Comprehensive Canal Dredging and Preventative Measures Feasibility Study (CCDPM)

Dredging Feasibility Report

ALAFIA

Prepared for:
Hillsborough County
Stormwater Management Section
Public Works Department

Contract No. 03-1322
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Hillsborough County
Florida

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EXECUTIVE SUMMARY

Post, Buckley, Schuh and Jernigan, Inc. (PBS&J) was contracted in September 2005 by Hillsborough County to complete the Comprehensive Canal Dredging and Preventative Measures Feasibility (CCDPM) Study. The purpose of the CCDPM Study is to investigate known areas of concern throughout the unincorporated portions of the county in order to develop a plan to assess potential canal dredging needs. The study includes completing hydrographic/bathymetric surveys, habitat analysis, sediment sampling, water quality sampling, spoil disposal options, conceptual design, cost estimates, investigating funding options and identifying permitting potential.

There are several interim reports required during the CCDPM Study. Each report represents the completion of a specific project milestone. This report represents the completion of the 2nd, 3rd, and 4th deliverables: Estimate Dredging Volume Report, Sediment Sampling Interim Report, and Permitting Requirements Report. These three interim reports have been combined into one deliverable for each project site and have been collectively named the *Dredging Feasibility Report(s)*. The sediment apportionment for the project area has not been included within this report. This task will be completed at a later date as a stand alone deliverable; and will include reports produced by both Hillsborough County and area residents.

This report contains describes the results of the field investigation, including bathymetric survey and sediment sampling results. Based on these results, pertinent regulatory issues are described and specific issues in regards to project permitting have been identified. Dredging volumes for both the areas of concern and the project as a whole, as well as a complete set of plans for the proposed dredge template, are provided in the report and appendices. Additionally, issues related to the selection of a dredge disposal site and site specific construction techniques are outlined.

Water depths at the site range from a minimum of -3.0 ft below MLW to -10.8 ft below MLW with an average depth of approximately -4.3 ft below MLW. The sediment sampling results show elevated concentrations of pollutant metals above recommended levels. As a result, this may require some portion of the dredge spoils to be upland disposed in a lined landfill.

The maximum dredge depth for the site is -5.0 ft below MLW. To achieve this depth within the proposed template, 42,080 cubic yards of material would be dredged from the areas of concern, while 54,786 cubic yards of material would be dredged from the project site as a whole.

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1.0 PURPOSE

Post, Buckley, Schuh and Jernigan, Inc. (PBS&J) was contracted by Hillsborough County in September 2005 to complete the required professional engineering services for the Comprehensive Canal Dredging and Preventative Measures Feasibility (CCDPM) Study. Services performed under this work assignment include public communications, data collection, engineering analysis, preparation of several reports, and general support for county staff at various meetings.

Hillsborough County Board of County Commissioners authorized the County Administrator to develop a study to address sedimentation within the coastal residential canal communities of the County. The County Public Work Department developed a scope of work for completing the CCDPM Study. The purpose of the CCDPM Study is to investigate known areas of concern throughout unincorporated portions of the County in order to develop a plan to assess potential canal dredging needs. The study includes completing hydrographic/bathymetric surveys, habitat analysis, sediment sampling, water quality sampling, spoil disposal options, conceptual design, cost estimates, investigating funding options and identifying permitting potential.

The overall work assignment to complete the CCDPM Study includes the following tasks:

- Task I Project Management and Coordination
- Task II Identification of Project Area and Background Information
- Task III Field Investigation – Data Collection and Survey
- Task IV Permitting Requirements
- Task V Planning and Prevention Measures
- Task VI Cost Estimates
- Task VII Technical Alternatives Analysis
- Task VIII Funding Alternatives Analysis
- Task IX Public Involvement
- Task X Project Recommendations
- Task XI Preparation of Final Report

Within the scope of work for the CCDPM Study, there are several interim reports that are to be prepared as part of the overall work assignment. Each report represents the completion of a project milestone and constitutes finalized sections of the Final Report. Information presented herein is for the Alafia project area. This report (Dredging Feasibility Report) represents the completion of the second, third and fourth deliverables:

Estimate Dredging Volume Report,
Sediment Sampling Interim Report, and
Permitting Requirements.

The report presents the existing conditions within the designated project area. This data extrapolated onto maps which are superimposed over current aerial photographs. This report presents a conceptual design/dredge footprint and calculates estimated sediment dredge volumes within the project area. Dredge volumes are presented for the areas of concern and the entire project area. This report also defines and evaluates the existing Natural Resources (i.e. sea grasses, oyster bars, emergent wetlands etc.) within the projects area. This report will not discuss WQ data collected as this will be reserved for a separate report at the completion of the sampling cycle.

