CENTRAL FLORIDA EXPRESSWAY AUTHORITY

CFX Contract Number: 001844
CFX Project Number: 408-174

POND SITING REPORT

SR 408 CAPACITY IMPROVEMENTS FROM KIRKMAN ROAD TO CHURCH STREET

Spessard L. Holland East-West Expressway

PROJECT DEVELOPMENT & ENVIRONMENT STUDY

Submitted By:

Signature: _____

Gregory S. Seidel, P.E.
The Balmoral Group, LLC
September 18, 2023

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a registered professional engineer in the State of Florida practicing engineering with The Balmoral Group and that I have supervised the preparation of and approve the analysis, findings, opinions, conclusions and technical advice hereby reported for:

PROJECT: SR 408 Capacity Improvements
From Kirkman Road to Church Street
Project Development and Environment Study
Pond Siting Report
CFX Contract Number: 001844
CFX Project Number: 408-174
Orange County, Florida

The engineering work represented by this document was performed through the following duly authorized engineering business:

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This report provides the results of the preliminary analysis of the existing drainage conditions and the analysis required for the estimation of stormwater pond sizes for the proposed improvements including the potential pond locations for the Project Development and Environment Study for SR 408 (from Kirkman Road to Church Street). The results in this report are based on assumptions from existing permits, best available desktop data, and limited field investigation. It is recommended that additional site-specific analysis be performed during design or prior to purchasing any recommended sites. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of hydrologic analysis and hydraulic engineering as applied through professional judgment and experience.

Any engineering analysis, documents, conclusions or recommendations relied upon from other professional sources or provided with responsibility by the client are referenced accordingly in the following report.

FLORIDA REGISTERED ENGINEER:
Gregory S. Seidel, State of Florida, Professional Engineer, License No. 47571

Gregory S Seidel 2023.09.18 16:30:51-04'00'

This item has been digitally signed and sealed by Gregory S. Seidel on the date indicated here. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Table of Contents

Tables

Appendix

Project Information

Project Name:	SR 408 Capacity Improvements from Kirkman Road to Church Street PD&E Study
Projects Limits:	SR 408 from Kirkman Road to Church Street
County:	Orange
Proposed Activity:	Analyze and evaluate a proposed one-lane widening in the eastbound direction of SR 408 from SR 435 (Kirkman Road) to Church Street as well as an additional travel lane in the westbound direction from SR 423 (John Young Parkway) to SR 435 (Kirkman Road).
Water Management District:	St. Johns River Water Management District (SJRWMD - west of Kirkman Road) and South Florida Water Management District (SFWMD - east of Kirkman Road)
Responsible Agency:	Central Florida Expressway Authority (CFX)
Planning Organization:	CFX
Phase:	Project Development & Environment (PD&E) Study

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Project Location Map

Figure 1 – Project Location

Project Background & Description

Background

In September 2022, the Central Florida Expressway Authority (CFX) began a Project Development and Environment Study (PD&E) to widen approximately three miles of SR 408 between SR 435 (Kirkman Road) and Church Street.

More than 164,000 vehicles a day travel on SR 408 as it crosses downtown Orlando. Traffic has generally increased on the segment of SR 408 from SR 435 (Kirkman Road) to I-4 and is expected to continue to grow in the future. Currently in the project study area, eastbound SR 408 is a three-lane facility from SR 435 (Kirkman Road) to I-4, while westbound SR 408 is a four-lane facility from I-4 to SR 423 (John Young Parkway) then transitions to a three-lane facility to SR 435 (Kirkman Road).

This PD&E Study will analyze and evaluate a proposed widening of a one-lane addition in the eastbound direction of SR 408 from SR 435 (Kirkman Road) to Church Street as well as an additional travel lane in the westbound direction from SR 423 (John Young Parkway) to SR 435 (Kirkman Road) to provide greater capacity, reduce congestion and delay, and increase safety.

Study Description

The study area of this project includes the portion of SR 408 between SR 435 (Kirkman Road) and Church Street. Eastbound and westbound SR 408 is currently a three-lane facility from SR 435 (Kirkman Road) to Church Street. East of Kirkman Road is a toll gantry consisting of All Electronic Tolling (AET) for the mainline lanes and adjacent gantries for cash payments. Currently, this portion of SR 408 experiences congestion and delay, especially during peak hour commute from SR 435 (Kirkman Road) to I-4 (east of Church Street). The 6-month study will provide the necessary documented information for CFX to reach a decision on the type, design, and location of the proposed SR 408 improvements.

Purpose and Need

The purpose and need provide the basis for developing, considering, evaluating, and eliminating alternatives.

Purpose

The purpose of the study is to address increasing traffic congestion and improve mobility along a three-mile stretch of SR 408 between Kirkman Road and Church Street. With over 164,000 vehicles traveling daily in the area, the traffic volume has been steadily rising and is expected to continue growing. The project aims to widen SR 408 by adding an additional travel lane in each direction. The goal is to improve traffic flow, accommodate growing demands, reduce congestion and delay, and enhance safety.

Need

The need for adding capacity on SR 408 is based on several factors:
1) **Improve traffic flow**: Segments of SR 408 within the project limits currently operate at an acceptable Level of Service (LOS) D or better during both the AM and PM peak hours, except for the eastbound segment between Old Winter Garden Road and John Young Parkway which operates at an unacceptable LOS E in the AM. As travel demands continue to increase, the LOS is expected to deteriorate if nothing is done. By 2045, travel demands on SR 408 are expected increase by approximately 40%.
2) **Reduce congestion and delay**: If nothing is done, increasing travel demands will result in more congestion and delays. This will affect the reliability of SR 408 for those who rely on it for their daily commute.

3) **Enhance safety**: A review of existing crash data indicates that rear end collisions account for 46% of all crash types. This is indicative of increasing congestion and vehicles having to abruptly stop or slow down within a limited distance. If nothing is done, it is expected that crashes would increase.
4) **Support regional connectivity**: SR 408 is a vital transportation corridor connecting commuters to downtown Orlando and Interstate 4 (I-4). By enhancing the capacity and efficiency of SR 408, the improvements will contribute to regional connectivity and support economic growth and development.
5) **Provide consistency with local plans and policies**: Improvements to SR 408 are aligned with local plans and policies related to transportation infrastructure and land use. The surrounding areas of SR 408 exhibit a mix of commercial and residential land use, with downtown Orlando located nearby. By providing a more efficient roadway, the project will ensure consistency with the existing land use patterns and support the area's planned growth and development.
6) **Support economic benefits**: Successful implementation of the study recommendations will bring economic benefits to the region. Reducing congestion and improving traffic flow will enhance logistics and other business transportation routes for goods and services. Commuters will also experience shorter travel times, leading to increased productivity and quality of life.

Pond Siting Report (PSR) Overview

General Overview

The Balmoral Group and Kimley-Horn and Associates, Inc. are providing Project Development and Environment (PD&E) services for the Central Florida Expressway Authority (CFX). The purpose of this report is to analyze and provide a preliminary stormwater management plan for the SR 408 Capacity Improvements from Kirkman Road to Church Street and includes identification of potential stormwater pond locations (see Appendix A, Figure 1). The stormwater management for the additional water quality treatment and runoff attenuation will be provided using existing and proposed wet detention stormwater management facilities. The design of the stormwater facilities will comply with the standards set forth by CFX, St. Johns River Water Management District (SJRWMD), South Florida Water Management District (SFWMD), Orange County, and Florida Department of Transportation (FDOT).

Project Datum

Elevations in this report are with respect to the North American Vertical Datum of 1988 (NAVD88). Data sources based in NGVD29 are converted to NAVD88. The conversion from NAVD29 to NGVD88 is (+)0.915 using the National Oceanic and Atmospheric Administration National Geodetic Survey (NOAA NGS) coordinate conversion and transformation tool (i.e. 100.915 ft NGVD = 100.000 ft NAVD).

Roadway Description

Within the study limits, SR 408, is a six-lane divided highway with a paved median to the inside separated by barrier wall. The design speed is 60 mph and the posted speed is 60 mph. The proposed improvements include widening to eight lanes for the length of the project. The existing drainage system for this project consists of barrier wall inlets in a closed system that either discharge without treatment and attenuation or discharge into the existing SMFs for water quality treatment and attenuation.

Existing Conditions

The study area consists of both a closed basin and an open basin. Between Kirkman Road (SR 435) and Old Winter Garden Road, SR 408 drains south to the three interconnected Westside Manor Ponds located at the southeast quadrant of the SR 408 and Kirkman Road interchange. As a closed basin, the Westside Manor Ponds are landlocked with the only outfall being a pump station, which discharges south to Shingle Creek. SR 408 runoff between Old Winter Garden Road and Church Street is routed to Lake Mann, a large lake located south of SR 408 mainline and east of Ivey Lane. Lake Mann is an open basin with two discharge structures: a drainwell located at its southern most point that discharges into the groundwater and an overflow control structure at the southwest corner of the lake, which outfalls to the canal S-03 that flows south to Shingle Creek (**see Appendix A, Figures 2 through 6 for the Digital Elevation Map (DEM), USGS Quadrangle Map, NRCS Soil Map, Existing Landuse Map**).

Previous SR 408-252B record drawings and existing Environmental Resource Permits (ERPs) from the SFWMD and FDEP databases for the project corridor were researched to obtain stormwater and drainage design information. Some portions of SR 408 are treated in existing stormwater treatment facilities (SMFs) with other portions discharging directly into the Westside Manor Ponds or Lake Mann. See **Table 1** for the Existing Permit Summary and **Appendix C, Existing Permit Documentation**.

All existing SMFs within the project limits were designed under Contract 252B, which was permitted through FDEP (ERP 48-205102-001), which utilized existing facilities from older SFWMD permits. This included expanding or eliminating existing linear swales and modifying the control structure at the East West Expressway / John Young

Parkway (EWE/JYP) interchange ponds. Under this contract, SR 408 was widened from four to six lanes and a mainline toll plaza was added between Pine Hills Road and Old Winter Garden Road. The SMF design utilizes compensatory treatment and basin diversion to attenuate at the outfalls to accommodate these improvements.

Table 1 - Existing Permit Summary

Project Name	Permit No.	Date Issued	Description
Eastwest Exprwy/John Young Pkwy Interchange	SFWMD 48-00859-S (950406-2)	8/17/1995	Addition of EB off-ramp & WB on-ramp at the SR 408 & John Young Parkway (EWE/JYP) interchange. Included a SMF to provide treatment and attenuation for this interchange, which included future widening. Also modified an existing JYP pond. Included treatment of the interchange and treatment of offsite areas and future widening to accommodate new impervious along SR 408.
State Road 408 Contract 252	SFWMD 48-00859-S (980512-1)	6/12/1998	Widen SR 408 around existing toll plaza between JYP and Tampa Ave. The added impervious within the EWE/JYP interchange basin was less than the amount of future impervious permitted within the EWE/JYP SMF (App. 950406-2).
SR 408, Contract 252B	CFX Record Drawings & FDEP 48-205102-001	2/7/2008	Widen SR 408 from four-lane to six-lane facility. Contract 252B maximized all existing SMFs (linear swales and offsite wet detention facilities) and constructed new ponds to accommodate new impervious.
SR 408, Contract 505 (State Proj. No. 75008-6450-504)	CFX Record Drawings & SFWMD 20358-8	--	Original Plans and Calculations for Ponds 1H, 2H and 3H
Ivey Lane Improvements	SFWMD 48-00776-S 930622-1	7/27/1993	Plans and Calculations for Pond 3 (Old Winter Garden Road Pond)

Note: NAVD datum was assumed for all permits in Table 1.

Floodplains

The 100-year floodplain crosses the SR 408 right-of-way (R/W) at the large box culvert (10-ft x 10-ft) located 1,200-ft east of Kirkman Road interchange. This box culvert has an established base flood elevation (BFE) of 83.3 ft-NAVD, and this location is within the LOMR limits for the Westside Manor Ponds. There are no regulated floodways that cross SR 408 within the project limits.

A preliminary floodplain analysis was conducted utilizing best available desktop data including Light Detection and Ranging (LiDAR) to determine the extent of the proposed floodplain impacts resulting from the widening project. Roadway cross sections were prepared using LiDAR data and compared to existing roadway plans which verified their reasonable accuracy. The floodplain analysis evaluated the impact of the widened pavement between existing ground elevation and the 100-year base flood elevation. The existing ground elevation was used for evaluation rather than the seasonal high-water table, which is a more conservative approach. The preliminary floodplain analysis indicated that the impacts to the floodplain will be minimal, and it is anticipated that these impacts can be mitigated cup-for-cup within the R/W with use of walls as needed to remove fill encroachment (see **Appendix D, Floodplain Impact Analysis**).

Proposed Stormwater Management

The design of the stormwater facilities will comply with the standards set forth by CFX, SJRWMD, SFWMD, Orange County, and FDOT. Since FDEP performed the original permit review, an Environmental Resource Permit is anticipated from FDEP in lieu of separate permits from SJRWMD and SFWMD. This should be confirmed during design. Required pond sizes for each basin were calculated by evaluating runoff volume using the Natural Resources Conservation Service Curve Number (NRCS CN) method and calculating treatment volume requirements. These volumes were added together and combined with landscaping and maintenance berm assumptions to result in the total required pond size. Please refer to the summary below for the water quality, water quantity, and detention pond facilities configuration criterion used for the project.

Pond Sizing Methodology

The required pond volume for the proposed improvements is calculated by adding the required treatment volume to the required attenuation volume. The treatment volume includes the first flush runoff volume from the proposed developed site to be detained and treated prior to discharging downstream. The attenuation volume includes the storage of the additional runoff caused by the proposed development by minimizing the peak flowrate or volume from the site to mimic pre-development conditions so as not to adversely impact offsite properties.

The floodplain impact volume includes the storage lost due to the proposed roadway widening between the existing ground elevation and the 100-year base flood elevation. As mentioned above, the preliminary floodplain analysis indicated that the impacts to the floodplain will be minimal, and it is anticipated that these impacts can be mitigated within the R/W with use of walls as needed to remove fill encroachment.

Within this PD&E effort, it is assumed that each of the pond volume parameters are “stacked” instead of taking credit for any possible volume overlapping; this provides a conservative estimate which can be further evaluated during the final design phase.

Treatment Volume

For the purposes of this preliminary analysis, all proposed ponds are assumed to be wet detention facilities, except for modified Pond 2H, which is a wet retention pond with no outfall other than underdrain in the existing condition. The required treatment volume for wet ponds is larger than dry ponds and the water tables are generally shallow within the project area. It assumed that evaluation of pond types will be accomplished during the final design phase.

The SFWMD required treatment volume criterion for a wet detention pond is the greatest volume of either one inch over the basin or 2.5-inches over the new impervious area. An additional 50% of the standard treatment volume is required for impaired waterbodies or outstanding Florida waters (OFWs). A portion of the project is located within Lake Okeechobee Basin Management Action Plan (BMAP). Proposed ponds within open basins are sized to accommodate the additional treatment volume measures for impaired waterbodies. As the closed basin ponds do not outfall, no additional treatment was included for closed basins, and it was assumed that nutrient loading calculations would not be required for the closed basins. Nutrient loading requirements will be determined during final design and were not included in the pond sizing. Based on the existing wet ponds, nutrient loading requirements may be met by utilizing pre-roadway conditions or dry pre-treatment through an exfiltration system.

Attenuation Volume

Criteria set forth by SJRWMD, SFWMD, and Orange County was reviewed to determine the governing criteria from these agencies. For all open basins, criteria for attenuation utilized the SFWMD requirement of the post-development peak flow rate not exceeding the pre-development peak flow rate for the 25-yr/72-hr storm event, 10.8 inches of rainfall except for Basin P. Basin P was originally permitted and designed for the 25-yr/24-hr storm event, 8.6 inches of rainfall,

however, for this analysis, Basin P will be sized using the 25-yr/72-hr storm event. It was determined for closed basins to utilize the permitted criteria of 100-yr/24-hr, 10.6 inches of rainfall. Since no routing is being performed during this phase, the attenuation volume will be based on the pre-post difference in volume generation, not peak discharge rate. A pre-application meeting with SFWMD is highly recommended to verify criteria prior to R/W acquisition.

The NRCS CN Method was used to determine the difference in pre and post-development runoff generated. The attenuation volume was calculated for the additional impervious area along the corridor. The pre-development and post development CN's were calculated using the permitted areas as a basis for the pre-development calculations. The post development calculations included adjustment of the areas for the proposed widening. The increase in runoff was then calculated for the additional impervious area from the widening.

The soils within the project limits were generally from hydrologic soil group types A, A/D and C/D (see **Appendix A, Figure 4, NRCS Soil Map**). The types A/D and C/D indicate a hydrologic type for both the drained and undrained conditions. As the project corridor is elevated with roadside ditches as well as manmade stormwater conveyance ditches within the surrounding basins, the project vicinity is considered to be a drained condition. The permitted calculations for the existing basins was used as the basis for the proposed calculations. It was noted that soil type B/D was used in some areas along the project which appears to be type C/D in current maps. The soil type was not changed in the existing/permitted or proposed calculations as it is considered slightly conservative to use a type B/D soil as compared to a type C/D soil to determine the runoff increase from pervious soil to impervious widened pavement. It also keeps consistency with the permitted calculations.

Pond Sizing

For proposed pond sizing, the assumed pond geometry is a rectangle shape with a length double the width, 1:4 side slopes, one-foot of freeboard, 20-foot maintenance berm for CFX ponds, 20% additional area for landscaping/ tie-in slopes, and a minimum of 0.5 acres at the normal water elevation. The design high water depth is assumed to be 4-ft deep. Preliminary pond sizing calculations were performed to determine whether the existing ponds have sufficient capacity for the proposed widening as well as proposed stormwater pond sizing (see **Appendix B, Pond Calculations & Grading**).

Proposed Stormwater Facilities

The proposed basin outfalls along SR 408 are anticipated to match the permitted condition with basins ultimately discharging to the Westside Manor North Pond (closed basins) and Lake Mann (open basins). Basins 2H, 3H, I, J, K, L, and R are land-locked closed basins while Basins M, N, O, P, and Q are open basins with positive outfalls. Wet detention systems were sized to meet water quality and water quantity criterion for the project runoff. Floodplain impacts are minimal, and it is anticipated that these impacts can be mitigated within the R/W.

Potential pond locations within this pond siting analysis are based on a desktop review of the best available data and field review of the existing ponds and outfall locations. A more detailed evaluation should be performed to include further analysis of parcel, wildlife, environmental, contamination, and geotechnical considerations prior to pond sites being finalized (see **Appendix A, Figure 8, Proposed Pond Locations**).

From an environmental perspective, Orange County, is generally habitat to a number of listed species of birds, plants, and reptiles that could be found on the proposed pond sites. Listed birds include the Audubon's Crested Caracara, Everglade Snail Kite, Florida Scrub-Jay, and Wood Stork. Listed plants include the Beautiful Pawpaw, Britton's Beargrass, Florida Bonamia, Papery Whitlow-Wort, Scrub Buckwheat, Scrub Lupine, Scrub Plum, and Wide-Leaf Warea. Listed reptiles include the Eastern Indigo Snake and Sand Skink.

Basin 2H

In the existing condition, wet retention pond, Pond 2H, treats and attenuates runoff from Basin 2H, which consists of the southwest quadrant of the SR 408 and Kirkman Road interchange. Pond 2H is a closed basin within the SJRWMD

that was designed not to discharge for the 100-year/24-hour storm event. There is permitted underdrain within the pond side slopes and an emergency overflow which discharges to the Kirkman Road drainage system and ultimately to the Westside Manor Ponds.

Pond 2H also incorporates Basin 1H, which flows to Pond 1H, a dry retention pond to the northwest, before overtopping southeasterly into Pond 2H. No changes to Basin or Pond 1H are anticipated from the widening project are anticipated.

Field Review: During field review, it was noted that the underdrain cleanout at the outfall location was clogged with debris, and does not appear to be functioning. Also, the terminal shoulder gutter inlet for the adjacent ramp on the north side of the pond was completely clogged and resulted in ponding which overtopped the berm and flowed into Pond 2H berm, causing erosion of the berm and pond side slope. Other than the clogged underdrain, no other outfall from Pond 2H was apparent during field review. It was noted that there is room for expansion of the pond along its south side, where there is a 40-foot wide berm and existing power line.

Pond Alternative 2H1: For this proposed alternative, it is recommended to expand Pond 2H to continue to treat and attenuate the runoff from Basin 2H, as well as treating and attenuating the additional runoff from Basin 2H, Basin J and Basin K. Basin J is located in the southeast quadrant of the SR 408 and Kirkman Road interchange. Basin K extends from the eastern end of the Kirkman interchange to the bridge over Pine Hills Road. Currently, the runoff from Basins J and K discharge into the Westside Manor Ponds without treatment or attenuation. Basins 2H, J and K have 0.14 acres, 0.27 and 1.04 acres of additional impervious area, respectively, which results in a total additional impervious area of 1.45 acres to be treated in to Pond 2H. It is noted that the SR 408 Ramp K-1, located within Basin J and currently untreated, can be diverted to Pond 2H. In addition, there is potential to divert the untreated Basin K pavement which is draining to inlet I-6 to Pond 2H, however, this may necessitate proposed pipe placement under the SR 408 EB lanes.

As Pond 2H does not discharge during the design storm event, the existing treatment capacity for the SMF is 6.5 ac-ft. and will require expansion to provide sufficient capacity to treat the additional impervious area and additional runoff volume from the 3 basins. A preliminary layout for the expanded Pond 2H consisted of raising the berm elevation from El. 83.00-feet to El. 85.00-feet, and included use of walls along the west and south side of the pond. The preliminary length of the walls would be 375 feet and 505 feet on the west and south sides, respectively. It should be noted that grading around the entire pond will be necessary to raise the berm elevation 2-feet, but is expected to be minimal on the north and east sides of the pond.

The additional required treatment volume is estimated to be 0.30 ac-ft. While there is an existing treatment volume of 0.64 ac-ft, this volume is already included within the existing pond volume. The additional impervious area results in 1.14 ac-ft of runoff generated volume. The proposed volumes can be accommodated within the regraded Pond 2H. The peak stage will increase from the permitted stage of 82.63 feet to a stage of 83.19 feet. As the proposed berm is at El. 85.00-feet, the pond will provide 1.8 feet of freeboard for the 100-year/24-hour storm event.

It is recommended to expand Pond 2H to the west and south using walls with minor regrading around the north and east sides of the pond. No additional R/W will be required. The pond berm will be raised and the underdrain will require replacement with the proposed pond modifications. Diversion of flow from Basins J and K untreated pavement will be necessary for this alternative. Refer to **Appendix A**, **Figure 9A.**

An Environmental Conditions Technical Memo, prepared for this project, did not indicate any contamination concerns at this location. It should be noted that the Pond 2H modifications will require existing utility location, environmental site analysis, survey and geotechnical information.

Basin 3H

In the existing condition, wet detention pond, Pond 3H, treats and attenuates runoff from Basin 3H and I. Basin 3H consists of the northwest quadrant of the SR 408 and Kirkman Road interchange. Basin I is located in the northeast

quadrant of the SR 408 and Kirkman Road interchange. Pond 3H is a closed basin within the SFWMD that was designed for the 100-year/24-hour storm event and ultimately outfalls to the Westside Manor Ponds.

Pond Alternative 3H1: In the proposed condition, Pond 3H will treat and attenuate the additional runoff resulting from the widening within Basins 3H and I. Basins 3H and I have 0.15 acres and 0.45 acres of additional impervious area, respectively, which results in a total additional impervious area of 0.60 acres to be treated in to Pond 3H. The treatment capacity for Pond 3H is 11.58 ac-ft, which is sufficient to treat the additional impervious area. The additional required treatment volume is estimated to be 0.13 ac-ft. While the permitted treatment volume is 1.17 ac-ft for both basins, the existing pond already includes storage of this volume. The additional impervious area results in 0.25 ac-ft of runoff generated volume and would bring the peak stage from the permitted stage of 82.63 feet to elevation 82.89 feet. As the berm elevation is 85.00 feet, this leaves 2.1 feet of freeboard for the 100-year/24-hour storm event.

Pond 3H can sufficiently treat and attenuate the additional impervious area from Basins 3H and I. Therefore, no modifications to Pond 3H and no additional R/W are required. Refer to **Appendix A**, **Figure 9B**.

Basin L

In the existing condition, the wet detention Pond L, treats and attenuates runoff from Basin L_MR36 which is located along SR 408 between the Pine Hills Bridge and the Winter Garden Bridge. Pond L is in a closed basin within the SFWMD. It was designed for the 100-year/24-hour storm event, and ultimately outfalls to the Westside Manor Ponds.

It should be noted that Basin L includes five subbasins consisting of Basins L_48S, L_PHS, L_PHN, L_48 and L_MR36. Some of the pavement widening extended into Basins L_48S, L_PHS and L_PHN, however, the widened pavement area was included in the much larger Basin L_MR36 in the post development condition. Basin L_48 drains a small section of roadway pavement to a treatment swale located on the north side of SR 408 and east of Pine Hills Road. This swale outfalls into an existing 42-inch cross drain pipe, which then discharges to the Westside Manor Ponds. It appears that this swale will not be impacted by the widening and therefore, it can continue to function in the same manner as existing. Swale L_48 should be evaluated to determine if improved maintenance is warranted during final design.

Field Review: During field review, it was noted that Pond L does have room for expansion along the south side of the pond, which is the location of the existing outfall ditch for Pond L. In addition, the pond control structure and the outfall pipe appeared to be functioning adequately.

Pond Alternative L1: For this proposed alternative, Pond L will treat and attenuate the runoff from Basin L_MR36. Pond L will accommodate the treatment and attenuation from an additional 0.89 acres of impervious area. The additional required treatment volume is estimated to be 0.19 ac-ft. While the permitted treatment volume is 4.42 ac-ft for the basin, the existing pond already includes storage of this volume. The additional impervious area results in 1.05 ac-ft of runoff generated volume and would bring the peak stage from the permitted stage of 91.45 feet to elevation 91.83 feet. As the top of berm elevation is 93.00 feet, there is 1.17 feet of freeboard for 100-year/24-storm event.

Pond L can sufficiently treat and attenuate the additional impervious area from Basin L_MR36. Therefore, no modifications to Pond L and no additional R/W are required. Refer to **Appendix A**, **Figure 9C1**.

Basin M

Basin M is located along SR 408 between the bridges over Old Winter Garden Road and N. Ortman Drive. In the existing condition, the basin is divided into Subbasins M_North and M_South, for which the runoff discharges either to the north or to the south. For Basin M_North, there is an existing widened swale area along the north side that will be impacted by the widening, and currently provides 0.27 ac-ft of water quality treatment. For this study, it will be assumed that the Basin M-North Swale will be fully impacted by the widening. Basin M_South is currently untreated as there is no stormwater management facility within this basin. Basin M is an open basin within the SFWMD that ultimately discharges to Lake Mann via the Pine Hills Road drainage system and utilizes the 25-year/72-hour design storm event.

Field Review: During field review, it was noted that the M-North swale does not appear to be maintained adequately. The basin consists mainly of commercial and residential land use with a lack of undeveloped or vacant parcels of the size required for the proposed Basin M Pond. In addition, an apparent large vacant parcel was noted which is located south of the SR 408 R/W between N. Ivey Lane and N. Ortman Drive. The site has existing buildings/structures which appear vacated. From the Orange County property appraiser site, it was determined to be a 4.92-acre parcel (Parcel ID: 29-22-29-0000-00-040), owned by a business, Southern Fiber.

Pond Alternative M1: For this proposed alternative, a new proposed wet detention pond, Pond M1, will treat and attenuate the runoff from the 0.84 acres of additional impervious area. In addition, treatment will be provided for the 1.3 acres of existing treated impervious area, currently treated within the Subbasin M-North Swale which is expected to be fully impacted from the widening. The required treatment and attenuation volume for Pond M1 is 0.668 ac-ft and 0.523 ac-ft (total of 1.19 ac-ft), respectively, which results in an estimated pond area of 1.9 acres. The pond area is larger than required to hold the estimated pond volume due to the minimum 0.5 ac. area at the NWL criteria required by the SFWMD.

One potential location for proposed Pond M1 is the parcel at the southwest corner of SR 408 R/W and N. Ortman Drive. The site was chosen due to the proximity to the right-of-way, therefore, a drainage easement is not necessary for this location. The site is a 2.10-acre parcel (Parcel ID: 29-22-29-0000-00-022), owned by an existing business (Fosters Auto Crushing). The site is completely developed. The site is not within the 100-year FEMA floodplain, and is located in Zone X where there is minimal flood hazard. The soil encountered is Wabasso-Urban Land Complex with hydrologic soil group type C/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

From review of GIS information, the following was noted. No indication of geotechnical concerns was indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated a high risk contamination concern at this site. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond Alternative M1 appears to be sufficient size to provide the required treatment and attenuation for Basin M. Refer to **Appendix A**, **Figure 9D1**.

Pond Alternative M2: For this proposed alternative, a new proposed wet detention pond, Pond M2, will treat and attenuate the runoff from the 0.84 acres of additional impervious area. In addition, treatment will be provided for the 1.3 acres of existing treated impervious area, currently treated within the Basin M-North Swale, which will be fully impacted from the widening. The required treatment and attenuation volume for Pond M2 is 0.668 ac-ft and 0.523 ac-ft (total of 1.19 ac-ft), respectively, which results in an estimated pond area of 1.9 acres. The pond area is larger than required to hold the estimated pond volume due to the minimum 0.5 ac. area at the NWL criteria required by the SFWMD.

One potential location for proposed Pond M2 is the parcel at the northeast corner of SR 408 and N. Ortman Drive. The site was chosen due to the proximity to the right-of-way, therefore, a drainage easement is not necessary for this location. The site is a 1.59-acre parcel (Parcel ID: 29-22-29-4592-04-110), owned by a business (Kalsi Childrens Irrevocable Trust). The site is partially undeveloped with some buildings/structures. The site is not within the 100-year FEMA floodplain, and is located in Zone X where there is minimal flood hazard. The soil encountered is Wabasso-Urban Land Complex with hydrologic soil group type C/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

From review of GIS information, the following was noted. No indication of geotechnical concerns was indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated a low risk site located just east of the alternate location. From an environmental perspective, no

specific listed species were found in close proximity to the site.

Pond Alternative M2 does not appear to be a sufficient size to provide the required treatment and attenuation for Basin M. If use of this pond is chosen, a second site will be required. Refer to **Appendix A**, **Figure 9D2**.

Pond Alternative M3: For this proposed alternative, an existing wet detention pond, known as Ivey Lane Pond 3, will treat and attenuate the runoff from the 0.84 acres of additional impervious area. In addition, treatment will be provided for the 1.3 acres of existing treated impervious area, currently treated within the Basin M-North Swale, which will be fully impacted from the widening. The required treatment and attenuation volume for Pond Alternative M3 is 0.668 ac-ft and 0.523 ac-ft (total of 1.19 ac-ft), respectively.

This alternative includes use of the existing Pond 3, built for improvements to Ivey Lane. The existing permit information for this project has been reviewed. Field review indicates that this site could be expanded along the northwest corner of the existing pond parcel. The site is located 600-feet south of SR 408 along N. Ortman Drive, and the total size is 14.14 ac. The site was chosen due to the proximity to Basin M and its current use as a stormwater management facility. A drainage easement along N. Ortman Drive may be required, but it should be noted that the previously mentioned Basin M-North Swale currently outfalls to N. Ortman Drive, and then, it is presumed to discharge to Pond Alternative M3. The site is a 14.14-acre parcel (Parcel ID: 29-22-29-0000-00-041), owned by the Orange County Board of County Commissioners. The site is almost entirely occupied by the existing stormwater pond with some undeveloped area along the northwest side of the parcel. The site is not within the 100-year FEMA floodplain, and is located in Zone X where there is minimal flood hazard. The soil encountered is mainly Basinger fine sand, depressional with a hydrologic soil group type A/D; and a small amount of Wabasso-Urban Land Complex with hydrologic soil group type C/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the proposed location.

From review of GIS information, the following was noted. No indication of contamination or geotechnical concerns were indicated at the proposed site. From an environmental perspective, no specific listed species were found in close proximity to the site. Use of this pond or purchase of this pond site will need to be coordinated with Orange County.

Pond Alternative M3 appears to be a sufficient size to provide the required treatment and attenuation for Basin M. Refer to **Appendix A**, **Figure 9D3**.

Basin N

Basin N extends from the Ortman Bridge to the Ferguson Bridge and in the existing condition is divided into four subbasins, N_NW, N_NE, N_SW, and N_SE. With the exception of N_NE, each subbasin currently receives treatment and attenuation from a dry detention pond within the CFX right-of-way, which will be impacted by the project. Each pond discharges south, via ditches and storm sewer, and ultimately into Lake Mann. Basin N is an open basin within the SFWMD, and utilizes the 25-year/72-hour design storm event.

Pond Alternative N1: For this proposed alternative, a new proposed wet detention pond, Pond N1 will treat and attenuate the runoff from the 3.61 acres of additional impervious area, in addition to providing treatment and attenuation for the 10.93 acres of existing treated impervious area within Basin N due to the full impact of the widening to the Subbasin N_NW, N_SW, and N_SE Swales. The total required volume for Pond N1 is 4.544 ac-ft and 2.563 ac-ft (total of 7.11 ac-ft), respectively, which results in an estimated pond area of 3.9 acres.

One potential location for proposed Pond N1 is the parcel located northwest of and adjacent to the SR 408 R/W and the SR 408 WB Off-Ramp to Old Winter Garden Road. The site was chosen due to the proximity to the right-of-way, therefore, a drainage easement is not necessary for this location. The site is a 0.87-acre parcel (Parcel ID: 29-22-29-4592-02-110), owned by an existing business (Steppi Roofing Inc.). The site is classified as commercial vacant land by the residential per the Orange County Property Appraiser website. As the parcel is not large enough to provide the necessary treatment and attenuation for Basin N, it will need to be used in combination with another Basin N site. The

site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered is Wabasso-Urban Land Complex with hydrologic soil group C/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

From review of GIS information, the following was noted. No indication of geotechnical concerns was indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated a low risk site located just west of the alternate location. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond Alternative N1 does not appear to be a sufficient size to provide the required treatment and attenuation for Basin N. If use of this pond is chosen, a second site will be required. Refer to **Appendix A**, **Figure 9E1**.

Pond Alternative N2: For this proposed alternative, a new proposed wet detention pond, Pond N2 will treat and attenuate the runoff from the 3.61 acres of additional impervious area, in addition to providing treatment and attenuation for the 10.93 acres of existing treated impervious area within Basin N due to the full impact of the widening to the Subbasin N_NW, N_SW, and N_SE Swales. The total required volume for Pond N2 is 4.544 ac-ft and 2.563 ac-ft (total of 7.11 ac-ft), respectively, which results in an estimated pond area of 3.9 acres.

One potential location for proposed Pond N2 is the six (6) parcels located south of the SR 408 R/W and west of Ferguson Drive. These parcels are just west of expanded Pond O1, and exclude the existing billboard property. The sites were chosen due to their proximity to the right-of-way, therefore, a drainage easement is not necessary at this location. These parcels comprise a total area of 1.94 acres (Parcel IDs: 28-22-29-5600-60-(710, 720, 730, 770, 780 & 790)), owned primarily by an existing business (BPB Enterprises Inc.) with Parcel 710 indicated to be vacant residential. The site is classified as vacant commercial and residential, per the Orange County Property Appraiser website. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered is primarily Wabasso-Urban Land Complex with hydrologic soil group type C/D and includes a small amount of Hontoon Muck, with hydrologic soil group type A/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take. This location will also provide improved maintenance access to Pond O and the back side of the noise walls.

As this site is located outside of the Basin N boundary, a desktop review was performed to demonstrate the hydraulic viability of the site. From LiDAR contours, Pond Alternative N2 is has an average ground elevation of 97.5-ft NAVD. From the existing Roadway Plans, Basin N reaches a low point in the profile of approximate El. 100.0-ft NAVD at Station 1852+00, with the right edge of pavement at approx. El 99.2-ft NAVD. The distance from the low point in the road to the outfall location into Pond N2 (at Station 1869+00 (Rt.)) is 1,700 feet. With use of an assumed design depth of 4-feet and an additional 1-ft of freeboard, the assumed pond control elevation at the site would be 92.5-feet NAVD. As the low point in the road elevation is above the assumed pond control elevation at the pond site, the proposed pond location is assumed to be viable.

From review of GIS information, the following was noted. No indication of contamination or geotechnical concerns were indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated no sites in the vicinity of this alternative. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond Alternative N2 does not appear to be a sufficient size to provide the required treatment and attenuation for Basin N. If use of this pond is chosen, a second site will be required. Use of this site in combination with Pond Alternative Q2 is recommended for Basin N. Refer to **Appendix A**, **Figures 9E2 and 9H2**.

Pond Alternative N3: For this proposed alternative, a new proposed wet detention pond, Pond N3 will treat and attenuate the runoff from the 3.61 acres of additional impervious area, in addition to providing treatment and attenuation

for the 10.93 acres of existing treated impervious area within Basin N due to the full impact of the widening to the SubBasin N_NW, N_SW, and N_SE Swales. The total required volume for Pond N3 is 4.544 ac-ft and 2.563 ac-ft (total of 7.11 ac-ft), respectively, which results in an estimated pond area of 3.9 acres.

One potential location for proposed Pond N3 is the two (2) parcels located at northeast of the SR 408 and Ferguson Drive R/W. These parcels were chosen due to their proximity to the right-of-way, therefore, a drainage easement is not necessary at this location. The site is a 3.07-acre parcel (Parcel ID: 28-22-29-0000-00-(110 &112)), owned by an existing business (BYIC LLC). The site is largely developed. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered is primarily Wabasso-Urban Land Complex with hydrologic soil group type C/D and includes a portion of Hontoon Muck, with hydrologic soil group type A/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

As this site is located outside of the Basin N boundary, a desktop review was performed to assess the hydraulic viability of the site. It was determined that the site has similar hydraulic viability to Pond Alternative N2. As the assumed pond control elevation for this location is higher than Pond Alternative N2, it should be noted that, if necessary, the groundwater can be controlled at a lower elevation to ensure viability of this pond site.

From review of GIS information, the following was noted. No indication of geotechnical concerns was indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated low risk and medium risk sites located just north of the alternate location. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond Alternative N3 does not appear to be a sufficient size to provide the required treatment and attenuation for Basin N. If use of this pond is chosen, a second site will be required. Refer to **Appendix A**, **Figure 9E3**.

Pond Alternative N4: For this proposed alternative, a new proposed wet detention pond, Pond N4 will treat and attenuate the runoff from the 3.61 acres of additional impervious area, in addition to providing treatment and attenuation for the 10.93 acres of existing treated impervious area within Basin N due to the full impact of the widening to the Subbasin N_NW, N_SW, and N_SE Swales. The total required volume for Pond N4 is 4.544 ac-ft and 2.563 ac-ft (total of 7.11 ac-ft), respectively, which results in an estimated pond area of 3.9 acres.

One potential location for proposed Pond N4 is the parcel located northeast of the SR 408 R/W and immediately west of N. Cottage Hill Road. The site was chosen due to the proximity to the right-of-way, therefore, a drainage easement is not necessary for this location. The site is a 5.06-acre parcel (Parcel ID: 28-22-29-0000-00-121), owned by an existing business (Orlando-Union Rescue Mission). The site is undeveloped. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered is primarily Hontoon Muck, with hydrologic soil group type A/D, and includes a portion of Wabasso-Urban Land Complex with hydrologic soil group type C/D. There are no wetlands identified at this location per the National Wetland Inventory, however, it appears that there is potential for wetlands at this site, and wetlands should be further assessed if this site is chosen. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take. It was noted during field review that there is an area of the parcel containing large cypress trees indicating the existence of wetlands. Field verification of wetlands on the site should be performed during final design.

A desktop review was performed to demonstrate that this site is anticipated to be viable from a hydraulic perspective. It was determined that the site has similar hydraulic viability to Pond Alternative N2.

From review of GIS information, the following was noted. No indication of geotechnical concerns was indicated at the proposed site. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated a medium risk site located just northwest of the alternate location. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond Alternative N4 appears to be sufficiently sized to provide the required treatment and attenuation for Basin N. Refer to **Appendix A**, **Figure 9E4**.

Basin O

Basin O extends from the Ferguson Bridge to North Cottage Hill Road. In the existing condition, the wet detention pond, Pond O, treats and attenuates runoff from Basin O. Existing Pond O is located just west of the eastbound off-ramp to John Young Parkway on the south side of SR 408, and will not be impacted by the widening project. Pond O outfalls to the south via a pipe system along an unpaved gated easement or roadway to W. Washington Street, where the system continues west. The outfall pipe crosses Bayshore Drive prior to discharging into a ditch at Roosevelt Martin Park, which then conveys to Lake Mann. Basin O is an open basin within the SFWMD that was designed for the 25-year/72-hour storm event.

Field Review: During field review, it was noted that Pond O appears to have ample room for expansion, particularly along the northwest side of the pond. The pond control structure appeared to be functioning adequately, however, the pond is not easily accessed due to its location. In addition, the pond control structure was covered with vegetation, and performance of more frequent maintenance would be recommended.

Proposed Expansion of Pond O: For this proposed alternative, Pond O will be expanded to treat and attenuate the runoff from Basins O. Pond O will accommodate the treatment and attenuation from an additional 1.14 acres of impervious area in addition to the existing impervious area of 4.75 acres. The total required treatment volume is 1.35 ac-ft which includes treatment of the existing and additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP. As existing Pond O cannot accommodate this volume, Pond O will be expanded

Pond Alternative O1: For this pond alternative, Pond O will be expanded to a total of 1.45 acres. Pond O2 will require a new outfall structure, and an improved outfall. There appears to be room for expansion, within the current pond parcel, just northwest of the pond, within the CFX right-of-way. The soils at the Pond O1 site consist of slightly more Hontoon Muck, with hydrologic soil group type A/D, than Wabasso-Urban Land Complex with hydrologic soil group type C/D. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The storage for the proposed and regraded Pond O1, which utilized the entire parcel, was used to determine preliminary design stages. The total treatment and attenuation volume of 3.42 ac-ft would bring the peak stage from the permitted stage of 101.19 feet to elevation 100.07 feet. As the top of berm elevation is 102.00 feet, there is 1.83 feet of freeboard for 25-year/72-hour storm event.

Pond O1 has more than enough capacity to treat and attenuate the additional impervious area from Basin O. No additional right-of-way would be needed for use of this alternative.
Refer to **Appendix A**, **Figure 9F1**.

Pond Alternative O2: For this proposed alternative, multiple ponds, Pond O2, Pond P1 and Pond P2 will be utilized to treat and attenuate the runoff from Basins O and P. These ponds will accommodate the treatment and attenuation from an additional 1.91 acres of impervious area in addition to the existing impervious area of 9.08 acres. The total required treatment volume is 2.49 ac-ft which includes treatment of the existing pavement and the additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP. As mentioned above, existing Pond O cannot accommodate this volume, Pond O will be expanded to a total of 2.27 acres. Pond O will require a new outfall structure, and an improved outfall. There appears to be room for expansion, within the current pond parcel, just northwest of the pond, within the CFX right-of-way. In addition, existing Pond P, (discussed below), and an additional pond, Pond P2, will be included with this alternative. Storage for the proposed Pond P2 has been preliminarily developed. The intent of this alternative is to provide additional storage to be used for both basins or potentially additional basins within existing CFX R/W.

For Pond O2, existing Pond O will be expanded to a total of 2.27 acres. Pond O2 will require a new outfall structure, and an improved outfall. There appears to be room for expansion, within the current pond parcel, just northwest of the pond, within the CFX right-of-way and including a new parcel on the south side of the existing pond. The parcel is 0.83-acres (Parcel ID: 28-22-29-1764-02-080), owned privately and classified as vacant residential per the Orange County Property Appraiser website. The soils at the Pond O2 site consist of slightly more Hontoon Muck, with hydrologic soil group type A/D, than Wabasso-Urban Land Complex with hydrologic soil group type C/D. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The storage for the proposed and regraded Pond O2, which utilized the entire parcel, was used to determine preliminary design stages. The total treatment and attenuation volume of 3.42 ac-ft would bring the peak stage from the permitted stage of 101.19 feet to elevation 98.32 feet. As the top of berm elevation is 102.00 feet, there is 3.68 feet of freeboard for 25-year/72-hour storm event.

The storage for the proposed and regraded Pond O2 and Pond P2 in addition with the Pond P existing storage volume was utilized to show that the storage volumes are more than adequate for these 2 basins, and there is potential to combine other basins during the design, as needed. The total storage required for treatment and attenuation of Basins O and P, and additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP is 6.57 ac-ft. While providing 1-ft of freeboard, Pond O2, Pond P and Pond P2 have storage volumes of 7.69 ac-ft, 4.25 ac-ft and 0.43 ac-ft, respectively, which is a total storage of 12.37 ac-ft. There is potential to include storage for Basin N or Basin Q within this proposed connected pond system.

These three ponds have more than enough capacity to treat and attenuate the additional impervious area from Basins O and P. No additional right-of-way would be needed for this pond alternative as all the sites are within current CFX R/W. Refer to **Appendix A**, **Figure 9F2**.

Basin P

In the existing condition, the wet detention pond, Pond P, treats and attenuates runoff from Basin P. Basin P is located on the west side of the SR 408 and John Young Parkway interchange and is an open basin within the SFWMD that was designed for the 25-year/72-hour storm event. Pond P is located just west of the SR 408 eastbound off-ramp to John Young Parkway and ultimately outfalls to a ditch that drains to Lake Mann. Pond P was originally designed for the widening of the expressway and accounted for an additional 0.60 acres. When the expressway was widened to six lanes the actual increase in impervious area utilized 0.45 acres of impervious area.

Field Review: During field review, it was noted that Pond P does have room for expansion, if needed, but may require walls to provide additional storage. The pond control structure appeared to require maintenance. There was leaking from the pond into the structure at the joint between the top and the bottom of the outfall structure, which should be repaired, as the flow into the structure is below the orifice elevation. In addition, there was a large amount of debris/trash located in the vicinity of the outfall structure. The outfall ditch for Pond P was checked, and appeared to be in adequate condition. The water level within the ditch was low and the grass height was moderate.

Pond Alternative P1: For this proposed alternative, existing Pond P will treat and attenuate the runoff from Basin P. The proposed condition estimates an additional 0.77 acres of impervious area in addition to the existing impervious area of 4.33 acres. The total required treatment volume is estimated to be 1.14 ac-ft and includes the additional impervious treatment volume of 0.24 ac-ft, which includes 50% volume for discharge to the Lake Okeechobee BMAP. The provided treatment volume is 1.14 ac-ft, and would require modification of the outfall weir from an elevation of 100.30-ft to 100.48-ft. The total storage capacity of Pond P is 4.25 ac-ft.

The total treatment and attenuation volume of 3.15 ac-ft would bring the peak stage from the permitted stage of 101.85 feet to elevation 102.23 feet. As the top of berm elevation is 104.00 feet, there is 1.77 feet of freeboard for 25-year/72-hour storm event.

Pond Alternative P1, or existing Pond P, has more than enough capacity to treat and attenuate the additional

impervious area from Basin P. No additional right-of-way would be needed. Refer to **Appendix A**, **Figure 9G1**.

Basin Q

In the existing condition, there is no stormwater treatment facility with Basin Q. Basin Q is location on the east side of the SR 408 and John Young Parkway interchange and is an open basin within the SFWMD. Basin Q outfalls to the southwest via double 42-inch pipes to the outfall ditch to the south of Pond P, which ultimately drains to Lake Mann.

Field Review: During field review, the outfall ditch for Basin Q was checked, and appeared to be in adequate condition. The water level within the ditch was low and the grass height was moderate. It is the same ditch that serves as outfall for Pond P.

Pond Q

Basin Q extends along SR 408 from east of John Young Parkway to the Church Street Bridge. In the existing condition, this basin currently has no water quality treatment or attenuation except for the compensating treatment credited within the Basin P pond. Basin Q is an open basin and utilizes the 25-year/72-hour design storm event. This area drains to the west into a ditch that discharges into Lake Mann. This ditch also serves as the outfall ditch for Pond P (Pond Alternative P1)

Pond Alternative Q1: For this proposed alternative, a new proposed wet detention pond, Pond Q1 will treat and attenuate the runoff from the 0.56 acres of additional impervious area from the widening. The total required volume for Pond Q is 0.50 ac-ft, which results in an estimated area of 1.9 acres. The pond area is larger than required to hold the estimated pond volume due to the minimum 0.5 ac. area at the NWL criteria required by the SFWMD.

One potential location for Pond Q1 is the 2.08-acre parcel located just east of John Young Parkway R/W and north of the SR 408 westbound off-ramp. The site was chosen due to the proximity to the right-of-way, and therefore, a drainage easement is not necessary. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered is Wabasso-Urban Land Complex with hydrologic soil group C/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

From review of GIS information, the following was noted. From a contamination perspective, an Environmental Conditions Technical Memo, prepared for this project, indicated low risk and medium risk sites within this alternate location. From an environmental perspective, no specific listed species were found in close proximity to the site. From a geotechnical perspective, a Florida Subsidence Incident was reported approximately 100-feet from the proposed site. Refer to **Appendix A**, **Figure 9H1**.

Pond Alternative Q2: For this proposed alternative, multiple ponds, Pond O2, Pond P1, Pond P2 and Pond N2 will be utilized to treat and attenuate the runoff from Basins N, O, P and Q. These ponds will accommodate the treatment and attenuation from an additional 0.56 acres of impervious area. The total required treatment volume is 0.18 ac-ft which includes treatment of the additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP. It will be necessary to acquire R/W for Pond N2 and one Parcel for Pond O2, as all the remaining pond sites are within CFX R/W.

As previously mentioned, one potential location for proposed Pond N2 are the six (6) parcels located south of the SR 408 R/W and west of Ferguson Drive. These parcels are just west of expanded Pond O2, and exclude the existing billboard property. The sites were chosen due to their proximity to the right-of-way, therefore, a drainage easement is not necessary at this location. These parcels comprise a total area of 1.94 acres (Parcel IDs: 28-22-29-5600-60-(710, 720, 730, 770, 780 & 790)), owned primarily by an existing business (BPB Enterprises Inc.) with Parcel 710 indicating residential. All parcels are vacant according to the Orange County Property Appraiser website. The Pond Alternative O2 required parcel is a 0.83-acre (Parcel ID: 28-22-29-1764-02-080), classified as vacant residential. The site is not within the 100-year FEMA floodplain and is located in Zone X where there is minimal flood hazard. The soil encountered

is primarily Wabasso-Urban Land Complex with hydrologic soil group type C/D and includes a small amount of Hontoon Muck, with hydrologic soil group type A/D. There are no wetlands identified at this location per the National Wetland Inventory. There are no cultural/historic resources within a 500-foot buffer of the potential parcel take.

This alternative includes diverting flow from an existing ditch which currently conveys untreated runoff from Basin Q and also serves as the outfall ditch for Pond P. This ditch extends along the south side of existing Pond P. The flow from the ditch would be diverted into Pond P1 while reversing the existing flow direction by moving the Pond P1 outfall to the north side of the pond with flow discharging toward the northwest into Pond P2. Pond P2 outflow will connect to Pond O2 to the northwest. Pond O2 and Pond N2 will outfall to the same location as existing Pond O, an easement located just west of Pond O. Stormwater modeling will be required during final design to ensure that this is a viable alternative from hydraulic perspective.

From review of GIS information, the following was noted. No indication of contamination or geotechnical concerns were indicated at the proposed site. From an environmental perspective, no specific listed species were found in close proximity to the site.

Pond N2 has not been shown to be an adequate size to treat and attenuate the additional runoff as well as existing treated areas within Basin N. However, the storage for the proposed and regraded ponds, Pond O1 and Pond P2, in addition with the Pond P existing storage volume was utilized to show that the storage volumes are more than adequate for Basins O, P and Q, and is assumed will be sufficient to provide enough capacity for Basin N as well. The total storage required for treatment and attenuation of Basins O and P with the additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP is 6.57 ac-ft. The total storage for Basin Q includes only the treatment and attenuation of the additional impervious area plus 50% additional water quality treatment for discharge to the Lake Okeechobee BMAP, and is 0.50 ac-ft. The total required storage for Basins O, P and Q is 7.07 ac-ft. While providing 1-foot of freeboard, Pond O1, Pond P and Pond P2 have storage volumes of 7.69 ac-ft, 4.25 ac-ft and 0.43 ac-ft, respectively, which is a total storage of 12.37 ac-ft. There is potential to include storage of other basins within this proposed connected pond system.

The proposed four ponds will have more than enough capacity to treat and attenuate the additional impervious area from Basins N, O, P and Q. For this alternative, proposed R/W will be required for Pond O2 and Pond N2. Refer to **Appendix A**, **Figure 9H2**.

Basin R

Basin R extends along SR 408 from the Church Street Bridge to west of the Tampa Avenue Ramps. In the existing condition, this basin has no treatment or attenuation. It is a closed basin that discharges to Sunset Lake, via storm drains outside the CFX right-of-way. As part of the proposed condition, 0.02 acres of impervious area is added to the basin. Per CFX Project 408-252B, 2.3 acres of untreated impervious area was previously removed from the basin. Additionally, as part of the CFX project 408-315 60% Stormwater Management Report, Basin R (Basin 1) will be reduced. Since, the addition of impervious area is minimal and does not exceed the impervious area previously reported, no improvements are proposed for Basin R as part of this study.

Conclusions and Recommendations

Proposed pond alternatives for the widening of the SR 408 corridor have been assessed per basin. Potential pond locations within this pond siting analysis are based on a desktop review of the best available data and field review of the existing ponds and outfall locations. A more detailed evaluation should be performed to include further analysis of parcel, wildlife, environmental, contamination, and geotechnical considerations after selection of pond sites during design. It will be important to evaluate potential contamination early within the design process.

For Basins 2H, 3H, L and P, use of existing pond sites is recommended as shown (in green shading) in **Table 2**, and no new R/W is required. The recommended pond alternatives for the project basins that will require acquisition of offsite R/W are shown in blue shading in **Table 2**. For Basin M, selection of Pond Alternative M3 was based upon joint use of an existing Orange County pond which appears to have sufficient room for expansion. Use of this pond or purchase of this pond site will need to be coordinated with Orange County. For Basin N, selection of Pond Alternative N2 was based upon acquisition of vacant parcels that are adjacent to existing Pond O with no evident contamination, utilities, wetlands or floodplain concerns. As Pond Alternative N2 is not large enough, use of this site in combination with Pond Alternative Q2 is recommended for Basin N. For Basin O, selection of Pond Alternative O2 was based upon use of existing CFX R/W and one acquisition parcel that is vacant with no evident contamination, utilities, wetlands or floodplain concerns. For Basin O, selection of Pond Alternative O2 was based upon use of existing CFX R/W and one acquisition parcel that is vacant with no evident contamination, utilities, wetlands or floodplain concerns. For Basin Q, selection of Pond Alternative Q2 was based upon use of existing CFX R/W and acquisition of vacant parcels with no evident contamination, utilities, wetlands or floodplain concerns.

Table 2– Pond Alternative Matrix

Pond Alternative	Contamination Potential[1]	Utilities[5]	Floodplain	Is R/W Existing CFX?[2]	Property Use (per Property Appraiser)	Business Damages Anticipated?	Pond Alternative Area (ac.)	Meets or Exceeds Required Size?	Offsite Pond Area Required (ac.)
2H1	No	Yes – power line	Yes	Yes	Pond	No	3.02	Yes	N/A
3H1	No	No	Yes	Yes	Pond	No	2.52	Yes	N/A
L1	No	No	Yes	Yes	Pond	No	3.66	Yes	N/A
M1	Yes	No	No	No	Auto Repair Garage	Yes	2.10	Yes	2.10
M2	No	No	No	No	Auto Repair Garage	Yes	1.59	No	1.59
M3	No	No	No	No	County Stormwater Pond	No	14.14	Yes	N/A
N1	No	Yes – power pole	No	No	Comm. Vacant Land	No	0.87	No	0.87
N2	No	No	No	No	Comm. Vacant Land & Vacant Residential	No	1.94	No	1.94
N3	No	Yes – power pole	No	No	Auto Repair Garage	Yes	3.07	No	3.07
N4[4]	No	Yes - billboard	No	No	Ind. Vacant	No	5.06	Yes	5.06
O1	No	No	No	Yes	Pond	No	1.45	Yes	N/A
O2	No	No	No	No - mixed	Pond & Vacant Residential	No	4.82	Yes	0.83
P1	No	No	No	Yes	Pond	No	2.17	Yes	N/A
Q1	Yes	Yes – power pole	No	No	Office One Story	Yes	2.08	Yes	2.08
Q2	No	No	No	No - mixed	Pond & Vacant Residential	No	6.76	Yes	2.76

Note: 1) Contamination potential was assessed "No" unless source with risk ranking was located on the pond alternative site. There are several risk ranked sites located adjacent to pond alternative locations. 2) For R/W, "Mixed" indicates the area is both existing CFX property and other ownership. 3) No sites have wetland impacts per the National Wetland Inventory (NWI). 4) According to NWI, this site does not include wetlands, however, further investigation is warranted to verify. 5) For Utilities, "No" indicates no obvious utilities. Several of the occupied properties have power poles assumed minor and used for bringing power to the site (i.e. N1, N3 and Q1). 6) Green Shading indicates use of existing CFX R/W and Blue Shading indicates R/W Acquisition is required.

See **Tables 3 through 6** below for the treatment volumes, attenuation volumes, a summary of the total volumes and improvements required for each basin.

Table 3– Summary Treatment Volumes

Basin	Existing Treatment Facility	Existing Impervious Untreated (ac.)	Additional Impervious Area (ac)	Proposed Impervious Treated (ac)	Proposed Treatment Volume - Closed Basins (ac-ft)	Proposed Treatment Volume - Open Basins -With Additional 50% (ac-ft)	Proposed Stormwater Facility
2H	2H	0.00	0.14	0.14	0.03	---	Existing Pond 2H
J	---	0.99	0.27	0.27	0.06	---	Existing Pond 2H
K	---	7.15	1.04	1.04	0.22	---	
3H	3H	0.00	0.15	0.15	0.03	---	Existing Pond 3H
I	3H	0.00	0.45	0.45	0.09	---	
LMR36	L	0.00	0.89	0.89	0.19	---	Existing Pond L
L-48	L-48 Swale	0.00	0.00	0.69	0.19	---	
M-South	---	0.75	0.33	0.33	---	0.103	Proposed Pond M
M-North	M-North Swale	1.66	0.51	1.81	---	0.564	
N-NW	N-NW	0.00	1.59	5.22	---	1.631	Proposed Pond N
N-SW	N-SW	0.00	0.27	1.78	---	0.556	
N-NE	---	0.91	0.44	2.42	---	0.757	
N-South	---	0.68	0.15	0.15	---	0.046	
N-SE	N-SE	0.00	1.16	4.97	---	1.553	
O	O	0.00	1.14	1.14	---	0.356	Existing Pond O
P	P	0.00	0.77	0.77	---	0.241	Existing Pond P
Q	---	6.01	0.56	0.56	---	0.175	Pond Q
R	---	4.93	0.02	0.02	0.00	---	None

Table 4– Pre-Development Runoff

Basin	Pre-Development Basin (ac)	CN	S	Ia	Pre-Development Runoff (ac-ft)
2H	9.49	76.5	3.1	0.6	6.038
J	2.54	75.4	3.3	0.7	1.586
3H	7.59	79.6	2.6	0.5	5.089
I	5.30	85.4	1.7	0.3	3.881
K	7.15	98.0	0.2	0.0	6.172
L-MR36	25.97	94.9	0.5	0.1	21.605
M-South	0.75	98.0	0.2	0.0	0.660
M-North	6.63	88.0	1.4	0.3	5.152
N-NW	6.21	82.6	2.1	0.4	4.467
N-SW	2.70	81.7	2.2	0.4	1.915
N-NE	8.56	73.5	3.6	0.7	5.295
N-South	1.29	80.5	2.4	0.5	0.898
N-SE	6.91	81.4	2.3	0.5	4.878
O	7.54	84.3	1.9	0.4	5.560
P	10.32	89.1	1.2	0.2	8.137
Q	10.00	90.8	1.0	0.2	8.062
R	7.31	92.1	0.9	0.2	5.873

Table 5– Post-Development Runoff and Attenuation Volumes

Treatment Facility	Basin	Proposed Alternatives	Post-Development Basin (ac)	CN	S	Ia	Runoff (ac-ft)	Pre/Post Runoff Volume (ac-ft)
2H	2H	Pond Alt. 2H1	9.49	77.2	3.0	0.6	6.11	0.075
	J		2.58	80.3	2.5	0.5	1.75	0.162
	K		8.19	98.0	0.2	0.0	7.07	0.898
3H	3H	Pond Alt. 3H1	7.59	80.3	2.5	0.5	5.15	0.057
	I		5.34	88.3	1.3	0.3	4.08	0.197
L	L-MR36	Pond Alt. L1	27.44	94.3	0.6	0.1	22.65	1.048
---	M-South	Pond Alts. M1, M2 & M3	1.08	98.0	0.2	0.0	0.95	0.290
M-North Swale	M-North		6.69	90.7	1.0	0.2	5.38	0.233
N-NW	N-NW	Pond Alts. N1, N2, N3, N4 & Q2	6.89	89.0	1.2	0.2	5.43	0.959
N-SW	N-SW		2.70	85.4	1.7	0.3	2.02	0.108
---	N-NE		8.56	82.1	2.2	0.4	6.10	0.809
---	N-South		1.29	84.7	1.8	0.4	0.96	0.059
N-SE	N-SE		7.25	86.4	1.6	0.3	5.51	0.628
O	O	Pond Alts. O1, O2 & Q2	8.42	88.8	1.3	0.3	6.61	1.050
P	P	Pond Alts. P1, O2 & Q2	10.50	90.3	1.1	0.2	8.41	0.269
---	Q	Pond Alts. Q1 & Q2	10.18	92.5	0.8	0.2	8.39	0.323
---	R	N/A	7.33	92.2	0.9	0.2	5.89	0.017

Note: The Pond Alternatives listed are potential options for the basin.

Table 6– Summary of Basins Requiring Offsite Ponds

Basin	Proposed Treatment Volume - with 50% Additional	Required Treatment Volume (ac-ft)	Required Roadway Attenuation Volume (ac-ft)	Existing Pond Volume at Design Stage (ac-ft)	Total Required Pond Volume (ac-ft)	Design Depth (ft)	Area at NWL (ac)	Provided Volume (ac-ft)	Additional Percent for Landscaping / Tie-In Area	Estimated Required Pond Area (ac)	Remarks
M-South	0.103	0.668	0.290	---	1.19	4	0.5	2.70	20%	1.9	Pond M
M-North	0.564		0.233	---		4					
N-NW	1.631	4.544	0.959	---	7.11	4	1.54	7.30	20%	3.9	Pond N
N-SW	0.556		0.108	---		4					
N-NE	0.757		0.809	---		4					
N-South	0.046		0.059	---		4					
N-SE	1.553		0.628	---		4					
Q	0.175	0.175	0.323	---	0.50	4	0.5	2.70	20%	1.9	Pond Q

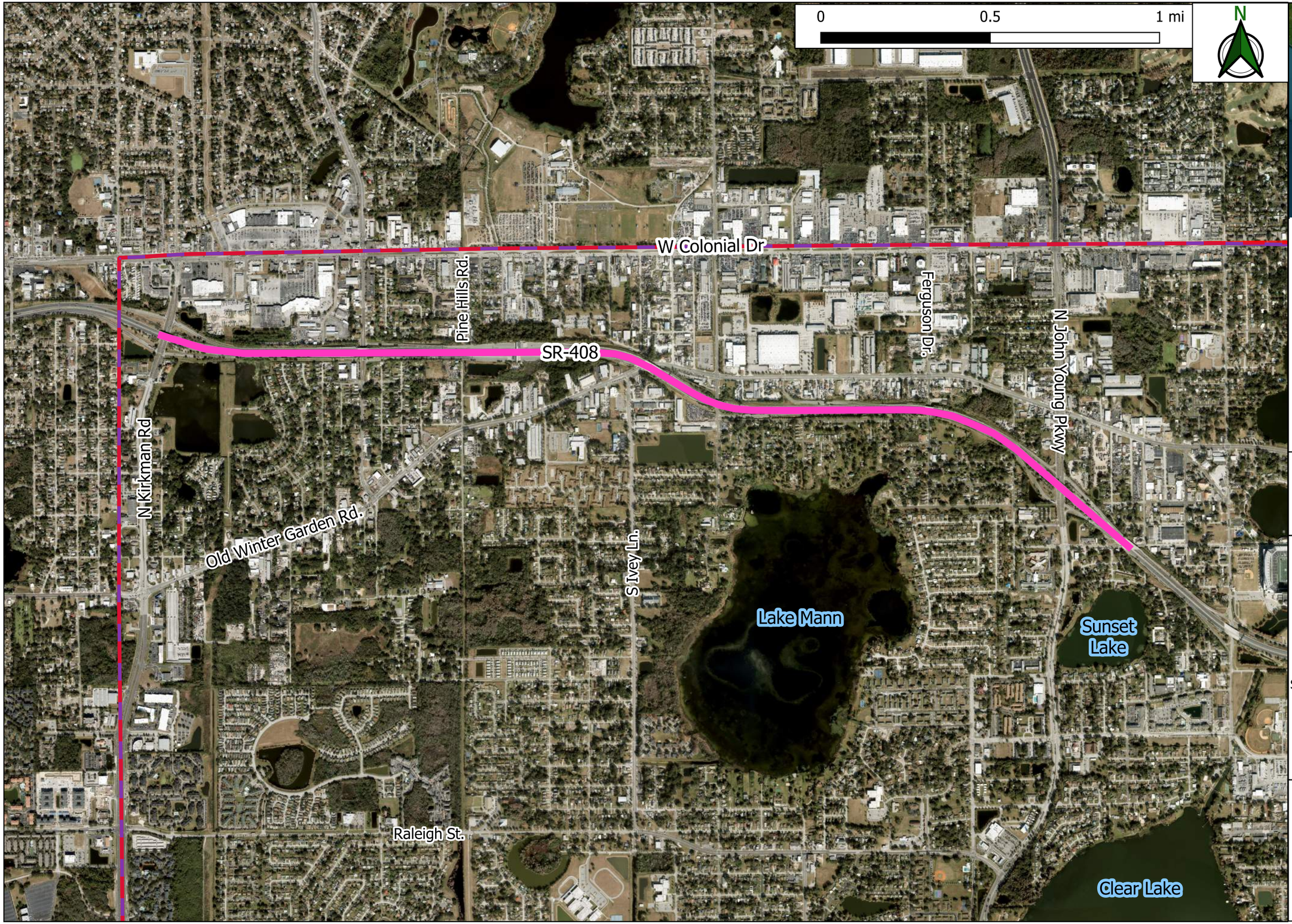
Notes: 1) A minimum 0.5 acre at the normal water elevation was used for pond sizing, per SFWMD criteria.
2) Pond Alternative O2 consists of expanding onto existing R/W and the addition of one proposed parcel.

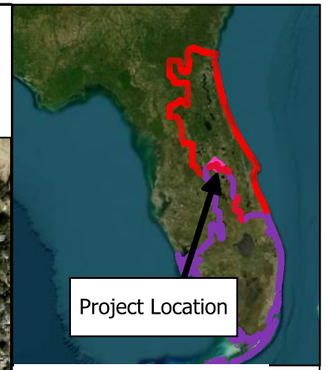
Table 7– Summary of Basins Not Requiring Offsite Ponds

Treatment Facility	Basin	Proposed Add'l Runoff Volume due to widening (ac-ft)	Additional Treatment Due to Impervious Area (ac-ft)	Additional Volume Total (ac-ft)	Total Retention Volume at Design Stage (ac-ft)	Total Treatment & Attenuation Volume (ac-ft)	Permitted Peak Stage (ft)	Proposed Peak Stage (ft)	Top of Berm Elevation (ft)	Freeboard (ft)	Remarks
2H	2H	0.075	0.03	1.44	6.40	7.84	82.63	83.19	85.00	1.81	Regraded Pond 2H
	J	0.162	0.06								
	K	0.898	0.22								
3H	3H	0.057	0.03	0.38	8.22	8.60	82.63	82.89	85.00	2.11	Existing Pond 3H
	I	0.197	0.09								
L	L-MR36	1.048	0.19	1.23	15.66	16.89	91.45	91.83	93.00	1.17	Existing Pond L
O	O	1.050	0.36	1.41	2.01	3.42	101.19	100.17	102.00	1.83	Expanded Pond O (Pond O1)
P	P	0.269	0.24	0.51	2.64	3.15	101.85	102.23	104.00	1.77	Existing Pond P

Notes: Regraded Pond 2H was regraded with walls on west and south sides. Berm El. was raised from 83.0-ft to 85.0-ft. Expanded Pond O1 was expanded to NW side of parcel with significant additional volume.

