



Alternatives Analysis Cross Bayou Watershed Management Plan

Pinellas County Board of County Commissioners and
Southwest Florida Water Management District | November 2013

**ALTERNATIVES ANALYSIS
CROSS BAYOU WATERSHED MANAGEMENT PLAN**

Prepared for

Pinellas County Board of County Commissioners

and

Southwest Florida Water Management District

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1 INTRODUCTION

1.1 AUTHORIZATION

Pinellas County and the Southwest Florida Water Management District (SWFWMD) initiated the Cross Bayou Watershed Management Plan., which incorporates Digital Topographic Information, Watershed Evaluation, and Watershed Management Plan elements from the SWFWMD Guidelines and Specifications (G&S) (SWFWMD, 2011). This report documents the Alternatives Analysis phase of the project.

Jones Edmunds & Associates, Inc. developed the Watershed Management Plan under Pinellas County Project No. 922271 (Contract No. 090-0374-A).

1.2 PROJECT LOCATION AND GENERAL DESCRIPTION

As a consultant to Pinellas County, Jones Edmunds completed a Watershed Management Plan for the Cross Bayou watershed. The Cross Bayou watershed encompasses approximately 13 square miles in the central portion of Pinellas County. The watershed is bordered on the southeast by Pinellas Park Ditch #1, Sawgrass Lake, and Roosevelt Creek watersheds and on the northwest by Long Branch and Starkey Road watersheds. Figure 1 and Figure 2 show the location and extent of the watershed within Pinellas County.

1.3 PURPOSE AND OBJECTIVES

This project developed elements of a Watershed Management Program for the Cross Bayou watershed. Jones Edmunds created the elements of the program in accordance with SWFWMD G&S and other guidance documents.

The primary project tasks included the following:

1. Develop a digital terrain model (DTM) of the study area using Light Detection and Ranging (LiDAR) data. This DTM provided the foundation for developing watershed and subbasin boundaries, storage, and conveyance. Figure 3 shows the DTM developed for the Cross Bayou watershed.
2. Develop a watershed evaluation focusing on feature inventory, field evaluation, and assessment of the watershed. Jones Edmunds created a Geographic Information Systems (GIS) geodatabase to store information collected in the field and to identify features in accordance with SWFWMD G&S (SWFWMD, 2011) and other guidance documents. As a part of the watershed evaluation the following datasets were reviewed:
 - a. Soils information (Figure 4).
 - b. Land use information (Figure 5).
 - c. Stream flow and water level data collected at sites in the watershed (Figure 6).
 - d. Water quality data collected at sites in the watershed (Figure 7).
3. Develop a watershed management plan (including watershed-wide hydrologic and hydraulic models), floodplains, and a surface-water resource assessment and analyze potential best-management practices within the watershed. Jones Edmunds created the model and determined floodplains in accordance with SWFWMD G&S (SWFWMD, 2011) and other guidance documents. These floodplains provided more detail throughout the watershed compared to the existing FEMA floodplains shown in Figure 8. The major tributaries to the Cross Bayou watershed

that were modeled are shown in Figure 9. Each tributary was further broken up into subbasins that were modeled using the Interconnected Channel and Pond Routing (ICPR) model.

4. Develop conceptual best management practices (BMPs) or alternatives that reduced flooding within the watershed and improve water quality.

2 CHARACTERIZATION OF FLOOD-PRONE AREAS

Elements of SWFWMD's suggested Table of Contents for this report are covered in the Floodplain Analysis and Level of Service Determination reports submitted by Jones Edmunds in March 2013. These reports describe the ICPR model that Jones Edmunds developed for the Cross Bayou watershed, the floodplains that were mapped for the Cross Bayou watershed, and the areas of the watershed that did not meet their flooding level of service. The characterization of flood-prone areas that was provided in these two reports was used as the basis for developing alternative BMPs that would reduce flooding in the Cross Bayou watershed.

3 ALTERNATIVE BMP FORMULATION

The alternative BMP formulation builds on the Level-of-Service Determination and Surface Water Resource Assessment reports, which were used to determine flooding and water quality problem areas, respectively. The Level-of-Service Determination found significant flooding concerns along the Cross Bayou Canal and elsewhere within the watershed. In addition, Jones Edmunds worked with Janicki Environmental to develop a pollutant-loading analysis to determine pollutant loading from the watershed to the Cross Bayou Canal. The results from this analysis were submitted as part of the Surface Water Resource Assessment.

The Level-of-Service Determination identified 25 instances of Level-of-Service E classifications and 15 instances of Level-of-Service D classifications. Given the widespread flooding within the watershed, most alternatives were developed by Jones Edmunds to address flooding. Where possible we looked at including components within these alternatives that would improve water quality.

Sections 3.1 through 3.8 discuss individual structural alternatives that Jones Edmunds considered to address flooding and water quality concerns, while Section 3.9 discusses possible non-structural alternatives that the County could implement in the watershed to reduce pollutant loading. The alternatives are not presented in any specific order. We have included detailed estimates of costs for the recommended alternatives in Appendix B. The Adena Drive flooding project previously identified in the Pinellas County Stormwater Master Plan was not reevaluated as a part of this report because drainage improvements in the Adena Drive area were being addressed by Pinellas County at the beginning of the Alternatives Analysis phase of the Cross Bayou WMP.

3.1 ALTERNATIVE 1 – CROSS BAYOU MAINTENANCE (KING ENGINEERING RECOMMENDATIONS)

3.1.1 ALTERNATIVE STORMWATER BMP CONCEPT

In its 2012 study of Cross Bayou Canal maintenance requirements, King Engineering identified several locations along the Cross Bayou Canal for dredging and vegetation removal and proposed maintenance and dredging to the original canal design depth. The extent of the proposed maintenance is highlighted in Figure A-1 in Appendix A. The goal of this maintenance was to partially restore the conveyance capacity of the canal and facilitate faster stormwater recovery during large storm events. Pinellas County requested that Jones Edmunds evaluate the effectiveness of King's proposed Alternate 2 for vegetation removal and dredging. This was an expansion of King's Alternate 1 and would provide the greater potential for reducing flooding. King Engineering's Alternate 2 included maintenance and dredging in the following locations along the canal:

- Maintenance dredging to -4.3 feet NAVD88 of 370 linear feet of the Canal near 126th Avenue North.
- Maintenance dredging to -4.3 feet NAVD88 of 1,800 linear feet of the Canal between Bryan Dairy Road and US-19.
- Maintenance dredging to -4.3 feet NAVD88 of 530 linear feet of the Canal northeast of 66th Street North.
- Removal of sediment deposits near the south side of the Ulmerton Road box culvert.
- Maintenance dredging to -4.3 feet NAVD88 starting near 126th Avenue North and going northeast approximately 930 linear feet.

- Maintenance dredging to -4.3 feet NAVD88 of 1,650 linear feet between 102nd Avenue North and 66th Street North.

When we simulated King's Alternate 2, the model did not indicate any significant reductions in peak stage along the Cross Bayou Canal for the 100-year/24-hour and the 25-year/24-hour events. Peak stages changed less than 0.1 foot in the canal for the 100-year/24-hour storm event. For this reason, we do not recommend the King Alternate 2 as a complete solution to address flooding along the Cross Bayou Canal.

In addition to evaluating King's recommended maintenance activities – to dredge approximately 5,300 feet of the channel to -4.3 feet and clear vegetation along the channel reaches – we reviewed the effectiveness of expanding this recommendation to additional reaches northeast or southwest of Bryan Dairy Road. The extent of this expanded maintenance is shown in Figure A-1. We chose Bryan Dairy Road as the approximate divide because this area was the high point in the peak water surface elevation along the channel. We simulated the maintenance dredging in the model by deepening the channel to -4.3 feet NAVD88. To simulate vegetation removal, we lowered Manning's roughness values from an average of 0.08 to 0.03.

Most of the channels southwest of Bryan Dairy Road are already deeper than the proposed dredge depth. Therefore, additional maintenance along these reaches had a small effect on flooding and reduced peak stages in the channel during the 100-year/24-hour event by 0.1 foot or less. We do not consider maintenance and dredging along these reaches to be a viable option for reducing flooding in Cross Bayou. Portions of the channel reaches southwest of Bryan Dairy are narrower than the typical Cross Bayou channel sections; widening these reaches may have more of an impact on flood stages upstream of the Belcher Road Bridge. However, widening these channel reaches was not evaluated as a part of this Alternative.

We found that dredging and maintaining restrictive channel reaches northeast of Bryan Dairy Road was more effective than dredging and maintaining channel reaches southwest of Bryan Dairy. We simulated dredging and vegetation removal along 14,500 feet of the most restrictive portions of the channel northeast of Bryan Dairy Road. This length of the canal has several reaches where the channel is at or above -2.0 feet NAVD88. The channels selected for Alternative 1 are shown in Figure A-1. The effect of this dredging and vegetation removal northeast of Bryan Dairy was to reduce peak stages along the canal by as much as 0.8 foot in the 100-year/24-hour storm event. However, this also resulted in some instances of increased peak stages in the canal, which is shown in Figure A-2.

3.1.2 ALTERNATIVE BMP EVALUATION

3.1.2.1 Pre- and Post-Hydraulic Analysis

Significant and widespread flooding occurs along the Cross Bayou Canal, especially during larger storm events such as the 25-year/24-hour and 100-year/24-hour events. Flooding impacts are greatest near the center of the canal, particularly on either side of Bryan Dairy Road.

For Alternative 1, Jones Edmunds evaluated the effect of implementing the maintenance activities proposed by King Engineering–Alternate 2 and including additional key reaches northeast of Bryan Dairy Road for maintenance and sediment removal. We modeled these reaches with a Manning's roughness value of 0.03 and deepened each representative cross-section to a minimum of -4.3 feet. These improvements created flow rates that were up to 20-percent higher in some areas of the canal. Modeled peak stages along the canal were reduced between 0.1 and 0.8 foot between 66th Street North and Ulmerton Road for the 100-year/24-hour storm event. Flooding along the Cross Bayou Canal typically occurs when stages within the canal are above 6.0 feet NAVD88 depending on location. For the 100-year

design storm, stages remain above 6.0 feet for 12 to 16 hours within the canal. The improved conveyance provided in Alternative 1 typically improved recovery times by 1 to 4 hours.

We identified a portion of the channel between 150th Avenue North and the Bayside Bridge where modeled peak stages were increased by as much as 0.65 foot due to the increased flow rates that result from the maintenance activities. The increased flows in the canal would create constrictions at the 150th Avenue North Bridge (RC3180A), the culverts under Roosevelt Boulevard (RC3200A, RC3200B, RC3200C, and RC3200D), and the Bayside Bridge (RC4632A). Each constriction causes significant head loss in the system, which results in increased peak stages. A spatial presentation of the model results for the 100-year/24-hour event is provided in Figure A-2 in Appendix At.

Implementing improvements to the Cross Bayou Canal would likely require a phased approach because of the significant time and costs associated with this type of project. Typically channel improvements are made from downstream to upstream. However, given the hydraulics of this system, this approach may create a possibility for additional flooding downstream. Therefore, Jones Edmunds recommends that as part of developing a dredging plan the flood risk of various phasing approaches be evaluated using a detailed hydraulic model.

3.1.2.2 Wetland and Water Quality Impacts

The National Wetlands Inventory (NWI) identifies several wetlands within the Cross Bayou Canal that may be impacted by dredging activities. The County will need to evaluate impacts to wetlands, mangroves, and other protected habitats before proceeding with designing and permitting Alternative 1.

3.1.2.3 Geotechnical Considerations

As part of their feasibility study for maintenance on Cross Bayou Canal, King provided geotechnical borings for 13 sites on the canal. The borings were taken at locations between Ulmerton Road and Belcher Road and did not cover the full length of the Canal. However, results of the borings were fairly homogenous and may be representative of soil characteristics along the rest of the canal. Within the proposed dredge zone, the borings typically identified a layer of silty fine sand with organic material near the surface. In some instances, shell fragments, leaf litter, and roots were also encountered. As part of design and permitting, the County will need additional geotechnical data for the entire extent of the proposed excavation zone. The soil must also be reviewed for possible soil contamination. Disposing of the contaminated soil can add significantly to the cost of the alternative. This possible additional cost was not included in the Jones Edmunds estimate of probable construction costs.

3.1.2.4 Land-Acquisition Requirements

No land acquisition is expected for Alternative 1.

3.1.2.5 Right-of-Way and/or Easement Requirements

The Cross Bayou Canal is a drainage canal that was constructed in 1916 to provide critical drainage in Pinellas County. A significant portion of the Cross Bayou Canal was not constructed within an easement. This may restrict where the County can maintain the canal by dredging and other canal maintenance activities.

3.1.2.6 Natural Systems Preservation

Since its construction in 1916, the drainage system has been colonized by a number of natural systems. Before permitting the proposed maintenance activities, the County will need to evaluate and quantify the impacts to natural systems such as wetlands and mangroves.

3.1.2.7 Permittability

A Clean Water Act (CWA) Section 404 Permit administered by the US Army Corps of Engineers (USACE) is required before dredging and depositing spoils. Additionally, the State has incorporated dredge-and-fill activities into its Environmental Resource Permit (ERP) program, which is administered by SWFWMD. The County will need to evaluate and quantify the water quality and quantity impacts as part of the requirements of this permit. Activities that exacerbate flooding when compared to the pre-development conditions are difficult to permit. While options in Alternative 1 alleviate flooding to some extent in certain areas, they also produce adverse flooding impacts in other portions of the watershed that the County must evaluate and quantify before applying to permit this BMP. The *Cross Bayou Canal Maintenance Project – Phase 1 Preliminary Feasibility Study* prepared by King Engineering details the permitting process required for this alternative.

Although Jones Edmunds did not model the watershed under the original design conditions, some of these increased peak stages may be close to the peak stages that would have occurred if the canal remained in its original design condition, which may help in permitting the channel improvements.

3.1.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternative 1 in 2013 dollars is provided in Appendix B.

3.2 ALTERNATIVE 2 – CROSS BAYOU CANAL IMPROVEMENTS NEAR BAYOU CLUB

3.2.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

The Cross Bayou Canal floods upstream of the Belcher Road Bridge. The flooding in this area is documented by photographs taken by residents during and reports written about Tropical Storm Debby in 2012. The ICPR model results also corroborate the flooding. Residents have raised concerns that the double-barrel culvert under the golf cart path approximately 400 feet south of the Belcher Road Bridge and the wooden golf cart bridge approximately 1,800 feet downstream of the Bayou Club Boulevard Bridge may be contributing to the flooding. In addition, some of the Cross Bayou Canal reaches downstream of the Belcher road bridge in the vicinity of the Bayou Club are narrower than the reaches upstream of the Belcher Road Bridge and downstream of Bayou Club. Jones Edmunds evaluated how these structures and reduced channel widths affect flooding in this area.

Based on this evaluation, we propose that the double-barrel culvert under the golf cart path approximately 400 feet south of the Belcher Road Bridge be replaced with a modular prefabricated bridge – Con/Span[®] or equivalent – that provides significantly more conveyance capacity than the existing culverts. This BMP concept is shown in Figure A-3 in Appendix A. This type of structure will also improve the accessibility of the Cross Bayou for recreation activities such as kayaking.

3.2.2 ALTERNATIVE BMP EVALUATION

3.2.2.1 Pre- and Post-Hydraulic Analysis

Jones Edmunds ran the Cross Bayou watershed model to determine the effect of individually removing each of the bridges and culverts in the Bayou Club area on flooding in the Cross Bayou Canal. Removing each structure was simulated during the 10-year, 25-year, and 100-year/24-hour storms. The removed structure and the effect on flooding in the Cross Bayou Canal are described below:

- The double-barrel culvert under the golf cart path approximately 400 feet south of the Belcher Road Bridge – Removing just this culvert results in a 0.25-foot decrease in peak stage immediately upstream of the Belcher Road Bridge for the 10-year/24-hour storm and less than a 0.05-foot change during the 25-year and 100-year/24-hour storms.
- The Bayou Club Boulevard Bridge – Removing just this culvert results in a less than 0.1-foot decrease in peak stage immediately upstream of the Belcher Road Bridge for the 10-year, 25-year, and 100-year/24-hour storms.
- The wooden golf cart bridge approximately 1,800 feet downstream of the Bayou Club Boulevard Bridge – Removing just this culvert results in a less than 0.1-foot decrease in peak stage immediately upstream of the Belcher Road Bridge for the 10-year, 25-year, and 100-year/24-hour storms.

Based on this analysis, the double-barrel culvert approximately 400 feet downstream of the Belcher Road Bridge contributes to some of the flooding experienced upstream of the Belcher Road Bridge. The cumulative effect of removing all the structures identified above was not simulated.

Replacing the existing double-barrel arch culverts (approximately 400 feet south of the Belcher Road Bridge) with a 28-foot-wide and 14-foot-high pre-fabricated bridge – Con/Span[®] type system or equivalent – has the following effects on flooding in the Cross Bayou Canal:

- Increases the peak flow through this culvert from 600 to 1,250 cubic feet per second (cfs) during the 100-year event.

- Decreases the peak stage immediately upstream of the culvert by 0.75, 0.16, and 0.06 foot during the 10-year, 25-year, and 100-year/24-hour storm, respectively.
- Decreases the peak stage immediately upstream of the Belcher Road Bridge by 0.25, 0.1, and 0.05 foot during the 10-year, 25-year, and 100-year/24-hour storm, respectively.
- Decreases the duration of flooding (water elevation above 4.0 feet) upstream of the Belcher Road Bridge by 3 hours during the 100-year/24-hour storm.
- Increases peak stages downstream of the culvert by less than 0.05 foot. Based on the modeling, we do not expect these increases to result in adverse impacts.
- Reduces peak stages by as much as 0.25 foot as far as 2,000 feet upstream of the culvert during the 10-year/24-hour storm.

Widening the Cross Bayou Canal in the vicinity of the Bayou Club did reduce peak stages upstream of the Belcher Road Bridge by up to 0.6 foot during the 10-year/24-hour event. However, these improvements also resulted in a 0.3-foot increase in peak stage downstream of the Bayou Club. Due to the adverse downstream effects and the difficulties with permitting, this improvement was not evaluated further.

3.2.2.2 Wetland and Water Quality Impacts

Mangroves are on the banks of the Cross Bayou Canal in the areas near the wooden golf cart bridge. The design and installation of the proposed bridge will need to consider the locations of the mangroves and minimize the impact to them. We do not expect adverse impacts to the water quality. However, the County will need a detailed wetland delineation to support an application for an ERP.

3.2.2.3 Geotechnical Considerations

The Natural Resources Conservation Service (NRCS) soil classification in the vicinity of the two golf cart crossings is Kesson fine sand. The depth to seasonal high water table of Kesson fine sand is typically within 0.5 foot below land surface. However due to extensive changes from the natural landscape, this soil classification may no longer be valid. The County, or its consultant, will need additional geotechnical data to characterize the underlying soil at the proposed locations for design and permitting of the proposed structures.

3.2.2.4 Land-Acquisition Requirements

No land acquisition is expected for Alternative 2.

3.2.2.5 Right-of-Way and/or Easement Requirements

No easements are along this portion of the Cross Bayou Canal, and the existing culverts are privately maintained. The County will need to work with the property owner to establish an easement for constructing the proposed prefabricated bridge.

3.2.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.2.2.7 Permittability

Alternative 2 is a retrofit of two existing structures that is expected to meet SWFWMD criteria for new development and enhance current flood attenuation. The County will need an ERP permit from SWFWMD for these retrofits.

3.2.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternative 2 in 2013 dollars is provided in Appendix B.