This report provides the findings of the sediment analysis. Information is provided that characterize the sediment quality within the project area. The results include grain size analysis, semi-volatile compounds, elutriate testing and total sorbed metals. All physical soil analysis will comply with Unified Soil Classification Systems as out lined in ASTM Standard D-2487. All chemical analyses will be compared with the States Residential and Commercial Soil Cleanup Target Levels (62-777 F.A.C.).

The report provides recommendations regarding the permitting requirements for the projects. Information is outlined regarding necessary permitting requirements as a result of the pre-application meeting held with the regulatory agencies. This report addresses permitting issues regarding the physical dredging as well as permitting required for disposal/reuse options.

2.0 PROJECT AREA DESCRIPTION

The Alafia project area is located along the northern and southern shores of the Alafia River west of I-75 and bordered by Gibsonton Drive to the south and Riverview Drive to the North. The entire project area covers about 2 square miles and includes the Alafia River itself, finger canals, and small embayments. Figure 1 illustrates the location and extent of the project site, as well as the dredging areas of concern.

This report brings together all fieldwork elements and presents a design for the project. A series of attachments are provided herein that provide information for the project, including drawings of the conceptual project design. Additional information is included in each section accordingly including, tables, photographs, figures, procedures, descriptions, etc.

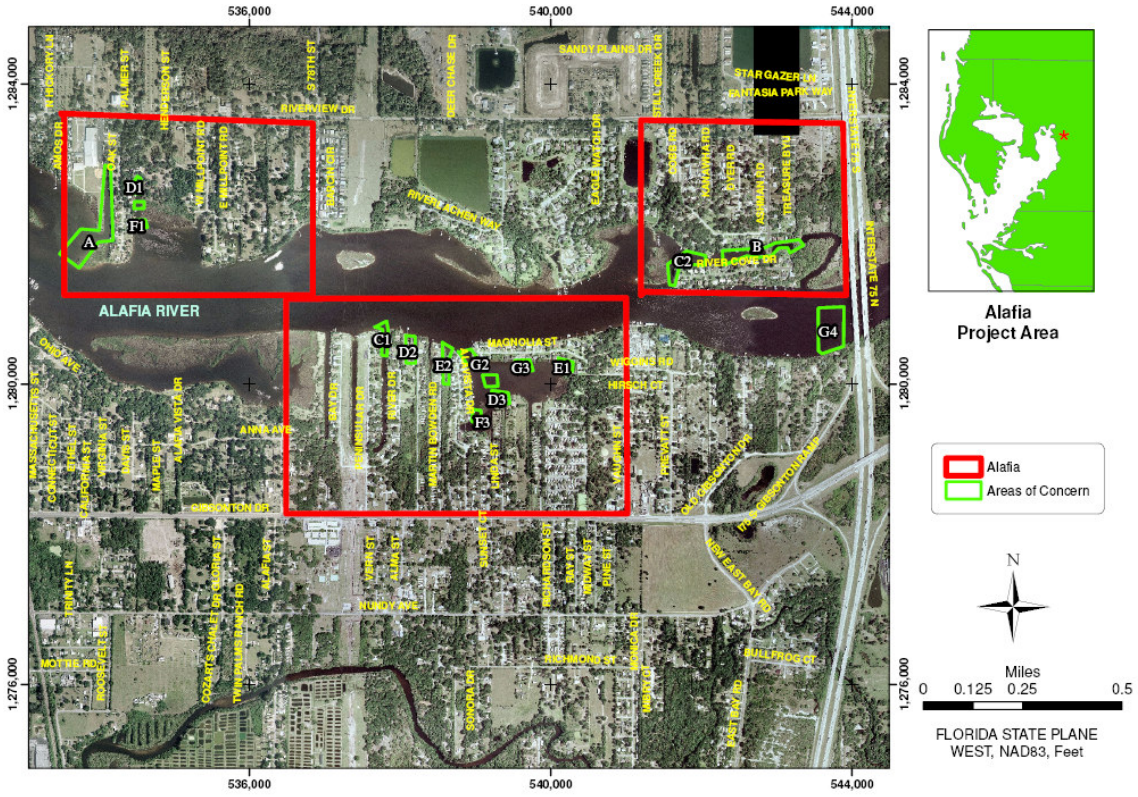

Figure 2.1: Project Location Map

3.0 RESULTS OF FIELD INVESTIGATION

Field investigations were conducted to obtain the data necessary to complete the conceptual design for the feasibility study. They included:

- Bathymetric/Hydrographic Survey
- Sediment Sampling and Analysis
- Habitat Survey and Analysis

In several places, navigation was difficult and care was required when maneuvering within the project area. Shoaled areas, overhanging vegetation along canal banks, and areas with submerged debris present were observed.

3.1 Hydrographic/Bathymetric Survey

The survey was completed in February and March of 2006 and included Alafia River as well as the numerous canals considered part of the Hillsborough County Comprehensive Canal Dredging and Preventative Measures (CCDPM) Feasibility Study (see Figure 1).