Appendix A – Maps & Figures





Legend

- Project Location
- South Florida Boundary
- St. Johns River Boundary

FIGURE 1
Project Location Map

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Orange County, FL

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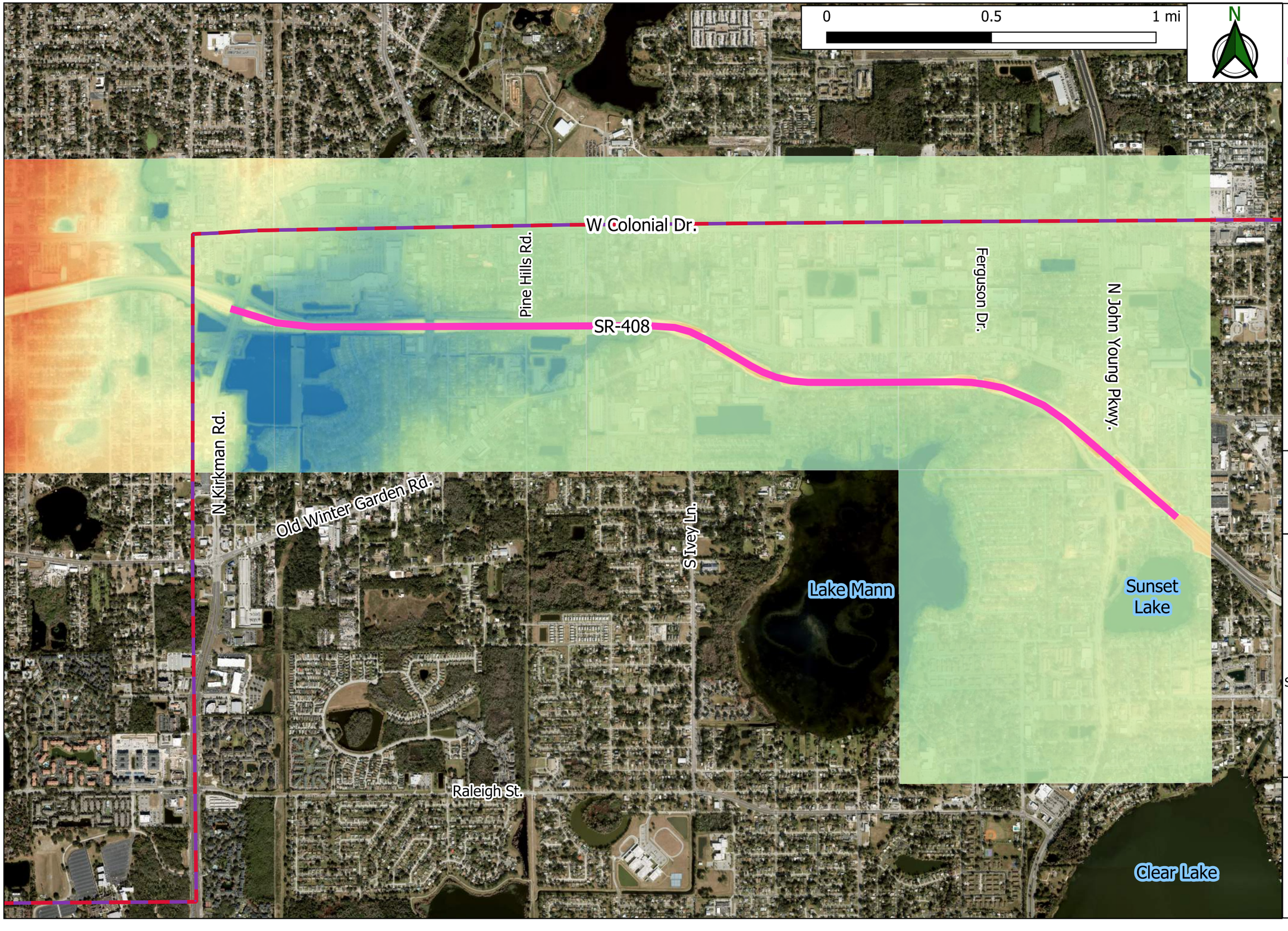

Legend

- Project Location
- DEM (ft-NAVD)
  - 151.18
  - 73.75
- St Johns River Boundary
- South Florida Boundary

FIGURE 2

Digital Elevation Map (DEM)

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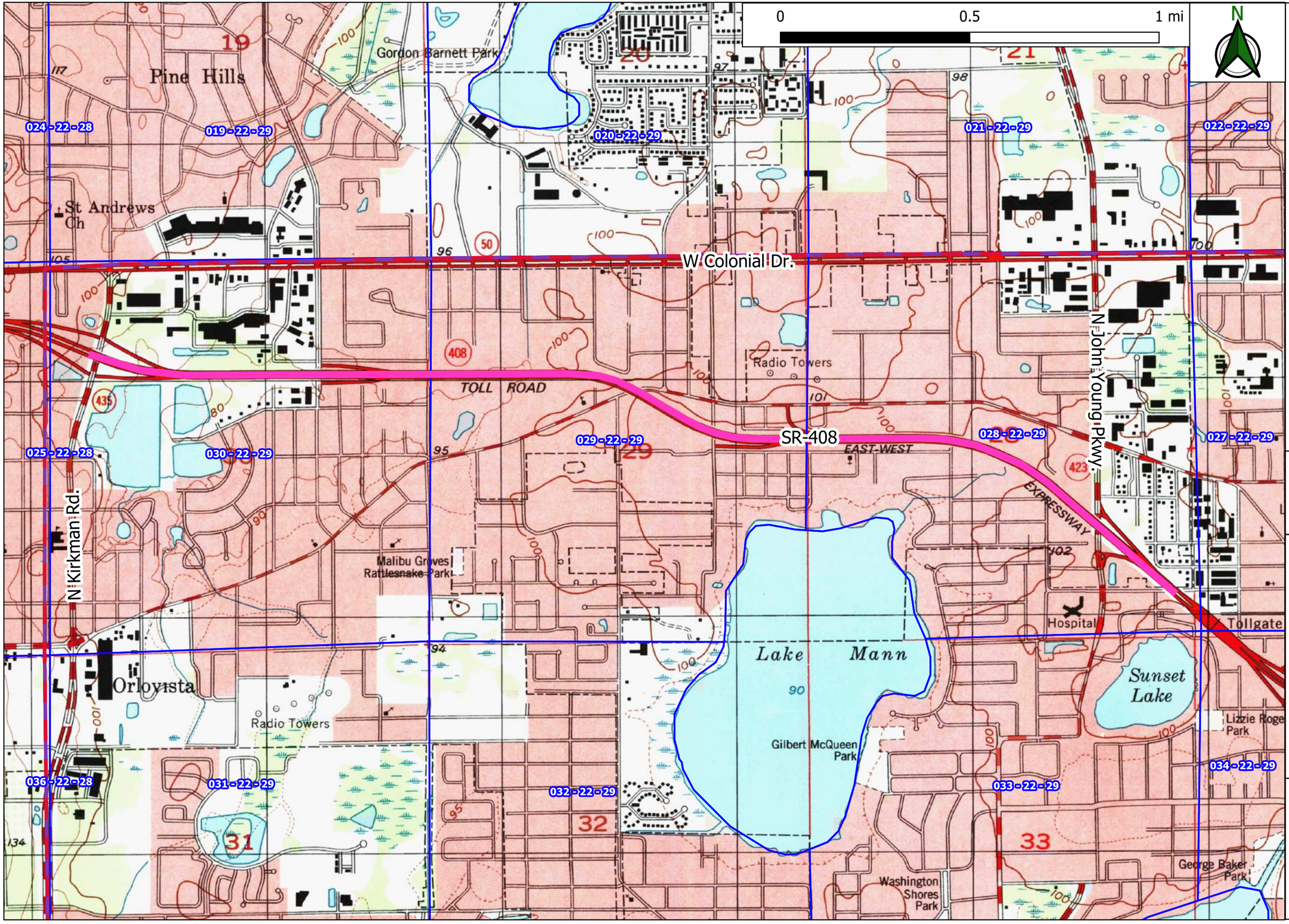

FIGURE 3

USGS Quadrangle Map

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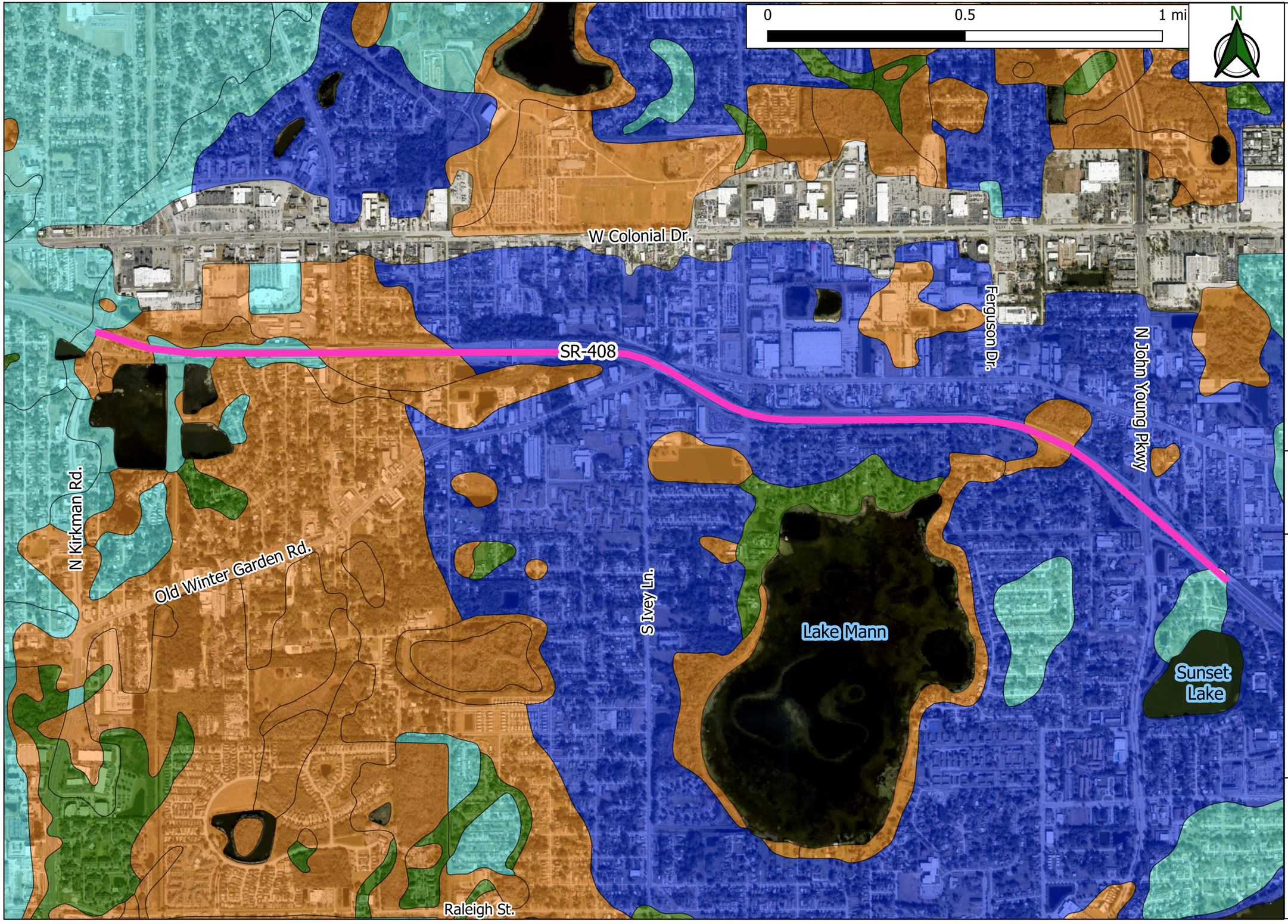

Legend

- Project Location

Hydro. Group

- A
- A/D
- B/D
- C/D

FIGURE 4

NRCS Soil Map

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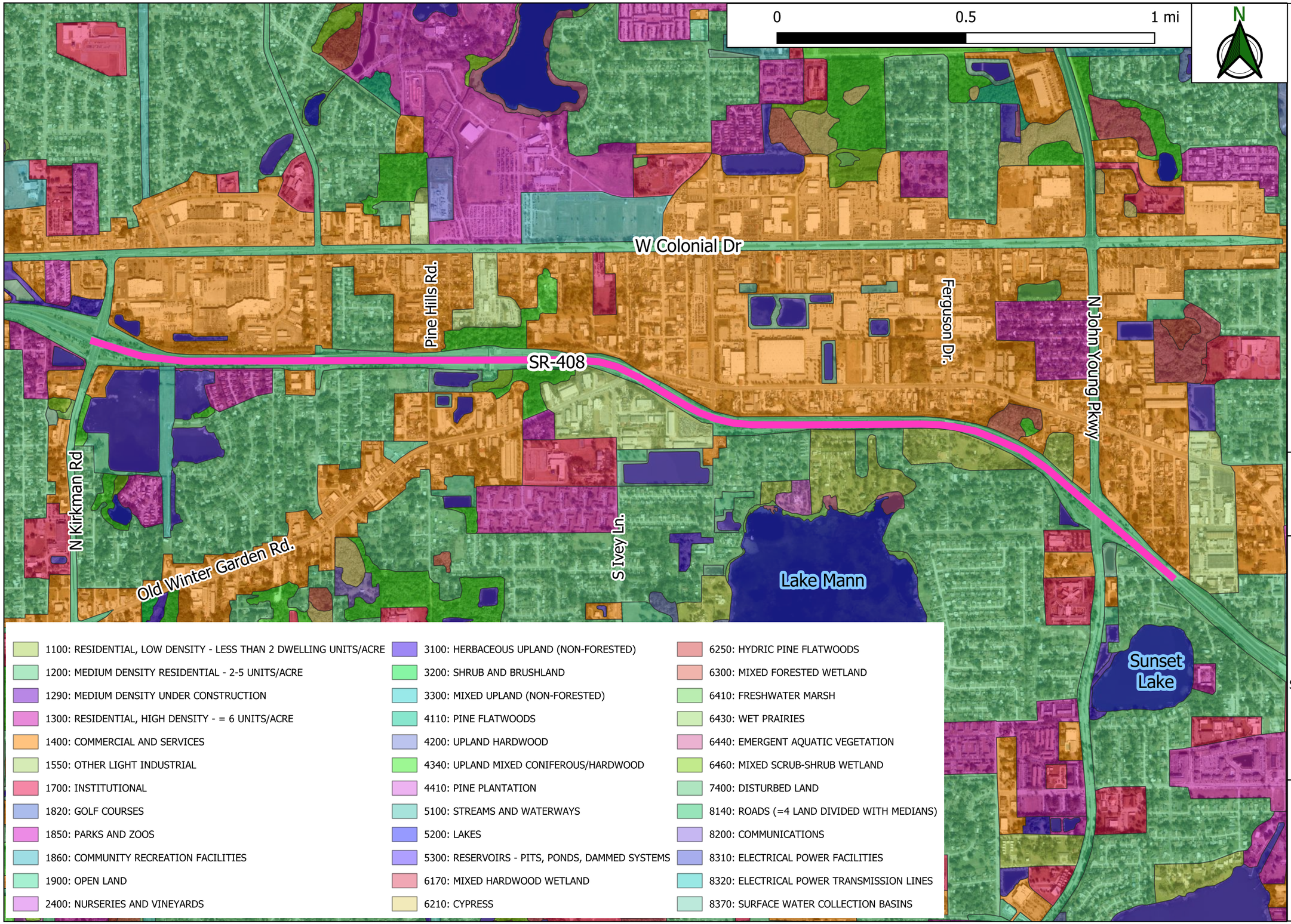

Legend

Project Location

FIGURE 5

Existing Landuse

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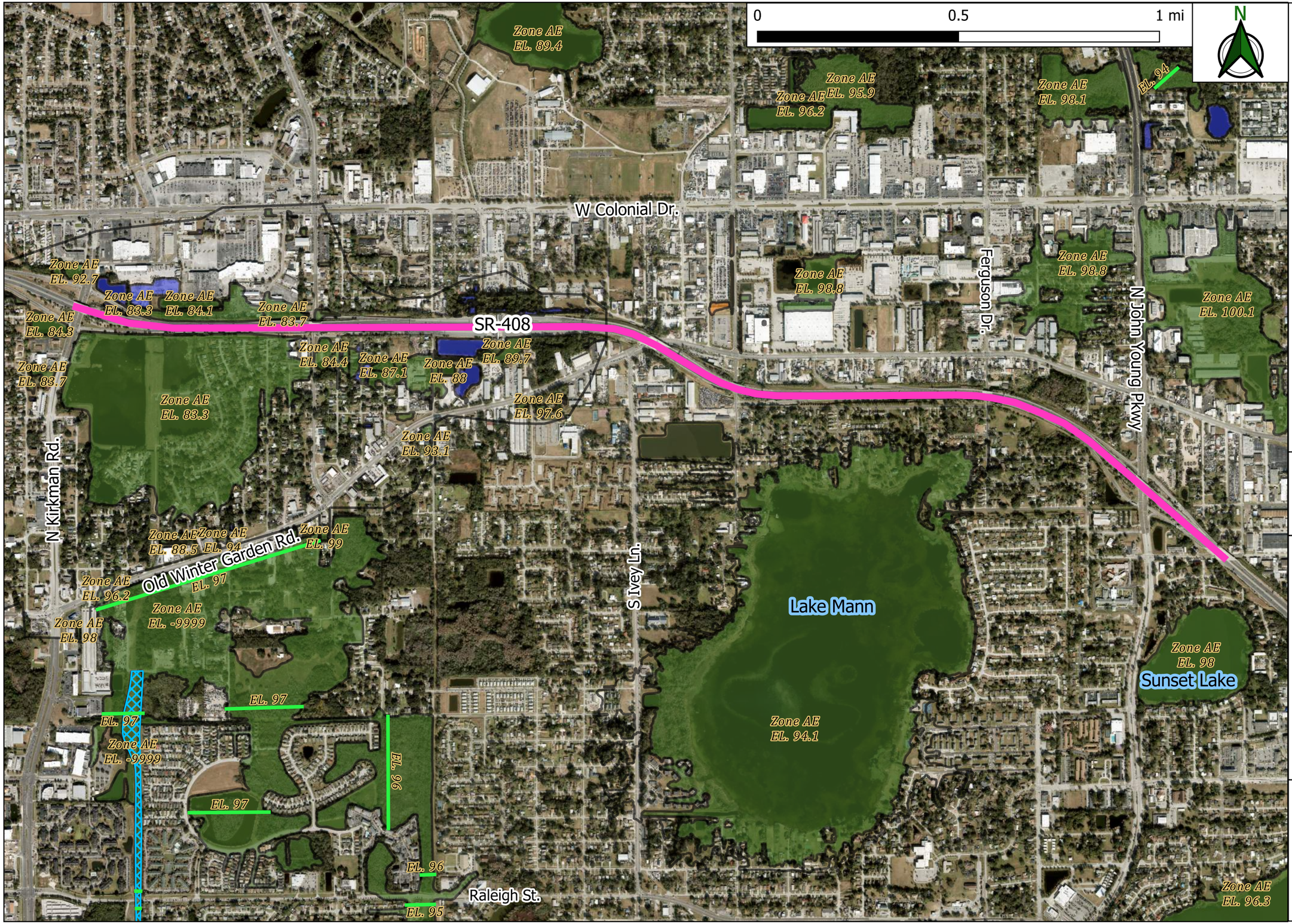

Legend

- Project Location
- BFE
- Floodway

FEMA Flood Zone

- A
- AE
- AH
- X

FIGURE 6

FEMA Flood Zone Map

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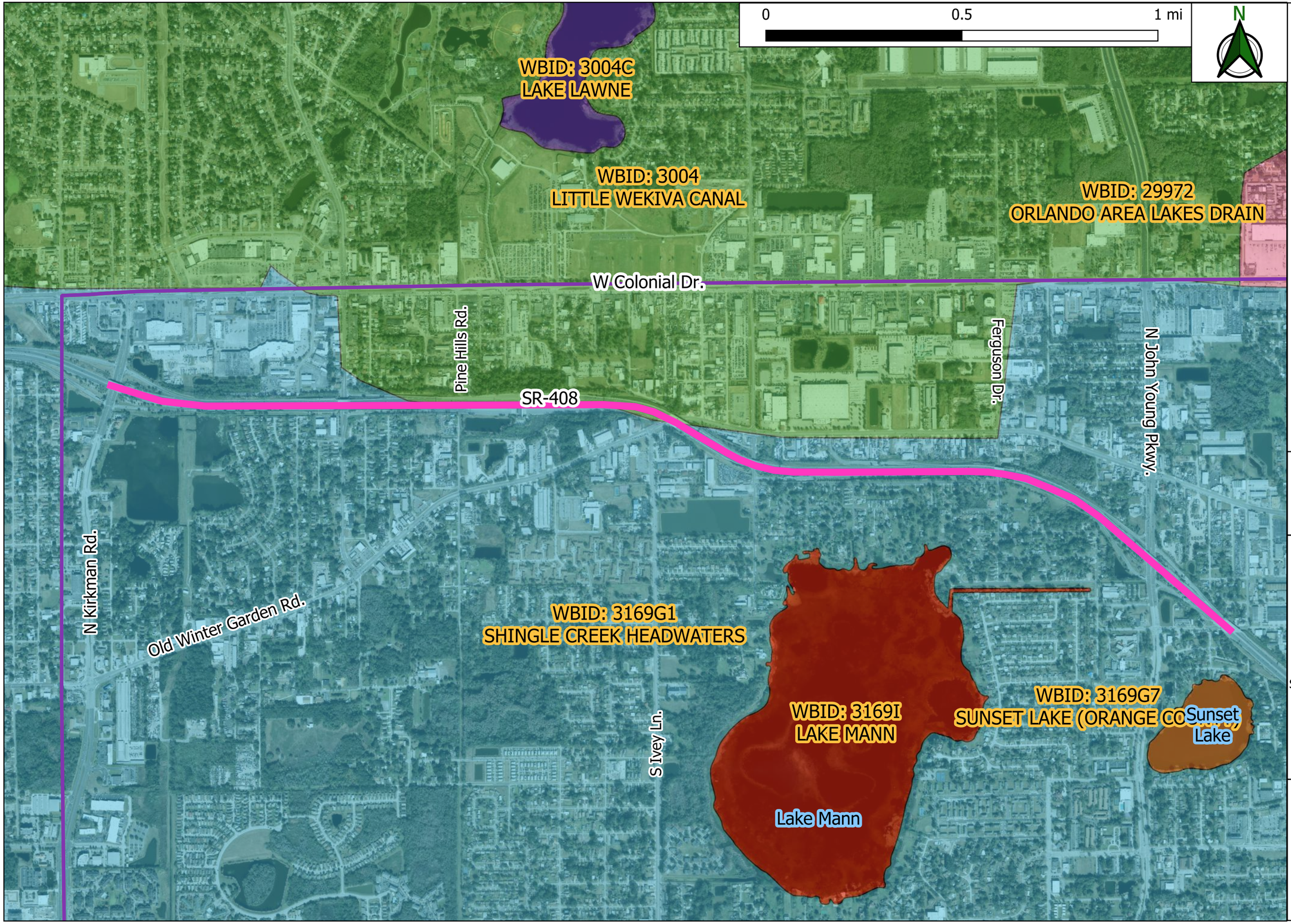

Legend

Project_Location

FIGURE 7
Waterbody ID (WBID) Map

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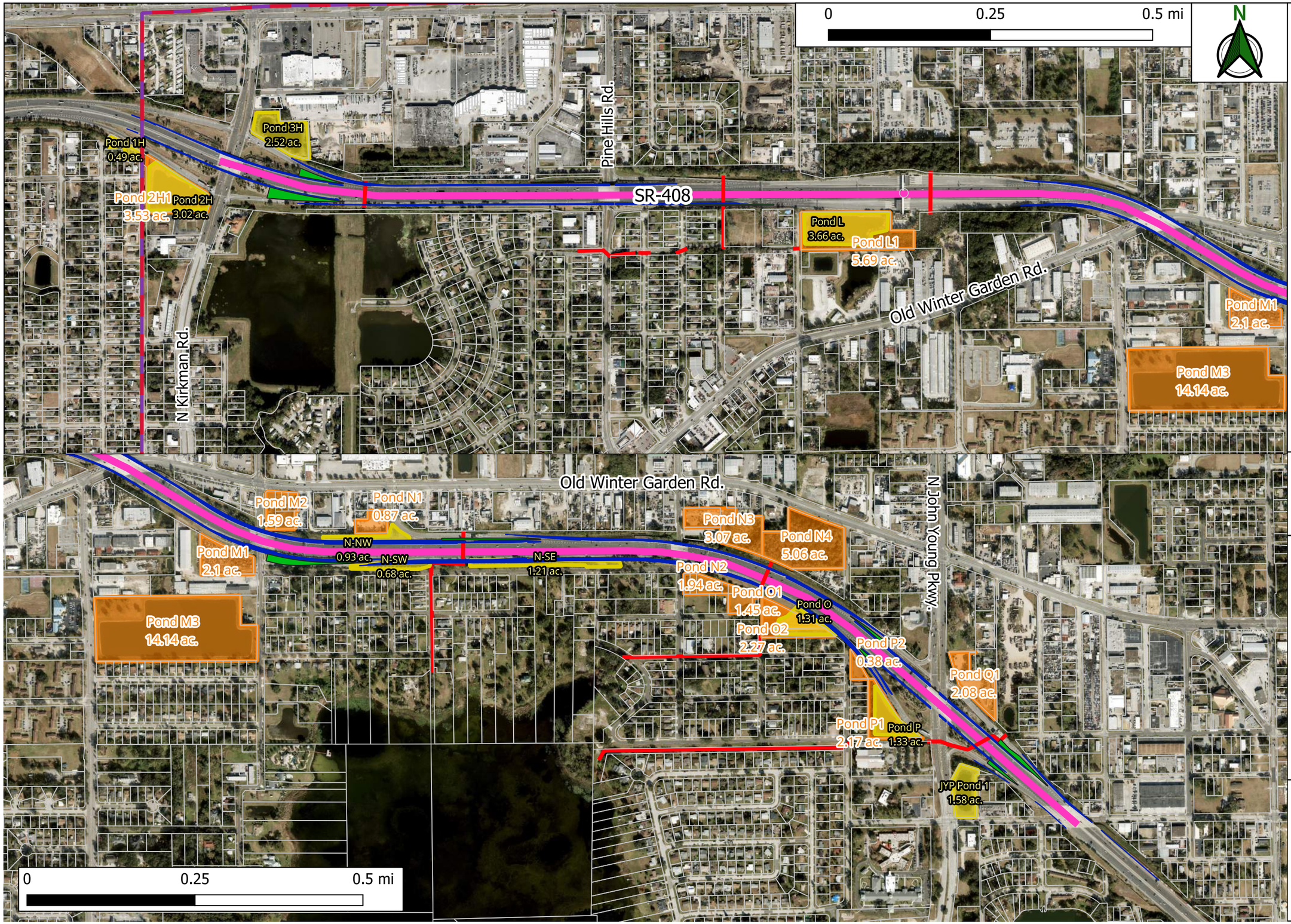

Legend

- Project Location
- Existing CD
- Open Space
- Widening
- Orange County Parcels
- South Florida Boundary
- St Johns River Boundary

Ponds

- Existing
- Proposed

FIGURE 8

Proposed Pond Locations

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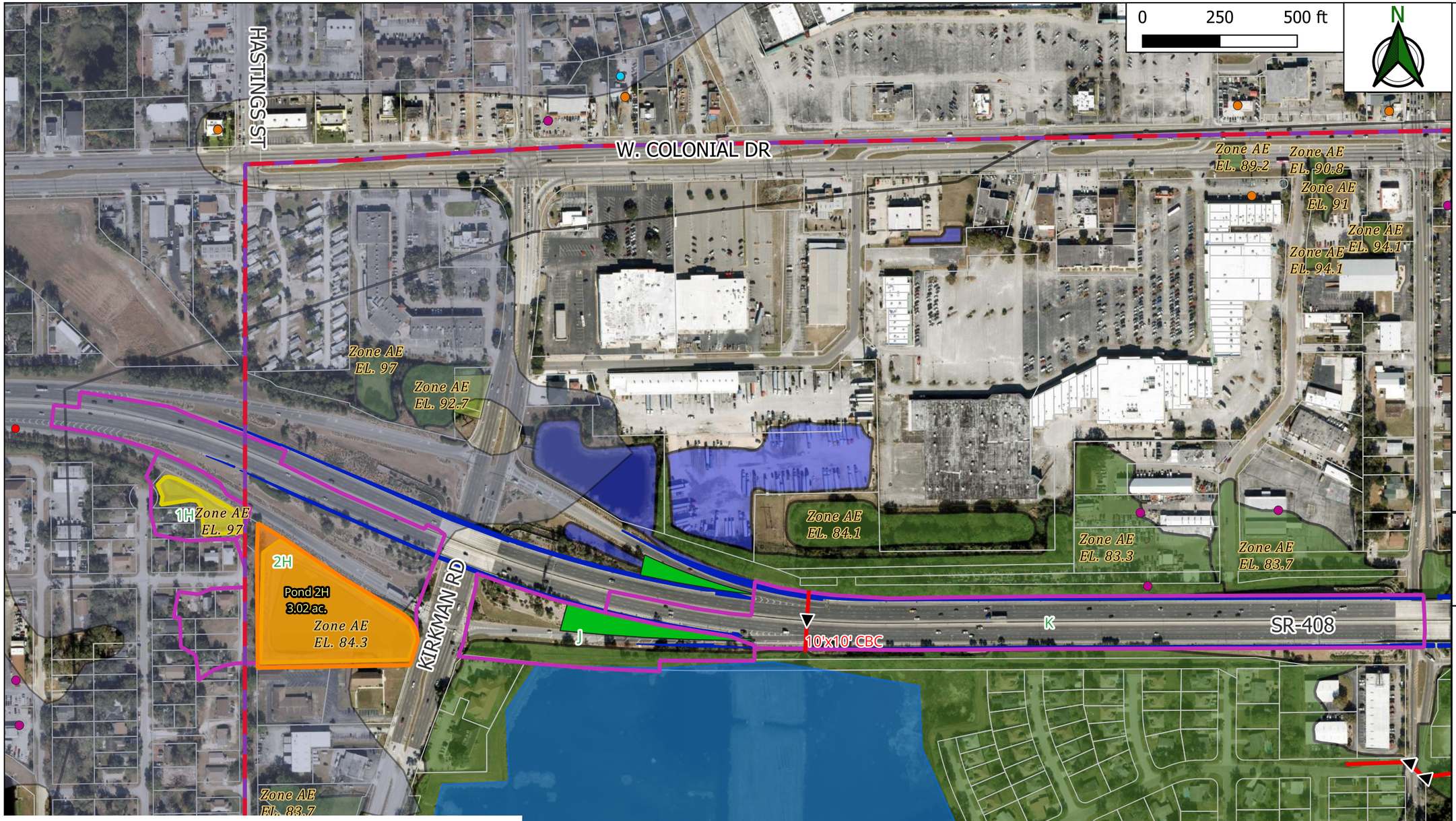

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land
- St. Johns River Boundary
- South Florida Boundary

Contamination Sites

FGS WELLS
- Other FGS Wells

WCU Inactive (Jan 2016)

CLEANUP SITES SP

PCTS DISCHARGES SP

Environmental
- Lakes

Wildlife
- Eagle Nests (2020)
- Skink Suitability (Jan 2013)

FEMA Flood Zone
- A
- AE
- X

FIGURE 9A

Pond Alternative 2H1
(Basins 2H, J & K)

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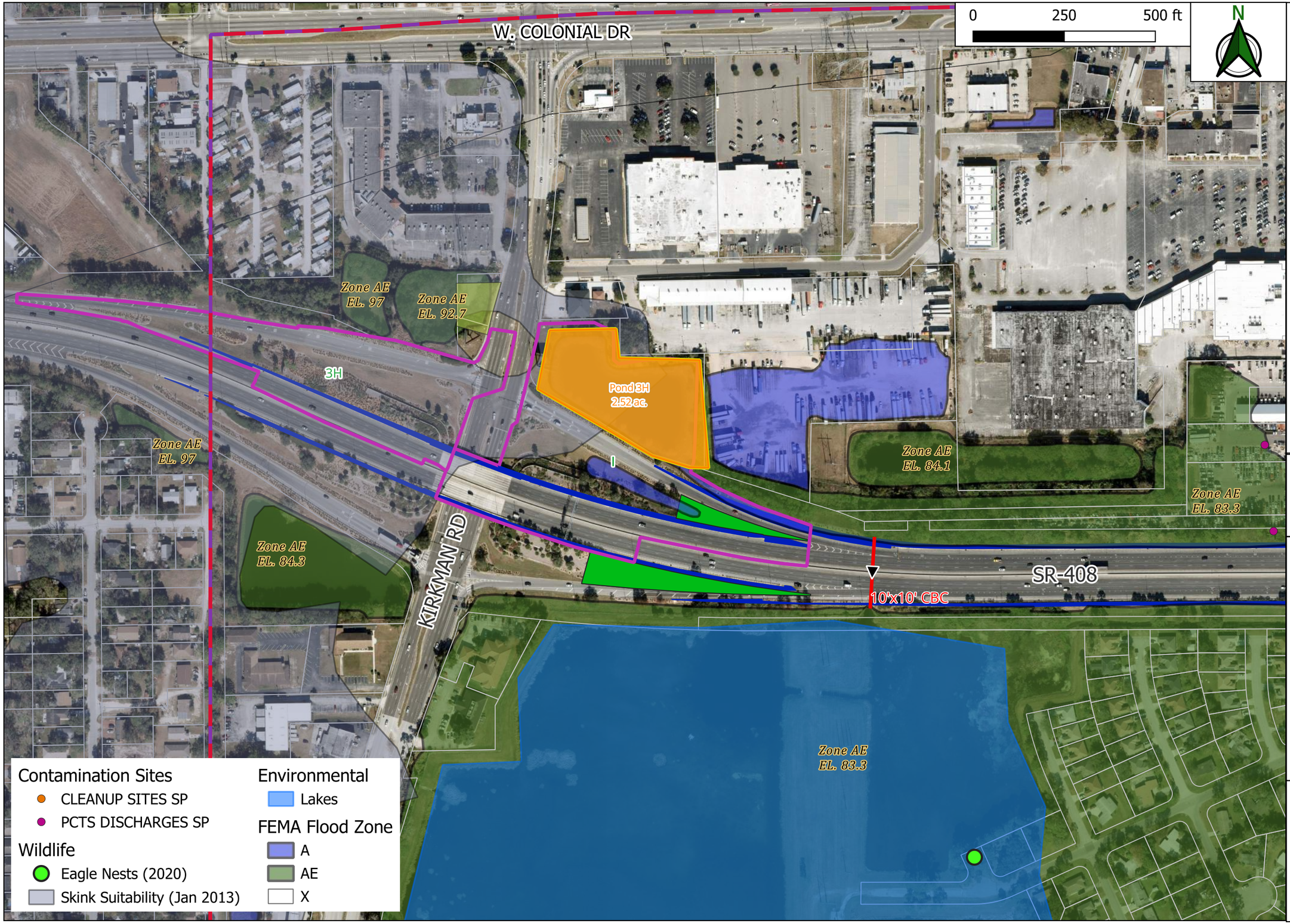

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land
- St. Johns River Boundary
- South Florida Boundary

FIGURE 9B
Pond Alternative 3H1
(Basins 3H)

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0 250 500 ft

N

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Widening
- Open Space
- Orange County Parcels
- State Owned Land

Zone AE EL. 94.9
Zone AE EL. 86.4
LPHN
L-48 Swale
42" RCP
SR-408
L-MR36
24" RCP
L-PHS
L-48S
48" RCP
Pond L 3.66 ac.
Zone AE EL. 84.4
Zone AE EL. 85.1
Zone AE EL. 84.6
Zone AE EL. 85.6
Zone AE EL. 87.1
Zone AE EL. 85.2
Zone AE EL. 86.5
Zone AE EL. 87.2
Zone AE EL. 88
Zone AE EL. 87.3
Zone AE EL. 87.4
Zone AE EL. 91.1
Zone AE EL. 93.1
Zone AE EL. 89.7
Zone AE EL. 98.5
Zone AE EL. 97
Zone AE EL. 97.6
Kerry Dr
OLD WINTER GARDEN RD
IVEY LN

Contamination Sites

- CLEANUP SITES SP
- PCTS DISCHARGES SP

FEMA Flood Zone

- A
- AE
- X

FIGURE 9C1

Pond Alternative L1
(Basin L)

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Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Widening
- Open Space
- Orange County Parcels
- State Owned Land

FIGURE 9D1

Pond Alternative M1
(Basin M)

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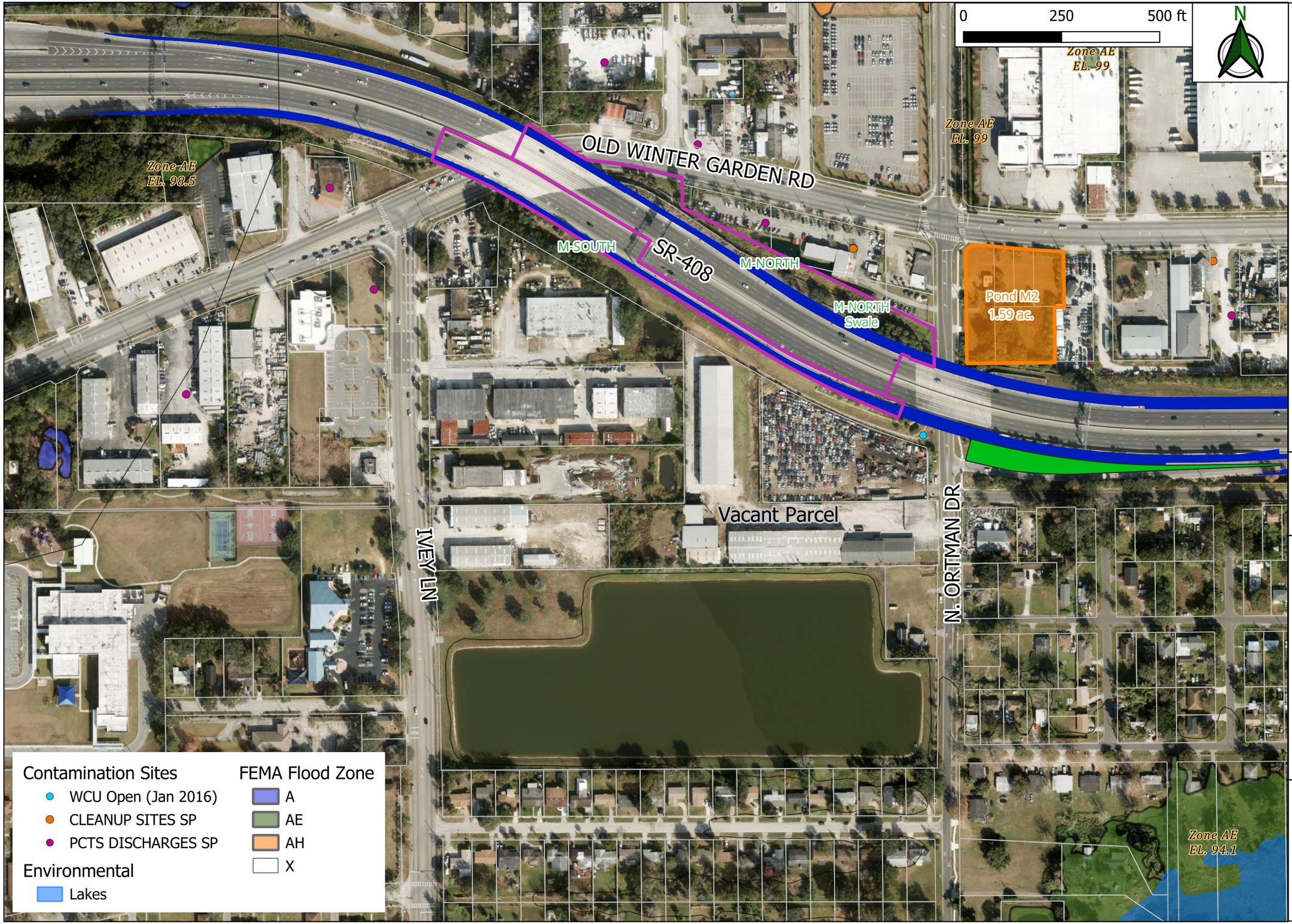

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Widening
- Open Space
- Orange County Parcels
- State Owned Land

FIGURE 9D2

Pond Alternative M2
(Basin M)

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Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Widening
- Open Space
- Orange County Parcels
- State Owned Land

FIGURE 9D3

Pond Alternative M3
(Basin M)

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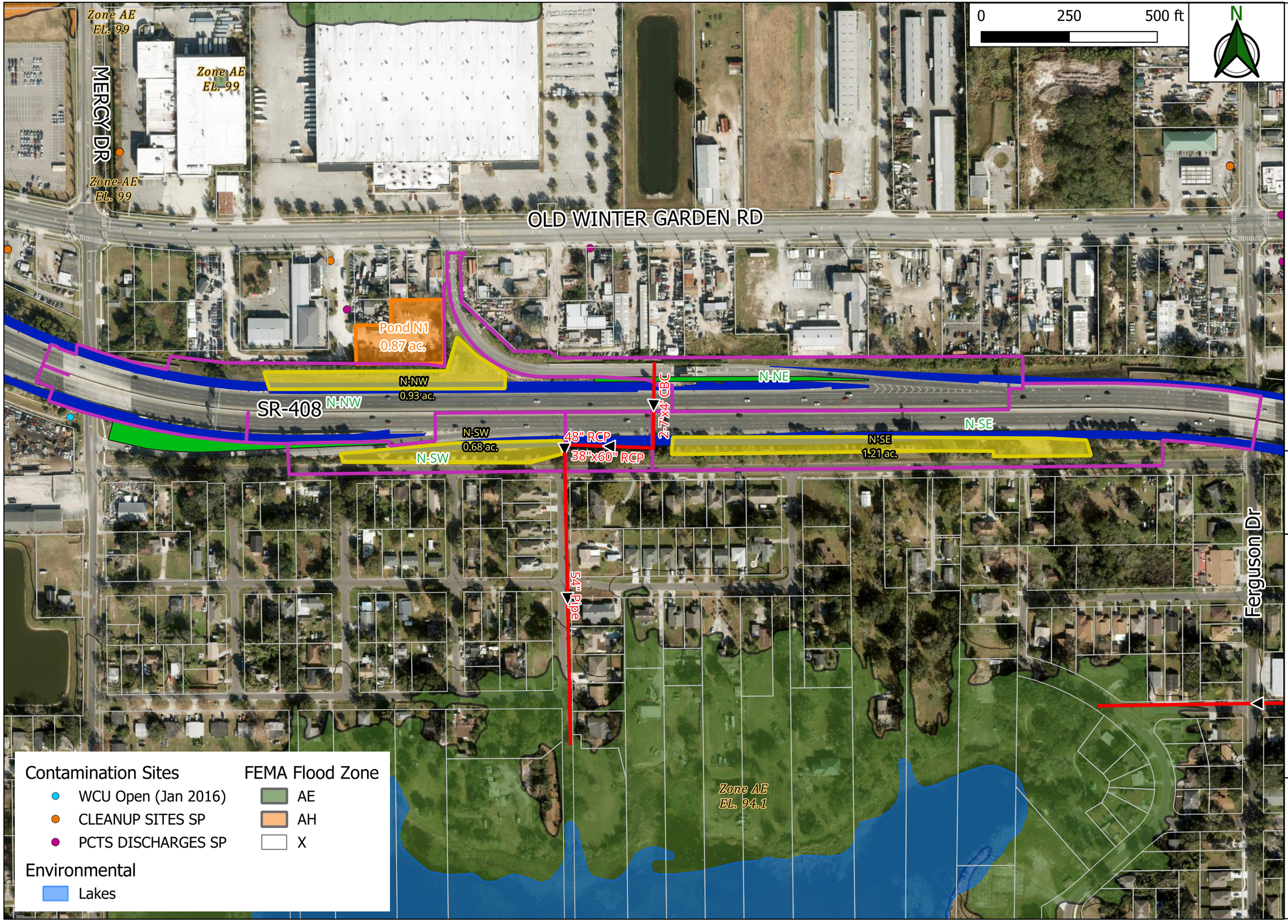

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land

FIGURE 9E1

Pond Alternative N1
(Basin N)

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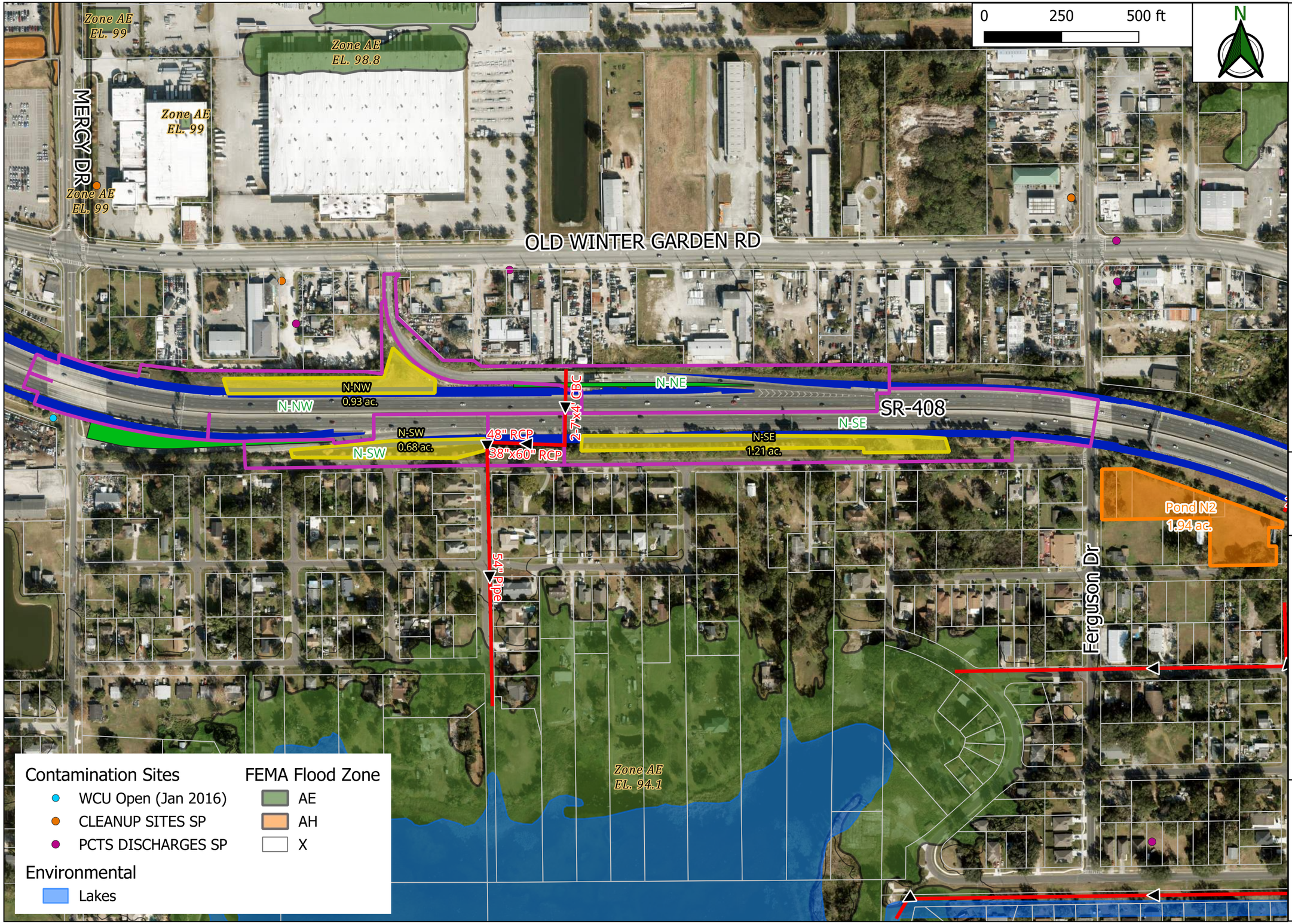

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land

FIGURE 9E2

Pond Alternative N2
(Basin N)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study
SR 408 Widening from Kirkman Road to Church Street
CFX Project No. 408-174
Orange County, FL

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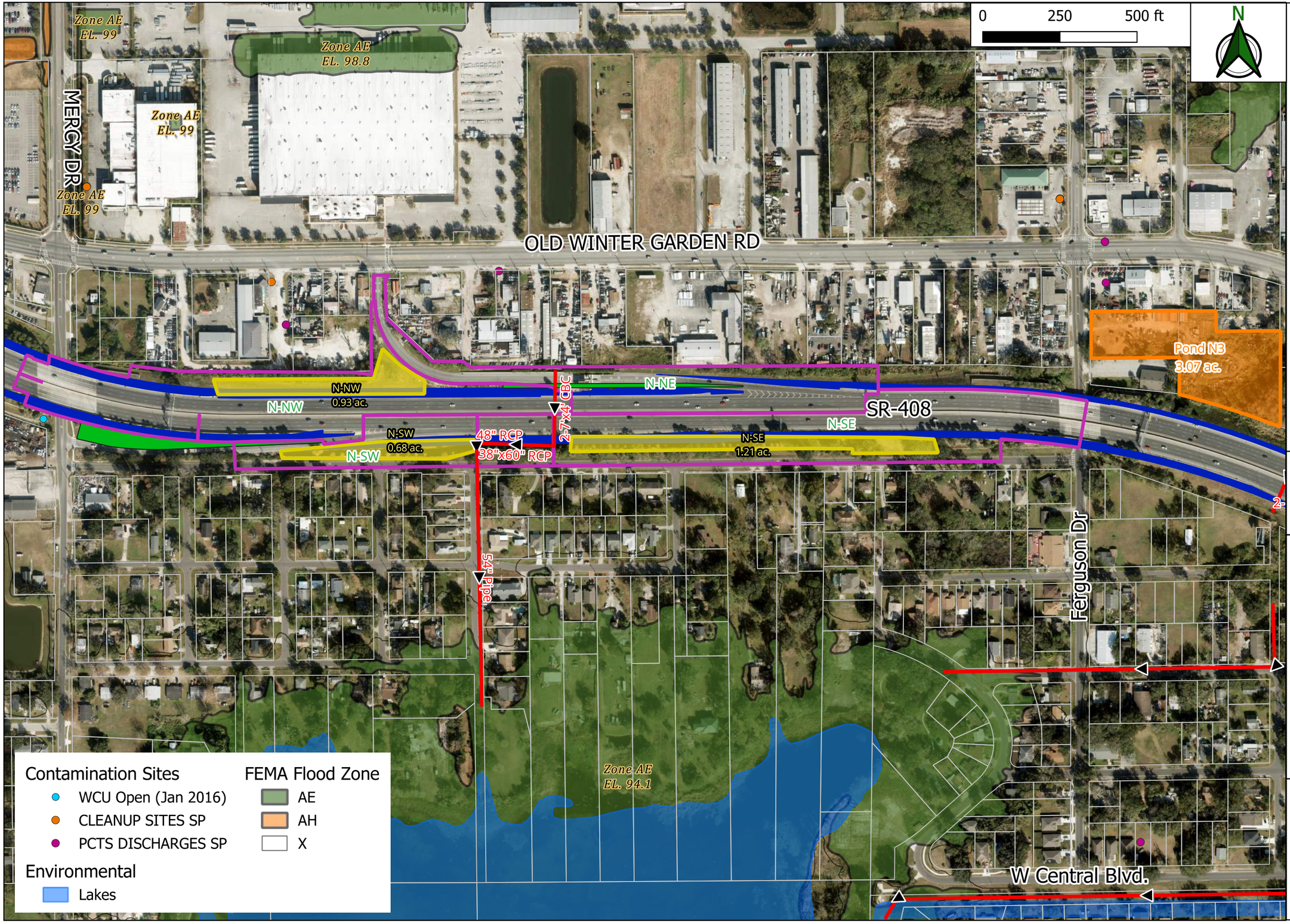

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land

FIGURE 9E3

Pond Alternative N3
(Basin N)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

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0 250 500 ft

N

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels
- State Owned Land

FIGURE 9E4

Pond Alternative N4
(Basin N)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

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CFX Project No. 408-174
Orange County, FL

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www.balmoralgroup.us

Zone AE EL. 98.8
Zone AE EL. 99
Zone AE EL. 99
MERCY DR
OLD WINTER GARDEN RD
SR-408
2-7'x4' CBC
N-NW
0.93 ac.
N-NW
N-NE
N-SW
0.68 ac.
N-SW
48" RCP
38"x60" RCP
N-SE
1.21 ac.
N-SE
Pond N4
5.06 ac.
2- 9'x3' CBC
S-1 pipe
Ferguson Dr
Pond O
1.31 ac.
Zone AE EL. 94.1
W Central Blvd

Contamination Sites
- WCU Open (Jan 2016)
- CLEANUP SITES SP
- PCTS DISCHARGES SP

FEMA Flood Zone
- AE
- AH
- X

Environmental
- Lakes

Contamination Sites
- CLEANUP SITES SP
- PCTS DISCHARGES SP

FEMA Flood Zone
- AE
- X

Environmental
- Lakes

0 250 500 ft

N

Zone AE
EL. 98.8

OLD WINTER GARDEN RD

Ferguson Dr

2-9'x3' CBC

SR-408

O

Pond O1
1.45 ac.

Pond O
1.31 ac.

W Washington St

Zone AE
EL. 94.1

N Cottage Hill Rd

JOHN YOUNG PKWY

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels

FIGURE 9F1

Pond Alternative O1
(Basin O)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

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Contamination Sites
- CLEANUP SITES SP
- PCTS DISCHARGES SP

Wildlife
- Skink Suitability (Jan 2013)

Environmental
- Lakes

FEMA Flood Zone
- AE
- X

0 250 500 ft

N

OLD WINTER GARDEN RD

JOHN YOUNG PKWY

SR-408

Ferguson Dr

W Washington St

W Central Blvd

Fitzgerald Dr

N Cottage Hill Rd

CHURCH ST

2-9'x3' CBC

O

Pond O2
2.27 ac.

Pond P2
0.38 ac.

P

Pond P1
2.17 ac.

2-42" Pipes

42" RCP

Q

Zone AE
EL. 94.1

Zone AE
EL.

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels

FIGURE 9F2

Alternative Pond O2
(Basins O & P)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study
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CFX Project No. 408-174
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FEMA Flood Zone
- AE
- X

Environmental
- Lakes

Geotech/Contamination
- Florida Subsidence Incident Reports

Contamination Sites
- PCTS DISCHARGES SP

0 250 500 ft

N

OLD WINTER GARDEN RD

SR-408

2-9'x3' CBC

Ferguson Dr

W Washington St

Zone AE
EL. 94.1

W Central Blvd

N Cottage Hill Rd

Fitzgerald Dr

JOHN YOUNG PKWY

P

Pond P1
2.17 ac.

2-42" Pipes

42" RCP

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange County Parcels

FIGURE 9G1

Pond Alternative P1
(Basin P)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

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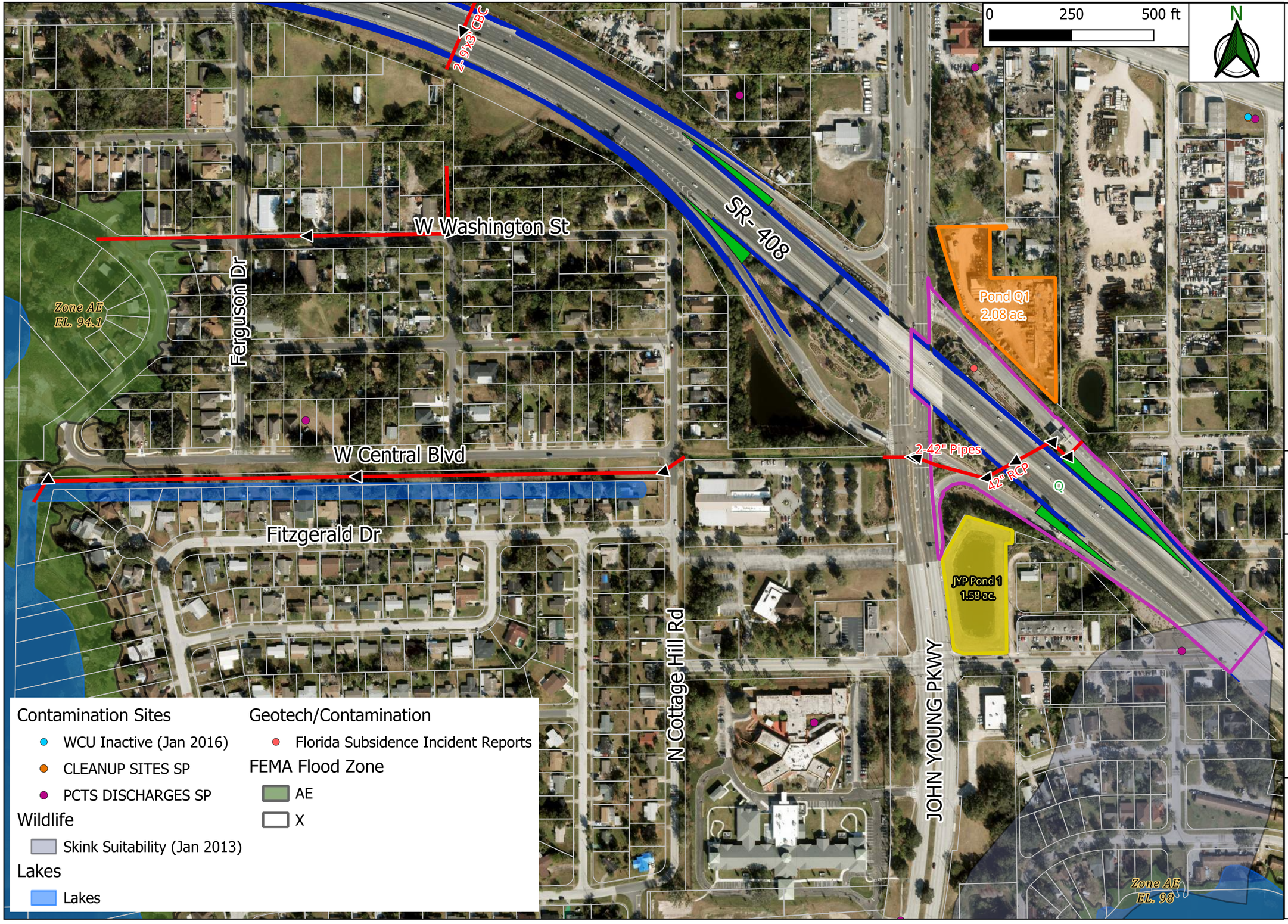

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange Couty Parcels

Contamination Sites

- WCU Inactive (Jan 2016)
- CLEANUP SITES SP
- PCTS DISCHARGES SP

Geotech/Contamination

- Florida Subsidence Incident Reports

FEMA Flood Zone

- AE
- X

Wildlife

- Skink Suitability (Jan 2013)

Lakes

- Lakes

FIGURE 9H1

Pond Alternative Q1
(Basin Q)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study
SR 408 Widening from Kirkman Road to Church Street
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Orange County, FL

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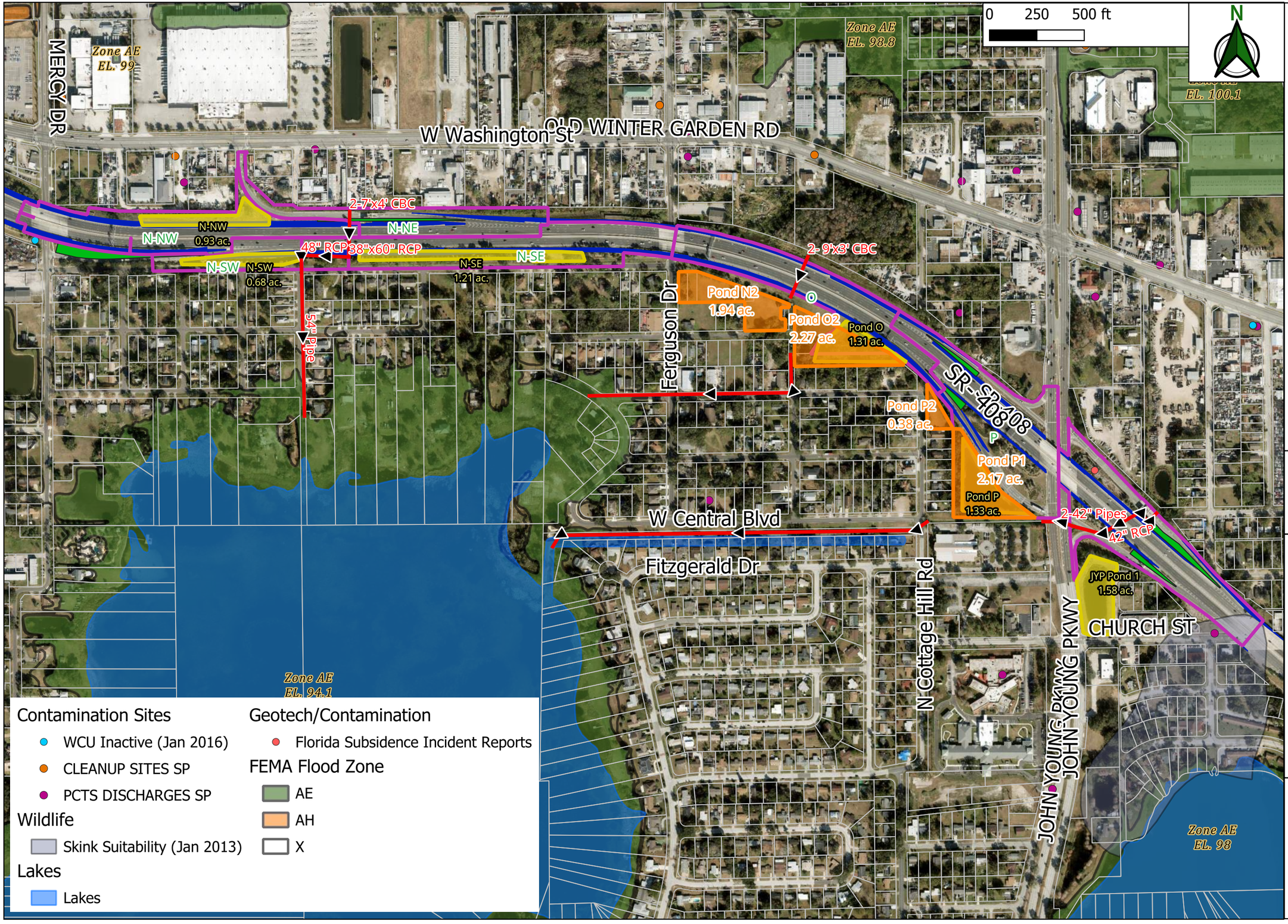

Legend

- Existing Culverts
- Proposed Ponds
- Existing Ponds
- Basins
- Open Space
- Widening
- Orange Couty Parcels

FIGURE 9H2

Pond Alternative Q2
(Basin N, O, P & Q)

CENTRAL FLORIDA EXPRESSWAY AUTHORITY

PD&E Study
SR 408 Widening from Kirkman Road to Church Street
CFX Project No. 408-174
Orange County, FL

The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789
Phone: (407) 629-2185
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Appendix B – Pond Calculations & Grading

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 06/27/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 06/27/23

Wet Detention Online Pond Treatment Calculations: Pond 2H (Expanded Pond)

SJRWMD Criteria:

BASINS 2H, J & K

Basin 2H Basin Area =	9.49	(Permitted)
Basin 2H Add'l Basin Area =	0.00	
Basin 2H Exist. Impervious Area =	2.62	(Permitted)
Basin 2H Add. Impervious Area =	0.14	
Basin J Basin Area =	2.54	(Permitted)
Basin J Add'l Basin Area =	0.04	
Basin J Exist. Impervious Area =	1.26	(Permitted)
Basin J Add. Impervious Area =	0.27	
Basin K Basin Area =	7.15	(Permitted)
Basin K Add'l Basin Area =	0.95	
Basin K Exist. Impervious Area =	7.15	(Permitted)
Basin K Add. Impervious Area =	1.04	

Total additional Basin Area =	0.04 Ac
Total additional Impervious area =	1.45 Ac
1" runoff from additional basin area =	0.00 Ac-Ft
2.5" runoff from additional impervious area =	0.30 Ac-Ft
Greater of Above =	0.30 Ac-Ft

Add'l Required Treatment Volume (T.V.) = 0.30 Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev. NAVD	h ft	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft
85.00	1.0	2.68	2.64	12.56
84.00	1.0	2.61	2.58	9.92
83.00	0.5	2.54	1.26	7.34
82.50	0.5	2.51	1.25	6.08
82.00	0.5	2.48	1.23	4.83
81.50	0.5	2.45	1.22	3.60
81.00	0.5	2.41	1.20	2.38
80.50	0.5	2.38	1.18	1.18
80.00	0.0	2.35	0.00	0.00

Permitted Volume at 100 yr/24 hr Peak Stage:

Ex. Peak Stage = 82.63 = 6.40 ac-ft

Proposed:

Required Add'l Treatment Volume =	**0.30**	**ac-ft**
Required Runoff Volume =	**7.54**	**ac-ft**
Total Retention Volume =	**7.84**	**ac-ft**

Peak Stage Adjustment with Addition of Proposed Volumes:

Proposed Peak 100 yr/24 hr Peak Stage	=	**83.19**	**ft**
Freeboard Provided	=	**1.81**	ft

Notes: Modified Pond 2H expanded to accommodate all Basin 2H and the increase in runoff from widened Basins 2H, J & K.

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 06/27/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 06/27/23

Wet Detention Online Pond Treatment Calculations: Pond 3H (Existing Pond)

SFWMD Criteria:

BASINS 3H and 3I

Basin 3H Basin Area =	7.26	(Permitted)
Basin 3H Exist. Impervious Area =	2.07	(Permitted)
Basin 3H Add. Impervious Area =	0.15	
Basin I Basin Area =	5.38	(Permitted + Add Bridge Area)
Basin I Exist. Impervious Area =	3.49	(Permitted)
Basin I Add. Impervious Area =	0.45	

Total additional Basin Area =	0.04 Ac	
Total additional Impervious area =	0.60 Ac	
1" runoff from additional basin area =	0.00 Ac-Ft	
2.5" runoff from additional impervious area =	0.13 Ac-Ft	
Greater of Above =	0.13 Ac-Ft	
Existing Permitted T.V. for Basin 3H =	0.43	(already included in pond volume at design stage)
Existing Permitted T.V. for Basin I =	0.73	(already included in pond volume at design stage)

Add'l Required Treatment Volume (T.V.) = **0.13** Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev.	h	Area	Inc. Volume	Cum. Volume	
NAVD	ft	ac	Ac-ft	Ac-ft	
85.00	1.0	1.89	1.86	12.52	Top of Berm
84.00	1.0	1.83	1.80	10.66	
83.00	1.0	1.77	1.74	8.86	
82.00	1.0	1.71	1.69	7.12	
81.00	1.0	1.66	1.56	5.44	
80.00	1.0	1.45	1.40	3.88	
79.00	1.0	1.34	1.29	2.49	
78.00	1.0	1.24	1.20	1.20	
77.00	0.0	1.15	0.00	0.00	

Permitted Volume at 100 yr/24 hr Peak Stage:

Elev. = 82.63 = 8.22 ac-ft

Proposed:

Required Add'l Treatment Volume =	**0.13**	**ac-ft**
Required Runoff Volume =	**8.47**	**ac-ft**
Total Retention Volume =	**8.60**	**ac-ft**

Peak Stage Adjustment with Addition of Proposed Volumes:

Proposed Peak 100 yr/24 hr Peak Stage	=	**82.89**	**ft**
Freeboard Provided	=	**2.11**	ft

Notes: Existing Pond 3H accommodates existing Basins 3H & I, and treats and attenuates widened Basins 3H & I.

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 06/27/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 06/27/23

Wet Detention Online Pond Treatment Calculations: Existing Pond L

SFWMD Criteria:

Basin L Basin Area =	25.97	(Permitted)
Basin L Add. Basin Area =	0.87	
Basin L Exist. Impervious Area =	21.2	(Permitted)
Basin L Add. Impervious Area =	0.89	

Total additional Basin Area =	0.87 Ac
Total additional Impervious area =	0.89 Ac
1" runoff from total basin area =	0.07 Ac-Ft
2.5" runoff from total impervious area =	0.19 Ac-Ft
Greater of Above =	0.19 Ac-Ft
Existing Permitted T.V. for Basin L =	4.42 (already included in pond volume at design stage)
Total Required Treatment Volume (T.V.) =	**4.61** Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev. NAVD	h ft	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	
93.00	1.0	3.96	3.75	21.27	Top of Berm
92.00	1.0	3.54	3.37	17.52	
91.00	1.0	3.20	3.13	14.15	
90.00	1.0	3.05	2.98	11.02	
89.00	1.0	2.90	2.83	8.05	
88.00	1.0	2.75	2.68	5.22	
87.00	1.0	2.61	2.54	2.54	
86.00	0.0	2.47	0.00	0.00	

Weir:

Required Add'l Treatment Volume = 0.19 ac-ft

Ex./Pr. Weir El. = 87.80 Proposed TV = 4.68 ac-ft No Mod. of Weir El. is Required

Peak Stage for Proposed Volumes:

Permitted 100 yr/24 hr Peak Stage =	91.45	=	15.66	ac-ft
Required Runoff Volume		=	16.89	ac-ft
Proposed Peak 100 yr/24 hr Peak Stage			91.83	ft
Freeboard Provided		=	1.17	ft

Notes: Existing Pond L can accommodate the increase in runoff from widened Basin L without expansion or modification of the weir.

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 08/23/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 08/23/23

Wet Detention Online Pond Treatment Calculations: Expanded Pond O1 (Using Entire Parcel)

SFWMD Criteria:

Basin O Basin Area =	6.63	(Permitted)
Basin O Add. Basin Area =	0.98	
Basin O Exist. Impervious Area =	4.75	(Permitted)
Basin O Add. Impervious Area =	1.14	
Total Add'l Basin Area =	0.98 Ac	
Total Add'l Impervious area =	1.14 Ac	
1" runoff from add'l basin area =	0.08 Ac-Ft	
2.5" runoff from add'l impervious area =	0.24 Ac-Ft	
Greater of Above =	0.24 Ac-Ft	
50% Additional TV =	0.36 Ac-Ft	
Total Required Treatment Volume (T.V.) =	**0.36**	Ac-ft
Existing Pond Retention Volume at Design Stage =	**2.01**	ac-ft
Provided Treatment Volume =	**1.35**	Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev. NGVD	h ft	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	
102.00	1.0	1.16	1.11	5.49	Toe of Berm
101.00	1.0	1.06	1.02	4.38	
100.00	1.0	0.97	0.93	3.36	
99.00	1.0	0.88	0.84	2.44	
98.00	1.0	0.79	0.75	1.60	
97.00	1.0	0.71	0.67	0.85	
96.00	0.3	0.63	0.18	0.18	
95.70	0.0	0.60	0.00	0.00	

Weir El.

