LOCATION HYDRAULICS REPORT

FINAL

Florida Department of Transportation

District 7

Gandy Boulevard (US 92/SR 600) Project Development and Environment (PD&E) Study

Limits of Project: 4th Street to West Shore Boulevard

Pinellas and Hillsborough Counties, Florida

Work Program Segment Number: 441250-1

ETDM Number: 14335

Date: February 2023

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

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PROFESSIONAL ENGINEER CERTIFICATION
LOCATION HYDRAULICS REPORT

Project: Gandy Blvd (US 92/SR 600) PD&E Study

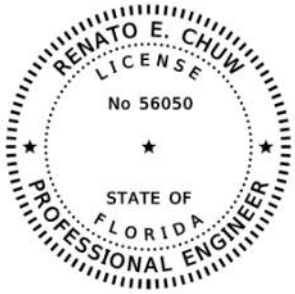
ETDM Number: 14335

Financial Project ID: 441250-1-22-01

Federal Aid Project Number: N/A

This Location Hydraulics Report contains engineering information that fulfills the purpose and need for the Gandy Boulevard Project Development & Environment Study from 4th Street in Pinellas County to West Shore Blvd in Hillsborough County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Inwood Consulting Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.



This item has been digitally signed and sealed by Renato Chuw, PE on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District Seven is conducting a Project Development and Environment (PD&E) study along State Road 600/US Highway 92/Gandy Boulevard in Pinellas and Hillsborough Counties to evaluate roadway and safety improvements along the corridor. The study limits extend for 7 miles from 4th Street in Pinellas County to West Shore Boulevard in Hillsborough County. The study will evaluate the effects of widening and reconstructing this section of Gandy Boulevard to reduce traffic congestion and improve pedestrian and bicycle accommodations.

The PD&E study is supported by preliminary engineering design activities and will determine the proposed build alternative, which will be depicted on typical roadway sections and conceptual design plans. The build alternative and the no-build, or "no action," alternative will be evaluated and compared to assess potential effects to the natural and physical environment, to determine their ability to meet the project's Purpose and Need, to obtain and consider agency and public comments, and to ensure compliance with all applicable federal and state laws. The proposed build alternative will include the construction of stormwater management facilities (SMFs) along with the use of nutrient mitigation credits. The no-build alternative will assume no improvements are made to the facility beyond routine roadway maintenance. A Natural Resources Evaluation (NRE) is being prepared as the environmental document for this study.

The purpose of this Location Hydraulics Report is to address base floodplain encroachments resulting from the roadway improvements evaluated in the PD&E Study. In accordance with Executive Order 11988 "Floodplain Management", U.S.DOT Order 5650.2, "Floodplain Management Protection", and Federal-Aid Policy Guide 23 CFR 650A, Floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the 100-year (base) floodplains and to avoid supporting land use development incompatible with floodplain values.

Floodplain encroachments areas resulting from the proposed Gandy Boulevard roadway widening were quantified. It is determined that impacts will occur to the floodplain associated with the proposed widening throughout the project limits and the extension of existing cross drains.

According to the FEMA FIRMs, the project is within Zone AE and Zone VE of the 100-year floodplain within Pinellas and Hillsborough Counties. These areas are associated with and directly connected to Old Tampa Bay and are tidally influenced. They have established 100-year flood elevations ranging from 9 to 14 feet NAVD. There are no federally regulated floodways within the project limits.

It was concluded that the project will impact approximately 119.84 acres of floodplain based on the proposed roadway alignment and preferred stormwater ponds. These impacts are minimal compared to the overall extent of the floodplain, therefore, it was determined that the floodplain encroachment is classified as "minimal." Minimal encroachments on a floodplain occur when there is a floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Please refer to **Section 3.2** for additional information.

In conclusion, the following floodplain statement is a slightly modified version of statement Number 4 in the FDOT PD&E Manual (Part 2, Chapter 13 "Floodplains"), tailored for this project:

"The proposed cross drains will perform hydraulically in a manner equal to or greater than the existing condition, and backwater surface elevations are not expected to significantly increase. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes. Therefore, it has been determined that this encroachment is not significant

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SECTION 1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT), District Seven, is conducting a Project Development and Environment (PD&E) study to evaluate improvements to US 92/SR 600/Gandy Boulevard including roadway widening, bridge widening and/or replacement, new stormwater management facilities, and pedestrian and bicycle accommodations. The limits of the study are from US 92/SR 687/4th Street North in St. Petersburg (Pinellas County) to CR 587/South West Shore Boulevard in Tampa (Hillsborough County), a distance of approximately 7.0 miles. The project study area and project limits are shown in **Figure 1-1**. The existing Gandy Boulevard is a four-lane roadway with sidewalks and segments of multi-use trails. The project is located in Sections 7 and 8 of Township 30 South, Range 18 East, and Sections 15, 16, 17, 18, and 19 of Township 30 South, Range 17 East. Proposed improvements include a 4-lane to 6-lane controlled access elevated roadway, frontage roads and multi-use trails. The results of the study will aid FDOT District Seven and the FDOT Office of Environmental Management (OEM) in deciding the location and design concept for the proposed improvements.

The project was evaluated through FDOT's Efficient Transportation Decision Making (ETDM) process as project #14335. An ETDM Programming Screen Summary Report containing comments from the Environmental Technical Advisory Team (ETAT) was published on November 8, 2018. The ETAT evaluated the project's effects on various natural, physical, and social resources.

1.2 PROJECT PURPOSE AND NEED

The purpose of this project is to reduce traffic congestion and improve pedestrian and bicycle accommodations on Gandy Boulevard.

This project is needed to address current and future traffic demand by improving roadway capacity and to address pedestrian and bicycle accommodations with potential connectivity over Old Tampa Bay. According to Forward Pinellas (Metropolitan Planning Organization) Active Transportation Plan, construction of bike lanes and a trail from 4th Street to west of San Martin Boulevard is planned. The Duke Energy/Pinellas Loop Trail from 28th Street to San Martin Boulevard and the San Martin Boulevard Trail from Macoma Drive (at Patica Road NE) to Gandy Boulevard are also planned.

Roadway Capacity: The US 92/SR 600/Gandy Boulevard PD&E study segment was divided into three segments for the purposes of roadway capacity and pedestrian analysis. The segment from 4th Street to the west end of the Gandy Bridge operates at a deficient level of service (LOS) in both the existing year 2020 and design year 2050. The segment from the east end of the Gandy bridges to West Shore Boulevard is forecasted to have a deficient LOS in the design year 2050.

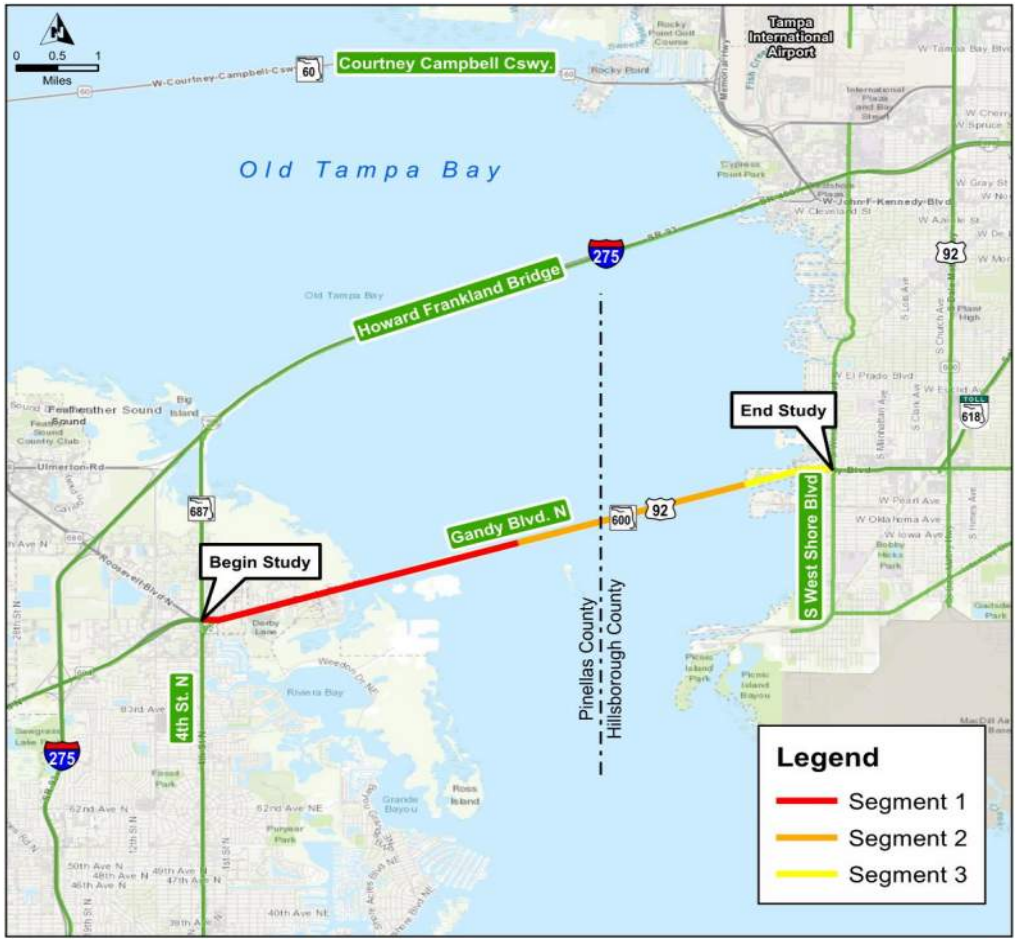
Roadway Deficiencies: On the western side of the Gandy Bridge, a sidewalk is present on the south side of the roadway from the vicinity of 99th Avenue North to approximately 0.25 miles east of San Fernando Drive. On the north side of the roadway a sidewalk is present from Oak Street to Brighton Bay Boulevard. At Brighton Bay Boulevard, a multi-use trail begins and terminates in the vicinity of the west end of Gandy bridges over Old Tampa Bay. On the eastern side of the Gandy Bridge, sidewalks are present on both sides of the roadway from the vicinity of Gandy Park South to West Shore Boulevard. There are no pedestrian or bicycle accommodations located on the Gandy Bridge. This project will address the need for bicycle and pedestrian improvements along the US 92/SR 600/Gandy Boulevard corridor.

1.3 EXISTING FACILITY AND PROJECT SEGMENTS

Gandy Boulevard is part of FDOT's Strategic Intermodal System (SIS) and a designated hurricane evacuation route. FDOT's functional classification for Gandy Boulevard is an urban principal arterial-other roadway.

The project was divided into three segments for the purpose of evaluating future traffic capacity needs and differences in existing roadway typical sections as shown in **Figure 1-1**.

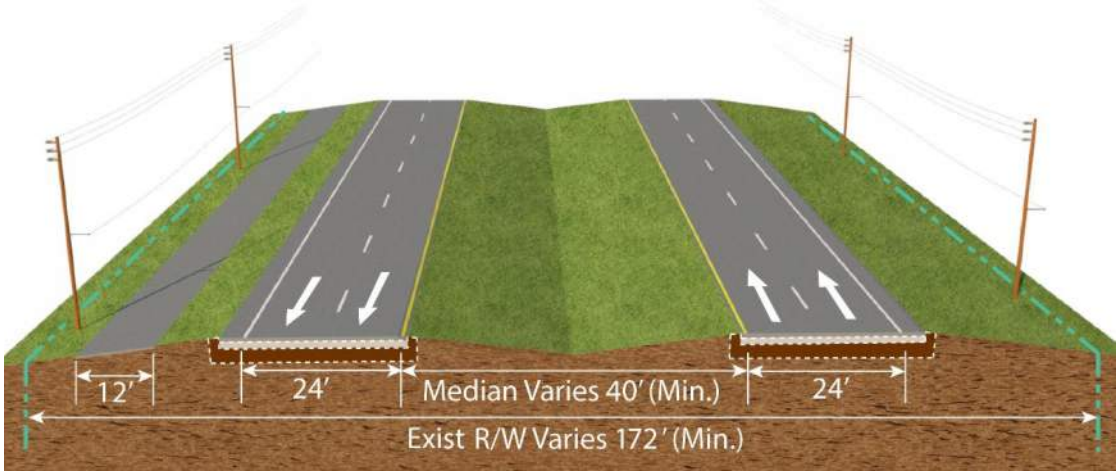
Figure 1-1: Project Location Map



1.3.1 Segment 1

Segment 1 (Pinellas Segment) begins at the western project limit at 4th Street and extends 3.5 miles to the west end of the Gandy bridges over Old Tampa Bay in Pinellas County. Within Segment 1, the existing facility consists of a four-lane divided roadway with a varying median width (40 feet minimum), four 12-foot travel lanes, paved outside shoulders (four-foot minimum) designated for bicycle use on the south side, intermittent sidewalk segments, a 12-foot multi-use trail on the north side, and open ditches along the outside. The existing right-of-way (ROW) width varies in Segment 1 with a minimum width of 172 feet as shown in **Figure 1-2**. There are numerous side street and driveway connections to the residential and business land uses between 4th Street and San Fernando Drive.

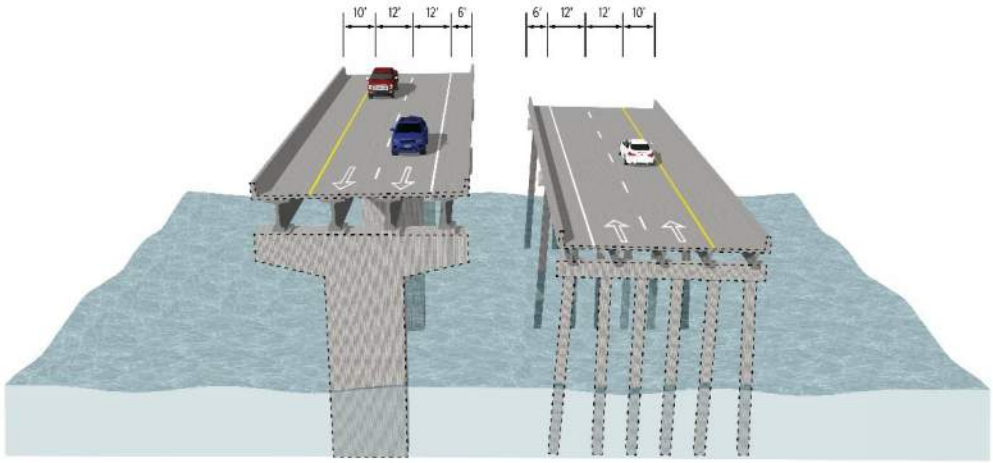
Figure 1-2: Existing Roadway Typical Section – Segment 1



1.3.2 Segment 2

Segment 2 (Bay Segment) includes the Gandy bridges over Old Tampa Bay. The existing eastbound bridge (#100300), constructed in 1975, and existing westbound bridge (#100585), constructed in 1996, extend approximately 2.5 miles. Both the existing eastbound and westbound bridges consist of two 12-foot travel lanes, a six-foot inside shoulder, and a ten-foot outside shoulder as shown in **Figure 1-3**. The westbound bridge was designed to accommodate an additional travel lane by widening on both sides of the bridge. Currently, neither the eastbound or westbound bridge provides pedestrian or bicycle accommodations.

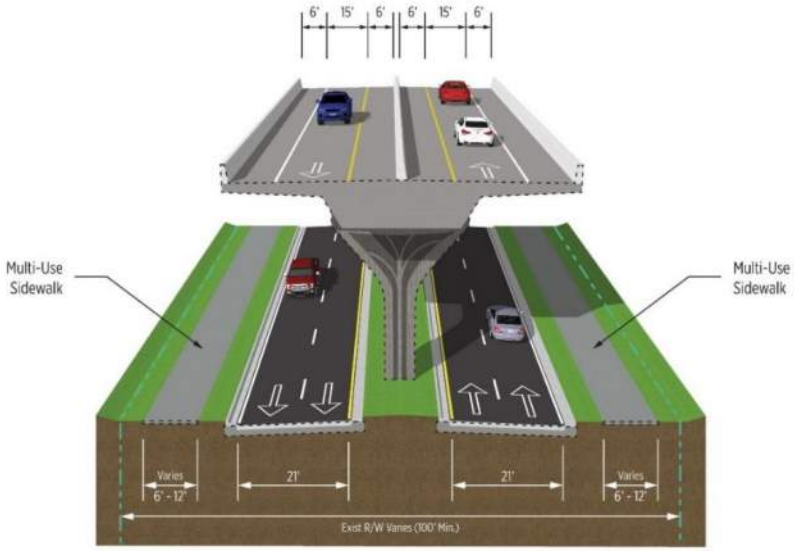
Figure 1-3: Existing Bridges Typical Section – Segment 2



1.3.3 Segment 3

Segment 3 (Hillsborough Segment) begins at the east end of the Gandy bridges over Old Tampa Bay and extends approximately one mile to West Shore Boulevard in Hillsborough County. Within Segment 3, the existing Gandy Boulevard consists of a four-lane divided roadway. The typical section consists of two 11-foot travel lanes, urban curb and gutter, and a 6 to 12-foot sidewalk/multi-use trail on the north and south side. There is a varying median width due to the inside two elevated travel lanes which serve as the Selmon Expressway (SR 618) viaduct operated and maintained by the Tampa Hillsborough Expressway Authority. The existing ROW width varies in Segment 3 with a minimum width of 100 feet as shown in **Figure 1-4**.

Figure 1-4: Existing Roadway Typical Section (Curb and Gutter) – Segment 3



1.4 PROPOSED ACTION

The proposed action is to reduce traffic congestion and improve pedestrian and bicycle accommodations by reconstructing Gandy Boulevard to provide an elevated controlled access roadway mainline separated from local traffic with frontage roads and multi-use trails on both sides of the corridor for pedestrians and bicyclists. The proposed action will also widen the existing westbound Gandy bridge to accommodate a third travel lane and construct a new bridge to provide a wider structure for three travel lanes and a multi-use trail.

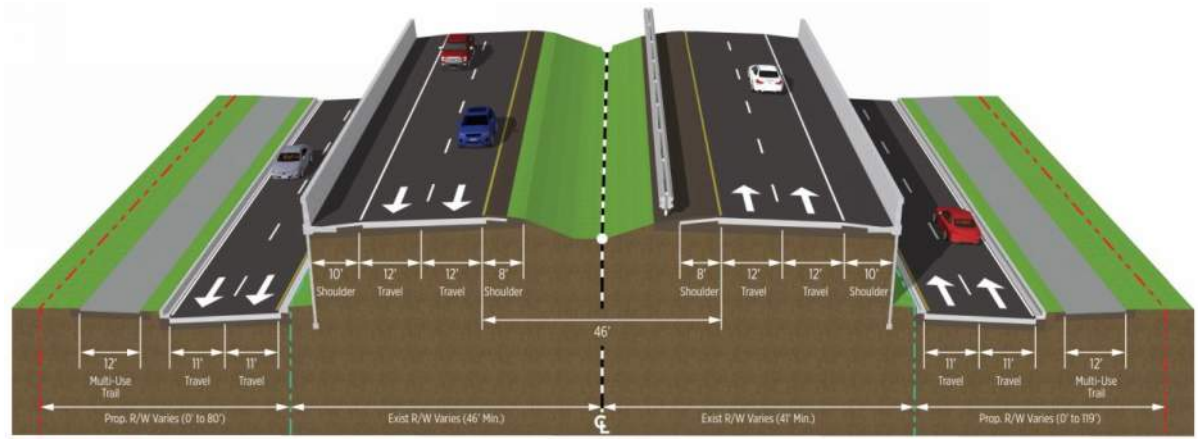
1.5 BUILD ALTERNATIVE

1.5.1 Segment 1

Typical Section 1

The Build Alternative for Segment 1 (Pinellas Segment) includes three typical sections. Typical Section 1 is proposed from 4th Street to Brighton Bay Boulevard and from east of San Martin Boulevard to approximately 3,000 feet east of San Fernando Drive. Typical Section 1 consists of an elevated controlled access facility with two 12-foot travel lanes in each direction, varying inside shoulder widths (four feet to eight feet paved), ten-foot paved outside shoulders, and a 46-foot depressed median separated by guardrail. The local traffic will be accommodated along eastbound and westbound one-way frontage roads consisting of two 11-foot travel lanes with curb and gutter. Twelve-foot multi-use trails are proposed along the outside of the frontage roads on both sides of the corridor as shown in **Figure 1-5**. Typical Section 1 will require ROW acquisition to the south side of Gandy Boulevard approaching Brighton Bay Boulevard which varies from zero to 119 feet. The alignment shifts from the south to the north through the San Martin Boulevard intersection heading east where the ROW acquisition varies from zero to 80 feet.

Figure 1-5: Segment 1 – Typical Section 1



Typical Section 2

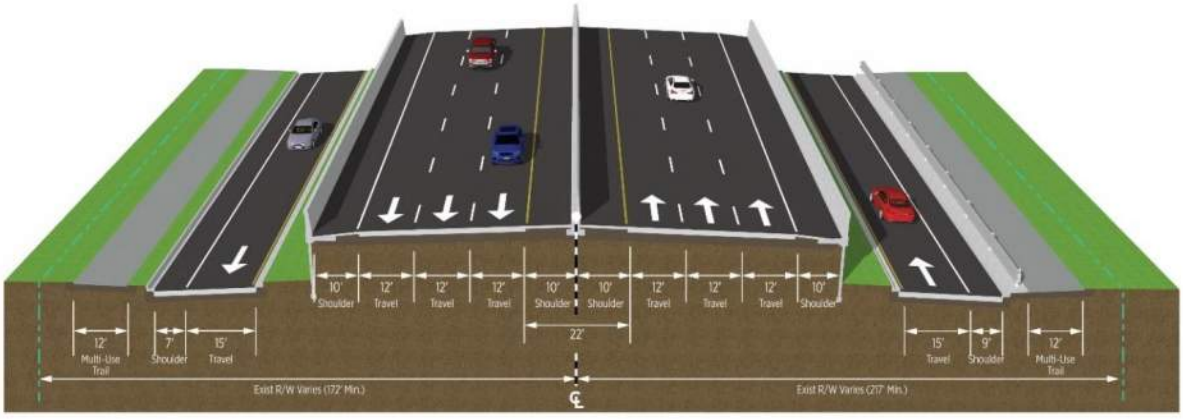
Typical Section 2 is proposed from west of Brighton Bay Boulevard to San Martin Boulevard and consists of a centered elevated viaduct with frontage roads on both sides. The viaduct consists of two 12-foot travel lanes in each direction separated by a concrete barrier wall with six-foot inside shoulders and ten-foot outside shoulders. The bridge concept could be widened to the outside if additional lanes are needed in the future. The eastbound and westbound frontage roads consist of two 11-foot travel lanes with curb and gutter. Twelve-foot multi-use trails are proposed along the outside of the frontage roads on both sides of the corridor as shown in **Figure 1-6**. Typical Section 2 will require ROW acquisition along the south side of Gandy Boulevard which varies from zero to 119 feet and along the north side of Gandy Boulevard varying from zero to 80 feet.

Figure 1-6: Segment 1 – Typical Section 2

Typical Section 3

Typical Section 3 is proposed from East of San Fernando Drive to the west end of the Gandy bridges. An additional travel lane in either direction is developed from the direct connect access ramps from the local frontage roads creating a six-lane typical section throughout the causeway which continues east over the Gandy bridges. Typical Section 3 consists of an elevated controlled access roadway with three 12-foot travel lanes in each direction, ten-foot paved inside shoulders, and ten-foot paved outside shoulders with barrier wall in each direction. The median transitions from 46 feet to 22 feet with opposing travel lanes separated by median barrier wall. One-lane frontage roads are proposed on the outside of the controlled access roadway in each direction with a 15-foot travel lane, varying outside shoulder widths (seven feet to nine feet paved), curb and gutter, and a 12-foot multi-use trail. One of the frontage roads will provide access to multi-use trail parking. Typical Section 3 is proposed within the existing FDOT ROW as shown in **Figure 1-7**.

Figure 1-7: Segment 1 – Typical Section 3

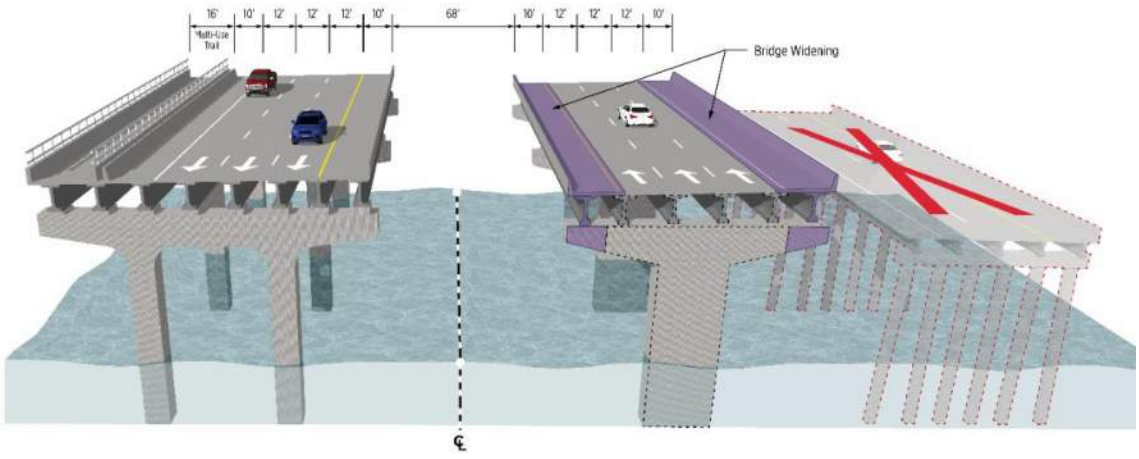


1.5.2 Segment 2

Typical Section 4

The Build Alternative for Segment 2 (Bay Segment) includes Typical Section 4 with three eastbound travel lanes, three westbound travel lanes, and a multi-use trail on the north side of the westbound bridge. As part of the Build Alternative, the existing eastbound bridge (#100300) will be demolished. The existing westbound bridge (#100585) will be widened to both the north and south sides and placed into service as the eastbound bridge. The widened bridge (#100585) will consist of three 12-foot travel lanes and ten-foot inside and outside shoulders. A new westbound bridge will be constructed on the north side of the widened bridge. The new westbound bridge will consist of three 12-foot travel lanes, ten-foot inside and outside shoulders, and a 16-foot multi-use trail separated by barrier wall as shown in **Figure 1-8**. The typical section includes an 88-foot median with approximately 65 feet of separation between the two bridges for constructability. The proposed bridge improvements over Old Tampa Bay are within the existing FDOT ROW.

Figure 1-8: Segment 2 – Typical Section 4

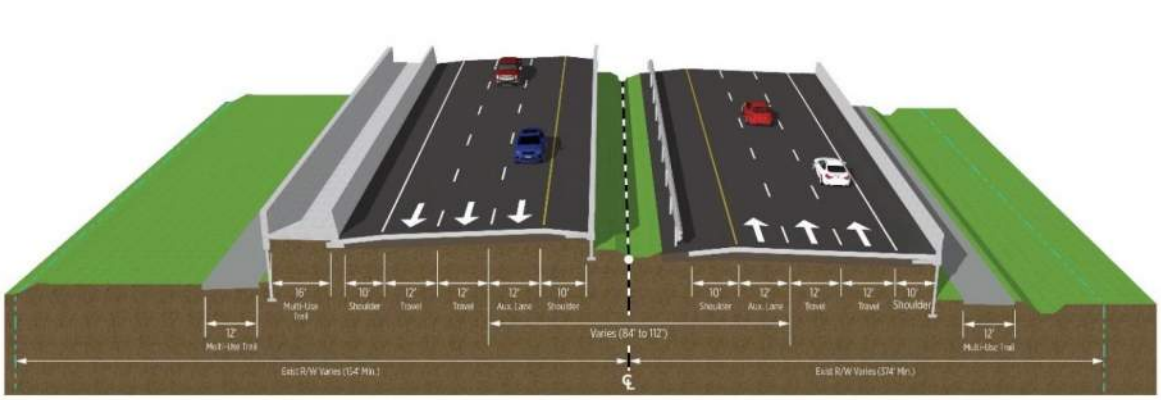


1.5.3 Segment 3

Typical Section 5

The Build Alternative for Segment 3 (Hillsborough Segment) provides a four-lane and six-lane divided typical section. Typical Section 5 is a transitional typical section proposed between the east end of the Gandy bridges to approximately 1,800 feet west of Bridge Street where the Selmon Expressway two-lane elevated viaduct begins in the median. Typical Section 5 consists of three 12-foot travel lanes in each direction, ten-foot paved inside shoulders bordered with guardrail and barrier wall, and ten-foot paved outside shoulders with barrier wall. The inside travel lanes function as the general use lanes across the Gandy bridges and become auxiliary lanes to serve as the entrance and exit lanes for the Selmon Expressway viaduct in the median. A 12-foot wide multi-use trail is proposed on both sides of the roadway as shown in **Figure 1-9**.

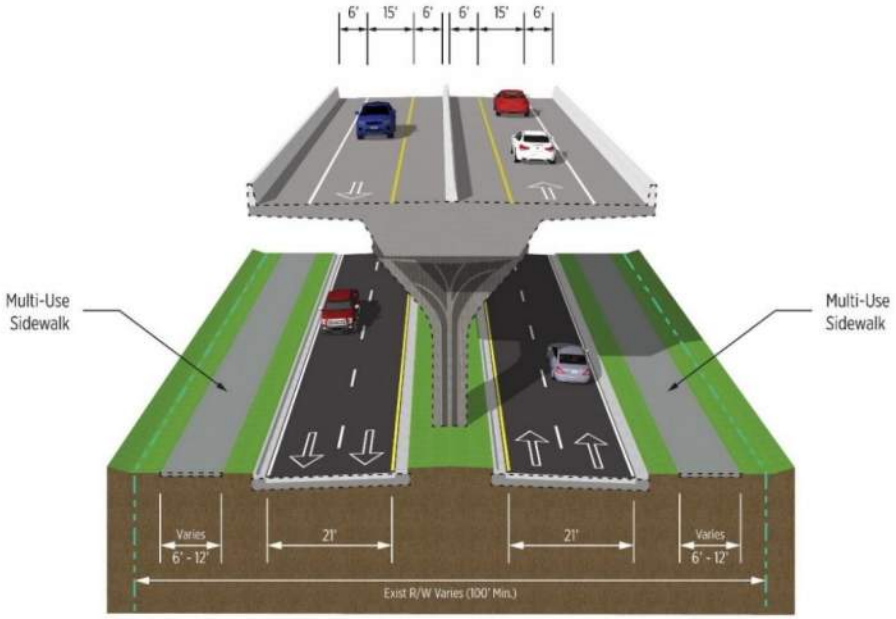
Figure 1-9: Segment 3 – Typical Section 5



Typical Section 6

Typical Section 6 is proposed from approximately 1,800 feet west of Bridge Street to West Shore Boulevard. The proposed improvements within the limits of Typical Section 6 are limited to intersection and access management improvements, and auxiliary lane development to connect the proposed relocated Gandy Boat Ramp turnout approximately 800 feet west of Bridge Street. The proposed typical section will match the existing roadway with a four-lane divided roadway, one 10-foot travel lane and one 11-foot travel lane in each direction. Typical Section 6 will accommodate the existing Selmon Expressway two-lane viaduct within the median with intermittent bridge piers. (**Figure 1-10**). The Segment 3 improvements are proposed within the existing FDOT ROW.

Figure 1-10: Segment 3 – Typical Section 6



1.6 PROPOSED POND SITES

There are four proposed drainage basins associated with the Build Alternative. In Basin 1, there is one proposed stormwater management facility (SMF), which is an expansion of an existing FDOT SMF. In Basin 2, there are two offsite wet detention SMF alternatives, both located on the south side of Gandy Boulevard, and one (Pond 2B) is recommended for this study. Basins 3 are 4 are proposed to utilize nutrient removal credits that were created by the Old Tampa Bay Water Quality Improvement Project, and therefore do not have proposed SMFs. In total, two SMFs are recommended for this study.

