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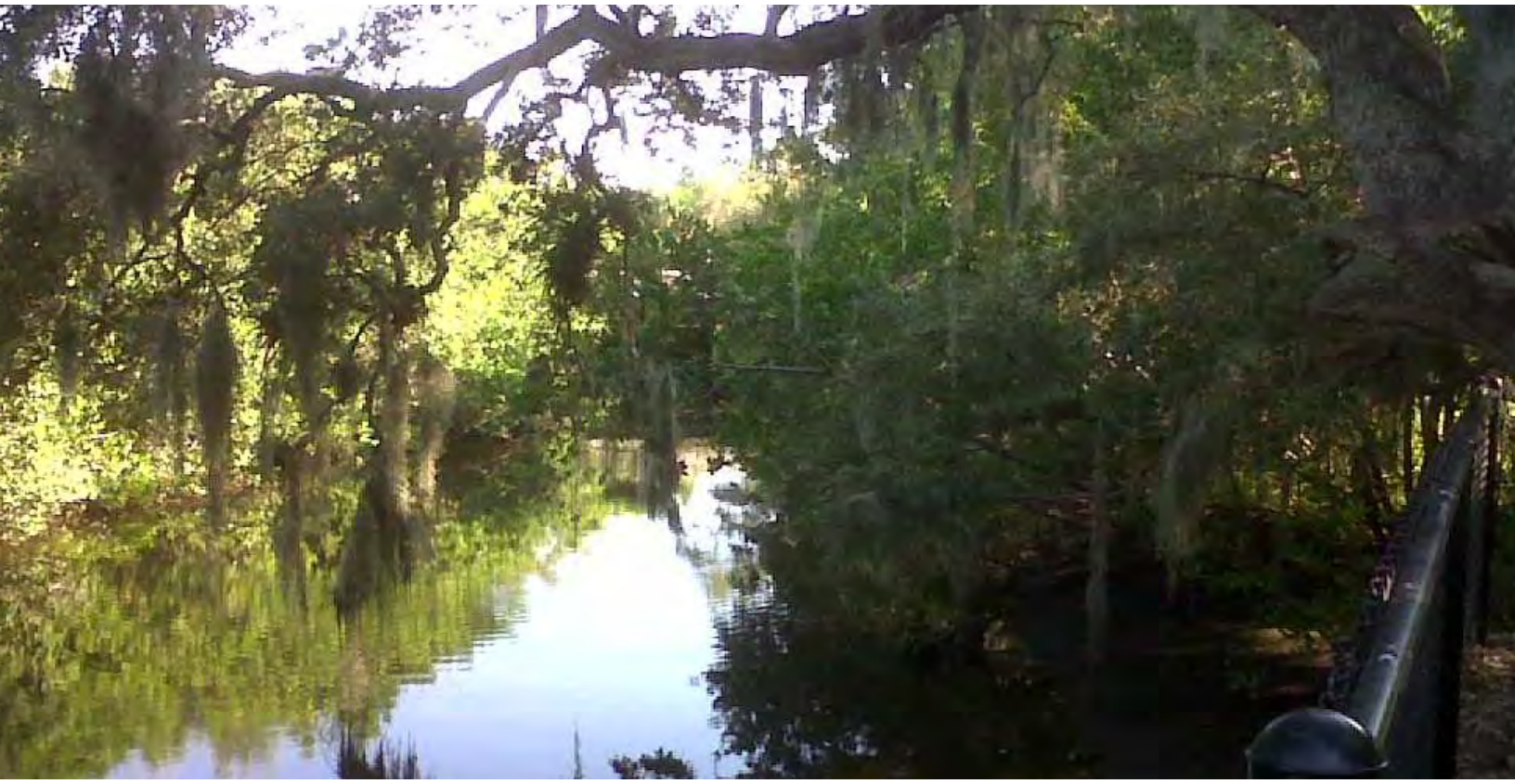
Whitaker Bayou Greenway Park and Stormwater LID Retrofit Pilot

Sarasota Bay Estuary Program

Contract 2011SBEP05



January 2012

WHITAKER BAYOU GREENWAY PARK AND STORMWATER LID RETROFIT PILOT

PREPARED FOR:

SARASOTA BAY ESTUARY PROGRAM
111 SOUTH ORANGE AVENUE, SUITE 200W
SARASOTA, FLORIDA 34236

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PROJECT: 215510014

JANUARY 2012

WHITAKER BAYOU GREENWAY PARK AND STORMWATER LID RETROFIT PILOT

CONTRACT 2011SBEP05

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SECTION 1

EXECUTIVE SUMMARY

1. EXECUTIVE SUMMARY

The Sarasota Bay Estuary Program (SBEP) received a grant from the Florida Department of Environmental Protection to conduct a stormwater Low Impact Design (LID) retrofit project in the Whitaker Bayou watershed and to explore options for creating a greenway park along the Bayou. The SBEP subsequently contracted with WilsonMiller Stantec to fulfill grant requirements.

The Whitaker Bayou watershed has been developed since the early 1900s and has undergone significant changes in the last century, beginning in 1923 with the creation of the Sarasota-Fruitville Drainage District. The District's role was to create additional land for farming by draining the surrounding sloughs and uplands. The District created a network of over 50 linear miles of canals effectively draining over 26,000 acres of land. The District's canals greatly expanded the boundaries of the original Whitaker Bayou watershed and increased the volume of stormwater runoff that was no longer treated naturally by flowing over native lands and instead discharged directly to the canals and ultimately to Sarasota Bay.

Early developments had no stormwater treatment requirements and were designed mainly to convey runoff. Incorporating Low Impact Design (LID) projects into the existing community can provide treatment for runoff that currently is untreated and provide educational opportunities for the community. Coordinating LID retrofits with other planned capital projects can improve the overall connectivity of the community to existing resources including schools and recreation.

While LID can be incorporated into the design of new residential or commercial stormwater management systems, its real potential lies in using it to retrofit existing stormwater management systems that have no current form of stormwater treatment, such as those systems designed solely to collect runoff and to route it directly to a surface water. Part of the flow can be rerouted to rain gardens or bio-swales, which are depressions containing sod or, preferably, native vegetation underlain with soils that facilitate percolation. Rain gardens are small depressions in native soils while bio-swales are more complex and may contain underdrains or very specific materials designed to control the rate of percolation. Whether rain gardens or bio-swales are used, they will retain and treat stormwater runoff that would otherwise go untreated and contribute to surface water contamination.

WilsonMiller Stantec reviewed and recommended numerous LID options for use in the watershed including installing bio-swales, baffle boxes, catch basin baskets and pervious pavement in appropriate locations in publicly owned rights-of-way. Private property owners are encouraged to make use of numerous options such as bio-swales and rain gardens, using rain barrels and cisterns to augment landscape irrigation, planting trees and installing green roofs.

WilsonMiller Stantec also evaluated the entire Whitaker Bayou watershed and identified numerous locations where LID retrofits would be feasible. The potential locations were further subdivided into types including those that could benefit from coordination with projects already being considered by local governments. While all of the projects have potential value to improve the water quality of Whitaker Bayou, eight were selected for additional analysis and development of a conceptual design and preliminary opinion of probable cost.

Another task was to investigate options for developing a greenway to provide pedestrian access along Whitaker Bayou. An assessment of feasibility started with a definition of waterway boundaries and was followed by a search of property ownership. We also considered whether other existing or proposed local government projects potentially could be connected to the greenway.

Although the City of Sarasota owns numerous parcels contiguous to Whitaker Bayou, they do not connect a significant enough part of the waterway to create a meaningful walking corridor. Private ownership of most of the property along Whitaker Bayou makes it economically infeasible for local government or non-government, non-profit organizations to purchase land or easements to create an uninterrupted greenway corridor along the majority of the Bayou. Developing a greenway along Whitaker Bayou and/or attempting to enhance the Blueway experience within the downstream sections of the Bayou do not appear to be cost effective endeavors at this time due to a variety of limitations.

SECTION 2

INTRODUCTION

2. INTRODUCTION

The Sarasota Bay Estuary Program (SBEP) received a grant from the Florida Department of Environmental Protection to conduct a stormwater Low Impact Design (LID) retrofit project in the Whitaker Bayou watershed and to explore options for creating a greenway park along the Bayou. The SBEP subsequently contracted with WilsonMiller Stantec to fulfill grant requirements.

Whitaker Bayou Watershed and Community

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Early developments had no stormwater treatment requirements and were designed mainly to convey runoff. Incorporating Low Impact Design (LID) projects into the existing community can provide treatment for runoff that currently is untreated and provide educational opportunities for the community. Coordinating LID retrofits with other planned capital projects can improve the overall connectivity of the community to existing resources including schools and recreation.

Whitaker Bayou Outfalls

The Whitaker Bayou Watershed is approximately 6.8 square miles. The main channel of Whitaker Bayou runs from University Parkway to the Sarasota Bay and is fed by four tributaries identified north to south as Tributary A, Tributary B, Tributary C, and Tributary D (Figure 1).

There are 73 outfall pipes discharging stormwater runoff to the main channel of Whitaker Bayou. GIS data developed by Sarasota County for the watershed model along with Asset Management GIS database and the 2007 LiDAR one-foot contours were used to delineate the contributing drainage basins for each of the outfall pipes (Figures 2A and 2B). A summary of the contributing drainage basins and the outfall pipes for the main Whitaker Bayou channel is included in Table 1. The data can be used to determine impact of LID designs by drainage basin. If there is a known issue in the Whitaker Bayou, the data are available to assist in tracking the source and developing a solution.

