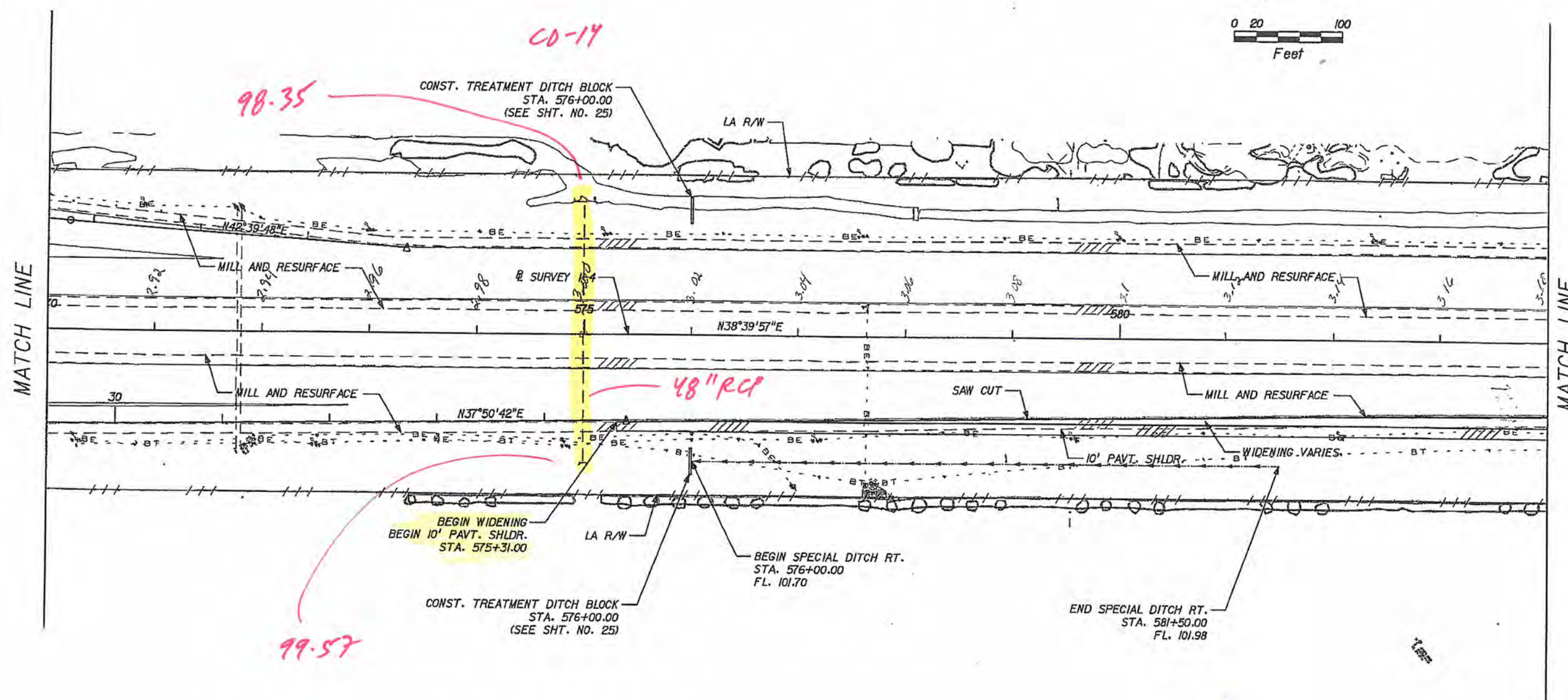
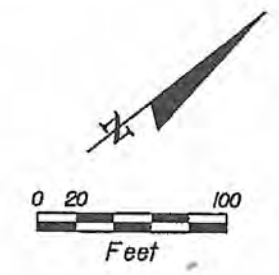
Approx  $99.20 - 0.85 = 98.35$

Approx.  $100.42 - 0.85 = 99.57$



REVISIONS				DESIGNED				DRAWN				APPROVED	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	NAME	DATE	NAME	DATE	DATE	DATE	DATE	
						PC	2-86	RR	2-86				

**DRAINAGE MAP**  
 SR 400 (I-4) & SR 535






MATCH LINE

MATCH LINE

*A.P. Melton*  
11/01/02  
AS-BUILT

TONY L. MELTON, P.E. #40398

DATE		BY	REVISIONS	HNTB CORPORATION 5850 T.G. LEE BLVD., SUITE 600 ORLANDO, FL 32822 PH. 407-859-8380 CA #6500	  	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			<b>I-4 AUXILIARY LANES PLAN 2</b>	SHEET NO.  31
DATE	BY	DESCRIPTION	ROAD NO.			COUNTY	FINANCIAL PROJECT ID			
						SR 400	ORANGE	405515-1-52-01		