1.7 PURPOSE OF THIS REPORT

The purpose of this Location Hydraulics Report (LHR) is to discuss, analyze, and identify the stormwater management plan for the proposed roadway improvements based on environmental, hydrologic, hydraulic, and economic factors. This Location Hydraulics Report was prepared in accordance with the FDOT *PD&E Manual* to meet the requirements of the National Environmental Policy Act (NEPA) and other associated federal and state laws, rules, and regulations.

SECTION 2 DATA COLLECTION

The design team collected and reviewed data from the following sources:

- Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel Nos. 12103C0207H, 12103C0226H, 12103C0163H, 12103C0164H, Effective Date 8/24/21 in Pinellas County, Florida and 12057C0343J, Effective Date 10/7/2021, in Hillsborough County, Florida.
- United States Geological Survey (USGS) Quadrangle Maps
- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soils Survey of Pinellas County, Florida, 2020 and Soils Survey of Hillsborough County, Florida, 2020
- Existing Permit Databases (SWFWMD)
- 1-ft LIDAR Data Source: Florida Division of Emergency Management (FDEM), Pinellas County and Hillsborough County, 2005

SECTION 3 EXISTING DRAINAGE CONDITIONS

3.1 TOPOGRAPHY & HYDROLOGIC FEATURES

Topography throughout the project is relatively flat with elevations ranging from 0 feet to 10 feet. All elevations mentioned in this report are in reference to the North American Vertical Datum of 1988 (NAVD) unless otherwise stated. Reference material that was originally in the National Geodetic Datum of 1929 (NGVD) was converted to NAVD using the equation NAVD = NGVD – 0.89 feet. Please refer to the **USGS Quadrangle Map**, **Figure 2** in **Appendix A**. The Pinellas County Aquatic Preserve is an Outstanding Florida Water (OFW) and is within the Pinellas County segment of the study. There are five (5) existing cross drains underneath Gandy Blvd and the bridge over Old Tampa Bay within the project limits. The cross drains allow for conveyance of offsite and onsite runoff beneath the road toward its historical path. The size and geometry of all cross drains and bridges culverts have been established from existing plans and permit documents. Please refer to **Table 3-1** for a **Summary of Existing Cross Drains**. Locations of the cross drains can be found in **Appendix B – Basin Maps**. Information regarding the existing bridge over Old Tampa Bay can be found in the National Bridge Inventory of which a copy is included in **Appendix F** of this report.

Table 3-1: Summary of Existing Cross Drains

Structure No.	Station	Description
CD-1	214+49	5’W x 3’H CBC
CD-2	226+51	24” RCP
CD-3	247+41	24” RCP
CD-4	260+87	24” x 38” RCP
CD-5	566+33	24” RCP

3.2 FLOODPLAINS

According to the Federal Emergency Management Agency (FEMA), the relevant Flood Insurance Rate Map (FIRM) panel numbers are 12103C0207H, 12103C0226H, 12103C0163H, 12103C0164H, in Pinellas County, dated 8/24/21, and 12057C0343J, in Hillsborough County, dated 10/7/2021.

According to the FEMA FIRMs, the entirety of the project lies within Zone AE and Zone VE of the 100-year floodplain with elevations ranging from 9 to 14 feet. These areas are associated with Old Tampa Bay and have a 1% probability of flooding every year with predicted flood water elevations that have been established. The flood zones within the project area are directly connected to Old Tampa Bay and therefore are tidally influenced. There are no federally regulated floodways within the project limits. Please refer to **Figure 5** in **Appendix A** for the **FEMA Floodplains Map**.

General comments relating to floodplains include the fact that any development within the 100-year floodplain has the potential for placing citizens and property at risk of flooding and producing changes in floodplain elevations and plan view extent. Development (such as roadways, housing developments, strip malls and other commercial facilities) within floodplains increases the potential for flooding by limiting flood storage capacity and exposing people and property to flood hazards. Development also reduces

vegetated buffers that protect water quality and destroys important habitats for fish and wildlife. The area surrounding the proposed roadway widening project has and will continue to experience growth.

Floodplain impacts were quantified by identifying and measuring areas in which the floodplain will potentially be impacted by proposed roadway fill within each drainage basin. This study did not evaluate the profile or elevations of the proposed roadway improvements. As a result, floodplain impacts were quantified in acres. It should be noted that the average floodplain elevations throughout this area are approximately 2-3 feet higher than the existing ground and most of the project is within the floodplain, so it should be anticipated that nearly all roadway fill will cause floodplain impacts. In total, it was estimated that there will be approximately 118.76 acres of impacts due to roadway improvements and an additional 1.08 acres associated with preferred Pond 2B. However, since these floodplains are all tidally influenced due to their direct connection to Old Tampa Bay it was determined that floodplain compensation is not required.

3.2.1 Flooding History and Maintenance Concern

Discussions were held with the FDOT regarding drainage issues along the project corridor. Abdul Waris from FDOT indicated that a flooding complaint was received for flooding occurring within the ditch between the Goodwill Industries property and the adjacent Mobile Home Park. The ditch, which has an easement over it and outfalls to the roadway R/W, has since been cleaned out to ease the flooding. Additional maintenance issues related to local construction have been submitted to FDOT and subsequently resolved. Copies of these requests can be found in the Correspondence appendix of the *Pond Siting Report***.**

SECTION 4 PROPOSED DRAINAGE CONDITIONS

The stormwater runoff from the project limits will be collected and conveyed to the recommended preferred pond alternative for Basins 1 and 2 via curb and gutter. The various pond alternatives consist of wet detention ponds. The ponds will discharge at or near the same cross drains or storm sewer systems that carry the roadway runoff in the existing condition. The proposed ponds have been sized to achieve the required water quality treatment and water quantity attenuation and assist the Department in the right-of-way estimation for the project. Please refer to the *Pond Siting Report* prepared for this study for more information.

A preliminary analysis of the cross drains has been performed to determine whether the existing cross drains have adequate capacity due to the increase in length. It is anticipated that extending each of these cross drains will not cause a significant increase in the headwater elevation. Please note that the hydraulic analysis is based on providing adequate conveyance capacity. **Table 4-1** below provides a **Summary of Cross Drains**.

Table 4-1: Summary of Cross Drains

Structure No.	Station	Existing Condition				Proposed Condition				Recommendation
		# of Barrels	Size	Type	Length (ft)	# of Barrels	Size	Type	Length (ft)	
CD-1	214+49	1	5’ X 3’	CBC	242	1	5’ X 3’	CBC	253	Extend
CD-2	226+51	1	24”	RCP	152	1	24”	RCP	259	Extend
CD-3	247+41	1	24”	RCP	130	1	24”	RCP	164	Extend
CD-4	260+87	1	24” X 38”	RCP	143	1	24” X 38”	RCP	228	Extend
CD-5	566+33	1	24”	RCP	149	1	24”	RCP	149	None

Hydraulic analysis was performed on CD-1 through CD-4 to compare the existing and proposed conditions. CD-5 is not anticipated to require any modification and therefore was not analyzed. All of the existing cross drains are within the limits of permitted improvements to Gandy Boulevard and pipe and flow data was collected from relevant documents. Where information was not available, assumptions were made based on the best available data including 1-foot LIDAR contours and aerial imagery. Excerpts from relevant permits are located in **Appendix E – Cross Drain Analysis Backup Information**.

For each cross drain, flows for the 50-year, 100-year, and 500-year storm frequencies were determined from existing data where available and supplemented with linear regression calculations. During the design phase, permitted information should be verified through survey and updated as appropriate. The cross drains were analyzed using the Federal Highway Administration HY-8 (v. 7.60) cross drain modeling software. For more information regarding the Cross Drain Analysis please refer to **Appendix D**.

4.1 LONGITUDINAL & TRANSVERSE FLOODPLAIN IMPACTS

The project will impact the 100-year floodplain in two (2) different ways;

1) Longitudinal impacts resulting from filling the floodplain areas associated with proposed roadway widening within the project limits, isolated wetlands, wetland systems, and depressional areas.
2) Transverse impacts resulting from the extension of the existing cross drain culverts.

The longitudinal impacts cannot be avoided since the floodplains extend both north and south of Gandy Boulevard within the study limits. The floodplain impact area was quantified based on the FEMA FIRMs and established 100-year base flood elevation, and the existing ground elevations were established from 1-foot LIDAR contours. Floodplain impacts were quantified by identifying and measuring areas in which the floodplain will potentially be impacted by proposed roadway fill within each drainage basin.

The transverse impacts resulting from the extension or replacement of the culverts have not been analyzed in this report. To minimize upstream impacts, FDOT design criteria for conveyance systems (e.g. culverts) allow no significant rise in flood stages at the upstream end of the structures. During design, efforts should be made to show that proposed base headwater elevations will not surpass 0.04 feet of rise from the existing condition, and every necessary action should be taken to minimize upstream impacts. A preliminary hydraulic analysis of the cross drains has been performed as part of this study and included in this report.

A Bridge Hydraulics Report will be required during the design phase to evaluate the hydraulic impacts to the Gandy Boulevard bridge over Old Tampa Bay. The proposed improvements include removal of the existing eastbound bridge, widening of the existing westbound bridge and conversion into the new eastbound bridge, and construction of a new westbound bridge.

4.2 PROJECT CLASSIFICATION

The floodplain is located in a high-density, urbanized area, but the encroachment area is classified as “minimal”. Minimal encroachments on a floodplain occur when there is a floodplain involvement, but the impacts on human life, transportation facilities, and natural and beneficial floodplain values are not significant and can be resolved with minimal efforts. Normally, these minimal efforts to address the impacts will consist of applying the Department’s drainage design standards and following the Water Management District’s procedures to achieve results that will not increase or significantly change the flood elevations and/or limits.

4.3 RISK EVALUATION

There is no change in flood “risk” associated with this project. The encroachments will not have a significant potential for interruption or termination of transportation facilities needed for emergency vehicles or used as an evacuation route. In addition, no significant adverse impacts on natural and beneficial floodplain values are anticipated and no significant impacts to highway users are expected.

4.4 PD&E MANUAL REQUIREMENTS WITH MINIMAL ENCROACHMENT

Chapter 13 – Floodplains of the FDOT's PD&E Manual, Part 2, defines four categories of encroachments as they pertain to base floodplain involvement; significant, minimal, none and no involvement, and also lists the report criteria corresponding to these encroachment categories. The FDOT has different requirements based on the category of encroachment. The proposed Gandy Boulevard widening project was determined to have minimal encroachments and as a result, the requirements for this category are listed as follows:

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

See Sections 1.0 through 3.2 of this LHR for general project information and the Pond Siting Report for drainage basin descriptions.

b) Determination of whether the proposed action is in the base floodplain.

It has been determined that improvements associated with the widening of Gandy Boulevard will encroach on the Zone AE and Zone VE 100-year floodplain as established by the most recent FEMA maps dated 8/24/2021 in Pinellas County and 10/7/2021 in Hillsborough County.

c) The history of flooding of the existing facilities and/or measures to minimize any impacts due to the proposed project improvements.

All floodplains within the project area are tidally influenced and Gandy Boulevard is subject to flooding related to storm surge, tide changes and rainfall events. Due to the tidal influence, floodplain compensation is not required. The project will have no adverse impact on the existing condition.

d) Determination of whether the encroachment is longitudinal or transverse, and if it is a longitudinal encroachment an evaluation and discussion of practicable avoidance alternatives.

With the increase in the number of travel lanes proposed, there will be longitudinal and transverse impacts to the floodplain. Longitudinal impacts will be minimized by utilizing the maximum allowable roadway embankment slope.

The transverse floodplain impacts from the project occur due to the lengthening of the existing cross drains. The impacts at these locations are not analyzed during this study and will need to be addressed during the design phase. A preliminary hydraulic analysis for the longer cross drains has been performed for this study and included in this report.

The existing roadway bisects the floodplain. There are no economically feasible avoidance alternatives.

e) The practicability of avoidance alternatives and/or measures to minimize impacts.

The project will take every effort to minimize floodplain impacts resulting from the roadway fill. The maximum allowable roadway embankment slope will be used within the floodplain area to minimize the floodplain impacts.

f) Impact of the project on emergency services and evacuation.

The proposed cross drains will perform hydraulically in a manner equal to or greater than the existing condition, and backwater elevations are not expected to increase significantly. As a result, there will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or in emergency evacuation routes.

g) Impacts of the project on the base flood, likelihood of flood risk, overtopping, location of overtopping, backwater.

The proposed cross drains will perform hydraulically in a manner equal to or greater than the existing condition. As a result, there will be no significant change in flood risk or overtopping.

h) Determination of the impact of the proposed improvements on regulatory floodways, if any, and documentation of coordination with FEMA and local agencies to determine the project's consistency with the regulatory floodway.

There is no involvement with regulatory floodways on this project.

i) The impacts on natural and beneficial floodplain values, and measures to restore and preserve these values (this information may also be addressed as part of the wetland impact evaluation and recommendations).

Addressed as part of the Natural Resource Evaluation Report.

j) Consistency of the project with the local floodplain development plan or the land use elements in the Comprehensive Plan, and the potential impacts of encouraging development within the 100-year base floodplain.

The project will remain consistent with local floodplain development plans. The project will not support base floodplain development that is incompatible with existing floodplain management programs.

k) Measures to minimize floodplain impacts associated with the project, and measures to restore and preserve the natural and beneficial floodplain values impacted by the project.

The project will take every effort to minimize floodplain impacts resulting from the roadway fill. The maximum allowable roadway embankment slope will be used within the floodplain area to minimize the floodplain impacts.

l) A map showing project, location and impacted floodplains. Copies of applicable maps should be included in the appendix.

See Figure 5 in Appendix A.

m) Results of any and all project risk assessments performed.

The proposed cross drains will perform hydraulically in a manner equal to or greater than the existing condition. As a result, there will be no significant change in flood risk.

SECTION 5 CONCLUSIONS AND RECOMMENDATIONS

The modification to the cross drains included in the project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. An alternative encroachment location is not considered in this category as it defeats the project purpose or is economically unfeasible. The proposed structures should be hydraulically equivalent to or greater than the existing structures, and backwater surface elevations are not expected to significantly increase. As a result, the project will not affect existing flood heights or floodplain limits. This project will not result in any new or increased adverse environmental impacts. There will be no significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that these encroachments are not significant.

APPENDICES

Appendix A Exhibits

Appendix B Basin Maps

Appendix C Floodplain Impact Calculations

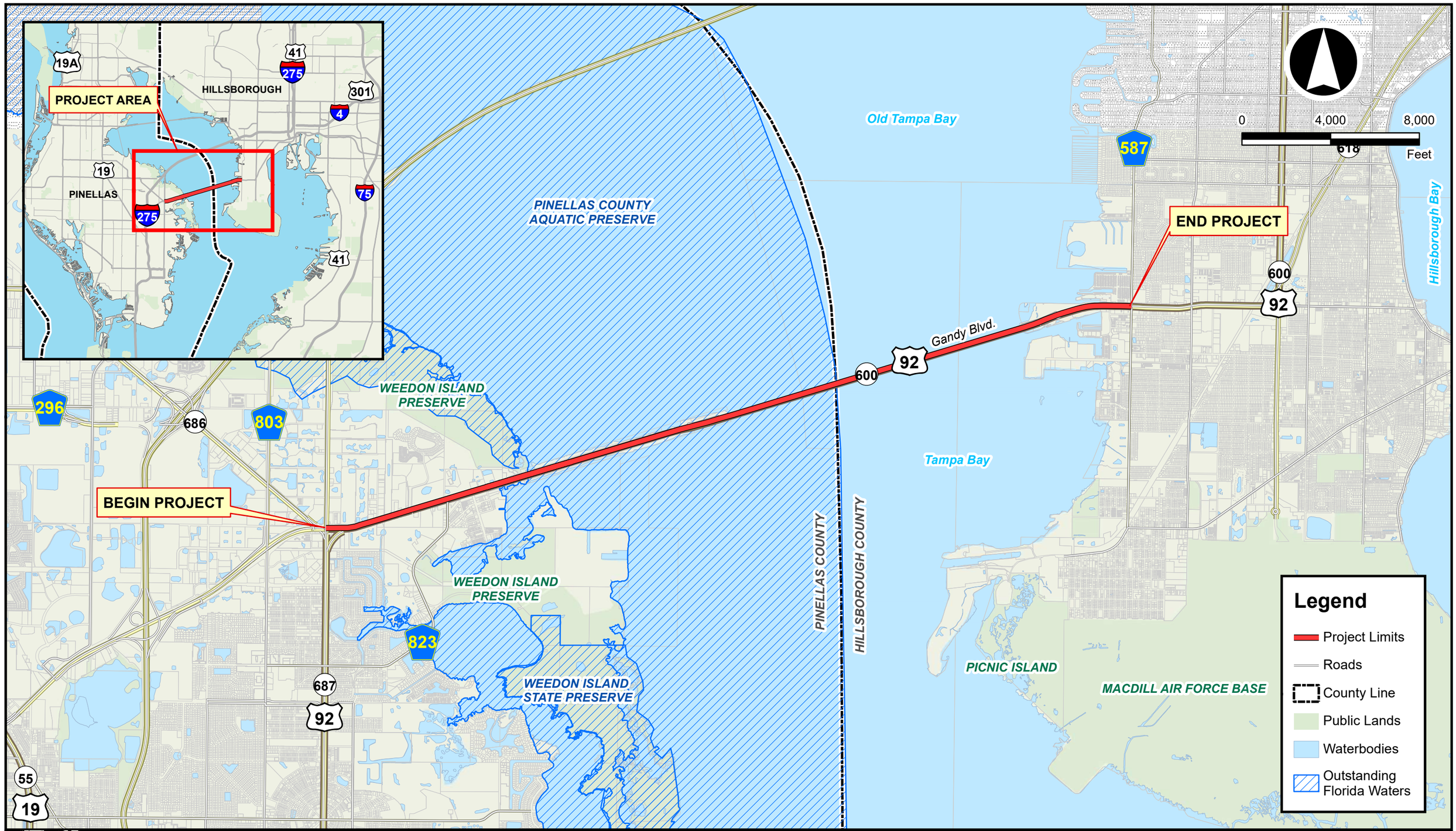
Appendix D Cross Drain Analysis

Appendix E Cross Drain Analysis Backup Information

Appendix F National Bridge Inventory Data

APPENDIX A

Figures



Florida Department of Transportation

District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

PROJECT LOCATION MAP

Figure
1

SAFETY HARBOR

GANDY BRIDGE

ST. PETERSBURG

PORT TAMPA

BEGIN PROJECT

END PROJECT

0 3,000 6,000 Feet

Legend

Project Limits

USGS Quadrangle

Florida Department of Transportation

District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

USGS QUADRANGLE MAP

Figure 2

Pinellas County Soil Descriptions

3: Anclote Fine Sand,
7: Basinger Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes*
10: EauGallie Soils and Urban Land
12: Felda Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes*
13: Immokalee Soils and Urban Land
14: Kesson Fine Sand, Very Frequently Flooded
16: Matlacha and St. Augustine Soils and Urban
17: Myakka Soils and Urban Land
22: Pineda Soils and Urban Land
24: Pits*
30: Urban Land, 0 to 2 Percent Slopes
31: Wabasso Soils and Urban Land
32: Wulfert Muck, Tidal, 0 to 1 Percent Slopes
58: Wabasso - Urban Land Complex*
99: Water*
100: Waters of the Gulf of Mexico

Hillsborough County Soil Descriptions

22: Immokalee - Urban Land Complex*
32: Myakka - Urban Land Complex*
45: St. Augustine - Urban Land Complex
56: Urban Land, 0 to 2 Percent Slopes*
58: Wabasso - Urban Land Complex
99: Water
100: Waters of the Gulf of Mexico

*Soil does not intersect study limits

BEGIN PROJECT

END PROJECT

0 2,500 5,000 Feet

Gandy Blvd.

PINELLAS COUNTY

HILLSBOROUGH COUNTY

Legend

- Project Limits
- Roads
- Parcels
- County Line

Soil Rating

Hydrogroup

- A/D
- B
- B/D
- C/D
- Water
- Pits/Urban Land

Florida Department of Transportation
District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

NRCS SOILS MAP

Figure 3

SWFWMD LAND USE

URBAN AND BUILT UP
- 1200: RESIDENTIAL MED DENSITY 2 TO 5 DWELLING UNITS PER ACRE
- 1300: RESIDENTIAL HIGH DENSITY
- 1400: COMMERCIAL AND SERVICES
- 1500: INDUSTRIAL
- 1700: INSTITUTIONAL
- 1800: RECREATIONAL
- 1900: OPEN LAND

RANGELAND
- 3200: SHRUB AND BRUSHLAND

UPLAND FOREST
- 4110: PINE FLATWOODS

WATER
- 5300: RESERVOIRS
- 5400: BAYS AND ESTUARIES

WETLANDS
- 6120: MANGROVE SWAMPS
- 6150: STREAM AND LAKE SWAMPS (BOTTOMLAND)
- 6210: CYPRESS
- 6300: WETLAND FORESTED MIXED
- 6410: FRESHWATER MARSHES
- 6420: SALTWATER MARSHES
- 6440: EMERGENT AQUATIC VEGETATION
- 6600: SALT FLATS

BARREN LAND
- 7100: BEACHES OTHER THAN SWIMMING

TRANSPORTATION AND UTILITIES
- 8100: TRANSPORTATION
- 8200: COMMUNICATION
- 8300: UTILITIES

BEGIN PROJECT

END PROJECT

0 2,500 5,000 Feet

Gandy Blvd.

PINELLAS COUNTY

HILLSBOROUGH COUNTY

Legend
- Project Limits
- Roads
- Parcels
- County Line

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Florida Department of Transportation
District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

LAND USE MAP

Figure
4

Flood Zone Descriptions

AE: 100-year flood zone with established Base Flood Elevation (BFE)

VE: 100-year coastal flood zone with wave action and established Base Flood Elevation (BFE)

PANEL 12103C0161H eff. 8/24/2021

PANEL 12057C0337J eff. 10/7/2021

PANEL 12057C0341J eff. 10/7/2021

PANEL 12103C0144H eff. 8/24/2021

PANEL 12103C0163H eff. 8/24/2021

PANEL 12103C0164H eff. 8/24/2021

PANEL 12103C0207H eff. 8/24/2021

PANEL 12103C0226H eff. 8/24/2021

PANEL 12057C0452J eff. 10/7/2021

PANEL 12057C0343J eff. 10/7/2021

PANEL 12057C0344J eff. 10/7/2021

PANEL 12057C0456J eff. 10/7/2021

BEGIN PROJECT

END PROJECT

Gandy Blvd.

92

600

686

687

823

587

PINELLAS COUNTY

HILLSBOROUGH COUNTY

EL. 8 ft
EL. 9 ft
EL. 10 ft
EL. 11 ft
EL. 12 ft
EL. 13 ft
EL. 14 ft
EL. 15 ft

0 2,500 5,000 Feet

Legend

- Project Limits
- Roads
- Parcels
- County Line
- FEMA FIRM Panels

Flood Zone

- AE
- VE
- OPEN WATER

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Florida Department of Transportation
District 7

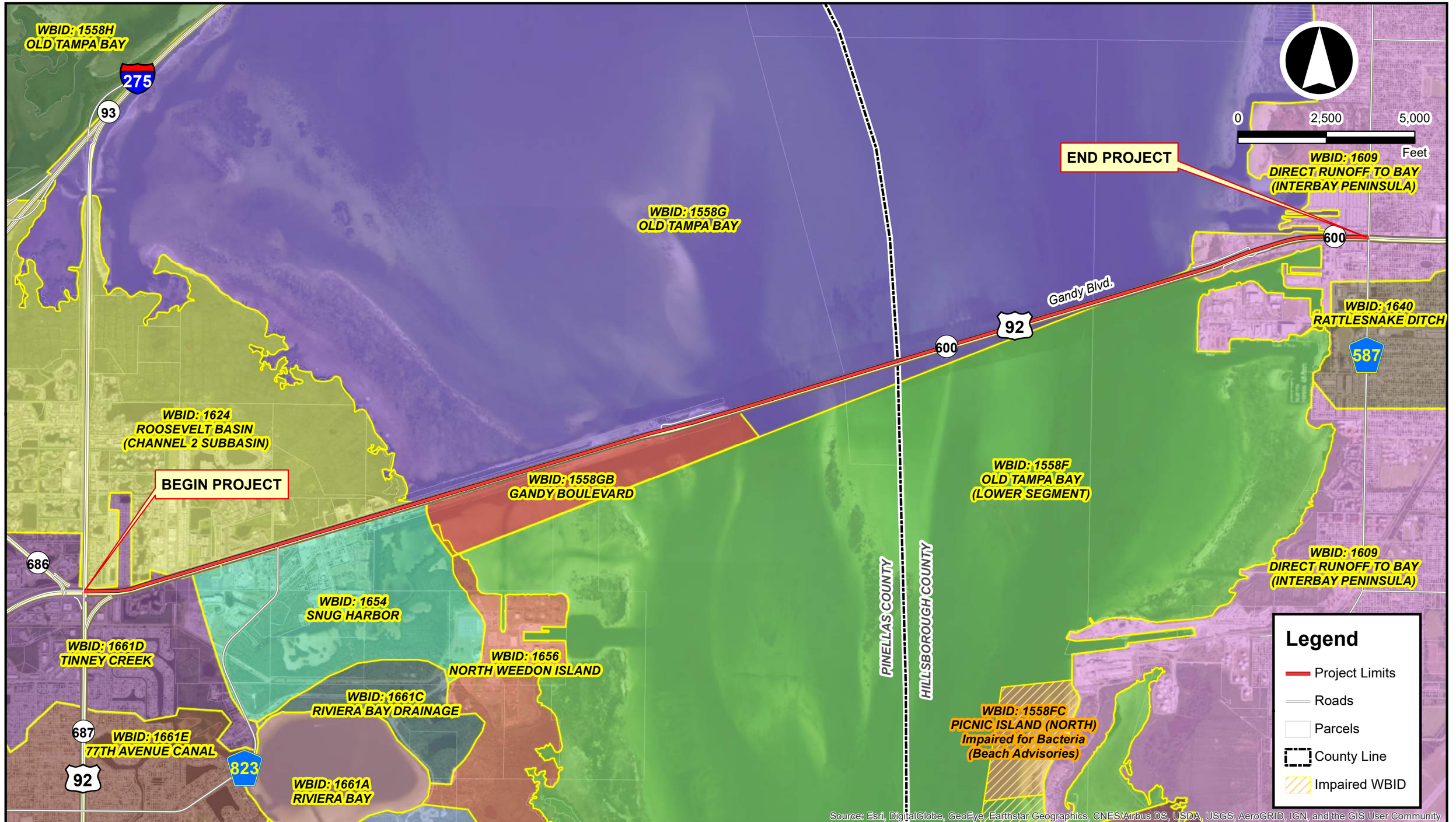
US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

FEMA MAP

Figure 5



Florida Department of Transportation
District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

WBID MAP

Figure
6

Florida Department of Transportation
District 7

US 92 / SR 600 / Gandy Boulevard PD&E Study

From 4th Street to West Shore Boulevard
Hillsborough & Pinellas Counties, Florida

Financial Project ID: 441250-1-22-01

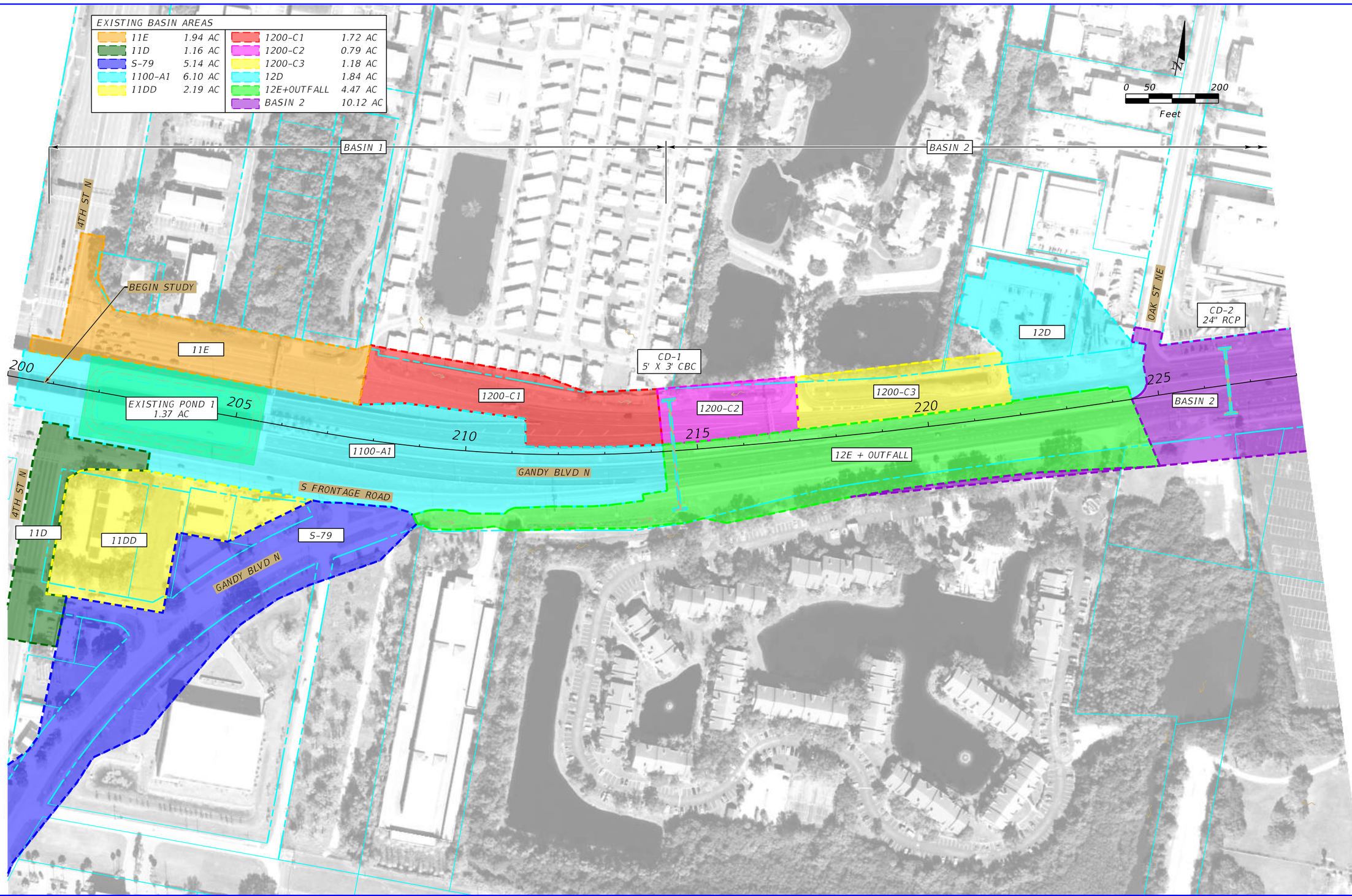
SENSITIVE KARST AREAS MAP

Figure 7

APPENDIX B

Basin Maps

EXISTING BASIN AREAS			
11E	1.94 AC	1200-C1	1.72 AC
11D	1.16 AC	1200-C2	0.79 AC
S-79	5.14 AC	1200-C3	1.18 AC
1100-A1	6.10 AC	12D	1.84 AC
11DD	2.19 AC	12E+OUTFALL	4.47 AC
		BASIN 2	10.12 AC