3.3 ALTERNATIVE 3 – THE HIGH POINTE VILLAGE MOBILE HOME PARK

3.3.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

Model results show flooding in the High Pointe Village Mobile Home Park south of High Point Elementary School. This mobile home park drains west to a drainage ditch immediately west of the High Pointe Village Mobile Home Park. The drainage ditch outfalls into a 38-inch-by-24-inch elliptical reinforced concrete pipe (RCP), which drains into the 150th Avenue North drainage system that discharges into Cross Bayou Canal to the east. Jones Edmunds reviewed two possible updates to the stormwater system in this area that will reduce the likelihood of flooding in this area:

- Increasing the capacity of the 150th Avenue North drainage system would reduce peak stages at the High Pointe Village Mobile Home Park. However, for the County to accomplish this improvement the drainage along approximately 3,000 feet of 150th Avenue Northwest of Avalon Avenue would need to be upgraded. Due to the expense associated with this type of drainage improvement, Jones Edmunds did not consider this option viable.
- Jones Edmunds recommends the County regrades the drainage ditch west of High Pointe Village Mobile Home Park to provide a second outfall to 60th Street North and ultimately to the Aluna Largo apartment complex pond to the south. This alternative is shown in Figure A-4 in Appendix A. We expect that the increased conveyance capacity from a second outfall will reduce flooding in the mobile home park. Constructing a 1.2-acre online wet detention pond with an average depth of 5.6 feet on a vacant parcel between 60th Street North and the Aluna Largo apartment complex pond will allow flows from the drainage ditch to be attenuated and reduce the impact of these additional flows on the Aluna Largo pond. This pond will also provide some water quality treatment. For additional water quality improvements, the County could construct a stormwater-harvesting system to supply water to irrigate the nursery west of the drainage ditch or the nursery east of the Mobile Home Park.

3.3.2 ALTERNATIVE BMP EVALUATION

3.3.2.1 Pre- and Post-Hydraulic Analysis

The 100-year/24-hour storm results in a peak flood stages of between 15.6 and 16.5 feet (NAVD 88) in the vicinity of the High Pointe Mobile Home Park. With the additional conveyance from the drainage ditch, the peak stages in the park reduced by 0.2 foot during the 100-year/24-hour event. Routing this additional flow to the Aluna Largo pond will increase peak stages in the pond by less than 0.1 foot during the 100-year/24-hour storm; however, this increase does not create adverse effects as the peak stage in the pond remains below the top of bank.

3.3.2.2 Wetland and Water Quality Impacts

The proposed stormwater treatment system may impact existing wetlands. The County will need to quantify the extent of the wetland impacts during detailed design and permitting.

The proposed 1.2-acre wet detention pond near 60th Street North reduces the nutrient load by up to 10 pounds per year of total phosphorus and 23 pounds per year of total nitrogen. This was calculated based on an approximate residence time of 13 days, although this residence time may differ based on the site constraints encountered during design. We estimated the removal efficiencies for phosphorus and nitrogen as 61 and 33 percent, respectively.

3.3.2.3 Geotechnical Considerations

The NRCS soil classifications for the areas of the proposed BMP are Myakka sand and Anclote fine sand. Myakka sand has a depth to seasonal high water table of less than 1.5 feet during wet months. Anclote fine sand has a depth to seasonal high water table of 10 inches during wet months. The County will need more detailed geotechnical data for the site to support a design.

3.3.2.4 Land-Acquisition Requirements

Alternative 2 requires land acquisition in the vicinity of 60th Street North.

3.3.2.5 Right-of-Way and/or Easement Requirements

The proposed stormwater systems will require an easement in the vicinity of 60th Street North. As part of a detailed evaluation and design, the County will need to establish easement requirements and identify and contact the property owners within this area.

3.3.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.3.2.7 Permittability

Routing stormwater from the High Pointe Village Mobile Home Park to the Aluna Largo apartment complex pond requires an ERP from SWFWMD. We expect that the project will be permittable as a retrofit project since the proposed changes to the stormwater system provide additional flood attenuation and water quality enhancement. However, the County will need to demonstrate that no adverse off-site impacts will occur for permitting purposes.

3.3.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternative 3 in 2013 dollars is provided in Appendix B.

3.4 ALTERNATIVE 4 – PINELLAS FARMS STORMWATER POND

3.4.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

Flooding of the Cross Bayou Canal south of the Bryan Dairy Road extension (between 66th Street North and US 19) is well documented by Pinellas County. ICPR model results show flooding in this area during the 25-year/24-hour and 100-year/24-hour storm events. We recommend the County consider using the property in this area that is subject to frequent flooding to construct a 4.3-acre offline wet detention or treatment wetland system with a depth of approximately 4.0 feet to treat low-flow runoff from the ditch that conveys stormwater from the intersection of 61st Street North and 110th Avenue North to the Cross Bayou Canal. This alternative is shown in Figure A-5 in Appendix A. The existing ditch drains more than 80 acres of untreated medium-density residential runoff to the Cross Bayou Canal. The offline system will not affect high flows, which will bypass the treatment system and discharge directly to the Cross Bayou Canal.

3.4.2 ALTERNATIVE BMP EVALUATION

3.4.2.1 Pre- and Post-Hydraulic Analysis

Jones Edmunds evaluated the effect of the proposed offline stormwater treatment system and found that it had minimal effect on peak stages in the Cross Bayou Canal and did not increase peak stages during the 100-year/24-hour event.

3.4.2.2 Wetland and Water Quality Impacts

The proposed stormwater treatment system will impact existing wetlands. The County will need to quantify the extent of the wetland impacts during detailed design and permitting.

A 4.3-acre offline wet detention system installed in this area may provide up to a 5-day residence time. The calculated removal efficiencies for this residence time are 54 percent for total phosphorus and 22 percent for total nitrogen. The calculated load reductions for this residence time are approximately 15 pounds per year and 36 pounds per year for phosphorus and nitrogen, respectively.

Installing a treatment train consisting of a wet detention pond followed by a treatment wetland may achieve higher pollutant-load removal. We recommend that the County evaluate a treatment train during a more detailed analysis of the proposed design concept.

3.4.2.3 Geotechnical Considerations

The NRCS soil classifications in the area of the proposed wet detention pond are Manatee loamy sand and Pinellas sand. NRCS has documented the seasonal high water table of Manatee loamy sand as approximately 1 foot below land surface and of Pinellas Sand as approximately 1.5 feet below land surface. Site-specific geotechnical tests are required for detailed design.

3.4.2.4 Land-Acquisition Requirements

This alternative will require acquisition of flood-prone land near the Cross Bayou Canal in the vicinity of the Bryan Dairy Road extension.

3.4.2.5 Right-of-Way and/or Easement Requirements

No right-of-way or easement requirements were identified for this alternative; however, the County will need to reevaluate their requirements during detailed design.

3.4.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.4.2.7 Permittability

We expect that the proposed detention pond and required stormwater infrastructure will meet SWFWMD's criteria for new development and will enhance current flood attenuation and water quality. This system will therefore qualify for a permit from SWFWMD.

3.4.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternative 4 in 2013 dollars is provided in Appendix B.

3.5 ALTERNATIVE 5 – 142ND AVENUE NORTH DRAINAGE IMPROVEMENTS

3.5.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

Model results show that significant flooding occurs in the Pleasure World Park Unit 1 neighborhood, south of 142nd Avenue North, during the 100-year/24-hour and 25-year/24-hour storm events. Jones Edmunds evaluated improvements to the drainage system in this area – shown in Figure A-6 in Appendix A – to reduce flooding:

- Removing and replacing 370 feet of 36-inch RCP pipe (ICPR model link RA3882A) that runs adjacent to 142nd Avenue North and east of 60th Street North (in front of the St. Petersburg College, Clearwater Campus) with a 370-foot-long 4-foot-by-6-foot box culvert will help increase the conveyance capacity along 142nd Avenue North and reduce flooding upstream of this drainage system. The proposed pipe will outfall into the 18.5-acre wet detention pond within the Aluna Largo apartment complex.
- Constructing a 3.0-acre wet detention pond or a combination detention pond and treatment wetland in the Progress Energy easement west of the Pleasure World Park Unit 1 neighborhood will provide stormwater flood attenuation and additional water quality treatment for runoff from this neighborhood. A control structure on the north end of the proposed wet detention pond (south of the 142nd Avenue North and 62nd Street North intersection) will control water levels in the pond. The control structure will drain into two 48-inch RCPs that will need to be installed under 142nd Avenue North. These culverts will outfall into the drainage system that runs along the north side of 142nd Avenue North. This drainage system will include the proposed 4-foot-by-6-foot box culvert that will outfall into the 18.5-acre wet detention pond within the Aluna Largo apartment complex.
- The proposed wet detention pond will also incorporate a control structure on the east end of the pond. This control structure will discharge through two 48-inch RCPs to the east and outfall into an existing swale system that drains into the Aluna Largo pond. The swale system will need to be widened to accommodate the flows from the 48-inch pipes.
- Retrofitting the existing Pleasure World Park Unit 1 local stormwater collection system requires routing stormwater from the neighborhood to the proposed detention pond and treatment wetland. This would require evaluating the current collection system and possibly removing and reconstructing existing infrastructure.

While developing this alternative, Jones Edmunds also evaluated the effect of routing runoff from the proposed detention pond to the existing detention pond east of Icot Boulevard. This option reduces flooding within the Pleasure World Park Unit 1 neighborhood during the 100-year/24-hour storm event. However, it also results in adverse off-site impacts, with increased flooding of the ponds east and west of Icot Boulevard. For this reason, we did not consider this option further.

3.5.2 ALTERNATIVE BMP EVALUATION

3.5.2.1 Pre- and Post-Hydraulic Analysis

Constructing a detention pond in the easement west of the Pleasure World Park Unit 1 neighborhood combined with replacing the 36-inch RCP with a box culvert will provide more attenuation and lower peak stages in the neighborhood. The following summarizes the results during the 100-year/24-hour event:

- Peak stages in the Pleasure World Park Unit 1 neighborhood decrease by approximately 0.2 foot.

- Peak stages in the easement between 62nd Street North and Pleasure World Park Unit 1 neighborhood decrease by 0.2 foot.
- Peak stages in the Icot Boulevard ponds decrease by approximately 0.5 foot, which reduces inundation across Icot Boulevard.
- Peak stages in the Aluna Largo pond increase by less than 0.15 foot but do not create adverse flooding impacts.

During the 25-year/24-hour event, the following would occur:

- Peak stages in the Pleasure World Park Unit 1 neighborhood decrease by 0.8 foot.
- Peak stages in the easement between 62nd Street North and Pleasure World Park Unit 1 neighborhood decrease by 0.6 foot.
- Peak stages in the Icot Boulevard ponds decrease by approximately 0.35 foot.
- Peak stages in the Aluna Largo pond increase by approximately 0.1 foot but do not create adverse flooding impacts.

We found no adverse off-site impacts when Alternatives 3 and 5 were combined.

3.5.2.2 Wetland and Water Quality Impacts

The County will need to determine the extent of wetlands on the site. The calculated residence time of 17 days provided in the detention pond reduces nutrient loading by 17 pounds of nitrogen per year and 5 pounds of phosphorus per year. This is based on a 35-percent total nitrogen removal efficiency and a 63-percent total phosphorus removal efficiency. If sufficient space is available within the easement, we recommend that the County evaluate the option of constructing a treatment train that includes a small wet detention pond followed by a treatment pond.

3.5.2.3 Geotechnical Considerations

The project area consists of primarily Myakka soils, which are poorly drained and have moderate infiltration rates. Typically the water table is within the 1.5 feet of the soil surface for 1 to 4 months of the year. During dry periods, the water table recedes to more than 3 feet below the surface. The County, or their consultant, will need soil borings at the proposed pond locations to accurately determine the attenuation volume provided by the detention ponds.

3.5.2.4 Land-Acquisition Requirements

Alternative 5 requires the acquisition of 5.0 acres of land within the easement southwest of the Pleasure World Park Unit 1 neighborhood. The land includes power transmission lines along the west portion of the easement, west of the proposed pond.

3.5.2.5 Right-of-Way and/or Easement Requirements

In general, electrical utilities do not allow construction of stormwater features within transmission line easements because it restricts maintenance access to the transmission lines for their workers, inhibits emergency repairs, and creates additional safety concerns. This option was proposed because two wet detention basins are already under the transmission lines in this area. Before the County pursues this BMP, we recommend that it explore this option with Progress Energy and perhaps create a joint right-of-way to provide access for Progress Energy and Pinellas County.

3.5.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.5.2.7 Permittability

Alternative 5 is a retrofit to an existing stormwater system. This option is expected to meet the SWFWMD criteria for new development and should enhance current flood attenuation and therefore be permittable by SWFWMD. The construction of a new stormwater treatment system will have to be permitted through an ERP administered by SWFWMD. The County will also need to document a maintenance and easement agreement with FPL.

3.5.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternatives 5 in 2013 dollars is provided in Appendix B.

3.6 ALTERNATIVE 6 – DRAINAGE IMPROVEMENTS IN PINEBROOK CANAL BETWEEN 142ND AVENUE NORTH AND ULMERTON ROAD

3.6.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

The Pinebrook Canal between 142nd Avenue North and Ulmerton Road floods during the 100-year/24-hour and 25-year/24-hour storms. The Bay Ranch Mobile Home Park – south of 142nd Avenue North and approximately 0.5 mile west of 66th Street North – also floods during the 100-year/24-hour and 25-year/24-hour storm events. Improving the stormwater system that drains the Bay Ranch Mobile Home Park and improving conveyance within the Pinebrook Canal may help reduce flooding in these two areas. Jones Edmunds evaluated conceptual designs to reduce this flooding. The following describes these designs.

3.6.1.1 Alternative 6-A

Replacing the current 34-inch-by-53-inch elliptical concrete pipe under San Miguel Drive just south of 142nd Avenue North (represented by ICPR model link RJ3879A) with 225 feet of 43-inch-by-68-inch elliptical concrete pipe and regrading the west-east ditch system just south of 142nd Avenue North will increase the conveyance capacity of the drainage system on the south side of 142nd Avenue North. This will reduce flooding in the Bay Ranch Mobile Home Park during the 25-year/24-hour and 100-year/24-hour events. This BMP concept is shown in Figure A-7 in Appendix A.

3.6.1.2 Alternative 6-B

Bank failures along portions of the Pinebrook Canal between Ulmerton Road and 142nd Avenue have reduced the conveyance capacity along this portion of the canal. When combined with the restriction at the culvert under Ulmerton Road, this causes flooding along the canal during the 100-year/24-hour and 25-year/24-hour events. Jones Edmunds recommends regrading, stabilizing, and possibly armoring portions of the approximately 5,200 feet of the Pinebrook Canal between Ulmerton Road and 142nd Avenue North. Additionally, adding a second 5-foot-by-7-foot concrete box culvert under Ulmerton Road would increase the flow capacity through this system. These enhancements would reduce the peak stages along the Pinebrook Canal during the 100-year/24-hour and 25-year/24-hour storm events. We recommend this be done in conjunction with the improvements in Alternative 6-A. This BMP concept is shown in Figure A-8 in Appendix A.

Jones Edmunds evaluated several other potential alternatives to address flooding in this area; however, none provide significant reductions in flooding during the 100-year/24-hour or 25-year/24-hour storm events. The following summarizes the other alternatives evaluated in this area:

- Regrade the Pinebrook Canal between Ulmerton Road and 142nd Avenue North without replacing the culvert under Ulmerton Road.
- Replace the culvert under Ulmerton Road without regrading the Pinebrook Canal between Ulmerton Road and 142nd Avenue North.
- Construct a 4.0-acre offline detention pond east of the Pinebrook Canal between Ulmerton Road and 142nd Avenue North.
- Install a control structure to regulate the discharge from the ditch that outfalls into the Pinebrook Canal just south of Granada Avenue.
- Construct approximately 3 acres of offline detention in the easement between Granada Avenue and Fresno Avenue.

- Lower the initial water level in the Down Yonder Mobile Home Park to simulate a pre-storm drawdown, which would provide additional retention volume in the drainage system.

3.6.2 ALTERNATIVE BMP EVALUATION

3.6.2.1 Pre- and Post-Hydraulic Analysis

A. Alternative 6-A

Alternative 6-A reduced peak stages within the Bay Ranch Mobile Home Park by 0.2 foot during the 100-year/24-hour storm event and did not result in adverse impacts downstream. Peak stages within the Bay Ranch Mobile Home Park were reduced by 0.5 foot during the 25-year/24-hour event. Based on a review of flooding extents, the reduced peak stage during the 25-year/24-hour storm event would most likely result in minimal street flooding and minimal structure flooding in the Bay Ranch Mobile Home Park.

B. Alternative 6-B

Alternative 6-B reduced the 100-year/24-hour peak stage within the Bay Ranch Mobile Home Park by more than 0.6 foot, while the peak stage in Pinebrook Canal immediately upstream of Ulmerton Road was reduced by 0.7 foot. Peak stages in Pinebrook Canal south of Ulmerton Road were increased by as much as 0.3 foot, but this did not appear to cause adverse flooding impacts. Peak stages during the 25-year/24-hour event were reduced by 1.3 feet in the Bay Ranch Mobile Home Park and by 1.0 foot in the Pinebrook Canal upstream of Ulmerton Road. Additionally, peak stages in the Down Yonder Mobile Home Park were reduced by 0.3 foot.

3.6.2.2 Wetland and Water Quality Impacts

Within the project area, two wetlands identified in the NWI layer may be impacted by Alternative 6-B. These wetlands are adjacent to the easement and to the Pinebrook Canal just north of Ulmerton Road. The County will need a detailed field review of wetlands in the project area as a part of detailed design and permitting.

3.6.2.3 Geotechnical Considerations

Alternative 6-A requires the County acquire some geotechnical testing as part of detailed design. Alternative 6-B requires significant earthwork and in-depth geotechnical analysis. The soil in the project area is classified as Felda fine sand or Pinellas soils and urban land. Both of these soil types are considered hydrologic group D and B/D, respectively, and are poorly to very poorly drained deep soils. The water table is typically within 1 to 3 feet of the surface.

3.6.2.4 Land-Acquisition Requirements

Alternatives 6-A and 6-B do not require the acquisition of land.

3.6.2.5 Right-of-Way and/or Easement Requirements

The proposed grading and construction for Alternative 6 is within a stormwater easement for the existing conveyance system. The County will require a detailed survey of the current easement to confirm that no additional acquisitions to the easement will be required.

3.6.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.6.2.7 Permittability

Alternatives 6-A and 6-B are upgrades to existing stormwater infrastructure, and SWFWMD should permit them as retrofits or improvements to an existing stormwater system.

3.6.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimates of the probable cost for Alternatives 6-A and 6-B in 2013 dollars are provided in Appendix B.

3.7 ALTERNATIVE 7 – IMPROVE DRAINAGE FROM THE SUN SEAIR MOBILE HOME PARK

3.7.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

Stormwater from the commercial areas on 123rd Avenue and 125th Avenue (east of 66th Street North) and the Sun Seair Mobile Home Park (south of 126th Avenue) flows north under 126th Avenue through a 42-inch circular concrete pipe (ICPR model link RL3905A). The pipe outfalls into a roadway ditch system along 126th Avenue. Within the park, as much as 2.0 feet of inundation is modeled during the 100-year/24-hour storm event.

The County may be able to use an unimproved parcel southeast of the Sun Seair Mobile Home Park to construct an online wet detention pond to treat runoff from the park. Alternative 7 consists of the following infrastructure improvements:

- Construct a 2.0-acre wet detention pond to treat stormwater runoff from the park.
- Regrade and expand the ditch just south of Jewelene Boulevard to route flow southeast toward the proposed detention pond. The proposed ditch has 3:1 side slopes (horizontal to vertical) and a bottom width of 8 feet. Based on the current topography and proposed bed slope, we estimate that the ditch will be 4 feet deep.
- Reroute existing local conveyance within the park to direct a portion of the flow to the proposed ditch system south of Jewelene Boulevard West, while possibly maintaining the outfall to 126th Avenue for flows during extreme events.

This BMP concept is shown in Figure A-9 in Appendix A.

While evaluating this alternative, Jones Edmunds also evaluated the effectiveness of the two additional alternatives listed below that were moderately effective at reducing peak stages in the Sun Seair Mobile Home Park. However, both created additional flooding near 126th Avenue North and were not considered further. A brief description of these two alternatives follows:

- Routing the runoff from the commercial area on 125th and 123rd Avenues North directly to 126th Avenue, bypassing the Sun Seair drainage system.
- Replacing the 42-inch culvert under 126th Avenue North with a larger culvert.

