PACE

Pithlachascotee/Anclote Conservation Effort
Watershed Management Program (L738)

Anclote West
Watershed Management Plan
Floodplain Analysis

PROJECT PLAN

December 2015

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water resources and civil engineering

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Pithlachascotee/Anclote Conservation Effort (L738)
Anclote West Watershed Management Plan - Floodplain Analysis

PROJECT PLAN

December 4, 2015. The purpose of this project plan is: (1) to document the approach to execute pending Task Work Assignment (TWA) tasks; and, (2) to identify outstanding project related issues. This is the first draft of project development for the Pithlachascotee/Anclote Conservation Effort (L738) Anclote West Watershed Management Plan - Floodplain Analysis. *This document will periodically be revisited to assess overall progress; describe upcoming tasks and deliverables; evaluate past and future staff allocations; and describe deficiencies and recovery actions completed and/or planned*.

Introduction

The Pithlachascotee/Anclote Conservation Effort (PACE) project, cooperatively funded by and between the Southwest Florida Water Management District (SWFWMD) and Pasco County, is being performed under the District's Watershed Management Program (WMP). SWFWMD Task Work Assignment (TWA) No. 15TW-94 was issued to DeLoach Engineering Science, PLLC (DES) on October 1, 2015, to perform Watershed Model Parameterization, Watershed Model Development, Floodplain Delineation, and Preliminary Floodplain Open House elements of the WMP in the Anclote West Watershed. This work builds upon PACE Anclote West Watershed Evaluation tasks completed by DES under TWA No. 14TW-42.

The PACE study area is comprised of three watersheds: Pithlachascotee River, Anclote East of Suncoast, and Anclote West. The Anclote West watershed is a particularly important part of the overall PACE study area, as:

- it includes areas that are, historically, the most flood-prone of the three watersheds;
- it is the site of flow exchange between the Pithlachascotee and Anclote River during extreme floods;
- it encompasses a rapidly growing area of Pasco County, including the SR 54 corridor (South Market Area, aka, Gateway Crossings) with its many planned developments: Mitchell Ranch, Western Hub, Trinity East, Starkey, Asturia, and Suncoast Crossings; and,
- it includes District-owned lands with potential storage for conservation and flood mitigation BMPs.

Models for the Pithlachascotee and Anclote East watersheds were previously developed, by others, under WMP agreements. Under TWA 15TW-94, the Anclote West watershed model will be developed, with inflow and stage boundaries taken from those other models, and used for floodplain mapping. Some localized Best Management Practices (BMPs) for flood mitigation may be developed using the Anclote West watershed model. Ultimately, however, the Anclote West model will be joined with the Pithlachascotee and Anclote East models to provide a single model domain covering the entire PACE study area. That combined PACE model will be used to refine flood risk mapping at model boundaries

and evaluate regional BMP alternatives, including development of regional detention areas for flood mitigation and the diversion of excess flows from the rivers onto District land for water conservation.

Basic Watershed Information.

As illustrated by the location map in Figure 1, the three watersheds associated with the PACE project span approximately 420 square miles in Pasco, Hernando, Pinellas, and Hillsborough counties. Portions of the cities of New Port Richey and Tarpon Springs lie within the overall study area. Major roads that pass through the area include I-75, US-41, US-19, State Road 52, State Road 54, Suncoast Parkway, Ridge Road, and Little Road.

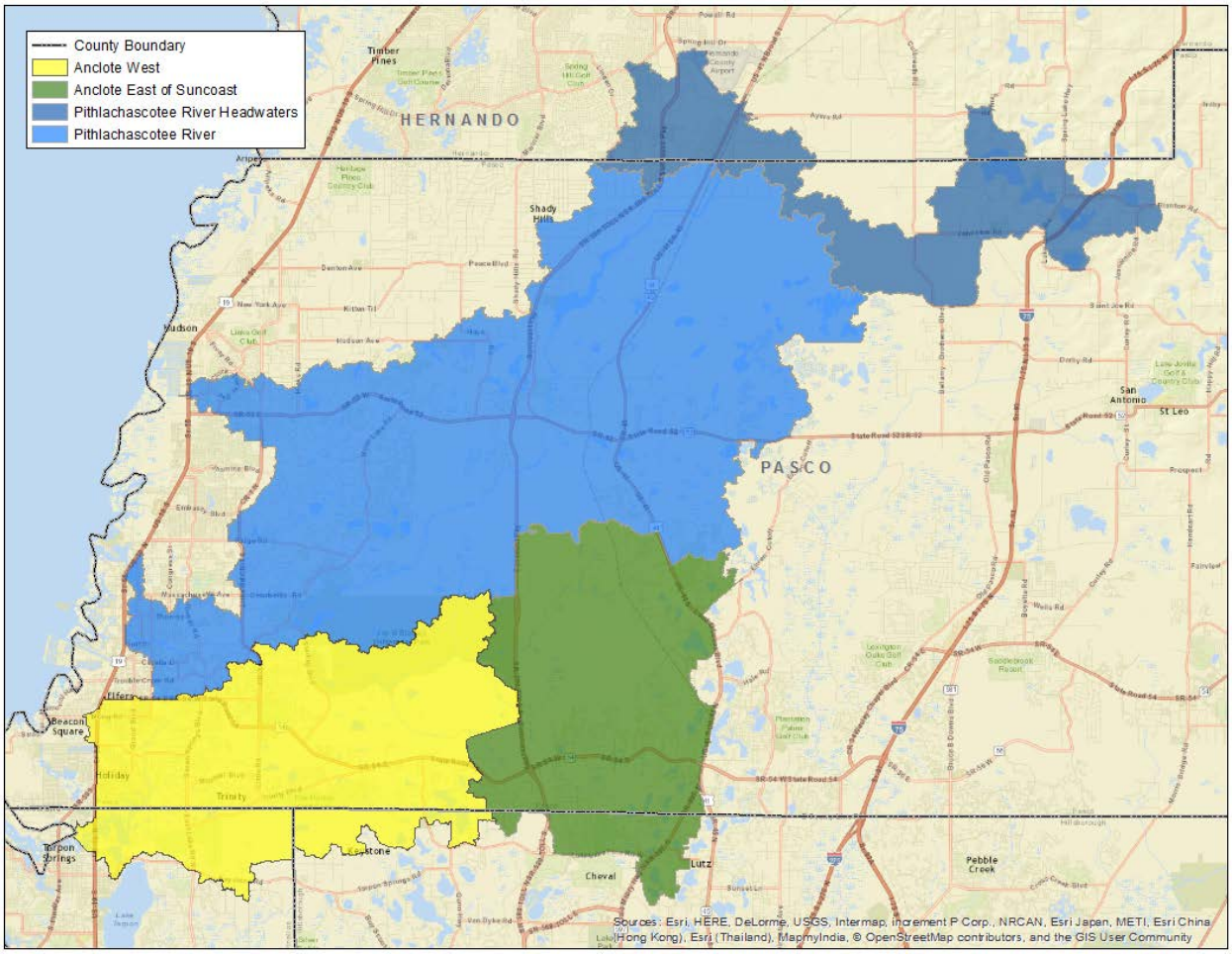


Figure 1: PACE Project Boundary

Figure 2 depicts the watersheds within and adjacent to the PACE study area. The following watersheds are adjacent to the PACE study area: Squirrel Prairie and Toachodka to the north; Cypress Creek to the east; Brooker Creek to the south; and Lower Coastal, Double Hammock, Port Richey, Hammock Creek, and Weeki Wachee to the west.

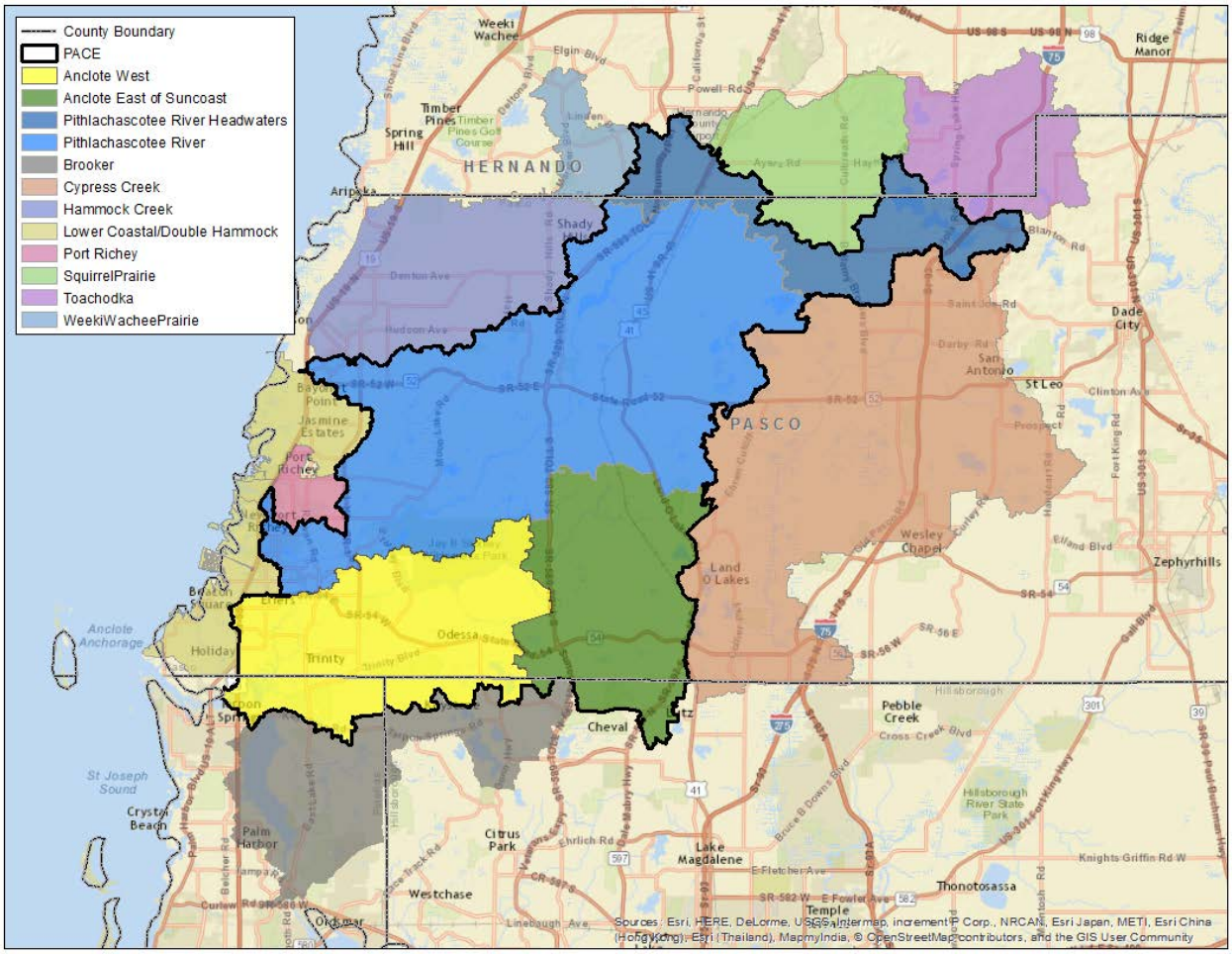


Figure 2: Adjacent Watersheds

The Anclote River begins east of the Suncoast Parkway and flows southwesterly towards the Gulf of Mexico. Tributaries that feed into the river within the 66 square mile Anclote West watershed include Cross Cypress Branch, Sandy Branch, Duck Slough, and Hollin Creek, as well as the south branch of the river itself. Lakes within this watershed include Ann, Dan, Frances, Geneva, Hiawatha, Minniola, Osceola, Salt, and Seminole. In the downstream portion of the watershed, close to where the river discharges into the Gulf, are several bayous including Kreamer, Tarpon, and Whitcomb. These waterways and water bodies are illustrated in Figure 3.