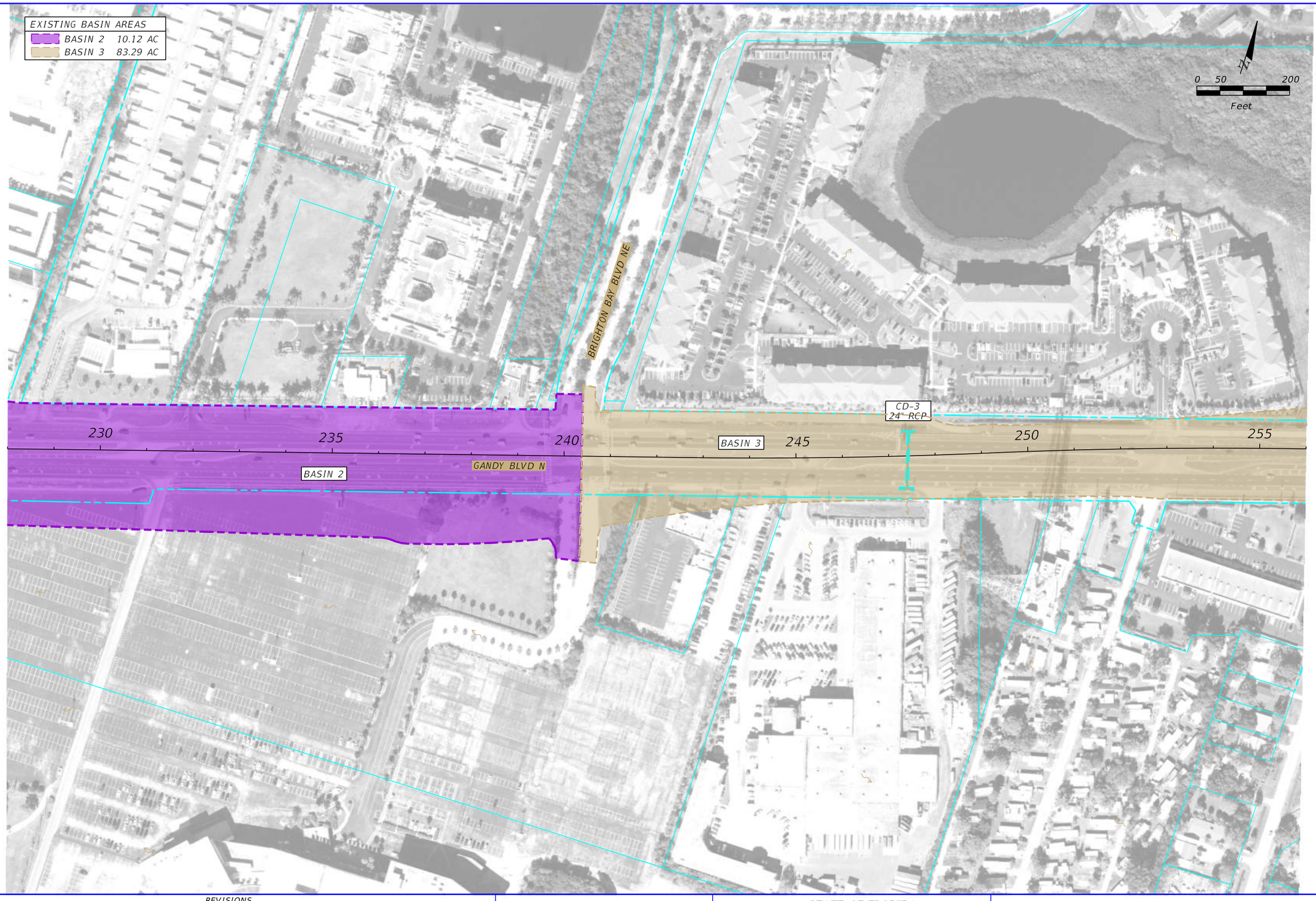
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 1



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 2

EXISTING BASIN AREAS
BASIN 3 83.29 AC

N

0 50 200
Feet

MANGROVE CAY LN NE

CD-4
24" X 38" RCP

260 265 BASIN 3 270 275 280

GANDY BLVD N

SNUG HARBOR RD NE

SAN FERNANDO DR NE

SAN MARTIN BLVD NE

RICARDO PL NE

SAVONA DR

PLAZA COMERCIO NE

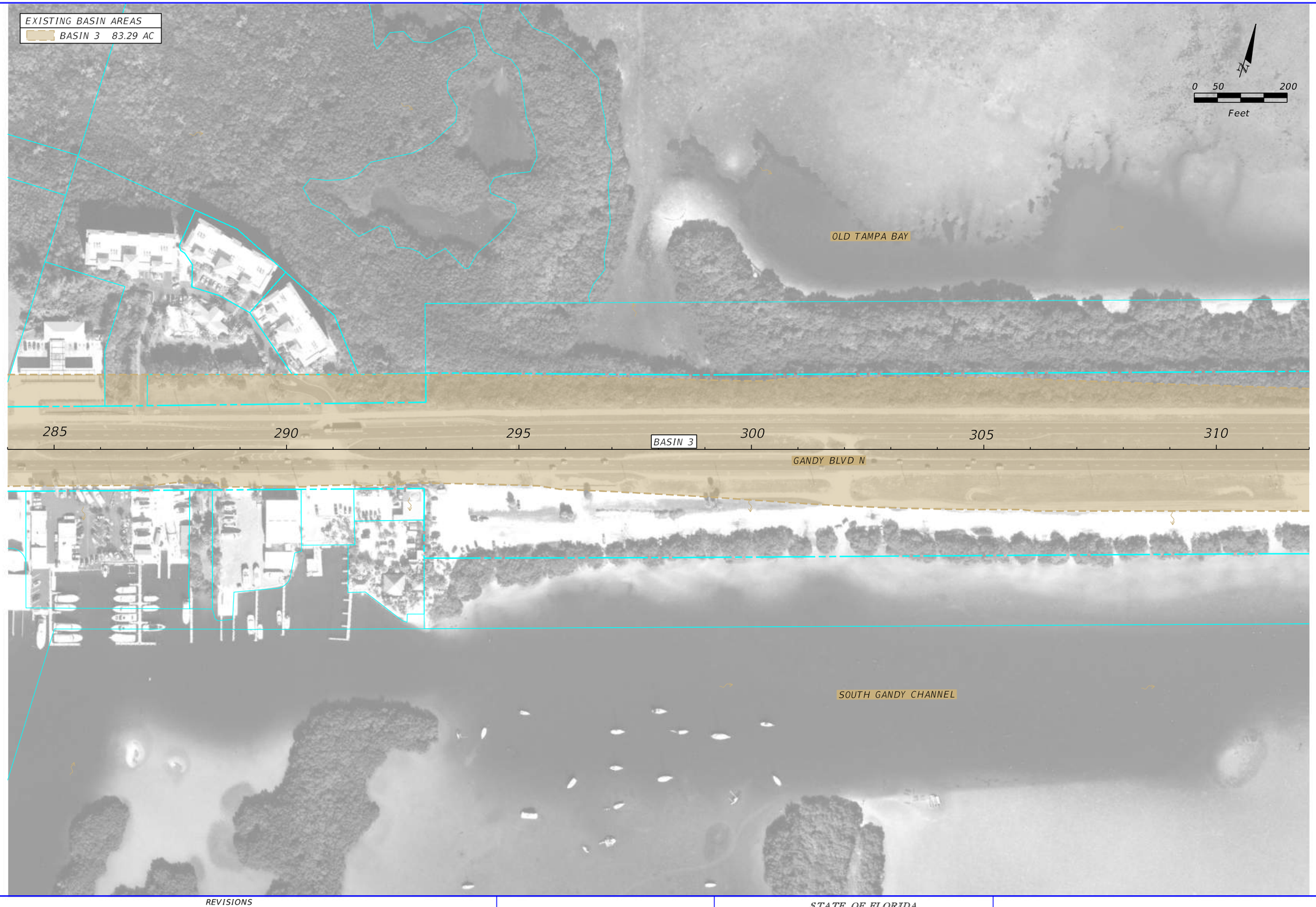
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 3



REVISIONS					STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION				SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	BASIN MAPS (EXISTING)	4
					SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01		

EXISTING BASIN AREAS

BASIN 3 83.29 AC

N

0 50 200

Feet

OLD TAMPA BAY

315 320 325 330 335 340

BASIN 3

GANDY BLVD N

SOUTH GANDY CHANNEL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 5

EXISTING BASIN AREAS

BASIN 3 83.29 AC

N

0 50 200

Feet

OLD TAMPA BAY

340 345 350 355 GANDY BLVD N 360 365

BASIN 3

SOUTH GANDY CHANNEL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 6

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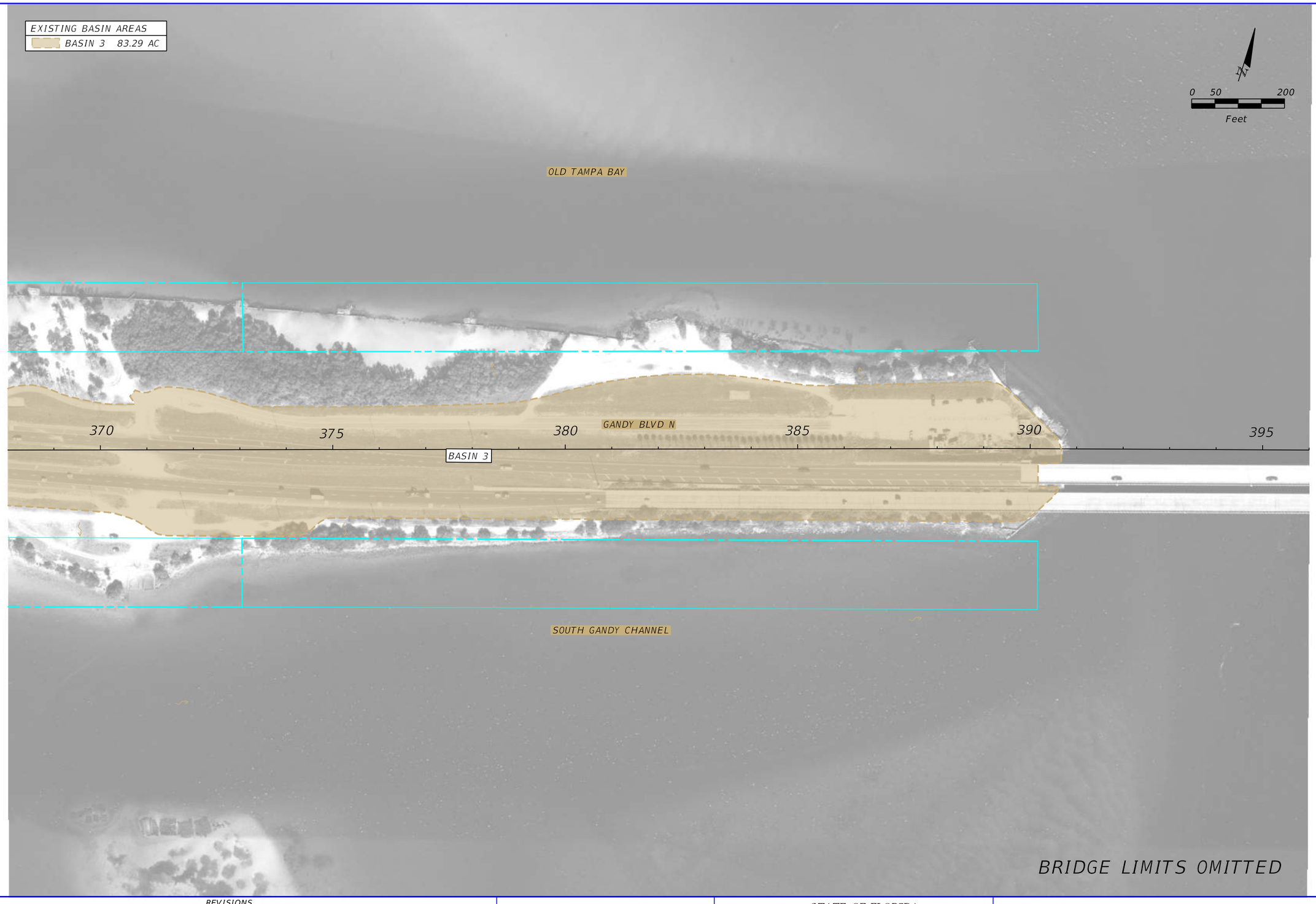

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 7

EXISTING BASIN AREAS

BASIN 4 24.42 AC

OLD TAMPA BAY

OLD TAMPA BAY

N

0 50 200

Feet

EXISTING SWALE H1

EXISTING SWALE H3

EXISTING SWALE H2

530 535 540 545 550

BASIN 4

SELMON EXPRESSWAY

GANDY BLVD N

OLD TAMPA BAY

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 8

EXISTING BASIN AREAS

BASIN 4 24.42 AC

N

0 50 200

Feet

OLD TAMPA BAY

CD-5
24" RCP

BASIN 4

555 560 565 570 575

SELMON EXPRESSWAY

GANDY BLVD N

7TH BLVD

S WEST SHORE BLVD

END STUDY

BRIDGE ST

OLD TAMPA BAY

S WEST SHORE BLVD

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (EXISTING)

SHEET NO. 9

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PROPOSED BASIN AREAS

11E	1.94 AC
11D	1.16 AC
S-79	5.14 AC
BASIN 1	6.42 AC
11DD	2.19 AC
BASIN 2	19.80 AC

N

0 50 200

Feet

4TH ST N

BEGIN STUDY

11E

200

POND 1
1.64 AC
(EXPAND EXISTING
POND BY 0.27 AC)

205

210

BASIN 1

GANDY BLVD N

CD-1
5' X 3' CBC

215

220

225

OAK ST NE

CD-2
24" RCP

BASIN 2

POND 2B
1.30 AC

4TH ST N

11D

11DD

S-79

GANDY BLVD N

100TH AVE N

POND 2A
2.86 AC

99TH AVE N

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS
(PROPOSED)

SHEET NO.
10

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PROPOSED BASIN AREAS

BASIN 2	19.80 AC
BASIN 3	83.29 AC

0 50 200

Feet

BRIGHTON BAY BLVD NE

CD-3
24" RCP

BASIN 3

SWALE 1 - 2.76 AC

BASIN 2

230 235 240 245 250 255

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 11

PROPOSED BASIN AREAS
BASIN 3 83.29 AC

N

0 50 200
Feet

MANGROVE CAY LN NE

CD-4
24" X 38" RCP

260 265 270 275 280

BASIN 3

N 72° 47' 36" E

GANDY BLVD N

N 72° 47' 36" E

SNUG HARBOR RD NE

SAN FERNANDO DR NE

SAN MARTIN BLVD NE

RICARDO PL NE

SAVONA DR

PLAZA COMERCIO NE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 12

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PROPOSED BASIN AREAS

BASIN 3 83.29 AC

N

0 50 200

Feet

OLD TAMPA BAY

285

290

295

300

305

310

BASIN 3

GANDY BLVD N

SOUTH GANDY CHANNEL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 13

PROPOSED BASIN AREAS

BASIN 3 83.29 AC

0 50 200

Feet

OLD TAMPA BAY

320

315

325

330

335

340

BASIN 3

GANDY BLVD N

SOUTH GANDY CHANNEL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 14

PROPOSED BASIN AREAS

BASIN 3 83.29 AC

N

0 50 200

Feet

OLD TAMPA BAY

340 345 350 355 GANDY BLVD N 360 365

BASIN 3

SOUTH GANDY CHANNEL

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 15

PROPOSED BASIN AREAS

BASIN 3 83.29 AC

N

0 50 200

Feet

OLD TAMPA BAY

370 375 380 385 390 395

GANDY BLVD N

N 72° 47' 36" E

BASIN 3

SOUTH GANDY CHANNEL

BRIDGE LIMITS OMMITTED

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 16

PROPOSED BASIN AREAS

BASIN 4 24.42 AC

OLD TAMPA BAY

OLD TAMPA BAY

N

0 50 200

Feet

530

535

540

545

550

BASIN 4

SELMON EXPRESSWAY

SWALE 2 - 1.16 AC

N 72° 47' 36" E

GANDY BLVD N

SWALE 3 - 0.39 AC

OLD TAMPA BAY

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 17

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PROPOSED BASIN AREAS

BASIN 4 24.42 AC

OLD TAMPA BAY

BASIN 4

555

560

565

570

575

SELMON EXPRESSWAY

GANDY BLVD N

CD-5
24" RCP

7TH BLVD

BRIDGE ST

S WEST SHORE BLVD

END STUDY

N

0 50 200

Feet

OLD TAMPA BAY

S WEST SHORE BLVD

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS HILLSBOROUGH	441250-1-22-01

BASIN MAPS (PROPOSED)

SHEET NO. 18

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APPENDIX C

Floodplain Impact Calculations

3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 (phone)
(407) 971-8955 (fax)

Made by: DLD **DATE:** 13-Oct-22
Checked by: MOL **Job Number:** KCA-001-01

PROJECT : **Gandy Blvd**

Roadway Floodplain Impacts

Basin	Stations	Approximate Length of Impact (ft)	Approximate Width of Impact (ft)	Floodplain Elevation (ft)	Impact Area $(ac)_3$
1_1	201+00 to 214+26	1326	255	9	7.51
2	214+26 to 240+35	2609	255	9-10	16.19
3_2	240+35 to 390+67	15032	255	10-12	78.28
4	527+00 to 545+38	1838	255	11-12	16.78
				TOTAL:	**118.76**

Notes:
1. Basin 1 area includes areas within smaller adjacent basins (11E, 11D and S-79)
2. Basin 3 limits exclude bridge. Floodplain impacts are not anticipated within the bridge limits.
3. Areas are measured in Microstation and include all areas within the proposed roadway footprint that intersect the floodplain.

Pond Floodplain Impacts

Pond	Pond Area (ac)	Berm Elevation (ft)	Existing Ground Elevation (ft)	Floodplain Elevation (ft)	Impact Area (ac)
1	1.37	4.61	4.61	9	0.00
2A	2.39	5.00	5.00	9	0.00
2B	1.08	6.00	3.50	10	1.08
				TOTAL:	**1.08**

APPENDIX D

Cross Drain Analysis

Inwood Consulting Engineers
3000 Dovera Drive, Suite 200, Oviedo, FL 32765
(407) 971-8850 - (407) 971-8955 (fax)

Made by: DLD
Ch'd by: REC

DATE: 01/12/23
PROJECT #: KCA-001

Gandy Boulevard PD&E Study

TABLE – CROSS DRAIN FLOOD DATA SHEET - EXISTING VS. PROPOSED

Structure Number	Approximate Location	Design Flood (50-yr Storm Event)					Base Flood (100-yr Storm Event)					Overtopping Flood				Greatest Flood (500-yr Storm Event)				
		Existing (A)		Proposed (B)		B-A	Existing (A)		Proposed (B)		B-A	Existing (A)		Proposed (B)		Existing (A)		Proposed (B)		B-A
		Discharge (cfs)	Stage (ft)	Discharge (cfs)	Stage (ft)	Stage (ft)	Discharge (cfs)	Stage (ft)	Discharge (cfs)	Stage (ft)	Stage (ft)	Discharge (cfs)	Stage (ft)	Discharge (cfs)	Stage (ft)	Discharge (cfs)	Stage (ft)	Discharge (cfs)	Stage (ft)	Stage (ft)
CD-1	Sta. 214+49	107.5	5.02	107.5	5.06	0.04	122.0	5.15	122.0	5.15	0.00	109.1	5.11	108.4	5.11	207.4	5.27	207.4	5.27	0.00
CD-2	Sta. 226+51	7.1	3.53	7.1	3.62	0.09	8.4	3.64	8.4	3.76	0.12	21.64	5.70	18.68	5.70	14.2	4.32	14.2	4.67	0.35
CD-3	Sta. 247+41	4.3	2.68	4.3	2.69	0.01	5.0	2.71	5.0	2.73	0.02	25.50	5.70	24.25	5.70	8.5	2.94	8.5	2.96	0.02
CD-4	Sta. 260+87	15.4	2.61	15.4	2.72	0.11	18.1	2.78	18.1	2.90	0.12	45.00	5.70	40.47	5.70	30.8	3.88	30.8	4.24	0.36
CD-5	Sta. 566+33	No Proposed Changes to CD-5																		

Cross Drain Upsizing Summary			
Structure Number	Existing Pipe Size	Proposed Pipe Size	Proposed Change
CD-1	5' x 3' CBC	5' x 3' CBC	Extend
CD-2	Single 24" RCP	Single 24" RCP	Extend[1]
CD-3	Single 24" RCP	Single 24" RCP	Extend
CD-4	Single 24" x 38" ERCP	Single 24" x 38" ERCP	Extend[1]
CD-5	Single 24" RCP	Single 24" RCP	None

Notes:

1. The headwater increase in this culvert is higher than the desired 0.04 ft. However, this culvert is part of an open drainage system that is anticipated to be converted into a closed storm sewer system in the final design. Therefore, it is anticipated that this cross drain will recieve less flow in the proposed condition and will therefore have a lower headwater. This should be verified during the design phase.

HY-8 Culvert Analysis Report

Crossing Discharge Data - EX CD-1

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

Minimum Flow: 107.5 cfs

Design Flow: 122 cfs

Maximum Flow: 207.4 cfs

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

Headwater Elevation (ft)	Total Discharge (cfs)	EX CD-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
5.02	107.50	107.50	0.00	1
5.15	122.00	105.45	16.05	10
5.16	127.48	103.76	23.03	4
5.18	137.47	100.70	36.04	4
5.20	147.46	97.65	49.37	4
5.21	157.45	94.61	62.58	4
5.22	167.44	91.53	74.95	3
5.24	177.43	88.46	88.13	3
5.25	187.42	85.41	101.38	3
5.26	197.41	82.33	114.60	3
5.27	207.40	79.24	127.79	3
5.11	109.11	109.11	0.00	Overtopping

Rating Curve Plot for Crossing: EX CD-1

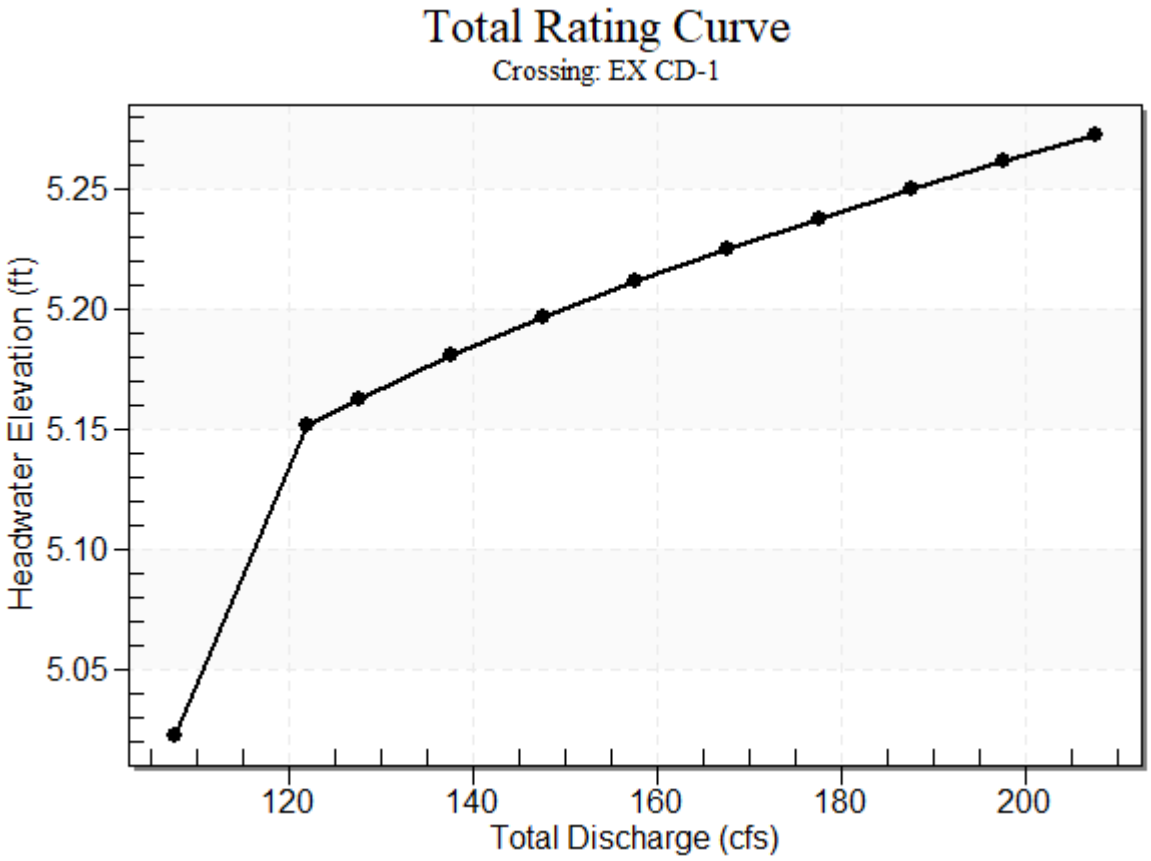


Table 2 - Culvert Summary Table: EX CD-1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
107.50	107.50	5.02	4.404	5.513	4-FFf	-1.000	2.430	3.000	3.378	7.167	1.065
122.00	105.45	5.15	4.325	5.641	4-FFf	-1.000	2.399	3.000	3.585	7.030	1.101
127.48	103.76	5.16	4.260	5.652	4-FFf	-1.000	2.374	3.000	3.659	6.917	1.113
137.47	100.70	5.18	4.146	5.670	4-FFf	-1.000	2.327	3.000	3.790	6.713	1.135
147.46	97.65	5.20	4.034	5.687	4-FFf	-1.000	2.280	3.000	3.915	6.510	1.156
157.45	94.61	5.21	3.925	5.702	4-FFf	-1.000	2.232	3.000	4.035	6.307	1.176
167.44	91.53	5.22	3.816	5.714	4-FFf	-1.000	2.183	3.000	4.150	6.102	1.195
177.43	88.46	5.24	3.711	5.727	4-FFf	-1.000	2.134	3.000	4.262	5.898	1.213
187.42	85.41	5.25	3.607	5.739	4-FFf	-1.000	2.085	3.000	4.370	5.694	1.231
197.41	82.33	5.26	3.504	5.751	4-FFf	-1.000	2.034	3.000	4.474	5.489	1.247
207.40	79.24	5.27	3.403	5.763	4-FFf	-1.000	1.983	3.000	4.575	5.283	1.263

****

Straight Culvert

Inlet Elevation (invert): -0.49 ft, Outlet Elevation (invert): -0.49 ft

Culvert Length: 242.00 ft, Culvert Slope: 0.0000

****

Culvert Data Summary - EX CD-1

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

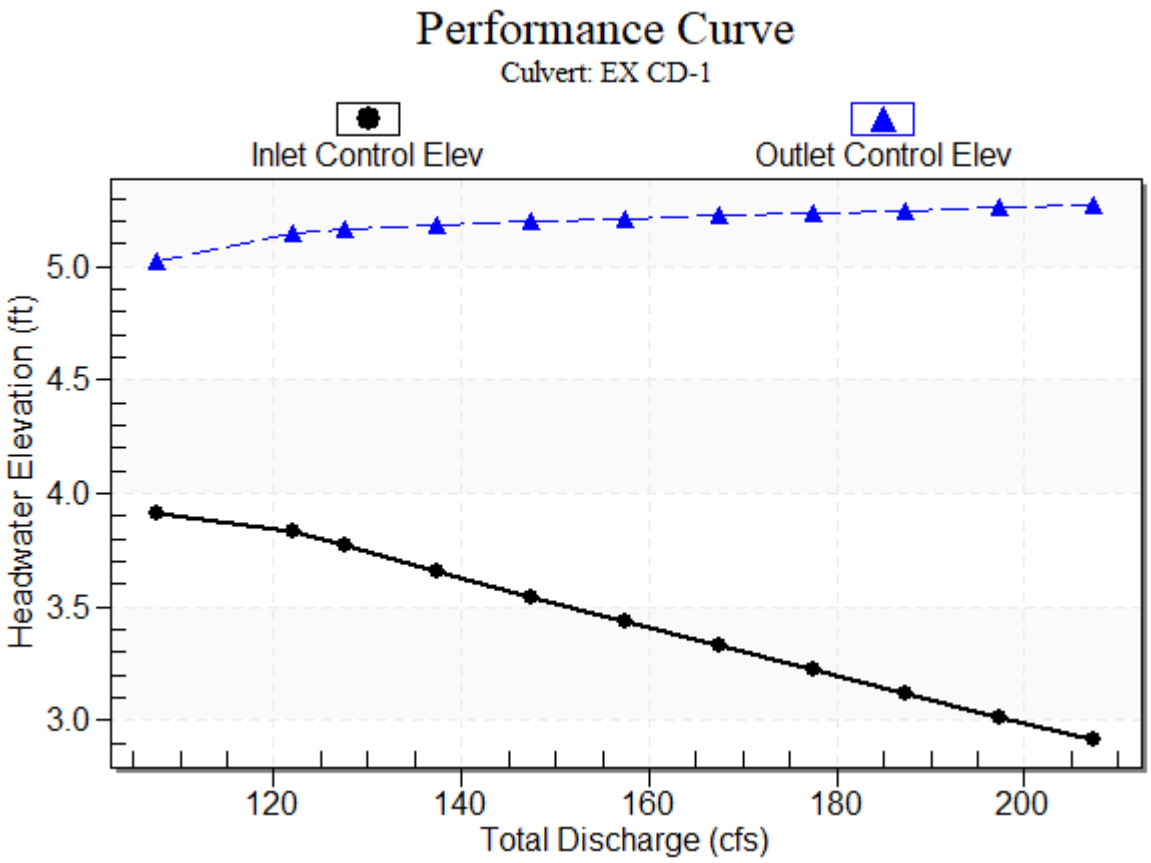
Barrel Manning's n: 0.0120

Culvert Type: Straight

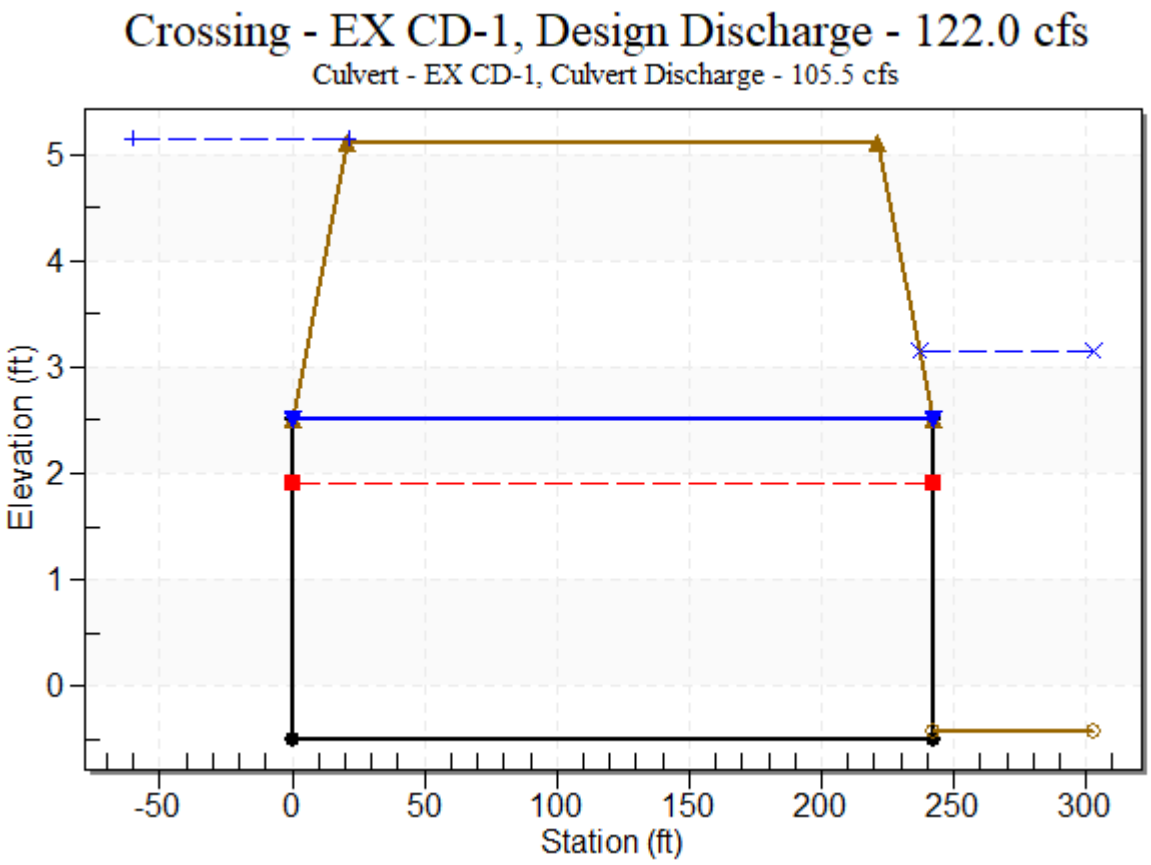
Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Culvert Performance Curve Plot: EX CD-1