3.7.2 ALTERNATIVE BMP EVALUATION

3.7.2.1 Pre- and Post-Hydraulic Analysis

Existing conditions result in significant flooding in the Sun Seair Mobile Home Park during the 100-year/24-hour and 25-year/24-hour storm events. Alternative 7 will reduce peak stages in the 100-year/24-hour event by 1.5 feet. This corresponds to no building flooding based in the extents of the mapped flooding and only minor street flooding (less than 0.5 foot deep). Peak stages in the ditch system on the north side of 126th Avenue North will also be reduced by up to 0.5 foot.

During the 25-year/24-hour storm event, the peak stage in the park will be reduced by 1.8 feet. Peak stages in the ditch system north of 126th Avenue North will be reduced by as much as 0.9 foot. The model indicated that peak stages will increase less than 0.05 foot at some locations within the immediate vicinity of the project; however, no adverse off-site impacts were created.

3.7.2.2 Wetland and Water Quality Impacts

Few wetlands appear to be within the area of interest; however, the County will need to further evaluate possible wetland impacts. The wet detention system will provide additional water quality improvements. The proposed pond has a calculated residence time of 10 days. The nutrient removal was calculated as 38 pounds of nitrogen a year and 12 pounds of phosphorus a year. This equals a 31-percent efficiency for nitrogen and a 59-percent efficiency for phosphorus. The residence time and pond effectiveness may vary based on site constraints evaluated during detailed design.

3.7.2.3 Geotechnical Considerations

The design and construction of a wet detention pond require the County to acquire site-specific geotechnical data used to determine the available storage at the site and its effectiveness as a BMP. Preliminary examination indicates the site is located on Myakka soils, which are considered a hydrologic group B/D soil and are poorly to very poorly drained deep soils. Infiltration rates are moderately rapid and the water table is within 1.5 feet of the surface during the wet season but may recede to depths of 3.5 feet or more during periods of dry weather.

3.7.2.4 Land-Acquisition Requirements

This alternative requires the County acquire approximately 2.5 acres of adjacent land west of 62nd Street North and south of 126th Avenue North. Additional land may be necessary pending the results of the geotechnical investigation and subsequent pond sizing analysis.

3.7.2.5 Right-of-Way and/or Easement Requirements

To provide swale conveyance and access, an easement along the north side of the proposed pond that extends from 62nd Street North westward to Jewelene Boulevard E would be necessary.

3.7.2.6 Natural Systems Preservation

No impacts to natural systems or preservation of natural systems are expected for this alternative.

3.7.2.7 Permittability

The proposed stormwater infrastructure improvements are stormwater retrofits and require a SWFWMD ERP.

3.7.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimate of the probable cost for Alternative 7 in 2013 dollars is provided in Appendix B.

3.8 ALTERNATIVE 8 – PINWOOD VILLAS DRAINAGE IMPROVEMENTS

3.8.1 ALTERNATIVE STORMWATER BMPs CONCEPTS

The Pinewood Villas neighborhood and adjacent Vacation Village Travel Resort are south of Ulmerton Road and east of Pinebrook Canal. Both neighborhoods experience flooding during the 100-year/24-hour with some limited flooding during the 25-year/24-hour storm events. The primary drainage system in this area collects stormwater from the 54-inch pipe under Ulmerton Road, which is conveyed through a 1,500-foot drainage system consisting of channels and culverts that outfall into Pinebrook Canal. Improvements to the primary drainage system in this area may reduce the depth and duration of this flooding.

3.8.1.1 Alternative 8-A

For Alternative 8-A, Jones Edmunds evaluated replacing the two 32-inch-by-51-inch arch culverts approximately 750 feet south of Ulmerton Road (ICPR model links RJ3897A and RJ3897B). The existing culverts appear to constrict the conveyance system and cause the channel to flood during the 100-year/24-hour storm. Replacing the two culverts with a single 5-foot-by-8-foot rectangular box culvert will increase the conveyance capacity under the road, which would reduce flooding in this area.

3.8.1.2 Alternative 8-B

For Alternative 8-B, Jones Edmunds evaluated installing a high-flow 48-inch bypass culvert to divert a portion of the high flows in this drainage system to the Pinebrook Canal, which appears to have additional conveyance capacity.

3.8.1.3 Alternative 8-C

Alternative 8-C combines the measures proposed in Alternative 8-A and 8-B into a single alternative. This BMP concept is shown in Figure A-10 in Appendix A.

3.8.2 ALTERNATIVE BMP EVALUATION

3.8.2.1 Pre- and Post-Hydraulic Analysis

A. Alternative 8-A

Replacing the two arch culverts with a 5-foot-by-8-foot box culvert will lower peak stages in the immediate vicinity of the culvert by approximately 0.1 foot during the 100-year/24-hour storm event. The results of the model simulations do not indicate any increases in peak stage within the drainage system.

B. Alternative 8-B

The high-flow bypass will lower peak stages in the Pinebrook Villas and Vacation Village Travel Resort by approximately 0.2 foot during the 100-year/24-hour event. Peak stages in the Pinebrook Canal will increase by approximately 0.05 foot and will be contained within the channel banks.

C. Alternative 8-C

Replacing the two arch culverts with a box culvert and constructing a high-flow bypass culvert will reduce flooding within the Pinebrook Villas and Vacation Village Travel Resort by 0.4 foot for the 100-year/24-hour storm event. Additionally, peak stages in the 1,500-foot channel system will be reduced between 0.2 and 0.4 foot between Ulmerton Road and Pineforest Way East. Peak stages in the Pinebrook Canal will increase by less than 0.1 foot and will be contained within the banks of the canal.

Based on the results of the post-development hydraulic analysis, Alternative 8-C is the most effective measure for reducing flooding in this area.

3.8.2.2 Wetland and Water Quality Impacts

A portion of the open channel conveyance system near Pinewood Villas is considered a wetland according to the NWI layer. The County will need to field-review possible wetland impacts as part of design and permitting. We do not expect the proposed alternatives will impact water quality.

3.8.2.3 Geotechnical Considerations

Soil in this area fall into the following series: Felda fine sand, Pinellas soils and urban land, and Wabasso soils and urban land. All of these soil types are considered B/D or D hydrologic group soils and are poorly to very poorly drained deep soils. The water table is typically within 1 to 3 feet of the surface. Because the land in this area is highly disturbed, the County may need additional geotechnical data, especially if Alternative 8-B or 8-C is chosen.

3.8.2.4 Land-Acquisition Requirements

The County does not need to acquire land for Alternative 8 other than the easements discussed in the next section.

3.8.2.5 Right-of-Way and/or Easement Requirements

The County will need an easements for Alternatives 8-B and 8-C to construct the high-flow bypass system and will need to contact property owners in the area. The County will need to evaluate possible routes for the bypass system during a detailed project evaluation.

3.8.2.6 Natural Systems Preservation

The proposed work for Alternative 8 is within the existing conveyance system. Therefore, no impact on natural systems is expected.

3.8.2.7 Permittability

SWFWMD should consider the conveyance system improvements described in Alternative 8 as a stormwater retrofit that would meet water quality and quantity requirements. We expect increases in post-development peak flows due to improvements to the system capacity. Although the off-site impacts are not likely to be considered adverse, the County will need to demonstrate this during permitting.

3.8.2.8 Estimates of Probable Construction Costs

Jones Edmunds' estimates of the probable cost for Alternatives 8-A, 8-B, and 8-C in 2013 dollars are provided in Appendix B.

3.9 NON-STRUCTURAL BMP CONSIDERATIONS

3.9.1 ALTERNATIVE 1 – PROPERTY BUY OUT

Some properties within the Cross Bayou watershed are subject to frequent flooding that cannot be mitigated because the cost of these improvements is prohibitive. Solutions for these flooding instances would generally also cause significant adverse off-site impacts and therefore would not be permitted by SWFWMD. In these cases, purchasing these properties and converting the land to a non-residential land use – such as park or athletic facilities – to avoid frequent flooding of homes may be beneficial. In some cases, Federal Emergency Management Agency (FEMA) grants may be available for acquisition of National Flood Insurance Program (NFIP) insured structures that have repeated losses.

The County can use the FEMA Benefit Cost Analysis toolkit to compare the expected annual damages caused by flooding with the cost of purchasing the property. For an example, Jones Edmunds reviewed a collection of low-lying homes on the north side of the Cross Bayou Canal that flood frequently. Using assumptions for finished floor elevations and structure and content values yields an expected annual damage of approximately \$160,000, while the property appraiser assessed value of the properties is approximately \$1.5 million. The approximate benefit-cost-ratio for this project over a 25-year period is 1.5.

3.9.2 LOW-IMPACT DEVELOPMENT OPPORTUNITIES

Low-impact development (LID) or green stormwater infrastructure can provide significant reductions in pollutant loading and reductions in runoff generation by promoting distributed retention and infiltration of stormwater. Examples of LID practices that the County could implement include grassed swales, bioswales, bioretention, green-roofs, and pervious pavement.

Pinellas County could offer incentives for communities and homeowners to include LID-type practices in their landscaping. For example, the City of Tallahassee offers to reimburse homeowners up to \$175 of the costs of plants and mulch when a rain garden is installed on their property. Similar incentives could also be offered to homeowner associations. Pleasure World Park Community and Leisure World Park Community include 6- to 8-foot-wide grassed areas between the road and sidewalk. Converting these grassed areas to bioretention systems and incorporating curb cuts could provide significant infiltration capacity, which may be as high as infiltrating 90 percent of the road runoff on an average annual basis. This would result in a significant reduction in annual runoff volume and pollutant loading to Cross Bayou Canal; neither of these subdivisions has a stormwater treatment system. An additional potential benefit for the residents is increased property values, as indicated by some studies on implementation of green infrastructure retrofits.

Redeveloping vacant commercial property can also be a great opportunity to work with developers to include LID-type practices in the redevelopment. For example, the Quinlan Motors Inc./Autoway Nissan property on Ulmerton Road east of US 19 is vacant and has a significant impervious area with very little stormwater treatment. Redeveloping this property would be a good opportunity to provide incentives or requirements for developers to retain runoff onsite by incorporating LID practices such as pervious pavement, bioretention areas constructed in inverted parking islands, or greenroofs into the redevelopment. This type of stormwater treatment could result in a significant annual reduction in pollutant loading from these types of properties.

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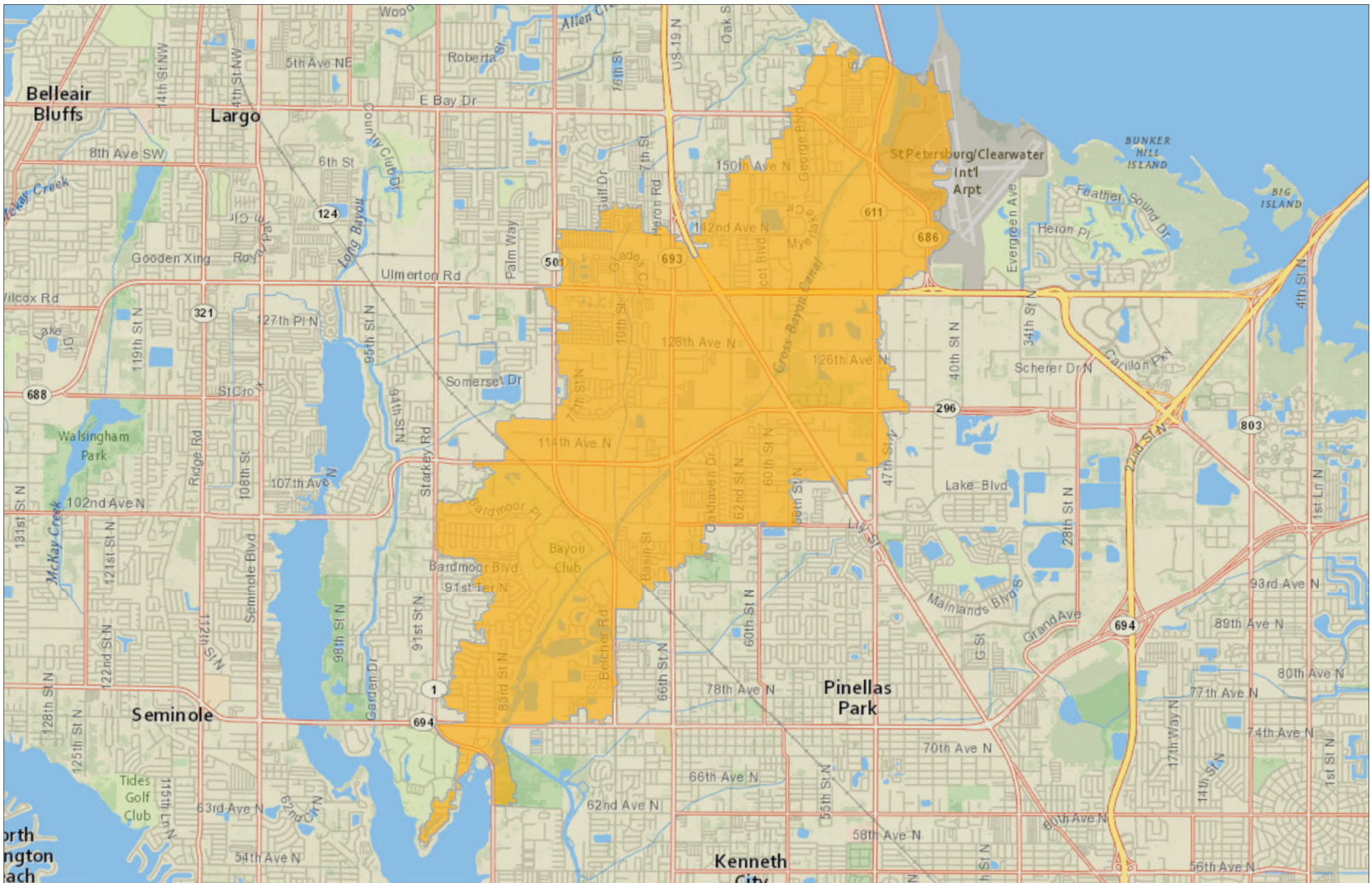
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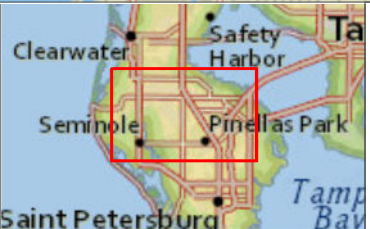


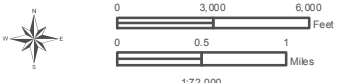
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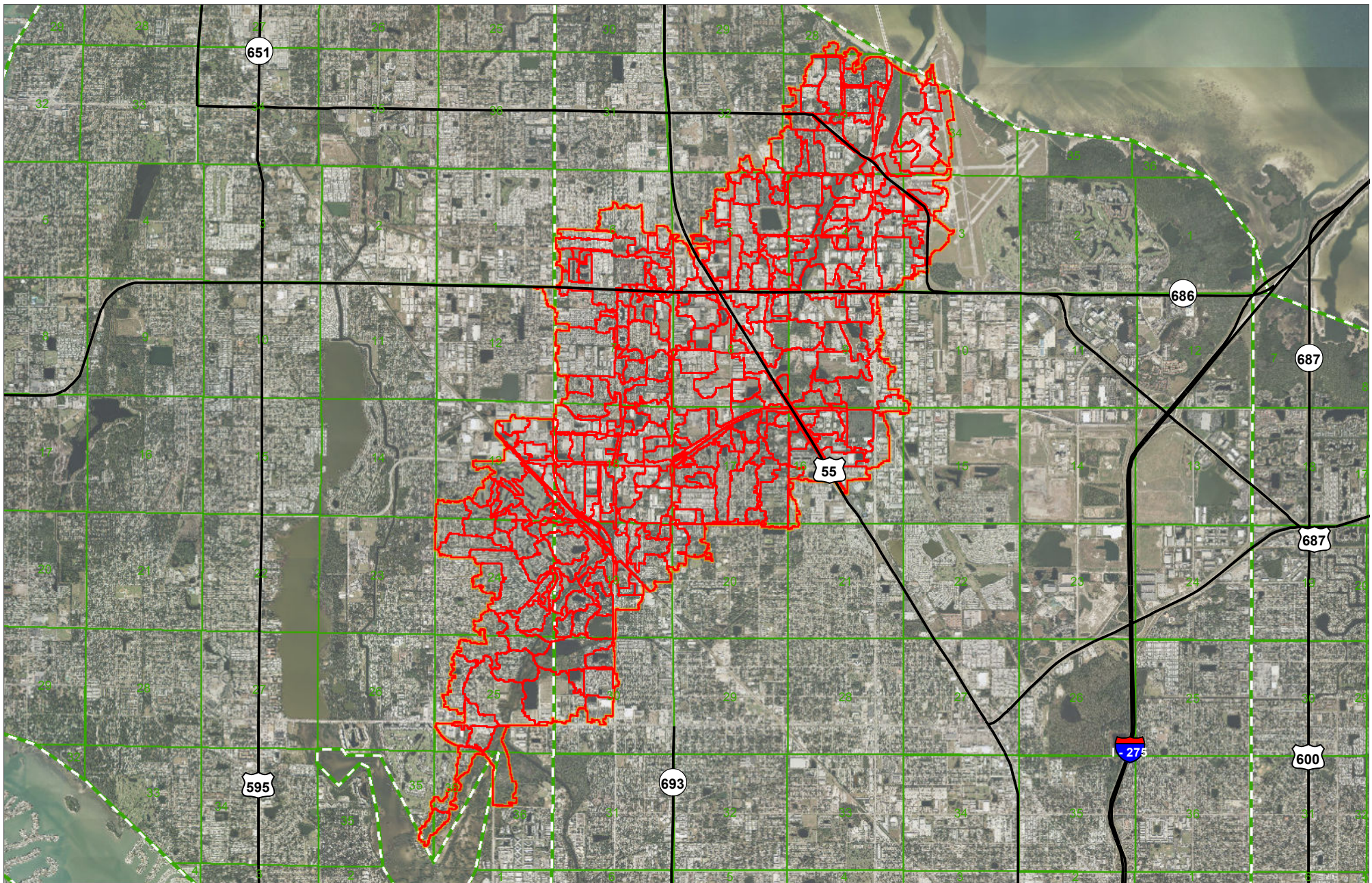
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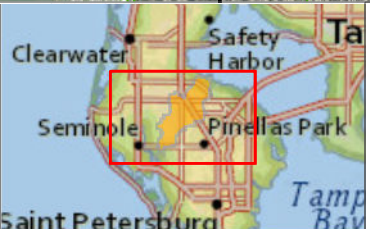