Low Impact Design Practices

Common stormwater management systems collect water from impervious surfaces, route it to a single detention or retention location such as a pond or grassed depression for treatment and then discharge to a surface water body. Low Impact Design (or Development) creates what is often called a "treatment train" that incorporates one or more depressions that captures and pre-treats stormwater prior to its discharge to a final retention or detention system. These depressions hold stormwater for designed periods of time which allow nutrients and other potential contaminants to be assimilated by the vegetation, for sediment to settle out and for the water to percolate through the soils. All of these mechanisms reduce the volume and increase the quality of stormwater that is ultimately discharged to surface water offsite.

While LID can be incorporated into the design of new residential or commercial stormwater management systems, its real potential lies in using it to retrofit existing stormwater management systems that have no current form of stormwater treatment, such as those systems designed solely to collect runoff and to route it directly to a surface water. Part of the flow can be rerouted to rain gardens or bio-swales, which are depressions containing sod or, preferably, native vegetation underlain with soils that facilitate percolation. Rain gardens are small depressions in native soils while bio-swales are more complex and may contain underdrains or very specific materials designed to control the rate of percolation. Whether rain gardens or bio-swales are used, they will retain and treat stormwater runoff that would otherwise go untreated and contribute to surface water contamination.

The technical and scientific literature is replete with examples of the successful applications of LID throughout the United States (see for examples Stanley, 1999; Bedan and Clausen, 2009; Li and Davis, 2009; Passeport, *et al.,* 2009; Chapman and Horner, 2010; and Damodaram, *et al*., 2010). Sarasota County has embraced LID as a viable addition to traditional stormwater treatment methods and has developed a technical LID manual that is currently undergoing peer review (a draft of which can be reviewed here):

http://www.scgov.net/EnvironmentalServices/Water/SurfaceWater/LowImpactDevelopment.asp.

Sarasota County also commissioned a study to determine the efficiency of grassed swales in reducing pollutant loads in stormwater (PBS&J, 2010) and found that they removed particulate loading significantly. They were found to be less effective at reducing concentrations of dissolved constituents; however, since the grassed swales did reduce overall loading there would be a concomitant reduction in dissolved constituents in the final discharge.

SECTION 3

COMMUNITY RESOURCES

3A. SCHOOLS
3B. RECREATIONAL FACILITIES

3. COMMUNITY RESOURCES

3A. SCHOOLS

LID retrofits when installed in locations that are highly visible in the community can provide educational opportunities, especially for younger people when the projects are located near schools or other recreational facilities. Schools built or expanded after stormwater treatment requirements were enacted (1985) already have functional stormwater management systems in place. Others could benefit from educational and/or water quality improvement standpoints by retrofitting their systems with LID. Students could benefit from these educational opportunities at the following schools located within the project area:

Bay Haven School of Basics Plus

Bay Haven School of Basics Plus is located on the west side of North Tamiami Trail between Patterson Drive and Virginia Drive and is recognized nationally as a "Blue Ribbon School" and has been a "Five Star School" for sixteen (16) years. Recent improvements to the school required stormwater treatment; however, most of the campus was constructed prior to stormwater treatment regulations.

Emma E. Booker Elementary

Emma E. Booker Elementary was built in 1989 and additional improvements were constructed in 1995. The school has a stormwater management system.

Booker Middle School

Booker Middle School is the Visual Performing Arts Magnet for Sarasota County and also hosts the north county cluster Academy for the Gifted & Talented program. The school is located on 42 acres in the Whitaker Bayou watershed and includes approximately 7.7 acres of wetlands. The school was constructed in June 1992 and an additional two-story building was completed in 2004 and includes a stormwater management system.

Booker High School

Booker High School is located on 47 acres in the Whitaker Bayou watershed, just east of the Seminole Gulf Railroad corridor on the south side of Myrtle Street and west of Goodrich Avenue. Recent renovations to the school incorporated a stormwater management system.

Ringling College of Art and Design

The Ringling College of Art and Design is a private college, located along the banks of the downstream stretch of Whitaker Bayou. As the College has expanded, stormwater management systems have been constructed as required.

3B. RECREATIONAL FACILITIES

Dr. Martin Luther King, Jr. Park

This is a passive neighborhood park located on the east shore of Whitaker Bayou, south of Dr. Martin Luther King, Jr. Way, east of Old Bradenton Road and west of Cocoanut Avenue, directly across the Bayou from the Ringling College of Art and Design. It includes a picnic pavilion, a paved parking lot and large grassed areas, but no stormwater treatment facilities.

North Water Tower Park

North Water Tower Park is a 26-acre community park located in the Whitaker Bayou watershed north of 42nd Street, south of 47th Street, west of Old Bradenton Road and east of North Tamiami Trail. The park is home to an 18-hole disc golf facility, a small playground, a paved parking lot, and also has a system of walking paths winding through the forested parcel. The existing stormwater management system was developed with the plans for the 18-hole disc golf facility and the parking area at the north end of the park.

Newtown Estates Park

Newtown Estates Park is a community park located in the Whitaker Bayou watershed north of Dr. Martin Luther King, Jr. Way, between Tuttle Avenue and Highway 301. Currently, the park is bordered along the north and the east property lines by drainage ditches, but the facility does not have a stormwater management system permitted through the Southwest Florida Water Management District (SWFWMD).

Robert L. Taylor Community Complex

Robert L. Taylor Community Complex is a historic community center located off Highway 301 north of Dr. Martin Luther King, Jr. Way on the south side of Myrtle Street. New construction for the complex includes a stormwater management system that discharges into a drainage ditch running east to west through the property and eventually along the north side of the property.

SECTION 4

LOW IMPACT DESIGN OPTIONS

4A. PUBLIC RIGHTS-OF-WAY AND PUBLIC PROPERTY
4B. PRIVATE PROPERTY

4. LOW IMPACT DESIGN OPTIONS

4A. PUBLIC RIGHTS-OF-WAY AND PUBLIC PROPERTY

When implementing Low Impact Design in public rights-of-way and on public or private property, future maintenance costs and life cycle costs must be considered. For the Whitaker Bayou project, the following Low Impact Design options were considered to minimize the capital and future maintenance costs and infringement into the community. While all locations for each LID element have not been identified, the following options can be used as projects are developed and design finalized.

Bio-swales

The construction of bio-swales in existing roadway rights-of-way in the Whitaker Bayou project area has the potential to provide significant stormwater runoff treatment. Projects selected for the Whitaker Bayou study are concentrated in areas that discharge to main canals and larger project areas. Each of these project areas has a contributing basin and opportunities to construct bio-swales in road rights-of-way should be identified in the upstream areas so that stormwater runoff can be retained upstream of the discharge point in the canal. Runoff volumes can be reduced and contact time (treatment) increased ultimately reducing volume and pollutant load on the main canal system.

Generally, runoff from the contributing basins drains to a series of canals, into the main Whitaker Bayou channel which runs north to southwest from University Parkway to U.S. 41 and ultimately to Sarasota Bay without the benefit of a designed treatment system. Construction of bio-swales in the road rights-of-way will provide collection areas for the initial roadway runoff, the “first flush”, which is considered the most polluted runoff resulting from rainfall. By collecting the first flush in the bio-swales, the runoff will be held for treatment by means of natural percolation and plant uptake while providing an opportunity for suspended solids to settle out.

Baffle Boxes

The use of baffle boxes or nutrient separation boxes provides treatment for areas with limited rights-of-way. Nutrient separation boxes have a mechanical system which includes a basket to capture trash and organic matter such as leaves in low flows and provides a bypass for high flows so as to minimize head loss in the structure. The structure also has a chamber or sump area providing an opportunity for suspended solids to settle out. Cost of maintaining the structures will be dependent on the amount of material collected in the basket and the sump.

Baffle boxes are structures with a chamber or sump area providing an opportunity for suspended solids to settle out (Figure 3). Head losses in the structure are more constant because the variability of volume of debris in the basket is not a factor; however the debris has a greater chance of being conveyed into the receiving water. Use of baffle boxes or nutrient separation boxes would be limited to those drainage basins where the right-of-way is restricted and the use of bio-swales is limited.

Catch Basin Baskets

Catch basin baskets can be installed in the existing inlets. The intent of the basket is to capture trash and organic material preventing transport to the bay. The stormwater runoff will bypass the basket once the basket is filled with trash and organic debris and can re-suspend debris from the basket making the efficiency of removal unreliable. Baskets can have significant maintenance costs associated with the routine removal of the debris. Maintenance costs tend to increase in areas with mature trees that produce significant leaf litter. If neighborhood programs where residents volunteer to clean out the debris can be established, maintenance costs can be reduced.

Pervious Pavement

Pervious pavement allows rain to percolate into the ground instead of running off its surface, thereby reducing runoff volume. For the Whitaker Bayou project area, there are opportunities for installing pervious pavement to meet multiple-use expectations for the roadway right-of-way. The schools in the Whitaker Bayou watershed may be able to identify areas where they have parking issues at peak drop off and pick up times. The addition of pervious pavement in those areas could provide a dual use for peak hour parking by providing a semi-solid surface on which to park and also would provide some stormwater retention and treatment.