Water Surface Profile Plot for Culvert: EX CD-1



Site Data - EX CD-1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: -0.49 ft

Outlet Station: 242.00 ft

Outlet Elevation: -0.49 ft

Number of Barrels: 1

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
107.50	2.95	3.38	1.06	0.25	0.13
122.00	3.15	3.58	1.10	0.27	0.13
127.48	3.23	3.66	1.11	0.27	0.13
137.47	3.36	3.79	1.14	0.28	0.13
147.46	3.48	3.91	1.16	0.29	0.13
157.45	3.60	4.03	1.18	0.30	0.13
167.44	3.72	4.15	1.20	0.31	0.13
177.43	3.83	4.26	1.21	0.32	0.13
187.42	3.94	4.37	1.23	0.33	0.13
197.41	4.04	4.47	1.25	0.34	0.13
207.40	4.15	4.58	1.26	0.34	0.13

Tailwater Channel Data - EX CD-1

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 13.00 ft

Side Slope (H:V): 5.00 (_:1)

Channel Slope: 0.0012

Channel Manning's n: 0.0800

Channel Invert Elevation: -0.43 ft

Roadway Data for Crossing: EX CD-1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 657.00 ft

Crest Elevation: 5.11 ft

Roadway Surface: Paved

Roadway Top Width: 200.00 ft

Crossing Discharge Data PR CD-1

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

Minimum Flow: 107.5 cfs

Design Flow: 122 cfs

Maximum Flow: 207.4 cfs

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

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD-1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
5.06	107.50	107.50	0.00	1
5.15	122.00	104.49	16.80	8
5.16	127.48	102.83	23.96	4
5.18	137.47	99.78	36.99	4
5.20	147.46	96.75	50.28	4
5.21	157.45	93.74	63.46	4
5.23	167.44	90.69	75.82	3
5.24	177.43	87.65	88.97	3
5.25	187.42	84.62	102.19	3
5.26	197.41	81.57	115.37	3
5.27	207.40	78.51	128.53	3
5.11	108.36	108.36	0.00	Overtopping

Rating Curve Plot for Crossing: PR CD-1

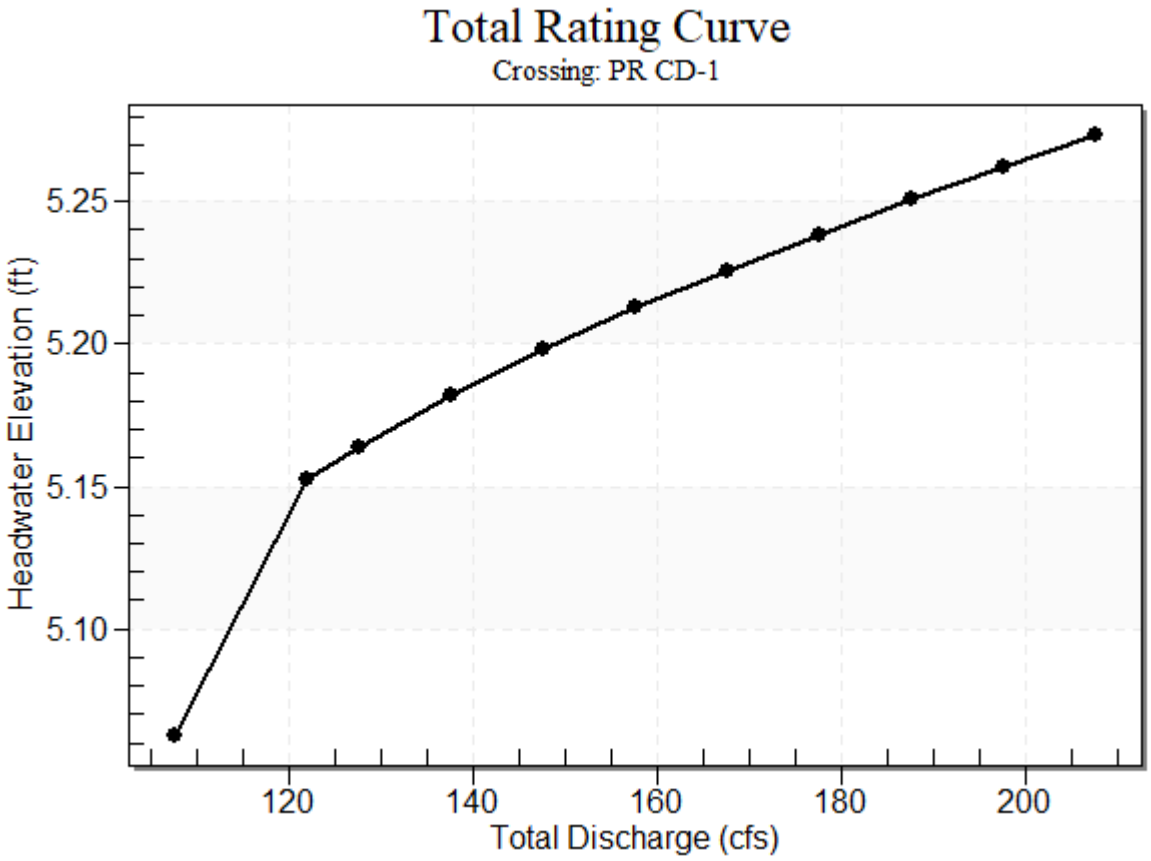


Table 5 - Culvert Summary Table: PR CD-1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
107.50	107.50	5.06	4.404	5.553	4-FFf	-1.000	2.430	3.000	3.378	7.167	1.065
122.00	104.49	5.15	4.288	5.642	4-FFf	-1.000	2.385	3.000	3.585	6.966	1.101
127.48	102.83	5.16	4.225	5.654	4-FFf	-1.000	2.359	3.000	3.659	6.855	1.113
137.47	99.78	5.18	4.112	5.671	4-FFf	-1.000	2.313	3.000	3.790	6.652	1.135
147.46	96.75	5.20	4.001	5.688	4-FFf	-1.000	2.266	3.000	3.915	6.450	1.156
157.45	93.74	5.21	3.894	5.702	4-FFf	-1.000	2.218	3.000	4.035	6.249	1.176
167.44	90.69	5.23	3.787	5.715	4-FFf	-1.000	2.170	3.000	4.150	6.046	1.195
177.43	87.65	5.24	3.683	5.728	4-FFf	-1.000	2.121	3.000	4.262	5.843	1.213
187.42	84.62	5.25	3.580	5.740	4-FFf	-1.000	2.072	3.000	4.370	5.641	1.231
197.41	81.57	5.26	3.479	5.752	4-FFf	-1.000	2.022	3.000	4.474	5.438	1.247
207.40	78.51	5.27	3.379	5.763	4-FFf	-1.000	1.971	3.000	4.575	5.234	1.263

****

Straight Culvert

Inlet Elevation (invert): -0.49 ft, Outlet Elevation (invert): -0.49 ft

Culvert Length: 253.00 ft, Culvert Slope: 0.0000

****

Culvert Data Summary - PR CD-1

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

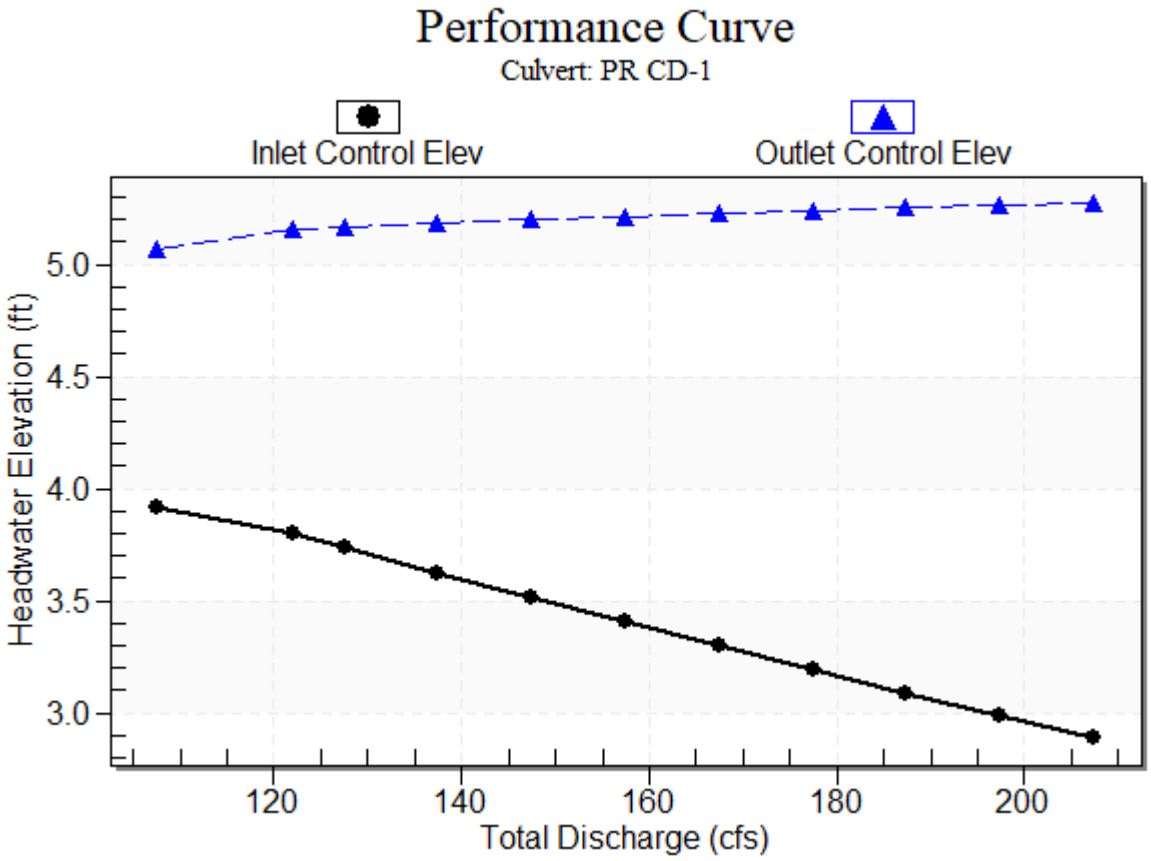
Barrel Manning's n: 0.0120

Culvert Type: Straight

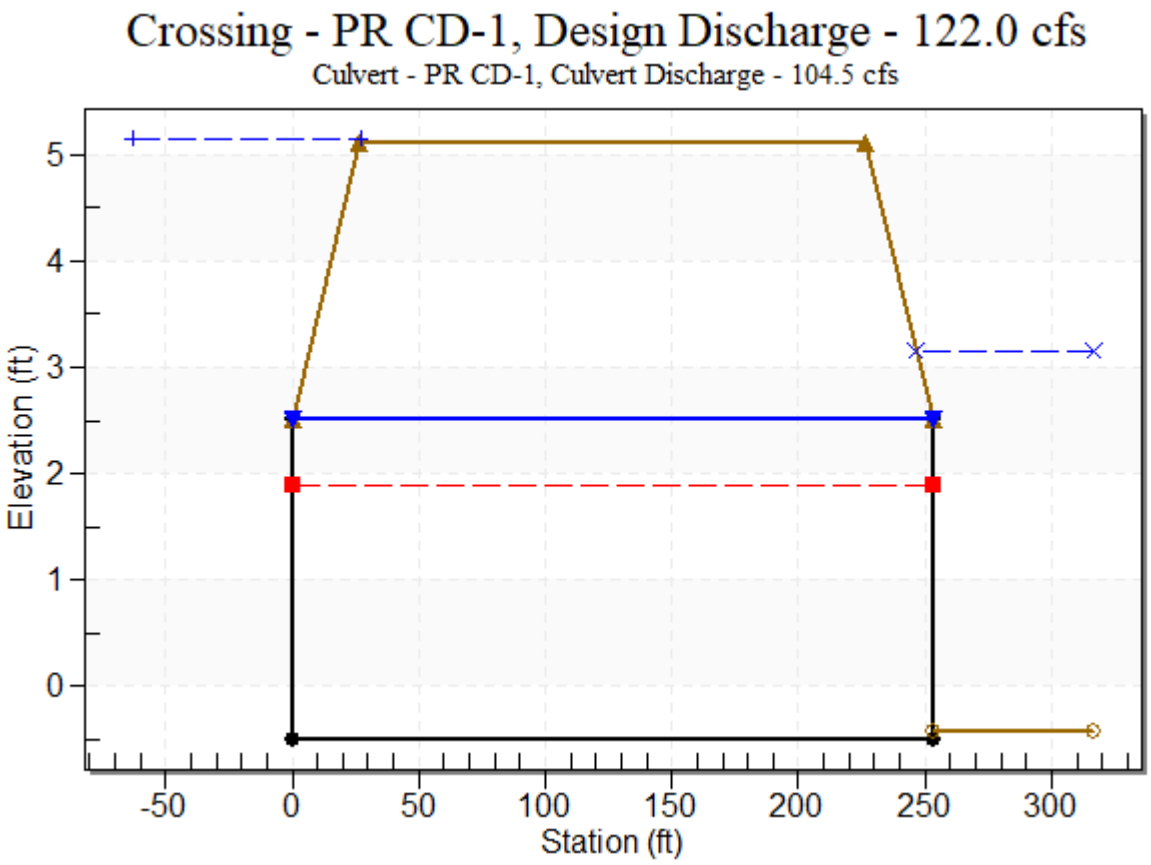
Inlet Configuration: Square Edge (90º) Headwall

Inlet Depression: None

Culvert Performance Curve Plot: PR CD-1



Water Surface Profile Plot for Culvert: PR CD-1



Site Data - PR CD-1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: -0.49 ft

Outlet Station: 253.00 ft

Outlet Elevation: -0.49 ft

Number of Barrels: 1

Table 6 - Downstream Channel Rating Curve (Crossing: PR CD-1)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
107.50	2.95	3.38	1.06	0.25	0.13
122.00	3.15	3.58	1.10	0.27	0.13
127.48	3.23	3.66	1.11	0.27	0.13
137.47	3.36	3.79	1.14	0.28	0.13
147.46	3.48	3.91	1.16	0.29	0.13
157.45	3.60	4.03	1.18	0.30	0.13
167.44	3.72	4.15	1.20	0.31	0.13
177.43	3.83	4.26	1.21	0.32	0.13
187.42	3.94	4.37	1.23	0.33	0.13
197.41	4.04	4.47	1.25	0.34	0.13
207.40	4.15	4.58	1.26	0.34	0.13

Tailwater Channel Data - PR CD-1

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 13.00 ft

Side Slope (H:V): 5.00 (_:1)

Channel Slope: 0.0012

Channel Manning's n: 0.0800

Channel Invert Elevation: -0.43 ft

Roadway Data for Crossing: PR CD-1

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 657.00 ft

Crest Elevation: 5.11 ft

Roadway Surface: Paved

Roadway Top Width: 200.00 ft

Crossing Discharge Data EX CD-2

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

Minimum Flow: 7.1 cfs

Design Flow: 8.4 cfs

Maximum Flow: 14.2 cfs

Table 7 - Summary of Culvert Flows at Crossing: EX CD-2

Headwater Elevation (ft)	Total Discharge (cfs)	EX CD-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
3.53	7.10	7.10	0.00	1
3.59	7.81	7.81	0.00	1
3.64	8.40	8.40	0.00	1
3.71	9.23	9.23	0.00	1
3.78	9.94	9.94	0.00	1
3.86	10.65	10.65	0.00	1
3.94	11.36	11.36	0.00	1
4.03	12.07	12.07	0.00	1
4.12	12.78	12.78	0.00	1
4.21	13.49	13.49	0.00	1
4.32	14.20	14.20	0.00	1
5.70	21.64	21.64	0.00	Overtopping

Rating Curve Plot for Crossing: EX CD-2

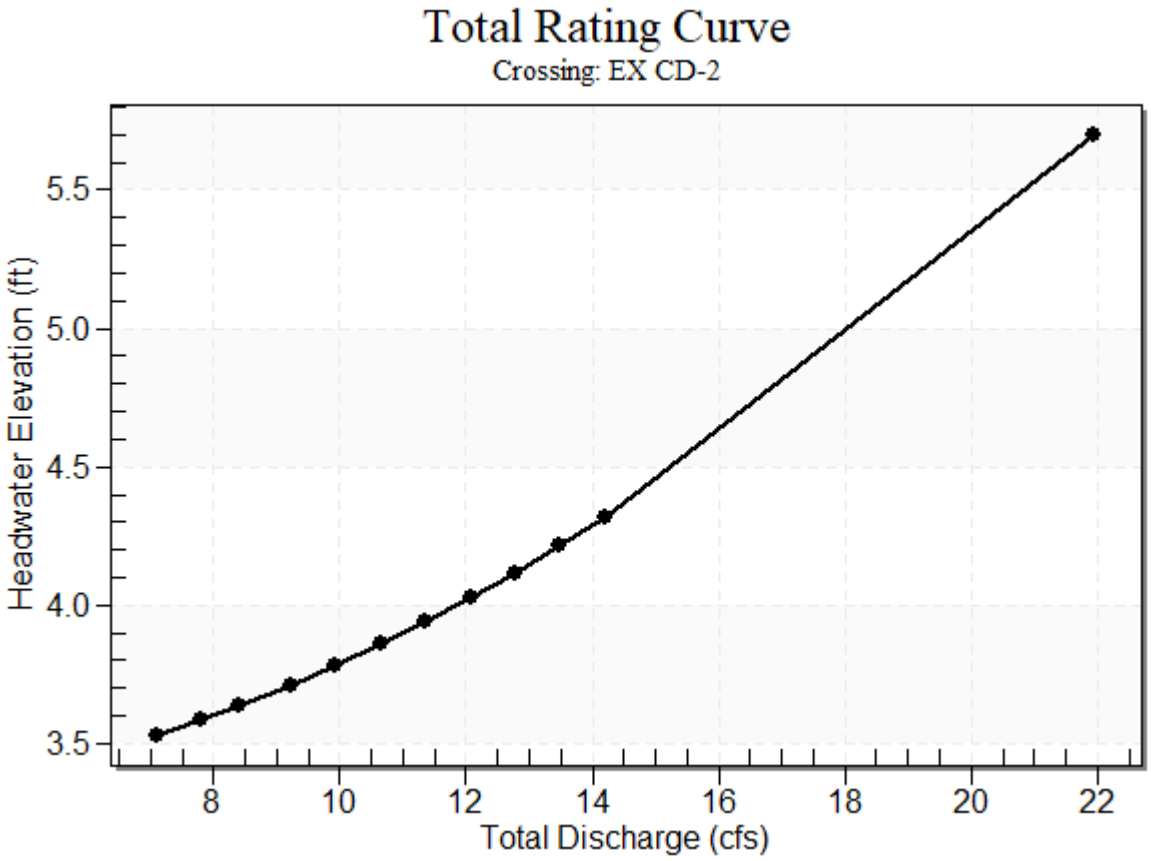


Table 8 - Culvert Summary Table: EX CD-2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
7.10	7.10	3.53	1.396	2.102	1-S1f	0.944	0.946	2.000	2.460	2.260	0.000
7.81	7.81	3.59	1.475	2.158	3-M1f	0.998	0.994	2.000	2.460	2.486	0.000
8.40	8.40	3.64	1.539	2.206	4-FFf	1.042	1.033	2.000	2.460	2.674	0.000
9.23	9.23	3.71	1.630	2.282	4-FFf	1.103	1.085	2.000	2.460	2.938	0.000
9.94	9.94	3.78	1.709	2.353	4-FFf	1.156	1.128	2.000	2.460	3.164	0.000
10.65	10.65	3.86	1.790	2.429	4-FFf	1.208	1.169	2.000	2.460	3.390	0.000
11.36	11.36	3.94	1.874	2.510	4-FFf	1.262	1.209	2.000	2.460	3.616	0.000
12.07	12.07	4.03	1.962	2.596	4-FFf	1.316	1.248	2.000	2.460	3.842	0.000
12.78	12.78	4.12	2.053	2.688	4-FFf	1.372	1.286	2.000	2.460	4.068	0.000
13.49	13.49	4.21	2.149	2.785	4-FFf	1.430	1.322	2.000	2.460	4.294	0.000
14.20	14.20	4.32	2.250	2.887	4-FFf	1.491	1.357	2.000	2.460	4.520	0.000

****

Straight Culvert

Inlet Elevation (invert): 1.43 ft, Outlet Elevation (invert): 0.81 ft

Culvert Length: 152.00 ft, Culvert Slope: 0.0041

****

Culvert Data Summary - EX CD-2

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

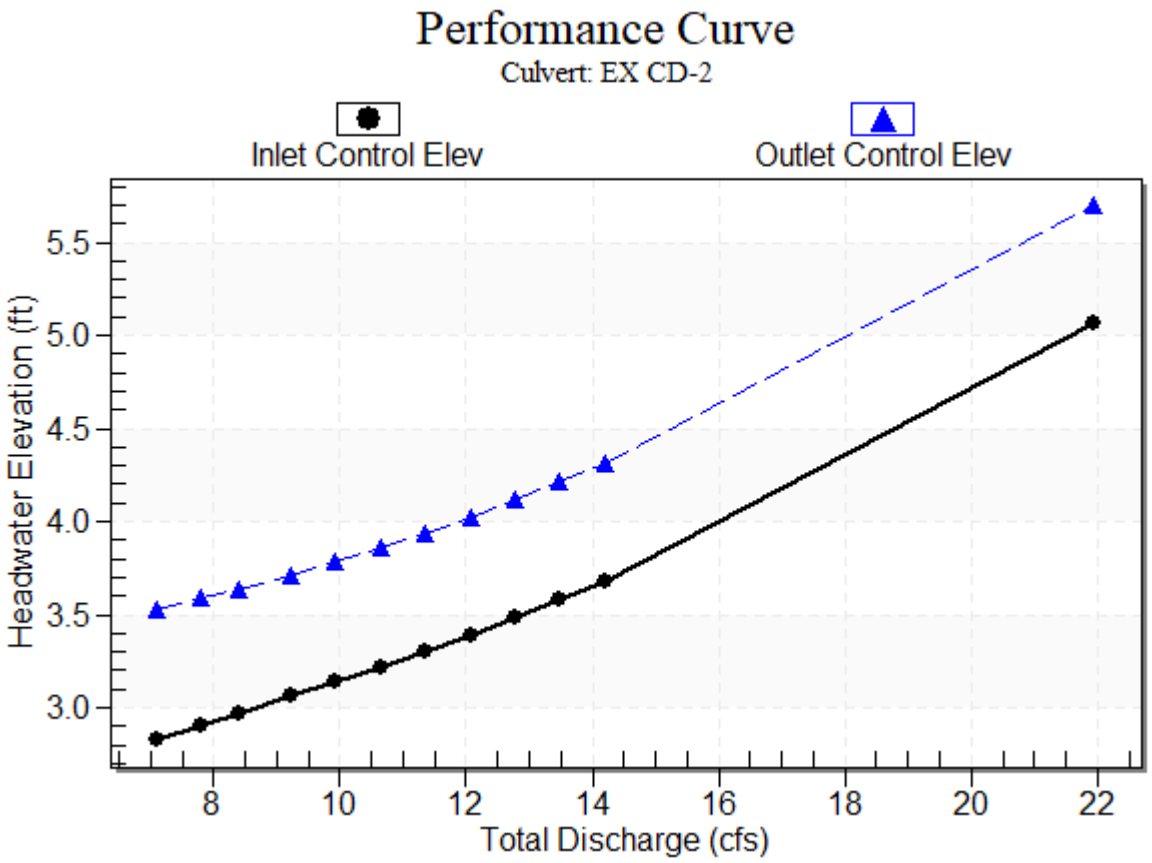
Barrel Manning's n: 0.0120

Culvert Type: Straight

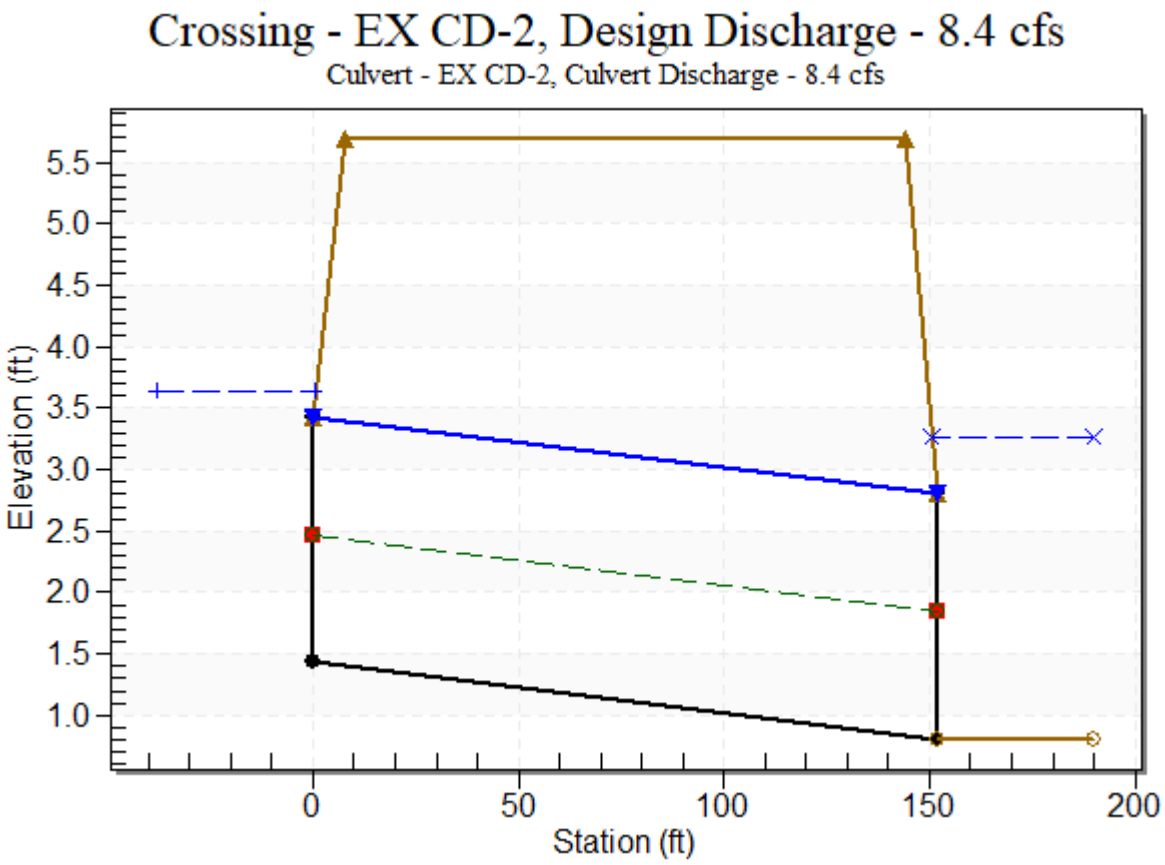
Inlet Configuration: Mitered to Conform to Slope

Inlet Depression: None

Culvert Performance Curve Plot: EX CD-2



Water Surface Profile Plot for Culvert: EX CD-2



Site Data - EX CD-2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1.43 ft

Outlet Station: 152.00 ft

Outlet Elevation: 0.81 ft

Number of Barrels: 1

Table 9 - Downstream Channel Rating Curve (Crossing: EX CD-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
7.10	3.27	2.46
7.81	3.27	2.46
8.40	3.27	2.46
9.23	3.27	2.46
9.94	3.27	2.46
10.65	3.27	2.46
11.36	3.27	2.46
12.07	3.27	2.46
12.78	3.27	2.46
13.49	3.27	2.46
14.20	3.27	2.46

Tailwater Channel Data - EX CD-2

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 3.27 ft

Roadway Data for Crossing: EX CD-2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 860.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 136.00 ft

Crossing Discharge Data PR CD-2

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

Minimum Flow: 7.1 cfs

Design Flow: 8.4 cfs

Maximum Flow: 14.2 cfs

Table 10 - Summary of Culvert Flows at Crossing: PR CD-2

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD-2 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
3.62	7.10	7.10	0.00	1
3.69	7.81	7.81	0.00	1
3.76	8.40	8.40	0.00	1
3.86	9.23	9.23	0.00	1
3.96	9.94	9.94	0.00	1
4.06	10.65	10.65	0.00	1
4.17	11.36	11.36	0.00	1
4.28	12.07	12.07	0.00	1
4.41	12.78	12.78	0.00	1
4.54	13.49	13.49	0.00	1
4.67	14.20	14.20	0.00	1
5.70	18.68	18.68	0.00	Overtopping

Rating Curve Plot for Crossing: PR CD-2

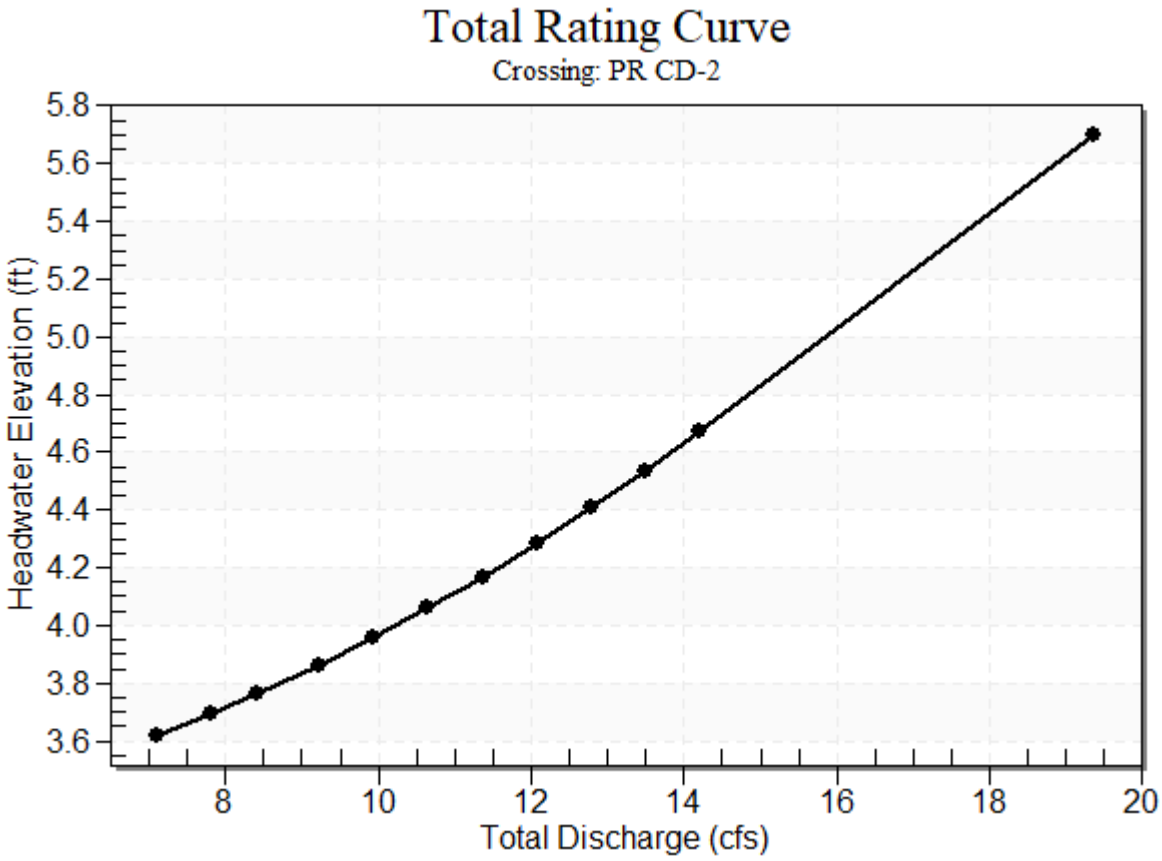


Table 11 - Culvert Summary Table: PR CD-2

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
7.10	7.10	3.62	1.396	2.161	4-FFf	0.943	0.946	2.000	2.870	2.260	0.000
7.81	7.81	3.69	1.475	2.235	4-FFf	0.997	0.994	2.000	2.870	2.486	0.000
8.40	8.40	3.76	1.539	2.301	4-FFf	1.041	1.033	2.000	2.870	2.674	0.000
9.23	9.23	3.86	1.630	2.403	4-FFf	1.102	1.085	2.000	2.870	2.938	0.000
9.94	9.94	3.96	1.709	2.498	4-FFf	1.155	1.128	2.000	2.870	3.164	0.000
10.65	10.65	4.06	1.790	2.600	4-FFf	1.207	1.169	2.000	2.870	3.390	0.000
11.36	11.36	4.17	1.874	2.709	4-FFf	1.260	1.209	2.000	2.870	3.616	0.000
12.07	12.07	4.28	1.962	2.824	4-FFf	1.315	1.248	2.000	2.870	3.842	0.000
12.78	12.78	4.41	2.053	2.947	4-FFf	1.370	1.286	2.000	2.870	4.068	0.000
13.49	13.49	4.54	2.149	3.077	4-FFf	1.428	1.322	2.000	2.870	4.294	0.000
14.20	14.20	4.67	2.250	3.214	4-FFf	1.489	1.357	2.000	2.870	4.520	0.000