The purpose of the survey was to delineate the bottom of the existing bay and canal systems. Water (tide) levels were determined by using existing published benchmarks.

The horizontal datum (coordinates) was referenced to the North American Datum of 1983, 1990 Adjustment (NAD 83/90) Florida State Plane Coordinate System West Zone (SPCS 902). The vertical datum (elevations) was referenced to the North American Vertical Datum (NAVD). All datums were referenced to published horizontal and vertical control points.

Standard survey quality depth-sounding equipment was used to recover bottom elevation data accurate vertically to 0.5' (one-half of a foot). Positioning was obtained with a Differential Global Positioning System (DGPS), with a horizontal accuracy of +/- 3 feet. Results of the bathymetric survey are provided in Appendix A and were used to design the dredge template.

The average bottom elevation for the Alafia project area was approximately -3' NAVD 88 (-4.3' MLW). At the deepest point the elevation was -9.5' NAVD 88 (-10.8' MLW), and the shallowest point was -1.7' NAVD 88 (-3.0' MLW).

3.2 Sediment Sampling & Analysis

The level of contamination of the bottom sediments is an important factor in the planning and feasibility analysis of dredging projects. The contamination levels present will play a large role in determining costs, environmental impacts, and design options for both the dredging works and upland disposal. Therefore, preliminary sediment sampling and analyses were performed for the Alafia area to determine contaminant levels present in the bottom sediments. The results were compared to regulatory agency standards to assist in project planning.

3.2.1 Sediment and Water Quality Standards

The Florida Department of Environmental Protection (FDEP) has developed guidance concentrations for Florida coastal areas (MacDonald 1994 and 2003). The guidance concentrations are based on:

- The "Threshold Effects Level" (TEL), which represents the upper limit of the range of sediment contamination that has no measurable effect on associated organisms.
- The "Probable Effects Level" (PEL), which is the estimated lower level on the range of contaminant concentration that most commonly is associated with adverse biological effects.

The current recommended TEL and PEL sediment concentrations for trace metals tested for this Project are presented in Table 3.1.

In addition, the FDEP has developed Cleanup Target Levels (CTLs) for anthropogenically contaminated groundwater and soils to protect human health in both residential and commercial settings [Table 3.1]. Groundwater Cleanup Target Levels (GCTLs) are determined using a lifetime excess cancer risk, which is defined as the amount of contaminant that must be consumed to result in a one in one million risk of cancer. Soil Cleanup Target Levels (SCTLs) are determined using a similar calculation. In this case, the levels are based on the soil acting as a source of contamination for groundwater or surface water through the process of leaching (CEHT, 2005). Leaching is the process by which soluble constituents are transferred between two mediums. The SCTL describes the amount of contaminant necessary in a soil that, when leached into waters, will be equal to the GCTL standard (USEPA, 1996). SCTLs are typically higher than TEL and PEL levels because they reference effects in humans rather than effects in organisms in general.

	mg/kg				mg/L	
	Soil Cleanup Target Levels					
Metal	***SCTL Residential***	***SCTL Commercial***	***TEL***	***PEL***	***Marine Surface Water Criteria***	***Groundwater Criteria***
Aluminum	*80,000*	*	*n/a*	*n/a*	*1.5*	*0.2*
Antimony	*27*	*370*	*n/a*	*n/a*	*4.3*	*0.006*
Arsenic	*2.1*	*12*	*7.24*	*41.6*	*0.05*	*0.01*
Barium	*120*	*130,000*	*n/a*	*n/a*	*n/a*	*2*
Beryllium	*120*	*1,400*	*n/a*	*n/a*	*0.00013*	*0.004*
Cadmium	*82*	*1,700*	*0.68*	*4.21*	*0.0093*	*0.005*
Chromium	*210*	*470*	*52.3*	*160*	*0.05*	*0.1*
Copper	*150*	*89,000*	*18.7*	*108*	*0.0029*	*1*
Lead	*400*	*1,400*	*30.2*	*112*	*0.0085*	*0.015*
Mercury	*3*	*17*	*0.13*	*0.7*	*0.000025*	*0.002*
Nickel	*340*	*35,000*	*15.9*	*42.8*	*0.0083*	*0.1*
Selenium	*440*	*11,000*	*n/a*	*n/a*	*0.071*	*0.05*
Silver	*410*	*8,200*	*0.73*	*1.77*	*0.0004*	*0.1*
Thallium	*6.1*	*150*	*n/a*	*n/a*	*0.0063*	*0.002*
Zinc	*26,000*	*630,000*	*124*	*271*	*0.086*	*5*

n/a – necessary data are not available
* - contaminant is not a health concern for this exposure scenario

Table 3.1. Soil Cleanup Target Levels & Water Cleanup Target Levels.