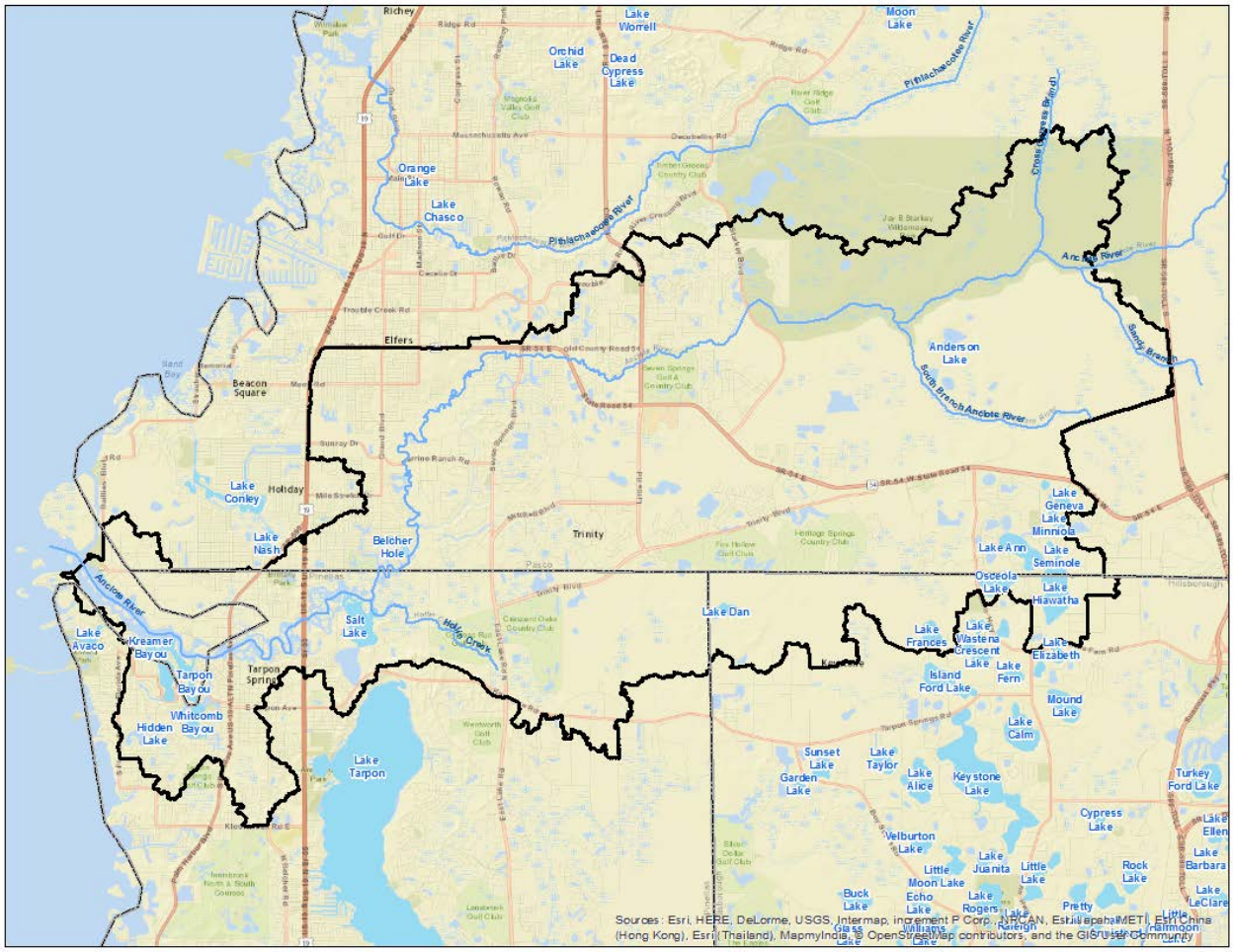


Figure 3: PACE Water Features

<u>Previous Work Completed.</u>

Studies of both the Pithlachascotee and the Anclote East watersheds have been performed under the District's WMP program. Those projects included watershed evaluation, model development, peer review, and floodplain mapping. Several Watershed Evaluation elements of the WMP program were initially performed for the Anclote West watershed by Ardaman & Associates, Inc. Subsequently, District staff collected as-built and construction plans from Environmental Resource Permit files and compiled additional high water mark information to document recent high water conditions and flood events in the Anclote West watershed area.

Under TWA NO. 14TW-42, DES reviewed the prior Ardaman work products, collected additional data from the District, and completed all remaining Watershed Evaluation tasks for the Anclote West watershed. Under separate contract, Ardaman continues to provide certain support services (field reconnaissance and GWIS data entry, terrain updates, and third party QA/QC) for the PACE project.

Potential issues.

The Anclote West watershed includes the lower reaches of a major riverine system that discharges to the Gulf of Mexico. The river is tidally influenced. It is prone to recurrent flooding in its lower reaches, across large portions of its middle reaches, and in portions of its headwaters area. Flooding in the lower reaches can occur as a result of tidal surge, from rainfall driven riverine flows, or from a combination of those two conditions. Flooding in the upper headwaters area is rainfall driven and highly dependent on long term rainfall volume (such as 90-day wet season, or year-to-year), initial water levels (associated with long term rainfall) in the numerous depressional features throughout the headwater area, and storm event volume as occurs with discrete multi-day rainfall events.

In the middle reaches, the Anclote River interacts with the Pithlachascotee River at flood stage. Extensive flooding and flow exchange between the two rivers was documented during Tropical Storm Debby. In order to model that storm event and replicate those conditions, it will be necessary to join the Pithlachascotee River and Anclote River models. The Pithlachascotee River model includes the Squirrel Prairie area in its headwaters, and it may be advisable to join the Cypress Creek model to the Pithlachascotee River model in order to correctly account for flows from Cypress Creek during that historical multi-day storm event. Alternatively, boundary condition inflows could be generated using the standalone Cypress Creek WMP model. It is recommended that the Anclote East (i.e., portions of the Anclote River watershed that are located east of the Suncoast Parkway) model be joined to the Anclote West model earlier in the project (i.e., during model development, parameterization, and testing).

A robust and highly detailed model is needed to identify flood risk and to support development of BMPs for flood mitigation and resource conservation due to the large volume of water entering the watershed. For example, recent work funded by Pasco County and the District within the Duck Slough portion of the Anclote Watershed indicated that the large flows would require extensive storage or conveyance BMPs for the 100-year event as well as smaller consecutive events. Current BMPs have been designed to reduce the duration of flooding only, as they require the Anclote River levels to have crested and begin receding prior to being operated in order to prevent downstream impacts. Other projects have been contemplated that cannot be developed further without an accurate Anclote Watershed model being in place in order to accurately assess current conditions and downstream impacts that BMPs would have. These include projects to create upstream storage, flow diversions between tributaries in the lower reaches of the river, and other storage and conveyance improvements that cannot be designed and permitted without more detailed information on the river's response to extreme and long duration rainfall.

In the past, the combination of adjacent models has been performed to allow for reasonable boundary inflows and/or tailwater conditions. In some cases, to reduce computational runtime, boundary stages or inflows were simply defined as a time series. In this case, however, several large and complex watershed models will be combined into a single model domain. The interconnections must be very carefully considered and well-constructed because the interactions between the watersheds are quite complex. The resulting model will be validated in a rigorous manner to clearly demonstrate that it can support the future development, design, and permitting of BMPs for flood mitigation. Due to the large volume of runoff entering a small area of the Anclote West watershed as well as the urbanization of the

watershed, it may be necessary to utilize upstream areas within other watersheds for storage. For these reasons it is recommended that the models for the affected and contributing watersheds be combined.

The merged model will comprise a much larger area and a far greater number of sub-catchments and model nodes and reaches than have been modeled previously under the WMP program. It may be necessary to convert the four models to ICPR v4 in order to assemble and perform simulations with the combined model. The larger model (consisting of as many as 10,000 sub-catchments) may be cumbersome to validate and to employ for floodplain determination and BMP development, a fact that should be accounted for in the estimation of man-hour requirements for select project tasks. The nature of the watershed and its interaction with the Pithlachascotee River watershed, and documented flooding that resulted from multi-day rainfall events (i.e., TS Debby), makes it very likely that simulations of multi-day events will be justified/warranted.

The above considerations regarding model domain, level of hydraulic detail, handling of boundaries, and merging of models are relevant to this TWA as they have a bearing on the approach to development, testing, and validation of the Anclote West model. Discussion of these issues will continue with District staff and others, including Pasco County and the assigned Peer Review Consultant, throughout the course of the project. The project plan will be updated to reflect those discussions and outcomes.

Outline of This Document

This document:

- provides an overview of the PACE project and this TWA, and includes the following sections:
    - Goals and Objectives
    - Work Breakdown Structure
    - Project Schedule
    - Project Costs
    - Staff Allocations
- describes the scope of work for all TWA activities (Task List, Deliverables and Approach)
- includes a brief narrative describing current assumptions, issues, and issue management
- presents updated plans for Quality Assurance, Quality Control and Communications

Goals and Objectives

The District initiated the WMP program more than a decade ago to improve floodplain information, and at the same time, to develop detailed watershed models for use in alternative analysis, planning, and regulatory programs. The program provides the methodology to evaluate capacity of a watershed to protect, enhance, and restore water quality and natural systems, while achieving flood protection.

Major elements of the program include: (1) Topographic Information including LiDAR-based terrain modeling; (2) Watershed Evaluation including field reconnaissance, junction-reach connectivity, sub-basin delineation, and geodatabase development; (3) Watershed Management Planning including storm event, continuous, and water quality modeling, floodplain mapping, flood risk and flood protection level of service (LOS) determination; (4) Implementation of BMPs for stormwater management, water quality improvement, and ecological enhancement; and (5) Maintenance of Watershed Parameters and Models

including geodatabase management and model updates. Through execution of these five elements, WMP projects produce more detailed and accurate floodplain information than otherwise would exist, generate valuable baseline information to serve a range of purposes, and develop BMPs to achieve an improved flood protection LOS, water quality condition, and/or hydrological/ecological condition.