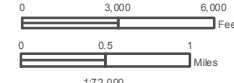
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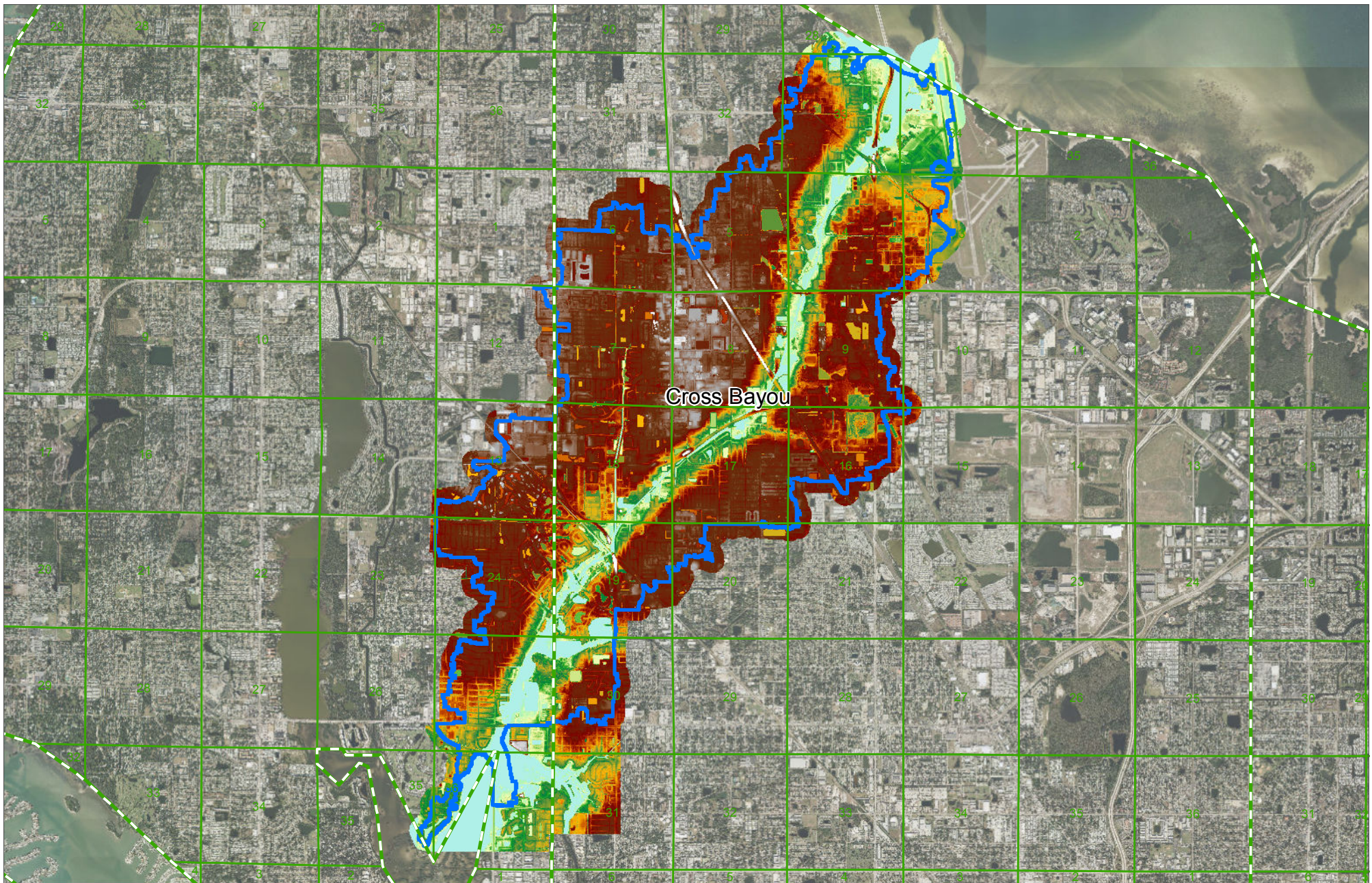
Figures



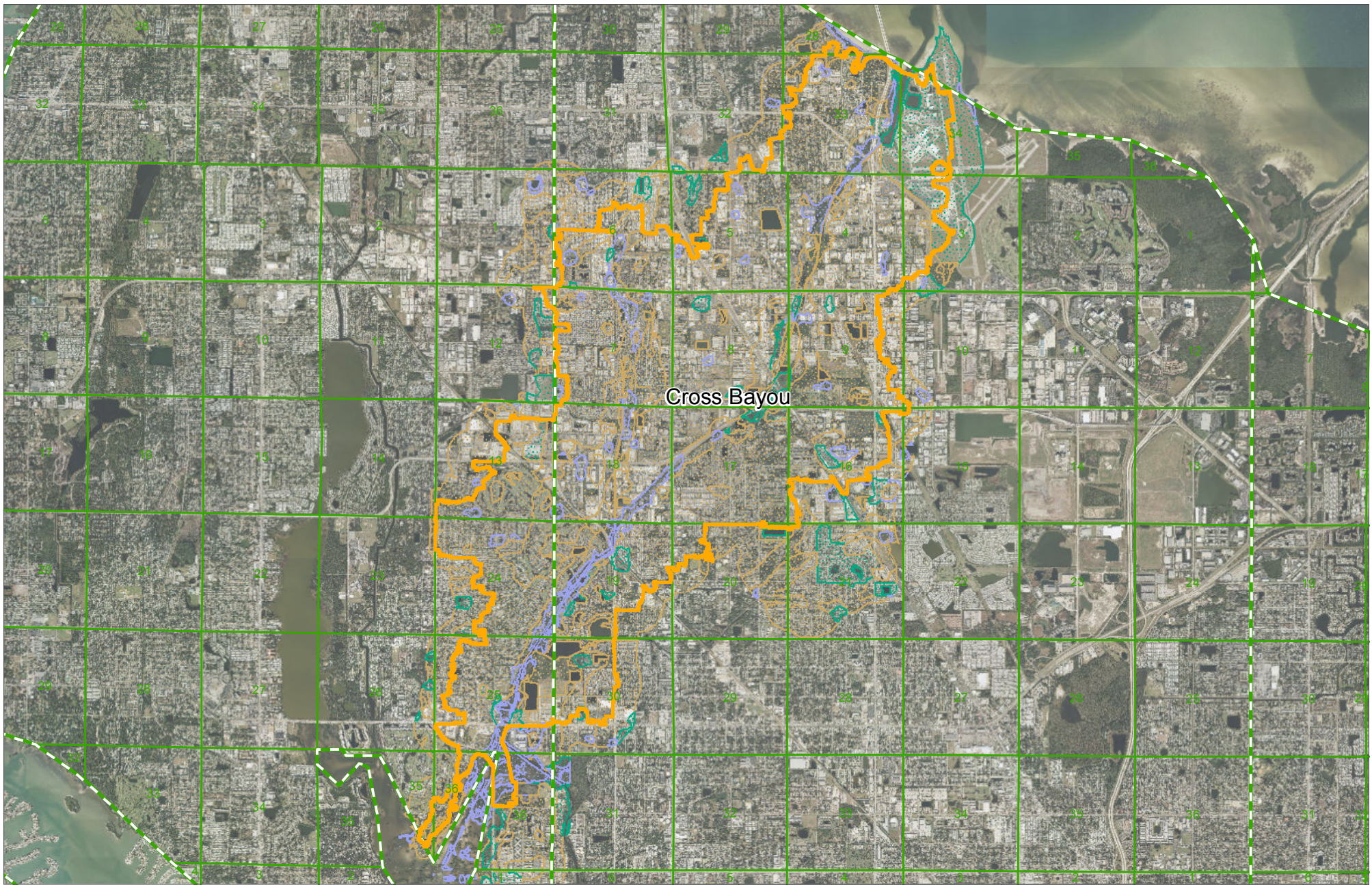
 730 NE Waldo Road Gainesville, FL 32641		Legend  Watershed Boundary	Notes: The project area for this study is the Cross Bayou watershed. The Cross Bayou watershed has a combined area of approximately 13 sq. miles. The watershed is located in the central portion of Pinellas County.	 	Figure 1: Location Map	Filename: Map1_LocationMap.mxd	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates
					Project: K659	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.		






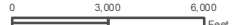



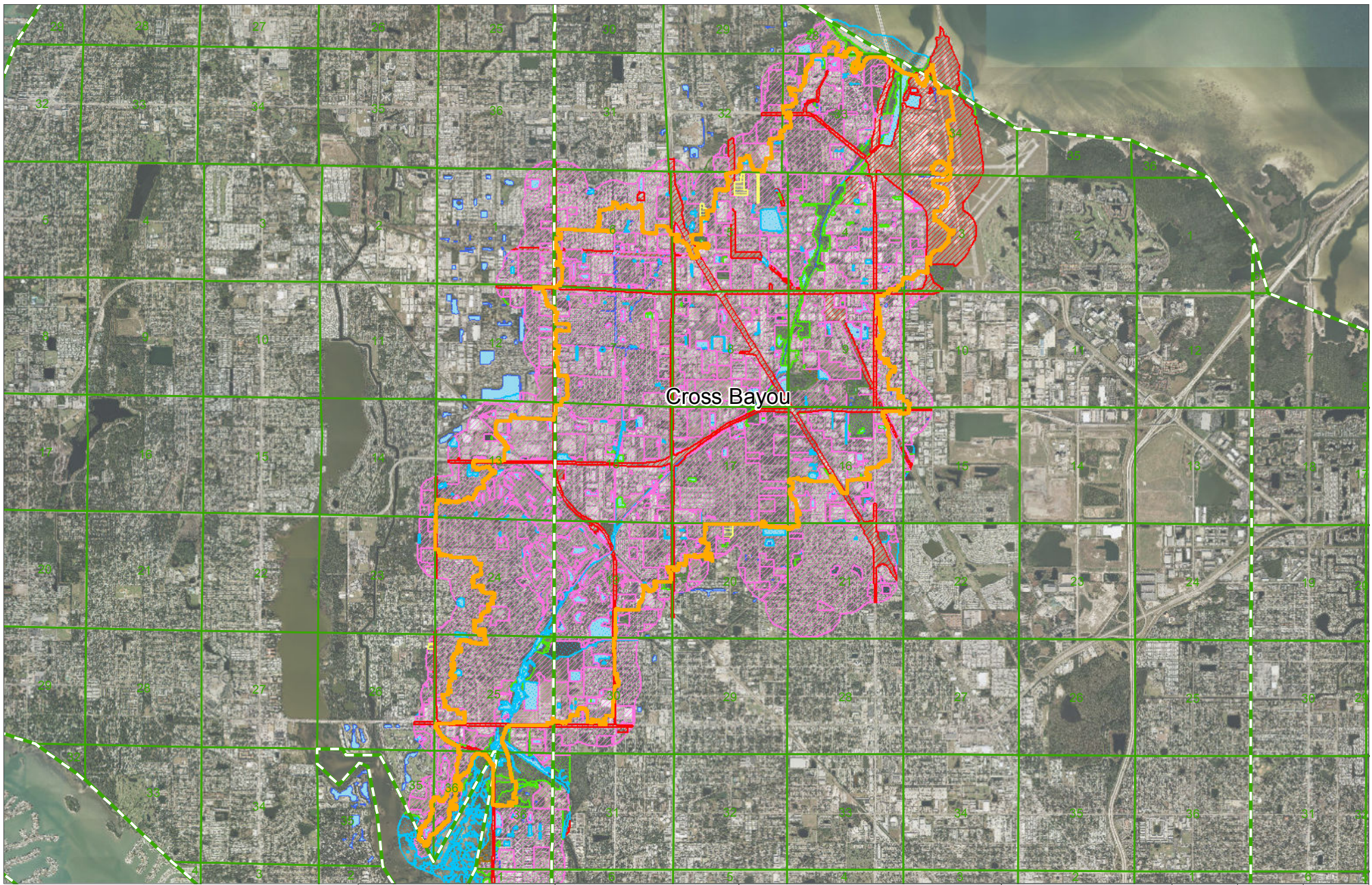
 730 NE Waldo Road Gainesville, FL 32641		Legend ~ Major Roads (FDOT) [Red Outline] Subbasin Boundaries [Orange Outline] Watershed Boundary [Green Grid] Township/Range [Green Grid] Section, Township, Range	Notes: The project area for this study is the Cross Bayou watershed. The Cross Bayou watershed has a combined area of approximately 13 sq. miles. The watershed is located in the central portion of Pinellas County.	   	Figure 2: Watershed Boundary Map	Filename: <small>Map 2_WatershedBoundary.aprx</small>	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates
					Project: K659 Watershed: Cross Bayou	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.		



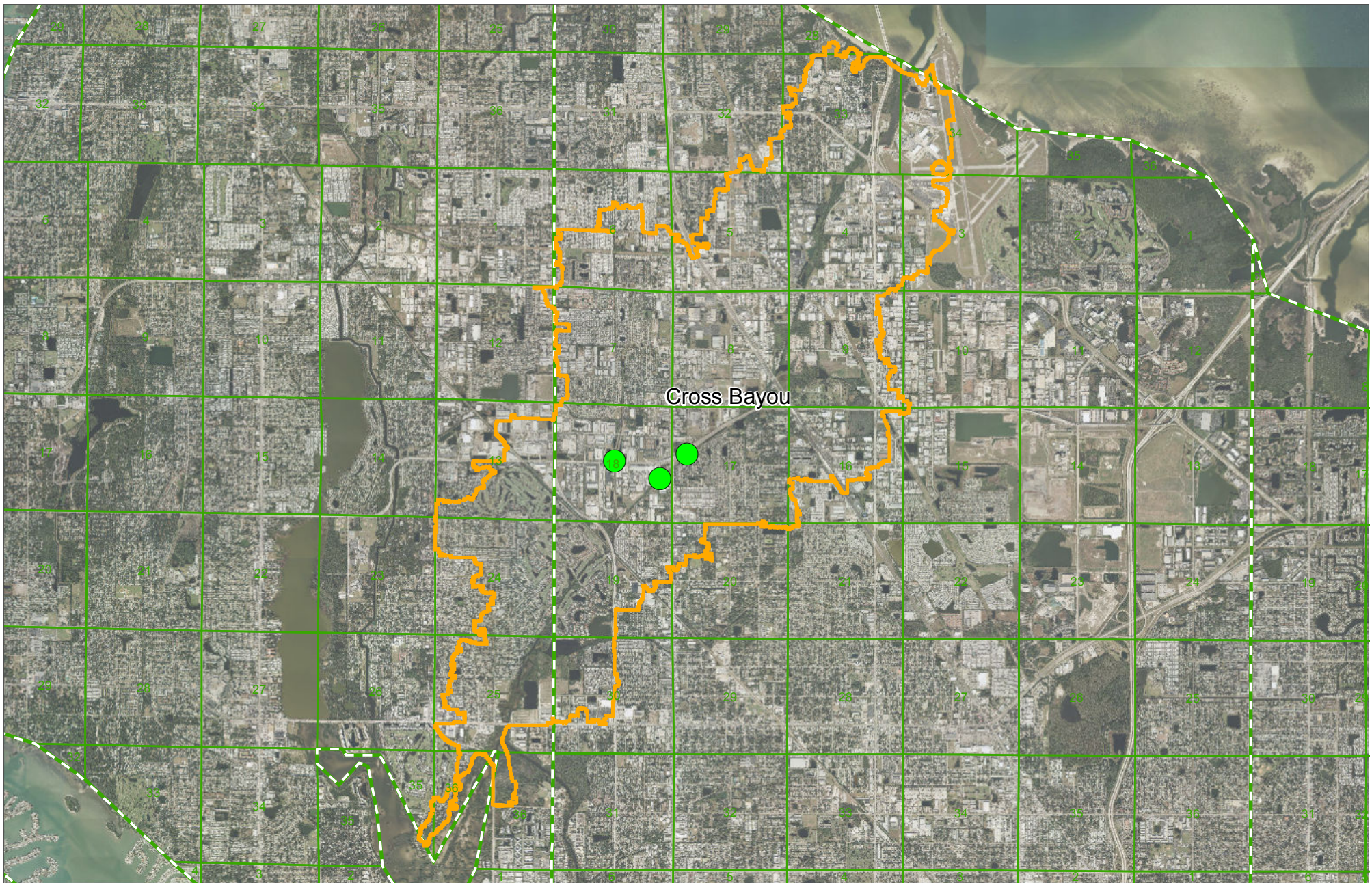
<div><div><div>JONES EDMUNDS</div></div><div>730 NE Waldo Road Gainesville, FL 32641</div></div> <div></div>	<div><div>Legend</div><div><div><div><div></div></div>Township/Range</div><div><div><div></div></div>Section, Township, Range</div><div><div><div></div></div>Watershed Boundary</div><div>Elevation - NAVD88</div><div><div><div></div></div>High : 45.1 ft</div><div><div><div></div></div>Low : -0.8 ft</div></div></div>	<div>Notes:</div> <div>The elevation information in this map was developed from 3rd return Bare Earth LIDAR. Each tile's DTM extends 10% beyond the tile boundary so that a proper DTM surface is created for a file-by-file analysis. The vertical positional accuracy of the data was verified by a control report that matches known ground control points against LIDAR acquired points. The digital terrain model meets FEMA Accuracy Standards for better than 0.6 feet vertical accuracy.</div>	<div><div><div><div><div>Pinellas County</div><div>FLORIDA</div><div>Pinellas County</div><div>MANAGEMENT</div></div></div><div><div><div><div></div></div><div>0</div><div>3,000</div><div>6,000</div><div>Feet</div></div><div><div><div><div></div></div><div>0</div><div>0.5</div><div>1</div><div>Miles</div></div><div>1:72,000</div></div></div><div><div><div><div></div></div><div>N</div><div>E</div><div>S</div><div>W</div></div></div></div></div>	<div>Figure 3: Topographic Map</div> <div>Project: K659</div> <div>Watershed: Cross Bayou</div>	<div><div>Filename:</div><div>Map Date:</div><div>Map Prepared By:</div></div> <div><div>Map_3_TopographicMap.mxd</div><div>June 2013</div><div>Jones Edmunds & Associates</div></div> <div><div>Date of Photography:</div><div>Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.</div></div>
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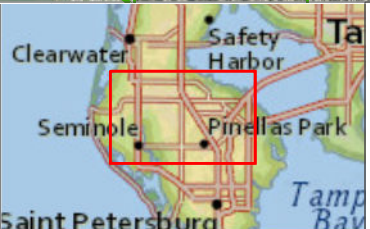



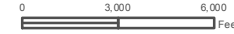
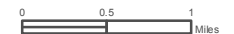


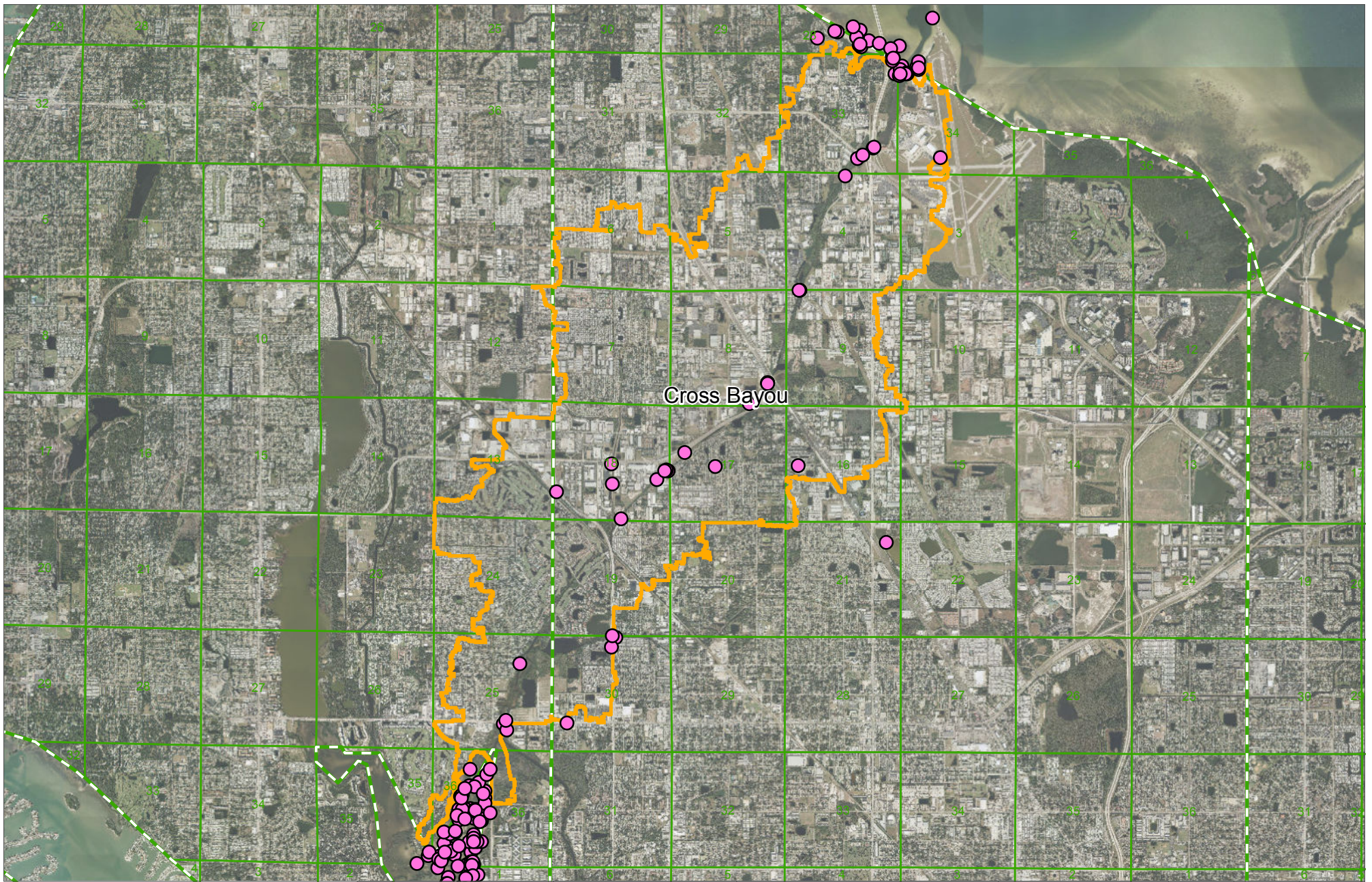
 <p>730 NE Waldo Road Gainesville, FL 32641</p>		<p>Legend</p> <ul style="list-style-type: none"> Watershed Boundary Township/Range Section, Township, Range A B/D C D 	<p>Notes:</p> <p>These data represent the information found in the county level soils atlases from the United States Department of Agriculture/Natural Resource Conservation Service (formerly USDA/SCS). This data was clipped to the Cross Bayou watershed. A visual inspection by SWFWMD Mapping and GIS staff and NRCS soil scientists by overlaying checkplots on the source materials on a light table has estimated accuracy to be 15 to 100 meters. This accuracy assessment was determined between 1989 and 1992.</p>	  <div>    <p>1:72,000</p> </div>	<p>Figure 4: Soil Map</p> <hr/> <p>Project: K659</p> <hr/> <p>Watershed: Cross Bayou</p>	<table border="1"> <tr> <td>Filename: Map4_SoilMap.mxd</td> <td>Map Date: June 2013</td> <td>Map Prepared By: Jones Edmunds & Associates</td> </tr> <tr> <td colspan="3">Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.</td> </tr> </table>	Filename: Map4_SoilMap.mxd	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.		
					Filename: Map4_SoilMap.mxd	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates					
Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.												