4B. PRIVATE PROPERTY

Low Impact Design and rainwater harvesting options for private property require the property owner to participate financially by being responsible for capital and maintenance costs. However, there are options available to homeowners to help subsidize these costs, for example, Bay Partner Grants from the Sarasota Bay Estuary Program and other possible subsidies from the City of Sarasota, Sarasota County, the Florida Department of Environmental Protection and the Southwest Florida Water Management District. Any of these agencies may be able to secure grants to help defray costs to private land owners. Evidence suggests that homeowners are often willing to participate in stormwater improvement projects in their neighborhoods when they understand their value to the surrounding environment (see for examples, Dietz, *et al.,* 2004; Ferguson, 2004; and Shuster, *et al.,* 2008).

Rain Gardens/Bio-swales

Rain Gardens and bio-swales serve the same functions which are to retain runoff and to promote natural infiltration and plant uptake thereby reducing the amount of pollution reaching the receiving water. Bio-swales tend to be deeper, not vegetated on the bottom, and can include a soil and/or rock filter along the sloped bottom. Rain gardens are shallow and completely vegetated. Rain gardens can be easily incorporated into the landscape of private property to capture overland flow and retain the runoff from the roof top or driveway. Recommended plants for the Whitaker Bayou area are illustrated on Figures 4A and 4B.

Rain Barrels/Cisterns

Above ground barrels (typically 55-gallon capacity) collect runoff from the roof downspout. The stored rainwater can then be used to water landscape features on the property thereby reducing the use of potable water for irrigation.

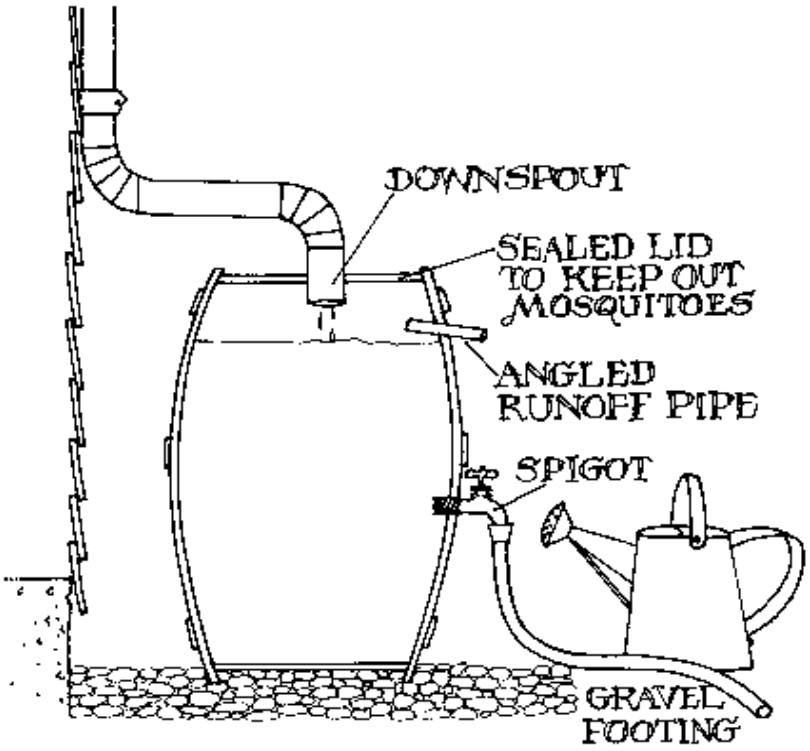


Figure 5. Rain barrel schematic
(Source: M. Smith (1992))

Cisterns can be above or below ground and are designed with a filtration system and can typically hold more water than rain barrels. Cisterns are installed to harvest rainwater for use in the home as well as landscape irrigation.

Pervious Pavement

Driveways and walkways can be replaced with pervious pavement. The rainfall is retained on the property and filters through the material under the pervious pavement and recharges the groundwater. Capital cost and long term maintenance costs may be prohibitive for private property owners and vary depending on selected materials. Pervious pavement requires vacuuming biannually with a commercial cleaning unit to remove grit and gravel that can block infiltration.

Planting Trees

Trees contribute to the beauty of neighborhoods and provide shade that reduces the reflection of heat off of pavement. During rainfall, trees capture and retain some volume of water based on the tree canopy and species. Private property owners should seek advice regarding tree selection and placement so that trees have room to grow without impacting overhead and underground utilities.

Green Roof

Private property owners have the option of constructing a green roof which essentially consists of vegetation that captures and treats rainfall by assimilating the nutrients within it. Care must be taken in the design to insure that the foundation and structure can handle the additional weight and that the roof top provides an effective treatment system. Often green roofs are combined with rain barrels or cisterns for irrigation of the vegetation.

SECTION 5

POTENTIAL PROJECT LOCATIONS

5. POTENTIAL PROJECT LOCATIONS

The following is a list of potential locations for Low Impact Design projects identified in the Whitaker Bayou watershed. The potential locations are further subdivided into project types. The contributing drainage basin for each project was identified and is shown in Figure 6. While all of the projects have potential value to improve the water quality of Whitaker Bayou, eight (shown in **bold type**) were selected for additional analysis and development of a conceptual design and preliminary opinion of probable cost. The locations of the eight conceptual projects are shown in Figure 7.

Greenway Projects

Potential greenway projects are located along the main Whitaker Bayou channel and provide opportunities for both stormwater runoff treatment, educational opportunities, expanded recreational facilities and improved connectivity for neighborhood residents. Greenway projects identified are:

- **Cocoanut Avenue**
- **32nd Street**
- **Dr. Martin Luther King, Jr. Park Area**

Coordination Projects

Potential coordination projects are those that would require incorporation with existing public projects through the formation of public/private partnerships. Coordination projects identified are:

- Dog Track Greenway – coordination with private property owner required. Concepts discussed with SBEP, City and County staffs but have not been discussed with the property owner.
- **North Sarasota Sidewalk Area**

Canal Projects

Potential canal projects involve evaluating canal segments where slope stabilization is needed and searching for locations in the contributing drainage basin to construct bio-swales for treatment of the stormwater runoff prior to discharge into the main canal. The projects would improve water quality and reduce erosion/sediment transport. Canal projects identified are:

- Northgate Center Canal
- Newtown Estates Canal
- Tri Par Estates Canal
- Middle Avenue
- **Spring Oaks Canal**
- 18th Street
- **12th Street and North Shade Area**
- Robert L. Taylor Complex

Stormwater Infrastructure Repair Program (SWIRP) Coordination Projects

Sarasota County has developed a Stormwater Infrastructure Repair Program and has identified areas in the City of Sarasota for evaluation, repair and replacement of stormwater infrastructure. Coordination with the SWIRP program has the potential of identifying areas where treatment of the stormwater runoff may be enhanced with an alternate design of the system. Rather than replacing the worn out stormwater infrastructure in kind, changes in the infrastructure could be designed to provide the conveyance required and improve water quality. SWIRP coordination projects identified are:

- **North Water Tower Park**
- 47th Street (M67)
- Myrtle Street East
- South of Whitaker Bayou

Wetland Opportunities

Wetland enhancements can improve water quality for the entire system. In the Whitaker Bayou watershed, two wetland areas are located on County school properties. The wetlands may have enhancement opportunities and the properties may be modified with bio-swales for additional stormwater runoff treatment. Wetland projects identified are:

- Booker Elementary School Wetland
- **Booker Middle School Wetland**

Other Areas

Other potential LID improvement opportunities were identified in road rights-of-way that may provide treatment for the existing pavement and/or future roadway improvements. These areas include:

- Tuttle Avenue and Myrtle Street
- 47th Street East
- Dr. Martin Luther King, Jr. Way and Tuttle East
- Tuttle and Dr. Martin Luther King, Jr. Way West

Bus Rapid Transit (BRT)

Sarasota County Area Transit (SCAT) is completing an alternatives analysis to examine bus transit service improvements designed to connect major employment and activity centers in a traffic-congested, north-south corridor. The study area begins in northern Sarasota County in the vicinity of the Sarasota Bradenton International Airport, continues south to serve downtown Sarasota, and eventually connects to Sarasota Memorial Hospital and areas farther south.

The Bus Rapid Transit investment in this north-south corridor is aimed at fulfilling adopted policies and goals of Sarasota County, the City of Sarasota and the Sarasota-Manatee Metropolitan Planning Organization (MPO) to manage growth and to foster sustainable economic and community development. The BRT project can use the Whitaker Bayou LID projects to meet requirements for federal matching funds.

The alternatives analysis is examining various transit service improvements to achieve these broad local and regional goals and to boost bus ridership by improving connectivity to key activity centers and bypassing congestion.

Potential Improvements

- Roadway infrastructure enhancements to create a dedicated transit guideway.
- Traffic signal priority for buses at selected intersections.
- Increased bus service frequencies and passenger information systems.
- Improved passenger stations and shelters.

Old Bradenton Road Corridor

The City of Sarasota has contracted with Ayres and Associates to design the Old Bradenton Road project. The project will refresh the corridor by rebuilding the two-lane roadway. Existing drainage patterns will be preserved and bio-swales will be designed between the edge of pavement and the rights-of-way lines where space is available. Landscape plans will include specifications of plants for the bio-swales. The road will be milled and resurfaced where possible and reconstructed including the base as required. Roundabouts will be designed for the Myrtle Street and the 47th Street intersections while the Mecca Drive intersection will remain a two way stop. The design will include lighting and pedestrian crossings and medians from 32nd Street to University Parkway.