The District has partnered with Pasco County through the Cooperative Funding Initiative (CFI) to implement the PACE WMP. The CFI allows local governments to share costs for projects that assist in creating sustainable water resources, provide flood protection, and enhance conservation efforts. As such, cooperatively funded WMP projects must meet various goals and objectives of both the District and the local partners. Most local governments have been partnering in the program because they need better floodplain information in order to make good land use (building and zoning) decisions. The program also routinely develops recommendations to improve deficiencies in flood protection level of service and to implement BMPs for water quality improvement.

Goals and Objectives of the PACE Project

The goal of PACE is to develop BMPs to address flooding and conserve water resources. More specifically, PACE is a multi-objective watershed management project, which will:

- develop accurate, highly detailed modeling and floodplain mapping tools
- define flood risk across a large, flood prone portion of Pasco County
- develop Best Management Practices to mitigate flood risk on a regional scale
- assess feasibility of diverting excess stream flow from the Pithlachascotee and Anclote Rivers onto SWFWMD property in Serenova, Starkey Ranch, Anclote River Ranch, and Crockett Lake Ranch, for conservation of the water resource
- provide baseline information, modeling, and mapping tools with which to evaluate impacts of future development in the rapidly growing region

Objective of TWA No. 15TW-94

The objective of this TWA is to complete all elements of the Watershed Management Plan - Floodplain Analysis according to District Guidance Documents. Key project requirements set forth in Agreement No. 14MA00000018 and, more specifically, in TWA No. 15TW-94 include:

- perform professional services in support of Chapter H, District's Watershed Management Program: Watershed Evaluation, Modeling and Planning
- complete tasks and provide deliverables (as described in TWA No. 15TW-94 Scope of Work Task Descriptions) to the satisfaction of the District and in accordance with the performance schedule and performance budget set forth in the TWA
- perform tasks in accordance with the District Guidance documents

District Guidance documents that are directly applicable or more generally relevant to this TWA include:

- SWFWMD Watershed Management Program Guidance (WMPG), January 2011
- SWFWMD Environmental Resource Permit Applicant's Handbook Vol. II, October 1, 2013
- SWFWMD Geographic Watershed Information System (GWIS) Database Design Document v1.6
- SWFWMD Acquisition of Geospatial Information to Complete Generic Watershed Parameters
- SWFWMD Hydraulic Element Point (HEP) User's Guide

- SWFWMD Arc Hydro Workflows and Documentation
- White Paper – Physically Based Determination of Rainfall Excess in the SWFWMD, Jan 8, 2008
- Urban Hydrology for Small Watersheds (TR-55), USDA, June 1986
- Drainage Hydrology Handbook, FDOT, February 2012
- Stormwater Level of Service Methodology, FDEP & Water Management Districts, Sep 1993
- ERP Stormwater Quality Applicant's Handbook, FDEP and WMDs, March 2010 Draft
- Approach to Assessing Level-of-Service, Surface Water Resources, and Best Management Practice Alternatives for Watersheds in Hernando County, FL, Jones Edmunds & Associates, Inc.
- FEMA Guidelines and Standards for Flood Risk Analysis and Mapping (incl. interim guidance)
- Scope of Work Task Descriptions Project Development, SWFWMD, effective August 1, 2014
- Scope of Work Task Descriptions Watershed Management Plan – Floodplain Analysis, SWFWMD, effective August 1, 2014
- Submittal of project deliverables shall follow the data delivery structure in Directory_Structure.zip and include all applicable contents to date.

Work Breakdown Structure

The complete PACE project includes elements of the WMP program through BMP Development.

- PACE Project WMP Elements
    - Project Development
    - Watershed Evaluation
    - Watershed Management Plan - Floodplain Analysis
    - Watershed Management Plan - Flood Protection LOS and BMP Analysis
    - Watershed Management Plan - Water Conservation BMP Analysis
    - Watershed Management Plan - SWRA and BMP Analysis (not included)

A Watershed Evaluation has recently been completed for the Anclote West watershed. This TWA is for completion of all Watershed Management Plan - Floodplain Analysis tasks for the Anclote West watershed, following current District Guidance Documents for the performance of WMP projects. Key project milestones for TWA No. 15TW-94 are as follows:

- 2.1 Project Development
    - 2.1.1 Data Collection and Initial Evaluation
    - 2.1.2 Draft Project Plan
    - 2.1.3 Kick-off Meeting
    - 2.1.4 Final Project Plan

- 2.2 Watershed Evaluation (previously completed)

- 2.3 Watershed Management Plan – Floodplain Analysis
    - 2.3.1 Watershed Model Parameterization
    - 2.3.2 Peer Review of Watershed Model Parameterization
    - 2.3.3 Final Approved Watershed Model Parameterization Deliverables
    - 2.3.4 Watershed Model Development and Floodplain Delineation
    - 2.3.5 Peer Review of Watershed Model Development and Floodplain Delineation

- 2.3.6 Approved Floodplain Analysis Deliverables for Preliminary Floodplain Open House
- 2.3.7 Preliminary Floodplain Open House and Response to Public Comments
- 2.3.8 Final Approved Floodplain Analysis Deliverables
- 2.3.9 Presentation to Governing Board (not included)
- 2.3.10 Project Management

Project Schedule

An accelerated schedule for the overall PACE project dictates completion of Floodplain Analysis tasks of TWA No. 15TW-94 within twenty-two (22) months of receiving Notice to Proceed. Table 1 presents the agreed upon performance schedule for the TWA. The performance schedule is also depicted in a project Gantt chart, provided in Appendix A. The schedule will be further compressed, wherever possible, to expedite model development. Some geodatabase tasks or deliverables may be revised or postponed in the interest of developing the watershed models most efficiently. With expedited District staff and peer reviews, and timely delivery of field data, perhaps three (3) months may be trimmed from the schedule.

Generally, the following task durations are expected:

- Project Plan, 1 month
- Watershed Model Parameterization, 8-9 months
- Peer Review of Watershed Model Parameterization, 1-2 months
- Watershed Model Development and Floodplain Delineation, 6-7 months (concurrent)
- Peer Review of Watershed Model and Floodplains and Preliminary Open House, 2-3 months
- Reports, Deliverables and Project Closeout, 1-2 months

Critical Path. During Watershed Model Parameterization, acquisition of additional model parameters is expected to be on the critical path for project completion. Various independent data collection efforts, including engineering site visits by DES, collection of field survey by a PLS, collection of field data using approximate methods by Ardaman, and collection of data to describe future build-out conditions by DES, will progress concurrently. Sites for field survey by a PLS will be identified by DES soon after project start-up, in order to allow the District to secure the services of one or more qualified firms to collect that data under separate contract. Field survey by a PLS should be completed within 3 months. Sites for field data collection by approximate methods were previously identified by DES during TWA 14TW-42, and that data will be collected and furnished by Ardaman in a GWIS-compatible geodatabase format on or before December 31, 2015, under separate contract to the District.

All data acquisition tasks, including engineering field visits and coordination with and collection of information from local consultants to describe build-out conditions of the Trinity and Heritage Springs communities, should be completed within the first 4 to 5 months of the project. Development of the model-specific geodatabase will be completed concurrently with data acquisition efforts. Four (4) incremental submittals of the updated model-specific geodatabase will be delivered to the District at regular intervals to allow for more efficient review, response, and corrections while the project team continues to make progress on the Watershed Model Parameterization task.

Data from the model-specific geodatabase will be transferred to a model-specific database for testing. Setup, debugging, and stabilization of the model will occur over 3 to 4 months. After Peer Review of

Watershed Model Parameterization has been completed, DES will proceed with Watershed Model Development and Floodplain Delineation tasks. Model calibration and validation, storm event simulation, and floodplain mapping will continue for about 6 months, culminating in submittal of the watershed model, floodplain delineations, and a floodplain justification report for peer review. A refined set of deliverables, addressing peer review comments, will be submitted and mapping will be used in a publicly-noticed floodplain open house meeting. Final project deliverables will address comments received during that open house meeting.

Expediting the Project. District approval of deliverables is required prior to authorizing payment for invoices and the consultant's proceeding with subsequent tasks. In order to expedite timely completion of the project, however, the District Project Manager has some discretion and may allow limited project work to move forward while prior deliverables are being reviewed and comments finalized. In the event that minor issues need to be addressed with respect to a deliverable, the District may, also in the interest of expediting the project, allow for re-submittal of corrected work products along with the next subsequent deliverable data set. Identification of major issues with any deliverable may result in stop of new work until such time as those matters can be resolved to the District's satisfaction.

Project Invoice Schedule. Invoicing for TWA No. 15TW-94 is deliverables-based with lump sum fee amounts assigned to each scheduled work product submittal. The lump sum fees are based upon labor estimates and other costs to produce those work products. Four (4) of the nineteen (19) scheduled invoices are related to incremental data acquisition and model-specific geodatabase development. Invoicing for ongoing Project Management and QA/QC activities is being held until the final invoice, despite the fact that those activities occur over the duration of the project.

Project Cost

The budget for the PACE project is $2.5M, allocating approximately $250K for field survey in the Anclote West watershed and $500K for development of BMPs including level of service determination, problem area identification, development of alternatives to address known flooding issues in portions of the watershed, and development alternatives related to moving of water for wetland rehydration, etc.

A portion of the PACE project, amounting to an estimated $500K in fees, has been and continues to be performed by Ardaman & Associates, Inc., under separate contract. Project tasks completed or to be performed by Ardaman, in parallel to DES work under TWA No. 15TW-94, include:

- preliminary work on the Anclote West Watershed Evaluation (completed)
- field reconnaissance and field data collection by approximate methods
- data entry and QC of collected recon information as HEP Points, per GWIS
- terrain updates
- third-party QA/QC of DES work products

Completion of the Anclote West Watershed Evaluation by DES, under TWA No. 14TW-42, was budgeted at just under $365K. Approximately $898K has been budgeted for model development, calibration, and validation, event simulations, flood mapping, and the open house meeting under TWA No. 15TW-94.

Cost of Services Performed under this TWA. The Consultant Fee Schedule, as included in the Master Agreement for Professional Services between the DISTRICT and DELOACH ENGINEERING SCIENCE, PLLC (Agreement No. 14MA00000018), is provided in Appendix B. An itemized project cost spreadsheet for all Watershed Management Plan – Floodplain Analysis tasks that have been authorized by the District under TWA NO. 15TW-94 is provided in Appendix C.

The itemized project cost spreadsheet reflects expected staff assignments and man-hour requirements to successfully provide the contracted services, and applies labor rates from the Agreement Consultant Fee Schedule to arrive at cost, by task, to perform the work. Staffing, man-hour requirements, and associated costs contained in the itemized project cost spreadsheet reflect the considered agreement between the District and DES, attained through discussion and negotiation, as to the level of detail desired and the effort required to satisfactorily complete the Anclote West Watershed Evaluation.

Importantly, the project costs also take into consideration a substantial amount of third-party support in performing field reconnaissance, field data collection, data entry of HEP points (GWIS), terrain updates, and third-party QA/QC of DES project work.