3.2.2 Sampling Locations and Methodology

A total of four sediment cores were collected on July 12, 2006 in Alafia. The locations [Figure 3.1] were chosen for the following reasons based upon concerns identified by Hillsborough County residents:

- ALC1 – Extracted to identify sheltered area water flow influences on sediment quality and possible storm pipe influence.
- ALC2 – Extracted to identify quiet canal system water flow and storm pipe influence on sediment quality.
- ALC3 – Extracted to identify sheltered cove water flow influences on sediment quality.
- ALC4 – Extracted to identify quiet canal system water flow and storm pipe influence on sediment quality.

Figure 3.1. Sediment Location Map.

At each sampling site, a single sediment core was collected using a 5.5cm diameter polycarbonate corer. The coring device was comprised of an elongated handle attached to a one-way valve manifold. The coring tube was attached to the manifold, which created suction when the coring tube was extracted from the sediment layer. Cores were brought to the surface and then disassembled from the coring handle. Samples were homogenized using disposable spoons and sanitized gloves; then carefully transferred to glass jars. All samples were placed on ice (4 degrees C) and transported to the laboratory within 12 hours.

All field collection and laboratory analyses were conducted in compliance with FDEP Standard Operating Procedures. The laboratory analyses were subcontracted to Xenco Laboratories (NELAC certification number E86675). The elutriate test is designed to simulate release of contaminants from a sediment during dredged material disposal. Analyses were performed using EPA method 8270C for semi-volatile organic

compounds. Method 8270 is used to determine the concentration of SVOCs in extracts prepared from many types of solid waste matrices, soils, air sampling media and water samples. Individual metals were tested by SW 6020A which is inductively coupled plasma-mass spectrometry (ICP-MS). This is applicable to the determination of sub-µg/L concentrations of a large number of elements in water samples and in waste extracts or digests (EPA). The grain size analysis for these samples was subcontracted to Ardaman & Associates, (CMEC # ASTM C1077 D3740). The purpose of the grain size analyses is to determine what percent of each sample will pass through the number 200 sieve. Samples that are primarily composed of fine gain material will be more susceptible to pollutants adhering to their surfaces. Sites which have an elevated pollutant presence, and are primarily fine-grained material, will have to have special considerations when disposing of material. This may include, but is not limited to, a disposal site with an impervious liner to prevent the discharge of pollutants back into the ground.

Physical Analysis

Sediment samples were visually inspected and logged in detail in accordance with FDEP and U.S. Army Corps of Engineers (USACOE) standards. The percentage (by weight) of particles finer than .074 millimeters can be found in Table 3.2. A graphic summary of each sample was generated and the results are provided in Appendix B.

Chemical Analysis

Sediment laboratory analytical results are provided in Table 3.2, as well as Appendix B. All of the pollutant metals were below both Residential and Commercial Soil Cleanup Target Levels in sample site ALC3. Arsenic exceeded the SCTL Residential limit in sample sites ALC1 and ALC4. In sample sites ALC1, ALC2, and ALC4; Cadmium exceeded TEL values.

Possible Pollutant Sources

All of the pollutant metals were below both Residential and Commercial Soil Cleanup Target Levels in sample sites ANC2 and ANC4. Sources of Arsenic include pressure treated wood used for pilings, and fertilizers. Cadmium is used in fertilizers and in bottom paint.

The metals which exceeded cleanup levels have many possible sources in the marine environment. Aluminum is naturally high in Florida soils, but is also found in paints. Lead is used in bottom paint, and building materials. Zinc is sometimes found in fertilizers as well.

The results of the SVOAs by EPA 8270C analysis indicated undetectable contaminant levels for all elements for all sample sites. The elutriate SVOCs by EPA 8270C analysis resulted in undetectable results for all parameters for all sample sites. The results of these tests are provided in Appendix B.