Dr. Martin Luther King, Jr. Way

Enhancements to the Dr. Martin Luther King, Jr. Way corridor between U.S. 41 and Leon Avenue, just east of the Seminole Railroad right-of-way can be designed using Low Impact Design techniques to improve the quality of the stormwater runoff. Opportunities could include construction of roundabouts to reduce car idle time and improve pedestrian safety near the MLK Park and for the students at Ringling College. Bio-swales could provide treatment for runoff that is currently untreated and enhance the aesthetics of the corridor. The corridor should be reviewed to improve the connectivity to the proposed Bus Rapid Transit corridor as the BRT project anticipates a loading/unloading area at Dr. Martin Luther King, Jr. Way. The corridor could be a gateway to the Whitaker Bayou community.

SECTION 6

PROJECT DESCRIPTIONS AND COST ESTIMATES

6. PROJECT DESCRIPTIONS AND COST ESTIMATES

6A. NORTH WATER TOWER PARK (FIGURE 8)

Stormwater runoff from North Tamiami Trail (U.S. 41) between Beverly Drive and 40th Street is routed east through pipes and for the most part is discharged untreated to Whitaker Bayou. Currently runoff from 38 acres of the North Trail and adjacent properties is routed through a 48" pipe to a canal that flows through the southern portion of North Water Tower Park (NWT Park). NWT Park is essentially a passive park with walking trails and an eighteen-hole disc golf course. Runoff from the North Trail is "flashy" and contact time in the canal is limited due to periodic high volumes and flows of runoff. Water quality treatment in the canal could be improved.

There are opportunities to incorporate Low Impact Design (LID) improvements at NWT Park that will provide additional treatment of stormwater. For example, flow from the North Trail can be split into a bypass system and a portion of the stormwater runoff can be directed along 47th Street to the northern end of NWT Park. If it is economically feasible, a second stormwater pipe could be added in the 46th Street right-of-way to direct runoff to the central NWT Park area. Treatment would be provided by creating bio-swales through the Park and planting them with native vegetation. LID improvements can be made without impacting the current uses of the NWT Park by incorporating them into the existing disc golf course and constructing them adjacent to the trails to enhance the aesthetic experience of walking through the park. LID improvements would enhance the park by providing additional landscaped features designed as dry retention. LID/Park improvements could also include removing existing nuisance and invasive vegetation which would open the landscape vista and enhance safety in the park.

With the construction of bypass systems, the flows from the North Trail to the existing 48" pipe would be reduced. Regrading or armoring the side slopes in the canal that passes through NWT Park would provide stabilization which would reduce bank erosion and save existing trees. Modifying the cross section of the existing canal would slow flows and increase contact (treatment) time. This canal would receive the runoff redirected along 47th Street and 46th Street, but the peak volumes in the existing ditch would change based on the created retention and the increased contact time. Co-location of water quality treatment systems with the trails in the Park provides a higher use and a potential economic benefit.

The potential economic benefit could be realized by providing the means for revitalization of the North Trail area. The North Trail Redevelopment Committee has been searching for ways to improve the North Trail to encourage economic redevelopment. One obstacle is the regulatory requirement to treat on-site any stormwater generated by redevelopment and providing the required treatment on individual lots can be costly and land-use intensive. The opportunity to create additional stormwater treatment capacity in a regional system like North Water Tower Park could offset some of the treatment required for redevelopment of the North Trail area. Regional systems tend to provide a greater value by concentrating facilities in one place to reduce overall construction and maintenance costs. If this plan is implemented, it may be possible to establish stormwater "credits" that persons wanting to develop in the North Trail area could purchase to offset their stormwater treatment requirements. Credits would be purchased and the funds could help offset the initial capital and future maintenance costs. A regional approach to the stormwater treatment needs of the North Trail area would eliminate the problem faced by each property owner to treat stormwater on his/her redeveloped property.

The primary permitting agency for a regional system is SWFWMD. The concept of a regional treatment system for the North Trail area has been discussed with SWFWMD staff at the Sarasota Service Office and the response was positive, with staff willing to help structure and process the required permit. The concept has also been discussed with and is supported by City staff (Glen Marzluf, Ryan Chapdelain and Todd Kucharski). The project may be eligible for up to a $200,000 Community Development Block Grant as discussed with Debra Figueroa.

Photograph 1. North Water Tower Park – 42nd Street looking west

Photograph 2. North Water Tower Park – 42nd Street looking east

Photograph 3. North Water Tower Park – Royal Palm Avenue looking south

Preliminary Opinion of Probable Cost

NORTH WATER TOWER PARK				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 25,000.00	1.00	$ 25,000
Clearing and Grubbing	AC	$ 5,000.00	3.30	$ 16,500
Staked Silt Fence	LF	$ 3.00	4000.00	$ 12,000
Floating Barrier	LF	$ 8.00	150.00	$ 1,200
Excavation	CY	$ 15.00	4000.00	$ 60,000
Embankment	CY	$ 15.00	500.00	$ 7,500
24" RCP	LF	$ 75.00	2700.00	$ 202,500
Manholes	EA	$ 2,500.00	8.00	$ 20,000
Control Structures	EA	$ 2,500.00	4.00	$ 10,000
6"PVC pipe	LF	$ 17.00	300.00	$ 5,100
Scarification	SY	$ 2.50	7260.00	$ 18,150
Plantings	SY	$ 3	10890.00	$ 32,670
Sod	SY	$ 2.50	3600.00	$ 9,000
Temp Irrigation	LS	$ 8,000.00	1.00	$ 8,000
Final Design and Permitting	LS	$ 85,524.00	1.00	$ 85,524
Subtotal				$ 513,144
20% Contingency				$ 102,629
Total Cost				$ 615,773

6B. DR. MARTIN LUTHER KING, JR. (MLK) PARK AREA (FIGURE 9)

The City of Sarasota owns MLK Park which is located on the southwest corner of Dr. Martin Luther King, Jr. Way and Cocoanut Avenue along with the parcel on the southeast corner of Dr. Martin Luther King, Jr. Way and Cocoanut Avenue. Scheda Ecological Associates, Inc. and Brown and Caldwell, (2010), recommended improvements to the shore line in the MLK Park including removing the seawall along the southern shoreline, removing exotic plants along the northern shoreline to the bridge and installing a canoe/kayak launch. At this time, the City of Sarasota has plans for the canoe/kayak launch and anticipates construction in 2013.

In addition to the improvements recommended by the Scheda/Brown and Caldwell report, (which WilsonMiller Stantec supports) the project should include slope stabilization along the entire shoreline. Construction of a bio-swale on the parcel on the southeast corner would provide treatment for a portion of the existing impervious area of Dr. Martin Luther King, Jr. Way. Proposed improvements are illustrated in the conceptual plan for Dr. Martin Luther King, Jr. Park. As part of the park improvements, the addition of dog waste stations provide the public with the opportunity to improve the water quality of Whitaker Bayou by collecting and disposing of pet waste rather than stormwater runoff washing it into the Bayou.

Photograph 4. MLK Park – Dr. Martin Luther King, Jr. Way looking south

Photograph 5. MLK Park – Walker Circle looking north

Preliminary Opinion of Probable Cost

DR. MARTIN LUTHER KING JR. PARK				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 10,000	1	$ 10,000
Clearing and Grubbing	AC	$ 5,000	0.08	$ 400
Staked Silt Fence	LF	$ 3	840	$ 2,520
Floating Barrier	LF	$ 8	240	$ 1,920
Excavation	CY	$ 15	930	$ 13,950
Embankment	CY	$ 15	400	$ 6,000
Seawall Removal	LF	$ 25	230	$ 5,750
Plantings	SY	$ 3	1400	$ 4,200
Sod	SY	$ 2.50	100	$ 250
Final Design and Permitting	LS	$ 22,495	1	$ 22,495
Subtotal				$ 67,485
20% Contingency				$ 13,497
Total Cost				$ 80,982

6C. 32nd STREET (FIGURE 10)

Scheda Ecological Associates, Inc. and Brown and Caldwell, (2010), recommended improvements to property just south of 32nd Street and north of North Riverside Drive including installing a bio-swale, protecting trees, installing educational signs, creating a wetland treatment cell off the main channel, and regrading the main channel along the existing property lines to the east.

In addition to the recommended improvements suggested by Scheda/Brown and Caldwell, opportunities to construct bio-swales in the upper reaches of the contributing drainage basin should be identified and access to the project area could be enhanced by constructing pervious sidewalks or trails. The pervious pathway could connect a Low Impact Design/shoreline restoration project to a parcel owned by the City of Sarasota along North Lemon Avenue and could include an educational kiosk and signs. Addition of dog waste stations along the pervious sidewalk and an education station dedicated to explaining the benefits of the dog waste station could be incorporated into this educational focus.

The 32nd Street project area and the North Lemon Avenue parcel is less than a mile from the Bay Haven Elementary School and Booker High School; 1.4 miles from Booker Elementary School; and 1.6 miles from Booker Middle School. The education kiosk can provide a destination for learning about water quality, the environment and the value of Whitaker Bayou. The sidewalk or trail connection could continue south on North Lemon Avenue to the future BRT transfer station at Dr. Martin Luther King, Jr. Way and provide greater access to the educational kiosk for all Sarasota County residents.