Staff Allocation

Project team members and their roles are summarized in the following:

TWA No. 15TW-94 identifies **Ms. Terese Power, PE**, and **Mr. David DeLoach, PE**, as project managers and prime contact persons for the District and DES, respectively. **Ms. Cindy Jolly, PE**, will serve as the project manager and lead point of contact for Pasco County. Ms. Power, Mr. DeLoach, and Ms. Jolly will collaborate over the course of the project, to update the project timeline, resource allocations, and budget in response to circumstances that may arise over the course of completing the project. Project deliverables, technical reviews, and related invoicing will be also managed by these individuals.

DES has assigned **Ms. Trillian Baldassari, PE**, as the team's Lead Project Engineer, responsible for technical execution and oversight of project-related activities, as well as, supporting Mr. DeLoach on certain duties related to project management. Ms. Baldassari will serve as Deputy Project Manager, will be knowledgeable in all technical aspects of the project, and will remain cognizant of the project's status, providing the District and County with access to a second, high-level point of contact at DES.

Mr. Christopher Hardin, PE, will serve as Project Engineer, responsible for technical execution of select project tasks, and, along with Mr. DeLoach and Ms. Baldassari, will contribute to the performance and timely completion of the project. **Mr. Chris Gilhooley** will serve as GIS Analyst, taking the lead role in geodatabase development, geoprocessing, and GIS deliverables production.

Projected staff utilization is provided in Table 2. Generally, utilization is expected to be within desirable levels across all project tasks. Ms. Baldassari may be slightly overextended on a few tasks. Mr. Hardin will be able to accept workload from Ms. Baldassari, as needed. Actual utilization and work progress will be closely monitored by Mr. DeLoach, to ensure that the schedule is adhered to. As Principal of the company, Mr. DeLoach is able to make and act upon staffing decisions quickly. He will shift project team member responsibilities or bring additional resources to assist with the project, as needed.

Ardaman & Associates, Inc., under separate contract to the District, is performing third-party QA/QC on portions of the project. This is not a peer review role, but rather a substitute for the performance of internal quality control checks by DES personnel. In that sense, the following **Ardaman staff** will be working as an extension to the Project Team:

- Mr. Nestor Aceituno, PE, will serve as Lead for Engineering QA/QC.
- Mr. Tim Coulombe, CMS, will serve as Lead for GIS QA/QC.
- Mr. Matt Jones, PE, Mr. Shankar Gautam, PE, and/or Ms. Jane Dai, PE, will serve as QA/QC staff.

Description of TWA Activities

Scope of Work. SWFWMD TWA No. 15TW-94 was issued to DES to perform Watershed Management Plan - Floodplain Analysis tasks in the Anclote West Watershed. These tasks include Watershed Model Parameterization, Watershed Model Development, Floodplain Delineation, and Preliminary Floodplain Open House elements of the WMP. This work builds upon Anclote West Watershed Evaluation tasks completed by DES under TWA No. 14TW-42. Table 3 provides a list of the specific tasks to be performed according to District Guidance Documents and completed to the District's satisfaction.

Project Approach. Floodplain Analysis work under TWA No. 15TW-94 will be performed according to the project scope of work and related District Guidance Documents. Additional guidance for model development is provided in the Anclote West Watershed Evaluation Final Report. Some key points are provided in the following.

Project development. DES will meet and coordinate with staff of the SWFWMD and Pasco County to discuss project goals and objectives for both the PACE project and the Anclote West Watershed Evaluation. The Scope of Work, schedule, and list of deliverables for TWA No. 15TW-94 will be reviewed during the meeting, with opportunities for all team members to offer input and share concerns regarding any aspect of the project. Based upon those discussions, the Project Plan (this document) will be updated and submitted to the District for approval and Notice to Proceed with project tasks.

Acquisition of Additional Model Parameters. DES will acquire additional information as needed to fill watershed parameter gaps, including:

- DES will perform engineering-level field visits to review and verify site conditions to be modeled.
- DES will develop field survey requirements for additional data collection by a third party PLS in order to describe major conveyance features such as riverine cross sections and bridge geometry (not previously collected by approximate methods).
- DES will incorporate survey data and replicate model features previously developed for design, permitting, and construction of Duck Slough BMPs 1A, 5A, and 6A, including as-built survey reflecting construction of those improvements.
- DES will coordinate with the District, Pasco County, and engineers representing the local development community to acquire and employ available information (design plans, as-built drawings, computer models, terrain information, historical water levels, reports, and other data) describing build-out conditions for the Trinity and Heritage Springs communities.

Development of Model Specific Geodatabase. DES will develop watershed model parameters per the approach defined in the previously completed Watershed Evaluation. When deemed necessary, a revised approach may be used for certain parameters, and that approach will be documented in Task 2.3.1.4. Parameterization information will be stored within a GWIS geodatabase in a format that can be imported into the model framework.

Model Setup, Debug, and Stabilization. Model parameters will be transferred from GWIS geodatabase into the model framework. Initial model testing will be performed. Once set up and debugged, the following preliminary simulations shall be performed:

- 100-year/1-day Storm
- 2.33-year/1-day Storm
- No Rainfall

Level pool plots will be developed for the following:

- Initial Conditions
- 100-year/1-day Floodplain
- 2.33-year/1-day Floodplain

Other modeling issues will be identified and addressed, based on review of the preliminary simulations and level pool plots, including the following potential issues:

- Continuity Error (preferably less than 2%)
- Inadequate Simulation Time
- Flow Reversals or Sudden Change
- Instability
- Significant Initial Flows

It is important to note that the model framework will be developed using ICPR Version 3 and will include incorporation of upstream inflows from the Anclote East Watershed (previously modeled by others) either through direct assignment of inflow boundary conditions or by linking the two model domains. Model assembly, testing, event simulations, and peer review will not yet address the exchange of flows between the Anclote and Pithlachascotee River watersheds.

Conversion to ICPR v4 may be necessary in order to link the Pithlachascotee River model domain to explicitly account for exchange of flows and allow for development of regional Best Management Practice alternatives for conservation and flood mitigation. Alternatively, the District may seek expansion of the ICPR v3 modeling software specifically for this application. A third option would be to develop a reduced domain model of the Pithlachascotee River model for use with ICPR v3. These issues will be addressed in a future TWA, after the Anclote West ICPR v3 model has been developed, reviewed, and accepted by the DISTRICT under this current TWA.

Model Calibration, Verification and Validation. Before it can be used to predict watershed response to various hypothetical rainfall conditions, the assembled model is to be tested and refined for accuracy through simulation of, and comparison to, various historical conditions. Historical data is available to perform calibration, verification, and validation of the Anclote West Watershed Model, as follows:

- Calibration – simulations will be performed of the Tropical Storm Debby multi-day storm event, with simplified (single value or time series stage) boundary conditions at select locations along the Pithlachascotee River. Model parameters will be adjusted within reasonable ranges to tune simulation results to recorded flows on the Anclote River and other gaged streams. Successful calibration will result in a model that can replicate watershed response to other historical rainfall events of similar magnitude, accounting for differences in initial and boundary conditions.
- Verification – simulations will be performed of the Hurricane Frances multi-day storm event, with simplified (single value or time series stage) boundary conditions at select locations along the Pithlachascotee River. Model parameters will not be adjusted unless also re-adjusted to better tune the aforementioned calibration model. These simulations will serve to verify that the calibrated model can reliably predict watershed response to a variety of large rainfall events relative to recorded flows on the Anclote River and other gaged streams.
- Validation – simulations will be performed of the Tropical Storm Debby, Hurricane Frances, and other historical events, with simplified (single value or time series stage) boundary conditions at select locations along the Pithlachascotee River, to compare simulation results to other discrete water level measurements and other available records throughout all portions of the watershed. Model parameters will not be adjusted unless also re-adjusted to better tune the aforementioned calibration and verification models. These simulations will serve to validate that the watershed model can reliably predict watershed response to a variety of large rainfall events relative to recorded water levels at sites located throughout the watershed.

Design Storm Simulations. Once validated and approved for use by the District, the watershed model will be used to predict the response of the Anclote River West Watershed to a range of synthetic rainfall events with 1-day and 5-day durations and recurrence intervals from 2.33 to 500 years. The premise behind the 1-day and 5-day event modeling is that the 1-day event will address peak rate sensitivity while the 5-day event will address volume sensitivity. The Florida Type II Modified Rainfall Distribution provided in the ERP Information Manual will be used to distribute rainfall over 24-hours. Distribution of the rainfall over the 5-day period will be based on a 5-day dimensionless curve provided by the District.

The District has developed rainfall maps for a 24-hour storm duration for the 2-year, 2.33-year, 5-year, 10-year, 25-year, 50-year, and 100-year return periods. Those rainfall maps will be utilized to determine depth of rainfall in inches for each return period. Other rainfall depths provided by the District will be used for selecting the 1-day 500-year volume and the 5-day rainfall volumes. While portions of the watershed are within Hillsborough and Pinellas County, rainfall depths for Pasco County will be used for simulations performed under this task order.

Multi-day Event Simulations. A rainfall event of duration longer than one day may be used to project the 100-year floodplain if compelling evidence, such as historic water levels, exists. DES will simulate the following additional multi-day events using FDOT rainfall distribution (Guidance Document 4c):

- 100-year/3-day
- 100-year/7-day
- 100-year/10-day

Floodplain Delineation. DES will delineate floodplains and approximate transition zone extents based on digital topographic information and model-predicted peak stages of 100-year storm event(s). Floodplain mapping will meet FEMA standards for updating existing DFIRMs (actual update performed by others). The delineated floodplain area will be compared to model stage versus area relationships, with a ten

percent error considered a maximum acceptable deviation for each sub-basin. DES will also generate flood depth grids associated with the delineated floodplain.

Floodplain Justification Report. DES will document model development, testing, calibration, verification, validation, design storm simulations, and floodplain mapping efforts in a final report. This report will also incorporate (merge) information from the previously completed Watershed Evaluation report.

Assumptions and Issue Management. Several assumptions were made in developing this project plan. Key assumptions were related to the magnitude (level of detail) of the work effort, accuracy of available as-built drawings and stormwater inventory data, availability of staff resources, and reliance on a third-party engineering firm for performance of certain tasks.

The expected level of detail (5,000 sub-catchments within the Anclote West model domain) is based on comparison to similar watersheds, assessment of overall project needs, and discussions with District and County staff. The number of features to be collected from ERP plans (including to describe build-out conditions for some communities) and through field inventory (both data collection by approximate methods and survey by a PLS) is based on comparison to similar watersheds, extrapolation of numbers of features collected under TWA NO. 14TW-42, and assessment of project needs.

It is assumed that as-built information retrieved from ERP documents is an accurate representation of current or future build-out conditions. Similarly, it is assumed that data utilized from the Pasco County stormwater inventory database is complete and accurate. No field verification of as-built or previously collected inventory data is planned. Data obtained from design (not as-built) plans is assumed to represent actual (as-built) conditions, where used.

Staffing and assignment of key personnel to the project is considered appropriate for this TWA and potential future project activities. Staffing deficiencies that would impact the project timeline will be identified quickly and effectively mitigated by shifting of responsibilities and addition of staff, if needed, with District approval. Progress of third-party firms in performing support activities (i.e., for field data collection by approximate methods and field survey by a PLS) will be monitored by the District and adjustments will be made, if necessary, to adhere to the project schedule.