Proposed Weir El. =	**97.66**	**=**	**1.35**	**ac-ft**

Peak Stage for Proposed Volumes:

Permitted 25 yr/72 hr Peak Stage =	101.19	=	4.59	ac-ft
Required Runoff Volume =		=	3.42	ac-ft
Proposed Peak 25 yr/72 hr Peak Stage =			**100.17**	ft
Freeboard Provided		=	**1.83**	ft

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 08/23/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 08/23/23

Wet Detention Online Pond Treatment Calculations: Expanded Pond O2 (Maximize size and add offsite parcel)

SFWMD Criteria:

Basin O Basin Area =	6.63	(Permitted)
Basin O Add. Basin Area =	0.98	
Basin O Exist. Impervious Area =	4.75	(Permitted)
Basin O Add. Impervious Area =	1.14	
Total Add'l Basin Area =	0.98 Ac	
Total Add'l Impervious area =	1.14 Ac	
1" runoff from add'l basin area =	0.08 Ac-Ft	
2.5" runoff from add'l impervious area =	0.24 Ac-Ft	
Greater of Above =	0.24 Ac-Ft	
50% Additional TV =	0.36 Ac-Ft	
Total Required Treatment Volume (T.V.) =	**0.36**	Ac-ft
Existing Pond Retention Volume at Design Stage =	**2.01**	ac-ft
Provided Treatment Volume =	**1.35**	Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev. NGVD	h ft	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft	
102.00	1.0	1.88	1.82	9.51	Toe of Berm
101.00	1.0	1.76	1.70	7.69	
100.00	1.0	1.64	1.58	5.99	
99.00	1.0	1.52	1.47	4.41	
98.00	1.0	1.41	1.35	2.94	
97.00	1.0	1.29	1.24	1.59	
96.00	0.3	1.19	0.35	0.35	
95.70	0.0	1.16	0.00	0.00	

Weir El.				
Proposed Weir El. =	**96.82**	**=**	**1.35**	**ac-ft**

Peak Stage for Proposed Volumes:				
Permitted 25 yr/72 hr Peak Stage =	101.19	=	8.03	ac-ft
Required Runoff Volume =		=	3.42	ac-ft
Proposed Peak 25 yr/72 hr Peak Stage =			**98.32**	ft
Freeboard Provided		=	**3.68**	ft

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 06/27/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 06/27/23

Wet Detention Online Pond Treatment Calculations: Pond P (Existing Pond P)

SFWMD Criteria:

Basin P Basin Area =	10.32	(Permitted)
Basin P Add. Basin Area =	0.18	
Basin P Exist. Impervious Area =	4.33	(Permitted)
Basin P Add. Impervious Area =	0.77	
Total Add'l Area =		0.18 Ac
Total Add'l Imp. area =		0.77 Ac
1" runoff from add'l basin area =		0.01 Ac-Ft
2.5" runoff from add'l impervious area =		0.16 Ac-Ft
Greater of Above =		0.16 Ac-Ft
50% Additional TV =		0.24 Ac-Ft
Existing Treatment Volume =		0.90 Ac-Ft
Total Required Treatment Volume (T.V.) =		**1.14** Ac-ft
Provided Treatment Volume =		**1.14** Ac-ft

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

Elev. NAVD	h ft	Area ac	Inc. Volume Ac-ft	Cum. Volume Ac-ft
104.00	2.0	1.77	2.96	5.78
102.00	1.0	1.19	1.14	2.82
101.00	1.0	1.08	1.03	1.68
100.00	0.7	0.97	0.66	0.66
99.30	0.0	0.90	0.00	0.00

Weir El.

Ex. Weir Elev. =	**100.30**	**=**	**0.96**	**ac-ft**
Proposed Weir El. =	**100.48**	**=**	**1.14**	**ac-ft**

Peak Stage Adjustment with Addition of Proposed Volumes:

Permitted Peak Stage =	101.85	=	2.64	ac-ft
Add Proposed Attenuation & T.V.		=	3.15	ac-ft
New 25 year Stage =		**=**	**102.23**	**ft**
Freeboard Provided		=	**1.77**	ft

Notes: Existing Pond P modified to accommodate the increase in runoff from widened Basin P. The contours appear to be NAVD for lower elevations (stage/area consistent with table), however, the 104-ft berm is not evident on the south side of the pond. The highest contour appears to be 103-ft on the south side of the pond. Will need some grading of pond.

VOLUME CALCULATIONS FOR PROPOSED CONDITION

PROJECT: 408-174 PREPARED: LCS DATE: 06/27/23

LOCATION: ORANGE COUNTY, FLORIDA CHECKED: GSS DATE: 06/27/23

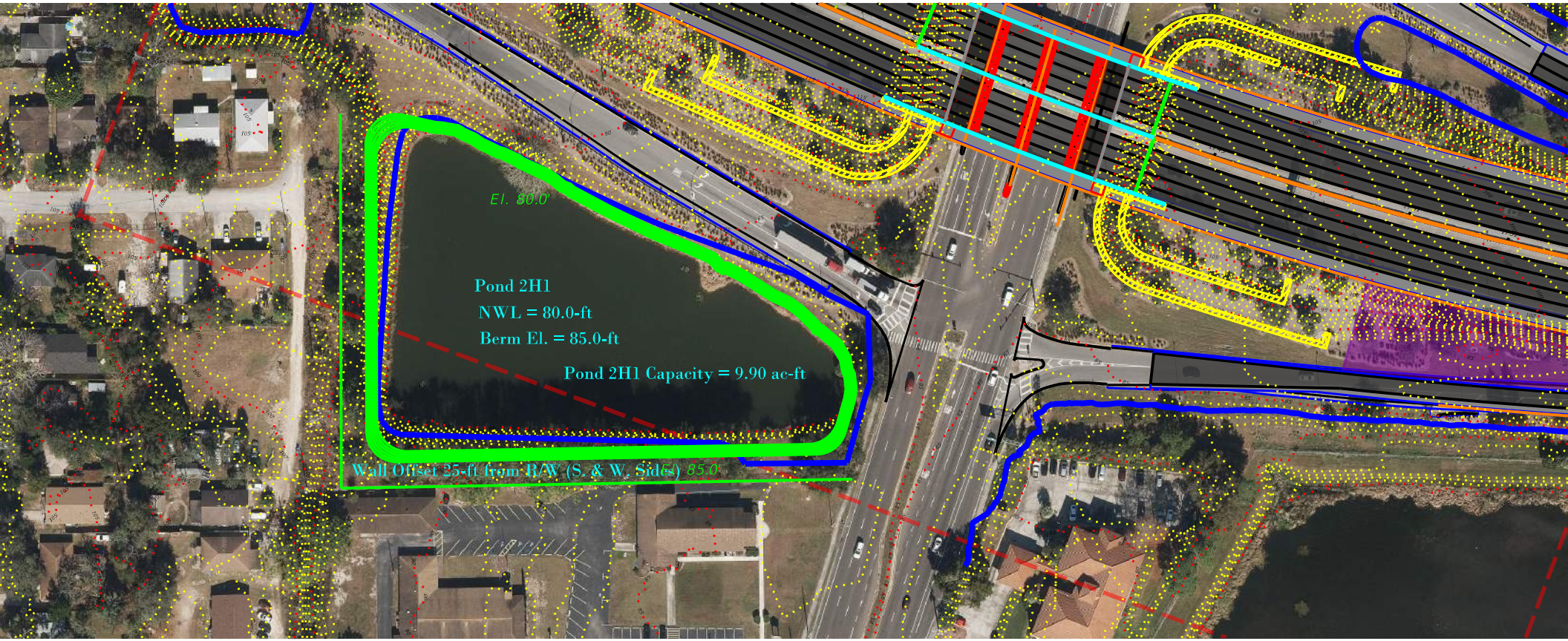
Wet Detention Online Pond Treatment Calculations: Pond P2 (Utilize Small Triangular Parcel)

Pond Stage Storage Calculations - Permitted - Assumed NAVD datum:

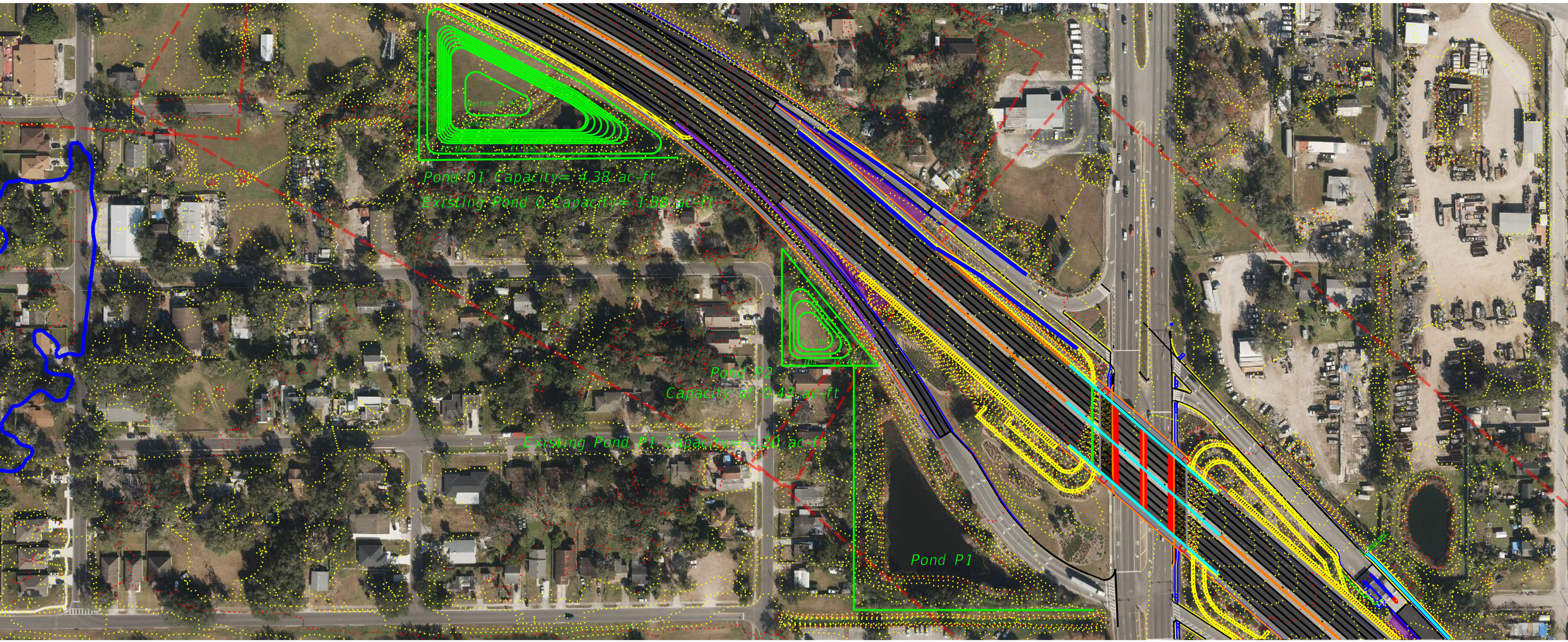
Elev.	h	Area	Inc. Volume	Cum. Volume
NAVD	ft	ac	Ac-ft	Ac-ft
104.00	2.0	0.24	0.39	0.63
102.00	2.0	0.15	0.24	0.24
100.00	0.0	0.08	0.00	0.00

Peak Stage Adjustment with Addition of Proposed Volumes:			
Max. Storage Volume	=	0.43	ac-ft
New 25 year Stage =	**=**	**102.99**	**ft**
Freeboard Provided	**=**	**1.01**	ft

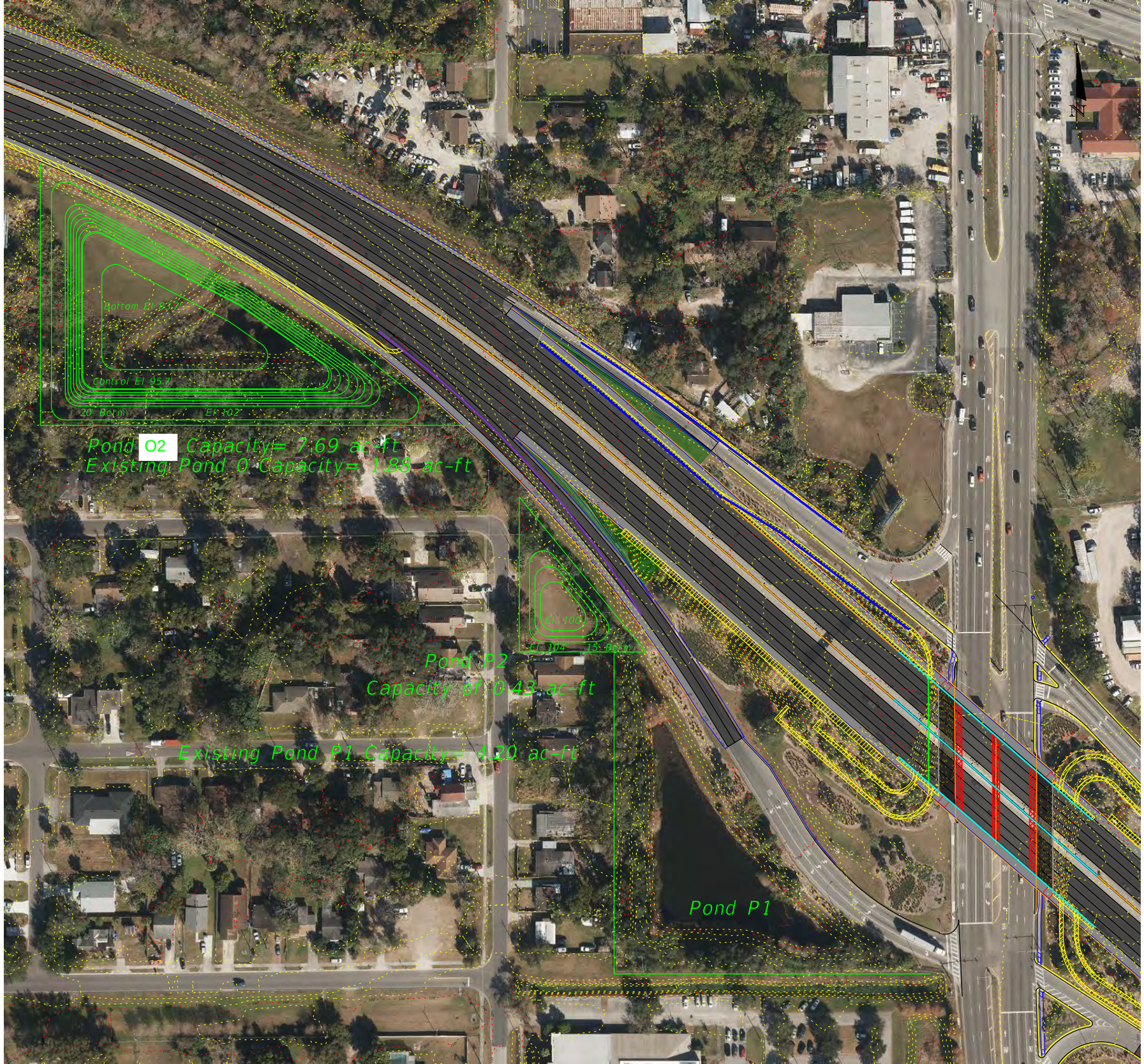
Regraded Pond 2H1



Expanded Pond O1 &
Proposed Pond P2



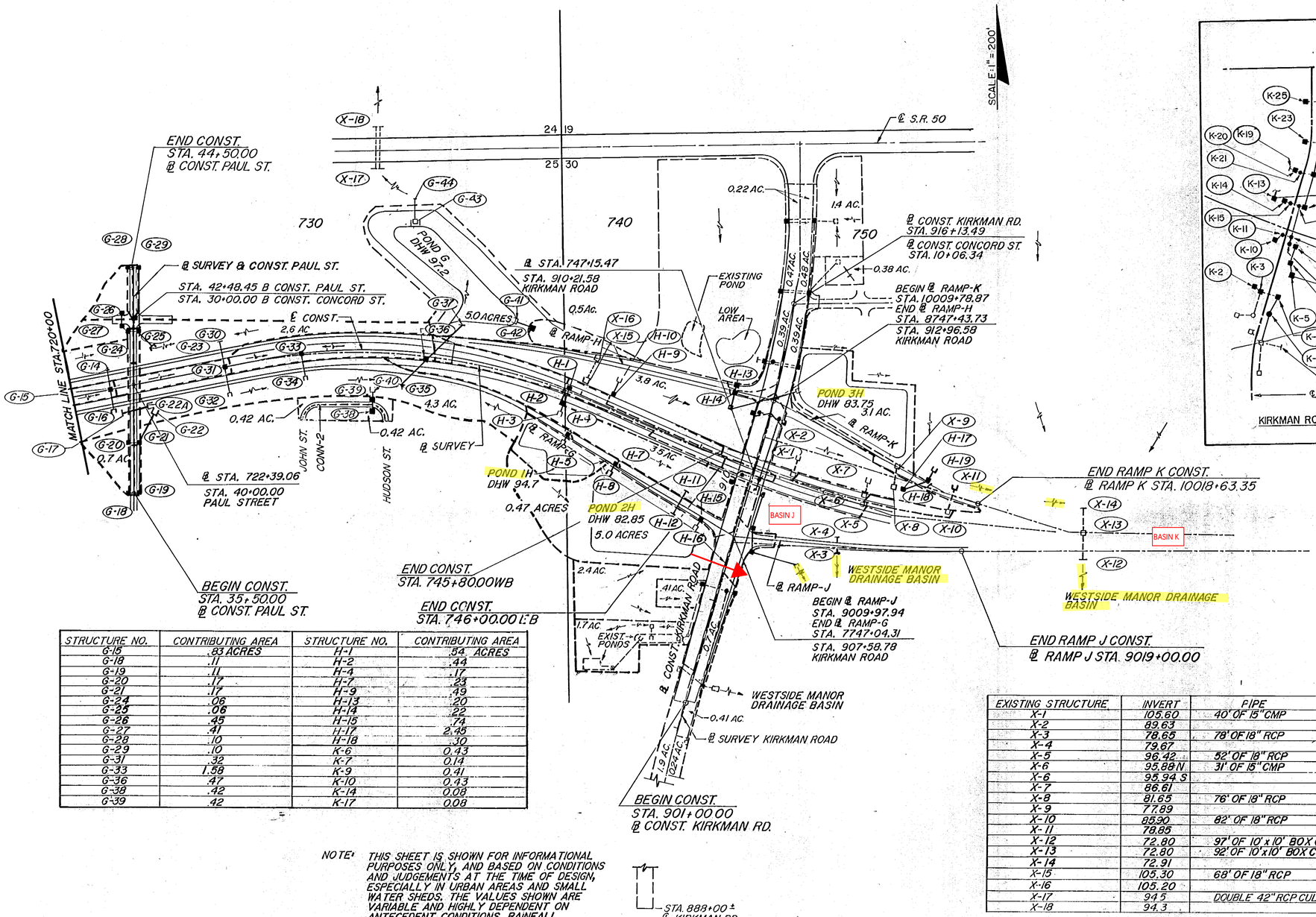
Expanded Pond O2 &
Proposed Pond P2

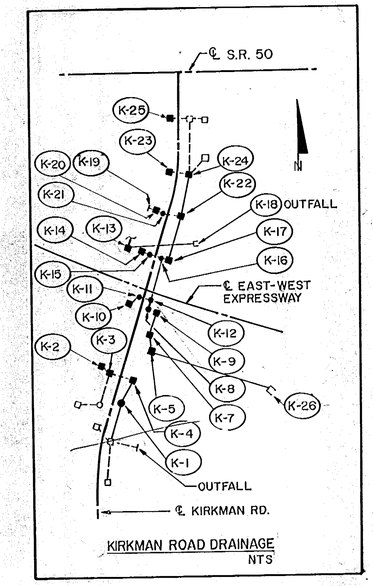


Appendix C – Existing Permit Documentation

PONDS 1H, 2H & 3H DRAINAGE MAP:
SJRWMD 20358-8

SHEET NO.
75008-6450-505	4





STRUCTURE NO.	CONTRIBUTING AREA	STRUCTURE NO.	CONTRIBUTING AREA
G-18	.83 ACRES	H-1	.54 ACRES
G-19	.11	H-2	.44
G-20	.11	H-4	.17
G-21	.17	H-7	.33
G-24	.17	H-9	.49
G-25	.06	H-13	.20
G-26	.06	H-14	.22
G-27	.45	H-15	.74
G-28	.41	H-17	2.45
G-29	.10	H-18	.30
G-31	.10	K-6	0.43
G-33	.32	K-7	0.14
G-36	1.58	K-9	0.41
G-38	.47	K-10	0.43
G-39	.42	K-14	0.08
		K-17	0.08

EXISTING STRUCTURE	INVERT	PIPE
X-1	105.60	40' OF 15" CMP
X-2	89.63	
X-3	78.65	78' OF 18" RCP
X-4	79.67	
X-5	96.42	52' OF 18" RCP
X-6	95.88 N	31' OF 15" CMP
X-6	95.94 S	
X-7	86.61	
X-8	81.65	76' OF 18" RCP
X-9	77.89	
X-10	88.30	82' OF 18" RCP
X-11	78.85	
X-12	72.80	97' OF 10' x 10' BOX CULV.
X-13	72.80	92' OF 10' x 10' BOX CULV.
X-14	72.91	
X-15	105.30	68' OF 18" RCP
X-16	105.20	
X-17	94.5	DOUBLE 42" RCP CULV.
X-18	94.3	

NOTE: THIS SHEET IS SHOWN FOR INFORMATIONAL PURPOSES ONLY, AND BASED ON CONDITIONS AND JUDGEMENTS AT THE TIME OF DESIGN, ESPECIALLY IN URBAN AREAS AND SMALL WATER SHEDS. THE VALUES SHOWN ARE VARIABLE AND HIGHLY DEPENDENT ON ANTECEDENT CONDITIONS, RAINFALL INTENSITY, LAND USE AND OVERLAND FLOW.

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED :
ON : 7-29-91
BY ; REYNOLDS, SMITH and HILL, Inc.

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

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

SUPERVISED BY A.B.H.

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

SUPPLEMENTARY DRAINAGE MAP
EAST-WEST EXPRESSWAY AND KIRKMAN ROAD

(192)

	SHEET NO.
75008-6450-505	27

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/29/91		⚠ AS BUILT									

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

SUPERVISED BY A.P.H.

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

PLAN
STA. 730+00 TO STA. 745+00
EAST-WEST EXPRESSWAY

(193)

	SHEET NO.
75008-6450-505	28

NOTE:

FOR KIRKMAN RD. AND INTERSECTION DETAILS SEE SHEETS NO. 33-36
FOR CURVE DATA SEE SHEETS NO. 37-39
FOR PONDS 2H & 3H DETAILS SEE SHEETS NO. 43-44
FOR UNDERDRAIN AND CLEAN-OUT DETAIL SEE SHEET NO. 106

▨ RAMP WIDENING

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED :

ON : 7-29-91
BY : REYNOLDS, SMITH and HILL, Inc.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/29/91		△ AS-BUILT CHANGE									

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88
SUPERVISED BY	A.B.H.				

EXPRESSWAY

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

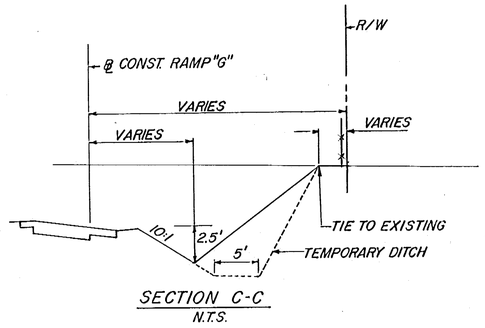
PLAN
STA. 745+00 TO END CONSTRUCTION
EAST-WEST EXPRESSWAY

PONDS 1H & 2H PLAN & SECTIONS:
SJRWMD 20358-8

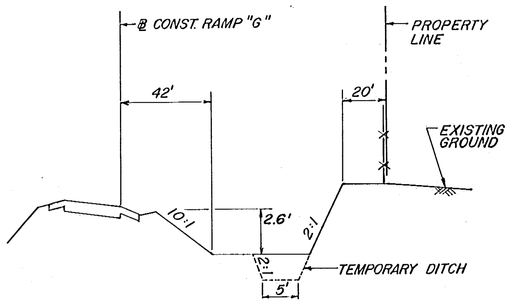
	SHEET NO.
75008-6450-505	43

306

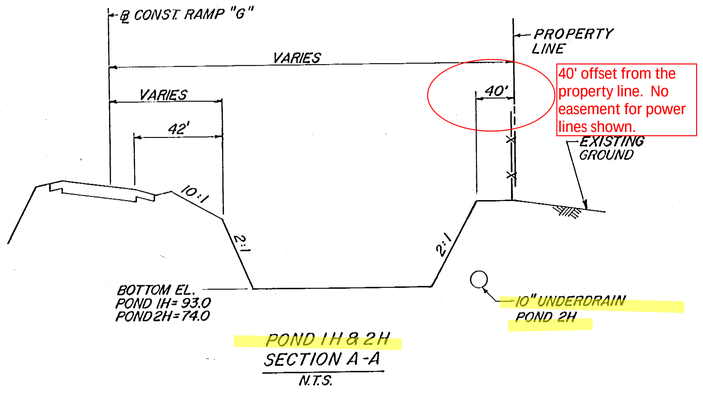
SCALE: 1" = 50'



SECTION C-C
N.T.S.

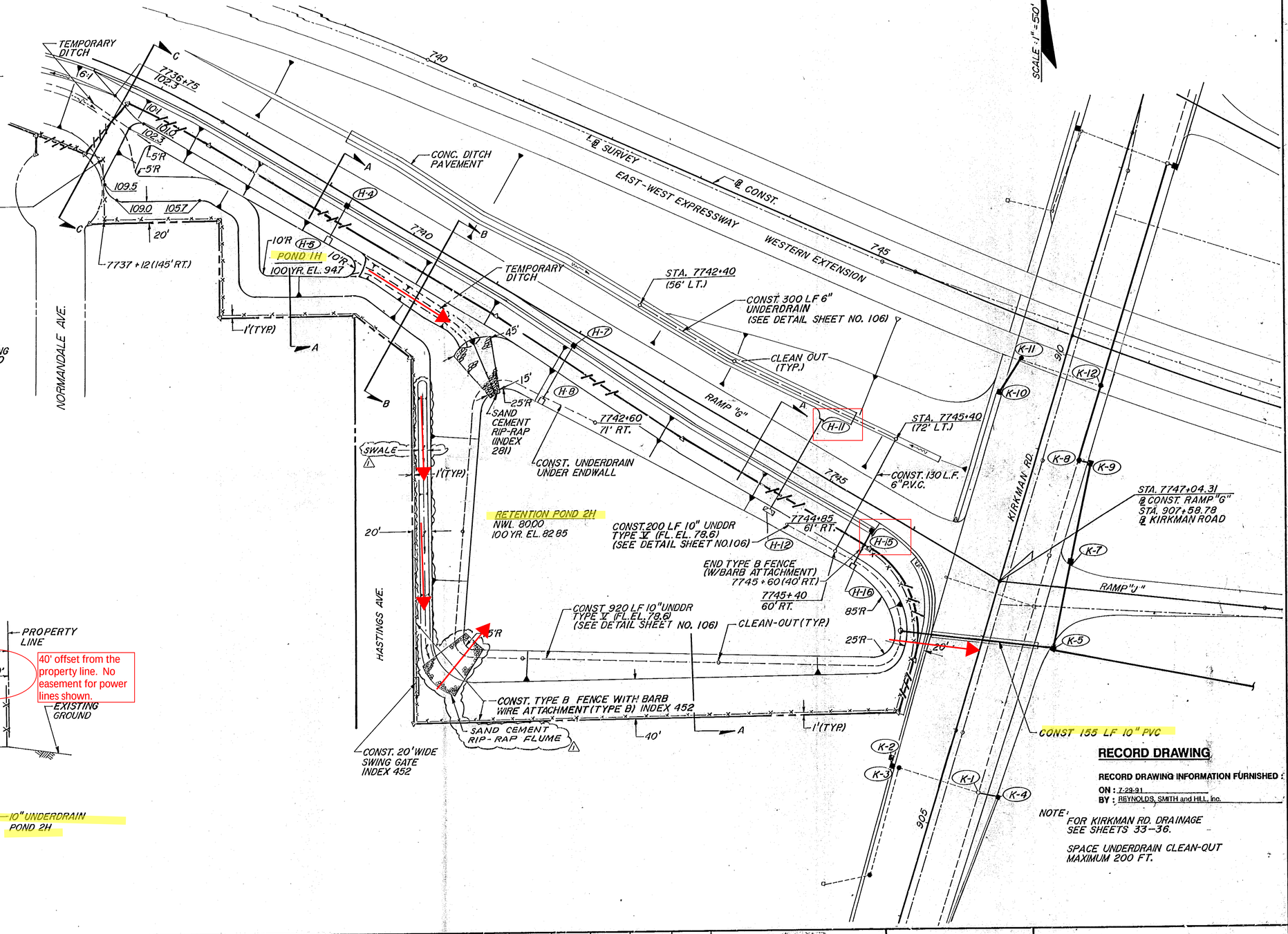


SECTION B-B
N.T.S.



40' offset from the property line. No easement for power lines shown.

POND 1H & 2H
SECTION A-A
N.T.S.



RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON: 7-23-91
BY: REYNOLDS, SMITH and HILL, Inc.

NOTE:
FOR KIRKMAN RD. DRAINAGE SEE SHEETS 33-36.

SPACE UNDERDRAIN CLEAN-OUT MAXIMUM 200 FT.

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/23/91		1 AS-BUILT CHANGE									

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	WITNESSED BY	P.W.M.	08/88
SUPERVISED BY	A.B.H.				

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE WITT

RETENTION PONDS
POND 1H AND 2H

POND 2H:
WIDENING PROJECT C-252B

LIMITS OF MILLING AND RESURFACING

LIMITS OF WIDENING

PAVED SHOULDER

CURVE KIRKI-I
PI STA. = 105+78.82
Delta = 6° 03' 51" (LT)
D = 1° 00' 00"
T = 302.99'
L = 605.42'
R = 5,729.58'
PC STA. = 102+75.52
PT STA. = 108+80.93
e=MATCH EXIST.

50'

END CONST. 6' TYPE 'B' BLACK VINYL FENCE
BEGIN 4' TYPE 'B' BLACK VINYL FENCE
STA. 1743+64.27, 141.50' RT

MATCH LINE STA. 412+60.00

EXIST. CONC. DITCH PAVT (TO BE REMOVED)

CONST. CONC. DITCH PAVT

30" RCP

H-10

CONST. 4' TYPE 'B' BLACK VINYL COATED FENCE

PLANTER WALL 2
SEE PLANTER WALL CONTROL PLANS

EXIST. FENCE (TO BE REMOVED)

413

EXIST. GUARDRAIL (TO REMAIN)

414 RAMP K-4

S 59° 11' 35" E

℄ SURVEY RAMP K-4

415

416

SAWCUT

EXIST. L.A. R/W

743+86.56
252.74' RT
℄ SURVEY

746+04.34
280.85' RT
℄ SURVEY

18" RCP

Pond 2H

EXIST. FENCE (TO REMAIN)

END MILLING & RESURFACING
STA. 416+60.00
℄ SURVEY RAMP K-4
MATCH TO EXIST.

STA. 417+14.31
END ℄ SURVEY RAMP K-4
STA. 359+61.37
℄ SURVEY KIRKMAN RD.

POND 2H

358+85.73
67.07' LT
℄ KIRKMAN RD.

358+03.48
67.07' LT
℄ KIRKMAN RD.

EXIST. R/W LINE

361

360

KIRKMAN RD.

417

100

50'

N 17° 04' 48" E

359

℄ SURVEY KIRKMAN ROAD

358

MATCH LINE STA. 361+00.00
SEE PLAN SHEET 10

30" RCP

MC1 FOC

CONST. 4' TYPE 'B' BLACK VINYL COATED FENCE

PLANTER WALL 8
SEE PLANTER WALL CONTROL PLANS

EXIST. FENCE (TO BE REMOVED)

PC STA. 102+75.52

MATCH LINE STA. 102+90.00

102 RAMP K-1

101

S 83° 55' 12" E

CURVE KIRKI-I

℄ SURVEY RAMP K-1

SAWCUT

397+29.21
335.07' RT
℄ SURVEY

30"x36" RCP

EXIST. L.A. R/W

EXIST. FENCE (TO BE REMOVED)

BEGIN CONST. TYPE 'B' FENCE
STA. 100+74.59, 93.17' RT.

BEGIN MILLING & RESURFACING
STA. 100+55.93
℄ SURVEY RAMP K-1
MATCH TO EXIST.

358+50.05
75.05' RT
℄ KIRKMAN RD.

358+10.67
74.60' RT
℄ KIRKMAN RD.

STA. 100+00.00
BEGIN ℄ SURVEY RAMP K-1
STA. 359+61.43
℄ SURVEY KIRKMAN RD.

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:

ON : October 17, 2007

BY : Metric Engineering, Inc.

CONTRACTOR : Hubbard Construction Co.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS · SURVEYORS · PLANNERS · SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADONS LICENSE NO. 38731

OOCEA PROJ. NO.

252B

EXPRESSWAY AUTHORITY

ROADWAY PLAN SHEET 38
KIRKMAN ROAD RAMPS K-1 & K-4

SHEET NO. 124

C.6

31-MAR-2008 10:31 \\orl1fs4\TC$\CADD\252B_As_Built$\S.R.408 - 252B\Roadway\Design\planRK184.dgn $DATE$ $TIME$ $FILE$

Divert Basin J Imp. & Part Basin K Imp. to Pond 2H:
WIDENING PROJECT C-252B

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering Inc.
CONTRACTOR : Hubbard Construction Co.

POND 3H (SEE POND 3H DETAIL)
OF-1
24" PIPE
R/W LINE
400+85.19, 204.22' (LT) ℄ SURVEY
CONST. 24" RCP CONSTRUCT OVERFLOW STR. SEE DETAIL
S 61° 37' 30" E
402+42.54, 209.81' (LT) ℄ SURVEY
EXIST. FENCE (TO REMAIN)
50'

CURVE KIRK2-I
PI STA. = 207+48.05
Delta = 10° 55' 28" (LT)
D = 4° 00' 00"
T = 136.97'
L = 273.11'
R = 1,432.39'
PC STA. = 206+11.08
PT STA. = 208+84.19
e = MATCH EXIST.

PLANTER WALL 6 SEE PLANTER WALL CONTROL PLAN FOR DETAILS
2' PAVED SHLDR.
RAMP K-2
205
206
207
208
PC STA. 206+11.08
REMOVE EXIST. 15" RCP
I-4
℄ SURVEY RAMP K-2
CONST. 18" RCP
I-5
8' PAVED SHLDR.
PT STA. 208+84.19
END ℄ RAMP K-2 BEGIN CONST. 10' PAVED SHLDR. STA 208+84.19
CONST. 10' PAVED SHLDR.
CURVE KIRK2-I
TO REMAIN

CURVE PBLCURVE11
PI STA. = 1753+61.41
℄ CONST. S.R. 408
Delta = 24° 15' 21" (LT)
D = 1° 29' 55"
T = 821.65'
L = 1,618.69'
R = 3,823.55'
PC STA. = 1745+39.76
PT STA. = 1761+58.44
e = (+) 0.046 FT/FT

CURVE INT14-XJ22
PI STA. = 403+34.77
℄ SURVEY S.R. 408
Delta = 21° 06' 30" (LT)
D = 1° 30' 00"
T = 711.68'
L = 1,047.22'
R = 3,819.72'
PC STA. = 396+23.09
PT STA. = 410+30.31
e = (+) 0.046 FT/FT

END CONST. 4' TYPE 'B' BLACK VINYL COATED FENCE BEGIN 6' TYPE 'B' BLACK VINYL COATED FENCE STA 1750+47.29 128.52' LT.
END CONST. 6' TYPE "B" BLACK VINYL COATED FENCE STA. 1752+93.26, 128.50' LT
18" RCP
TO REMAIN
END CONST. GUARDRAIL CONST. SRT 350. FLARED END STA. 1755+27.42, 63.10' LT.
END CONST. SHLDR. GUTTER STA 1755+00.42
15" RCP
END MISC. ASPH. STA 1755+37.89
1756+60.06 57.00' LT.
CONST. WIDENING
CONST. 8' PAVED SHLDR.
CONST. 3' MISC. ASPH.
CONST. GUARDRAIL & SHLDR. GUTTER
15" CMP
TO REMAIN
EXIST. GUARDRAIL & SHLDR. GUTTER (TO BE REMOVED)
MATCH LINE STA. 1750+00.00
MATCH LINE STA. 1757+00.00 VARIES
36'
8'
10'
2'
1750
1751
1752
1753
1754
1755
1756
1757
400
401
402
403
404
405
406
CONST. 18" RCP
INT14-XJ22
CONST. 10' PAVED SHLDR.
℄ SURVEY
℄ CONST. S.R. 408
SAW CUT
EI-7
CONST. 8' PAVED SHLDR.
END CONST. 8' PAVED SHLDR. 1756+60.40, 47.00' LT.
REMOVE EXIST. GUARDRAIL
I-1A
I-1
PBLCURVE11
CONST. 3' MISC. ASPH.
CONST. 8' PAVED SHLDR.
CONST. GUARDRAIL & SHLDR. GUTTER
REMOVE EXIST. GUARDRAIL
CONST. 10' PAVED SHLDR.
S.R. 408
SAW CUT
CONST. DBL. FACE CONC. BARRIER WALL
I-6
CONST. 18" RCP
END MISC. ASPH. 1756+08.87
END CONST. PAVED SHLDR. STA. 1756+53.48 47.15' RT.

CURVE KIRK1-I
PI STA. = 105+78.82
Delta = 6° 03' 15" (LT)
D = 1° 00' 00"
T = 302.99'
L = 605.42'
R = 5,729.58'
PC STA. = 102+75.52
PT STA. = 108+80.93
e = MATCH EXIST.

END CONST. SHLDR. GUTTER STA 1751+51.43
END CONST. 6' TYPE "B" BLACK VINYL COATED FENCE STA. 1751+40.69, 140.50' RT
CONST. WIDENING
CONST. WIDENING
CONST. 10' PAVED SHLDR.
CONST. 4.5' MISC. ASPH.
I-1B
PLANTER WALL 8 SEE PLANTER WALL CONTROL PLAN FOR DETAILS
18" CMP
REMOVE EXISTING ENDWALL
℄ SURVEY RAMP K-1
RAMP K-1
103
104
105
106
107
108
109
110
TO REMAIN
CURVE KIRK1-I
END CONST. 4' TYPE 'B' BLACK VINYL COATED FENCE BEGIN 6' TYPE 'B' BLACK VINYL COATED FENCE STA 1750+52.77 140.50' RT
BEGIN MISC. ASPH. STA. 104+66.54
EXIST. GUARDRAIL & SHLDR. GUTTER (TO REMAIN)
REMOVE EXIST. END TREATMENT REPLACE W/ SRT 350 FLARED END REPLACE MISC. ASPHALT (TIE TO EXIST.)
END MISC. ASPH. STA. 105+13.48
2' PAVED SHLDR.
PI STA. 403+34.77
END CONST. GUARDRAIL TYPE II END ANCHORAGE STA. 1755+94.91, 59.00' RT.
PT STA. 108+80.93
EXIST. GUARDRAIL (TO BE REMOVED) S 89° 25' 01" E
BEGIN CONST. SHLDR. GUTTER STA 109+14.55
1756+59.66 98.78' RT
RECONST. GORE PAVEMENT
BEGIN CONST. GUARDRAIL & MISC. ASPH. TIE TO EXIST. GUARDRAIL BEGIN CONST.8' SHLDR. STA. 108+73.77
4' PAVED SHLDR.
BEGIN WIDENING STA. 1756+94.24
404+76.74 156.68' (RT) ℄ SURVEY
CONST. 6' TYPE 'B' FENCE
EXIST. L.A. R/W
EXIST. FENCE (TO BE REMOVED)
403+07.08, 183.77' (RT) ℄ SURVEY
403+13.25, 218.18' (RT) ℄ SURVEY
EXIST. R/W
6.5'
8' VAR.
VAR.
3'

LIMITS OF MILLING AND RESURFACING
LIMITS OF RECONSTRUCTION
LIMITS OF WIDENING
PAVED SHOULDER

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS · SURVEYORS · PLANNERS · SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

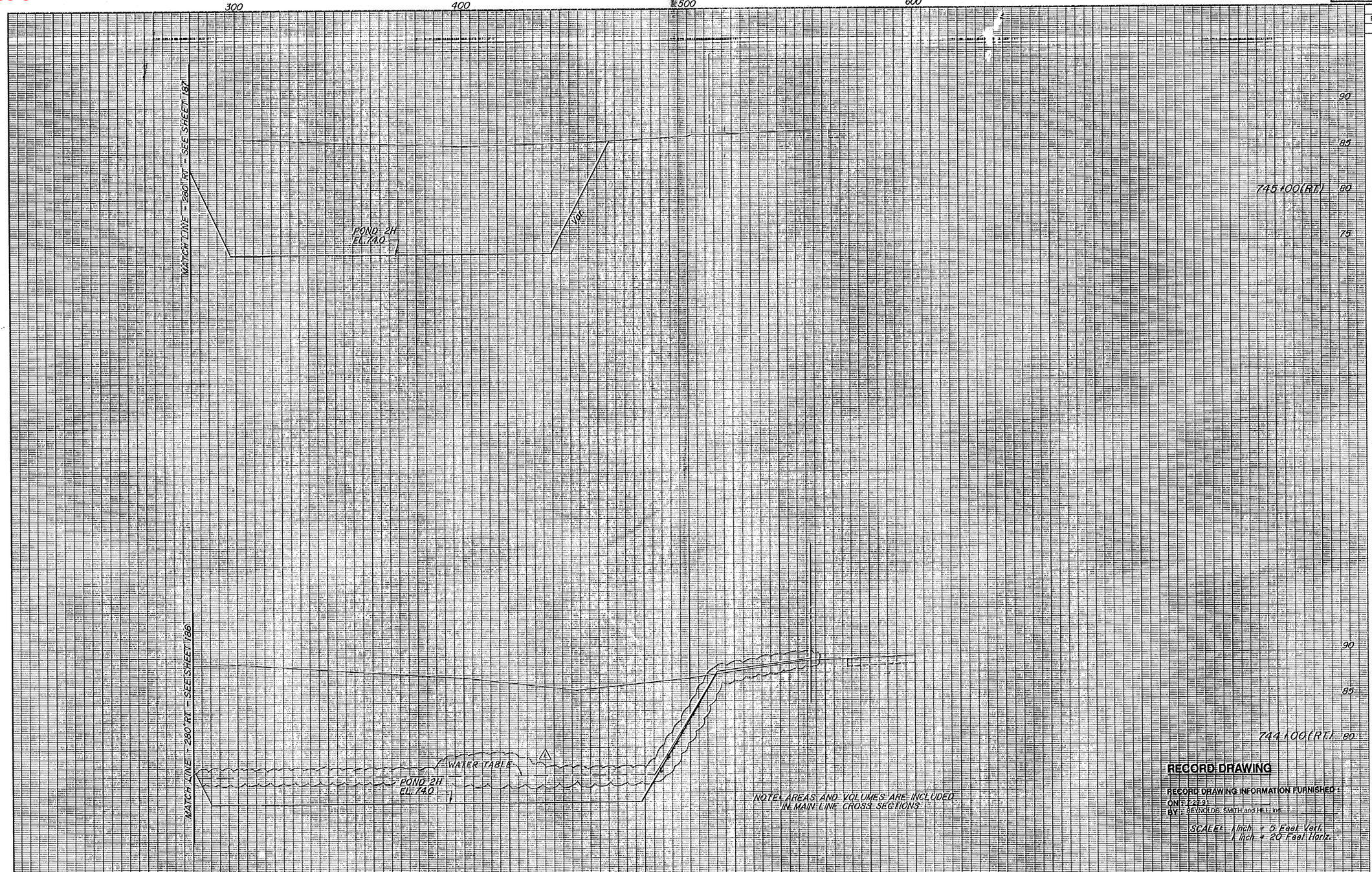
ROADWAY PLAN SHEET 11
STA. 1750+00 TO STA. 1757+00

SHEET NO. 97

24-MAR-2008 10:25 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\planrd11.dgn
$DATE$ $TIME$ $FILE$

POND 2H CROSS SECTIONS:
SJRWMD 20358-8

STATE PROJ. NO.	SHEET NO.
75008-6450-505	195 (53)



Rdwy. Exc. A	Rdwy. Exc. V	Fill A	Fill V

NOTE: AREAS AND VOLUMES ARE INCLUDED IN MAIN LINE CROSS SECTIONS

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED :
ON : 7/29/91
BY : REYNOLDS, SMITH and HILL, Inc.

SCALES: 1 Inch = 5 Feet Vert.
1 Inch = 20 Feet Horiz.

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/29/91		1 AS-BUILT									

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

SUPERVISED BY A.B.H.

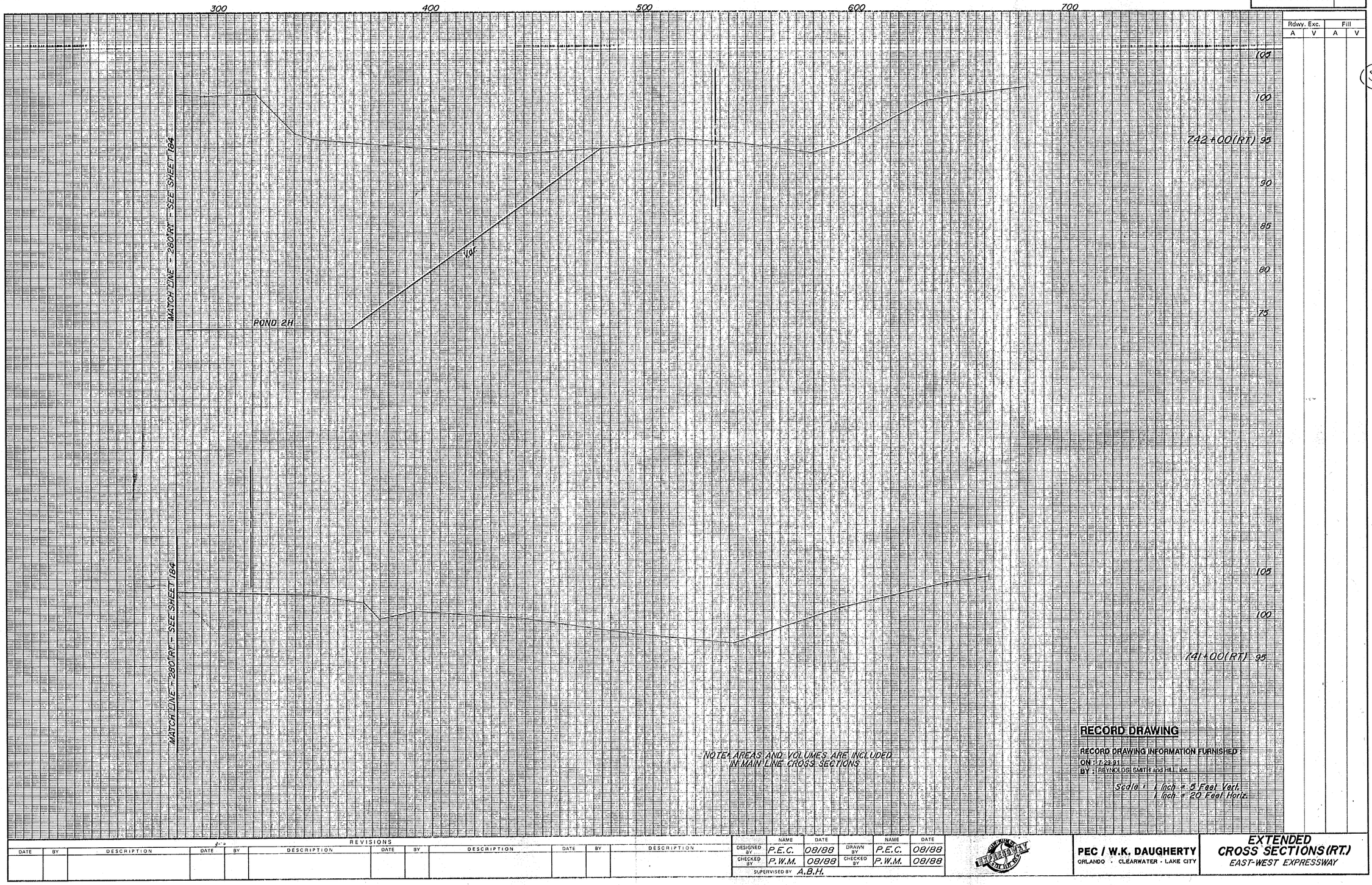
PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

EXTENDED CROSS SECTIONS (RT.)
EAST-WEST EXPRESSWAY

AIC 2FR N93377

POND 2H CROSS SECTIONS:
SJRWMD 20358-8

STATE PROJ. NO.	SHEET NO.
75008-6450-505	193A



Rdwy. Exc. A	Rdwy. Exc. V	Fill A	Fill V

(51)

NOTE: AREAS AND VOLUMES ARE INCLUDED IN MAIN LINE CROSS SECTIONS

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED
ON: 7-29-91
BY: REYNOLDS SMITH and HILL, inc.

Scale: 1 inch = 5 Feet Vert.
1 inch = 20 Feet Horiz.

REVISIONS

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

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88
SUPERVISED BY	A.B.H.				

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

EXTENDED CROSS SECTIONS (RT.)
EAST-WEST EXPRESSWAY

ARC 1PR N93377

POND 2H CROSS SECTIONS:
SJRWMD 20358-8

STATE PROJ. NO.	SHEET NO.
75008-6450-505	194

Rdwy. Exc.		Fill	
A	V	A	V

52

300 400 500 600 700

95
90
743+00 (RT.)
85
80
75

MATCH LINE – 280' RT. – (SEE SHEET 185)

POND 2H
BOTTOM EL. 74.0

10:1

NOTE: AREAS AND VOLUMES ARE INCLUDED IN MAINLINE CROSS SECTIONS

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON: 7-29-91
BY: REYNOLDS, SMITH and HILL, Inc.

Scale: 1 Inch = 5 Feet Vert.
1 Inch = 20 Feet Horiz.

REVISIONS

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

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

SUPERVISED BY A.B.H.

EAST WEST EXPRESSWAY CORPORATION

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

EXTENDED
CROSS SECTIONS (RT.)
EAST WEST EXPRESSWAY

AXC 2FE N93277

POND 3H PLAN & SECTIONS:
SJRWMD 20358-8

	SHEET NO.
75008-6450-505	44

207

CONCORD ST.

LOW AREA

EXISTING PIPE

GATE SHIFTED 10 FT. TO NORTH

CONST. 20' WIDE SWING GATE (DOUBLE 10') INDEX 452.

CONST. TYPE B FENCE (W/BARB WIRE ATTACHMENT) INDEX 452

1' (TYP.)

END ℄ RAMP 'H'
STA. 8747+43.73
BEGIN ℄ RAMP 'K'
STA. 10009+78.87
STA. 912+96.58
KIRKMAN RD.

℄ RAMP 'H'

BILLBOARD LOCATION

STREET LIGHT SWITCH BOX (TO BE RELOCATED)

10011+50
262' LT.

10010+81
98' LT.

RETENTION POND 3H
DESIGN HIGH WATER EL. 83.90
100 YR.-24 HR. EVENT

CONST. 545 LF 10" UNDDR TYPE V (SEE DETAIL SHEET NO. 106)
FL.EL. 79.6

BEGIN SODDED DITCH STA. 12 + 30

CONST. 485 LF 10" UNDERDRAIN TYPE V (FL.EL. 79.6) (SEE DETAIL SHEET NO. 106)

℄ "KK"

℄ RAMP K

CLEAN-OUT (TYP.)

1' (TYP.)

END SODDED DITCH STA. 15+75

EXIST. FLUME

SAND-CEMENT RIP-RAP

SAND-CEMENT RIP-RAP BOTH SIDES OF V-DITCH

PERIMETER V-DITCH

EL. 85.0

DELETED
CLAY CORE
(SEE SHEET 106)

PERIMETER V-DITCH

FOR WEIR DETAILS SEE SHEET NO. 106

EL. 82.5

BLEED DOWN DEVICE (SEE DETAIL ABOVE)

OUTFALL

CONST. TYPE B FENCE (TIE TO EXISTING) INDEX 452

EAST-WEST EXPRESSWAY - WESTERN EXTENSION

STA. 747+15.47
℄ CONST. E/W EXP.
STA. 910+21.58
KIRKMAN RD.

KIRKMAN RD.

EXISTING PIPE

END ℄ RAMP 'G'
STA. 7747+04.31
BEGIN ℄ RAMP I
STA. 9009+97.94
STA. 907+58.78
KIRKMAN RD.

℄ RAMP 'G'

℄ RAMP 'I'

K-13, X-2, X-1, X-7, X-6, X-5, H-17, H-18, H-19, X-11, X-10

MAINTENANCE BLEED-DOWN STRUCTURE
N.T.S.

5' TOP ELEV. 85.0 BERM

POND

TYPE C DITCH BOTTOM INLET WITH STEEL OBSERVATION GRATE

CONC. APRON (SEE DETAIL) INV. EL. 81.0

2% 10"Ø PVC

CLOW CORP. MODEL F-3000 SHEAR GATE OR EQUIVALENT TO BE CHAINED & PADLOCKED (INDEX 201)
INV. EL. 80.8

53 LF 10" PVC

10"Ø UNDERDRAIN UNPERFORATED

INV. EL. 79.6

CONC. APRON (SEE DETAIL)

ELBOW

INV. EL. 78.3

10"Ø PVC

1'R

6'

3'

2:1 BEVEL
1/2" GALVANIZED HARDWARE CLOTH
TROUGH SLOPE SHALL MATCH OUTLET PIPE SLOPE

3H

4'

ELBOW

10'

CLASS I CONCRETE (6" THICK)

PLAN
N.T.S.

SECTION A-A
CONCRETE APRON
N.T.S.

SECTION C-C
N.T.S.

KIRKMAN RD.

30' 40'

20'

10'

2:1

POND 3H

SCALE: 1" = 50'

EL. 82.5

EL. 78.0

1'

4.5'

SECTION D-D
N.T.S.

R/W LINE

TYPE B FENCE

EXIST. PARKING LOT

20'

MIN. EL. 85.0

3:1

MAX. 2:1 VARIES

MIN. EL. 85.0

6"

POND

2:1

EL. 81.0

EXIST. GROUND

UNDERDRAIN

SECTION B-B
N.T.S.

PROPERTY LINE

VARIES

20'

℄ CONST. RAMP K

EXISTING PARKING LOT

"V" DITCH

MIN. EL. 85.0
(SEE CROSS SECTIONS)

VARIES

3:1

2:1

VARIES

42'

10:1

2:1

BOTTOM EL. 81.0

UNDERDRAIN

UNDERDRAIN

SECTION A-A
N.T.S.

NOTE: FOR KIRKMAN RD. DRAINAGE SEE SHEETS 33-36.

SPACE UNDERDRAIN CLEAN-OUT MAXIMUM 200 FT.

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED :
ON : 7-29-91
BY : REYNOLDS, SMITH and HILL, Inc.

REVISIONS											
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7-31-89	MED	⚠1 CPR # 11									
7-29-91		⚠2 AS-BUILT CHANGE									

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

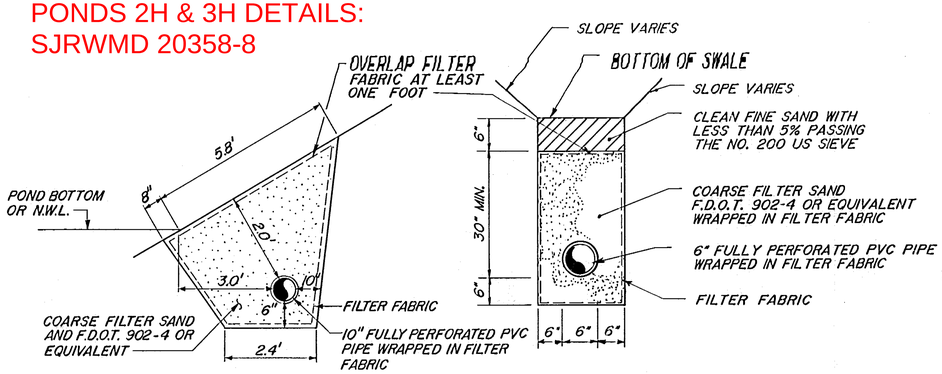
SUPERVISED BY A.B.H.

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

RETENTION POND
POND 3H

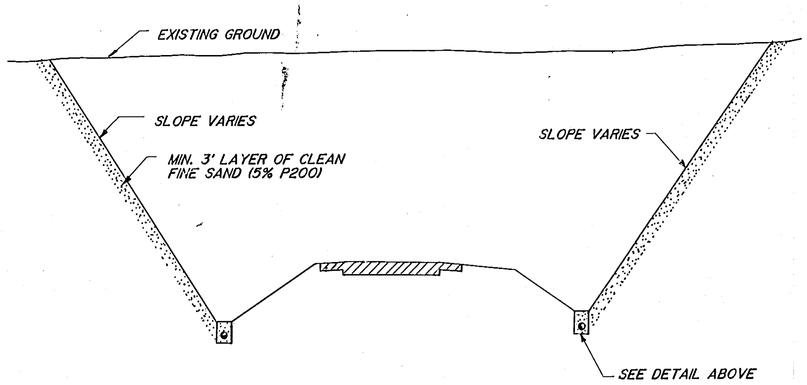
PONDS 2H & 3H DETAILS:
SJRWMD 20358-8

STATE PROJ. NO.	SHEET NO.
75008-6450-505	106

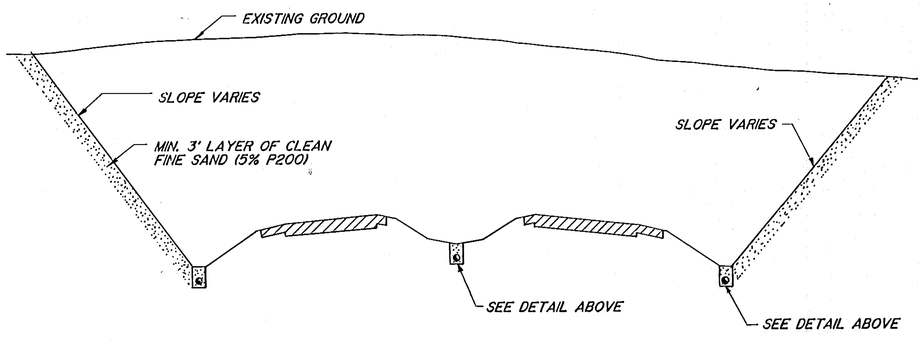


TYPICAL POND UNDERDRAIN DETAIL
FOR PONDS 2H & 3H
PAID FOR AS UNDERDRAIN (TYPE V)

SWALE TYPICAL UNDERDRAIN DETAIL
PAID FOR AS UNDERDRAIN (SPECIAL)



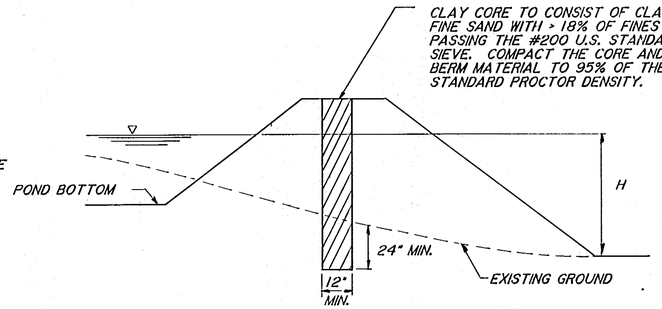
TYPICAL RAMP UNDERDRAIN



TYPICAL MAINLINE UNDERDRAIN

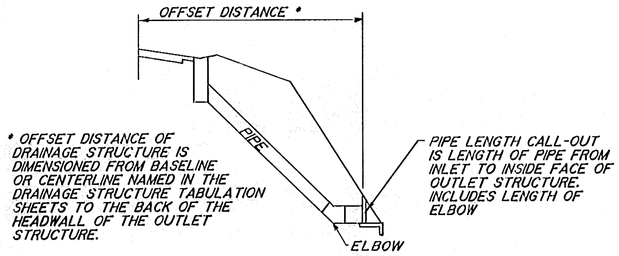
NOTE:
1. SEE SHEET 11A FOR UNDERDRAIN LOCATION.
2. SEE SPECIAL PROVISIONS FOR LIMITS OF CONSTRUCTION OF CLEAN FINE SAND BACKFILL.

*CLAY CORE IS REQUIRED IF H ≥ 2 FEET.

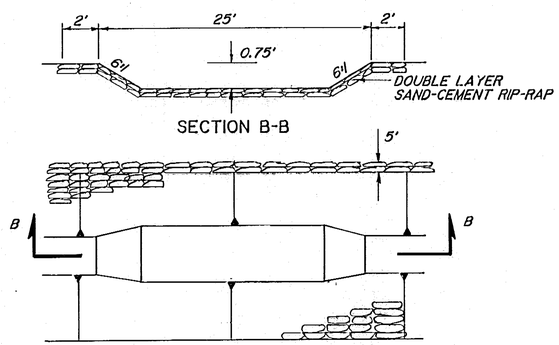


* TYPICAL POND BERM CROSS-SECTION WITH CLAY CORE

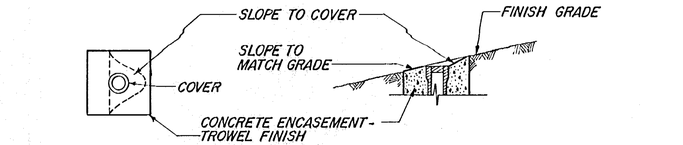
FOR PONDS 1E,2E,G AND 3H



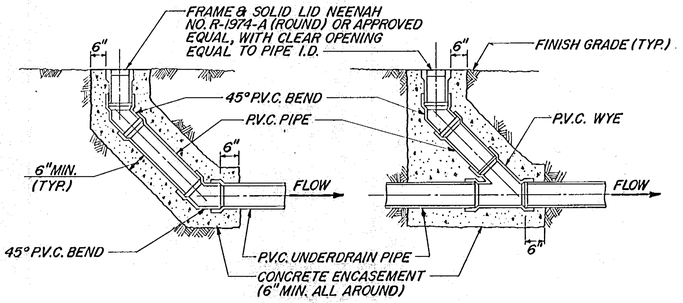
PIPE MEASUREMENT DETAIL



OVERFLOW WEIR DETAIL
FOR PONDS 1E, 2E, & 3H

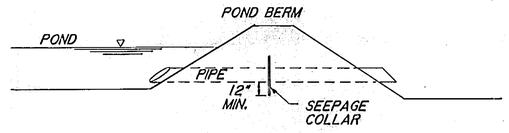


PLAN SLOPE INSTALLATION

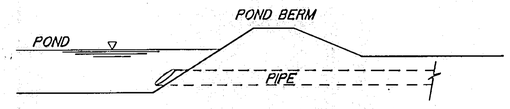


TERMINAL CLEANOUT IN-LINE CLEANOUT

UNDERDRAIN CLEANOUT



TYPICAL POND BERM CROSS-SECTION REQUIRING SEEPAGE COLLAR
PONDS 1E, G, & 3H



RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED :
ON : 7-29-91
BY : REYNOLDS, SMITH and HILL, Inc.

TYPICAL POND BERM CROSS-SECTION NOT REQUIRING SEEPAGE COLLAR

NOTE : UNDERDRAINS DESIGN BASED ON SOILS INVESTIGATION PROVIDED BY JAMMAL AND ASSOC., INC. (4-18-88)

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

	NAME	DATE		NAME	DATE
DESIGNED BY	P.E.C.	08/88	DRAWN BY	P.E.C.	08/88
CHECKED BY	P.W.M.	08/88	CHECKED BY	P.W.M.	08/88

SUPERVISED BY A.B.H.

PEC / W.K. DAUGHERTY
ORLANDO · CLEARWATER · LAKE CITY

DRAINAGE DETAILS

SHEET INSERTED By CEE

Noted By CEE
Pond / Stormwater As Builts / Permitting

ORLANDO-ORANGE COUNTY EXPRESSWAY AUTHORITY
CONTRACT PLANS
S.R. 408 IMPROVEMENTS FROM HIAWASSEE ROAD TO TAMPA AVENUE

SR 408
WIDENING PROJECT C-252B

COMPONENTS OF CONTRACT PLANS SET

VOL. 1 OF 4 : ROADWAY PLANS
VOL. 2 OF 4 : SIGNING AND PAVEMENT MARKING PLANS
SIGNALIZATION PLANS
LIGHTING PLANS
FIBER OPTIC NETWORK PLANS
VOL. 3 OF 4 : STRUCTURAL PLANS
WALL PLANS
VOL. 4 OF 4 : TOLL PLAZA

A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT

INDEX OF ROADWAY PLANS

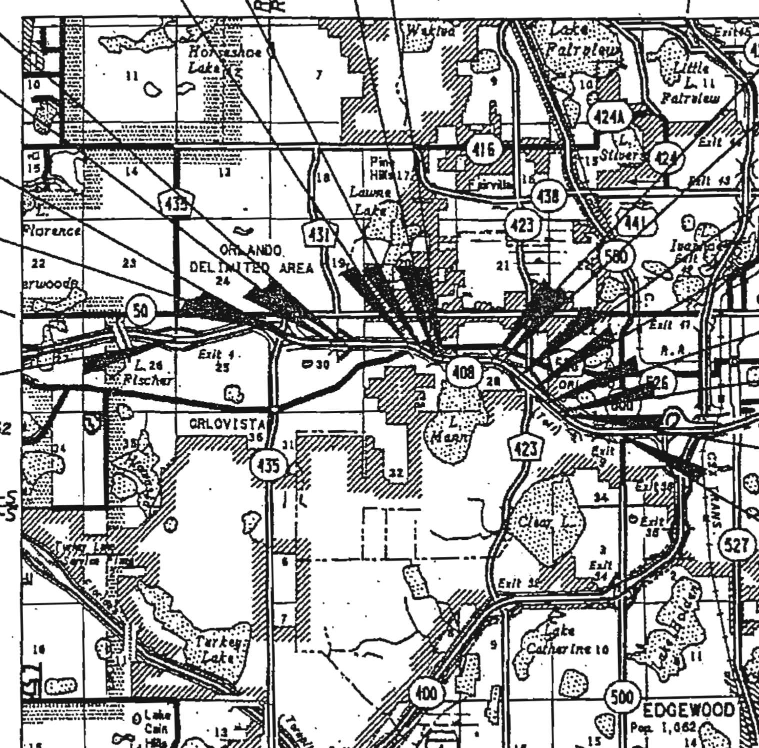
GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED JANUARY 2002, AND
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
DATED 2000, AS AMENDED BY CONTRACT DOCUMENTS.

