CITY OF NEW PORT RICHEY
2013 STORMWATER MASTER DRAINAGE PLAN
10-YEAR UPDATE

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City of New Port Richey

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CHAPTER 1
INTRODUCTION

1.1. BACKGROUND

This is the January 2014 10-Year Update of the City of New Port Richey Stormwater Master Drainage Plan Update. This plan updates the prior plan of May 2002.

New Port Richey has identified the following key issues and concerns that are being addressed in order to meet the stormwater management needs of the citizens and to comply with the current and pending regulatory requirements of the Federal and State agencies:

- ***Current Master Plan Update*** - Is based upon current needs within the City and increasingly stringent regulatory constraints. The 2013 *Master Drainage Plan 10-Year Update* provide information on the cost of constructing the projects identified to be included in this 2013 Master Drainage Plan Update. Twenty-one projects have been identified and an additional six project listed as future projects. Preliminary Pre-Application meetings have been held with the Southwest Florida Water Management District for nine of the projects. The meeting notes are included.

- ***Prepare a Basin Management Action Plan - For the TMDL for Dissolved Oxygen*** - This plan will include, but not be limited to; Stakeholder meetings, listing of activities to achieve reductions, funding, identification of BMP's, local ordinance review, permits, identification of point and non-point source polluting.

- ***Funding*** - A major source of funding is from the stormwater utility billing. Additional funding may be obtained from City secured grants.

1.2 STUDY GOAL AND OBJECTIVES

The goal of the 2013 *Stormwater Master Drainage Plan 10-Year Update* is to provide estimated preliminary cost information needed by City Staff to make their long-term decisions regarding the most effective approach for the City.

1.3 AUTHORIZATION

The City of New Port Richey has authorized the 2013 Stormwater Management Drainage Plan 10-Year Update as Task Order No. 26 as approved on June 18, 2013.

1.4 SUMMARY REPORT

This summary report contains a description of assessments and findings covering each of the identified projects. There are Twenty-One Project sections included, with a section for each of the Twenty-One identified Projects.

CHAPTER 2
ASSESSMENT OF REGULATORY CONSTRAINTS

The objective of this Chapter is to assess current Federal, State and Regional regulations that will impact the City's stormwater management activities with respect to completion of the projects identified in the 2013 *Master Drainage Plan 10-Year Update.* The implementation of these alternatives is dependent on existing regulations currently impacting the City's stormwater management, and pending regulations which may impact the future implementation of stormwater projects.

The City's stormwater management activities are currently subject to direct or indirect regulation by:

- The U.S. Army Corps of Engineers (US ACE) Dredge and Fill Permitting Program.
- The U.S. Fish and Wildlife Service (USFWS) and sister agency, the National Marine Fisheries Service (NMFS).
- The Federal Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) stormwater regulation program for Municipal Separate Storm Sewer Systems (delegated in 2001 to the Florida Department of Environmental Protection).
- The Federal EPA NPDES stormwater regulation program for Construction activities disturbing land area of 5.0 acres or greater (delegated in 2001 to the F10nda Department of Environmental Protection).
- The Southwest Florida Water Management District (SWFWMD) State Wide Environmental Resource Permit (SWERP) Regulations.
- The Florida Fish and Wildlife Conservation Commission (FWCC).

2.1 EXISTING FEDERAL REGULATORY PROGRAMS

Several Federal programs regulate stormwater management or related construction activities directly through issuance of permits, or indirectly through commenting authority. Federal programs having potential to impact the City's stormwater management activities over the next 10 years are described below.

2.1.1 USACE Dredge and Fill Permitting

The USACE has authority to regulate activities in waters of the U.S. under the Clean Water Act and the Marine Protection, Research, .and Sanctuaries Act of 1972, as amended. The USACE regulates all dredging, excavation and filling activities taking place in or adjacent to Waters of the United States (generally including canals, streams, wetland floodplains and coastal plains). Projects are reviewed by USACE for impacts to navigation and environmental resources (wetlands). Regulations require the following:

- U.S Waters/Wetland delineations must be established and approved.
- Proposed excavation and fill volumes must be quantified and justified.
- Any adverse impacts are expected to be fully described and mitigated.
- Narrative descriptions of proposed projects, construction techniques, and typical construction details must be forwarded to the regional USACE office for review and comment prior to issuance of Federal approvals.

The regional USACE office for Dredge and Fill Permit review is located in Tampa. The review process is most often carried out concurrently with the SWFWMD ERP review (described m Section 4.2.2).

The completion of some of the current proposed projects in the *Stormwater Master Drainage Plan 10-Year Update* will require USACE Dredge and Fill permits, especially those discharging to the Gulf of Mexico, west of U.S. 19 or with an outfall to the Pithlachascotee River.

2.1.2 Federal Fish & Wildlife Service and National Marine Fisheries Service

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) share responsibility for administration of the Endangered Species Act (ESA), which requires that all Federal agencies undertake programs for the conservation of endangered and threatened species. Federal agencies are prohibited from authorizing. funding. or carrying out any action that would:

- Jeopardize a listed endangered species.
- Jeopardize a listed threatened species.
- Destroy or modify its "critical habitat."

A species may be classified as "endangered" when it is in danger of extinction within the foreseeable future throughout all or a significant portion of its range. A "threatened" classification is provided to those animals and plants likely to become endangered within the foreseeable future throughout all or a significant portion of their ranges. Critical habitat is defined as the geographic area containing the physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection.

Generally, the NMFS deals with those protected species occurring in marine environments, while the USFWS is responsible for terrestrial and freshwater species and migratory birds. Both of these agencies most commonly exert their protection authority through commenting prerogatives associated with the USACE Dredge & Fill Permit process.

USFWS

The USFWS does review and issue its own Federal "Incidental Take" Permit, where applicants propose to destroy critical habitat or protected species as an unavoidable Impact sufficiently justified by the "public's best interest". Implementation of remaining and new stormwater management projects within the City of New Port Richey will not require USFWS "Incidental Take" permits.

The terrestrial and freshwater species concerns of this agency will need to be addressed in conjunction with any required USACE Dredge and Fill permits associated with freshwater wetlands, freshwater portions of the Pithlachascotee River or upland areas which may provide "critical habitat" for protected species. USFWS approvals will require the following actions:

- Enquiry to the regional office of the USFWS (located in Vero Beach, FL) prior to submittal of USACE Dredge and Fill Permit applications, to determine the potential for the presence of threatened or endangered species in proposed project areas.
- Where species are potentially present, the actual presence/absence of the species should be verified if possible.
- If protected species are reasonably expected to be present, impacts from proposed project activities must be evaluated. Negative impacts are expected to be mitigated.
- Copies of NFMS agency correspondence and subsequent site evaluations and mitigation plans should be included in the USACE Dredge and Fill permit application.

NMFS

Although the NMFS does not issue permits for, or have direct regulatory authority over, impacts to protected marine species and habitats, the concerns of this agency are addressed through commenting prerogatives associated with required USACE Dredge and Fill permits. In addition to the protection of nationally listed species, recent enactment of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq. Public Law 104-208) has provided authority and responsibility for the protection of essential fishery habitat (EFH). EFH is broadly defined by the Act as " ... those waters and substrate necessary to fish for spawning, breeding, or growth to maturity.". EFH is regionally identified and described for representative managed fish species by regional fishery management councils.

The City's Gulf of Mexico outfalls are within the Gulf of Mexico Fishery Management Council's area of jurisdiction, which extends from the Texas/Mexico border to the Florida Keys. The Gulf of Mexico Fishery Management Council separates EFH into estuarine and marine components. For the estuarine component, EFH is defined as all estuarine waters and substrates (mud, sand, shell, rock, and associated biological communities), including sub-tidal vegetation (seagrasses and algae) and adjacent inter-tidal vegetation (marshes and mangroves).

Any future CIP projects with associated dredging, filling or sea grass removal/destruction activities in estuarine portions of the Pithlachascotee River or the Gulf of Mexico will need to address the concerns of this agency by:

- Enquiry to the regional office of the NFMS (located in St. Petersburg, FL) prior to submittal of USACE Dredge and Pill Permit applications, to determine the potential for the presence of threatened or endangered species or EPH in proposed project areas.
- Where species are potentially present, the actual presence/absence of the species should be verified if possible.
- If protected species are reasonably expected to be present, impacts from proposed project activities must be evaluated. Negative impacts are expected to be mitigated.

Copies of NFMS agency correspondence and subsequent site evaluations and mitigation plans should be included in the USACE Dredge and Fill permit application.

2.1.3 Federal NPDES Permits

The 1972 Clean Water Act (CWA) was amended (refer to Federal Register No. 64, No. 235) to prohibit the discharge of any pollutant to waters of the United States from a point source, unless the discharge is authorized by a NPDES permit. Initial efforts to improve water quality under the NPDES program primarily focused on reducing pollutants in industrial process wastewater or municipal sewage. In 1987 the CW A was amended to require Implementation of a comprehensive national program for addressing stormwater discharges. Phase I was promulgated by the EPA in 1990 and required the development and Issuance of general NPDES permits for storm water discharge from a large number of priority sources.

Sources included several categories of industrial activity, including construction sites that disturb five or more acres of land, and municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or more. Implementation of the second phase of the Federal NPDES program, Phase II, was initiated in 2000. Phase II expanded the Phase I program to include smaller municipalities in MS4 permitting, provide certain exclusions for industrial stormwater discharge permitting, and expanded construction permitting to include smaller sites with disturbed area between one and five acres. The NPDES program was subsequently delegated to Florida Department of Environmental Protection (FDEP) and is described in greater detail in Section 2.2.

The City of New Port Richey has coverage under the Phase I MS4 program as a co-permittee with Pasco County in 1996 and is currently operating under Permit FLS000032-003, issued December 1, 2011. Specific activities associated with that permit are currently managed and enforced by the FDEP and are described in Section 2.2.

2.2 EXISTING STATE REGULATORY PROGRAMS

State regulatory programs with authority over stormwater management projects within the City of New Port Richey include:

- NPDES Permitting Program, implemented and enforced by the FDEP (Tallahassee Office).
- SWERP Permitting Program, implemented and enforced by the Brooksville service office of the SWFWMD.
- FDEP - for construction activities within impaired WBID's.
- Threatened and Endangered Species protection, implemented by the Florida Fish and Wildlife Conservation Commission.

Each of these programs, and potential impacts to City stormwater management activities, are described below.

2.2.1 Florida NPDES Permits

In 2001, subsequent to Phase II NPDES program expansion, Region IV, EPA delegated to the State of Florida (through the FDEP) the authority to regulate the Federal NPDES stormwater discharge programs previously described in Section 2.1.3.

Municipal Separate Storm Sewer (MS4) Permitting.

The Tallahassee office of the FDEP has assumed responsibility for management and enforcement of the City's MS4 Permit (FLS000032-0003). The Federal rules and requirements through which the original EPA permit was governed remain the same. There have been no significant functional changes to general stormwater management operations as a result of State delegation of the program. The 1997 MS4 permit requirements mandated the following key stormwater management activities for the City.

- The Inventory (GIS) and assessment of the structural elements of the City's MS-4 System.
- Develop a stormwater master plan as it relates to the NPDES program. This will include all SOP's and plans implemented by the City.
- Formal record-keeping of stormwater maintenance and inspection activities.
- Monitoring and inspection of high risk facilities (municipal waste transfer, industrial).
- Road maintenance activities (litter-control, street sweeping, CDS devices).
- Controlled application of pesticides/herbicides.
- Illicit connection identification and elimination.
- Construction site inspections (turbidity, erosion control).

The City prepares an annual report each year that documents the City's progress toward permit goals and summarizes permit-related activities. Annual reports and permit correspondence for the City's NPDES MS4 permit are now handled through the FDEP Tallahassee office.

As the City completes CIP projects, the following compliance activities should occur:

- CIP project facilities must be included/updated in the City storm system inventory, as they are constructed.

- Appropriate maintenance activities and schedules should be developed for any new elements (ponds, new pipe networks, filtration inlets, etc.).

- All new outfall locations must be identified and reported in the NPDES MS4 Annual report.

2.2.2 NPDES Construction General Permit (CGP) for Small Construction Activities

The Phase II expansion of the NPDES program extends the current regulation for construction activities to include "small" construction sites - defined as I-acre up to 5-acres of disturbed land area. The intent is to issue small construction CGPs, to be managed and enforced by the FDEP.

General requirements of the permit to include:

- The submission of a Notice of Intent, a $250 fee to FDEP (Tallahassee) and copied to owners of any receiving MS4.
- Previous procurement of a FDEP storm water discharge permit under Chapter 62-25, F.A.C., or a SWFWMD ERP.
- The development of a Stormwater Pollution Prevention Plan that prescribes the design and utilization of project-specific erosion/turbidity control measures.
- Stormwater discharge monitoring after significant rainfall events (to verify the effectiveness of site controls) by qualified inspection personnel.
- Execution and documentation of site erosion control BMP compliance inspections.
- Retention of stormwater pollution prevention plans and inspection records for a specified period after site stabilization.
- Submission of a Notice of Termination to FDEP (Tallahassee) when stabilization of the site has been achieved.

NPDES Construction General Permitting (CGP) or Disturbed Areas Greater than 5 Acres

Under Phase I of EPA's stormwater discharge permitting program, Construction General Permits (CGPs) were required for all construction activities that disturbed 5 acres or more of land area. This program is now implemented and enforced by FDEP. Permit coverage applies only to discharges composed entirely of stormwater (with specific uncontaminated non-stormwater exceptions such as potable waterline flushings, irrigation water, etc.). The permit specifically excludes discharges resulting from groundwater dewatering activities. The focus of permitting requirements has been to protect State Waters through control of sediment transport from clearing, grading, and excavation activities during construction by intentional application of erosion control "Best Management Practices" (BMPs). General requirements of the permit include:

- The submission of a Notice of Intent (application for permit coverage) a $400 fee to FDEP (Tallahassee) and copied to owners of any receiving MS4.

- Previous procurement of a FDEP stormwater discharge permit under Chapter 62-25, Florida Administrative Code (FAC.), or a SWFWMD ERP.

- The development of a Stormwater Pollution Prevention Plan that prescribes the design and utilization of project-specific erosion/turbidity control measures.

- Stormwater discharge monitoring after significant rainfall events (to verify the effectiveness of site controls) by qualified inspection personnel.

- Execution and documentation of site erosion control BMP compliance inspections.

- Retention of stormwater pollution prevention plans and inspection records for a period of three years after site stabilization.

- Submission of a Notice of Termination to FDEP (Tallahassee) when stabilization of the site has been achieved.

- Period of coverage is limited to five years.

Although the design and use of erosion/turbidity control measures have long been a part of Florida's regional stormwater management permitting process through SWFWMD, additional budget allocation for the inspection and monitoring elements of the NPDES program should be included in future project cost projections.

2.2.3 Southwest Florida Water Management District - SWERP CRITERIA

Florida's SWFWMD regulates activities related to State water resources under the authorizations provided in Chapter 373, Florida Statutes. The SWERP review process is defined under Chapter 62-330 F,A.C. Permits are required from SWFWMD for construction. alteration, operation or abandonment of most real property improvements that can control surface waters, affect stormwater. pollution, or impact wetlands.. An applicant for a SWERP must demonstrate that the proposed construction or alteration of the surface water management system will not be harmful to the water resources of the District (Southwest Florida Water Management District) and will not adversely impact adjacent properties, in terms of flooding. The SWERP regulations were largely developed to address stormwater management for new construction and are applied to such projects in a very straight "forward fashion. Applications for permits to reconstruct existing systems which. over time. have been taxed by surrounding land development beyond their design capacities (municipal retrofit projects) are reviewed under the SWERP criteria.

The City's past experiences with the SWFWMD permitting process have identified several key points that must be addressed with each proposed flood control/retrofit project.

- ***Prevention of Water Quality Degradation*** · While the City's objective under its Stormwater Master Plan is to improve the quality of stormwater discharges to the Pithlachascotee River and to the Gulf of Mexico, some projects have been selected for implementation without provision of water quality ponds or special water quality inlets. Chapter 62-330 FAC call for provision of new stormwater treatment facilities if the proposed stormwater facilities serve new development, increase the impervious area contributing to the system, or serve a new land use which may be expected to increase the average pollutant load. The simple construction of new inlets and pipes of larger diameter would not be expected to cause increased pollutant loading to the receiving waters. However, the SWFWMD permitting staff have historically argued that the provision of adequate pipe flow capacity, in eliminating temporary ponding in yards and grassed rights-of-way, removes incidental treatment and thus degrades existing water quality. The City has been successful in arguing this point, only where it can be demonstrated that the yard and/or right-of-way ponding occurs only for design return frequencies greater than the mean annual event. The SWFWMD has been known to make allowances for nonconventional water quality treatment systems (such as water quality inlets) in lieu of ponds, for municipal retrofit projects.

- ***Attenuation for Increased Peak Discharge Rates*** - Increasing the capacity of the City's stormwater conveyance systems will inevitably increase the peak rate of discharge to the receiving water. Chapter 62-330 requires demonstration that proposed activities will not adversely impact downstream systems or receiving waters. This criterion is typically addressed for new development through a pre- versus post-construction assessment of the 25-year, 24-hour design event, peak system discharge. SWFWMD typically requires that the post construction discharge rate not exceed the pre-construction rate. The SWERP rules make allowances for tidal systems and very large waterbodies, which have virtually unlimited receiving capacities (e.g. the Gulf of Mexico cannot be flooded by increased discharge rates). It is up to the applicant, however, to demonstrate that the system discharges to the tidal system at a point where unlimited receiving capacity applies. Not all Stormwater Master Plan projects will qualify for a waiver of the preconstruction discharge rate limit.

- ***Protection of Sensitive Receiving Waters*** - Increased rates of discharge as a result of enlarged conveyance systems, even if allowed, can produce concentrated flow at erosive velocities. Stormwater Master Plan projects which discharge to wetlands, tidal marshes or the Pithlachascotee River must demonstrate that the selected outfall location(s), and structural designs are protective of the receiving systems. In some cases, energy dissipaters, spreader swales, or similar end-pipe designs will be required to protect the receiving system from adverse impacts.

2.2.4 Florida Fish and Wildlife Conservation Commission (FWCC)

The Florida FWCC serves, at the State level, a function similar to the Federal USFWS agency, which is to ensure the protection and propagation of endangered and protected species, including species of "special concern". The Florida FWCC does not issue regulatory permits for construction of water resource projects, but has commenting authority for USACE Dredge and Fill permits in Florida and SWFWMD ERP applications. The southwest regional office is located in Lakeland, Florida. The Florida FWCC posts a listing of protected species and has GIS mapping of documented species locations and habitat, with a search engine that can be accessed through the internet site

http://myfwc.com

The concerns of this agency will need to be addressed in conjunction with any required USACE Dredge and Fill permits or SWFWMD ERP applications associated with wetlands, portions of the Pithlachascotee River, or upland areas which may provide "critical habitat" for protected species. Florida FWCC approvals will require the following actions:

- Enquiry through the official web-site to determine the potential for the presence of threatened or endangered species in proposed project areas.
- Where species are potentially present, the actual presence/absence of the species should be verified if possible.
- If protected species are reasonably expected to be present, impacts from proposed project activities must be evaluated. Negative impacts are expected to be mitigated.
- Copies of Florida FWCC coordination and subsequent site evaluations and mitigation plans should be included in the USACE Dredge and Fill permit/ERP application.

2.3 PENDING REGULATIONS

In addition to the existing regulations described above. there are a number of pending regulations that may impact the City's implementation of CIP projects recommended for the next ten years. Pending regulations for water resources in the State of Florida are described below.

2.3.1 Section 303(d) Impaired Waters/TMDL Programs

Section 303(d) of the CWA, requires Florida to develop a list of surface waters that do not meet applicable water quality standards or designated uses, after implementation of technology-based effluent limitations and state water resource protection regulations. Pursuant to the consent decree that resulted from the Earth Justice suit, Florida is required to establish 285 "total maximum daily loads," or TMDLs, for impaired waters by December 31,2002. Once TMDLs are established, regulated discharges to any impaired waterbody will be subject to additional water quality controls, designed to reduce annual pollutant discharges and bring the waterbodies back into compliance with State standards. The State's proposed TMDL Allocation Rule is designed to fairly apportion the total allowable load among all identified stakeholders. The anticipated impact to the City is as follows:

- The only waterbody identified in Pasco County on the 1998 Section 303(d) list is the Pithlachascotee River, which was specifically identified as impaired for dissolved oxygen and coliforms. As a discharger to the Pithlachascotee River, the City's *Stormwater Master Drainage Plan* projects Will be subject to higher scrutiny in the future.
- The 1998 Section 303(d) listing indicates, however, that the Pithlachascotee River is a low priority (as compared to more seriously impaired Florida waterbodies) and is not slated for TMDL development until the year 2011.
- Additional regulatory constraints will not go into effect until after TMDLs are developed and approved, which may extend beyond the next 10-year CIP.

- It must be noted that FDEP is scheduled to receive another water quality and biological data set from EPA in May 2002 (updates from the EPA's environmental data management system called the "STORET" system), that will be evaluated using the State's current Impaired Waters Rule (IWR) Criteria. It is possible that this new data could impact the City's Stormwater Management Plan program in the following manner:

- Inclusion of new parameters for segments of the Pithlachascotee River currently identified in the 1998 Section 303(d) List.

- Identification of new segments of the Pithlachascotee River, not previously included in the 1998 Section 303(d) List (potentially regulating additional City outfalls).

- Changes to the relative priority for TMDL development between the listed Section 303(d) segments (potentially moving up the TMDL development schedule for the Pithlachascotee River segments).

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CHAPTER 3
REVIEW OF TECHNOLOGICAL ADVANCES

The objective of this Chapter is to review technological advancements in stormwater management.

3.1 IDENTIFYING TECHNOLOGICAL ADVANCES

Technological advances in the field of stormwater management include new and improved construction materials and geo-textiles, hydraulic capabilities, treatment mechanisms, flood control capabilities, and maintenance/operation equipment advances. Advancements in technology can improve the performance, efficiency or the cost effectiveness of stormwater management elements. In the best of cases, cost savings are combined with higher performance. In other cases, higher performance can only be obtained at a higher cost. Such advances are desirable only if the perceived benefit possesses a higher "value" than the monetary cost.

Low Impact Design (LID)

In an effort to control stormwater runoff and improve water quality, the City is striving to use many of the concepts of LID. LID is a principle of design aimed at using a combination of engineered and natural systems to control and utilize rainwater water runoff. The use of porous pavement, bio swales, turf pave, rain cisterns, etc., are just a few of the technologies used in LID.

The following sections describe new/improved products available for construction, conveyance and treatment of stormwater, specifically as they might apply to City CIP projects. Product capabilities, relative costs and maintenance needs are discussed where such data was available through product vendors. Independent research has not been conducted to either confirm or deny vendor claims.

3.2 ALTERNATIVE CONSTRUCTION MATERIALS

3.2.1 Geo-textile Fabrics

Significant advances have been made in the field of geo-textile fabrics. which may be utilized in City CIP projects for construction/stabilization of pond banks, for side-drain or underdrain filter designs, or for open channel stabilization.

- ***Porous Geo-Textiles*** - Use of porous geo-textile fabrics can allow for utilization of steeper embankment design slopes, without fear of sloughing and excessive bank erosion. Steeper pond and channel banks, in turn, allow greater flow-through or storage capacities per unit of land area. Considering the high cost of land acquisition, use of geo-textiles to support steeper embankments might prove to be a beneficial construction technology. The fabrics, once installed in a proper design, require reduced maintenance, and reduce the potential for bank erosion and subsequent transport of sediments to surface waters, Proper use of these materials in design may reduce man-hours needed by operations staff for bank repairs. It should be noted that removal of accumulated sediments from upstream sources Within a geo-textile reinforced channel is more difficult, as care must be taken not to damage the fabric.

- ***Non-porous (watertight) Geo-textiles*** - Watertight materials are also becoming popular as alternatives to clay liners, concrete channels and slurry walls. These products can be used to separate stormwater treatment systems from high groundwater tables, to protect groundwater from potential contamination from concentrated stormwater pollutants, or to hydraulically separate stormwater management facilities from adjacent sources of groundwater contamination (material storage piles, abandoned landfills, septic systems, industrial municipal wastewater ponds), New products, such as a rubber polymer mat, are available at competitive prices and are easier and less expensive to install than conventional clay liners. These products, once installed in a properly designed facility, require reduced maintenance. The use of watertight liners has no appreciable impact on operational maintenance staffing or equipment costs.

3.2.2 Pipe Construction Materials

The use of alternative pipe construction materials may be considered by the City for use in future CIP projects.

- ***High/Medium Density Polyethylene (HDPE, MDPE)*** - HDPE/MDPE piping is increasing due to the products' reduced weight (saving on shipping/transport and installation costs), resistance to corrosion, and improved hydraulic performance resulting from a lower coefficient of friction, or Manning's "n" value, as compared to RCP or CMP. Unit cost of HDPE and MDPE pipe is comparable to traditional concrete or metal storm sewer pipe, with similar long-term operational and maintenance costs. The projected life of HDPE/MDPE pipe is longer than for concrete or metal pipe due to a lower material loss rate from abrasion and resistance to chemical or pH-related corrosion. This pipe material does, however, require greater care in installation. HDPE/MDPE pipe could be considered for future CIP projects.

3.3 ALTERNATIVE DETENTION STORAGE PRODUCTS

Flood control projects recommending construction of surface detention facilities may, In some cases, be constructed as dual use facilities, doubling as recreational fields or park landscape areas. Such dual use often requires a larger surface area anchor shallower design high water depths with gentler embankment slopes for aesthetic reasons. Alternate approaches to providing detention/retention volumes for stormwater have emerged which the City may wish to consider in future projects. The products listed below are adaptable to dual use facilities without the large increase in total land area required:

- ***Subsurface storage facilities*** - Product vendors manufacture plastic drainage chambers for on-site septic and stormwater management that, under certain conditions, can replace trench drains, retention/detention ponds, concrete vaults, and dry wells. This system can be used under low load-bearing parking lots, athletic playing fields, golf courses and other similar areas, with careful attention to design, application and proper installation. These systems are not constructed with solid foundations and are designed to rest upon a gravel base, over in-situ soils. As such, they are susceptible to differential settling and will not exhibit the same strength for surface loading as the heavy-load bearing products described below for use in any sumped inlet/manhole structure and can be applied over any type of outlet pipe. As storm water enters the catchbasin, floatables and free oil and grease float to the surface, while gross particles and some suspended solids sink. The SNOUT appliance operates much like a down-turned elbow pipe in a detention pond, to limit the entry of oil, grease, and floatables with the water outflow. The device itself requires no maintenance and is simple but effective in trapping oil and debris within the catchbasins. Increased catch basin inspection and clean-out frequency, Using standard catchbasin clean-out equipment, may be required. It is not suitable for existing catchbasins designed without sumps.

- ***Heavy load-bearing subsurface storage*** - A similar but larger-scale product, Con-Span arch pipes, can also be readily adapted to subsurface storage designs. This product possesses sufficient load bearing capacity to allow the surface land area to be used as public or commercial parking, recreational fields or even heavy traffic areas.

These products are only recommended where the surficial water table is deep enough to accommodate reasonable detention volumes above the seasonal high water table. Product designs typically include manhole access points for periodic (quarterly recommended) inspection and clean-out (as-needed) of underground stormwater vaults using a water jet and vacuum pump. Long-term operational and maintenance costs (in terms of man-hours and equipment) would be expected to be slightly less than traditional surface detention facilities due to the absence of mowing and bank maintenance. Inspection frequency would be the same as for traditional surface storage facilities. Capital costs are higher than conventional pond construction, with deeper excavation required and the added cost of vault construction materials. The primary benefit is the efficiency of land use and/or the reduction of land acquisition costs for CIP projects.

3.4 STORMWATER QUALITY ENHANCEMENTS

A number of new products have entered the market to reduce the amount of sediment and debris transported to storm sewer systems and discharges to surface waters. Designs include stormwater filter bends, pervious pavement and stormwater inlet modifications, attachments, or custom inlet designs. The use of these products can reduce the total suspended solids load discharged from storm sewer pipes, reduce siltation and clogging problems in low velocity systems, and greatly improve the aesthetic quality of open waters by removing unsightly floatables. Some water quality inlet products claim higher removal efficiencies than traditional stormwater settling basins, making them ideal for water quality enhancements to municipal retrofit projects.

3.4.1 Infiltration Systems

The City may wish to consider alternate approaches to enhancing infiltration treatment of stormwaters for future projects such as:

- **StormTreat Type Systems** - These systems works by directing storm water through a multi-stage total suspended solids removal system. The system includes:
    1. a grit-filter bag to trap larger floatables, and

2. a series of sedimentation chambers fitted with "skimmers" (which enhance the settling efficiency of particulates by continually drawing from just below the surface of the water and decanting it to the next chamber) and
3. a gravel filter which serves as a substrate for a constructed wetland. Larger-diameter particulates are trapped inside the sedimentation chambers and smaller particles are filtered in the gravel wetland substrate (StormTreat Systems, Inc., 1998)

Maintenance may be limited to quarterly/semi-annual inspections and replacement of the grit filter bag, and sediment pumping, using a standard septic system pumper. Long-term operation and maintenance costs are expected to be slightly higher than typical pipe and inlet maintenance, due to the grit filter bag replacement.

3.4.2 Inlet Enhancements

Several systems have emerged providing treatment at the inlets, rather than the end of pipe, and focusing on retrofit of existing catchbasins or enhancement of standard catchbasins:

- **Hydro-Kleen Type Systems** - A multi-media filtration system combined with containment and overflow protection, manufactured to fit into a catchbasin or drain. The units are placed into existing catchbasins by removing the cover, or grate, inserting the units into the basin and replacing the cover. Water flow enters the unit and is directed into a sedimentation chamber that collects course sediment and debris, which passes through the grate cover. The water then passes from the sedimentation side through a transition inlet at the top of the sedimentation chamber into the filtration side. The first media (Sorb44) catches hydrocarbon contaminants through adsorption to a hydrophobic pulp material. The second media is an activated carbon (AC10), which polishes any remaining hydrocarbons in the water and removes a variety of organically bound metals and other contaminants that may be in the runoff. The water then passes through the bottom into the catch basin or drainpipes (Hydro Compliance Management Inc., undated). Maintenance requirements include periodic vacuuming (with a 8-inch or smaller hose) of the sediment chambers and removal of debris such as grass clippings, leaves and trash from the initial debris screens to maintain flow. The frequency of this activity is not specified by the vendor. Filter media replacement is recommended every 4 months or as indicated by media color-change, water quality sampling, or specifically engineered load accumulation data.

- **The SNOUT Type Systems** - A product that is suitable for new construction or retrofitting, which is placed in a stormwater catchbasin. It is a hood-type oil/debris skimmer design suited for use in any sumped inlet/manhole structure and can be applied over any type of outlet pipe. As stormwater enters the catchbasin, floatables are free oil and grease float to the surface, while gross particles and some suspended solids sink. The SNOUT appliance operates much like a down-turned elbow pipe in a detention pond, to limit the entry of oil, grease, and floatables with the water outflow. The device itself requires limited maintenance and is simple but effective in trapping oil and debris within the catchbasins. Increased catch basin inspection and clean-out frequency, using standard catchbasin clean-out equipment, may be required. It is not suitable for existing catchbasins designed without sumps.

3.4.3 Custom Inlets (Oil and Sediment Separators)

Several vendor-specific systems have emerged for providing limited trash removal via baskets that periodically need to be emptied, sediment removal, some chemical uptake via replaceable filters, and oil separation within custom designed inlets/catchbasins. Inlets may be incorporated into new system designs or installed within existing storm sewer systems to enhance water quality. Care must be taken to evaluate potential headloss through these separation inlets, which may result in reduced flood level of service for the upstream system if inlets are not carefully designed:

- ***Stormceptor*** - A system designed for installation as a custom storm water inlet, or inline component along a submerged pipe system. Under normal operating conditions, stormwater flows into the upper chamber and is diverted by a u-shaped weir, into the separation holding chamber. Right angle outlets direct flow around the circular walls of the chamber. Fine and coarse sediments settle to the floor of the chamber, while the petroleum products rise and become trapped beneath a fiberglass insert. Maintenance/operation costs are similar to standard inlet clean-out costs. Inspections are recommended quarterly for the first year to determine specific accumulation rates. Sediment removal with a vacuum truck is typical.

- ***Continuous Deflective Separation (CDS)*** - A off-line separation system comprised of a diversion box and separation unit, which can be incorporated into an existing storm sewer system or built as a component of a new system. A CDS unit was installed as a component of the Indiana Avenue and Adams Street Drainage Improvement Project. The CDS units separate and retain gross pollutants using vortex (centrifugal) separation to divert flow and associated pollutants within a stormwater or combined sewer drainage system into a separation and containment chamber. The separation and containment chamber consists of a containment sump in the lower section and an upper separation section. Gross pollutants are separated within the chamber using a perforated plate allowing the filtered water to pass through to a volute return system and then to the outlet pipe. The water and associated pollutant contained within the separation chamber are kept in continuous motion be the energy generated by the incoming flow. This has the effect of preventing the separation plate from being blocked by the gross solids separated from the inflow. The heavier solids ultimately settle into the containment sump (Wong, undated). CDS units have no moving parts and are self-operating. Units have large sump capacities compared to their design flows, and can be cleaned out (quarterly to annually) Using standard vactor/vacuum truck, clam or basket equipment.

- ***Vortechs System*** - A similar product which also uses centrifugal separation, combined with a standard oil baffle to provide in-line (flow-through) treatment of stormwater. The vendor recommends quarterly inspection and clean-cut, as needed, when sediments accumulate to within 6-inches of the dry weather water level. Grit chamber clean-out can be executed using standard vacuum truck or clam equipment.

- Other Vendors such as Eco Sense International and Sun Tree Technologies may be explored and utilized on a case by case basis, as with the other systems listed.

3.4.4 Diffuser Aeration System

A Diffuser Aeration System may be proposed for ponds/lakes that have an average depth of around 10 feet± or greater. Suppliers state that this depth provides sufficient contact time and circulation enhancement characteristics.

Diffuser systems generally utilize weighted tubing. They also utilize a diffuser pump, diffusers, diffuser heads, a weatherproof cabinet with an Axial Fan, a timer and a GFI connection and electric power supplied to the site weatherproof cabinet. Systems are usually available in 120 volt or 240 volt power.

Periodic maintenance starting with Quarterly Maintenance is recommended. This period may be adjusted depending on the Quarterly Maintenance results.

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CHAPTER 4
EVALUATION OF STORMWATER MAINTENANCE NEEDS

The City's drainage systems include over twenty (20) miles of stormwater pipes. over 800 stormwater structures, and twenty five (25) detention/retention ponds. Primary drainage systems east of U.S. 19 typically discharge to the Pithlachascotee River. Systems west of U.S. 19 typically discharge through drainage canals to the Gulf. The development of a clear understanding of the current maintenance level and ongoing maintenance program is an important aspect of evaluating the behavior and capability of the stormwater management system.

The performance of a drainage system is directly related to the maintenance level of the conduits and structures from which the system is composed. Failure to adequately maintain pipes, ditches and structures can frequently cause chronic local flooding during minor storm events. The effects of inadequate system maintenance are greatly magnified during larger, more significant storm events.

The objective of this Chapter is to update the stormwater maintenance plan for the City, and to be in compliances with the City's MS-4 Permit (FLS000032-003). The Stormwater Maintenance Plan was developed by:

- Investigating current maintenance practices and frequencies
- Investigating the adequacy of the current maintenance program
- Recommending enhancements to the program

4.1 CURRENT MAINTENANCE PRACTICES

The current stormwater maintenance consists of the following program elements:

1. Structural Controls Inspection and Maintenance
2. Road Maintenance and Street Sweeping
3. Combined Monitoring
4. Pesticide/Herbicide Application
5. Illicit Discharge Reductions
6. Construction

- ***Structural Controls Element*** - Addresses the inspection of major Control structures, maintenance of detention ponds, inspection of major system components, and maintenance of major channels. Major control structures include fifteen (15) detention ponds that are inspected semi-annually. Other structures include outfalls, pipes and culverts, ditches and canals. For ponds and open channels or ditches, erosion damage is noted during inspection and scheduled for repair. Pipes and inlets reported or observed to be functioning poorly, or noted in the field as needing maintenance, are reported to the Stormwater Utility Division. Debris is typically removed from pipes and catch basins using the Sewer Collection Division's Vac-Con vacuum truck or SMC pressure wash equipment. Hydraulic capacity of channels and ditches is maintained by removal of accumulated sediment using the Street & Right-of-way Maintenance Division's tractor equipment with a clam-shell bucket, and major channels are routinely mowed, or cleared of vegetation by other means. Maintenance activities are logged by the Stormwater Utility Division.

- ***Road Maintenance and Street Sweeping Element*** - Consists of street sweeping and roadside litter collection. Downtown area streets are swept weekly or as needed, whereas residential area streets are swept bi-weekly or as needed. Roadway maintenance is conducted as needed.

- ***Combined Monitoring Element*** - Applies to monitoring of municipal waste transfer, storage and disposal facilities, industrial facilities, and "high risk" industrial facilities. There are no municipal waste treatment systems or designated "high risk" industrial facilities within the City. Thirteen (13) industrial facilities have been identified, that discharge to the New Port Richey MS4. These facilities are inspected by fire safety inspectors each year. Any anomalies related to stormwater pollution prevention or illicit discharges are reported to the Public Works Department.

- ***Pesticide/Herbicide Element*** - In 2013 the City adopted the FDEP's Model Ordinance for Florida Friendly Fertilizer Ordinance. After January 1, 2014, the City must require that all employees or contractors that spray in City owned or maintained property, must be certified (FDACS).

- ***Illicit Discharges Element*** - Focuses on the identification and elimination of illicit (unallowable, non-stormwater) discharges to the City MS4. Illicit discharges are controlled through regulations, citizens complaints, inspection of industrial facilities, and establishment of public awareness programs. The regulations are to protect MS4s by:

    - Controlling the quality of industrial discharge
    - Prohibiting illicit discharges
    - Controlling spilling, dumping & disposal of materials other than stormwater

Citizens' complaints on suspected illicit discharge may be received by the Public Works Department as frequently as observed. Public awareness programs include issuing newsletters, scheduling annual "River Clean-Up Day", stenciling inlets with "No Dumping" markers. The public awareness program is ongoing.

- Construction Element - Addresses construction sites within the City limits. As per the MS-4 Permit Construction sites must be inspected a minimum of (3) three times; pre, mid and post construction. Also, sites may be routinely visited by the City's Building and Public Works construction inspectors to ensure that stormwater erosion and sedimentation are effectively controlled.

4.2 ADEQUACY OF THE CURRENT MAINTENANCE PROGRAM

This subsection presents an evaluation of the adequacy of the current maintenance program relative to maintaining the hydraulic characteristics and properties of conveyances and structures. The evaluation is based on a review of the current maintenance program specified in the NPDES Permit FLSOOO032-003, and interviews with City staff.

4.2.1 Maintenance Practices

The maintenance program outlined in the NPDES MS4 Permit (Part II), described in the previous section, and confirmed through interviews with City Staff complies with minimum recommended practices, published in EPA guidance manuals, for municipal systems. The inspection and upkeep of structural elements - storm pipe networks, surface water ponds, ditches, and channels appears to be occurring in accordance with permit requirements, although it could be expanded to be less reactive (complaint or problem-area based) and more pro-active, with a more formal rotating inspection/maintenance schedule. An expanded, pro-active maintenance program will require that the City allocate additional funding or personnel expenses in the Stormwater Utility Operating Budget. In addition, the street sweeping programs and litter control campaigns conducted by the City are recognized as highly effective source controls.

4.2.2 Staffing

The Stormwater Utility Division currently employs three full-time personnel supported from the new Stormwater Utility Division fee-based budget. These employees were previously a part of the Street & Right-of-Way Maintenance Division, and continue to support that Division where needed. Simarily, Street & Right-of-Way Maintenance personnel are sometimes utilized for Stormwater Utility Division projects.

The current level of staffing appears to be adequate for the inspection and maintenance of the existing system, which is currently in a mode of prioritized inspection of known problem areas and complaint-driven maintenance activity. Additional man-hours may be needed to implement a regular schedule of inspection for all structural elements or to provide a more pro-actively scheduled maintenance program.

Implementation of the next 10 year CIP is anticipated to add more surface water facilities, storm sewer/inlets and special water quality controls (such as new water quality inlets) that will require more frequent inspection, at least initially, and potentially more frequent clean-out and replacement of inlet filters.

To pro-actively maintain the existing stormwater management system and to meet the maintenance demands of future stormwater management facility construction, additional staff will be required. The current level of Stormwater Utility Division funding will not support additional staff. Stormwater Utility fee increases within the next 10 year period will be necessary to support additional staff.

4.2.3 Equipment

The Stormwater Utility Division has primary control/responsibility for the following stormwater maintenance equipment:

- One 0.75 (¾)-ton Pick-Up Truck.
- One (1) Slope Mower.
- One (1) Flail Mower.
- One (1) 1.5 Ton Service Truck.
- One 2-ton Flat Bed Truck.
- One Street Sweeper.

Catchbasin and pipe clean-out activities requiring vacuum truck equipment are dependent upon the use of both the Sewer Collection Division equipment and specialized operating personnel. Pressure spray equipment is borrowed from this Division without need of a special operator. Ditch maintenance activities also require borrowing of equipment from the Street & Right-of-Way Maintenance Division, but the equipment may be operated by Stormwater Utility Division personnel.

The current inventory (and shared availability) of equipment is reported to be adequate for the existing system and current maintenance schedule. However, implementation of a more proactive maintenance program and implementation of the next 10-year CIP may add more surface water facilities and special water quality controls (such as new water quality inlets) that will require more frequent bank maintenance and inlet clean-out. The City should consider the acquisition or transfer of equipment (such as a vacuum truck and ditch maintenance equipment), to be operated and controlled solely by the Stormwater Utility Division.

4.3 RECOMMENDED ENHANCEMENTS TO THE STORMWATER MAINTENANCE PROGRAM

The current level of pollution prevention and stormwater conveyance system maintenance activity meets the needs of the City at this time. It is expected that the overall performance of the system would be improved by moving toward a more pro-active inspection and maintenance program.

Historically, the City's flood control projects were largely composed of replacing existing pipe networks with larger diameter pipes, which did not substantially increase the maintenance burden on the Stormwater Utility Division. Future CIP projects, for the most part, will be required to include water quality enhancements, such as new stormwater treatment facilities or installation of water quality inlets, that do increase the maintenance burden, as do surface water or subsurface flood detention facilities. As the recommended CIP projects are constructed and brought into operation, additional staff and/or equipment will be required in order to maintain the current standards and comply with the City's NPDES MS4 permit conditions.

The following recommendations are made for the enhancement of the current stormwater maintenance program:

1. A similar scheduled maintenance program should be developed with defined clean out, mowing, bank stabilization, weed/exotic plant removal schedules for various element types.

2. It is recommended that the City attempt to obtain maintenance easements or permission to access/maintain any open channel or ditch that is believed to be causing upstream flooding of residences or publicly maintained streets.

3. The City should anticipate a Stormwater Utility fee increase sufficient to support 1-2 additional Stormwater Utility Division staff members over the next 10-year period.

4. The Stormwater Utility Division should acquire, through purchase or transfer, a vacuum truck and ditch maintenance equipment to be operated and controlled solely by the Stormwater Utility Division.

4.4 ENHANCEMENTS THAT HAVE BEEN IMPLEMENTED

1. A formal scheduled inspection program has been developed for each structural element type in the City's MS4 (See Part II of MS4 Permit). An Appropriate inspection interval and rotation have been assigned for different element types such as:

   - Quarterly for catch basins with high sedimentation potential. All catchbasins will be inspected for functional and structural defects a minimum of once every 10 years.
   - Semi-annual for catchbasins with low sedimentation potential. All catchbasins will be inspected for functional and structural defects a minimum of once every 10 years.
   - Monthly or bi-monthly during the rainy season, and once during the dry season for ponds. All ponds will be inspected for functional and structural defects a minimum of once every 3 years.
   - Bi-monthly for ditches and channels. All ditches and channels will be inspected for functional and structural defects a minimum of once every 10 years.
   - Quarterly for water quality inlets and subsurface filtration units. All underdrain filter systems will be inspected for functional and structural defects a minimum of once every 3 months.
   - Major outfalls are to inspect for functional and structural defects annually.

CHAPTER 5
EVALUATION OF CURRENT LEVELS OF SERVICE

The objective of this Chapter is to review the Level of Service (LOS) Standards established by the City to determine whether they should be revised, given the City's long-term stormwater management objectives. The following sections summarize the LOS currently approved by the City Council and make specific recommendations concerning LOS for the City of New Port Richey

5.1 EXISTING LEVELS OF SERVICE

The concept of establishing a level of service for a municipal storm water system involves the formulation of operational goals for that system. The operational goal sets the target demand load and the desired performance level.

For stormwater management, the demand load is generally defined by a design storm. An established storm return frequency (such as a 10-year or 25-year design storm) is selected and an acceptable level of system performance defined. LOS criteria may allow for some level of road or yard flooding, for passable depths and reasonable durations. Different criteria can be applied to existing versus proposed systems, and for different elements of a stormwater management (such as ponds, open ditches, closed conveyances) or various service areas (residential, major transportation corridors, emergency routes, etc).

Table 5-1 presents a summary of the current LOS utilized by the City. This is taken from the City of New Port Richey Stormwater Management and Erosion Control Policy Procedures Criteria Manual as updated in September 2012 by Florida Design Consultants.

TABLE 5-1
MASTER DRAINAGE PLAN LEVEL OF SERVICE SUMMARY

The LOS described in Table 5-1 were taken from the September 2012 Stormwater Management and Erosion Control Policy Procedures Criteria Manual. Reference this Manual, as may be updated from time to time for complete criteria.

The following is taken from Chapters 3 and 4 of the referenced September 2012 Stormwater Management and Erosion Control Policy Procedures Criteria Manual. The entire Manual is to be complied with. Unless specifically exempted, modified, or waived pursuant to the City's development review procedures, a copy of the issued FDEP-NPDES-NOI Permit, the issued Construction Permit or Permit Exemption from the Southwest Florida Water Management District, and a Stormwater Management Plan meeting the requirements of this Manual, must be submitted and approved before commencing development. Said plan shall comply with the following standards:

5.1 General Standards

5.1.1 The hydrologic requirements mandated by this Manual shall be developed in accordance with the latest releases and revisions of the U .S_ Department of Agriculture, Soil Conservation Service's Technical Release No. 55 entitled "Urban Hydrology for Small Watersheds", SCS National Engineering Handbook, Section 4, entitled "Hydrology", and applicable supplements thereto. Alternate methods may be used if, in the opinion of the Development Review Committee, the method produces similar results to the above listed technical guides.

5.1.2 Innovative approaches to storm water management shall be encouraged and the concurrent control of erosion, sedimentation, water pollution and flooding shall be mandatory.

5.1.3 The design of water retention or detention structures and flow attenuation devices shall be subject to the approval of the Development Review Committee pursuant to the requirements of this regulation.

5.1.4 Runoff computation shall be based upon the designated regulatory criteria (rainfall duration, distribution and antecedent soil moisture condition), and conform to acceptable engineering practices using rainfall data and other local information applicable to the affected area.

5.1.5 All stormwater management facilities shall be designed for a minimum of twenty (20) year life, have low maintenance cost, and adequate legal access for periodic maintenance.

5.1.6 No site alteration shall allow water to become a health hazard or contribute to the breeding of mosquitoes.

5. 1.7 The drainage area used in runoff calculation shall be the total existing and natural watershed area including areas beyond proposed site limits.

5.1.8 All proposed stormwater management systems shall be designed to prevent flood, safety or health hazards.

5.1.9 All stormwater management systems shall be designed to enhance groundwater recharge while reducing pollution. However, in an area designated as a groundwater recharge area, the developer shall take all possible measures to limit runoff from the proposed site. In addition, the Development Review Committee, while enforcing standards set for pollution and sedimentation control, may encourage or request innovative approaches to achieve the above-stated purpose.

5.1.10 A stormwater management system shall be provided for protecting lots, roads and streets from the potential adverse impacts of stormwater runoff and for handling stormwater runoff that comes into or across the site plan from the outside. Soil types shall be considered and ultimate land usage assumed for selection of proper runoff coefficients within the drainage areas involved. The system shall be designed in accordance with accepted engineering principles to attenuate to predevelopment levels. The system shall be designed for low maintenance cost and ease of maintenance by normal maintenance methods. The City may require such data as is determined to be necessary from the applicant to provide the adequacy of the design of the water management system.

5.1.11 The applicant shall provide facilities to hold stormwater on-site per the requirements of this section or to drain the runoff to positive outfalls that can be legally maintained in permanent use, or to a public drainage system with adequate capacity which discharges into positive outlets. If the applicant elects to utilize a public drainage system, the applicant must have the consent of the governing body which exercises control over the public drainage system.

5.1.12 In the event the applicant elects to drain to a public drainage system, the applicant, at his own expense, may be required to modify the public drainage system in part or in whole, including but not limited to storm sewers, inlets, ponds, control structures, side ditches or roadside swales adjacent to public roads over which the drainage will flow. Any such modification shall be subject to the approval of any governing body having jurisdiction over the public drainage system.

5.1.13 Projects that are to be developed in phases will require the submission of a master plan of the applicant's contiguous land holdings. Applications for individual project phases may be considered only when the phases are consistent with the approved master plan.

5.1.14 All Projects and their Plans shall be designed to be fully compliant with the current Florida Department of Environmental Protection (FDEP) State of Florida Municipal Separate Stonn Sewer System Permit (MS4) Number FLS 000032-003 issued 12/0112011 and as may be amended from time to time.

5.2 Performance and Maintenance Standards - Stormwater management plans must demonstrate the proposed development activity has been planned, designed, and will be constructed and maintained to meet each of the following performance standards:

5.2.1 To limit the post-development hydrograph for the developed site so that rate of flow, volume (in a closed basin), and timing shall not exceed pre-development conditions;

5.2.2 To protect or improve the quality of ground and surface water;

5.2.3 To insure that there is no erosion after development;

5.2.4 To maintain groundwater levels and enhance groundwater recharge;

5.2.5 To protect the beneficial function of wetlands, such as swamps, bogs, marshes, estuaries, sloughs, floodplains, for the natural storage of surface waters and the biological reduction and assimilation of pollutants;

5.2.6 To prevent saltwater intrusion by adhering to applicable best management practices;

5.2.7 To prevent increased flooding and damage that result from improper location, construction and design of structures in areas which are presently susceptible to dangers of flooding;

5.2.8 To protect the natural fluctuating levels of salinity in estuarine areas;

5.2.9 To minimize injury to flora and fauna, and adverse impacts to fish and wildlife habitats;

5.2.10 Retention and detention ponds shall be used to retain and detain the increased and accelerated runoff which the development generates. Water shall be released from detention ponds into watercourses, wetlands, existing stormwater management facilities, etc., at a rate and in a manner approximating the natural flow which would have occurred before development;

5.2.11 The area of land disturbed by development shall be as small as practicable. Those areas which are not to be disturbed shall be protected by an adequate barrier from construction activity. Whenever possible, natural vegetation shall be retained and protected;

5.2.12 No grading, cutting or filling shall be commenced until erosion and sedimentation control devices have been installed between the disturbed area and water bodies, watercourses, and wetlands;

5.2.13 Land which has been cleared for development and upon which construction will not commence and continue within 30 days shall be protected from erosion and sedimentation by appropriate techniques;

5.2.14 On sites greater than one acre, if more than one contiguous acre is cleared, a ground cover sufficient to prevent erosion shall be planted or otherwise provided within 10 working days on that portion of the site upon which further active construction will not be undertaken within 90 days;

5.2.15 Sediment shall be retained on the site of the development;

5.2.16 Wetlands and other water bodies shall not be used as sediment traps during development;

5.2.17 Erosion, sedimentation and all stormwater management system facilities shall receive regular maintenance to ensure that they continue to function properly. This shall be done by the Developer or the approved Operation and Maintenance Entity. Should this not be done, then the City of New Port Richey is hereby granted access and authorized to perform maintenance operations they deem necessary to protect the health, safety and welfare of the public and to charge the Developer or approved Maintenance Entity for these costs, who hereby agrees to pay and be responsible for these costs within 60 days of notification.