This Project Plan will be updated periodically. Revisions may include minor editorial changes to clarify project background and goals, changes to better define task objectives and approach to performing the work, and/or updates to Quality Assurance, Quality Control and Communications. Any and all substantive changes to the plan will be discussed and made with concurrence of District staff.

Quality Assurance Plan

DES is committed to the concept of Total Quality Management (TQM), where each individual involved with development and delivery of our work product is responsible for its quality. TQM requires effort and accountability from management, staff, and all other project participants, and it is the Project Manager's responsibility to ensure that all are capable and eager to deliver a high quality product.

Quality Assurance

Quality Assurance (QA) is achieved through appropriate assignment of project tasks and responsibilities to team members, staff training, development of and adherence to protocols (including protocols for quality control), adherence to the baseline schedule and budget, and daily task oversight.

Assignment of Team Members. The Anclote West Watershed Management Plan – Floodplains project consists of a set of discrete project tasks. DES staff members will be assigned to each task team by the Project Manager, taking into consideration capabilities and experience. A Task Leader will be assigned to direct the work of each task team. In most cases, Ms. Baldassari will serve as Task Leader, and will see that all work is performed in accordance with established protocols.

Development and Adherence to Protocols. Task-specific DES Protocols will serve as a supplement to the District's Guidance documents, and include procedures for documentation of work, frequent communication and quality control checks throughout task completion. Task Protocols indicate team member assignments and encourage acceptance of individual responsibilities. Each protocol includes the following elements:

- Task Name
- Task Description
- Prerequisite Tasks
- Required Data Resources
- Initial Quality Control Procedures
- Approach to Task Completion
- Schedule for Task Completion
- Estimated Cost for Task Completion
- Anticipated Correspondence
- Approach to Quality Assurance
- Task Completion QC Procedures
- Task Reporting, Mapping & Deliverables
- Summary and Sign-off Responsibilities
- Project De-brief Checklist

Prior to initiating a task under the District's WMP, the associated task protocol document(s) are reviewed by and discussed among assigned team members in a task kickoff meeting. Based on team discussion, a determination is made whether the standard protocols can be applied to the project. Any deviations from the standard protocols will be identified and a description provided of the special conditions necessitating those deviations.

Adherence to Baseline Schedule and Budget. An initial project timeline, extending approximately twenty-two (22) months from Notice to Proceed (NTP), was developed and incorporated into TWA No. 15TW-94. Similarly, the TWA contains initial staff allocations, man-hour estimates, and associated costs for each discrete task that makes up the overall project. At this time, both the project schedule and the budget contained in the TWA are judged to be accurate, and staff allocations appear sufficient.

DES management and staff fully understand the critical importance of the expeditious completion of the PACE project and are absolutely committed to meeting the project timeline as it has been developed for this TWA, within the allocated budget. As work proceeds, DES will provide monthly updates to the District regarding both the schedule and the budget. As project tasks are completed and project needs and data limitations (if any) are better understood, recommendations may be made to the District's Project Manager for changes to staffing allocations and/or project approach, including potential adjustments to the timeline and costs.

Daily Task Oversight. As discussed above, DES has assigned Ms. Trillian Baldassari, PE, as the team's Lead Project Engineer. Ms. Baldassari will be responsible for daily oversight of project-related activities. Mr. DeLoach will also be fully engaged in the management of all aspects of the work, and will be intimately involved in the day-to-day operation. As such, two experienced professional engineers will be performing the oversight needed to provide for quality assurance on this important project.

Quality Control

Quality Control (QC) is the process where raw data, data manipulation, and calculations; parameter selection, processing, and computations; reporting, mapping, and deliverables production are subject to verification checks and validation. QC is performed according to well-designed protocols to check for errors and omissions, to verify that staff are using tools and following procedures correctly and effectively, and to fully understand why certain processes result in certain outcomes.

Project Task Protocols include the District's Guidelines and Specifications and other task-specific procedures for performance and documentation of work performed and results achieved. The protocols also outline task-specific procedures for team communication and for quality control checks at multiple steps through project completion and acceptance.

Typically, a rigorous internal peer review is undertaken as part of our standard QA/QC protocol for all tasks, and is performed and/or directed by the DES Project Manager. In addition, some QC is to be performed by a third-party consultant. Specific QC checks, which were developed by the third-party consultant and the District, for the review of all project tasks to be performed by DES under TWA No. 14TW-42, are included as a reference attachment to this document.

Consequently, QC for the Anclote West Watershed Evaluation will consist of:

- protocol review by Task Leader and team member(s) assigned to a task, prior to start of work
- self-check of work by team members while performing project tasks
- handoff of task materials to third-party QA/QC Team Leader
- QA review and QC checks by third-party QA/QC Team
- return of task materials, comments and QA/QC report from third-party QA/QC Team Leader
- review of third-party findings by DES Project Manager and DES Task Manager for resolution
- incorporation of QA/QC work products and reports into project deliverables for District review

Communication Plan

Frequent and effective communication, whether internal between project team members or external with District or County staff, will carry a high priority throughout the project. Protocols for each distinct task will include a description of the purpose, frequency, method and participants to be involved, and the DES Project Manager will see that communications requirements are met, documented, and fulfill their intended purpose. Communication responsibilities that are unique to a specific task, if needed, will become part of the protocol for that task, and will be documented in memorandum form.

Internal Communication

Internal communication regarding project work assignments will be conducted by and between the Project Manager, Lead Project Engineer and/or Task Leader, and will primarily be in the form of email exchange. Internal staff meetings will be held for kickoff of each discrete project task, regularly thereafter for team updates to the Project Manager, prior to and following exchanges with the third-party QA/QC consultant, and prior to the delivery of task deliverables to the District.

External Communication

At the onset of the project, the DES Project Manager will communicate with the District Project Manager and others to understand expectations of all involved parties, including District staff, local cooperating agency staff, agency officials, and the affected public. The DES Project Manager and Lead Project Engineer will, at a minimum, talk directly with the District Project Manager once each week to discuss progress on current activities, resolve outstanding issues, and coordinate future tasks, and will employ methods and measures to track and report monthly progress relative to scope, schedule, resource allocations, and budget. Also on a monthly basis, the DES Project Manager will coordinate with all District Project Managers (if working under multiple task assignments) to avoid or minimize coinciding deliverables and to prioritize activities.

External project communications may be in person or via phone/internet (using collaboration software such as GoTo Meeting), at the District's discretion. Routine exchange of written messages and accompanying data will be by email, while exchange of larger documents and data will be accomplished using the District and/or DES FTP sites. Very large data exchanges, as in the transfer of project deliverables, will be made using portable hard drives.

Meetings

The DES Project Manager and Lead Project Engineer will attend regularly-scheduled project status meetings with representatives of the District, Pasco County, and Ardaman & Associates, to discuss project goals and objectives and the team's progress toward completing current project tasks. The DES Project Manager, Lead Project Engineer and other DES staff will attend pre-submittal meetings, as outlined in the scope of work, as well as other task-related meetings as may be deemed necessary by the project team. A brief agenda will be provided for all meetings, and a recap memorandum will be developed by DES staff to document the meeting, ensuing discussion, and resulting action items. Meetings may be in person or via phone/internet (using collaboration software such as GoTo Meeting), at the District's discretion.

Tables

Table 1. TWA Project Schedule		
Task	Start Date	Completion Date
Project Plan[1]	~~August 1, 2015~~ October 1, 2015	~~August 31, 2015~~ October 6, 2015
Acquisition of Additional Model Parameters / Development of Model Specific Geodatabase (25%)[1]	~~August 31, 2015~~ October 6, 2015	~~September 28, 2015~~ October 22, 2015
Acquisition of Additional Model Parameters / Development of Model Specific Geodatabase (50%)[1]	~~September 28, 2015~~ October 22, 2015	~~October 26, 2015~~ November 12, 2015
Acquisition of Additional Model Parameters / Development of Model Specific Geodatabase (75%)[1]	~~October 26, 2015~~ November 12, 2015	~~November 30, 2015~~ December 3, 2015
Acquisition of Additional Model Parameters / Development of Model Specific Geodatabase (100%)[1]	~~November 30, 2015~~ December 3, 2015	~~December 28, 2015~~ December 31, 2015
Development of Preliminary Model Specific Database	December 28, 2015	January 25, 2016
Model Specific Database Revision / Level Pool Plot / No Rainfall Run Results	January 25, 2016	February 29, 2016
Joined with Anclote East Model / 1D100Y and 1D233Y Results / Parameterization Approach Update	February 29, 2016	April 25, 2016
Peer Review / Revised Deliverables	April 25, 2016	June 6, 2016
Model Calibration	June 6, 2016	August 15, 2016
Model Validation	August 15, 2016	September 26, 2016
Event Simulation Results / Rainfall Justification	September 26, 2016	November 14, 2016
Floodplain Delineations / Floodplain Justification	November 14, 2016	December 19, 2016
Peer Review of Model Development and Floodplains	December 19, 2016	January 9, 2017
Floodplain Analysis Deliverables for Open House	January 9, 2017	March 20, 2017
Preliminary Floodplain Open House / Final Floodplain Analysis Deliverables	March 20, 2017	May 29, 2017
Presentation to Governing Board	May 29, 2017	June 26, 2017
Project Management	August 31, 2015	June 26, 2017

[1] Schedule revised from original Project Plan to accommodate the actual notice to proceed date.