REVISION #2
ROADWAY PLANS: 1, 2, 3, 4, 5, 6, 23, 28, 41, 53, 57, 104, 112, 118, 491, 492, 493, 550, 552, 557, 593, 635, 851, 852
SIGNING & PAVEMENT MARKING PLANS: S-2, S-3, S-5, S-6, S-9, S-11, S-12, S-14, S-15
S-17, S-18, S-20, S-21, S-23, S-24, S-26, S-27, S-157, S-157B, S-158, S-165A
FO PLANS: FO-1, FO-8, FO-13, FO-14, FO-16, FO-19, FO-20, FO-23, FO-30, FO-33, FO-35,
FO-39, FO-41A, FO-41B, FO-46A, FO-47, FO-47A, FO-48, FO-49, FO-50, FO-50A, FO-51, FO-53,
FO-54, FO-55, FO-56, FO-69, FO-70
WALL PLANS: P-26
TOLL PLAZA ARCHITECTURAL PLANS: A1.12, A1.15, A2.11, A2.14, A3.23, A3.25, A3.34
TOLL PLAZA STRUCTURAL PLANS: S2.1, S2.2, S2.9, S3.3, S3.8 S3.9, S3.10
TOLL PLAZA UTILITY PLANS: SQ-1, SQ-2, SQ-3

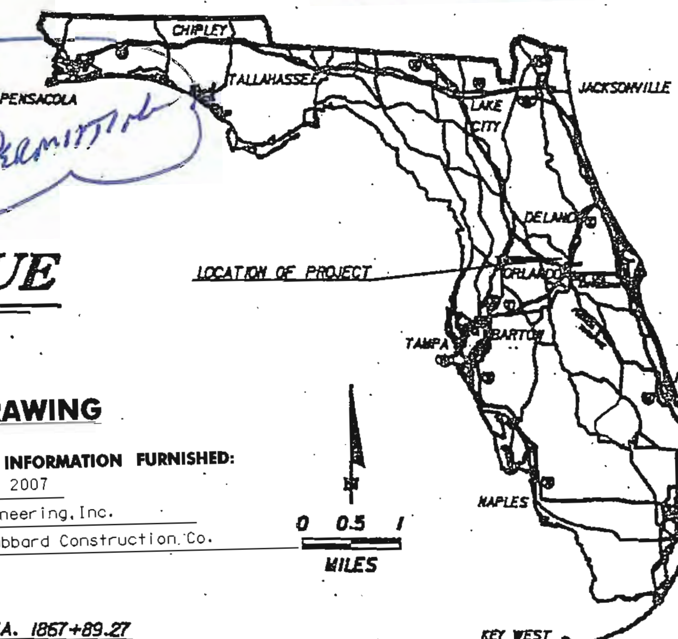
REVISION #3
ROADWAY PLANS: 1, 2, 3, 4, 5, 6, 10, 11, 12, 14, 15A, 22, 40, 53, 54, 56, 57, 62, 63, 67, 68, 70, 75, 76,
77, 87, 111, 118, 119, 122, 130, 184, 282, 306A, 412, 413, 414, 415, 522, 541, 546, 552, 821, 822, 826, 887,
893, 910, 911, 912, 913, 914
SIGNING & PAVEMENT MARKING PLANS: S-35, S-38, S-58, S-63, S-124, S-137, S-147A, S-154, S-155, S-156,
S-157A, S-159, S-165, S-175, S-176, S-177, S-178, S-179, S-180, S-181, S-182, S-183, S-184, S-185
LIGHTING PLANS: L-1, L-4, L-5, L-12, L-17, L-20, L-40, L-44, L-45, L-63A, L-66, L-69
FO PLANS: FO-2, FO-3, FO-4, FO-5, FO-6, FO-6A, FO-9, FO-12, FO-26, FO-27, FO-32, FO-38, FO-43,
FO-44, FO-44A, FO-46, FO-64, FO-65, FO-71, FO-76A, FO-76B, FO-76C, FO-80, FO-84
STRUCTUAL PLANS: A-1, A-2, A-3, A-13A, A-13B, C-1A, C-9, D-1, D-2A, D-9, D-10, D-11, D-24, D-30, D-31, D-31A
D-32, D-82, D-83, D-84, D-85, D-86, H-1, H-2, H-3, H-4, H-5, J-1, J-2
WALL PLANS: W-7, W-12, W-13, W-14, W-15, W-16, W-17, W-19, W-23, W-26, W-29, AP-1, AP-4,
AP-17, AP-37, S-7, S-10, S-13, S-14, S-15, S-16, S-17, S-20, S-21, S-22, S-24, S-25, S-26, S-27, S-28,
S-31, P-19, P-20, P-25, P-31, P-41, P-45, P-47, P-52, P-56
TOLL PLAZA UTILITY PLANS: GN-1, SQ-1, SQ-2, SQ-3, UT-12, UT-14, UT-15
TOLL PLAZA STRUCTURAL PLANS: B-4, R2.2, R2.4, R4.4, S1.1, S1.2, S4.3, S4.4
TOLL PLAZA ARCHETECTURAL PLANS: A2.11A, A4.11, A5.11, P2.01, P2.04, P2.05, P2.06, P2.07, P4.02,
E1.02A, E1.03A, E2.01, E2.01A, E3.01, E3.11, E3.12, E4.02, E4.02A, E4.05, E4.05A, E9.04

REVISION #5
ROADWAY PLANS: 1, 2, 3, 23, 34, 53
SIGNING AND PAVEMENT MARKING PLANS: S-1, S-8, S-26, S-30, S-45, S-55, S-73, S-105, S-166,
S-166A, S-166B, S-166C
FO PLANS: FO-12A, FO-69
STRUCTURE PLANS: A-3, C-3
WALL PLANS: W-1, AP-2, AP-6, AP-14, G-35 THRU G-53

ORANGE COUNTY
OOCEA PROJECT NUMBER - 252B



END BRIDGE STA. 1824+46.89 S.R. 408 OVER OLD WINTER GARDEN RD.
BEGIN BRIDGE STA. 1821+72.18 S.R. 408 OVER OLD WINTER GARDEN RD.
END BRIDGE STA. 1779+19.88 S.R. 408 OVER PINE HILLS RD.
BEGIN BRIDGE STA. 1777+47.88 S.R. 408 OVER PINE HILLS RD.
END BRIDGE STA. 1748+15.98 S.R. 408 OVER KIRKMAN RD.
BEGIN BRIDGE STA. 1746+14.48 S.R. 408 OVER KIRKMAN RD.
TO CLERMONT
BEGIN PROJECT
BEGIN CONSTRUCTION
STA. 1686+54.64
T-22-S
T-23-S
R-28-E
R-29-E
TO TAMPA
BEGIN BRIDGE STA. 1834+64.52 S.R. 408 OVER ORTMAN DR.
END BRIDGE STA. 1836+63.78 S.R. 408 OVER ORTMAN DR.
TO SANFORD
BEGIN BRIDGE STA. 1867+89.27 S.R. 408 OVER FERGUSON DR.
END BRIDGE STA. 1869+22.59 S.R. 408 OVER FERGUSON DR.
BEGIN BRIDGE STA. 1891+20.15 S.R. 408 OVER JOHN YOUNG PKWY.
END BRIDGE STA. 1893+77.40 S.R. 408 OVER JOHN YOUNG PKWY.
BEGIN BRIDGE STA. 1904+69.24 S.R. 408 OVER CHURCH ST.
END BRIDGE STA. 1907+31.26 S.R. 408 OVER CHURCH ST.
END PROJECT STA. 1926+07.05
END CONSTRUCTION STA. 680+00.00 (PER CONTRACT NO. 252A)



LOCATION OF PROJECT

0 0.5 1 MILES

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

PLANS PREPARED BY:

DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON S. MEADOWS LICENSE NO. 38731

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

AS-BUILT SURVEY

APPROVED ________________ DATE / /
MICHAEL SNYDER, P.E.
EXECUTIVE DIRECTOR
...-ORANGE COUNTY

SURVEYORS NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO DEPICT RECORD INFORMATION OBTAINED DURING CONSTRUCTION OF SAID IMPROVEMENTS.
2. BENCHMARK DATUM,VERTICAL NAVD 88 DATUM BM #30 4X4 CONC MONUMENT CLC STA. 1688+80.87 239' LT ELEV. 79.26
OOCEA PROJECT NUMBER 252B PLANS BY DRMP

CERTIFICATION

WE DO HEREBY CERTIFY THAT THE ATTACHED PRINTS INDICATING RECORD INFORMATION FOR THIS PROJECT, IS IN COMPLIANCE WITH THE MINIMUM TECHNICAL REQUIREMENTS FOR FIELD SURVEYING SET FORTH BY THE FLORIDA ADMINISTRATIVE CODE 61G- 17.5 UNLESS IT BEARS THE SIGNATURE & ORIGINAL SEAL OF A FLORIDA REGISTERED SURVEYOR AND MAPPER . THIS REPORT IS FOR INFORMATIONAL PURPOSES ONLY.

CERTIFIED THIS 3(DAY OF AUG 2007

'04

FOR THE FIRM BY: GARY A. BURDEN PSM NO. 3691
ALD II INC, LB# 6529
5850 LAKEHURST DR. SUITE 150-33
ORLANDO FL.32819
TELEPHONE # (407) 352-7181

...CONSTRUCTION
...PRIL 2004
...OLUME 1 OF 4

LENGTH OF PROJECT		
	LINEAR FEET	MILES
ROADWAY	23,952.41	4.536
BRIDGES	1,500.06	0.284
NET LENGTH OF PROJECT	23,807.05	4.509
EXCEPTIONS	0.00	0.000
GROSS LENGTH OF PROJECT	23,807.05	4.509

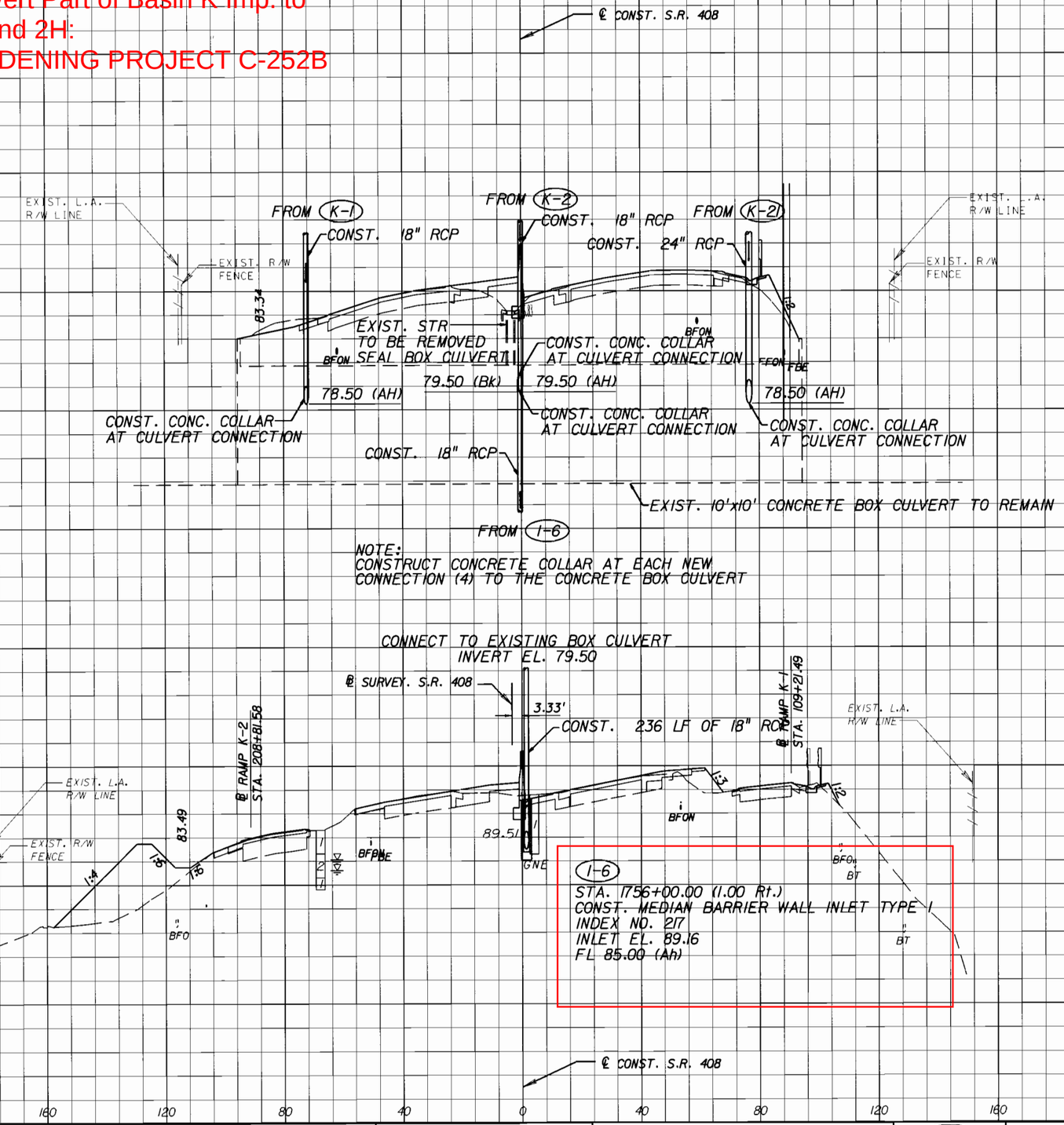
SHEET NO. 1

04/15/2004 02:09:07 PM p:\Roadway\Design\keyrd01.dgn

CONTRACTOR AS BUILT

302B

Divert Part of Basin K Imp. to
Pond 2H:
WIDENING PROJECT C-252B



RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:

ON : October 17, 2007

BY : Metric Engineering, Inc.

CONTRACTOR : Hubbard Construction Co.

STA. 1758+42.24

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 FL. LIC. NO. 6618

OOCEA PROJ. NO.

252B

EXPRESSWAY AUTHORITY

DRAINAGE STRUCTURES
S.R. 408

SHEET NO. 194

C.14

02-APR-2008 15:19 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\RDWYaddendum•3\rdxsrd03c-west.shg $DATE$ $TIME$ $FILE$

Divert Part of Basin K Imp. to Pond 2H:
WIDENING PROJECT C-252B

(WB) e = (+) 0.046

(EB) e = (+) 0.046

I-7

18" PIPE

FL 103.50

BM 24
REC 3" BRASS DISK
℄ CONST. STA. 1748+23.94, 51.54' RT.
℄ SURVEY STA. 397+31.96, 54.54' RT.
EL. 114.20'

I-1A

I-1

FL 97.90

Const. 18" PIPE

FL 96.35

EXIST. PROFILE GRADE LINE RT.

EXIST. PROFILE GRADE LINE LT.

BM 23
4X4 CONC. MONUMENT
℄ CONST. STA. 1752+94.76, 194.79' LT.
℄ SURVEY STA. 402+02.52, 191.60' LT.
EL. 84.91'

BEGIN SPECIAL DITCH RT.

D.P.I. RT.
1749+00.00
℄ CONST. S.R. 408
EL. 84.50

(-)0.180%

D.P.I. RT.
1751+92.83
℄ CONST. S.R. 408
EL. 83.97

(+)0.950%

END SPECIAL DITCH RT.

D.P.I. RT.
1753+00.00
℄ CONST. S.R. 408
EL. 84.99

BEGIN SPECIAL DITCH LT.

D.P.I. LT.
1753+89.52
℄ CONST. S.R. 408
EL. 83.39

(-) 0.082%

D.P.I. LT.
1753+40.18
℄ CONST. S.R. 408
EL. 83.39

(+) 0.048%

D.P.I. LT.
1753+95.05
℄ CONST. S.R. 408
EL. 83.44

100.26
99.80
F.O.N.
F.O.N.
91.63
91.52

1748+00 1749+00 1750+00 1751+00 1752+00 1753+00 1754+00 1755+00

110 105 100 95 90 85 80

1760+96.36
℄ CONST. S.R. 408

(WB) SUPERELEVATION TRANSITION TO NC *

1760+51.40
℄ CONST. S.R. 408

(EB) SUPERELEVATION TRANSITION TO NC *

24' LT. & RT. OF EXIST. PGL

EXIST. PGL

PROP. SHLDR. PROFILE LT.

* SUPERELEVATION TRANSITION DIAGRAM REFERS TO THE EXIST. PGL WHICH IS STILL THE SUPER ROTATION POINT.

EXIST. PROFILE GRADE LINE RT.

EXIST. PROFILE GRADE LINE LT.

BEGIN SHLDR. PROFILE LT.
STA. 1759+00.00

D.P.I. LT.
1758+00.00
℄ CONST. S.R. 408
EL. 83.59

I-6

K-2I

K-4

END SPECIAL DITCH LT.

FL 85.00

(+) 0.049%

Const. 18" PIPE

Const. 24" PIPE

RCP

FL 79.50

FL 78.50

FL 78.60

Const. 24" PIPE

FL 78.80

(+) 0.330%

EL. 85.49

(-) 0.260%

EL. 85.82

EL. 85.56

(+) 0.370%

EL 85.93

91.63
91.52
F.O.N.
87.65
87.61

Existing 10'X10' Conc. Box Culvert

SEE BACK PREV. SHEET

SCALE:
1" = 50' HORIZ
1" = 10' VERT.

1755+00 1756+00 1757+00 1758+00 1759+00 1760+00 1761+00 1762+00

100 95 90 85 80

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
3/5/08		RECORD DRAWING			

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594
JON MEADOWS
CERT. OF AUTH. NO. 4615
LICENSE NO. 29315

00CEA PROJ. NO.

252B

EXPRESSWAY AUTHORITY

EXISTING PROFILE
S.R. 408
STA 1748+00 TO STA 1762+00

SHEET NO. 142

C-15

01-APR-2008 11:25 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\profew8.dgn

$DATE$ $TIME$ $FILE$

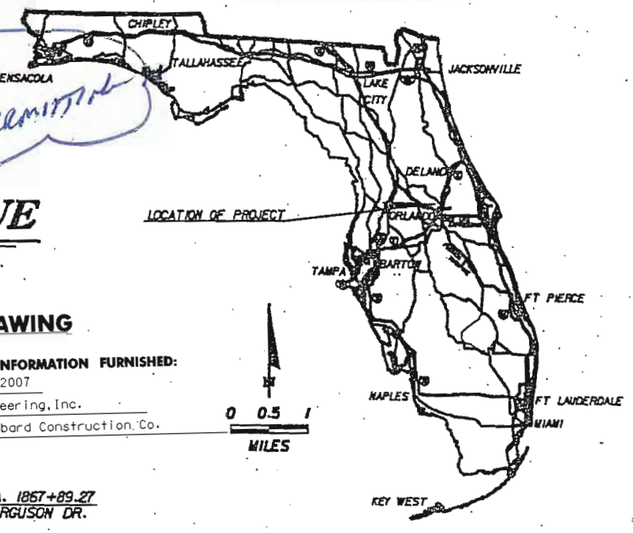
SHEET INSERTED By CEL

NOTED By CEL
POND/ STORMWATER AS-BUILTS/PERMITTING

PONDS 2H TO P:
WIDENING PROJECT C-252B
AS-BUILT PLANS

ORLANDO-ORANGE COUNTY EXPRESSWAY AUTHORITY
CONTRACT PLANS
S.R. 408 IMPROVEMENTS
FROM HIAWASSEE ROAD TO TAMPA AVENUE

ORANGE COUNTY
OOCEA PROJECT NUMBER - 252B



COMPONENTS OF CONTRACT PLANS SET

VOL. 1 OF 4 : ROADWAY PLANS
VOL. 2 OF 4 : SIGNING AND PAVEMENT MARKING PLANS
SIGNALIZATION PLANS
LIGHTING PLANS
FIBER OPTIC NETWORK PLANS
VOL. 3 OF 4 : STRUCTURAL PLANS
WALL PLANS
VOL. 4 OF 4 : TOLL PLAZA

A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT

INDEX OF ROADWAY PLANS

GOVERNING STANDARDS AND SPECIFICATIONS:
FLORIDA DEPARTMENT OF TRANSPORTATION,
DESIGN STANDARDS DATED JANUARY 2002, AND
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION DATED 2000, AS AMENDED BY CONTRACT DOCUMENTS.

REVISION #2
ROADWAY PLANS: 1, 2, 3, 4, 5, 6, 23, 28, 41, 53, 57, 104, 112, 118, 491, 492, 493, 550, 552, 557, 593, 635, 851, 852
SIGNING & PAVEMENT MARKING PLANS: S-2, S-3, S-5, S-6, S-9, S-11, S-12, S-14, S-15 S-17, S-18, S-20, S-21, S-23, S-24, S-26, S-27, S-157, S-157B, S-158, S-165A
FO PLANS: FO-1, FO-8, FO-13, FO-14, FO-16, FO-19, FO-20, FO-23, FO-30, FO-33, FO-35, FO-39, FO-41A, FO-41B, FO-46A, FO-47, FO-47A, FO-48, FO-49, FO-50, FO-50A, FO-51, FO-53, FO-54, FO-55, FO-56, FO-69, FO-70
WALL PLANS: P-26
TOLL PLAZA ARCHITECTURAL PLANS: A1.12, A1.13, A2.11, A2.14, A3.23, A3.25, A3.34
TOLL PLAZA STRUCTURAL PLANS: S2.1, S2.2, S2.9, S3.3, S3.8 S3.9, S3.10
TOLL PLAZA UTILITY PLANS: SQ-1, SQ-2, SQ-3

REVISION #3
ROADWAY PLANS: 1, 2, 3, 4, 5, 6, 10, 11, 12, 14, 15A, 22, 40, 53, 54, 56, 57, 62, 63, 67, 68, 70, 75, 76, 77, 87, 111, 118, 119, 122, 130, 184, 282, 306A, 412, 413, 414, 415, 522, 541, 546, 552, 821, 822, 826, 887, 893, 910, 911, 912, 913, 914
SIGNING & PAVEMENT MARKING PLANS: S-35, S-38, S-58, S-63, S-124, S-137, S-147A, S-154, S-155, S-156, S-157A, S-159, S-165, S-175, S-176, S-177, S-178, S-179, S-180, S-181, S-182, S-183, S-184, S-185
LIGHTING PLANS: L-1, L-4, L-5, L-12, L-17, L-20, L-40, L-44, L-45, L-63A, L-66, L-69
FO PLANS: FO-2, FO-3, FO-4, FO-5, FO-6, FO-6A, FO-9, FO-12, FO-25, FO-27, FO-32, FO-38, FO-43, FO-44, FO-44A, FO-46, FO-64, FO-65, FO-71, FO-76A, FO-76B, FO-76C, FO-80, FO-84
STRUCTUAL PLANS: A-1, A-2, A-3, A-13A, A-13B, C-1A, C-9, D-1, D-2A, D-9, D-10, D-11, D-24, D-30, D-31, D-31A D-32, D-82, D-83, D-84, D-85, D-86, H-1, H-2, H-3, H-4, H-5, J-1, J-2
WALL PLANS: W-7, W-12, W-13, W-14, W-15, W-16, W-17, W-19, W-23, W-26, W-29, AP-1, AP-4, AP-17, AP-37, S-7, S-10, S-13, S-14, S-15, S-16, S-17, S-20, S-21, S-22, S-24, S-25, S-26, S-27, S-28, S-31, P-19, P-20, P-25, P-31, P-41, P-45, P-47, P-52, P-56
TOLL PLAZA UTILITY PLANS: GN-1, SQ-1, SQ-2, SQ-3, UT-12, UT-14, UT-15
TOLL PLAZA STRUCTURAL PLANS: B-4, R2.2, R2.4, R4.4, S1.1, S1.2, S4.3, S4.4
TOLL PLAZA ARCHETECTURAL PLANS: A2.11A, A4.11, A5.11, P2.01, P2.04, P2.05, P2.06, P2.07, P4.02, E1.02A, E1.03A, E2.01, E2.01A, E3.01, E3.11, E3.12, E4.02, E4.02A, E4.05, E4.05A, E9.04

REVISION #5
ROADWAY PLANS: 1, 2, 3, 23, 34, 53
SIGNING AND PAVEMENT MARKING PLANS: S-1, S-8, S-26, S-30, S-45, S-55, S-73, S-105, S-166, S-166A, S-166B, S-166C
FO PLANS: FO-12A, FO-69
STRUCTURE PLANS: A-3, C-3
WALL PLANS: W-1, AP-2 , AP-6, AP-14, G-35 THRU G-53

END BRIDGE STA. 1824+46.89
S.R. 408 OVER OLD WINTER GARDEN RD.

BEGIN BRIDGE STA. 1821+72.18
S.R. 408 OVER OLD WINTER GARDEN RD.

END BRIDGE STA. 1779+19.88
S.R. 408 OVER PINE HILLS RD.

BEGIN BRIDGE STA. 1777+47.88
S.R. 408 OVER PINE HILLS RD.

END BRIDGE STA. 1748+15.98
S.R. 408 OVER KIRKMAN RD.

BEGIN BRIDGE STA. 1746+14.48
S.R. 408 OVER KIRKMAN RD.

TO CLERMONT

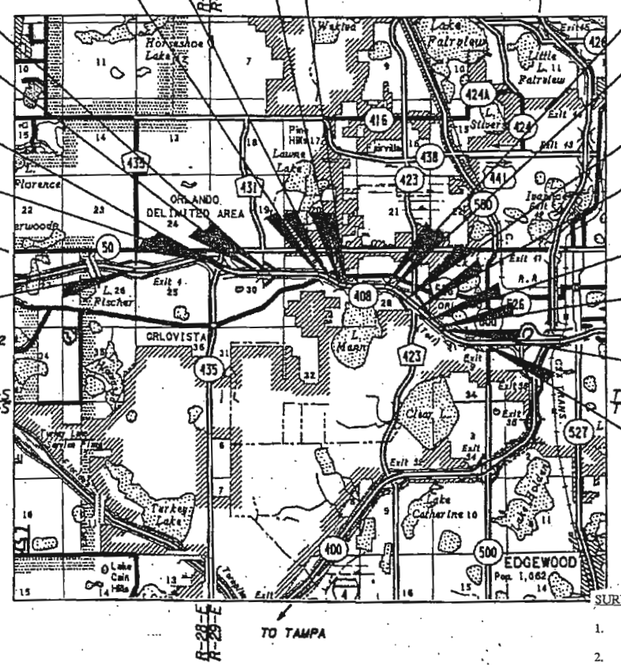
BEGIN PROJECT
BEGIN CONSTRUCTION
STA. 1686+54.64

T-22-S
T-23-S

BEGIN BRIDGE STA. 1834+64.52
S.R. 408 OVER ORTMAN DR.

END BRIDGE STA. 1836+63.78
S.R. 408 OVER ORTMAN DR.

TO SANFORD



BEGIN BRIDGE STA. 1867+89.27
S.R. 408 OVER FERGUSON DR.

END BRIDGE STA. 1869+22.59
S.R. 408 OVER FERGUSON DR.

BEGIN BRIDGE STA. 1891+20.15
S.R. 408 OVER JOHN YOUNG PKWY.

END BRIDGE STA. 1893+77.40
S.R. 408 OVER JOHN YOUNG PKWY.

BEGIN BRIDGE STA. 1904+69.24
S.R. 408 OVER CHURCH ST.

END BRIDGE STA. 1907+31.26
S.R. 408 OVER CHURCH ST.

END PROJECT
STA. 1926+07.05

T-22-S
T-23-S

END CONSTRUCTION
STA. 680+00.00
(PER CONTRACT NO. 252A)

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

ORLANDO-ORANGE COUNTY EXPRESSWAY AUTHORITY BOARD MEMBERS

ALLAN E. KEEN	CHAIRMAN
ORLANDO L. EVORA	VICE CHAIRMAN
JAMES H. PUGH, JR.	SECRETARY/TREASURER
RICHARD T. CROTTY	EX-OFFICIO MEMBER
TO BE ANNOUNCED	EX-OFFICIO MEMBER
MICHAEL SNYDER, P.E.	EXECUTIVE DIRECTOR

PLANS PREPARED BY:

DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON S. MEADOWS LICENSE NO. 38731

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

LENGTH OF PROJECT

	LINEAR FEET	MILES
ROADWAY	23,952.41	4.536
BRIDGES	1,500.06	0.284
NET LENGTH OF PROJECT	23,807.05	4.509
EXCEPTIONS	0.00	0.000
GROSS LENGTH OF PROJECT	23,807.05	4.509

AS-BUILT SURVEY

APPROVED _____ DATE / /
MICHAEL SNYDER, P.E.
EXECUTIVE DIRECTOR

SURVEYORS NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO DEPICT RECORD INFORMATION OBTAINED DURING CONSTRUCTION OF SAID IMPROVEMENTS.
2. BENCHMARK DATUM,VERTICAL NAVD 88 DATUM BM #30 4X4 CONC MONUMENT CLC STA. 1688+80.87 239' LT ELEV. 79.26 OOCEA PROJECT NUMBER 252B PLANS BY DRMP

CERTIFICATION

WE DO HEREBY CERTIFY THAT THE ATTACHED PRINTS INDICATING RECORD INFORMATION FOR THIS PROJECT, IS IN COMPLIANCE WITH THE MINIMUM TECHNICAL REQUIREMENTS FOR FIELD SURVEYING SET FORTH BY THE FLORIDA ADMINISTRATIVE CODE 61G- 17.5 UNLESS IT BEARS THE SIGNATURE & ORIGINAL SEAL OF A FLORIDA REGISTERED SURVEYOR AND MAPPER . THIS REPORT IS FOR INFORMATIONAL PURPOSES ONLY.

CERTIFIED THIS 31 DAY OF AUG 2007

FOR THE FIRM BY: GARY A. BURDEN PSM NO. 3691
ALD II INC, LB# 6529
5850 LAKEHURST DR. SUITE 150-33
ORLANDO FL.32819
TELEPHONE # (407) 352-7181

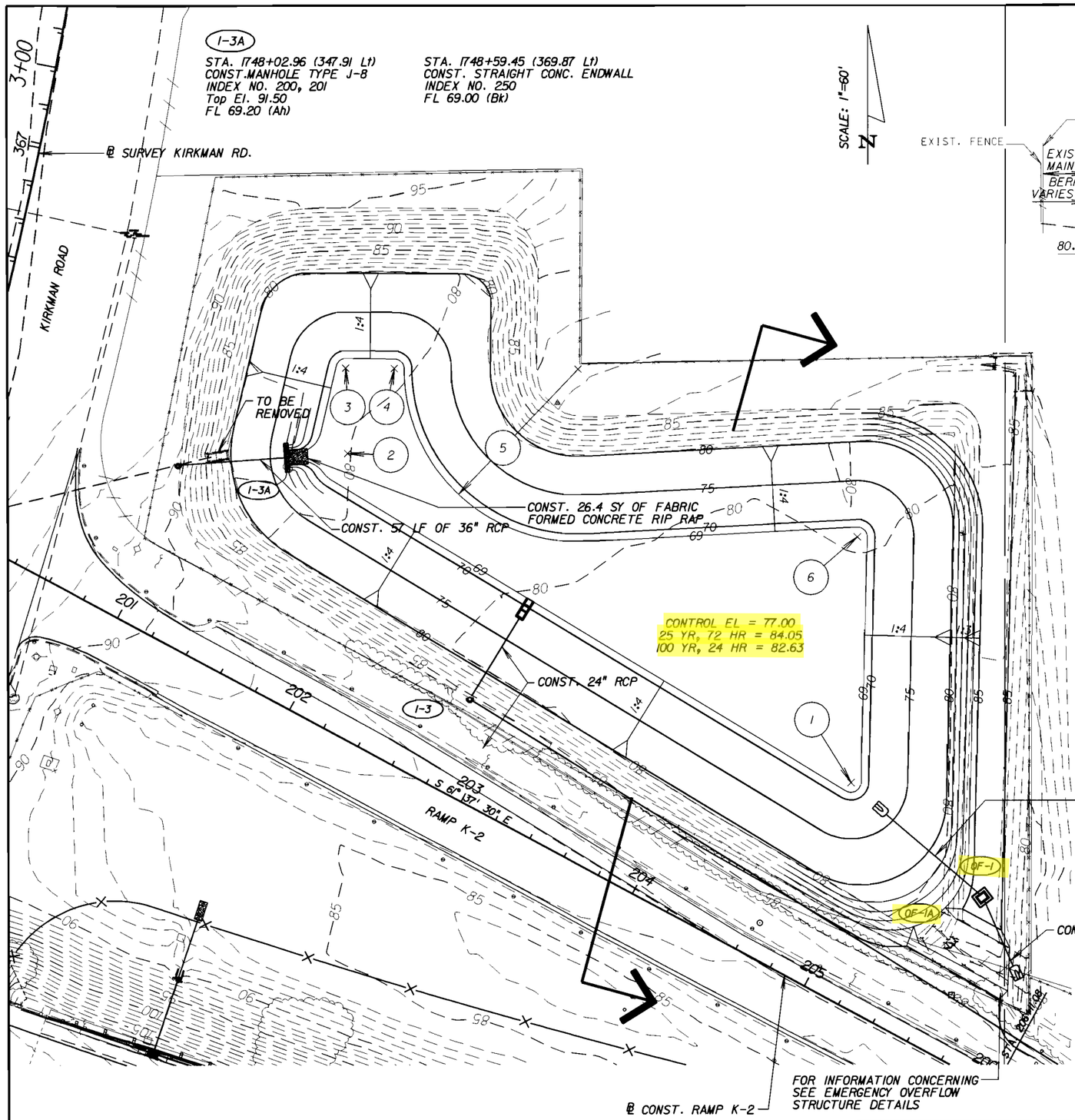
AS CONSTRUCTION
APRIL 2004
VOLUME 1 OF 4

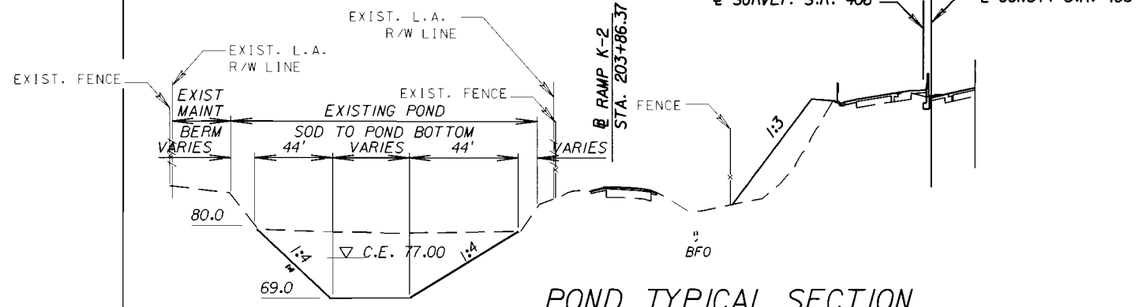
SHEET NO. 1

04/15/2004 02:09:07 PM p:\Roadway\Design\keysht01.dgn

CONTRACTOR AS-BUILT 302B

SHEET INSERTED BY CEI





POND TYPICAL SECTION
NOT TO SCALE

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

CONTROL POINTS

ID	STATION, OFFSET,	RADIUS
1	1752+15.04 289.73 LT	5'
2	1748+91.72 381.96 LT	16'
3	1748+75.03 423.38 LT	5'
4	1749+01.82 431.10 LT	5'
5	1750+03.41 459.01 LT	89'
6	1751+85.23 413.65 LT	5'

CONTRACTOR ASBUILT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 36701

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

POND 3H DETAIL

SHEET NO.
297

C.17

03-APR-2008 15:19\\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\retrd0H_302C.dgn $DATE$ $TIME$ $FILE$

302C

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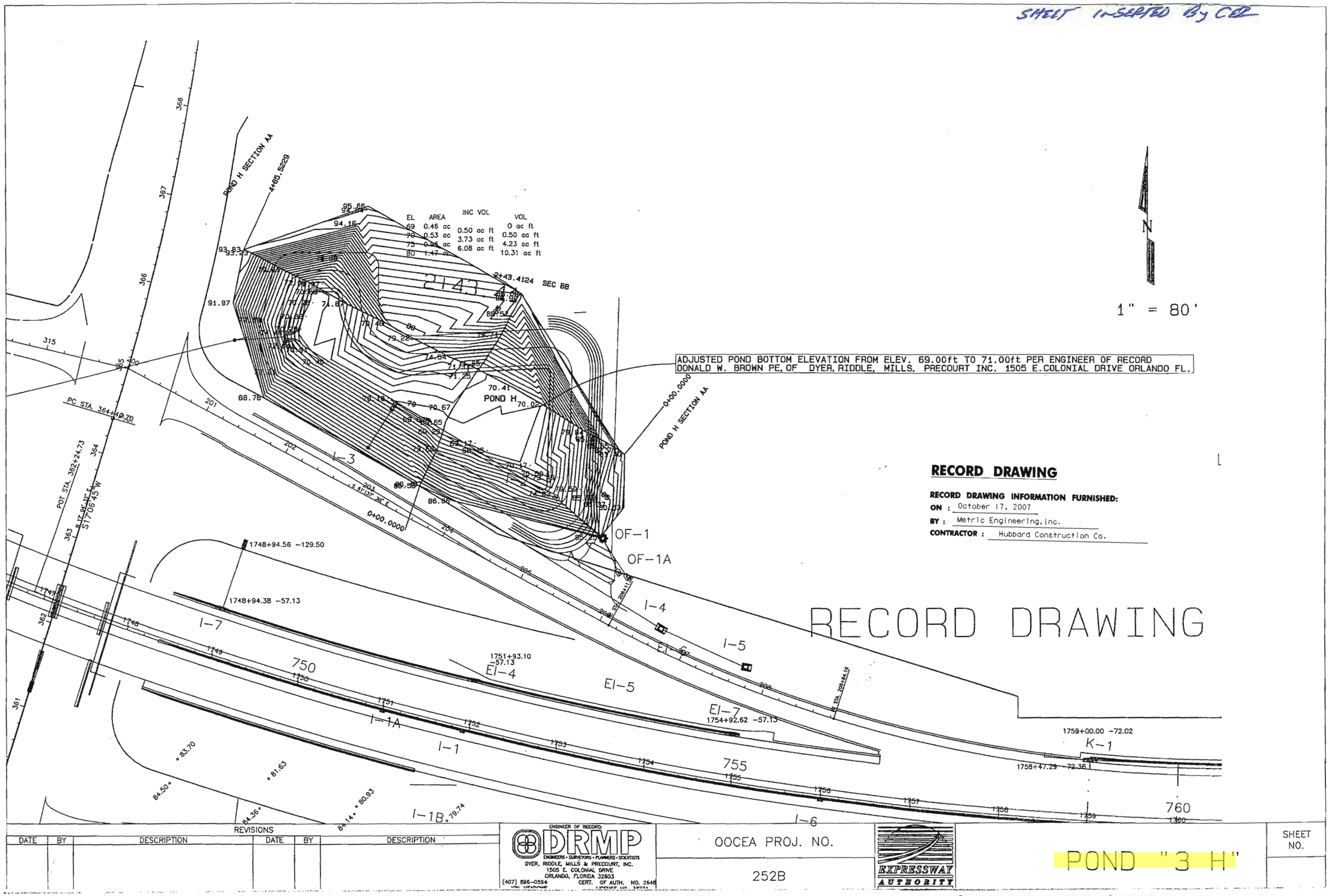


REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

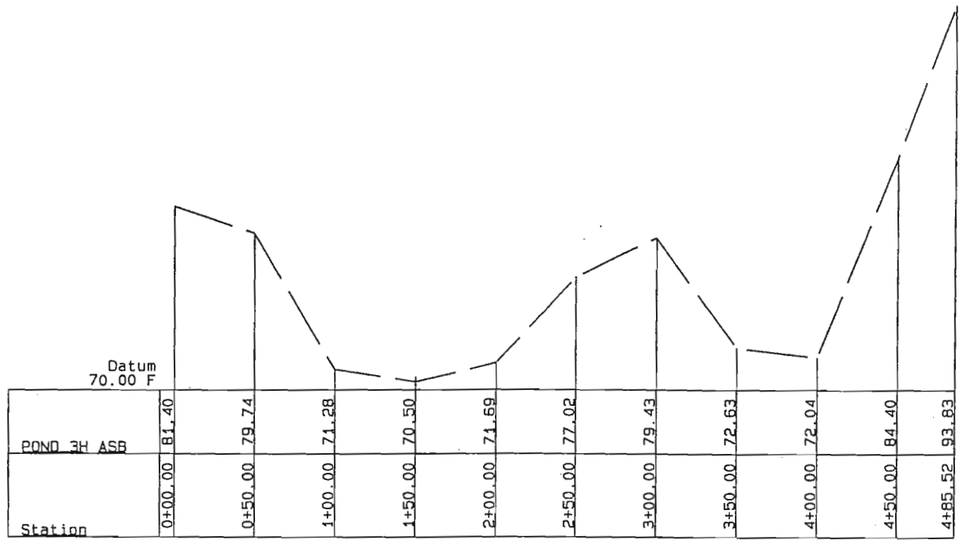
POND "3 H"

SHEET NO.

CONTRACTOR AS-BUILT

302D

SHEET INSERTED By CEI



HUBBARD CONSTRUCTION COMPANY
PROJECT: C:\abuiltpods sr40B\pond H.pro

VERTICAL ALIGNMENT REPORT

Vertical Alignment Name: PONO H SEC AA

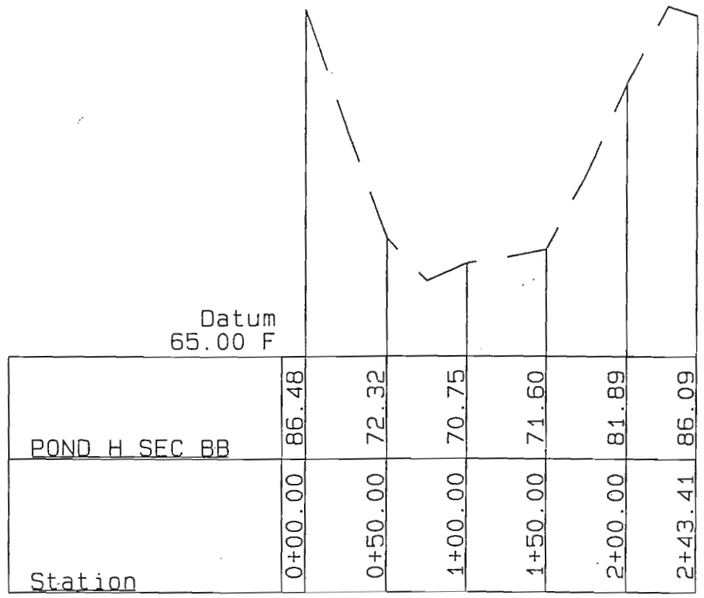
Point	Sta	Elev
PVI	0+00.00	81.40
PVI	0+50.00	79.74
PVI	1+00.00	71.28
PVI	1+50.00	70.50
PVI	2+00.00	71.69
PVI	2+50.00	77.02
PVI	3+00.00	79.43
PVI	3+50.00	72.63
PVI	4+00.00	72.04
PVI	4+50.00	84.40
PVI	4+85.52	93.83

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

REVISIONS						ENGINEER OF RECORD:	OOCEA PROJ. NO.		SHEET NO.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRMP ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS DYER, RIDDLE, MILLS & PRECOURT, INC. 1505 E. COLONIAL DRIVE ORLANDO, FLORIDA 32803 (407) 896-0594 CERT. OF AUTH. NO. 2648 JON MEADOWS LICENSE NO. 38731	C.19 252B	EXPRESSWAY AUTHORITY	POND3H SECTION AA CONTRACTOR AS-BUILT	302E

SHEET INSERTED BY C.E.



PROJECT: C:\abuiltpods sr408\pond h.pro

VERTICAL ALIGNMENT REPORT

Vertical Alignment Name: POND H SECTION BB

Point	Sta	Elev
PVI	0+00.00	86.48
PVI	0+25.00	79.15
PVI	0+50.00	72.32
PVI	0+75.00	69.66
PVI	1+00.00	70.75
PVI	1+25.00	71.11
PVI	1+50.00	71.60
PVI	1+75.00	76.29
PVI	2+00.00	81.89
PVI	2+25.00	86.70
PVI	2+43.41	86.09

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.
C.20 252B

EXPRESSWAY AUTHORITY

POND H SEC BB
CONTRACT AS-BUILT

SHEET NO.
302F

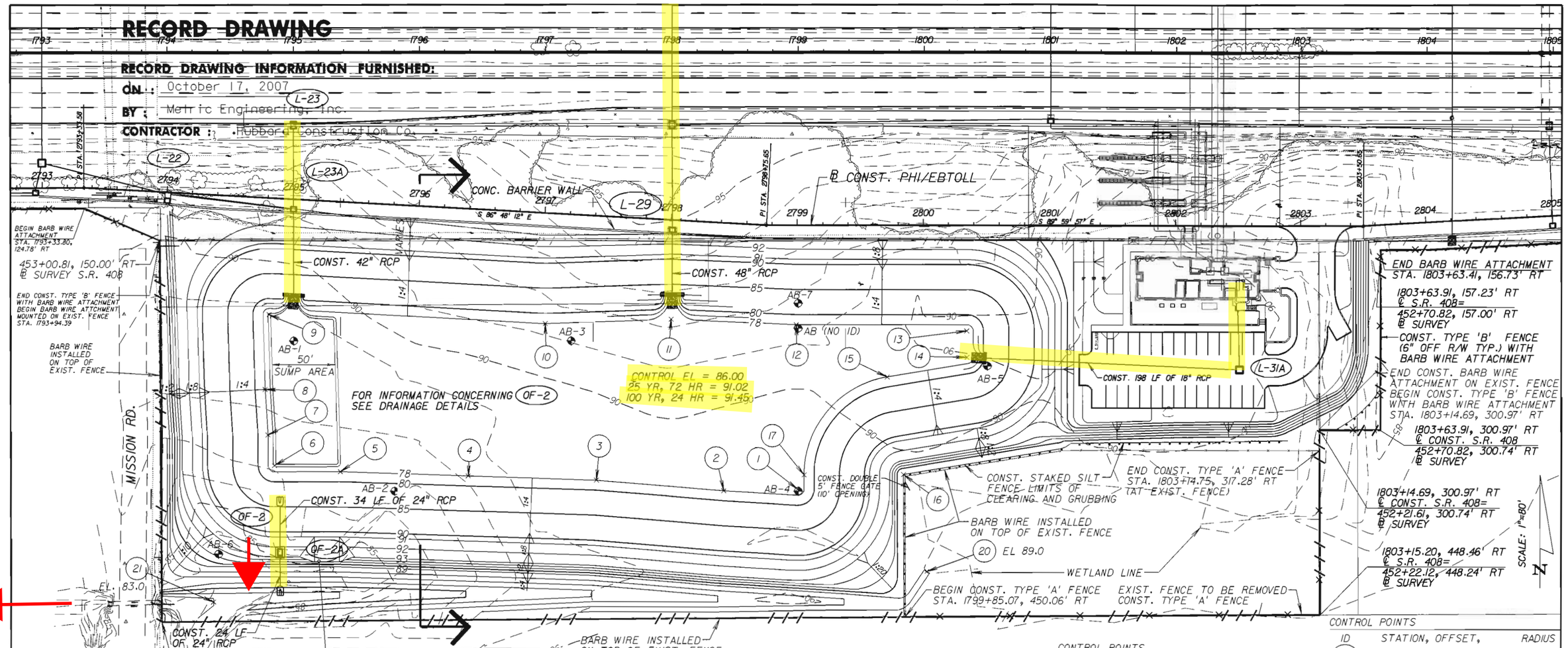
RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:

ON : October 17, 2007

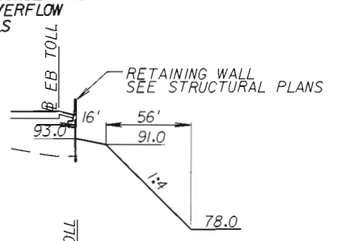
BY : Metric Engineering, Inc.

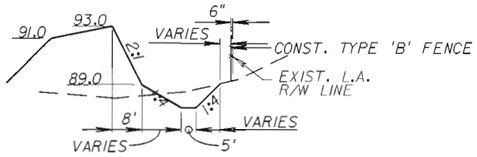
CONTRACTOR : Rubber Construction Co.



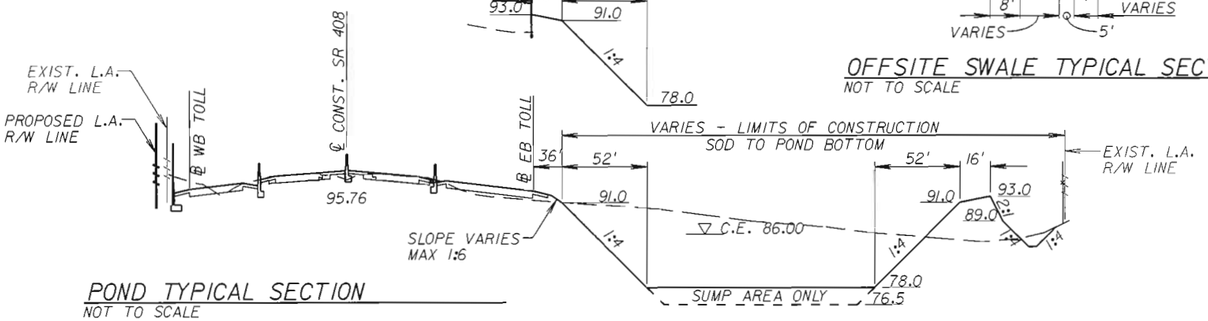
NOTE

◆ DENOTES AUGER BORING LOCATIONS SEE ROADWAY SOILS REPORT BY GEOTECHNICAL PROFESSIONAL ASSOC., INC.





OFFSITE SWALE TYPICAL SECTION
NOT TO SCALE



POND TYPICAL SECTION
NOT TO SCALE

CONTROL POINTS

ID	STATION, OFFSET,	RADIUS
1	1798+99.56 348.40 RT	5'
2	1798+41.03 349.68 RT	N/A
3	1797+39.96 341.23 RT	N/A
4	1796+38.25 337.81 RT	N/A
5	1795+37.01 334.40 RT	N/A
6	1794+84.58 329.50 RT	5'
7	1794+79.49 305.02 RT	N/A
8	1794+77.29 268.74 RT	N/A
9	1794+80.54 209.12 RT	5'
10	1796+99.45 216.34 RT	N/A
11	1797+99.09 212.86 RT	N/A
12	1798+98.53 217.17 RT	N/A
13	1800+33.95 222.17 RT	5'
14	1800+33.97 243.22 RT	5'
15	1799+70.53 258.87 RT	N/A
16	1799+83.52 336.79 RT	61'
17	1799+04.52 337.04 RT	N/A
20	1800+02.25 414.09 RT	N/A
21	1794+36.10 438.34 RT	N/A

CONTROL POINTS

ID	STATION, OFFSET,	RADIUS
10	1796+99.45 216.34 RT	N/A
11	1797+99.09 212.86 RT	N/A
12	1798+98.53 217.17 RT	N/A
13	1800+33.95 222.17 RT	5'
14	1800+33.97 243.22 RT	5'
15	1799+70.53 258.87 RT	N/A
16	1799+83.52 336.79 RT	61'
17	1799+04.52 337.04 RT	N/A
20	1800+02.25 414.09 RT	N/A
21	1794+36.10 438.34 RT	N/A

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
		SHEET INSERTED BY CEI			

ENGINEER OF RECORD:
DRMP
ENGINEERS · SURVEYORS · PLANNERS · SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 648
JON HEADOMS LICENSE NO. 21

OOCEA PROJ. NO.

252B

EXPRESSWAY AUTHORITY

POND L DETAIL

CONTRACTOR AS-BUILT

SHEET NO. 298

03-APR-2008 15:23 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\retrd0L_302G.dgn

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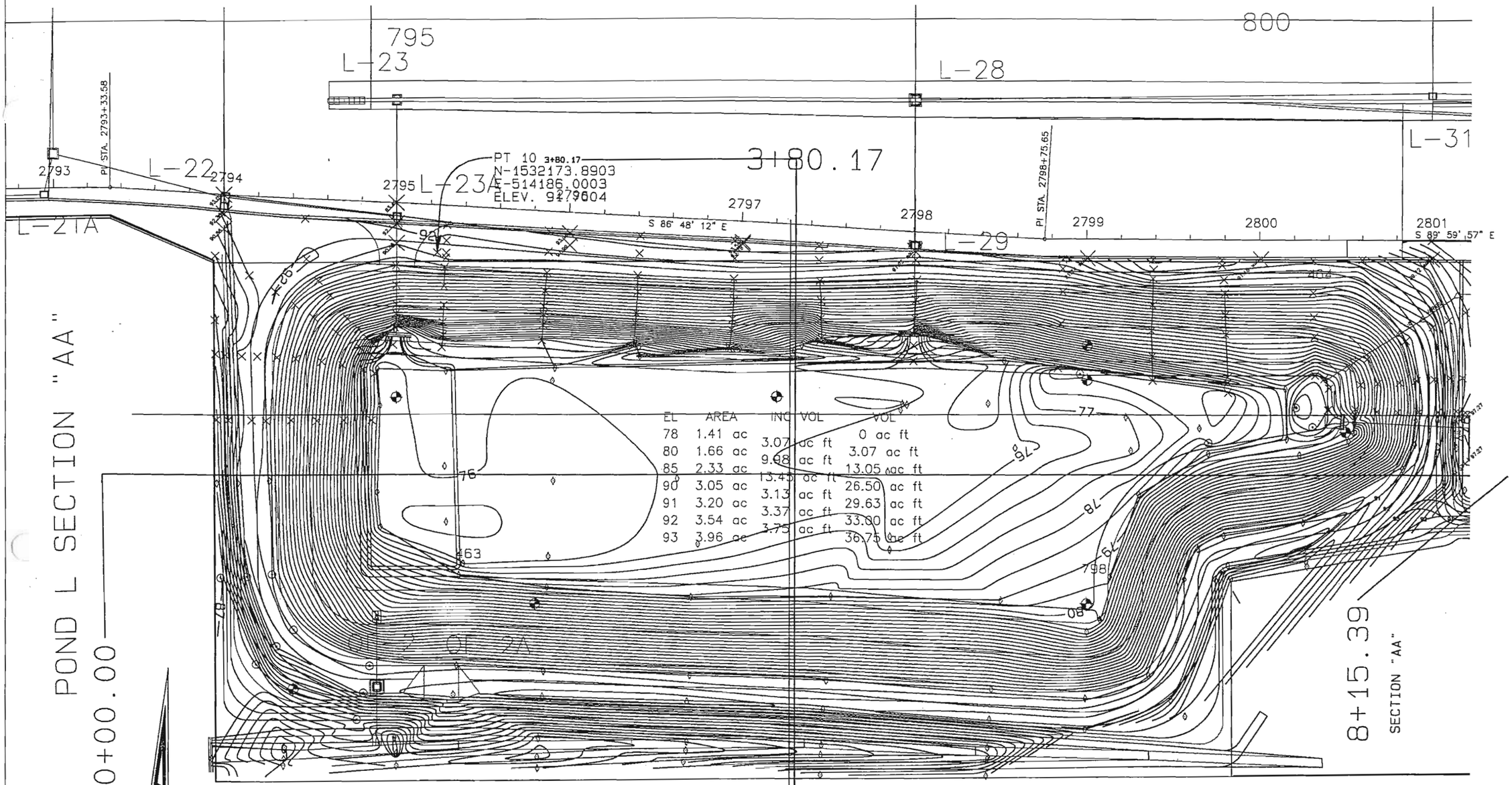
302G



SHEET INSERTED BY CEI

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
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ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 898-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

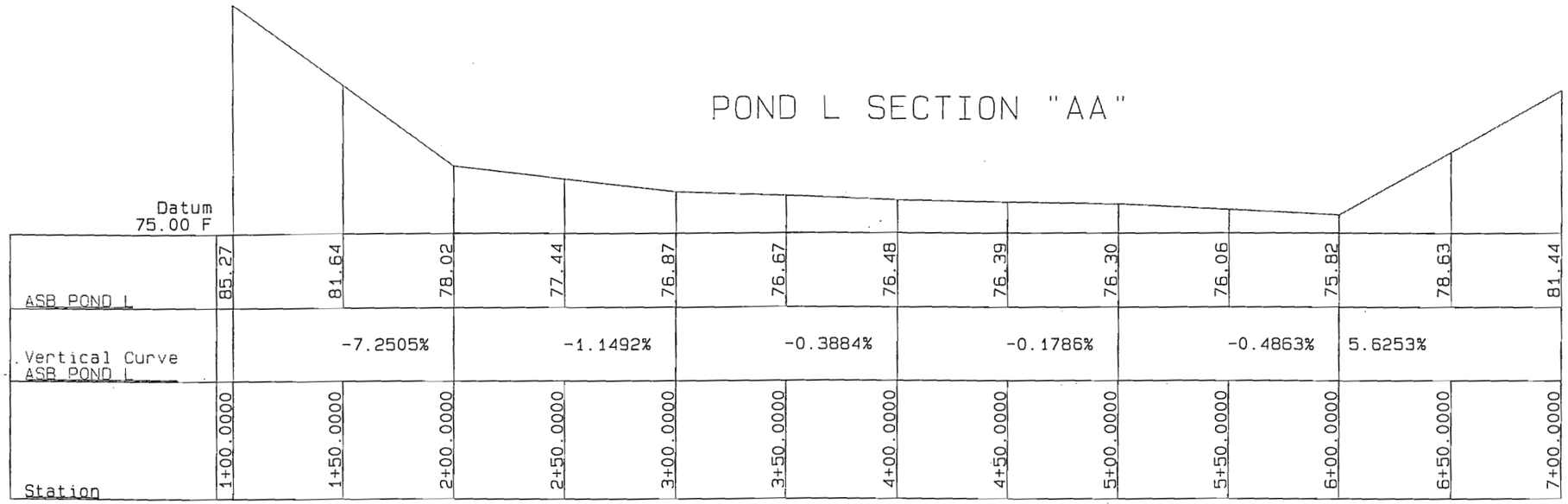
OOCEA PROJ. NO.
C.22 252B

EXPRESSWAY AUTHORITY

POND L ASBUILT
CONTRACTOR AS-BUILT

SHEET NO.
302H

POND L SECTION "AA"



PROJECT: C:\abuiltpods sr408\POND L.pro

CROSS SECTION REPORT

Vertical Alignment Name: POND L SEC AA

Point	STA	ELEV
PVI	1+00.0000	85.27
PVI	2+00.0000	78.02
PVI	3+00.0000	76.87
PVI	4+00.0000	76.48
PVI	5+00.0000	76.30
PVI	6+00.0000	75.82
PVI	7+00.0000	81.44

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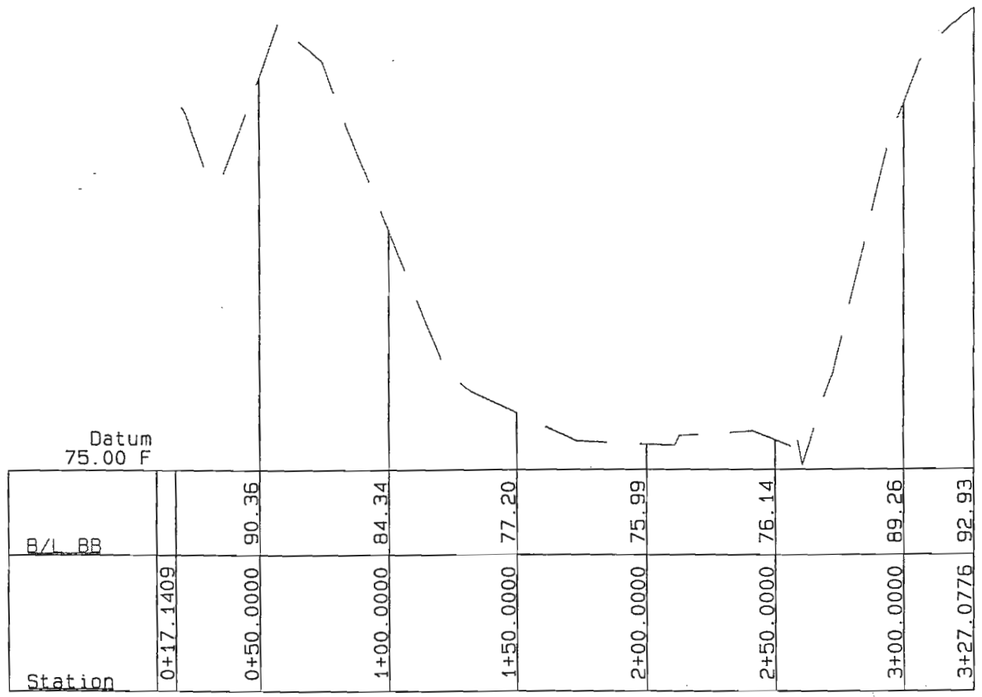
(407) 898-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.
C.23 252B

EXPRESSWAY AUTHORITY

PON L SEC AA
CONTRACTOR As-Built

SHEET NO.
302I



SECTION "BB"

POND L SR-408

PROJECT: C:\abuiltpods sr408\POND L.pro

VERTICAL ALIGNMENT REPORT

Vertical Alignment Name: PONL L SEC BB

Point	st	el
PVI	0+19.9502	89.24
Pnt-tan	0+50.0000	90.36
Pnt-tan	1+00.0000	84.34
Pnt-tan	1+50.0000	77.20
PVI	1+73.1628	76.10
Pnt-tan	2+00.0000	75.99
Pnt-tan	2+50.0000	76.14
Pnt-tan	3+00.0000	89.26
PVI	3+27.0776	92.93

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

SHEET INSERTED BY CEI

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.

252B

C.24

EXPRESSWAY AUTHORITY

POND L SEC BB

CONTRACTOR AS-BUILT

SHEET NO.

3025

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

℄ CONST. S.R. 408

L-11
STA. 1787+63.04 (69.00 Rt.)
CONST. BARRIER WALL INLET W/ J-BOTTOM (10.0x6.0)
INDEX NO. 218
INLET EL. 91.45
FL 85.60 (Ah)
FL 85.60 (Bk)
Exist. FL 82.69 (Rt)
Exist. FL 82.69 (Lt)
BOTTOM EL 80.50

TO L-14

CONST. 133 LF OF 36" RCP

SOUND WALL 1 SEE STRUCTURE PLAN FOR DETAILS

SOUND WALL 3 SEE STRUCTURE PLAN FOR DETAILS

℄ WB TOLL STA. 3787+62.04 EL. 90.60

℄ EB TOLL STA. 2787+62.09 EL. 90.28

EXIST. L.A. R/W LINE

EXIST. R/W FENCE

L-12
STA. 1787+63.45 (135.92 Lt.)
CONST. DBI TYPE H
INDEX NO. 232
GRATE EL. 88.00
2.0 INCH SLOT, EL. 87.50 (Ah)
FL 83.45 (Rt)

REMOVE EXIST. STR. TOP

90.93

EXIST. 42" RCP TO REMAIN

CONST. CONC. COLLAR

REMOVE EXIST. STR.

15.89

L-13
STA. 1787+62.85 (114.84 Rt.)
CONST. GUTTER INLET TYPE S W/ J BOTTOM (5.5'x3.5')
INDEX NO. 220, 200
GRATE EL. 89.60
Exist. FL 82.52 (Rt)
FL 82.52 (Bk)
FL 82.52 (Lt)

CONST. 5 LF OF 42" PIPE

BFON

BT

BFO

26

CONST. 30 LF OF 42" RCP

CONST. CONC. COLLAR SEE INDEX 280

CUT AND REMOVE EXIST. 42" RCP THROUGH STRUCTURE

CONST. 36" RCP FROM L-10

CONST. 12 LF OF 42" STEEL PIPE

FROM L-5

EXIST. 48" RCP TO REMAIN

CONST. 18" RCP

L-11B
STA. 1787+62.92 (0.15 Lt.)
CONST. MANHOLE PARTIAL SLAB TOP ONLY
INDEX NO. 200, 201
SLAB TOP 87.00
EXIST. FL 82.87 (Lt)
EXIST. FL 82.90 (Rt)

Existing Storage within Basin L-48 which outfalls to 48" cross drain

Cross Drain pipe goes through the structure, thereby, keeping Basin L-48 separate from Basin LMR36

L-13
STA. 1787+62.85
L-12
STA. 1787+63.45
L-11
STA. 1787+63.04

L-9
STA. 1786+89.97 (82.45 Lt.)
CONST. GUTTER INLET TYPE S
INDEX NO. 220
GRATE EL. 90.91
FL 86.30 (Rt)
FL 86.84 (Bk)

TO L-11

CONST. 70 LF OF 36" RCP

℄ WB TOLL STA. 3786+89.58 EL. 90.36

℄ EB TOLL STA. 2786+89.81 EL. 89.97

87.54

91.74

JACK & BORE 140 LF OF 30" BCSP, 0.25" MIN THICK

CONST. 24" RCP FROM L-8

CONST. 24" RCP FROM L-7

L-10
STA. 1786+89.97 (69.00 Rt.)
CONST. BARRIER WALL INLET W/ J-BOTTOM (9.5x3.67)
INDEX NO. 218
INLET EL. 91.39
FL 85.65 (Ah)
FL 86.15 (Lt)
FL 86.69 (Bk)

L-10
STA. 1786+89.97
L-9
STA. 1786+89.97

℄ CONST. S.R. 408

SCALE: HORT. 1" = 40'
VERT. 1" = 10'

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
3/5/08		RECORD DRAWING			

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 FL. LIC. NO. 6258

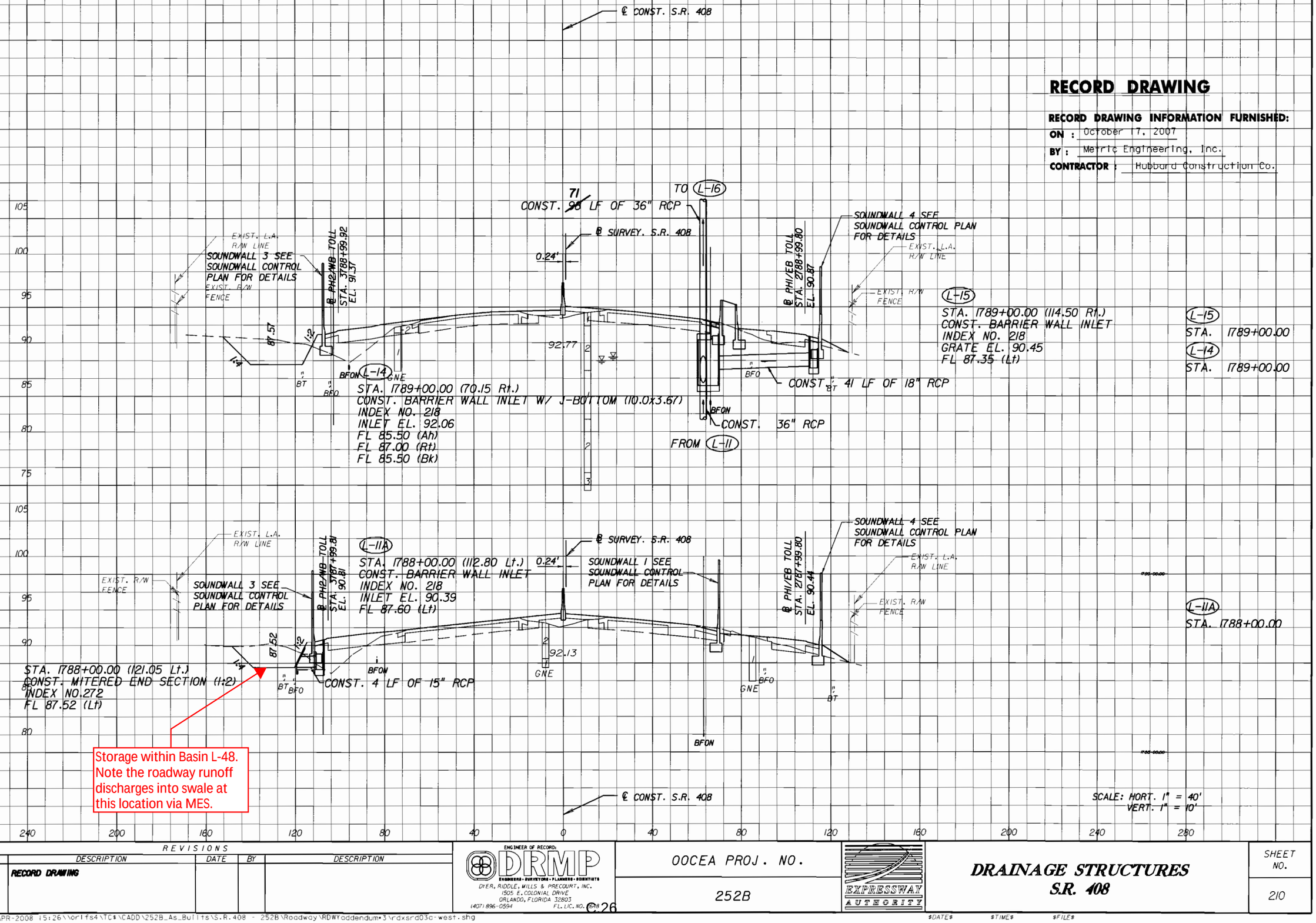
OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

DRAINAGE STRUCTURES
S.R. 408

SHEET NO.
209

02-APR-2008 15:26 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\RDWYaddendum•3\rdxsrd03c-west.shg $DATE$ $TIME$ $FILE$



RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Merric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

Storage within Basin L-48. Note the roadway runoff discharges into swale at this location via MES.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
3/5/08		RECORD DRAWING			

ENGINEER OF RECORD:
DRMP
ENGINEERS · SURVEYORS · PLANNERS · SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 FL. LIC. NO. 6618

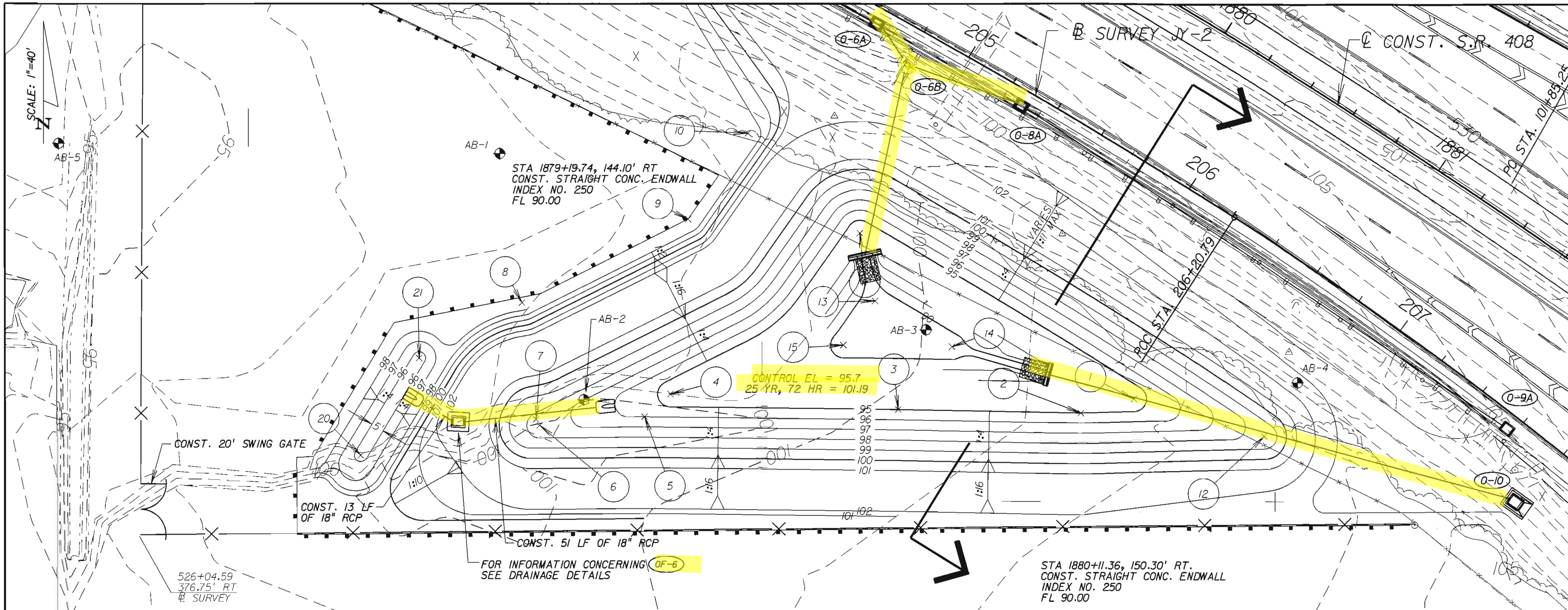
OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

DRAINAGE STRUCTURES
S.R. 408

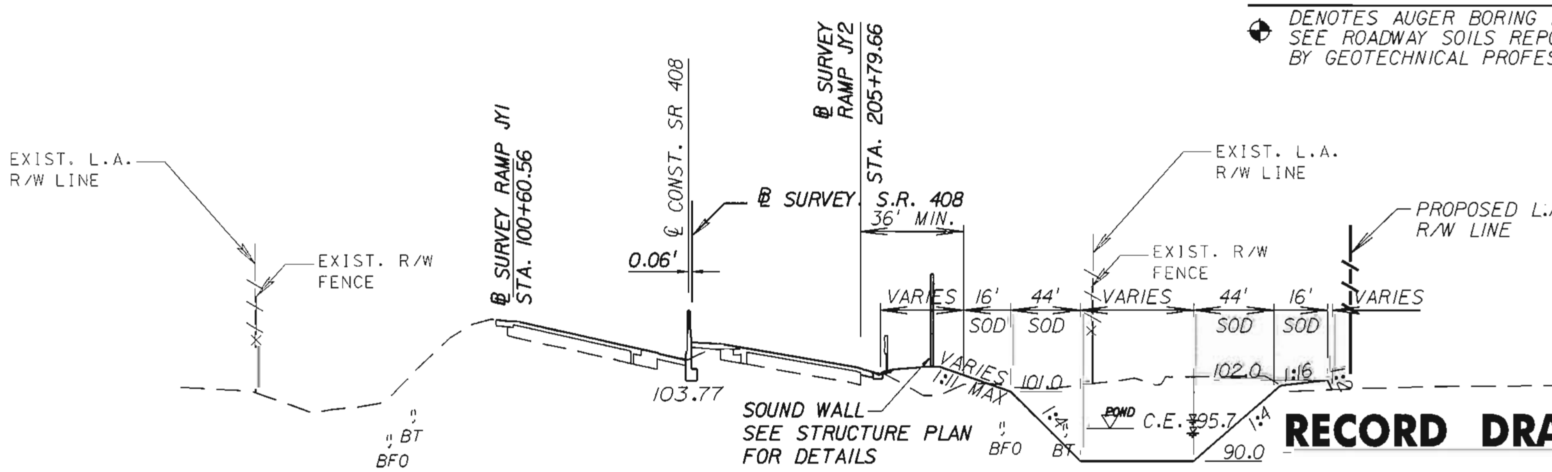
SHEET NO.
210

02-APR-2008 15:26 \\orlfs4\TC$\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\RDWYaddendum-3\rdxsrd03c-west.shg 15:26 $DATE$ $TIME$ $FILE$



NOTE

⊕ DENOTES AUGER BORING LOCATIONS
SEE ROADWAY SOILS REPORT
BY GEOTECHNICAL PROFESSIONAL ASSOC., INC.