5.2.18 Development, including grading and contouring, shall take place m a manner that protects the roots and stability of trees.

5.3 Design and Maintenance Standards - To insure attainment of the objectives of this regulation and to insure that the performance standards will be met, the design, construction and maintenance of drainage systems shall be consistent with the following standards:

5.3.1 The hydro graph for the developed or redeveloped site shall not exceed the rate of flow, volume (in a closed basin), and timing of runoff produced by conditions existing before development or redevelopment, unless runoff is discharged into an off-site drainage facility as provided in Section 3.3.10 below.

5.3.2 Channeling runoff directly into water bodies shall be prohibited. Instead, runoff shall be routed through swales and other systems designed' to increase time of concentration, decrease velocity, increase infiltration, allow suspended solids to settle and remove pollutants.

5.3.3 Natural watercourses shall not be dredged, cleared of vegetation, deepened, widened, straightened, stabilized, or otherwise altered. Water shall be retained or detained before it enters any natural watercourse in order to preserve the natural hydro-dynamics of the watercourse in order to preserve the natural hydrodynamics of the watercourse and to prevent siltation or other pollutions.

5.3.4 Artificial watercourses shall be designed, considering soil type, so that the velocity flow is low enough to prevent erosion.

5.3.5 Vegetated buffer strips shall be created or, where practical, retained in their natural state along the banks of all watercourses, water bodies, or wetlands. The width of the buffer shall be sufficient to prevent erosion, trap the sediment and overland runoff, provide access to the water body and allow for periodic flooding without structures.

5.3.6 Detention and retention areas shall be designed so that shore lines are sinuous rather than straight and so that the length of shoreline is maximizing, thus offering more space for the growth of littoral vegetation.

5.3.7 The banks of wet detention and retention areas shall slope at a gentle grade (maximum 4: 1) into the waters as a safeguard against drowning, personal injury or other accidents, to encourage the growth of vegetation, and to allow the alternate flooding and exposure of areas along the shore as water levels periodically rise and fall. Fencing (6 feet tall chain link - from existing ground may be allowed as an alternative.

5.3 .8 The use of drainage detention and vegetated buffer zones as open space, recreation and conservation areas shall be encouraged.

5.3.9 The developer shall be responsible for obtaining any necessary permits for the storm water management system required by local, state or federal agencies.

5.3.10 The Development Review Committee may allow storm water discharged into drainage facilities off the site of development following conditions is met: runoff to be if each of the

a. It is not practicable to completely manage runoff on the site in a manner that meets the performance and design standards;

b. The off-site drainage facilities and conveyance system leading designed, constructed and maintained in accordance requirements of this manual; to them are with the -

c. Adequate provision and written agreements for use of the land are made for the sharing of construction, maintaining and operating costs of the facilities. The developer may be required to pay a portion of the cost of constructing the facilities as a condition to receiving approval of the drainage plans; and

d. Adverse environmental impacts on the site of development will be minimized.

e. A request to use off-site drainage facilities and all information related to the proposed off-site facilities shall be made a part of the developer's approved stormwater management plan.

5.4 Frequency

The system at a minimum, shall be designed for "design storms" resulting from rainfall of the following frequencies as stated below.

5.4.1 10-Year - All storm sewers and culverts, except those crossing arterial roads. A minimum time of concentration of 15 minutes to the first inlet may be utilized in determining design flows.

5.4.2 25-Year/24-Hour - All floodways, ditches, channels, and detention/retention areas with outfalls (open drainage basin).

5.4.3 50-Year - All storm sewer and culverts crossing arterial roads.

5.4.4 100-Year/24-Hour - All retention areas without outfalls (closed drainage basin).

Rainfall intensity factors shall come from accepted meteorological and rainfall sources applicable to the City of New Port Richey.

5.5 Development Criteria in Floodplains

5.5.1 The criteria for development in floodplains pertains to all floodplains and is not limited to those deferred on FEMA maps. The Developer's Design Engineer is responsible for determining the on-site 100-year flood elevations if not defined by a FEMA detailed study. The Developer's Design Engineer is encouraged to submit a Letter of Map Amendments to FEMA for any changes in flood zone designations as determined by detailed study of the area.

5.5.2 No development (structures and/or fill) shall be allowed in the conveyance portion of any 100-year frequency floodplain associated with any stream, channel, lake or waterway unless provisions are made to effectively compensate for any reduction in conveyance caused by the development.

This does not apply to the 100-year floodplain immediately adjacent to a tidally produced 100-year floodplain influenced water body for on-site areas. Off-site areas shall not be impacted in any way.

5.5.3 No development (structures and/or fill) shall be allowed in the Riverine 100-year frequency floodplain unless provisions are made to effectively compensate for the reduction in storage volume areas due to the proposed development.

a. General

A computer routing analysis is required in the design of all detention ponds. A computer routing analysis is also required for retention ponds where percolation is considered during the runoff event. Tailwater conditions must be considered in the routing calculations.

b. Straight Line (Constant) Discharge

Straight line or constant, non-varying discharge is not acceptable.

5.6 Lot Drainage

5.6.1 The finished grade of individual lots shall be shown on the construction plans. Generally, lots shall be drained in accordance with the Type A, B, or C typical grading plans. When topography or other features make such lot drainage impractical, alternate methods may be presented for the City's review and approval. See typical lot grading schematics in Figure 10-A, B and C of the September 2012 Stormwater Management and Erosion Control Policy Procedures Criteria Manual.

5.6.2 The proposed minimum finished floor elevation of all structures which may be constructed shall be included on the construction plans. As a minimum, the finished floor elevation shall be at least 16 inches above the highest crown line of the street lying between the projection of the side building lines, unless otherwise approved by the City of New Port Richey (see Type C grading plan). Finished floor elevations shall be a minimum of 1 foot above the 100-year floodplain as designated by the Federal Insurance Administration Flood Hazard boundary Maps. When a detailed study from FEMA has not been provided, the Developer's Design Engineer shall establish the 100-year base flood elevation for review by the City.

5.7 RECOMMENDED LEVEL OF SERVICE

Current LOS, as referenced in Section 5.1 and Table 5-1, are recommended to remain in place. However, there will be significant additional cost for future project alternatives associated with achieving a 25-year LOS for existing ponds or providing a new/upgraded storm sewer system to the 10-year frequency design. While these LOS are enforced for new development, it significantly impacts the cost of flood abatement projects serving fully developed areas.

It is recommended that the City:

1. Retain the current 10-year LOS for non-emergency roadway protection.

2. Retain the current 100-yearLOS for protection of habitable structures.

3. Retain the current elevated LOS (100-year) for evacuation routes.

4. Apply the 100-year LOS to critical community facilities and emergency (hospital, fire, police) entrance/exit routes.

5. Retain the current 25-year LOS for open channels and ponds associated with all new construction.

6. Apply the 25-year LOS selectively, on a case-by-case basis, for existing ponds and open channels where road LOS and habitable structure LOS is being met.

7. Continue to place high priority on construction of CIP projects associated with stormwater systems discharging directly to the Pithlachascotee River or the Gulf of Mexico currently lacking treatment.

8. Provide, at a minimum, sediment sump/oil skimming modifications to the downstream inlets of all untreated stormwater systems (such as SNOUT devices).

9. Apply SWFWMD water quality treatment design standards to all stormwater management facilities serving new development or re-development.

10. Apply SWFWMD water quality treatment design standards to newly constructed surface detention/retention facilities, even when not serving new development.

CHAPTER 6
RECOMMENDED TEN-YEAR STORMWATER MANAGEMENT PLAN

The objective of this Chapter is to present an integrated stormwater management plan that provides the necessary information for the City to complete the implementation of the *2013 Stormwater Master Drainage Plan – 10-Year Update* and continue the development of the City's stormwater management program.

6.1 PROJECT PRIORITIZATION

A full listing of the twenty-one (21) proposed *2013 Stormwater Master Plan – 10-Year Update* project is contained in this Chapter. These projects were developed by City staff utilizing their knowledge of the stormwater issues within the City of New Port Richey.

6.1.1 Flood Abatement

Stormwater management projects that primarily address flood control issues were prioritized as "High," "Medium," "Low," or "Future" by the Public Works Department, based upon several factors. These factors are listed below, in order of descending import, with factors given higher importance listed first and lower importance last.

1. Public transportation safety (depth of water over road).
2. Proximity to Medical Facilities/Hospital route protection.
3. Evacuation route protection.
4. Historic flood damages (home, property).
5. Records of citizen complaints/Frequency of flooding.
6. Duration of residual flooding.

Projects were classified as "Future" only where construction and/or land ownership constraints precluded their implementation, or where funding needs to be finalized.

6.1.2 Water Quality

Stormwater management projects that primarily address water quality enhancement were prioritized as "High," "Medium," "Low," or "Future" by the Public Works Department, based upon the following criteria:

- "High" priority given to water quality projects that directly discharge to the Pithlachascotee River or to the Gulf untreated runoff.

- "Medium" priority given to water quality projects that directly discharge to the Pithlachascotee River or to the Gulf partially untreated runoff.

- "Low" priority given to water quality projects that do not directly discharge to the Pithlachascotee River or to the Gulf, or that currently provide some water quality benefit.

Water quality projects were only classified as "Future" only where construction and/or land ownership constraints precluded their implementation, or where funding needs to be finalized.

6.2 CAPITAL FUNDING

Implementation of the Projects listed in Items #1–#21 is dependent upon the availability of funding, regardless of the potential public and environmental benefits associated with these Projects. The City of New Port Richey has at its disposal several funding tools. These funding mechanisms can be divided into two categories:

- *Internal Funding Sources* including stormwater utility revenues, taxes, bonds, fees, special assessments.

- *External Funding Sources* including grants, State Revolving Fund loans, and regional/State/Federal matching funds.

Each of these funding categories is described in greater detail below.

6.2.1 Internal Funding

Internal funding sources, typically available to municipalities and commonly used to fund annual stormwater operations and capital projects include:

- Stormwater Utility Revenues.
- Municipal Budget Allocations from the General Fund.
- Special Taxing/Assessment Districts.
- Permit/Impact Fees.
- Local Dedicated Tax Income (e.g. local option gas tax).
- Issuance of Bonds.

The City of New Port Richey has historically financed its general stormwater management operations (primarily system maintenance and repair activities) through the General Fund on a pay-as-you-go basis. Capital improvements were financed through a combination of City capital improvement funds, community development block grants and local gas tax revenues.

In October 2001, New Port Richey took steps to ensure that current and future stormwater infrastructure improvements and water quality enhancement projects are supported when the City Council adopted and implemented a stormwater utility. Fees are paid by property owners based upon their property's impervious area and on-site stormwater management facilities. Initial stormwater bills were issued in the Fall of 2001. The stormwater utility is a dedicated funding source that provides predictable annual funding for the ongoing annual operations and capital improvements required to support the City's stormwater management program.

The stormwater utility revenues, as projected by the City Finance Director, are approximately $ 914,000 per year, at the current unit fee rate. While this amount is not anticipated to fully fund all operation, maintenance and capital improvement activities, it will significantly reduce the burden on the City's General Fund, allowing some of those dollars to be reallocated according to City-determined priorities.

6.2.2 External Funding

In addition to the City's internal funding sources, several external funding sources exist that may allow the City to accelerate the implementation of these Projects. Additional funds would enable the City to undertake larger portions of projects in a given year, thereby increasing the number of projects that can be completed in a fixed timeframe. An alternate strategy would be to take advantage of special grants and/or low-interest loans. Several of these potential Federal, State or Regional financing sources are described below.

Community Assistance Grants

The State of Florida offers several grant programs related to environmental protection (especially for coastal communities), infrastructure improvement, community development, and environmental education. Examples of grant programs that might be investigated for eligibility, to finance specific elements of potential capital improvements, are:

- Community Development Block Grants (through HUD).
- Keep Florida Beautiful Approved Community Based Grant.
- Public Works and Development Facilities Program.
- Flood Mitigation Assistance Program.
- Environmental Education Grants Program.
- Florida Coastal Management Program Coastal Partnerships Initiative.
- Section 319 Non-point Source Management Implementation Grant.

Many of these programs have very specific requirements and may only be applicable to certain aspects of a stormwater project.

The Community Development Block Grant (CDBG) Program has been successfully utilized for City improvements in the past. However, it should be noted that this program is not applicable for all of the recommended stormwater projects because it is limited to funding improvements in low to medium income areas, these areas being identified by the most recent published U.S. Census data.

The Section 319 Nonpoint Source Management Implementation Grant grants favor projects associated with recognized water quality problems that are listed on the §3030(d) Impaired Waters List, with state Surface Water Improvement and Management priority waterbodies, and for waters with defined TMDL allocations. Improvements to Pithlachascotee River outfalls should receive extra points in potential applications under this grant.

Clean Water State Revolving Funds

The Clean Water Act replaced the long-running federal Construction Grants program with a more flexible State Revolving Fund (SRF) Program. The SRF Program creates a revolving loan fund to provide independent, permanent sources of low-cost financing for a wide range of water quality infrastructure projects. Funds to establish or capitalize the Florida SRF program are provided by the Federal and State Governments, with SRF loans being administered in the State of Florida through the FDEP in Tallahassee.

SRF programs work like banks, where Federal and State contributions provide the capital to make low-interest loans for important water quality projects. Loans are made to qualified applicants at a preferential interest rate.

Repaid funds are then recycled to fund other important water quality projects. Advantages to SRF loans include:

- Little or no up-front cash requirements.
- Significant potential interest cost savings over the life of the loan.
- Streamlined federal requirements compared to grants.
- Possible combination of an SRF loan with grants from other sources.
- Interest rates are fixed and the loan amounts are repayable in equal, semi-annual payments over the useful life (20 years maximum) of the project.
- Preference points are given to communities with an established stormwater utility.

Loans are provided for planning and engineering (pre-construction) as well as construction costs associated with a variety of water management projects, such as stream bank rehabilitation, wetland creation/protection, sedimentation-stormwater treatment basins, and septic system improvements. Loan repayment can be derived from dedicated local taxes or fees, recreational fees, or stormwater utility fees.

SWFMWD Cooperative Funding Initiative

Each year the Basin Boards of the SWFWMD review, prioritize and recommend water resource management projects within their boundaries for cooperative funding (which has been 50% matching funds). Funding proposals must be submitted for review at least one year before the fiscal year in which funding is requested. Proposals are accepted for projects related to water supply, water quality, wetland/water resource protection, flood control or a combination thereof.

The City of New Port Richey is located within the District's Coastal Springs Basin, and has benefited from cooperative funding on non-stormwater projects. Available funds for projects within each Basin are derived from collected millage within that jurisdiction and vary from year to year, based on previous financial commitments. Current Basin Board emphasis appears to be focused on water supply and reclaimed water initiatives. Although SWFWMD encourages cities to apply for cooperative funding each year, there is significant competition in the region for a limited pool of funding. This pool of funds is also used to finance the Water Management District's portion of approved SWIM projects.

6.3 RECOMMENDED TEN-YEAR IMPLEMENTATION PROGRAM

Based upon assessment of the City's stormwater management needs, combined with an assessment of long-term goals and projected funding, a Ten-Year Implementation Program has been developed that addresses annual operations and capital investments for the period of Fiscal Years 2014-2023.

6.3.1 Annual Operations

The City's current operating program generally provides sufficient levels of maintenance to keep the existing open and closed conveyances in adequate condition to pass normal storm flows and satisfy the City's MS4 permit requirements regarding minimum maintenance levels for water quality management. The incremental annual operations activities that are related to the proposed CIP projects are minimal, compared to current operations, and are within the capacity of the City's current annual operations program.

These projected annual operating costs could be substantially increased in future years under the following considerations:

- Significant changes in weather patterns producing significantly higher annual and monthly rainfall run-off volumes, which tend to produce higher levels of erosion in open channels, could increase damage and clogging in closed conduit systems, and require more frequent sediment deposit removals.

- Significant changes in Federal/State regulatory programs, notably the City's MS4 permit may potentially require higher levels of stormwater system maintenance.

6.3.2 Capital Investments

Capital investments in prioritized stormwater projects are limited to the available capital funding during each of the ten fiscal years. Both available funding and recommended projects are discussed in the following paragraphs.

<u>**Available Capital Funding**</u>

For the purpose of this implementation plan, the following assumptions have been made with respect to the projection of potential funds for capital investments in the City's stormwater management infrastructure:

- Stormwater Utility Revenue is a constant $ 914,000 (rounded) per year.
- No rate increases or significant property additions/modifications to the utility rate base.
- The City will continue with its long-standing policy of pay-as-you-go funding.
- Bonds will not be issued to accelerate the CIP projects, unless conditions warrant and are approved by the City Council.
- The City will not use the State Revolving Fund to accelerate the CIP projects.
- A constant inflation rate of 4.00% per year will be used to determine costs in future years.
- Construction of projects may be phased.
- Unspent capital funds will be accumulated until the construction project contract is awarded.

6.4.1 Index of Task Order Items

Item Number	Type	SWFWMD Meeting Held	Location
1.	FC/WQ		Pennsylvania Avenue and Polk Street
2.	FC/WQ	X	5135/5143 Hemlock Drive
3.	FC/WQ	X	Marine Parkway
4.	FC/WQ	X	6251 Delaware Avenue
5.	FC/WQ		Carlton Road, Dartmouth Road and Berkley Road
6.	FC/WQ	X	Florida Avenue
7.	FC/WQ	X	Orange Lake Outfall
8.	FC		Tanglewood
9.	FC/WQ		Louisiana Avenue and Congress Street (Lake Chasco)
10.	WQ		The Meadows Outfall Headwall
11.	FC/WQ	X	Riverview Drive
12.	WQ	X	5440 Richey Drive
13.	FC/WQ	X	Madison Street and Gulf Drive
14.	FC/WQ		Indiana Avenue Closed Landfill
15.	FC/WQ		Aspen Street at Grand Boulevard
16.	FC/WQ		High Street at Grand Boulevard
17.	FC		Azalea Pond
18.	FC/WQ		7230 Grand Boulevard
19.	FC		Orchid Lake Road Industrial Park
20.	FC/WQ		Tropic Shores
21.	FC	X	Missouri Avenue at Madison Street

Notes:
1) Reference the attached detail for each Task Order Items #1–#21
2) Item numbers do not indicate any reference to ranking importance.
3) FC = Flood Control
4) WQ = Water Quality

Future Proposed Projects Where Construction Costs are Expected to Exceed Appropriated Funding

1. **Grand Boulevard (Tennessee Avenue and Georgia Intersections) Georgia and Franklin Street Storm Sewer System Drainage Upgrades (Road Flooding)**
   Upsize the system from these intersections to the river outfall. **This project is in the current 2002 STMW Master Drainage Plan.**

2. **West Main Street Drainage System Upgrades and Possible Pond Construction (Road Flooding)**
   Connect existing storm sewer systems. Provide a new stormwater pond in the vacant parcel, west of U.S. 19, north side of Main Street at the west end of the 'S' curve. **This project is in the current 2002 STMW Master Drainage Plan.**

3. **Congress Street from Massachusetts Avenue to Florida Avenue (flooding - no existing system in place)**
   Provide for a new storm sewer and drainage system with ponds and outfalls.

4. **Congress Street & Emerson Drive Drainage Improvements (Road Flooding)**
   Provide upsizing of the existing storm sewer system to move stormwater from Congress Street to the existing stormwater pond on the east side of Congress Street. Consider stormwater excavation and removal of the existing island.

5. **Massachusetts Avenue & Van Buren Street Drainage Improvements (Road Flooding)**
   Provide for a new storm sewer and drainage system with a pond and outfall. Consider property acquisition for the new stormwater pond on the south side of Massachusetts Avenue.

6. **Maple Street and Meadow Lane Street Drainage Improvements**
   Provide for intersection drainage and storm sewer replacement along Maple Street from High Street to the north side of Gulf Drive. Connect to the existing 30" RCP. **This project is in the current 2002 STMW Master Drainage Plan.**

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CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 1

LOCATION: PENNSYLVANIA AVENUE AND POLK STREET

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 1
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

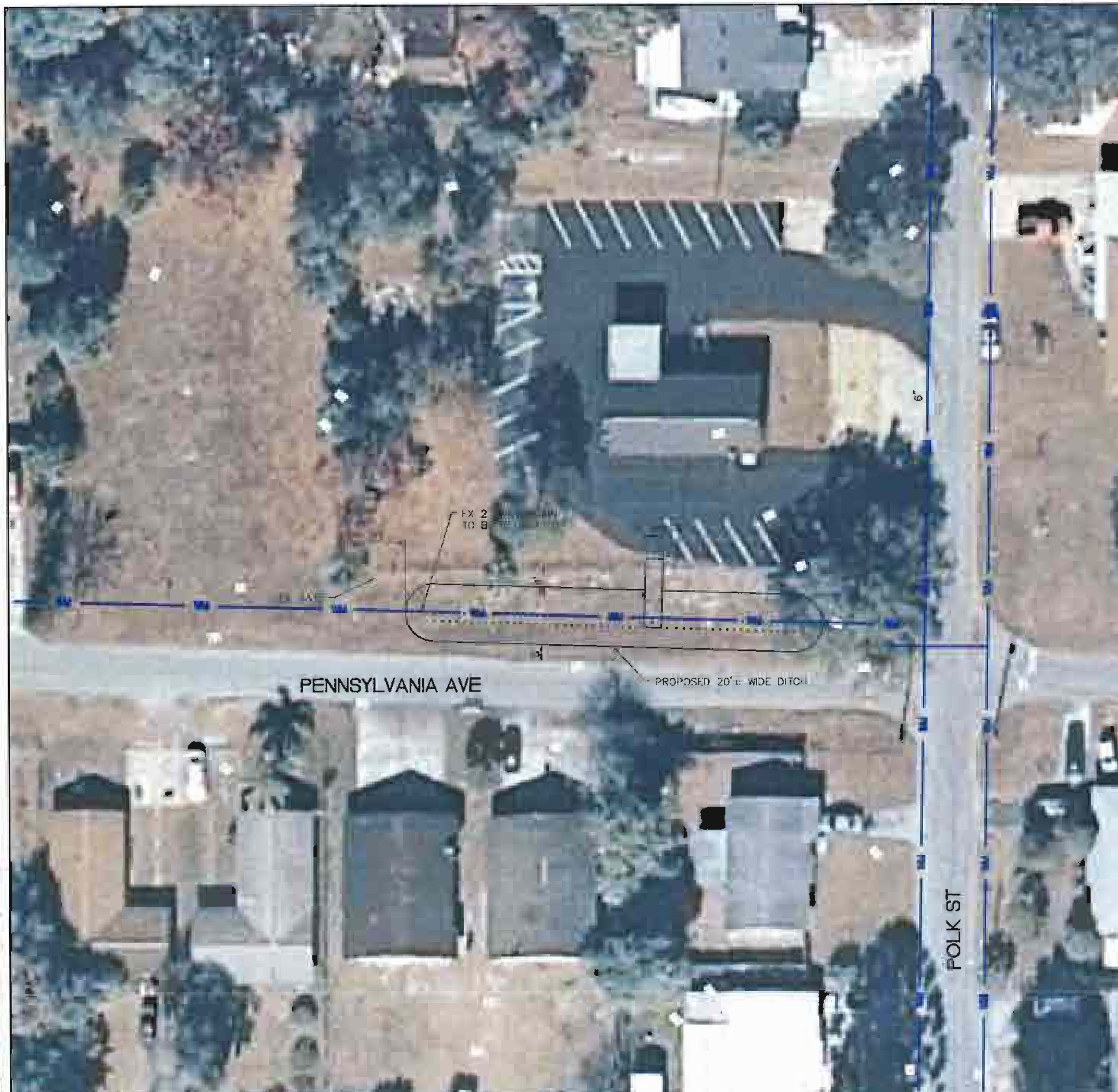
PRELIMINARY ENGINEER'S ESTIMATE
ITEM 1-PENNSYLVANIA AVE.

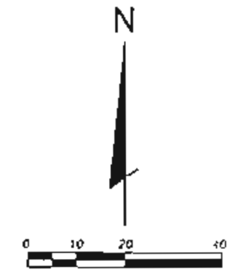
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	570	SY	$3.60	$2,052
I-A-2	STAKED SILT FENCE	190	LF	$1.40	$266
I-A-3	ROOT PRUNE	40	LF	$9.40	$376
I-A-4	EXCAVATE SWALE 3-FT DEEP (145 LF)	1	LS	$770.00	$770
I-C-1	CONC. RIP-RAP	3	TN	$88.00	$264
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$550.00	$550
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	147	LF	$6.60	$970
2-A-2	2-INCH WM MJ 45	4	EA	$305.00	$1,220
I-D-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$1,500.00	$1,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

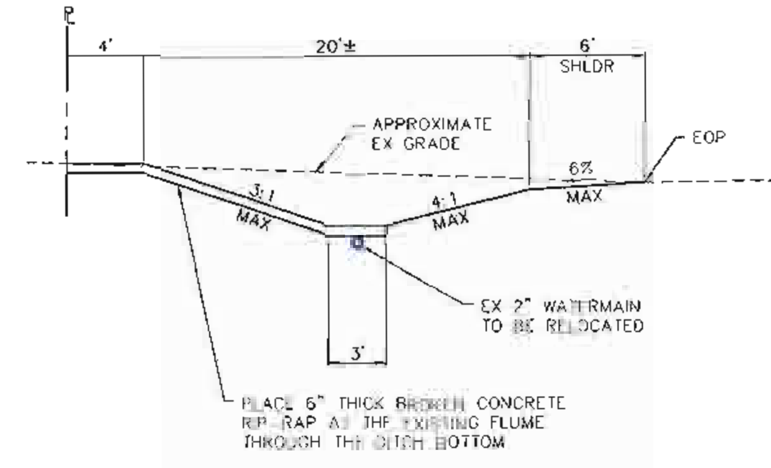
SUB-TOTAL		**$7,968**
MOBILIZATION		$500
CONTINGENCY		$1,000
SUB-TOTAL		**$9,468**
CONSULTING FEES-DESIGN SURVEY, DESIGN-(NO BIDDING)		$3,400
SUB-SURFACE UTILITY LOCATE		$1,000
REIMBURBURSABLES		$50
TOTAL	**$**	**13,918**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 1 Pennsylvania Ave..xlsx]Sheet1







TYPICAL DITCH CROSS SECTION

N.T.S.

NOTES

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #1

PENNSYLVANIA AVE AND POLK ST
DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 2

LOCATION: 5135/5143 HEMLOCK DRIVE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 2
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 2-HEMLOCK AND TANGELO

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	HOUSE ITEMS				
	PURCHASE HOUSES	2	EA	$ 40,000	$ 80,000
	DEMO HOUSES	2	EA	$ 5,000	$ 10,000
	REMOVAL/ HALL AWAY OF DEMO MATERIAL	2	EA	$ 1,500	$ 3,000
	ASBESTOS SURVEY	2	EA	$ 1,500	$ 3,000
	ASBESTOS REMOVAL	2	EA	$ 6,000	$ 12,000
	CONSTRUCTION ITEMS				
I-A-1	SOD (FLORATAM)	1333	SY	$3.60	$4,799
I-A-2	STAKED SILT FENCE	480	LF	$1.40	$672
I-A-3	ROOT PRUNE	90	LF	$9.40	$846
I-A-4	EXCAVATE POND 5 FT DEEP	890	CY	$3.85	$3,427
I-A-5	SEED AND MULCH POND BOTTOM	2,800	SY	$1.70	$4,760
I-B-1	REMOVE CONC. DRIVEWAY & APRON	112	SY	$19.25	$2,156
I-C-1	24" RCP	20	LF	$37.50	$750
I-C-2	24 " FLARED END SECTION	1	EA	$1,485.00	$1,485
I-C-3	CONNECT EXISTING MANHOLE	1	EA	$1,100.00	$1,100
I-D-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

HOUSE TOTAL	**$108,000**
CONSTRUCTION SUB-TOTAL	**$24,494**
MOBILIZATION	$2,000
CONTINGENCY	$3,000
SUB-TOTAL	**$29,494**
CONSULTING FEES- DESIGN SURVEY,DESIGN & PERMITTING-(NO BIDDING)	$6,800
GEOTECHNICAL BORINGS (2 @ 20')	$2,000
PERMIT FEES AND REIMBURSABLES	$350
CONSTRUCTION ITEMS TOTAL	**$38,644**
GRAND TOTAL WITH HOUSE	**$146,644**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

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0516-0043-30.04 EPN 536

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400578

Date:	10/22/2013
Time:	10:00 AM
Project Name:	City of New Port Richey – 3 Stormwater Ponds
Attendees:	Monte Ritter, Steve Wasson, Florida Design Consultants (727) 849-7588

County:	Pasco	**Sec/Twp/Rge:**	8/26/16 & 4/26/16
Total Land Acreage:	>0.93 acres	**Project Acreage:**	0.93 acres

Prior On-Site/Off-Site Permit Activity:
- None

Project Overview:
- 3 proposed stormwater retrofit projects:
- (1) Hemlock Drive 8/26/16 – Proposed pond construction on two existing lots (0.30 acres total) to provide additional attenuation/floodplain storage. Two soil borings will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (2) Marine Parkway 8/26/16 – Proposed pond expansion onto existing lot (0.46 acres total) to provide additional attenation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (3) Delaware Avenue 4/26/16 - Proposed pond construction on existing lot (0.17 acres total) to provide additional attenuation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- Wetlands / Surface Waters – No (upland stormwater ponds, new construction); DRI – No; District Funds – None at this time; discussion – alleviating flooding issues

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- If applicable:
- Provide the limits of jurisdictional wetlands.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Watersheds: (1) & (2) – Anclote. (3) – Pithlachascotee.
- Possibly discharging to impaired waters: (1) & (2) –WBID 1450 impaired for Mercury – No special BMP required. (3) – WBID 1409 not impaired.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- The permit must be issued to the property owner(s).
- Provide proof of ownership in the form of a deed or contract for sale.
- Provide appropriate O&M instructions.

Application Type and Fee Required:

- Notice of Intent to use an Environmental Resource General Permit – $250.
- Include copy of these notes as part of the ERP application per Rule 62-330.451(8), F.A.C.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

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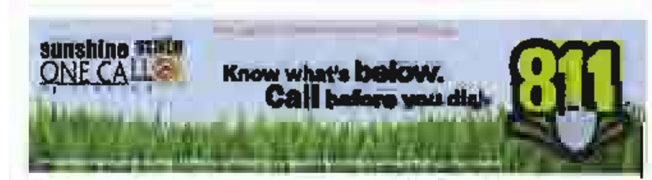

NOTES:

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5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #2

5143 HEMLOCK DRIVE & TANGELO DRIVE
RETENTION POND CONSTRUCTION PROJECT

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 3

LOCATION: MARINE PARKWAY

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
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4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 3
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 3-MARINE AND ALLAMANDA

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	HOUSE ITEMS				
	PURCHASE HOUSES	1	EA	$ 40,000.00	$ 40,000
	DEMO HOUSES	1	EA	$ 5,000.00	$ 5,000
	REMOVAL/ HALL AWAY OF DEMO MATERIAL	1	EA	$ 1,500.00	$ 1,500
	ASBESTOS SURVEY	1	EA	$ 1,500.00	$ 1,500
	ASBESTOS REMOVAL	1	EA	$ 6,000.00	$ 6,000
	CONSTRUCTION ITEMS				
I-A-1	SOD (FLORATAM)	1267	SY	$3.60	$4,561
I-A-2	STAKED SILT FENCE	460	LF	$1.40	$644
I-A-3	ROOT PRUNE	110	LF	$9.40	$1,034
I-A-4	EXCAVATE POND 5 FT DEEP	1,158	CY	$3.85	$4,458
I-A-5	SEED AND MULCH POND BOTTOM	2,150	SY	$1.70	$3,655
I-B-1	REMOVE CONC. DRIVEWAY & APRON	94	SY	$19.25	$1,810
I-D-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

HOUSE TOTAL	**$54,000**
CONSTRUCTION	
SUB-TOTAL	**$20,662**
MOBILIZATION	$2,000
CONTINGENCY	$3,000
SUB-TOTAL	**$25,662**
CONSULTING FEES- DESIGN SURVEY,DESIGN, PERMITTING-(NO BIDDING)	$6,800
GEOTECHNICAL BORINGS (1 @ 20')	$1,500
PERMIT FEES AND REIMBURSABLES	$350
TOTAL	**$34,312**
GRAND TOTAL WITH HOUSE	**$88,312**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 3 Marine and Allamanda.xlsx]Sheet1

0516-0043-30.04 Epn 536

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400578

Date:	10/22/2013
Time:	10:00 AM
Project Name:	City of New Port Richey – 3 Stormwater Ponds
Attendees:	Monte Ritter, Steve Wasson, Florida Design Consultants (727) 849-7588

County:	Pasco	**Sec/Twp/Rge:**	8/26/16 & 4/26/16
Total Land Acreage:	>0.93 acres	**Project Acreage:**	0.93 acres

Prior On-Site/Off-Site Permit Activity:
- None

Project Overview:
- 3 proposed stormwater retrofit projects:
- (1) Hemlock Drive 8/26/16 – Proposed pond construction on two existing lots (0.30 acres total) to provide additional attenuation/floodplain storage. Two soil borings will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (2) Marine Parkway 8/26/16 – Proposed pond expansion onto existing lot (0.46 acres total) to provide additional attenation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (3) Delaware Avenue 4/26/16 - Proposed pond construction on existing lot (0.17 acres total) to provide additional attenuation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- Wetlands / Surface Waters – No (upland stormwater ponds, new construction); DRI – No; District Funds – None at this time; discussion – alleviating flooding issues

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- If applicable:
- Provide the limits of jurisdictional wetlands.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Watersheds: (1) & (2) – Anclote. (3) – Pithlachascotee.
- Possibly discharging to impaired waters: (1) & (2) –WBID 1450 impaired for Mercury – No special BMP required. (3) – WBID 1409 not impaired.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

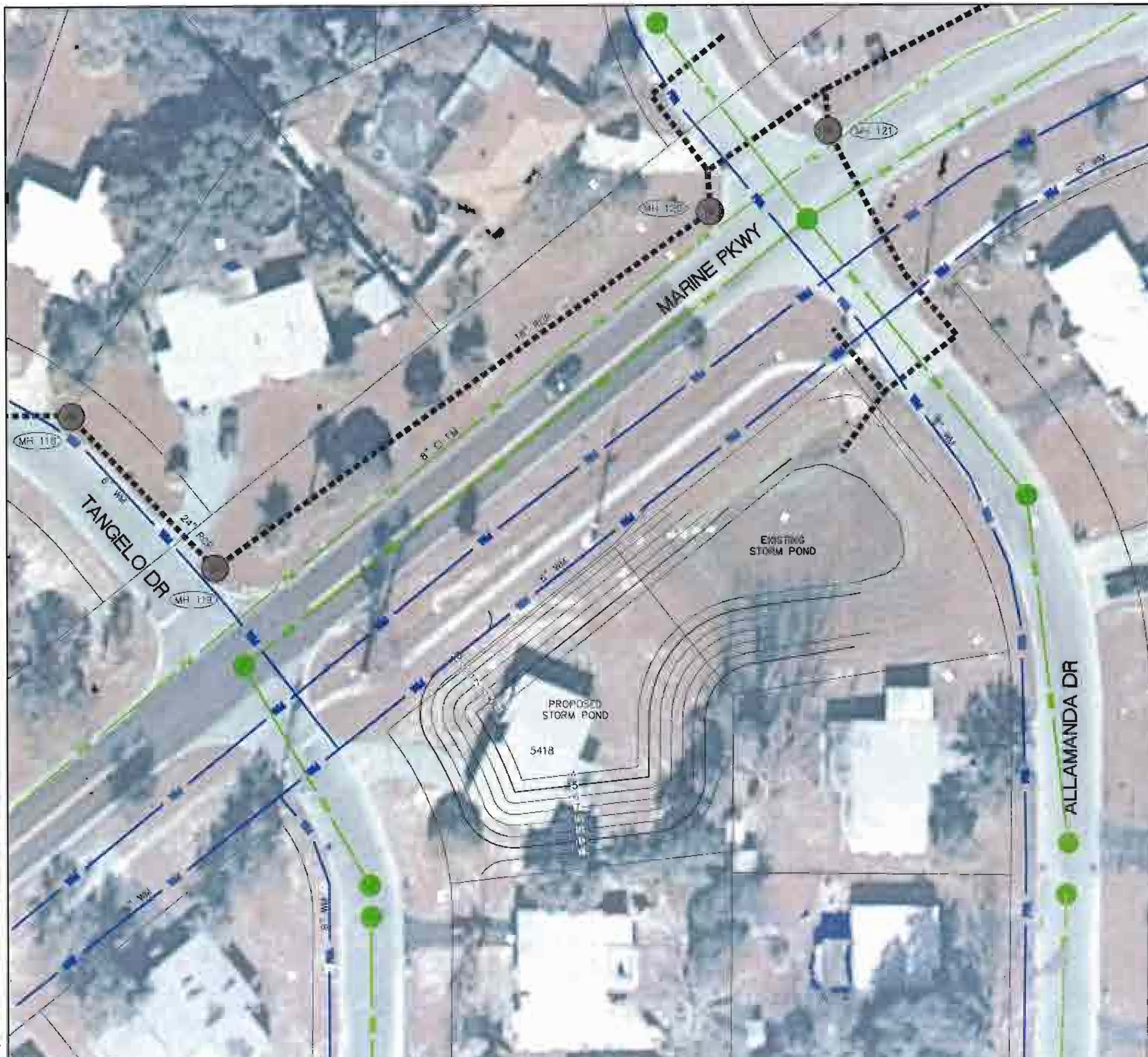
- The permit must be issued to the property owner(s).
- Provide proof of ownership in the form of a deed or contract for sale.
- Provide appropriate O&M instructions.

Application Type and Fee Required:

- Notice of Intent to use an Environmental Resource General Permit – $250.
- Include copy of these notes as part of the ERP application per Rule 62-330.451(8), F.A.C.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-



NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #3

MARINE PARKWAY & ALLAMANDA DRIVE
RETENTION POND EXPANSION

N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 4

LOCATION: 6251 DELAWARE AVENUE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 4
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 4-6251 DELAWARE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	HOUSE ITEMS				
	PURCHASE HOUSES	1	EA	$ 40,000	$ 40,000
	DEMO HOUSES	1	EA	$ 5,000	$ 5,000
	REMOVAL/ HALL AWAY OF DEMO MATERIAL	1	EA	$ 1,500	$ 1,500
	ASBESTOS SURVEY	1	EA	$ 1,500	$ 1,500
	ASBESTOS REMOVAL	1	EA	$ 6,000	$ 6,000
	CONSTRUCTION ITEMS				
I-A-1	SOD (FLORATAM)	1450	SY	$3.60	$5,220
I-A-2	STAKED SILT FENCE	500	LF	$1.40	$700
I-A-3	ROOT PRUNE	100	LF	$9.40	$940
I-A-4	EXCAVATE POND 5 FT DEEP	990	CY	$3.85	$3,812
I-A-5	SEED AND MULCH POND BOTTOM	134	SY	$1.50	$201
I-B-1	REMOVE ASPHALT DRIVEWAY & APRON	94	SY	$19.25	$1,810
I-C-1	18" RCP	25	LF	$28.00	$700
I-C-2	FDOT TYPE C BOX	1	EA	$2,700.00	$2,700
I-C-3	CONNECT TO EXISTING INLET	1	EA	$1,100.00	$1,100
I-D-1	REMOVE TREES	3	LS	$165.00	$495
I-O-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

HOUSE ITEMS TOTAL	**$64,000**
CONSTRUCTION ITEMS SUB-TOTAL	**$22,177**
MOBILIZATION	$2,000
CONTINGENCY	$3,000
SUB-TOTAL	**$27,177**
CONSULTING FEES-DESIGN SURVEY, DESIGN, PERMITTING- (NO BIDDING)	$ 6,800
GEOTECHNICAL BORINGS (1 @ 20')	$1,500
PERMIT FEES AND REIMBURSABLES	$350
CONSTRUCTION ITEMS TOTAL	**$ 35,827**
GRAND TOTAL WITH HOUSE	**$ 89,827**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 4- 6251 Delaware.xlsx]Sheet1

0516-0043-30.04 EPN 5360

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400578

Date:	10/22/2013		
Time:	10:00 AM		
Project Name:	City of New Port Richey – 3 Stormwater Ponds		
Attendees:	Monte Ritter, Steve Wasson, Florida Design Consultants (727) 849-7588		
County:	Pasco	**Sec/Twp/Rge:**	8/26/16 & 4/26/16
Total Land Acreage:	>0.93 acres	**Project Acreage:**	0.93 acres

Prior On-Site/Off-Site Permit Activity:
- None

Project Overview:
- 3 proposed stormwater retrofit projects:
- (1) Hemlock Drive 8/26/16 – Proposed pond construction on two existing lots (0.30 acres total) to provide additional attenuation/floodplain storage. Two soil borings will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (2) Marine Parkway 8/26/16 – Proposed pond expansion onto existing lot (0.46 acres total) to provide additional attenation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- (3) Delaware Avenue 4/26/16 - Proposed pond construction on existing lot (0.17 acres total) to provide additional attenuation/floodplain storage. One soil boring will be provided to show excavation will not breach an aquitard or be within 2-feet of underlying limestone.
- Wetlands / Surface Waters – No (upland stormwater ponds, new construction); DRI – No; District Funds – None at this time; discussion – alleviating flooding issues

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- If applicable:
- Provide the limits of jurisdictional wetlands.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Watersheds: (1) & (2) – Anclote. (3) – Pithlachascotee.
- Possibly discharging to impaired waters: (1) & (2) –WBID 1450 impaired for Mercury – No special BMP required. (3) – WBID 1409 not impaired.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- Provide certification by a registered professional that the project will meet the General Permit criteria specified in Rule 62-330.451, F.A.C.

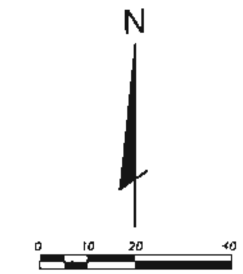
Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- The permit must be issued to the property owner(s).
- Provide proof of ownership in the form of a deed or contract for sale.
- Provide appropriate O&M instructions.

Application Type and Fee Required:
- Notice of Intent to use an Environmental Resource General Permit – $250.
- Include copy of these notes as part of the ERP application per Rule 62-330.451(8), F.A.C.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)
-



NOTES.

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811
3. SOD ALL DISTURB AREAS
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #4

6251 DELAWARE AVE DRAINAGE SYSTEM EXPANSION
DETANTION POND CONSTRUCTION

JOB NO. 516-43
536
N/A
DATE 12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 5

LOCATION: CARLTON ROAD, DARTMOUTH ROAD AND BERKLEY ROAD

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 5
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 5-CARLTON, DARTMOUTH AND BERKLEY

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	1400	LF	$1.40	$1,960
I-A-2	ROOT PRUNE	120	LF	$9.40	$1,128
I-A-3	CLEAR EXISTING SWALE & RE-GRADE	650	LF	$15.50	$10,075
I-A-4	SOD (FLORATAM)	3,615	SY	$3.60	$13,014
I-B-1	TYPE D CURBING	75	LF	$12.00	$900
I-C-1	FDOT TYPE 3 INLET- SET IN PLACE- COMPLETE	3	EA	$5,500.00	$16,500
I-C-2	18 " RCP	36	LF	$54.50	$1,962
I-C-3	18" FES	3	EA	$1,355.00	$4,065
ID-1	REMOVE & REPLACE EXISTING FENCE END OF STREETS	60	LF	$13.25	$795
I-D-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$2,200.00	$2,200
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$52,599**
MOBILIZATION	$2,000
CONTINGENCY	$3,000
SUB-TOTAL	**$57,599**
CONSULTING FEES-DESIGN SURVEY,DESIGN- (NOBIDDING)	$4,800
REIMBURBURSABLES	**$50**
TOTAL	**$62,449**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 5 Carlton-Dartmouth and Berkley.xlsx]Sheet1

N

0 25 50 100

NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811
3. SOD ALL DISTURB AREAS
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT - THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #5
CARLTON RD, DARTMOUTH RD & BERKLEY RD
@ US19 DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 6

LOCATION: FLORIDA AVENUE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 6
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 6-FLORIDA AVE. DRAINAGE SYSTEM

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	50	SY	$3.60	$180
I-A-2	STAKED SILT FENCE	270	LF	$1.40	$378
I-B-1	1 " S-3 ASPHALT OVERLAY	40	SY	$12.30	$492
I-B-2	8" S-1 ASPHALT BASE	20	SY	$44.00	$880
I-B-3	2' CONCRETE VALLEY CURB	300	LF	$20.00	$6,000
I-B-4	REMOVE & REPLACE CONC. DRIVEWAY APRON	100	SY	$38.50	$3,850
I-B-5	REMOVE & REPLACE ASPHALT PAVEMENT APRON	50	SY	$25.50	$1,275
I-C-1	FDOT TYPE 4 STORM INLET(S)	2	EA	$3,850.00	$7,700
I-C-2	STORM MANHOLE	1	EA	$2,500.00	$2,500
I-C-3	18 " RCP	30	LF	$28.00	$840
I-C-4	24 " RCP	90	LF	$37.50	$3,375
I-C-5	TIE-IN TO EXISTING STORM INLET	1	EA	$1,100.00	$1,100
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$1,650.00	$1,650
I-D-2	24" STOP BAR (THERMOPLASTIC)	20	LF	$4.25	$85
I-D-3	CROSSWALKS (THERMOPLASTIC) FDOT INDEX 17346	1	LS	$880.00	$880
2-A-1	RELOCATE EXISTING 8-INCH WATER MAIN	40	EA	$28.50	$1,140
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
I-D-4	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,500	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$37,375**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$43,375**
CONSULTING FEES-DESIGN,PERMITTING- (NO BIDDING)	$5,800
SUB-SURFACE UTILITY LOCATE	$3,000
REIMBURBURSABLES	$200
TOTAL	**$52,375**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 6 Florida Ave Drainage System.xlsx]Sheet1

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400614

Date:	10/29/2013		
Time:	7:45 AM		
Project Name:	City of New Port Richey Master Drainage		
Attendees:	Monte Ritter; David Sauskojus, Steve Wasson		
County:	Pasco	**Sec/Twp/Rge:**	(1) 5/26/16 (2) 8/26/16
Total Land Acreage:	(1) <0.5 acres (2) <0.5 acres	**Project Acreage:**	(1) <0.5 acres (2) <0.5 acres

Prior On-Site/Off-Site Permit Activity:
- (1) Adjacent permits: 6835.001 and 22259.001
- (2) Adjacent Permit: 28815.000

Project Overview:
- (1) Approx. 100 linear feet of proposed 18"-24" storm sewer addition to alleviate nuisance flooding (approx 40' x 25') on Florida Ave. Proposed storm sewer will connect to existing storm sewer, which discharges to Orange Lake. Orange Lake discharges to tidal portion of Pithlachascotee River.
- (2) Approx. 440 linear feet of proposed 18"-36" storm sewer addition and replacement to alleviate nuisance flooding on Riverview Drive and to improve conveyance to the Pithlachascotee River. Discharge will continue to be directed to non-tidal portion of the river. Includes replacing exist 24" with 36" pipe to river and plugging existing 6" pipe to river.
- Wetlands/Surface Waters – Yes; DRI – No; District Funds – No.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- (1) No wetlands or surface waters within this pipe installation project.
- (2) Pithlachascotee River is SSL. Will need Consent by Rule or Letter of Consent for work involving 36-inch pipe construction at river. Will be some temporary construction impacts in river. Probably minor enough so no mitigation required. 36" pipe outlet to river must have safety grating installed.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

Both projects in Pithlachascotee River Watershed and are in open basins.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- (1) Attenuation not required. Orange lake discharges to tidal portion of Pithlachascotee River.
- (2) Demonstrate that discharges from proposed project area will not cause an adverse impact for a 25-year, 24-hour storm event and will not increase flood stages up- or down-stream of the project area(s) from storm events up to and including the 100-year, 24-hour event. Use results from 1996 Pithlachascotee River watershed study for boundary conditions.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- (1) and (2) Water quality treatment not necessary. No new impervious areas are proposed.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- (1) N/A
- (2) Pithlachascotee River will be involved with minor temporary construction. Authorization will be linked to Individual ERP.

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- (1) N/A
- (2) The permit must be issued to the property owner(s).