Table 2. Projected Staff Utilization, by Month				
Month	DeLoach	Baldassari	Hardin	Gilhooley
1	30%	40%	0%	20%
2	40%	40%	30%	100%
3	40%	80%	30%	100%
4	40%	80%	30%	100%
5	30%	60%	30%	80%
6	30%	70%	10%	90%
7	10%	60%	60%	80%
8	30%	80%	30%	60%
9	30%	40%	0%	40%
10	20%	30%	0%	30%
11	10%	70%	0%	40%
12	20%	100%	0%	50%
13	20%	90%	10%	30%
14	10%	80%	30%	10%
15	40%	100%	30%	30%
16	50%	110%	40%	40%
17	50%	90%	10%	50%
18	20%	110%	10%	50%
19	20%	110%	0%	50%
20	20%	50%	0%	40%
21	20%	60%	0%	40%
22	20%	50%	0%	40%
23	10%	20%	0%	20%
Overall	25%	70%	15%	50%

Table 3. TWA Project Task List	
Task No.	DESCRIPTION
2.1	**PROJECT DEVELOPMENT**
2.1.1	**Data Collection and Initial Evaluation**
2.1.2	**Draft Project Plan**
2.1.3	**Kick-off Meeting**
2.1.4	**Final Project Plan**
2.2	**WATERSHED EVALUATION (COMPLETED)**
2.3	**WATERSHED MANAGEMENT PLAN – FLOODPLAIN ANALYSIS**
2.3.1	**Watershed Model Parameterization**
2.3.1.1	Acquisition of Additional Model Parameters • Acquire additional information needed to fill watershed parameter gaps o Perform engineering-level field visits o Develop field survey requirements for data collection by a third-party PLS o Incorporate survey data and replicate model features for Duck Slough BMPs 1A, 5A and 6A. o Coordinate with District, Pasco County, and engineers representing local development community to acquire information to describe build-out conditions for the Trinity and Heritage Springs communities.
2.3.1.2	Development of Model Specific Geodatabase ▪ Develop watershed model parameters per the approach defined in Task 2.2.4.3 of Watershed Evaluation o Store parameterization information within a GWIS geodatabase in a format that can be imported into the model framework
2.3.1.3	Model Setup, Debug, and Stabilization ▪ Transfer model parameters from GWIS geodatabase into an ICPR v3 model framework, set up, and debug the model, incorporating Anclote East Watershed inflows (by others) through direct assignment of inflow boundary conditions or by linking the two model domains o Perform preliminary simulations ▪ 100-year 1-day storm ▪ 2.33-year 1-day storm ▪ No rainfall o Develop level pool plots ▪ Initial Conditions ▪ 100-year 1-day Floodplain ▪ 2.33-year 1-day floodplain o Identify and address potential issues ▪ Continuity error (preferably less than 2%)

	▪ Inadequate simulation time ▪ Flow reversals or sudden change ▪ Instability ▪ Significant initial flows
2.3.1.4	Model Parameterization Approach Update • Update Watershed Evaluation Report with revised parameterization approach
2.3.1.5	Pre-Submittal Meeting
2.3.1.6	DISTRICT Review
2.3.2	**Peer Review of Watershed Model Parameterization**
2.3.2.1	Peer Review Meeting and Presentation • Conduct a PowerPoint presentation, summarizing work accomplished in Watershed Model Parameterization with emphasis on approach, effort, and product
2.3.2.2	Meeting to Present Peer Review Comments • Conduct meeting for peer review consultant to present draft review comments
2.3.2.3	Meeting to Discuss Approach of Responding to Peer Review Comments • Conduct meeting to present approach to respond to peer review comments
2.3.3	**Final Approved Watershed Model Parameterization Deliverables**
2.3.3.1	Revised Deliverables • Re-submit watershed model parameterization deliverables, addressing peer review comments
2.3.3.2	Pre-Submittal Meeting
2.3.3.3	DISTRICT Approval and Notice
2.3.4	**Watershed Model Development and Floodplain Delineation**
2.3.4.1	Model Calibration and Verification • Simulate a monitored event by adjusting appropriate model parameters within an acceptable range and using the measured rainfall depth and distribution, and then compare simulated surface water stages, flows, volumes, and time of occurrence to the measured data collected at gaging stations. The antecedent moisture content (AMC) condition and site-specific condition shall also be considered. The model is considered well-calibrated when simulated surface water stages, flows, volumes, and time of occurrence are in reasonable range with measured data • Simulate one or more other recent storm events independent of the event used for calibration. The model is considered well-verified when simulated surface water stages, flows, volumes, and time of occurrence are in reasonable range with measured data
2.3.4.2	Model Validation • Model simulation results will be assessed for accuracy and reasonableness with historic water levels, if any, developed in Task 2.2.1.6 of Watershed Evaluation as well as for consistency with frequency of occurrence
2.3.4.3	Design Storm Simulations • Simulate the following nine (9) design storms

	o 2.33-year, 5-year, 10-year, 25-year, 50-year, and 100-year 1-day events, using the Florida Modified Type II 24-hour rainfall distribution o 10-year, 50-year, and 100-year 5-day events, using the DISTRICT's 120-hour rainfall distribution
2.3.4.4	Multi-Day Event Simulations and Rainfall Justification to Project Floodplain • Simulate 100-year 3-day, 100-year 7-day, and 100-year 10-day events using FDOT rainfall distribution
2.3.4.5	Floodplain Delineation • Delineate the floodplain based on digital topographic information and model predicted peak stages of 100-year storm event(s) • Compare floodplain area for accuracy with model stage versus area relationships • Generate flood depth grids associated with the delineated floodplain • Compare the preliminary floodplain with effective FEMA flood hazard zone
2.3.4.6	Floodplain Justification Report • Document efforts involved in Tasks 2.3.4.1 through 2.3.4.5 and merge with Watershed Evaluation Report
2.3.4.7	Pre-Submittal Meeting
2.3.4.8	DISTRICT Review
2.3.5	**Peer Review of Watershed Model Development and Floodplain Delineation**
2.3.5.1	Peer Review Meeting and Presentation • Conduct a PowerPoint presentation, summarizing work accomplished in Watershed Model Development and Floodplain Delineation with emphasis on approach, effort, and product
2.3.5.2	Meeting to Present Peer Review Comments • Conduct meeting for peer review consultant to present draft review comments
2.3.5.3	Meeting to Discuss Approach of Responding to Peer Review Comments • Conduct meeting to present approach to respond to peer review comments
2.3.6	**Approved Floodplain Analysis Deliverables for Preliminary Floodplain Open House**
2.3.6.1	Revised Deliverables • Address peer review comments, as well as DISTRICT review comments, and re-submit watershed model development and floodplain delineation deliverables.
2.3.6.2	Pre-Submittal Meeting
2.3.6.3	DISTRICT Review and Approval
2.3.7	**Preliminary Floodplain Open House and Response to Public Comments**
2.3.7.1	Preliminary Floodplain Open House • Assist DISTRICT with conducting the preliminary floodplain open house, providing adequate professionals as needed based on the number of impacted parcels and anticipated attendance of the public meeting. Assist citizens by responding to questions at the meeting. Operate laptop computers that can display recent aerials, existing flood hazard zones, base map information, parcels, and the preliminary floodplains
2.3.7.2	Response to Public Comments

	• Review and Respond to public comments, and update Task 2.3.6 deliverables as necessary
2.3.8	**Final Approved Floodplain Analysis Deliverables**
2.3.8.1	Revised Deliverables • Respond to public comments and re-submit full floodplain analysis deliverables.
2.3.8.2	Pre-Submittal Meeting
2.3.8.3	DISTRICT Approval and Notice
2.3.9	**Presentation to Governing Board (not included)**
2.3.10	**Project Management**
2.3.10.1	Progress Meetings • Attend remote meeting on a monthly basis. • Report work completed, staff utilization, actual progress as compared to the performance schedule, work planned for the next month, coming milestone, project issues, any deficiencies and the recovery actions completed and planned
2.3.10.2	Progress Reports with Invoicing • All scheduled invoices shall include a progress report with an assessment of the project's actual progress as compared to the performance schedule in the TWA. Details must include deficiencies and recovery actions completed and planned.
2.3.10.3	Pre-submittal Meetings • Within five (5) business days of each anticipated submittal, conduct a pre-submittal meeting with the DISTRICT prior to transmitting full deliverables
2.3.10.4	Quality Assurance and Quality Control

Appendices

Project Plan attachments and appendices, to be added over the course of the project, include progress reports, meeting minutes, memoranda, and other related documents. Project Plan appendices and documents that have been attached, to date, include the following:

Appendix A. Project Gantt Chart, TWA NO. 15TW-94

Appendix B. Consultant Fee Schedule, Agreement No. 14MA00000018

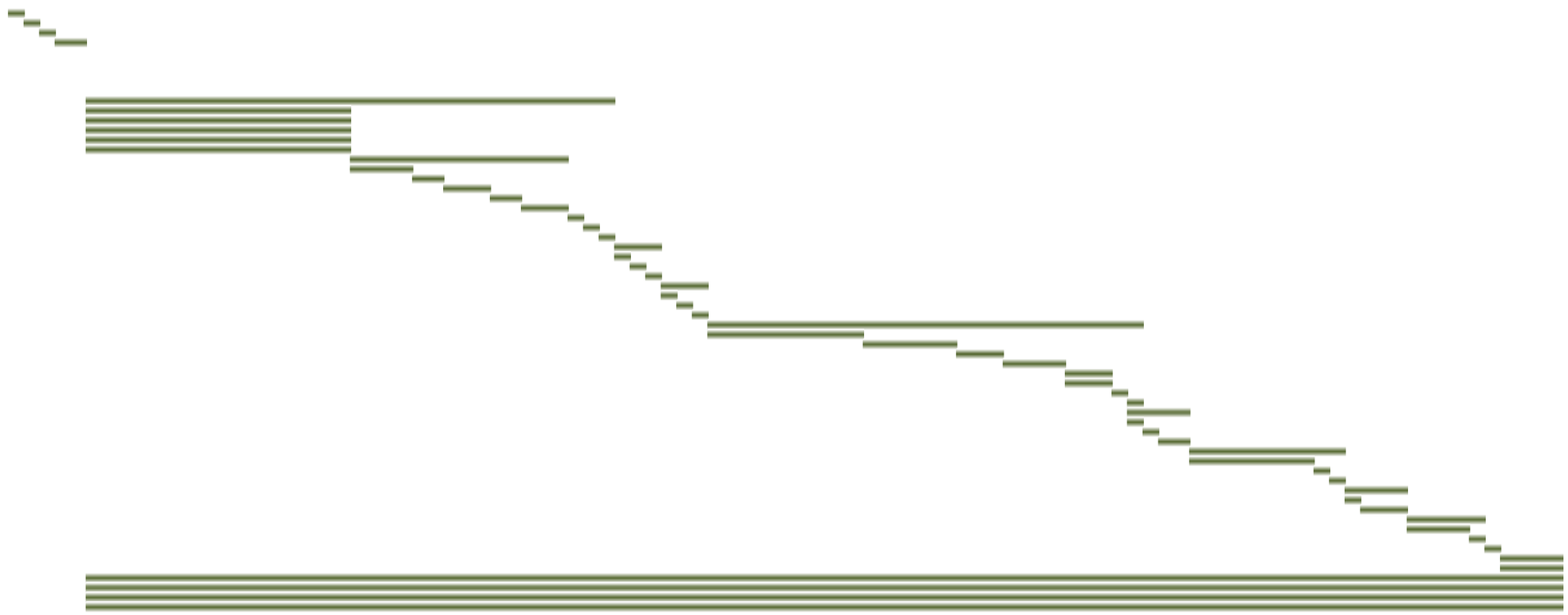
Appendix C. Itemized Project Cost Spreadsheet, TWA NO. 15TW-94