POND TYPICAL SECTION
NOT TO SCALE

SHEET INSERTED BY CEI

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:

ON : October 17, 2007

BY : Metric Engineering, Inc.

CONTRACTOR : Hubbard Construction Co.

CONTROL POINTS

ID	STATION, OFFSET,	RADIUS
1	1880+47.68 140.32 RT	5'
2	1880+32.41 156.14 RT	N/A
3	1879+67.11 192.40 RT	N/A
4	1878+80.95 231.79 RT	5'
5	1878+76.12 244.46 RT	N/A
6	1878+38.70 267.04 RT	5'
7	1878+36.10 265.67 RT	5'
8	1878+07.80 227.46 RT	5'
9	1878+51.78 168.41 RT	5'

CONTROL POINTS

ID	STATION, OFFSET,	RADIUS
10	1878+56.35 127.76 RT	5'
11	1879+16.21 140.44 RT	5'
12	1881+00.55 124.85 RT	5'
13	1879+35.67 160.42 RT	5'
14	1879+72.92 160.39 RT	5'
15	1879+33.67 181.59 RT	5'
20	1877+76.20 309.98 RT	2.5'
21	1877+79.25 265.67 RT	2.5'

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO.
JON MEADOWS LICENSE NO.

C.27

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

POND O DETAIL

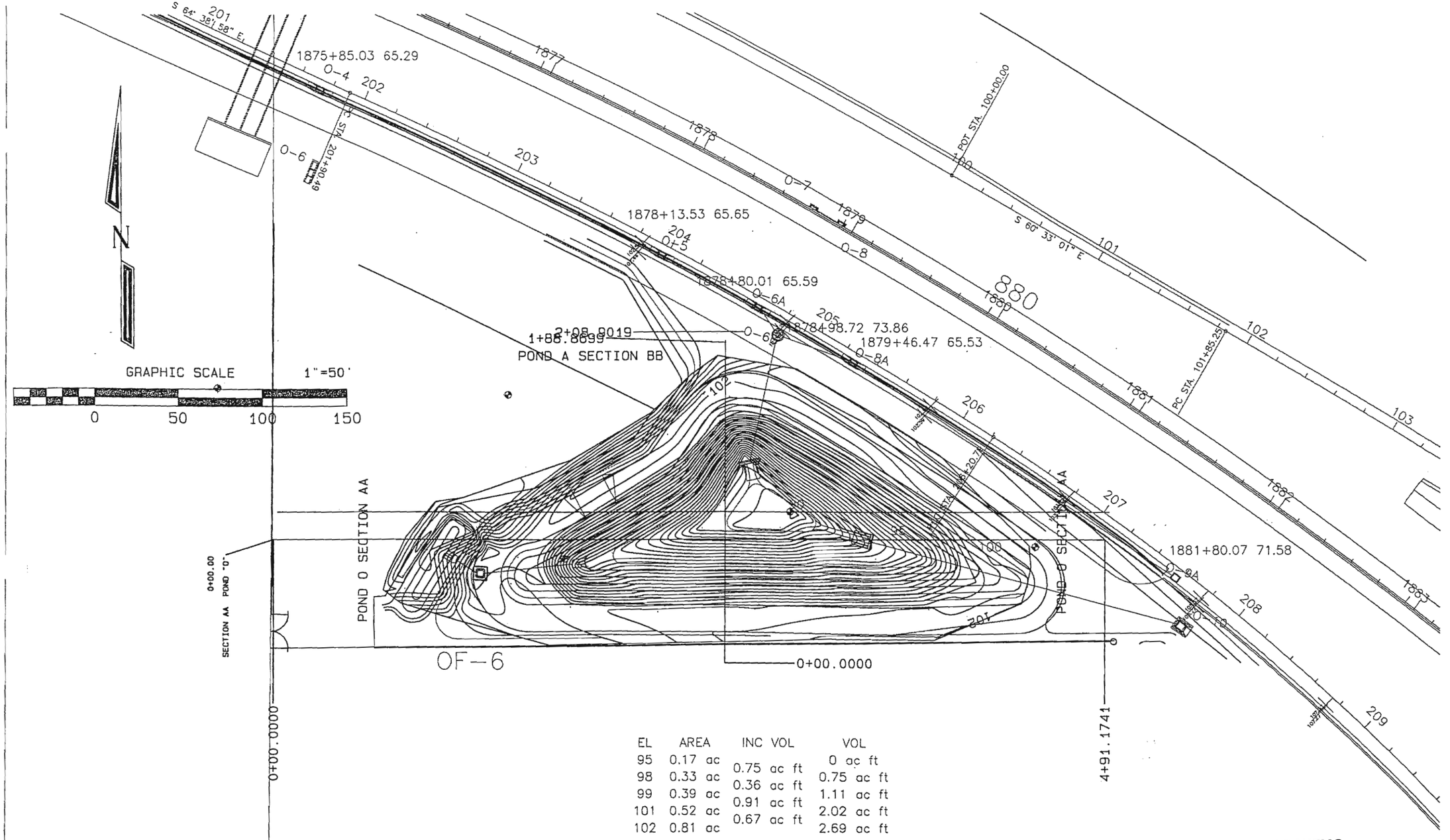
CONTRACTOR - AS-BUILT

SHEET NO.
299

302K

03-APR-2008 15:28 \\orlfs4\TCs\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\retra00_302K.dgn

$DATE$ $TIME$ $FILE$



EL	AREA	INC VOL	VOL
95	0.17 ac		0 ac ft
		0.75 ac ft	
98	0.33 ac		0.75 ac ft
		0.36 ac ft	
99	0.39 ac		1.11 ac ft
		0.91 ac ft	
101	0.52 ac		2.02 ac ft
		0.67 ac ft	
102	0.81 ac		2.69 ac ft

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

SHEET INSERTED BY CEI

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

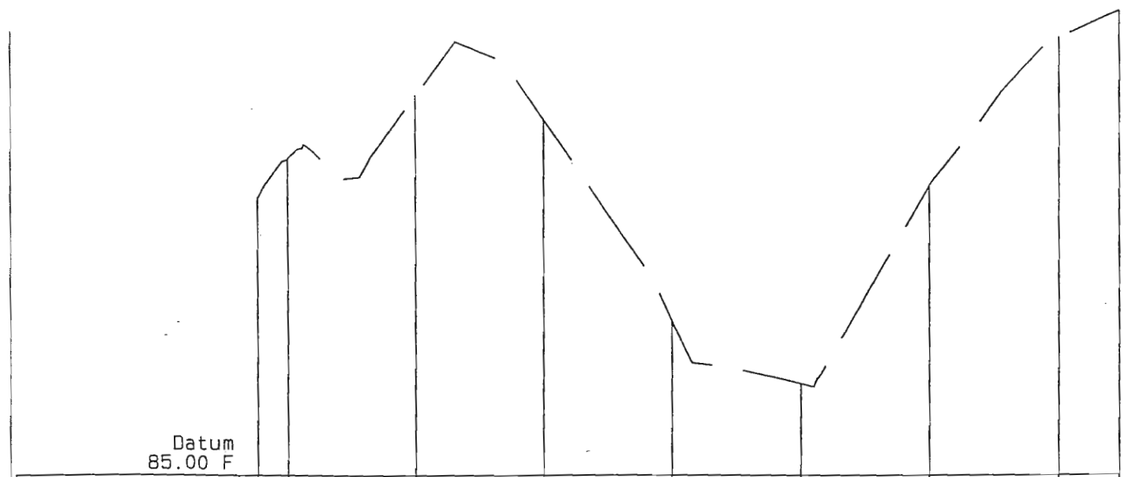
ENGINEER OF RECORD
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

POND O ASBUILT
CONTRACTOR AS-BUILT

SHEET NO. 302L



POND O SEC AA	95.81	97.36	99.81	98.85	91.01	88.57	96.27	102.02	103.05
Station	0+88.2859	1+00.0000	1+50.0000	2+00.0000	2+50.0000	3+00.0000	3+50.0000	4+00.0000	4+23.7603

PROJECT: C:\abuiltpods sr408\ASB_PONDS_COMBO_408.pro

VERTICAL ALIGNMENT REPORT

Vertical Alignment Name: POND O SECTION AA

Point	st	el
PVI	0+88.2859	95.81
PVI	0+90.9220	96.33
PVI	0+97.6893	97.26
PVI	0+97.7922	97.26
PVI	0+99.5080	97.31
Pnt-tan	1+00.0000	97.36
Pnt-tan	1+50.0000	99.81
PVI	1+65.4420	101.89
PVI	1+84.7758	101.09
PVI	1+87.9108	100.57
PVI	1+89.3494	100.41
Pnt-tan	2+00.0000	98.85
Pnt-tan	2+50.0000	91.01
Pnt-tan	3+00.0000	88.57
Pnt-tan	3+50.0000	96.27
PVI	3+50.7503	96.40
PVI	3+69.9920	98.84
PVI	3+77.4365	99.90
PVI	3+96.5576	101.94
Pnt-tan	4+00.0000	102.02
PVI	4+20.2907	102.90
PVI	4+23.7603	103.05

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:
ON : October 17, 2007
BY : Metric Engineering, Inc.
CONTRACTOR : Hubbard Construction Co.

SHEET INSERTED BY CEI

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38731

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

POND O SEC AA
CONTRACTOR As-Built

SHEET NO.
302M

FISCAL YEAR	SHEET NO.
96	1

THIS CONTRACT PLAN SET INCLUDES:

ROADWAY PLANS
SIGNING AND PAVEMENT MARKING PLANS
SIGNALIZATION PLANS
ROADWAY LIGHTING PLANS
TOLL PLAZA PLANS

POND P ORIGINAL PLANS:
SFWMD 950406-2
PROJECT PRIOR TO C-252B
WIDENING

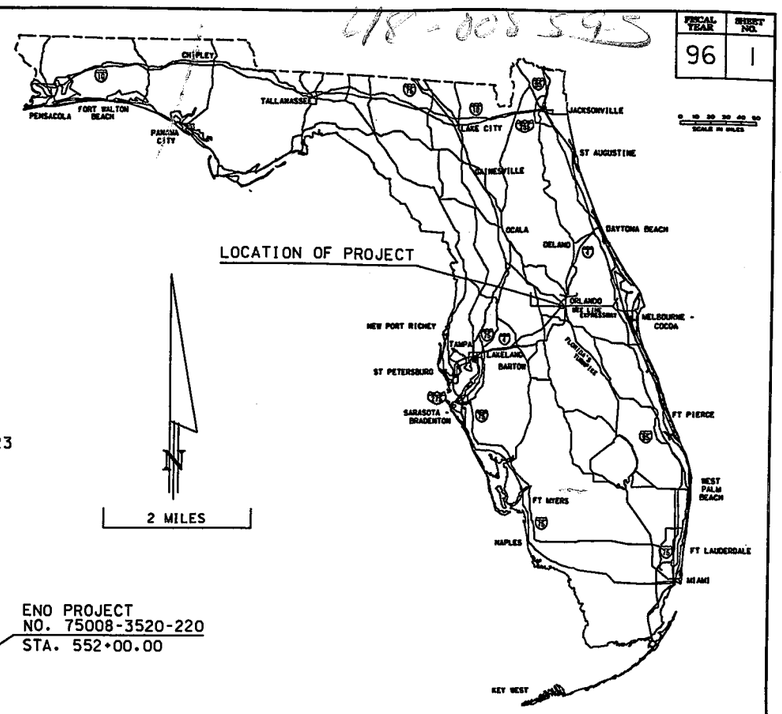
A DETAILED INDEX APPEARS ON THE KEY SHEET OF EACH COMPONENT SET OF PLANS

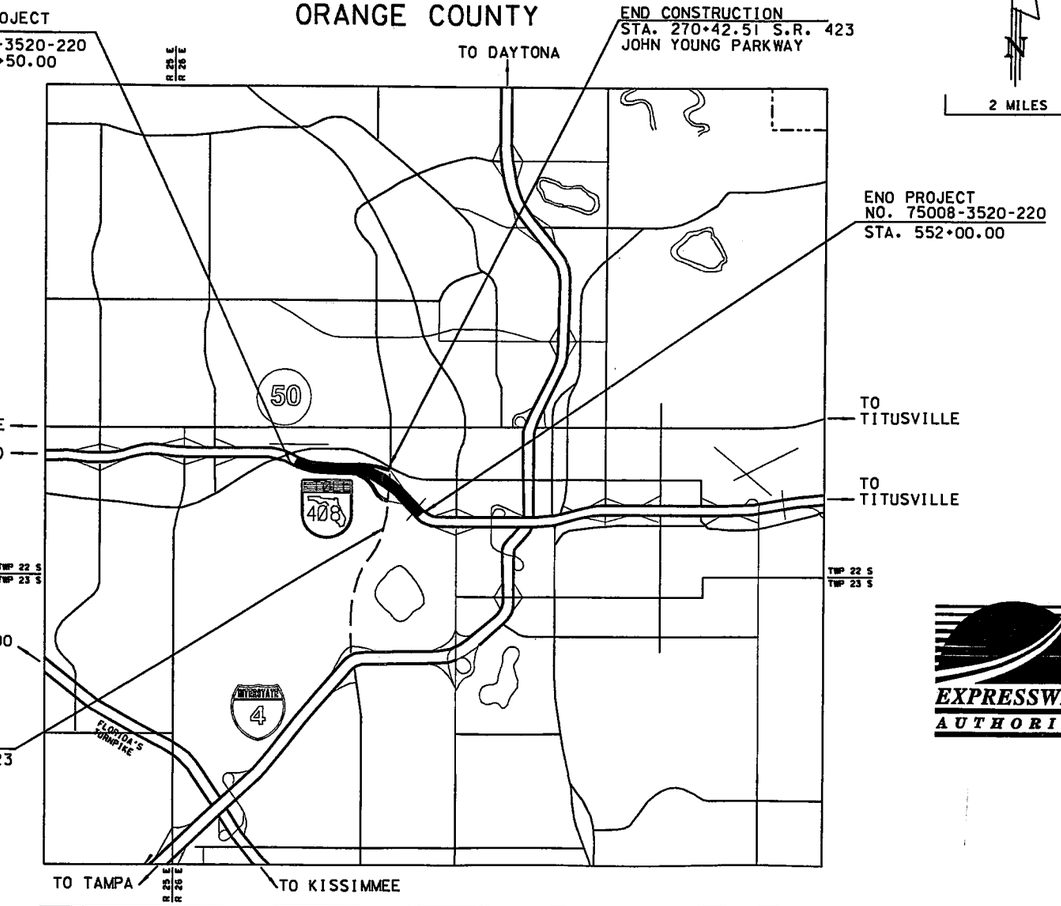
ORLANDO-ORANGE COUNTY EXPRESSWAY AUTHORITY

PLANS OF PROPOSED
STATE ROAD NO. 408
EAST-WEST EXPRESSWAY
INTERCHANGE WITH
STATE ROAD NO. 423 (JOHN YOUNG PARKWAY)

PROJECT NO. 75008-3520-220

ORANGE COUNTY





2 MILES

INDEX OF ROADWAY PLANS

SHEET NO.	SHEET DESCRIPTION
1	KEY SHEET
2-4	SUMMARY OF PAY ITEMS (3 SHEETS)
INSERT	DRAINAGE MAP
5-8	TYPICAL SECTIONS
9	SUMMARY OF QUANTITIES
10	SUMMARY OF DRAINAGE STRUCTURES
11	PROJECT LAYOUT
12	REFERENCE TIES
13-15	ROADWAY PLAN
16-19	ROADWAY PLAN - PROFILE
20-23	RAMP PROFILES
24	INTERCHANGE LAYOUT
25	GORE DETAIL
26	SHOULDER PAVEMENT WIDENING AND BARRIER WALL DETAIL
27-28	INTERSECTION DETAIL
29	FENCE DETAIL
30	DEMOLITION PLAN
31	RETENTION POND DETAIL
32	DRAINAGE DETAILS
33-40	DRAINAGE STRUCTURES
41	CROSS SECTION PATTERN SHEET
42	ROADWAY SOIL SURVEY
43-75	CROSS SECTIONS
76-85	TRAFFIC CONTROL SHEETS
86-92	UTILITY ADJUSTMENTS
93-119	STRUCTURAL PLANS

ROADWAY PLANS
ENGINEER OF RECORD

JON S. MEADOWS, P.E.
DYER, RIDDLE, MILLS & PRECOURT

PLANS PREPARED BY :

DRMP
DYER, RIDDLE, MILLS & PRECOURT, INC.
ENGINEERS · SURVEYORS
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594

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).

RECEIVED
JUN 19 1995
ORLANDO SERVICE CENTER

REVISIONS

LENGTH OF PROJECT

	LINEAR FT.	MILES
ROADWAY	7,650.00	1.448
BRIDGES	0.00	0.000
NET LENGTH OF PROJ.	7,650.00	1.448
EXCEPTIONS	0.00	0.000
GROSS LENGTH OF PROJ.	7,650.00	1.448

OOCEA PROJECT MANAGER : JOSEPH A. BERENIS, P.E.
PBSJ PROJECT MANAGER : R. KEITH JACKSON, P.E.

REVISIONS		
DATE	BY	DESCRIPTION

EXPRESSWAY AUTHORITY

ORLANDO - ORANGE COUNTY EXPRESSWAY AUTHORITY

CHAIRMAN	A. WAYNE RICH
VICE CHAIRMAN	WILLIAM A. BECKETT
SECRETARY/TREASURER	INEZ LONG
EX-OFFICIO MEMBER	NANCY HOUSTON, DISTRICT 5 SECRETARY, FDOT
EX-OFFICIO MEMBER	LINDA CHAPIN, CHAIRMAN ORANGE COUNTY

ATTENTION IS DIRECTED TO THE FACT THAT THESE PLANS MAY HAVE BEEN REDUCED IN SIZE BY REPRODUCTION. THIS MUST BE CONSIDERED WHEN OBTAINING SCALED DATA.

GOVERNING SPECIFICATIONS: STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS, DATED 1991 AND SUPPLEMENTS THERETO IF NOTED IN THE SPECIAL PROVISIONS FOR THIS PROJECT.

Jon S. Meadows
6.13.95

ROADWAY PLANS APPROVED BY: JON S. MEADOWS, P.E.
DATE:
P.E. NO.: 0038731


PROJECT NO. 220
SHEET NO.
NOTE:
THE HYDRAULIC DATA SHOWN IS 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, N.G.V.D., 1929.
END CONST S.R. 423
STA 270+00.00
(JOHN YOUNG PARKWAY)
200'
BEGIN CONST S.R. 408
(EAST-WEST EXPRESSWAY)
OLD WINTER GARDEN RD
JOHN YOUNG PARKWAY
DUNCAN PL
FERGUSON ST
COTTAGE HILL RD
WASHINGTON ST
LAWRANCE ST
CENTRAL ST
BASIN
25 YR. STORM
DHW EL. 101.98
NWL EL 99.30
4.31 AC. IMPERVIOUS
2.53 AC. PERVIOUS
FROM S.P.N. 75190-3512
BASIN 3
16.50 AC
OHIO AVE
BARLOW AVE
TEXAS AVE
COBURN AVE
DOLLINS AVE
END CONST S.R. 408
STA 548+00.86
(EAST-WEST EXPRESSWAY)
S.R. 408
EXIST RET POND
25 YR STORM
DHW EL 100.7
NWL EL 99.0
SFWMD PERMIT • 88-00016-S
CHURCH ST
BEGIN CONST S.R. 423
STA 254+58.22
(JOHN YOUNG PARKWAY)
SECT 28, TWN 22 S, RNG 29 E
SECT 33, TWN 22 S, RNG 29 E
SECT 27, TWN 22 S, RNG 29 E
SECT 28, TWN 22 S, RNG 29 E
SUNSET LAKE
100 YR STORM EL 99.0 (F.E.M.A.)
NO CONTROL STR
MAX STAGE EL 97.65 (4/70 ORANGE CO SURVEY DEPT)
NORAML HIGH WATER EL N/A
LAKE MANN
100 YR STORM EL 95.0 (F.E.M.A.)
CONTROL STR EL 92.0, WEIR 91.2
MAX STAGE EL 94.32 (8/60 ORANGE CO SURVEY DEPT)
NORMAL HIGH WATER 91.7 (10/25/82 BOARD OF CO COMM)

STRUCTURE •	BASIN AREA-AC.
A-2	0.13
A-3	0.18
A-4	0.20
A-5	1.25
A-6	0.33
A-9	0.16
B-0	0.08
B-1	0.30
B-4	0.20
B-5	2.32
C-2	34.03
C-4	0.20
J-1	0.34
J-1A	0.81
J-4	0.21
J-7A	0.34
J-8	0.12
J-8A	0.10
J-11	0.26
J-12	0.46
J-14	0.34

REVISIONS

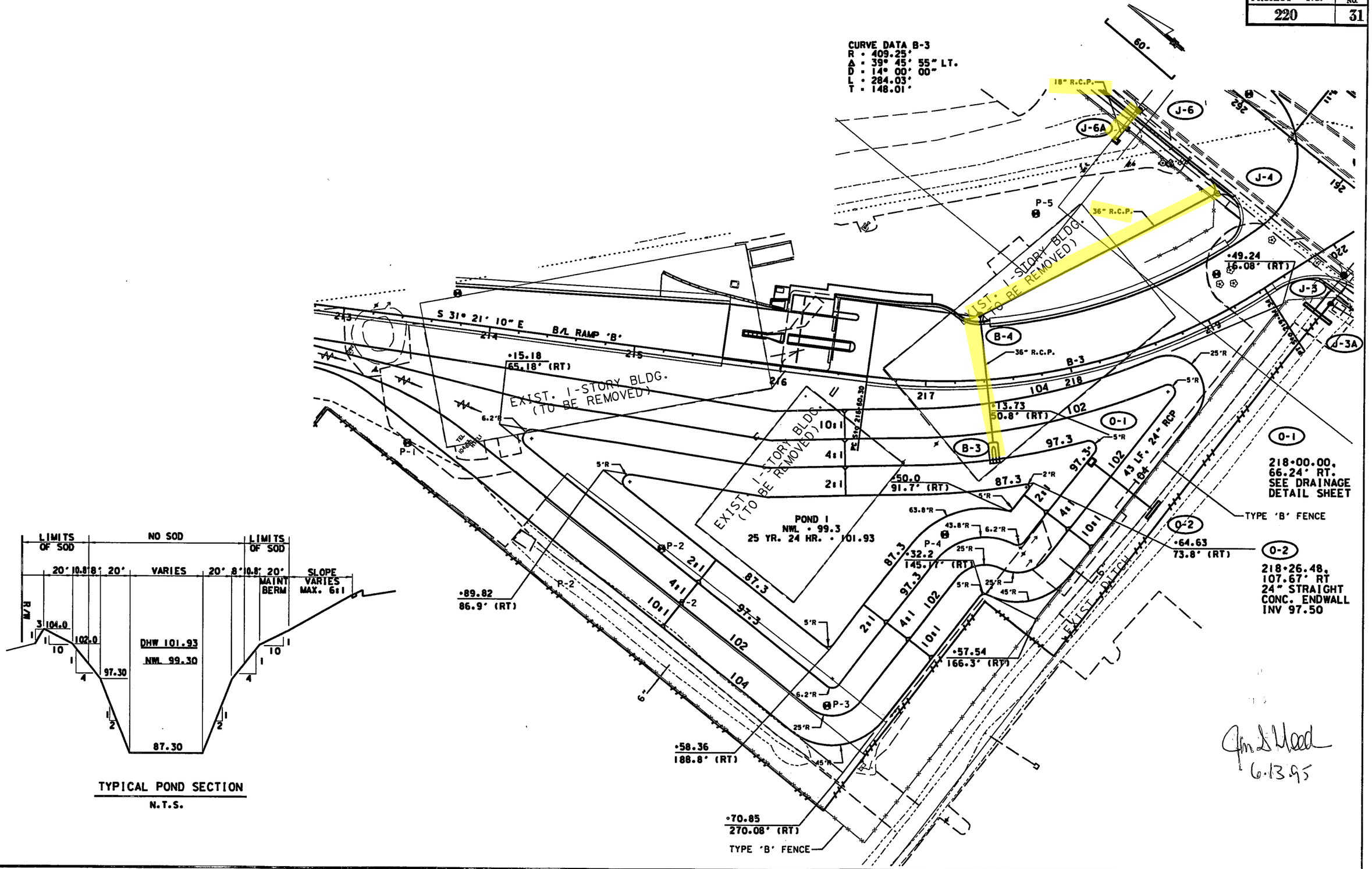
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

EXPRESSWAY AUTHORITY

POST DRAINAGE MAP

RECEIVED
APR 6 1995
ORLANDO SERVICE CENTER

PROJECT NO.	SHEET NO.
220	31



TYPICAL POND SECTION

N.T.S.

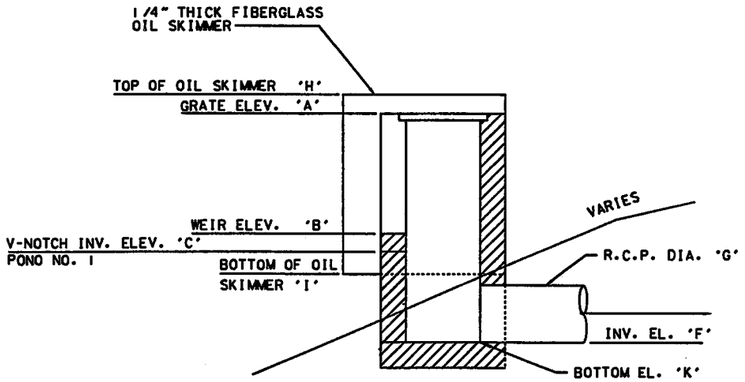
Jm L Mead
6.13.95

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

EXPRESSWAY AUTHORITY

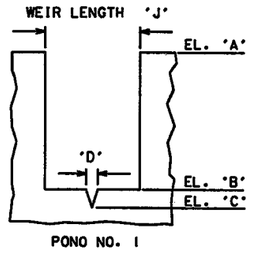
PREPARED BY:
DYER, RIDDLE, MILLS
& PRECOURT INC.

POND DETAIL SHEET



SECTION A - A

N.T.S.

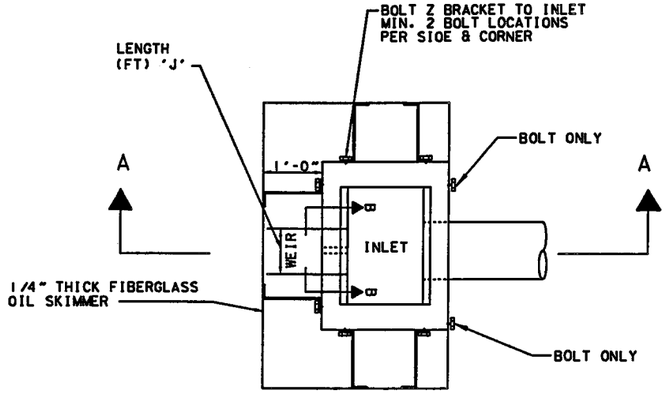


SECTION B - B

N.T.S.

OUTFALL STRUCTURE

N.T.S.

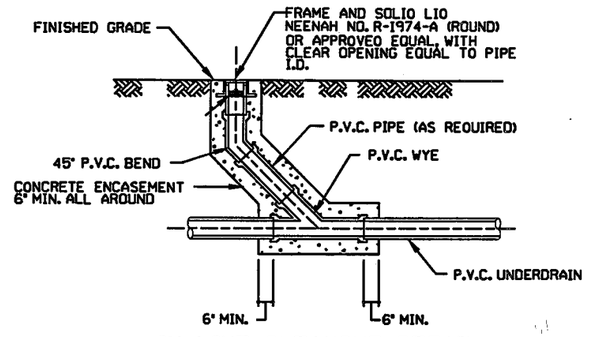


PLAN

N.T.S.

PONO	STRUCT #	STATION	OFFSET	INLET TYPE	A	B	C	D	E	F	G	H	I	J	K
1	O-1	218+00.00	66.24'RT	'O'	103.00	100.3	99.30	0.35'	-	97.60	24"	103.0	98.80	2.00	95.0

NOTE: SKIMMER AND INLET MODIFICATIONS TO BE INCLUDED WITH COST OF STRUCTURE

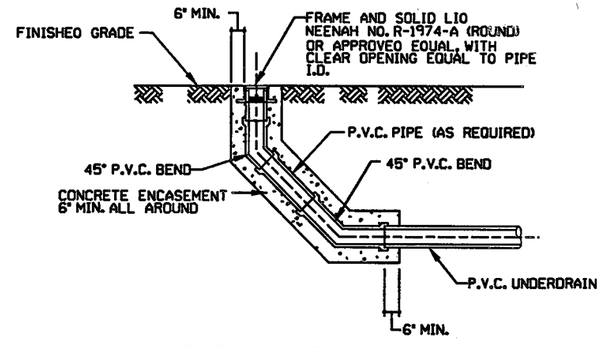


IN LINE CLEANOUT DETAIL

N.T.S.

UNDERDRAIN CLEANOUT LOCATIONS			
STATION	OFFSET	SIDE	TYPE
JOHN YOUNG PARKWAY			
STA. 260+17	53.25'	RT.	TERMINAL
STA. 260+60	53.25'	RT.	TERMINAL
STA. 264+60	53.25'	RT.	TERMINAL
STA. 266+00	53.25'	RT.	TERMINAL
STA. 263+40	66.25'	LT.	IN LINE
STA. 269+00	53.25'	LT.	IN LINE

Jon S Wood
6.13.95



UNDERDRAIN CLEANOUT DETAIL

N.T.S.

REVISIONS

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

EXPRESSWAY AUTHORITY

PREPARED BY:
DYER, RIDDLE, MILLS & PRECOURT INC.

DRAINAGE DETAILS

PROJECT NO.	SHEET NO.
220	25

WASHINGTON AVE.

BEGIN CAST-IN-PLACE RETAINING WALL 1B
STA. 113+00.00, 7.67'(LT)

BEGIN TYPE 'F' CURB & GUTTER
STA. 113+00.00

RETAINING WALL 1B

CONST. 18" R.C.P.

CONST. TYPE 'F' CURB & GUTTER

BEGIN TYPE 'F' CURB & GUTTER
STA. 113+00, 24.19' RT.

CONST. 18" R.C.P.

RETAINING WALL 1A

BEGIN CAST-IN-PLACE BRRRIER WALL 1A
STA. 113+00.00, 31.32'(RT)
ELEV. 114.01

END GUARDRAIL CONNECT TO EXIST.
STA. 535+32.05

PT Sta 533+67.06 SHLDR. PAVT. (WIDTH VARIES)

CURVE A-2

℄ RAMP 'A'

EXIST. SHLDR. TO BE REMOVED

PC Sta 533+15.00

℄ SURVEY & ℄ CONST.

EAST-WEST EXPRESSWAY (S.R. 408)

CURVE EW1

BEGIN SHLDR. GUTTER
STA. 534+16.08

CONST. TYPE IV END ANCHORAGE

BEGIN GUARDRAIL
STA. 534+07.05

END SHLDR. GUTTER CONNECT TO EXIST.
STA. 534+91.34

CONST. SHLDR. GUTTER

EXIST. SHLDR. TO BE REMOVED

℄ RAMP 'B'

CURVE B-2

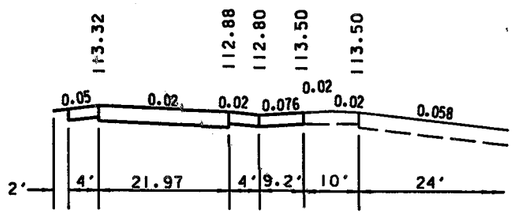
CURVE B-1

PCC STA. 206+20.80

BEGIN TAPER
STA. 211+66.81
15.00' LT

18" R.C.P.

SECTION A-A
STA. 112+75.00



COTTAGE HILL RD.

4' PAVED SHLDR.
6' SHLDR.
2' PAVED SHLDR.
6' SHLDR.

6.13.95

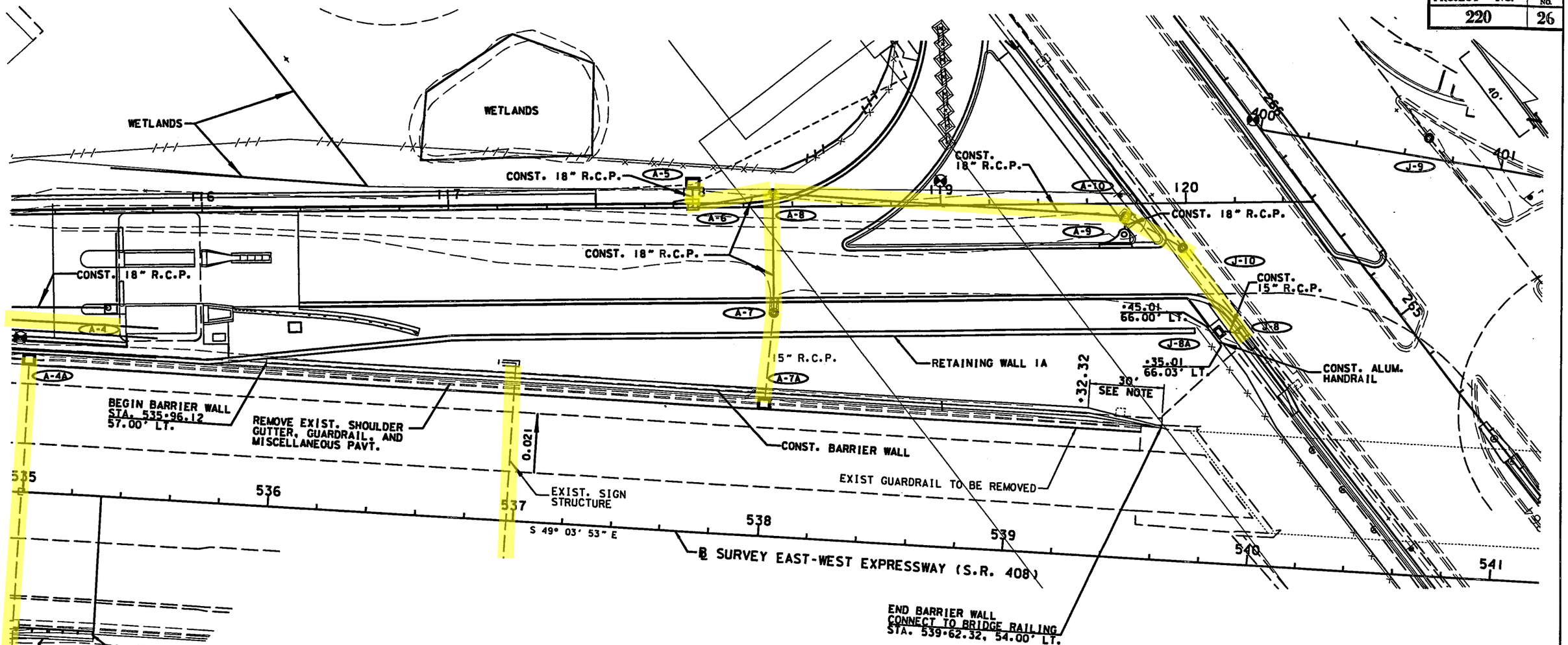
REVISIONS															
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	

EXPRESSWAY AUTHORITY

PREPARED BY:
DYER, RIDDLE, MILLS & PRECOURT INC.

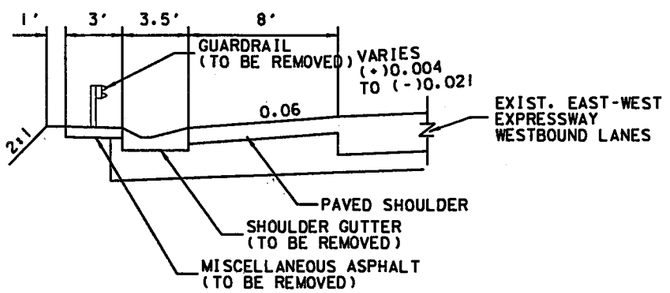
GORE DETAIL

PROJECT NO.	SHEET NO.
220	26

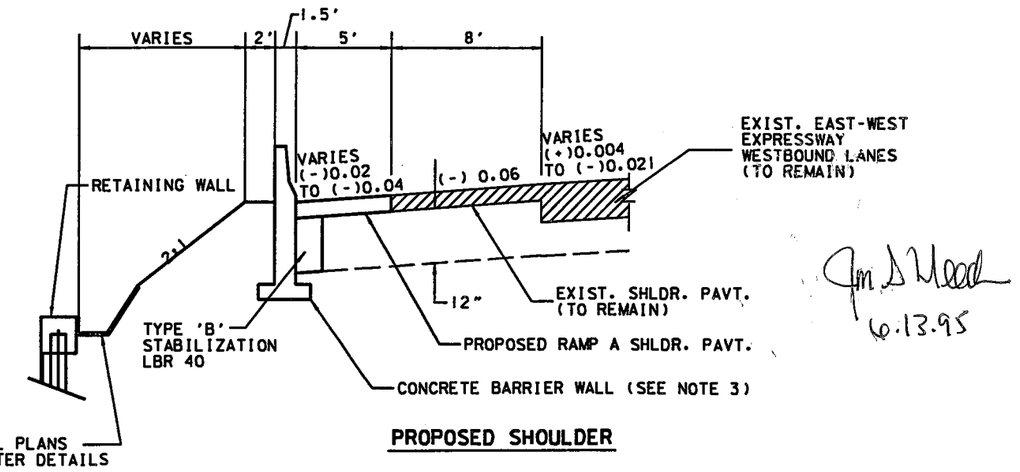


NOTES:

1. TRANSITION BARRIER FROM 57' LT. TO MATCH TO BRIDGE RAILING AT 54' LT.
2. REMOVE EXISTING SHOULDER GUTTER FROM STA. 532+70.91 TO STA. 539+53.24 AND REPLACE WITH RAMP 'A' SHOULDER PAVEMENT.
3. SEE STRUCTURAL PLANS FOR BARRIER WALL DETAIL.



EXISTING SHOULDER



PROPOSED SHOULDER

Jm S Mead
6.13.95

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

EXPRESSWAY AUTHORITY

PREPARED BY: ODRIVP

EAST-WEST EXPRESSWAY SHOULDER PAVEMENT WIDENING AND BARRIER WALL DETAIL

PROJECT NO.	SHEET NO.
220	27

STATION EQUATION
STA. 261+45.12 BK. =
STA. 261+58.90 AHD.

END ℄ RAMP 'B'
STA. 220+41.07
STA. 260+64.29
℄ CONST. & ℄ SURVEY
JOHN YOUNG PARKWAY

BEGIN ℄ RAMP 'C'
STA. 300+00.00
STA. 260+54.63
℄ CONST. & ℄ SURVEY JOHN YOUNG PARKWAY

℄ RAMP 'B'
PT. STA. 219+44.34

END CONSTRUCTION
STA. 304+57.73 ℄ RAMP 'C'

℄ SURVEY & ℄ CONST. JOHN YOUNG PARKWAY

NOTES:
1. FOR DRAINAGE STRUCTURE DETAILS SEE DRAINAGE STRUCTURE SHEETS.
2. FOR CONSTRUCTION DETAILS ON JOHN YOUNG PARKWAY SEE PLAN & PROFILE SHEETS.
3. CURB & GUTTER ELEVATIONS ARE TO THE FLOW LINE.
4. NEW RAMP CONSTRUCTION IS FROM STA. 300+56.11 TO STA. 302+44.00. WIDEN AND MATCH CROSS SLOPE OF EXIST. RAMP FROM STA. 302+90.00 TO STA. 304+57.73.

EXISTING POND
(SFWMD APP. #030381)

▨ PAVEMENT WIDENING EXISTING (TO BE REMOVED)
▨ EXISTING PAVEMENT (TO BE REMOVED)

6.13.95

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

EXPRESSWAY AUTHORITY

PREPARED BY:
DYER, RIDDLE, MILLS & PRECOURT INC.

INTERSECTION DETAIL

PROJECT NO.	SHEET NO.
220	28

BEGIN ℄ RAMP 'D'
STA. 400+00.00
STA. 265+94.82
℄ CONST. & ℄ SURVEY JOHN YOUNG PARKWAY

END ℄ RAMP 'A'
STA. 120+53.01
STA. 265+58.04
℄ CONST. & ℄ SURVEY JOHN YOUNG PARKWAY

NOTES:
1. FOR DRAINAGE STRUCTURE DETAILS SEE DRAINAGE STRUCTURE SHEETS
2. FOR CONSTRUCTION DETAILS ON JYP SEE PLAN & PROFILE SHEETS
3. CURB & GUTTER ELEVATIONS ARE FLOW LINE

END CONSTRUCTION
STA. 404+07.67 ℄ RAMP 'D'

- 4' PAVED SHOULDER
- 6' SHOULDER
- REMOVE EXIST. 4' SHOULDER
- MILL & RESURFACE
- WIDENING
- TYPE 'F' GURB & GUTTER
- PAVEMENT WIDENING EXISTING (TO BE REMOVED)
- EXISTING PAVEMENT (TO BE REMOVED)

Jm S Mead 6.13.95

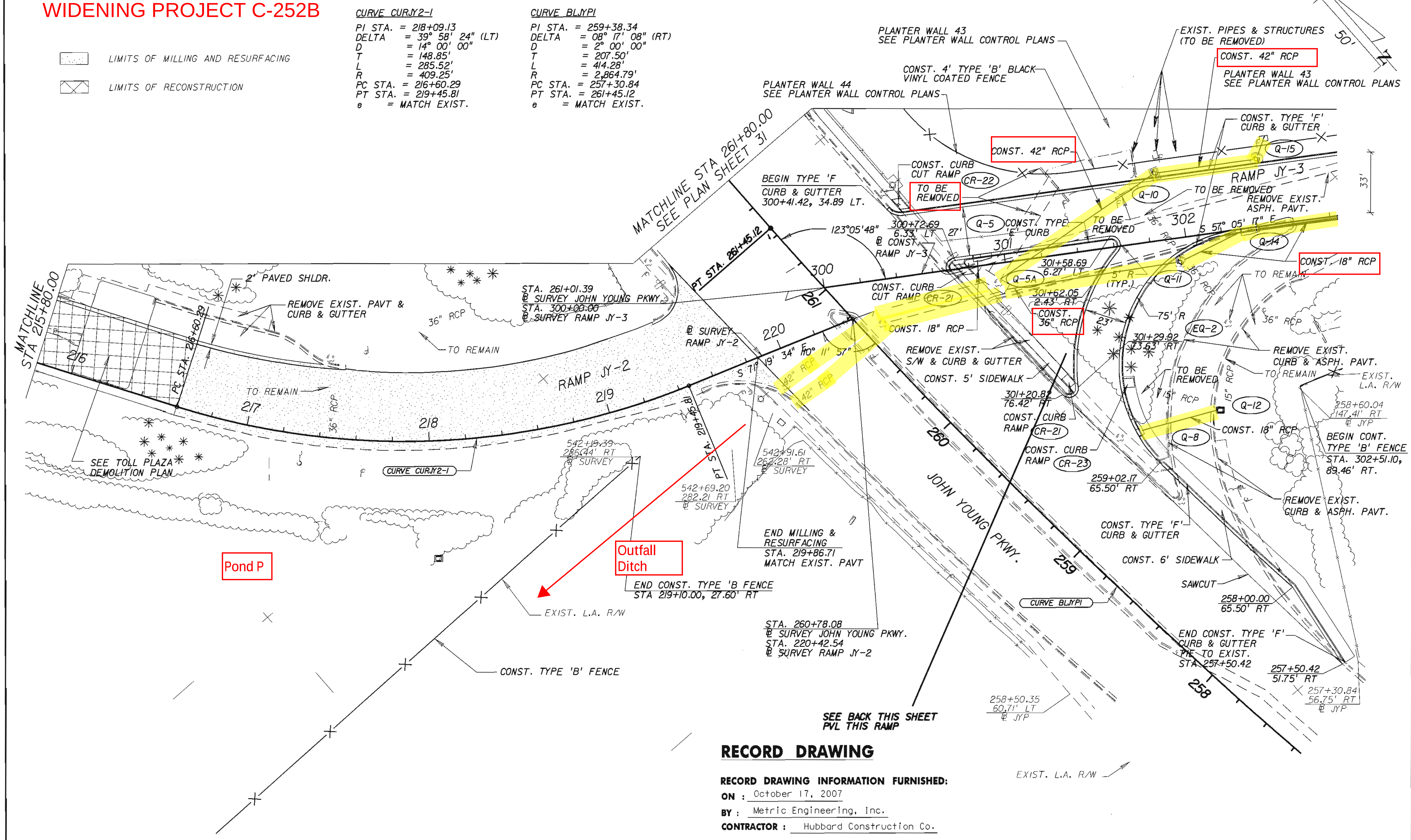
REVISIONS														
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

EXPRESSWAY AUTHORITY

PREPARED BY:
DYER, RIDDLE, MILLS & PRECOURT INC.

INTERSECTION DETAIL

POND P:
WIDENING PROJECT C-252B



LIMITS OF MILLING AND RESURFACING
LIMITS OF RECONSTRUCTION
CURVE CURJY2-1
PI STA. = 218+09.13
DELTA = 39° 58' 24" (LT)
D = 14° 00' 00"
T = 148.85'
L = 285.52'
R = 409.25'
PC STA. = 216+60.29
PT STA. = 219+45.81
e = MATCH EXIST.
CURVE BLJYPI
PI STA. = 259+38.34
DELTA = 08° 17' 08" (RT)
D = 2° 00' 00"
T = 207.50'
L = 414.28'
R = 2,864.79'
PC STA. = 257+30.84
PT STA. = 261+45.12
e = MATCH EXIST.
PLANTER WALL 43
SEE PLANTER WALL CONTROL PLANS
EXIST. PIPES & STRUCTURES (TO BE REMOVED)
CONST. 42" RCP
CONST. 4' TYPE 'B' BLACK VINYL COATED FENCE
PLANTER WALL 44
SEE PLANTER WALL CONTROL PLANS
CONST. TYPE 'F' CURB & GUTTER
MATCHLINE STA 261+80.00
SEE PLAN SHEET 31
BEGIN TYPE 'F' CURB & GUTTER 300+41.42, 34.89 LT.
CONST. CURB CUT RAMP
TO BE REMOVED
CR-22
Q-15
RAMP JY-3
Q-10
TO BE REMOVED
REMOVE EXIST. ASPH. PAVT.
33'
PT STA. 261+45.12
123°05'48"
300+72.69
6.33' LT
27'
Q-5
CONST. TYPE 'E' CURB
TO BE REMOVED
302
S 57° 05' 17" E
Q-14
CONST. 18" RCP
CONST. RAMP JY-3
301
301+58.69
6.27' LT
Q-5A
Q-11
TO REMAIN
MATCHLINE STA 215+80.00
2' PAVED SHLDR.
REMOVE EXIST. PAVT & CURB & GUTTER
36" RCP
TO REMAIN
STA. 261+01.39
℄ SURVEY JOHN YOUNG PKWY.
STA. 300+00.00
℄ SURVEY RAMP JY-3
300
261
CONST. CURB CUT RAMP
CR-21
301+62.05
2.43' RT
5' R (TYP.)
CONST. 36" RCP
23'
75' R
EQ-2
36" RCP
℄ SURVEY RAMP JY-2
220
S 71° 19' 34" E
10° 11' 57"
42" RCP
42" RCP
CONST. 18" RCP
REMOVE EXIST. S/W & CURB & GUTTER
CONST. 5' SIDEWALK
301+29.92
23.63' RT
REMOVE EXIST. CURB & ASPH. PAVT.
TO REMAIN
EXIST. L.A. R/W
216
PC STA. 216+60.29
TO REMAIN
217
36" RCP
218
RAMP JY-2
219
219+45.81
301+20.82
76.42' RT
CONST. CURB RAMP
CR-21
TO BE REMOVED
15" RCP
15" RCP
Q-12
258+60.04
147.41' RT
℄ JYP
CONST. 18" RCP
Q-8
BEGIN CONST. TYPE 'B' FENCE
STA. 302+51.10, 89.46' RT.
SEE TOLL PLAZA DEMOLITION PLAN
542+19.39
286.44' RT
℄ SURVEY
CURVE CURJY2-1
542+91.61
262.28' RT
℄ SURVEY
260
CONST. CURB RAMP
CR-23
259+02.17
65.50' RT
542+69.20
282.21 RT
℄ SURVEY
PT STA.
JOHN YOUNG PKWY.
REMOVE EXIST. CURB & ASPH. PAVT.
CONST. TYPE 'F' CURB & GUTTER
END MILLING & RESURFACING
STA. 219+86.71
MATCH EXIST. PAVT
CONST. 6' SIDEWALK
Outfall Ditch
Pond P
259
SAWCUT
END CONST. TYPE 'B FENCE
STA 219+10.00, 27.60' RT
CURVE BLJYPI
258+00.00
65.50' RT
EXIST. L.A. R/W
STA. 260+78.08
℄ SURVEY JOHN YOUNG PKWY.
STA. 220+42.54
℄ SURVEY RAMP JY-2
END CONST. TYPE 'F' CURB & GUTTER
TIE TO EXIST.
STA. 257+50.42
257+50.42
51.75' RT
CONST. TYPE 'B' FENCE
258
257+30.84
56.75' RT
℄ JYP
258+50.35
60.71' LT
℄ JYP
SEE BACK THIS SHEET PVL THIS RAMP
EXIST. L.A. R/W
50'
N

RECORD DRAWING

RECORD DRAWING INFORMATION FURNISHED:

ON : October 17, 2007

BY : Metric Engineering, Inc.

CONTRACTOR : Hubbard Construction Co.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
3/5/08		RECORD DRAWING			

ENGINEER OF RECORD:
DRMP
ENGINEERS • SURVEYORS • PLANNERS • SCIENTISTS
DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 CERT. OF AUTH. NO. 2648
JON MEADOWS LICENSE NO. 38438

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

ROADWAY PLAN SHEET 40
JOHN YOUNG PKWY.
RAMPS JY-2 & JY-3

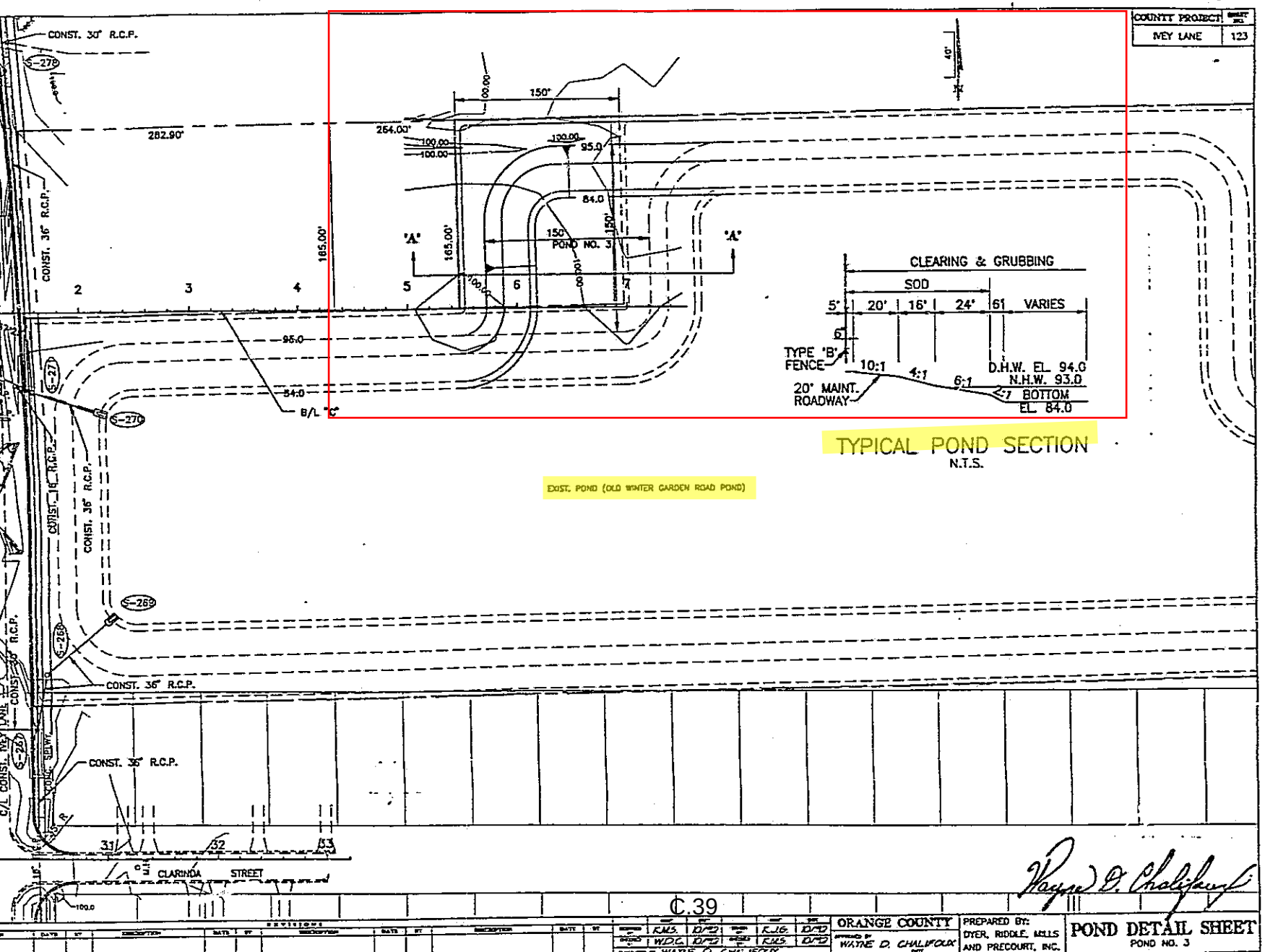
SHEET NO.
126

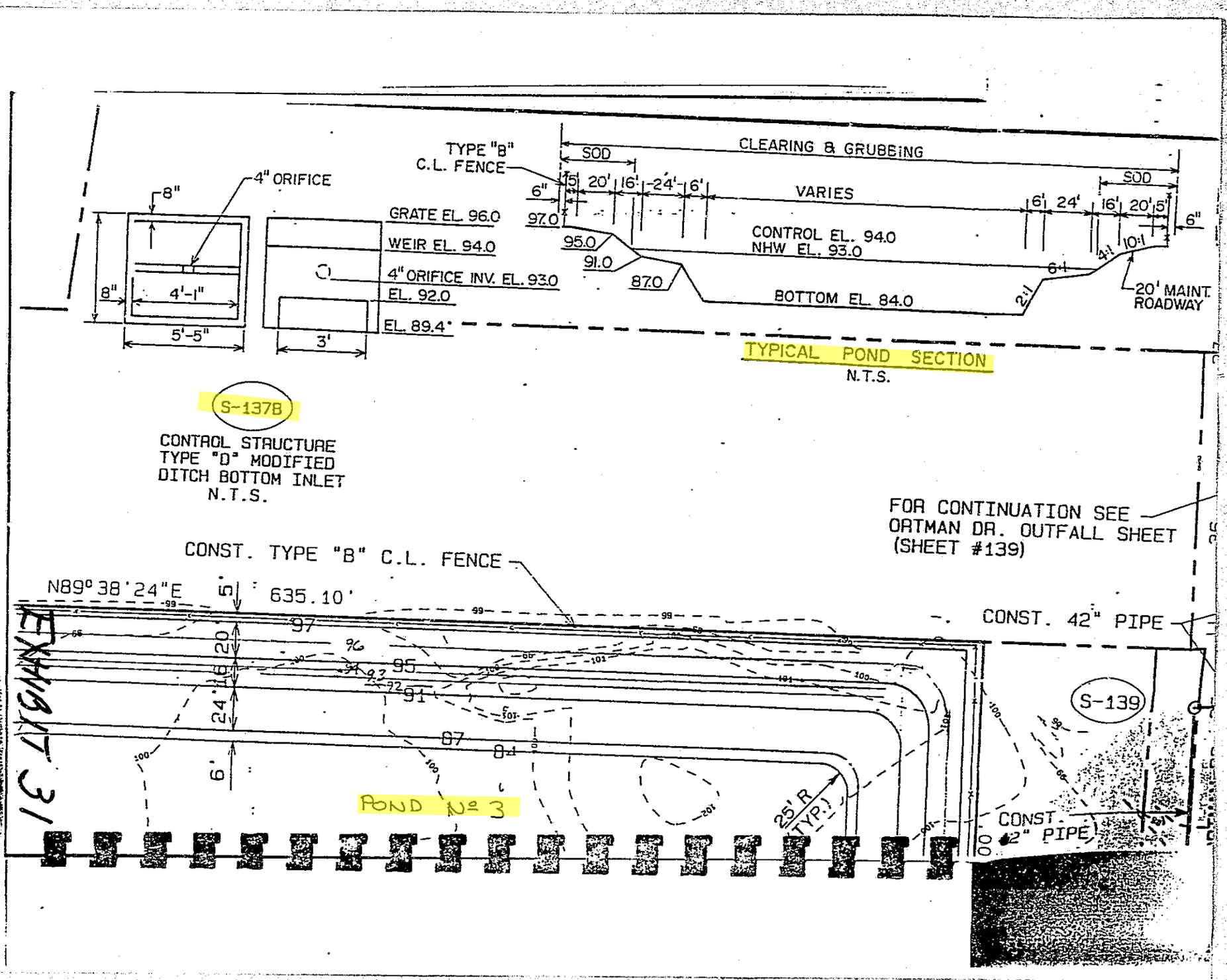
C-38

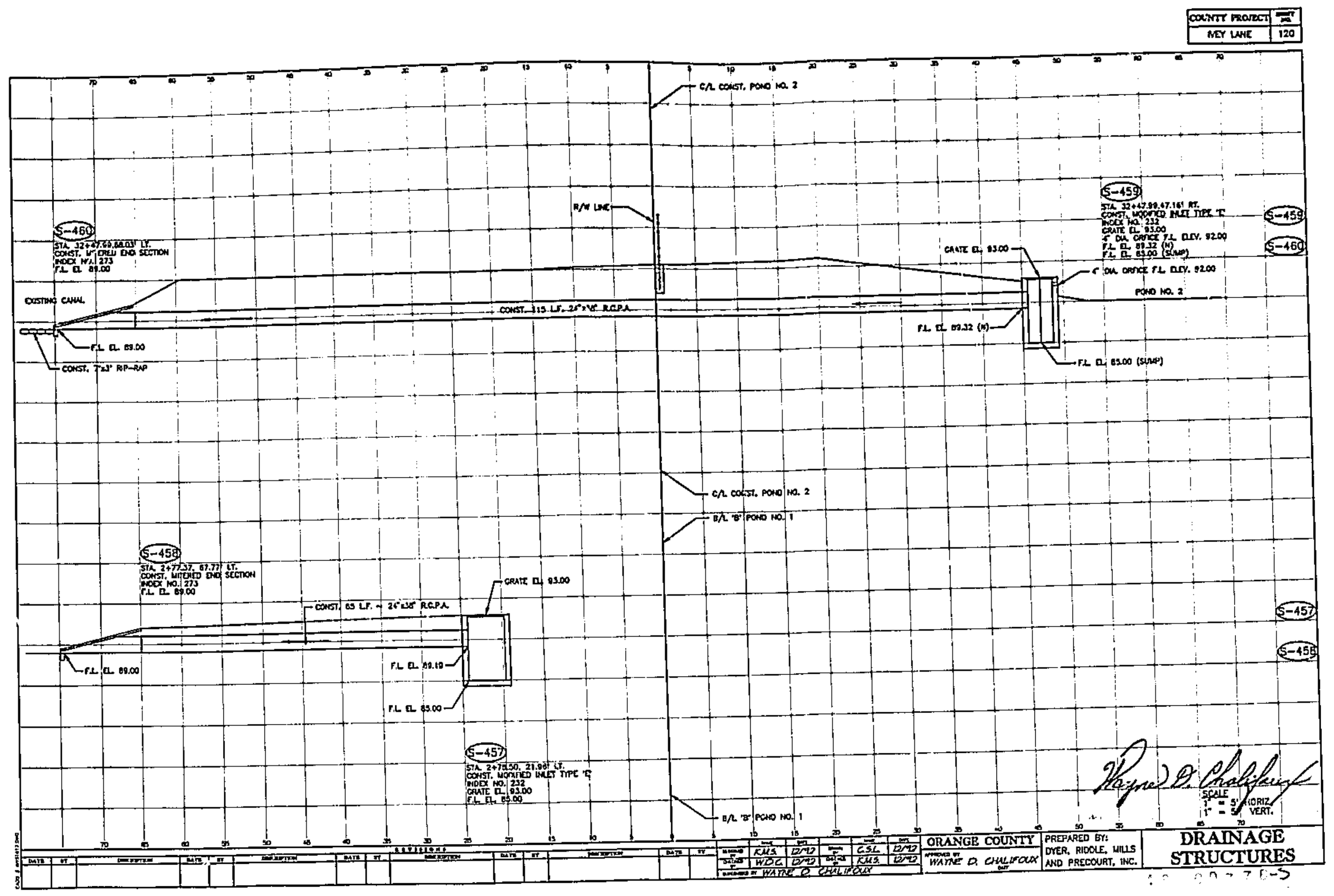
31-MAR-2008 11:17 \\orlfs4\fcs\CADD\252B_As_Builts\S.R.408 - 252B\Roadway\Design\planjy01.dgn

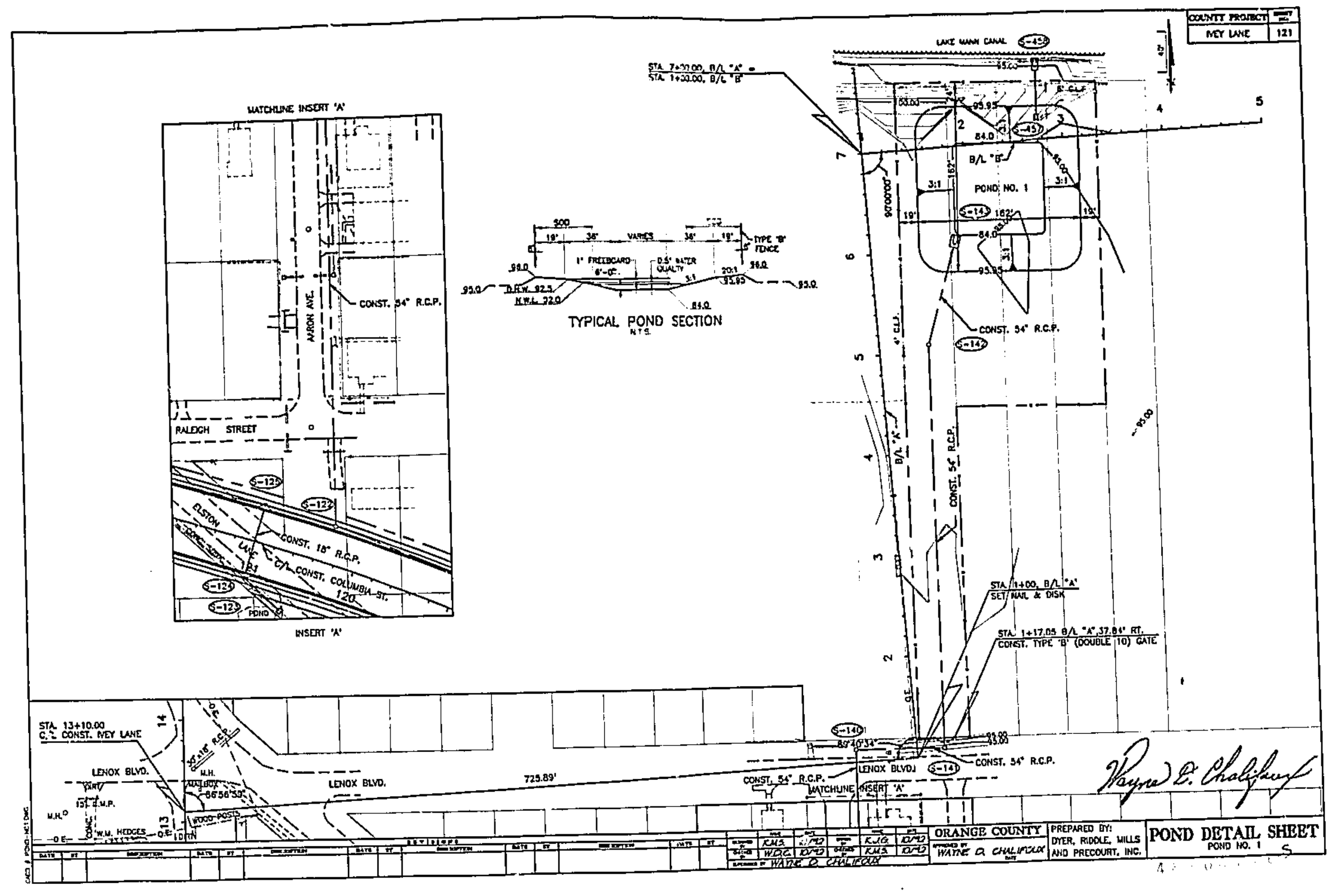
$DATE$ $TIME$ $FILE$

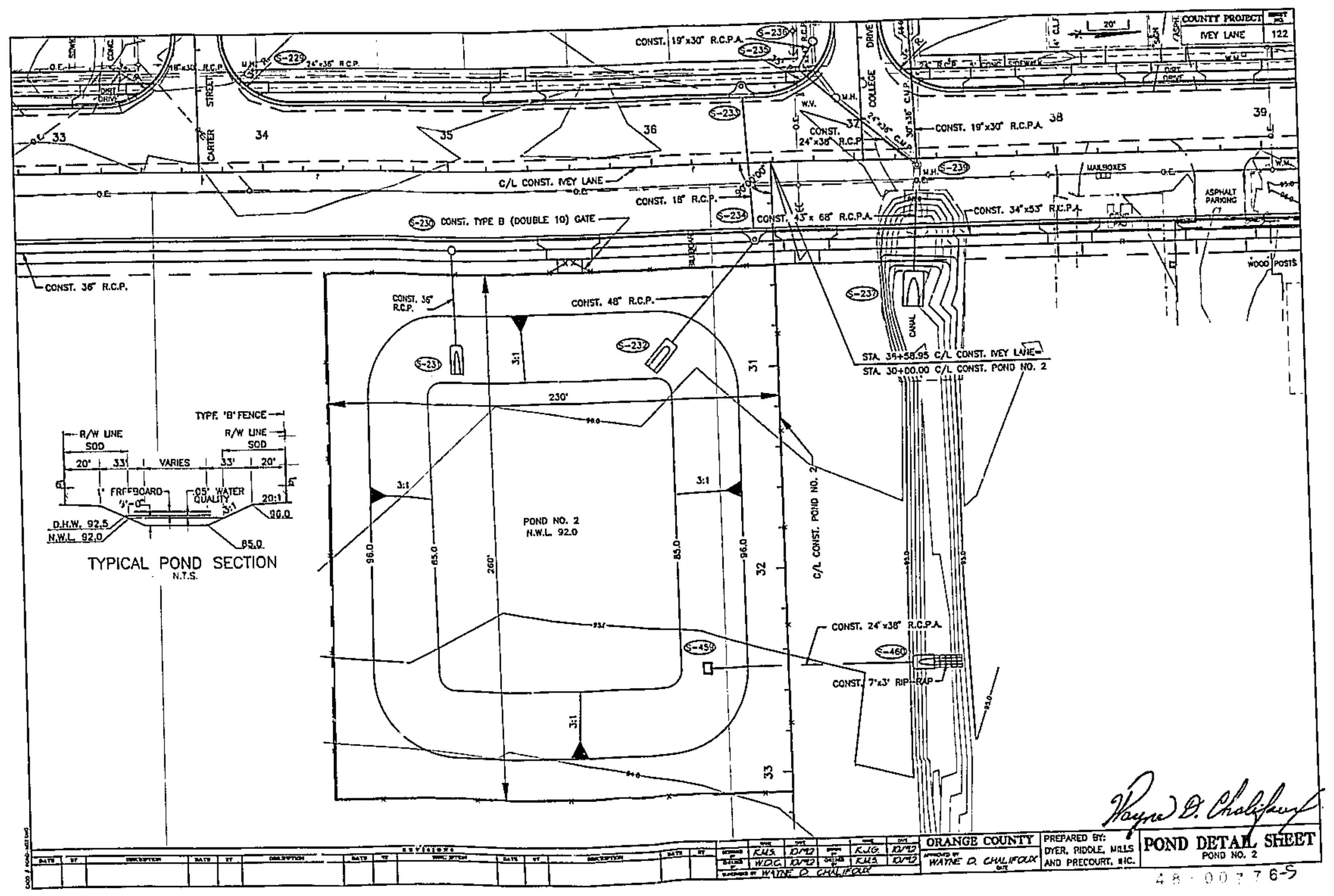
SFWMD 930622-1:
IVEY LANE PROJECT
-POND 3 (OLD
WINTER GARDEN RD
POND)