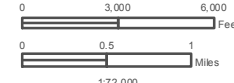


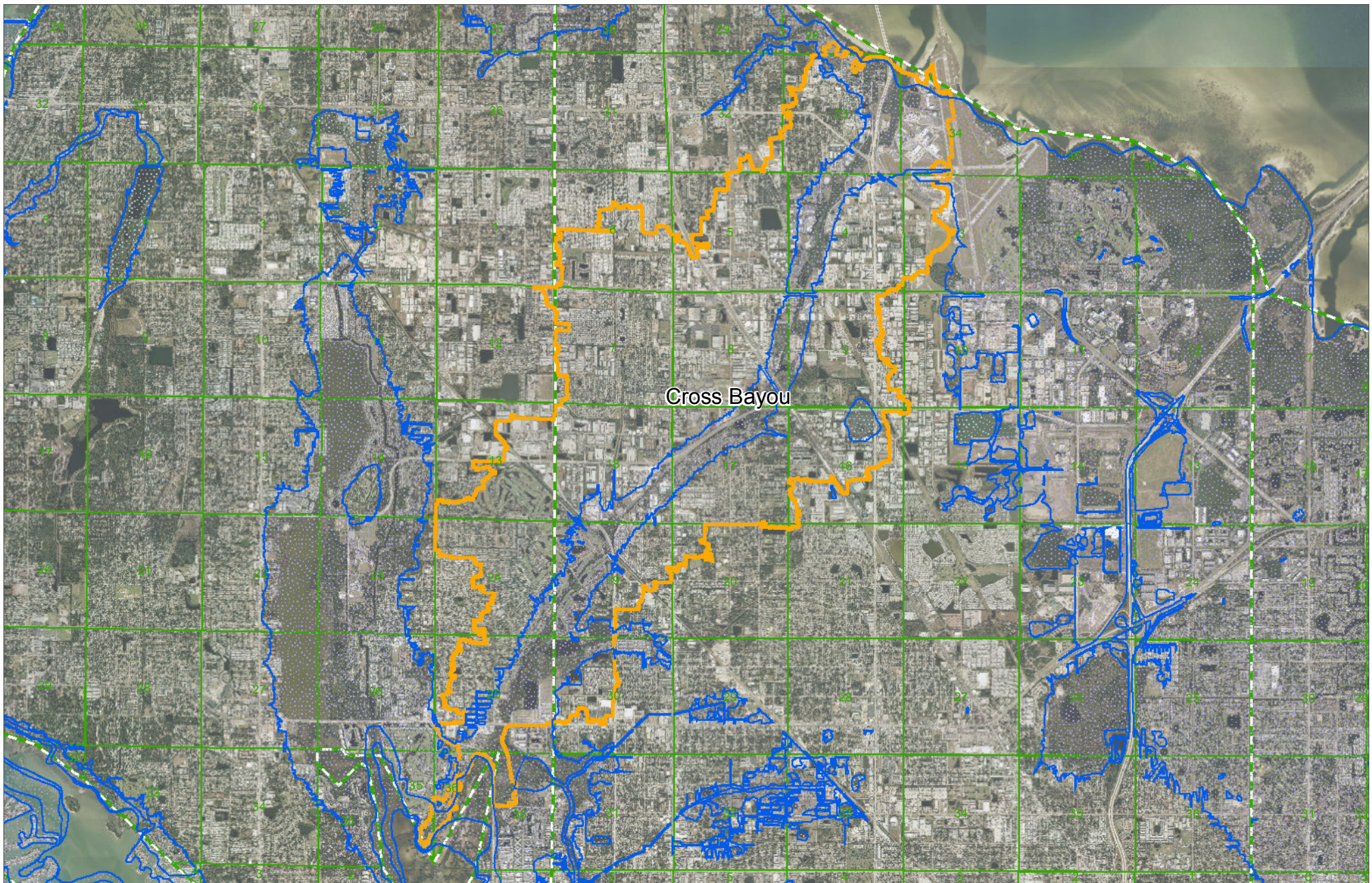
<p>730 NE Waldo Road Gainesville, FL 32641</p>		<p>Legend</p> <ul style="list-style-type: none"> Watershed Boundary Township/Range Section, Township, Range Urban and Built-Up Agriculture Rangeland Upland Forests Water Wetlands Transportation, Communication, Utilities Waterbodies 	<p>Notes:</p> <p>The land use coverage was created using the 2007 SWFWMD land use (based on the Florida Land Use, Land Cover Classification System) and updated using the most current Environmental Resource Permit sheppelle and high resolution aerial photography.</p>		<p>Figure 5: Land Use Map</p> <p>Project: K659</p> <p>Watershed: Cross Bayou</p>	<table border="1"> <tr> <td>Filename: Map5_LandUseMap.mxd</td> <td>Map Date: June 2013</td> <td>Map Prepared By: Jones Edmunds & Associates</td> </tr> <tr> <td colspan="3">Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.</td> </tr> </table>	Filename: Map5_LandUseMap.mxd	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.		
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Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.												


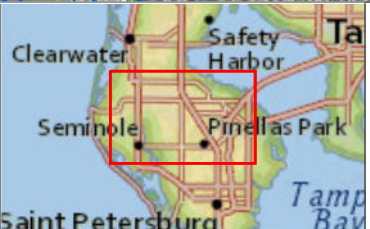








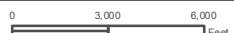
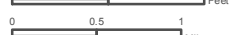


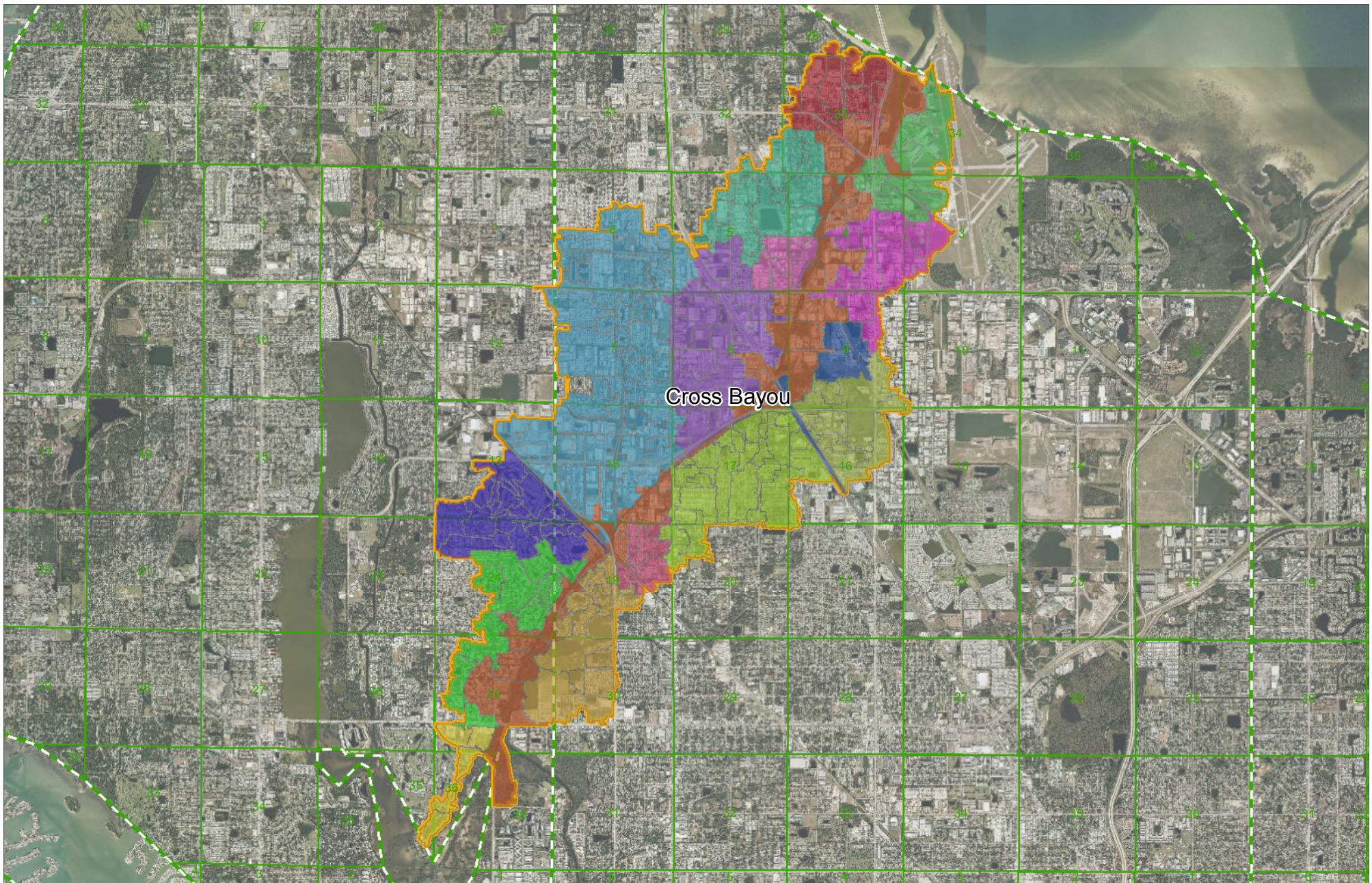
 730 NE Waldo Road Gainesville, FL 32641		Legend <ul style="list-style-type: none"> ● Gauging Station ▬ Watershed Boundary ▬ Township/Range ▬ Section, Township, Range 	Notes: This map shows the location of all available gauging stations within or near the Cross Bayou watershed.	    	Figure 6: Gauging Station Map Project: K659	Filename: Map6_GaugingStationMap.mxd Map Date: June 2013 Map Prepared By: Jones Edmunds & Associates Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.
					Watershed: Cross Bayou	


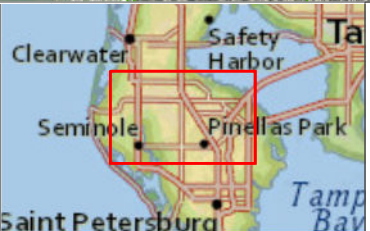



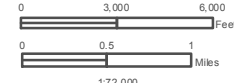


 730 NE Waldo Road Gainesville, FL 32641		Legend <ul style="list-style-type: none">  Water Quality Sampling Locations  Watershed Boundary  Township/Range  Section, Township, Range 	Notes: This map shows the location of all available water quality sampling locations within or near the Cross Bayou watershed.	   	Figure 7: Water Quality Sampling Map Project: K659	<table border="1"> <tr> <td data-bbox="1753 1338 1848 1565"> Filename: <small>Map7_WaterQualityMap.mxd</small> </td> <td data-bbox="1848 1338 1942 1565"> Map Date: June 2013 </td> <td data-bbox="1942 1338 2053 1565"> Map Prepared By: Jones Edmunds & Associates </td> </tr> <tr> <td colspan="3" data-bbox="1753 1565 2053 1565"> Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD. </td> </tr> </table>	Filename: <small>Map7_WaterQualityMap.mxd</small>	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.		
					Filename: <small>Map7_WaterQualityMap.mxd</small>	Map Date: June 2013	Map Prepared By: Jones Edmunds & Associates					
Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.												
Watershed: Cross Bayou												



 730 NE Waldo Road Gainesville, FL 32641		Legend FEMA Floodzone  A  AE  Watershed Boundary  Township/Range  Section, Township, Range	Notes: This map provides the most current flood zone data as provided by the Federal Emergency Management Agency (FEMA).	     1:72,000	Figure 8: FEMA Flood Zones Map Project: K659	Filename: Map_FEMA Flood Zones Map.mxd Map Date: June 2013 Map Prepared By: Jones Edmunds & Associates
					Watershed: Cross Bayou	Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.



 <p>730 NE Waldo Road Gainesville, FL 32641</p>		<p>Legend</p> <ul style="list-style-type: none"> Watershed Boundary Township/Range Section, Township, Range Major Tributaries <table border="0"> <tr> <td>A</td><td>E</td><td>I</td><td>M</td></tr> <tr> <td>B</td><td>F</td><td>J</td><td></td></tr> <tr> <td>C</td><td>G</td><td>K</td><td></td></tr> <tr> <td>D</td><td>H</td><td>L</td><td></td></tr> </table>	A	E	I	M	B	F	J		C	G	K		D	H	L		<p>Notes:</p> <p>This map provides an overview of the subwatersheds that are located in the study area. All of the reaches within a specific subwatershed are part of the same tributary.</p>	  <div>   </div>	<p>Figure 9: Major Tributary Map</p> <p>Project: K659</p>	<p>Filename: Map9_MajorTributaryMap.mxd</p> <p>Map Date: June 2013</p> <p>Map Prepared By: Jones Edmunds & Associates</p> <p>Date of Photography: Pinellas County 2011 orthomosaic tiles with 1-foot resolution produced for SWFWMD.</p>
			A	E	I	M																
B	F	J																				
C	G	K																				
D	H	L																				
<p>Watershed: Cross Bayou</p>																						