****

Straight Culvert

Inlet Elevation (invert): 1.46 ft, Outlet Elevation (invert): 0.40 ft

Culvert Length: 259.00 ft, Culvert Slope: 0.0041

****

Culvert Data Summary - PR CD-2

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

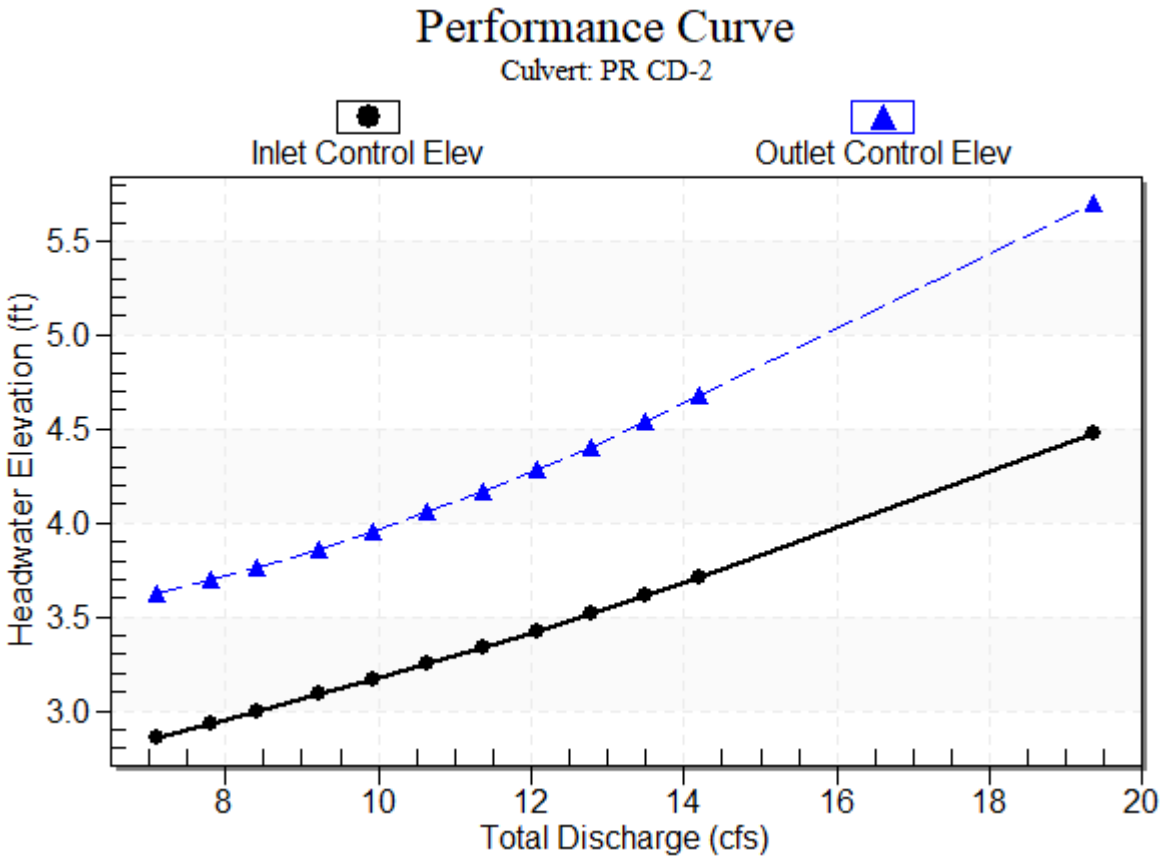
Barrel Manning's n: 0.0120

Culvert Type: Straight

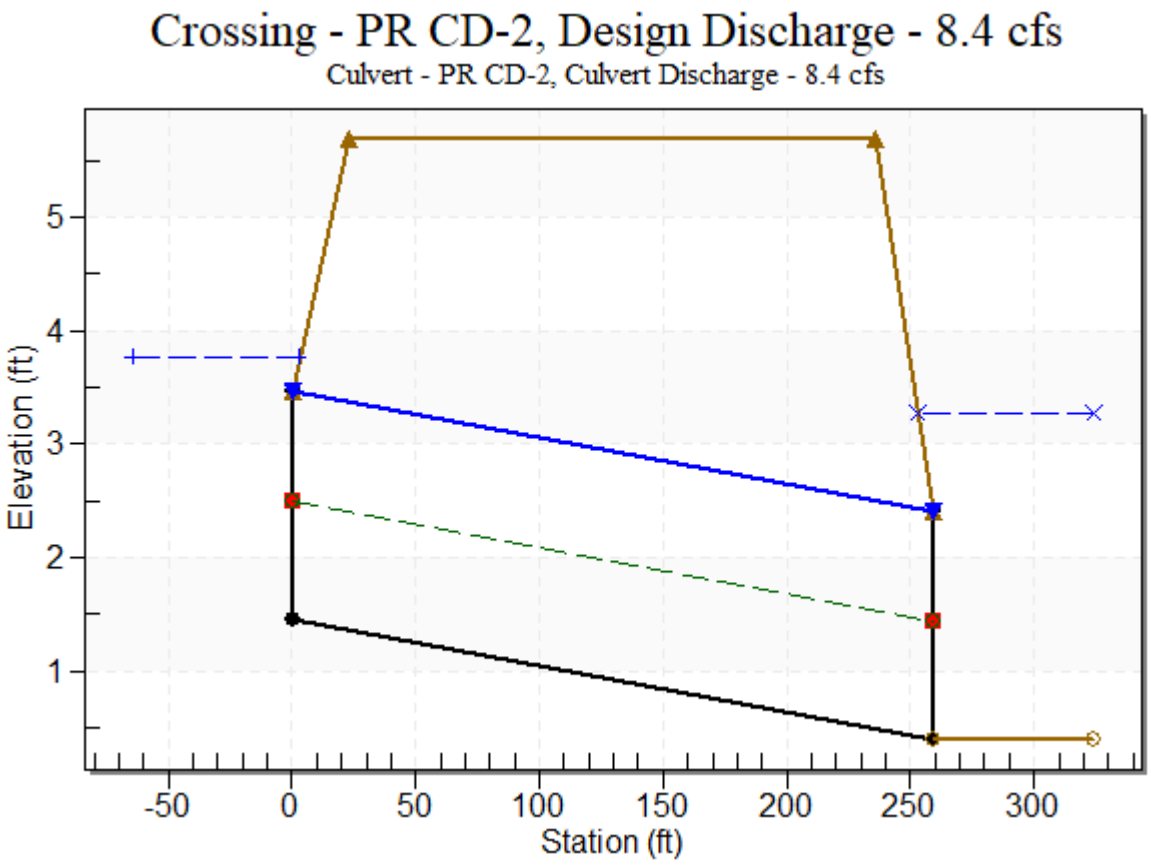
Inlet Configuration: Mitered to Conform to Slope

Inlet Depression: None

Culvert Performance Curve Plot: PR CD-2



Water Surface Profile Plot for Culvert: PR CD-2



Site Data - PR CD-2

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1.46 ft

Outlet Station: 259.00 ft

Outlet Elevation: 0.40 ft

Number of Barrels: 1

Table 12 - Downstream Channel Rating Curve (Crossing: PR CD-2)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
7.10	3.27	2.87
7.81	3.27	2.87
8.40	3.27	2.87
9.23	3.27	2.87
9.94	3.27	2.87
10.65	3.27	2.87
11.36	3.27	2.87
12.07	3.27	2.87
12.78	3.27	2.87
13.49	3.27	2.87
14.20	3.27	2.87

Tailwater Channel Data - PR CD-2

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 3.27 ft

Roadway Data for Crossing: PR CD-2

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 860.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 213.00 ft

Crossing Discharge Data EX CD-3

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

Minimum Flow: 4.3 cfs

Design Flow: 5 cfs

Maximum Flow: 8.5 cfs

Table 13 - Summary of Culvert Flows at Crossing: EX CD-3

Headwater Elevation (ft)	Total Discharge (cfs)	EX CD-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2.68	4.30	4.30	0.00	1
2.70	4.72	4.72	0.00	1
2.71	5.00	5.00	0.00	1
2.74	5.56	5.56	0.00	1
2.77	5.98	5.98	0.00	1
2.79	6.40	6.40	0.00	1
2.82	6.82	6.82	0.00	1
2.84	7.24	7.24	0.00	1
2.87	7.66	7.66	0.00	1
2.90	8.08	8.08	0.00	1
2.94	8.50	8.50	0.00	1
5.70	25.49	25.49	0.00	Overtopping

Rating Curve Plot for Crossing: EX CD-3

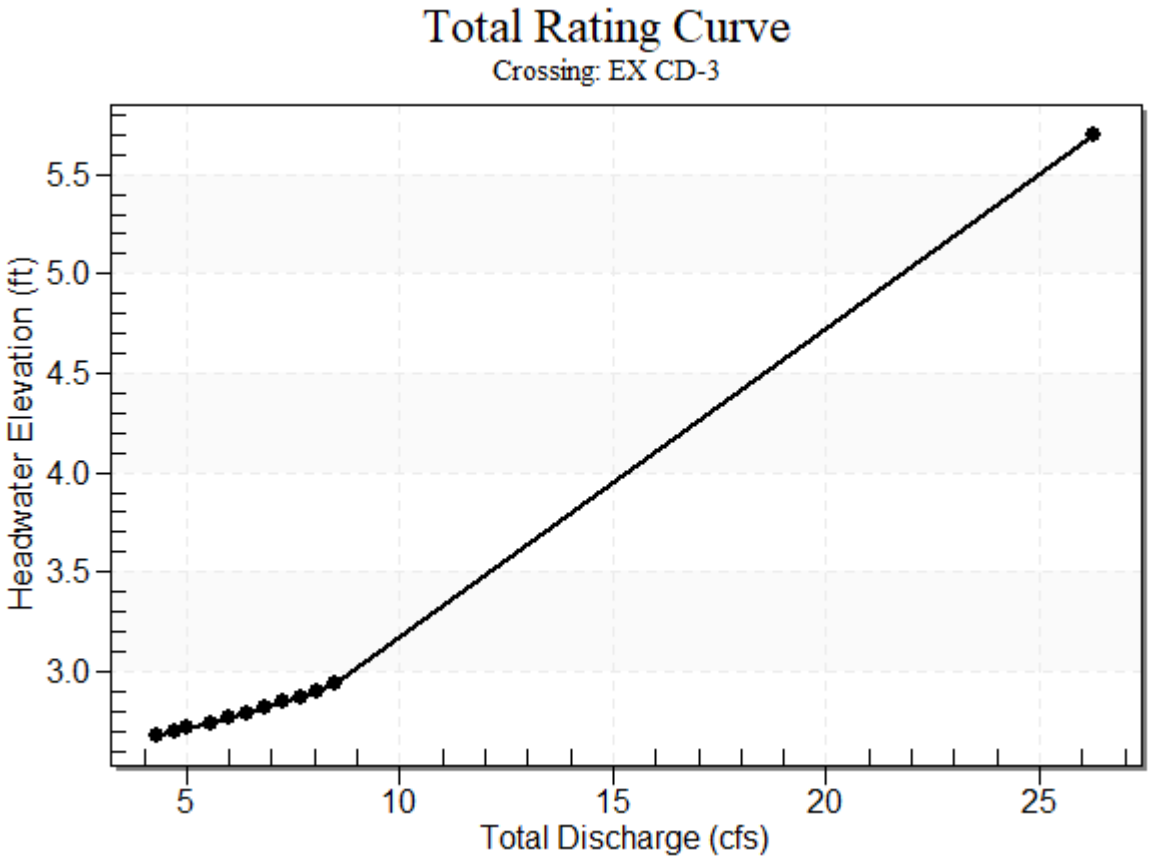


Table 14 - Culvert Summary Table: EX CD-3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
4.30	4.30	2.68	1.010	1.682	3-M1t	1.039	0.728	1.730	1.730	1.489	0.000
4.72	4.72	2.70	1.072	1.701	3-M1t	1.100	0.764	1.730	1.730	1.634	0.000
5.00	5.00	2.71	1.111	1.714	3-M1t	1.140	0.788	1.730	1.730	1.731	0.000
5.56	5.56	2.74	1.188	1.743	3-M1t	1.221	0.832	1.730	1.730	1.925	0.000
5.98	5.98	2.77	1.243	1.766	3-M1t	1.283	0.864	1.730	1.730	2.071	0.000
6.40	6.40	2.79	1.297	1.791	3-M1t	1.346	0.896	1.730	1.730	2.216	0.000
6.82	6.82	2.82	1.348	1.817	3-M1t	1.412	0.926	1.730	1.730	2.361	0.000
7.24	7.24	2.84	1.399	1.844	3-M1t	1.481	0.955	1.730	1.730	2.507	0.000
7.66	7.66	2.87	1.448	1.873	3-M1t	1.557	0.984	1.730	1.730	2.652	0.000
8.08	8.08	2.90	1.495	1.904	3-M1t	1.644	1.012	1.730	1.730	2.798	0.000
8.50	8.50	2.94	1.542	1.935	3-M2t	1.764	1.039	1.730	1.730	2.943	0.000

****

Straight Culvert

Inlet Elevation (invert): 1.00 ft, Outlet Elevation (invert): 0.86 ft

Culvert Length: 130.00 ft, Culvert Slope: 0.0011

****

Culvert Data Summary - EX CD-3

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

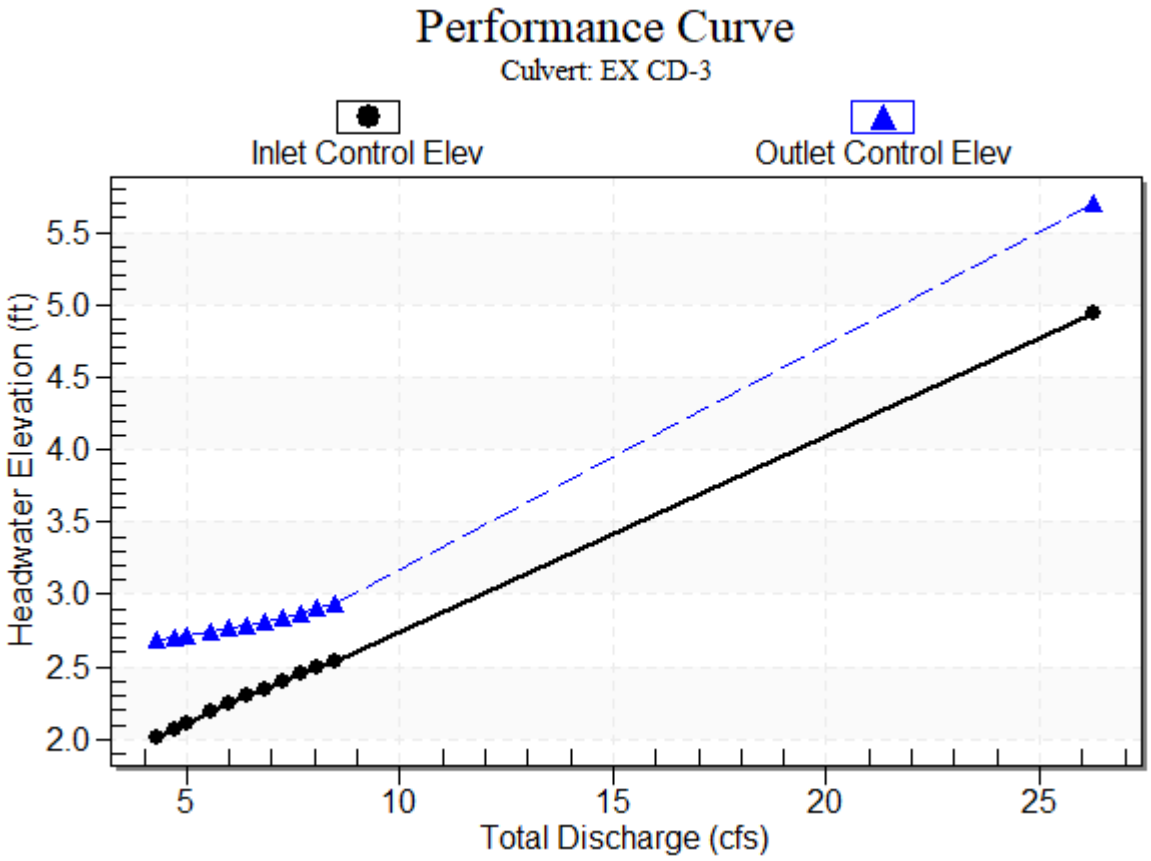
Barrel Manning's n: 0.0120

Culvert Type: Straight

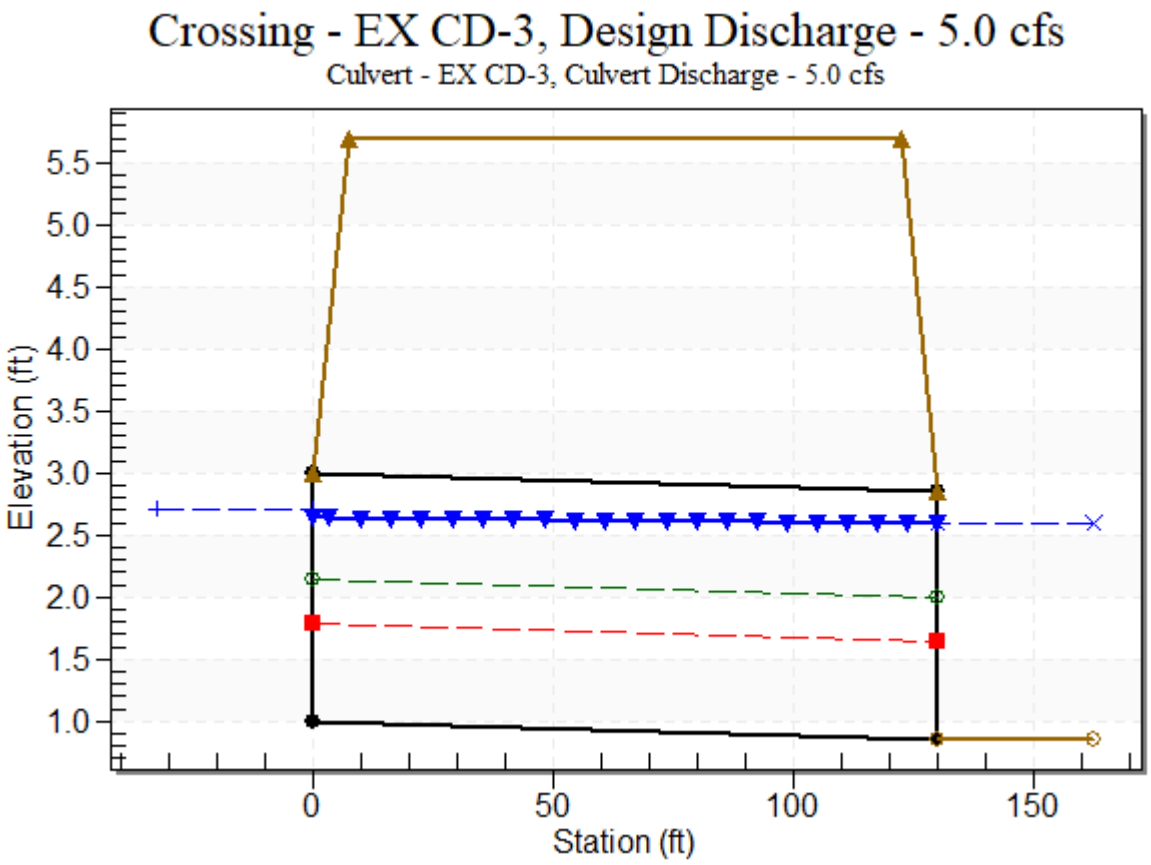
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Culvert Performance Curve Plot: EX CD-3



Water Surface Profile Plot for Culvert: EX CD-3



Site Data - EX CD-3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1.00 ft

Outlet Station: 130.00 ft

Outlet Elevation: 0.86 ft

Number of Barrels: 1

Table 15 - Downstream Channel Rating Curve (Crossing: EX CD-3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
4.30	2.59	1.73
4.72	2.59	1.73
5.00	2.59	1.73
5.56	2.59	1.73
5.98	2.59	1.73
6.40	2.59	1.73
6.82	2.59	1.73
7.24	2.59	1.73
7.66	2.59	1.73
8.08	2.59	1.73
8.50	2.59	1.73

Tailwater Channel Data - EX CD-3

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2.59 ft

Roadway Data for Crossing: EX CD-3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1200.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 115.00 ft

Crossing Discharge Data PR CD-3

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

Minimum Flow: 4.3 cfs

Design Flow: 5 cfs

Maximum Flow: 8.5 cfs

Table 16 - Summary of Culvert Flows at Crossing: PR CD-3

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD-3 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2.69	4.30	4.30	0.00	1
2.71	4.72	4.72	0.00	1
2.73	5.00	5.00	0.00	1
2.76	5.56	5.56	0.00	1
2.78	5.98	5.98	0.00	1
2.81	6.40	6.40	0.00	1
2.84	6.82	6.82	0.00	1
2.87	7.24	7.24	0.00	1
2.90	7.66	7.66	0.00	1
2.93	8.08	8.08	0.00	1
2.96	8.50	8.50	0.00	1
5.70	24.25	24.25	0.00	Overtopping

Rating Curve Plot for Crossing: PR CD-3

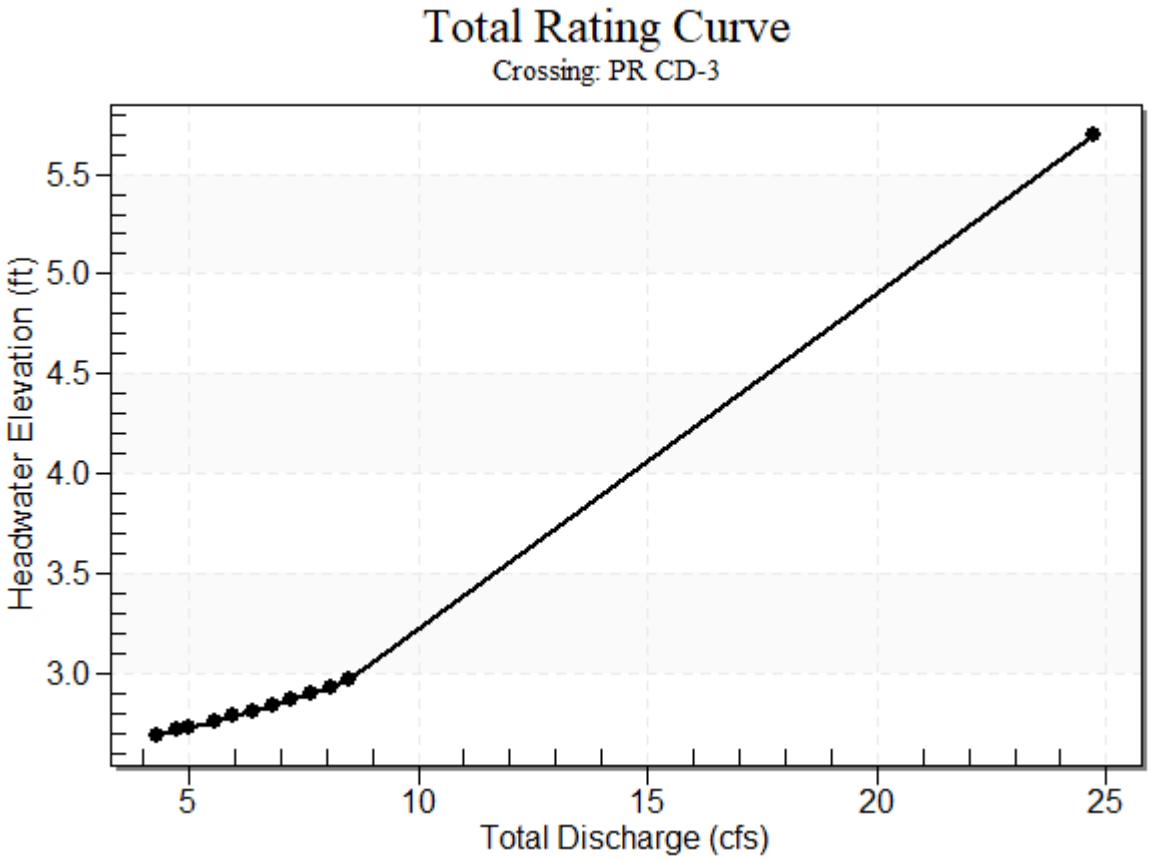


Table 17 - Culvert Summary Table: PR CD-3

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
4.30	4.30	2.69	1.010	1.681	3-M1t	1.033	0.728	1.760	1.750	1.469	0.000
4.72	4.72	2.71	1.072	1.701	3-M1t	1.094	0.764	1.760	1.750	1.612	0.000
5.00	5.00	2.73	1.111	1.715	3-M1t	1.133	0.788	1.760	1.750	1.708	0.000
5.56	5.56	2.76	1.188	1.746	3-M1t	1.214	0.832	1.760	1.750	1.899	0.000
5.98	5.98	2.78	1.243	1.772	3-M1t	1.274	0.864	1.760	1.750	2.042	0.000
6.40	6.40	2.81	1.297	1.798	3-M1t	1.337	0.896	1.760	1.750	2.186	0.000
6.82	6.82	2.84	1.348	1.827	3-M1t	1.402	0.926	1.760	1.750	2.329	0.000
7.24	7.24	2.87	1.399	1.856	3-M1t	1.470	0.955	1.760	1.750	2.473	0.000
7.66	7.66	2.90	1.448	1.888	3-M1t	1.543	0.984	1.760	1.750	2.616	0.000
8.08	8.08	2.93	1.495	1.920	3-M1t	1.628	1.012	1.760	1.750	2.760	0.000
8.50	8.50	2.96	1.542	1.954	3-M1t	1.735	1.039	1.760	1.750	2.903	0.000

****

Straight Culvert

Inlet Elevation (invert): 1.01 ft, Outlet Elevation (invert): 0.83 ft

Culvert Length: 164.00 ft, Culvert Slope: 0.0011

****

Culvert Data Summary - PR CD-3

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

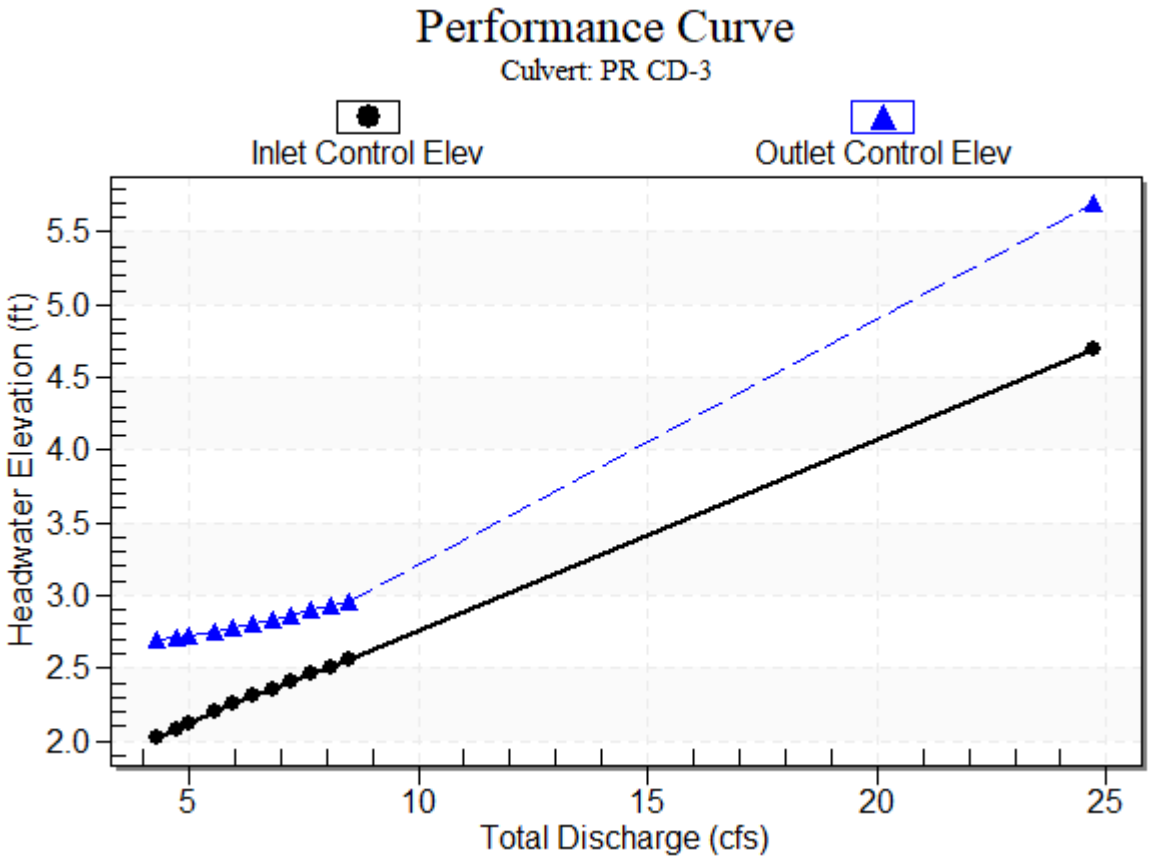
Barrel Manning's n: 0.0120

Culvert Type: Straight

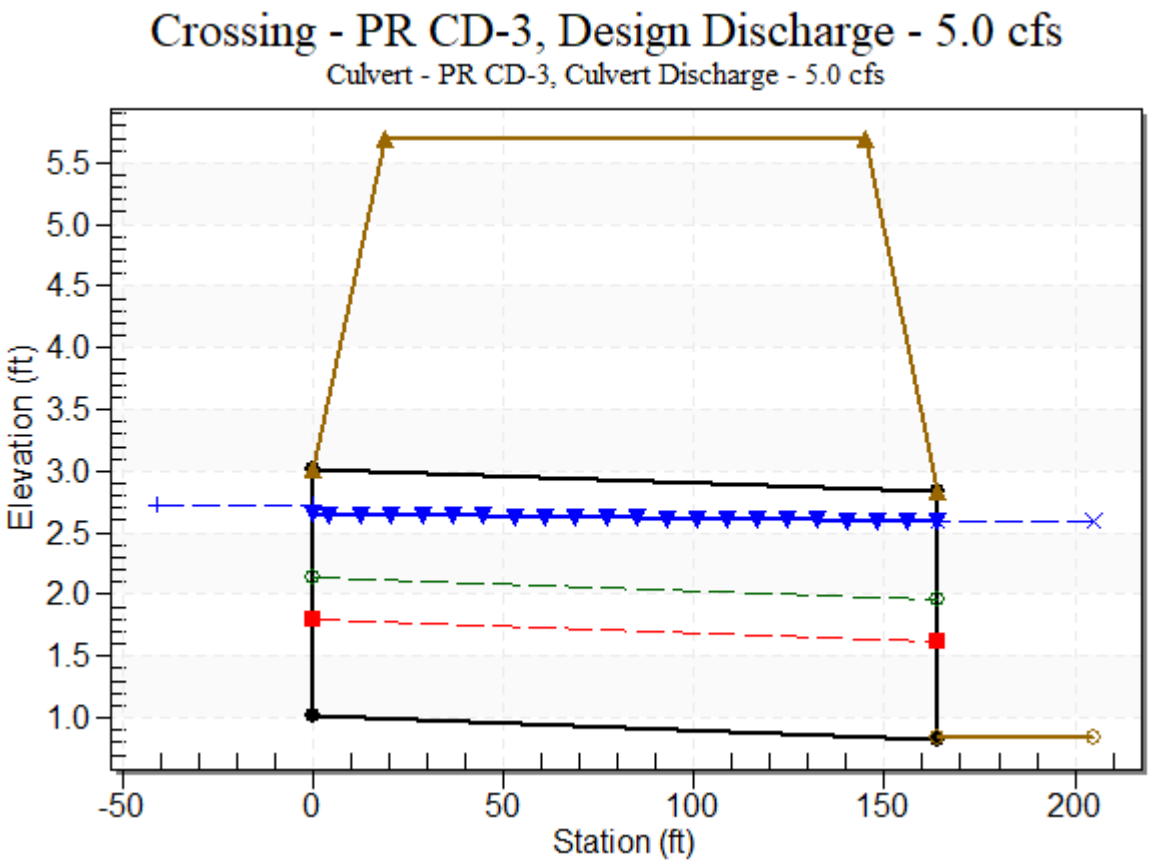
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Culvert Performance Curve Plot: PR CD-3