Photograph 6. 32nd Street looking south

Photograph 7. 32nd Street – North Riverside Drive looking north

Photograph 8. 32nd Street – North Lemon Avenue – City Owned Property

Preliminary Opinion of Probable Cost*

32nd STREET				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 25,000	1	$ 25,000
Clearing and Grubbing	AC	$ 5,000	1.2	$ 6,000
Staked Silt Fence	LF	$ 3	800	$ 2,400
Floating Barrier	LF	$ 8	160	$ 1,280
Excavation	CY	$ 15	890	$ 13,350
Embankment	CY	$ 15	300	$ 4,500
Control Structures	EA	$ 2,500.00	2.00	$ 5,000
Pervious Pavement	SY	$ 75	3100	$ 232,500
6"PVC pipe	LF	$ 17	100	$ 1,700
Scarification	SY	$ 2.50	550	$ 1,375
Plantings	SY	$ 3	700	$ 2,100
Sod	SY	$ 2.50	1500	$ 3,750
Temp Irrigation	LS	$ 8,000	1	$ 8,000
Final Design and Permitting	LS	$ 61,391	1	$ 61,391
Subtotal				$ 368,346
20% Contingency				$ 73,669
Total Cost				$ 442,015

**does not include probable cost for kiosk design and construction*

6D. COCOANUT AVENUE AREA (FIGURE 11)

The Cocoanut Avenue project is located between 32nd Street (just north of the 32nd Street project) and Myrtle Street to the north. Cocoanut Avenue runs north – south along the west side of the main Whitaker Bayou channel for approximately 1,240 feet. Four east-west streets intersect Cocoanut Avenue. Of eleven parcels on the west side of Cocoanut Avenue, only five driveways access Cocoanut Avenue and four of the five properties also have frontage on an east-west road. On the east side of the main Whitaker Bayou channel, Clark Drive runs north-south between 32nd Street and Myrtle Street with eleven properties fronting only Clark Drive. Both of the two parallel streets may not be necessary for traffic flow. By removing a portion of Cocoanut Avenue, impervious area is reduced and the area can be restored to a pervious cover. A secondary option may be to change both streets to one-way traffic and remove the excess impervious pavement.

The Whitaker Bayou channel in this location has steep slopes and problems with erosion. The conceptual project is to reclaim the Cocoanut Avenue road right-of-way and construct bio-swales and a pervious sidewalk and to use some of the area for slope stabilization by regrading. The area has stands of mature trees that should be protected. The use of the Cocoanut Avenue right-of-way would provide a linear park amenity for the neighborhood and improve water quality using bio-swales and slope stabilization. Dog waste stations could be added to provide the public with the opportunity to improve the water quality of Whitaker Bayou by collecting and disposing of pet waste rather than stormwater runoff washing the pet waste into the Bayou.

Reclaiming the Cocoanut Avenue right-of-way would require discussions with the property owners with special attention given to the properties with driveway access off of Cocoanut Avenue. Open discussions with emergency services, City staff and other interested parties would be held to ensure public health, safety and welfare are not compromised.

Photograph 9. Cocoanut Avenue – At 32nd Street looking north

Photograph 10. Cocoanut Avenue – At Myrtle Street looking south

Preliminary Opinion of Probable Cost

COCOANUT AVE				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 25,000	1	$ 25,000
Clearing and Grubbing	AC	$ 5,000	0.75	$ 3,750
Asphalt Removal	SY	$ 5	3250	$ 16,250
Staked Silt Fence	LF	$ 3	2400	$ 7,200
Floating Barrier	LF	$ 8	200	$ 1,600
Excavation	CY	$ 15	360	$ 5,400
Embankment	CY	$ 15	60	$ 900
Control Structures	EA	$ 2,500.00	4.00	$ 10,000
Channel Slope Stabilization	SY	$ 50	3500	$ 175,000
Pervious Pavement	SY	$ 75	1100	$ 82,500
Driveway Replacement	SY	$ 35	650	$ 22,750
6"PVC pipe	LF	$ 17	300	$ 5,100
Scarification	SY	$ 2.50	1000	$ 2,500
Plantings	SY	$ 3	1440	$ 4,320
Sod	SY	$ 2.50	1000	$ 2,500
Temp Irrigation	LS	$ 8,000	1	$ 8,000
Final Design and Permitting	LS	$ 74,554	1	$ 74,554
Subtotal				$ 447,324
20% Contingency				$ 89,465
Total Cost				$ 536,789

6E. SPRING OAKS CANAL (FIGURE 12)

The Spring Oaks Canal project is located north of Booker Middle School, south of 47th Street between Highway 301 and Tuttle Avenue. Currently, the main canal conveys water from as far as Lockwood Ridge Road through the Spring Oaks development and continues through a canal that ultimately drains to the main Whitaker Bayou waterway. In the immediate project area, stormwater from the Spring Oaks development drains to the roadways which are graded towards the canal and the runoff collects in cul-de-sacs. Inlets at the end of the cul-de-sacs drain the water to the 80-foot wide drainage easement and into the canal. The Spring Oaks development was constructed prior to stormwater treatment regulations.

Recommended project improvements include a series of bio-swales along the west side of the main canal to provide treatment for runoff from the Spring Oaks development and slope stabilization along the west side of the main canal by regrading or armoring as required to protect the mature trees on the east side of the main channel. In addition, bio-swales may be constructed in a 50-foot wide drainage easement along the north side of the Spring Oaks development to provide water quality treatment for 47th Street and portions of Shade Avenue. A pervious sidewalk or trail can be constructed and wind through the bio-swales to provide a linear park area and improve pedestrian connectivity.

The proposed design can incorporate an educational kiosk to provide information on the function and value of the bio-swales and the pervious sidewalks along with information on rainwater harvesting and tree preservation. Dog waste stations along the pervious sidewalk and educational information dedicated to explaining the benefits of the dog waste station could be incorporated into the kiosk. This kiosk would provide an educational destination less than a mile from Booker Middle School and Emma Booker Elementary school where students could learn about the environment and how they can help improve the water quality of Whitaker Bayou and Sarasota Bay.

Photograph 11A. Spring Oaks Canal - Seward Drive looking north

Photograph 11B. Spring Oaks Canal – Ashberry Circle

Preliminary Opinion of Probable Cost*

SPRING OAKS CANAL				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 25,000	1	$ 25,000
Clearing and Grubbing	AC	$ 5,000	1.65	$ 8,250
Staked Silt Fence	LF	$ 3	4000	$ 12,000
Floating Barrier	LF	$ 8	160	$ 1,280
Excavation	CY	$ 15	2800	$ 42,000
Embankment	CY	$ 15	500	$ 7,500
Curb Cuts	EA	$ 120	10	$ 1,200
Control Structures	EA	$ 2,500.00	4.00	$ 10,000
Channel Slope Stabilization	SY	$ 50	6400	$ 320,000
Pervious Pavement	SY	$ 75	2500	$ 187,500
6"PVC pipe	LF	$ 17	400	$ 6,800
Scarification	SY	$ 2.50	1650	$ 4,125
Plantings	SY	$ 3	2600	$ 7,800
Sod	SY	$ 2.50	2220	$ 5,550
Temp Irrigation	LS	$ 12,000	1	$ 12,000
Final Design and Permitting	LS	$ 130,201	1	$ 130,201
Subtotal				$ 781,206
20% Contingency				$ 156,241
Total Cost				$ 937,447

**does not include probable cost for kiosk design and construction*

6F. BOOKER MIDDLE SCHOOL AND WETLAND (FIGURE 13)

Booker Middle School (BMS) is located on the north side of Myrtle Street between Highway 301 and Tuttle Avenue with the Spring Oaks development to the north. BMS was constructed in the early 1990s and an addition was constructed in 2004. The school property has an existing stormwater management system and over 8 acres of wetlands. BMS is just upstream of the Spring Oaks Canal project area and the stormwater management system and the wetland discharge into the canal on the east side of the property.

Recommended project improvements include construction of bio-swales at two roadway access points along Seward Drive and in the Myrtle Street medians. The existing stormwater management system for BMS can be enhanced with plantings to create bioretention areas in the three dry retention areas along the north side of Myrtle Street and there is an additional opportunity to construct a bio-swale along the west side of the canal at the north east corner of the BMS property. The wetland on the BMS property may be enhanced by removing nuisance and exotic vegetation and replacing it with native species.

The proposed design can incorporate an educational focus with signage and kiosks to provide information on the function and value of the bio-swales and explain the function of wetlands with additional information about the enhancements to the wetlands. This kiosk would provide an educational destination less than a half-mile from Booker Middle School and Emma Booker Elementary school where students could learn about the environment and how they can help improve the water quality of the Whitaker Bayou and Sarasota Bay.