Appendix A

Alternative BMP Figures

Figure A-1
Alternative 1
Cross Bayou BMP Analysis

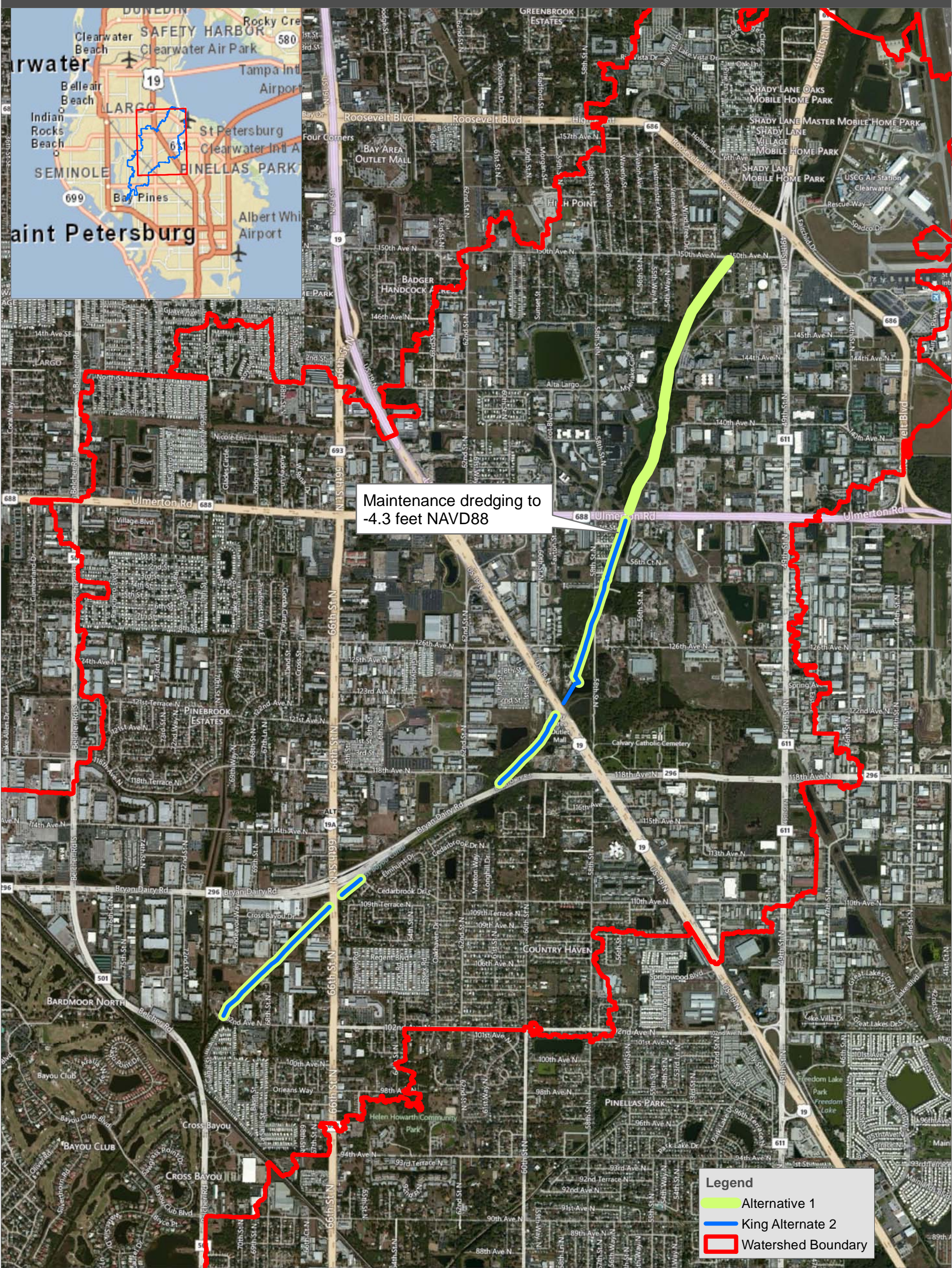


Figure A-2
Alternative 1 Results
Cross Bayou BMP Analysis

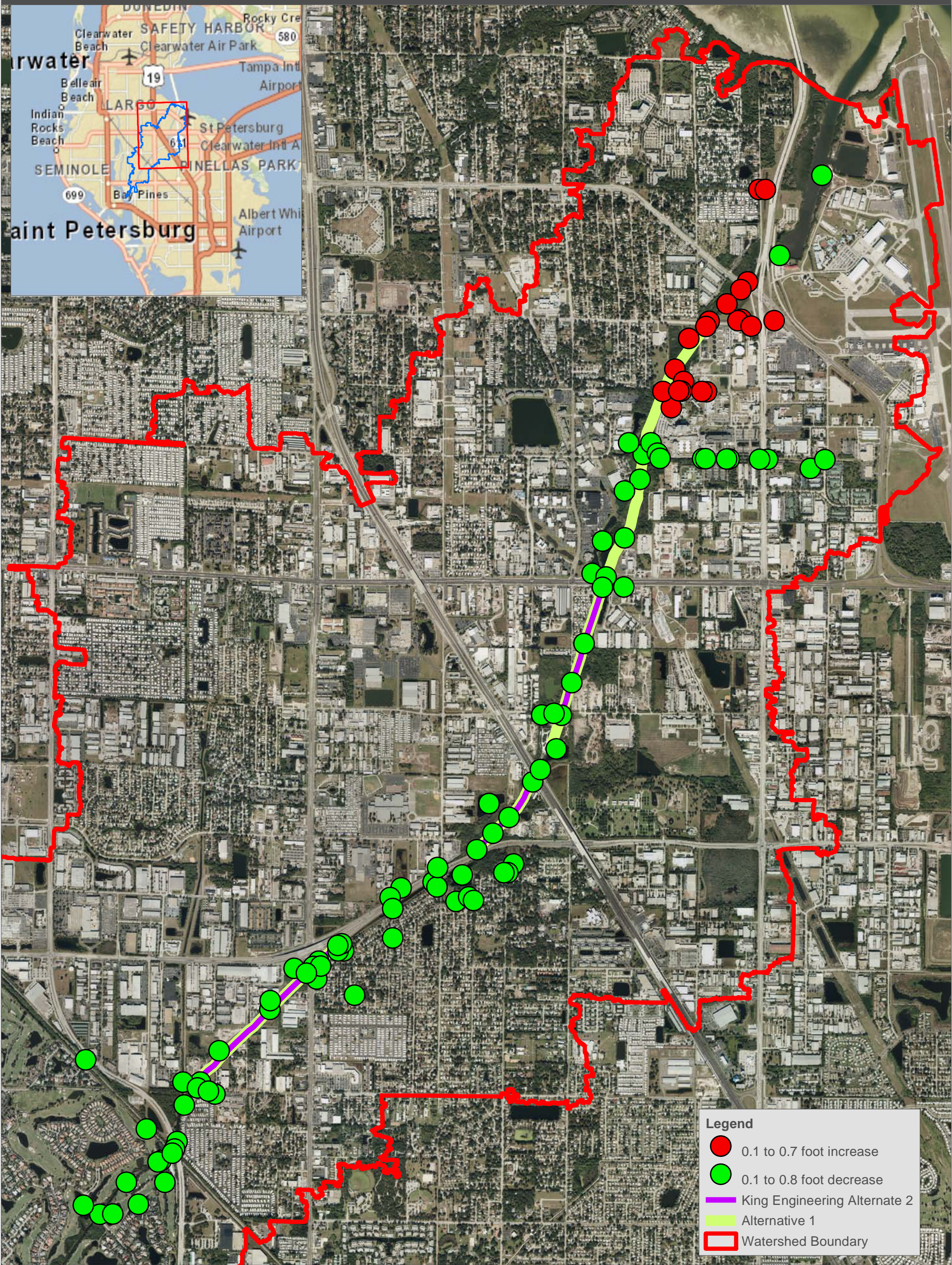


Figure A-3
Alternative 2
Cross Bayou BMP Analysis

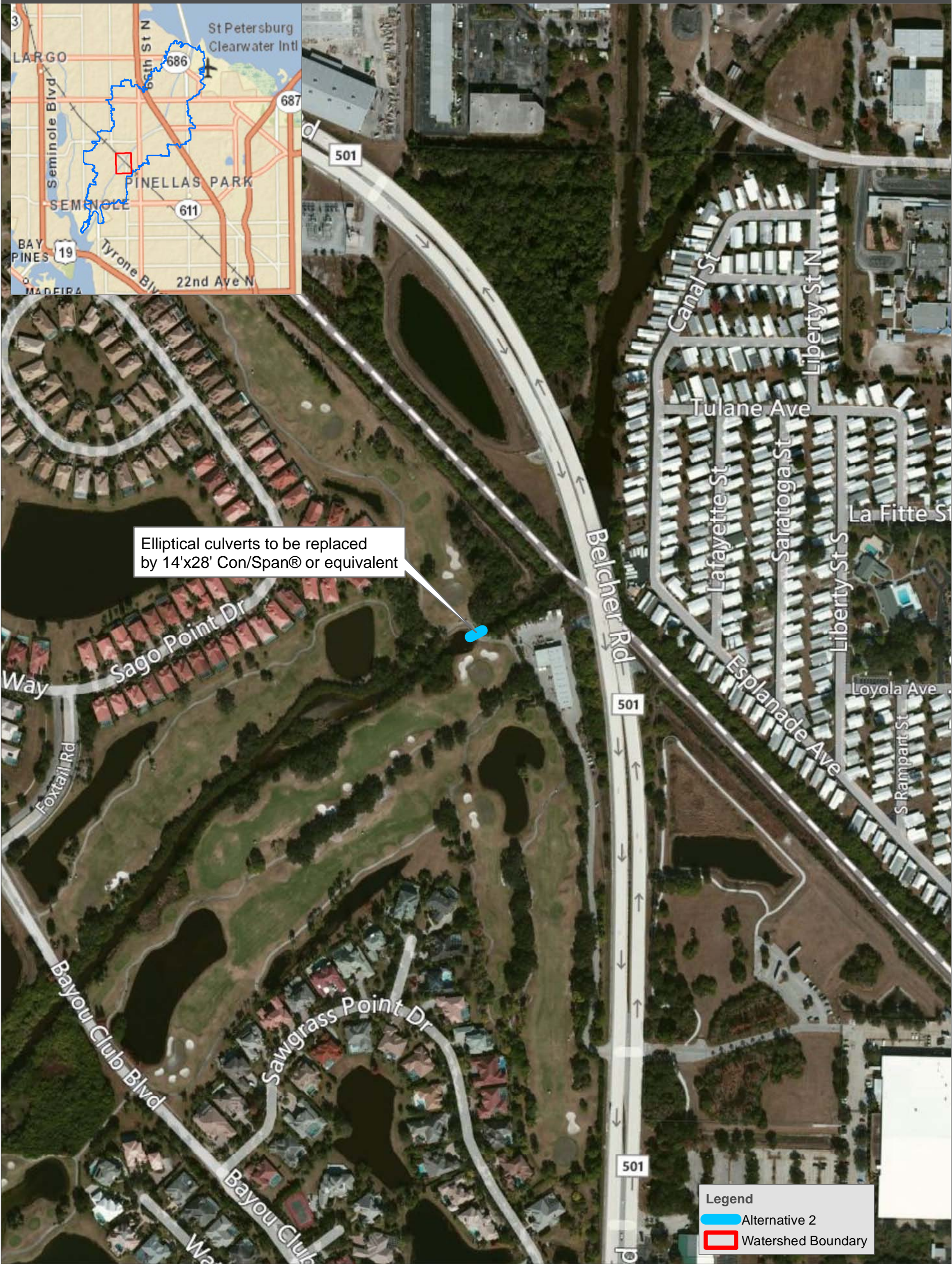


Figure A-4
Alternative 3
Cross Bayou BMP Analysis

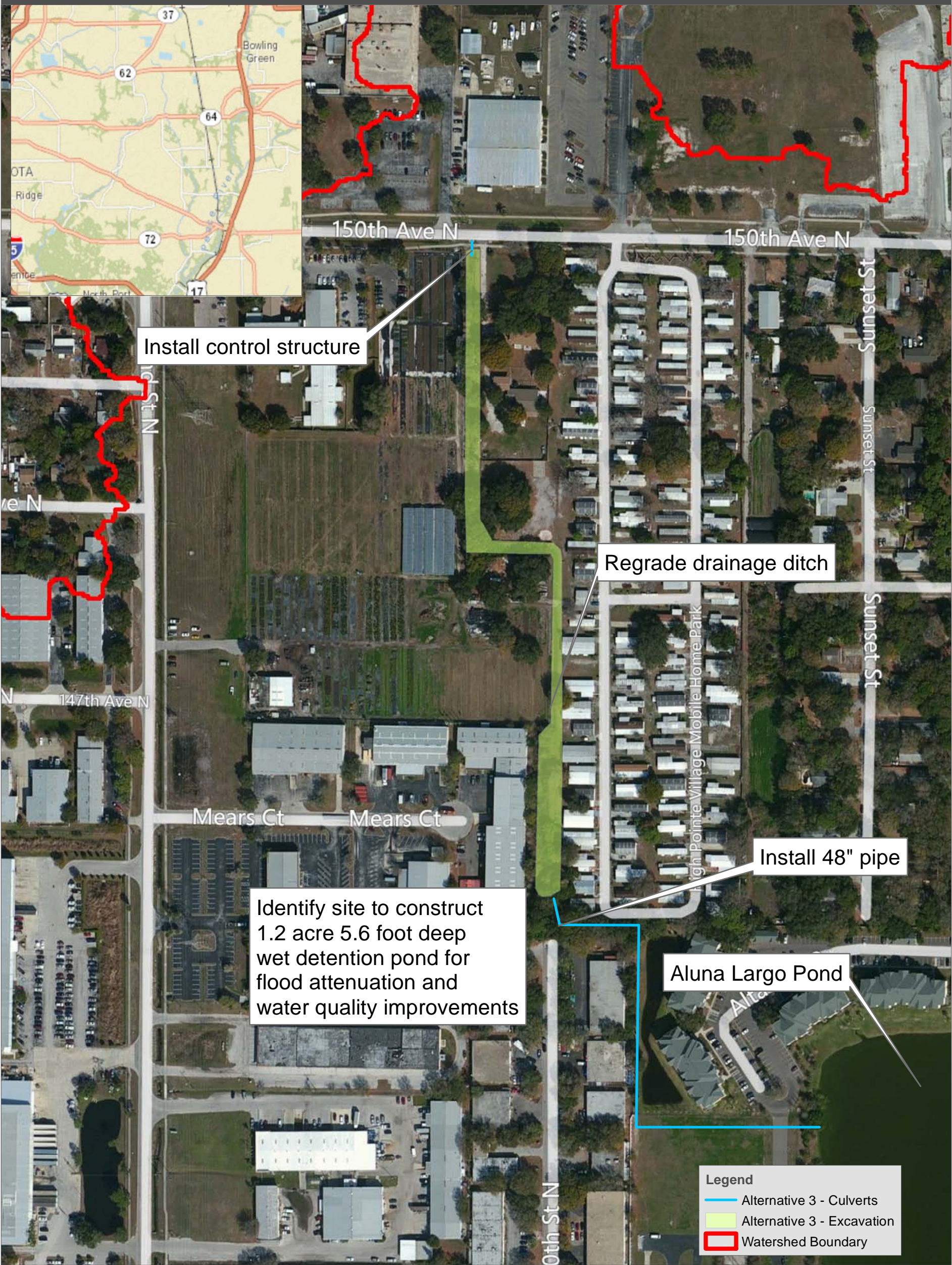
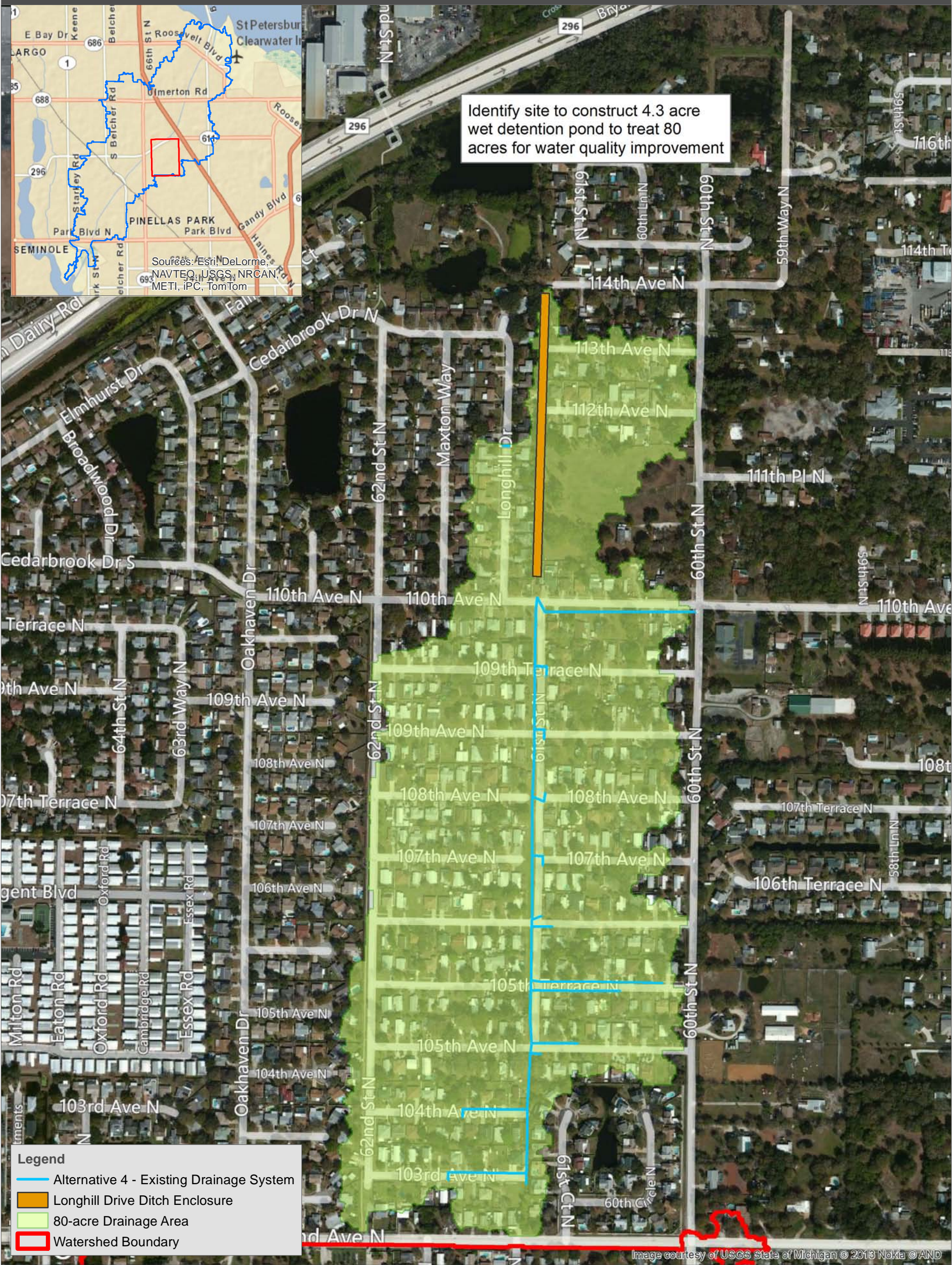