Water Surface Profile Plot for Culvert: PR CD-3



Site Data - PR CD-3

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 1.01 ft

Outlet Station: 164.00 ft

Outlet Elevation: 0.83 ft

Number of Barrels: 1

Table 18 - Downstream Channel Rating Curve (Crossing: PR CD-3)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
4.30	2.59	1.75
4.72	2.59	1.75
5.00	2.59	1.75
5.56	2.59	1.75
5.98	2.59	1.75
6.40	2.59	1.75
6.82	2.59	1.75
7.24	2.59	1.75
7.66	2.59	1.75
8.08	2.59	1.75
8.50	2.59	1.75

Tailwater Channel Data - PR CD-3

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2.59 ft

Roadway Data for Crossing: PR CD-3

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1200.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 126.00 ft

Crossing Discharge Data EX CD-4

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

Minimum Flow: 15.4 cfs

Design Flow: 18.1 cfs

Maximum Flow: 30.8 cfs

Table 19 - Summary of Culvert Flows at Crossing: EX CD-4

Headwater Elevation (ft)	Total Discharge (cfs)	EX CD-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2.61	15.40	15.40	0.00	1
2.71	16.94	16.94	0.00	1
2.78	18.10	18.10	0.00	1
2.91	20.02	20.02	0.00	1
3.01	21.56	21.56	0.00	1
3.12	23.10	23.10	0.00	1
3.23	24.64	24.64	0.00	1
3.35	26.18	26.18	0.00	1
3.51	27.72	27.72	0.00	1
3.69	29.26	29.26	0.00	1
3.88	30.80	30.80	0.00	1
5.70	45.00	45.00	0.00	Overtopping

Rating Curve Plot for Crossing: EX CD-4

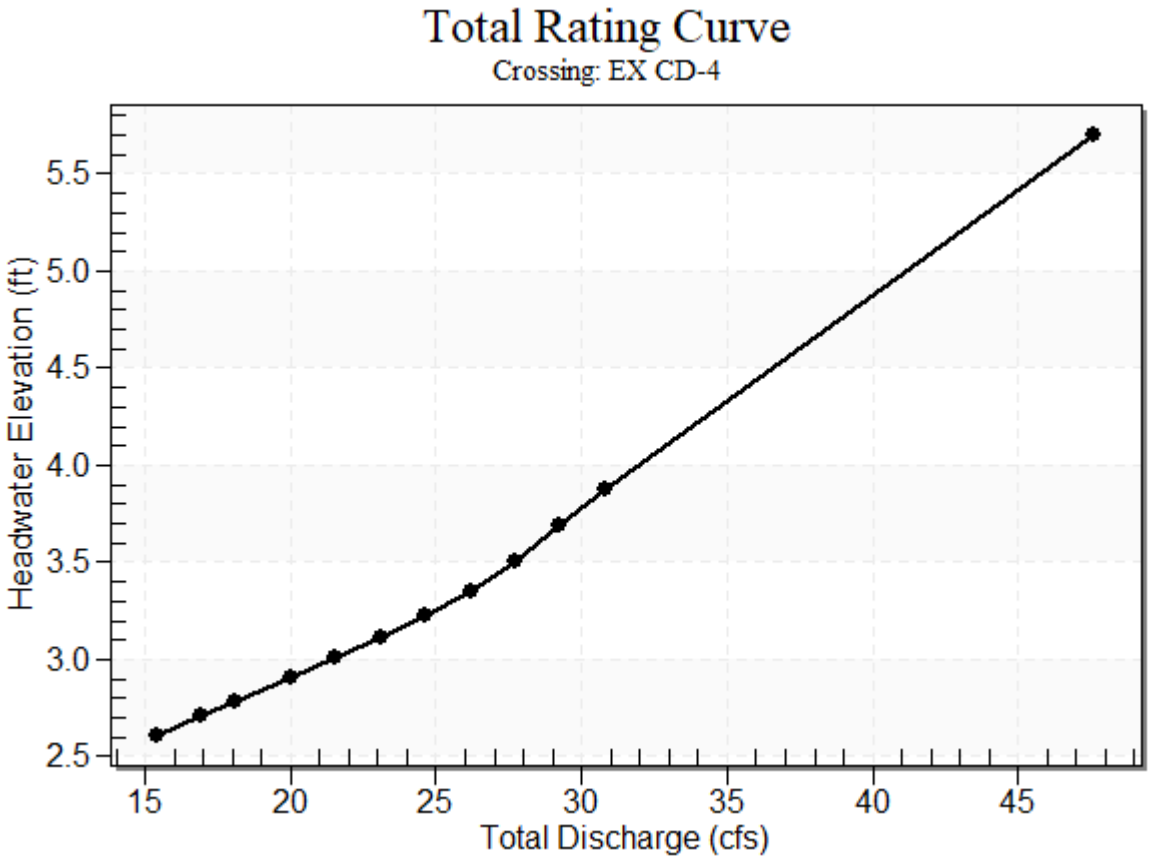


Table 20 - Culvert Summary Table: EX CD-4

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
15.40	15.40	2.61	1.605	1.802	3-M2t	1.451	1.091	1.440	1.440	3.929	0.000
16.94	16.94	2.71	1.710	1.898	3-M2t	1.566	1.149	1.440	1.440	4.321	0.000
18.10	18.10	2.78	1.789	1.971	3-M2t	1.669	1.191	1.440	1.440	4.617	0.000
20.02	20.02	2.91	1.920	2.096	3-M2t	2.000	1.258	1.440	1.440	5.107	0.000
21.56	21.56	3.01	2.028	2.199	3-M2t	2.000	1.309	1.440	1.440	5.500	0.000
23.10	23.10	3.12	2.139	2.305	3-M2t	2.000	1.358	1.440	1.440	5.893	0.000
24.64	24.64	3.23	2.254	2.418	3-M2t	2.000	1.406	1.440	1.440	6.286	0.000
26.18	26.18	3.35	2.374	2.544	7-M2c	2.000	1.451	1.451	1.440	6.623	0.000
27.72	27.72	3.51	2.498	2.697	7-M2c	2.000	1.495	1.495	1.440	6.796	0.000
29.26	29.26	3.69	2.628	2.879	7-M2c	2.000	1.537	1.537	1.440	6.972	0.000
30.80	30.80	3.88	2.764	3.066	7-M2c	2.000	1.577	1.577	1.440	7.151	0.000

****

Straight Culvert

Inlet Elevation (invert): 0.81 ft, Outlet Elevation (invert): 0.61 ft

Culvert Length: 143.00 ft, Culvert Slope: 0.0014

****

Culvert Data Summary - EX CD-4

Barrel Shape: Elliptical

Barrel Span: 38.00 in

Barrel Rise: 24.00 in

Barrel Material: Concrete

Embedment: 0.00 in

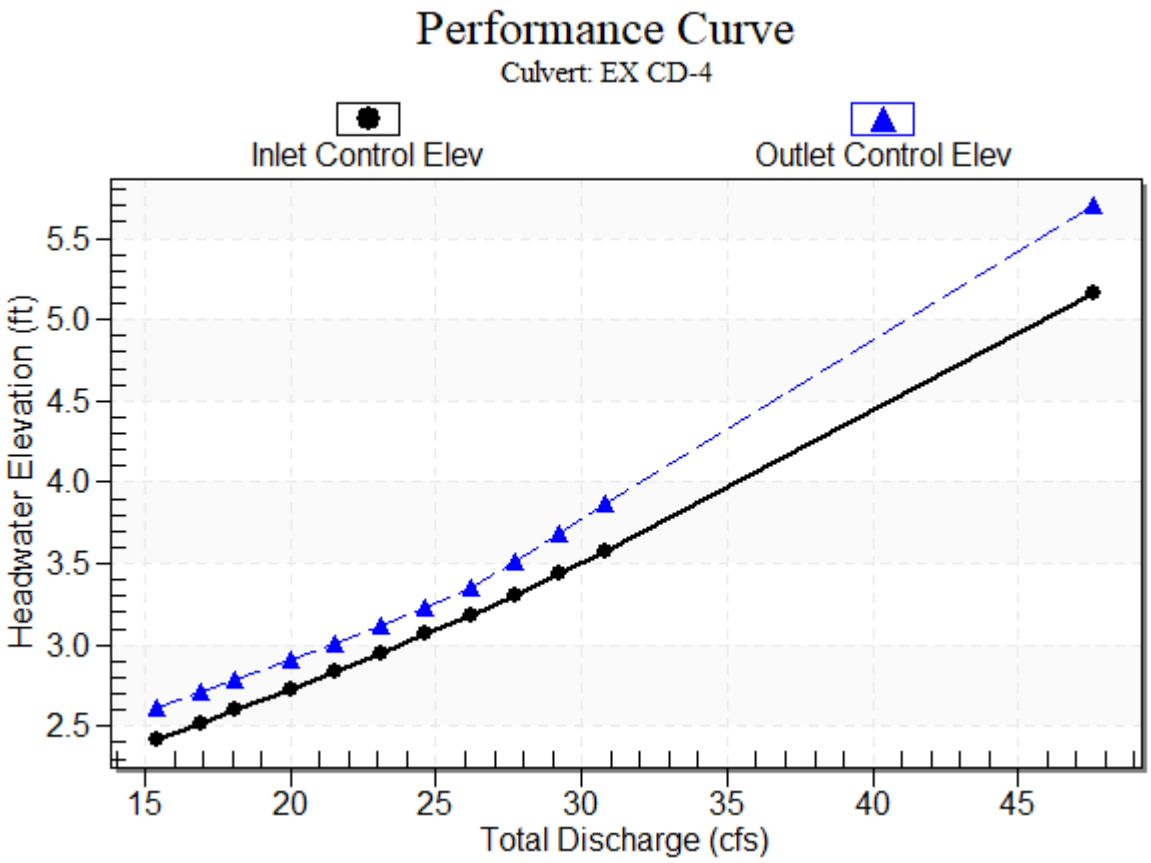
Barrel Manning's n: 0.0120

Culvert Type: Straight

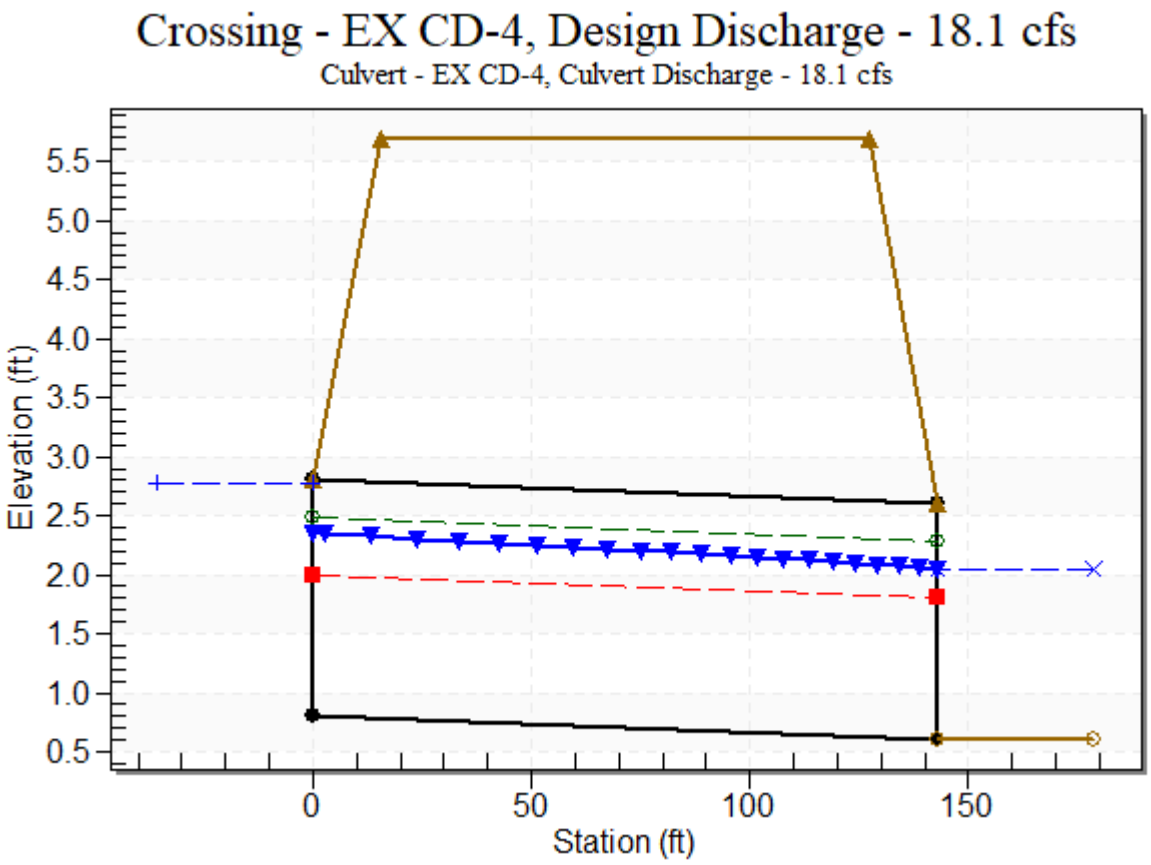
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Culvert Performance Curve Plot: EX CD-4



Water Surface Profile Plot for Culvert: EX CD-4



Site Data - EX CD-4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 0.81 ft

Outlet Station: 143.00 ft

Outlet Elevation: 0.61 ft

Number of Barrels: 1

Table 21 - Downstream Channel Rating Curve (Crossing: EX CD-4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
15.40	2.05	1.44
16.94	2.05	1.44
18.10	2.05	1.44
20.02	2.05	1.44
21.56	2.05	1.44
23.10	2.05	1.44
24.64	2.05	1.44
26.18	2.05	1.44
27.72	2.05	1.44
29.26	2.05	1.44
30.80	2.05	1.44

Tailwater Channel Data - EX CD-4

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2.05 ft

Roadway Data for Crossing: EX CD-4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1800.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 112.00 ft

Crossing Discharge Data PR CD-4

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

Minimum Flow: 15.4 cfs

Design Flow: 18.1 cfs

Maximum Flow: 30.8 cfs

Table 22 - Summary of Culvert Flows at Crossing: PR CD-4

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2.72	15.40	15.40	0.00	1
2.82	16.94	16.94	0.00	1
2.90	18.10	18.10	0.00	1
3.03	20.02	20.02	0.00	1
3.14	21.56	21.56	0.00	1
3.26	23.10	23.10	0.00	1
3.40	24.64	24.64	0.00	1
3.59	26.18	26.18	0.00	1
3.80	27.72	27.72	0.00	1
4.01	29.26	29.26	0.00	1
4.24	30.80	30.80	0.00	1
5.70	40.47	40.47	0.00	Overtopping

Rating Curve Plot for Crossing: PR CD-4

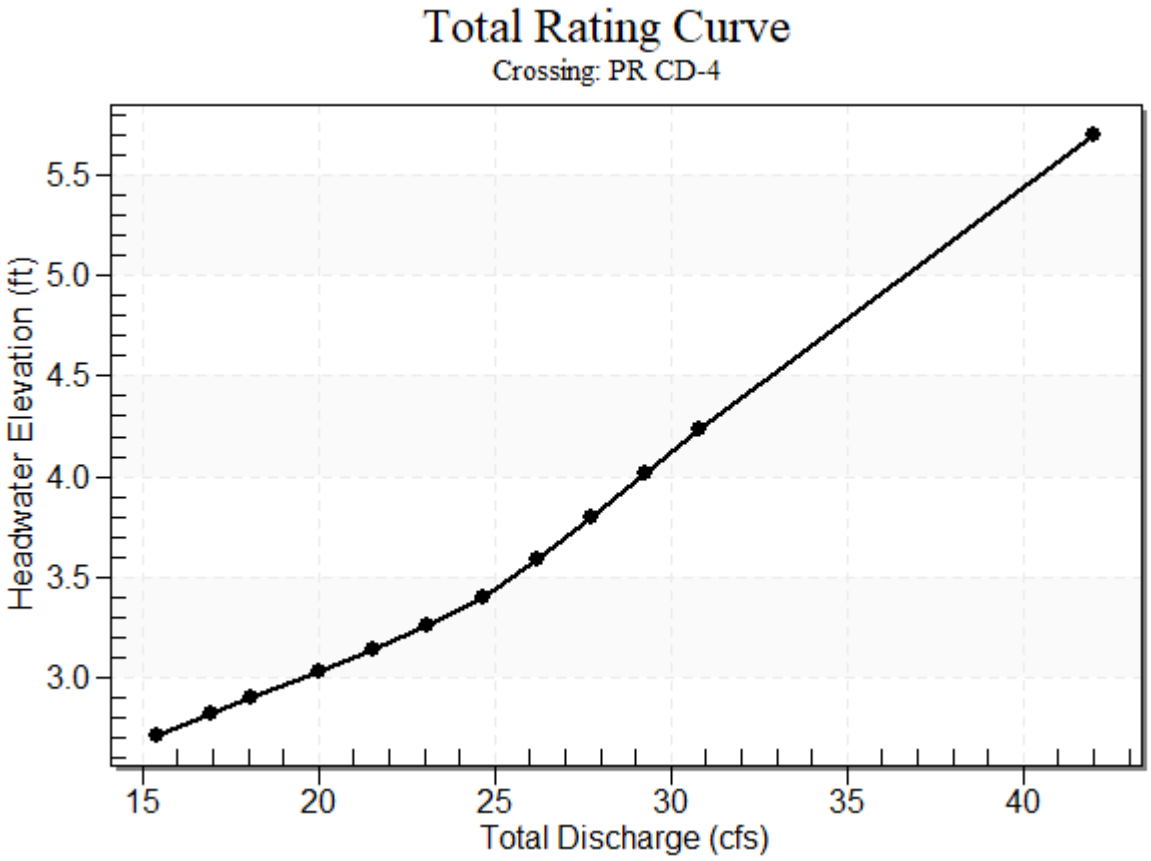


Table 23 - Culvert Summary Table: PR CD-4

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
15.40	15.40	2.72	1.605	1.807	3-M1t	1.449	1.091	1.460	1.460	3.871	0.000
16.94	16.94	2.82	1.710	1.909	3-M2t	1.564	1.149	1.460	1.460	4.258	0.000
18.10	18.10	2.90	1.789	1.987	3-M2t	1.666	1.191	1.460	1.460	4.550	0.000
20.02	20.02	3.03	1.920	2.120	3-M2t	2.000	1.258	1.460	1.460	5.033	0.000
21.56	21.56	3.14	2.028	2.232	3-M2t	2.000	1.309	1.460	1.460	5.420	0.000
23.10	23.10	3.26	2.139	2.351	3-M2t	2.000	1.358	1.460	1.460	5.807	0.000
24.64	24.64	3.40	2.254	2.490	3-M2t	2.000	1.406	1.460	1.460	6.194	0.000
26.18	26.18	3.59	2.374	2.676	7-M2t	2.000	1.451	1.460	1.460	6.581	0.000
27.72	27.72	3.80	2.498	2.885	7-M2c	2.000	1.495	1.495	1.460	6.796	0.000
29.26	29.26	4.01	2.628	3.102	7-M2c	2.000	1.537	1.537	1.460	6.972	0.000
30.80	30.80	4.24	2.764	3.326	7-M2c	2.000	1.577	1.577	1.460	7.151	0.000

****

Straight Culvert

Inlet Elevation (invert): 0.91 ft, Outlet Elevation (invert): 0.59 ft

Culvert Length: 228.00 ft, Culvert Slope: 0.0014

****

Culvert Data Summary - PR CD-4

Barrel Shape: Elliptical

Barrel Span: 38.00 in

Barrel Rise: 24.00 in

Barrel Material: Concrete

Embedment: 0.00 in

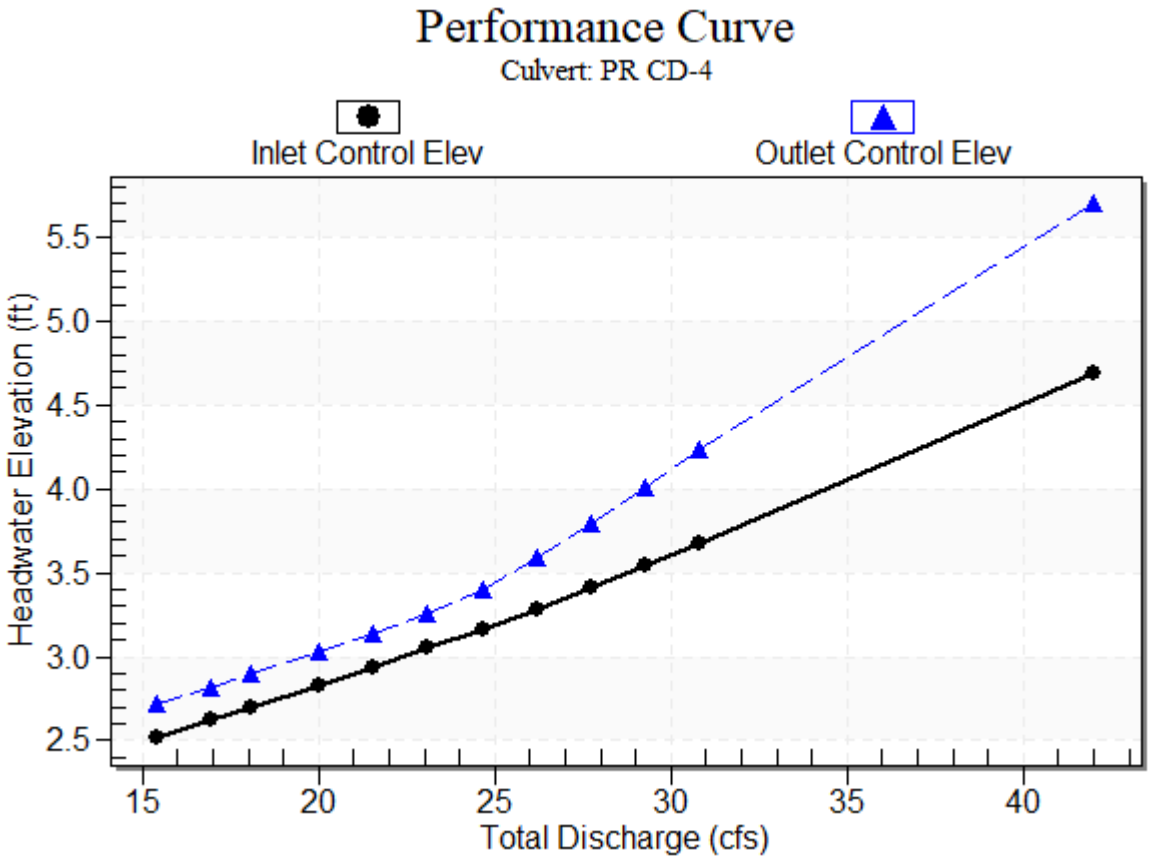
Barrel Manning's n: 0.0120

Culvert Type: Straight

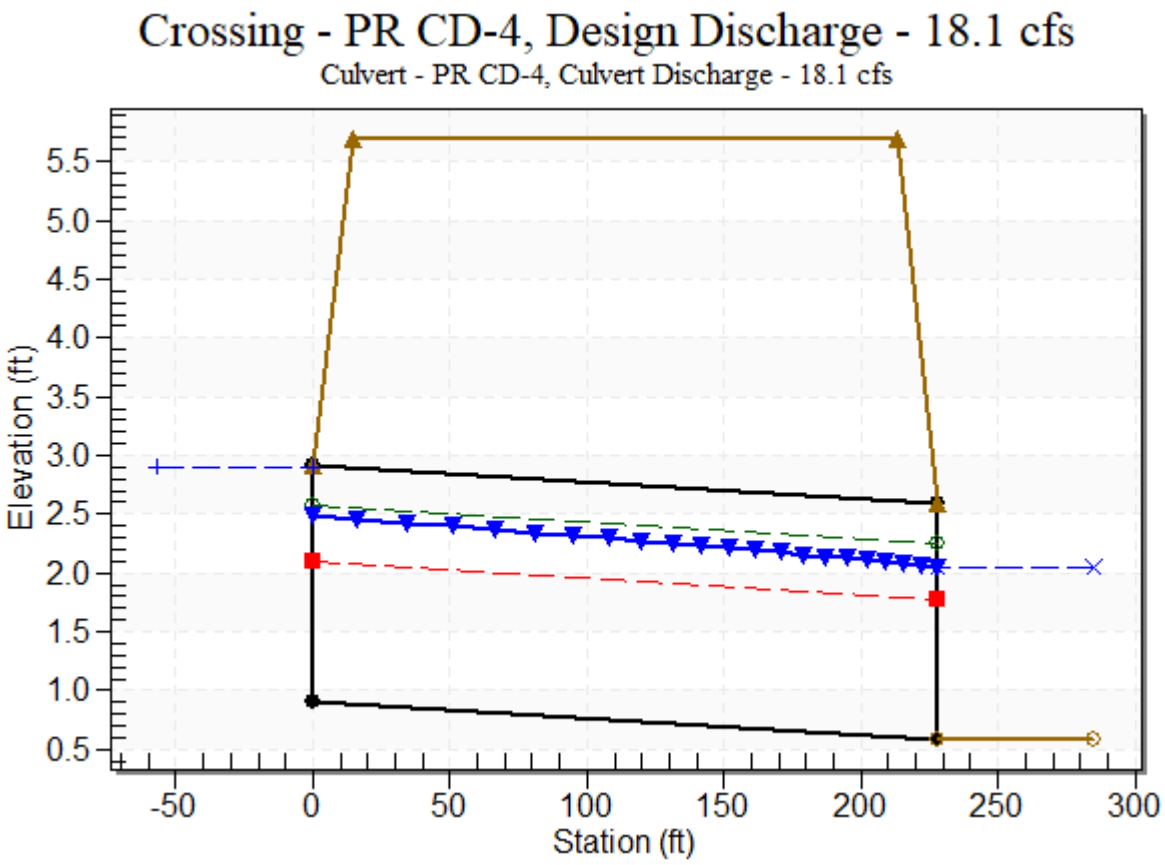
Inlet Configuration: Square Edge with Headwall

Inlet Depression: None

Culvert Performance Curve Plot: PR CD-4



Water Surface Profile Plot for Culvert: PR CD-4



Site Data - PR CD-4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 0.91 ft

Outlet Station: 228.00 ft

Outlet Elevation: 0.59 ft

Number of Barrels: 1

Table 24 - Downstream Channel Rating Curve (Crossing: PR CD-4)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
15.40	2.05	1.46
16.94	2.05	1.46
18.10	2.05	1.46
20.02	2.05	1.46
21.56	2.05	1.46
23.10	2.05	1.46
24.64	2.05	1.46
26.18	2.05	1.46
27.72	2.05	1.46
29.26	2.05	1.46
30.80	2.05	1.46

Tailwater Channel Data - PR CD-4

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2.05 ft

Roadway Data for Crossing: PR CD-4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 1800.00 ft

Crest Elevation: 5.70 ft

Roadway Surface: Paved

Roadway Top Width: 198.00 ft

APPENDIX E

Cross Drain Analysis Backup Information

CD-1

Permit No. 11339.007

In proposed conditions, the two box culvert segments will be connected. Due to this connection, ICPR was used to model the cross drain hydraulics.

CD-4

CD-4 is a 5 ft by 3 ft concrete box culvert at Station 1207+60. CD-4 collects 43 acres of runoff consisting mostly of runoff from the offsite Gateway Mobile Park and some Gandy on-site runoff. The tailwater is set at 3.5 ft based on the crown of the box and the outfall ditch top of bank contours. The SHW is 2.92 ft at the downstream end of the cross drain based on biological indicators. The basin pop off is located at the driveway at Station 1200+77 at elevation 6.0.

CD-4A

CD-4A is a 24 inch RCP at Station 1216+00. The drainage area to this proposed cross drain is 2.02 acres, which is mostly offsite and some Gandy on-site runoff. Due to the linear SMF's on the north side of Gandy Blvd, this cross drain is required to convey the runoff that was draining in the existing north side Gandy Blvd ditches to the upstream end of CD-4. CD-4A will convey this runoff to the south side Gandy Blvd ditch which drains to the west to the downstream end of CD-4, thus maintaining existing drainage patterns. This cross drain is modeled in the Basin 1200 ICPR post condition model, as well as in HY-8.

CD-5

CD-5 is a proposed 18 inch RCP at Station 114+79, baseline of survey 9th Street. This cross drain flows east to west and crosses 9th Street. The drainage area to this proposed cross drain is 1.35 acres, which is mostly northbound 9th Street runoff as well as the grassed area between 9th Street and SMF 900-D. Reviewing the existing drainage patterns for this area shows that this area drains to the north towards the pipe system at the northeast corner of 9th Street and Gandy Blvd which ultimately drains to the west ditch on 9th Street which flows to the south towards the box culvert at Station 105+00, baseline of survey 9th Street, and ultimately to Tinney Creek. This cross drain is required to maintain the existing drainage patterns. The roadway overtopping elevation is 6.00 ft.