Appendix A. Project Gantt Chart, TWA NO. 15TW-94

Month	Date	Week
1	8/1	1
	8/8	2
	8/15	3
	8/22	4
	8/29	5
2	9/5	6
	9/12	7
	9/19	8
	9/26	9
3	10/3	10
	10/10	11
	10/17	12
	10/24	13
	10/31	14
4	11/7	15
	11/14	16
	11/21	17
	11/28	18
5	12/5	19
	12/12	20
	12/19	21
	12/26	22
6	1/2	23
	1/9	24
	1/16	25
	1/23	26
	1/30	27
7	2/6	28
	2/13	29
	2/20	30
	2/27	31
8	3/5	32
	3/12	33
	3/19	34
	3/26	35
9	4/2	36
	4/9	37
	4/16	38
	4/23	39
	4/30	40
10	5/7	41
	5/14	42
	5/21	43
	5/28	44
11	6/4	45
	6/11	46
	6/18	47
	6/25	48
12	7/2	49
	7/9	50
	7/16	51
	7/23	52
	7/30	53
13	8/6	54
	8/13	55
	8/20	56
	8/27	57
14	9/3	58
	9/10	59
	9/17	60
	9/24	61
15	10/1	62
	10/8	63
	10/15	64
	10/22	65
	10/29	66
16	11/5	67
	11/12	68
	11/19	69
	11/26	70
17	12/3	71
	12/10	72
	12/17	73
	12/24	74
	12/31	75
18	1/7	76
	1/14	77
	1/21	78
	1/28	79
19	2/4	80
	2/11	81
	2/18	82
	2/25	83
20	3/4	84
	3/11	85
	3/18	86
	3/25	87
21	4/1	88
	4/8	89
	4/15	90
	4/22	91
	4/29	92
22	5/6	93
	5/13	94
	5/20	95
	5/27	96
23	6/3	97
	6/10	98
	6/17	99
	6/24	100

Title/Job Description
Personnel Hourly Rate
Name of Key Individuals
David DeLoach
Trillian Baldassari
Chris Hardin
Chris Gilhooley
ELEMENT & TASK DESCRIPTIONS
2.1 Project Development
2.1.1 Data Collection and Initial Evaluation
2.1.2 Draft Project Plan
2.1.3 Kick-off Meeting
2.1.4 Final Project Plan
Element 1 Hours
Element 1 Days (8 Hour/Day)
Element 1 Costs
2.3 Watershed Management Plan - Floodplain Analysis
2.3.1 Watershed Model Parameterization
2.3.1.1 Acquisition of Additional Model Parameters (including eng. site visits)
2.3.1.1.1 Engineering-level Site Visits
2.3.1.1.1 Development and Coordination of Field Survey by PLS
2.3.1.1.1 Coordination and Collection of Data for Future Build-Out Conditions
2.3.1.2 Development of Model Specific Geodatabase (Incl Dist, Ard, PLS, & Buildout)
2.3.1.3 Model Setup, Debug, and Stabilization
2.3.1.3.1 Transfer Data to Model Specific Database (and initial setup/testing)
2.3.1.3.2 Level Pool Plot of Initial Elevations (and revisions)
2.3.1.3.3 No Rainfall Run for Initial Flows (and revisions)
2.3.1.3.4 Join Anclote East Model Domain (or develop offsite inflows, and test)
2.3.1.3.5 1-Day 100-Year, 1-Day 2.33-Year Simulations (prelim mapping, revisions)
2.3.1.4 Model Parameterization Approach Update
2.3.1.5 Pre-Submittal Meeting
2.3.1.6 DISTRICT Review
2.3.2 Peer Review of Watershed Model Parameterization
2.3.2.1 Peer Review Meeting and Presentation
2.3.2.2 Meeting to Present Peer Review Comments
2.3.2.3 Meeting to Discuss Approach of Responding to Peer Review Comments
2.3.3 Final Approved Watershed Model Parameterization Deliverables
2.3.3.1 Revised Deliverables
2.3.3.2 Pre-Submittal Meeting
2.3.3.3 DISTRICT Approval and Notice
2.3.4 Watershed Model Development and Floodplain Delineation
2.3.4.1 Model Calibration and Verification
2.3.4.2 Model Validation
2.3.4.3 Design Storm Simulations
2.3.4.4 Multi-Day Event Simulations and Rainfall Justification to Project Floodplain
2.3.4.5 Floodplain Delineation
2.3.4.6 Floodplain Justification Report
2.3.4.7 Pre-Submittal Meeting
2.3.4.8 DISTRICT Review
2.3.5 Peer Review of Watershed Model Development and Floodplain Delineation
2.3.5.1 Peer Review Meeting and Presentation
2.3.5.2 Meeting to Present Peer Review Comments
2.3.5.3 Meeting to Discuss Approach of Responding to Peer Review Comments
2.3.6 Approved Floodplain Analysis Deliverables for Preliminary Floodplain Open House
2.3.6.1 Revised Deliverables
2.3.6.2 Pre-Submittal Meeting
2.3.6.3 DISTRICT Review and Approval
2.3.7 Preliminary Floodplain Open House and Response to Public Comments
2.3.7.1 Preliminary Floodplain Open House
2.3.7.2 Response to Public Comments
2.3.8 Final Approved Floodplain Analysis Deliverables
2.3.8.1 Revised Deliverables
2.3.8.2 Pre-Submittal Meeting
2.3.8.3 DISTRICT Approval and Notice
2.3.9 Presentation to Governing Board
2.3.9.1 Presentation
2.3.10 Project Management
2.3.10.1 Progress Meetings
2.3.10.2 Progress Reports with Invoicing
2.3.10.4 QA/QC

Note: NTP received on October 1, 2015



Appendix B. Consultant Fee Schedule, Agreement No. 14MA00000018

EXHIBIT "B"
FEE SCHEDULE

Billable hourly rates are furnished for all CONSULTANT and subcontractor personnel as identified in response to RFQ 015-13 and Exhibit "C," Key Personnel. Subcontractor charges shall be included as part of the fixed price negotiated for completing a task listed in an authorized TWA. The DISTRICT shall not pay for CONSULTANT surcharges added to third party charges.

The CONSULTANT and subcontractor billable rates are subject to Paragraphs 4, Compensation and 29, Truth-in-Negotiation, of this Agreement. The billable rates are firm for the first year of this Agreement, beginning from the date of execution, and may increase or decrease annually thereafter by no more than 5% as determined by the DISTRICT in its sole discretion. The CONSULTANT shall provide a written request for any increase and such request shall be subject to the DISTRICT'S written approval in accordance with the DISTRICT'S Signature Authority. Any changes to this Fee Schedule, including any increases to the billable rates, must be approved through a formal written amendment signed by both parties to this Agreement.

Expenditures by CONSULTANT and subcontractors for travel, telecommunications, courier services, bulk mailings, photographs, materials for map and report generation, or any other PROJECT expenditures are to be included in the Project Budget of each Fixed Price TWA.

CHAPTER H - DISTRICT'S WATERSHED MANAGEMENT PROGRAM: WATERSHED EVALUATION, MODELING, AND PLANNING

JOB CLASSIFICATION	POSITION TITLES	MINIMUM QUALIFICATIONS	BILLING RATE
DELOACH ENGINEERING SCIENCE, PLLC			
ADMINISTRATIVE			
1	Clerical	High School/GED and 0 Years Experience	$35.00
2	Administrative Assistant	High School/GED and 5 Years Experience	$50.00
DATA ANALYST			
1	Reuse Coordinator; Staff GIS Analyst	Bachelor's Degree and 3 Years Experience	$75.00
2	Senior GIS Scientist; Chief Structure Controls Analyst	Bachelor's Degree and 6 Years Experience	$100.00
ENGINEER			
1	Senior Professional Engineer	Bachelor's Degree and 7 Years Experience; and Florida PE Certification	$125.00
2	Senior Professional Engineer	Master's Degree and 10 Years Experience and Florida PE Certification; or Bachelor's and 15 Years Experience and Florida PE Certification	$190.00
HYDROGEOLOGIST			
1	Staff Hydrologist; Hydrogeologist	Bachelor's Degree and 2 Years Experience	$85.00
2	Senior Professional Geologist; Senior Professional Engineer; Senior Hydrogeologist	Master's Degree and 10 Years Experience, or Bachelor's Degree and 15 Years Experience; and Florida PG or PE Certification	$100.00
PROJECT MANAGEMENT PROFESSIONAL			
1	Senior Project Manager	Bachelor's Degree and 8 Years Experience; and Project Management Professional Certification	$150.00

* Equivalent Experience: 2 Years of Experience Equals 1 Year of Education

On-Site Fee Schedule

If CONSULTANT performs work at DISTRICT offices, an On-Site Fee Schedule will be negotiated. The On-Site Fee Schedule must be approved through a formal written amendment signed by both parties to this Agreement.

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Appendix C. Itemized Project Cost Spreadsheet, TWA NO. 15TW-94

PROJECT BUDGET BY: DeLoach Engineering Science, PLLC Submitted: 8/14/2015 Revised: NA
PROJECT NAME: Pithlachascotee/Anclote Conservation Evaluation (PACE) Watershed
AGREEMENT NUMBER: 14MA00000018
TASK WORK ASSIGNMENT: TWA 15TW94

PROJECT METRIC (SQ MI): 66 417 (combined model)