Figure A-5
Alternative 4
Cross Bayou BMP Analysis



Alternative 5



Figure A-7
Alternative 6-A
Cross Bayou BMP Analysis

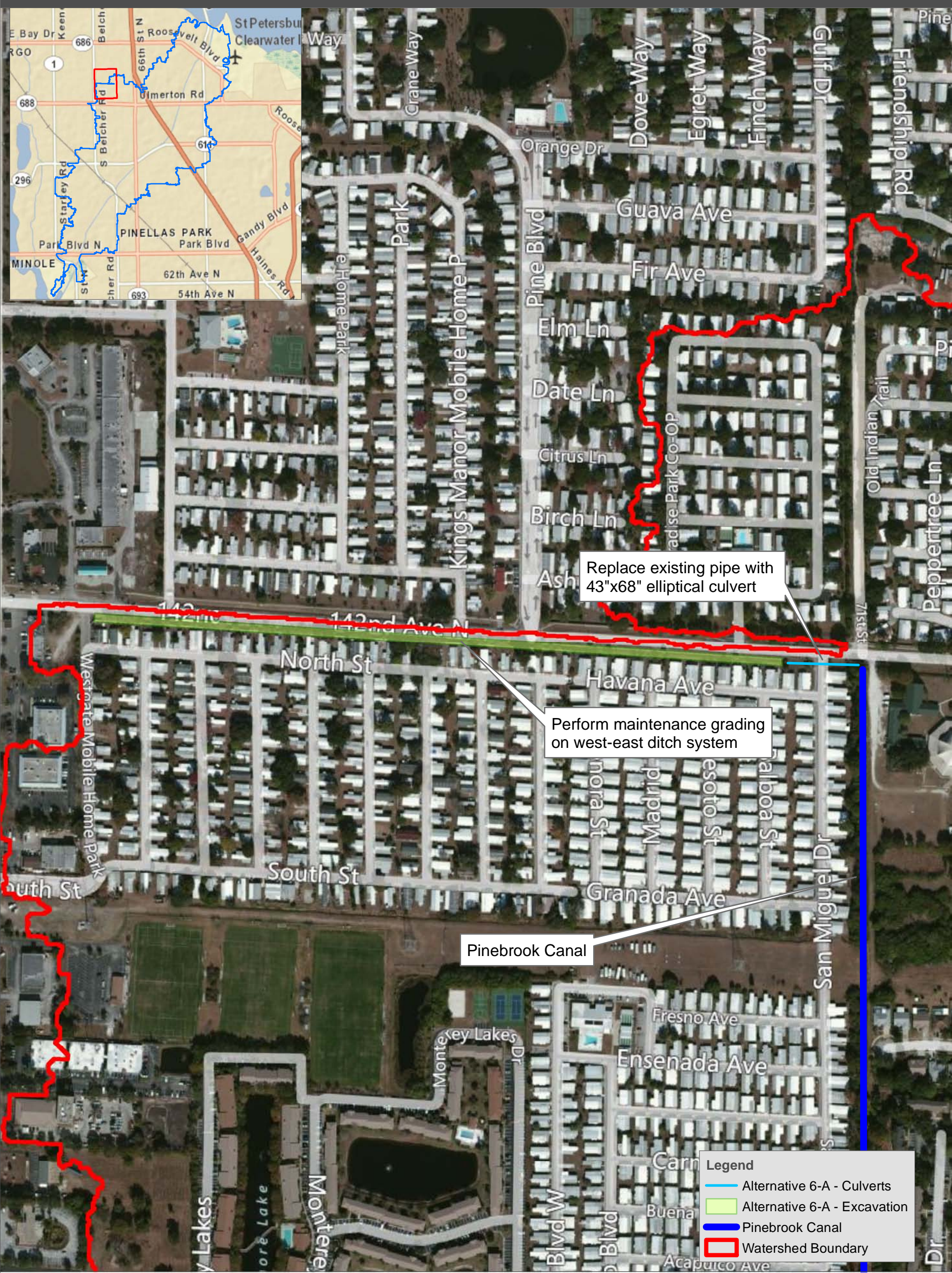


Figure A-8
Alternative 6-B
Cross Bayou BMP Analysis

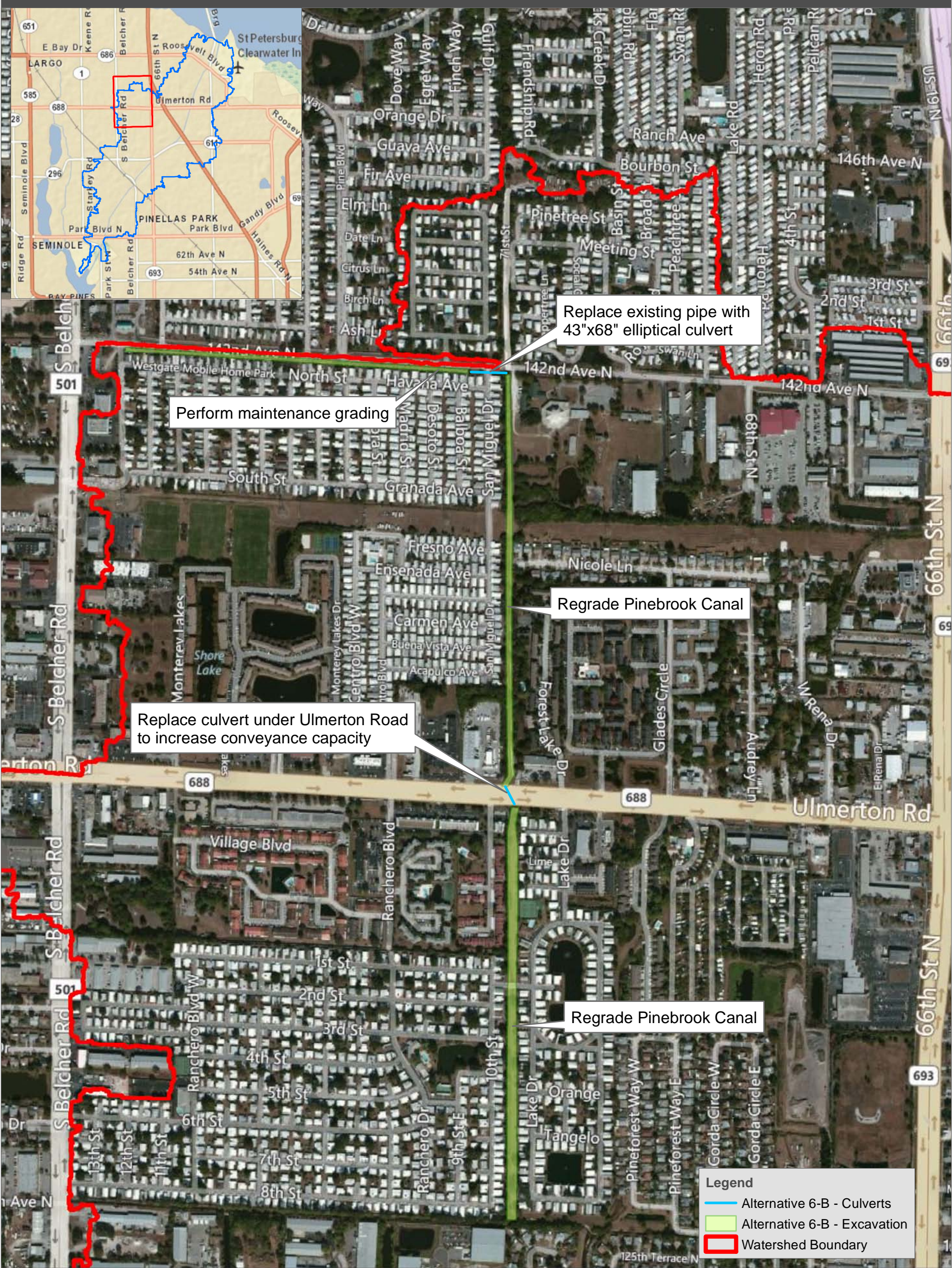
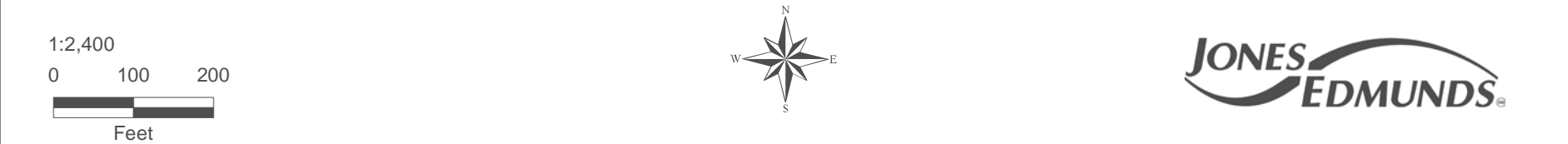
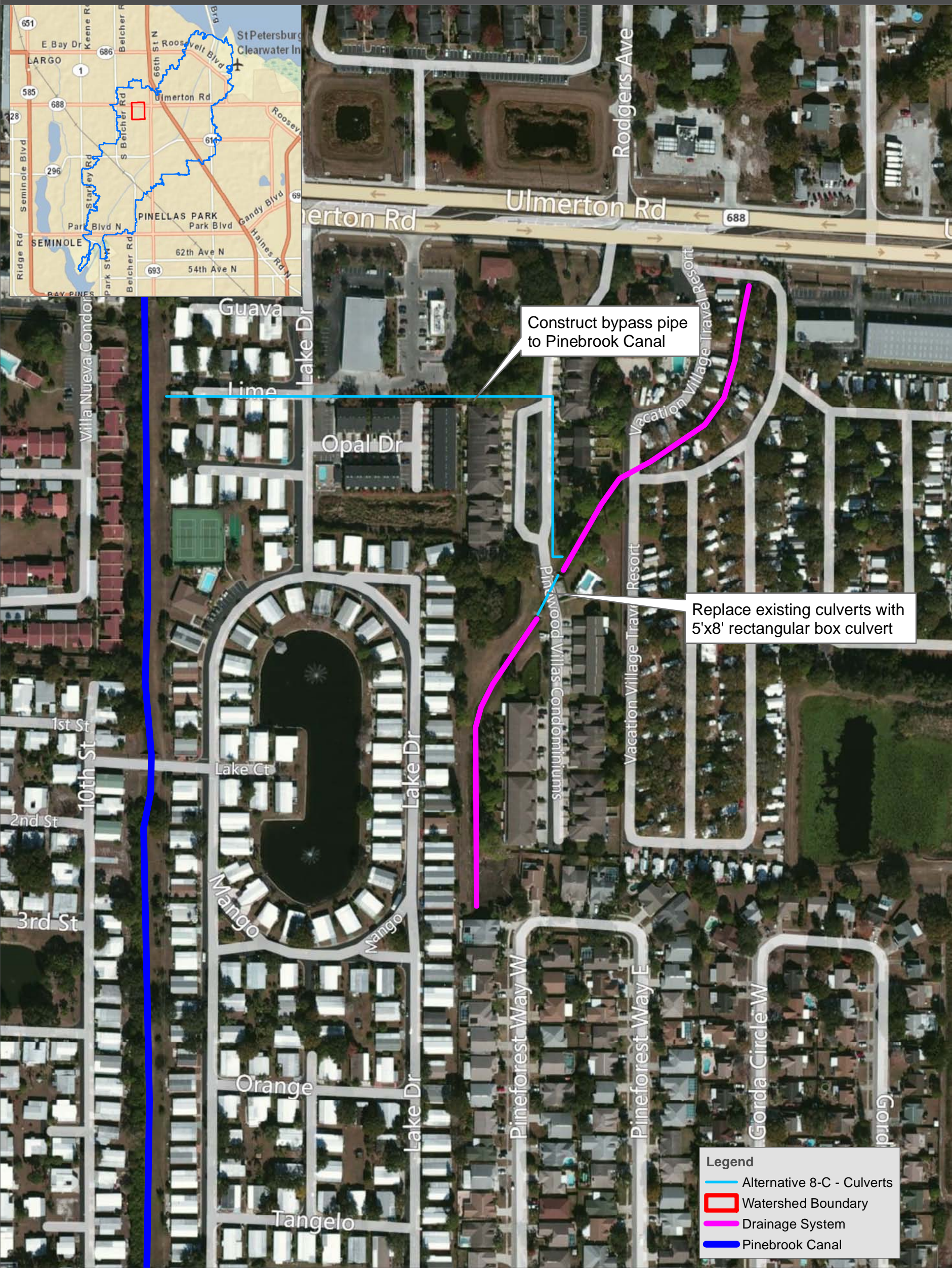


Figure A-9
Alternative 7
Cross Bayou BMP Analysis



Figure A-10
Alternative 8-C
Cross Bayou BMP Analysis



Appendix B

**Detailed Estimates of Probable Costs for
Recommended Alternatives**

Summary of the Opinion of Probable Cost for BMP Recommendations					
Conceptual BMP		Cost (2013 Dollars)			
Number	Description	Construction	Land Acquisition	Engineering	Total
1	Alternative 1	\$4,916,700	-	\$740,100	\$5,656,800
2	Alternative 2	\$430,900	-	\$129,200	\$560,100
3	Alternative 3	\$597,500	\$71,000	\$119,700	\$788,200
4	Alternative 4	\$438,900	\$224,000	\$104,700	\$767,600
5	Alternative 5	\$629,300	\$12,000	\$155,900	\$797,200
6	Alternative 6-A	\$119,000	-	\$51,650	\$170,650
7	Alternative 6-B	\$2,157,000	-	\$407,279	\$2,564,279
8	Alternative 7	\$525,500	\$259,000	\$135,100	\$919,600
9	Alternative 8-C	\$378,800	-	\$105,800	\$484,600



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT: BMP ALTERNATIVE 1			CLIENT: PINELLAS COUNTY		
ESTIMATE TYPE: DESIGN SERVICES & CONSTRUCTION ROM			PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL		
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (6%)	LS	1	\$219,491.40	\$219,491.40
102-1	MAINTENANCE OF TRAFFIC (1%)	LS	1	\$36,581.90	\$36,581.90
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$182,909.50	\$182,909.50
	* CONSTRUCTION SURVEYS (PRE AND POST)	LS	1	\$75,000.00	\$75,000.00
110-1-1	* CLEARING & GRUBBING, VEGETATION REMOVAL	AC	14.3	\$12,500.00	\$178,750.00
	DEWATERING	LS	1.0	\$107,500.00	\$107,500.00
	* MAINTENANCE DREDGE (APPROX 14,500 LF)	CY	38,504	\$85.00	\$3,272,840.00
120-6	* EMBANKMENT	CY	1,867	\$10.50	\$19,600.00
570-1-2	* SODDING	SY	1,500	\$3.00	\$4,500.00
999-25	CONTINGENCY AMOUNT (20%)	LS	1	\$819,435.00	\$819,435.00
CONSTRUCTION SUBTOTAL					\$4,916,700.00
	SURVEYING AND TESTING (4%)	LS	1	\$196,668.00	\$196,668.00
	DESIGN (8%)	LS	1	\$393,336.00	\$393,336.00
	PERMITTING	LS	1	\$50,000.00	\$50,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$50,000.00	\$50,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$50,000.00	\$50,000.00
ENGINEERING SUBTOTAL					\$740,100.00
TOTAL COST ESTIMATE					\$5,656,800.00

Notes: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 20% was used to account for uncertainties in conceptual level design.
 * Includes King Engineering's Alternate 2 in the amount of \$2,001,875, except for Consulting, Permitting, Geotechnical Sampling and Testing.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT:		BMP ALTERNATIVE 2		CLIENT: PINELLAS COUNTY	
ESTIMATE TYPE:		DESIGN SERVICES & CONSTRUCTION ROM		PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL	
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (20%)	LS	1	\$49,097.33	\$49,097.33
102-1	MAINTENANCE OF TRAFFIC (3%)	LS	1	\$7,364.60	\$7,364.60
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	\$29,458.40	\$29,458.40
110-1-1	CLEARING & GRUBBING	LS	1	\$30,000.00	\$30,000.00
120-6	EMBANKMENT	CY	1,019	\$10.50	\$10,702.22
125-1	EXCAVATION FOR STRUCTURES	CY	95	\$48.00	\$4,551.11
	ASPHALT REPAIR	SY	167	\$25.00	\$4,166.67
	BRIDGE, PRE-FABRICATED, (14'x28' CONSPAN)	LS	1	\$195,000.00	\$195,000.00
570-1-2	SODDING	SY	356	\$3.00	\$1,066.67
999-25	CONTINGENCY AMOUNT (30%)	LS	1	\$99,422.00	\$99,422.00
CONSTRUCTION SUBTOTAL					\$430,900.00
	SURVEYING AND TESTING (3%)	LS	1	\$12,927.00	\$12,927.00
	DESIGN (20%)	LS	1	\$86,180.00	\$86,180.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
ENGINEERING SUBTOTAL					\$129,200.00
TOTAL COST ESTIMATE					\$560,100.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 30% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT:		BMP ALTERNATIVE 3		CLIENT: PINELLAS COUNTY	
ESTIMATE TYPE:		DESIGN SERVICES & CONSTRUCTION ROM		PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL	
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	\$39,616.80	\$39,616.80
102-1	MAINTENANCE OF TRAFFIC (1%)	LS	1	\$3,961.68	\$3,961.68
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$19,808.40	\$19,808.40
110-1-1	CLEARING & GRUBBING	AC	1.7	\$10,000.00	\$17,000.00
120-1	EXCAVATION	CY	14,326	\$10.00	\$143,264.00
120-5	CHANNEL EXCAVATION	CY	1,610	\$16.50	\$26,565.00
	ASPHALT REPAIR	SY	55	\$25.00	\$1,375.00
425-1-571	INLETS, DT BOT, TYPE G, <10'	EA	1	\$4,100.00	\$4,100.00
425-1-581	INLETS, DT BOT, TYPE H, <10'	EA	1	\$7,500.00	\$7,500.00
425-2-91	MANHOLES, J-8, <10'	EA	3	\$5,500.00	\$16,500.00
430-175-248	PIPE CULV, OPT MATL, OTHER, 48"S/CD (38"x60")	LF	1,028	\$137.00	\$140,836.00
430-982-641	MITERED END SECTION, OPTIONAL -ELLIPTICAL, 48" CD	EA	1	\$3,500.00	\$3,500.00
524-1-29	CONC DITCH PAVT, 4", REINFORCED	SY	16	\$52.50	\$840.00
570-1-2	SODDING	SY	11,563	\$3.00	\$34,688.00
999-25	CONTINGENCY AMOUNT (30%)	LS	1	\$137,866.00	\$137,866.00
CONSTRUCTION SUBTOTAL					\$597,500.00
	LAND ACQUISITION (DRAINAGE EASEMENT)	LS	1	\$71,000.00	\$71,000.00
LAND ACQUISITION SUBTOTAL					\$71,000.00
	SURVEYING AND TESTING (5%)	LS	1	\$29,875.00	\$29,875.00
	DESIGN (10%)	LS	1	\$59,750.00	\$59,750.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
ENGINEERING SUBTOTAL					\$119,700.00
TOTAL COST ESTIMATE					\$788,200.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 30% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT:		BMP ALTERNATIVE 4		CLIENT: PINELLAS COUNTY	
ESTIMATE TYPE:		DESIGN SERVICES & CONSTRUCTION ROM		PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL	
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	\$28,607.64	\$28,607.64
102-1	MAINTENANCE OF TRAFFIC (3%)	LS	1	\$8,582.29	\$8,582.29
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$14,303.82	\$14,303.82
110-1-1	CLEARING & GRUBBING	AC	3.0	\$15,000.00	\$45,000.00
120-1	EXCAVATION	CY	19,000	\$10.00	\$190,000.00
120-6	EMBANKMENT	CY	493	\$10.50	\$5,172.22
	LOW FLOW DIVERSION STRUCTURE	EA	1	\$7,500.00	\$7,500.00
400-1-2	CLASS I, ENDWALLS	CY	8	\$790.00	\$6,320.00
430-175-242	PIPE CULV, OPT MATL, OTHER, 42"S/CD	LF	150	\$120.00	\$18,000.00
524-1-29	CONC DITCH PAVT, 4", REINFORCED	SY	27	\$52.50	\$1,417.50
570-1-2	SODDING	SY	4,222	\$3.00	\$12,666.67
999-25	CONTINGENCY AMOUNT (30%)	LS	1	\$101,271.00	\$101,271.00
	CONSTRUCTION SUBTOTAL				\$438,900.00
	LAND ACQUISITION	LS	1	\$224,000.00	\$224,000.00
	LAND ACQUISITION SUBTOTAL				\$224,000.00
	SURVEYING AND TESTING (7%)	LS	1	\$30,723.00	\$30,723.00
	DESIGN (10%)	LS	1	\$43,890.00	\$43,890.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
	ENGINEERING SUBTOTAL				\$104,700.00
	TOTAL COST ESTIMATE				\$767,600.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds. A contingency of 30% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT: BMP ALTERNATIVE 5			CLIENT: PINELLAS COUNTY		
ESTIMATE TYPE: DESIGN SERVICES & CONSTRUCTION ROM			PREPARED BY: U.ROSARIO CHECKED BY: W.NICKEL		
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	\$44,441.49	\$44,441.49
102-1	MAINTENANCE OF TRAFFIC (3%)	LS	1	\$13,332.45	\$13,332.45
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$22,220.75	\$22,220.75
110-1-1	CLEARING & GRUBBING	LS	1	\$10,000.00	\$10,000.00
120-1	EXCAVATION	CY	17,690	\$10.00	\$176,900.00
120-6	EMBANKMENT	CY	544	\$10.50	\$5,716.67
	ASPHALT REPAIR	SY	171	\$25.00	\$4,266.67
400-4-1	CLASS IV, CULVERTS (BOX CULVERT)	CY	165	\$530.00	\$87,450.00
415-1-6	REINF STEEL- MISCELLANEOUS	LB	2,818	\$1.20	\$3,381.60
425-1-581	INLETS, DT BOT, TYPE H, <10'	EA	5	\$7,500.00	\$37,500.00
425-2-91	MANHOLES, J-8, <10'	EA	2	\$5,500.00	\$11,000.00
430-175-224	PIPE CULV, OPT MATL, OTHER, 24"S/CD	LF	280	\$80.00	\$22,400.00
430-175-248	PIPE CULV, OPT MATL, ROUND, 48"S/CD	LF	420	\$121.00	\$50,820.00
430-982-129	MITERED END SECT, OPTIONAL RD, 24" CD	EA	2	\$1,200.00	\$2,400.00
430-982-141	MITERED END SECTION, OPTIONAL ROUND (48" CD)	EA	6	\$3,000.00	\$18,000.00
522-1	SIDEWALK CONC, 4" THICK	SY	20	\$29.00	\$580.00
570-1-2	SODDING	SY	4,667	\$3.00	\$14,000.00
999-25	CONTINGENCY AMOUNT (20%)	LS	1	\$104,882.00	\$104,882.00
	CONSTRUCTION SUBTOTAL				\$629,300.00
	LAND ACQUISITION (EASEMENT)	LS	1	\$12,000.00	\$12,000.00
	LAND ACQUISITION SUBTOTAL				\$12,000.00
	SURVEYING AND TESTING (5%)	LS	1	\$31,465.00	\$31,465.00
	DESIGN (15%)	LS	1	\$94,395.00	\$94,395.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
	ENGINEERING SUBTOTAL				\$155,900.00
	TOTAL COST ESTIMATE				\$797,200.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 20% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT: BMP ALTERNATIVE 6-A			CLIENT: PINELLAS COUNTY		
ESTIMATE TYPE: DESIGN SERVICES & CONSTRUCTION ROM			PREPARED BY: U.ROSARIO		
			CHECKED BY: W.NICKEL		
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (20%)	LS	1	\$13,510.00	\$13,510.00
102-1	MAINTENANCE OF TRAFFIC (5%)	LS	1	\$3,377.50	\$3,377.50
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (10%)	LS	1	\$6,755.00	\$6,755.00
110-1-1	CLEARING & GRUBBING	LS	1	\$10,000.00	\$10,000.00
120-3	LATERAL DITCH EXCAVATION	CY	917	\$3.50	\$3,208.33
	ASPHALT REPAIR	SY	67	\$25.00	\$1,666.67
425-1-581	INLETS, DT BOT, TYPE H, <10', 4 GRATE	EA	1	\$8,500.00	\$8,500.00
430-175-254	PIPE CULV, OPT MATL, OTHER 54"S/CD	LF	225	\$135.00	\$30,375.00
430-984-642	MITERED END SECTION, OPTIONAL OTHER (54" SD)	EA	1	\$5,000.00	\$5,000.00
570-1-2	SODDING	SY	2,933	\$3.00	\$8,800.00
999-25	CONTINGENCY AMOUNT (30%)	LS	1	\$27,358.00	\$27,358.00
CONSTRUCTION SUBTOTAL					\$119,000.00
	SURVEYING AND TESTING (15%)	LS	1	\$17,850.00	\$17,850.00
	DESIGN (20%)	LS	1	\$23,800.00	\$23,800.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$5,000.00	\$5,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$5,000.00	\$5,000.00
ENGINEERING SUBTOTAL					\$51,650.00
TOTAL COST ESTIMATE					\$170,650.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 30% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT: BMP ALTERNATIVE 6-B			CLIENT: PINELLAS COUNTY		
ESTIMATE TYPE: DESIGN SERVICES & CONSTRUCTION ROM			PREPARED BY: U.ROSARIO CHECKED BY: W.NICKEL		
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
	ALTERNATIVE 6-A	LS	1	\$119,000.00	\$119,000.00
101-1	MOBILIZATION (15%)	LS	1	\$174,147.34	\$174,147.34
102-1	MAINTENANCE OF TRAFFIC (15%)	LS	1	\$174,147.34	\$174,147.34
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$58,049.11	\$58,049.11
110-1-1	CLEARING & GRUBBING	LS	1	\$60,000.00	\$60,000.00
120-5	CHANNEL EXCAVATION	CY	15,801	\$16.50	\$260,712.22
	ASPHALT REPAIR	SY	311	\$25.00	\$7,777.78
400-4-1	CLASS IV, CULVERTS (BOX CULVERT)	CY	106	\$530.00	\$56,180.00
415-1-6	REINF STEEL- MISCELLANEOUS	LB	913	\$1.20	\$1,095.60
	SLOPE ARMORING?	Tn	10,005	\$74.00	\$740,370.00
522-1	SIDEWALK CONC, 4" THICK	SY	20	\$29.00	\$580.00
570-1-2	SODDING	SY	11,422	\$3.00	\$34,266.67
999-25	CONTINGENCY AMOUNT (30%)	LS	1	\$470,198.00	\$470,198.00
CONSTRUCTION SUBTOTAL					\$2,157,000.00
	ALTERNATIVE 6-A	LS	1	\$51,650.00	\$51,650.00
	SURVEYING AND TESTING (5%)	LS	1	\$101,876.20	\$101,876.20
	DESIGN (10%)	LS	1	\$203,752.41	\$203,752.41
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$20,000.00	\$20,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$20,000.00	\$20,000.00
ENGINEERING SUBTOTAL					\$407,278.61
TOTAL COST ESTIMATE					\$2,564,278.61