Application Type and Fee Required:

- (1) De minimis Exemption - $100.00
- (2) Individual ERP – Sections A, C and E of the ERP Application - $2184 for online submittal.
-

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 7

LOCATION: ORANGE LAKE OUTFALL

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. Limited field elevations were obtained and are shown on the Master Plan.
6. Limited Preliminary ICPR Drainage Programs were prepared. They are included.
7. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
8. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
9. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 7
CITY OF NEW PORT RICHEY, FL
MARCH 2014

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 7-ORANGE LAKE OUTFALL

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	3225	SY	$3.60	$11,610
I-A-2	STAKED SILT FENCE	1610	LF	$1.40	$2,254
I-A-3	FLOATING TURBIDITY BARRIER	280	LF	$9.00	$2,520
I-A-4	ROOT PRUNE	220	LF	$10.00	$2,200
I-A-5	DE-WATERING- SHEET PILING	1	WK	$1,650.00	$1,650
I-B-1	1.5 " S3 ASPHALT OVERLAY	260	SY	$13.50	$3,510
I-B-2	1.5" S1 ASPHALT BASE	260	SY	$18.75	$4,875
I-B-3	2' CONCRETE VALLEY GUTTER	120	LF	$20.00	$2,400
I-B-4	REMOVE & REPLACE COMBINATION CURB/WALK	108	SY	$54.00	$5,832
I-B-5	REMOVE & REPLACE ASPHALT PATH	40	SY	$3.50	$140
I-B-6	REMOVE & REPLACE CONC. WALK	70	SY	$38.50	$2,695
I-B-7	PIPE BACKFILL	4,448	CY	$13.50	$60,048
I-B-8	REMOVE & REPLACE ROADWAY BASE (8"CRUSHED CONC.)	260	SY	$15.00	$3,900
I-C-1	48 X 76 ERCP	700	LF	$264.00	$184,800
I-C-2	STORM MANHOLE JUNCTION	1	EA	$5,610.00	$5,610
I-C-3	REMOVE EXISTING WEIRS & BLEEDDOWN ORIFICE	2	EA	$825.00	$1,650
I-C-4	CONSTRUCT NEW WEIRS & BLEEDDOWN ORIFICE	180	LF	$165.00	$29,700
I-C-5	CONSTRUCT NEW OUTFALL	1	EA	$6,600.00	$6,600
I-C-6	REMOVE & REPLACE SEAWALL PILING (1)	1	EA	$11,000.00	$11,000
I-C-7	REMOVE & REPLACE SEAWALL TIEBACK (1)	1	EA	$11,000.00	$11,000
I-C-8	REMOVE & REPLACE SEAWALL DEADMAN (1)	2	EA	$1,210.00	$2,420
I-D-1	TRAFFIC STRIPE SOLID 6" WHITE (THERMOPLASTIC)	240	LF	$1.40	$336
I-D-2	TEMPORARY TRAFFIC PAINT	240	LF	$1.25	$300
I-D-3	DIRECTIONAL TRAFFIC ARROWS (THERMOPLASTIC)	3	EA	$66.00	$198
I-D-4	CROSSWALKS (THERMOPLASTIC) FDOT INDEX 17346	1	LS	$880.00	$880
I-D-5	REMOVE & REPLACE SIGNAGE	2	EA	$330.00	$660
I-D-6	REMOVE & REPLACE FENCING	40	LF	$22.00	$880
I-D-7	REMOVE & REPLACE TREES	5	EA	$660.00	$3,300
I-D-8	MAINTENANCE OF TRAFFIC	1	LS	$5,500.00	$5,500
I-D-9	SHEET PILING	280	LF	$55.00	$15,400
I-D-10	REMOVE AND REPLACE EXISTING SHELTER- COMPLETE	1	LS	$11,000.00	$11,000
2-A-1	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
2-A-2	ADJUST EXIST. 2 INCH WATER MAIN	40	LF	$22.00	$880
2-B-1	ADJUST EXIST. 2" PVC FM	40	LF	$27.50	$1,100
2-B-1	ADJUST EXIST. FM VALVE TO GRADE	2	EA	$275.00	$550
2-C-1	ADJUST EXIST. 4 " RECLAIMED	40	LF	$27.50	$1,100
I-D-10	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$5,100.00	$5,100
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$382,664**
MOBLIZATION	$5,000
CONTINGENCY	$25,000
SUB-TOTAL	**$412,664**
CONSULTING FEES-DESIGN SURVEY COMPLETION,DESIGN, PERMITTING-(NO BIDDING)	$19,800
SUB-SURFACE UTILITY LOCATE	$3,500
PERMIT FEES AND REIMBURSEABLES	$2,400
(2) WATER QUALITY DIFFUSER SYSTEM ($5000) & ELECTRIC HOOK-UP ($1500)	$6,500
TOTAL	**$444,864**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.
(1) CONTRACTOR TO FURNISH ALL STRUCTURAL SIGNED, DATED, & SEALED DRAWINGS TO COMPLETE THIS WORK
(2) ADDED MARCH 2014
(3) A WATER QUALITY DIFFUSER SYSTEM, AND/OR INLET BASKET COLLECTION SYSTEM, AND/OR CONSTRUCTION OF DRY RETENTION POND[S] AS A TYPE OF A PRE-TREATMENT FACILTY ARE TO BE CONSIDERED AS POSSIBILITIES. THE ORANGE LAKE DIFFUSER SYSTEM SHOULD BE PROVEN SUCCESSFUL PRIOR TO IMPLEMENTATION IN OTHER AREAS.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 7 Orange Lake Outfall.xlsx]Sheet1

American Ecosystems, Inc.
AQUATIC MANAGEMENT SERVICES
PO Box 40517 • St. Petersburg, FL 33743-0517
Phone: (727) 545-4404 • Fax: (727) 5450770
Web: americanecosystems.com

March 6, 2014

Mr. Robert Rivera
C/O Don Richardson
City of New Port Richey – Public Works Operation Center
6132 Pine Hill Road
Port Richey, Florida 34668

Dear Mr. Rivera:

Please find enclosed for your review and consideration a proposal to install a diffuser type aeration system to your pond. The diffuser type aeration system uses large ceramic diffusers located on the bottom of the pond to move large amounts of water from the bottom of the pond to the surface where it then absorbs oxygen from the atmosphere. This then results in the elimination of the conditions that can cause algae to grow, and results in a cleaner, healthier pond.

The aeration system will moderate the cost for future aquatic weed and algae control. It also requires little or no maintenance and uses a small amount of electrical power each month.

We appreciate your business and look forward to working with you on the restoration and maintenance of your pond at Orange Lake in New Port Richey. If you have any questions regarding this proposal or any of our other services please do not hesitate to call me at 727-359-2044.

Sincerely,

Tony Smith

Tony Smith
Regional Manager

BAS/neg

American Ecosystems, Inc.

AQUATIC MANAGEMENT SERVICES
P.O. Box 40517
St. Petersburg, FL 33743-0517
Phone (727) 545-4404 • Fax (727) 545-0770

FOUNTAIN & AERATION SYSTEM SALES AGREEMENT

This agreement, made this ________ day of ____________ 20 _____ is between American Ecosystems, Inc., a Florida Corporation, hereafter called "CONTRACTOR" and

NAME ______________________________

ADDRESS ______________________________

CITY ____________ STATE ________ ZIP ____________ PHONE (_____) ____________

hereinafter called "CUSTOMER".

The parties hereto agree as follows:

1) Contractor agrees to install or supply the following equipment in accordance with the terms and conditions of this Agreement in the following location(s):
One pond under the control and supervision of Public Works Operation Center (Orange Lake) located in New Port Richey, Florida.
Delivery and installation of one (1) aeration system consisting of one: 3/4-HP, 220v compressor with four air diffusion stations. Includes a one year parts & 90 day labor guarantee excluding: damage caused by vandalism, unauthorized repairs and acts of God.** Yearly inspection and maintenance will be provided at an additional $175.00 to change carbon vein kit and filter.**

2) CUSTOMER agrees to pay AMERICAN ECOSYSTEMS, INC., its agents or assigns, the following sum for specified equipment:

a.	One 3/4-HP, 220v compressor with four air diffusion stations	$	$4,536.00
b.	Yearly inspection and maintenance to change carbon vein kit and filter	$	$175.00
c.	All necessary hardware, self weighted airlines	$	Included
d.	Professional installation and system testing	$	Included
e.	One year parts and 90 day labor guarantee	$	Included
		Total $	$4,711.00

A deposit of $2,355.50 shall be due and payable upon execution of this Agreement. The balance shall be payable upon installation, plus any taxes, including sales use taxes, fees or charges that are imposed by any governmental body relating to the service provided under this Agreement. AMERICAN ECOSYSTEMS, INC. considers this sale as made in Florida and is not responsible for the payment of any out-of-state (non-Florida) taxes except as required by law.

3) AMERICAN ECOSYSTEMS, INC. agrees to sell only products with a demonstrated quality and reliability.

4) AMERICAN ECOSYSTEMS, INC. agrees to supply equipment within 30 days, subject to availability, from the date of receipt of this executed Agreement.

5) The offer contained herein shall terminate automatically unless executed and returned by CUSTOMER to CONTRACTOR on or before April 6, 2014.

6) The terms and conditions appearing on the reverse side shall be made a part hereof and are incorporated herein by reference.

AMERICAN ECOSYSTEMS, INC.	CUSTOMER
Signature [signature]	Signature ____________
Printed Name Kevin R. Youngberg, President	Printed Name ____________
Dated March 6, 2014	Dated ____________

White - American Ecosystems, Inc. Yellow - Customer Pink - File

1) Equipment sold by CONTRACTOR, exclusive of electric lamp bulbs, is warranted to be free from defects in materials and workmanship for a period of one year from receipt of equipment by CUSTOMER. The liability is limited to the repair or replacement of such items deemed by CONTRACTOR to be defective and will not include items damaged by misuse, vandalism, acts of God or other causes. Unless equipment was installed by CONTRACTOR within Florida, it is understood that purchaser shall deliver such defective items to CONTRACTOR for repair and bear all shipping costs to and from site. Any repairs, alterations or modifications made by anyone other than an authorized representative of CONTRACTOR will void the warranty. Warranty work will not be performed or paid for by the CONTRACTOR unless all past due balances are paid in full.

2) Items not covered under our warranty will be treated and billed as regular service calls. Examples of non-warranty work include cleaning of light lenses, unclogging of nozzles and filters, valve adjustments, resetting tripped breakers and other common maintenance items.

3) **CUSTOMER shall be responsible for providing proper electrical power and performing electrical hookups.** All electrical work shall meet all applicable governmental requirements. Said power shall be supplied to a designated site agreed upon by CONTRACTOR and CUSTOMER and generally within 25' or less of lake or pool edge. In all cases, power supplied should be in accordance with Article 680 and other appropriate provisions of the National Electrical Code including the use of ground fault circuit interrupter type breakers on each submersible equipment circuit above 15 volts between conductors. It shall be CUSTOMER's responsibility to ensure that proposed equipment to be supplied by CONTRACTOR meets all other governmental standards including but not limited to local electrical codes, building codes, etc. Additionally, CUSTOMER SHALL be responsible for obtaining any necessary permits.

4) Due to possible electrical shock hazards resulting from improper functioning of defective equipment, CONTRACTOR strongly advises CUSTOMER and other responsible parties to prohibit swimming and wading in pools or bodies of water in which electrical equipment has been installed. <u>Posted notice is advised</u>.

5) The CONTRACTOR does not assume any liability whatsoever for damages, losses or conditions arising from improper use or maintenance of equipment installed by CONTRACTOR. Furthermore, CONTRACTOR assumes no liability whatsoever for damages, losses or conditions arising from equipment purchased from CONTRACTOR and improperly installed, used, or maintained by CUSTOMER or others.

6) Neither party shall be responsible in damages, penalties or otherwise for any failure or delay in the performance of any of its obligations hereunder caused by strikes, riots, war, acts of God, accidents, governmental orders and regulations, curtailment or failure to obtain sufficient materials, or other force majeure condition (whether or not of the same class or kind as those set forth above) beyond its reasonable control and which, by the exercise of due diligence, it is unable to overcome.

7) CONTRACTOR agrees to hold CUSTOMER harmless from any loss, damage or claims arising out of the sole negligence of CONTRACTOR. However, CONTRACTOR shall in no event be liable to CUSTOMER, or others, for indirect, special or consequential damages.

8) CONTRACTOR, at its expense, shall maintain the following insurance coverages: A) Comprehensive General Liability, including Products Liability and Completed Operations in the amount of $2,000,000 and B) Automobile and Watercraft Liability. **Customers requesting to be named as Additional Insured or requesting Hold Harmless statements will be billed an additional amount to cover cost of providing such additional coverage.**

9) This Agreement may not be terminated except by mutual written agreement of both parties. Termination will require a charge equal to time and materials expended up to time of cancellation.

10) This Agreement is not assignable by CUSTOMER except upon prior written consent by CONTRACTOR.

11) This Agreement constitutes the entire agreement of the parties hereto and no oral or written alterations or modifications of the terms combined herein shall be valid unless made in writing and accepted by an authorized representative of both CONTRACTOR and CUSTOMER.

12) All notices required hereunder shall be sent certified mail, return receipt requested to the address of CUSTOMER and CONTRACTOR as set forth on page one of this Agreement. Either party may change the address to which notices are sent by written notice sent to the address set forth on page 1 in the manner provided therein.

13) This Agreement shall be governed by the laws of the State of Florida.

Steve Wasson

#7- ORANGE LAKE

From: Monte Ritter
Sent: Monday, November 04, 2013 3:31 PM
To: Steve Wasson
Cc: David Sauskojus
Subject: Pre App Notes for City of New Port Richey Master Drainage
Attachments: 10-29-13 0745am PA 400614 City of New Port Richey Master Drainage.pdf

Steve,

Please find the attached notes from our meeting last week.

Also, regarding to your inquiry on our other pre-app meeting held on July 16, 2013, Individual ERP's will now be required for both the proposed Orange Lake outfall pipe and the Madison Avenue storm sewer projects. The fees for these two projects will be $2184 and $273, respectively, if submitted online. Also safety gratings will be required at the end of the proposed 48"x76" Orange Lake outfall pipe.

Let me know f you have any questions.

Thanks,
Monte

Monte G. Ritter, P.E.
Senior Professional Engineer
Environmental Resource Permit Bureau
Regulation Division
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604
352-796-7211 x 4351
800-423-1476 x 4351 (Florida only)
Monte.Ritter@swfwmd.state.fl.us
WaterMatters.org/ePermitting

516-0043-30.04 epn 536

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT RESOURCE REGULATION DIVISION PRE-APPLICATION MEETING NOTES	FILE NUMBER: PA 400327

Date:	7/16/2013
Time:	11:00
Project Name:	City of New Port Richey – Multiple Projects
Attendees:	Monte Ritter, David Sauskojus; Vinay Goel, Steve Wasson

County:	Pasco	**Sec/Twp/Rge:**	1. 05/26/16, 2. 8/26/16, 9/26/16
Total Land Acreage: 1. >10 acres 2. >10 acres		**Project Acreage:**	1. 0.3 acres, 2. 0.3 acres

Prior On-Site/Off-Site Permit Activity: 1. 47006835.001, 2. No prior permits
- NPR Item # 7 (Orange Lake), 13 (Madison Street)

Project Overview:
- 2 projects: 1. Orange Lake – Add third 48"x 76" outfall pipe from Orange Lake to tidal portion of Pithlachascotee River. 2. Madison Avenue Storm Sewer to reduce street flooding prior to discharge to non tidal portion of Pithlachascotee River

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)

#7
- 1. Pithlachascotee River is SSL. Will need Consent by Rule or Letter of Consent for work at outfall of pipe. Orange Lake is not SSL (waffle letter from FDEP in past). Will be some wetland/sw impacts in both river and lake. Will need wetland line done for lake, unless can establish that previous permit has acceptable line. Probably minor enough so no mitigation required. This will depend on amount of impact to lake. River will only be temp construction impact.
- 2. No wetlands or SW's within this pipe installation project.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)
- 1 and 2 – Pithlachascotee River Watershed. Use results from 1996 study for boundary conditions.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- 1. Attenuation not required for discharges to tidal portion of Pithlachascotee River. Demonstrate that discharges will not cause harmful erosion or shoaling from a 25-year, 24-hour storm event.
- 2. Attenuate peak discharge rate from 25-year, 24-hour storm and demonstrate that the project will not increase flood stages up- or down-stream of the project area(s) from storm events up to and including the 100-year, 24-hour event.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- 1. and 2. Water quality treatment not necessary for pipe installation.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- 1. Pithlachascotee River will be involved with minor temporary construction. Authorization will be linked to ERP Gen.
- 2. N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- The permit must be issued to the property owner(s).
- Provide detailed construction surface water management plan.

Application Type and Fee Required:
- 1. General Construction ERP – Sections A, C and E of the ERP Application. $1456.00
- 2. General Construction ERP – Sections A, C and E of the ERP Application. $0.00

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Steve Wasson

From: David Sauskojus
Sent: Thursday, November 14, 2013 2:13 PM
To: swasson@fldesign.com
Subject: Manatee Exclusion Devices
Attachments: manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org
WaterMatters.org/ePermitting

Florida Fish and Wildlife Conservation Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

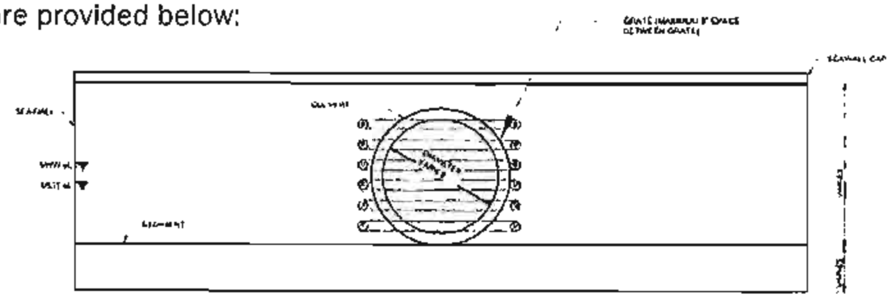
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

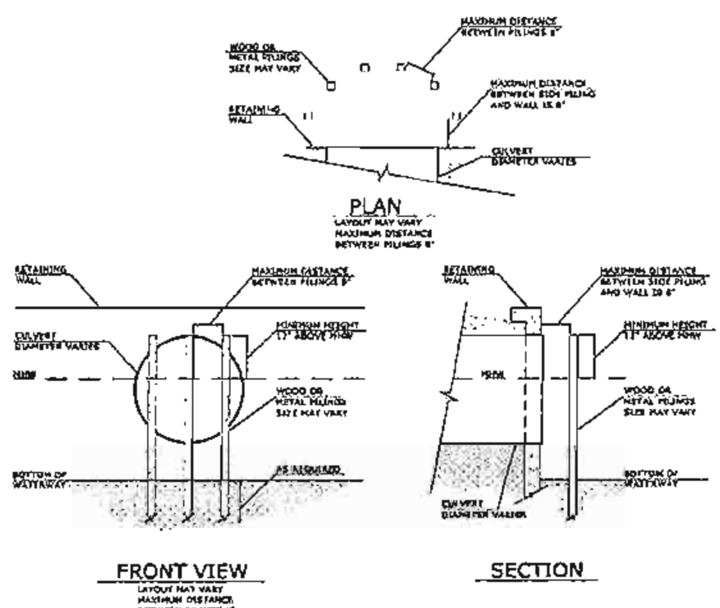
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH
GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER

#7 7-11-13
FINAL

ORNAGE LAKE WEIR REHABILITATION SUMMARY (WITHOUT FLAP GATES)					
			PEAK STAGE DIFF.		PIPE/WEIR
PRE EXISTING	PEAK STAGE	25 YR	6.68		42" RCP
		100 YR	8.83		IRREGULAR
	DISCHARGE	25 YR	178		48"x76" ERCP
		100 YR	229		104"x36"
POST WEIR ON 3 SIDES	PEAK STAGE	25 YR	6.70	0.0	42" RCP
		100 YR	8.56	-0.3	156"
	DISCHARGE	25 YR	190		48"x76" ERCP
		100 YR	246		176"
POST 200' WIDE WEIR	PEAK STAGE	25 YR	6.63	0.0	42" RCP
		100 YR	8.51	-0.3	2400"
	DISCHARGE	25 YR	189		48"x76" ERCP
		100 YR	246		176"
POST ADD 48x76" PIPE	PEAK STAGE	25 YR	5.55	-1.1	42" RCP
		100 YR	6.53	-2.3	156"
	DISCHARGE	25 YR	217		48"x76" ERCP
		100 YR	297		(2) 176"
POST REPLACE 42" TO 48"x76"	PEAK STAGE	25 YR	5.99	-0.7	48"x76" ERCP
		100 YR	7.14	-1.7	176"
	DISCHARGE	25 YR	210		48"x76" ERCP
		100 YR	284		176"
POST 50' WIDE WEIR	PEAK STAGE	25 YR	6.82	0.1	42" RCP
		100 YR	8.86	0.0	600"
	DISCHARGE	25 YR	183		48"x76" ERCP
		100 YR	236		176"
POST ONE BOX	PEAK STAGE	25 YR	6.50	-0.2	42" RCP 48"x76" ERCP
		100 YR	8.36	-0.5	
	DISCHARGE	25 YR	189		
		100 YR	249		300"

7-11-13

ORNAGE LAKE WEIR REHABILITATION SUMMARY
(WITH FLAP GATES)

			PEAK STAGE DIFF.		PIPE/WEIR
PRE EXISTING	PEAK STAGE	25 YR	6.68	0.0	42" RCP
PRE EXISTING	PEAK STAGE	100 YR	8.83	0.0	IRREGULAR
PRE EXISTING	DISCHARGE	25 YR	178		48"x76" ERCP
PRE EXISTING	DISCHARGE	100 YR	229		104"x36"
POST WEIR ON 3 SIDES	PEAK STAGE	25 YR	6.70	0.0	42" RCP
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POST ONE BOX	DISCHARGE	25 YR	189		
POST ONE BOX	DISCHARGE	100 YR	249		300"

ORANGE LAKE DATA

- **<u>42" RCP</u>**

  INV = 0.87 +3.5' = Crown at 4.37
  Weir = 3.94

- **<u>48' x 76" ERCP</u>**

  INV = 0.49 + 4.0' = Crown at 4.49
  Weir = 3.90

- **<u>River</u>**

25 Yr =	6.6 (1996)
100 Yr =	10.0 (1996)
High Tide =	2.6
Low Tide =	-1.0
Wall Cap =	5.25

516-0043.0002, Orange Lake - #7, EPN 536

ORANGE LAKE WEIR REHABILITATION - PRE MODEL
WITHOUT FLAP GATES
INPUTS

Basins

Name: SYSTEM11
Group: BASE

Node: POND
Type: SCS Unit Hydrograph CN

Status: Onsite

Unit Hydrograph: Uh256
Rainfall File: Flmod
Rainfall Amount(in): 0.000
Area(ac): 127.100
Curve Number: 78.90
DCIA(%): 0.00

Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 60.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

Nodes

Name: POND
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Stage(ft)	Area(ac)
2.000	2.0000
3.000	2.1000
4.000	2.2000
5.000	2.3000
6.000	2.4000
7.000	2.6000
8.000	2.7000
9.000	2.8000
10.000	2.9000

Name: RIVER
Group: BASE
Type: Time/Stage

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Time(hrs)	Stage(ft)
0.00	2.600
48.00	6.600

Cross Sections

Name: 42WEIR
Encroachment: No

Group: BASE

Station(ft)	Elevation(ft)	Manning's N
0.000	5.490	0.011000
3.200	5.490	0.011000
4.700	3.940	0.011000
11.300	3.940	0.011000
12.800	5.490	0.011000
16.000	5.490	0.011000

Drop Structures

Name: POND-DS-N
Group: BASE

From Node: POND
To Node: RIVER

Length(ft): 707.00
Count: 1

```
              UPSTREAM       DOWNSTREAM                    Friction Equation: Average Conveyance
   Geometry: Circular       Circular                     Solution Algorithm: Automatic
    Span(in): 42.00          42.00                                     Flow: Both
    Rise(in): 42.00          42.00                        Entrance Loss Coef: 0.500
  Invert(ft): 0.870          -0.470                           Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000          0.000                           Solution Incs: 10

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

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


*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                               TABLE
               Count: 1                        Bottom Clip(ft): 0.000
                Type: Vertical: Mavis             Top Clip(ft): 0.000
                Flow: Both                      Weir Disc Coef: 3.200
            Geometry: Irregular              Orifice Disc Coef: 0.600

       Cross Section: 42WEIR                  Control Elev(ft): 3.940
          Invert(ft): 3.940           Struct Opening Dim(ft): 9999.00

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                               TABLE
               Count: 1                        Bottom Clip(in): 0.000
                Type: Vertical: Mavis             Top Clip(in): 0.000
                Flow: Both                      Weir Disc Coef: 3.200
            Geometry: Circular               Orifice Disc Coef: 0.600

            Span(in): 4.00                          Invert(ft): 2.560
            Rise(in): 4.00                    Control Elev(ft): 2.560

------------------------------------------------------------------------------------------------------
        Name: POND-DS-S            From Node: POND                 Length(ft): 704.00
       Group: BASE                   To Node: RIVER                     Count: 1

              UPSTREAM       DOWNSTREAM                    Friction Equation: Average Conveyance
    Geometry: Horz Ellipse   Horz Ellipse                Solution Algorithm: Automatic
    Span(in): 76.00          76.00                                     Flow: Both
    Rise(in): 48.00          48.00                        Entrance Loss Coef: 0.500
  Invert(ft): 0.490          -1.560                           Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000          0.000                           Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                               TABLE
               Count: 1                        Bottom Clip(in): 0.000
                Type: Horizontal                  Top Clip(in): 0.000
                Flow: Both                      Weir Disc Coef: 3.200
            Geometry: Rectangular            Orifice Disc Coef: 0.600

            Span(in): 104.00                        Invert(ft): 3.900
            Rise(in): 36.00                   Control Elev(ft): 3.900

==================================================================================================
==== Hydrology Simulations =======================================================================
==================================================================================================
```

```
         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

```
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

```
==============================================================================
==== Routing Simulations =====================================================
==============================================================================

         Name: 100YR24HR           Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages: 100YR24HR                 Boundary Flows:


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

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

```
         Name: 25YR24HR            Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                     End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:


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

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

==== Boundary Conditions ====

Name: 100YR24HR Node: RIVER Type: Stage

Time(hrs)	Stage(ft)
0.000	2.600
72.000	10.000

ORANGE LAKE WEIR REHABILITATION - PRE MODEL
WITHOUT FLAP GATES
BASIN SUMMARY

```
           Basin Name: SYSTEM11
           Group Name: BASE
           Simulation: 100YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 8.00
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 12.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 60.00
     Time Shift (hrs): 0.00
            Area (ac): 127.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 78.900
             DCIA (%): 0.000

       Time Max (hrs): 12.67
       Flow Max (cfs): 322.02
   Runoff Volume (in): 9.288
  Runoff Volume (ft3): 4285424
```

```
           Basin Name: SYSTEM11
           Group Name: BASE
           Simulation: 25YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 8.00
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 60.00
     Time Shift (hrs): 0.00
            Area (ac): 127.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 78.900
             DCIA (%): 0.000

       Time Max (hrs): 12.67
       Flow Max (cfs): 224.39
   Runoff Volume (in): 6.427
  Runoff Volume (ft3): 2965327
```

ORANGE LAKE WEIR REHABILITATION - PRE MODEL
WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.41	8.83	10.00	0.0050	121230	12.67	322.02	13.38	229.01
RIVER	BASE	100YR24HR	24.01	5.07	10.00	0.0017	0	13.38	229.01	0.00	0.00
POND	BASE	25YR24HR	13.21	6.68	10.00	0.0050	110472	12.67	224.38	13.19	178.19
RIVER	BASE	25YR24HR	24.00	4.60	10.00	0.0014	0	13.19	178.19	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - PRE MODEL
WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-N	BASE	100YR24HR	13.38	74.22	0.151	13.41	8.83	24.01	5.07
POND-DS-S	BASE	100YR24HR	13.38	154.79	0.397	13.41	8.83	24.01	5.07
POND-DS-N	BASE	25YR24HR	13.19	56.96	0.173	13.21	6.68	24.00	4.60
POND-DS-S	BASE	25YR24HR	13.19	121.24	-1.195	13.21	6.68	24.00	4.60

ORANGE LAKE WEIR REHABILITATION - POST MODEL
WEIR ON THREE SIDES OF 42" DROP STRUCTURE - WITHOUT FLAP GATES
INPUTS

==== Basins ====

```
        Name: SYSTEM11                   Node: POND                 Status: Onsite
       Group: BASE                       Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                 Peaking Factor: 256.0
         Rainfall File: Flmod             Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000              Time of Conc(min): 60.00
              Area(ac): 127.100              Time Shift(hrs): 0.00
          Curve Number: 80.20           Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00
```

==== Nodes ====

```
      Name: POND                Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                               Warn Stage(ft): 10.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
2.000	2.0000
3.000	2.1000
4.000	2.2000
5.000	2.3000
6.000	2.4000
7.000	2.6000
8.000	2.7000
9.000	2.8000
10.000	2.9000

```
      Name: RIVER               Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                               Warn Stage(ft): 10.000
      Type: Time/Stage
```

Time(hrs)	Stage(ft)
0.00	2.600
48.00	6.600

==== Drop Structures ====

```
        Name: POND-DS-N            From Node: POND             Length(ft): 707.00
       Group: BASE                   To Node: RIVER                 Count: 1

              UPSTREAM        DOWNSTREAM              Friction Equation: Average Conveyance
    Geometry: Circular        Circular               Solution Algorithm: Automatic
    Span(in): 42.00           42.00                                Flow: Both
    Rise(in): 42.00           42.00                  Entrance Loss Coef: 0.500
  Invert(ft): 0.870           -0.470                     Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000           0.000                    Solution Incs: 10
```

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

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

```
*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                    TABLE
            Count: 1                      Bottom Clip(in): 0.000
             Type: Vertical: Mavis           Top Clip(in): 0.000
             Flow: Both                    Weir Disc Coef: 3.200
         Geometry: Rectangular           Orifice Disc Coef: 0.600

         Span(in): 156.00                       Invert(ft): 3.940
         Rise(in): 999.00                 Control Elev(ft): 3.940

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                    TABLE
            Count: 1                      Bottom Clip(in): 0.000
             Type: Vertical: Mavis           Top Clip(in): 0.000
             Flow: Both                    Weir Disc Coef: 3.200
         Geometry: Circular              Orifice Disc Coef: 0.600

         Span(in): 4.00                         Invert(ft): 2.560
         Rise(in): 4.00                   Control Elev(ft): 2.560

--------------------------------------------------------------------------------------------

     Name: POND-DS-S           From Node: POND              Length(ft): 704.00
    Group: BASE                  To Node: RIVER                  Count: 1

            UPSTREAM         DOWNSTREAM             Friction Equation: Average Conveyance
   Geometry: Horz Ellipse    Horz Ellipse          Solution Algorithm: Automatic
   Span(in): 76.00           76.00                               Flow: Both
   Rise(in): 48.00           48.00                  Entrance Loss Coef: 0.500
 Invert(ft): 0.490           -1.560                     Exit Loss Coef: 0.500
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 dn
Bot Clip(in): 0.000          0.000                    Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                    TABLE
            Count: 1                      Bottom Clip(in): 0.000
             Type: Vertical: Mavis           Top Clip(in): 0.000
             Flow: Both                    Weir Disc Coef: 3.200
         Geometry: Rectangular           Orifice Disc Coef: 0.600

         Span(in): 176.00                       Invert(ft): 3.900
         Rise(in): 999.00                 Control Elev(ft): 3.900


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

     Name: 100YR24HR
 Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
        Rainfall File: Flmod
   Rainfall Amount(in): 12.00

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

--------------------------------------------------------------------------------------------
     Name: 25YR24HR
 Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
```

```
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

         Name: 100YR24HR           Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages: 100YR24HR                 Boundary Flows:


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

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

--------------------------------------------------------------------------------------
         Name: 25YR24HR            Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


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

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

==============================================================================
==== Boundary Conditions =====================================================
==============================================================================

      Name: 100YR24HR            Node: RIVER                 Type: Stage

      Time(hrs)       Stage(ft)
--------------- ---------------
          0.000           2.600
         72.000          10.000
```

```
            Basin Name: SYSTEM11
            Group Name: BASE
            Simulation: 100YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 8.00
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 12.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 60.00
      Time Shift (hrs): 0.00
             Area (ac): 127.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 80.200
              DCIA (%): 0.000

        Time Max (hrs): 12.67
        Flow Max (cfs): 327.27
    Runoff Volume (in): 9.465
   Runoff Volume (ft3): 4366956
```

```
            Basin Name: SYSTEM11
            Group Name: BASE
            Simulation: 25YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 8.00
   Comp Time Inc (min): 5.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 60.00
      Time Shift (hrs): 0.00
             Area (ac): 127.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 80.200
              DCIA (%): 0.000

        Time Max (hrs): 12.67
        Flow Max (cfs): 229.63
    Runoff Volume (in): 6.587
   Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
WEIR ON THREE SIDES OF 42" DROP STRUCTURE - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.30	8.56	10.00	0.0050	120056	12.67	327.27	13.28	245.94
RIVER	BASE	100YR24HR	24.01	5.07	10.00	0.0017	0	13.28	245.94	0.00	0.00
POND	BASE	25YR24HR	13.14	6.70	10.00	0.0050	110602	12.67	229.63	13.12	190.04
RIVER	BASE	25YR24HR	23.99	4.60	10.00	0.0014	0	13.12	190.04	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
WEIR ON THREE SIDES OF 42" DROP STRUCTURE - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-N	BASE	100YR24HR	13.28	72.07	-0.252	13.30	8.56	24.01	5.07
POND-DS-S	BASE	100YR24HR	13.28	173.87	-1.316	13.30	8.56	24.01	5.07
POND-DS-N	BASE	25YR24HR	13.11	57.43	-0.528	13.14	6.70	23.99	4.60
POND-DS-S	BASE	25YR24HR	13.13	132.61	1.664	13.14	6.70	23.99	4.60

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

        Name: SYSTEM11                  Node: POND                   Status: Onsite
       Group: BASE                      Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                 Peaking Factor: 256.0
         Rainfall File: Flmod            Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000              Time of Conc(min): 60.00
              Area(ac): 127.100              Time Shift(hrs): 0.00
          Curve Number: 80.20           Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00

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

     Name: POND                Base Flow(cfs): 0.000          Init Stage(ft): 2.600
    Group: BASE                                               Warn Stage(ft): 10.000
     Type: Stage/Area


     Stage(ft)        Area(ac)
--------------- ---------------
         2.000          2.0000
         3.000          2.1000
         4.000          2.2000
         5.000          2.3000
         6.000          2.4000
         7.000          2.6000
         8.000          2.7000
         9.000          2.8000
        10.000          2.9000

------------------------------------------------------------------------------------------
     Name: RIVER               Base Flow(cfs): 0.000          Init Stage(ft): 2.600
    Group: BASE                                               Warn Stage(ft): 10.000
     Type: Time/Stage


     Time(hrs)       Stage(ft)
--------------- ---------------
          0.00           2.600
         48.00           6.600

==========================================================================================
==== Drop Structures =====================================================================
==========================================================================================

       Name: POND-DS-N            From Node: POND                  Length(ft): 707.00
      Group: BASE                   To Node: RIVER                     Count: 1

               UPSTREAM        DOWNSTREAM                 Friction Equation: Average Conveyance
     Geometry: Circular        Circular                  Solution Algorithm: Automatic
     Span(in): 42.00           42.00                                   Flow: Both
     Rise(in): 42.00           42.00                     Entrance Loss Coef: 0.500
   Invert(ft): 0.870           -0.470                        Exit Loss Coef: 0.500
  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 dn
 Bot Clip(in): 0.000           0.000                        Solution Incs: 10

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

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

```
*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                         TABLE
             Count: 1                       Bottom Clip(in): 0.000
              Type: Vertical: Mavis            Top Clip(in): 0.000
              Flow: Both                     Weir Disc Coef: 3.200
          Geometry: Rectangular           Orifice Disc Coef: 0.600

          Span(in): 2400.00                     Invert(ft): 3.940
          Rise(in): 999.00                Control Elev(ft): 3.940

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                         TABLE
             Count: 1                       Bottom Clip(in): 0.000
              Type: Vertical: Mavis            Top Clip(in): 0.000
              Flow: Both                     Weir Disc Coef: 3.200
          Geometry: Circular              Orifice Disc Coef: 0.600

          Span(in): 4.00                        Invert(ft): 2.560
          Rise(in): 4.00                  Control Elev(ft): 2.560

--------------------------------------------------------------------------------------------
      Name: POND-DS-S           From Node: POND                Length(ft): 704.00
     Group: BASE                  To Node: RIVER                    Count: 1

            UPSTREAM        DOWNSTREAM           Friction Equation: Average Conveyance
  Geometry: Horz Ellipse    Horz Ellipse        Solution Algorithm: Automatic
  Span(in): 76.00           76.00                             Flow: Both
  Rise(in): 48.00           48.00               Entrance Loss Coef: 0.500
Invert(ft): 0.490           -1.560                  Exit Loss Coef: 0.500
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 dn
Bot Clip(in): 0.000         0.000                  Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                         TABLE
             Count: 1                       Bottom Clip(in): 0.000
              Type: Vertical: Mavis            Top Clip(in): 0.000
              Flow: Both                     Weir Disc Coef: 3.200
          Geometry: Rectangular           Orifice Disc Coef: 0.600

          Span(in): 176.00                      Invert(ft): 3.900
          Rise(in): 999.00                Control Elev(ft): 3.900


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

       Name: 100YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 12.00

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

--------------------------------------------------------------------------------------------
       Name: 25YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
```

```
        Rainfall File: Flmod
   Rainfall Amount(in): 9.00

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

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

        Name: 100YR24HR            Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages: 100YR24HR                Boundary Flows:


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

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

----------------------------------------------------------------------------------
        Name: 25YR24HR             Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


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

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

==================================================================================
==== Boundary Conditions =========================================================
==================================================================================

      Name: 100YR24HR             Node: RIVER                Type: Stage

      Time(hrs)       Stage(ft)
---------------  ---------------
          0.000            2.600
         72.000           10.000
```

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 327.27
     Runoff Volume (in): 9.465
    Runoff Volume (ft3): 4366956
```

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 229.63
     Runoff Volume (in): 6.587
    Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
200' WIDE WEIR - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.30	8.51	10.00	0.0050	119822	12.67	327.27	13.28	245.88
RIVER	BASE	100YR24HR	23.99	5.07	10.00	0.0017	0	13.28	245.88	0.00	0.00
POND	BASE	25YR24HR	13.14	6.63	10.00	0.0050	110065	12.67	229.63	13.13	189.23
RIVER	BASE	25YR24HR	24.00	4.60	10.00	0.0014	0	13.13	189.23	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
200' WIDE WEIR - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-N	BASE	100YR24HR	13.28	73.11	-0.576	13.30	8.51	23.99	5.07
POND-DS-S	BASE	100YR24HR	13.28	172.76	-1.304	13.30	8.51	23.99	5.07
POND-DS-N	BASE	25YR24HR	13.12	58.76	-0.603	13.14	6.63	24.00	4.60
POND-DS-S	BASE	25YR24HR	13.13	130.47	1.661	13.14	6.63	24.00	4.60

==== Basins ====

Name: SYSTEM11
Group: BASE

Node: POND
Type: SCS Unit Hydrograph CN

Status: Onsite

Unit Hydrograph: Uh256
Rainfall File: Flmod
Rainfall Amount(in): 0.000
Area(ac): 127.100
Curve Number: 80.20
DCIA(%): 0.00

Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 60.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

==== Nodes ====

Name: POND
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Stage(ft)	Area(ac)
2.000	2.0000
3.000	2.1000
4.000	2.2000
5.000	2.3000
6.000	2.4000
7.000	2.6000
8.000	2.7000
9.000	2.8000
10.000	2.9000

Name: RIVER
Group: BASE
Type: Time/Stage

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Time(hrs)	Stage(ft)
0.00	2.600
48.00	6.600

==== Cross Sections ====

Name: 42WEIR
Encroachment: No

Group: BASE

Station(ft)	Elevation(ft)	Manning's N
0.000	5.490	0.011000
3.200	5.490	0.011000
4.700	3.940	0.011000
11.300	3.940	0.011000
12.800	5.490	0.011000
16.000	5.490	0.011000

==== Drop Structures ====

Name: POND-DS-3
Group: BASE

From Node: POND
To Node: RIVER

Length(ft): 700.00
Count: 1

```
              UPSTREAM        DOWNSTREAM                  Friction Equation: Average Conveyance
     Geometry: Horz Ellipse   Horz Ellipse               Solution Algorithm: Automatic
     Span(in): 76.00          76.00                                    Flow: Both
     Rise(in): 48.00          48.00                      Entrance Loss Coef: 0.500
   Invert(ft): 0.870          -1.560                         Exit Loss Coef: 0.500
  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 dn
 Bot Clip(in): 0.000          0.000                           Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-3 ***
                                                                            TABLE
                 Count: 1                       Bottom Clip(in): 0.000
                  Type: Vertical: Mavis            Top Clip(in): 0.000
                  Flow: Both                     Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 176.00                       Invert(ft): 3.900
              Rise(in): 999.00                 Control Elev(ft): 3.900

--------------------------------------------------------------------------------------------
         Name: POND-DS-N           From Node: POND            Length(ft): 707.00
        Group: BASE                  To Node: RIVER                Count: 1

              UPSTREAM        DOWNSTREAM                  Friction Equation: Average Conveyance
     Geometry: Circular       Circular                   Solution Algorithm: Automatic
     Span(in): 42.00          42.00                                    Flow: Both
     Rise(in): 42.00          42.00                      Entrance Loss Coef: 0.500
   Invert(ft): 0.870          -0.470                         Exit Loss Coef: 0.500
  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 dn
 Bot Clip(in): 0.000          0.000                           Solution Incs: 10

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

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


*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                            TABLE
                 Count: 1                       Bottom Clip(in): 0.000
                  Type: Vertical: Mavis            Top Clip(in): 0.000
                  Flow: Both                     Weir Disc Coef: 3.200
              Geometry: Rectangular           Orifice Disc Coef: 0.600

              Span(in): 156.00                       Invert(ft): 3.940
              Rise(in): 999.00                 Control Elev(ft): 3.940

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                            TABLE
                 Count: 1                       Bottom Clip(in): 0.000
                  Type: Vertical: Mavis            Top Clip(in): 0.000
                  Flow: Both                     Weir Disc Coef: 3.200
              Geometry: Circular              Orifice Disc Coef: 0.600

              Span(in): 4.00                         Invert(ft): 2.560
              Rise(in): 4.00                   Control Elev(ft): 2.560

--------------------------------------------------------------------------------------------
         Name: POND-DS-S           From Node: POND            Length(ft): 704.00
        Group: BASE                  To Node: RIVER                Count: 1
```

```
               UPSTREAM          DOWNSTREAM                   Friction Equation: Average Conveyance
     Geometry: Horz Ellipse     Horz Ellipse                Solution Algorithm: Automatic
     Span(in): 76.00            76.00                                     Flow: Both
     Rise(in): 48.00            48.00                       Entrance Loss Coef: 0.500
   Invert(ft): 0.490            -1.560                          Exit Loss Coef: 0.500
  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 dn
 Bot Clip(in): 0.000            0.000                            Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                                 TABLE
                  Count: 1                          Bottom Clip(in): 0.000
                   Type: Vertical: Mavis               Top Clip(in): 0.000
                   Flow: Both                       Weir Disc Coef: 3.200
               Geometry: Rectangular             Orifice Disc Coef: 0.600

               Span(in): 176.00                         Invert(ft): 3.900
               Rise(in): 999.00                   Control Elev(ft): 3.900


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

        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
           Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

----------------------------------------------------------------------------------------------------------
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

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

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages: 100YR24HR                Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 25YR24HR Hydrology Sim: 25YR24HR
Filename: K:\536\ProjData\DxnData\ICPR\25YR24HR.I32

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

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

==== Boundary Conditions ====

Name: 100YR24HR Node: RIVER Type: Stage

Time(hrs)	Stage(ft)
0.000	2.600
72.000	10.000

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 327.27
     Runoff Volume (in): 9.465
    Runoff Volume (ft3): 4366956
```

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 229.63
     Runoff Volume (in): 6.587
    Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
3RD 48"x76" PIPE - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	12.95	6.53	10.00	0.0050	109167	12.67	327.27	12.94	297.13
RIVER	BASE	100YR24HR	24.01	5.07	10.00	0.0017	0	12.94	297.13	0.00	0.00
POND	BASE	25YR24HR	12.87	5.55	10.00	0.0050	102577	12.66	229.62	12.87	216.92
RIVER	BASE	25YR24HR	24.00	4.60	10.00	0.0014	0	12.87	216.92	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
3RD 48"x76" PIPE - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-3	BASE	100YR24HR	12.94	121.98	0.312	12.95	6.53	24.01	5.07
POND-DS-N	BASE	100YR24HR	12.93	53.32	0.196	12.95	6.53	24.01	5.07
POND-DS-S	BASE	100YR24HR	12.94	121.83	-1.101	12.95	6.53	24.01	5.07
POND-DS-3	BASE	25YR24HR	12.87	88.43	0.332	12.87	5.55	24.00	4.60
POND-DS-N	BASE	25YR24HR	12.85	43.86	-0.541	12.87	5.55	24.00	4.60
POND-DS-S	BASE	25YR24HR	12.87	84.63	1.391	12.87	5.55	24.00	4.60

==== Basins ====

Name: SYSTEM11
Group: BASE

Node: POND
Type: SCS Unit Hydrograph CN

Status: Onsite

Unit Hydrograph: Uh256
Rainfall File: Flmod
Rainfall Amount(in): 0.000
Area(ac): 127.100
Curve Number: 80.20
DCIA(%): 0.00

Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 60.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

==== Nodes ====

Name: POND
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Stage(ft)	Area(ac)
2.000	2.0000
3.000	2.1000
4.000	2.2000
5.000	2.3000
6.000	2.4000
7.000	2.6000
8.000	2.7000
9.000	2.8000
10.000	2.9000

Name: RIVER
Group: BASE
Type: Time/Stage

Base Flow(cfs): 0.000

Init Stage(ft): 2.600
Warn Stage(ft): 10.000

Time(hrs)	Stage(ft)
0.00	2.600
48.00	6.600

==== Drop Structures ====

Name: POND-DS-N
Group: BASE

From Node: POND
To Node: RIVER

Length(ft): 707.00
Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Horz Ellipse	Horz Ellipse
Span(in):	48.00	48.00
Rise(in):	76.00	76.00
Invert(ft):	0.870	-0.470
Manning's N:	0.012000	0.012000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.500
Exit Loss Coef: 0.500
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Solution Incs: 10

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

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

```
*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                        TABLE
               Count: 1                  Bottom Clip(in): 0.000
                Type: Vertical: Mavis       Top Clip(in): 0.000
                Flow: Both                Weir Disc Coef: 3.200
            Geometry: Rectangular      Orifice Disc Coef: 0.600

            Span(in): 176.00                 Invert(ft): 3.900
            Rise(in): 999.00           Control Elev(ft): 3.900

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                        TABLE
               Count: 1                  Bottom Clip(in): 0.000
                Type: Vertical: Mavis       Top Clip(in): 0.000
                Flow: Both                Weir Disc Coef: 3.200
            Geometry: Circular         Orifice Disc Coef: 0.600

            Span(in): 4.00                   Invert(ft): 2.560
            Rise(in): 4.00             Control Elev(ft): 2.560

------------------------------------------------------------------------------------------------------
        Name: POND-DS-S           From Node: POND             Length(ft): 704.00
       Group: BASE                  To Node: RIVER                 Count: 1

              UPSTREAM       DOWNSTREAM               Friction Equation: Average Conveyance
    Geometry: Horz Ellipse   Horz Ellipse            Solution Algorithm: Automatic
    Span(in): 76.00          76.00                                 Flow: Both
    Rise(in): 48.00          48.00                   Entrance Loss Coef: 0.500
  Invert(ft): 0.490          -1.560                      Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000          0.000                       Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                        TABLE
               Count: 1                  Bottom Clip(in): 0.000
                Type: Vertical: Mavis       Top Clip(in): 0.000
                Flow: Both                Weir Disc Coef: 3.200
            Geometry: Rectangular      Orifice Disc Coef: 0.600

            Span(in): 176.00                 Invert(ft): 3.900
            Rise(in): 999.00           Control Elev(ft): 3.900

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

        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

------------------------------------------------------------------------------------------------------
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
```

```
        Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

         Name: 100YR24HR          Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                      End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages: 100YR24HR                 Boundary Flows:


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

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

----------------------------------------------------------------------------------------------------
         Name: 25YR24HR           Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                      End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:


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

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

==========================================================================================
==== Boundary Conditions =================================================================
==========================================================================================

      Name: 100YR24HR            Node: RIVER                 Type: Stage

      Time(hrs)         Stage(ft)
--------------- ---------------
          0.000           2.600
         72.000          10.000
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
REPLACE 42" PIPE WITH 48"x76" PIPE - WITHOUT FLAP GATES
BASIN SUMMARY

```
           Basin Name: SYSTEM11
           Group Name: BASE
           Simulation: 100YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 8.00
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 12.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 60.00
     Time Shift (hrs): 0.00
            Area (ac): 127.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 80.200
             DCIA (%): 0.000

       Time Max (hrs): 12.67
       Flow Max (cfs): 327.27
   Runoff Volume (in): 9.465
  Runoff Volume (ft3): 4366956
```

```
           Basin Name: SYSTEM11
           Group Name: BASE
           Simulation: 25YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 8.00
  Comp Time Inc (min): 5.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 60.00
     Time Shift (hrs): 0.00
            Area (ac): 127.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 80.200
             DCIA (%): 0.000

       Time Max (hrs): 12.67
       Flow Max (cfs): 229.63
   Runoff Volume (in): 6.587
  Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
REPLACE 42" PIPE WITH 48"x76" PIPE - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.04	7.14	10.00	0.0050	113870	12.67	327.27	13.03	284.25
RIVER	BASE	100YR24HR	24.00	5.07	10.00	0.0017	0	13.03	284.25	0.00	0.00
POND	BASE	25YR24HR	12.95	5.99	10.00	0.0050	104510	12.67	229.63	12.94	209.93
RIVER	BASE	25YR24HR	23.99	4.60	10.00	0.0014	0	12.94	209.93	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
REPLACE 42" PIPE WITH 48"x76" PIPE - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-N	BASE	100YR24HR	13.04	144.33	0.759	13.04	7.14	24.00	5.07
POND-DS-S	BASE	100YR24HR	13.02	139.93	-1.225	13.04	7.14	24.00	5.07
POND-DS-N	BASE	25YR24HR	12.95	103.72	1.074	12.95	5.99	23.99	4.60
POND-DS-S	BASE	25YR24HR	12.93	106.21	1.773	12.95	5.99	23.99	4.60

ORANGE LAKE WEIR REHABILITATION - POST MODEL
50' WIDE WEIR - WITHOUT FLAP GATES
INPUTS

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

        Name: SYSTEM11                       Node: POND                  Status: Onsite
       Group: BASE                           Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                      Peaking Factor: 256.0
         Rainfall File: Flmod                 Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000                  Time of Conc(min): 60.00
              Area(ac): 127.100                   Time Shift(hrs): 0.00
          Curve Number: 80.20              Max Allowable Q(cfs): 999999.000
              DCIA(%): 0.00

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

      Name: POND                 Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                                Warn Stage(ft): 10.000
      Type: Stage/Area

      Stage(ft)        Area(ac)
--------------- ---------------
          2.000          2.0000
          3.000          2.1000
          4.000          2.2000
          5.000          2.3000
          6.000          2.4000
          7.000          2.6000
          8.000          2.7000
          9.000          2.8000
         10.000          2.9000
----------------------------------------------------------------------------------
      Name: RIVER                Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                                Warn Stage(ft): 10.000
      Type: Time/Stage

      Time(hrs)       Stage(ft)
--------------- ---------------
           0.00           2.600
          48.00           6.600

==================================================================================
==== Drop Structures =============================================================
==================================================================================

        Name: POND-DS-N           From Node: POND               Length(ft): 707.00
       Group: BASE                  To Node: RIVER                   Count: 1

              UPSTREAM         DOWNSTREAM             Friction Equation: Average Conveyance
    Geometry: Circular         Circular              Solution Algorithm: Automatic
    Span(in): 42.00            42.00                               Flow: Both
    Rise(in): 42.00            42.00                 Entrance Loss Coef: 0.500
  Invert(ft): 0.870            -0.470                    Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000            0.000                 Solution Incs: 10

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

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

```
*** Weir 1 of 2 for Drop Structure POND-DS-N ***
                                                                          TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 600.00                     Invert(ft): 3.940
             Rise(in): 999.00               Control Elev(ft): 3.940