3.2.3 Results

Metal	(mg/kg)							
	Results (Totals)				*Target Soil Cleanup Target Levels*			
	ALC1	ALC2	ALC3	ALC4	*SCTL Residential*	*SCTL Commercial*	*TEL*	*PEL*
Aluminum	5890	4430	2410	5830	*80,000*	*	*n/a*	*n/a*
Antimony	U	U	U	U	*27*	*370*	*n/a*	*n/a*
Arsenic	2.34	2	0.958	3.1	*2.1*	*12*	*7.24*	*41.6*
Barium	40.3	28.8	25	44.6	*120*	*130,000*	*n/a*	*n/a*
Beryllium	0.487	0.396	0.254	0.641	*120*	*1,400*	*n/a*	*n/a*
Cadmium	1.11	1.13	0.465	1.35	*82*	*1,700*	*0.68*	*4.21*
Chromium	23.5	16.8	7.34	21.3	*210*	*470*	*52.3*	*160*
Copper	7.77	7.14	U	11.7	*150*	*89,000*	*18.7*	*108*
Lead	19.1	11	1.38	15.8	*400*	*1,400*	*30.2*	*112*
Mercury	0.0696	0.0396	U	0.0712	*3*	*17*	*0.13*	*0.7*
Nickel	3.62	2.93	1.16	4.06	*340*	*35,000*	*15.9*	*42.8*
Selenium	2.02	1.82	1.13	3.24	*440*	*11,000*	*n/a*	*n/a*
Silver	U	U	U	U	*410*	*8,200*	*0.73*	*1.77*
Thallium	U	U	U	U	*6.1*	*150*	*n/a*	*n/a*
Zinc	42.5	30.5	1.92	59.4	*26,000*	*630,000*	*124*	*271*
TOC (mg/kg)	114,000	47,600	93,600	434,000				
***%* Moisture**	56.9	49.46	29.04	71.91				
Percent Passing No.200 Sieve	46.6	26	17.6	33.7				

U - Undetected
n/a – necessary data are not available
* - contaminant is not a health concern for this exposure scenario
Exceeded Cleanup Levels

Table 3.2. Results of Sediment Sampling Compared to Target Levels.

Metal	(mg/L)			
	ALC1	ALC3	*Marine Surface Water Criteria*	*Groundwater Criteria*
Aluminum	6.06	2.87	*1.5*	*0.2*
Antimony	U	U	*4.3*	*0.006*
Arsenic	0.004	0.003	*0.05*	*0.01*
Barium	0.015	0.008	*n/a*	*2*
Beryllium	U	U	*0.00013*	*0.004*
Cadmium	0.004	0.001	*0.0093*	*0.005*
Chromium	0.021	0.004	*0.05*	*0.1*
Copper	U	U	*0.0029*	*1*
Lead	0.019	U	*0.0085*	*0.015*
Mercury	U	U	*0.000025*	*0.002*
Nickel	0.002	0.002	*0.0083*	*0.1*
Selenium	U	U	*0.071*	*0.05*
Silver	U	U	*0.0004*	*0.1*
Thallium	U	U	*0.0063*	*0.002*
Zinc	0.117	U	*0.086*	*5*

U- Undetected
Exceeded Cleanup Levels

Table 3.3. Results of the Elutriate Testing for Pollutant Metals Compared to Target Levels.

3.3 Habitat Survey and Analysis

The Alafia River project area was reviewed for potential submerged aquatic resources and other potential environmental impacts. Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWRI) conducted a seagrass survey in 2003 and the information that was collected was imported to the above aerial. Based on the information provided by FWRI, there are no seagrasses within the project areas. PBS&J conducted a field visit to collect sediment and hydrologic data. During the field visit no submerged aquatic resources were directly observed. However, a resource survey may be required by the regulatory agencies upon application for an exemption or a permit. It is recommended that a resource survey be conducted only upon request of the regulatory agencies.

Figure 3.2: Resource Location Map

4.0 REGULATORY COORDINATION

4.1 Agency Authorization & Permit Requirements

An application for a permit or exemption letter for a maintenance dredge activity will be required for the following agencies: the Tampa Port Authority, the Department of Environmental Protection, and the Army Corps of Engineers. Each regulatory agency has separate rules and standards for permitting a maintenance dredging project. A general overview of the standards and rules for each agency is provided below:

Tampa Port Authority

The Tampa Port Authority (the Port) is the local agency that regulates work in the water of Hillsborough County Port District. The Tampa Port Authority's Enabling Act, Section 25, defines maintenance dredging as "dredging to restore the contours of a canal, channel, turning basin, or berth to its previously constructed dimensions".

There are two types of permits that a maintenance dredge event may qualify for, a minor work permit or a standard work permit. A minor work permit is needed for maintenance dredging project that will dredge less than 10,000 cubic yards of material from existing canals, channels, turning basins, or berths, where the dredged material (spoil) would be removed and deposited on a self- contained upland site. The standard work permit is required for projects that exceed the thresholds of a minor works permit or for projects

that may be expected to have significant environmental impacts, such as impacts to an established seagrass bed or oyster reef.

The Tampa Port Authority will also issue proprietary authorization for maintenance dredging on publicly owned submerged lands (sovereign submerged lands) within Hillsborough County. For submerged lands that are not publicly owned, Tampa Port Authority will require authorization from the adjacent property owners prior to any dredging acitivities. The Port defines Sovereign Submerged Lands as "those lands waterward of the ordinary or mean high water line under navigable waterbodies to which the State of Florida acquired title on March 3, 1845, by virtue of statehood, or subsequently received by any act of the legislature or the United States, that have not been conveyed or alienated by the State of Florida, and which have been transferred to the Authority pursuant to Chapter 23-338, Laws of Florida, as amended".