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 30% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT: BMP ALTERNATIVE 7			CLIENT: PINELLAS COUNTY		
ESTIMATE TYPE: DESIGN SERVICES & CONSTRUCTION ROM			PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL		
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	\$37,428.02	\$37,428.02
102-1	MAINTENANCE OF TRAFFIC (2%)	LS	1	\$7,485.60	\$7,485.60
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$18,714.01	\$18,714.01
110-1-1	CLEARING & GRUBBING	LS	1	\$8,000.00	\$8,000.00
120-1	EXCAVATION	CY	29,363	\$10.00	\$293,626.67
120-5	CHANNEL EXCAVATION	CY	902	\$16.50	\$14,886.67
120-6	EMBANKMENT	CY	316	\$10.50	\$3,321.11
425-1-542	INLETS, DT BOT, TYPE D, >10'	EA	1	\$4,750.00	\$4,750.00
430-175-136	PIPE CULV, OPT MATL, ROUND, 36"S/CD	LF	156	\$89.00	\$13,884.00
430-982-138	MITERED END SECT, OPTIONAL RD, 36" CD	EA	7	\$2,450.00	\$17,150.00
524-1-29	CONC DITCH PAVT, 4", REINFORCED	SY	50	\$52.50	\$2,625.00
530-3-4	RIPRAP, RUBBLE, F&I, DITCH LINING	TN	22	\$95.00	\$2,103.40
	SODDING	SY	4,644	\$3.00	\$13,933.33
999-25	CONTINGENCY AMOUNT (20%)	LS	1	\$87,582.00	\$87,582.00
CONSTRUCTION SUBTOTAL					\$525,500.00
	LAND ACQUISITION (LOT SPLIT)	LS	1	\$259,000.00	\$259,000.00
LAND ACQUISITION SUBTOTAL					\$259,000.00
	SURVEYING AND TESTING (5%)	LS	1	\$26,275.00	\$26,275.00
	DESIGN (15%)	LS	1	\$78,825.00	\$78,825.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
ENGINEERING SUBTOTAL					\$135,100.00
TOTAL COST ESTIMATE					\$919,600.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 20% was used to account for uncertainties in conceptual level design.



PROJECT NAME: Cross Bayou BMP
 Alternatives Analysis
 PROJECT No.: 16450-026-01
 DATE: 04 September 2013
 SUBMITTAL: PRELIMINARY

OPINION OF PROBABLE COST					
PROJECT SEGMENT:		BMP ALTERNATIVE 8-C		CLIENT: PINELLAS COUNTY	
ESTIMATE TYPE:		DESIGN SERVICES & CONSTRUCTION ROM		PREPARED BY U.ROSARIO CHECKED BY: W.NICKEL	
FDOT ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST
101-1	MOBILIZATION (10%)	LS	1	\$23,777.75	\$23,777.75
102-1	MAINTENANCE OF TRAFFIC (3%)	LS	1	\$7,133.32	\$7,133.32
	EROSION, SEDIMENT, AND TURBIDITY CONTROL (5%)	LS	1	\$11,888.87	\$11,888.87
110-1-1	CLEARING & GRUBBING	LS	1	\$20,000.00	\$20,000.00
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	SY	60	\$12.50	\$750.00
	ASPHALT REPAIR	SY	160	\$25.00	\$4,000.00
400-1-2	CLASS I, ENDWALLS	CY	9	\$790.00	\$7,110.00
400-4-1	CLASS IV, CULVERTS (BOX CULVERT)	CY	68	\$530.00	\$36,040.00
415-1-6	REINF STEEL- MISCELLANEOUS	LB	814	\$1.20	\$976.80
425-2-91	MANHOLES, J-8, <10'	EA	3	\$5,500.00	\$16,500.00
430-175-248	PIPE CULV, OPT MATL, ROUND, 48"S/CD	LF	1,150	\$121.00	\$139,150.00
430-982-141	MITERED END SECTION, OPTIONAL ROUND (48" CD)	EA	1	\$3,000.00	\$3,000.00
522-1	SIDEWALK CONC, 4" THICK	SY	89	\$29.00	\$2,571.33
522-2	SIDEWALK CONC, 6" THICK, DRIVEWAY	SY	60	\$35.00	\$2,100.00
530-3-4	RIPRAP, RUBBLE, F&I, DITCH LINING	TN	4.7	\$95.00	\$446.02
570-1-2	SODDING	SY	1,711	\$3.00	\$5,133.33
999-25	CONTINGENCY AMOUNT (35%)	LS	1	\$98,202.00	\$98,202.00
CONSTRUCTION SUBTOTAL					\$378,800.00
	SURVEYING AND TESTING (5%)	LS	1	\$18,940.00	\$18,940.00
	DESIGN (15%)	LS	1	\$56,820.00	\$56,820.00
	PERMITTING	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION ADMINISTRATION	LS	1	\$10,000.00	\$10,000.00
	CONSTRUCTION OBSERVATION	LS	1	\$10,000.00	\$10,000.00
ENGINEERING SUBTOTAL					\$105,800.00
TOTAL COST ESTIMATE					\$484,600.00

Note: Unit prices are based on FDOT Area 8 prices, FDOT statewide prices, and recent bids received by Jones Edmunds.
 A contingency of 35% was used to account for uncertainties in conceptual level design.

Appendix C

Pinellas County Drainage Project Rating

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 1

TOTAL SCORE: 54

Project Name: Cross Bayou Maintenance (King Engineering Recommendations)

Maintenance District: _____

Location: Cross Bayou Canal

Limits: _____

Description of Drainage Issue: Flooding of properties adjacent to Cross Bayou Canal

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / > \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	Yes	15
Frequency of flooding:	1 time	1
Dates of reported flooding: _____		
Duration:	> 1 hour	5
How many structures flooded?	3 or more	5
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	No points awarded
Duration:	> 1 hour	No points awarded
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
TOTAL FOR SECTION I (40 max.)		31

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	moderate	1
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	moderate	1
Maintenance accessibility:	difficult	1
Labor for each maintenance:	1 - 2 days	1
Total staff and equipment required:	extended staff or equipment	3
TOTAL FOR SECTION II (20 max.)		9

III. CONSTRUCTABILITY		
Feasibility:	moderate	1
Cost Benefit:	low	0
Adequate existing easements or rights-of-way?	Yes	2
TOTAL FOR SECTION III (8 max.)		3

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	Yes	5
Will project result in water quality improvements?	No	0
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	difficult	0
TOTAL FOR SECTION IV (15 max.)		7

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	54
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	54
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 2

TOTAL SCORE: 56

Project Name: Cross Bayou Canal Improvements near Bayou Club

Maintenance District: _____

Location: Cross Bayou Canal approximately 400 feet southwest of Belcher Road

Limits: _____

Description of Drainage Issue: Flooding of golf course

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / < \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	Yes	15
Frequency of flooding:	1 time	1
Dates of reported flooding: _____		
Duration:	> 1 hour	5
How many structures flooded?	3 or more	5
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	No points awarded
Duration:	> 1 hour	No points awarded
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe:		
Damage to infrastructure:	severe	No points awarded
Describe:		
TOTAL FOR SECTION I (40 max.)		31

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	moderate	1
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	moderate	1
Maintenance accessibility:	easy	0
Labor for each maintenance:	< 1 day	0
Total staff and equipment required:	extended staff or equipment	3
TOTAL FOR SECTION II (20 max.)		7

III. CONSTRUCTABILITY		
Feasibility:	moderate	1
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	Yes	2
TOTAL FOR SECTION III (8 max.)		4

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	Yes	5
Will project result in water quality improvements?	No	0
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		10

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	56
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	56
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 3

TOTAL SCORE: 52

Project Name: The High Pointe Village Mobile Home Park

Maintenance District: _____

Location: High Pointe Village Mobile Home Park south of 150th Ave N between 62nd St N and Sunset St

Limits: _____

Description of Drainage Issue: Flooding of residential areas

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	Yes	15
Frequency of flooding:	1 time	1
Dates of reported flooding: _____		
Duration:	> 1 hour	5
How many structures flooded?	3 or more	5
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
<u>B. Non-Structure Flooding</u>		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	No points awarded
Duration:	> 1 hour	No points awarded
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
TOTAL FOR SECTION I (40 max.)		31

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	moderate	1
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	severe	2
Maintenance accessibility:	easy	0
Labor for each maintenance:	< 1 day	0
Total staff and equipment required:	normal staff	0
TOTAL FOR SECTION II (20 max.)		5

III. CONSTRUCTABILITY		
Feasibility:	high	3
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	No	0
TOTAL FOR SECTION III (8 max.)		4

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	Yes	3
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		8

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	52
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	52
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 4

TOTAL SCORE: 49

Project Name: Pinellas Farms Stormwater Pond

Maintenance District: _____

Location: South of Cross Bayou Canal and north of 102nd Ave N between 60th St N and 62nd St N

Limits: _____

Description of Drainage Issue: Flooding immediately south of Cross Bayou Canal with potential for water quality improvements during smaller storm events

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / > \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

I. FLOODING		
A. Structure Flooding	Response	Points
Has structure flooding been reported and verified?	Yes	15
Frequency of flooding:	1 time	1
Dates of reported flooding: _____		
Duration:	> 1 hour	5
How many structures flooded?	3 or more	5
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Describe: _____	moderate	1
Describe: _____		
Describe: _____	moderate	1
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	No points awarded
Duration:	> 1 hour	No points awarded
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
TOTAL FOR SECTION I (40 max.)		31

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	low	0
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	low	0
Maintenance accessibility:	easy	0
Labor for each maintenance:	< 1 day	0
Total staff and equipment required:	normal staff	0
TOTAL FOR SECTION II (20 max.)		2

III. CONSTRUCTABILITY		
Feasibility:	high	3
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	No	0
TOTAL FOR SECTION III (8 max.)		4

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	Yes	3
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		8

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.) **49**

SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT **49**

SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 5

TOTAL SCORE: 29

Project Name: 142nd Ave N Drainage Improvements

Maintenance District: _____

Location: South of 142nd Ave N and north of 138th Ave N between 62nd St N and Icot Blvd

Limits: _____

Description of Drainage Issue: Flooding of the Pleasure World Park Unit 1 neighborhood

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / < \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	No	Go to section B
Frequency of flooding:	1 time	No points awarded
Dates of reported flooding: _____		
Duration:	> 1 hour	No points awarded
How many structures flooded?	3 or more	No points awarded
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	3 or more	5
Duration:	> 1 hour	5
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
TOTAL FOR SECTION I (40 max.)		15

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	low	0
Threat to property:	low	0
Frequency of maintenance:	yearly	0
How critical is required maintenance?	low	0
Maintenance accessibility:	easy	0
Labor for each maintenance:	< 1 day	0
Total staff and equipment required:	normal staff	0
TOTAL FOR SECTION II (20 max.)		0

III. CONSTRUCTABILITY		
Feasibility:	moderate	1
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	No	0
TOTAL FOR SECTION III (8 max.)		2

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	Yes	3
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		8

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	29
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	29
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 6-A

TOTAL SCORE: 36

Project Name: Drainage Improvements in Pinebrook Canal between 142nd Ave N and Ulmerton Road

Maintenance District: _____

Location: South of 142nd Ave N and north of Havana Ave between Belcher Road and Pinebrook Canal

Limits: _____

Description of Drainage Issue: Flooding of the Bay Ranch Mobile Home Park

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / > \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	No	Go to section B
Frequency of flooding:	3 or more	No points awarded
Dates of reported flooding: _____		
Duration:	> 1 hour	No points awarded
How many structures flooded?	3 or more	No points awarded
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	1
Duration:	> 1 hour	5
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
TOTAL FOR SECTION I (40 max.)		11

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	severe	3
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	moderate	1
Maintenance accessibility:	easy	0
Labor for each maintenance:	1 - 2 days	1
Total staff and equipment required:	extended staff or equipment	3
TOTAL FOR SECTION II (20 max.)		10

III. CONSTRUCTABILITY		
Feasibility:	high	3
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	Yes	2
TOTAL FOR SECTION III (8 max.)		6

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	No	0
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		5

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.) **36**

SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT **36**

SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 6-B

TOTAL SCORE: 36

Project Name: Drainage Improvements in Pinebrook Canal between 142nd Ave N and Ulmerton Road

Maintenance District: _____

Location: South of 142nd Ave N and north of Ulmerton Road between Belcher Road and Pinebrook Canal

Limits: _____

Description of Drainage Issue: Flooding of the Bay Ranch Mobile Home Park

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / > \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	No	Go to section B
Frequency of flooding:	3 or more	No points awarded
Dates of reported flooding: _____		
Duration:	> 1 hour	No points awarded
How many structures flooded?	3 or more	No points awarded
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	1
Duration:	> 1 hour	5
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
TOTAL FOR SECTION I (40 max.)		11

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	severe	3
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	moderate	1
Maintenance accessibility:	easy	0
Labor for each maintenance:	1 - 2 days	1
Total staff and equipment required:	extended staff or equipment	3
TOTAL FOR SECTION II (20 max.)		10

III. CONSTRUCTABILITY		
Feasibility:	moderate	1
Cost Benefit:	high	3
Adequate existing easements or rights-of-way?	Yes	2
TOTAL FOR SECTION III (8 max.)		6

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	No	0
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		5

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	36
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	36
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 7

TOTAL SCORE: 29

Project Name: Improve Drainage from the Sun Seair Mobile Home Park

Maintenance District: _____

Location: South of 126th Ave N and north of 118th Ave N between 62nd St N and 66th St N

Limits: _____

Description of Drainage Issue: Flooding of the Sun Seair Mobile Home Park

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / \$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	No	Go to section B
Frequency of flooding:	3 or more	No points awarded
Dates of reported flooding: _____		
Duration:	> 1 hour	No points awarded
How many structures flooded?	3 or more	No points awarded
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe: _____		
Damage to infrastructure:	severe	No points awarded
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	1
Duration:	> 1 hour	5
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
TOTAL FOR SECTION I (40 max.)		11

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	low	0
Threat to property:	low	0
Frequency of maintenance:	yearly	0
How critical is required maintenance?	low	0
Maintenance accessibility:	easy	0
Labor for each maintenance:	< 1 day	0
Total staff and equipment required:	normal staff	0
TOTAL FOR SECTION II (20 max.)		0

III. CONSTRUCTABILITY		
Feasibility:	high	3
Cost Benefit:	high	3
Adequate existing easements or rights-of-way?	No	0
TOTAL FOR SECTION III (8 max.)		6

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	Yes	3
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		8

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	29
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		
		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	29
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____

DRAINAGE PROJECT RATING SHEET
Partially Complete - Uncompleted Items to be Assigned by County

PROJECT ID NO. Cross Bayou - Alternative 8

TOTAL SCORE: 47

Project Name: Pinewood Villas Drainage Improvements

Maintenance District: _____

Location: South of Ulmerton Road and north of 126th Ave N between Pinebrook Canal and 66th St N

Limits: _____

Description of Drainage Issue: Flooding of the Pinewood Villas

Drainage Issue Initiated By: _____

City or Other Agency Involvement: _____

Project cost estimate (circle one): \$0-\$50,000 / \$50,000 - \$100,000 / \$100,000 - \$250,000 / >\$250,000

Date: 9/4/2013

Rater(s): Jones Edmunds & Associates

SECTIONS I AND II

TO BE FILLED OUT BY HIGHWAY DISTRICT PERSONNEL

<u>I. FLOODING</u>		
A. Structure Flooding	<u>Response</u>	<u>Points</u>
Has structure flooding been reported and verified?	Yes	15
Frequency of flooding:	1 time	1
Dates of reported flooding: _____		
Duration:	> 1 hour	5
How many structures flooded?	3 or more	5
Types of structures: _____		
Depth of flooding at roadway:	> 12 inches	3
Is the flooded location part of an evacuation route?	No	0
Safety issues:	moderate	1
Describe: _____		
Damage to infrastructure:	moderate	1
Describe: _____		
B. Non-Structure Flooding		
Has there been reported flooding in the area?	Yes	
Frequency of flooding	1 time	No points awarded
Duration:	> 1 hour	No points awarded
Depth of flooding at roadway:	> 12 inches	No points awarded
Is the flooded location part of an evacuation route?	Yes	No points awarded
Safety issues:	severe	No points awarded
Describe:		
Damage to infrastructure:	severe	No points awarded
Describe:		
TOTAL FOR SECTION I (40 max.)		31

II. EXTENT OF MAINTENANCE		
Description of erosion issues:		
Erosion issues:	moderate	1
Threat to property:	moderate	2
Frequency of maintenance:	yearly	0
How critical is required maintenance?	moderate	1
Maintenance accessibility:	difficult	1
Labor for each maintenance:	1 - 2 days	1
Total staff and equipment required:	normal staff	0
TOTAL FOR SECTION II (20 max.)		6

III. CONSTRUCTABILITY		
Feasibility:	low	0
Cost Benefit:	moderate	1
Adequate existing easements or rights-of-way?	No	0
TOTAL FOR SECTION III (8 max.)		1

IV. ENVIRONMENTAL IMPROVEMENTS		
Can project be combined or assist with other projects?	No	0
Will project result in water quality improvements?	No	0
Is the project part of a Watershed Management Plan?	Yes	2
Ease of permitting:	easy	3
TOTAL FOR SECTION IV (15 max.)		5

V. LEVEL OF COMMITMENT BY PINELLAS COUNTY		
Penny project?	No	0
BCC initiative?	No	0
Cooperative effort with another public agency?	No	0
Has a commitment been made to public?	No	0
Annexation issues?	No	1
TOTAL FOR SECTION V (7 max.)		1

VI. EXTERNAL/ADDITIONAL FUNDING SOURCES		
Are external/additional funding sources available for this project?	0 - 19%	3
TOTAL FOR SECTION V (7 max.)		3

TOTAL FOR SECTIONS I - VI (100 max.)	47
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SPECIAL CIRCUMSTANCES IDENTIFIED BY SPCC		
List any special circumstances below to justify additional points to be given to the project		

_____		0
ADDITIONAL POINTS APPROVED BY SPCC		0

TOTAL RATING FOR PROJECT	47
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SPCC Evaluation Date: _____

Names of Scorers: _____

NOTES: _____