*** Weir 2 of 2 for Drop Structure POND-DS-N ***
                                                                          TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Circular            Orifice Disc Coef: 0.600

             Span(in): 4.00                       Invert(ft): 2.560
             Rise(in): 4.00                 Control Elev(ft): 2.560

-----------------------------------------------------------------------------------------
        Name: POND-DS-S            From Node: POND              Length(ft): 704.00
       Group: BASE                   To Node: RIVER                  Count: 1

             UPSTREAM        DOWNSTREAM                Friction Equation: Average Conveyance
    Geometry: Circular       Circular                 Solution Algorithm: Automatic
    Span(in): 76.00          76.00                                  Flow: Both
    Rise(in): 48.00          48.00                     Entrance Loss Coef: 0.500
  Invert(ft): 0.490          -1.560                        Exit Loss Coef: 0.500
 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 dn
Bot Clip(in): 0.000          0.000                         Solution Incs: 10

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

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


*** Weir 1 of 1 for Drop Structure POND-DS-S ***
                                                                          TABLE
                Count: 1                     Bottom Clip(in): 0.000
                 Type: Vertical: Mavis          Top Clip(in): 0.000
                 Flow: Both                   Weir Disc Coef: 3.200
             Geometry: Rectangular         Orifice Disc Coef: 0.600

             Span(in): 176.00                     Invert(ft): 3.900
             Rise(in): 999.00               Control Elev(ft): 3.900


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

       Name: 100YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

-----------------------------------------------------------------------------------------
       Name: 25YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
```

```
         Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

         Name: 100YR24HR            Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages: 100YR24HR                  Boundary Flows:


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

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

------------------------------------------------------------------------------------------
         Name: 25YR24HR             Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

==========================================================================================
==== Boundary Conditions =================================================================
==========================================================================================

      Name: 100YR24HR              Node: RIVER                 Type: Stage

      Time(hrs)        Stage(ft)
--------------- ---------------
          0.000           2.600
         72.000          10.000
```

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 327.27
    Runoff Volume (in): 9.465
   Runoff Volume (ft3): 4366956
```

```
             Basin Name: SYSTEM11
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 8.00
    Comp Time Inc (min): 5.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 60.00
       Time Shift (hrs): 0.00
              Area (ac): 127.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 80.200
               DCIA (%): 0.000

         Time Max (hrs): 12.67
         Flow Max (cfs): 229.63
    Runoff Volume (in): 6.587
   Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
50' WIDE WEIR - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.38	8.86	10.00	-0.0050	121374	12.67	327.27	13.35	236.34
RIVER	BASE	100YR24HR	24.00	5.07	10.00	0.0017	0	13.35	236.34	0.00	0.00
POND	BASE	25YR24HR	13.21	6.82	10.00	0.0050	111653	12.67	229.63	13.18	183.19
RIVER	BASE	25YR24HR	24.00	4.60	10.00	0.0014	0	13.18	183.19	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
50' WIDE WEIR - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS-N	BASE	100YR24HR	13.35	75.57	-0.912	13.38	8.86	24.00	5.07
POND-DS-S	BASE	100YR24HR	13.36	160.77	0.291	13.38	8.86	24.00	5.07
POND-DS-N	BASE	25YR24HR	13.18	60.11	-0.994	13.21	6.82	24.00	4.60
POND-DS-S	BASE	25YR24HR	13.19	123.08	-1.590	13.21	6.82	24.00	4.60

ORANGE LAKE WEIR REHABILITATION - POST MODEL
(ASSUME TWO 52" RCPs) ONE BOX - WITHOUT FLAP GATES
INPUTS

==== Basins ====

```
        Name: SYSTEM11                 Node: POND                 Status: Onsite
       Group: BASE                     Type: SCS Unit Hydrograph CN

     Unit Hydrograph: Uh256               Peaking Factor: 256.0
       Rainfall File: Flmod            Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000            Time of Conc(min): 60.00
            Area(ac): 127.100             Time Shift(hrs): 0.00
        Curve Number: 80.20          Max Allowable Q(cfs): 999999.000
             DCIA(%): 0.00
```

==== Nodes ====

```
      Name: POND              Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                             Warn Stage(ft): 10.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
2.000	2.0000
3.000	2.1000
4.000	2.2000
5.000	2.3000
6.000	2.4000
7.000	2.6000
8.000	2.7000
9.000	2.8000
10.000	2.9000

```
      Name: RIVER             Base Flow(cfs): 0.000          Init Stage(ft): 2.600
     Group: BASE                                             Warn Stage(ft): 10.000
      Type: Time/Stage
```

Time(hrs)	Stage(ft)
0.00	2.600
48.00	6.600

==== Drop Structures ====

```
        Name: POND-DS             From Node: POND              Length(ft): 705.00
       Group: BASE                  To Node: RIVER                  Count: 2

              UPSTREAM         DOWNSTREAM              Friction Equation: Average Conveyance
    Geometry: Circular         Circular               Solution Algorithm: Automatic
    Span(in): 52.00            52.00                                Flow: Both
    Rise(in): 52.00            52.00                  Entrance Loss Coef: 0.000
  Invert(ft): 0.870            -1.560                     Exit Loss Coef: 0.000
 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 dn
Bot Clip(in): 0.000            0.000                     Solution Incs: 0
```

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

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

```
*** Weir 1 of 2 for Drop Structure POND-DS ***
                                                                    TABLE
             Count: 1                      Bottom Clip(in): 0.000
              Type: Vertical: Mavis           Top Clip(in): 0.000
              Flow: Both                    Weir Disc Coef: 3.200
          Geometry: Rectangular          Orifice Disc Coef: 0.600

          Span(in): 300.00                      Invert(ft): 3.900
          Rise(in): 999.00                Control Elev(ft): 3.900

*** Weir 2 of 2 for Drop Structure POND-DS ***
                                                                    TABLE
             Count: 1                      Bottom Clip(in): 0.000
              Type: Vertical: Mavis           Top Clip(in): 0.000
              Flow: Both                    Weir Disc Coef: 3.200
          Geometry: Circular             Orifice Disc Coef: 0.600

          Span(in): 4.00                        Invert(ft): 2.560
          Rise(in): 4.00                  Control Elev(ft): 2.560
```

```
================================================================================
==== Hydrology Simulations =====================================================
================================================================================

        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

--------------------------------------------------------------------------------
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

```
================================================================================
==== Routing Simulations =======================================================
================================================================================

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                   End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000            Max Calc Time(sec): 60.0000
       Boundary Stages: 100YR24HR               Boundary Flows:


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

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

```
          Name: 25YR24HR            Hydrology Sim: 25YR24HR
      Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

         Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                    End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
         Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

==== Boundary Conditions ====

Name: 100YR24HR   Node: RIVER   Type: Stage

Time(hrs)	Stage(ft)
0.000	2.600
72.000	10.000

```
              Basin Name: SYSTEM11
              Group Name: BASE
              Simulation: 100YR24HR
               Node Name: POND
              Basin Type: SCS Unit Hydrograph

         Unit Hydrograph: Uh256
           Peaking Fator: 256.0
     Spec Time Inc (min): 8.00
     Comp Time Inc (min): 5.00
           Rainfall File: Flmod
    Rainfall Amount (in): 12.000
    Storm Duration (hrs): 24.00
                  Status: Onsite
      Time of Conc (min): 60.00
        Time Shift (hrs): 0.00
               Area (ac): 127.100
    Vol of Unit Hyd (in): 1.000
            Curve Number: 80.200
                DCIA (%): 0.000

          Time Max (hrs): 12.67
          Flow Max (cfs): 327.27
      Runoff Volume (in): 9.465
     Runoff Volume (ft3): 4366956
```

```
              Basin Name: SYSTEM11
              Group Name: BASE
              Simulation: 25YR24HR
               Node Name: POND
              Basin Type: SCS Unit Hydrograph

         Unit Hydrograph: Uh256
           Peaking Fator: 256.0
     Spec Time Inc (min): 8.00
     Comp Time Inc (min): 5.00
           Rainfall File: Flmod
    Rainfall Amount (in): 9.000
    Storm Duration (hrs): 24.00
                  Status: Onsite
      Time of Conc (min): 60.00
        Time Shift (hrs): 0.00
               Area (ac): 127.100
    Vol of Unit Hyd (in): 1.000
            Curve Number: 80.200
                DCIA (%): 0.000

          Time Max (hrs): 12.67
          Flow Max (cfs): 229.63
      Runoff Volume (in): 6.587
     Runoff Volume (ft3): 3039022
```

ORANGE LAKE WEIR REHABILITATION - POST MODEL
(ASSUME TWO 52" RCPs) ONE BOX - WITHOUT FLAP GATES
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
POND	BASE	100YR24HR	13.29	8.36	10.00	0.0050	119174	12.67	327.27	13.26	248.66
RIVER	BASE	100YR24HR	24.00	5.07	10.00	0.0017	0	13.26	248.66	0.00	0.00
POND	BASE	25YR24HR	13.15	6.50	10.00	0.0050	108904	12.67	229.62	13.13	188.89
RIVER	BASE	25YR24HR	23.99	4.60	10.00	0.0014	0	13.13	188.89	0.00	0.00

ORANGE LAKE WEIR REHABILITATION - POST MODEL
(ASSUME TWO 52" RCPs) ONE BOX - WITHOUT FLAP GATES
LINK MIN MAX

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
POND-DS	BASE	100YR24HR	13.26	248.66	5.301	13.29	8.36	24.00	5.07
POND-DS	BASE	25YR24HR	13.13	188.89	2.955	13.15	6.50	23.99	4.60

VERTICAL DATUM

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT. (NAVD 88).

CONVERSION FACTOR.

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

NOTES

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT — THIS IS NOT A CONSTRUCTION PLAN.

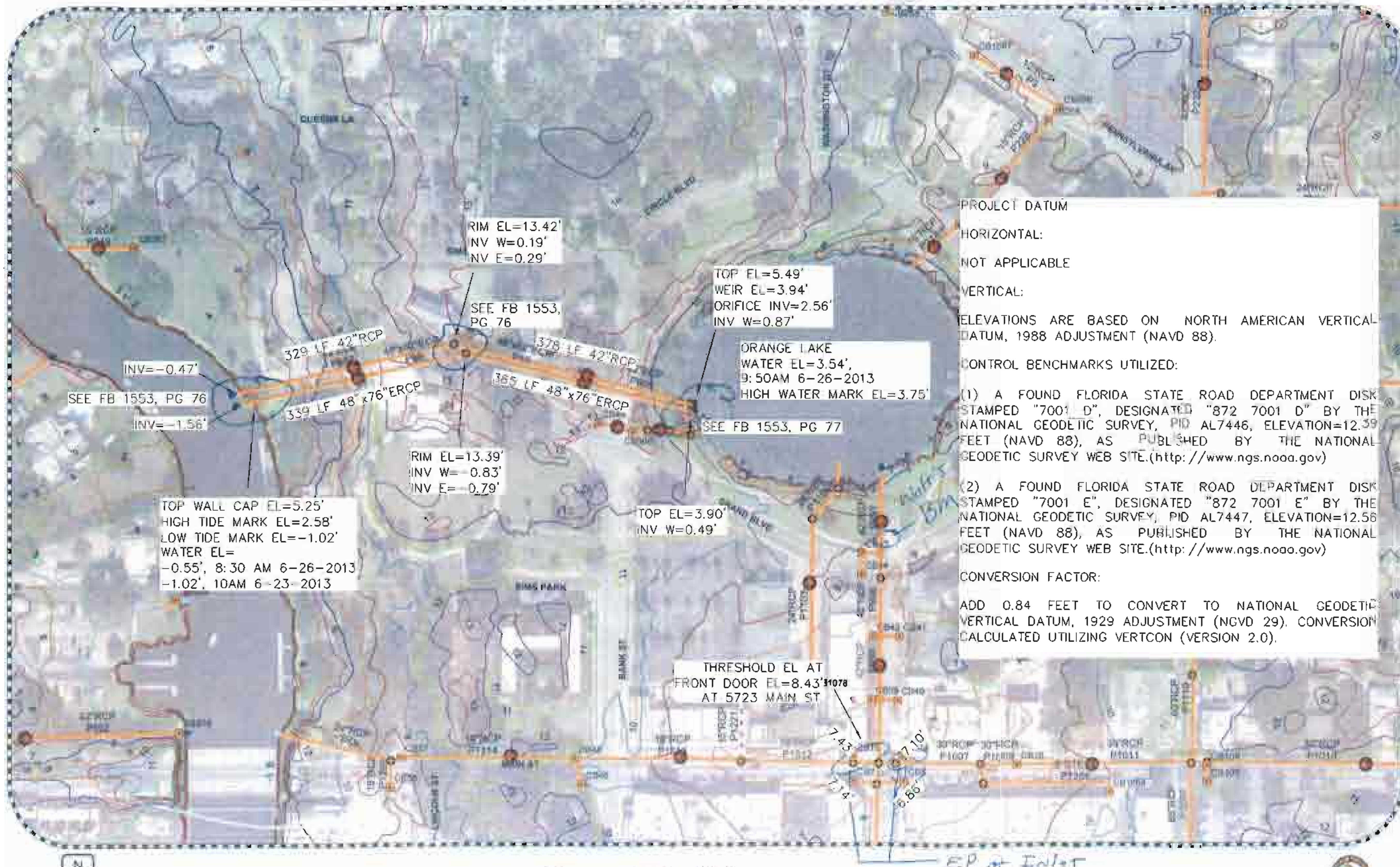
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #7

ORANGE LAKE OUTFALL

616-43
536
N/A
12/04/13
1
1



PROJECT DATUM

HORIZONTAL:

NOT APPLICABLE

VERTICAL:

ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT (NAVD 88).

CONTROL BENCHMARKS UTILIZED:

(1) A FOUND FLORIDA STATE ROAD DEPARTMENT DISK STAMPED "7001 D", DESIGNATED "872 7001 D" BY THE NATIONAL GEODETIC SURVEY, PID AL7446, ELEVATION=12.39 FEET (NAVD 88), AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE.(http://www.ngs.noaa.gov)

(2) A FOUND FLORIDA STATE ROAD DEPARTMENT DISK STAMPED "7001 E", DESIGNATED "872 7001 E" BY THE NATIONAL GEODETIC SURVEY, PID AL7447, ELEVATION=12.56 FEET (NAVD 88), AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE.(http://www.ngs.noaa.gov)

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

Orange Lake Weir Outfall #7

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #7

516-43
536
N/A
12/04/13

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 8

LOCATION: TANGLEWOOD

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. Limited field elevations were obtained and are shown on the Master Plan.
6. Limited Preliminary ICPR Drainage Programs were prepared. They are included.
7. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
8. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
9. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 8 A- 3:1 SLOPES
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 8A-TANGLEWOOD

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	7460	SY	$3.60	$26,856
I-A-2	STAKED SILT FENCE	1320	LF	$1.40	$1,848
I-A-3	CLEARING AND GRUBBING	2	AC	$1,790.00	$2,864
I-A-4	DETENTION POND EXCAVATION	14,600	SY	$3.85	$56,210
I-A-5	SEED AND MULCH	2,158	SY	$0.70	$1,511
I-B-1	1.5 " S-3 ASPHALT	175	SY	$10.00	$1,750
I-B-2	6" CRUSHED CONCRETE BASE	190	SY	$14.00	$2,660
I-B-3	COMPACTED SUB-GRADE	205	SY	$3.50	$718
I-C-1	30" CONCRETE FES	1	EA	$1,760.00	$1,760
I-C-2	42" CONCRETE FES	1	EA	$2,550.00	$2,550
I-C-3	CONNECT TO EXISTING STORM (CONCRETE COLLAR)	2	EA	$1,000.00	$2,000
I-C-4	CONC. RIP-RAP	2	TN	$90.00	$180
I-C-5	REMOVE 30" CMP & REPLACE 30" RCP	20	LF	$76.00	$1,520.00
I-C-6	REMOVE 42" CMP & REPLACE 42" RCP	20	LF	$151.00	$3,020.00
I-D-1	FDOT TYPE B 6' CHAIN LINK VINYL FENCE AT TOB	1,320	LF	$33.00	$43,560
I-D-2	FDOT TYPE B 8' WIDE GATE	2	EA	$1,265.00	$2,530
I-D-3	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$3,000.00	$3,000
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$154,536**
MOBILIZATION	$4,000
CONTINGENCY	$6,000
SUB-TOTAL	**$164,536**
CONSULTING FEES-DESIGN SURVEY COMPLETION,DESIGN-(NO BIDDING)	$6,400
SUB-SURFACE UTILITY LOCATE	$1,500
REIMBURBURSABLES	$100
TOTAL	**$172,536**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 8-A Tanglewood.xlsx]Sheet1

2013 MASTER DRAINAGE PLAN ITEM 8 B- 4:1 SLOPES
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

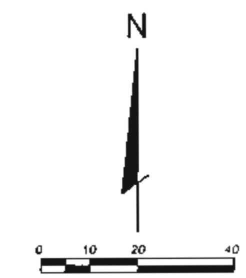
PRELIMINARY ENGINEER'S ESTIMATE
ITEM 8B-TANGLEWOOD

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	8660	SY	$3.60	$31,176
I-A-2	STAKED SILT FENCE	1320	LF	$1.40	$1,848
I-A-3	CLEARING AND GRUBBING	2	AC	$1,790.00	$2,864
I-A-4	DETENTION POND EXCAVATION	10,100	SY	$3.85	$38,885
I-A-5	SEED AND MULCH	968	SY	$0.70	$678
I-B-1	1.5 " S-3 ASPHALT	175	SY	$10.00	$1,750
I-B-2	6" CRUSHED CONCRETE BASE	190	SY	$14.00	$2,660
I-B-2	COMPACTED SUB-GRADE	205	SY	$3.50	$718
I-C-1	30" CONCRETE FES	1	EA	$1,760.00	$1,760
I-C-2	42" CONCRETE FES	1	EA	$2,550.00	$2,550
I-C-3	CONNECT TO EXISTING STORM (CONCRETE COLLAR)	2	EA	$1,000.00	$2,000
I-C-4	CONC. RIP-RAP	2	TN	$90.00	$180
I-C-5	REMOVE 30" CMP & REPLACE 30" RCP	20	LF	$76.00	$1,520.00
I-C-6	REMOVE 42" CMP & REPLACE 42" RCP	20	LF	$151.00	$3,020.00
I-D-2	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$3,000.00	$3,000
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$94,608**
MOBILIZATION	$4,000
CONTINGENCY	$6,000
SUB-TOTAL	**$104,608**
CONSULTING FEES-DESIGN SURVEY, DESIGN-(NO BIDDING)	$6,400
SUB-SURFACE UTILITY LOCATE	$1,500
REIMBURBURSABLES	$100
TOTAL	**$112,608**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 8-B Tanglewood.xlsx]Sheet1



VERTICAL DATUM:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS). NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT. (NAVD 88)

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

NOTES:

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.

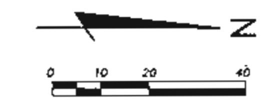
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #8

TANGLEWOOD DRAINAGE BASIN
WITH PROPOSED POND

516-43
536
N/A
12/04/13
1
1



VERTICAL DATUM:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS). NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT. (NAVD 88).

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

NOTES

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #8

TANGLEWOOD DRAINAGE BASIN
WITH PROPOSED POND

518-43
536
N/A
12/04/13
1
1

PROJECT DATUM:

HORIZONTAL

BEARINGS AND COORDINATES (IN U.S. SURVEY FEET) ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), STATE PLANE COORDINATES, FLORIDA WEST ZONE, NORTH AMERICAN DATUM 1983/1990 ADJUSTMENT, (NAD 83/90)

COORDINATES WERE DERIVED BY ROTATING AND TRANSLATING THE TOPOGRAPHIC DATA DRAWING TO MATCH COMMON IDENTIFIABLE FEATURES CONTAINED WITHIN A 2011 SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT DIGITAL ORTHOPHOTOGRAPH BY BEST FIT METHODS. THE META DATA FOR THE ORTHOPHOTOGRAPHY STATES THE HORIZONTAL COORDINATE SYSTEM NAME IS "NAD 1983 HARN STATE PLANE FLORIDA WEST FIPS 0902 FEET".

VERTICAL

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT, (NAVD 88)

CONTROL BENCHMARKS UTILIZED

(1) "X 672", PID-DK4667, A FOUND 12" DIAMETER CONCRETE MONUMENT WITH A FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION SURVEYING AND MAPPING DISK STAMPED "X 672 2007", ELEVATION = 14.00 (NAVD 88), AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE. (www.ngs.noaa.gov)

(2) "X 672", PID-DK4668, A FOUND 3/4" IRON ROD WITH PUNCH HOLE, INSIDE METAL CASING, SO STAMPED "Y 672 2007" ELEVATION = 12.72 FEET, AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE. (http://www.ngs.noaa.gov)

CONVERSION FACTOR

ADD 0.94 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29) CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0)

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
L.B. No. 6707
E.B. No. 7421

CITY OF
NEW PORT RICHEY

TANGLEWOOD
DRAINAGE
INVESTIGATION
SPECIFIC PURPOSE SURVEY

THIS IS NOT A BOUNDARY SURVEY

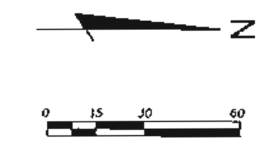
A SEPARATE SURVEYOR'S REPORT TITLED SPECIFIC PURPOSE SURVEY TANGLEWOOD DRAINAGE INVESTIGATION JOB NUMBER 0516-0043 LAST DATE OF ORIGINAL FIELD WORK 7-2-2013 HAS BEEN UTILIZED AS A TEXT OPTION FOR THIS SURVEY MAP.

USERS OF THIS SURVEY MAP ARE DIRECTED TO ACKNOWLEDGE THE CONTENT OF THE SURVEYOR'S REPORT.

THE SURVEY MAP AND REPORT ARE NOT FULL AND COMPLETE WITHOUT THE OTHER.

NO	DATE	REVISIONS	APP'D BY

JOB NO. 0516-0043
EPN 536
F.B. & PG. 1640/3-10
DATE 12/04/13
SHT 1 OF 1



HORIZONTAL

BEARINGS AND COORDINATES (IN U.S. SURVEY FEET) ARE BASED ON NATIONAL GEODETIC SURVEY (NGS). STATE PLANE COORDINATES, FLORIDA WEST ZONE, NORTH AMERICAN DATUM 1983/1990 ADJUSTMENT, (NAD 83/90).

COORDINATES WERE DERIVED BY ROTATING AND TRANSLATING THE TOPOGRAPHIC DATA DRAWING TO MATCH COMMON DEFINABLE FEATURES CONTAINED WITHIN A 2011 SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT DIGITAL ORTHOPHOTOGRAPH BY BEST FIT METHODS. THE META DATA FOR THE ORTHOPHOTOGRAPHY STATES THE HORIZONTAL COORDINATE SYSTEM NAME IS "NAD 1983 HARN STATE PLANE FLORIDA WEST FIPS 0902 FEET".

VERTICAL:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT, (NAVD 88).

CONTROL BENCHMARKS UTILIZED:

(1) "X 672", PID-DK4667, A FOUND 12" DIAMETER CONCRETE MONUMENT WITH A FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION SURVEYING AND MAPPING DISK STAMPED "X 672 2007", ELEVATION = 14.00' (NAVD 88), AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE. (www.ngs.noaa.gov)

(2) "Y 672", PID-DK4668, A FOUND 3/4" IRON ROD WITH PUNCH HOLE, INSIDE METAL CASING, LID STAMPED "Y 672 2007", ELEVATION = 12.72 FEET, AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE. (http://www.ngs.noaa.gov)

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0)

NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASE ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM COMBINATION OF SOURCES, OF ACTUAL SURVEY SHOTS & LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT - THIS IS NOT A CONSTRUCTION PLAN.

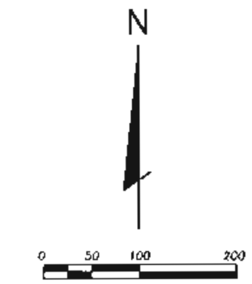
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #8

TANGLEWOOD DRAINAGE ANALYSIS
EXISTING POND

516-43
536
N/A
12/04/13
1
1



VERTICAL DATUM:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT. (NAVD 88).

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

NOTES.

1. NO UTILITIES LOCATED.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

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5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #8

TANGLEWOOD
DRAINAGE BASIN

N/A
12/04/13
1
1

TANGLEWOOD DRAINAGE ANALYSIS				
	PEAK STAGE	10 YR/24 HR	25 YR/24 HR	100 YR/24 HR
EXISTING	**TOS AT 6.0**	**18.71**	**19.51**	**20.86**
PROPOSED 3:1 SLOPES	TOS AT 5.0	17.66	18.69	20.26
	(PRE) - (POST) STAGE	1.05	0.82	0.60
	TOS AT 4.0	17.49	18.56	20.16
	(PRE) - (POST) STAGE	1.22	0.95	0.70
	TOS AT 3.0	17.33	18.44	20.08
	(PRE) - (POST) STAGE	1.38	1.07	0.78
	TOS AT 2.0	17.16	18.33	20.00
	(PRE) - (POST) STAGE	1.55	1.18	0.86
	TOS AT 1.0	17.01	18.22	19.92
	(PRE) - (POST) STAGE	1.70	1.29	0.94
	TOS AT 0.0	16.86	18.12	19.85
	(PRE) - (POST) STAGE	1.85	1.39	1.01

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

        Name: TANGLEWOOD                  Node: POND                 Status: Onsite
       Group: BASE                        Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                     Peaking Factor: 256.0
         Rainfall File:                       Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                   Time of Conc(min): 30.00
              Area(ac): 42.100                   Time Shift(hrs): 0.00
          Curve Number: 77.00                Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00

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

      Name: IDLEWILD             Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                Warn Stage(ft): 15.500
      Type: Stage/Area

      Stage(ft)          Area(ac)
   --------------- ---------------
         16.000            0.1400
         17.000            0.3600

----------------------------------------------------------------------------------
      Name: POND                 Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                Warn Stage(ft): 20.000
      Type: Stage/Area

      Stage(ft)          Area(ac)
   --------------- ---------------
          5.000            0.7000
          6.000            0.7500
          7.000            0.8100
          8.000            0.8700
          9.000            0.9200
         10.000            0.9800
         11.000            1.0500
         12.000            1.1100
         13.000            1.1700
         14.000            1.2400
         15.000            1.3100

----------------------------------------------------------------------------------
      Name: SCHOOL               Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                Warn Stage(ft): 14.750
      Type: Stage/Area

      Stage(ft)          Area(ac)
   --------------- ---------------
         15.000            0.1300
         16.000            0.4200
         17.000            1.3900

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

        Name: IDLEWILD-SCHOOL      From Node: IDLEWILD           Length(ft): 225.00
       Group: BASE                   To Node: SCHOOL                  Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM          DOWNSTREAM              Solution Algorithm: Automatic
    Geometry: Circular          Circular                              Flow: Both
```

```
     Span(in): 36.00            36.00                    Entrance Loss Coef: 0.50
     Rise(in): 36.00            36.00                        Exit Loss Coef: 0.50
   Invert(ft): 10.500           9.750                        Bend Loss Coef: 0.00
  Manning's N: 0.011000         0.011000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000            0.000                       Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND          From Node: SCHOOL              Length(ft): 625.00
        Group: BASE                   To Node: POND                     Count: 1
                                                             Friction Equation: Average Conveyance
               UPSTREAM          DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular          Circular                                Flow: Both
     Span(in): 42.00             42.00                     Entrance Loss Coef: 0.50
     Rise(in): 42.00             42.00                         Exit Loss Coef: 0.50
   Invert(ft): 9.750             5.250                         Bend Loss Coef: 0.50
  Manning's N: 0.011000          0.011000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000             0.000                        Inlet Ctrl Spec: Use dn
 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

```
=========================================================================================
==== Hydrology Simulations ==============================================================
=========================================================================================

         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

---------------------------------------------------------------------------------------------------
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

---------------------------------------------------------------------------------------------------
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
```

```
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

         Name: 100YR24HR           Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:

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

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

--------------------------------------------------------------------------------------------------
         Name: 10YR24HR            Hydrology Sim: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:

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

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

--------------------------------------------------------------------------------------------------
         Name: 25YR24HR            Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:

Time(hrs)        Print Inc(min)
---------------  ---------------
```

999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 5.0
BASIN SUMMARY

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 100YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 12.000
 Storm Duration (hrs): 24.00
               Status: Onsite
  Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 157.48
   Runoff Volume (in): 9.033
  Runoff Volume (ft3): 1380385
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 10YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 7.500
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 84.74
   Runoff Volume (in): 4.816
  Runoff Volume (ft3): 736016
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 25YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
```

```
Vol of Unit Hyd (in): 1.000
       Curve Number: 77.000
           DCIA (%): 0.000

     Time Max (hrs): 12.27
     Flow Max (cfs): 108.88
  Runoff Volume (in): 6.197
 Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 5.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	23.99	20.24	15.50	-10.5000	46773	0.00	0.00	12.34	2.97
POND	BASE	100YR24HR	23.99	20.26	20.00	-5.0000	73146	12.25	154.33	0.00	0.00
SCHOOL	BASE	100YR24HR	23.99	20.24	14.75	-9.7500	197654	12.34	2.97	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.00	17.66	15.50	-10.5000	22015	0.00	0.00	12.99	3.22
POND	BASE	10YR24HR	24.00	17.66	20.00	-5.0000	65236	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.66	14.75	-9.7500	88463	12.99	3.22	0.00	0.00
IDLEWILD	BASE	25YR24HR	24.00	18.68	15.50	-10.5000	31827	0.00	0.00	12.56	3.07
POND	BASE	25YR24HR	24.00	18.69	20.00	-5.0000	68367	12.29	104.14	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.68	14.75	-9.7500	131745	12.56	3.07	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 5.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.34	2.97	-4.262	23.99	20.24	23.99	20.24
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.170	23.99	20.24	23.99	20.26
IDLEWILD-SCHOOL	BASE	10YR24HR	12.99	3.22	-4.098	24.00	17.66	24.00	17.66
SCHOOL-POND	BASE	10YR24HR	0.00	0.00	1.041	24.00	17.66	24.00	17.66
IDLEWILD-SCHOOL	BASE	25YR24HR	12.56	3.07	-4.134	24.00	18.68	24.00	18.68
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.954	24.00	18.68	24.00	18.69

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

         Name: TANGLEWOOD                 Node: POND                   Status: Onsite
        Group: BASE                       Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                  Peaking Factor: 256.0
          Rainfall File:                   Storm Duration(hrs): 0.00
     Rainfall Amount(in): 0.000              Time of Conc(min): 30.00
               Area(ac): 42.100                Time Shift(hrs): 0.00
           Curve Number: 77.00           Max Allowable Q(cfs): 999999.000
                DCIA(%): 0.00

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

      Name: IDLEWILD              Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 15.500
      Type: Stage/Area

      Stage(ft)          Area(ac)
 --------------- ---------------
         16.000           0.1400
         17.000           0.3600

-------------------------------------------------------------------------------------
      Name: POND                  Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 20.000
      Type: Stage/Area

      Stage(ft)          Area(ac)
 --------------- ---------------
          4.000           0.6400
          5.000           0.7000
          6.000           0.7500
          7.000           0.8100
          8.000           0.8700
          9.000           0.9200
         10.000           0.9800
         11.000           1.0500
         12.000           1.1100
         13.000           1.1700
         14.000           1.2400
         15.000           1.3100

-------------------------------------------------------------------------------------
      Name: SCHOOL                Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 14.750
      Type: Stage/Area

      Stage(ft)          Area(ac)
 --------------- ---------------
         15.000           0.1300
         16.000           0.4200
         17.000           1.3900

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

        Name: IDLEWILD-SCHOOL      From Node: IDLEWILD           Length(ft): 225.00
       Group: BASE                   To Node: SCHOOL                  Count: 1
                                                        Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
```

```
     Geometry: Circular       Circular                          Flow: Both
     Span(in): 36.00          36.00              Entrance Loss Coef: 0.50
     Rise(in): 36.00          36.00                  Exit Loss Coef: 0.50
   Invert(ft): 10.500         9.750                  Bend Loss Coef: 0.00
  Manning's N: 0.011000       0.011000            Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND        From Node: SCHOOL             Length(ft): 625.00
        Group: BASE                 To Node: POND                    Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM           DOWNSTREAM             Solution Algorithm: Automatic
     Geometry: Circular           Circular                             Flow: Both
     Span(in): 42.00              42.00                  Entrance Loss Coef: 0.50
     Rise(in): 42.00              42.00                      Exit Loss Coef: 0.50
   Invert(ft): 9.750              5.250                      Bend Loss Coef: 0.50
  Manning's N: 0.011000           0.011000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000              0.000                    Inlet Ctrl Spec: Use dn
 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

==== Hydrology Simulations ====

```
         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

```
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

```
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
```

```
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


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

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

--------------------------------------------------------------------------------
        Name: 10YR24HR            Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


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

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

--------------------------------------------------------------------------------
        Name: 25YR24HR            Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


Time(hrs)        Print Inc(min)
```

999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 4.0
BASIN SUMMARY

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 157.48
    Runoff Volume (in): 9.033
   Runoff Volume (ft3): 1380385
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 10YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 7.500
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 84.74
    Runoff Volume (in): 4.816
   Runoff Volume (ft3): 736016
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
```

```
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 108.88
    Runoff Volume (in): 6.197
   Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 4.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	20.15	15.50	-10.5000	45889	0.00	0.00	12.40	1.74
POND	BASE	100YR24HR	24.00	20.16	20.00	-4.0000	72865	12.25	158.14	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	20.15	14.75	-9.7500	193759	12.40	1.74	12.24	1.47
IDLEWILD	BASE	10YR24HR	24.00	17.49	15.50	-10.5000	20379	0.00	0.00	12.92	2.87
POND	BASE	10YR24HR	24.00	17.49	20.00	-4.0000	64714	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.49	14.75	-9.7500	81245	12.92	2.87	13.16	2.10
IDLEWILD	BASE	25YR24HR	24.00	18.55	15.50	-10.5000	30599	0.00	0.00	12.96	2.83
POND	BASE	25YR24HR	24.00	18.56	20.00	-4.0000	67976	12.22	105.10	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.56	14.75	-9.7500	126327	12.96	2.83	12.65	1.80

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 4.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.40	1.74	4.077	24.00	20.15	24.00	20.15
SCHOOL-POND	BASE	100YR24HR	12.24	1.47	2.386	24.00	20.15	24.00	20.16
IDLEWILD-SCHOOL	BASE	10YR24HR	12.92	2.87	-4.083	24.00	17.49	24.00	17.49
SCHOOL-POND	BASE	10YR24HR	13.16	2.10	-3.303	24.00	17.49	24.00	17.49
IDLEWILD-SCHOOL	BASE	25YR24HR	12.96	2.83	4.122	24.00	18.55	24.00	18.56
SCHOOL-POND	BASE	25YR24HR	12.65	1.80	-3.147	24.00	18.56	24.00	18.56

==== Basins ====

Name: TANGLEWOOD
Group: BASE

Node: POND
Type: SCS Unit Hydrograph CN

Status: Onsite

Unit Hydrograph: Uh256
Rainfall File:
Rainfall Amount(in): 0.000
Area(ac): 42.100
Curve Number: 77.00
DCIA(%): 0.00

Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 30.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

==== Nodes ====

Name: IDLEWILD
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 15.500

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 20.000

Stage(ft)	Area(ac)
3.000	0.5900
4.000	0.6400
5.000	0.7000
6.000	0.7500
7.000	0.8100
8.000	0.8700
9.000	0.9200
10.000	0.9800
11.000	1.0500
12.000	1.1100
13.000	1.1700
14.000	1.2400
15.000	1.3100

Name: SCHOOL
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 14.750

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

Name: IDLEWILD-SCHOOL
Group: BASE

From Node: IDLEWILD
To Node: SCHOOL

Length(ft): 225.00
Count: 1
Friction Equation: Average Conveyance

```
              UPSTREAM       DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 36.00         36.00                   Entrance Loss Coef: 0.50
     Rise(in): 36.00         36.00                       Exit Loss Coef: 0.50
   Invert(ft): 10.500        9.750                       Bend Loss Coef: 0.00
  Manning's N: 0.011000      0.011000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND        From Node: SCHOOL          Length(ft): 625.00
        Group: BASE                 To Node: POND                 Count: 1
                                                       Friction Equation: Average Conveyance
              UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular      Circular                              Flow: Both
     Span(in): 42.00         42.00                   Entrance Loss Coef: 0.50
     Rise(in): 42.00         42.00                       Exit Loss Coef: 0.50
   Invert(ft): 9.750         5.250                       Bend Loss Coef: 0.50
  Manning's N: 0.011000      0.011000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000         0.000                     Inlet Ctrl Spec: Use dn
 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


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

        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

       Override Defaults: Yes
     Storm Duration(hrs): 24.00
            Rainfall File: Flmod
     Rainfall Amount(in): 12.00

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

--------------------------------------------------------------------------------------
        Name: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

       Override Defaults: Yes
     Storm Duration(hrs): 24.00
            Rainfall File: Flmod
     Rainfall Amount(in): 7.50

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

--------------------------------------------------------------------------------------
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32
```

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

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

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

         Name: 100YR24HR          Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

-------------------------------------------------------------------------------------------
         Name: 10YR24HR           Hydrology Sim: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

-------------------------------------------------------------------------------------------
         Name: 25YR24HR           Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 3.0
INPUT SUMMARY

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 3.0
BASIN SUMMARY

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 100YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 12.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 157.48
   Runoff Volume (in): 9.033
  Runoff Volume (ft3): 1380385
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 10YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 7.500
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 84.74
   Runoff Volume (in): 4.816
  Runoff Volume (ft3): 736016
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 25YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Facor: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 3.0
BASIN SUMMARY

```
Vol of Unit Hyd (in): 1.000
       Curve Number: 77.000
           DCIA (%): 0.000

     Time Max (hrs): 12.27
     Flow Max (cfs): 108.88
 Runoff Volume (in): 6.197
Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 3.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.01	20.06	15.50	-10.5000	45064	0.00	0.00	12.45	1.75
POND	BASE	100YR24HR	24.01	20.08	20.00	-3.0000	72602	12.27	158.06	0.00	0.00
SCHOOL	BASE	100YR24HR	24.01	20.06	14.75	-9.7500	190119	12.45	1.75	12.29	1.51
IDLEWILD	BASE	10YR24HR	24.01	17.32	15.50	-10.5000	18793	0.00	0.00	13.06	2.82
POND	BASE	10YR24HR	24.01	17.33	20.00	-3.0000	64209	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.01	17.32	14.75	-9.7500	74247	13.06	2.82	13.35	2.14
IDLEWILD	BASE	25YR24HR	24.00	18.43	15.50	-10.5000	29438	0.00	0.00	12.74	3.11
POND	BASE	25YR24HR	24.00	18.44	20.00	-3.0000	67606	12.25	108.14	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.43	14.75	-9.7500	121209	12.74	3.11	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 3.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.45	1.75	4.080	24.01	20.06	24.01	20.06
SCHOOL-POND	BASE	100YR24HR	12.29	1.51	2.241	24.01	20.06	24.01	20.08
IDLEWILD-SCHOOL	BASE	10YR24HR	13.06	2.82	-4.061	24.01	17.32	24.01	17.32
SCHOOL-POND	BASE	10YR24HR	13.35	2.14	-3.304	24.01	17.32	24.01	17.33
IDLEWILD-SCHOOL	BASE	25YR24HR	12.74	3.11	-4.104	24.00	18.43	24.00	18.43
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.911	24.00	18.43	24.00	18.44

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 2.0
INPUT SUMMARY

==== Basins ====

Name: TANGLEWOOD — Node: POND — Status: Onsite
Group: BASE — Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256 — Peaking Factor: 256.0
Rainfall File: — Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 — Time of Conc(min): 30.00
Area(ac): 42.100 — Time Shift(hrs): 0.00
Curve Number: 77.00 — Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes ====

Name: IDLEWILD — Base Flow(cfs): 0.000 — Init Stage(ft): 0.000
Group: BASE — Warn Stage(ft): 15.500
Type: Stage/Area

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND — Base Flow(cfs): 0.000 — Init Stage(ft): 0.000
Group: BASE — Warn Stage(ft): 20.000
Type: Stage/Area

Stage(ft)	Area(ac)
2.000	0.5400
3.000	0.5900
4.000	0.6400
5.000	0.7000
6.000	0.7500
7.000	0.8100
8.000	0.8700
9.000	0.9200
10.000	0.9800
11.000	1.0500
12.000	1.1100
13.000	1.1700
14.000	1.2400
15.000	1.3100

Name: SCHOOL — Base Flow(cfs): 0.000 — Init Stage(ft): 0.000
Group: BASE — Warn Stage(ft): 14.750
Type: Stage/Area

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

Name: IDLEWILD-SCHOOL — From Node: IDLEWILD — Length(ft): 225.00
Group: BASE — To Node: SCHOOL — Count: 1

```
                                                        Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
    Geometry: Circular      Circular                                 Flow: Both
   Span(in): 36.00          36.00                      Entrance Loss Coef: 0.50
   Rise(in): 36.00          36.00                          Exit Loss Coef: 0.50
 Invert(ft): 10.500         9.750                          Bend Loss Coef: 0.00
 Manning's N: 0.011000      0.011000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dn
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: SCHOOL-POND          From Node: SCHOOL              Length(ft): 625.00
       Group: BASE                   To Node: POND                     Count: 1
                                                        Friction Equation: Average Conveyance
            UPSTREAM        DOWNSTREAM                 Solution Algorithm: Automatic
    Geometry: Circular      Circular                                 Flow: Both
   Span(in): 42.00          42.00                      Entrance Loss Coef: 0.50
   Rise(in): 42.00          42.00                          Exit Loss Coef: 0.50
 Invert(ft): 9.750          5.250                          Bend Loss Coef: 0.50
 Manning's N: 0.011000      0.011000                     Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000         0.000                         Inlet Ctrl Spec: Use dn
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

==== Hydrology Simulations ====

```
        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 12.00

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

```
        Name: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 7.50

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

```
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32
```

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

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

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

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


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

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

------------------------------------------------------------------------------------------
        Name: 10YR24HR            Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


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

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

------------------------------------------------------------------------------------------
        Name: 25YR24HR            Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 2.0
BASIN SUMMARY

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
         Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 157.48
     Runoff Volume (in): 9.033
    Runoff Volume (ft3): 1380385
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 10YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 7.500
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 84.74
     Runoff Volume (in): 4.816
    Runoff Volume (ft3): 736016
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 2.0
BASIN SUMMARY

Vol of Unit Hyd (in):	1.000
Curve Number:	77.000
DCIA (%):	0.000
Time Max (hrs):	12.27
Flow Max (cfs):	108.88
Runoff Volume (in):	6.197
Runoff Volume (ft3):	947022

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 2.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	19.98	15.50	-10.5000	44283	0.00	0.00	12.49	2.96
POND	BASE	100YR24HR	24.00	20.00	20.00	-2.0000	72353	12.32	154.13	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	19.98	14.75	-9.7500	186676	12.49	2.96	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.00	17.16	15.50	-10.5000	17242	0.00	0.00	13.55	3.27
POND	BASE	10YR24HR	24.00	17.16	20.00	-2.0000	63715	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.16	14.75	-9.7500	67402	13.55	3.27	13.16	0.95
IDLEWILD	BASE	25YR24HR	24.01	18.32	15.50	-10.5000	28346	0.00	0.00	12.83	3.15
POND	BASE	25YR24HR	24.01	18.33	20.00	-2.0000	67258	12.25	108.52	0.00	0.00
SCHOOL	BASE	25YR24HR	24.01	18.32	14.75	-9.7500	116395	12.83	3.15	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 2.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.49	2.96	-4.250	24.00	19.98	24.00	19.98
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.156	24.00	19.98	24.00	20.00
IDLEWILD-SCHOOL	BASE	10YR24HR	13.55	3.27	-4.038	24.00	17.16	24.00	17.16
SCHOOL-POND	BASE	10YR24HR	13.16	0.95	-2.595	24.00	17.16	24.00	17.16
IDLEWILD-SCHOOL	BASE	25YR24HR	12.83	3.15	-4.094	24.01	18.32	24.01	18.32
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.946	24.01	18.32	24.01	18.33

==== Basins ====

Name: TANGLEWOOD   Node: POND   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256   Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000   Time of Conc(min): 30.00
Area(ac): 42.100   Time Shift(hrs): 0.00
Curve Number: 77.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes ====

Name: IDLEWILD   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 15.500
Type: Stage/Area

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 20.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.000	0.4900
2.000	0.5400
3.000	0.5900
4.000	0.6400
5.000	0.7000
6.000	0.7500
7.000	0.8100
8.000	0.8700
9.000	0.9200
10.000	0.9800
11.000	1.0500
12.000	1.1100
13.000	1.1700
14.000	1.2400
15.000	1.3100

Name: SCHOOL   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 14.750
Type: Stage/Area

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

Name: IDLEWILD-SCHOOL   From Node: IDLEWILD   Length(ft): 225.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 1.0
INPUT SUMMARY

```
---------------------------------------------------------------------------------------------------
      Group: BASE               To Node: SCHOOL                   Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
   Geometry: Circular        Circular                              Flow: Both
   Span(in): 36.00           36.00                   Entrance Loss Coef: 0.50
   Rise(in): 36.00           36.00                       Exit Loss Coef: 0.50
 Invert(ft): 10.500          9.750                       Bend Loss Coef: 0.00
Manning's N: 0.011000        0.011000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
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: SCHOOL-POND        From Node: SCHOOL                Length(ft): 625.00
      Group: BASE                 To Node: POND                       Count: 1
                                                      Friction Equation: Average Conveyance
             UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
   Geometry: Circular        Circular                              Flow: Both
   Span(in): 42.00           42.00                   Entrance Loss Coef: 0.50
   Rise(in): 42.00           42.00                       Exit Loss Coef: 0.50
 Invert(ft): 9.750           5.250                       Bend Loss Coef: 0.50
Manning's N: 0.011000        0.011000                 Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
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

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

       Name: 100YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

---------------------------------------------------------------------------------------------------
       Name: 10YR24HR
   Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

---------------------------------------------------------------------------------------------------
       Name: 25YR24HR
```

```
      Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

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

          Name: 100YR24HR           Hydrology Sim: 100YR24HR
      Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

         Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                      End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

----------------------------------------------------------------------------------------------------
          Name: 10YR24HR            Hydrology Sim: 10YR24HR
      Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

         Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                      End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

----------------------------------------------------------------------------------------------------
          Name: 25YR24HR            Hydrology Sim: 25YR24HR
      Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

         Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
         Start Time(hrs): 0.000                      End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000                Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Ran
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 1.0
BASIN SUMMARY

```
         Basin Name: TANGLEWOOD
         Group Name: BASE
         Simulation: 100YR24HR
          Node Name: POND
         Basin Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256
      Peaking Fator: 256.0
Spec Time Inc (min): 4.00
Comp Time Inc (min): 4.00
      Rainfall File: Flmod
Rainfall Amount (in): 12.000
Storm Duration (hrs): 24.00
             Status: Onsite
 Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
          Area (ac): 42.100
Vol of Unit Hyd (in): 1.000
       Curve Number: 77.000
           DCIA (%): 0.000

     Time Max (hrs): 12.27
     Flow Max (cfs): 157.48
 Runoff Volume (in): 9.033
Runoff Volume (ft3): 1380385
```

```
         Basin Name: TANGLEWOOD
         Group Name: BASE
         Simulation: 10YR24HR
          Node Name: POND
         Basin Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256
      Peaking Fator: 256.0
Spec Time Inc (min): 4.00
Comp Time Inc (min): 4.00
      Rainfall File: Flmod
Rainfall Amount (in): 7.500
Storm Duration (hrs): 24.00
             Status: Onsite
 Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
          Area (ac): 42.100
Vol of Unit Hyd (in): 1.000
       Curve Number: 77.000
           DCIA (%): 0.000

     Time Max (hrs): 12.27
     Flow Max (cfs): 84.74
 Runoff Volume (in): 4.816
Runoff Volume (ft3): 736016
```

```
         Basin Name: TANGLEWOOD
         Group Name: BASE
         Simulation: 25YR24HR
          Node Name: POND
         Basin Type: SCS Unit Hydrograph

    Unit Hydrograph: Uh256
      Peaking Fator: 256.0
Spec Time Inc (min): 4.00
Comp Time Inc (min): 4.00
      Rainfall File: Flmod
Rainfall Amount (in): 9.000
Storm Duration (hrs): 24.00
             Status: Onsite
 Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
          Area (ac): 42.100
```

BASIN SUMMARY

```
    Vol of Unit Hyd (in): 1.000
            Curve Number: 77.000
                DCIA (%): 0.000

          Time Max (hrs): 12.27
          Flow Max (cfs): 108.88
      Runoff Volume (in): 6.197
    Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 1.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.01	19.91	15.50	-10.5000	43574	0.00	0.00	12.54	2.96
POND	BASE	100YR24HR	24.01	19.92	20.00	-1.0000	72127	12.33	152.50	0.00	0.00
SCHOOL	BASE	100YR24HR	24.01	19.91	14.75	-9.7500	183550	12.54	2.96	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.00	17.01	15.50	-10.5000	15748	0.00	0.00	13.75	3.28
POND	BASE	10YR24HR	24.00	17.01	20.00	-1.0000	63238	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.00	14.75	-9.7500	60801	13.75	3.28	13.33	1.[illegible]
IDLEWILD	BASE	25YR24HR	24.00	18.21	15.50	-10.5000	27310	0.00	0.00	12.92	3.[illegible]7
POND	BASE	25YR24HR	24.00	18.22	20.00	-1.0000	66928	12.25	108.52	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.21	14.75	-9.7500	111827	12.92	3.17	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 1.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.54	2.96	-4.251	24.01	19.91	24.01	19.91
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.028	24.01	19.91	24.01	19.92
IDLEWILD-SCHOOL	BASE	10YR24HR	13.75	3.28	-3.998	24.00	17.01	24.00	17.00
SCHOOL-POND	BASE	10YR24HR	13.32	1.10	-2.689	24.00	17.00	24.00	17.01
IDLEWILD-SCHOOL	BASE	25YR24HR	12.92	3.17	-4.088	24.00	18.21	24.00	18.21
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	1.080	24.00	18.21	24.00	18.22

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
INPUT SUMMARY

==== Basins ====

Name: TANGLEWOOD
Group: BASE

Node: POND
Type: SCS Unit Hydrograph CN

Status: Onsite

Unit Hydrograph: Uh256
Rainfall File:
Rainfall Amount(in): 0.000
Area(ac): 42.100
Curve Number: 77.00
DCIA(%): 0.00

Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 30.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

==== Nodes ====

Name: IDLEWILD
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 15.500

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 20.000

Stage(ft)	Area(ac)
0.000	0.4500
1.000	0.4900
2.000	0.5400
3.000	0.5900
4.000	0.6400
5.000	0.7000
6.000	0.7500
7.000	0.8100
8.000	0.8700
9.000	0.9200
10.000	0.9800
11.000	1.0500
12.000	1.1100
13.000	1.1700
14.000	1.2400
15.000	1.3100

Name: SCHOOL
Group: BASE
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 0.000
Warn Stage(ft): 14.750

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
INPUT SUMMARY