Applications submitted to the Tampa Port Authority are also reviewed by the Hillsborough County Environmental Protection Commission and possibly by the Hillsborough County Planning Commission. Each reviewing agency has its own processing fee associated with each permit application.

Florida Department of Environmental Protection

The Department of Environmental Protection (DEP) is a state government regulatory agency in which the Environmental Resource Permitting section regulates work that is in, on, or over wetlands or surfaces waters. The DEP does not provide an explicit definition of maintenance dredging in their rules and regulations.

A maintenance dredge project that has adequate documentation of the original dredge specifications and/or other supporting documentation may qualify for an exemption from the permitting process, pursuant to Chapter 40D-4.051(8)(d), Florida Administrative Codes (F.A.C.). In the past, the original dredge specifications have been documented through the submittal of past permits, historical aerials, and/or soil core borings. The exemption allows for the performance of maintenance dredging of existing manmade canals, channels, basins, berths, and other such artificial features provided that no more dredging is preformed than is necessary to restore the original design specifications. The exemption applies to all canals and previously dredge portions of natural water bodies within recorded drainage right of way or drainage easements constructed before April 3, 1970 and to those canals and previously dredged portions of natural water bodies constructed on or after April 3, 1970, pursuant to all required State permits. The exemption allows for maintenance dredging to no more than 5 feet below mean low water when no previous permits were issued by the following regulatory groups: the Board of Trustees of the Internal Improvement Trust Fund, DEP, the Southwest Florida Water Management District, or the Army Corps of Engineers for construction of the manmade canal or channel. A project with evidence of previous dredging may not qualify for this exemption if it is determined that the proposed project area is no longer functioning as it was originally designed or as a navigable channel.

If the maintenance dredging does not meet the specifications for an exemption, a Standard General Permit or an Individual Permit would be required. The project is subject to mitigation for loss of function when permitted through a Standard General Permit or an Individual Permit.

Army Corps of Engineers

The Army Corps of Engineers (ACOE) is the federal agency responsible for protecting and maintaining navigable waters. In accordance with the Clean Water Act Section 404 and Section 10 of the Rivers and Harbors Act, the Jacksonville District Regulatory Program has authority to permit activities in navigable waters in Florida. The ACOE would issue 3 different types of permits for maintenance dredging based on the amount of material to be removed and the impact to natural resources associated with the project such as seagrasses, oyster reefs, corals, etc. These permits are as follows: General Permit, a Letter of Permission (LOP), or an Individual permit.

General Permit, SAJ-5, applies to maintenance dredging in residential canals in Florida. The work authorized by SAJ-5 is limited to the maintenance dredging of existing residential canals to restore the canal to its original excavated depth; however, the depth of the canal can not exceed a depth greater than 5 feet below mean low water. ACOE defines residential canals as a manmade waterway, historically dredged from uplands, and surrounded on both sides by uplands adjacent to principally residential property. Also, the material dredge/excavated using this permit may not exceed 4,000 cubic yards per year.

A “letter of permission” is a type of individual permit issued in accordance with the abbreviated procedures of 33 CFR 325.2(e) under Section 10 of the Rivers and Harbors Act of 1899. The LOP allows for the maintenance dredging of up to 50,000 cubic yards of material where the material is removed and placed in an upland disposal location.
The final permit, an Individual Permit, is required when the maintenance dredge does not meet the specifications required for a General Permit or a Letter of Permission. This includes maintenance dredging that would remove greater than 50,000 cubic yards of material.

4.2 Identification of Specific Issues

The areas of concern within Alafia River consist of both natural and manmade bodies of water. The manmade bodies of water associated with Alafia River are all considered to be upland cut canals. Based on aerial interpretation that was conducted in the previous report, it was determined that the canals were dredged out of uplands between 1957 and 1968. The upland cut canals, which were indicated in the previous report, are as follows: canals adjacent to Bay Drive, Peninsular Drive, River Drive, Alavista Drive, and Linda Street.

It has been determined that the areas considered natural water bodies have not been previously dredged. There were no historic permits located to indicate that dredging had been conducted within the Alafia River. For those areas where evidence of previous dredging is lacking, it is recommended that soil core borings be collected. The soil core borings may indicate that previous dredging has occurred within the areas of concern.

The water bodies considered to be upland cut canals may qualify for an exemption for maintenance dredge from the Department of Environmental Protection. To qualify, the applicant would be required to illustrate the previous dredge depths within the canals. This may be accomplished by a push core or elevation rod being pushed through the sediment until reaching refusal. The maximum proposed dredge depth would be -5.0 feet below mean low water.