Photograph 12. Booker Middle School

Preliminary Opinion of Probable Cost*

BOOKER MIDDLE SCHOOL and WETLAND				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 15,000	1	$ 15,000
Clearing and Grubbing	AC	$ 5,000	1.6	$ 8,000
Staked Silt Fence	LF	$ 3	975	$ 2,925
Floating Barrier	LF	$ 8	80	$ 640
Excavation	CY	$ 15	830	$ 12,450
Embankment	CY	$ 15	150	$ 2,250
6"PVC pipe	LF	$ 17	200	$ 3,400
Removal of Exotics	AC	$ 5,000	8	$ 40,000
Scarification	SY	$ 2.50	5000	$ 12,500
Plantings	SY	$ 3	6300	$ 18,900
Sod	SY	$ 2.50	1300	$ 3,250
Temp Irrigation	LS	$ 8,000	1	$ 8,000
Final Design and Permitting	LS	$ 38,195	1	$ 38,195
Subtotal				$ 165,510
20% Contingency				$ 33,102
Total Cost				$ 198,611

**does not include probable cost for kiosk design and construction*

6G. NORTH SARASOTA SIDEWALK AREA (FIGURE 14)

Sarasota County has designed and constructed more than three miles of sidewalks in the north Sarasota area south of Dr. Martin Luther King, Jr. Way, west of North Washington Boulevard. north of 17th Street, and east of Tuttle Avenue, including widening of North Euclid Avenue between 17th Avenue and Dr. Martin Luther King, Jr. Way and widening of Mango Avenue from Dr. Martin Luther King, Jr. Way to 19th Street. The construction is part of the Sidewalks to Schools Program for safe walking routes to schools. The construction included a stormwater management system consisting of multiple roadside swales for collection and conveyance of the stormwater runoff to a stormwater pond and two dry retention areas for water quality treatment. The treatment volume provided was designed to treat an equivalent area to the new impervious area constructed for the North Euclid Avenue and Mango Avenue improvements and the roadway swales were constructed for conveyance only and do not retain stormwater runoff volume for treatment.

The existing stormwater management system for the roadway improvements can be enhanced with plantings to create bioretention areas in what are currently dry retention depressions. The channel in Tributary B of Whitaker Bayou can be evaluated to determine slope stabilization requirements by regrading the side slopes or armoring as required to protect the mature trees on the south side of the main channel. Additional bio-swales can be located on the south side of the main canal.

The roadside swales can be evaluated to determine seasonal high water elevations and percolation rates to determine if the swales could be converted to bio-swales. If the roadway swales can percolate excess stormwater, the ditch bottom inlet structures can be raised so that runoff from the existing roadway pavement areas could be retained, increasing contact time in the roadside swales. Bio-swale plantings can be installed to provide additional water quality treatment.

Again, the project area can incorporate an educational kiosk to provide information on the function and value of the bio-swales. This kiosk would provide an educational destination less than a half-mile from Booker Middle School and Emma Booker Elementary school where students could learn about the environment and how they can help improve the water quality of the Whitaker Bayou and Sarasota Bay.

Photograph 13. North Sarasota Sidewalk Area - Intersection of 24th Street and Booker Avenue, facing southeast

Preliminary Opinion of Probable Cost*

NORTH SARASOTA SIDEWALK AREA				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 15,000	1	$ 15,000
Clearing and Grubbing	AC	$ 5,000	1.00	$ 5,000
Staked Silt Fence	LF	$ 3	100	$ 300
Floating Barrier	LF	$ 8	80	$ 640
Excavation	CY	$ 15	1100	$ 16,500
Embankment	CY	$ 15	300	$ 4,500
Curb Cuts	EA	$ 120	2	$ 240
6"PVC pipe	LF	$ 17	60	$ 1,020
Channel Slope Stabilization	SY	$ 50	2900	$ 145,000
Scarification	SY	$ 2.50	2400	$ 6,000
Plantings	SY	$ 3	3400	$ 10,200
Sod	SY	$ 2.50	1020	$ 2,550
Temp Irrigation	LS	$ 8,000	1	$ 8,000
Final Design and Permitting	LS	$ 42,990	1	$ 42,990
Subtotal				$ 257,940
20% Contingency				$ 51,588
Total Cost				$ 309,528

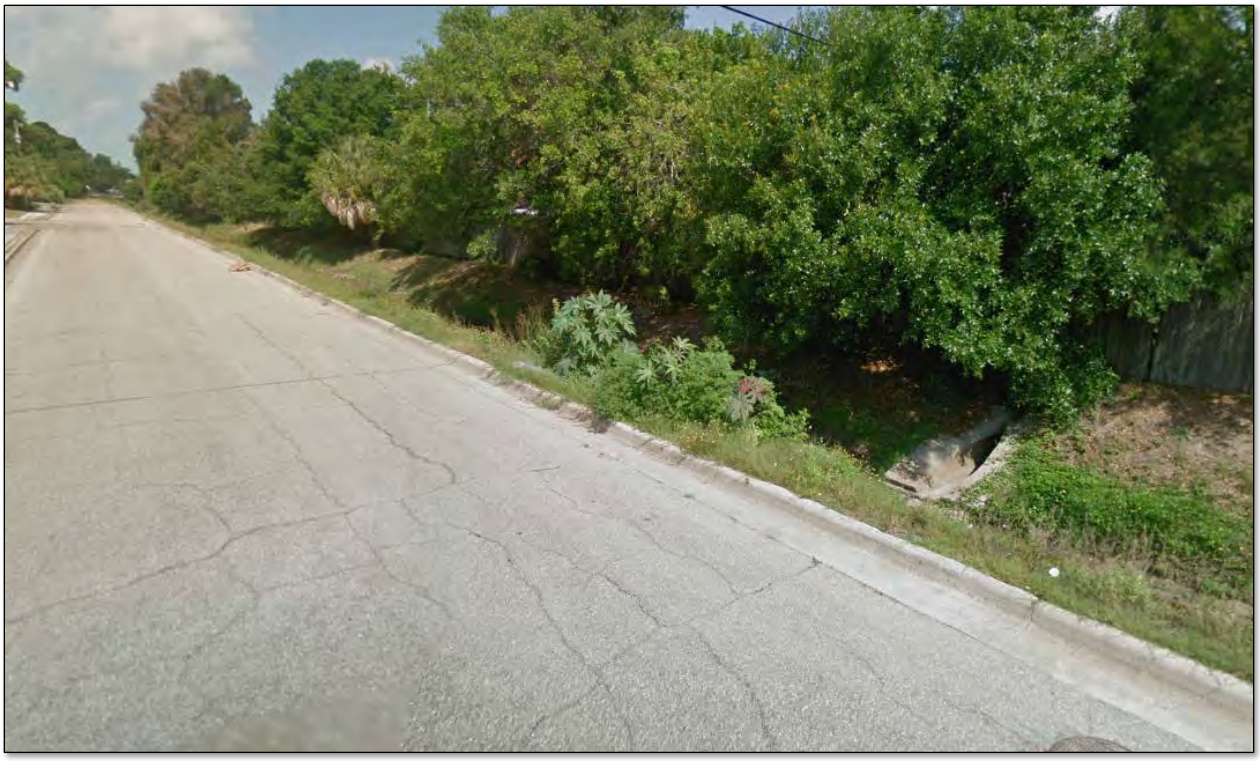
**does not include probable cost for kiosk design and construction*

6H. 12TH STREET AND NORTH SHADE AVENUE (FIGURE 15)

The 12th Street and North Shade Avenue project area is located south of 17th Street, east of Highway 301, north of Fruitville Road and west of Tuttle Avenue. In existing conditions, the main drainage ditch is located in the North Shade Avenue right-of-way. The right-of-way width is 60 feet between 10th Street and 17th Street and is 40 feet wide between 10th Street and 8th Street. The surrounding parcels are light industrial use with minimal stormwater management or treatment facilities. Most of the development was constructed prior to stormwater treatment regulations.

Recommended project improvements include a series of bio-swales along the north side of 8th Street; along the north and south sides of 11th Street; and along the north and south sides of 15th Street. In the North Shade Avenue right-of-way there are opportunities to include LID improvements between 8th Street and 17th Street. Slope stabilization of the drainage ditch between 15th Street and 17th Street would involve regrading the side slopes or armoring as required to protect the mature trees. In addition, bio-swales may be feasible in the North Shade Avenue road right-of-way between 8th Street and 15th Street. A pervious sidewalk or trail can be constructed along the south side of 15th Street to connect existing sidewalk to North Euclid Avenue improving the pedestrian connectivity for the businesses and residents.

Photograph 14. 12th Street and North Shade Avenue



Photograph 15. 12th Street and North Shade Avenue at 11th Street and Lewis Avenue

Preliminary Opinion of Probable Cost

12th STREET and N SHADE AVENUE				
ITEM	UNITS	UNIT COST ($)	QTY	COST ($)
Mobilization	EA	$ 15,000	1	$ 15,000
Clearing and Grubbing	AC	$ 5,000	1.75	$ 8,750
Staked Silt Fence	LF	$ 3	100	$ 300
Floating Barrier	LF	$ 8	80	$ 640
Excavation	CY	$ 15	2300	$ 34,500
Embankment	CY	$ 15	350	$ 5,250
Curb Cuts	EA	$ 120	16	$ 1,920
6"PVC pipe	LF	$ 17	300	$ 5,100
Channel Slope Stabilization	SY	$ 50	2900	$ 145,000
Pervious Pavement	SY	$ 75	700	$ 52,500
Scarification	SY	$ 2.50	3500	$ 8,750
Plantings	SY	$ 3	5400	$ 16,200
Sod	SY	$ 2.50	2190	$ 5,475
Temp Irrigation	LS	$ 12,000	1	$ 12,000
Final Design and Permitting	LS	$ 62,277	1	$ 62,277
Subtotal				$ 373,662
20% Contingency				$ 74,732
Total Cost				$ 448,394

SECTION 7

WHITAKER BAYOU GREENWAY

7. WHITAKER BAYOU GREENWAY

Introduction and Study Area

A greenway typically consists of a long narrow corridor that can provide pedestrian access along an amenity such as a waterway, or the greenway can be an amenity itself, such as when one is created to provide hiking or biking opportunities through urban landscapes (e.g., Rails to Trails) or to provide a travelway for wildlife. WilsonMiller Stantec was asked to investigate developing a greenway for pedestrian access along Whitaker Bayou. An assessment of feasibility started with a definition of waterway boundaries and was followed by a search of property ownership. Whether other existing or proposed local government projects potentially could be connected to the greenway was also considered.