Note: Assumes QA/QC for Tasks 2.3.1.1 and 2.3.1.2 performed by others

Title/Job Description	Principal Engineer	Project Engineer	GIS Analyst	*GIS Analyst at GIS Specialist Rate*	Line Item Costs	Line Item Costs Per SQ MI	Line Item Hours	Line Item Days (8 Hour/Day)	Project Costs Running Total	Start Date	Calendar Days	End Date	Number of Invoices	Invoice Amounts
Personnel Hourly Rate	$190.00	$125.00	$100.00	$75.00										
Name of Key Individuals														
David DeLoach	X													
Trillian Baldassari		X												
Chris Hardin		X												
Chris Gilhooley			X	X										
ELEMENT & TASK DESCRIPTIONS														
2.1 Project Development														
2.1.1 Data Collection and Initial Evaluation	0.0	0.0	0.0	0.0	$0.00	$0.00	0.0	0.0	$0.00	**8/1/2015**	**7**	**8/8/2015**		
2.1.2 Draft Project Plan	24.0	24.0	8.0	0.0	$8,360.00	$126.67	56.0	7.0	$8,360.00	**8/8/2015**	**7**	**8/15/2015**		
2.1.3 Kick-off Meeting	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$11,680.00	**8/15/2015**	**7**	**8/22/2015**		
2.1.4 Final Project Plan	8.0	16.0	8.0	0.0	$4,320.00	$65.45	32.0	4.0	$16,000.00	**8/22/2015**	**9**	**8/31/2015**	1	$16,000.00
Element 1 Hours	40.0	48.0	24.0	0.0										
Element 1 Days (8 Hour/Day)	5.0	6.0	3.0	0.0										
Element 1 Costs	$7,600	$6,000	$2,400	$0										
2.3 Watershed Management Plan - Floodplain Analysis														
2.3.1 Watershed Model Parameterization										**8/31/2015**	**238**	**4/25/2016**		
2.3.1.1 Acquisition of Additional Model Parameters (including eng. site visits)	0.0	0.0	0.0	0.0	$0.00	$0.00	0.0	0.0	$16,000.00	*8/31/2015*	119	*12/28/2015*		
2.3.1.1.1 Engineering-level Site Visits	80.0	80.0	20.0	0.0	$27,200.00	$412.12	180.0	22.5	$43,200.00	*8/31/2015*	119	12/28/2015		
2.3.1.1.1 Development and Coordination of Field Survey by PLS	24.0	60.0	80.0	0.0	$20,060.00	$303.94	164.0	20.5	$63,260.00	*8/31/2015*	119	12/28/2015		
2.3.1.1.1 Coordination and Collection of Data for Future Build-Out Conditions	48.0	96.0	144.0	0.0	$35,520.00	$538.18	288.0	36.0	$98,780.00	*8/31/2015*	119	12/28/2015		
2.3.1.2 Development of Model Specific Geodatabase (Incl Dist, Ard, PLS, & Buildout)	80.0	400.0	360.0	0.0	$101,200.00	$1,533.33	840.0	105.0	$199,980.00	*8/31/2015*	119	12/28/2015	4	$45,995.00
2.3.1.3 Model Setup, Debug, and Stabilization	0.0	0.0	0.0	0.0	$0.00	$0.00	0.0	0.0	$199,980.00	*12/28/2015*	98	*4/4/2016*		
2.3.1.3.1 Transfer Data to Model Specific Database (and initial setup/testing)	40.0	120.0	120.0	0.0	$34,600.00	$524.24	280.0	35.0	$234,580.00	*12/28/2015*	30	1/27/2016		
2.3.1.3.2 Level Pool Plot of Initial Elevations (and revisions)	8.0	60.0	80.0	0.0	$17,020.00	$257.88	148.0	18.5	$251,600.00	*1/27/2016*	12	2/8/2016		
2.3.1.3.3 No Rainfall Run for Initial Flows (and revisions)	8.0	120.0	80.0	0.0	$24,520.00	$371.52	208.0	26.0	$276,120.00	*2/8/2016*	21	2/29/2016	2	$38,070.00
2.3.1.3.4 Join Anclote East Model Domain (or develop offsite inflows, and test)	24.0	80.0	40.0	0.0	$18,560.00	$281.21	144.0	18.0	$294,680.00	*2/29/2016*	14	3/14/2016		
2.3.1.3.5 1-Day 100-Year, 1-Day 2.33-Year Simulations (prelim mapping, revisions)	24.0	120.0	60.0	0.0	$25,560.00	$387.27	204.0	25.5	$320,240.00	*3/14/2016*	21	4/4/2016		
2.3.1.4 Model Parameterization Approach Update	24.0	24.0	16.0	0.0	$9,160.00	$138.79	64.0	8.0	$329,400.00	*4/4/2016*	7	4/11/2016		
2.3.1.5 Pre-Submittal Meeting	4.0	4.0	4.0	0.0	$1,660.00	$25.15	12.0	1.5	$331,060.00	*4/11/2016*	7	4/18/2016		
2.3.1.6 DISTRICT Review	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$334,380.00	*4/18/2016*	7	4/25/2016	1	$58,260.00
2.3.2 Peer Review of Watershed Model Parameterization										**4/25/2016**	**21**	**5/16/2016**		
2.3.2.1 Peer Review Meeting and Presentation	8.0	24.0	24.0	0.0	$6,920.00	$104.85	56.0	7.0	$341,300.00	*4/25/2016*	7	5/2/2016		
2.3.2.2 Meeting to Present Peer Review Comments	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$344,620.00	*5/2/2016*	7	5/9/2016		
2.3.2.3 Meeting to Discuss Approach of Responding to Peer Review Comments	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$347,940.00	*5/9/2016*	7	5/16/2016		
2.3.3 Final Approved Watershed Model Parameterization Deliverables										**5/16/2016**	**21**	**6/6/2016**		
2.3.3.1 Revised Deliverables	8.0	16.0	16.0	0.0	$5,120.00	$77.58	40.0	5.0	$353,060.00	*5/16/2016*	7	5/23/2016		
2.3.3.2 Pre-Submittal Meeting	4.0	4.0	4.0	0.0	$1,660.00	$25.15	12.0	1.5	$354,720.00	*5/23/2016*	7	5/30/2016		
2.3.3.3 DISTRICT Approval and Notice	0.0	0.0	0.0	0.0	$0.00	$0.00	0.0	0.0	$354,720.00	*5/30/2016*	7	6/6/2016	1	$20,340.00
2.3.4 Watershed Model Development and Floodplain Delineation										**6/6/2016**	**196**	**12/19/2016**		
2.3.4.1 Model Calibration and Verification	48.0	360.0	180.0	200.0	$87,120.00	$1,320.00	788.0	98.5	$441,840.00	*6/6/2016*	70	8/15/2016	2	$43,560.00
2.3.4.2 Model Validation	24.0	320.0	24.0	80.0	$52,960.00	$802.42	448.0	56.0	$494,800.00	*8/15/2016*	42	9/26/2016	1	$52,960.00
2.3.4.3 Design Storm Simulations	40.0	120.0	16.0	80.0	$30,200.00	$457.58	256.0	32.0	$525,000.00	*9/26/2016*	21	10/17/2016		
2.3.4.4 Multi-Day Event Simulations and Rainfall Justification to Project Floodplain	40.0	160.0	40.0	80.0	$37,600.00	$569.70	320.0	40.0	$562,600.00	*10/17/2016*	28	11/14/2016	1	$67,800.00
2.3.4.5 Floodplain Delineation	24.0	120.0	24.0	80.0	$27,960.00	$423.64	248.0	31.0	$590,560.00	*11/14/2016*	21	12/5/2016		
2.3.4.6 Floodplain Justification Report	80.0	120.0	40.0	80.0	$40,200.00	$609.09	320.0	40.0	$630,760.00	*11/14/2016*	21	12/5/2016		
2.3.4.7 Pre-Submittal Meeting	4.0	4.0	4.0	0.0	$1,660.00	$25.15	12.0	1.5	$632,420.00	*12/5/2016*	7	12/12/2016		
2.3.4.8 DISTRICT Review	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$635,740.00	*12/12/2016*	7	12/19/2016	1	$73,140.00
2.3.5 Peer Review of Watershed Model Development and Floodplain Delineation										**12/12/2016**	**28**	**1/9/2017**		
2.3.5.1 Peer Review Meeting and Presentation	16.0	40.0	32.0	0.0	$11,240.00	$170.30	88.0	11.0	$646,980.00	*12/12/2016*	7	12/19/2016		
2.3.5.2 Meeting to Present Peer Review Comments	8.0	8.0	2.0	0.0	$2,720.00	$41.21	18.0	2.3	$649,700.00	*12/19/2016*	7	12/26/2016		
2.3.5.3 Meeting to Discuss Approach of Responding to Peer Review Comments	24.0	120.0	40.0	80.0	$29,560.00	$447.88	264.0	33.0	$679,260.00	*12/26/2016*	14	1/9/2017	1	$43,520.00

PROJECT BUDGET BY: DeLoach Engineering Science, PLLC Submitted: 8/14/2015 Revised: NA
PROJECT NAME: Pithlachascotee/Anclote Conservation Evaluation (PACE) Watershed
AGREEMENT NUMBER: 14MA00000018
TASK WORK ASSIGNMENT: TWA 15TW94

PROJECT METRIC (SQ MI): 66 417 (combined model)

Note: Assumes QA/QC for Tasks 2.3.1.1 and 2.3.1.2 performed by others

Title/Job Description	Principal Engineer	Project Engineer	GIS Analyst	*GIS Analyst at GIS Specialist Rate*	Line Item Costs	Line Item Costs Per SQ MI	Line Item Hours	Line Item Days (8 Hour/Day)	Project Costs Running Total	Start Date	Calendar Days	End Date	Number of Invoices	Invoice Amounts
Personnel Hourly Rate	$190.00	$125.00	$100.00	$75.00										
Name of Key Individuals														
David DeLoach	X													
Trillian Baldassari		X												
Chris Hardin		X												
Chris Gilhooley			X	X										
ELEMENT & TASK DESCRIPTIONS														
2.3.6 Approved Floodplain Analysis Deliverables for Preliminary Floodplain Open House										**1/9/2017**	**70**	**3/20/2017**		
2.3.6.1 Revised Deliverables	40.0	320.0	140.0	160.0	$73,600.00	$1,115.15	660.0	82.5	$752,860.00	*1/9/2017*	56	3/6/2017		
2.3.6.2 Pre-Submittal Meeting	4.0	4.0	4.0	0.0	$1,660.00	$25.15	12.0	1.5	$754,520.00	*3/6/2017*	7	3/13/2017		
2.3.6.3 DISTRICT Review and Approval	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$757,840.00	*3/13/2017*	7	3/20/2017	1	$78,580.00
2.3.7 Preliminary Floodplain Open House and Response to Public Comments										**3/20/2017**	**28**	**4/17/2017**		
2.3.7.1 Preliminary Floodplain Open House	16.0	16.0	24.0	8.0	$8,040.00	$121.82	64.0	8.0	$765,880.00	*3/20/2017*	7	3/27/2017		
2.3.7.2 Response to Public Comments	16.0	40.0	24.0	40.0	$13,440.00	$203.64	120.0	15.0	$779,320.00	*3/27/2017*	21	4/17/2017		
2.3.8 Final Approved Floodplain Analysis Deliverables										**4/17/2017**	**35**	**5/22/2017**		
2.3.8.1 Revised Deliverables	12.0	120.0	80.0	60.0	$29,780.00	$451.21	272.0	34.0	$809,100.00	*4/17/2017*	28	5/15/2017		
2.3.8.2 Pre-Submittal Meeting	4.0	4.0	4.0	0.0	$1,660.00	$25.15	12.0	1.5	$810,760.00	*5/15/2017*	7	5/22/2017		
2.3.8.3 DISTRICT Approval and Notice	8.0	8.0	8.0	0.0	$3,320.00	$50.30	24.0	3.0	$814,080.00	*5/22/2017*	7	5/29/2017	1	$56,240.00
2.3.9 Presentation to Governing Board										**5/29/2017**	**28**	**6/26/2017**		
2.3.9.1 Presentation	16.0	16.0	20.0	20.0	$8,540.00	$129.39	72.0	9.0	$822,620.00	*5/29/2017*	28	6/26/2017	1	$8,540.00
2.3.10 Project Management										**8/31/2015**	**665**	**6/26/2017**		
2.3.10.1 Progress Meetings	40.0	40.0	40.0	0.0	$16,600.00	$251.52	120.0	15.0	$839,220.00	8/31/2015	665	6/26/2017		
2.3.10.2 Progress Reports with Invoicing	40.0	40.0	40.0	0.0	$16,600.00	$251.52	120.0	15.0	$855,820.00	8/31/2015	665	6/26/2017		
2.3.10.4 QA/QC	80.0	120.0	120.0	0.0	$42,200.00	$639.39	320.0	40.0	$898,020.00	8/31/2015	665	6/26/2017	1	$75,400.00
Element 3 Hours	1,008.0	3,348.0	1,994.0	968.0										
Element 3 Days (8 Hour/Day)	126.0	418.5	249.3	121.0										
Element 3 Costs	$191,520	$418,500	$199,400	$72,600										
Total Hours	1,048.0	3,396.0	2,018.0	968.0										
Total Days (8 Hour/Day)	131.0	424.5	252.3	121.0										
Total Costs	$199,120	$424,500	$201,800	$72,600									Total	$898,020.00