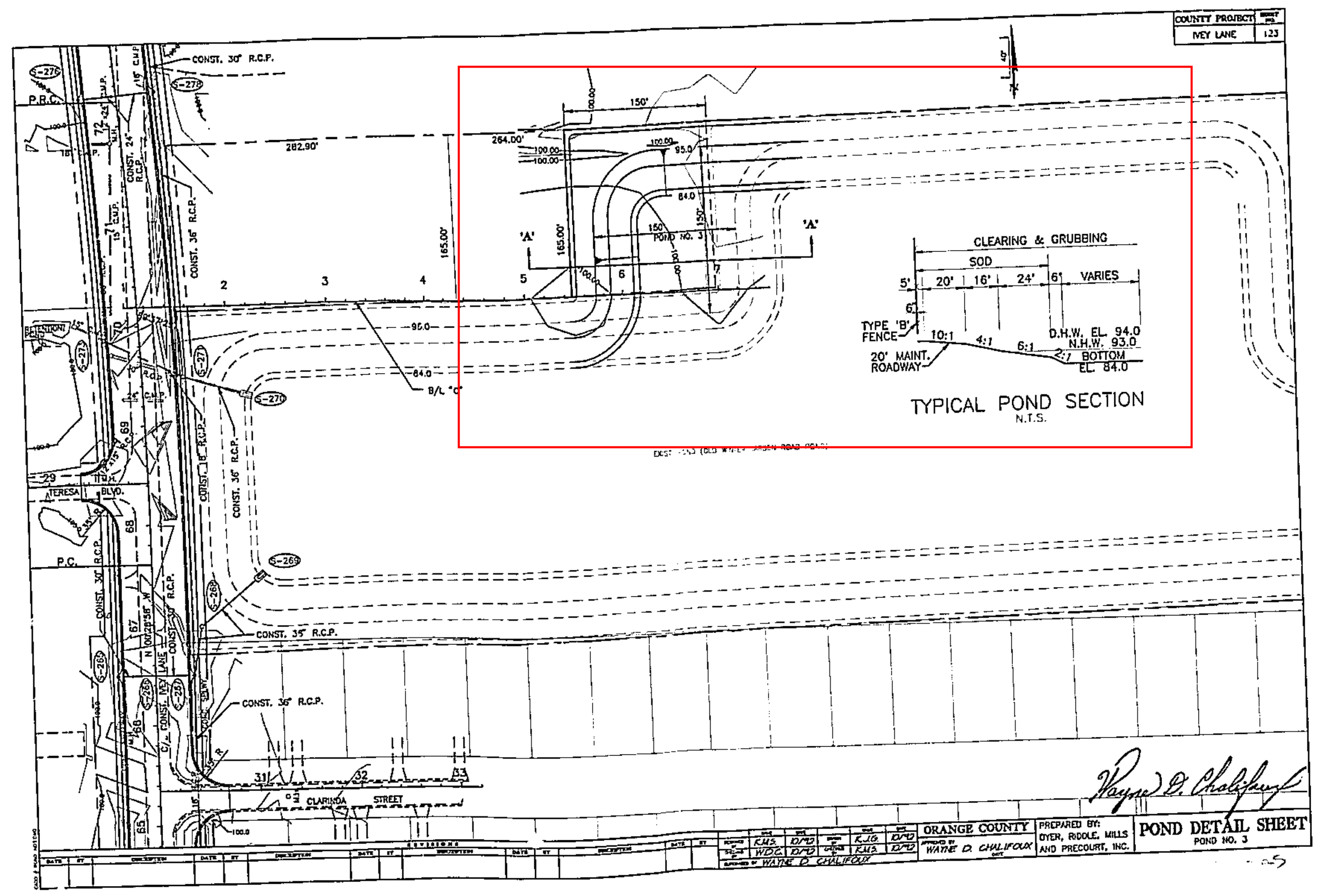



TYPE "B"
C.L. FENCE
SOD
CLEARING & GRUBBING
SOD
6"
5'
20'
16'
24'
6'
VARIES
6'
24'
16'
20'
5'
6"
97.0
95.0
91.0
87.0
CONTROL EL. 94.0
NHW EL. 93.0
BOTTOM EL. 84.0
6:1
2:1
10:1
2:1
20' MAINT. ROADWAY
4" ORIFICE
8"
8"
4'-1"
5'-5"
GRATE EL. 96.0
WEIR EL. 94.0
4" ORIFICE INV. EL. 93.0
EL. 92.0
EL. 89.4
3'
TYPICAL POND SECTION
N.T.S.
S-137B
CONTROL STRUCTURE
TYPE "D" MODIFIED
DITCH BOTTOM INLET
N.T.S.
FOR CONTINUATION SEE
ORTMAN DR. OUTFALL SHEET
(SHEET #139)
CONST. TYPE "B" C.L. FENCE
N89°38'24"E
635.10'
CONST. 42" PIPE
S-139
EXHIBIT 3
20'
24'
6'
97
96
95
91
87
8:1
POND No 3
25' R
(TYP.)
CONST. 42" PIPE

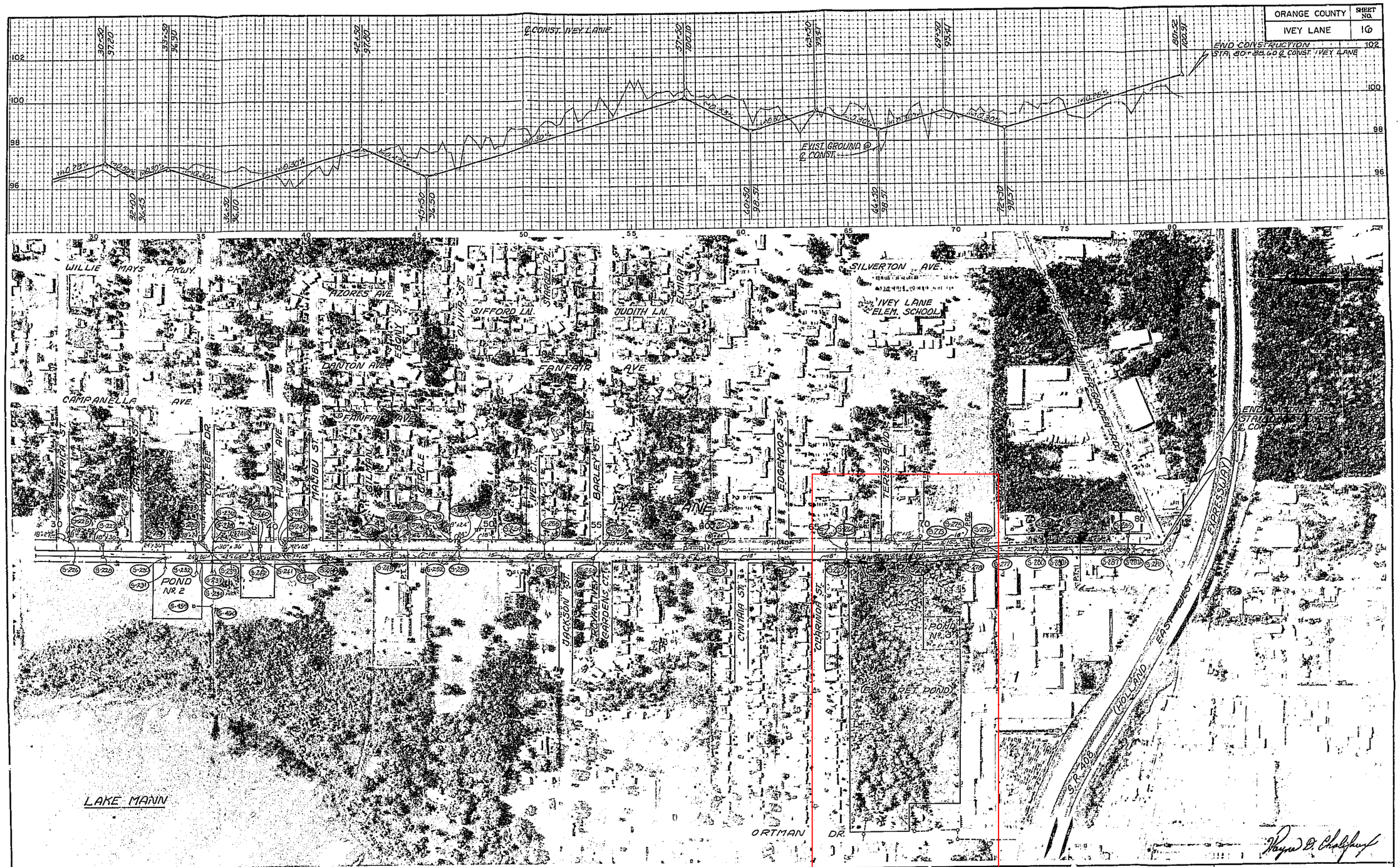

COUNTY PROJECT
IVEY LANE
120
ORANGE COUNTY
DYER, RIDDLE, MILLS AND PRECOURT, INC.
DRAINAGE STRUCTURES


COUNTY PROJECT
IVEY LANE
121
TYPICAL POND SECTION
INSERT 'A'
LENOX BLVD.
ORANGE COUNTY
DYER, RIDDLE, MILLS AND PRECOURT, INC.
POND DETAIL SHEET
POND NO. 1


COUNTY PROJECT
IVEY LANE
122
POND NO. 2
TYPICAL POND SECTION
N.T.S.
ORANGE COUNTY
DYER, RIDDLE, MILLS AND PRECOURT, INC.
POND DETAIL SHEET
POND NO. 2


COUNTY PROJECT
IVEY LANE
123
CLEARING & GRUBBING
SOD
TYPE "B" FENCE
20' MAINT. ROADWAY
D.H.W. EL. 94.0
N.H.W. 93.0
BOTTOM EL. 84.0
TYPICAL POND SECTION
N.T.S.
ORANGE COUNTY
DYER, RIDDLE, MILLS AND PRECOURT, INC.
POND DETAIL SHEET
POND NO. 3

ORANGE COUNTY	SHEET NO.
IVEY LANE	16



REVISIONS								
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

AERIAL PHOTOGRAPHY DATA			DATE			DATE	FLORIDA DEPARTMENT OF TRANSPORTATION	Prepared By: Dyer, Riddle, Mills & Precourt, Inc.	IVEY LANE DRAINAGE MAP
FLOWN BY	DESIGNED BY	NAME: K.M.S.		DRAWN BY	NAME: L.T.S.		APPROVED BY:		
PHOTO DATE	CHECKED BY	W.D.C.		CHECKED BY	K.M.S.		DATE:		
PHOTO ID. NO.	SUPERVISED BY:								

98-00776-S

SFWMD 930622-1: POND 3 (OLD WINTER GARDEN RD POND) FROM IVEY LANE PROJECT

IVEY LANE, ELSTON LANE & COLUMBIA STREET

PERMIT SUMMARY SHEET

APPLICATION NUMBER: 930322-1

LOCATION: ORANGE COUNTY, S32/T22S/R29E

OWNER: ORANGE COUNTY HIGHWAY CONSTRUCTION DEPT.

ENGINEER: DAO ENGINEERING, INC.

PROJECT AREA: 23.69 ACRES **DRAINAGE AREA:** 23.69 ACRES

PROJECT USE: HIGHWAY

FACILITIES:

1. EXISTING: The roadways being improved are all existing with poorly defined swales and ditches serving as the water management system. Basin 300 drains to a previously permitted, but not constructed, pond which serves Old Winter Garden Road, and will expand that pond to serve this section of Ivey Lane. Additional right way will be obtained to accomplish the widening.

2. PROPOSED: The proposed road widening will change Ivey Lane and its connecting streets from a two lane to a five lane facility, from Old Winter Garden Road to Bruton Blvd. The project is divided into three drainage basins, each served by a water management system, discharging to Lake Mann via existing canals or ditches.

PROJECT LEVEL:

DRAINAGE BASIN: SHINGLE CREEK

RECEIVING BODY: LAKE MANN VIA EXISTING CANAL OR DITCH

LOCAL ROAD CRITERIA: 25 YR 24 HR STORM

BASIN DESIGN FREQUENCY: 25 YR 24 HR STORM

Exhibit 2-A

IVEY LANE, ELSTON LANE & COLUMBIA STREET

PERMIT SUMMARY SHEET

WATER QUALITY:

Water quality treatment is provided for one inch of runoff over the additional pavement area in wet detention ponds.

Basin	Method	Vol Req'd. (ac-ft)	Vol Prov'd (ac-ft)
BASIN 100	.39 acres WET DETENTION	.26	.47
BASIN 200	.65 acres WET DETENTION	.38	.75
BASIN 300	.52 acres WET DETENTION	.35	.60

DISCHARGE RATE:

Basin	Allow Disch (cfs)	Method of Determination	Design Disch (cfs)	Design Stage (ft, NGVD)
BASIN 100	18	PRE VS. POST	17.43	93.66
BASIN 200	25	PRE VS. POST	24.6	93.8
BASIN 300	15	PRE VS. POST	13.5	95.1

0.25 EXTRA W.Q. VOLUME

ENVIRONMENTAL ASSESSMENT:

ENDANGERED, THREATENED & SPECIES OF SPECIAL CONCERN SUMMARY:

The project site does not contain preferred habitat for endangered, threatened, or species of special concern. No endangered/threatened or species of special concern were observed on site, and submitted information indicates that endangered/threatened or species of special concern use of the site is not an issue. This permit does not relieve the applicant from complying with all applicable rules and any other agencies' requirements if in the future, endangered/threatened or species of special concern are discovered on the site.

ENVIRONMENTAL SUMMARY

There are no wetlands, or unique uplands located within the project boundaries.

	TOTAL PROJECT	PREVIOUSLY PERMITTED	THIS PHASE	
TOTAL ACRES	23.69	.00	23.69	acres
WTRM ACREAGE	1.56	.00	1.56	acres
PAVEMENT	18.46	.00	18.46	acres
PERVIOUS	3.67	.00	3.67	acres

Exhibit 2-B

IVEY LANE, ELSTON LANE & COLUMBIA STREET

PERMIT SUMMARY SHEET

BASIN LEVEL BREAKDOWN AND FLOOD PROTECTION:

Basin Name: BASIN 100

	TOTAL PROJECT	PREVIOUSLY PERMITTED	THIS PHASE	
TOTAL ACRES	5.94	.00	5.94	acres
WTRM ACREAGE	.39	.00	.39	acres
PAVEMENT	4.63	.00	4.63	acres
PERVIOUS	.92	.00	.92	acres

FLOOD PROTECTION:

LOCAL ROAD CRITERIA
- FLOOD CONTOUR 93.66 FEET NGVD
- MINIMUM ROAD GRADE 95.00 FEET NGVD

Basin Name: BASIN 200

	TOTAL PROJECT	PREVIOUSLY PERMITTED	THIS PHASE	
TOTAL ACRES	8.82	.00	8.82	acres
WTRM ACREAGE	.65	.00	.65	acres
PAVEMENT	6.93	.00	6.93	acres
PERVIOUS	1.24	.00	1.24	acres

FLOOD PROTECTION:

LOCAL ROAD CRITERIA
- FLOOD CONTOUR 93.80 FEET NGVD
- MINIMUM ROAD GRADE 95.00 FEET NGVD

Basin Name: BASIN 300

	TOTAL PROJECT	PREVIOUSLY PERMITTED	THIS PHASE	
TOTAL ACRES	8.93	.00	8.93	acres
WTRM ACREAGE	.52	.00	.52	acres
PAVEMENT	6.90	.00	6.90	acres
PERVIOUS	1.51	.00	1.51	acres

Exhibit 2-C

IVEY LANE, ELSTON LANE & COLUMBIA STREET

PERMIT SUMMARY SHEET

FLOOD PROTECTION:

LOCAL ROAD CRITERIA

FLOOD CONTOUR	95.10 FEET NGVD
MINIMUM ROAD GRADE	97.00 FEET NGVD

COMMENTS:

1 . The roadway drainage system is based on the right of way only. There are approximately 50 acres of the existing residential development which drain to the right of way.

Exhibit 2-D

Job Number
Sheet No. _____ By _____
Calculated By RLW Date 2-19-93
Checked By _____ Date _____
Scale _____

GENERATING A SBUH HYDROGRAPH DATA SHEET

TITLE: IVEY LANE

NAME OF FILE IVEY 3

NO. OF HYDROGRAPHS 2

BASIN I.D.	300												999
NODE	30												99
AREA (AC.)	47.3												1
% LAKE	0												0
% D.C.I.A.	50												0
CN (N-D.C.I.A.)	80												1
T.C. (MIN.)	24.5												1
IN AB DCIA (IN.)	0.1												99
IN AB N_DCIA	0.2												99

NUMBER OF COLUMNS 9

SIMULATION DURATION (HR.) 24.5

TIME INCREMENT (MIN.) 1

PRINT INTERVAL 15

COMPOSITE FILE NAME IVEY3.CH

DISTRIBUTION TYPE 10

STORM DURATION (HR.) 24 RAINFALL (IN.) 8.6

COMMENTS: 8.5 acres of the above basin comes from proposed Old Winter Garden Road improvements as designed by Lochrane Engineering.

91

SANTA BARBARA URBAN HYDROGRAPH SB86107 VER 1.1

IVEY LANE 3/OLD W G ROAD\ 25 YR/24 HR

BASIN ID	NODE #	AREA (acres)	% LAKE	% DCIA	CN N-DCIA	TC (min)	INI AB DCIA (ins)	INI AB N-DCIA (dec)
300	30	47.3	0.0	50.0	80.0	24.5	0.10	0.20
999	99	1.0	0.0	0.0	1.0	1.0	99.00	99.00

***** RAINFALL INPUT SECTION *****

Mass Curve or Actual Rainfall? (M/A) --> M

1 SCS TYPE II
2 TAMPA 24-HOUR
3 TAMPA 48-HOUR
4 TAMPA 72-HOUR
5 SFWMD 24-HOUR
6 SFWMD 72-HOUR
7 SCS TYPE II FL. MODIFIED
8 SJRWMD 96-HOUR
9 CAPE SCS TYPE II
10 ORANGE COUNTY DISTRIBUTION
11 ORLANDO 6 HR
12 SEMINOLE CO. 25 YR/6HR
13 SEMINOLE CO. 10YR/3HR

Specify CURVE TYPE = 10

Storm Duration (hrs) --> 24
Total Rainfall (inches) --> 8.6

93

SANTA BARBARA URBAN HYDROGRAPH SB86107 VER 1.1
(C) Copyright 1983, Peter J. Singhofen, P.E.

IVEY LANE 3/OLD W G ROAD\ 25 YR/24 HR

*** RUNOFF SUMMARY ***

BASIN ID# -->	300	999
RO VOL (cfs-hrs)	350	0
RO VOL (ac-ft)	28.9	0.0
RO VOL (inches)	7.34	0.00
PEAK FLOW (cfs)	76.4	0.0
PEAK TIME (hrs)	9.000	0.000

97

*** INTER-CONNECTED POND ROUTING PROGRAM *** IC86110 VER 2.7
(C) Copyright 1983, Peter J. Singhofen, P.E.

IVEY LANE 3/OLD W G ROAD
2-93

*** PEAK CONDITIONS SUMMARY ***

NODE #	PEAK STAGE (feet)	PEAK STORAGE (acft)	TIME TO PEAK (hrs)	PEAK OUTFLOW (cfs)	TIME TO PEAK (hrs)
30	95.05	21.56	13.45	13.90	13.45
99	91.45	12.49	24.02	0.00	0.02

FROM NODE	TO NODE	PEAK OUTFLOW (cfs)	TIME TO PEAK (hrs)
30	99	13.90	13.45

Pre 15.

///

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PROJECT: _____ JOB NO. _____
MADE BY: _____ CHECKED BY: _____ DATE: _____ SHEET _____ OF _____

PONDS 1H, 2H & 3H ORIGINAL:
SJRWMD 20358-8

SYSTEM 11 SUMMARY

- POND 1H WILL RECEIVE FLOW FROM STRUCTURES H-3 THRU H-4
- POND 2H WILL RECEIVE FLOW FROM STRUCTURES H-1, H-2, H-5 THRU H-8 & H-11, H-12
- BOTTOM OF POND ELEVATIONS: POND 1H: 93.0 POND 3H: 81.0
  POND 2H: 74.0
- REQUIRED RETENTION VOLUME: POND 1H: 0.28 ACRE-FT. POND 3H: 4.71 AC-FT.
  POND 2H: 6.50 ACRE-FT.
- GROUNDWATER TABLE IS APPROXIMATELY 3' BELOW EXISTING GRADE FOR POND 2H (ELEV. 82.5±) AND APPROXIMATELY 3' BELOW EXISTING GRADE FOR POND 3H (ELEV 77±)
- ALL AREAS EAST OF KIRKMAN ROAD DO NOT GO INTO EITHER POND. (EXCEPT FOR POND 2H AREA)
- SYSTEM IS SIZED TO RETAIN THE 100YR/24HR STORM AS PER ORANGE COUNTY.

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 2-17-88 SHEET _____ OF _____

SOILS SUMMARY

SOILS CONSISTS OF:

- CANDLER - URBAN LAND COMPLEX - 0 TO 5 PERCENT SLOPES (TYPE A)
  CN = 39
- POMELLO - URBAN LAND COMPLEX - 0 TO 5 PERCENT SLOPES (TYPE C)
  CN = 74
- SMYRNA - URBAN LAND COMPLEX (TYPE B/D)
  CN = 80
- SANIBEL MUCK
  CN = 84

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PROJECT: _____ JOB NO. _____
MADE BY: _____ CHECKED BY: _____ DATE: _____ SHEET _____ OF _____

RETENTION POND
DESIGN

205

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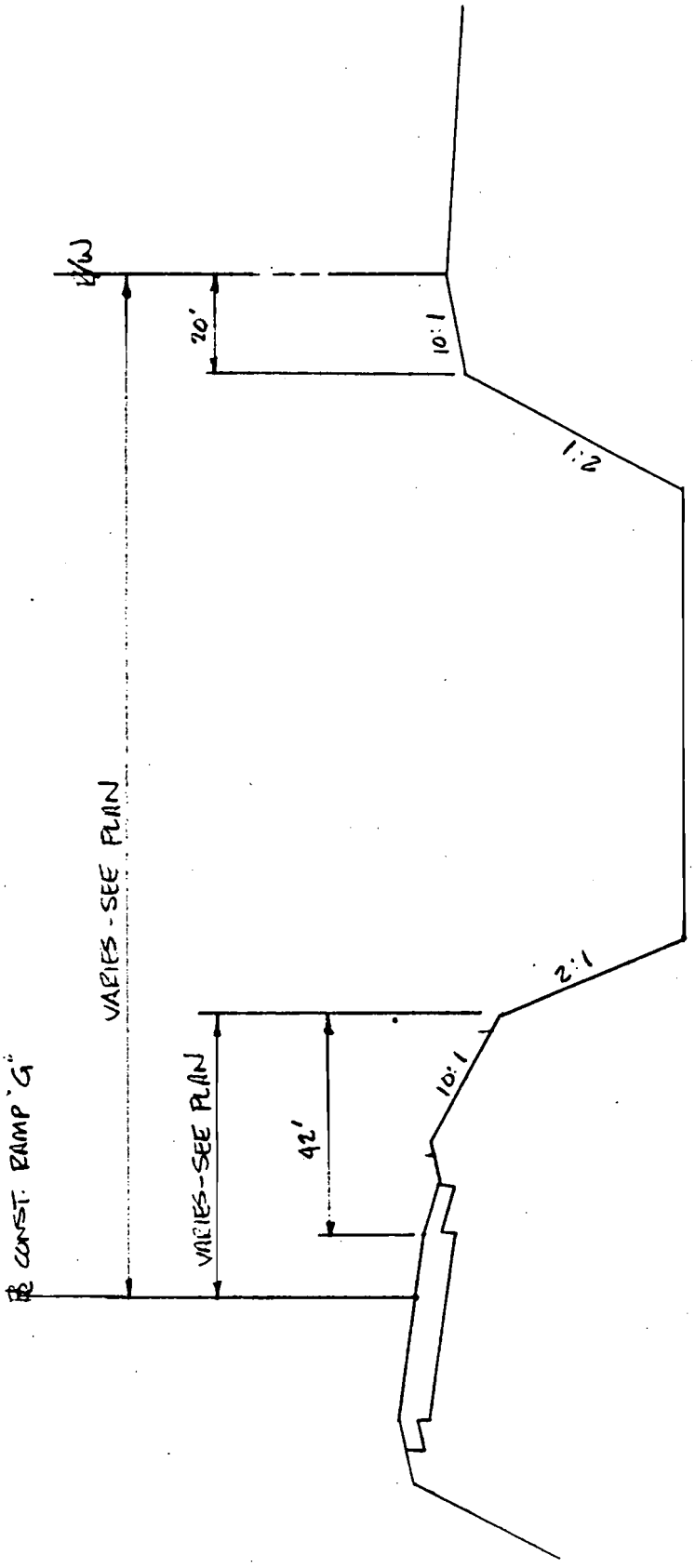
PROJECT: _____ JOB NO. _____

MADE BY: _____ CHECKED BY: _____ DATE: _____ SHEET _____ OF _____



BOND III & 2H
SECTION H-H
NTS

C.54

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION JOB NO. EA-03
MADE BY: EDB CHECKED BY: _____ DATE: 2-17-88 SHEET _____ OF _____

POND 1H

PERVIOUS (CN=61) = 0.14 ACRES (OFFSITE 1/4 ACRE HOMES)
PERVIOUS (CN=39) = 0.33 ACRES (POND AREA)
IMPERVIOUS (CN=98) = 0.17 ACRES
TOTAL = 0.64 ACRES

WEIGHTED CN:

$$\frac{0.14(61) + 0.33(39) + 0.17(98)}{0.64} = 59.5$$

CALCULATE R.O. VOLUME: (P=10.6)

S = 1000/CN - 10 = 6.81 IN.

R.O. = $(P-0.2S)^2/(P+0.8S)$ = 5.32 IN.

VOLUME = 5.32 * 0.64 * 1/12 = **0.28 ACRE-FT.**

211

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION POND 1H JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 2-17-88 SHEET _____ OF _____

POND 2H

CONTRIBUTARY AREAS

PERVIOUS (CN=59)	=	2.66 ACRES
PERVIOUS (CN=74)	=	3.47 ACRES
PERVIOUS (CN=61)	=	1.50 ACRES
IMPERVIOUS (CN=98)	=	2.88 ACRES
TOTAL	=	10.51 ACRES

(POND AREA - SEE SHEET)
(OFF-SITE ¼ ACRE HOMES)

WEIGHTED CN

$$\frac{2.66(59) + 3.47(74) + 1.50(61) + 2.88(98)}{10.51} = 74.9$$

CALCULATE R.O. VOLUME (P = 10.6 IN.)

$S = 1000/CN - 10 = 3.35$

$R.O. = (P-0.2S)^2/(P+0.8S) = 7.42$

VOLUME = 7.42 * 10.51 * ½ = **6.50 ACRE-FT.**

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION - POND 3H JOB NO. E.I-05
MADE BY: EDB CHECKED BY: _____ DATE: 2-17-88 SHEET _____ OF _____

POND 3H

CONTRIBUTARY AREAS

PERVIOUS (CN = 53) = 2.47 ACRES (SEE SHEET)
PERVIOUS (CN = 78) = 3.07 ACRES (SEE SHEET) POND 3EH
IMPERVIOUS (CN = 98) = 2.03 ACRES
TOTAL = 7.57 ACRES

WEIGHTED CN

$$\frac{2.47(53) + 3.07(78) + 2.03(98)}{7.57} = 75.2$$

CALCULATE R.O. VOLUME (P = 10.6 IN.)

S = 1000/CN - 10 = 3.30 INCHES
R.O. = $(P-0.2S)^2/(P+0.8S)$ = 7.46
VOLUME = 7.64 * 7.57 * 1/12 = **4.71 ACRE-FT.**

2/3

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION - POND 1H JOB NO. EA-05
MADE BY: EDB CHECKED BY: _____ DATE: 2-18-88 SHEET _____ OF _____

POND 1H

BOTTOM AREA : 6042 FT^2 (ELEV. 93.0)
TOP AREA : 8625 FT^2 (ELEV. 95)
BOTTOM PERIMETER : 600 FT

ELEV.	STORAGE (AC-FT.)
93.0	0.0
93.5	0.07
94.0	0.15
94.5	0.24
95.0	0.33
95.5	0.43
96.0	0.54

VOLUME REQ'D = 0.28 ACRE-FT.

$\frac{0.28-0.24}{0.33-0.24} =$ ELEV. @ 0.28 ACRE-FT = 94.7

CALCULATED USING HP-15C.

POND 1H

STAGE STORAGE CALCULATIONS

Top El. 95.0
Bot. El. 93.0

Bot. Area 6042.0
Top Area 8625.0

Average area per 1/2 foot of elevation 645.750

Elev. (FT.)	Area (SQ. FT.)	Storage (CUB. FT.)	Sum of Storage (CUB. FT.)	Sum of Storage (AC. FT.)
93.0	6042.0		0.0	0.000
		3182.4		
93.5	6687.8		3182.4	0.073
		3505.3		
94.0	7333.5		6687.8	0.154
		3828.2		
94.5	7979.3		10515.9	0.241
		4151.1		
95.0	8625.0		14667.0	0.337
		4473.9		
95.5	9270.8		19140.9	0.439
		4796.8		
96.0	9916.5		23937.8	0.550

NOTE: THIS CALCULATION IS A CHECK OF A PREVIOUS CALCULATION.

215

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PROJECT: E/W EXPRESSWAY-WESTERN EXT. POND 2H JOB NO. EA-03
MADE BY: EDB CHECKED BY: _____ DATE: 2-18-88 SHEET _____ OF _____

POND 2H

BOTTOM AREA = 95,500 FT² (ELEV. 80)
TOP AREA = 105,750 FT² (ELEV 83)
PERIMETER LENGTH = 1350 FT.

ELEV.	STORAGE (AC-FT.)
80	0.0
81	2.22
82	4.51
83	6.86

REQ'D STORAGE = 6.50 ACRE-FT.

$\frac{6.86-6.50}{6.86-4.51} = .15$ ELEV. @ 6.50 AC-FT. = 82.85

CALCULATED USING HP-15C

POND
2H

STAGE STORAGE CALCULATIONS

Top El. 83.0
Bot. El. 80.0

Bot. Area 95500.0
Top Area 105750.0

Average area per 1/2 foot of elevation 1708.333

Elev. (FT.)	Area (SQ. FT.)	Storage (CUB. FT.)	Sum of Storage (CUB. FT.)	Sum of Storage (AC. FT.)
80.0	95500.0		0.0	0.000
		48177.1		
80.5	97208.3		48177.1	1.106
		49031.3		
81.0	98916.7		97208.3	2.232
		49885.4		
81.5	100625.0		147093.8	3.377
		50739.6		
82.0	102333.3		197833.3	4.542
		51593.7		
82.5	104041.7		249427.1	5.726
		52447.9		
83.0	105750.0		301875.0	6.930

NOTE:

THIS CALCULATION IS A CHECK OF A PREVIOUS CALCULATION.

218

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PROJECT: E/W EXPRESSWAY - WESTERN EXTENSION - POND 2H JOB NO. EA-03
MADE BY: EDB CHECKED BY: _____ DATE: 2-17-88 SHEET _____ OF _____

POND 3H

BOTTOM AREA 72,125 FT^2 TOP AREA: 79,667 FT^2 (ELEV. 84.0)
BOTTOM LENGTH 1340 FT.

ELEV.	STORAGE (AC-FT)
81.0	0
82.0	1.69
83.0	3.44
84.0	5.25
85.0	7.12

VOLUME REQ'D = 4.80 AC-FT.

$\frac{4.80-3.44}{5.25-3.44} = .75$

ELEV. @ 4.80 = 83.75

CALCULATED USING HP-15C.

POND
3H

STAGE STORAGE CALCULATIONS

Top El. 84.0
Bot. El. 81.0

Bot. Area 72125.0
Top Area 79667.0

Average area per 1/2 foot of elevation 1257.000

Elev. (FT.)	Area (SQ. FT.)	Storage (CUB. FT.)	Sum of Storage (CUB. FT.)	Sum of Storage (AC. FT.)
81.0	72125.0		0.0	0.000
		36376.8		
81.5	73382.0		36376.8	0.835
		37005.3		
82.0	74639.0		73382.0	1.685
		37633.8		
82.5	75896.0		111015.8	2.549
		38262.3		
83.0	77153.0		149278.0	3.427
		38890.8		
83.5	78410.0		188168.8	4.320
		39519.3		
84.0	79667.0		227688.0	5.227
		40147.8		
84.5	80924.0		267835.8	6.149
		40776.3		
85.0	82181.0		308612.0	7.085

NOTE: THIS CALCULATION IS A CHECK OF A PREVIOUS CALCULATION.

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PROJECT: E/W EXPRESSWAY - WESTERN EXT. JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-29-88 SHEET _____ OF _____

WATER QUALITY VOLUMES

POND # 2H

AREA = 0.64 + 10.51 = 11.15 ACRES
CN_W = 0.64(59.5) + 10.51(74.9) / 11.15 = 74.0 S = 3.51 IN.

FIRST ½" OF RUNOFF = ½(11.15)(1/12) = 0.46 AC-FT.

RUNOFF FROM FIRST INCH OF RAINFALL

$$C = 1 - \frac{3.51}{10.6}\left(1.2 - \frac{3.51}{10.64\,8(3.51)}\right) = 0.69$$

VOLUME = 0.69(11.15)(1/12) = 0.64 AC-FT.

WATER QUALITY ELEV. = $80 + \frac{0.64}{2.22} = 80.29$

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PROJECT: E/W EXPRESSWAY WESTERN EXT. JOB NO. EA-03
MADE BY: EDB CHECKED BY: _____ DATE: 4-29-88 SHEET _____ OF _____

WATER QUALITY VOLUME

POND #3H

AREA = 7.57 ACRES
CN_w = 75.2 S = 3.30 IN.

FIRST ½" OF RUNOFF = $\frac{1}{2}(7.57)(\frac{1}{12}) = 0.32$ AC-FT.

RUNOFF FROM FIRST INCH OF RAINFALL

$$C_4 = 1 - \frac{3.30}{10.6}\left(1.2 - \frac{3.30}{10.6 + .8(3.30)}\right) = 0.70$$

VOLUME = $0.70(7.57)(\frac{1}{12}) = 0.44$ AC-FT.

WATER QUALITY ELEV. = $81.0 + \frac{.44}{1.69} = 81.26$

224

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PROJECT: _____ JOB NO. _____
MADE BY: _____ CHECKED BY: _____ DATE: _____ SHEET _____ OF _____

COMPARISON OF PRE-CONST. AND
POST-CONST. FLOWS AND RUNOFF
VOLUMES TO WESTSIDE MINOR BASIN

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PROJECT: EAST-WEST EXPRESSWAY - KIRKMAN JOB NO. EW-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

INTRODUCTION (BASIN 2H)

THE RUNOFF FROM THE KIRKMAN DRAINAGE SYSTEM INTO WESTSIDE MANOR BASIN INCLUDES FLOWS FROM THE EAST-WEST EXPRESSWAY AND KIRKMAN RD.

THE PRE-CONSTRUCTION DRAINAGE SYSTEM INCLUDES SIMPLE OVERLAND FLOW INTO A RCP COLLECTION SYSTEM (KIRKMAN RD.) THAT OUTFALLS INTO WESTSIDE MANOR BASIN.

THE POST-CONSTRUCTION DRAINAGE SYSTEM INCLUDES FLOWS FROM A RETENTION POND UNDERDRAIN SYSTEM, ROADWAY DRAINAGE (KIRKMAN RD. WIDENED.) AND GROUNDWATER FLOWS.

THE DIFFERENCES IN THE PRE AND POST BASINS ARE AS FOLLOWS:

1) PRE INCLUDES APPROX 4.5 ACRES OF RUNOFF FROM WESTBOUND E/W EXP THAT DRAINS TO KIRKMAN SYSTEM.
2) KIRKMAN WILL BE WIDENED THEREBY CREATING ADDITIONAL FLOWS
3) SOME IMPERVIOUS AREAS WILL BE REMOVED (HOUSES, PARKING LOTS, ETC.) THEREBY REDUCING FLOWS.

NOTE: THE 4.5 ACRES IN 1) ABOVE IS BEING DRAINED TO A RETENTION POND AT NE QUAD OF E/W AND KIRKMAN.

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PROJECT: EAST-WEST EXPRESSWAY - KIRKMAN JOB NO. EW-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

PRE-CONSTRUCTION FLOWS AND VOLUMES

TOTAL RUNOFF VOLUME

14.98 ACRES FROM KIRKMAN RD. SYSTEM
CN = 85 (MOSTLY IMPERVIOUS PAVMT)
RUNOFF VOLUME (100YR/24 HR STORM) = 10.9 AC-FT.
6.5 AC-FT. FROM SAME AREA IN POST DET. POND SH

TOTAL = 10.9 + 6.5 = 17.4 AC-FT.

MAX. FLOW ESTIMATE

$Q = CiA$ $C = 0.65$
$i = 6.0$ in/hr. ($T_c = 20$ MIN.)
$A = 25.5$ ACRES

$Q = .65(5.7)(25.5) = 94$ CFS

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PROJECT: EAST-WEST EXPRESSWAY - KIRKMAN JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

POST CONSTRUCTION

VOLUMES AND FLOWS FROM PONDS

RUNOFF VOLUMES : 14 ACRE-FT. (INCLUDES GROUNDWATER FLOWS)
MAX. FLOW = 144.85 ft^3/day/lf. of UNDERDRAIN. (SEE ATTACHED)
1120 ft. OF UNDERDRAIN

$$144.85\ ft^3/day/lf.\ (1120\ lf)\left(\frac{1\ day}{24\ hrs.}\right)\left(\frac{1\ hr.}{60\ min.}\right)\left(\frac{1\ min}{60\ sec.}\right)$$

$$= 1.88\ CFS$$

FLOWS FROM KIRKMAN DRAINAGE

MAX. = 60± CFS (SEE STORM TABS)

TOTAL FLOWS = 60 + 2 = 62± CFS MAX.

256

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PROJECT: EAST/WEST EXPRESSWAY JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

INTRODUCTION (BASIN 3H)

THIS BASIN PRESENTLY PRODUCES FLOWS FROM APPROX. 4 ACRES THIS AREA WILL BE CHANGED FROM SUBSTANTIALLY GRASSY, TREED COVER WITH SOME BUILDINGS AND PARKING LOTS TO A RETENTION POND WITH SOME BUILDINGS AND PARKING LOT COVER.

THIS BASIN ALSO ACCEPTS 4.5 ACRES OF RUNOFF FROM THE WESTBOUND E/W AND ACCELERATION RAMP.

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PROJECT: E/W EXPRESSWAY - WESTSIDE MINOR JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

BASIN 3H

PRE-CONSTRUCTION FLOWS & VOLUMES

FLOWS: APPROX. 4 ACRES
$i = 5.7$ in/hr. ($T_c = 20$ MIN.)
$C = .3$

$Q = CiA = .3(5.7)(4) = 6.8$ CFS

VOLUME = 2.7 ACRE-FT. (100 YR/24 HR STORM)
CN = 80

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PROJECT: E/W EXPRESSWAY-WESTSIDE MINOR BASIN JOB NO. EA-03
MADE BY: EDB CHECKED BY: _____ DATE: 4-20-88 SHEET _____ OF _____

BASIN 3H

POST-DEVELOPMENT FLOWS & VOLUMES

MAX FLOW = FLOW FROM UNDERDRAINS

$$140.5\ ft^3/day/lf(1030 lf)\left(\frac{day}{24 hrs.}\right)\left(\frac{hr.}{60 min}\right)\left(\frac{1 min}{60 sec.}\right) = 1.7\ cfs.$$

VOLUME = 5.90 ACRE-FT.

SUMMATION

TOTAL

PRE-VOLUME = 2.7 + 17.4 = 20.1 AC-FT.
POST-VOLUME = 5.9 + 14 = 19.9 AC-FT. (1% REDUCTION)

PRE-FLOWS = 94 + 5 = 99 CFS
POST FLOWS: 62 + 2 = 64 CFS (35% REDUCTION)

CONCLUSION: THE FLOWS ARE LESS AND THE VOLUMES ESSENTIALLY UNCHANGED AFTER CONSTRUCTION.

THE MAJOR DIFFERENCE IN THE MAX. FLOW IS THAT 13.1± AC. ARE BEING RETAINED AND OUTLET AT A MAX Q OF 4± CFS. WHEREAS IT WAS ALLOWED TO FLOW FREELY TO WESTSIDE MINOR BASIN BEFORE CONST.

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PROJECT: EAST/WEST EXPRESSWAY ACCESS RD JOB NO. EA-03
MADE BY: RDB CHECKED BY: _____ DATE: 7/26/88 SHEET _____ OF _____

4 NORTHEAST PART OF ROAD

STA 20+12 TO STA 15+00
512 FT X 14 FT. = .16 AC. (CN=98)
512 FT X 50 FT. = .59 AC. (CN=39)

$$\frac{.16(98) + .59(39)}{0.75} = 51.6$$

5. SOUTHEAST PART OF ROAD

STA 20+12 TO STA 15+00
512 FT X 14 FT = .16 AC. (CN=98)
512 FT X 11 FT. = .13 AC. (CN=39)

$$\frac{.16(98) + .13(39)}{.29} = 71.6$$

003

PONDS 2H TO P:
WIDENING PROJECT C-252B

OOCEA FILE COPY
C-252B

S.R. 408
East-West Expressway

Stormwater Management
&
Drainage Design

FINAL
~~100%~~

Prepared For

Orlando Orange County Expressway Authority
(OOCEA)

Submitted To

PBS&J

Prepared By

DRMP Inc.

December 2003

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

ENGINEER OF RECORD
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DYER, RIDDLE, MILLS & PRECOURT, INC.
1505 E. COLONIAL DRIVE
ORLANDO, FLORIDA 32803
(407) 896-0594 FL. LIC. NO. 2648

OOCEA PROJ. NO.
252B

EXPRESSWAY AUTHORITY

POST DEVELOPMENT DRAINAGE MAP

SHEET NO.

KIRKMAN ROAD

PINE HILLS ROAD

SCALE: 1"=500'

N

BASIN 3H
7.59 Ac
CE=77.0
25YR/72HR=82.42
100YR/24HR=82.76

EXISTING POND 3H

OUTFALL STR OF-1

BASIN I
5.30 Ac

BASIN K
7.15 Ac

OUTFALL STR L-12

BASIN L-PHN
1.63 Ac

BASIN L-48
2.30 Ac
CE=87.50
25YR/72HR=88.29
100YR/24HR=88.18

BASIN 2H
10.39 Ac
CE=80.0
25YR/72HR=82.68
100YR/24HR=82.63

BASIN J
2.54 Ac

WESTSIDE MANOR DRAINAGE BASIN
NORMAL WATER EL. 75.5 NGVD (SCDBMSMS)
100 YR 82.24 (SCDBMSMS)
25 YR 81.08 (SCDBMSMS)
10 YR 80.39 (SCDBMSMS)

BASIN L-PHS
0.60 Ac

BASIN L-48S
0.62 Ac

OUTFALL STR OF-2

PROPOSED POND L

BASIN L-MR36
25.97 Ac
CE=86.0
25YR/72HR=91.02
100YR/24HR=91.45

OLD WINTER GARDEN ROAD

SEC 25, TWN 22S, RNG 28E
SEC 30, TWN 22S, RNG 29E
SEC 30, TWN 22S, RNG 29E
SEC 29, TWN 22S, RNG 29E

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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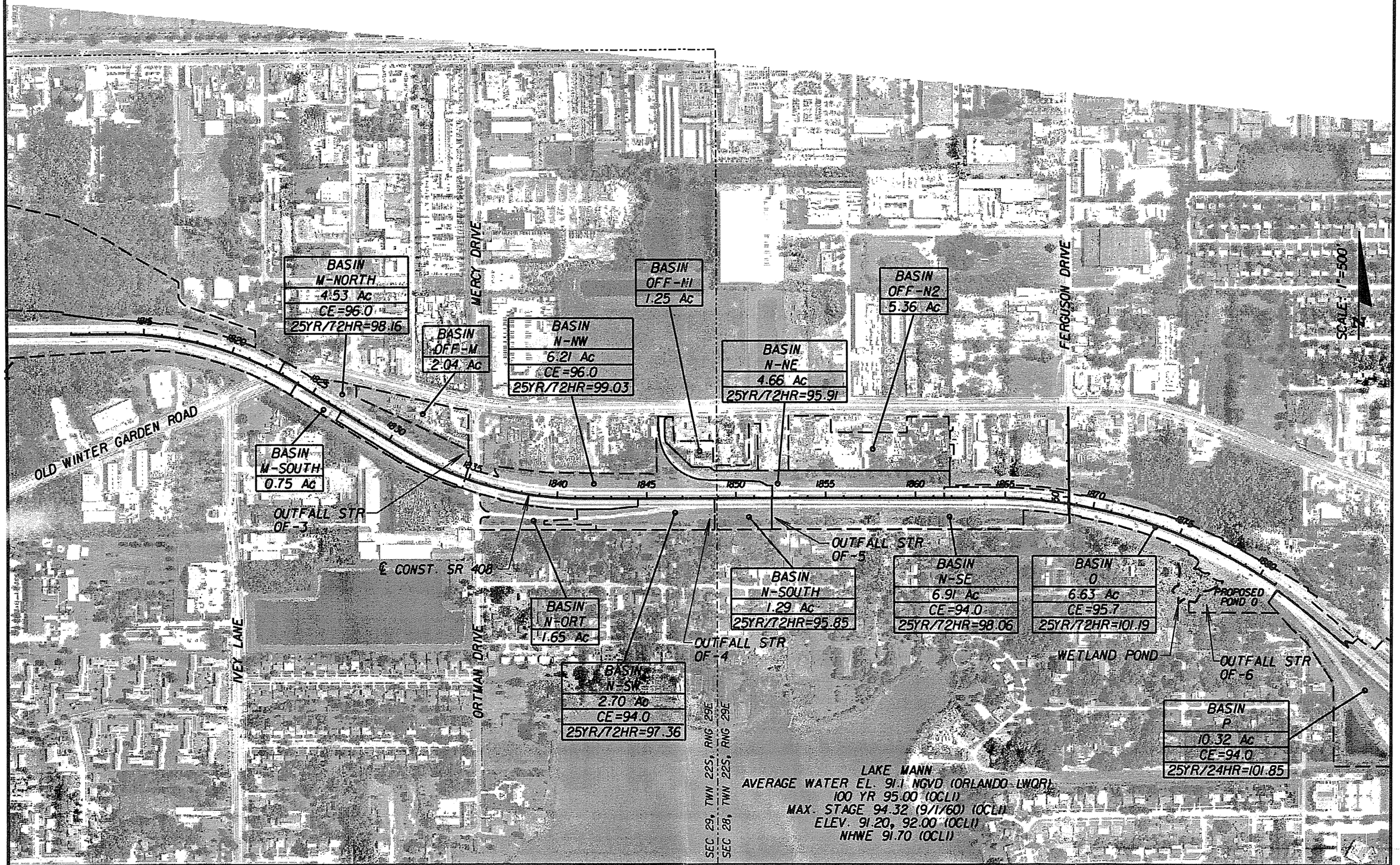

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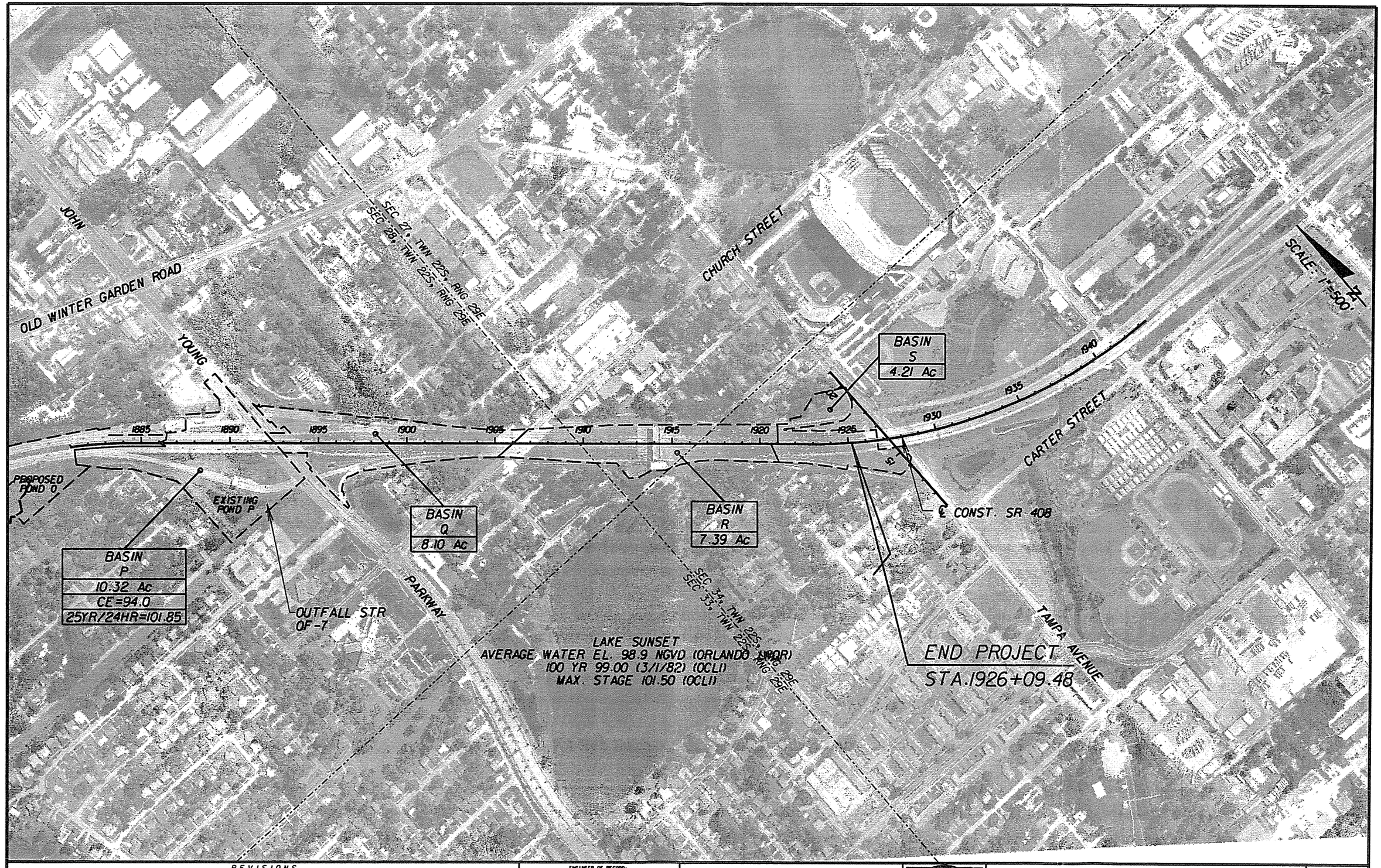

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EXPRESSWAY AUTHORITY

POST DEVELOPMENT DRAINAGE MAP

SHEET NO.

Table of Contents

FIGURES

TABLES

Table of Contents

APPENDICES

Introduction

The project is located within Sections 27, 28, 29, 30 and 34 Township 22 South, Range 29 East and Sections 25 and 26 Township 22 South, Range 28 East within Orange County (see Location Map Figure 1). Proposed is the widening of the roadway to six lanes for approximately 24,000 feet. In addition the existing toll plaza area will be relocated, expanded and improved to accommodate high-speed lanes along with the traditional toll facilities.

Presently the project stormwater management plan is operating under several different types of water management district permits. The project is located within two different water management districts: 1) the St. Johns River Water Management District (SJRWMD) west of the Kirkman interchange and 2) the South Florida Water Management District (SFWMD) east of the Kirkman Interchange. Portions of the project have been designed to meet permitting criteria while other portions of the project were constructed prior to any permitting requirements.

The following existing permits were found within the project limits:

- Kirkman and to the West - FDEP 4-095-0199AGM4
- John Young Parkway Interchange – SFWMD 48-00859-S

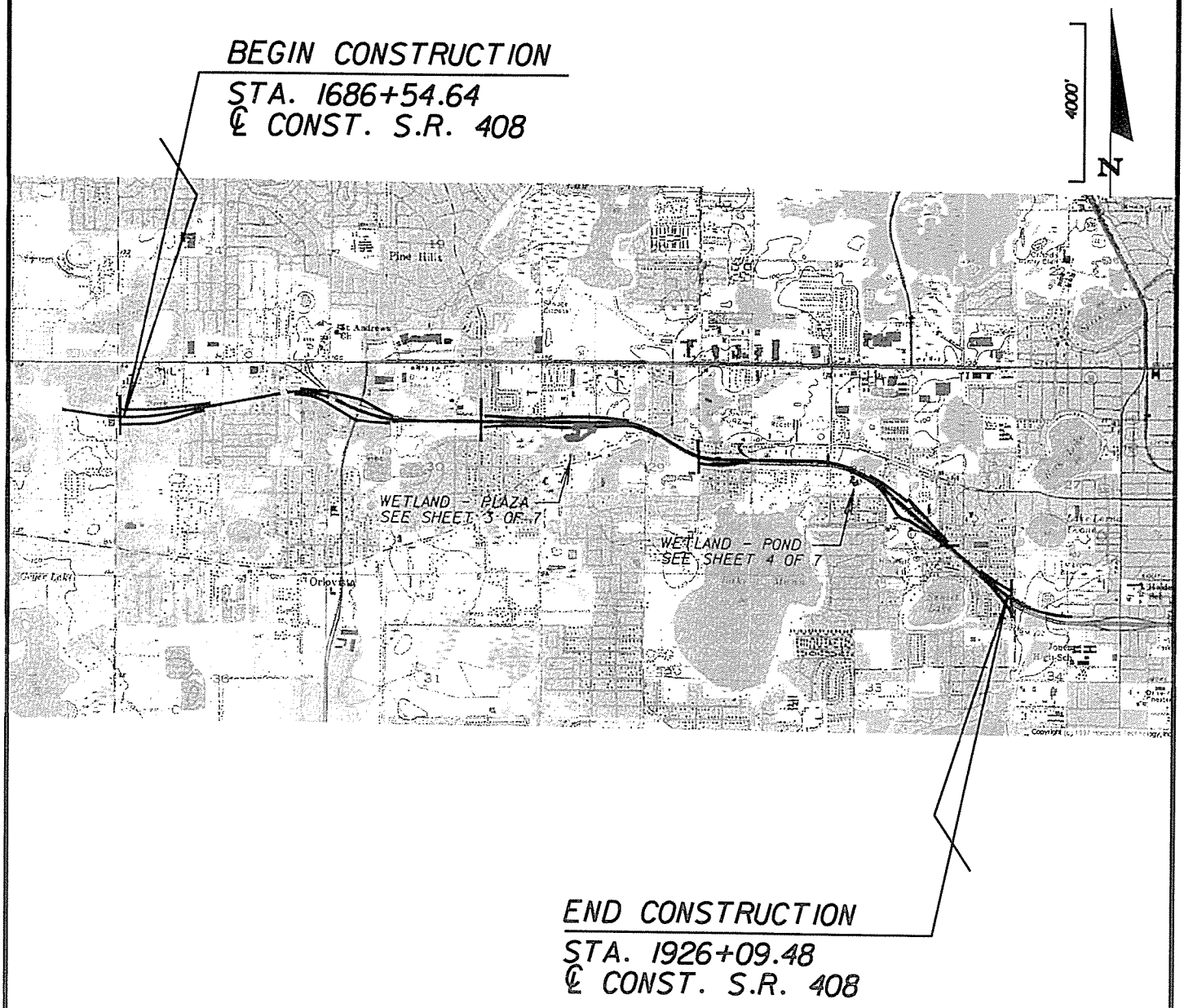
These permits will be modified to include the proposed changes within this project.

General Design Considerations

The intent of these criteria is to provide design standards for the drainage design for the Expressway SR 408, by providing criteria and guidance for safe, economical designs for roadway drainage and least cost maintenance. The criteria are from the FDOT Drainage Manual (DM), Standards of General Reference (GR) criteria shown in Volumes 2A, 2B and 3 of the 1992 Drainage Manual, and are referenced as such.

Stormwater Permitting Criteria

The project alignment is located entirely within Orange County, Florida and within the regulatory boundaries of the SJRWMD and SFWMD. The project is located within five major basins. The first basin area at Hiawassee Road does not discharge to any offsite property and will be contained within the existing ponds. The design for these ponds was set up to accommodate the future widening of the mainline and therefore no additional work is required.



USGS QUADRANGLE ORLANDO WEST
PHOTOREVISED 1980

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EXPRESSWAY AUTHORITY

LOCATION MAP

STATE ROAD 408
OOCEA PROJ. NO. 2528

FIGURE 1

The second basin area is a land locked system that discharges to Shingle Creek via a pump station located within Westside Manor Lake. Ponds within this basin are required to be designed so that post development volumes do not exceed existing runoff. There are four ponds for portions of the existing roadway, mainly the areas that were modified when the old East-West Expressway was extended further east. Included within the second basin is the proposed relocated toll facility. The third basin area is the Lake Mann basin. Runoff from the existing road as well as area north of the expressway discharges to Lake Mann through various existing pipes and ditches. The fourth basin is the Lake Sunset basin that is a land-locked basin. There is only a small portion of the project located within this basin (mainly the existing toll plaza area). The fifth basin is the Clear Lake basin. At the very end of this project there are areas that drain to Clear Lake via an outfall pipe/ditch system.

Design Storm Criteria

Systems must meet the peak discharge requirements for the following design storm events:

100-year 24-hour analysis (Pre-post volumes) Land Locked systems (SJRWMD)
25-year 72-hour return period for peak discharge rates (SFWMD)
25-year 24-hour return period open drainage basins John Young Parkway Permit

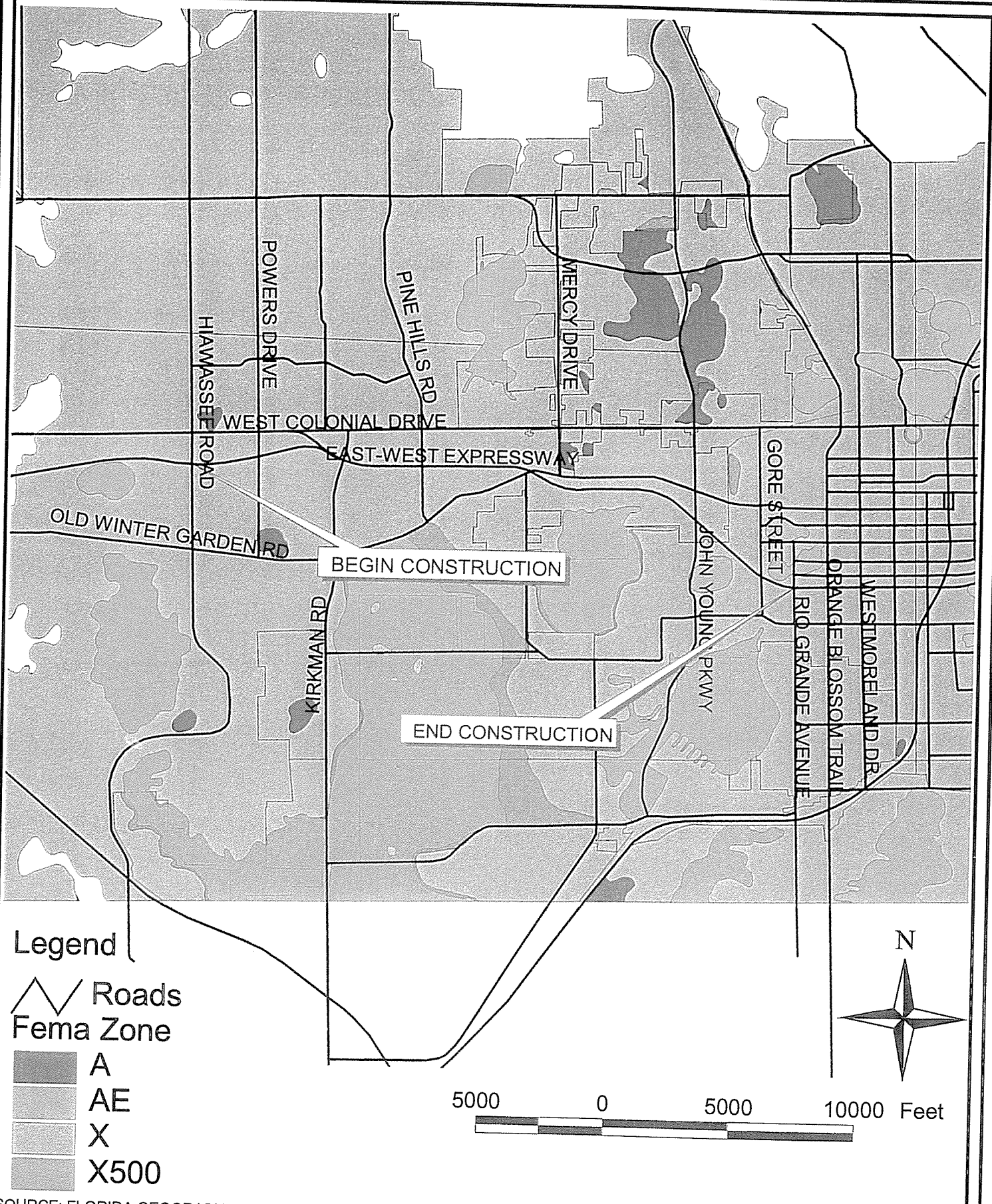
The proposed design will follow the SJRWMD criteria for ponds west of Kirkman Road and the SFWMD criteria for areas east of Kirkman Road. There are no significant changes proposed for the ponds west of Kirkman Road, since they were originally designed and permitted for the additional lanes proposed by this project. The proposed water management plan does not change any of these ponds other than some minor modifications to the secondary drainage systems serving these ponds (Basins F, G, 1H and 2H). All of these ponds will accommodate the 100-year 24-hour event and water quality is not a major concern since there are no discharges for the 100-year 24-hour event.

For the areas east of Kirkman Road the SFWMD criteria will be used. There are several types of stormwater treatment systems proposed. Portions of these areas are in the land-locked Westside Manor basin and there are portions that have positive outfalls. For the land-locked system the 100-year 24-hour event will be analyzed as well as the 25-year 72-hour to check for predevelopment versus post development discharge rates (Basins 3H, I, J, K, and L). The basins with positive outfalls will be evaluated pursuant to the predevelopment versus post development discharge rates (Basins M, N, O, P and Q). Both wet detention systems and dry detention systems are proposed for these areas.

There are two basins (R & S) that will be modified and the impervious area within these basins will be decreased. Therefore there are no modifications or additional analysis proposed for these facilities.

Floodplain Storage Criteria

This project does not impact any designated flood zone areas (see Figure 2 – Flood Plain Map).



SOURCE: FLORIDA GEOGRAPHIC DATA LIBRARY, ORANGE COUNTY CORE V2 1999, MAJRDS48.SHP, FEMA9648.

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FEMA MAP
STATE ROAD 408 OOCEA PROJ. NO. 252B
ORANGE COUNTY, FLORIDA

FIGURE 2

Existing Conditions

The existing project is located within five major drainage basins. The first portion of the project is located within a land locked area along Hiawassee Road (Begin project station 1686+54 to station 1712+50). This basin contains good soils and excellent infiltration rates within the proposed pond areas.

The second basin is the Westside Manor Basin (stations 1712+50 – 1823+00). The basin is a land locked system that is pumped to the headwaters of Shingle Creek. The existing stormwater pumps are regulated by Orange County and were recently improved (2 years ±). There is a significant portion of the project that discharges directly to the low area within this basin and another portion of the project that drains to ditches that ultimately discharge into the low area within Westside Manor Basin.

The third basin drains to Lake Mann via various ditches and piping systems (stations 1823+00 – 1906+00). All of the runoff from the expressway outfalls through an existing pipe system that drains to the northeastern shore of Lake Mann.

The fourth basin contains the existing toll plaza that is located on a fill section (station 1906+00 – 1921+00). The runoff from this basin is collected in storm sewers and discharged to Lake Sunset which is a land locked lake located to the south of the expressway.

The fifth basin is a small basin located at the end of the project (station 1921+00 – end of project station 1926+00) which discharges to Clear Lake via a canal system located south of the alignment. There are two existing dry detention ponds that were recently constructed as part of the toll plaza improvements.

The proposed systems will utilize much of the systems that were previously permitted and designed for the existing projects. The beginning (Hiawassee Road to Kirkman Road) and the end of the project (John Young Parkway to Tampa Avenue) have existing pond sites that were designed to accommodate the proposed improvements within these areas. The middle section (Kirkman Road to John Young Parkway) will require pond construction and modifications for stormwater treatment and attenuation (this area has been broken into smaller basins for analysis purposes). A summary of the existing conditions with a brief description of each sub-basin follows. Figures 3 and 4 are the nodal schematic diagrams for the stormwater modeling of the existing systems.

Basin F (Sta. 1685+00 – 1712+50)
(38.4 acres)
This basin accommodates the drainage from Hiawassee Road to Powers Drive and includes the north side of the roadway. The existing pond was designed to accept two additional lanes of pavement (24 feet). However, due to design criteria the median will be fully paved so an additional 8 feet of impervious area will be required due to median constraints. This basin contains a permitted stormwater management facility.

Basin G (Sta. 1712+50 – 1741+00)
(24.91 acres)
This basin accommodates the area from Powers Drive to approximately the beginning of the interchange at Kirkman Road. The pond area was created when the right-of-way for the connection to SR 50 was abandoned for roadway purposes and extended to the east. The pond was designed to accept an additional 24 feet of pavement within the basin. However there is an additional 8 feet width of impervious surface created by the median criteria used in this area. This basin contains a permitted stormwater management facility.

Basin 1H (Sta. 1739+00 – 1741+00)
(0.64 acres)
This is a small area located along the southern side of the basin before the interchange with Kirkman Road. This basin will not be impacted by the proposed improvements to the roadway and will remain in its current condition. This basin contains a permitted stormwater management facility.

Basin 2H (Sta. 1734+00 – 1747+00)
(10.39 acres)
This basin accommodates the southern half of the interchange with Kirkman Road. The existing wet pond retains runoff with an underdrain bleed down to Westside Manor Lake. The existing pond was set up to accommodate two new travel lanes however an additional 8 feet of impervious has been added due to the median treatments. This basin contains a permitted stormwater management facility.

Basin 3H (Sta.1735+00 – 1747+00)
(7.26 acres)
This basin accommodates the northwestern portion of the interchange with Kirkman Road. The pond was designed to accommodate the two new travel lanes. However an additional 8-foot paved median will be added. This basin contains a permitted stormwater management facility.

Basin I (Sta. 1747+00 – 1758+25)
(5.60 acres)
This basin currently receives no stormwater treatment or attenuation prior to discharging to Westside Manor basin. The basin is essentially the northeastern portion of the interchange with Kirkman including the mainline due to the superelevation of the roadway.

Basin J (Sta. 1747+00 – 1758+25)
(2.83 acres)
This basin currently receives no stormwater treatment or attenuation prior to discharging to Westside Manor basin. This basin consists of the southeastern portion of the interchange.

Basin K (Sta. 1758+25 – 178+50)
(6.39 acres)
This basin currently receives no stormwater treatment or attenuation prior to discharging to the Westside Manor Basin. This basin is located from the eastern end of the Kirkman interchange to the bridge over Pine Hills Road. Runoff from this basin drains off of the expressway and directly into the Westside Manor pond.

Basin L (Sta. 178+50 – 1823+00)
(31.19 acres)
This basin currently receives no stormwater treatment or attenuation. The existing basin discharges through two existing culverts. The first area flows through an existing culvert located at station 1790+00 and another culvert (sta. 1805+00) to a wetland area located in the middle of this basin. All of this area discharges via a large ditch to the west and eventually into Westside Manor basin. This is a land locked basin.