WilsonMiller Stantec limited its greenway feasibility study to the main Whitaker Bayou channel only (Figure 1) and did not include the numerous ditches that have been excavated and connected to the Bayou over the last 50 years (primarily to convey stormwater), or any of the main tributaries. These areas were considered the least scenic along the Bayou and therefore not compatible with the greenway concept. For purposes of this analysis, the origin of Whitaker Bayou is located southeast of the Sarasota Bradenton International Airport. It flows south through the Sarasota Kennel Club, where it is essentially contained within a ditch that bisects the Kennel Club's parking lot. From there, Whitaker Bayou continues to flow south within a shallow, narrow channel through highly urbanized neighborhoods. Channel banks are mostly sloped steeply and intersect a box-cut configured channel bottom. The adjacent uplands are heavily vegetated throughout much of its course in the upper reaches with intermittent shoreline hardening adjacent to mostly privately owned properties. The channel widens at the Dr. Martin Luther King, Jr. Way Bridge and passes Dr. Martin Luther King, Jr. Park on the east and Ringling College of Art and Design on the west. From this point south and west to its terminus at Sarasota Bay, Whitaker Bayou is a shallow waterway with a mostly hardened shoreline. Uplands consist primarily of private residences with manicured lawns.

Incorporation of Other Projects

A. Sarasota County is investigating options to build a Bus Rapid Transit (BRT) system in the north part of the County. The preferred route would begin at General Spaatz Boulevard immediately north of the New College Campus and extend south to an existing bus transfer site on Southgate Drive. The main corridor would essentially align with the railroad right-of-way between DeSoto Road and 20th Street. The railroad right-of-way is owned by CSX Corporation, and Seminole-Gulf Railway has a long term lease on the corridor. Sarasota County is currently developing strategies to meet the local funding match requirements for funding assistance from the Federal Transit Administration to begin developing the project. While the proposed corridor is not adjacent to Whitaker Bayou, connections could be made through neighborhoods from points along the BRT to Whitaker Bayou.

B. The City of Sarasota adopted a Parks and Connectivity Master Plan in 2008 and as partial fulfillment of that plan has earmarked funding in its 2017 Capital Improvements Budget from the one-cent sales tax initiative for creating greenways and trails. The scope is currently undefined.

C. As part of its adopted Parks and Connectivity Master Plan, the City has identified and has sought funding to construct 7 canoe/kayak launching facilities. One of those sites is at Dr. Martin Luther King, Jr. Park which is on the southeast quadrant of the intersection of Whitaker Bayou and Dr. Martin Luther King, Jr. Way, about three-quarters of a mile upstream of the Bayou's confluence with Sarasota Bay. Construction of the approximately $39,000 facility is scheduled to begin in 2013.

D. Whitaker Bayou is a component of the Sarasota Bay Blueway Trail. Canoeists or kayakers could launch at the Centennial Park Boat Ramp and then paddle north approximately ½ mile following the shoreline into Whitaker Bayou. The trail narrows into what is primarily an improved drainage canal north of Martin Luther King, Jr. Park, where visibility is limited by the high-sided banks and navigation is limited by a shallow and narrow channel.

E. The Ringling School of Art and Design is a private, not-for-profit college located on a 35-acre campus adjacent to Whitaker Bayou. The campus has about 1500 feet of shoreline along the Bayou, most of it hardened with seawall. Because the campus is privately owned, it is not a good candidate for incorporating into a greenway (see Constraints Section); however, community members are always welcome to come to the campus for a guided tour.

F. The City of Sarasota owns numerous parcels contiguous with and proximal to Whitaker Bayou (Figure 16). While the sites are not extensive enough to create a connected walkway along the Bayou, they may be good candidates for locating Low Impact Design stormwater improvements (e.g., water quality improvement features) that could also serve as amenities from which the public could enjoy views of the Bayou. The shorelines at most of these sites could be enhanced to improve water quality or to provide additional habitat. For example, softening the shorelines by removing the hardened fixtures currently in place or expanding unhardened shorelines landward and planting the newly created areas with native vegetation can provide additional aquatic habitat for fish and wildlife. Installing constructed reef modules in front of existing hardened shorelines can also enhance habitat value. Descriptions of those parcels and potential uses are as follows:

1. **Parcel 2006-09-0063 (± 0.16 acre)**

   Location: Northeast side of the North Tamiami Trail Bridge crossing at Whitaker Bayou. Its southwest edge is a potential location for shoreline enhancements or bioretention features.

2. **Parcel 2024-12-0032 (± 0.12 acre)**

   Location: West side of Panama Drive; east of Whitaker Bayou and northeast of North Tamiami Trail. The parcel has potential for shoreline enhancements or bioretention features.

3. **Parcel 2024-04-0075 (± 2.13 acres)**

   Location: Southeast quadrant at the Martin Luther King, Jr. Way crossing at Whitaker Bayou, immediately across the bayou from the Ringling School of Art and Design. This is the City of Sarasota's Martin Luther King, Jr. Park, a passive park with restrooms, open grassed play areas and a parking lot. It is the site of the City's proposed kayak launch as part of its Blueways expansion plan.

4. **Parcel 2024-04-0044 (± 0.48 acre)**

   Location: East side of Cocoanut Avenue immediately east of Parcel 3. Planned use is currently unknown.

5. **Parcel 2020-11-0001 (± 0.86 acre)**

Location: West of Lemon Ave and east of Whitaker Bayou at the eastern terminus of 31st Street. The parcel is adjacent to existing, unimproved road rights-of-way connecting to Parcel 2020-12-0016 and could be incorporated into a passive park with water quality improvement features. The parcel provides an opportunity to include kiosks, walking paths and educational signage to enhance the neighborhood.

6. **Parcel 2020-12-0016 (±0.69 acre)**

Location: West of Lemon Ave, west of Whitaker Bayou between 31st Street and 32nd Street (Photograph 16). The parcel is adjacent to existing, unimproved road rights-of-way connecting to Parcel 2020-11-0001 and could be incorporated into a passive park with water quality improvement features. Parcel 2020-12-0016 is the location identified for a conceptual design for the "Whitaker Bayou 32nd Street Greenway Park" developed in a report prepared for the Sarasota Bay Estuary Program by Scheda Ecological Associates, Inc. and Brown and Caldwell (2010). WilsonMiller Stantec has recommended additional improvements at this site (Section 6C.).

Photograph 16. On 32nd Street Bridge, facing south. Bayou is immediately east (left) of trees in the foreground. Note vacant, City-owned property to the west (right) of the Bayou.

7. Parcel 2020-04-0059 (± 0.18 acre)

Location: Directly south of the Cocoanut Avenue and Myrtle Street intersection. The section of Whitaker Bayou adjacent to this parcel is a candidate for shoreline enhancements. The parcel provides an opportunity to provide a trail head with parking for access to the Whitaker Bayou recreational features including the proposed linear park along Whitaker Bayou between 32nd Street and Myrtle Street. The parking area could incorporate bioretention for treatment of the new impervious surfaces. The linear park is located on the west side of Whitaker Bayou along Cocoanut Avenue. The Bayou is essentially an improved ditch in this area, but its banks are lined with mature trees (Photographs 17 and 18), making the corridor a pleasant place to walk.

Photograph 17. On 32nd Street Bridge, facing north. Note tree-lined corridor on both sides of the Bayou; Linear Park would be on the west (left) side of the Bayou.

Photograph 18. East of Cocoanut Avenue (shown on extreme left of photograph) approximately one- half the distance between 32nd Street and Myrtle Street, facing north showing steeply incised shoreline and narrow section of Whitaker Bayou. This stretch of the Bayou would be part of the referenced Linear Park.

Constraints

1. **Property Ownership/Acquisition Costs:** Except for the City-owned properties listed above (which are not contiguous) and a few other rights-of-way, the majority of Whitaker Bayou is lined with privately owned property, making it difficult to create a linear corridor accessible to the public. Complicating matters is that private property ownership lines are difficult to discern in some places where ownership meanders with the shoreline especially where the Bayou is not hardened. Also, it is not likely that a sufficient number of contiguous private property owners would agree to granting easements behind their homes to allow public access. Purchasing enough properties outright to create a significant corridor adjacent to the Bayou would be cost prohibitive even if enough willing sellers could be identified.

2. **Water/Sediment Quality:** The Florida Department of Environmental Protection (FDEP) lists Whitaker Bayou as a Class III waterbody, meaning that it is intended to be safe for recreational uses including water contact sports such as swimming, and it should be suitable to sustain a balanced population of fish and wildlife. The United States Environmental Protection Agency (EPA) lists the designated use of Whitaker Bayou for "Fish and Wildlife Propagation." Both agencies have declared Whitaker Bayou as impaired under their respective rules, i.e., Florida's Impaired Waters Rule (Chapter 62-303, F.A.C.) and a variety of provisions within the Federal Clean Water Act, as amended. An impaired waterbody is one that chronically fails to meet designated water quality standards in one or more parameters for its intended use. Based on State and Federal water quality standards, Whitaker Bayou is impaired for nutrients, dissolved oxygen, fecal coliform bacteria, mercury (in fish tissue) and chlorophyll-a. The impairments do not limit the use of Whitaker Bayou as a feature to be viewed while walking along and adjacent to the greenway except perhaps for aesthetic reasons as discussed in the following section, but they could limit the use of the Bayou as a Blueway since it is not meeting its intended use as a waterbody safe for water contact sports.