```
         Name: IDLEWILD-SCHOOL     From Node: IDLEWILD            Length(ft): 225.00
        Group: BASE                  To Node: SCHOOL                   Count: 1
                                                           Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular        Circular                                 Flow: Both
     Span(in): 36.00           36.00                      Entrance Loss Coef: 0.50
     Rise(in): 36.00           36.00                          Exit Loss Coef: 0.50
   Invert(ft): 10.500          9.750                          Bend Loss Coef: 0.00
  Manning's N: 0.011000        0.011000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                        Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND         From Node: SCHOOL              Length(ft): 625.00
        Group: BASE                  To Node: POND                     Count: 1
                                                           Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM                 Solution Algorithm: Automatic
     Geometry: Circular        Circular                                 Flow: Both
     Span(in): 42.00           42.00                      Entrance Loss Coef: 0.50
     Rise(in): 42.00           42.00                          Exit Loss Coef: 0.50
   Invert(ft): 9.750           5.250                          Bend Loss Coef: 0.50
  Manning's N: 0.011000        0.011000                    Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                        Inlet Ctrl Spec: Use dn
 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

==== Hydrology Simulations ====

```
        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
        Rainfall File: Flmod
   Rainfall Amount(in): 12.00

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

```
        Name: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
        Rainfall File: Flmod
   Rainfall Amount(in): 7.50

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

```
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

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

        Name: 100YR24HR          Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


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

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

------------------------------------------------------------------------------
        Name: 10YR24HR           Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


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

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

------------------------------------------------------------------------------
        Name: 25YR24HR           Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
BASIN SUMMARY

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 157.48
     Runoff Volume (in): 9.033
    Runoff Volume (ft3): 1380385
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 10YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 7.500
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 84.74
     Runoff Volume (in): 4.816
    Runoff Volume (ft3): 736016
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
BASIN SUMMARY

```
Vol of Unit Hyd (in): 1.000
       Curve Number: 77.000
           DCIA (%): 0.000

     Time Max (hrs): 12.27
     Flow Max (cfs): 108.88
  Runoff Volume (in): 6.197
 Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	19.84	15.50	-10.5000	42910	0.00	0.00	12.58	2.94
POND	BASE	100YR24HR	24.00	19.85	20.00	0.0050	71916	12.33	151.18	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	19.84	14.75	-9.7500	180623	12.58	2.94	0.00	0.00
IDLEWILD	BASE	10YR24HR	23.99	16.85	15.50	-10.5000	14297	0.00	0.00	13.97	3.29
POND	BASE	10YR24HR	23.99	16.86	20.00	0.0050	62775	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	23.99	16.85	14.75	-9.7500	54388	13.97	3.29	13.47	1.18
IDLEWILD	BASE	25YR24HR	24.00	18.11	15.50	-10.5000	26340	0.00	0.00	13.01	3.18
POND	BASE	25YR24HR	24.00	18.12	20.00	0.0050	66619	12.25	108.52	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.11	14.75	-9.7500	107551	13.01	3.18	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST
POND BOTTOM AT 0.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.58	2.94	-4.229	24.00	19.84	24.00	19.84
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.056	24.00	19.84	24.00	19.85
IDLEWILD-SCHOOL	BASE	10YR24HR	13.97	3.29	-3.976	23.99	16.85	23.99	16.85
SCHOOL-POND	BASE	10YR24HR	13.47	1.18	-2.714	23.99	16.85	23.99	16.86
IDLEWILD-SCHOOL	BASE	25YR24HR	13.01	3.18	-4.082	24.00	18.11	24.00	18.11
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	1.000	24.00	18.11	24.00	18.12

TANGLEWOOD DRAINAGE ANALYSIS				
PEAK STAGE		10 YR/24 HR	25 YR/24 HR	100 YR/24 HR
EXISTING	**TOS AT 6.0**	**18.71**	**19.51**	**20.86**
PROPOSED 4:1 SLOPES	TOS AT 5.0	18.04	18.98	20.45
	(PRE) - (POST) STAGE	0.67	0.53	0.41
	TOS AT 4.0	17.94	18.90	20.40
	(PRE) - (POST) STAGE	0.77	0.61	0.46
	TOS AT 3.0	17.83	18.83	20.34
	(PRE) - (POST) STAGE	0.88	0.68	0.52
	TOS AT 2.0	17.77	18.77	20.31
	(PRE) - (POST) STAGE	0.94	0.74	0.55
	TOS AT 1.0	17.70	18.72	20.27
	(PRE) - (POST) STAGE	1.01	0.79	0.59
	TOS AT 0.0	17.64	18.67	20.24
	(PRE) - (POST) STAGE	1.07	0.84	0.62

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 0.0
INPUT SUMMARY

==== Basins ====

Name: TANGLEWOOD   Node: POND   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256   Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000   Time of Conc(min): 30.00
Area(ac): 42.100   Time Shift(hrs): 0.00
Curve Number: 77.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes ====

Name: IDLEWILD   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 15.500
Type: Stage/Area

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 20.000
Type: Stage/Area

Stage(ft)	Area(ac)
0.000	0.2000
1.000	0.2500
2.000	0.3000
3.000	0.3600
4.000	0.4200
5.000	0.4800
6.000	0.5400
7.000	0.6100
8.000	0.6800
9.000	0.7500
10.000	0.8300
11.000	0.9000
12.000	0.9900
13.000	1.0700
14.000	1.1600
15.000	1.2500

Name: SCHOOL   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 14.750
Type: Stage/Area

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

```
        Name: IDLEWILD-SCHOOL     From Node: IDLEWILD          Length(ft): 225.00
       Group: BASE                  To Node: SCHOOL                 Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular         Circular                               Flow: Both
    Span(in): 36.00            36.00                    Entrance Loss Coef: 0.50
    Rise(in): 36.00            36.00                        Exit Loss Coef: 0.50
  Invert(ft): 10.500           9.750                        Bend Loss Coef: 0.00
 Manning's N: 0.011000         0.011000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
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: SCHOOL-POND         From Node: SCHOOL            Length(ft): 625.00
       Group: BASE                  To Node: POND                   Count: 1
                                                         Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM               Solution Algorithm: Automatic
    Geometry: Circular         Circular                               Flow: Both
    Span(in): 42.00            42.00                    Entrance Loss Coef: 0.50
    Rise(in): 42.00            42.00                        Exit Loss Coef: 0.50
  Invert(ft): 9.750            5.250                        Bend Loss Coef: 0.50
 Manning's N: 0.011000         0.011000                  Outlet Ctrl Spec: Use dc or tw
Top Clip(in): 0.000            0.000                      Inlet Ctrl Spec: Use dn
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

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

        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 12.00

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

--------------------------------------------------------------------------------------------------
        Name: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

     Override Defaults: Yes
   Storm Duration(hrs): 24.00
         Rainfall File: Flmod
   Rainfall Amount(in): 7.50

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

--------------------------------------------------------------------------------------------------
```

```
        Name: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

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

        Name: 100YR24HR          Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


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

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

--------------------------------------------------------------------------------
        Name: 10YR24HR           Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:


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

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

--------------------------------------------------------------------------------
        Name: 25YR24HR           Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                     End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000               Max Calc Time(sec): 60.0000
       Boundary Stages:                          Boundary Flows:
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 0.0
INPUT SUMMARY

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 0.0
BASIN SUMMARY

```
          Basin Name: TANGLEWOOD
          Group Name: BASE
          Simulation: 100YR24HR
           Node Name: POND
          Basin Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256
       Peaking Fator: 256.0
 Spec Time Inc (min): 4.00
 Comp Time Inc (min): 4.00
      Rainfall File: Flmod
Rainfall Amount (in): 12.000
Storm Duration (hrs): 24.00
              Status: Onsite
  Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
           Area (ac): 42.100
Vol of Unit Hyd (in): 1.000
        Curve Number: 77.000
            DCIA (%): 0.000

      Time Max (hrs): 12.27
      Flow Max (cfs): 157.48
  Runoff Volume (in): 9.033
 Runoff Volume (ft3): 1380385
```

```
          Basin Name: TANGLEWOOD
          Group Name: BASE
          Simulation: 10YR24HR
           Node Name: POND
          Basin Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256
       Peaking Fator: 256.0
 Spec Time Inc (min): 4.00
 Comp Time Inc (min): 4.00
       Rainfall File: Flmod
Rainfall Amount (in): 7.500
Storm Duration (hrs): 24.00
              Status: Onsite
  Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
           Area (ac): 42.100
Vol of Unit Hyd (in): 1.000
        Curve Number: 77.000
            DCIA (%): 0.000

      Time Max (hrs): 12.27
      Flow Max (cfs): 84.74
  Runoff Volume (in): 4.816
 Runoff Volume (ft3): 736016
```

```
          Basin Name: TANGLEWOOD
          Group Name: BASE
          Simulation: 25YR24HR
           Node Name: POND
          Basin Type: SCS Unit Hydrograph

     Unit Hydrograph: Uh256
       Peaking Fator: 256.0
 Spec Time Inc (min): 4.00
 Comp Time Inc (min): 4.00
       Rainfall File: Flmod
Rainfall Amount (in): 9.000
Storm Duration (hrs): 24.00
              Status: Onsite
  Time of Conc (min): 30.00
    Time Shift (hrs): 0.00
           Area (ac): 42.100
```

```
    Vol of Unit Hyd (in): 1.000
            Curve Number: 77.000
                DCIA (%): 0.000

          Time Max (hrs): 12.27
          Flow Max (cfs): 108.88
     Runoff Volume (in): 6.197
    Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 0.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	20.23	15.50	-10.5000	46610	0.00	0.00	12.36	2.77
POND	BASE	100YR24HR	24.00	20.24	20.00	0.0050	75045	12.25	157.92	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	20.23	14.75	-9.7500	196934	12.36	2.77	12.21	1.51
IDLEWILD	BASE	10YR24HR	24.00	17.64	15.50	-10.5000	21831	0.00	0.00	13.06	3.21
POND	BASE	10YR24HR	24.00	17.64	20.00	0.0050	64866	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.64	14.75	-9.7500	87650	13.06	3.21	0.00	0.00
IDLEWILD	BASE	25YR24HR	24.00	18.67	15.50	-10.5000	31680	0.00	0.00	12.60	3.05
POND	BASE	25YR24HR	24.00	18.67	20.00	0.0050	68907	12.21	105.08	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.67	14.75	-9.7500	131095	12.60	3.05	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 0.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.36	2.77	4.165	24.00	20.23	24.00	20.23
SCHOOL-POND	BASE	100YR24HR	12.21	1.51	-2.262	24.00	20.23	24.00	20.24
IDLEWILD-SCHOOL	BASE	10YR24HR	13.06	3.21	-4.098	24.00	17.64	24.00	17.64
SCHOOL-POND	BASE	10YR24HR	0.00	0.00	1.049	24.00	17.64	24.00	17.64
IDLEWILD-SCHOOL	BASE	25YR24HR	12.60	3.05	-4.138	24.00	18.67	24.00	18.67
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.956	24.00	18.67	24.00	18.67

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
INPUT SUMMARY

==== Basins ====

Name: TANGLEWOOD   Node: POND   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256   Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000   Time of Conc(min): 30.00
Area(ac): 42.100   Time Shift(hrs): 0.00
Curve Number: 77.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes ====

Name: IDLEWILD   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 15.500
Type: Stage/Area

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 20.000
Type: Stage/Area

Stage(ft)	Area(ac)
1.000	0.2500
2.000	0.3000
3.000	0.3600
4.000	0.4200
5.000	0.4800
6.000	0.5400
7.000	0.6100
8.000	0.6800
9.000	0.7500
10.000	0.8300
11.000	0.9000
12.000	0.9900
13.000	1.0700
14.000	1.1600
15.000	1.2500

Name: SCHOOL   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 14.750
Type: Stage/Area

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3300

==== Pipes ====

Name: IDLEWILD-SCHOOL   From Node: IDLEWILD   Length(ft): 225.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
INPUT SUMMARY

```
        Group: BASE                 To Node: SCHOOL                 Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular        Circular                              Flow: Both
     Span(in): 36.00           36.00                   Entrance Loss Coef: 0.50
     Rise(in): 36.00           36.00                       Exit Loss Coef: 0.50
   Invert(ft): 10.500          9.750                       Bend Loss Coef: 0.00
   Manning's N: 0.011000       0.011000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  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: SCHOOL-POND        From Node: SCHOOL            Length(ft): 625.00
        Group: BASE                 To Node: POND                   Count: 1
                                                        Friction Equation: Average Conveyance
              UPSTREAM        DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular        Circular                              Flow: Both
     Span(in): 42.00           42.00                   Entrance Loss Coef: 0.50
     Rise(in): 42.00           42.00                       Exit Loss Coef: 0.50
   Invert(ft): 9.750           5.250                       Bend Loss Coef: 0.50
   Manning's N: 0.011000       0.011000                 Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
  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

==== Hydrology Simulations ====

```
        Name: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

```
        Name: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

```
        Name: 25YR24HR
```

```
TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
INPUT SUMMARY
```

```
      Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

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

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

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

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


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

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

------------------------------------------------------------------------------------------
        Name: 10YR24HR            Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:


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

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

------------------------------------------------------------------------------------------
        Name: 25YR24HR            Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
     Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                    End Time(hrs): 24.00
      Min Calc Time(sec): 0.5000             Max Calc Time(sec): 60.0000
        Boundary Stages:                          Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
BASIN SUMMARY

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 100YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
        Rainfall File: Flmod
  Rainfall Amount (in): 12.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 157.48
    Runoff Volume (in): 9.033
   Runoff Volume (ft3): 1380385
```

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 10YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
         Rainfall File: Flmod
  Rainfall Amount (in): 7.500
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 84.74
    Runoff Volume (in): 4.816
   Runoff Volume (ft3): 736016
```

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 25YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
         Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
```

```
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 108.88
   Runoff Volume (in): 6.197
  Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.01	20.26	15.50	-10.5000	46913	0.00	0.00	12.34	1.71
POND	BASE	100YR24HR	24.01	20.27	20.00	-1.0000	75169	12.25	157.95	0.00	0.00
SCHOOL	BASE	100YR24HR	24.01	20.26	14.75	-9.7500	198273	12.34	1.71	12.19	1.52
IDLEWILD	BASE	10YR24HR	23.99	17.70	15.50	-10.5000	22363	0.00	0.00	13.00	3.20
POND	BASE	10YR24HR	23.99	17.70	20.00	-1.0000	65084	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	23.99	17.70	14.75	-9.7500	90000	13.00	3.20	0.00	0.00
IDLEWILD	BASE	25YR24HR	24.01	18.71	15.50	-10.5000	32091	0.00	0.00	12.57	3.03
POND	BASE	25YR24HR	24.01	18.72	20.00	-1.0000	69075	12.19	103.74	0.00	0.00
SCHOOL	BASE	25YR24HR	24.01	18.71	14.75	-9.7500	132908	12.57	3.03	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 1.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.34	1.71	4.073	24.01	20.26	24.01	20.26
SCHOOL-POND	BASE	100YR24HR	12.19	1.52	2.387	24.01	20.26	24.01	20.27
IDLEWILD-SCHOOL	BASE	10YR24HR	13.00	3.20	-4.087	23.99	17.70	23.99	17.70
SCHOOL-POND	BASE	10YR24HR	0.00	0.00	0.925	23.99	17.70	23.99	17.70
IDLEWILD-SCHOOL	BASE	25YR24HR	12.57	3.03	-4.141	24.01	18.71	24.01	18.71
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.917	24.01	18.71	24.01	18.72

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
INPUT SUMMARY

==== Basins ====

Name: TANGLEWOOD
Group: BASE
Node: POND
Type: SCS Unit Hydrograph CN
Status: Onsite

Unit Hydrograph: Uh256
Rainfall File:
Rainfall Amount(in): 0.000
Area(ac): 42.100
Curve Number: 77.00
DCIA(%): 0.00
Peaking Factor: 256.0
Storm Duration(hrs): 0.00
Time of Conc(min): 30.00
Time Shift(hrs): 0.00
Max Allowable Q(cfs): 999999.000

==== Nodes ====

Name: IDLEWILD
Group: BASE
Type: Stage/Area
Base Flow(cfs): 0.000
Init Stage(ft): 0.000
Warn Stage(ft): 15.500

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND
Group: BASE
Type: Stage/Area
Base Flow(cfs): 0.000
Init Stage(ft): 0.000
Warn Stage(ft): 20.000

Stage(ft)	Area(ac)
2.000	0.3000
3.000	0.3600
4.000	0.4200
5.000	0.4800
6.000	0.5400
7.000	0.6100
8.000	0.6800
9.000	0.7500
10.000	0.8300
11.000	0.9000
12.000	0.9900
13.000	1.0700
14.000	1.1600
15.000	1.2500

Name: SCHOOL
Group: BASE
Type: Stage/Area
Base Flow(cfs): 0.000
Init Stage(ft): 0.000
Warn Stage(ft): 14.750

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

Name: IDLEWILD-SCHOOL
Group: BASE
From Node: IDLEWILD
To Node: SCHOOL
Length(ft): 225.00
Count: 1

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
INPUT SUMMARY

```
                                                    Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM          Solution Algorithm: Automatic
     Geometry: Circular        Circular                          Flow: Both
     Span(in): 36.00           36.00               Entrance Loss Coef: 0.50
     Rise(in): 36.00           36.00                   Exit Loss Coef: 0.50
   Invert(ft): 10.500          9.750                   Bend Loss Coef: 0.00
  Manning's N: 0.011000        0.011000             Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                 Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND         From Node: SCHOOL             Length(ft): 625.00
        Group: BASE                  To Node: POND                    Count: 1
                                                        Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM              Solution Algorithm: Automatic
     Geometry: Circular        Circular                              Flow: Both
     Span(in): 42.00           42.00                   Entrance Loss Coef: 0.50
     Rise(in): 42.00           42.00                       Exit Loss Coef: 0.50
   Invert(ft): 9.750           5.250                       Bend Loss Coef: 0.50
  Manning's N: 0.011000        0.011000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                     Inlet Ctrl Spec: Use dn
 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

==== Hydrology Simulations ====

```
         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 12.00
```

Time(hrs)	Print Inc(min)
30.000	5.00

```
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.50
```

Time(hrs)	Print Inc(min)
30.000	5.00

```
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32
```

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

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

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

         Name: 100YR24HR            Hydrology Sim: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

----------------------------------------------------------------------------------------------------
         Name: 10YR24HR             Hydrology Sim: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:


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

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

----------------------------------------------------------------------------------------------------
         Name: 25YR24HR             Hydrology Sim: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                  Max Calc Time(sec): 60.0000
        Boundary Stages:                            Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
BASIN SUMMARY

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 100YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 12.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 157.48
   Runoff Volume (in): 9.033
  Runoff Volume (ft3): 1380385
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 10YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 7.500
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

       Time Max (hrs): 12.27
       Flow Max (cfs): 84.74
   Runoff Volume (in): 4.816
  Runoff Volume (ft3): 736016
```

```
           Basin Name: TANGLEWOOD
           Group Name: BASE
           Simulation: 25YR24HR
            Node Name: POND
           Basin Type: SCS Unit Hydrograph

      Unit Hydrograph: Uh256
        Peaking Fator: 256.0
  Spec Time Inc (min): 4.00
  Comp Time Inc (min): 4.00
        Rainfall File: Flmod
 Rainfall Amount (in): 9.000
 Storm Duration (hrs): 24.00
               Status: Onsite
   Time of Conc (min): 30.00
     Time Shift (hrs): 0.00
            Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
BASIN SUMMARY

```
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 108.88
    Runoff Volume (in): 6.197
   Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	20.29	15.50	-10.5000	47267	0.00	0.00	12.32	2.98
POND	BASE	100YR24HR	24.00	20.31	20.00	-2.0000	75314	12.25	154.32	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	20.29	14.75	-9.7500	199831	12.32	2.98	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.00	17.76	15.50	-10.5000	23010	0.00	0.00	12.75	2.87
POND	BASE	10YR24HR	24.00	17.77	20.00	-2.0000	65349	12.25	84.41	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.76	14.75	-9.7500	92853	12.75	2.87	12.93	2.01
IDLEWILD	BASE	25YR24HR	24.00	18.76	15.50	-10.5000	32577	0.00	0.00	12.53	3.03
POND	BASE	25YR24HR	24.00	18.77	20.00	-2.0000	69274	12.31	103.53	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.76	14.75	-9.7500	135049	12.53	3.03	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 2.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.32	2.98	-4.276	24.00	20.29	24.00	20.29
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.054	24.00	20.29	24.00	20.31
IDLEWILD-SCHOOL	BASE	10YR24HR	12.75	2.87	-4.097	24.00	17.76	24.00	17.76
SCHOOL-POND	BASE	10YR24HR	12.93	2.01	-3.286	24.00	17.76	24.00	17.77
IDLEWILD-SCHOOL	BASE	25YR24HR	12.53	3.03	-4.146	24.00	18.76	24.00	18.76
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.864	24.00	18.76	24.00	18.77

==== Basins ====

Name: TANGLEWOOD   Node: POND   Status: Onsite
Group: BASE   Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256   Peaking Factor: 256.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000   Time of Conc(min): 30.00
Area(ac): 42.100   Time Shift(hrs): 0.00
Curve Number: 77.00   Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes ====

Name: IDLEWILD   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 15.500
Type: Stage/Area

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

Name: POND   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 20.000
Type: Stage/Area

Stage(ft)	Area(ac)
3.000	0.3600
4.000	0.4200
5.000	0.4800
6.000	0.5400
7.000	0.6100
8.000	0.6800
9.000	0.7500
10.000	0.8300
11.000	0.9000
12.000	0.9900
13.000	1.0700
14.000	1.1600
15.000	1.2500

Name: SCHOOL   Base Flow(cfs): 0.000   Init Stage(ft): 0.000
Group: BASE   Warn Stage(ft): 14.750
Type: Stage/Area

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

Name: IDLEWILD-SCHOOL   From Node: IDLEWILD   Length(ft): 225.00
Group: BASE   To Node: SCHOOL   Count: 1
Friction Equation: Average Conveyance

```
                UPSTREAM          DOWNSTREAM                      Solution Algorithm: Automatic
      Geometry: Circular          Circular                                      Flow: Both
      Span(in): 36.00             36.00                           Entrance Loss Coef: 0.50
      Rise(in): 36.00             36.00                               Exit Loss Coef: 0.50
    Invert(ft): 10.500            9.750                               Bend Loss Coef: 0.00
   Manning's N: 0.011000          0.011000                         Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                             Inlet Ctrl Spec: Use dn
  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: SCHOOL-POND         From Node: SCHOOL                   Length(ft): 625.00
         Group: BASE                  To Node: POND                          Count: 1
                                                               Friction Equation: Average Conveyance
                UPSTREAM          DOWNSTREAM                   Solution Algorithm: Automatic
      Geometry: Circular          Circular                                   Flow: Both
      Span(in): 42.00             42.00                        Entrance Loss Coef: 0.50
      Rise(in): 42.00             42.00                            Exit Loss Coef: 0.50
    Invert(ft): 9.750             5.250                            Bend Loss Coef: 0.50
   Manning's N: 0.011000          0.011000                      Outlet Ctrl Spec: Use dc or tw
  Top Clip(in): 0.000             0.000                          Inlet Ctrl Spec: Use dn
  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

==== Hydrology Simulations ====

```
         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 12.00
```

Time(hrs)	Print Inc(min)
30.000	5.00

```
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
         Rainfall File: Flmod
    Rainfall Amount(in): 7.50
```

Time(hrs)	Print Inc(min)
30.000	5.00

```
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 3.0
INPUT SUMMARY

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

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

```
==========================================================================================
==== Routing Simulations =================================================================
==========================================================================================

        Name: 100YR24HR            Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:


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

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

--------------------------------------------------------------------------------------------
        Name: 10YR24HR             Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:


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

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

--------------------------------------------------------------------------------------------
        Name: 25YR24HR             Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

        Max Delta Z(ft): 1.00                       Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                       End Time(hrs): 24.00
     Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
        Boundary Stages:                           Boundary Flows:
```

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 3.0
BASIN SUMMARY

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 100YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
        Rainfall File: Flmod
  Rainfall Amount (in): 12.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 157.48
    Runoff Volume (in): 9.033
   Runoff Volume (ft3): 1380385
```

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 10YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
        Rainfall File: Flmod
  Rainfall Amount (in): 7.500
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 84.74
    Runoff Volume (in): 4.816
   Runoff Volume (ft3): 736016
```

```
            Basin Name: TANGLEWOOD
            Group Name: BASE
            Simulation: 25YR24HR
             Node Name: POND
            Basin Type: SCS Unit Hydrograph

       Unit Hydrograph: Uh256
         Peaking Fator: 256.0
   Spec Time Inc (min): 4.00
   Comp Time Inc (min): 4.00
        Rainfall File: Flmod
  Rainfall Amount (in): 9.000
  Storm Duration (hrs): 24.00
                Status: Onsite
    Time of Conc (min): 30.00
      Time Shift (hrs): 0.00
             Area (ac): 42.100
```

```
 Vol of Unit Hyd (in): 1.000
         Curve Number: 77.000
             DCIA (%): 0.000

      Time Max (hrs): 12.27
      Flow Max (cfs): 108.88
   Runoff Volume (in): 6.197
  Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 3.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	24.00	20.34	15.50	-10.5000	47692	0.00	0.00	12.29	2.97
POND	BASE	100YR24HR	24.00	20.35	20.00	-3.0000	75488	12.25	154.32	0.00	0.00
SCHOOL	BASE	100YR24HR	24.00	20.34	14.75	-9.7500	201709	12.29	2.97	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.00	17.84	15.50	-10.5000	23762	0.00	0.00	13.34	2.84
POND	BASE	10YR24HR	24.00	17.84	20.00	-3.0000	65657	12.25	84.34	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.84	14.75	-9.7500	96171	13.34	2.84	12.86	1.98
IDLEWILD	BASE	25YR24HR	24.01	18.82	15.50	-10.5000	33159	0.00	0.00	12.49	3.01
POND	BASE	25YR24HR	24.01	18.83	20.00	-3.0000	69513	12.28	103.91	0.00	0.00
SCHOOL	BASE	25YR24HR	24.01	18.82	14.75	-9.7500	137616	12.49	3.01	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 3.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.29	2.97	-4.263	24.00	20.34	24.00	20.34
SCHOOL-POND	BASE	100YR24HR	0.00	0.00	-1.025	24.00	20.34	24.00	20.35
IDLEWILD-SCHOOL	BASE	10YR24HR	13.34	2.84	-4.086	24.00	17.84	24.00	17.84
SCHOOL-POND	BASE	10YR24HR	12.86	1.98	-3.279	24.00	17.84	24.00	17.84
IDLEWILD-SCHOOL	BASE	25YR24HR	12.49	3.01	-4.157	24.01	18.82	24.01	18.82
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	0.836	24.01	18.82	24.01	18.83

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 4.0
INPUT SUMMARY

==== Basins ====

```
         Name: TANGLEWOOD                 Node: POND                    Status: Onsite
        Group: BASE                       Type: SCS Unit Hydrograph CN

        Unit Hydrograph: Uh256                  Peaking Factor: 256.0
          Rainfall File:                   Storm Duration(hrs): 0.00
    Rainfall Amount(in): 0.000               Time of Conc(min): 30.00
               Area(ac): 42.100                Time Shift(hrs): 0.00
          Curve Number: 77.00            Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00
```

==== Nodes ====

```
      Name: IDLEWILD              Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 15.500
      Type: Stage/Area
```

Stage(ft)	Area(ac)
16.000	0.1400
17.000	0.3600

```
      Name: POND                  Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 20.000
      Type: Stage/Area
```

Stage(ft)	Area(ac)
4.000	0.4200
5.000	0.4800
6.000	0.5400
7.000	0.6100
8.000	0.6800
9.000	0.7500
10.000	0.8300
11.000	0.9000
12.000	0.9900
13.000	1.0700
14.000	1.1600
15.000	1.2500

```
      Name: SCHOOL                Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 14.750
      Type: Stage/Area
```

Stage(ft)	Area(ac)
15.000	0.1300
16.000	0.4200
17.000	1.3900

==== Pipes ====

```
        Name: IDLEWILD-SCHOOL      From Node: IDLEWILD           Length(ft): 225.00
       Group: BASE                   To Node: SCHOOL                  Count: 1
                                                          Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM                Solution Algorithm: Automatic
```

```
     Geometry: Circular        Circular                             Flow: Both
     Span(in): 36.00           36.00                  Entrance Loss Coef: 0.50
     Rise(in): 36.00           36.00                      Exit Loss Coef: 0.50
   Invert(ft): 10.500          9.750                      Bend Loss Coef: 0.00
  Manning's N: 0.011000        0.011000                Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                    Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND          From Node: SCHOOL              Length(ft): 625.00
        Group: BASE                   To Node: POND                     Count: 1
                                                          Friction Equation: Average Conveyance
               UPSTREAM        DOWNSTREAM                Solution Algorithm: Automatic
     Geometry: Circular        Circular                                Flow: Both
     Span(in): 42.00           42.00                     Entrance Loss Coef: 0.50
     Rise(in): 42.00           42.00                         Exit Loss Coef: 0.50
   Invert(ft): 9.750           5.250                         Bend Loss Coef: 0.50
  Manning's N: 0.011000        0.011000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000           0.000                       Inlet Ctrl Spec: Use dn
 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


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

         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

------------------------------------------------------------------------------------------------------
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

------------------------------------------------------------------------------------------------------
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
```

```
    Storm Duration(hrs): 24.00
          Rainfall File: Flmod
    Rainfall Amount(in): 9.00

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

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

        Name: 100YR24HR           Hydrology Sim: 100YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


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

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

--------------------------------------------------------------------------------------------
        Name: 10YR24HR            Hydrology Sim: 10YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


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

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

--------------------------------------------------------------------------------------------
        Name: 25YR24HR            Hydrology Sim: 25YR24HR
    Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

       Max Delta Z(ft): 1.00                      Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                      End Time(hrs): 24.00
    Min Calc Time(sec): 0.5000                 Max Calc Time(sec): 60.0000
       Boundary Stages:                           Boundary Flows:


Time(hrs)        Print Inc(min)
```

999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 4.0
BASIN SUMMARY

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
         Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 157.48
     Runoff Volume (in): 9.033
    Runoff Volume (ft3): 1380385
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 10YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
         Rainfall File: Flmod
   Rainfall Amount (in): 7.500
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 84.74
     Runoff Volume (in): 4.816
    Runoff Volume (ft3): 736016
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
         Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 4.0
BASIN SUMMARY

```
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 108.88
    Runoff Volume (in): 6.197
   Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 4.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	23.99	20.39	15.50	-10.5000	48191	0.00	0.00	12.09	2.28
POND	BASE	100YR24HR	23.99	20.40	20.00	-4.0000	75692	12.25	158.05	0.00	0.00
SCHOOL	BASE	100YR24HR	23.99	20.39	14.75	-9.7500	203908	12.09	2.28	12.09	1.60
IDLEWILD	BASE	10YR24HR	24.00	17.93	15.50	-10.5000	24627	0.00	0.00	12.77	3.16
POND	BASE	10YR24HR	24.00	17.94	20.00	-4.0000	66012	12.25	82.81	0.00	0.00
SCHOOL	BASE	10YR24HR	24.00	17.93	14.75	-9.7500	99993	12.77	3.16	0.00	0.00
IDLEWILD	BASE	25YR24HR	24.00	18.89	15.50	-10.5000	33831	0.00	0.00	12.44	2.99
POND	BASE	25YR24HR	24.00	18.90	20.00	-4.0000	69788	12.33	104.59	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.89	14.75	-9.7500	140580	12.44	2.99	0.00	0.00

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 4.0
LINK MIN MAX

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
IDLEWILD-SCHOOL	BASE	100YR24HR	12.09	2.28	4.073	23.99	20.39	23.99	20.39
SCHOOL-POND	BASE	100YR24HR	12.09	1.60	2.798	23.99	20.39	23.99	20.40
IDLEWILD-SCHOOL	BASE	10YR24HR	12.77	3.16	-4.081	24.00	17.93	24.00	17.93
SCHOOL-POND	BASE	10YR24HR	0.00	0.00	1.075	24.00	17.93	24.00	17.94
IDLEWILD-SCHOOL	BASE	25YR24HR	12.44	2.99	-4.163	24.00	18.89	24.00	18.89
SCHOOL-POND	BASE	25YR24HR	0.00	0.00	-0.896	24.00	18.89	24.00	18.90

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

        Name: TANGLEWOOD                 Node: POND                  Status: Onsite
       Group: BASE                       Type: SCS Unit Hydrograph CN

       Unit Hydrograph: Uh256                      Peaking Factor: 256.0
         Rainfall File:                         Storm Duration(hrs): 0.00
   Rainfall Amount(in): 0.000                     Time of Conc(min): 30.00
              Area(ac): 42.100                      Time Shift(hrs): 0.00
          Curve Number: 77.00                 Max Allowable Q(cfs): 999999.000
               DCIA(%): 0.00

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

      Name: IDLEWILD              Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 15.500
      Type: Stage/Area

      Stage(ft)         Area(ac)
--------------- ---------------
         16.000          0.1400
         17.000          0.3600

----------------------------------------------------------------------------------
      Name: POND                  Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 20.000
      Type: Stage/Area

      Stage(ft)         Area(ac)
--------------- ---------------
          5.000          0.4800
          6.000          0.5400
          7.000          0.6100
          8.000          0.6800
          9.000          0.7500
         10.000          0.8300
         11.000          0.9000
         12.000          0.9900
         13.000          1.0700
         14.000          1.1600
         15.000          1.2500

----------------------------------------------------------------------------------
      Name: SCHOOL                Base Flow(cfs): 0.000          Init Stage(ft): 0.000
     Group: BASE                                                 Warn Stage(ft): 14.750
      Type: Stage/Area

      Stage(ft)         Area(ac)
--------------- ---------------
         15.000          0.1300
         16.000          0.4200
         17.000          1.3900

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

        Name: IDLEWILD-SCHOOL     From Node: IDLEWILD            Length(ft): 225.00
       Group: BASE                  To Node: SCHOOL                   Count: 1
                                                      Friction Equation: Average Conveyance
              UPSTREAM         DOWNSTREAM            Solution Algorithm: Automatic
    Geometry: Circular         Circular                            Flow: Both
```

```
     Span(in): 36.00          36.00                  Entrance Loss Coef: 0.50
     Rise(in): 36.00          36.00                      Exit Loss Coef: 0.50
   Invert(ft): 10.500         9.750                      Bend Loss Coef: 0.00
  Manning's N: 0.011000       0.011000                 Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                     Inlet Ctrl Spec: Use dn
 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: SCHOOL-POND        From Node: SCHOOL            Length(ft): 625.00
        Group: BASE                 To Node: POND                   Count: 1
                                                        Friction Equation: Average Conveyance
               UPSTREAM       DOWNSTREAM               Solution Algorithm: Automatic
     Geometry: Circular       Circular                               Flow: Both
     Span(in): 42.00          42.00                    Entrance Loss Coef: 0.50
     Rise(in): 42.00          42.00                        Exit Loss Coef: 0.50
   Invert(ft): 9.750          5.250                        Bend Loss Coef: 0.50
  Manning's N: 0.011000       0.011000                   Outlet Ctrl Spec: Use dc or tw
 Top Clip(in): 0.000          0.000                       Inlet Ctrl Spec: Use dn
 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

==== Hydrology Simulations ====

```
         Name: 100YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
           Rainfall File: Flmod
    Rainfall Amount(in): 12.00

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

```
         Name: 10YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
           Rainfall File: Flmod
    Rainfall Amount(in): 7.50

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

```
         Name: 25YR24HR
     Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.R32

      Override Defaults: Yes
    Storm Duration(hrs): 24.00
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 5.0
INPUT SUMMARY

Rainfall File: Flmod
Rainfall Amount(in): 9.00

Time(hrs)	Print Inc(min)
30.000	5.00

==== Routing Simulations ====

Name: 100YR24HR Hydrology Sim: 100YR24HR
Filename: K:\536\ProjData\DrnData\ICPR\100YR24HR.I32

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

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 10YR24HR Hydrology Sim: 10YR24HR
Filename: K:\536\ProjData\DrnData\ICPR\10YR24HR.I32

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

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
999.000	15.000

Group	Run
BASE	Yes

Name: 25YR24HR Hydrology Sim: 25YR24HR
Filename: K:\536\ProjData\DrnData\ICPR\25YR24HR.I32

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

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 24.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)

999.000	15.000

Group	Run
BASE	Yes

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 5.0
BASIN SUMMARY

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 100YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 12.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 157.48
     Runoff Volume (in): 9.033
    Runoff Volume (ft3): 1380385
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 10YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 7.500
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
   Vol of Unit Hyd (in): 1.000
           Curve Number: 77.000
               DCIA (%): 0.000

         Time Max (hrs): 12.27
         Flow Max (cfs): 84.74
     Runoff Volume (in): 4.816
    Runoff Volume (ft3): 736016
```

```
             Basin Name: TANGLEWOOD
             Group Name: BASE
             Simulation: 25YR24HR
              Node Name: POND
             Basin Type: SCS Unit Hydrograph

        Unit Hydrograph: Uh256
          Peaking Fator: 256.0
    Spec Time Inc (min): 4.00
    Comp Time Inc (min): 4.00
          Rainfall File: Flmod
   Rainfall Amount (in): 9.000
   Storm Duration (hrs): 24.00
                 Status: Onsite
     Time of Conc (min): 30.00
       Time Shift (hrs): 0.00
              Area (ac): 42.100
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 5.0
BASIN SUMMARY

```
  Vol of Unit Hyd (in): 1.000
          Curve Number: 77.000
              DCIA (%): 0.000