Basin M (Sta. 1823+00 – 1835+25)
(5.64 acres)
This basin is the area between Old Winter Garden Road and Ortman Drive. The existing area within this basin is a high fill section due to the location of the two bridges over the existing roads. This area drains east into an inlet that discharges into the Pine Hills Road drainage system eventually discharging into Lake Mann.

Basin N (Sta. 1835+25 – 1868+60)
(23.07 acres)
This basin accommodates the area between the bridge over Pine Hills Road to the bridge over Ferguson Drive. This area drains through existing culverts to the south via ditches and storm sewer into Lake Mann. There is some water quality treatment located within the swales along this section. However there is minimal attenuation of discharges from this basin.

Basin O (Sta. 1868+60 – 1881+00)
(6.63 acres)
This basin accommodates the area between Ferguson Road Bridge and up to the western side of the John Young Parkway interchange. There are some ditch blocks within this area that provide some water quality improvements. However, there is minimal attenuation that occurs within this area.

Basin P (Sta. 1881+00 – 1892+00)
(10.32 acres)
This basin is from the western side of the John Young Parkway interchange to the intersection with John Young Parkway. There is an existing pond that provides for treatment and attenuation of the stormwater runoff in this area under a SFWMD permit. This pond has been designed to accommodate the widening of the expressway. The permit utilized a compensating discharge from the John Young Parkway ponds to offset un-attenuated discharges from the section of roadway between John Young Parkway and Church Street Bridge (Basin Q). This basin drains into a ditch that discharges into Lake Mann.

Basin Q (Sta. 1892+00 – 1906+00)
(8.10 acres)
This basin accommodates the area east of John Young Parkway to the Church Street Bridge. This basin presently has no water quality treatment or attenuation except for the compensating treatment credited within the Basin P pond. This area drains to the west into a ditch that discharges into Lake Mann.

Basin R (Sta. 1906+00 – 1921+00)
(7.31 acres)
This basin accommodates the area between the Church Street Bridge and the beginning of the Tampa Avenue interchange (west side) including the toll plaza area. Runoff from this area is directed to Lake Sunset via drains under the Expressway. There is no water quality or attenuation within this basin.

Basin S (Sta. 1921+00 – 1928+00)
(4.21 acres)
This basin accommodates the area beginning at the west side of the Tampa Avenue interchange to a high point on the Expressway over Tampa Avenue. There are some ponds constructed within the recently completed project that provide for treatment of the new pavement area constructed under that project. These ponds are located within the ramp areas of Tampa Avenue interchange.

The tables below summarize the pre-development hydrology of each basin along the project.

Table 1 – Existing Hydrologic/Hydraulic Permitted Information

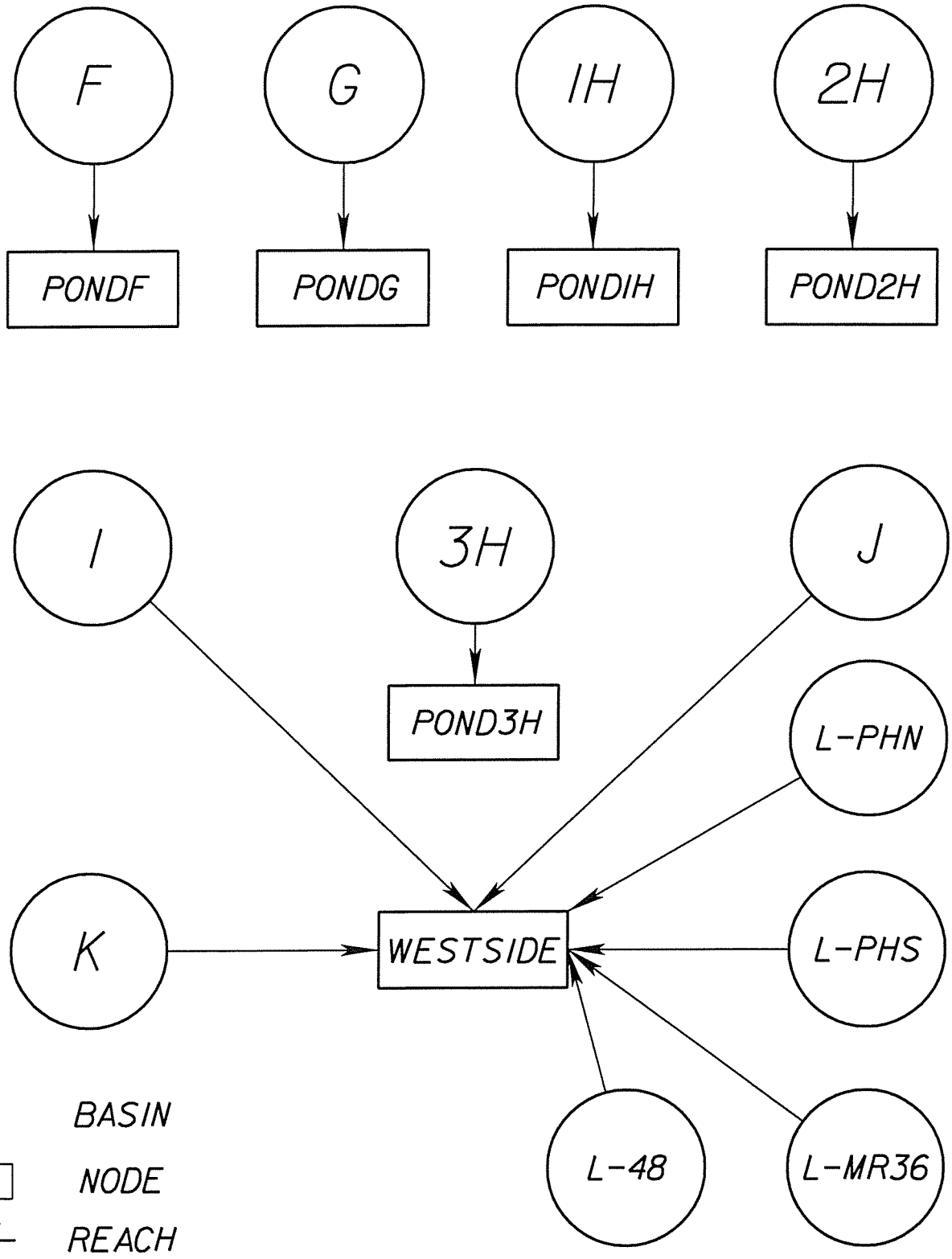
Basin ID	Control Elevation	Peak Stages		Permitted Q25 (cfs)	Permit #
		25-yr 24-hr	100-yr 24-hr		
Basin F	72.5	n/a	77.92	n/a	4-095-0199AGMA
Basin G	92.0	n/a	97.15	n/a	4-095-0199AGMA
Basin 1H	93.0	n/a	94.71	n/a	4-095-0199AGMA
Basin 2H	80.0	n/a	82.78	n/a	4-095-0199AGMA
Basin 3H	81.0	n/a	83.74	n/a	4-095-0199AGMA
Basin P/Q	99.3	101.76	n/a	20.5	48-00859-S
Basin R	n/a	n/a	n/a	n/a	48-00859-S
Basin S	n/a	n/a	n/a	n/a	48-00859-S

* Discharges Directly to Westside Manor Pond
** No Permitted Facilities

Table 2 – Existing Hydrology

Description	Major Basin	Area (acres)	CN	Tc (minutes)	$Q_{pre\ 25\text{-}yr}$ (cfs)
Basin F	1	38.4	60.3	20.8	n/a
Basin G	2	24.91	62.1	20	n/a
Basin 1H	2	0.64	59.5	10	n/a
Basin 2H	2	10.39	74.6	16	n/a
Basin 3H	2	7.26	78.2	15	n/a
Basin I	2	5.60	81.4	57.7	9.16
Basin J	2	2.83	75.3	56.8	4.23
Basin K	2	6.39	83.4	42.3	11.56
Basin L					
L_MR36	2	19.95	70.6	35.6	30.76
L_PHN	2	3.05	68.9	12.1	
L_PHS	2	0.84	71.6	10	
L_48	2	7.35	74.7	15	13.38
West Side Manor		**89.21**			**111.65**
Basin M		**7.32**			
M_North	3	4.47	87.7	23	23.81
M_South	3	0.82	87.2	10	4.10
OFF-M	3	2.04	88	20	To M_North
Basin N					**62.65**
N_NW	3	4.46	77.8	25	15.15
N_NE	3	4.38	73.2	22.1	35.38
N_South	3	11.85	76.9	37.4	62.65
N_ORT	3	2.38	73.9	22.6	8.14
OFF-N1	3	1.25	88.0	25.9	4.51
OFF-N2	3	5.36	88.0	72.0	10.74
Basin O	3	6.63	80.6	26.7	22.51
Lake Mann		**43.63**			**118.14**
Basin P/Q	3	10.32	89.1	41	20.72
Basin Q	3	8.10	92.8	21	To Basin P
Basin R	4	7.31	97.8	15	n/a
Basin S	5	4.21	87.0	10	n/a

Major Basin 1 = Hiawassee
Major Basin 2 = Westside Manor
Major Basin 3 = Lake Mann
Major Basin 4 = Sunset Lake
Major Basin 5 = Clear Lake



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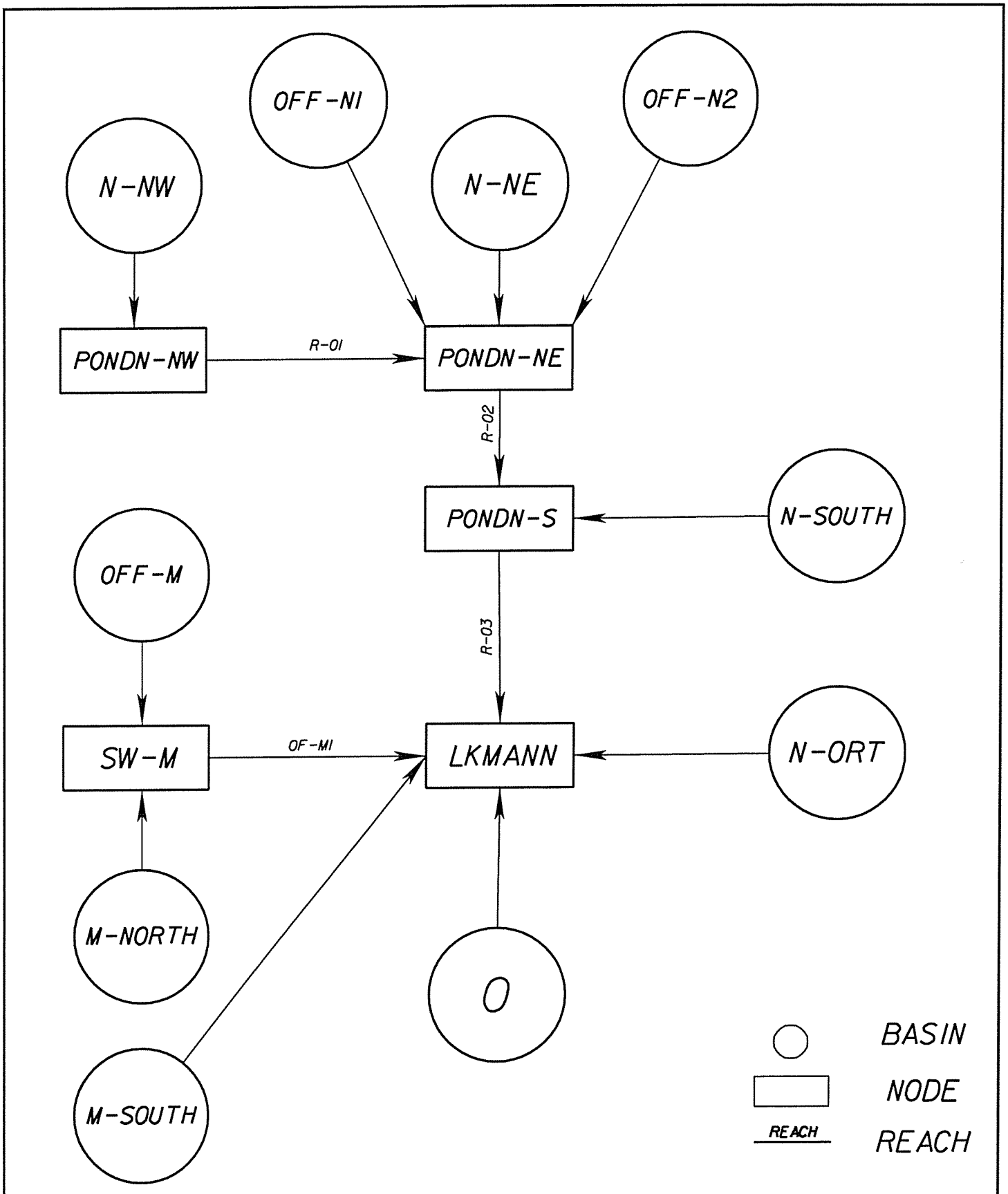
EXPRESSWAY AUTHORITY

PREDEVELOPMENT NODAL DIAGRAM

S.R. 408
WIDENING FROM HIAWASSEE RD. TO TAMPA AVE.
OOCEA PROJECT NO. 252B

FIGURE 3



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PREDEVELOPMENT NODAL DIAGRAM

S.R. 408
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OOCEA PROJECT NO. 252B

FIGURE 4

Proposed Conditions

The proposed stormwater management system will maximize the use of the existing ponds and construct new ponds located to minimize impacts to the surrounding properties and owners. Several different types of ponds will be used to meet the stormwater quality criteria while also providing protection for the proposed improvements and assuring that there are no adverse impacts to surrounding properties.

The overall stormwater management strategy is to maximize treatment within a basin where feasible to compensate for areas where construction of a stormwater facility would adversely impact offsite properties. Based on this type of system, the proposed water management plan has provided for stormwater treatment greater than the new impervious area proposed to meet the intent of the rules. The resulting system will improve overall water quality discharges from the project. This strategy will be applied on a basin-by-basin analysis. In addition, this same strategy will be used for the peak discharge rates to ensure that the receiving waters will not be adversely impacted and that post development discharge rates will not exceed predevelopment rates.

The SFWMD criteria for water quality treatment on public existing roadways are to provide for treatment of 2.5" over the new impervious surfaces proposed (typical roadway widening). The goal of this project was to meet the intent of this rule by treating both existing and proposed impervious surfaces where feasible (compensatory treatment) while allowing some new impervious areas to not receive a quantified treatment. Table 3 summarizes the basins and the treatment provided for by the proposed stormwater management system. From this table it is apparent that the amount of impervious surfaces that will be treated is 1.5 to 2 times the required treatment area.

Table 3 – Water Quality Impervious Surface. Existing versus Proposed

Basins	#	Total Area		Treatment Area			Impervious Area			Impervious Treatment Area		
		Existing	Proposed	Existing	Proposed	Difference	Existing	Proposed	Difference	Existing	Proposed	Difference
F	1	38.4	38.4	38.4	38.4	0.0	12.9	14.2	1.2	12.9	14.2	1.2
G	2	24.9	24.9	24.9	24.9	0.0	7.7	8.8	1.1	7.7	8.8	1.1
1H	2	0.6	0.6	0.6	0.6	0.0	0.2	0.2	0.0	0.2	0.2	0.0
2H	2	10.4	9.5	10.4	9.5	-0.9	2.7	2.6	-0.1	2.7	2.6	-0.1
3H	2	7.3	7.6	7.3	7.6	0.3	1.7	2.1	0.3	1.7	2.1	0.3
I	2	5.6	5.3	0.0	5.3	5.3	3.1	3.5	0.4	0.0	3.5	3.5
J	2	2.8	2.5	0.0	0.0	0.0	1.1	1.0	-0.1	0.0	0.0	0.0
K	2	6.4	7.2	0.0	0.0	0.0	3.9	7.2	3.3	0.0	0.0	0.0
L	2	31.2	31.1	0.0	28.3	28.3	8.8	22.8	14	0.0	21.9	21.9
Subtotal	**2**	**89.2**	**88.7**	**43.2**	**76.2**	**33**	**29.2**	**48.1**	**19**	**12.3**	**39.**	**26.7**
M	3	5.3	5.3	0.0	0.0	0.0	2.2	3.7	1.5	0.0	0.0	0.0
N	3	23.1	23.4	0.0	15.8	15.8	9.4	13.4	4.0	0.0	9.0	9.0
O	3	6.6	6.6	0.0	6.6	6.6	3.5	4.8	1.2	0.0	4.8	4.8
P	3	10.3	10.3	10.3	10.3	0.0	3.7	4.3	0.6	4.3	4.3	0.0
Q	3	8.1	8.1	0.0	0.0	0.0	5.8	6.0	0.3	5.8	5.8	0
Subtotal	**3**	**53.4**	**53.8**	**10.3**	**32.8**	**22.5**	**24.6**	**32.2**	**7.6**	**10.1**	**23.8**	**13.7**
R	4	7.3	7.3	0.0	0.0	0.0	7.2	4.9	-2.3	0.0	0.0	0.0
S	5	4.2	4.2	4.2	4.2	0.0	1.6	1.2	-0.4	1.6	1.2	-0.4
Totals		**192.5**	**192.4**	**96.1**	**151.6**	**55.5**	**75.6**	**100.6**	**25.1**	**37.0**	**78.2**	**41.3**

C.93

Table 3A – Water Quality Comparison

Basins	#	New Impervious Area (ac.)	Treatment Required (ac-ft)	Treatment Provided (ac-ft)
F	1	1.2	.26	.26
G	2	1.1	.23	.23
1H	2	0.0	0.00	0.00
2H	2	(0.1)	0.00	0.00
3H	2	0.3	0.07	0.07
I	2	0.4	0.09	0.73
J	2	(0.1)	0.00	0.00
K	2	3.3	0.68	0.00
L	2	14.0	2.92	4.56
Subtotal	**2**	19.0	3.99	5.59
M	3	1.5	0.31	0.00
N	3	4.0	0.83	1.86
O	3	1.2	0.26	0.99
P	3	0.6	0.13	0.00
Q	3	0.3	0.05	0.00
Subtotal	**3**	7.6	1.58	2.85
R	4	(2.3)	0.00	0.00
S	5	(0.4)	0.00	0.00
Totals		25.1	5.83	8.70

3H, M-North & P do not match calculations.

Table 4 – Existing versus Post Development Discharge Rates (25-year)

Basin	Qexist cfs	Qpost cfs
Basin F	0	0
Basin G	0	0
Basin H1	0	0
Basin H2	0	0
Westside Manor	111.65	63.76
Lake Mann	118.28	117.59
Basin P/Q	20.72	20.17

The proposed stormwater treatment system will be designed as if the medians are being fully paved. Figures 5 and 6 contain the nodal diagram for the stormwater modeling for the proposed water management plan.

The following is a summary by basin of the anticipated stormwater management improvements:

Basin F .....Utilize Existing Pond
Basin G.....Utilize Existing Pond
Basin 1H.....Utilize Existing Pond
Basin 2H.....Utilize Existing Pond. Decrease in drainage area
Basin 3H.....Deepen/Enlarge Pond. Increase peak stages
.....Combine Basins H3 and I for treatment
Basin J.....No Changes existing system
Basin K.....Swales both side of roadway
Basin L.....New Pond Adjacent to Toll Plaza
Basin M.....New swale north Side Existing R/W
Basin N .....New swales both sides of Roadway
Basin O.....New Pond south side of Roadway
Basin P .....Existing Pond
Basin Q.....Compensate for discharge Basin P (per previous permit)
Basin R.....Decrease in impervious area (no pond required)
Basin S .....Decrease in impervious area (existing pond ok)

Basin F (Sta. 1685+00 – 1712+50)
(38.40 acres)
The existing pond within this basin will be used to accommodate the additional runoff. The pond was originally sized to include two new lanes so the only additional runoff will be from the 8 foot paved median. Based on the analysis of this additional impervious area there is only a minor change in the peak stage. The resulting peak stage is 1.98 feet below top of the pond berm.

Basin G (Sta. 1712+50 – 1741+00)
(24.91 acres)
The existing pond within this basin will be used to accommodate the additional runoff. The pond was originally sized to include two new lanes so the only additional runoff will be from the 8' paved median. Based on the analysis of this additional impervious area there is only a minor change in the peak stage. The peak stage is 3.75 feet from the top of the pond berm.

Basin 1H (Sta. 1739+00 – 1741+00)
(0.64 acres)
There is no change in the existing basin. Therefore no modifications are proposed within this basin.

Basin 2H (Sta. 1734+00 – 1747+00)
(9.49 acres)
The existing pond will accommodate the runoff. The existing basin was decreased in size resulting in lower post development stage.

Basin 3H (Sta.1735+00 – 1747+00), Basin I (Sta. 1747+00 – 1758+25)
(12.89 acres)
This basin and pond 3H will be revised significantly. The pond will be expanded by excavating the existing bottom and changing it to a wet detention system with a bleed down orifice to the Westside Manor pond. Basin I will be drained to this pond to provide for stormwater quality treatment and attenuation of volumes so that the existing pumping system within Westside Manor pond will not receive any greater volumes during the design storm than it receives now during major storm events. An orifice sufficient to recover water quality volumes will be the major discharge for this pond once the modifications to the existing system have been made. In order to model this system, the entire Expressway system of Basin L was also considered as part of this model to analyze the volumes discharged into Westside Manor Pond for existing and proposed conditions. Both of the existing and proposed models are located within Appendix C. The results of this model are summarized in Table 5. The model shows less volumes flowing to Westside Manor Pond during the peak runoff time, hour 24 and hour 36 for the existing versus the proposed systems. This is a conservative model that does not account for any infiltration that would occur at the pond sites. The Westside manor pond operates on an automatic float system with two pumps. Pump number 1 turns on at elevation 76.4 and back off at 74.9 while pump number 2 turns on at elevation 76.9 and off at 74.9 (elevations NGVD).

Table 5 – Westside Manor Runoff Volume from Expressway During 100-yr 24-hr Storm

Time	Existing Runoff Volume ac-ft	Proposed Runoff Volume ac-ft	Δ Volume ac-ft
0	0.0	0.0	0
12	19.65	11.14	(8.51)
24	26.34	21.65	(4.69)
36	27.45	26.13	(1.32)
48	27.69	28.60	0.91
72	27.81	31.84	4.03

Basin J (Sta. 1747+00 – 1758+25)
(2.54 acres)
The actual basin is decreased in area and impervious surface from existing conditions by the proposed improvements. Due to these types of modifications no stormwater improvements are proposed for this basin.

Basin K (Sta. 1758+25 – 178+50)
(7.15 acres)
This area will be modified and additional travel lanes will be constructed. However, no new stormwater treatment is proposed. The new impervious area will be compensated by diverting existing areas to the ponds 3H and L to compensate for the proposed improvements. There will be some secondary system improvements that will provide some additional best management practices so that some treatment will occur prior to discharging to the Westside Manor Pond. The existing

system sheet flows off the roadway and virtually directly into Westside Manor Pond. The proposed system will use dry swales to collect the runoff that will provide some treatment (not quantified) prior to discharging to Westside Manor Pond.

Basin L (Sta. 178+50 – 1823+00)
(31.12 acres)
This basin will contain the proposed relocated toll facility and associated additional lanes. In order to effectively treat this area, a pond site is proposed adjacent to the proposed toll facility. This site will provide for water quality and attenuation of volumes prior to discharging into the Westside Manor pond via an existing ditch system. The pond will provide for the difference in predevelopment versus post development volume for Basin L and bleed this volume down to the Westside Manor pond so that the existing pumping system will not be adversely impacted. The design incorporates an orifice for bleed down of water quality volume and a weir set at the 100-year 24-hour Pre vs. Post runoff volume. In addition, the post development peak discharge rate for the 25-year storm will not exceed the existing discharge rate for this event.

Basin M (Sta. 1823+00 – 1835+25)
(7.32 acres)
This basin will use a widened swale area along the north side in addition to right-of-way that was originally purchased as a remainder parcel from the original design (northwesterly corner of the intersection of the Expressway and Ortman Drive). This area remainder is in the northeastern part of this basin. The outfall will remain to the Pine Hills Road drainage system.

Basin N (Sta. 1835+25 – 1868+60)
(23.42)
For this basin it is proposed to convert a major portion of the existing swale system into a dry detention system. Utilizing the existing right-of-way through this portion of the roadway the required water quality and attenuation volumes can be achieved within the existing right-of-way before discharging offsite. There are offsite areas that discharge to the existing system. These areas will have to be accommodated to ensure that there are no offsite adverse impacts.

Basin O (Sta. 1868+60 – 1881+00)
(6.63 acres)
Proposed within this basin is a pond site that is located within a piece of property that was left over from the original design (remnant parcel). This pond area is located on the south side of the alignment and will outfall to an existing ditch system to Lake Mann. All of the stormwater treatment and attenuation will be accomplished within this pond for the entire basin.

Basin P (Sta. 1881+00 – 1892+00)
(10.32 acres)
The existing pond within this section of roadway will accomplish the required water quality and attenuation for the proposed improvements within this basin.

Basin Q (Sta. 1892+00 – 1906+00)
(8.10 acres)
This basin presently discharges to Lake Mann without any treatment or attenuation. The proposed system will provide for compensating attenuation within Basin P. This will be provided by decreasing the weir length in the existing structure to reduce peak discharges compensating for the slight increase in impervious area within this basin.

Basin R (Sta. 1906+00 – 1921+00)
(7.31 acres)
This basin will have the existing impervious area reduced by a significant amount due to the relocation of the toll plaza. By providing grassed swale areas before discharging offsite the net runoff volume to Lake Sunset will be reduced while also providing water quality enhancements prior to this discharge (pre-runoff volume = 7.31 ac-ft --- post runoff volume = 5.81 ac-ft).

Basin S (Sta. 1921+00 – 1928+00)
(4.21 acres)
Due to the reconfigured toll plaza the net impervious area within this basin will be reduced therefore reducing the water quality and attenuation requirements. The existing ponds will function as they do presently within the existing design except the total impervious area to the pond has been reduced. The CN value for these existing ponds will be decreased from 87 to 85.3 and the areas will be essentially the same. Therefore the existing ponds should provide more treatment than the existing systems.

Table 6 – Peak Stage. Existing vs. Proposed

Basin ID Pre/Post	#	Existing Peak Stages		Proposed Peak Stages	
		25-year	100-year	25-year	100-year
Basin F	1	78.04	77.92	78.28	78.16
Basin G	2	97.25	97.15	97.51	97.41
Basin 1H	2	94.76	94.71	94.76	94.71
Basin 2H	2	82.84	82.78	82.68	82.63
Basin 3H	2	83.80	83.74	82.42	82.76
Basin I	2	n/a	n/a	n/a	n/a
Basin J	2	n/a	n/a	n/a	n/a
Basin K	2	n/a	n/a	n/a	n/a
Basin L	2				
L_MR36	2	n/a	n/a	91.02	91.45
L_PHN	2	n/a	n/a	n/a	n/a
L_PHS	2	n/a	n/a	n/a	n/a
L_48	2	n/a	n/a	88.31	88.19
Basin M	3				
SW-M/ M_North	3	98.49	n/a	98.40	n/a
M_South	3	n/a	n/a	n/a	n/a
OFF-M	3	n/a	n/a	n/a	n/a
Basin N	3				
N_NW	3	94.79	n/a	99.03	n/a
N_NE	3	94.70	n/a	95.91	n/a
N-South/N_SW	3	94.66	n/a	97.36	n/a
N-South/ N-9C	3	94.66	n/a	95.85	n/a
N-South/N_SE	3	94.66	n/a	98.06	n/a
N_ORT	3	n/a	n/a	n/a	n/a
Basin O	3	n/a	n/a	101.19	n/a
Basin P/Q	3	101.76	n/a	101.85	n/a
Basin R	4	n/a	n/a	n/a	n/a
Basin S	5	n/a	n/a	n/a	n/a

Table 7 – Post Development Hydrology

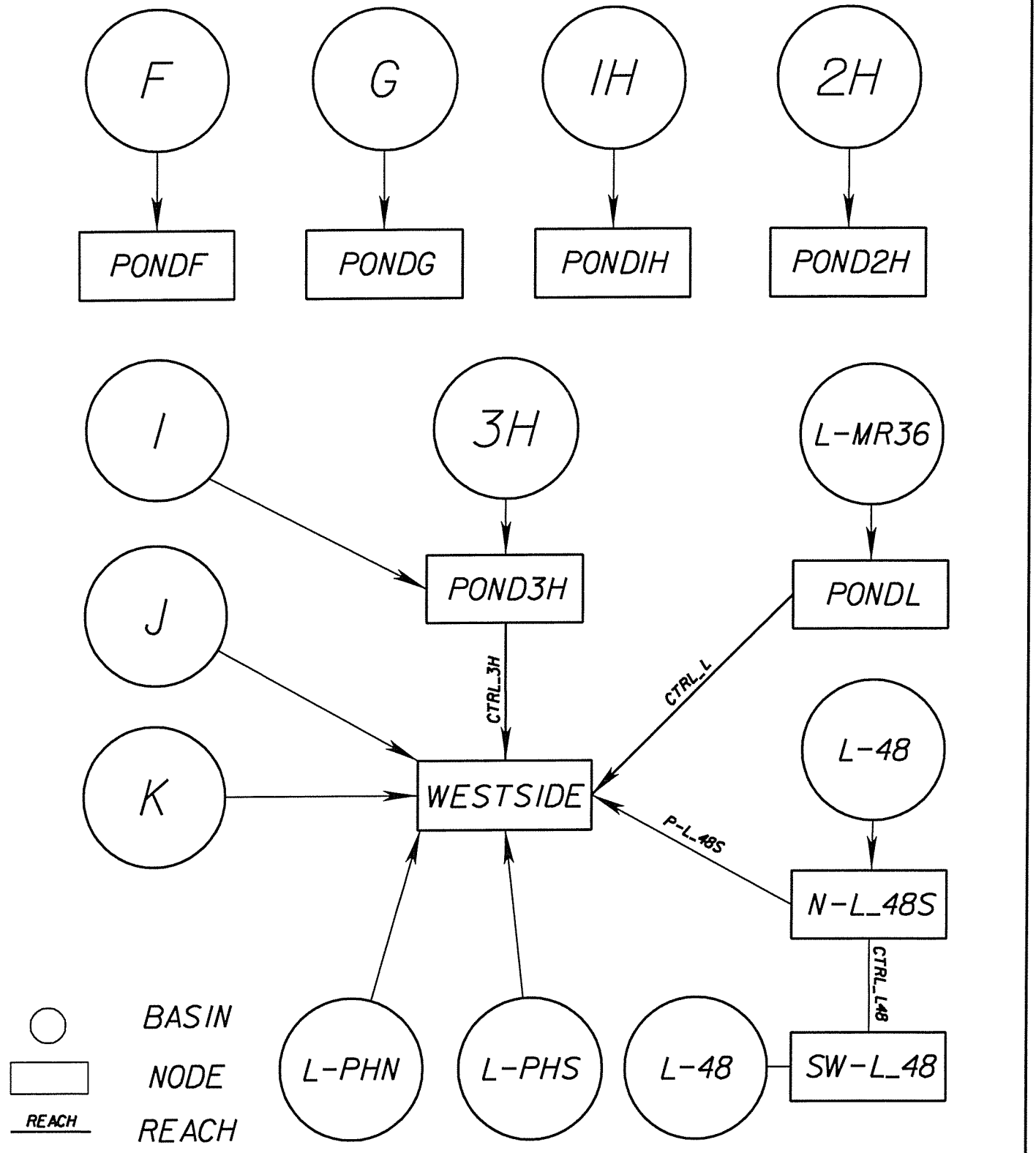
Basin ID	#	Area (acres)	CN	Tc (min.)
Basin F	1	38.40	62.2	20.8
Basin G	2	24.91	64.5	20.0
Basin 1H	2	0.64	59.5	10.0
Basin 2H	2	9.49	76.5	16.0
Basin 3H	2	7.59	79.6	15.0
Basin I	2	5.30	85.4	57.7
Basin J	2	2.54	75.4	56.8
Basin K	2	7.15	98	10
Basin L	2			
L_MR36	2	25.97	94.9	16.8
L_PHN	2	1.63	68.3	12.6
L_PHS	2	0.60	73.3	10
L_48	2	2.3	72.1	10
L_48S	2	0.62	80.1	10
Basin M	3			
M_North	3	4.53	91.8	10
M_South	3	0.75	98	10
OFF-M	3	2.04	88	20
Basin N	3			
N_NW	3	6.21	82.6	19
N_NE	3	4.66	83.9	23
N_SW	3	2.70	81.7	10
N_South	3	1.29	80.5	39
N_SE	3	6.91	81.4	10
N_ORT	3	1.65	80.5	10
Basin O	3	6.63	87.5	10
Basin P	3	10.32	89.1	41
Basin Q	3	8.10	93.4	21
Basin R	4	7.31	92.1	15
Basin S	5	4.21	85.3	10

Table 8 – Predevelopment versus Post Development Discharge Rates 25-year

Description	#	Qpre (cfs)	Qpost (cfs)
Basin F	1	0	0
Basin G	2	0	0
Basin 1H	2	0	0
Basin 2H	2	0	0
Basin 3H	2	0	0.63
Basin I	2	9.16	To 3H
Basin J	2	4.23	n/a
Basin K	2	11.56	n/a
Basin L	2		
L_MR36	2	30.76	8.50
L_PHN	2	12.33	6.47
L_PHS	2	3.68	2.68
L_48	2	13.38	10.63
West Side Manor	**2**	**113.38**	**63.78**
Basin M	**3**		22.24
M_North	3	23.81	21.30
M_South	3	4.10	3.87
OFF-M	3	To M_North	
Basin N	3		
N_NW	3	15.15	16.57
N_NE	3	37.71	43.74
N_South	3	66.04	66.63
N-SW	3	n/a	7.73
N-SE	3	n/a	13.47
N_ORT	3	8.14	7.89
OFF-N1	3	4.51	4.51
OFF-N2	3	10.74	10.74
Basin O	3	22.51	18.79
Lake Mann	**3**	**118.28**	**117.59**
Basin P/Q	3	20.72	20.17
Basin R	4	n/a	< impervious
Basin S	5	n/a	< impervious

Table 9 – Water Quality Volumes

Basin ID	#	Water Quality (ac-ft)	Bleed-Down Device (cfs)
Basin F	1		No Discharge
Basin G	2		No Discharge
Basin 1H	2		No Discharge
Basin 2H	2		No Discharge
Basin 3H & I	2	1.16	3.8" –Diam. Orifice
Basin K	2	0.0	
Basin L	2		
L_MR36	2	4.42	6.4" Diam. Orifice
L_PHN	2	0	
L_PHS	2	0	
L_48	2	0.24	2" Slot
Basin M	3		
M_NORTH	3	0.27	2" Slot (BMP no credit)
M_South	3	0	
Basin N	3		
N_NW	3	0.76	2.8" Diam. Orifice
N_NE	3	0	
N_SW	3	0.31	2.8" Diam. Orifice
N_South	3	0	
N_SE	3	0.79	2.8" Diam. Orifice
N_ORT	3	0	
Basin O	3	0.99	2.8" Diam. Orifice
Basin P/Q	3		Existing Permit
Basin R	4		Decrease Impervious Area
Basin S	5		Decrease Impervious Area



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EXPRESSWAY AUTHORITY

POST DEVELOPMENT NODAL DIAGRAM

S.R. 408
WIDENING FROM HIAWASSEE RD. TO TAMPA AVE.
OOCEA PROJECT NO. 252B

FIGURE 5

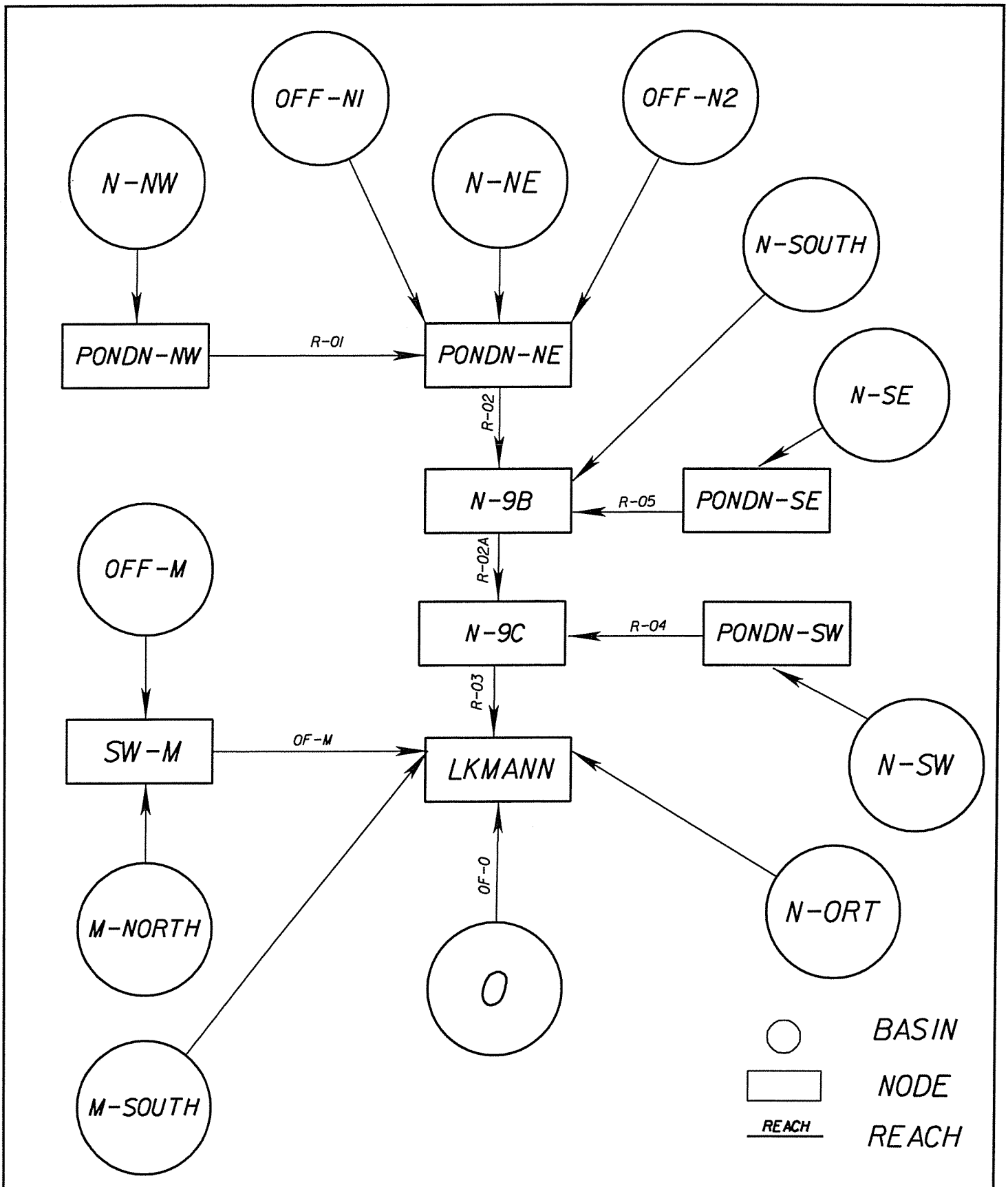

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FIGURE 6

Culverts

There are five major culverts located along this section of the Expressway. All of these culverts serve both the existing roadway and various offsite areas. Three of these culverts will be modified or extended and two will remain in their existing configuration.

Existing Structure # 61 (Sta. 1758+40)
This is an existing 10x10 box culvert that discharges to the Westside Manor basin. This culvert drains a large area north of the expressway including areas north of State Road 50. Based on the proposed plan no modifications will be made to this existing culvert and there is no historical problem at this location, therefore no additional analysis is proposed.

L-12 (Sta. 1787+60)
This is an existing 42-inch RCP that crosses the expressway and extends south approximately 400 feet (48-inch RCP at south R/W line) to an existing ditch that flows west to the Westside Manor Basin. This culvert will be used to maintain any offsite flows under the Expressway and an inlet has been added to the north side to improve the maintenance conditions. Appropriate calculations are contained in Appendix D.

Existing Structure #70, OS-1 through OS-5, (Sta. 1804+90)
The existing culvert is a double elliptical 24x38 RCP pipe that has a damaged headwall on the northern side of the roadway. This pipe accommodates both onsite and offsite areas from the north side to the south into an existing wetland system. This pipe will be replaced to accommodate the lane configuration for the new toll plaza. The proposed system is a series of inlets (OS-xx) used to collect offsite areas and discharge south of the expressway into the existing wetland area. Calculations for this system are included in Appendix D.

N-9A (Sta. 1851+50)
This is an existing double 7x3 concrete box culvert. This culvert handles both onsite and offsite areas but discharges to a 54" RCP pipe that flows into Lake Mann. Due to the configuration of the Mercy Drive off-ramp and the toll plaza configuration associated with this ramp, this culvert will be extended north under the proposed pavement. In addition the culvert will be extended to the south to meet clear zone requirements. The proposed improvements have been modeled including onsite and offsite areas to develop the proposed conditions. Based on this analysis there will not be any adverse offsite impacts associated with the proposed extensions (see Appendix D).

Existing Structure #116 (Sta. 1875+40)
This is an existing double 9x3 concrete box culvert that discharges to the south and drains a wetland area to the north of the alignment. There will be no modifications to this culvert based on the proposed improvements. There are no historical problems associated with this structure, therefore no further analysis is warranted.

Appendix B – Post Development Hydrology

Post Development Hydrology

BASIN F (Existing Pond F System From PEC Calcs.)

Comments: Areas assume 6 lane typical section. Pond design for 100yr/24hr event
Shared retention pond w/Hiawassee Rd. (from PEC calcs.)
24' (two lanes) of future impervious already included in existing calculations
21' of additional impervious area added

Area 38.40 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Expressway				
Impervious (pavement)		8.29	98	812.42
Pervious (Open/grass)	A	14.67	39	572.13
Pond area (dry)	A	3.00	39	117.00
Hiawassee Rd				
Impervious (pavement)		5.88	98	576.24
Pervious (Open/grass)	A	3.26	39	127.14
Offsite				
La Jolla St. & add. Residential	A	3.30	56	184.80
TOTAL		38.40		2389.73
			Weighted CN =	62.2

Time of Concentration

From PEC Calculations using Kirpich Equation
Tc= 20.8 min

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
72.5	124300.0	2.85	0.00	0.00
73.0	127177.0	2.92	1.44	1.44
73.5	130055.0	2.99	1.48	2.92
74.0	132932.0	3.05	1.51	4.43
74.5	135809.0	3.12	1.54	5.97
75.0	138686.0	3.18	1.58	7.55
75.5	141564.0	3.25	1.61	9.16
76.0	144441.0	3.32	1.64	10.80
76.5	147318.0	3.38	1.67	12.47
77.0	150196.0	3.45	1.71	14.18
77.5	153073.0	3.51	1.74	15.92
78.0	155950.0	3.58	1.77	17.69
80.0	178596.0	4.10	7.68	25.37

BASIN G (Existing Pond G System From PEC Calcs.)

Comments: Areas assume 6 lane typical section. Pond design for 100yr/24hr event
24' (two lanes) of future impervious already included in existing calculations
21' of additional impervious area added

Area 24.91 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (pavement)		8.79	98	861.42
Pervious (Open/grass)	A	11.12	45	500.40
Pond area (dry)	A	5.00	49	245.00
TOTAL		24.91		1606.82
			Weighted CN =	64.5

Time of Concentration

From PEC Calculations using Kirpich Equation
Tc= 20.0 min

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
92.0	83225.0	1.91	0.00	0.00
92.5	86460.9	1.98	0.97	0.97
93.0	89696.9	2.06	1.01	1.98
93.5	92932.8	2.13	1.05	3.03
94.0	96168.8	2.21	1.09	4.12
94.5	99404.7	2.28	1.12	5.24
95.0	102640.6	2.36	1.16	6.40
95.5	105876.5	2.43	1.20	7.60
96.0	109112.5	2.50	1.23	8.83
96.5	112348.4	2.58	1.27	10.10
97.0	115584.4	2.65	1.31	11.41
97.5	118820.3	2.73	1.35	12.76
98.0	122056.3	2.80	1.38	14.14
98.5	125292.2	2.88	1.42	15.56
99.0	128528.1	2.95	1.46	17.01
99.5	131764.1	3.02	1.49	18.51
100.0	135000.0	3.10	1.53	20.04

BASIN 1H (Existing Pond H System From PEC Calcs.)

Comments: Pond design for 100yr/24hr event

Area 0.64 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (pavement)		0.17	98	16.66
Pervious (offsite 1/4 acre homes)	B/D	0.14	61	8.54
Pond area (dry)	A	0.33	39	12.87
TOTAL		0.64		38.07
			Weighted CN =	59.5

Time of Concentration

From PEC Calculations using Kirpich Equation

Tc= 10.0 min

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
93.0	6042.0	0.14	0.00	0.00
93.5	6687.8	0.15	0.07	0.07
94.0	7333.5	0.17	0.08	0.15
94.5	7979.3	0.18	0.09	0.24
95.0	8625.0	0.20	0.10	0.34
95.5	9270.8	0.21	0.10	0.44
96.0	9916.5	0.23	0.11	0.55

BASIN 2H (Existing Pond H System From PEC Calcs.)

Comments: Pond design for 100yr/24hr event

Addition of paved lanes and median to impervious area. Some imp. area moved to Basin I

Area 9.49 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (pavement)		2.62	98	256.76
Pervious (open/grass)	A	1.90	49	93.10
Pervious (offsite 1/4 acre homes)	B/D	1.50	61	91.50
Pond area (dry)	B/D	3.47	82	284.54
TOTAL		9.49		725.90
			Weighted CN =	76.5

Time of Concentration

From PEC Calculations using Kirpich Equation

Tc= 16.0 min

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
80.0	95500.0	2.19	0.00	0.00
80.5	97208.3	2.23	1.11	1.11
81.0	98916.7	2.27	1.13	2.23
81.5	100625.0	2.31	1.15	3.38
82.0	102333.3	2.35	1.16	4.54
82.5	104041.7	2.39	1.18	5.73
83.0	105750.0	2.43	1.20	6.93

Post Development Hydrology

BASIN 3H (Existing Pond 3H System From PEC Calcs.)

Comments: Pond design for 100yr/24hr event
Addition of paved lanes and median to impervious area

Area 7.59 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (pavement)		2.07	98	202.86
Pervious	B/D	4.07	63	256.41
Pond area	B/D	1.45	100	145.00
TOTAL		7.59		604.27
			Weighted CN =	79.6

Time of Concentration

From PEC Calculations using Kirpich Equation
Tc= 15.0 min

Water Quality Volume

1-inch over basin

Basin 3H	0.63 ac-ft
Basin I	0.44 ac-ft
Total	1.07 ac-ft

2.5" over the impervious area

Basin 3H	0.43 ac-ft
Basin I	0.73 ac-ft
Total	1.16 ac-ft

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
77.0		1.15	0.00	0.00
78.0		1.24	1.20	1.20
79.0		1.34	1.29	2.49
80.0		1.45	1.40	3.88
81.0	72125.0	1.66	1.55	5.43
81.5	73382.0	1.68	0.84	6.27
82.0	74639.0	1.71	0.85	7.12
82.5	75896.0	1.74	0.86	7.98
83.0	77153.0	1.77	0.88	8.86
83.5	78410.0	1.80	0.89	9.75
84.0	79667.0	1.83	0.91	10.66
84.5	80924.0	1.86	0.92	11.58
85.0	82181.0	1.89	0.94	12.52

Orifice Drawdown Calculations

Proposed Requirement:
1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event
Q = CA(2gh)^0.5
where:

Orifice Invert =	77.00	Pond Bottom EL. =	77.00
C =	0.60	Treatment Vol.(ac-ft) =	1.16
Diameter (in) =	3.80	Treatment Vol. EL. =	77.97
No. of orifices =	1	1/2 Treatment Vol. EL. =	77.49

First 1/2 treatment volume avg. depth:	h (ft) =	0.57
Average flow rate to bleed in 24 hours:	Q (cfs)=	0.29
Orifice Diameter:	Dia. (in)=	3.841

BASIN I (To Pond 3H in proposed system)

Comment: Kirkman Bridge to Box Culvert.
Some additional imp. area from Pre Basin 2H. Lost some imp. area to Basin K

Area 5.30 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (roadway)		3.49	98	342.02
Open/grass (median)	B/D	1.81	61	110.41
TOTAL		5.30		452.43
			Weighted CN =	85.4

Time of Concentration

SHEET FLOW

Length (ft)=	300		
n=	0.15		
Slope (ft/ft)=	0.0017		
Intensity=	4.8		
Time of conc. (hr)=	0.861	**SUBTOTAL =**	**0.86**

CONCENTRATED FLOW

Length (ft)=	700		
Slope (ft/ft)=	0.0143		
Paved or Unpaved=	Unpaved		
Velocity (ft/s)=	1.93		
Time of conc. (hr)=	0.101	**SUBTOTAL =**	**0.10**
		TOTAL Tc (hr) =	**0.96**
		TOTAL Tc (min) =	**57.7**

Water Quality Volume

1-inch over basin	0.44 ac-ft
2.5" over the impervious area	0.73 ac-ft

BASIN J

Comment: Kirkman Bridge to Box Culvert Eastbound Ramp

Area 2.54 ac
Soils

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (roadway)		0.99	98	97.02
Open/grass (median)	B/D	1.55	61	94.55
TOTAL		2.54		191.57
			Weighted CN =	75.4

Time of Concentration

SHEET FLOW

Length (ft)=	300	
n=	0.15	
Slope (ft/ft)=	0.0017	
Intensity=	4.8	
Time of conc. (hr)=	0.861	**SUBTOTAL = 0.86**

CONCENTRATED FLOW

Length (ft)=	500	
Slope (ft/ft)=	0.01	
Paved or Unpaved=	Unpaved	
Velocity (ft/s)=	1.61	
Time of conc. (hr)=	0.086	**SUBTOTAL = 0.09**
		TOTAL Tc (hr) = 0.95
		TOTAL Tc (min) = 56.8

BASIN K

Comment: Box Culvert to Pine Hills Bridge
Additional imp. area from Pre Basin I

Area 7.15 ac
Soils N/A

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious (roadway)		7.15	98	700.70
Open/grass (median)	B/D	0.00	61	0.00
TOTAL		7.15		700.70
			Weighted CN =	98.0

Time of Concentration

Use minimum Tc=10 min.

Post Development Hydrology

BASIN L

Comment: Proposed Toll Plaza Area
Pine Hills Bridge to Winter Garden Bridge

Sub-Basin L_MR36

Area 25.97 ac

Soils Type B/D

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		21.20	98	2077.60
Open/grass	B/D	2.30	61	140.30
Pond Surface		2.47	100	247.00
TOTAL		25.97		2464.90
			Weighted CN =	94.9

Time of Concentration

Tc=16.8 min. (see storm tabs)

Water Quality Volume

1-inch over basin	2.16 ac-ft
2.5" over the impervious area	4.42 ac-ft

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
86.0	107448.0	2.47	0.00	0.00
87.0	113652.0	2.61	2.54	2.54
88.0	119956.0	2.75	2.68	5.22
89.0	126360.0	2.90	2.83	8.05
90.0	132858.0	3.05	2.98	11.02
91.0	139392.0	3.20	3.13	14.15
92.0	154202.0	3.54	3.37	17.52
93.0	172498.0	3.96	3.75	21.27

Orifice Drawdown Calculations

Proposed Requirement:
1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event
$Q = CA(2gh)^{0.5}$
where:

Orifice Invert =	86.00	Pond Bottom EL. =	86.00
C =	0.60	Treatment Vol.(ac-ft) =	4.42
Diameter (in) =	6.40	Treatment Vol. EL. =	87.72
No. of orifices =	1	1/2 Treatment Vol. EL. =	86.94
First 1/2 treatment volume avg. depth:		h (ft) =	1.06
Average flow rate to bleed in 24 hours:		Q (cfs)=	1.11
Orifice Diameter:		Dia. (in)=	6.420

Post Development Hydrology

Sub-Basin L_PHN
Area 1.63 ac
Soils Type B/D

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.32	98	31.36
Open/grass	B/D	1.31	61	79.91
TOTAL		1.63		111.27
			Weighted CN =	68.3

Time of Concentration
Use Tc=12.6 min. (see pre-development)

Sub-Basin L_PHS
Area 0.60 ac
Soils Type B/D

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.20	98	19.60
Open/grass	B/D	0.40	61	24.40
TOTAL		0.60		44.00
			Weighted CN =	73.3

Time of Concentration
Use minimum Tc=10 min.

Sub-Basin L_48
Area 2.30 ac
Soils Type B/D

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.69	98	67.62
Open/grass	B/D	1.61	61	98.21
TOTAL		2.30		165.83
			Weighted CN =	72.1

Time of Concentration
Use minimum Tc=10 min.

Water Quality Volume

1-inch over basin	0.19 ac-ft
2.5" over the impervious area	0.14 ac-ft

Stage Storage Conditions
Swale provides 0.50 ac-ft of storage between el. 87.50 and el. 88.50

Drawdown Calculations
Use minimum slot width of 2 in.

Sub-Basin L_48S
Area 0.62 ac
Soils Type B/D

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.32	98	31.36
Open/grass	B/D	0.30	61	18.30
TOTAL		0.62		49.66
			Weighted CN =	80.1

Time of Concentration
Use minimum Tc=10 min.

BASIN M

Comment: Winter Garden Bridge to Ortman Bridge

Sub-basin M_North

Area 4.53 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		2.96	98	290.08
Open/grass	B/D	1.57	80	125.60
TOTAL		4.53		415.68
			Weighted CN =	91.8

Time of Concentration

Use Minimum of 10 min.

Water Quality Volume (Required)

1-inch over basin (includes offsite)	0.55 ac-ft
2.5" over the impervious area	0.62 ac-ft

Water Quality Volume (Provided)

1/2-inch over basin(includes offsite)	0.27 ac-ft

Stage Storage Conditions

Swale provides 0.51 ac-ft of storage between el. 96.00 and el. 98.00

Drawdown Calculations

Use minimum slot width of 2 in. (SFWMD)

Sub-basin M_South

Area 0.75 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.75	98	73.50
Open/grass	B/D	0.00	80	0.00
TOTAL		0.75		73.50
			Weighted CN =	98.0

Time of Concentration

Use Minimum of 10 min.

Sub-basin OFF-M

Area 2.04 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Industrial	B/D	2.04	88	179.52
Open/grass	B/D	0.00	80	0.00
TOTAL		2.04		179.52
			Weighted CN =	88.0

Time of Concentration

Tc=20 min.

BASIN N

Comment: Ortman Bridge to Ferguson Bridge

Sub-basin N_NW

Area 6.21 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		3.63	98	355.74
Open/grass	B/D	2.58	61	157.38
TOTAL		6.21		513.12
			Weighted CN =	82.6

Time of Concentration

Use Minimum of 10 minutes

400 ft swale @ 0.75 ft/s TC = 19 min

Water Quality Volume

1-inch over basin 0.52 ac-ft

2.5" over the impervious area 0.76 ac-ft

Stage-Storage Conditions

Swale storage on north side of aligment-Dry storage

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
96.00		0.19	0.00	0.00
97.00		0.51	0.35	0.35
98.00		0.81	0.66	1.01
99.00		1.10	0.96	1.97

Orifice Drawdown Calculations

Proposed Requirement:

1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event

Q = CA(2gh)^0.5

where:

Orifice Invert =	96.00	Pond Bottom EL. =	96.00
C =	0.60	Treatment Vol.(ac-ft) =	0.76
Diameter (in) =	2.30	Treatment Vol. EL. =	97.62
No. of orifices =	1	1/2 Treatment Vol. EL. =	97.05

First 1/2 treatment volume avg. depth:	h (ft) = 1.24
Average flow rate to bleed in 24 hours:	Q (cfs)= 0.19
Orifice Diameter:	Dia. (in)= 2.561

Use minimum orifice diameter of 2.8 in.

(SFWMD minimum oriface area = 6 sq.in.)

Post Development Hydrology

Sub-basin N_NE
Area 4.66 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		2.89	98	283.22
Open/grass	B/D	1.77	61	107.97
TOTAL		4.66		391.19
			Weighted CN =	83.9

Time of Concentration

Use Minimum of 10 minutes to inlet
600 ft swale @ 0.75 ft/s TC = 23 min

Stage-Storage Conditions

Swale storage on north side of aligment-Dry storage

Stage (FT)	Cumulative Storage (Ac-Ft)
92.00	0.003
93.00	0.003
96.00	0.003
97.00	0.138
98.00	0.275
99.00	0.413

Post Development Hydrology

Sub-basin N_SW
Area 2.70 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		1.51	98	147.98
Open/grass	B/D	1.19	61	72.59
TOTAL		2.70		220.57
			Weighted CN =	81.7

Time of Concentration

Use Minimum of 10 minutes

Water Quality Volume

1-inch over basin	0.23 ac-ft
2.5" over the impervious area	0.31 ac-ft

Stage-Storage Conditions

Swale storage on south side of aligment-Dry storage

Stage (FT)	Area (Ac)	Cumulative Storage (Ac-Ft)
94.00	0.00	0.00
95.00	0.11	0.06
96.00	0.17	0.20
97.00	0.25	0.41
98.00	0.34	0.70

Orifice Drawdown Calculations

Proposed Requirement:
1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event
Q = CA(2gh)^0.5
where:

Orifice Invert =	93.50	Pond Bottom EL. =	94.00
C =	0.60	Treatment Vol.(ac-ft) =	0.31
Diameter (in) =	1.50	Treatment Vol. EL. =	96.55
No. of orifices =	1	1/2 Treatment Vol. EL. =	95.75

First 1/2 treatment volume avg. depth:	h (ft) = 2.59
Average flow rate to bleed in 24 hours:	Q (cfs)= 0.08
Orifice Diameter:	Dia. (in)= 1.360

Use minimum orifice diameter of 2.8 in.
(SFWMD minimum oriface area = 6 sq.in.)

Post Development Hydrology

Sub-basin N_South
Area 1.29 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.68	98	66.64
Open/grass	B/D	0.61	61	37.21
TOTAL		1.29		103.85
			Weighted CN =	80.5

Time of Concentration

SHEET FLOW

Length (ft)=	225
n=	0.24
Slope (ft/ft)=	0.005
Intensity=	4.8
Time of conc. (hr)=	0.647

SUBTOTAL =	0.65
TOTAL Tc (hr) =	0.65
TOTAL Tc (min) =	38.8

Stage-Storage Conditions

Storage in box culvert extension only

Post Development Hydrology

Sub-basin N_SE
Area 6.91 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		3.81	98	373.38
Open/grass	B/D	3.10	61	189.10
TOTAL		6.91		562.48
			Weighted CN =	81.4

Time of Concentration
Use Minimum of 10 minutes

Water Quality Volume
1-inch over basin 0.58 ac-ft
2.5" over the impervious area 0.79 ac-ft

Stage-Storage Conditions
Swale storage on south side of aligment-Dry storage

Stage (FT)	Area (Ac)	Cumulative Storage (Ac-Ft)	
94.00	0.00	0.00	94
95.00	0.30	0.15	95
96.00	0.44	0.52	96
97.00	0.60	1.04	97
98.00	0.77	1.73	98

Orifice Drawdown Calculations
Proposed Requirement:
1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event
Q = CA(2gh)^0.5
where:

Orifice Invert =	93.50	Pond Bottom EL. =	94.00
C =	0.60	Treatment Vol.(ac-ft) =	0.79
Diameter (in) =	2.19	Treatment Vol. EL. =	96.52
No. of orifices =	1	1/2 Treatment Vol. EL. =	95.68

First 1/2 treatment volume avg. depth:	h (ft) =	2.51
Average flow rate to bleed in 24 hours:	Q (cfs)=	0.20
Orifice Diameter:	Dia. (in)=	2.188

Use minimum orifice diameter of 2.8 in.
(SFWMD minimum orifice area = 6 sq.in.)

Sub-basin N_ORT
Area 1.65 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		0.87	98	85.26
Open/grass	B/D	0.78	61	47.58
TOTAL		1.65		132.84
			Weighted CN =	80.5

Time of Concentration
Use Minimum of 10 minutes

Post Development Hydrology

BASIN O

Comment: Ferguson Bridge to JYP Interchange System

Area 6.63 ac

Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		4.75	98	465.50
Open/grass	B/D	1.88	61	114.68
TOTAL		6.63		580.18
			Weighted CN =	87.5

Time of Concentration

Use Minimum of 10 minutes

Water Quality Volume

1-inch over basin 0.55 ac-ft

2.5" over the impervious area 0.99 ac-ft

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
95.7	8930.0	0.21	0.00	0.00
96.0	9583.2	0.22	0.06	0.06
97.0	11761.2	0.27	0.25	0.31
98.0	14374.8	0.33	0.30	0.61
99.0	16988.4	0.39	0.36	0.97
100.0	20037.6	0.46	0.43	1.39
101.0	22651.2	0.52	0.49	1.88
102.0	35283.6	0.81	0.67	2.55

Orifice Drawdown Calculations

Proposed Requirement:

1/2 of treatment volume must bleed down within 24 to 30 hours following a storm event

$Q = CA(2gh)^{0.5}$

where:

Orifice Invert = 95.70 Pond Bottom EL. = 95.00

C = 0.60 Treatment Vol.(ac-ft) = 0.99

Diameter (in) = 2.43 Treatment Vol. EL. = 99.10

No. of orifices = 1 1/2 Treatment Vol. EL. = 97.68

First 1/2 treatment volume avg. depth: h (ft) = 2.59

Average flow rate to bleed in 24 hours: Q (cfs)= 0.25

Orifice Diameter: Dia. (in)= 2.430

Use minimum orifice diameter of 2.8 in.

(SFWMD minimum orifice area = 6 sq.in.)

BASIN P (Existing system from DRMP calcs.)

Comment: Existing JYP Interchange System
Actual increase in impervious area is 0.45 ac. (600'x32' median =0.45 ac.)
Additonal impervious area in design is 0.60 ac.

Area 10.32 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		4.33	98	424.34
Open/grass	B/D	5.09	80	407.20
Pond		0.90	98	88.20
TOTAL		10.32		919.74
			Weighted CN =	89.1

Time of Concentration

Tc= 41 min. (From DRMP Calcs.)

Water Quality Volume

1-inch over basin	0.86 ac-ft
2.5" over the impervious area	0.90 ac-ft

Stage Storage Conditions

Stage (FT)	Area (sf)	Area (Ac)	Incremental Storage (Ac-Ft)	Cumulative Storage (Ac-Ft)
99.3	39204.0	0.90	0.00	0.00
100.0	42253.2	0.97	0.65	0.65
101.0	47044.8	1.08	1.03	1.68
102.0	51836.4	1.19	1.14	2.81
104.0	77101.2	1.77	2.96	5.77

Post Development Hydrology

BASIN Q

Comment: JYP Bridge to Church Street Bridge
Widening area already impervious. Additional imp. with ramp toll boths.

Area 8.10 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		6.01	98	588.98
Open/grass	B/D	2.09	80	167.20
TOTAL		8.10		756.18
			Weighted CN =	93.4

Time of Concentration

Tc= 21 min. (From H.W. Lochner Calcs.)

For this system to work the total discharge rate from the Existing Pond Basin P and the Untreated Basin Q was analyzed for the existing and proposed conditions (predevelopment - post development). The total Q to the existing canal (Node TW) was not increased by slightly reducing the weir from the existing expressway pond.

	Predevelopment			Post Development		
Time	Onsite	Link Q	Total	Onsite	Link Q	Total
(hrs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
8.01	11.2	1.3	12.5	11.8	1.4	13.2
8.08	11.7	1.6	13.3	12.3	1.8	14.1
8.17	12.2	2.1	14.3	12.7	2.3	15.0
8.25	12.6	2.5	15.2	13.0	2.7	15.7
8.34	12.9	3.1	16.0	13.3	3.2	16.5
8.43	13.2	3.6	16.8	13.4	3.7	17.1
8.51	13.4	4.1	17.5	13.6	4.2	17.7
8.59	13.5	4.6	18.1	13.7	4.7	18.3
8.67	13.6	5.2	18.8	13.8	5.2	19.0
8.76	13.7	5.8	19.5	13.8	5.7	19.6
8.84	**13.8**	**6.3**	**20.1**	**13.9**	**6.3**	**20.1**
8.93	13.8	6.9	20.7	13.5	6.7	20.2
9.00	13.5	7.2	20.7	12.8	7.2	19.9
9.09	12.7	7.8	20.5	12.2	7.6	19.8
9.17	12.1	8.2	20.4	11.7	8.0	19.7
9.26	11.7	8.7	20.3	11.3	8.4	19.7
9.35	11.3	9.1	20.4	11.1	8.7	19.8
9.43	11.0	9.4	20.4	10.8	9.0	19.8
9.51	10.8	9.7	20.5	10.6	9.3	19.9
9.59	10.5	10.0	20.5	10.4	9.5	19.9
9.67	10.3	10.2	20.5	10.2	9.8	20.0
9.75	10.2	10.4	20.6	10.1	10.0	20.1
9.84	**10.1**	**10.6**	**20.7**	**10.0**	**10.2**	**20.1**
9.92	10.0	10.8	20.7	9.5	10.3	19.8
10.00	9.4	10.9	20.3	8.5	10.4	19.0
10.09	8.5	11.0	19.5	7.8	10.5	18.3
10.17	7.8	11.0	18.8	7.2	10.5	17.7
10.25	7.2	11.0	18.2	6.7	10.5	17.2
10.34	6.7	11.0	17.7	6.3	10.5	16.8
10.42	6.3	10.9	17.3	6.1	10.4	16.5

BASIN R

Comment: Church Street Bridge to Tampa Ave. Ramps
Widening area already impervious.
Removing toll plaza and adding pervious area.

Area 7.31 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		4.93	98	483.14
Open/grass	B/D	2.38	80	190.40
TOTAL		7.31		673.54
			Weighted CN =	92.1

Time of Concentration

Tc= 15 min.

Water Quality Volume

1-inch over basin	0.61 ac-ft
2.5" over the impervious area	1.03 ac-ft

Runoff Volume

Area (ac)= 7.31
Precipitation, P (in) = 10.5 (100yr/24hr)
Q= (P-0.2*S)^2/P+0.8*S WHERE S= 1000/CN - 10
Soil Storage = 0.85 inches
Q (runoff) = 9.54 inches
Volume = 5.81 ac-ft

Pre/Post = 0.68 ac-ft

Area (ac)= 7.31
Precipitation, P (in) = 12.5 (25yr/96hr)
Q= (P-0.2*S)^2/P+0.8*S WHERE S= 1000/CN - 10
Soil Storage = 0.85 inches
Q (runoff) = 11.53 inches
Volume = 7.02 ac-ft

Pre/Post = 0.81 ac-ft

BASIN S (From H.W. Lochner, Inc. calcs)
Comment: Tampa Ave. Ramps to Tampa Ave. Bridge

Area 4.21 ac
Soils Type B/D

Weighted CN Calculation

Land Use	Soil Class	Area (Ac)	CN	Product
Impervious		1.24	98	121.52
Open/grass	B/D	2.97	80	237.60
TOTAL		4.21		359.12
			Weighted CN =	85.3

Time of Concentration
Tc= 10 min.

Runoff Volume

Area (ac)= 4.21
Precipitation, P (in) = 10.5 (100yr/24hr)
Q= (P-0.2*S)^2/P+0.8*S WHERE S= 1000/CN - 10
Soil Storage = 1.72 inches
Q (runoff) = 8.68 inches
Volume = 3.05 ac-ft **Pre/Post = -0.08 ac-ft**

Area (ac)= 4.21
Precipitation, P (in) = 12.5 (25yr/96hr)
Q= (P-0.2*S)^2/P+0.8*S WHERE S= 1000/CN - 10
Soil Storage = 1.72 inches
Q (runoff) = 10.65 inches
Volume = 3.74 ac-ft **Pre/Post = -0.08 ac-ft**

POND P ORIGINAL CALCS.:
SFWMD 950406-2
PROJECT PRIOR TO C-252B WIDENING

Orlando-Orange County Expressway Authority

East West Expressway/John Young Parkway Interchange

Orange County, Florida

South Florida Water Management District

Surface Water Permit Submittal

Prepared for

Orlando-Orange County Expressway Authority

April 1995

Prepared By

Dyer, Riddle, Mills & Precourt Inc.
1505 East Colonial Drive
Orlando, Florida 32853
(407) 896-0594

Purpose

The purpose of these calculations is to provide information relative to the proposed improvements to the East West Expressway/John Young Parkway Interchange (EWE/JYP) stormwater management plan. Due to right of way constraints, physical features and in order to minimize impacts to adjacent properties the overall stormwater management approach developed utilizes compensating treatment and storage for stormwater runoff.

Existing Conditions

Presently the overall project can be divided into three basins all of which discharge to Lake Mann.

Basin 1 runs from station 535+00 to station 541+50 which is the approximate intersection of the EWE/JYP. This area includes offsite commercial development and utilizes swales and storm sewer system to convey stormwater runoff to an existing ditch that flows to into Lake Mann. There is no stormwater treatment for this basin with the west half of JYP collected in a curb and gutter system discharging directly into the outfall ditch to Lake Mann.

Basin 2 starts at the beginning of the project and runs from station 520+00 to station 535+00 with all of the runoff discharging to the crossdrain at station 524+50 This crossdrain flows through swales/ditches to Lake Mann. There is no stormwater treatment system for this area and the only stormwater treatment occurs within the existing swales along the East West Expressway.

Basin 3 consists of the area east of the centerline of JYP. A portion of this area (JYP east side) drains to a permitted stormwater treatment pond (SFWMD Permit # 88-16, Application #03038-1) located to the south east of the interchange. This pond treats runoff from the eastern half of the JYP before discharging across JYP to the west into the same outfall ditch utilized for basin two. The rest of basin 3 utilizes a storm system consisting of double 42" sewers to cross JYP eventually discharging to the outfall ditch used for basin 2.