Natural bodies of water such as the embayment adjacent to Magnolia Street would most likely require an Environmental Resource Permit from the Department of Environmental Protection. DEP staff suggested applying for a permit to dredge a perimeter canal within the Magnolia Street embayment to minimize the overall impact of the project. DEP also suggested that soil core borings be collected within the proposed dredge footprint to potentially show previous dredging. All other natural water bodies should apply for an Environmental Resource Permit from DEP as well as collect soil core borings to illustrate past dredging. The maximum dredge depth with a permit would most likely be -5.0 feet below mean low water.

Permitting for both the Tampa Port Authority and the Army Corps of Engineers depends on the proposed dredge volumes. Based on the footprint of the areas of concern, the volume of the dredge material would be greater than 10,000 cubic yards and less than 50,000 cubic yards based on a depth of -5.0 feet below mean low water. These volumes would require a “standard work permit” from TPA and a “letter of permission” from the ACOE. However, if the entire project area were to be dredged to -5.0 feet below mean low water the dredge volumes would exceed 50,000 cubic yards and an “individual” permit would be required from the ACOE. No changes to the TPA permit requirements would be necessary.

5.0 PROJECT DESIGN

The dredge template design brings together all elements of the field investigations and provides a recommended design for the project area. The dredge template is based on the results of the bathymetric survey data, sediment analysis, and the submerged aquatic resource survey. The proposed configuration of the dredge template takes into account comments and suggestions from County personnel and the Canal Advisory Sub-Committee. AutoCAD Land Development Desktop was used to prepare plans showing the location of the dredge template and cross-sections indicating existing grade and proposed dredge depths.

5.1 Dredge Volumes

Permitting requirements for the State of Florida indicate that maintenance dredging of canals and channels is limited to a maximum depth of -5 feet below Mean Low Water (MLW) or the previously documented dredge depth. No as-built drawings or permits were found for the canals in the Alafia River Project Area, therefore a maximum dredge depth of -5 feet below MLW is proposed. Proposed channel bottom widths range from 15 feet wide for the man-made canals to 40 feet wide in the main channels and larger canals.

The estimated volumes of material to be dredged, based on the proposed template, is shown in Tables 1 and 2. Table 1 includes the volume of material within areas of concern identified by homeowners, the Canal Advisory Sub-committee and County personnel. Table 2 includes the volume of material that could be removed from the entire project area. A set of proposed channel design drawings can be found in Appendix D.

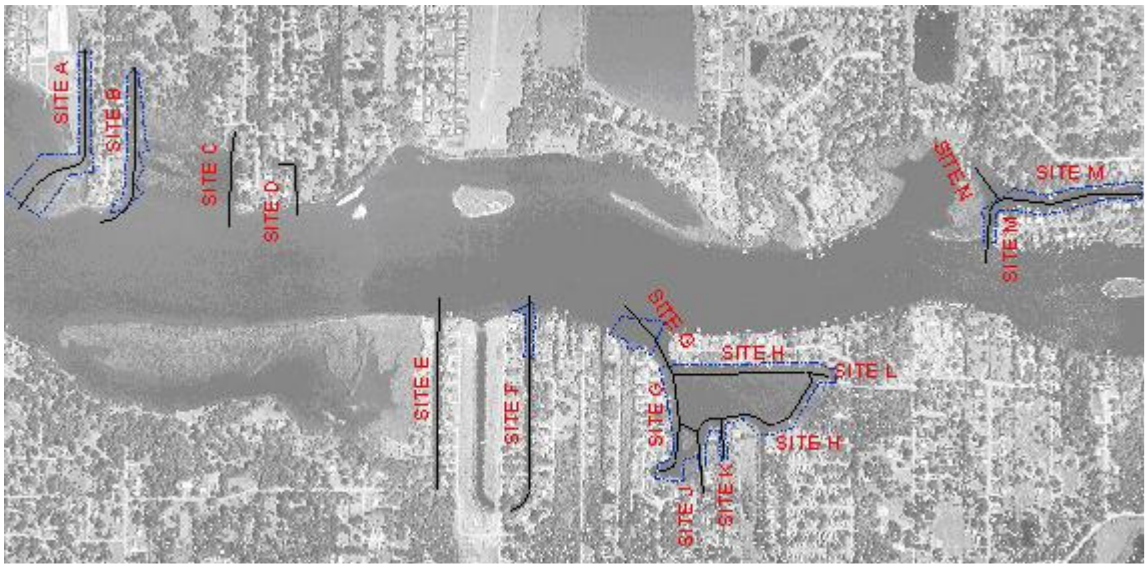

Figure 5.1 Alafia River Map of Dredge Reaches

Volumes by Areas of Concern	
SITE	Volume (Cu. Yds.)
A	5,130
B	5,765
C	0
D	0
E	0
F	1,429
G	6,497
H	14,358
J	1811
K	874
L	1218
M	4998
N	0
TOTAL	42,080

Table 5.1: Expected Dredge Volumes for Areas of Concern (based on -5 feet MLW).