        Time Max (hrs): 12.27
        Flow Max (cfs): 108.88
    Runoff Volume (in): 6.197
   Runoff Volume (ft3): 947022
```

TANGLEWOOD DRAINAGE ANALYSIS - POST 4:1 SLOPES
POND BOTTOM AT 5.0
NODE MIN MAX

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
IDLEWILD	BASE	100YR24HR	23.99	20.45	15.50	-10.5000	48761	0.00	0.00	12.23	2.98
POND	BASE	100YR24HR	23.99	20.46	20.00	-5.0000	75926	12.22	152.65	0.00	0.00
SCHOOL	BASE	100YR24HR	23.99	20.45	14.75	-9.7500	206421	12.23	2.98	0.00	0.00
IDLEWILD	BASE	10YR24HR	24.01	18.03	15.50	-10.5000	25607	0.00	0.00	12.69	3.15
POND	BASE	10YR24HR	24.01	18.04	20.00	-5.0000	66413	12.27	80.88	0.00	0.00
SCHOOL	BASE	10YR24HR	24.01	18.03	14.75	-9.7500	104316	12.69	3.15	0.00	0.00
IDLEWILD	BASE	25YR24HR	24.00	18.97	15.50	-10.5000	34596	0.00	0.00	12.39	3.00
POND	BASE	25YR24HR	24.00	18.98	20.00	-5.0000	70101	12.31	105.47	0.00	0.00
SCHOOL	BASE	25YR24HR	24.00	18.97	14.75	-9.7500	143951	12.39	3.00	0.00	0.00

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 9

LOCATION: LOUISANA AVENUE AND CONGRESS STREET (LAKE CHASCO)

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 9
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 9-LOUISIANA AND CONGRESS (LAKE CHASCO)

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	456	SY	$3.60	$1,642
I-A-2	STAKED SILT FENCE	270	LF	$1.40	$378
I-B-1	1.5" S-3 ASPHALT OVERLAY	779	SY	$13.50	$10,517
I-B-2	8" S-1 ASPHALT BASE	154	SY	$44.00	$6,776
I-B-3	2' CONCRETE VALLEY CURB	160	LF	$20.00	$3,200
I-B-7	4' WIDE CONC SIDEWALK	240	SF	$3.00	$720
I-B-8	CURB RAMPS	3	EA	$1,375.00	$4,125
I-B-9	HC RAMPS	3	EA	$1,100.00	$3,300
I-C-1	FDOT TYPE 4 STORM INLET(S)	4	EA	$4,950.00	$19,800
I-C-2	STORM MANHOLE	1	EA	$2,500.00	$2,500
I-C-3	18 " RCP	90	LF	$28.00	$2,520
I-C-4	24 " RCP	45	LF	$37.50	$1,688
I-C-5	30" RCP	135	LF	$51.00	$6,885
I-C-6	30" FES	1	EA	$1,760.00	$1,760
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$3,300.00	$3,300
I-D-2	24" STOP BAR (THERMOPLASTIC)	24	LF	$4.25	$102
I-D-3	CROSSWALKS (THERMOPLASTIC) FDOT INDEX 17346	2	EA	$800.00	$1,600
I-D-4	REMOVE & REPLACE EXISTING TREES	9	EA	$660.00	$5,940
I-D-5	TRAFFIC STRIPE SOLID 6" WHITE (THERMOPLASTIC)	20	LF	$1.40	$28
I-D-6	TEMPORARY TRAFFIC PAINT	20	LF	$1.25	$25
2-A-1	RELOCATE EXISTING 8-INCH WATER MAIN	40	EA	$28.60	$1,144
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
I-D-5	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$3,500	$3,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$81,999**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$87,999**
CONSULTING FEES- DESIGN SURVEY,DESIGN-(NO BIDDING)	$4,800
SUB-SURFACE UTILITY LOCATE	$3,000
REIMBURBURSABLES	$100
WATER QUALITY DIFFUSER SYSTEM ($4000) & ELECTRIC HOOK UP ($2500)	$6,500
TOTAL	**$102,399**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

(1) WATER QUALITY DIFFUSER SYSTEM TO BE PLACED IN LAKE CHASCO, ONCE THE ORANGE LAKE DIFFUSER SYSTEM HAS PROVEN SUCCESSFUL-ADDED MAY 2014

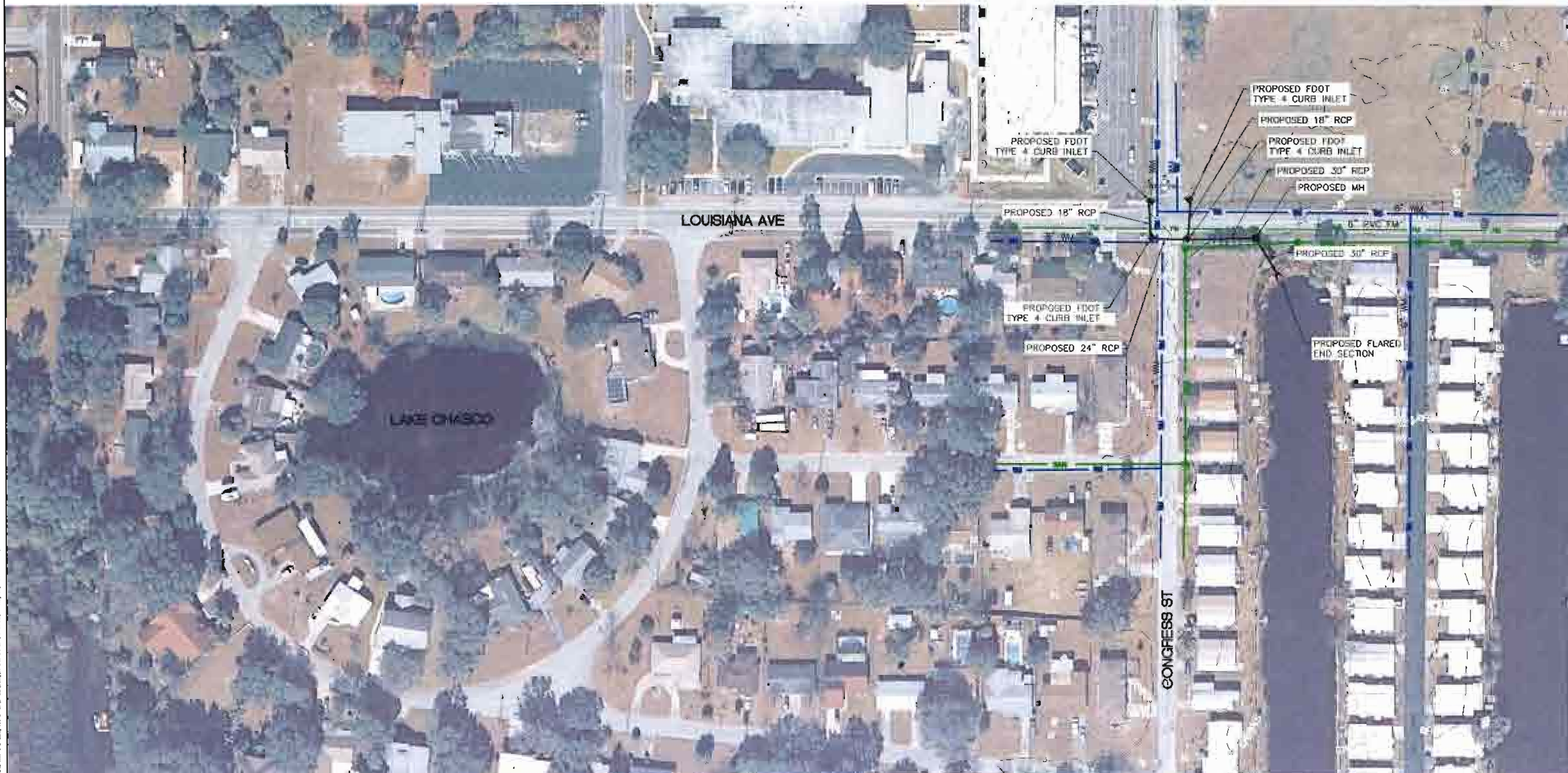
(2) A WATER QUALITY DIFFUSER SYSTEM, AND/OR INLET BASKET COLLECTION SYSTEM, AND/OR CONSTRUCTION OF DRY RETENTION POND[S] AS A TYPE OF A PRE-TREATMENT FACILTY ARE TO BE CONSIDERED AS POSSIBILITIES. THE ORANGE LAKE DIFFUSER SYSTEM SHOULD BE PROVEN SUCCESSFUL PRIOR TO IMPLEMENTATION IN OTHER AREAS.

NOTES:

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY ON NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SCD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LiDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

N

0 30 60 120



FLORIDA DESIGN CONSULTANTS, INC.
THINK IT ACHIEVE IT

PREPARED FOR:

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

SHEET DESCRIPTION:
2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #9
LOUISIANA AVE & CONGRESS STREET (LAKE CHASCO)
DRAINAGE IMPROVEMENTS

NO.	DATE	REVISIONS	APP'D BY

516-43
538
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 10

LOCATION: THE MEADOWS OUTFALL HEADWALL

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 10
CITY OF NEW PORT RICHEY, FL
OCTOBER 2103

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 10-THE MEADOWS OUTFALL HEADWALL

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	120	LF	$1.40	$168
I-A-2	FLOATING TURBIDITY BARRIER	160	LF	$9.00	$1,440
I-A-3	DEMO HEADWALLS	12	SY	$22.00	$264
I-A-4	SHEET PILE DE-WATERING	3	WK	$1,650.00	$4,950
I-A-5	SOD (FLORATAM)	200	SY	$3.60	$720
I-C-1	REPLACE 38" X 60" HEADWALL	1	EA	$9,350.00	$9,350
I-C-2	REPLACE 43" X 68" HEADWALL	2	EA	$11,000.00	$22,000
I-C-3	REPLACE 36" HEADWALL WITH TIE IN TO 43 x 68 HDWLL	1	LF	$4,950.00	$4,950
I-D-1	REMOVE TREES	1	LS	$1,100.00	$1,100
I-D-2	REPLACE SIGN "THE MEADOWS"	1	LS	$5,500.00	$5,500
I-D-3	PLANTINGS (BUTTONWOOD & MANGROVES)	1	LS	$5,500.00	$5,500
I-D-4	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$3,100.00	$3,100
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$59,042**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$65,042**
CONSULTING FEES-DESIGN SURVEY, DESIGN-(NO BIDDING)	$4,800
REIMBURBURSABLES	$50
TOTAL	**$69,892**

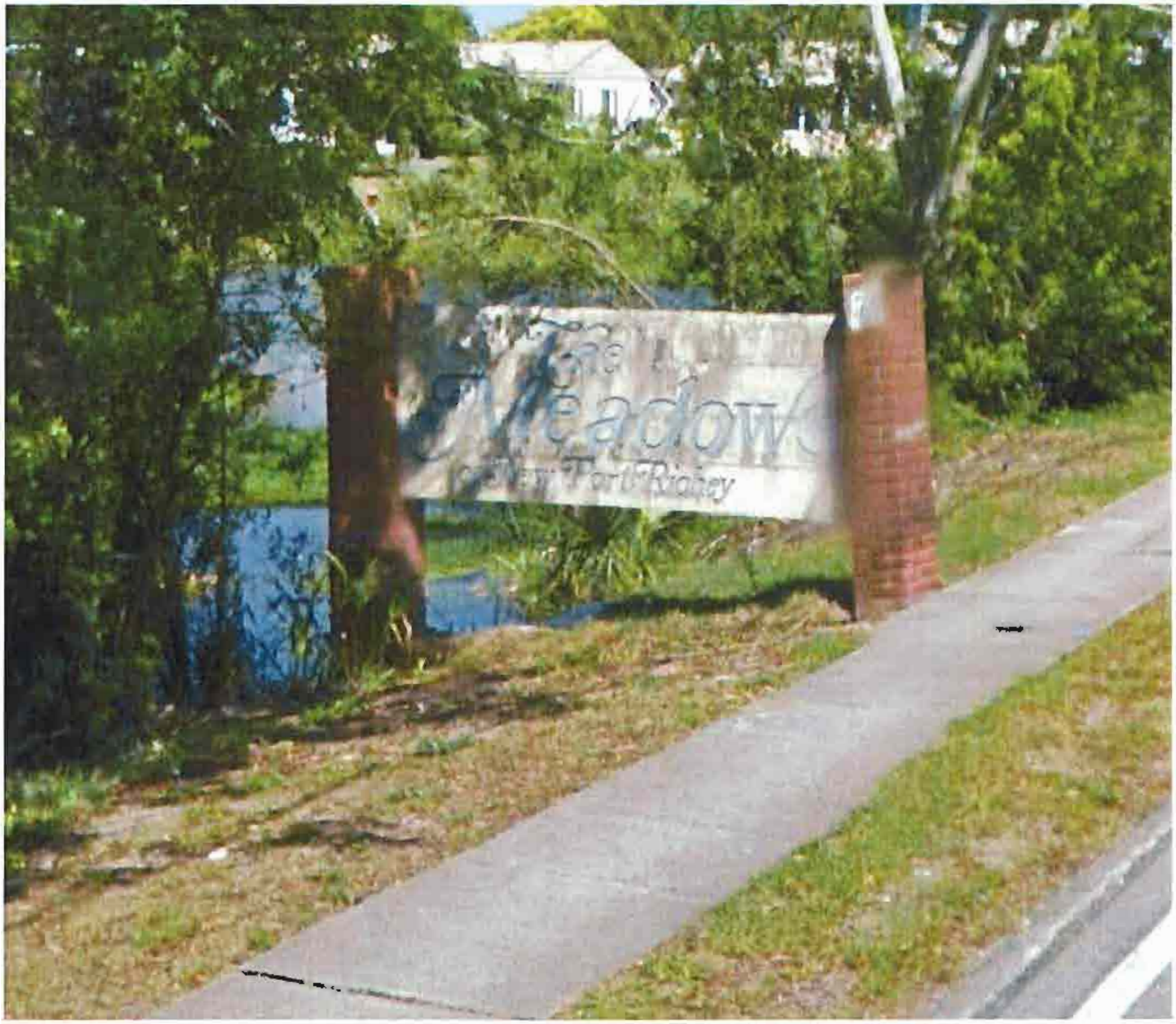
NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\(NPR Master Drainage Plan ITEM 10 The Meadows Outfall Headwall.xlsx]Sheet1

CECELIA DRIVE AT "THE MEADOWS" SUBDIVISION ENTRANCE

(LOOKING WEST)

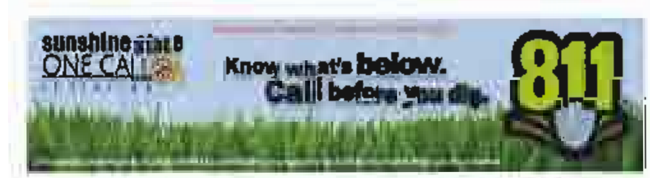
2013 MASTER DRAINAGE PLAN 10-YEAR UPDATE TASK ORDER ITEM #10 THE MEADOWS OUTFALL HEADWALL	516-43	536
FLORIDA DESIGN CONSULTANTS, INC. ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS	12-04-13 AVS	A



CECELIA DRIVE AT "THE MEADOWS" SUBDIVISION ENTRANCE

(LOOKING EAST)

2013 MASTER DRAINAGE PLAN 10-YEAR UPDATE TASK ORDER ITEM #10 THE MEADOWS OUTFALL HEADWALL	516-43	536
FLORIDA DESIGN CONSULTANTS, INC. ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS	12-04-13 AVS	B



NOTES:

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #10
THE MEADOWS OUTFALL HEADWALL

JOB NO.	516-43
	536
	N/A
DATE	12/04/13
	1
OF	1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 11

LOCATION: RVIERVIEW DRIVE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A limited Preliminary Storm Sewer Design Drainage Program was prepared. It is included.
6. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
7. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
8. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 11
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 11-RIVERVIEW DRIVE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	1715	SY	$3.60	$6,174
I-A-2	STAKED SILT FENCE	700	LF	$1.40	$980
I-A-3	FLOATING TURBIDITY BARRIER	40	LF	$9.00	$360
I-B-1	1.5" S-3 ASPHALT OVERLAY	700	SY	$13 50	$9,450
I-B-2	1.5" S-1 ASPHALT BASE	700	SY	$9.00	$6,300
I-B-3	6" CRUSHED CONCRETE BASE	715	SY	$14.00	$10,010
I-B-4	PIPE BACKFILL	1,733	CY	$13.50	$23,396
I-C-1	FDOT TYPE D STORM INLET(S)	6	EA	$2,715.00	$16,290
I-C-2	36" SINGLE HEADWALL	1	EA	$3,850.00	$3,850
I-C-3	18 " RCP	61	LF	$27.25	$1,662
I-C-4	24 " RCP	138	LF	$37.50	$5,175
I-C-5	30" RCP	132	LF	$51.00	$6,732
I-C-6	36" RCP	111	LF	$72.75	$8,075
I-C-7	SHEET PILING FOR STORM INSTALLATION	150	LF	$55.00	$8,250
I-C-8	REMOVE EXISTING STORM PIPE	270	EA	$13.50	$3,645
I-C-9	ABANDON AND GROUT EXIST. 6" PIPE	1	EA	$3,300.00	$3,000
I-C-10	TIE IN EXISTING PIPE TO STORM INLET	1	EA	$1,100.00	$1,100
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$5,500.00	$5,500
I-D-2	REMOVE & REPLACE EXISTING TREES	2	EA	$660.00	$1,320
I-D-3	REMOVE & REPLACE SHED AND PAD	1	LS	$3,300.00	$3,300
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	280	LF	$13.50	$3,780
2-A-2	ADJUST EXIST. VALVE TO GRADE	4	EA	$275.00	$1,100
I-D-4	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,600	$4,600
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$134,049**
MOBILIZATION	$4,000
CONTINGENCY	$8,000
SUB-TOTAL	**$146,049**
CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NO BIDDING)	$16,200
SUB-SURFACE UTILITY LOCATE	$3,000
REIMBURBURSABLES	$2,400
TOTAL	**$167,649**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 11 Riverview Drive.xlsx]Sheet1

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400614

Date:	10/29/2013
Time:	7:45 AM
Project Name:	City of New Port Richey Master Drainage
Attendees:	Monte Ritter; David Sauskojus, Steve Wasson

County:	Pasco	**Sec/Twp/Rge:**	(1) 5/26/16 (2) 8/26/16
Total Land Acreage:	(1) <0.5 acres (2) <0.5 acres	**Project Acreage:**	(1) <0.5 acres (2) <0.5 acres

Prior On-Site/Off-Site Permit Activity:
- (1) Adjacent permits: 6835.001 and 22259.001
- (2) Adjacent Permit: 28815.000

Project Overview:
- (1) Approx. 100 linear feet of proposed 18"-24" storm sewer addition to alleviate nuisance flooding (approx 40' x 25') on Florida Ave. Proposed storm sewer will connect to existing storm sewer, which discharges to Orange Lake. Orange Lake discharges to tidal portion of Pithlachascotee River.
- (2) Approx. 440 linear feet of proposed 18"-36" storm sewer addition and replacement to alleviate nuisance flooding on Riverview Drive and to improve conveyance to the Pithlachascotee River. Discharge will continue to be directed to non-tidal portion of the river. Includes replacing exist 24" with 36" pipe to river and plugging existing 6" pipe to river.
- Wetlands/Surface Waters – Yes; DRI – No; District Funds – No.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- (1) No wetlands or surface waters within this pipe installation project.
- (2) Pithlachascotee River is SSL. Will need Consent by Rule or Letter of Consent for work involving 36-inch pipe construction at river. Will be some temporary construction impacts in river. Probably minor enough so no mitigation required. 36" pipe outlet to river must have safety grating installed.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

Both projects in Pithlachascotee River Watershed and are in open basins.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- (1) Attenuation not required. Orange lake discharges to tidal portion of Pithlachascotee River.
- (2) Demonstrate that discharges from proposed project area will not cause an adverse impact for a 25-year, 24-hour storm event and will not increase flood stages up- or down-stream of the project area(s) from storm events up to and including the 100-year, 24-hour event. Use results from 1996 Pithlachascotee River watershed study for boundary conditions.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- (1) and (2) Water quality treatment not necessary. No new impervious areas are proposed.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- (1) N/A
- (2) Pithlachascotee River will be involved with minor temporary construction. Authorization will be linked to Individual ERP.

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- (1) N/A
- (2) The permit must be issued to the property owner(s).

Application Type and Fee Required:

- (1) De minimis Exemption - $100.00
- (2) Individual ERP – Sections A, C and E of the ERP Application - $2184 for online submittal.
-

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Steve Wasson

From:	David Sauskojus
Sent:	Thursday, November 14, 2013 2:13 PM
To:	swasson@fldesign.com
Subject:	Manatee Exclusion Devices
Attachments:	manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org
WaterMatters.org/**ePermitting**

Florida Fish
and Wildlife
Conservation
Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

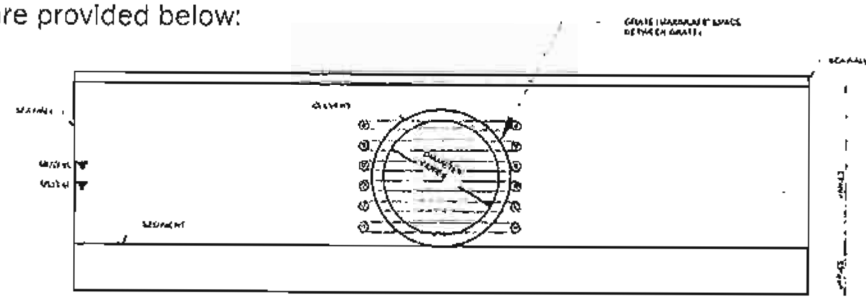
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

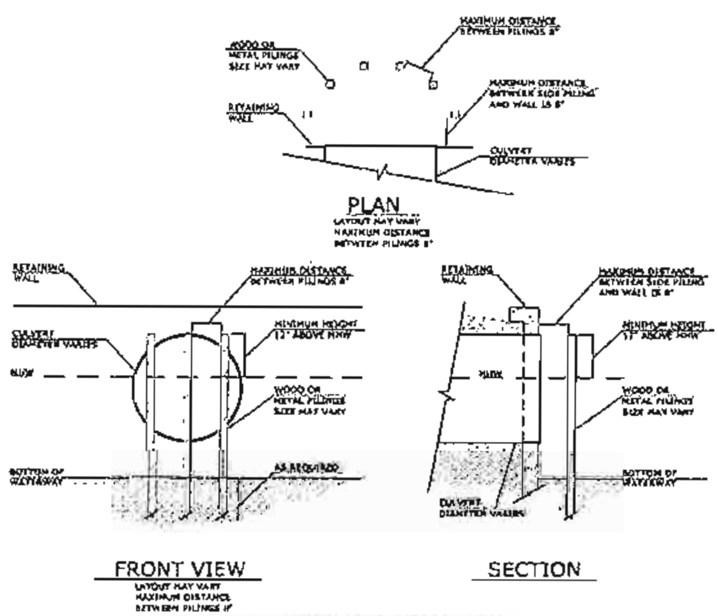
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH
GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER

STORM SEWER HYDRAULICS

System: **NEW**

PROJECT	
Number:	536
Description:	.
County:	Pasco

Organization: FLORIDA DESIGN CONSULTANTS, INC.
Designed by: Vinay Goel, P.E.
Checked by: Steve Wasson, P.E.

Outfall Tailwater El:	2.75
Exit Loss at Outfall:	0.15
Storm Sewer Control El:	3.00

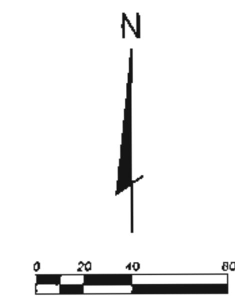
Storm Event - IDF Curve	
Zone	Frequency
1	10

CONDITIONS		
Runoff Coeff. (default)		
Area 1	Area 2	Area 3
0.64	0.00	0.00

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs) Qb	Sum(Qb) CIA TOTAL	Inlet Elevations Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations HGL Crown Line Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
S-6		**S-5**	1.04	0.64	0.66	0.66					0.00	0.00	4.00	3.58	3.53	3.48	0.047	18.00	0.1663	Full	2.63		
		0.00	0.00	0.00	0.00	0.00	10.00	0.18	6.97	0.66		4.64		0.00	2.26	2.17						6.45	0.0120
DBI-D	1	28.00	0.00	0.00	0.00	0.66						**4.64**	0.42	0.05	0.76	0.67	0.090	18.00	0.3214		3.65		
S-5		**S-2**	0.51	0.64	0.32	0.32					0.00	0.00	4.00	3.48	3.44	3.36	0.086	24.00	0.0787	Full	2.19		
		0.00	0.00	0.00	0.00	0.66	10.18	0.83	6.93	0.99		6.88		0.00	2.67	2.34						13.48	0.0120
DBI-D	1	109.00	0.00	0.00	0.00	0.99						**6.88**	0.52	0.04	0.67	0.34	0.330	24.00	0.3028		4.29		
S-4		**S-3**	1.65	0.64	1.05	1.05					0.00	0.00	4.00	3.70	3.56	3.43	0.138	18.00	0.4187	Full	4.17		
		0.00	0.00	0.00	0.00	0.00	10.00	0.13	6.97	1.05		7.36		0.00	2.34	2.24						6.26	0.0120
DBI-D	1	33.00	0.00	0.00	0.00	1.05						**7.36**	0.30	0.13	0.84	0.74	0.100	18.00	0.3030		3.54		
S-3		**S-2**	0.23	0.64	0.14	0.14					0.00	0.00	3.50	3.43	3.40	3.36	0.047	30.00	0.0353	Full	1.70		
		0.00	0.00	0.00	0.00	1.05	10.13	1.10	6.94	1.20		8.35		0.00	3.24	2.84						24.46	0.0120
DBI-D	1	132.00	0.00	0.00	0.00	1.20						**8.35**	0.07	0.02	0.74	0.34	0.400	30.00	0.3030		4.98		
S-9		**S-8**	0.99	0.64	0.63	0.63					0.00	0.00	8.50	4.12	4.07	3.90	0.178	18.00	0.1507	Full	2.50		
		0.00	0.00	0.00	0.00	0.00	10.00	0.79	6.97	0.63		4.42		0.00	2.53	2.17						6.29	0.0120
DBI-D	1	118.00	0.00	0.00	0.00	0.63						**4.42**	4.38	0.05	1.03	0.67	0.360	18.00	0.3051		3.56		
S-8		**S-7**	0.16	0.64	0.10	0.10					0.00	0.00	4.00	3.90	3.83	3.68	0.153	18.00	0.1934	Full	2.83		
		0.00	0.00	0.00	0.00	0.63	10.79	0.46	6.80	0.73		5.00		0.00	2.17	1.93						6.27	0.0120
DBI-D	1	79.00	0.00	0.00	0.00	0.73						**5.00**	0.10	0.06	0.67	0.43	0.240	18.00	0.3038		3.55		
S-7		**S-2**	2.58	0.64	1.65	1.65					0.00	0.00	4.00	3.68	3.48	3.36	0.124	24.00	0.4265	Full	5.09		
		0.00	0.00	0.00	0.00	0.73	11.25	0.09	6.70	2.38		16.00		0.00	2.43	2.34						13.65	0.0120
DBI-D	1	29.00	0.00	0.00	0.00	2.38						**16.00**	0.32	0.20	0.43	0.34	0.090	24.00	0.3103		4.35		
S-2		**S-1**	0.11	0.64	0.07	0.07					0.00	0.00	3.50	3.36	3.21	3.00	0.206	36.00	0.1853	Full	4.40		
		0.00	0.00	0.00	0.00	4.58	11.35	0.00	6.69	4.65		31.10		0.00	3.34	3.00						39.99	0.0120
DBI-D	1	111.00	0.00	0.00	0.00	4.65						**31.10**	0.14	0.15	0.34	0.00	0.340	36.00	0.3063		5.66		

Units: ENGLISH



NOTES:

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

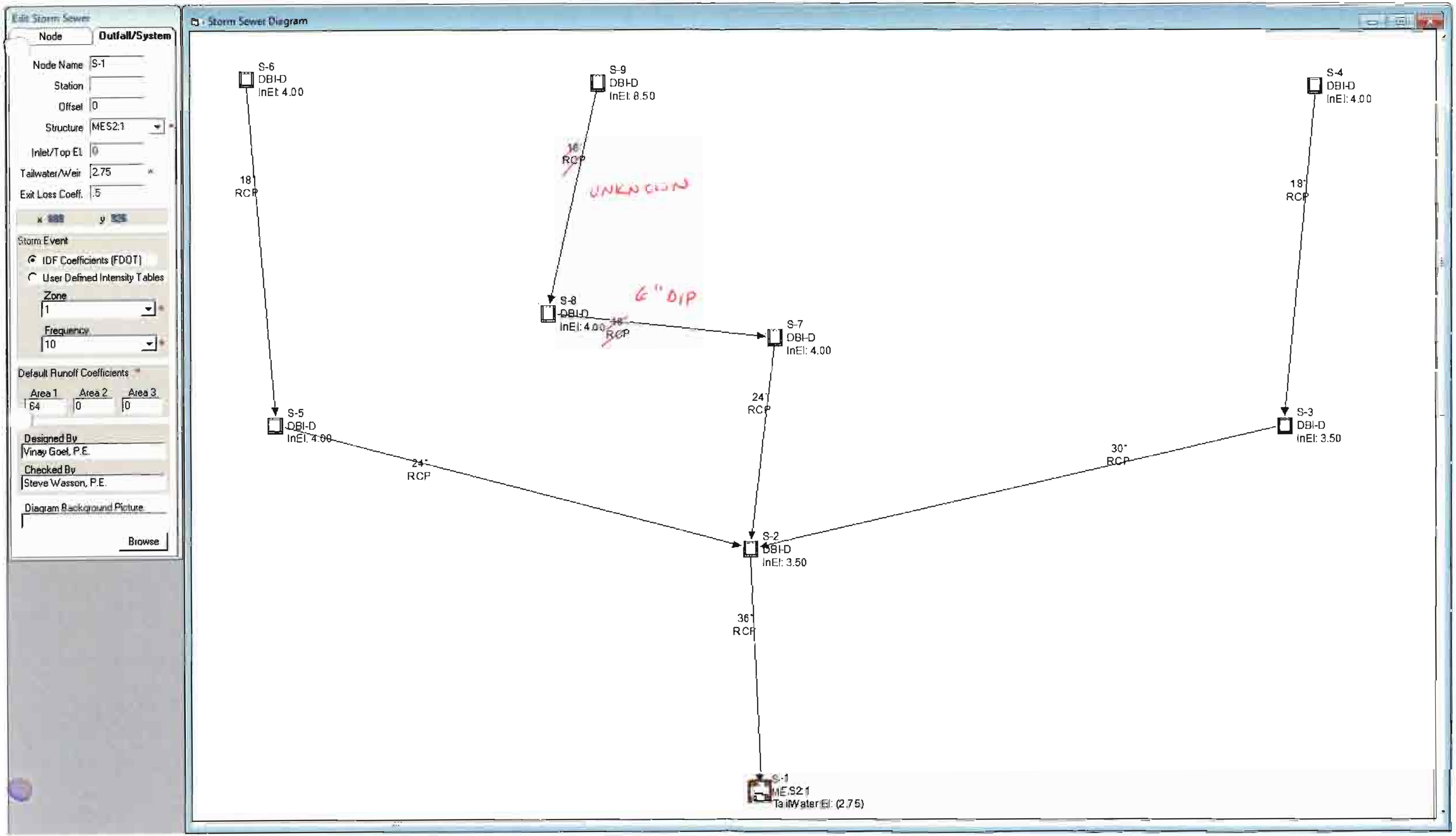
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #11

RIVERVIEW DRIVE
DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1
1


Edit Storm Sewer
Node
Outfall/System
Node Name S-1
Station
Offset 0
Structure MES2:1
Inlet/Top El. 0
Tailwater/Weir 2.75
Exit Loss Coeff. .5
Storm Event
IDF Coefficients (FDOT)
User Defined Intensity Tables
Zone
1
Frequency
10
Default Runoff Coefficients
Area 1 Area 2 Area 3
64 0 0
Designed By
Vinay Goel, P.E.
Checked By
Steve Wasson, P.E.
Diagram Background Picture
Browse
Storm Sewer Diagram
S-6
DBI-D
InEl: 4.00
S-9
DBI-D
InEl: 8.50
S-4
DBI-D
InEl: 4.00
18"
RCP
~~18"~~
~~RCP~~
UNKNOWN
18"
RCP
6" DIP
S-8
DBI-D
InEl: 4.00
~~18"~~
~~RCP~~
S-7
DBI-D
InEl: 4.00
24"
RCP
S-5
DBI-D
InEl: 4.00
24"
RCP
30"
RCP
S-3
DBI-D
InEl: 3.50
S-2
DBI-D
InEl: 3.50
36"
RCP
S-1
MES2:1
TailWater El: (2.75)

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 12

LOCATION: 5440 RICHEY DRIVE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A limited Preliminary Storm Sewer Design Drainage Program was prepared. It is included.
6. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
7. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
8. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 12
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013
PRELIMINARY ENGINEER'S ESTIMATE
ITEM 12-RICHEY DRIVE AND QUEENS LANE

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	RICHEY DRIVE				
I-A-1	SOD (FLORATAM)	80	SY	$3.60	$288
I-A-2	STAKED SILT FENCE	512	LF	$1.40	$717
I-A-3	FLOATING TURBIDITY BARRIER	40	LF	$9.00	$360
I-B-1	1.5" S-3 ASPHALT OVERLAY	206	SY	$13.50	$2,781
I-B-2	1.5 S-1 ASPHALT BASE	206	SY	$9.00	$1,854
I-B-3	6" CRUSHED CONCRETE BASE	206	SY	$14.00	$2,884
I-B-4	PIPE BACKFILL	333	CY	$13.50	$4,496
I-C-1	FDOT TYPE 3 STORM INLET(S)	2	EA	$3,575.00	$7,150
I-C-2	24" SINGLE HEADWALL	1	EA	$1,980.00	$1,980
I-C-3	18 " RCP	22	LF	$27.25	$600
I-C-4	24 " RCP	229	LF	$37.50	$8,588
I-C-5	SHEET PILING FOR STORM INSTALLATION	40	LF	$55.00	$2,200
I-C-6	STORM MANHOLE	1	EA	$2,530.00	$2,530
I-C-7	REMOVE & REPLACE EXISTING CURB	30	LF	$23.00	$690
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$550.00	$550
I-D-2	REMOVE & REPLACE EXISTING TREES	5	EA	$660.00	$3,300
2-A-1	RELOCATE EXISTING 1.5-INCH WATER MAIN	20	LF	$22.00	$440
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
	QUEENS LANE				
I-B-1	1.5" S-3 ASPHALT OVERLAY	6	SY	$27.00	$162
I-B-2	1.5 S-1 ASPHALT BASE	6	SY	$17.50	$105
I-C-1	REMOVE EXISTING SLOT DRAIN	24	LF	$11.00	$264
I-C-2	INSTALL 12" WIDE TRENCH DRAIN	24	LF	$88.00	$2,112
I-C-3	TIE IN TO EXISTING INLET AND FLUME	1	EA	$1,100.00	$1,100
I-D-3	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,000	$4,000
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$49,699**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$55,699**
CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NO BIDDING)	$7,800
SUB-SURFACE UTILITY LOCATE	$2,000
PERMIT FEES AND REIMBURSEABLES	$2,400
TOTAL	**$67,899**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

C:\Users\mfitzgerald\Downloads\[NPR Master Drainage Plan ITEM 12 Richey Drive and Queens Lane.xlsx]Sheet1

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT RESOURCE REGULATION DIVISION PRE-APPLICATION MEETING NOTES	FILE NUMBER: PA 400650

Date:	11/14/2013		
Time:	1:00		
Project Name:	City of New Port Richey Master Drainage		
Attendees:	Monte Ritter, David Sauskojus; Steve Wasson, Florida Design (727) 247-7540		
County:	Pasco	**Sec/Twp/Rge:**	(1) 5/26/16 (2) 4/26/16
Total Land Acreage:	(1) 0.1 acres (2) 0.4 acres	**Project Acreage:**	(1) 0.1 acres (2) 0.4 acres

Prior On-Site/Off-Site Permit Activity:
- (1) None, (2) 22259.001 Adjacent

Project Overview:
- (1) 5/26/16 – Richey Drive. Proposed 18 – 24 inch storm sewer on private property within proposed #12 easement to reduce flooding on Richey Drive. Pipe will outfall in tidal portion of Pithlachascotee River. Grating will be required at pipe outlet to river. Project will also involve replacement of existing trench drain with slightly larger trench drain on Queen Lane (De minimis activity). Wetlands – Yes; DRI – No; ERP – No; Compliance – No; District Funds – No
- (2) 4/26/16 – Missouri Ave. Proposed 24 -30 inch storm sewer connection to existing 36 inch storm sewer in #21 Missouri Ave previously permitted under 44022259.001. Project should qualify for Minor Modification since project area is less than 10% of original project area of 5.51 acres for 44022259.001. Wetlands – No; DRI – No; ERP – No; Compliance – No; District Funds – No

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- If applicable:
- Provide the limits of jurisdictional wetlands.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.
- (1) Minor disturbance anticipated at river for pipe installation. Grating on pipe will be required. No other wetland/surface water involved.
- (2) No wetlands/surface waters

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)
- Both projects in Pithlachascotee River Watershed and are in open basins.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- (1) Attenuation not required. Richey Drive discharges to tidal portion of Pithlachascotee River. Demonstrate proposed discharge will not cause harmful erosion or shoaling in river.
- (2) Demonstrate that proposed storm sewer is part of drainage area for Orange Lake as established in ERP 44022259.001.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- (1) and (2) Water quality treatment not necessary. No new impervious areas are proposed.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- (1) Installation of outfall pipe in headwall (if there) otherwise construct such. Work in river will require Letter of Consent.
- (2) N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- (1) and (2) The permit must be issued to the City of New Port Richey. (1) Provide evidence of an easement.

Application Type and Fee Required:

- (1) Individual ERP – Sections A, C and E of the ERP Application - $2184 for online submittal.
- (2) Minor Modification to 44022259.001 – Request modification by letter and provide executed copy of last two pages in Section A of ERP application - $0.00

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Steve Wasson

From: David Sauskojus
Sent: Thursday, November 14, 2013 2:13 PM
To: swasson@fldesign.com
Subject: Manatee Exclusion Devices
Attachments: manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org
WaterMatters.org/ePermitting

Florida Fish
and Wildlife
Conservation
Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

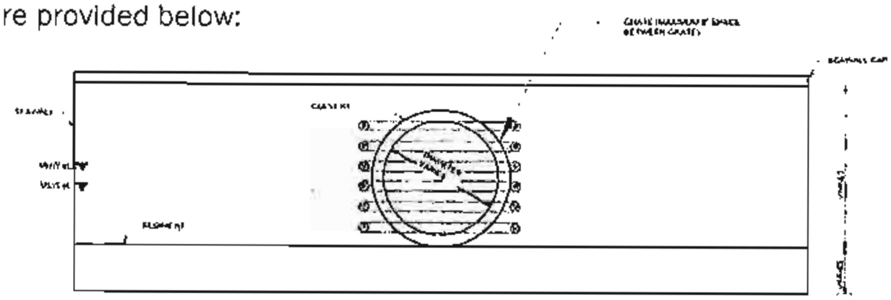
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

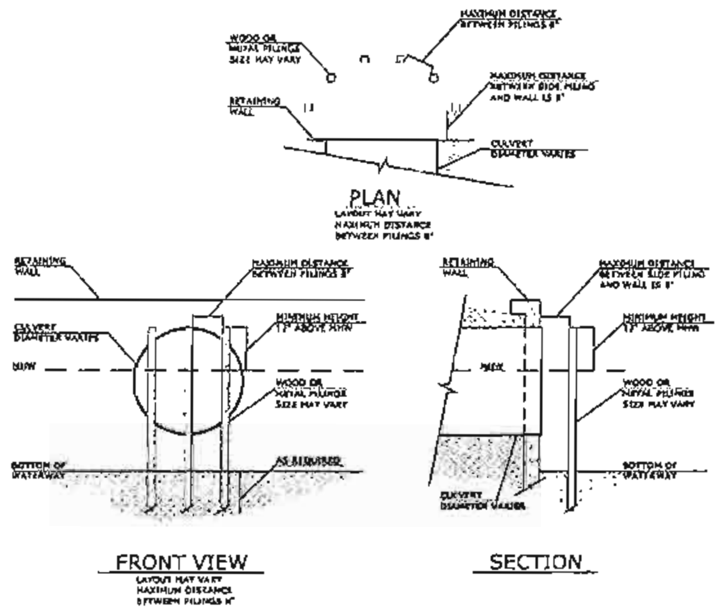
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH
GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER
N.T.S.

#12

Blue Numbers	= Input data
Red Numbers	= Answers

Velocity and Capacity of Pipes Flowing Full

Pipe Span =	24	inches
Pipe Rise =	24	inches
Manning's n =	0.011	
Slope =	0.0030	ft/ft

Velocity =	4.66	fps
Q =	14.64	cfs

Head for Pipes Flowing Full

Manning's equation

Entrance coefficient, k_e =	0.2	- see chart below
Pipe Length =	229.0	feet
Head from headwater to tailwater =	1.09	feet

Slope Calculation

Upstream invert =	2.50	feet
Downstream invert =	1.81	feet
Pipe length =	229	feet

Slope = 0.3013% or 0.0030 feet/foot

Volume in a Pipe

Pipe Length =	229.0	feet
Pipe Volume =	719.4	cubic feet

Type of Structure and Design of Entrance	Coefficient, k_e
Pipe, Concrete	0.2
Projecting from fill, groove end	0.5
Projecting from fill, square cut end	
Headwall or headwall and wingwalls	
Groove end of pipe	0.2
Square-edge	0.5
Rounded*	0.1
Mitered to conform to fill slope	0.7
End-Section conforming to fill slope**	0.5
Pipe, or Pipe-Arch, Corrugated Metal	

Blue Numbers	= Input data
Red Numbers	= Answers

Rainfall Intensity

FDOT Zone =	6	Use 1 through 11
Storm =	10	Year Event - Use 2, 3, 5, 10, 25, or 50 Years

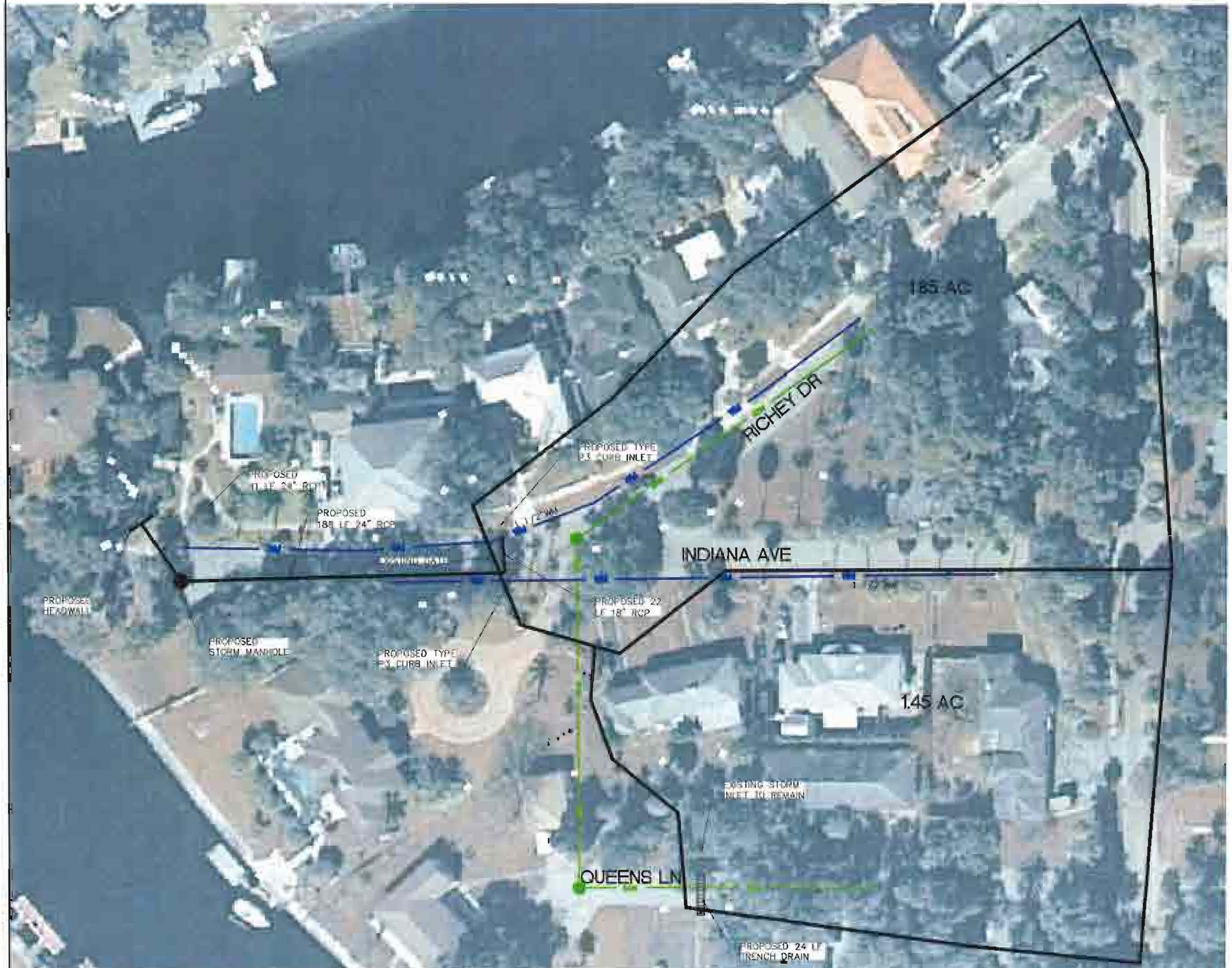
Note : T_C values are from 8 to 180 minutes only!!

T_c in Minutes	Intensity (i) in/hr	Accum. Rain In.
10	7.47	1.245

Allowable Q

c =	0.64	(coefficient of runoff)
A =	1.85	acres
Q =	8.84	cfs

$Q = c\,i\,A$



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3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
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5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #12

5440 RICHEY DRIVE
DRAINAGE IMPROVEMENTS

516-43
N/A
12/04/13
1 of 1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 13

LOCATION: MADISON STREET AND GULF DRIVE

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A limited Preliminary Storm Sewer Design Drainage Program was prepared. It is included.
6. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
7. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
8. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 13
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 13-MADISON ST.

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	PHASE 1				
I-A-1	SOD (FLORATAM)	2900	SY	$3.60	$10,440
I-A-2	STAKED SILT FENCE	2660	LF	$1.40	$3,724
I-A-3	FLOATING TURBIDITY BARRIER	50	LF	$9.00	$450
I-B-1	1.5" S-3 ASPHALT OVERLAY	1900	SY	$13.50	$25,650
I-B-2	1.5 S-1 ASPHALT BASE	1050	SY	$9.00	$9,450
I-B-3	8" CRUSHED CONCRETE	1050	SY	$15.00	$15,750
I-B-4	MILLING 1.5 INCH	850	SY	$3.60	$3,060
I-B-5	6' WIDE CONCRETE SIDEWALK WITH RAMPS	540	LF	$8.00	$4,320
I-B-6	REMOVE & REPLACE CONCRETE DRIVEWAY	330	SY	$38.50	$12,705
I-B-7	TYPE "D" CURB	570	LF	$13.25	$7,553
I-C-1	FDOT TYPE 4 STORM INLET(S)	5	EA	$4,950.00	$24,750
I-C-2	FDOT TYPE J8 MANHOLE(S)	8	EA	$3,465.00	$27,720
I-C-3	18 " RCP	220	LF	$27.25	$5,995
I-C-4	24 " RCP	50	LF	$37.50	$1,875
I-C-5	36 " RCP	110	LF	$72.60	$7,986
I-C-6	48 " RCP	40	LF	$130.00	$5,200
I-C-7	54 " RCP	1000	LF	$143.00	$143,000
I-C-8	SHEET PILING FOR STORM INSTALL	220	LF	$55.00	$12,100
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$16,500.00	$16,500
I-D-2	REMOVE & REPLACE EXISTING TREES	4	EA	$660.00	$2,640
I-D-3	REMOVE & REPLACE EXISTING LANDSCAPE ITEMS	100	LF	$55.00	$5,500
I-D-4	CROSSWALKS THERMOPLASTIC	144	LF	$9.25	$1,332
I-D-5	STOP BAR THERMOPLASTIC	72	LF	$4.25	$306
I-D-6	TRAFFIC STRIPE SOLID YELLOW DOUBLE THERM.	540	LF	$2.50	$1,350
I-D-7	TRAFFIC STRIPE SOLID WHITE SINGLE THERMOPLASTIC	1080	LF	$1.40	$1,512
I-D-8	REMOVE AND REPLACE SIGNS	3	EA	$330.00	$990
I-D-9	REMOVE AND REPLACE POWER POLES	6	EA	$3,300.00	$19,800
I-D-10	6" TEMPORARY TRAFFIC PAINT	1,620	LF	$1.25	$2,025
2-A-1	RELOCATE EXISTING WATER MAIN	360	LF	$16.50	$5,940
2-A-2	ADJUST EXIST. VALVE TO GRADE	4	EA	$275.00	$1,100
2-C-1	RELOCATE EXISTING RECLAIMED MAIN	360	LF	$16.50	$5,940
I-D-11	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$17,800	$17,800
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				
	SUB-TOTAL				$404,463
	MOBILIZATION				$15,000
	CONTIGENCY				$50,000
	TOTAL PHASE 1				$469,463
	PHASE 2				
I-A-1	SOD (FLORATAM)	2045	SY	$3.60	$7,362
I-A-2	STAKED SILT FENCE	2260	LF	$1.40	$3,164
I-B-1	1.5" S-3 ASPHALT OVERLAY	2,700	SY	$13.50	$36,450
I-B-2	1.5 S-1 ASPHALT BASE	1,400	SY	$9.00	$12,600
I-B-3	8" CRUSHED CONCRETE	1400	SY	$15.00	$21,000
I-B-4	MILLING 1.5 INCH	1300	SY	$3.60	$4,680
I-B-5	6' WIDE CONCRETE SIDEWALK WITH RAMPS	920	LF	$8.00	$7,360
I-B-6	REMOVE & REPLACE CONCRETE DRIVEWAY	275	SY	$38.50	$10,588
I-B-6	REMOVE & REPLACE VALLEY CURB	40	LF	$39.60	$1,584
I-B-7	TYPE "D" CURB	970	LF	$13.50	$13,095
I-C-1	FDOT TYPE 4 STORM INLET(S)	14	EA	$4,950.00	$69,300
I-C-2	18 " RCP	380	LF	$27.25	$10,355
I-C-3	36 " RCP	540	LF	$72.60	$39,204
I-C-4	42 " RCP	240	LF	$100.00	$24,000

I-C-5	STORM MANHOLE	6	EA	$2,530.00	$15,180
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$16,500.00	$16,500
I-D-2	REMOVE & REPLACE EXISTING TREES	8	EA	$660.00	$5,280
I-D-3	REMOVE & REPLACE EXISTING LANDSCAPE ITEMS	50	LF	$55.00	$2,750
I-D-4	CROSSWALKS THERMOPLASTIC	72	LF	$9.25	$666
I-D-5	STOP BAR THERMOPLASTIC	84	LF	$4.25	$357
I-D-6	TRAFFIC STRIPE SOLID YELLOW DOUBLE THERM.	920	LF	$2.50	$2,300
I-D-7	TRAFFIC STRIPE SOLID WHITE SINGLE THERMOPLASTIC	1840	LF	$1.40	$2,576
I-D-8	6" TEMPORARY TRAFFIC PAINT	2,760	LF	$1.25	$3,450
I-D-9	REMOVE AND REPLACE POWER POLES	7	EA	$3,300.00	$23,100
2-A-1	RELOCATE EXISTING WATER MAIN	300	LF	$16.50	$4,950
2-A-2	ADJUST EXIST. VALVE TO GRADE	8	EA	$275.00	$2,200
2-C-1	RELOCATE EXISTING RECLAIMED MAIN	300	LF	$16.50	$4,950
I-D-11	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$11,800	$11,800
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$356,801**
MOBILIZATION	$15,000
CONTINGENCY	$50,000
TOTAL PHASE 2	**$421,801**
SUB-TOTAL BOTH PHASES	**$891,263**
CONSULTING FEES- BOTH PHASES-DESIGN SURVEY,DESIGN,CROSS SECTIONS,PERMITTING, &IC	$98,700
SUB-SURFACE UTILITY LOCATE	$10,000
PERMIT FEES AND REIMBURSEABLES	$2,500
GRAND TOTAL	**$1,002,463**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 13-Madison St..xlsx]Sheet1