Proposed Conditions

The proposed stormwater treatment system will maximize stormwater treatment and minimize offsite discharges for existing roadways and development in order to compensate for the added impervious surfaces within basin 1,2 and basin 3. With respect to water quality issues the proposed system will continue to discharge areas (new and old) within basin 1 utilizing the existing swale/ditch conveyance system. To offset the untreated areas within basins 2 and 3 all of the existing East West Expressway and JYP within basin 1 will be treated within a wet detention system. In addition to offset the increased impervious area within basin 2 the post development discharge will be decreased in basin 1 so that the ultimate post development discharge to Lake Mann (basin 1 + basin 2) will not be increased over the predevelopment rate. To summarize these areas the following analysis has been broken down into water quality and water quantity sections.

Water Quality

As previously stated the proposed stormwater management system is designed to provide for a maximum amount of treatment within basin 1 for additional impervious areas that will not be treated within basin 2 and basin 3. This will be accomplished by diverting runoff from the existing EWE/JYP to proposed treatment ponds. To summarize these areas the following two tables were developed. Table 1 shows the proposed new impervious areas that will not receive stormwater treatment. Table 2 shows the proposed impervious areas that will receive stormwater treatment within the proposed stormwater management system. Within these impervious areas is an additional 0.60 acre of future widening for the East/West Expressway.

Table 1
Proposed Untreated Impervious Areas

Description	Basin 2 New Impervious acres	Basin 3 New Impervious acres
Ramp A	0.70	N/A
Ramp B	0.31	N/A
Ramp C*	N/A	0.04
Ramp D	N/A	0.07
Totals	1.01	0.11

*Ramp C = 0.19 new construction with 0.15 removal of existing ramp

Table 2
Proposed Treated Impervious Areas

Description	Basin 1	
	New Impervious (ac.)	Existing Impervious (ac.)
Ramp A	0.45	N/A
Ramp B	0.85	N/A
East West Expressway		
Mainline	N/A	1.33
Future Mainline	0.60	N/A
John Young Parkway	N/A	1.10
Totals	1.90	2.43

In comparing the amount of new impervious that will not be treated to the existing areas that will be treated (1.12 vs. 2.43) there is about a 2.2:1 ratio. In addition the traffic volumes on the existing areas that will be treated are much higher than the proposed ramps and therefore it can be stated that even more than a 2.2:1 ratio will be provided.

Water Quantity

To determine the post development discharge rates versus the predevelopment rates basins 1 and basin 2 where analyzed and combined to give the total discharge to Lake Mann. Basin 2 was analyzed as just the expressway area even though there are some offsite areas that contribute to the crossdrain. For purposes of this analysis the total predevelopment and post development rates to Lake Mann where considered. Table 3 summarizes the peak discharges for the proposed project.

Table 3
Predevelopment vs. Post Development
Discharge Rates

Description	Predevelopment cfs	Post Development cfs @ Hour 10.00
Basin 1	15.99	9.79
Basin 2	12.79	11.65
Totals (to Lake Mann)	28.78	21.44

Based on the results of this analysis there is an overall decrease in the net discharge to Lake Mann for the proposed stormwater management system.

Hydrology

Predevelopment

Basin 1
Drainage Area = 10.75 acres

Soils - Wabasso B/D
(use Undrained due to compacted fills/swales)

Weighted CN

Description	Area(ac.)	CN	Product
John Young Parkway	0.81	98	79.38
East West Expressway	1.33	98	130.34
Development	3.46	98	339.08
Open Space Grass - good	5.15	80	412.00
Total	10.75		960.80
	CN =	89.4	

Hydrographs

```
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  E.W. EXPY - JOHN YOUNG PKWY PRE-DEV 25/24 (FILE EWJYPEX)
  12/15/94

BASIN NAME                BASIN1    BASIN2
NODE NAME                 BASIN1    BASIN2

TIME INCREMENT (min)        5.00      5.00

RAINFALL FILE             ORANGE    ORANGE
RAIN AMOUNT (in)            8.60      8.60
STORM DURATION (hrs)       24.00     24.00

AREA (ac)                  10.75      8.90
CURVE NUMBER               89.40     84.40
DCIA (%)                     .00       .00
TC (mins)                  48.60     42.00
LAG TIME (hrs)               .00       .00
BASIN STATUS              ONSITE    ONSITE

  BASIN QMX (cfs) TMX (hrs)  VOL (in) NOTES
BASIN1     15.99      8.92      7.32 PRE-DEVELOPED 25YR 24HR EVENT
BASIN2     12.79      8.92      6.72 PRE-DEVELOPED 25YR-24HR EVENT
```

Post Development

Basin P and POND P: in EWE widening project C-252B in 2003 by DRMP

Basin 1

Drainage Area = 10.32 acres

Soils - Wabasso (B/D) (use Undrained due to compacted fills/swales)

Weighted CN

Description	Area(ac.)	CN	Product
East West Expressway			
Main Line	1.33	98	130.34
Ramp A	0.45	98	44.10
Ramp B	0.85	98	83.30
Future East West Expressway	0.60	98	58.80
John Young Parkway	1.10	98	107.80
Ponds	0.90	98	88.20
Open Space Grass - good	5.09	80	407.20
Total	10.32		919.74
	CN =	89.1	

Time of Concentration

from the storm sewer tabulations

Tc (hr) = 0.69

Water Quality Volume

Stage Storage for Pond P

1" over basin area =	0.86 ac-ft
or	
2.5" over impervious area =	0.90 ac-ft

Stage Storage

Stage ft	Area acre	Storage ac-ft
99.30	0.90	0.00
100.00	0.97	0.65
101.00	1.08	1.68
102.00	1.19	2.81
104.00	1.77	5.77

Basin 2

Partial Basin O in the EWE widening project C-252B in 2003 by DRMP

Drainage Area = 9.33 acres

Soils - Wabasso
(B/D)
(use Undrained due to compacted fills/swales)

Weighted CN

Description	Area(ac.)	CN	Product
East West Expressway	2.20	98	215.60
Ramp A	0.70	98	68.60
Ramp B	0.31	98	30.38
Open Space Grass - good	6.12	80	489.60
Total	9.33		804.18
	CN =	86.2	

Time of Concentration

Same as predevelopment basin 1
Tc (hr) = 0.70

Tailwater

To estimate a tailwater condition for the proposed pond 1 the contributing area east of John Young Parkway including offsite areas and the existing pond outfall were analyzed and combined with the outfall from pond 1. This peak runoff rate was analyzed for the existing channel in order to estimate the peak stage in this channel for the flow. The following is a time stage relationship for the outfall ditch.

Time (hr)	Stage (ft)
0.0	98.5
6.0	99.0
8.0	100.0
9.0	101.0
10.0	101.0
12.0	100.0
14.0	99.5
30.0	99.0

Routings - Offsite Areas

Offsite Area and Existing Pond

```
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  TAILWATER ANALYSIS FOR OUTFALL/CULVERTS
  12/18/94

                    NODAL MIN/MAX/TIME CONDITIONS REPORT
                    ===================================
                              |<-- MINIMUMS  -->|  |<-- MAXIMUMS -->|
NODE ID          PARAMETER      VALUE TIME (hr)      VALUE TIME (hr)
--------  ---------------- --------- --------- --------- ---------
TW             STAGE (ft):     98.50     24.00     98.50     24.00
              VOLUME (af):       .00      3.00     26.34     24.00
             RUNOFF (cfs):       .00      3.00     46.39      9.00
            OFFSITE (cfs):       .00     24.00       .00     24.00
              OTHER (cfs):       .00      3.58     15.73     10.00
            OUTFLOW (cfs):       .00     24.00       .00     24.00

POND           STAGE (ft):     99.00      3.58    100.76     10.00
              VOLUME (af):       .00      3.50      1.86     10.00
             RUNOFF (cfs):       .00      3.50     18.59      9.00
            OFFSITE (cfs):       .00     24.00       .00     24.00
              OTHER (cfs):       .00     24.00       .00     24.00
            OUTFLOW (cfs):       .00      3.58     15.73     10.00
```
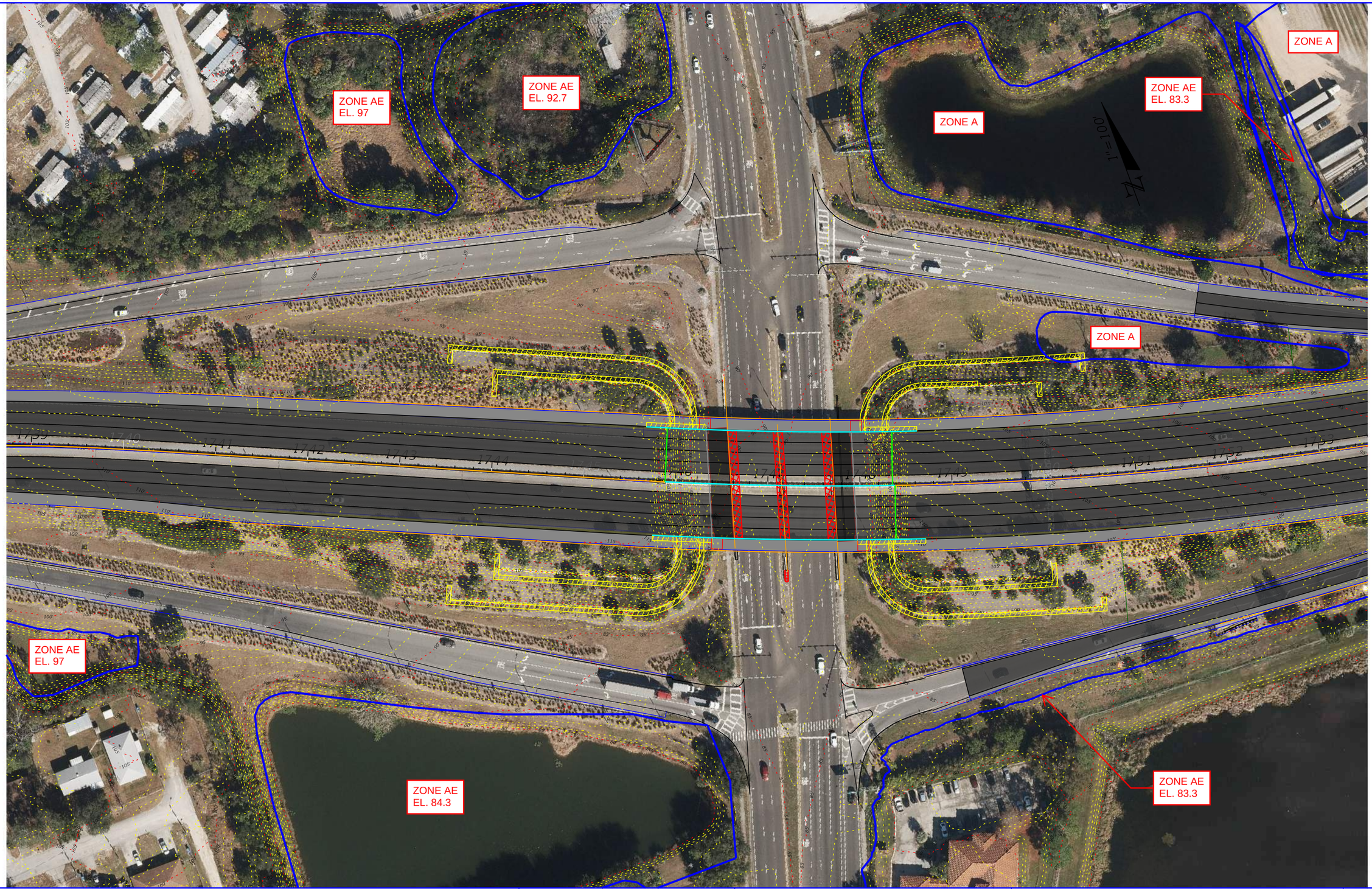

Appendix D – Floodplain Impact Analysis



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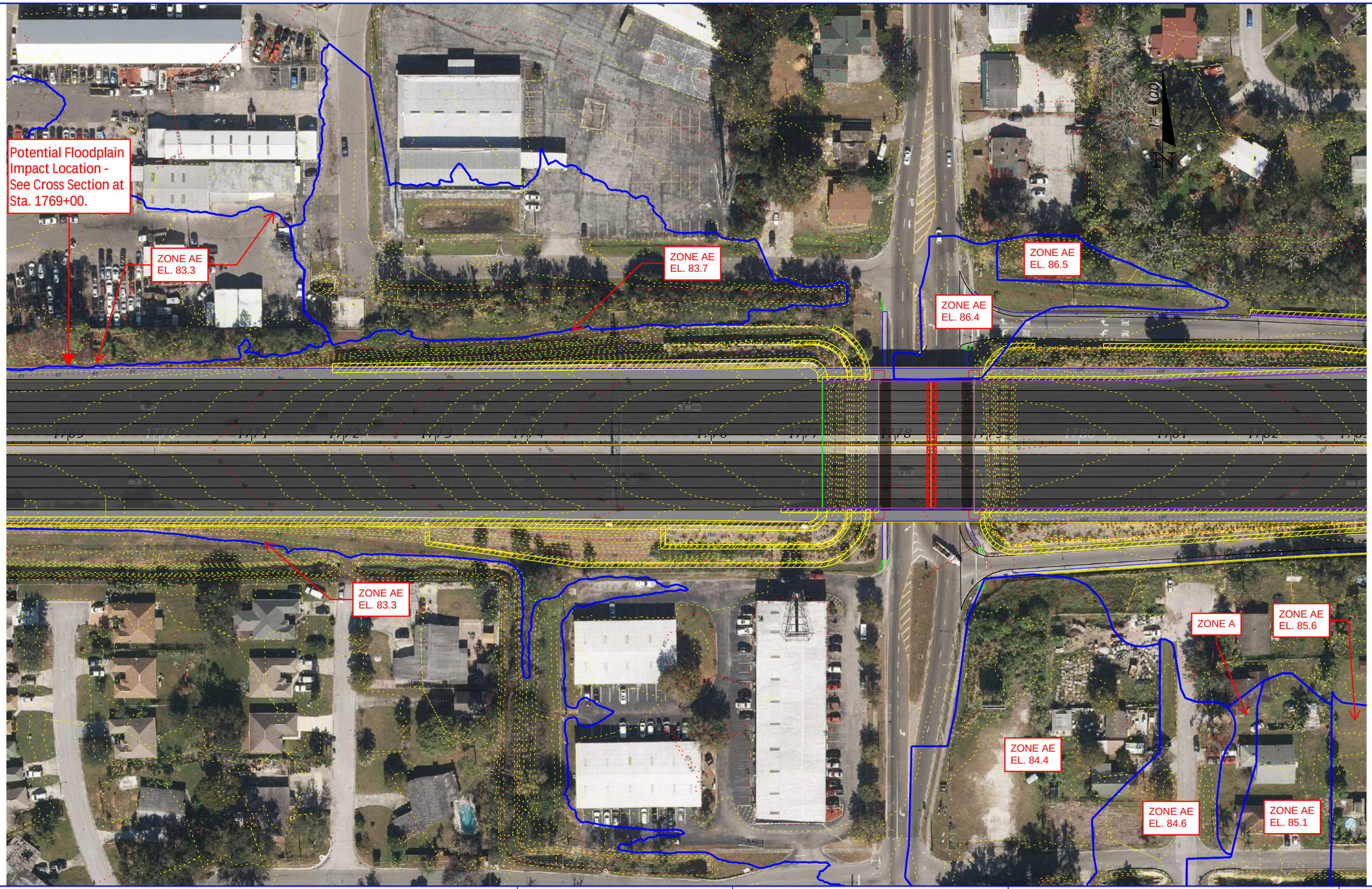

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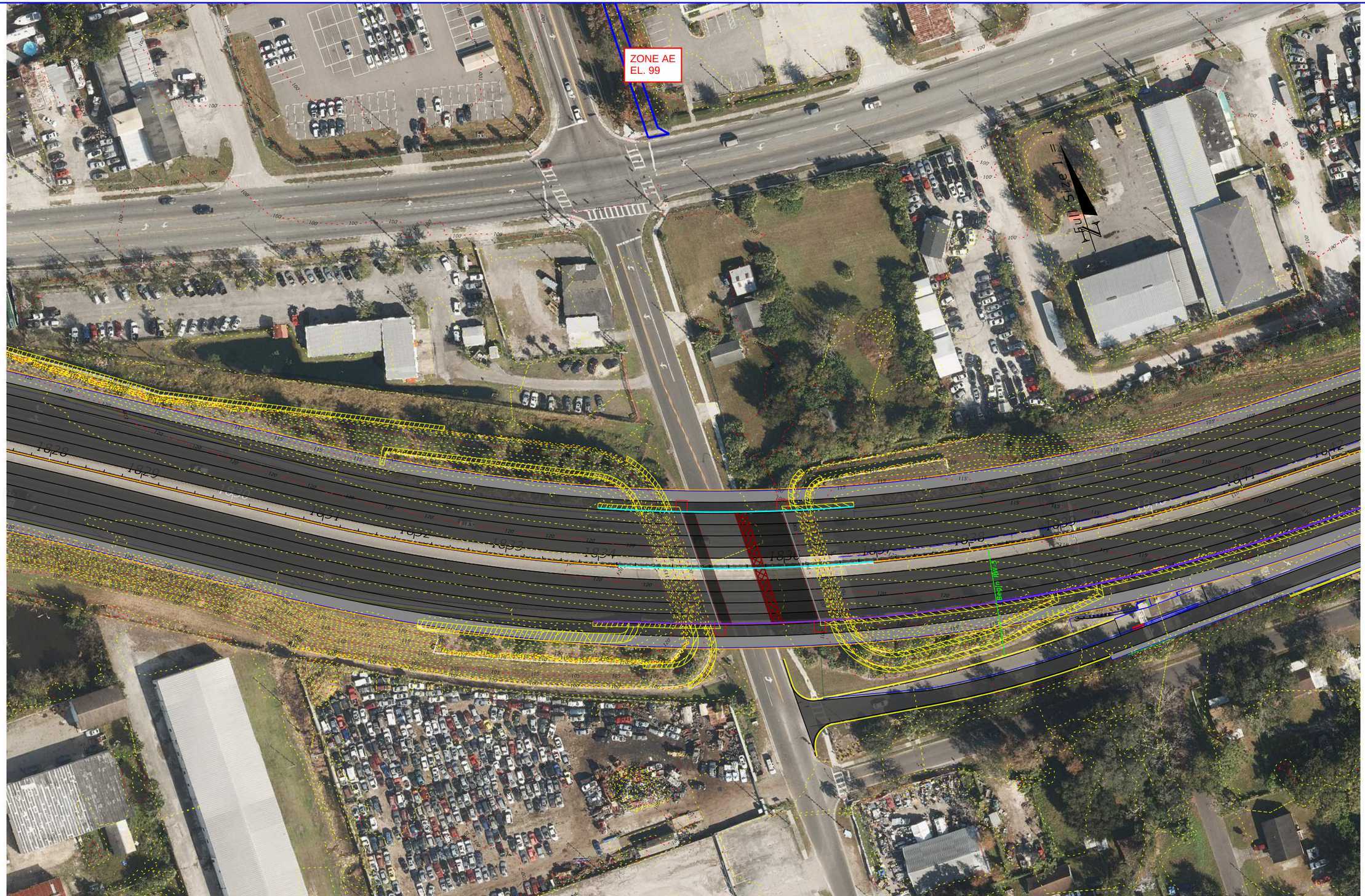

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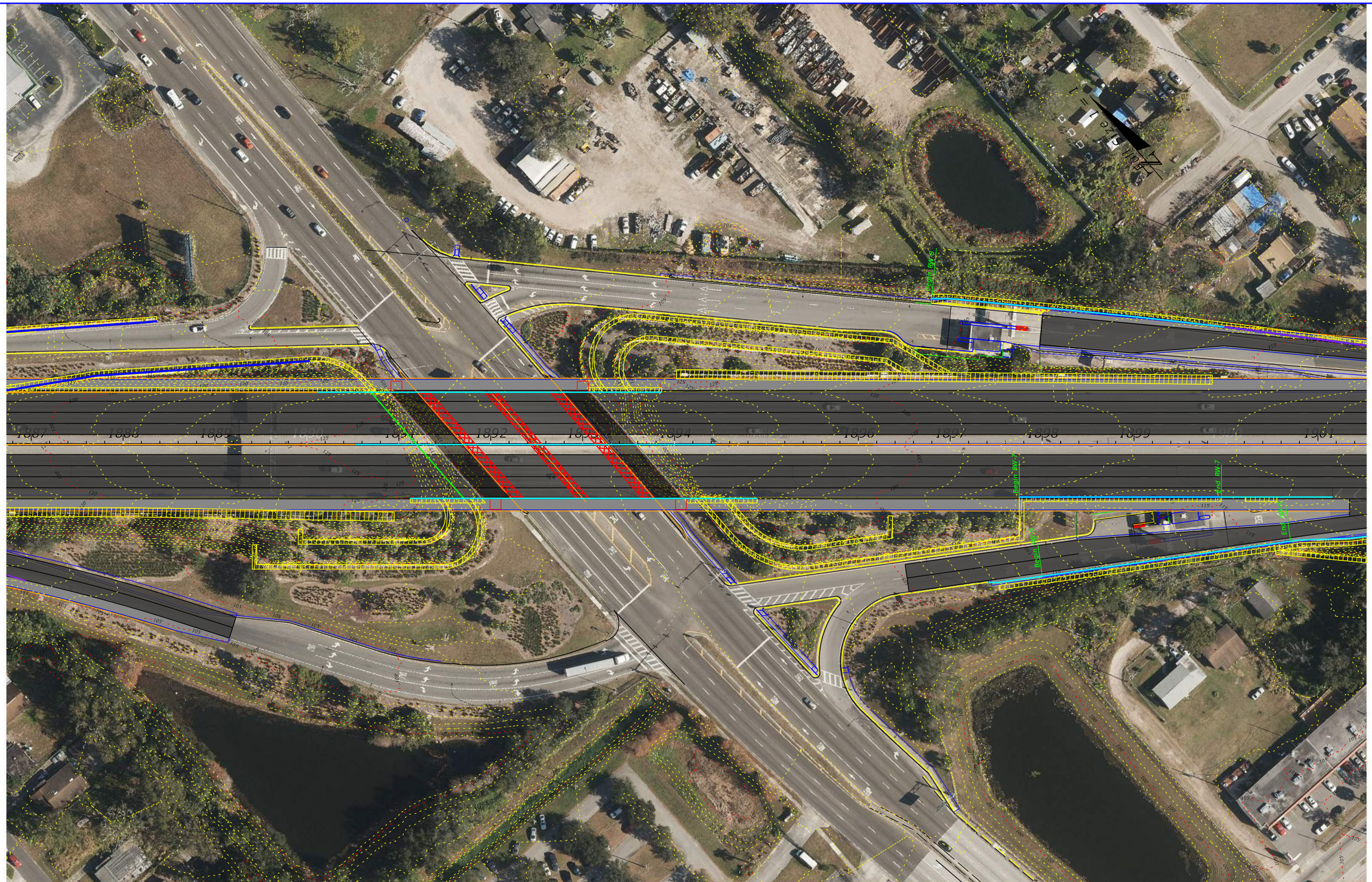

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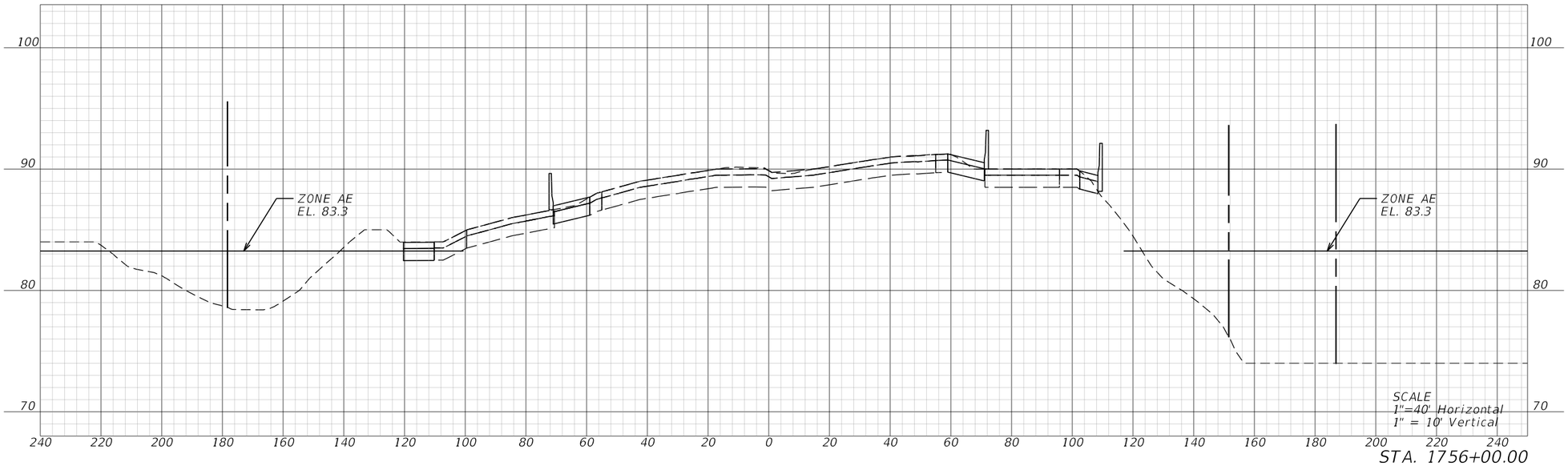

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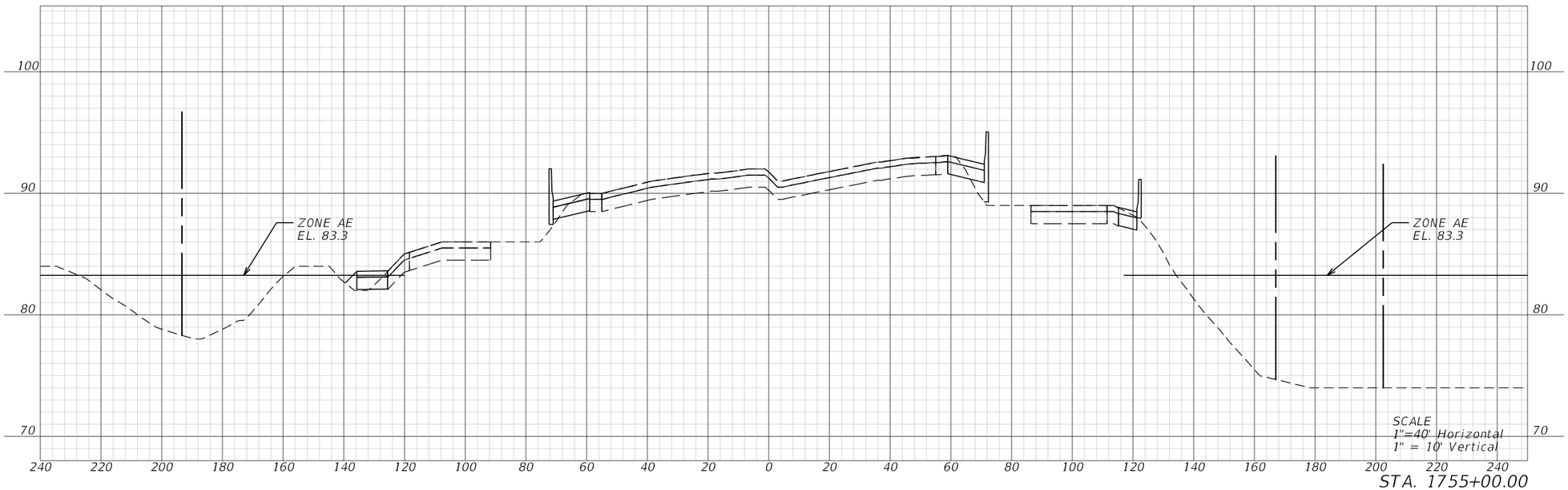

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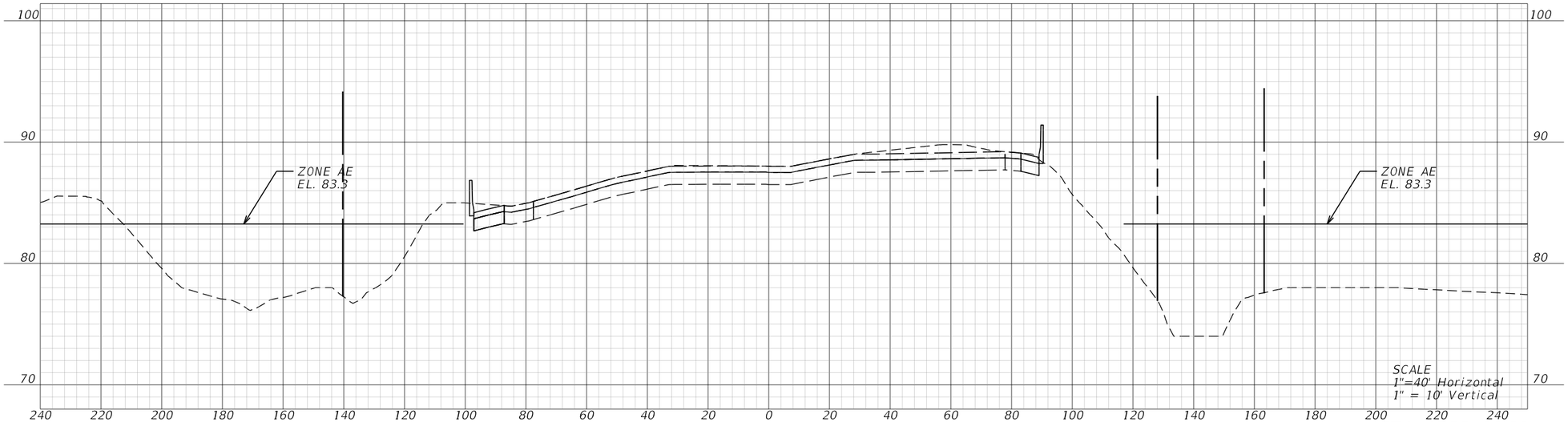

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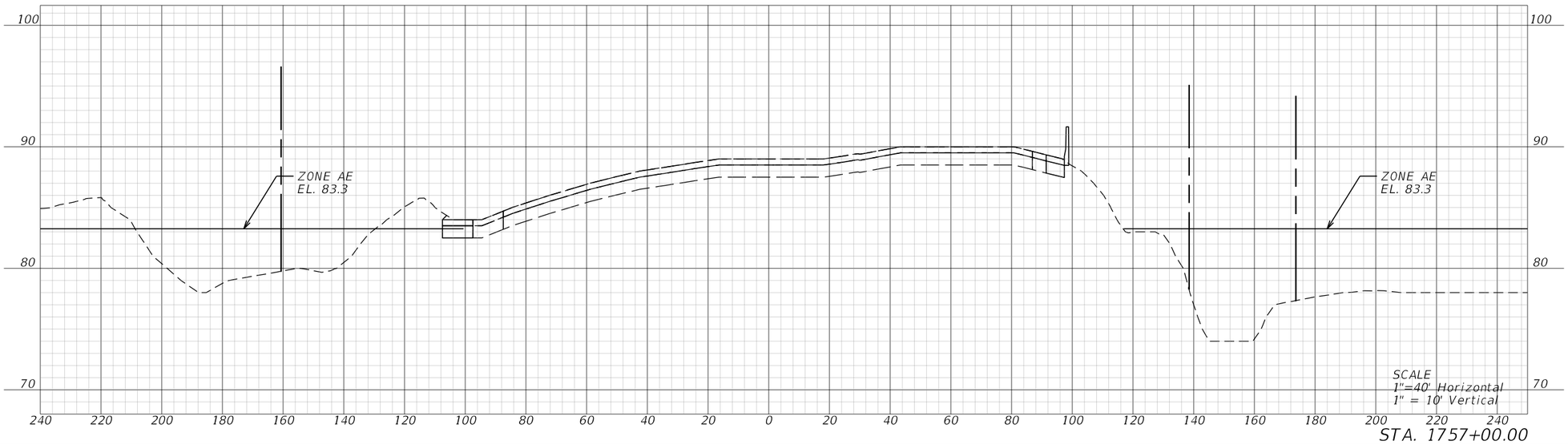

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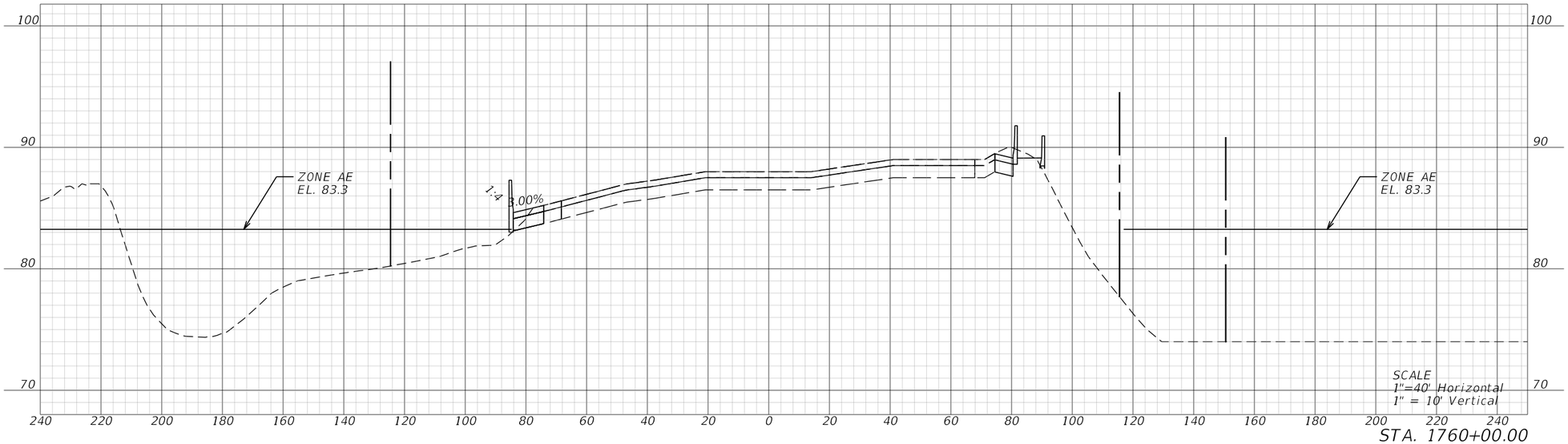

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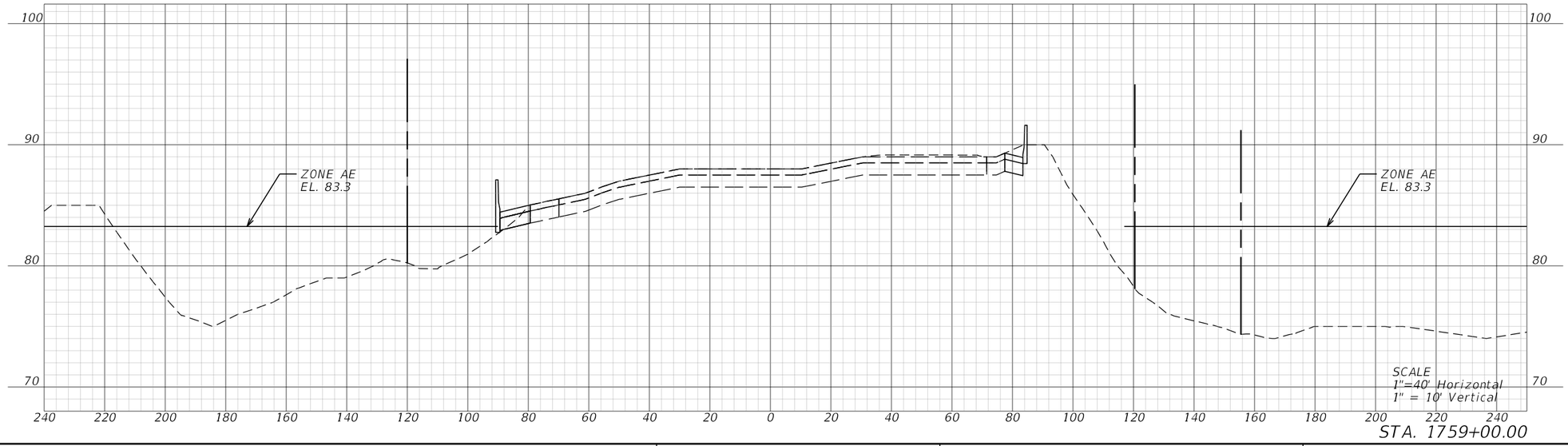

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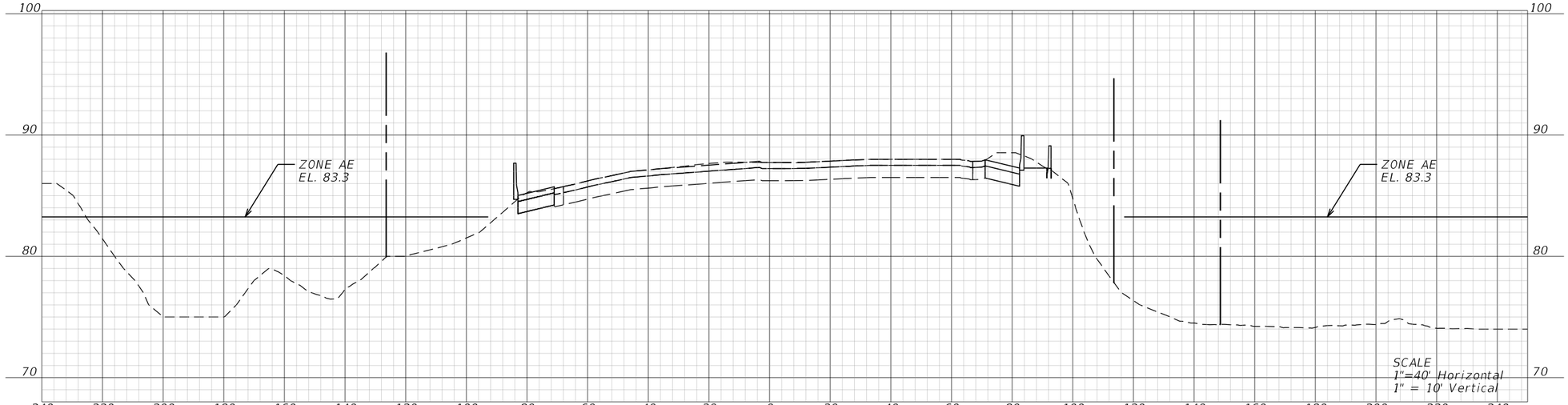

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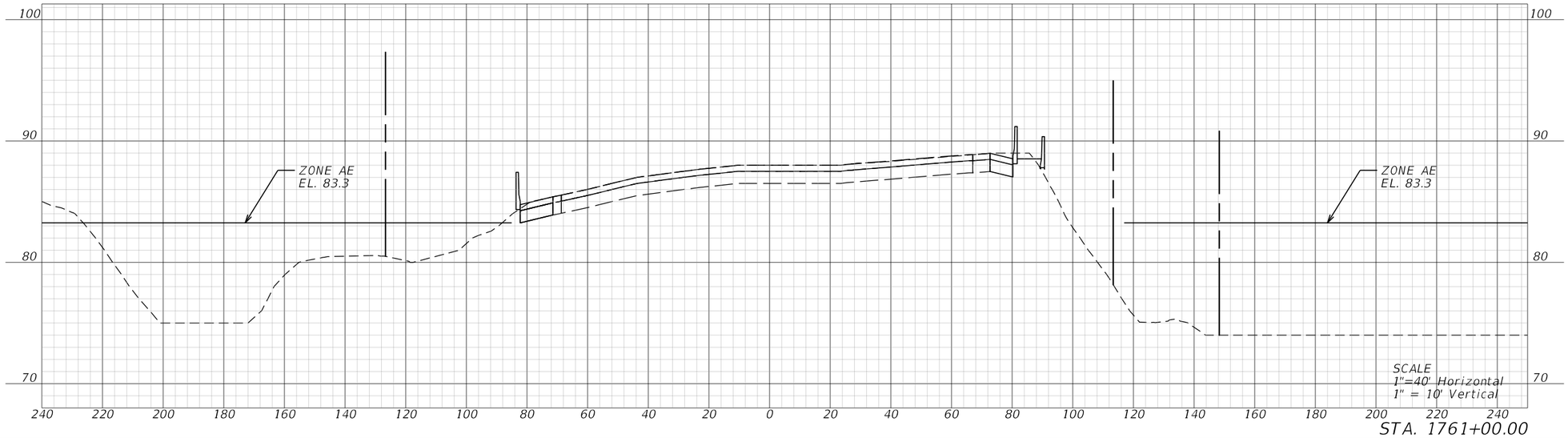

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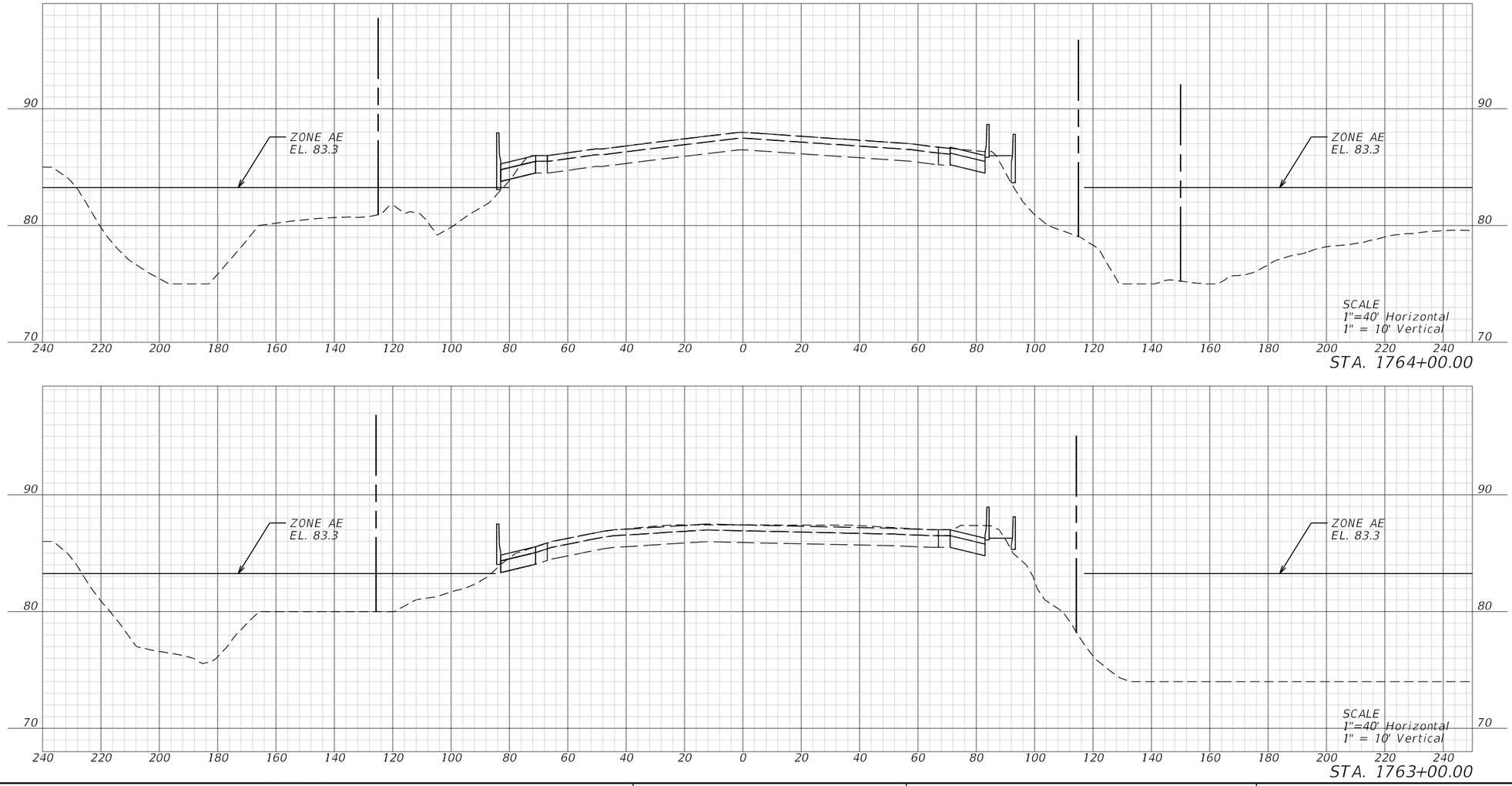
STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

DRAINAGE CROSS SECTIONS

SHEET NO.

D.16



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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STATE OF FLORIDA
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID

DRAINAGE CROSS SECTIONS

SHEET NO.
D.17

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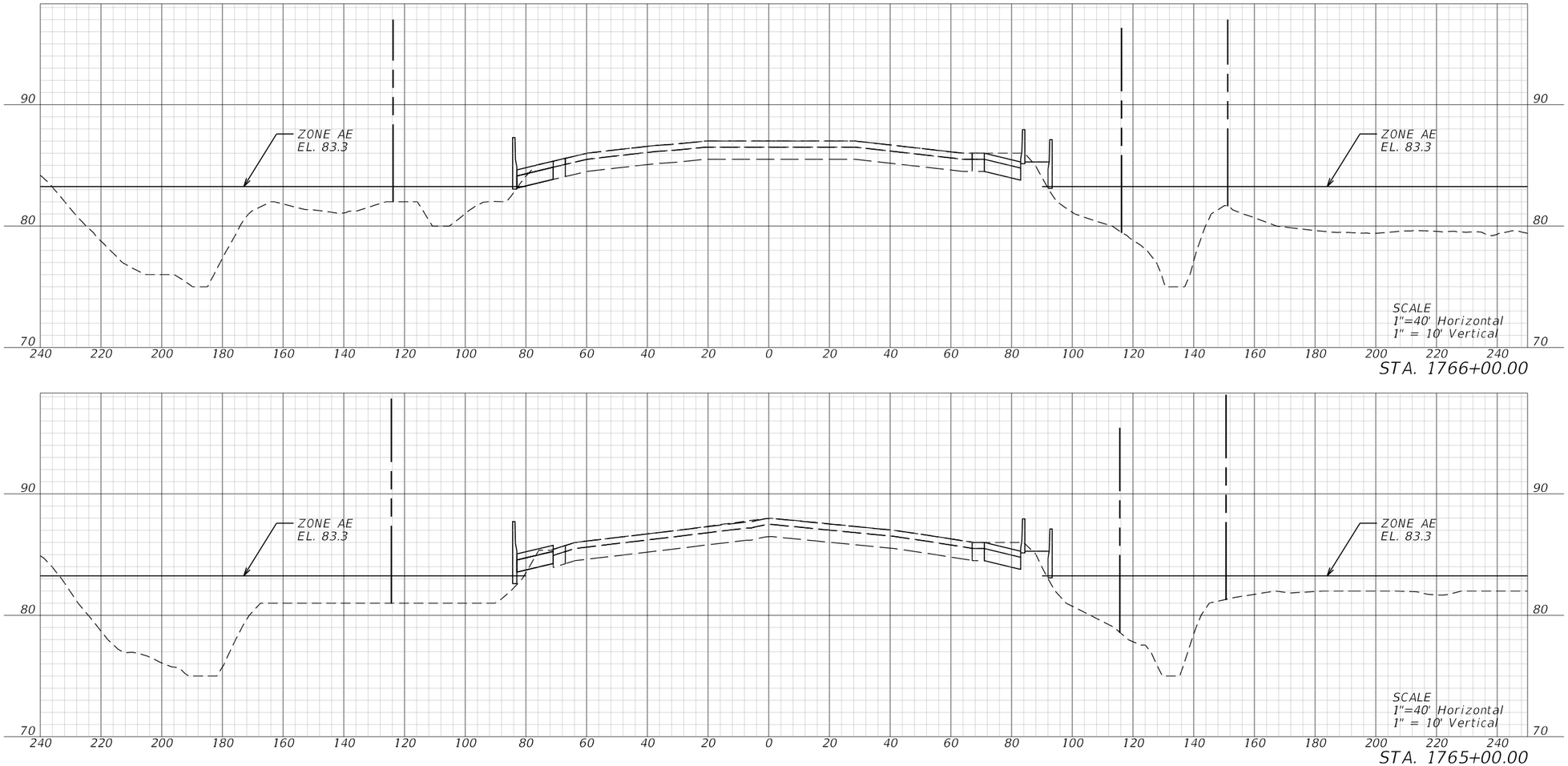

REVISIONS			
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID

DRAINAGE CROSS SECTIONS

SHEET NO.
D.18

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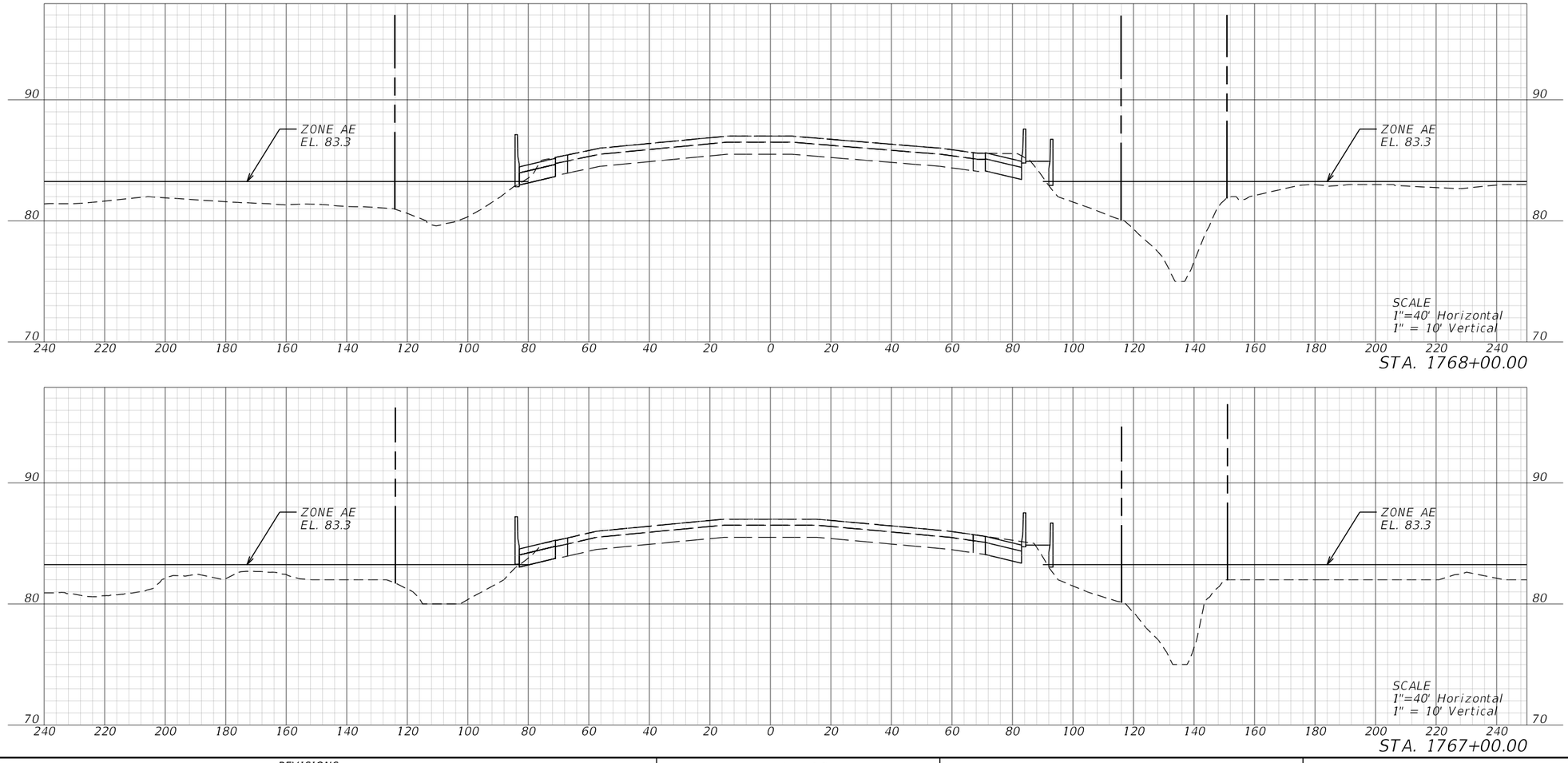

REVISIONS			
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ROAD NO.	COUNTY	FINANCIAL PROJECT ID

DRAINAGE CROSS SECTIONS

SHEET NO.
D.19

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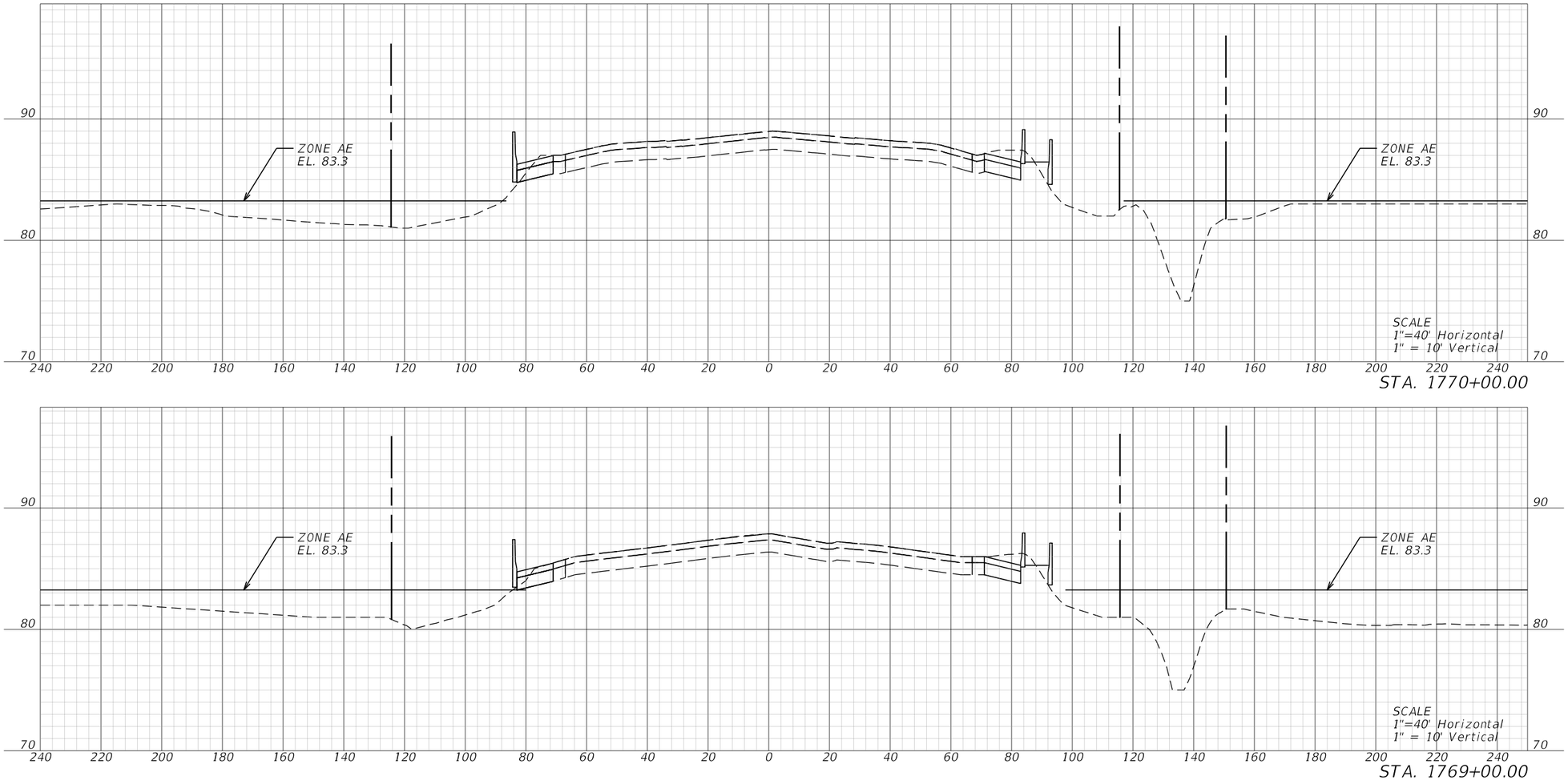

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DRAINAGE CROSS SECTIONS

SHEET NO.
D.20

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

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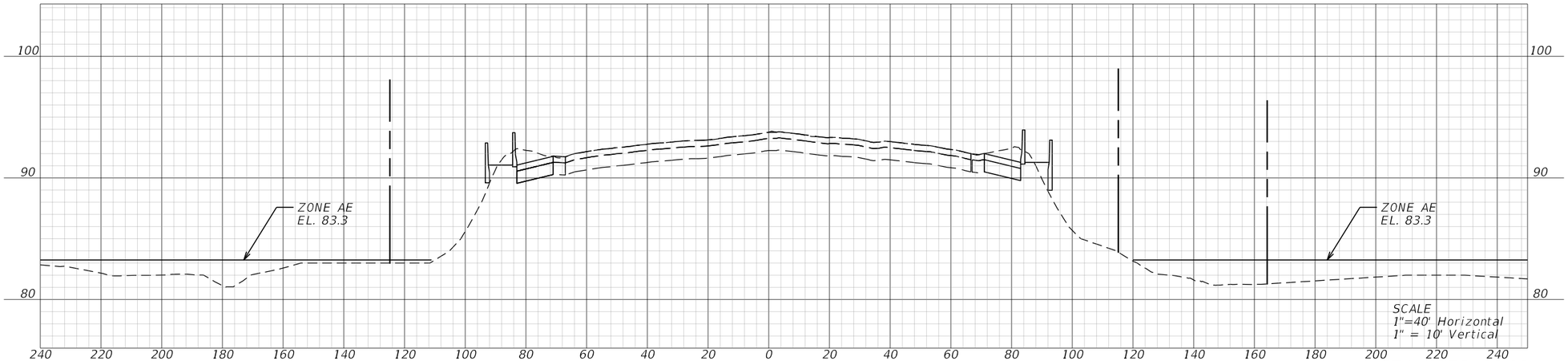

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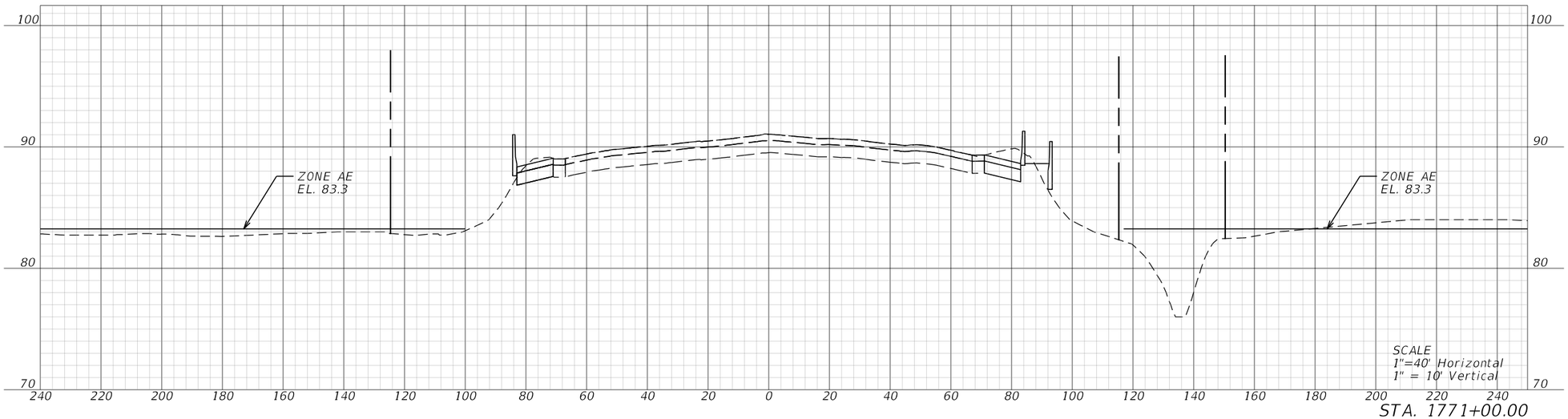

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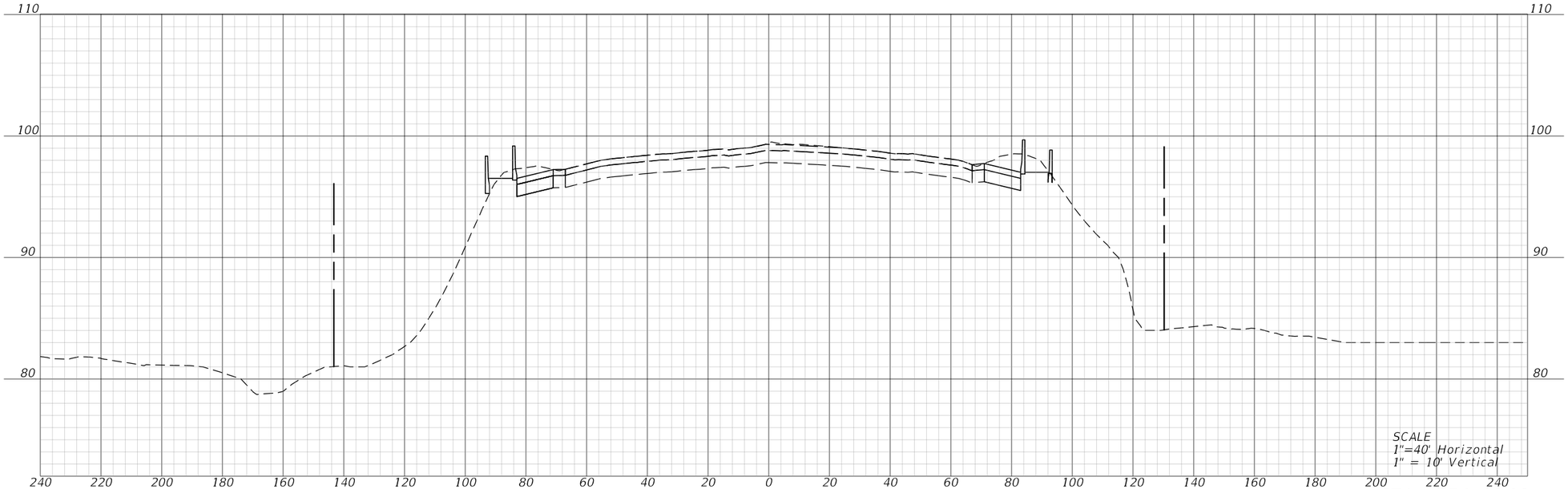
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

DRAINAGE CROSS SECTIONS

SHEET NO.
D.21



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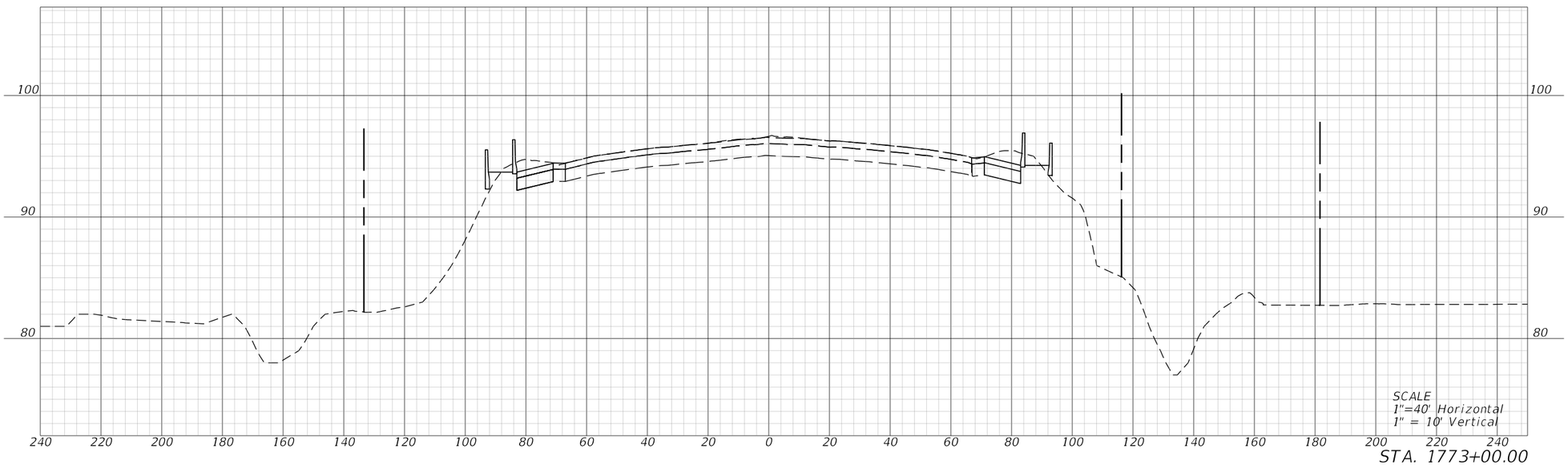

STA. 1773+00.00

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DRAINAGE CROSS SECTIONS

SHEET NO.
D.22

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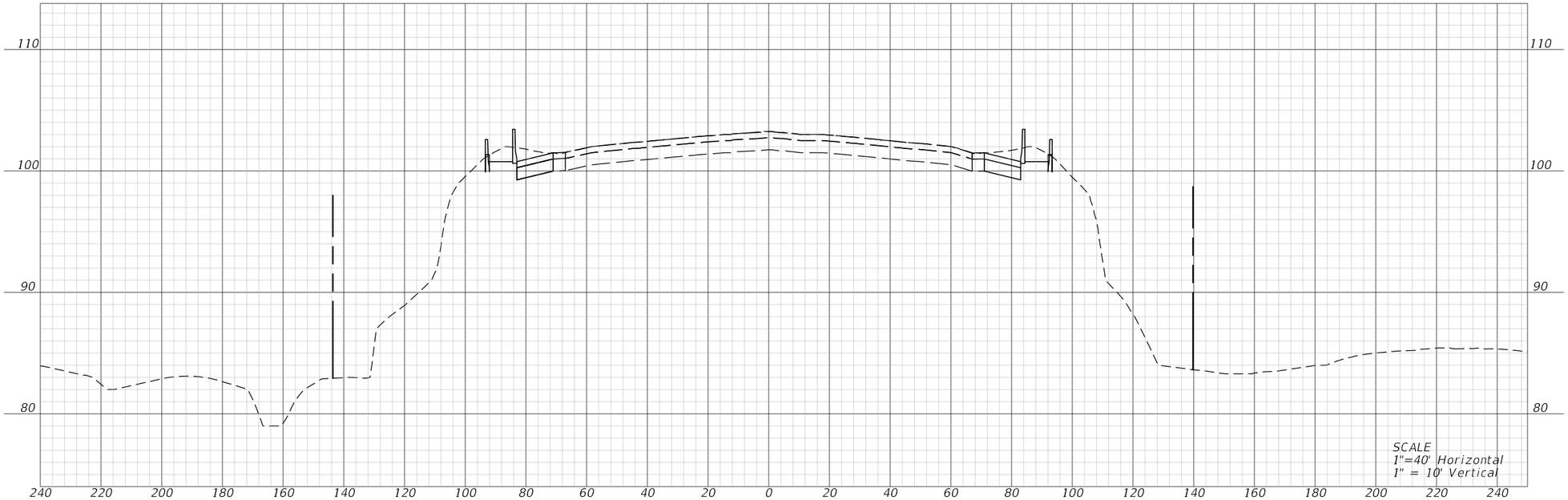

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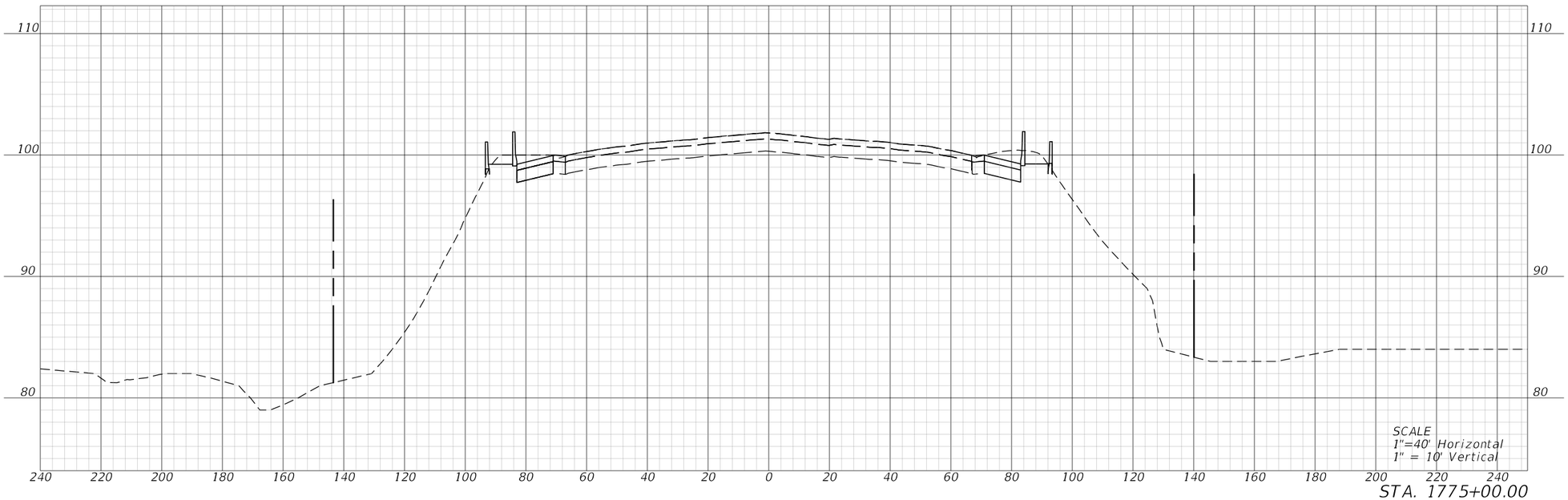

STA. 1775+00.00

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DRAINAGE CROSS SECTIONS

SHEET NO.
D.23

6/15/2023 12:27:04 PM SErgle
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