Volumes for Entire Project Area	
SITE	Volume (Cu. Yds.)
A	5,130
B	5,765
C	1,264
D	1,812
E	4,091
F	5,011
G	6,970
H	14,358
J	1811
K	874
L	1218
M	4998
N	1484
TOTAL	54,786

Table 5.2: Expected Dredge Volumes for the entire Project Area (based on -5 feet MLW).

5.2 Disposal Site Selection

There are several possible disposal sites for the dredged sediment, and a disposal plan would be based upon the County's needs and the suitability of the material. Some material may be able to be placed offshore, or in coastal mitigation sites. Other dredge sediments may be required to be disposed of on an upland site. An upland site will require a dewatering area close to the project. This dewatering area may be public or private, and may or may not be the final resting place for the dredge sediment. The results of the sediment testing indicate that some of the material would not be suitable for residential use. There were elevated levels of arsenic and cadmium found through the metals testing and that sediment would have to be placed in the lined area of a landfill. The dredged sediment will be tested again in the dewatering area for contamination, and those results will dictate where sediment will be disposed. Based on the disposal site permitting process, the plan for where the sediment goes will be in place before dredging begins.

FDEP regulates Solid Waste Management Facilities under Chapter 62-701, Florida Administrative Code (F.A.C.). (Based upon site-specific conditions that may affect public and/or environmental health, some local governments may impose more stringent rules upon the management of solid waste.) Non-hazardous solid waste is a Class I waste which by definition can be disposed of at lined landfills, pursuant to Chapter 62-701.520, F.A.C. Also, contaminated soil that does not contain petroleum, can be disposed of at most lined solid waste facilities. Contaminated soil has a meaning given by Chapter 62-713.200(3), F.A.C., as soil that has become contaminated with concentrations of chemical constituents that are a.) in excess of Residential Direct Exposure (RDE) Soil Cleanup Target Levels (SCTL), b.) are in excess of the SCTL calculated in accordance with 62-713.520(2)(c), F.A.C., (see below), or c.) are expected to result in values that exceed the Department of Environmental Protection groundwater or surface water standards as evaluated in 62-713.510(6)(d), F.A.C. (leachability impacts). Although the arsenic concentrations at the sediment sampling sites ALC1 and ALC3 exceeded the RDE SCTL, and the cadmium concentrations at sites ALC1, ALC2, and ALC3 exceeded the Threshold Effects Level (TEL) the associated sediments can be disposed of at a lined landfill.

Contaminated soils must be properly managed so they will not pose a significant threat to public health of the environment. The contaminated soil can be transported to a Class I landfill, or it can be treated and cleaned. The cost of the treatment and cleaning processes depend on the type of contaminant and type of remediation required. Cleaned soil can be distributed on land and even in wetlands or other surface waters provided that it can be demonstrated that it will not cause surface water violations, be toxic to aquatic life or cause nuisance odors if saturated. Cleaned soil, or treated soil, must be at concentrations at or below the RDE SCTL. If not, the treated soil can be evaluated on a case-by-case basis based upon a number of rule-defined calculations that evaluate the toxicity of the contaminant.

5.3 Construction Techniques

Residential, commercial, and undeveloped properties within the project area have been reviewed for the potential to provide the necessary staging for the dredge activity. The selection and acquisition of the staging areas will be the responsibility of the construction contractor.

Hydraulic and/or mechanical dredging techniques can be used to complete the dredging of the proposed project area: The selection of the dredging method and associated equipment is dependent on the following:

- Physical and chemical properties of the material to be dredged
- Quantity of material
- Design depth
- Location of disposal area
- Physical environment of dredge area
- Type of disposal

Hydraulic dredging is the technique by which loose material is removed from the bottom of a waterway using hydraulic suction. This technique may incorporate the use of a cutterhead that may be able to remove rock or hardpan material. As the sediment is removed from the bottom, it is transported via the discharge hose either directly to the designated upland disposal site, if it is within close proximity, or onto a small barge, which would then be taken to the disposal site and unloaded. This technique requires an area for dewatering which can be of substantial size, and could include additional costs for restoring the site after project completion.

Mechanical dredging is a technique that utilizes a barge-mounted crane and bucket or simply a track-hoe on a barge to excavate compacted sediments and rock from the desired location. Different types of buckets can fulfill various types of dredging needs. Typically, either a clamshell or a dragline bucket is used. The barge is maneuvered into place, anchored, and the crane or track-hoe works within the limits of that position. The excavated material is brought to the surface, stored on a barge and transported to the disposal site.

A monitoring program will be developed outlining the necessary turbidity measurements while dredging is underway. These regulations are set by the Department of Environmental Protection when the permit is issued and vary depending on the water body.

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