*13 - Madison Street

Steve Wasson

From: Monte Ritter
Sent: Monday, November 04, 2013 3:31 PM
To: Steve Wasson
Cc: David Sauskojus
Subject: Pre App Notes for City of New Port Richey Master Drainage
Attachments: 10-29-13 0745am PA 400614 City of New Port Richey Master Drainage.pdf

Steve,

Please find the attached notes from our meeting last week.

Also, regarding to your inquiry on our other pre-app meeting held on July 16, 2013, Individual ERP's will now be required for both the proposed Orange Lake outfall pipe and the Madison Avenue storm sewer projects. The fees for these two projects will be $2184 and $273, respectively, if submitted online. Also safety gratings will be required at the end of the proposed 48"x76" Orange Lake outfall pipe.

Let me know f you have any questions.

Thanks,
Monte

Monte G. Ritter, P.E.
Senior Professional Engineer
Environmental Resource Permit Bureau
Regulation Division
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604
352-796-7211 x 4351
800-423-1476 x 4351 (Florida only)
Monte.Ritter@swfwmd.state.fl.us
WaterMatters.org/ePermitting

Steve Wasson

From: Monte Ritter
Sent: Thursday, November 21, 2013 2:42 PM
To: Steve Wasson
Subject: Correction to Pre App Notes for City of New Port Richey - Multiple Projects (PA 400327)

Steve,

As discussed earlier today, the language in the referenced pre app notes under Water Quantity, Project No. 2, should be changed to:

2. Demonstrate that discharges from proposed project area will not cause an adverse impact for a 25-year, 24-hour storm event and will not increase flood stages up- or down-stream of the project area(s) from storm events up to and including the 100-year, 24-hour event. Use results from 1996 Pithlachascotee River watershed study for boundary conditions.

Feel free to contact me if you have any further questions or comments regarding these notes.

Thanks,
Monte

Monte G. Ritter, P.E.
Senior Professional Engineer
Environmental Resource Permit Bureau
Regulation Division
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604
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516-0043-30.04 epn 536

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER: PA 400327

Date:	7/16/2013
Time:	11:00
Project Name:	City of New Port Richey – Multiple Projects
Attendees:	Monte Ritter, David Sauskojus; Vinay Goel, Steve Wasson

County:	Pasco	**Sec/Twp/Rge:**	1. 05/26/16, 2. 8/26/16, 9/26/16
Total Land Acreage: 1. >10 acres 2. >10 acres		**Project Acreage:**	1. 0.3 acres, 2. 0.3 acres

Prior On-Site/Off-Site Permit Activity: 1. 47006835.001, 2. No prior permits
- NPR Item # 7 (Orange Lake), 13 (Madison Street)

Project Overview:
- 2 projects: 1. Orange Lake – Add third 48"x 76" outfall pipe from Orange Lake to tidal portion of Pithlachascotee River. 2. Madison Avenue Storm Sewer to reduce street flooding prior to discharge to non tidal portion of Pithlachascotee River

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- 1. Pithlachascotee River is SSL. Will need Consent by Rule or Letter of Consent for work at outfall of pipe. Orange Lake is not SSL (waffle letter from FDEP in past). Will be some wetland/sw impacts in both river and lake. Will need wetland line done for lake, unless can establish that previous permit has acceptable line. Probably minor enough so no mitigation required. This will depend on amount of impact to lake. River will only be temp construction impact.
- 2. No wetlands or SW's within this pipe installation project.

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)
- 1 and 2 – Pithlachascotee River Watershed. Use results from 1996 study for boundary conditions.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- 1. Attenuation not required for discharges to tidal portion of Pithlachascotee River. Demonstrate that discharges will not cause harmful erosion or shoaling from a 25-year, 24-hour storm event.
- 2. Attenuate peak discharge rate from 25-year, 24-hour storm and demonstrate that the project will not increase flood stages up- or down-stream of the project area(s) from storm events up to and including the 100-year, 24-hour event.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- 1. and 2. Water quality treatment not necessary for pipe installation.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- 1. Pithlachascotee River will be involved with minor temporary construction. Authorization will be linked to ERP Gen.
- 2. N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- The permit must be issued to the property owner(s).
- Provide detailed construction surface water management plan.

Application Type and Fee Required:
- 1. General Construction ERP – Sections A, C and E of the ERP Application. $1456.00
- 2. General Construction ERP – Sections A, C and E of the ERP Application. $0.00

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

-

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Steve Wasson

From: David Sauskojus
Sent: Thursday, November 14, 2013 2:13 PM
To: swasson@fldesign.com
Subject: Manatee Exclusion Devices
Attachments: manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org

ePermitting

Florida Fish
and Wildlife
Conservation
Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

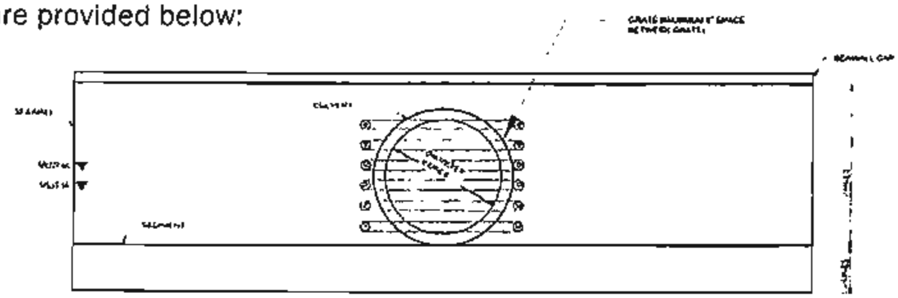
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

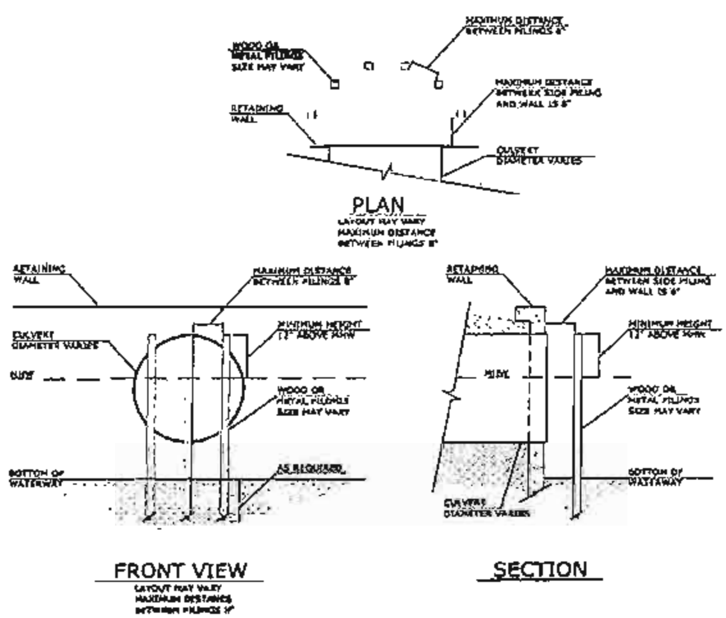
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH
GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER

#3 FINAL

7/22/2013

STORM SEWER HYDRAULICS

System: **PROP**

PROJECT						CONDITIONS	
Number: 536	Organization: FLORIDA DESIGN CONSULTANTS, IN	Outfall Tailwater El:	2.75	Storm Event - IDF Curve		Runoff Coeff. (default)	
Description: MADISON ST	Designed by: VINAY GOEL, P.E.	Exit Loss at Outfall:	0.00	Zone	Frequency	Area 1 / Area 2 / Area 3	
County: PASCO	Checked by: STEVE WASSON, P.E.	Storm Sewer Control El:	2.75	6	10	0.70 / 0.00 / 0.00	

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas: Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs): Qb	Sum(Qb) CIA TOTAL	Inlet Elevations: Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations: HGL Crown Line Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB19		**CB18**	0.49	0.70	0.34	0.34					0.00	0.00	22.00	19.77	19.77	19.75	0.022	18.00	0.0507	Full	1.45		
		0.00	0.00	0.00	0.00	0.00	10.00	0.37	7.47	0.34		2.56		0.00	19.90	19.75						6.64	0.0120
BW217-1	1	44.00	0.00	0.00	0.00	0.34						**2.56**	2.23	0.00	18.40	18.25	0.150	18.00	0.3409		3.76		
CB18		**CB10**	0.59	0.70	0.41	0.41					0.00	0.00	21.50	19.73	19.73	19.63	0.101	18.00	0.2397	Full	3.15		
		0.00	0.00	0.00	0.00	0.34	10.37	0.22	7.37	0.75		5.57		0.00	19.40	19.25						6.80	0.0120
BW217-1	1	42.00	0.00	0.00	0.00	0.75						**5.57**	1.77	0.00	17.90	17.75	0.150	18.00	0.3571		3.85		
CB11		**CB10**	4.19	0.70	2.93	2.93					0.00	0.00	22.00	21.13	21.13	19.80	1.334	18.00	3.7046	Full	12.39		
		0.00	0.00	0.00	0.00	0.00	10.00	0.05	7.47	2.93		21.90		0.00	19.90	19.80						6.00	0.0120
BW217-1	1	36.00	0.00	0.00	0.00	2.93						**21.90**	0.87	0.00	18.40	18.30	0.100	18.00	0.2778		3.39		
CB10		**CB09**	0.85	0.70	0.59	0.59					0.00	0.00	22.00	19.63	19.63	19.20	0.432	36.00	0.1879	Full	4.43		
		0.00	0.00	0.00	0.00	3.68	10.59	0.87	7.31	4.28		31.32		0.00	19.90	19.20						39.86	0.0120
BW217-1	1	230.00	0.00	0.00	0.00	4.28						**31.32**	2.37	0.00	16.90	16.20	0.700	36.00	0.3043		5.64		
CB17		**CB16**	0.51	0.70	0.35	0.35					0.00	0.00	21.00	18.99	18.99	18.97	0.023	18.00	0.0549	Full	1.51		
		0.00	0.00	0.00	0.00	0.00	10.00	0.35	7.47	0.35		2.67		0.00	18.90	18.75						6.80	0.0120
BW217-1	1	42.00	0.00	0.00	0.00	0.35						**2.67**	2.01	0.00	17.40	17.25	0.150	18.00	0.3571		3.85		
CB16		**CB09**	1.23	0.70	0.86	0.86					0.00	0.00	20.00	18.97	18.97	18.71	0.262	18.00	0.6228	Full	5.08		
		0.00	0.00	0.00	0.00	0.35	10.35	0.14	7.37	1.21		8.98		0.00	17.90	17.75						6.80	0.0120
BW217-1	1	42.00	0.00	0.00	0.00	1.21						**8.98**	1.03	0.00	16.40	16.25	0.150	18.00	0.3571		3.85		
CB09		**CB08**	2.62	0.70	1.83	1.83					0.00	0.00	20.50	18.71	18.71	18.55	0.156	36.00	0.5193	Full	7.37		
		0.00	0.00	0.00	0.00	5.50	11.45	0.07	7.10	7.33		52.07		0.00	18.40	18.30						41.72	0.0120
BW217-1	1	30.00	0.00	0.00	0.00	7.33						**52.07**	1.79	0.00	15.40	15.30	0.100	36.00	0.3333		5.90		
CB08		**CB07**	1.07	0.70	0.74	0.74					0.00	0.00	20.00	18.55	18.55	17.35	1.199	36.00	0.6280	Full	8.10		
		0.00	0.00	0.00	0.00	7.33	11.52	0.39	7.08	8.08		57.26		0.00	17.90	17.35						38.77	0.0120
BW217-1	1	191.00	0.00	0.00	0.00	8.08						**57.26**	1.45	0.00	14.90	14.35	0.550	36.00	0.2880		5.49		
CB15		**CB14**	0.35	0.70	0.24	0.24					0.00	0.00	18.00	15.81	15.81	15.80	0.009	18.00	0.0258	Full	1.04		
		0.00	0.00	0.00	0.00	0.00	10.00	0.30	7.47	0.24		1.83		0.00	15.90	15.80						6.00	0.0120
BW217-1	1	36.00	0.00	0.00	0.00	0.24						**1.83**	2.19	0.00	14.40	14.30	0.100	18.00	0.2778		3.39		
CB14		**CB07**	0.54	0.70	0.37	0.37					0.00	0.00	17.00	15.20	15.20	15.13	0.064	18.00	0.1635	Full	2.60		
		0.00	0.00	0.00	0.00	0.24	10.30	0.25	7.39	0.62		4.60		0.00	14.90	14.80						5.76	0.0120
BW217-1	1	39.00	0.00	0.00	0.00	0.62						**4.60**	1.80	0.00	13.40	13.30	0.100	18.00	0.2564		3.26		
CB07		**CB06**	0.00	0.70	0.00	0.00					0.00	0.00	17.00	15.13	15.13	14.75	0.383	36.00	0.7100	Full	8.61		
		0.00	0.00	0.00	0.00	8.70	11.91	0.10	6.99	8.70		60.88		0.00	14.90	14.75						38.08	0.0120
MHJ-7T	1	54.00	0.00	0.00	0.00	8.70						**60.88**	1.87	0.00	11.90	11.75	0.150	36.00	0.2778		5.39		
CB06		**CB05**	2.23	0.70	1.56	1.56					0.00	0.00	15.00	13.84	13.84	13.45	0.392	36.00	0.9808	Full	10.12		
		0.00	0.00	0.00	0.00	8.70	12.02	0.07	6.97	10.26		71.56		0.00	12.90	12.80						36.13	0.0120
BW217-1	1	40.00	0.00	0.00	0.00	10.26						**71.56**	1.16	0.00	9.90	9.80	0.100	36.00	0.2500		5.11		

Units: ENGLISH

PROJECT				CONDITIONS		
Number: .	Organization: FLORIDA DESIGN CONSULTANTS, IN	Outfall Tailwater El: 2.75	Storm Event - IDF Curve	Runoff Coeff. (default)		
Description: .	Designed by: VINAY GOEL, P.E.	Exit Loss at Outfall: 0.00	Zone: 6 / Frequency: 10	Area 1	Area 2	Area 3
County: .	Checked by: STEVE WASSON, P.E.	Storm Sewer Control El: 2.75		0.70	0.00	0.00

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station / Type	Brls	TO Offset / Len	Drainage Areas: Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs): Qb	Sum(Qb) CIA TOTAL	Inlet Elevations: Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations: HGL / Crown Line / Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB05		**CB04**	0.78	0.70	0.54	0.54					0.00	0.00	15.00	13.45	13.45	12.81	0.638	42.00	0.4761	Full	7.82		
		0.00	0.00	0.00	0.00	10.26	12.09	0.29	6.95	10.81		75.20		0.00	12.90	12.50						59.55	0.0120
BW217-1	1	134.00	0.00	0.00	0.00	10.81						75.20	1.55	0.00	9.40	9.00	0.400	42.00	0.2985		6.19		
CB13		**CB12**	1.17	0.70	0.81	0.81					0.00	0.00	15.00	13.10	13.10	13.01	0.095	18.00	0.2889	Full	3.46		
		0.00	0.00	0.00	0.00	0.00	10.00	0.16	7.47	0.81		6.12		0.00	12.90	12.80						6.26	0.0120
BW217-1	1	33.00	0.00	0.00	0.00	0.81						6.12	1.90	0.00	11.40	11.30	0.100	18.00	0.3030		3.54		
CB12		**CB04**	0.55	0.70	0.38	0.38					0.00	0.00	15.00	13.01	13.01	12.81	0.197	18.00	0.6170	Full	5.06		
		0.00	0.00	0.00	0.00	0.81	10.16	0.11	7.42	1.20		8.94		0.00	12.80	12.70						6.36	0.0120
BW217-1	1	32.00	0.00	0.00	0.00	1.20						8.94	1.99	0.00	11.30	11.20	0.100	18.00	0.3125		3.60		
CB04		**CB03**	0.00	0.70	0.00	0.00					0.00	0.00	15.00	12.81	12.81	12.20	0.612	42.00	0.5775	Full	8.61		
		0.00	0.00	0.00	0.00	12.01	12.37	0.21	6.89	12.01		82.83		0.00	12.50	12.20						57.98	0.0120
MHJ-7T	1	106.00	0.00	0.00	0.00	12.01						82.83	2.19	0.00	9.00	8.70	0.300	42.00	0.2830		6.03		
CB03		**CB02**	2.31	0.70	1.61	1.61					0.00	0.00	13.00	11.43	11.43	11.25	0.184	48.00	0.3600	Full	7.43		
		0.00	0.00	0.00	0.00	12.01	12.58	0.11	6.85	13.63		93.37		0.00	10.90	10.75						84.39	0.0120
BW217-1	1	51.00	0.00	0.00	0.00	13.63						93.37	1.57	0.00	6.90	6.75	0.150	48.00	0.2941		6.72		
CB02		**CB485**	1.31	0.70	0.91	0.91					0.00	0.00	13.00	11.25	11.25	10.94	0.308	54.00	0.2173	Full	6.24		
		0.00	0.00	0.00	0.00	13.63	12.69	0.38	6.82	14.55		99.30		0.00	10.90	10.45						119.93	0.0120
BW217-1	1	142.00	0.00	0.00	0.00	14.55						99.30	1.75	0.00	6.40	5.95	0.450	54.00	0.3169		7.54		
CB01		**CB485**	1.03	0.70	0.72	0.72					0.00	0.00	15.00	12.46	12.46	12.01	0.450	18.00	0.3082	Partial	4.02		
		0.00	0.00	0.00	0.00	0.00	10.00	0.60	7.47	0.72		5.38		0.00	12.90	12.45				super		6.32	0.0120
BW217-1	1	146.00	0.00	0.00	0.00	0.72						5.38	2.54	0.00	11.40	10.95	0.450	18.00	0.3082		3.58		
CB485		**CB484**	1.13	0.70	0.79	0.79					0.00	0.00	13.00	10.94	10.94	10.82	0.124	54.00	0.2587	Full	6.81		
		0.00	0.00	0.00	0.00	15.27	13.07	0.12	6.74	16.06		108.36		0.00	10.45	10.30						119.09	0.0120
BW217-1	1	48.00	0.00	0.00	0.00	16.06						108.36	2.06	0.00	5.95	5.80	0.150	54.00	0.3125		7.49		
CB486		**CB484**	2.98	0.70	2.08	2.08					0.00	0.00	13.00	10.96	10.96	10.82	0.145	24.00	0.4040	Full	4.96		
		0.00	0.00	0.00	0.00	0.00	10.00	0.12	7.47	2.08		15.58		0.00	10.90	10.80						12.92	0.0120
BW217-1	1	36.00	0.00	0.00	0.00	2.08						15.58	2.04	0.00	8.90	8.80	0.100	24.00	0.2778		4.11		
CB484		**CB421**	0.39	0.70	0.27	0.27					0.00	0.00	13.00	10.82	10.82	10.43	0.389	54.00	0.3379	Full	7.79		
		0.00	0.00	0.00	0.00	18.15	13.19	0.25	6.72	18.42		123.83		0.00	10.30	10.00						108.81	0.0120
DBI-A	1	115.00	0.00	0.00	0.00	18.42						123.83	2.18	0.00	5.80	5.50	0.300	54.00	0.2609		6.84		
CB421		**CB420**	0.19	0.70	0.13	0.13					0.00	0.00	14.00	10.43	10.43	9.86	0.574	54.00	0.3378	Full	7.79		
		0.00	0.00	0.00	0.00	18.42	13.43	0.36	6.67	18.55		123.82		0.00	10.00	9.45						121.17	0.0120
BW217-1	1	170.00	0.00	0.00	0.00	18.55						123.82	3.57	0.00	5.50	4.95	0.550	54.00	0.3235		7.62		
CB420		**CB422**	1.42	0.70	0.99	0.99					0.00	0.00	12.50	9.86	9.86	8.97	0.881	54.00	0.3671	Full	8.12		
		0.00	0.00	0.00	0.00	18.55	13.80	0.49	6.60	19.55		129.07		0.00	9.45	8.75						115.05	0.0120
DBI-A	1	240.00	0.00	0.00	0.00	19.55						129.07	2.64	0.00	4.95	4.25	0.700	54.00	0.2917		7.23		

Units: ENGLISH

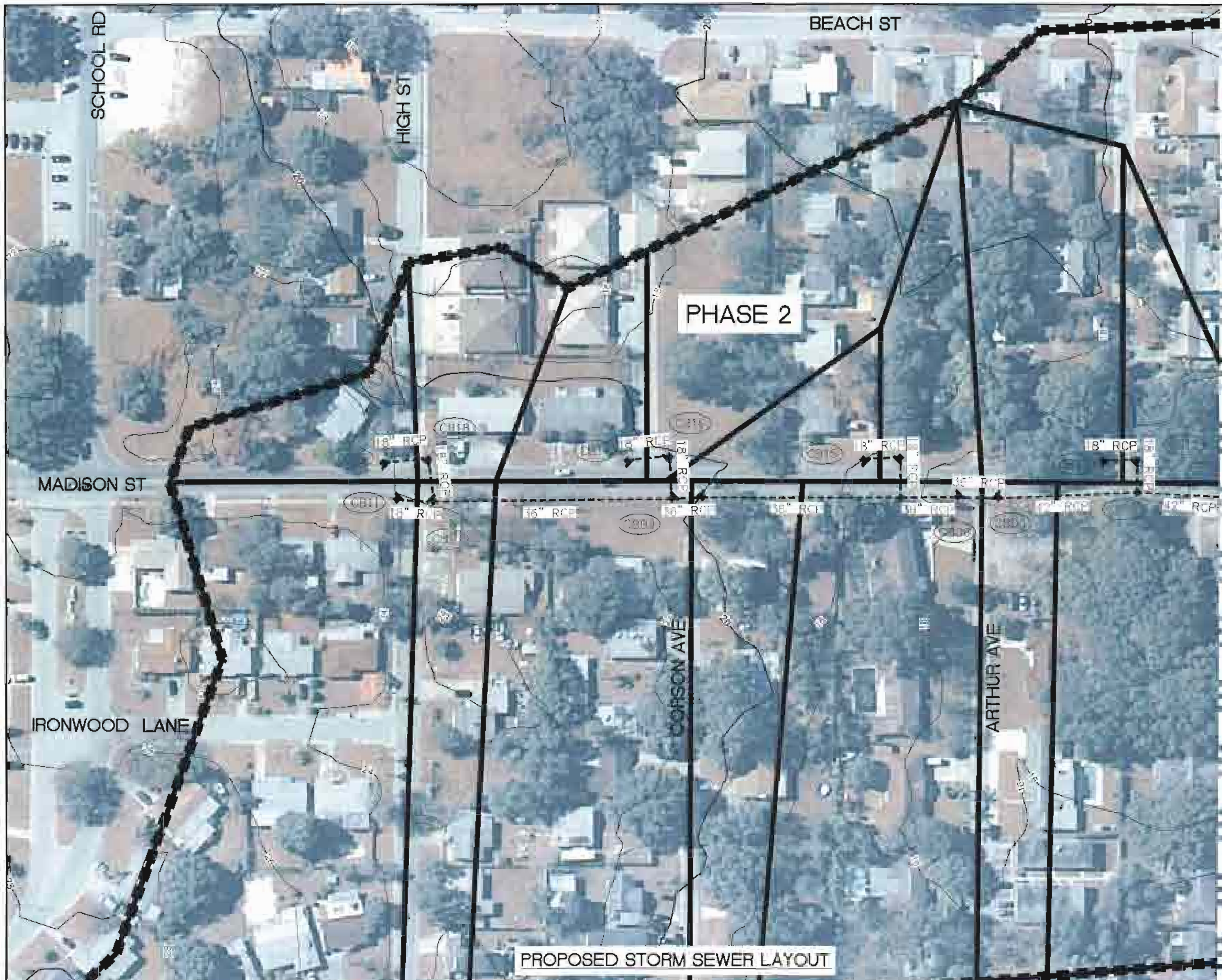
STORM SEWER HYDRAULICS

System: **PROP**

PROJECT				CONDITIONS	
Number: .	Organization: FLORIDA DESIGN CONSULTANTS, IN	Outfall Tailwater El:	2.75	Storm Event - IDF Curve	Runoff Coeff. (default)
Description: .	Designed by: VINAY GOEL, P.E.	Exit Loss at Outfall:	0.00	Zone: 6 / Frequency: 10	Area 1: 0.70 / Area 2: 0.00 / Area 3: 0.00
County: .	Checked by: STEVE WASSON, P.E.	Storm Sewer Control El:	2.75		

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs) Qb	Sum(Qb) CIA TOTAL	Inlet Elevations Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations HGL Crown Line Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB422		CB344	1.88	0.70	1.31	1.31					0.00	0.00	11.00	8.97	8.97	8.10	0.874	54.00	0.4066	Full	8.54		
		0.00	0.00	0.00	0.00	19.55	14.29	0.42	6.51	20.86		135.84		0.00	8.75	8.10						117.14	0.0120
DBI-D	1	215.00	0.00	0.00	0.00	20.86						135.84	2.03	0.00	4.25	3.60	0.650	54.00	0.3023		7.37		
CB344		CB345	2.70	0.70	1.89	1.89					0.00	0.00	9.00	6.96	6.96	6.85	0.113	54.00	0.4724	Full	9.21		
		0.00	0.00	0.00	0.00	20.86	14.71	0.04	6.43	22.75		146.42		0.00	6.90	6.85						97.24	0.0120
BW217-1	1	24.00	0.00	0.00	0.00	22.75						146.42	2.04	0.00	2.40	2.35	0.050	54.00	0.2083		6.11		
CB345		MOF13	0.81	0.70	0.56	0.56					0.00	0.00	9.00	3.85	3.85	2.75	1.097	36.00	1.0757	Full	10.60		
		0.00	0.00	0.00	0.00	22.75	14.75	0.00	6.43	23.32		149.89		0.00	3.00	2.00						143.09	0.0120
BW217-1	2	102.00	0.00	0.00	0.00	23.32						149.89	5.15	0.00	0.00	-1.00	1.000	36.00	0.9804		10.12		



N

0 25 50 100

NOTES:

1. NO UTILITIES LOCATED.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #13

MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

516-43
536
N/A
12/04/13
1
2

NOTES

1. NO UTILITIES LOCATED.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
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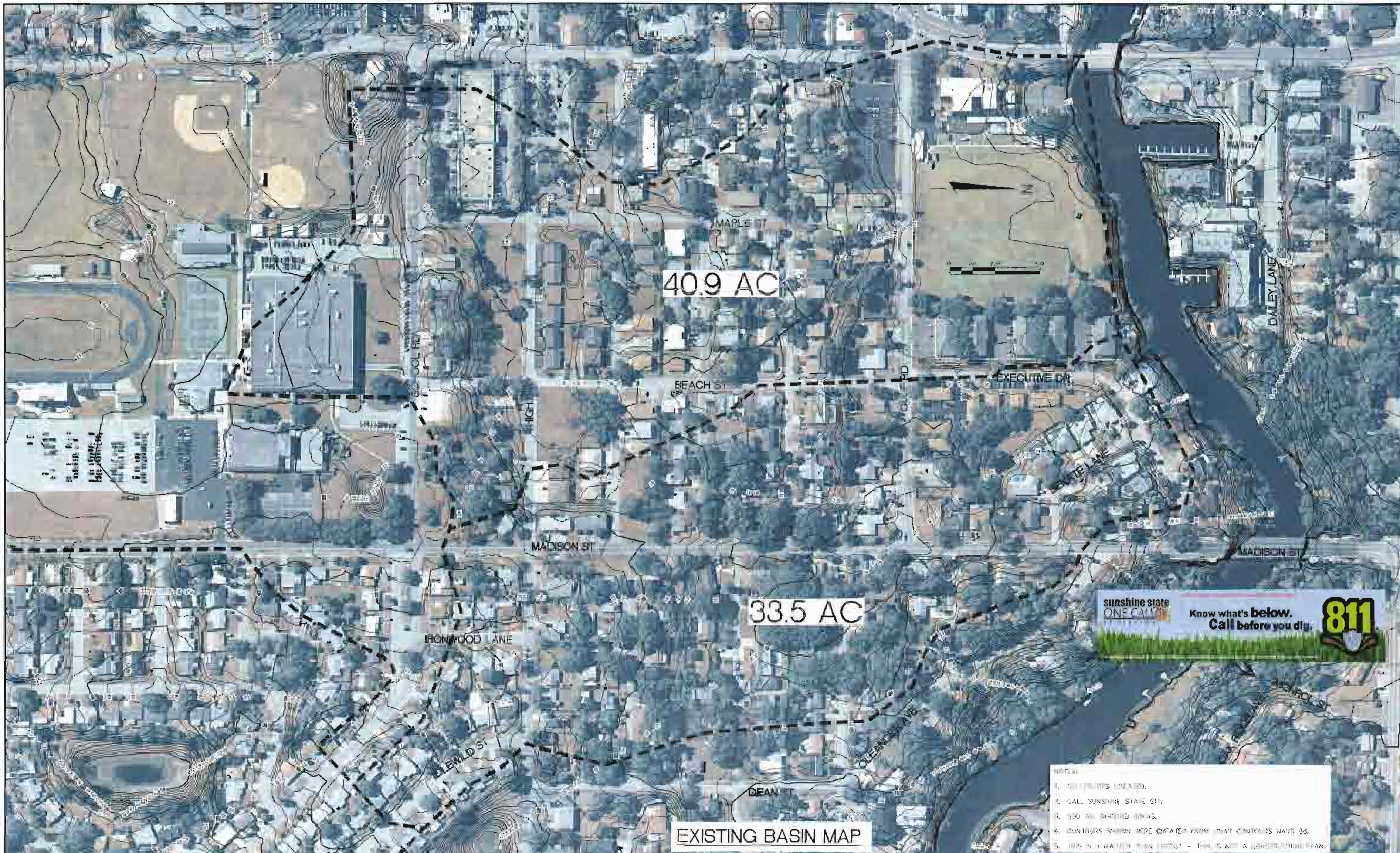
2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #13

MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

516-43
536
N/A
12/04/13
2 of 2



NOTES:

2. CALL SUNSHINE STATE 811.

FLORIDA DESIGN CONSULTANTS, INC.
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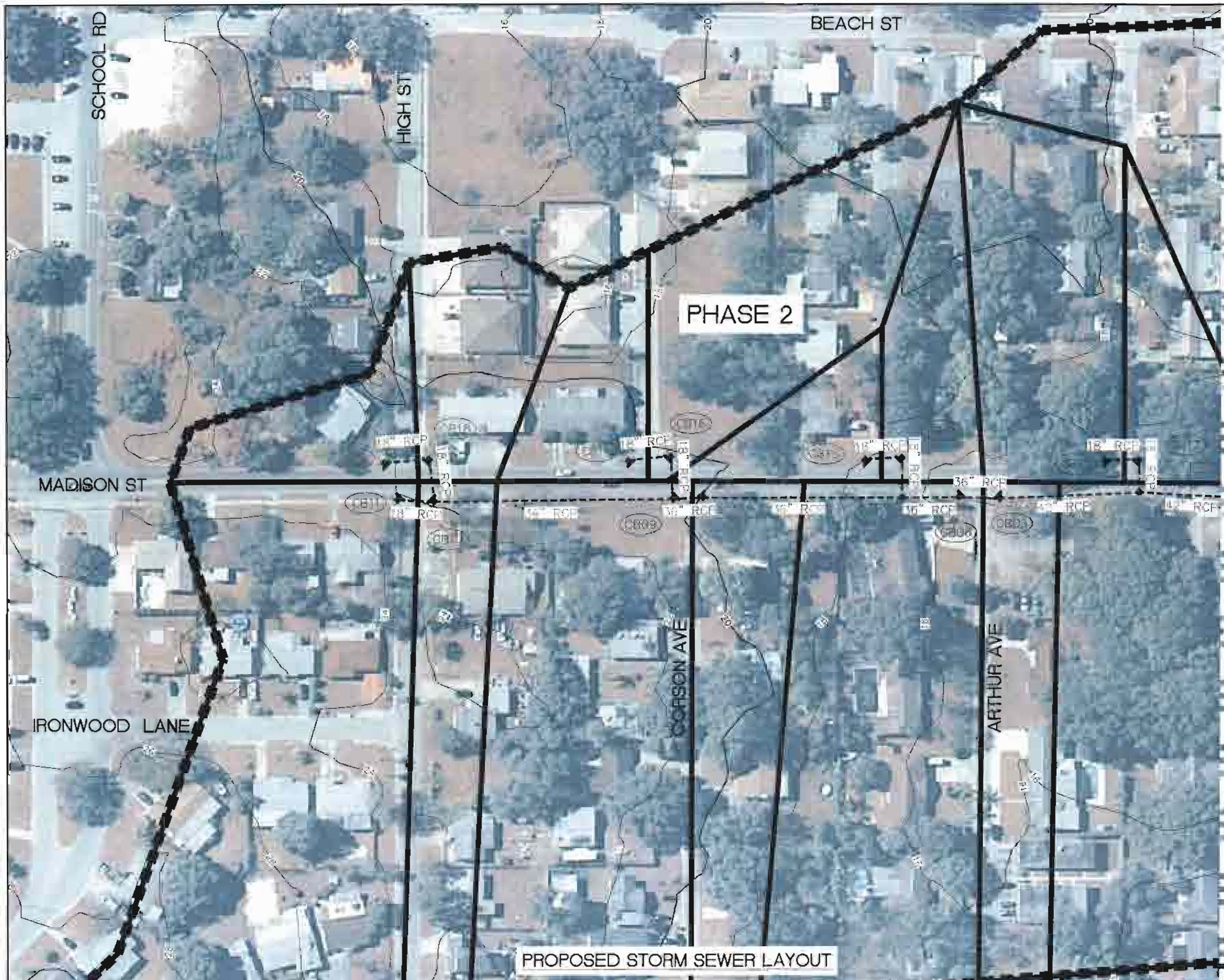
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #13

MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

516-43
N/A
12/04/13



NOTES:

1. NO UTILITIES LOCATED.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
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FLORIDA DESIGN CONSULTANTS, INC.
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CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #13

MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

JOB NO.	516-43
	538
SCALE	N/A
DATE	12/04/13
SHEET	1 of 2

PROPOSED STORM SEWER LAYOUT

NOTES

1. [illegible]
2. CALL SUNSHINE STATE 811.
3. [illegible] ALL D[illegible] AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

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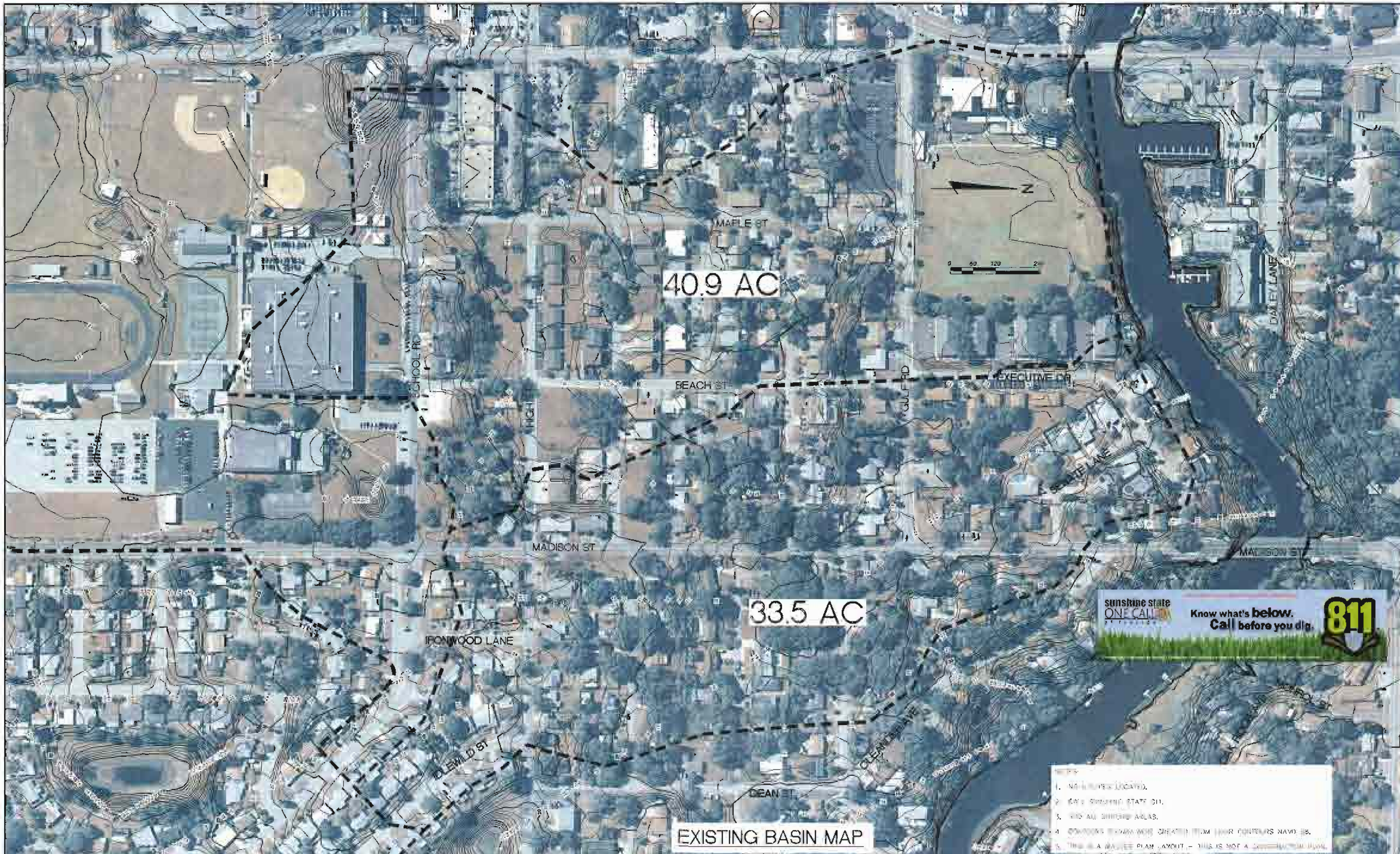
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #13
MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

516-43	
536	2
N/A	
12/04/13	2



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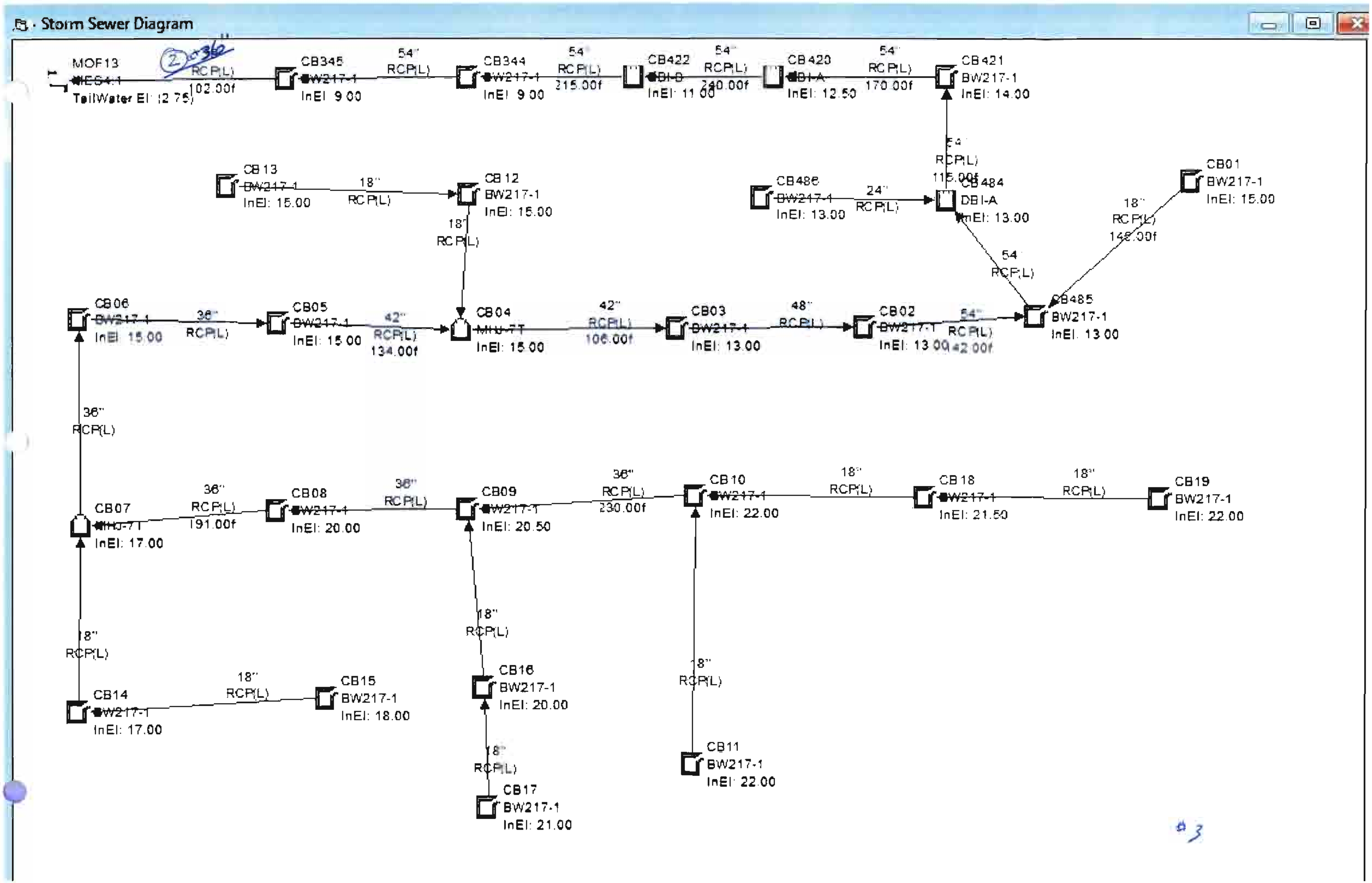
2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #13

MADISON ST / HIGH ST TO SENATE LANE
STORMWATER UPGRADES

518-43
538
12/04/13
1
1



Storm Sewer Diagram
MOF13
IES4-1
TailWater El: (2.75)
RCP(L)
102.00f
CB345
BW217-1
InEl: 9.00
54"
RCP(L)
CB344
BW217-1
InEl: 9.00
54"
RCP(L)
215.00f
CB422
DBI-B
InEl: 11.00
54"
RCP(L)
240.00f
CB420
DBI-A
InEl: 12.50
54"
RCP(L)
170.00f
CB421
BW217-1
InEl: 14.00
54"
RCP(L)
115.00f
CB13
BW217-1
InEl: 15.00
18"
RCP(L)
CB12
BW217-1
InEl: 15.00
18"
RCP(L)
CB486
BW217-1
InEl: 13.00
24"
RCP(L)
CB484
DBI-A
InEl: 13.00
CB01
BW217-1
InEl: 15.00
18"
RCP(L)
148.00f
54"
RCP(L)
CB06
BW217-1
InEl: 15.00
36"
RCP(L)
CB05
BW217-1
InEl: 15.00
42"
RCP(L)
134.00f
CB04
MH-7T
InEl: 15.00
42"
RCP(L)
106.00f
CB03
BW217-1
InEl: 13.00
48"
RCP(L)
CB02
BW217-1
InEl: 13.00
54"
RCP(L)
142.00f
CB485
BW217-1
InEl: 13.00
36"
RCP(L)
CB07
MH-7T
InEl: 17.00
36"
RCP(L)
191.00f
CB08
BW217-1
InEl: 20.00
36"
RCP(L)
CB09
BW217-1
InEl: 20.50
36"
RCP(L)
230.00f
CB10
BW217-1
InEl: 22.00
18"
RCP(L)
CB18
BW217-1
InEl: 21.50
18"
RCP(L)
CB19
BW217-1
InEl: 22.00
18"
RCP(L)
CB14
BW217-1
InEl: 17.00
18"
RCP(L)
CB15
BW217-1
InEl: 18.00
18"
RCP(L)
CB16
BW217-1
InEl: 20.00
18"
RCP(L)
CB17
BW217-1
InEl: 21.00
18"
RCP(L)
CB11
BW217-1
InEl: 22.00
#3

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 14

LOCATION: INDIANA AVENUE CLOSED LANDFILL

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 14
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013
PRELIMINARY ENGINEER'S ESTIMATE
INDIANA LANDFILL

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	3700	SY	$3.60	$13,320
I-A-2	STAKED SILT FENCE	1000	LF	$1.40	$1,400
I-A-3	CLEARING AND GRUBBING	1	AC	$1,625.00	$1,625
I-A-4	OFFSITE BORROW	6650	CY	$16.50	$109,725
I-A-5	DETENTION POND EXCAVATION	110	CY	$3.85	$424
I-A-6	SEED AND MULCH POND BOTTOM	1,200	SY	$1.20	$1,440
I-A-7	ROOT PRUNING	120	LF	$9.40	$1,128
I-C-1	CONCRETE COLLARS	2	EA	$1,000.00	$2,000
I-C-2	24 " RCP	62	LF	$37.50	$2,325
I-C-3	36" RCP	55	LF	$72.75	$4,001
I-C-4	24" FES	1	EA	$1,485.00	$1,485
I-C-5	36" FES	1	EA	$2,145.00	$2,145
I-C-6	CONCRETE RIP-RAP	2	TN	$86.00	$172
I-D-1	REMOVE & REPLACE EXISTING TREES	3	EA	$660.00	$1,980
I-D-2	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,500	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$147,670**
MOBILIZATION	$2,000
CONTINGENCY	$5,000
SUB-TOTAL	**$154,670**
CONSULTING FEES-DESIGN SURVEY-DESIGN-(NO BIDDING)	$5,700
REIMBURBURSABLES	$50
TOTAL	**$160,420**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 14 Indiana Landfill.xlsx]Sheet1

NOTES.

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
EB No 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #14

INDIANA AVE CLOSED LANDFILL (HILLS DRIVE)
RETENTION POND REHABILITATION

516-43
536
N/A
12/04/13

N

0 10 20 40

NOTES.

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ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #14

INDIANA AVE CLOSED LANDFILL (HILLS DRIVE)
RETENTION POND REHABILITATION

536
N/A
12/04/13
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 15

LOCATION: ASPEN STREET AT GRAND BOULEVARD

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 15
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 15-ASPEN AT GRAND

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	60	LF	$2.75	$165
I-A-2	SOD (FLORATAM)	10	SY	$3.60	$36
I-B-1	1 " S-3 ASPHALT OVERLAY	188	SY	$13.50	$2,538
I-B-2	8" S-1 ASPHALT BASE	188	SY	$44.00	$8,272
I-B-3	REMOVE AND REPLACE SIDEWALK 4' WIDE	60	LF	$8.00	$480
I-B-4	HC SIDEWALK RAMP (ADA COMPLIANT)	2	EA	$1,100.00	$2,200
I-B-5	TYPE D CURBING TIE IN	60	LF	$11.50	$690
I-C-1	FDOT TYPE 4 INLET- SET IN PLACE- COMPLETE	3	EA	$5,500.00	$16,500
I-C-2	18 " RCP	94	LF	$54.50	$5,123
IC-3	CONNECT TO EXISTING LINE WITH TYPE 4 INLET	1	EA	$1,650.00	$1,650
ID-1	MAINTENANCE OF TRAFFIC	1	EA	$5,500.00	$5,500
I-D-2	24" STOP BAR (THERMOPLASTIC)	12	LF	$4.25	$51
I-D-3	CROSSWALKS (THERMOPLASTIC) FDOT INDEX 17346	1	LS	$880.00	$880
I-D-4	TRAFFIC STRIPE DOUBLE YELLOW 6"(THERMOPLASTIC)	30	LF	$5.00	$150
2-A-1	RELOCATE EXISTING 6-INCH WATER MAIN	80	LF	$13.50	$1,080
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
I-D-5	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$50,365**
MOBILIZATION	**$2,000**
CONTINGENCY	**$4,000**
SUB-TOTAL	**$56,365**
CONSULTING FEES-DESIGN SURVEY & DESIGN-(NO BIDDING)	$4,100
SUB-SURFACE UTILITY LOCATE	$1,000
REIMBURBURSABLES	$50
TOTAL	**$61,515**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 12 Richey Drive and Queens Lane.xlsx]Sheet1

NOTES:

1. NO UTILITIES LOCATED. UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
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3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #15

ASPEN STREET
DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 16

LOCATION: HIGH STREET AT GRAND BOULEVARD

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 16
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

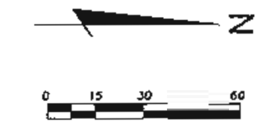
PRELIMINARY ENGINEER'S ESTIMATE
ITEM 16-HIGH AT GRAND

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	60	LF	$2.75	$165
I-A-1	SOD (FLORATAM)	10	SY	$3.60	$36
I-B-1	1 " S-3 ASPHALT OVERLAY	230	SY	$13.50	$3,105
I-B-2	8" S-1 ASPHALT BASE	215	SY	$44.00	$9,460
I-B-3	REMOVE AND REPLACE SIDEWALK	60	LF	$8.00	$480
I-B-4	HC SIDEWALK RAMP (ADA COMPLIANT)	2	EA	$1,100.00	$2,200
I-B-5	TYPE D CURBING TIE IN	60	LF	$11.50	$690
I-C-1	FDOT TYPE 4 INLET- SET IN PLACE- COMPLETE	3	EA	$5,500.00	$16,500
I-C-2	18 " RCP	90	LF	$54.50	$4,905
IC-3	CONNECT TO EXISTING LINE WITH TYPE 4 INLET	1	EA	$1,650.00	$1,650
ID-1	MAINTENANCE OF TRAFFIC	1	EA	$5,500.00	$5,500
I-D-2	24" STOP BAR (THERMOPLASTIC)	12	LF	$4.25	$51
I-D-3	CROSSWALKS (THERMOPLASTIC) FDOT INDEX 17346	1	LS	$880.00	$880
I-D-4	TRAFFIC STRIPE DOUBLE YELLOW 6"(THERMOPLASTIC)	30	LF	$5.00	$150
2-A-1	RELOCATE EXISTING 6-INCH WATER MAIN	70	LF	$13.50	$945
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
2-B-1	RELOCATE EXISTING FORCE MAIN	20	EA	$12.50	$250
I-D-5	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$52,017**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$58,017**
CONSULTING FEES-DESIGN SURVEY & DESIGN-(NO BIDDING)	$4,100
SUB-SURFACE UTILITY LOCATE	$1,000
REIMBURBURSABLES	$50
TOTAL	**$63,167**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 16 High at Grand.xlsx]Sheet1



NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #16

GRAND BOULEVARD & HIGH STREET
DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 17

LOCATION: AZALEA POND

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. A Southwest Florida Water Management District Preliminary Pre-Application Meeting has not been authorized.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 17
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 17-AZALEA POND REHABILITATION

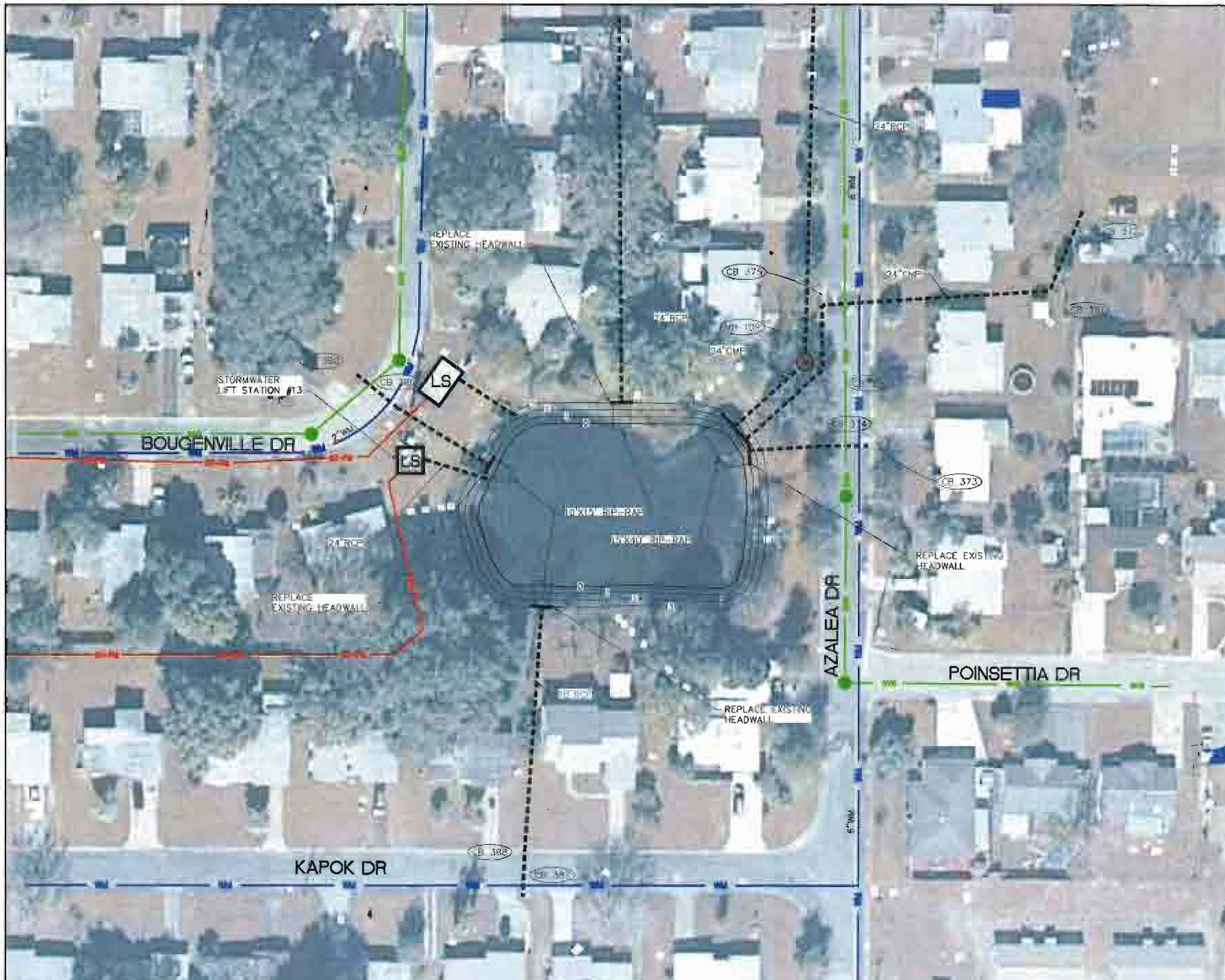
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	600	LF	$1.40	$840
I-A-2	SOD (FLORATAM)	650	SY	$3.60	$2,340
I-A-3	FLOATING TURBIDITY BARRIER	140	LF	$9.00	$1,260
I-A-4	DEMO HEADWALLS	5	EA	$550.00	$2,750
I-A-5	DETENTION POND EXCAVATION & REMOVAL	17,000	CY	$6.00	$102,000
I-A-6	POND REGRADE BANKS	600	LF	$3.85	$2,310
I-A-7	POND DE-WATERING	1	WK	$2,750.00	$2,750
IC-1	REPLACE DOUBLE 24" HEADWALL	1	EA	$3,960.00	$3,960
I-C-2	REPLACE SINGLE 24" HEADWALL	2	EA	$1,980.00	$3,960
I-C-3	REPLACE SINGLE 18" HEADWALL	2	EA	$1,430.00	$2,860
I-C-4	CONCRETE RIP-RAP-1 FOOT THICK	35	TN	$88.00	$3,080
I-D-1	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,500.00	$4,500
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$132,610**
MOBILIZATION	$2,000
CONTINGENCY	$4,000
SUB-TOTAL	**$138,610**
CONSULTING FEES-DESIGN SURVEY & DESIGN-(NO BIDDING)	$5,100
REIMBURSEABLES	$50
WATER QUALITY DIFFUSER SYSTEM ($4000) & ELECTRIC HOOK UP ($1500)	$5,500
TOTAL	**$149,260**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

(1) WATER QUALITY DIFFUSER SYSTEM TO BE PLACED IN AZALEA POND, ONCE THE ORANGE LAKE DIFFUSER SYSTEM HAS PROVEN SUCCESSFUL-ADDED MAY 2014

(2) A WATER QUALITY DIFFUSER SYSTEM, AND/OR INLET BASKET COLLECTION SYSTEM, AND/OR CONSTRUCTION OF DRY RETENTION POND[S] AS A TYPE OF A PRE-TREATMENT FACILTY ARE TO BE CONSIDERED AS POSSIBILITIES. THE ORANGE LAKE DIFFUSER SYSTEM SHOULD BE PROVEN SUCCESSFUL PRIOR TO IMPLEMENTATION IN OTHER AREAS.



NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LiDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT - THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #17

AZALEA DRIVE
POND REHABILITATION

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 18

LOCATION: 7230 GRAND BOULEVARD

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
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5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting to be held in the future.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 18
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 18-GRAND BLVD

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	STAKED SILT FENCE	1480	LF	$1.40	$2,072
I-A-2	SOD (FLORATAM)	1125	SY	$3.60	$4,050
I-A-3	RESTORE CLEAR EXISTING DITCH	1,100	LF	$5.00	$5,500
I-B-1	1 " S-3 ASPHALT OVERLAY	107	SY	$13.50	$1,445
I-B-2	8" S-1 ASPHALT BASE	107	SY	$44.00	$4,708
I-B-3	REMOVE & REPLACE CONCRETE DRIVEWAY	220	SY	$38.50	$8,470
IC-1	REMOVE EXISTING CATCH BASIN	1	EA	$275.00	$275
IC-2	REMOVE EXISTING 18" PIPE	270	LF	$11.50	$3,105
IC-3	REMOVE EXISTING HEADWALLS	2	EA	$550.00	$1,100
I-C-4	FDOT TYPE E INLET- SET IN PLACE- COMPLETE	2	EA	$5,500.00	$11,000
I-C-5	36 " RCP	268	LF	$72.60	$19,457
IC-6	36" CONCRETE HEADWALL DOUBLE	2	EA	$7,700.00	$15,400
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$2,750.00	$2,750
I-D-2	REMOVE & REPLACE EXISTING TREES	5	EA	$660.00	$3,300
I-D-3	REMOVE & REPLACE EXISTING LANDSCAPING	50	LF	$55.00	$2,750
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	40	EA	$28.60	$1,144
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$250.00	$500
2-B-1	RELOCATE EXISTING 8-INCH FORCE MAIN	40	EA	$28.60	$1,144
2-B-2	ADJUST EXIST. FM VALVE TO GRADE	2	EA	$275.00	$550
I-D-4	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$4,400.00	$4,400
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$93,119**