HY-8 Culvert Analysis Report

CROSS DRAIN ANALYSIS
CD-4

5' X 3' CONCRETE BOX CULVERT STA. 295+60 (BL GANDY)

PROPOSED CONDITIONS ANALYSIS

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

Headwater Elevation (ft)	Total Discharge (cfs)	PR CD-4 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
4.91	87.80	87.80	0.00	1
5.08	91.22	91.22	0.00	1
5.25	94.64	94.64	0.00	1
5.42	98.06	98.06	0.00	1
5.60	101.48	101.48	0.00	1
5.77	104.90	104.90	0.00	1
5.91	107.50	107.50	0.00	1
6.01	111.74	108.46	2.45	17
6.02	115.16	107.52	7.16	5
6.03	118.58	106.47	11.57	4
6.04	122.00	105.44	16.18	4

Rating Curve Plot for Crossing: PR CD-4

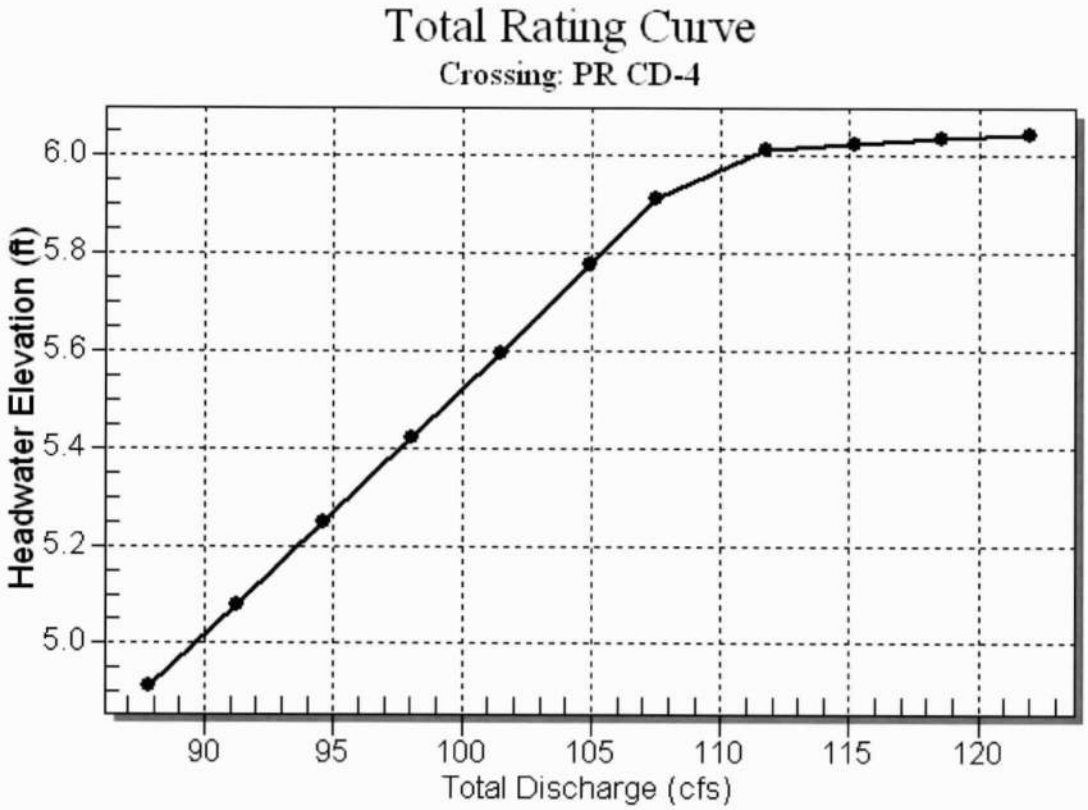


Table 2 - Culvert Summary Table: PR CD-4

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
87.80	87.80	4.91	3.688	4.514	4-FFf	3.000	2.128	3.000	3.070	5.853	1.009
91.22	91.22	5.08	3.806	4.680	4-FFf	3.000	2.183	3.000	3.126	6.081	1.019
94.64	94.64	5.25	3.926	4.849	4-FFf	3.000	2.237	3.000	3.181	6.309	1.029
98.06	98.06	5.42	4.049	5.022	4-FFf	3.000	2.291	3.000	3.235	6.537	1.039
101.48	101.48	5.60	4.175	5.197	4-FFf	3.000	2.344	3.000	3.288	6.765	1.048
104.90	104.90	5.77	4.304	5.375	4-FFf	3.000	2.396	3.000	3.339	6.993	1.058
107.50	107.50	5.91	4.404	5.512	4-FFf	3.000	2.436	3.000	3.378	7.167	1.065
111.74	108.46	6.01	4.442	5.611	4-FFf	3.000	2.450	3.000	3.439	7.231	1.076
115.16	107.52	6.02	4.405	5.624	4-FFf	3.000	2.436	3.000	3.489	7.168	1.084
118.58	106.47	6.03	4.364	5.633	4-FFf	3.000	2.420	3.000	3.538	7.098	1.092
122.00	105.44	6.04	4.324	5.641	4-FFf	3.000	2.404	3.000	3.586	7.029	1.100

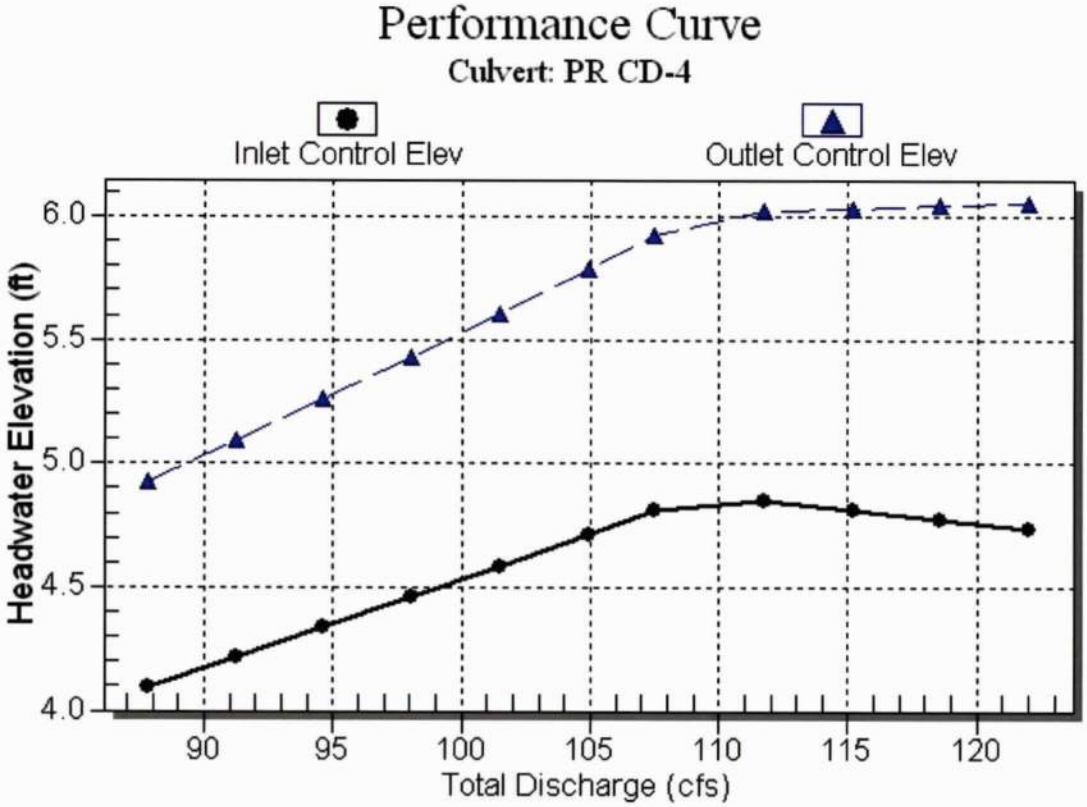
****

Inlet Elevation (invert): 0.40 ft, Outlet Elevation (invert): 0.40 ft

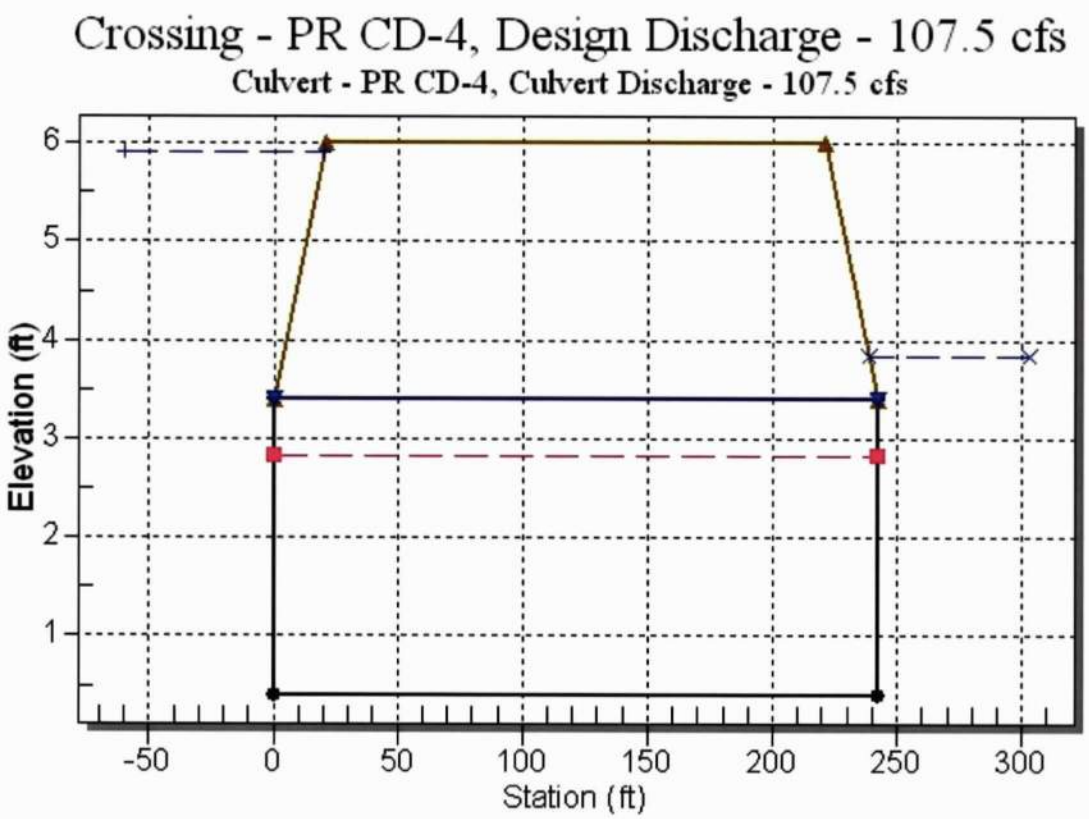
Culvert Length: 242.00 ft, Culvert Slope: 0.0000

****

Culvert Performance Curve Plot: PR CD-4



Water Surface Profile Plot for Culvert: PR CD-4



Site Data - PR CD-4

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 0.40 ft

Outlet Station: 242.00 ft

Outlet Elevation: 0.40 ft

Number of Barrels: 1

Culvert Data Summary - PR CD-4

Barrel Shape: Concrete Box

Barrel Span: 5.00 ft

Barrel Rise: 3.00 ft

Barrel Material: Concrete

Barrel Manning's n: 0.0120

Inlet Type: Conventional

Inlet Edge Condition: Square Edge (90º) Headwall

Inlet Depression: None

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

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)	Shear (psf)	Froude Number
87.80	3.53	3.07	1.01	0.23	0.13
91.22	3.59	3.13	1.02	0.23	0.13
94.64	3.64	3.18	1.03	0.24	0.13
98.06	3.70	3.24	1.04	0.24	0.13
101.48	3.75	3.29	1.05	0.25	0.13
104.90	3.80	3.34	1.06	0.25	0.13
107.50	3.84	3.38	1.06	0.25	0.13
111.74	3.90	3.44	1.08	0.26	0.13
115.16	3.95	3.49	1.08	0.26	0.13
118.58	4.00	3.54	1.09	0.26	0.13
122.00	4.05	3.59	1.10	0.27	0.13

Tailwater Channel Data - PR CD-4

Tailwater Channel Option: Trapezoidal Channel

Bottom Width: 13.00 ft

Side Slope (H:V): 5.00 (_:1)

Channel Slope: 0.0012

Channel Manning's n: 0.0800

Channel Invert Elevation: 0.46 ft

Roadway Data for Crossing: PR CD-4

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 657.00 ft

Crest Elevation: 6.00 ft

Roadway Surface: Paved

Roadway Top Width: 200.00 ft

CD-2 and CD-3

Permit No. 11339.006

2.2 West Segment

The west segment models the two 24" RCP cross drains between existing structures 18 and 20 at STA. 307+70 (CR-307) and existing structures 52 and 53 at STA. 328+60 (CR-328). These two cross drains appear to work together for the larger storm events as they convey runoff to Tampa Bay in multiple directions.

CR-307 conveys stormwater from the north side of US 92 to the south side then westerly through open channels and 18" culverts to a box culvert cross drain connected to Tampa Bay through a tidal ditch. This outfall is outside of the project limits. During the larger storm events, the stormwater will also flow along the north side of the road westerly through open channels and culverts to the same tidally connected box culvert cross drain mentioned above. Stormwater will also flow easterly through open channels and culverts on the south side of the road and intermingle with runoff through CR-328. Further, during both the SWFWMD 25-year 24-hour and 100-year 24-hour event, the top of bank of the ditch is overtopped and stormwater appears to flow southerly **offsite** at existing structure 18 to a tidal canal (Tidal Ditch-3) to Tampa Bay that is roughly 150 feet from the ditch bank. There is also a portion of this system that stormwater is conveyed westerly along the north side of the road to an inlet at Brighton Bay Blvd which is connected by a 24" pipe to tidally influenced marshes outside of the project limits.

The 24" CR-328 conveys stormwater from the north side of US 92 to the south side then easterly through a culvert and a short open channel before directed south **offsite** through a pair of 14"x23" pipes that lead to a tidally influenced Mangrove lined ditch (Tidal Ditch-3) leading to Tampa Bay. During the larger storm events, the stormwater will also flow along the northern side of the road ditch to a culvert at Mangrove Cay Blvd to Wetland 16 which is tidally influenced by Tampa Bay through canals and mosquito ditches and is heavily covered in Mangroves.

Please refer to the Existing Drainage Maps and Existing Drainage Structure Schedule, included in Appendix B of this report. Please refer to the Nodal Diagram and ICPR Data included in Appendix C of this report.

2.3 East Segment

The east segment models the cross drain between existing structures 82 and 83 at STA. 342+00 (CR-342) and side drain systems on the north side of US 92 between existing structures 101 and 108 (S-West) and 116 and 111 (S-East).

The 24" CR-342 conveys stormwater from the south side of US 92 to the north side into Wetland 16 which is tidally influenced by Tampa Bay through canals and mosquito ditches. During the larger storm events, the stormwater will also flow southerly **offsite** from existing structure 98 at the southeast corner of Snug Harbor Rd through a system of culverts and ditches that lead directly to Tampa Bay (Tampa-Bay-S).

The side drain system S-West connects Wetland 17 and Wetland 18 along the north side of US 92. Wetland 17 and 18 are tidally influenced by Tampa Bay through channels and mosquito ditches and is heavily covered in Mangroves. The side drain system S-East connects Wetland 18 and Tampa Bay along the north side of US 92.

LEGEND

MILLING / RESURFACING

PAVEMENT REMOVAL

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT PERMITTED CONSTRUCTION DRAWINGS

RECORD

CD-2

N

0 10 40

Feet

CITY OF ST. PETE 24" SAN (TO REMAIN)

CITY OF ST. PETE 12" WM (TO REMAIN)

EXIST. MCI FOC (TO REMAIN)

AT&T (LONG DISTANCE) BFO (TO REMAIN)

R/W +00.65 68.00' LT.

R/W +69.25 68.00' LT.

R/W +14.75 68.00' LT.

BARNEY'S MINI STORAGE

OAK STREET NE

BM NO. GANDY D FND 12" ROUND CONC. MONUMENT W/ PINELLAS CO. ENGR. DEPT. DISK STAMPED "GANDY D" STA. 306+44.00, 39.40' LT. EL. 5.951'

KNOLOGY BROADBAND OF FLORIDA UG CATV (TO REMAIN)

VERIZON OF FLORIDA 2-DIRECT BURIED CABLES & 2-FOC (TO REMAIN)

BRIGHTHOUSE NETWORKS OH FOC (TO REMAIN)

KNOLOGY BROADBAND OF FLORIDA OH CATV (TO REMAIN)

EXIST. MCI HH (TO REMAIN)

CITY OF ST. PETE 8" RCW (TO REMAIN)

PROGRESS ENERGY OE (TO REMAIN)

EXIST. MCI HH (TO REMAIN)

TECO/PEOPLES GAS 2" GAS LINE (TO REMAIN)

BARNEY'S MOTORCYCLES

CONST. 5' SIDEWALK

ASPH PARKING

DESILT 44 LF OF 18" CMP

DESILT 4 LF OF 18" RCP

DESILT 66 LF OF 14"X23" ERCP

WETLAND AREA 7

DESILT 13 LF OF 18" RCP

DESILT 44 LF OF 18" RCP

WETLAND AREA 6

@ SURVEY/℄ CONST. SR 600/GANDY BLVD.

+18.79 39.35' LT.

+73.86 39.35' LT.

CONST. BUS PAD

CONST. 4 LF OF 18" PIPE

DESILT 76 LF OF 18" RCP

DESILT 66 LF OF 18" RCP

CONST. 5' SHLDR.

+81.25 29.70' LT.

+61.25 29.68' LT.

WETLAND AREA 5

FIBERLIGHT BFO (TO REMAIN)

BEGIN 5' SIDEWALK +37.88, 37.86' LT

+83.83 32.56' LT.

+03.83 34.35' LT.

CONST. 5' SHLDR.

CONST. 8 LF OF 24" PIPE

CITY OF ST. PETE 8" SAN (TO REMAIN)

END 5' SHLDR. +07.26, 29.00' LT.

304

305

306

307

308

309

REMOVE CONC. SIDEWALK

BEGIN 5' SHLDR. +51.41, 29.00' LT.

BEGIN 5' SHLDR. +82.92, 29.00' LT.

END 5' SHLDR. +13.71, 29.00' LT.

N 72° 47' 38" E

DESILT 75 LF OF 24" RCP

FLORIDA GAS TRANS. CO. HIGH PRESSURE NATURAL GAS LINE (TO REMAIN)

CONST. 4 LF OF 24" PIPE

SR 600 (GANDY BLVD.)

DESILT 60 LF OF 24" RCP

BEGIN 5' SHLDR. +28.74, 138.50' RT.

+75.86 98.61' RT.

BEGIN 5' SHLDR. +17.00, 103.50' RT.

CITY OF ST. PETE 8" WW (TO REMAIN)

CONST. 5' SHLDR.

END 5' SHLDR. +70.69, 94.00' RT.

CONST. 5' SHLDR.

WETLAND AREA 33

CONST. DETECTABLE WARNING SURFACE

WETLAND AREA 35

WETLAND AREA 34

CONST. 66 LF OF 18" PIPE

+24.93 119.40' RT.

+33.99 119.40' RT.

CONST. 5' SIDEWALK

+57.19 143.40' RT.

R/W LINE

BEGIN 5' SHLDR. +13.90, 94.40' RT.

PROGRESS ENERGY OE (TO REMAIN)

END 5' SHLDR. +29.33, 105.00' RT.

CONST. 122 LF OF 18" PIPE

TECO/PEOPLES GAS 4" GAS LINE (TO REMAIN)

R/W +33.01 143.74' RT.

CITY OF ST. PETE 8" WM (TO REMAIN)

BRIGHTHOUSE NETWORKS UG CATV (TO REMAIN)

CITY LIMIT LINE (CITY OF ST. PETE)

SHADY LANE BLVD.

PROGRESS ENERGY TO ADJUST GUY WIRES

VERIZON OF FLORIDA 12-4" CONDUITS & 8-DIRECT BURIED CABLES (TO REMAIN)

BACKFLOW PREVENTER TO BE RELOCATED BY CITY OF ST. PETE

4401339.006

RECEIVED SEP 28 2009 RPD-Tampa

8-22-09

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUMBEY & FAIR, INC.
2463 ENTERPRISE ROAD
CLEARWATER, FLORIDA 33765
PHONE: (727) 797-8983

CERTIFICATE OF AUTHORIZATION NO. 00002168
TIMOTHY E. BOURNE, P.E. 47149

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS	416838-1-52-01

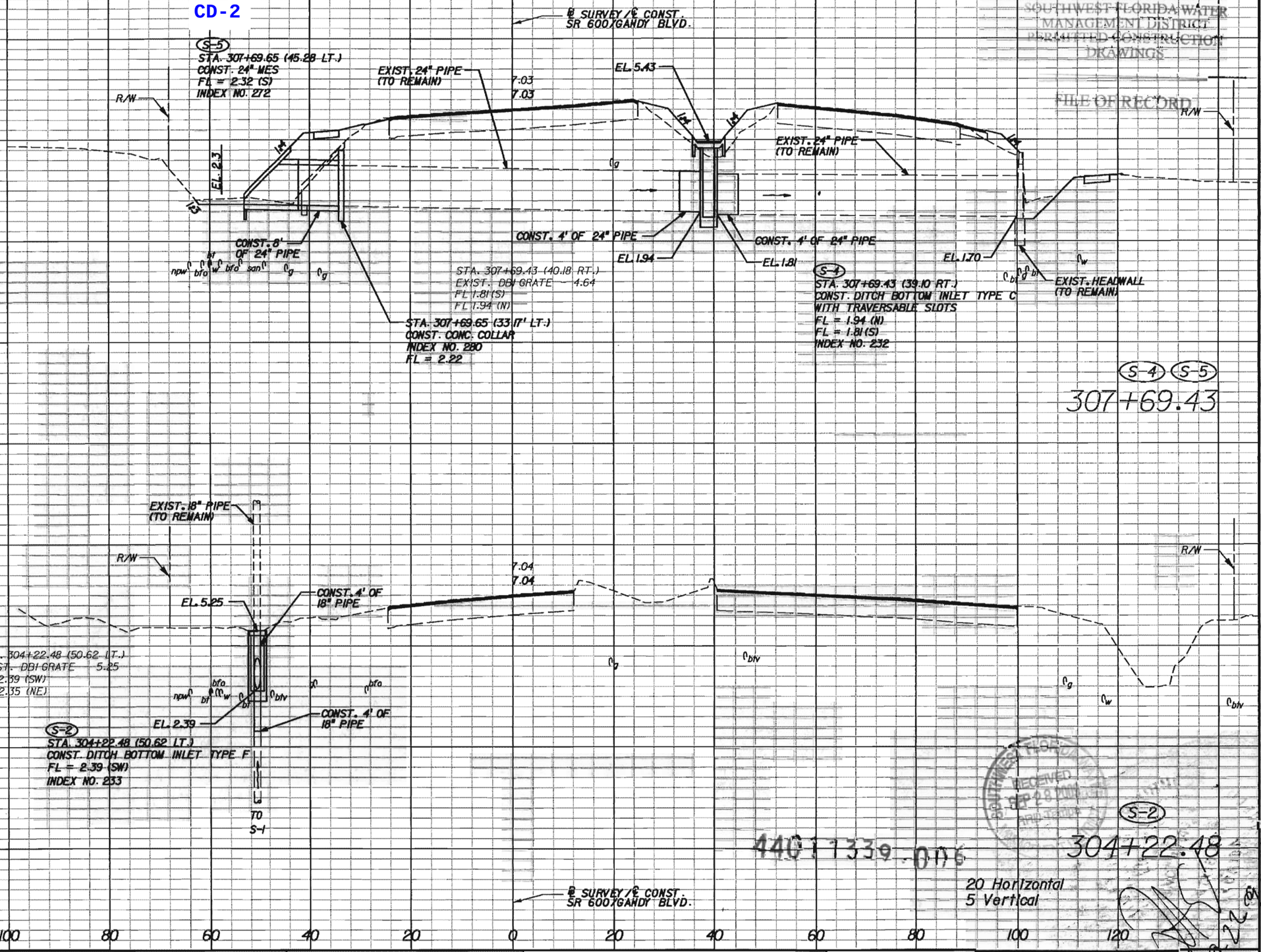
ROADWAY PLAN (2)

STA. 303+60.00 TO STA. 309+20.00

SHEET NO. 22

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

CD-2



44011339.016

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CUMBEY & FAIR, INC.
2465 ENTERPRISE ROAD
CLEARWATER, FLORIDA 33765
PHONE: (727) 797-8982
CERTIFICATE OF AUTHORIZATION NO. 00002168
TIMOTHY E. BOURNE, P.E. 47149

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS	416838-1-52-01

DRAINAGE STRUCTURES

SHEET NO. 52

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

LEGEND

MILLING / RESURFACING

PAVEMENT REMOVAL

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

0 10 40

Feet

VERIZON OF FLORIDA
1-DIRECT BURIED CABLE
(TO REMAIN)

CITY OF ST. PETE
12" WM (TO REMAIN)

KNOLOGY BROADBAND
OF FLORIDA OH CATV
(TO REMAIN)

CITY LIMIT LINE
(CITY OF ST. PETE)

R/W LINE

PC +61.04
51.00' LT.

R 107'

PT +85.34
47.84' LT.

PROGRESS ENERGY
OE (TO REMAIN)

AT&T (LONG DISTANCE)
BFO (TO REMAIN)

CITY OF ST. PETE
4" FM (TO REMAIN)

BRIGHTHOUSE NETWORKS
OH FOC (TO REMAIN)

CONST. 64 LF
OF 19"X30" PIPE

R 95'

WETLAND AREA 15

CONST. 12' SHARED USE PATH

+00.00
52.00' LT.

+24.27
15.74' LT.

+23.24
28.92' LT.

PC +43.77
32.31' LT.

R 107'

PT +70.43
29.00' LT.

℄ SURVEY/ ℄ CONST.
SR 600/GANDY BLVD.

326 327 328 329 330 331

N 72° 47' 36" E

BRIGHTHOUSE NETWORKS
BFO (TO REMAIN)

FLORIDA GAS TRANS. CO.
HIGH PRESSURE NATURAL
GAS LINE (TO REMAIN)

FIBERLIGHT
BFO (TO REMAIN)

SR 600 (GANDY BLVD.)

DESILT 130 LF
OF 24" RCP

FLORIDA GAS TRANS. CO.
HIGH PRESSURE NATURAL
GAS LINE (TO REMAIN)

CONST. 5'
SIDEWALK

WETLAND AREA 29

R/W LINE

PROGRESS ENERGY
OE (TO REMAIN)

TECO/PEOPLES GAS
4" GAS LINE
(TO REMAIN)

DESILT 80 LF
OF 29"X45" ERCP

PLASTIC SCREEN FENCE
W/ WD PST

BEGIN 5'
SIDEWALK
+14.05, 104.33' RT.

BEGIN
GRAVITY WALL
+40.00, 105.00' RT.

CITY OF ST. PETE
6" WM (TO REMAIN)

CITY OF ST. PETE
8" WM (TO REMAIN)

WETLAND
AREA 29

WETLAND
AREA 28

VERIZON OF FLORIDA
11-4" CONDUITS W/COPPER
& FOC AND 6-DIRECT BURIED
CABLES (TO REMAIN)

RECEIVED
SEP 28 2009
RRD Tampa

44011339.006

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUMBEY & FAIR, INC.
2463 ENTERPRISE ROAD
CLEARWATER, FLORIDA 33763
PHONE: (727) 797-8962

CERTIFICATE OF AUTHORIZATION NO. 00002168
TIMOTHY R. BOURNE, P.E. 47149

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS	416838-1-52-01

ROADWAY PLAN (6)

STA. 326+00.00 TO STA. 331+60.00

SHEET NO. 26

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

Name:	Pipe_NEW26-25	From Node:	NEW-26	Length(ft):	44.0
Group:	BASE	To Node:	EX-25	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	18.0	18.0		Entrance Loss Coef:	0.20
Rise(in):	18.0	18.0		Exit Loss Coef:	0.00
Invert(ft):	2.85	2.75		Bend Loss Coef:	0.00
Manning's N:	0.024000	0.024000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

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

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

Name:	Pipe_NEW70-74	From Node:	S-06_NEW-70	Length(ft):	72.0
Group:	BASE	To Node:	Tidal Wet-16	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse		Flow:	Both
Span(in):	30.0	30.0		Entrance Loss Coef:	0.20
Rise(in):	19.0	19.0		Exit Loss Coef:	0.00
Invert(ft):	1.60	1.50		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name:	Pipe_S2-S1	From Node:	S-02	Length(ft):	16.0
Group:	BASE	To Node:	EX-06_S-01	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	18.0	18.0		Entrance Loss Coef:	0.20
Rise(in):	18.0	18.0		Exit Loss Coef:	0.00
Invert(ft):	2.39	2.36		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

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

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

CD-2

Name:	Pipe_S4-18	From Node:	S-04	Length(ft):	60.0
Group:	BASE	To Node:	S-03_EX-18	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	24.0	24.0		Entrance Loss Coef:	0.20
Rise(in):	24.0	24.0		Exit Loss Coef:	0.00
Invert(ft):	1.81	1.70		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

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

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

CD-2 Name: Pipe_S5-19 From Node: EX-21_S-05 Length(ft): 92.0
Group: BASE To Node: S-04 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	24.0	24.0
Rise(in):	24.0	24.0
Invert(ft):	2.32	1.94
Manning's N:	0.013000	0.013000
Top Clip(in):	0.00	0.00
Bot Clip(in):	0.00	0.00

Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both
Entrance Loss Coef: 0.20
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

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

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

==========
==== Channels ==========
==========

Name: Ditch_12-16 From Node: EX-12 Length(ft): 90.00
Group: BASE To Node: EX-16 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Trapezoidal	Trapezoidal
Invert(ft):	1.600	1.500
TClpInitZ(ft):	9999.000	9999.000
Manning's N:	0.035000	0.035000
Top Clip(ft):	0.000	0.000
Bot Clip(ft):	0.000	0.000
Main XSec:		
AuxElev1(ft):		
Aux XSec1:		
AuxElev2(ft):		
Aux XSec2:		
Top Width(ft):		
Depth(ft):		
Bot Width(ft):	8.000	8.000
LtSdSlp(h/v):	3.00	3.00
RtSdSlp(h/v):	3.00	3.00

Friction Equation: Automatic
Solution Algorithm: Automatic
Flow: Both
Contraction Coef: 0.100
Expansion Coef: 0.300
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

Name: Ditch_25-24 From Node: EX-25 Length(ft): 90.00
Group: BASE To Node: EX-24 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Trapezoidal	Trapezoidal
Invert(ft):	2.750	1.890
TClpInitZ(ft):	9999.000	9999.000
Manning's N:	0.035000	0.035000
Top Clip(ft):	0.000	0.000
Bot Clip(ft):	0.000	0.000
Main XSec:		
AuxElev1(ft):		
Aux XSec1:		
AuxElev2(ft):		
Aux XSec2:		
Top Width(ft):		
Depth(ft):		
Bot Width(ft):	5.000	5.000
LtSdSlp(h/v):	4.00	4.00
RtSdSlp(h/v):	10.00	10.00

Friction Equation: Automatic
Solution Algorithm: Automatic
Flow: Both
Contraction Coef: 0.100
Expansion Coef: 0.300
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

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

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

Name:	Pipe_50-51	From Node:	EX-49_EX-50	Length(ft):	126.0
Group:	BASE	To Node:	EX-51	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	18.0	18.0		Entrance Loss Coef:	0.20
Rise(in):	18.0	18.0		Exit Loss Coef:	0.00
Invert(ft):	2.35	2.02		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

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

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

CD-3

Name:	Pipe_52-53	From Node:	EX-52	Length(ft):	130.0
Group:	BASE	To Node:	EX-53_EX-54	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	24.0	24.0		Entrance Loss Coef:	0.20
Rise(in):	24.0	24.0		Exit Loss Coef:	0.00
Invert(ft):	1.89	1.75		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

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

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

Name:	Pipe_52-Break33	From Node:	EX-52	Length(ft):	84.0
Group:	BASE	To Node:	Break-330	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse		Flow:	Both
Span(in):	30.0	30.0		Entrance Loss Coef:	0.20
Rise(in):	19.0	19.0		Exit Loss Coef:	0.00
Invert(ft):	2.50	2.40		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.00	0.00		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.00	0.00		Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name:	Pipe_54-55	From Node:	EX-53_EX-54	Length(ft):	80.0
Group:	BASE	To Node:	EX-55_EX-56	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse		Flow:	Both

	Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft	
	Box-Cross	BASE	WMD_25yr-24hr	12.41	4.05	-1.647	12.37	2.54	12.37	2.54	
	Box-Outfall	BASE	WMD_25yr-24hr	12.37	11.99	-8.430	12.37	2.54	8.00	2.50	
	Brighton	BASE	WMD_25yr-24hr	12.31	5.35	0.008	12.31	4.26	12.31	3.38	
	Brighton-Inlet	BASE	WMD_25yr-24hr	12.31	5.35	0.008	12.31	3.38	8.00	2.50	
	Ditch_12-16	BASE	WMD_25yr-24hr	12.13	1.96	3.020	12.16	3.56	12.16	3.56	
	Ditch_25-24	BASE	WMD_25yr-24hr	12.39	16.23	-14.467	12.38	4.48	12.38	4.47	
	Ditch_27-18	BASE	WMD_25yr-24hr	12.26	7.00	0.538	12.25	4.11	12.21	4.04	
	Ditch_29-26	BASE	WMD_25yr-24hr	11.94	3.84	0.164	12.40	4.55	12.40	4.55	
	Ditch_30-33	BASE	WMD_25yr-24hr	12.69	2.27	2.452	12.39	4.55	12.39	4.55	
	Ditch_35A-EX-35	BASE	WMD_25yr-24hr	13.01	4.48	-6.645	12.37	4.47	12.37	4.47	
	Ditch_4-Box-N	BASE	WMD_25yr-24hr	12.37	4.04	0.358	12.37	2.63	12.37	2.54	
	Ditch_40-40A	BASE	WMD_25yr-24hr	11.72	1.20	-0.672	12.36	4.43	12.37	4.43	
	Ditch_42-28	BASE	WMD_25yr-24hr	12.13	2.06	0.051	12.28	4.47	12.30	4.42	
	Ditch_47-52	BASE	WMD_25yr-24hr	12.09	6.40	0.010	12.10	4.16	12.16	3.52	
	Ditch_51-53	BASE	WMD_25yr-24hr	12.27	5.33	0.008	12.17	3.67	12.16	3.48	
	Ditch_9-Box-S	BASE	WMD_25yr-24hr	12.28	7.99	-0.170	12.32	2.60	12.37	2.54	
	Ditch_Break-70	BASE	WMD_25yr-24hr	12.17	8.32	0.011	12.19	3.44	12.38	3.10	
	Overbank-18	BASE	WMD_25yr-24hr	12.21	8.74	0.135	12.21	4.04	8.00	2.50	
	Pipe_10-13	BASE	WMD_25yr-24hr	11.65	0.17	0.357	12.19	4.08	12.24	4.17	
	Pipe_10-S2	BASE	WMD_25yr-24hr	12.42	4.61	-0.758	12.19	4.08	12.20	3.94	
	Pipe_12-9	BASE	WMD_25yr-24hr	12.16	8.10	0.120	12.16	3.56	12.32	2.60	
	Pipe_13-14	BASE	WMD_25yr-24hr	11.65	1.11	-0.869	12.24	4.17	12.25	4.20	
	Pipe_16-S3	BASE	WMD_25yr-24hr	0.00	0.00	-0.083	12.16	3.56	12.21	4.04	
	Pipe_22-21	BASE	WMD_25yr-24hr	12.48	4.21	0.652	12.34	4.38	12.25	4.20	
	Pipe_23-24	BASE	WMD_25yr-24hr	0.00	0.56	0.560	12.34	4.38	12.38	4.47	
	Pipe_27-28	BASE	WMD_25yr-24hr	0.00	0.00	-0.009	12.25	4.11	12.30	4.42	
	Pipe_30-29	BASE	WMD_25yr-24hr	11.91	2.36	-0.039	12.39	4.55	12.40	4.55	
	Pipe_34-33	BASE	WMD_25yr-24hr	11.83	1.84	-0.941	12.38	4.53	12.39	4.55	
	Pipe_34-35	BASE	WMD_25yr-24hr	12.62	3.00	1.615	12.38	4.53	12.37	4.47	
	Pipe_4-3	BASE	WMD_25yr-24hr	12.20	4.09	0.019	12.20	3.62	12.20	2.54	
	Pipe_40A-35A	BASE	WMD_25yr-24hr	11.80	1.14	0.977	12.37	4.43	12.37	4.47	
	Pipe_41-40	BASE	WMD_25yr-24hr	11.69	0.70	-0.129	12.31	4.26	12.36	4.43	
	Pipe_42-43	BASE	WMD_25yr-24hr	12.69	2.30	-0.021	12.28	4.47	12.25	4.44	
	Pipe_45-47	BASE	WMD_25yr-24hr	12.04	3.67	0.787	12.09	4.30	12.10	4.16	
	Pipe_46-44	BASE	WMD_25yr-24hr	1.84	0.01	0.015	12.22	4.38	12.25	4.44	
	Pipe_48-46	BASE	WMD_25yr-24hr	0.00	0.00	0.046	12.20	4.29	12.22	4.38	
	Pipe_48-49	BASE	WMD_25yr-24hr	12.51	4.77	-0.748	12.20	4.29	12.18	4.15	
	Pipe_50-51	BASE	WMD_25yr-24hr	12.22	5.29	-0.257	12.18	4.15	12.17	3.67	
CD-3	Pipe_52-53	BASE	WMD_25yr-24hr	12.17	3.56	-0.461	12.16	3.52	12.16	3.48	
	Pipe_52-Break33	BASE	WMD_25yr-24hr	12.12	5.01	0.009	12.16	3.52	12.19	3.44	
	Pipe_54-55	BASE	WMD_25yr-24hr	12.15	11.35	0.017	12.16	3.48	12.15	3.26	
	Pipe_56-Tide	BASE	WMD_25yr-24hr	12.17	12.05	0.016	12.17	2.96	8.00	2.50	
	Pipe_6-5	BASE	WMD_25yr-24hr	12.19	4.09	-0.008	12.20	3.87	12.20	3.62	
	Pipe_68-S6	BASE	WMD_25yr-24hr	12.08	0.60	0.005	12.36	3.11	12.38	3.10	
	Pipe_NEW26-25	BASE	WMD_25yr-24hr	11.91	2.93	-0.103	12.40	4.55	12.38	4.48	
	Pipe_NEW70-74	BASE	WMD_25yr-24hr	12.36	10.67	0.230	12.38	3.10	12.01	3.08	
	Pipe_S2-S1	BASE	WMD_25yr-24hr	12.06	4.61	-0.535	12.20	3.94	12.20	3.87	
	Pipe_S4-18	BASE	WMD_25yr-24hr	12.24	5.97	-0.283	12.24	4.16	12.21	4.04	FROM MES TO DBI
CD-2	Pipe_S5-19	BASE	WMD_25yr-24hr	12.29	4.68	-0.554	12.25	4.20	12.24	4.16	FROM DBI TO HEADWALL

CD-4

Permit No. 11339.006

2.2 West Segment

The west segment models the two 24" RCP cross drains between existing structures 18 and 20 at STA. 307+70 (CR-307) and existing structures 52 and 53 at STA. 328+60 (CR-328). These two cross drains appear to work together for the larger storm events as they convey runoff to Tampa Bay in multiple directions.

CR-307 conveys stormwater from the north side of US 92 to the south side then westerly through open channels and 18" culverts to a box culvert cross drain connected to Tampa Bay through a tidal ditch. This outfall is outside of the project limits. During the larger storm events, the stormwater will also flow along the north side of the road westerly through open channels and culverts to the same tidally connected box culvert cross drain mentioned above. Stormwater will also flow easterly through open channels and culverts on the south side of the road and intermingle with runoff through CR-328. Further, during both the SWFWMD 25-year 24-hour and 100-year 24-hour event, the top of bank of the ditch is overtopped and stormwater appears to flow southerly **offsite** at existing structure 18 to a tidal canal (Tidal Ditch-3) to Tampa Bay that is roughly 150 feet from the ditch bank. There is also a portion of this system that stormwater is conveyed westerly along the north side of the road to an inlet at Brighton Bay Blvd which is connected by a 24" pipe to tidally influenced marshes outside of the project limits.

The 24" CR-328 conveys stormwater from the north side of US 92 to the south side then easterly through a culvert and a short open channel before directed south **offsite** through a pair of 14"x23" pipes that lead to a tidally influenced Mangrove lined ditch (Tidal Ditch-3) leading to Tampa Bay. During the larger storm events, the stormwater will also flow along the northern side of the road ditch to a culvert at Mangrove Cay Blvd to Wetland 16 which is tidally influenced by Tampa Bay through canals and mosquito ditches and is heavily covered in Mangroves.

Please refer to the Existing Drainage Maps and Existing Drainage Structure Schedule, included in Appendix B of this report. Please refer to the Nodal Diagram and ICPR Data included in Appendix C of this report.

2.3 East Segment

The east segment models the cross drain between existing structures 82 and 83 at STA. 342+00 (CR-342) and side drain systems on the north side of US 92 between existing structures 101 and 108 (S-West) and 116 and 111 (S-East).

The 24" CR-342 conveys stormwater from the south side of US 92 to the north side into Wetland 16 which is tidally influenced by Tampa Bay through canals and mosquito ditches. During the larger storm events, the stormwater will also flow southerly **offsite** from existing structure 98 at the southeast corner of Snug Harbor Rd through a system of culverts and ditches that lead directly to Tampa Bay (Tampa-Bay-S).

The side drain system S-West connects Wetland 17 and Wetland 18 along the north side of US 92. Wetland 17 and 18 are tidally influenced by Tampa Bay through channels and mosquito ditches and is heavily covered in Mangroves. The side drain system S-East connects Wetland 18 and Tampa Bay along the north side of US 92.

LEGEND

MILLING / RESURFACING

PAVEMENT REMOVAL

TURNOUT CONSTRUCTION

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
PERMITTED CONSTRUCTION DRAWINGS

FILE OF RECORD

0 10 40
Feet

MANGROVE BAY BLVD.

WETLAND DELINEATION LINE

BM NO. GANDY E
FND 12" ROUND CONC. MONUMENT W/ PINELLAS CO. ENGR. DEPT. DISK STAMPED "GANDY E"
STA. 339+20.30, 27.60' LT.
EL. 4.345'

R/W LINE

CITY LIMIT LINE (CITY OF ST. PETE)

CONST. 10'x8' RIPRAP (RUBBLE)

WETLAND AREA 16

REMOVE 24" PIPE

5' CONCRETE WARNING STRIP

+70.41 66.33' LT.
CONST. 72 LF OF 19"X30" PIPE

R/W +89.57 66.91' LT.

R/W +25.56 66.91' LT.
+42.60 66.35' LT.

+73.63 41.33' LT.

+36.25 41.36' LT.

+73.73 41.00' LT.

+36.12 41.00' LT.

+63.79

+21.72 14.86' LT.

CONST. 12' SHARED USE PATH

SR 600 (GANDY BLVD.)

N 72°47'36" E

℄ SURVEY/ ℄ CONST. SR 600/GANDY BLVD.

338 339 340 341 342

DESILT 143 LF OF 18" RCP

DESILT 82 LF OF 48" RCP

DESILT 14 LF OF 18" RCP

END 6' BOARDWALK +94.12, 109.01' RT.
END 5' SHLDR. +99.90, 94.33' RT.

R/W +90.71 89.32' RT.
R/W +51.82 114.47' RT.

OSW 25

CONST. 5' SIDEWALK

R/W +51.80 120.57' RT.

TRACT "A" DRAINAGE EASEMENT(P) +80.00 134.00' RT.

CONST. 6' BOARDWALK

+24.80 114.23' RT.

+19.82 124.12' RT.

R/W +101.34 120.72' RT.

R/W +14.27 138.33' RT.

+79.06 114.23' RT.

15' PUBLIC DRAINAGE EASEMENT(P)

SAN MARTIN BLVD.

2 STY STUCCO 10812 ALLSTATE

1 STY STUCCO DAVE'S BAR & GRILL

R/W +90.91 119.32' RT.

+03.55 94.31' RT.

R/W +47.60 114.36' RT.

R/W +47.60 119.36' RT.

BEGIN 5' SHLDR. +33.98, 94.00' RT.

+37.81 88.70' RT.

+26.40 99.62' RT.

CONST. 5' SHLDR.

CONST. 5' SIDEWALK

OSW 24

+35.00 99.33' RT.

BEGIN GRAVITY WALL W/HANDRAIL +37.00, 100.00' RT.
TOP OF WALL EL. 6.25

END GRAVITY WALL W/HANDRAIL +50.00, 100.00' RT.
TOP OF WALL EL. 5.90

END 5' SHLDR. +46.79, 85.00' RT.

+14.80 83.41' RT.

CONST. 84 LF OF 24"x38" PIPE

CONST. 59 LF OF 24"x38" PIPE

+85.94 90.72' RT.

+51.27 94.33' RT.

DESILT 38 LF OF 18" RCP

R/W LINE

END GRAVITY WALL +94.30, 98.83' RT.
TOP OF WALL EL. 4.50

REMOVE 24" PIPE

BEGIN GRAVITY WALL +87.00, 98.83' RT.
TOP OF WALL EL. 4.50

REMOVE 24" PIPE

CONST. 5' SIDEWALK

OSW 23

S-7 S-8 S-9 S-10

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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

CUMBEY & FAIR, INC.
2463 ENTERPRISE ROAD
CLEARWATER, FLORIDA 33765
PHONE: (727) 797-8982

CERTIFICATE OF AUTHORIZATION NO. 00002168
TIMOTHY E. BOURNE, P.E. 47149

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS	416838-1-52-01

ROADWAY PLAN (8)

STA. 337+20.00 TO STA. 342+80.00

SHEET NO. 28

brad 11/24/2009 1:22:25 PM K:\E\Projects\416838\520\emo\planrd08.dgn

NOTICE: THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE SIGNED AND SEALED UNDER RULE 61G15-23.003, F.A.C.

℄ SURVEY/℄ CONST.
SR 600/GANDY BLVD.

R/W

EL. 5.50

5.94
5.94

R/W

STA. 343+97.54 (101.49' RT.)
EXIST. DBI GRATE - 5.00
SLOTS - 5.04 (E & W)
FL 2.62 (SW)
FL 2.75 (NE)
CONNECT TO EX. STRUCTURE

EL. 2.70

CONST. 16' OF 18" PIPE

S-11
STA. 343+78.00 (105.00' RT.)
CONST. 18" MES (1:4)
FL = 2.60
INDEX NO. 272

S-11

343+78.00

S-10
STA. 342+00.08 (46.50' LT.)
CONST. STRAIGHT CONC. ENDWALL
FL = 1.50
INDEX NO. 250

EXIST. 24" PIPE (TO BE REMOVED)

6.98
6.98

EL. 5.78

S-8
STA. 341+99.80 (98.58' RT.)
CONST. STRAIGHT CONC. ENDWALL
FL = 1.70
INDEX NO. 250

R/W

EXIST. 24" PIPE (TO BE REMOVED)

EL. 5.80

EL. 1.5

R/W

CONST. RIPRAP (RUBBLE) (DITCH LINING) (1.5" DEPTH) W/ FILTER FABRIC PER FDOT INDEX 199 & 281

CONST. 84' OF 24"x38" PIPE

EL. 1.80

EL. 1.60

CONST. 59' OF 24"x38" PIPE

STA. 341+99.80 (38.16 RT.)
EXIST. DBI GRATE - 5.78
SLOTS - 5.04 (E & W)
FL 2.22 (S)
FL 2.09 (N)

S-9
STA. 341+99.80 (38.16 RT.)
CONST. DITCH BOTTOM INLET TYPE H WITH TRAVERSABLE SLOTS
FL 1.60 (N)
FL 1.60 (S)
INDEX NO. 232

341+99.80

S-8 S-9
S-10

20 Horizontal
5 Vertical

℄ SURVEY/℄ CONST.
SR 600/GANDY BLVD.

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PERMITTED CONSTRUCTION DRAWINGS
FILE OF RECORD

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NOV 21 2008
Brooksville

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

CUMBEY & FAIR, INC.
2461 ENTERPRISE ROAD
CLEARWATER, FLORIDA 33765
PHONE: (727) 797-8982

CERTIFICATE OF AUTHORIZATION NO. 00002168
TIMOTHY E. BOURNE, P.E. 47149

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 600	PINELLAS	416838-1-52-01

DRAINAGE STRUCTURES

SHEET NO. 54

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

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

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

Name:	Pipe_S23-S25	From Node:	S-23	Length(ft):	75.00
Group:	BASE	To Node:	S-25	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	18.00	18.00		Entrance Loss Coef:	0.20
Rise(in):	18.00	18.00		Exit Loss Coef:	0.00
Invert(ft):	2.400	2.300		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

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

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

Name:	Pipe_S25-S26	From Node:	S-25	Length(ft):	70.00
Group:	BASE	To Node:	Wetland-18	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	18.00	18.00		Entrance Loss Coef:	0.20
Rise(in):	18.00	18.00		Exit Loss Coef:	0.00
Invert(ft):	2.300	2.200		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

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

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

Name:	Pipe_S29-S-30	From Node:	S-29	Length(ft):	82.00
Group:	BASE	To Node:	S-30	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Circular	Circular		Flow:	Both
Span(in):	15.00	15.00		Entrance Loss Coef:	0.20
Rise(in):	15.00	15.00		Exit Loss Coef:	0.00
Invert(ft):	3.150	2.950		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

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

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

Name:	Pipe_S8-S9	From Node:	EX-080_S-08	Length(ft):	59.00
Group:	BASE	To Node:	S-09	Count:	1
				Friction Equation:	Automatic
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Most Restrictive
Geometry:	Horz Ellipse	Horz Ellipse		Flow:	Both

Span(in):	38.00	38.00	Entrance Loss Coef:	0.20
Rise(in):	24.00	24.00	Exit Loss Coef:	0.00
Invert(ft):	1.700	1.600	Bend Loss Coef:	0.00
Manning's N:	0.012000	0.012000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Name: Pipe_S9-S10 From Node: S-09 Length(ft): 84.00
Group: BASE To Node: Wetland-16 Count: 1
Friction Equation: Automatic
Solution Algorithm: Most Restrictive
Flow: Both

	UPSTREAM	DOWNSTREAM		
Geometry:	Horz Ellipse	Horz Ellipse		
Span(in):	38.00	38.00	Entrance Loss Coef:	0.20
Rise(in):	24.00	24.00	Exit Loss Coef:	0.00
Invert(ft):	1.600	1.500	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dc
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

Downstream FHWA Inlet Edge Description:
Horizontal Ellipse Concrete: Square edge with headwall

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==== Channels ==========
==========

Name: Ditch_073-064 From Node: EX-073 Length(ft): 350.00
Group: BASE To Node: EX-064 Count: 1
Friction Equation: Automatic
Solution Algorithm: Automatic
Flow: Both
Contraction Coef: 0.100
Expansion Coef: 0.300
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Trapezoidal	Trapezoidal
Invert(ft):	2.800	2.600
TClpInitZ(ft):	9999.000	9999.000
Manning's N:	0.035000	0.035000
Top Clip(ft):	0.000	0.000
Bot Clip(ft):	0.000	0.000
Main XSec:		
AuxElev1(ft):		
Aux XSec1:		
AuxElev2(ft):		
Aux XSec2:		
Top Width(ft):		
Depth(ft):		
Bot Width(ft):	3.000	3.000
LtSdSlp(h/v):	3.00	3.00
RtSdSlp(h/v):	3.00	3.00

Name: Ditch_078-079 From Node: EX-078 Length(ft): 110.00
Group: BASE To Node: EX-079 Count: 1
Friction Equation: Automatic
Solution Algorithm: Automatic
Flow: Both
Contraction Coef: 0.100
Expansion Coef: 0.300
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dc
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Trapezoidal	Trapezoidal
Invert(ft):	2.540	2.260
TClpInitZ(ft):	9999.000	9999.000
Manning's N:	0.035000	0.035000
Top Clip(ft):	0.000	0.000
Bot Clip(ft):	0.000	0.000
Main XSec:		
AuxElev1(ft):		
Aux XSec1:		
AuxElev2(ft):		
Aux XSec2:		
Top Width(ft):		

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft	
Ditch_073-064	BASE	WMD_25yr-24hr	3.95	0.05	0.086	12.37	4.61	12.37	4.61	
Ditch_078-079	BASE	WMD_25yr-24hr	12.08	6.33	-0.118	12.08	4.04	12.08	4.03	
Ditch_084-083	BASE	WMD_25yr-24hr	12.12	4.63	0.009	12.11	3.43	12.11	3.14	
Ditch_096-Bay	BASE	WMD_25yr-24hr	12.46	1.95	-0.005	12.46	3.55	8.00	2.50	
Ditch_112-S30	BASE	WMD_25yr-24hr	0.00	0.00	-0.096	12.15	5.05	12.15	5.06	
Ditch_115-S-30	BASE	WMD_25yr-24hr	12.13	0.98	0.002	12.15	5.12	12.15	5.06	
Ditch_116-117	BASE	WMD_25yr-24hr	12.09	0.78	0.024	12.09	5.33	12.09	5.24	
Pipe-091-S12	BASE	WMD_25yr-24hr	12.19	2.76	-0.295	12.11	4.44	12.10	4.38	
Pipe_058-057	BASE	WMD_25yr-24hr	3.51	0.21	0.271	12.54	4.64	12.57	4.65	
Pipe_060-059	BASE	WMD_25yr-24hr	12.09	0.72	0.879	12.47	4.63	12.54	4.64	
Pipe_060-061	BASE	WMD_25yr-24hr	13.18	2.68	1.113	12.47	4.63	12.40	4.63	
Pipe_062-061	BASE	WMD_25yr-24hr	12.18	8.56	-10.237	12.37	4.62	12.40	4.63	
Pipe_064-062	BASE	WMD_25yr-24hr	12.19	1.57	-1.886	12.37	4.61	12.37	4.62	
Pipe_073-S7	BASE	WMD_25yr-24hr	13.22	5.32	1.385	12.37	4.61	12.33	4.50	
Pipe_077-075	BASE	WMD_25yr-24hr	2.10	0.01	0.093	12.24	4.37	12.33	4.50	
Pipe_077-078	BASE	WMD_25yr-24hr	12.54	5.24	0.739	12.24	4.37	12.08	4.04	
Pipe_079-080	BASE	WMD_25yr-24hr	12.08	6.19	0.013	12.08	4.03	12.08	2.86	
Pipe_086-085	BASE	WMD_25yr-24hr	12.04	4.20	0.083	12.04	4.18	12.04	4.00	
Pipe_087-086	BASE	WMD_25yr-24hr	12.17	3.69	-0.543	12.10	4.32	12.04	4.18	
Pipe_091-092	BASE	WMD_25yr-24hr	2.80	0.00	0.082	12.11	4.44	12.11	4.46	
Pipe_093-092	BASE	WMD_25yr-24hr	11.73	1.89	0.229	12.12	4.48	12.11	4.46	
Pipe_093-094	BASE	WMD_25yr-24hr	12.00	0.63	-1.686	12.12	4.48	12.12	4.48	
Pipe_096-097	BASE	WMD_25yr-24hr	0.00	0.00	-0.014	12.12	3.92	12.14	4.40	
Pipe_098-095	BASE	WMD_25yr-24hr	12.82	1.70	1.222	12.12	4.48	12.12	4.48	
Pipe_112-111	BASE	WMD_25yr-24hr	12.15	4.70	0.010	12.15	5.05	12.15	3.75	
Pipe_116-115	BASE	WMD_25yr-24hr	12.08	1.03	0.003	12.09	5.33	12.08	5.18	
Pipe_117-118	BASE	WMD_25yr-24hr	12.09	3.14	0.007	12.09	5.24	12.09	4.94	
Pipe_EX-85-S11	BASE	WMD_25yr-24hr	12.04	4.70	-0.025	12.04	4.00	12.04	3.53	
Pipe_S12-087	BASE	WMD_25yr-24hr	11.71	3.01	0.847	12.10	4.38	12.10	4.32	
Pipe_S19-S20	BASE	WMD_25yr-24hr	0.00	0.00	-0.003	12.08	3.17	12.08	3.36	
Pipe_S20-S21	BASE	WMD_25yr-24hr	11.66	0.13	0.129	12.08	3.36	12.08	3.36	
Pipe_S21-S22	BASE	WMD_25yr-24hr	12.00	0.82	-0.009	12.08	3.36	12.08	3.35	
Pipe_S22-S23	BASE	WMD_25yr-24hr	12.09	1.31	0.004	12.08	3.35	12.08	3.32	
Pipe_S23-S25	BASE	WMD_25yr-24hr	12.09	2.00	0.004	12.08	3.32	12.08	3.25	
Pipe_S25-S26	BASE	WMD_25yr-24hr	12.08	2.90	0.026	12.08	3.25	12.08	3.15	
Pipe_S29-S-30	BASE	WMD_25yr-24hr	12.08	1.62	-0.189	12.13	5.13	12.15	5.06	
Pipe_S8-S9	BASE	WMD_25yr-24hr	12.11	12.33	0.023	12.11	3.14	12.11	3.06	Headwall to DBI
Pipe_S9-S10	BASE	WMD_25yr-24hr	12.11	12.93	0.024	12.11	3.06	12.11	2.94	DBI to Headwall
S-16	BASE	WMD_25yr-24hr	12.00	1.13	0.003	12.00	5.91	12.12	4.48	
Weir_98-97	BASE	WMD_25yr-24hr	12.09	4.44	0.023	12.12	4.48	12.14	4.40	

APPENDIX F

National Bridge Inventory Data

- LandmarkHunter.com

Share:

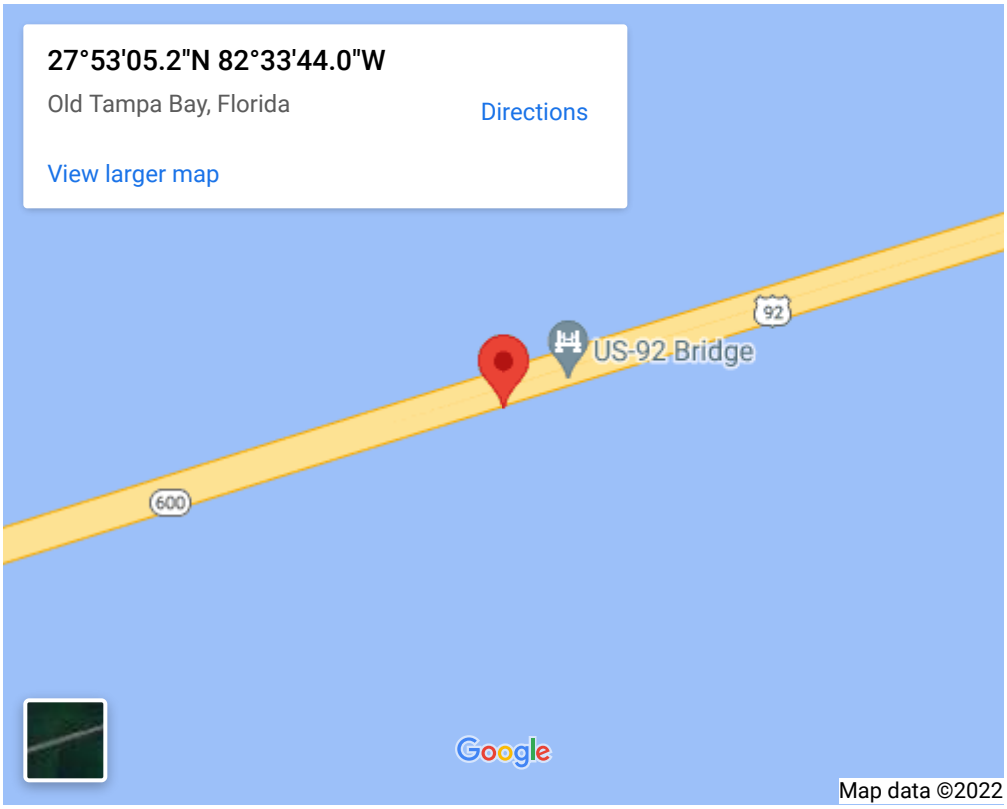
US-92 (SR-600) over OLD TAMPA BAY

Hillsborough County, Florida

Map

- Google Maps
- Bing Maps
- OpenStreetMap
- MapQuest.com
- USGS National Map
- Geo URI (Android)

Coordinates:
+27.88477, -82.56222
27°53'05" N, 82°33'44" W



Facts

Source: National Bridge Inventory. Information not verified; use at your own risk.

Name:	US-92 (SR-600) over OLD TAMPA BAY
Structure number:	100300
Location:	2.0 MILE W OF SR-618
Purpose:	Carries highway over waterway
Route classification:	Other Principal Arterial (Urban) *[14]*
Length of largest span:	86.9 ft. *[26.5 m]*
Total length:	14860.6 ft. *[4529.3 m]*
Roadway width between curbs:	40.4 ft. *[12.3 m]*
Deck width edge-to-edge:	42.3 ft. *[12.9 m]*
Vertical clearance below bridge:	42.7 ft. *[13.0 m]*
Owner:	State Highway Agency *[01]*
Year built:	1975
Historic significance:	Bridge is not eligible for the National Register of Historic Places *[5]*
Design load:	MS 18+Mod / HS 20+Mod *[6]*
Number of main spans:	296
Main spans material:	Prestressed concrete *[5]*
Main spans design:	Stringer/Multi-beam or girder *[02]*
Deck type:	Concrete Cast-in-Place *[1]*

Latest Available Inspection: January 2017

Good/Fair/Poor Condition:	Fair
Status:	Open, no restriction *[A]*
Average daily traffic:	18,250 *[as of 2017]*
Truck traffic:	6% of total traffic
Deck condition:	Good *[7 out of 9]*
Superstructure condition:	Fair *[5 out of 9]*
Substructure condition:	Satisfactory *[6 out of 9]*
Structural appraisal:	Somewhat better than minimum adequacy to tolerate being left in place as is *[5]*
Deck geometry appraisal:	Better than present minimum criteria *[7]*
Water adequacy appraisal:	Equal to present desirable criteria *[8]*
Roadway alignment appraisal:	Equal to present desirable criteria *[8]*
Channel protection:	Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift. *[7]*
Pier/abutment protection:	In place and functioning *[2]*
Scour condition:	Countermeasures have been installed to mitigate an existing problem with scour. *[7]*
Sufficiency rating:	86.0

Previous Inspections

Date	Condition	Deck	Superstructure	Substructure	ADT	Suff. Rating
January 2017	Fair	Good	Fair	Satisfactory	18250	86.0
January 2015	Fair	Good	Fair	Satisfactory	17000	86.1
January 2013	Fair	Good	Fair	Satisfactory	16500	86.1
January 2011	Fair	Good	Good	Satisfactory	14500	97.3
January 2009	Fair	Good	Good	Satisfactory	18750	97.1
January 2007	Good	Good	Good	Good	17750	97.2
January 2005	Good	Good	Good	Good	14750	97.3
January 2003	Good	Good	Good	Good	16750	98.2
January 2002	Fair	Satisfactory	Satisfactory	Good	15500	98.3
January 2001	Fair	Satisfactory	Fair	Satisfactory	16000	87.1
March 2000	Poor	Good	Poor	Satisfactory	15500	60.4
March 1999	Poor	Good	Poor	Satisfactory	145000	58.0
September 1997	Fair	Good	Good	Satisfactory	145000	85.0
November 1995	Fair	Good	Good	Satisfactory	145000	85.0
December 1993	Good	Good	Good	Good	12960	97.0
January 1992	Good	Good	Good	Good	12200	97.1
May 1991	Good	Good	Good	Good	12200	97.1

Element Data

Source: National Bridge Elements dataset, 2019 edition. This feature is experimental.

Element	Units	Quantity	1-Good	2-Fair	3-Poor	4-Serious
Superstructure						
Prestressed Concrete Girder/Beam	linear ft.	75,896	75,529	243	124	0
Deck						
Reinforced Concrete Deck	sq. ft.	627,092	308,305	318,493	294	0
Substructure						
Reinforced Concrete Column	each	48	42	0	6	0
Reinforced Concrete Pier Wall	linear ft.	66	5	26	35	0
Reinforced Concrete Abutment	linear ft.	82	82	0	0	0
Reinforced Concrete Pile Cap/Footing	linear ft.	512	496	0	16	0
Prestressed Concrete Pile	each	1,753	106	0	1,644	3
Reinforced Concrete Pile	each	4	4	0	0	0
Reinforced Concrete Pier Cap	linear ft.	12,136	12,090	12	34	0
Joints						
Pourable Joint	linear ft.	2,255	2,244	10	1	0
Bearings						
Elastomeric Bearing	each	2,210	2,193	14	3	0
Bridge Rail						
Reinforced Concrete Bridge Rail	linear ft.	29,720	29,642	36	42	0

BridgeReports.com: National Bridge Inventory data
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