MOBILIZATION	$3,000
CONTINGENCY	$6,000
SUB-TOTAL	**$102,119**
CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NO BIDDING)	$18,900
SUB-SURFACE UTILITY LOCATE	$1,500
PERMIT FEES AND REIMBURSEABLES	$2,400
TOTAL	**$124,919**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 18 Grand Blvd.xlsx]Sheet1

Steve Wasson

From: David Sauskojus
Sent: Thursday, November 14, 2013 2:13 PM
To: swasson@fldesign.com
Subject: Manatee Exclusion Devices
Attachments: manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org
ePermitting

Florida Fish and Wildlife Conservation Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

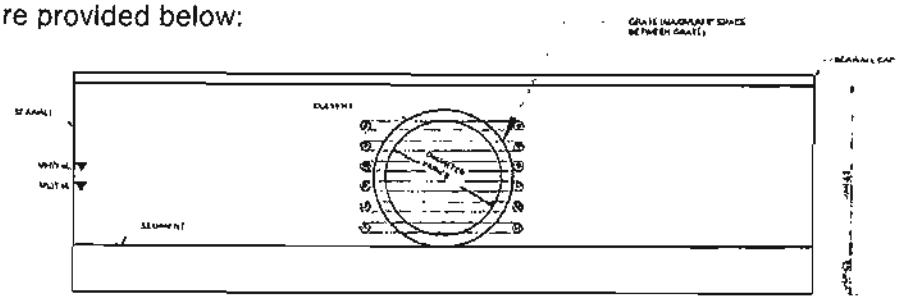
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

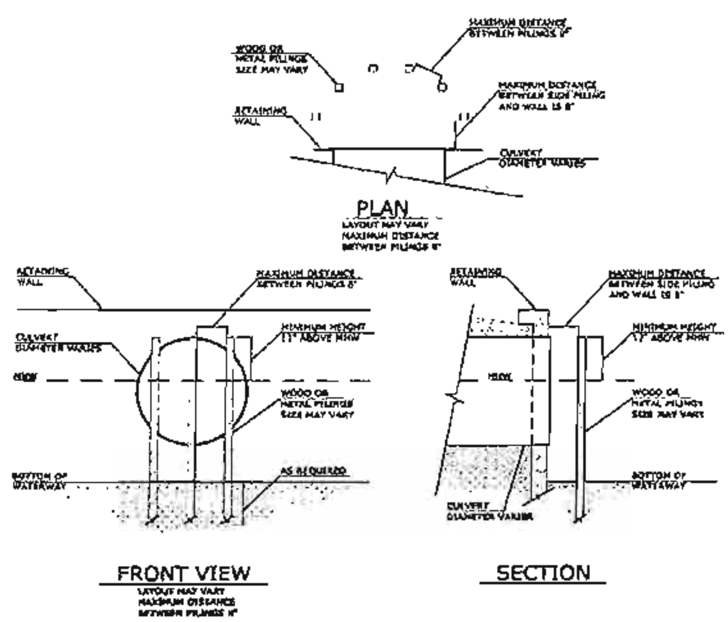
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

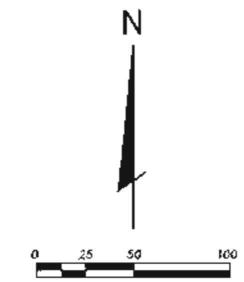
There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER



VERTICAL DATUM.

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT. (NAVD 88).

CONTROL BENCHMARKS UTILIZED:

(1) "Y 672", A FOUND STAINLESS STEEL ROD STAMPED "Y 672 2007", ELEVATION = 12.72 FEET, AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE AT www.ngs.noaa.gov.

(2) "Z 672", A FOUND CONCRETE MONUMENT, WITH A DISK STAMPED "Z 672 2007", ELEVATION = 16.29 FEET, AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE AT www.ngs.noaa.gov.

(3) "G 761", A FOUND CONCRETE MONUMENT, WITH A SWFWMD DISK STAMPED "G761 2012", ELEVATION = 4.59 FEET, AS PUBLISHED BY THE NATIONAL GEODETIC SURVEY WEB SITE AT www.ngs.noaa.gov.

CONVERSION FACTOR:

ADD 0.84 FEET TO CONVERT TO NATIONAL GEODETIC VERTICAL DATUM, 1929 ADJUSTMENT (NGVD 29). CONVERSION CALCULATED UTILIZING VERTCON (VERSION 2.0).

NOTES:

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2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT - THIS IS NOT A CONSTRUCTION PLAN.

FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE - TASK ORDER ITEM #18
7230 GRAND BOULEVARD
(BETWEEN GARDEN GROVE & HOME CREST)
DITCH LINE

516-43
536
N/A
12/04/13

VERTICAL DATUM:

ELEVATIONS ARE BASED ON NATIONAL GEODETIC SURVEY (NGS), NORTH AMERICAN VERTICAL DATUM, 1988 ADJUSTMENT, (NAVD 88).

CONTROL BENCHMARKS UTILIZED:

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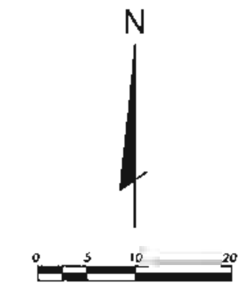
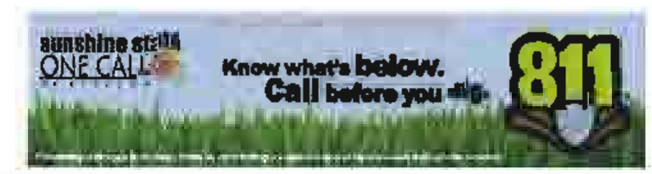
CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #18
7230 GRAND BOULEVARD
(BETWEEN GARDEN GROVE & HOME CREST)
DITCH LINE

516-43
538
N/A
12/04/13





VERTICAL DATUM:

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CONTROL BENCHMARKS UTILIZED

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CONVERSION FACTOR:

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NOTES:

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5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #18
7230 GRAND BOULEVARD
(BETWEEN GARDEN GROVE & HOME CREST)
DITCH LINE

516-43
556
N/A
12/04/13

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 19

LOCATION: ORCHID LAKE ROAD INDUSTRIAL PARK

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting to be held in the future.
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2013 MASTER DRAINAGE PLAN ITEM 19
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

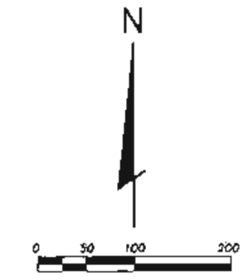
PRELIMINARY ENGINEER'S ESTIMATE
ITEM 19-ORCHID LAKE INDUSTRIAL PARK

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	1700	SY	$3.60	$6,120
I-A-2	STAKED SILT FENCE	1900	LF	$1.40	$2,660
I-A-3	CONSTRUCT "RED" SWALE	230	LF	$9.35	$2,151
I-A-4	CLEAR EXISTING PERIMETER DITCH & CULVERTS	2,535	LF	$9.70	$24,590
I-A-5	REGRADE AREA SE CNR OF ORCHID LAKE & RUTILLIO	20	LF	$9.70	$194
I-B-1	1.5" S-3 ASPHALT OVERLAY	80	SY	$13.50	$1,080
I-B-2	8" S-1 ASPHALT BASE	80	SY	$44.00	$3,520
I-B-3	REMOVE & REPLACE DRIVEWAYS	605	SY	$38.50	$23,293
I-C-1	FDOT TYPE D INLET- SET IN PLACE- COMPLETE	2	EA	$2,715.00	$5,430
I-C-2	24 " RCP	883	LF	$37.50	$33,113
I-C-3	24" CONCRETE MES	13	EA	$1,320.00	$17,160
I-C-4	FDOT TYPE D INLET-CONTROL STRUCTURE W/WEIR	1	EA	$2,715.00	$2,715
2-A-1	RELOCATE EXISTING 8-INCH WATER MAIN	80	EA	$28.60	$2,288
2-A-2	ADJUST EXIST. VALVE TO GRADE	4	EA	$275.00	$1,100
2-A-2	ADJUST WATER MAIN SERVICES	6	EA	$275.00	$1,650
2-A-1	RELOCATE EXISTING 6-INCH FORCE MAIN	40	EA	$28.60	$1,144
I-D-1	CONSTRUCTION STAKE-OUT & RECORD SURVEY	1	EA	$5,100.00	$5,100
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$127,186**
MOBILIZATION	$3,000
CONTINGENCY	$10,000
SUB-TOTAL	**$140,186**
CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NOBIDDING)	$25,400
SUB-SURFACE UTILITY LOCATE	$4,000
PERMIT FEES AND REIMBURSEABLES	$2,400
TOTAL	**$171,986**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 19 Orchid Lake Industrial Park.xlsx]Sheet1



NOTES:

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2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN.

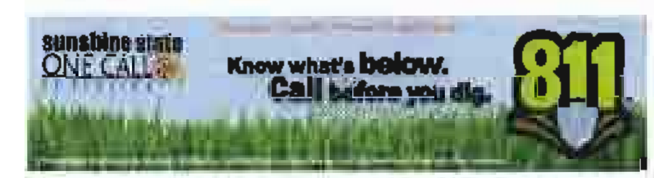
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #19

ORCHID LAKE INDUSTRIAL PARK
DITCH/CANAL REHABILITATION

516-43
536
N/A
12/04/13
1
1



NOTES:

1. NO UTILITIES LOCATED, UTILITIES SHOWN ARE BASED ON INFORMATION PROVIDED BY THE CITY OF NEW PORT RICHEY.
2. CALL SUNSHINE STATE 811.
3. SOD ALL DISTURB AREAS.
4. CONTOURS SHOWN WERE CREATED FROM LIDAR CONTOURS NAVD 88.
5. THIS IS A MASTER PLAN LAYOUT – THIS IS NOT A CONSTRUCTION PLAN

FLORIDA DESIGN CONSULTANTS, INC.
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5919 MAIN STREET
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2013 MASTER DRAINAGE PLAN
10-YEAR UPDATE – TASK ORDER ITEM #19

ORCHID LAKE INDUSTRIAL PARK
DITCH/CANAL REHABILITATION

516-43
536
N/A
12/04/13
1
1

CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 20

LOCATION: TROPIC SHORES

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A limited Preliminary Storm Sewer Design Drainage Program was prepared. It is included.
6. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
7. The Southwest Florida Water Management District Preliminary Pre-Application Meeting to be held in the future.
8. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 20
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 20-TROPIC SHORES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
	TROPIC DRIVE				
I-A-1	SOD (FLORATAM)	1400	SY	$3.60	$5,040
I-A-2	STAKED SILT FENCE	1260	LF	$1.40	$1,764
I-A-3	FLOATING TURBIDITY BARRIER	80	LF	$9.00	$720
I-A-4	REMOVE & DISPOSE OF EXISTING STORM PIPE	540	LF	$11.50	$6,210
I-A-5	REMOVE & DISPOSE OF EXISTING STORM STRUCTURE	4	EA	$275.00	$1,100
I-B-1	1.5" S-3 ASPHALT OVERLAY	1,280	SY	$13.50	$17,280
I-B-2	1.5 S-1 ASPHALT BASE	60	SY	$9.00	$540
I-B-3	6" CRUSHED CONCRETE	60	SY	$14.00	$840
I-B-4	REMOVE & REPLACE CONCRETE DRIVEWAYS	605	SY	$38.50	$23,293
I-B-5	PIPE BACKFILL	800	CY	$13.50	$10,800
I-C-1	FDOT TYPE C STORM INLET(S)	8	EA	$2,530.00	$20,240
I-C-2	FDOT TYPE D STORM INLET(S)	1	EA	$2,715.00	$2,715
I-C-3	24" SINGLE SEAWALL HEADWALL	1	EA	$6,600.00	$6,600
I-C-4	30" SINGLE SEAWALL HEADWALL	1	EA	$6,600.00	$6,600
I-C-5	18 " RCP	51	LF	$27.25	$1,390
I-C-6	24 " RCP	627	LF	$37.50	$23,513
I-C-7	30 " RCP	110	LF	$51.00	$5,610
I-C-8	SHEET PILING FOR STORM INSTALLATION	420	LF	$55.00	$23,100
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$2,200.00	$2,200
I-D-2	REMOVE & REPLACE EXISTING TREES	3	EA	$660.00	$1,980
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	260	EA	$13.50	$3,510
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
I-D-3	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$5,300	$5,300
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				
	SUB-TOTAL				**$170,894**
	MOBILIZATION				$3,000
	CONTINGENCY				$10,000
	TROPIC DRIVE TOTAL				**$183,894**
	DRINKARD DRIVE				
I-A-1	SOD (FLORATAM)	1160	SY	$3.60	$4,176
I-A-2	STAKED SILT FENCE	1040	LF	$1.40	$1,456
I-A-3	FLOATING TURBIDITY BARRIER	40	LF	$9.00	$360
I-A-4	REMOVE & DISPOSE OF EXISTING STORM PIPE	160	LF	$11.50	$1,840
I-A-5	REMOVE & DISPOSE OF EXISTING STORM STRUCTURE	2	EA	$275.00	$550
I-B-1	1.5" S-3 ASPHALT OVERLAY	1,360	SY	$13.50	$18,360
I-B-2	1.5 S-1 ASPHALT BASE	50	SY	$9.00	$450
I-B-3	6" CRUSHED CONCRETE	50	SY	$14.00	$700
I-B-4	PIPE BACKFILL	550	CY	$13.50	$7,425
I-C-1	FDOT TYPE C STORM INLET(S)	7	EA	$2,530.00	$17,710
I-C-2	24" SINGLE SEAWALL HEADWALL	1	EA	$6,600.00	$6,600
I-C-3	18 " RCP	412	LF	$27.25	$11,227
I-C-4	24 " RCP	129	LF	$37.50	$4,838
I-C-5	SHEET PILING FOR STORM INSTALLATION	230	LF	$55.00	$12,650
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$2,200.00	$2,200
I-D-2	REMOVE & REPLACE EXISTING TREES	2	EA	$660.00	$1,320
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	60	EA	$13.50	$810
2-A-2	ADJUST EXIST. VALVE TO GRADE	2	EA	$275.00	$550
I-D-3	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,800	$4,800
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				
	SUB-TOTAL				**$98,022**
	MOBILIZATION				$3,000
	CONTINGENCY				$8,000
	DRINKARD DRIVE TOTAL				**$109,022**
	SUB-TOTAL				**$292,916**
	CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NO BIDDING)				$25,400
	SUB-SURFACE UTILITY LOCATE- 2500 X 2				$5,000
	PERMIT FEES AND REIMBURSEABLES				$2,400
	GRAND TOTAL				**$325,716**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

STORM SEWER HYDRAULICS

System: **NORTH**

PROJECT			
Number:	536	Organization:	FLORIDA DESIGN CONSULTANTS, INC.
Description:	Tropic Shores	Designed by:	Vinay Goel, P.E.
County:	Pasco	Checked by:	Steve Wasson, P.E.

Outfall Tailwater El:	2.75
Exit Loss at Outfall:	0.01
Storm Sewer Control El:	2.76

Storm Event - IDF Curve		CONDITIONS: Runoff Coeff. (default)		
Zone	Frequency	Area 1	Area 2	Area 3
6	10	0.64	0.00	0.00

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas: Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs): Qb	Sum(Qb) CIA TOTAL	Inlet Elevations: Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations: HGL Crown Line Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB105		**CB378**	0.45	0.64	0.28	0.28					0.00	0.00	3.00	2.82	2.81	2.79	0.018	18.00	0.0357	Full	1.22		
		0.00	0.00	0.00	0.00	0.00	10.00	0.43	7.47	0.28		2.15		0.00	1.96	1.81						6.17	0.0120
DBI-C	1	51.00	0.00	0.00	0.00	0.28						**2.15**	0.18	0.01	0.46	0.31	0.150	18.00	0.2941		3.49		
CB378		**NORTH**	0.28	0.64	0.17	0.17					0.00	0.00	3.00	2.79	2.78	2.76	0.020	24.00	0.0197	Full	1.09		
		0.00	0.00	0.00	0.00	0.28	10.43	0.00	7.35	0.46		3.44		0.00	2.31	2.00						13.51	0.0120
DBI-C	1	102.00	0.00	0.00	0.00	0.46						**3.44**	0.21	0.01	0.31	0.00	0.310	24.00	0.3039		4.30		

NORTH

#20

9/27/2013

STORM SEWER HYDRAULICS

System: **WEST**

Page: 1

PROJECT		Organization: FLORIDA DESIGN CONSULTANTS, INC	Outfall Tailwater El:	2.75	Storm Event - IDF Curve		CONDITIONS Runoff Coeff. (default)		
Number:	536	Designed by: Vinay Goel, P.E.	Exit Loss at Outfall:	0.02	Zone	Frequency	Area 1	Area 2	Area 3
Description:	Tropic Shores	Checked by: Steve Wasson, P.E.	Storm Sewer Control El:	2.77	6	10	0.64	0.00	0.00
County:	Pasco								

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs) Qb	Sum(Qb) CIA TOTAL	Inlet Elevations Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations HGL / Crown Line / Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB1		**CB2**	0.16	0.64	0.10	0.10					0.00	0.00	3.00	2.85	2.85	2.85	0.001	24.00	0.0010	Full	0.24		
		0.00	0.00	0.00	0.00	0.00	10.00	0.82	7.47	0.10		0.76		0.00	3.12	2.83						13.33	0.0120
MES2:1	1	98.00	0.00	0.00	0.00	0.10						**0.76**	0.15	0.00	1.12	0.83	0.290	24.00	0.2959		4.24		
CB2		**CB3**	0.15	0.64	0.09	0.09					0.00	0.00	3.00	2.85	2.85	2.85	0.001	24.00	0.0034	Full	0.46		
		0.00	0.00	0.00	0.00	0.10	10.82	0.28	7.25	0.19		1.44		0.00	2.83	2.73						13.49	0.0120
DBI-C	1	33.00	0.00	0.00	0.00	0.19						**1.44**	0.15	0.00	0.83	0.73	0.100	24.00	0.3030		4.29		
CB3		**CB379**	0.10	0.64	0.06	0.06					0.00	0.00	3.00	2.85	2.85	2.84	0.005	24.00	0.0059	Full	0.60		
		0.00	0.00	0.00	0.00	0.19	11.09	0.64	7.18	0.26		1.89		0.00	2.73	2.50						13.39	0.0120
DBI-C	1	77.00	0.00	0.00	0.00	0.26						**1.89**	0.15	0.00	0.73	0.50	0.230	24.00	0.2987		4.26		
CB379		**CB377**	0.11	0.64	0.07	0.07					0.00	0.00	3.00	2.84	2.84	2.83	0.005	24.00	0.0091	Full	0.75		
		0.00	0.00	0.00	0.00	0.26	11.73	0.46	7.03	0.33		2.34		0.00	2.50	2.33						13.63	0.0120
DBI-C	1	55.00	0.00	0.00	0.00	0.33						**2.34**	0.16	0.00	0.50	0.33	0.170	24.00	0.3091		4.34		
CB4		**CB948**	0.17	0.64	0.10	0.10					0.00	0.00	3.00	2.84	2.84	2.84	0.001	24.00	0.0011	Full	0.26		
		0.00	0.00	0.00	0.00	0.00	10.00	0.82	7.47	0.10		0.81		0.00	2.73	2.44						13.26	0.0120
MES2:1	1	99.00	0.00	0.00	0.00	0.10						**0.81**	0.16	0.00	0.73	0.44	0.290	24.00	0.2929		4.22		
CB948		**CB377**	0.15	0.64	0.09	0.09					0.00	0.00	3.00	2.84	2.83	2.83	0.001	24.00	0.0037	Full	0.47		
		0.00	0.00	0.00	0.00	0.10	10.82	0.29	7.25	0.20		1.49		0.00	2.44	2.33						13.74	0.0120
DBI-C	1	35.00	0.00	0.00	0.00	0.20						**1.49**	0.16	0.00	0.44	0.33	0.110	24.00	0.3143		4.37		
CB5		**CB6**	0.73	0.64	0.46	0.46					0.00	0.00	3.00	2.89	2.88	2.88	0.007	24.00	0.0203	Full	1.11		
		0.00	0.00	0.00	0.00	0.00	10.00	0.28	7.47	0.46		3.49		0.00	2.71	2.61						13.29	0.0120
DBI-C	1	34.00	0.00	0.00	0.00	0.46						**3.49**	0.11	0.01	0.71	0.61	0.100	24.00	0.2941		4.23		
CB6		**CB377**	0.18	0.64	0.11	0.11					0.00	0.00	3.00	2.88	2.86	2.83	0.029	24.00	0.0309	Full	1.37		
		0.00	0.00	0.00	0.00	0.46	10.28	0.78	7.39	0.58		4.30		0.00	2.61	2.33						13.38	0.0120
DBI-C	1	94.00	0.00	0.00	0.00	0.58						**4.30**	0.12	0.01	0.61	0.33	0.280	24.00	0.2979		4.26		
CB377		**WEST**	0.12	0.64	0.07	0.07					0.00	0.00	3.00	2.83	2.81	2.77	0.038	30.00	0.0348	Full	1.69		
		0.00	0.00	0.00	0.00	1.12	12.19	0.00	6.93	1.19		8.29		0.00	2.83	2.50						24.34	0.0120
DBI-D	1	110.00	0.00	0.00	0.00	1.19						**8.29**	0.17	0.02	0.33	0.00	0.330	30.00	0.3000		4.96		

WEST

Units: ENGLISH

STORM SEWER HYDRAULICS

System: **EAST**

PROJECT				
Number:	536	Organization:	FLORIDA DESIGN CONSULTANTS, INC.	
Description:	Tropic Shores	Designed by:	Vinay Goel, P.E.	
County:	Pasco	Checked by:	Steve Wasson, P.E.	

Outfall Tailwater El:	2.75
Exit Loss at Outfall:	0.01
Storm Sewer Control El:	2.76

Storm Event - IDF Curve		CONDITIONS Runoff Coeff. (default)		
Zone	Frequency	Area 1	Area 2	Area 3
6	10	0.64	0.00	0.00

HGL method: Standard FDOT (Jump HGL to pipe crown).

FROM Station Type	Brls	TO Offset Len	Drainage Areas Area (A)	Runoff Coeff (C)	C*A (CA)	Lcl CA UpStrm Tot CA	Tc (min)	Travel Time (min)	Inten. (in/hr)	Total CA (ac)	Flow (cfs) Qb	Sum(Qb) CIA TOTAL	Inlet Elevations Inlet Clear.	HGL Min HGL Jnc Loss	Pipe Elevations HGL Crown Line Flow Line		Fall (ft)	Pipe Height Width (in)	HGL (%) FL (%)	Flow Type	Velocity Actual Physical (fps)	Capacity (cfs)	Mann'g 'N'
CB7		**CB8**	0.36	0.64	0.23	0.23					0.00	0.00	4.00	2.94	2.94	2.94	0.009	18.00	0.0229	Full	0.97		
		0.00	0.00	0.00	0.00	0.00	10.00	0.32	7.47	0.23		1.72		0.00	2.51	2.39						6.39	0.0120
DBI-C	1	38.00	0.00	0.00	0.00	0.23						**1.72**	1.06	0.00	1.01	0.89	0.120	18.00	0.3158		3.62		
CB8		**CB9**	0.21	0.64	0.13	0.13					0.00	0.00	4.00	2.94	2.92	2.88	0.035	18.00	0.0560	Full	1.52		
		0.00	0.00	0.00	0.00	0.23	10.32	0.52	7.38	0.36		2.69		0.00	2.39	2.21						6.08	0.0120
DBI-C	1	63.00	0.00	0.00	0.00	0.36						**2.69**	1.06	0.02	0.89	0.71	0.180	18.00	0.2857		3.44		
CB9		**CB381**	0.09	0.64	0.05	0.05					0.00	0.00	4.00	2.88	2.88	2.81	0.077	18.00	0.0724	Full	1.73		
		0.00	0.00	0.00	0.00	0.36	10.84	0.88	7.25	0.42		3.06		0.00	2.21	1.89						6.25	0.0120
DBI-C	1	106.00	0.00	0.00	0.00	0.42						**3.06**	1.12	0.00	0.71	0.39	0.320	18.00	0.3019		3.54		
CB380		**CB381**	0.19	0.64	0.12	0.12					0.00	0.00	4.00	2.81	2.81	2.81	0.002	18.00	0.0064	Full	0.51		
		0.00	0.00	0.00	0.00	0.00	10.00	0.26	7.47	0.12		0.91		0.00	1.98	1.89						6.13	0.0120
DBI-C	1	31.00	0.00	0.00	0.00	0.12						**0.91**	1.19	0.00	0.48	0.39	0.090	18.00	0.2903		3.47		
CB10		**CB11**	0.23	0.64	0.14	0.14					0.00	0.00	4.00	2.89	2.89	2.89	0.003	18.00	0.0093	Full	0.62		
		0.00	0.00	0.00	0.00	0.00	10.00	0.30	7.47	0.14		1.10		0.00	2.42	2.31						6.29	0.0120
DBI-C	1	36.00	0.00	0.00	0.00	0.14						**1.10**	1.11	0.00	0.92	0.81	0.110	18.00	0.3056		3.56		
CB11		**CB381**	0.36	0.64	0.23	0.23					0.00	0.00	4.00	2.89	2.89	2.81	0.085	18.00	0.0601	Full	1.58		
		0.00	0.00	0.00	0.00	0.14	10.30	1.18	7.39	0.37		2.79		0.00	2.31	1.89						6.19	0.0120
DBI-C	1	142.00	0.00	0.00	0.00	0.37						**2.79**	1.11	0.00	0.81	0.39	0.420	18.00	0.2958		3.50		
CB381		**EAST**	0.28	0.64	0.17	0.17					0.00	0.00	4.00	2.81	2.79	2.76	0.032	24.00	0.0250	Full	1.23		
		0.00	0.00	0.00	0.00	0.92	11.72	0.00	7.03	1.10		7.74		0.00	2.39	2.00						26.95	0.0120
DBI-D	2	129.00	0.00	0.00	0.00	1.10						**7.74**	1.19	0.01	0.39	0.00	0.390	24.00	0.3023		4.29		

EAST

Units: ENGLISH

Steve Wasson

From: David Sauskojus
Sent: Thursday, November 14, 2013 2:13 PM
To: swasson@fldesign.com
Subject: Manatee Exclusion Devices
Attachments: manatee_grates.pdf

Steve,
Here is the info from FWC relative to pipe grating.

David K. Sauskojus, M.S.
Senior Environmental Scientist
Environmental Resource Permit Bureau
Southwest Florida Water Management District
(800) 836-0797 or (813) 985-7481, ext 4370
david.sauskojus@watermatters.org
ePermitting

Florida Fish
and Wildlife
Conservation
Commission

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

620 South Meridian Street
Tallahassee, Florida
32399-1600

MyFWC.com

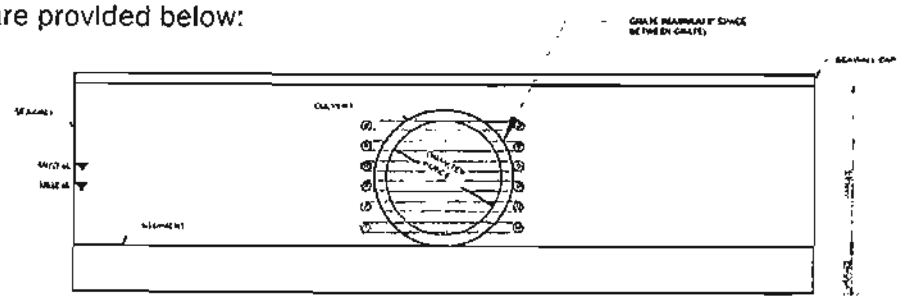
Grates and Other Manatee Exclusion Devices for Culverts and Pipes

February 2011

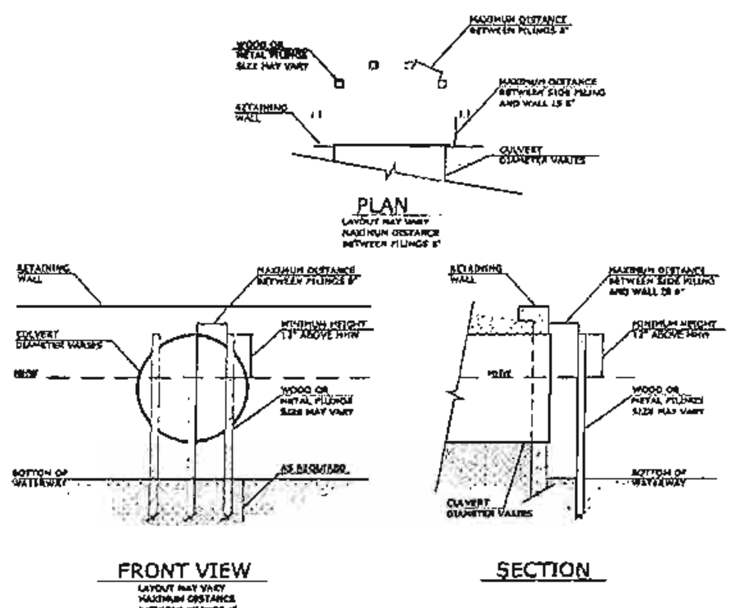
Over a dozen manatees have died from starvation or drowning after becoming stranded in culverts and pipes (such as storm water drains, dead-end culverts, etc.). Numerous manatees have been rescued from these structures, which seem to attract manatees due to the flow of fresh water, or the access that pipes or structures provide to other habitat. Because they cannot swim backwards, manatees can become entrapped when entering long or dead-end culverts.

Not all culverts and pipes present a risk to manatees, and some provide needed corridors for other wildlife. The decision to allow a culvert to remain accessible to manatees will depend on culvert length, water level, available habitat and other risk factors. These situations can be evaluated on a case-by-case basis by the FWC.

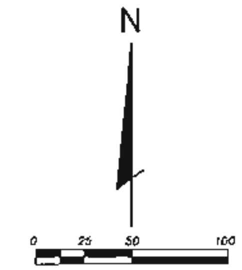
There are various ways to preclude manatees from entering risky culverts and pipes, including grates, pilings, flap gates, and in some circumstances, valves. If a pipe or culvert is greater than 8 inches in diameter, but smaller than 8 feet, it is a possible risk to manatees because there is not enough room to turn around. Bars or pilings should be no more than 8 inches apart in front of the entrance to restrict manatee access. Bars on grates can be diagonal, horizontal or vertical, and grates can be hinged (swinging outwards) if needed so that debris can escape from inside the pipe. Examples are provided below:



TYPICAL CULVERT END WITH
GRATING FOR MANATEE PROTECTION



CULVERT ALTERNATIVE MANATEE BARRIER



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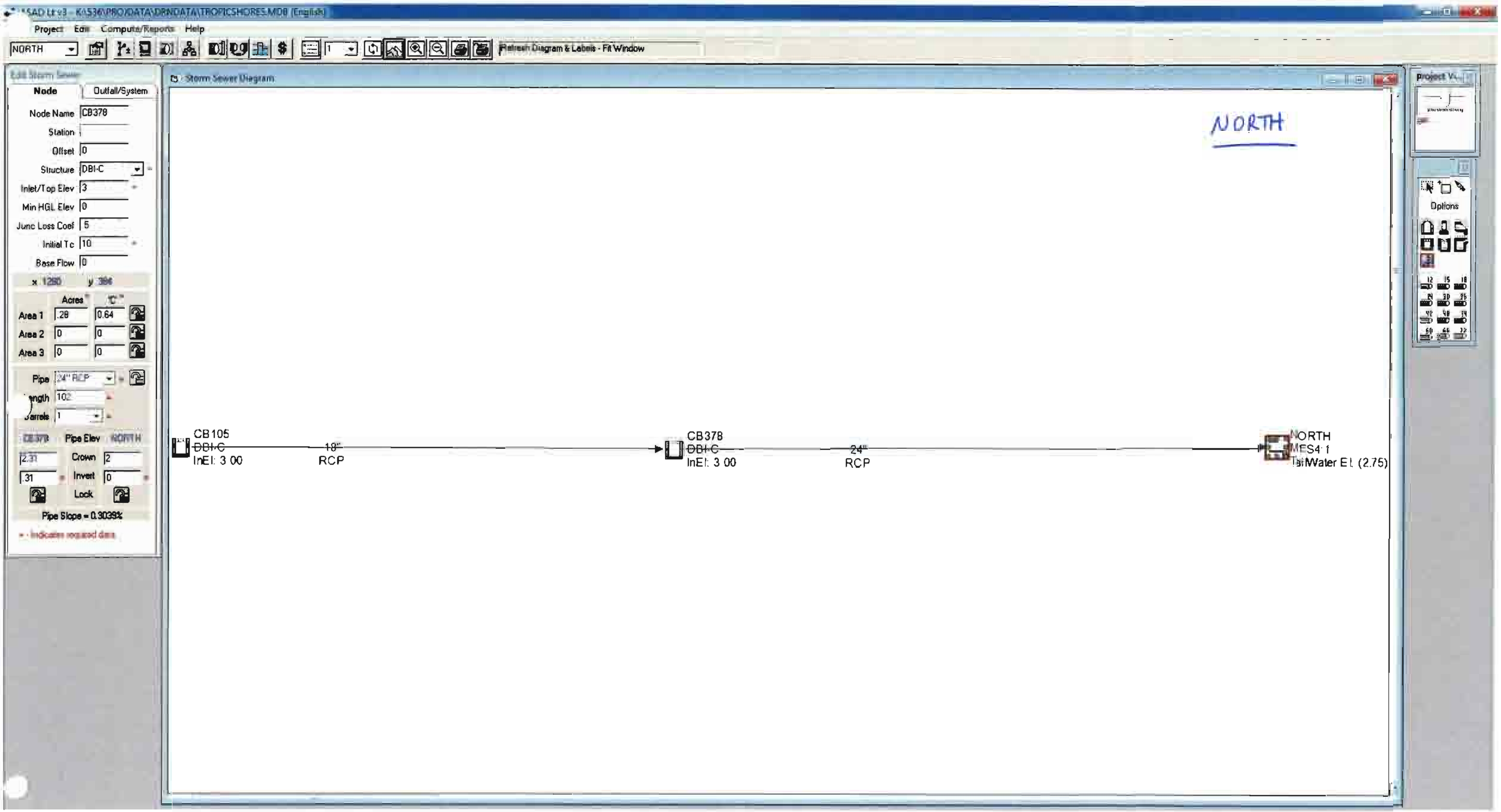
FLORIDA DESIGN CONSULTANTS, INC.
ENGINEERS, ENVIRONMENTALISTS, SURVEYORS & PLANNERS
E.B. No. 7421

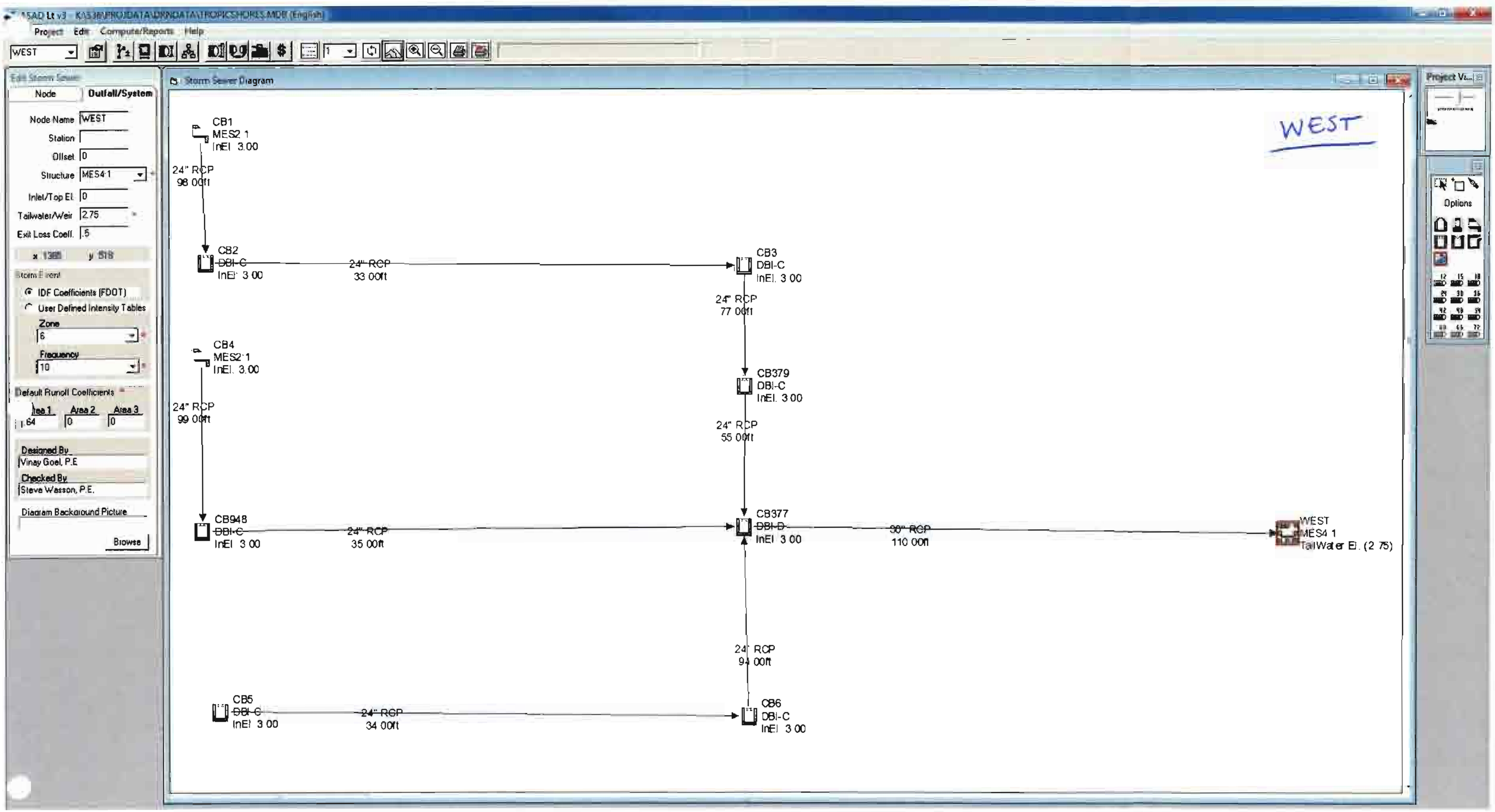
CITY OF NEW PORT RICHEY
5919 MAIN STREET
NEW PORT RICHEY, FLORIDA 34652

2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #20

TROPIC SHORES
DRAINAGE IMPROVEMENTS

516-43
536
N/A
12/04/13
1 of 1


SAD Lt v3 - K:\536\PRO\DATA\DRNDATA\TROPICSHORES.MDB (English)
Project
Edit
Compute/Reports
Help
NORTH
Refresh Diagram & Labels - Fit Window
Storm Sewer Diagram
Node
Outfall/System
Node Name CB378
Station
Offset 0
Structure DBI-C
Inlet/Top Elev 3
Min HGL Elev 0
Junc Loss Coef 5
Initial Tc 10
Base Flow 0
Acres
"C"
Area 1 .28 0.64
Area 2 0 0
Area 3 0 0
Pipe 24" RCP
Length 102
Barrels 1
Pipe Elev
Crown 2.31 2
Invert .31 0
Lock
Pipe Slope = 0.3039%
NORTH
CB105
DBI-C
InEl: 3.00
18"
RCP
CB378
DBI-C
InEl: 3.00
24"
RCP
NORTH
MES4:1
TailWater El (2.75)
Options



Project Edit Compute/Reports Help
WEST
Storm Sewer Diagram
Node
Outfall/System
Node Name WEST
Station
Offset 0
Structure MES4:1
Inlet/Top El. 0
Tailwater/Weir 2.75
Exit Loss Coeff. .5
Storm Event
IDF Coefficients (FDOT)
User Defined Intensity Tables
Zone
6
Frequency
10
Default Runoff Coefficients
Area 2
Area 3
0
0
Designed By
Vinay Goel, P.E.
Checked By
Steve Wasson, P.E.
Diagram Background Picture
Browse
Options
WEST
CB1
MES2 1
InEl. 3.00
24" RCP
98.00ft
CB2
~~DBI-C~~
InEl 3.00
24" RCP
33.00ft
CB3
DBI-C
InEl. 3.00
24" RCP
77.00ft
CB4
MES2 1
InEl. 3.00
24" RCP
99.00ft
CB379
DBI-C
InEl. 3.00
24" RCP
55.00ft
CB948
~~DBI-C~~
InEl 3.00
24" RCP
35.00ft
CB377
~~DBI-D~~
InEl 3.00
30" RCP
110.00ft
WEST
MES4 1
TailWater El. (2.75)
24" RCP
94.00ft
CB5
~~DBI-C~~
InEl 3.00
24" RCP
34.00ft
CB6
DBI-C
InEl 3.00

Edit Storm Sewer

Node | **Outfall/System**

Node Name: EAST
Station:
Offset: 0
Structure: MES4:1
Inlet/Top El: 0
Tailwater/Weir: 2.75
Exit Loss Coeff.: .5

x 1211 y 480

Storm Event
- IDF Coefficients (FDOT)
- User Defined Intensity Tables

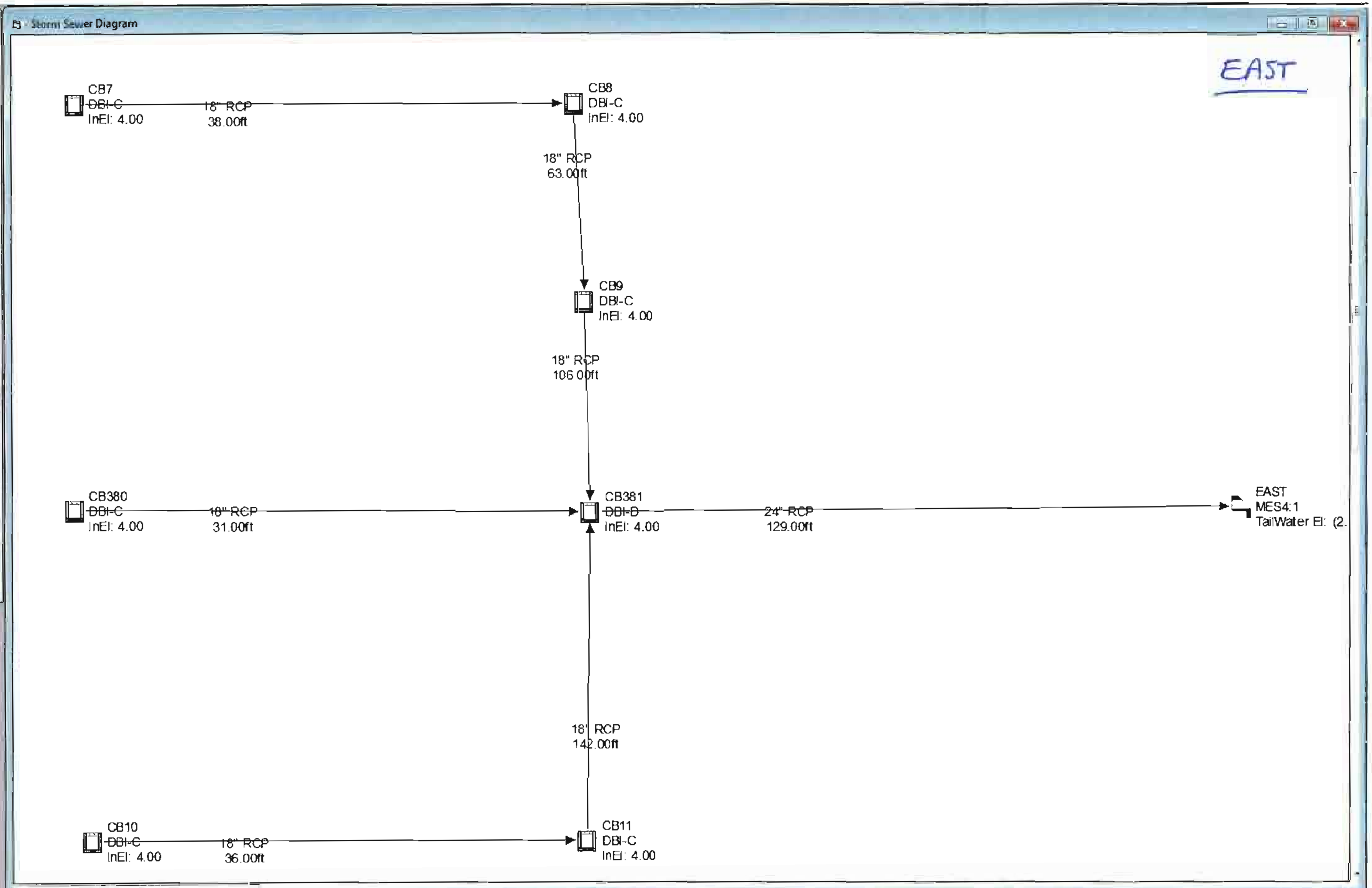
Zone: 6
Frequency: 10

Default Runoff Coefficients

Area 1	Area 2	Area 3
.64	0	0

Designed By: Vinay Goel, P.E.
Checked By: Steve Wasson, P.E.
Diagram Background Picture

Browse



CITY OF NEW PORT RICHEY

2013 MASTER DRAINAGE PLAN - 10 YEAR UPDATE

ITEM NUMBER 21

LOCATION: MISSOURI AVENUE AT MADISON STREET

NOTES:

1. No utilities have been located, utilities shown are based on information provided by the City of New Port Richey.
2. Call Sunshine State 811.
3. Sod all disturbed areas.
4. Contours shown were created from LiDar contours NAVD 88.
5. A very Preliminary Engineer's Estimate has been prepared. Note: All construction costs are based upon 2013 prices. Cost factor increases to be established by the City of New Port Richey.
6. The Southwest Florida Water Management District Preliminary Pre-Application Meeting Notes are attached.
7. This is a Master Plan Layout - this is not a Construction Plan.

2013 MASTER DRAINAGE PLAN ITEM 21
CITY OF NEW PORT RICHEY, FL
OCTOBER 2013

PRELIMINARY ENGINEER'S ESTIMATE
ITEM 21-MISSOURI AVE.

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
I-A-1	SOD (FLORATAM)	750	SY	$3.60	$2,700
I-A-2	STAKED SILT FENCE	760	LF	$1.40	$1,064
I-B-1	1.5" S-3 ASPHALT OVERLAY	1030	SY	$13.50	$13,905
I-B-2	1.5" S-1 ASPHALT BASE	1030	SY	$9.00	$9,270
I-B-3	6" CRUSHED CONCRETE BASE-MISSOURI	950	SY	$14.00	$13,300
I-B-4	8" CRUSHED CONCRETE BASE-MADISON	80	SY	$15.00	$1,200
I-B-5	COMPACTED SUB-GRADE	1100	SY	$3.50	$3,850
I-B-6	REMOVE AND REPLACE 4' SIDEWALK	180	SF	$5.50	$990
I-B-7	HC RAMPS AND YELLOW PADS	6	EA	$1,100.00	$6,600
I-C-1	FDOT TYPE D STORM INLET(S)	2	EA	$2,465.00	$4,930
I-C-2	FDOT TYPE 3 STORM INLET(S)	4	EA	$3,500.00	$14,000
I-C-3	18 " RCP	20	LF	$27.25	$545
I-C-4	24 " RCP	68	LF	$37.50	$2,550
I-C-5	30" RCP	325	LF	$51.00	$16,575
I-C-8	TIE IN EXISTING PIPE TO STORM MANHOLE	2	EA	$1,650.00	$3,300
I-C-9	STORM MANHOLE	4	EA	$2,530.00	$10,120
I-C-9	REMOVE EXISTING STORM INLETS	2	EA	$275.00	$550
I-D-1	MAINTENANCE OF TRAFFIC	1	LS	$13,200.00	$13,200
I-D-2	CROSSWALKS THERMOPLASTIC FDOT 17346	24	LF	$9.25	$222
I-D-3	STOP BAR THERMOPLASTIC	24	LF	$4.25	$102
2-A-1	RELOCATE EXISTING 2-INCH WATER MAIN	60	LF	$13.50	$810
2-A-1	RELOCATE EXISTING 16-INCH WATER MAIN	40	LF	$92.40	$3,696
2-A-2	ADJUST EXIST. VALVE TO GRADE 2-INCH	2	EA	$275.00	$550
2-A-2	ADJUST EXIST. VALVE TO GRADE 16-INCH	2	EA	$495.00	$990
I-D-4	CONSTRUCTION STAKEOUT AND RECORD SURVEY	1	EA	$4,700	$4,700
	NOTE: SAW CUT COSTS ARE TO BE INCLUSIVE				

SUB-TOTAL	**$129,719**
MOBILIZATION	$5,000
CONTINGENCY	$15,000
SUB-TOTAL	**$149,719**
CONSULTING FEES-DESIGN SURVEY,DESIGN,PERMITTING- (NO BIDDING)	**$6,700**
SUB-SURFACE UTILITY LOCATE	$3,500
PERMIT FEES AND REIMBURSEABLES	$2,000
TOTAL	**$161,919**

NOTE: ALL CONSTRUCTION COSTS ARE BASED ON 2013 PRICES. COST FACTOR INCREASES TO BE ESTABLISHED BY THE CITY OF NEW PORT RICHEY.

K:\536\ProjData\Quantities\[NPR Master Drainage Plan ITEM 21 Missouri Ave.xlsx]Sheet1

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT RESOURCE REGULATION DIVISION PRE-APPLICATION MEETING NOTES	FILE NUMBER: PA 400650

Date:	11/14/2013
Time:	1:00
Project Name:	City of New Port Richey Master Drainage
Attendees:	Monte Ritter, David Sauskojus; Steve Wasson, Florida Design (727) 247-7540

County:	Pasco	**Sec/Twp/Rge:**	(1) 5/26/16 (2) 4/26/16
Total Land Acreage:	(1) 0.1 acres (2) 0.4 acres	**Project Acreage:**	(1) 0.1 acres (2) 0.4 acres

Prior On-Site/Off-Site Permit Activity:
- (1) None, (2) 22259.001 Adjacent

Project Overview:
- (1) 5/26/16 – Richey Drive. Proposed 18 – 24 inch storm sewer on private property within proposed easement to reduce flooding on Richey Drive. Pipe will outfall in tidal portion of Pithlachascotee River. Grating will be required at pipe outlet to river. Project will also involve replacement of existing trench drain with slightly larger trench drain on Queen Lane (De minimis activity). Wetlands – Yes; DRI – No; ERP – No; Compliance – No; District Funds – No
- (2) 4/26/16 – Missouri Ave. Proposed 24 -30 inch storm sewer connection to existing 36 inch storm sewer in Missouri Ave previously permitted under 44022259.001. Project should qualify for Minor Modification since project area is less than 10% of original project area of 5.51 acres for 44022259.001. Wetlands – No; DRI – No; ERP – No; Compliance – No; District Funds – No

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Drawdown Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)
- If applicable:
- Provide the limits of jurisdictional wetlands.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.
- (1) Minor disturbance anticipated at river for pipe installation. Grating on pipe will be required. No other wetland/surface water involved.
- (2) No wetlands/surface waters

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)
- Both projects in Pithlachascotee River Watershed and are in open basins.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)
- (1) Attenuation not required. Richey Drive discharges to tidal portion of Pithlachascotee River. Demonstrate proposed discharge will not cause harmful erosion or shoaling in river.
- (2) Demonstrate that proposed storm sewer is part of drainage area for Orange Lake as established in ERP 44022259.001.

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)
- (1) and (2) Water quality treatment not necessary. No new impervious areas are proposed.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)
- (1) Installation of outfall pipe in headwall (if there) otherwise construct such. Work in river will require Letter of Consent.
- (2) N/A

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)
- (1) and (2) The permit must be issued to the City of New Port Richey. (1) Provide evidence of an easement.

Application Type and Fee Required:

- (1) Individual ERP – Sections A, C and E of the ERP Application - $2184 for online submittal.
- (2) Minor Modification to 44022259.001 – Request modification by letter and provide executed copy of last two pages in Section A of ERP application - $0.00

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

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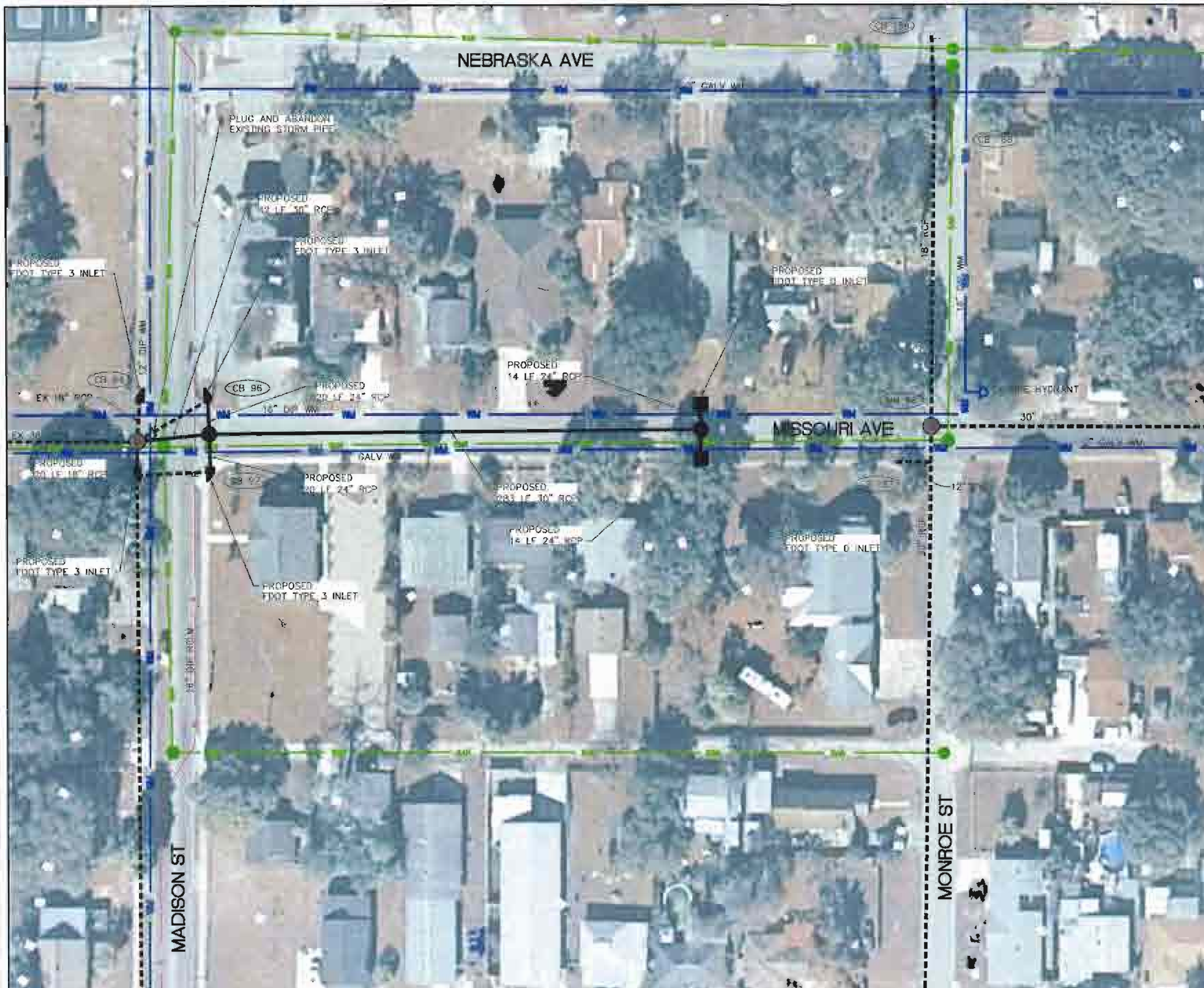

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2013 MASTER DRAINAGE PLAN
10–YEAR UPDATE – TASK ORDER ITEM #21

MISSOURI AVE
DRAINAGE ISSUE

JOB NO.	516-43
	536
	N/A
DATE	12/04/13
	1
	1