   There are very limited sediment quality data available and no recent data. Dixon, *et al*. (1999), reviewed the sediment data in Lowrey, *et al.* (1993) and provided supplemental analyses of additional constituents. Both studies included sample sites in Whitaker Bayou, which included three stations downstream of U.S. 41 in Lowrey, *et al.* (1993) including one in Sarasota Bay, east of the confluence of Whitaker Bayou with the Bay and one station at U.S. 41 in Dixon, *et al*. (1999). Both reports included data on other stations in Whitaker Bayou, but those downstream of the bridge crossing at Dr. Martin King Jr. Way were of most interest because that is the area most likely to be used by recreational boaters.

   Pesticides, polynuclear aromatic hydrocarbons (PAH) and metals are the main constituents of concern in terms of sediment quality and while chlorinated pesticides were found by Lowrey *et al.* (1993) previous sources have apparently been reduced significantly because Dixon *et al.* (1999) found no chlorinated pesticides above detection limits in their Whitaker Bayou samples. The sediment sample collected by Dixon, *et al*. (1999) at the U.S. 41 station exceeded the Probable Effects Level (PEL) for 8 of the 18 PAH compounds tested and an additional compound (anthracene) exceeded the Threshold Effects Level (TEL). Sediments at the same station were above TEL for copper and zinc. Sediment collected by Lowrey *et al.* (1993) at a station downstream of U.S. 41 near a marina all exceeded TEL or PEL for concentrations of copper, lead and zinc, while none of these constituents exceeded either level in samples collected at the mouth of Whitaker Bayou, immediately downstream of the "marina" site.

Differences in concentrations of virtually all of the common constituents sampled were noted between the two studies. Factors contributing to the differences include small samples sizes and the time that elapsed between the two studies. The latter is significant because changes in land uses and regulations controlling discharges, and types of industries within the watershed change over time, and can lead to significant decreases in certain constituents. Also, as Dixon, *et al.* (1999) point out, water and sediment chemistries, sediment size and type, and flow rates play significant roles in the concentrations of the metals, pesticides and PAHs sampled and their movement downstream. Even though it has been over a decade since sediments were tested throughout the watershed, the data that are available suggest that sediment quality in sections of Whitaker Bayou has been compromised. That, along with conclusive evidence of nutrient enrichment in the surface water, points to the need for further study prior to promoting Whitaker Bayou as an area for watersports, especially those involving contact with the water or sediment. Further study is also warranted prior to embarking on plans to dredge the Bayou because the extent of contamination greatly affects costs of transporting and disposing the material.

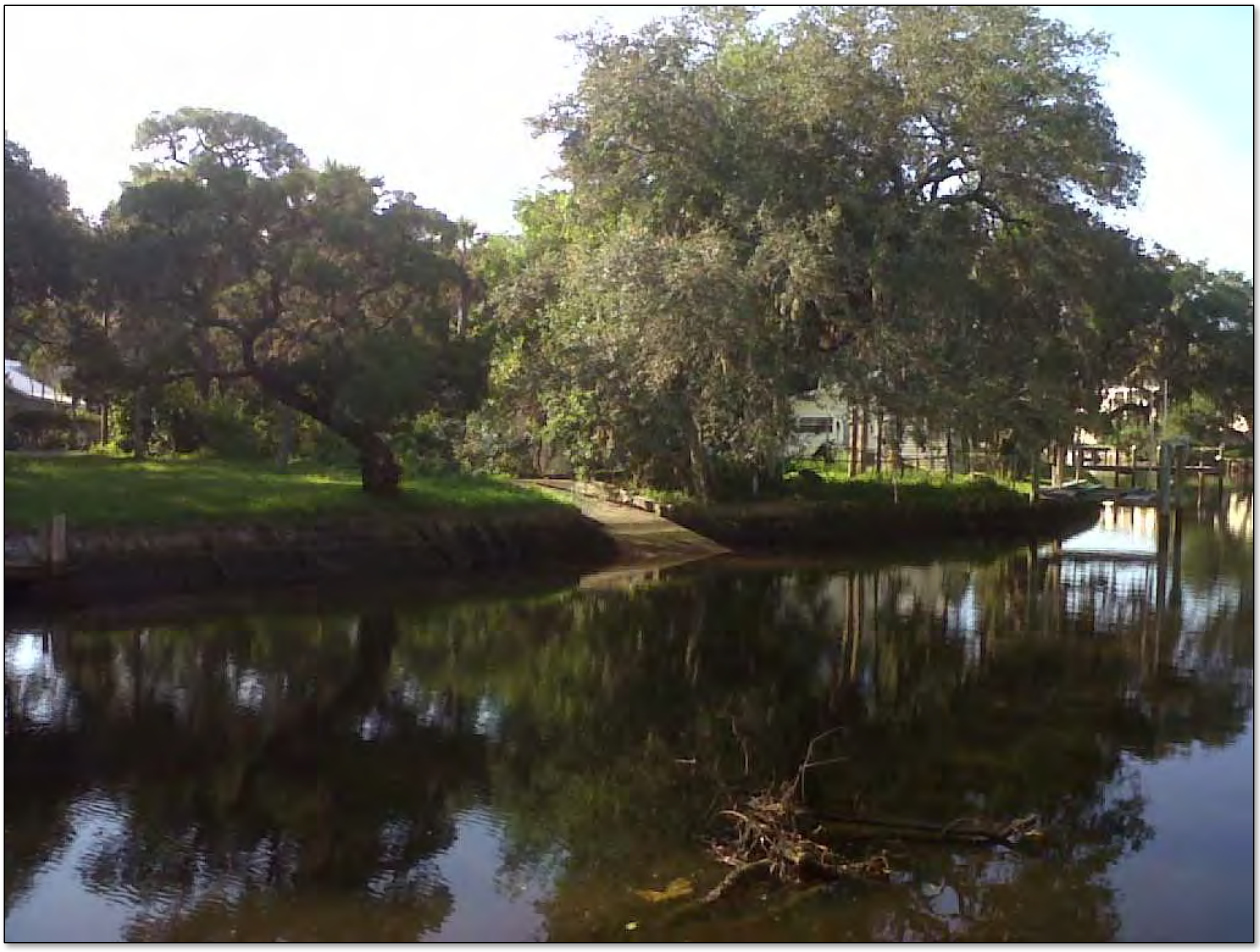
Sediment quality, like water quality, would not impact a greenway, but could affect the use of the Bayou as a Blueway. Most of the upstream "navigable" sections of the Bayou are scoured from pulses of stormwater discharged at a variety of point sources. From Dr. Martin Luther King, Jr. Way Bridge, downstream to Sarasota Bay, the Bayou widens and flows decrease. The sediment has built up within the deeper portions of this stretch, is much less consolidated and has a more silty texture. Typically, the chemical makeup of silty, fine soils makes them more likely than sandy soils to harbor natural and anthropogenic contaminants and pathogens. Because the water quality in this stretch (and others) in the Bayou is impaired, it is likely that the silt is also "impaired." There is anecdotal evidence of drug paraphernalia being seen in the water near Dr. Martin Luther King, Jr. Park and sponsored coastal clean-ups removed a significant volume of trash and debris along the Bayou near the Park. Contact with the submerged soils when launching a canoe or kayak or portaging around obstructions or shallow areas would not be encouraged.

3. **Aesthetics:** Whitaker Bayou was excavated and its length expanded in the 1920's by the Fruitville Drainage District to drain tens of thousands of acres of land making it more suitable for agriculture. Those improvements effectively expanded the Bayou's watershed and routed significant volumes of essentially untreated stormwater to the Bayou and ultimately to Sarasota Bay. Very little of the original Bayou and its contiguous uplands remain today which is why the Bayou resembles a drainage ditch more than a natural, meandering creek. However, due to the length of time that has passed since the original dredging in the upstream components and today, parts of the Bayou have regained a more natural appearance. One such area that is currently accessible to the public and may be made more appealing through the creation of a linear park is that stretch between 32nd Street and Myrtle Street, described more fully in a previous section. While this section of the Bayou is too shallow and the channel is too narrow to facilitate even the smallest of vessels, it is a scenic area that could be enjoyed by the walking public.

   Most of the remainder of the Bayou is adjacent to private property where public walking trails are not feasible. The lower reach of the Bayou, from just upstream of the Dr. Martin Luther King, Jr. Way Bridge crossing, down to Sarasota Bay, (a distance of less than one mile) is already part of the City of Sarasota's Blueway Trail, although its mostly hardened shoreline and adjacent urban development detract from what is normally considered a scenic, natural waterway experience along a Blueway (Photograph 19).

Photograph 19. Whitaker Bayou upstream of U.S. 41 (Tamiami Trail) Bridge showing typical hardened shorelines and urban setting.

Although as seen in Photograph 19, the Bayou is deep enough to support small motorized vessels at least during high tide, the Bayou immediately downstream of Dr. Martin Luther King, Jr. Park is very shallow during low tide, and is clogged with natural and anthropogenic debris (Photograph 20), further detracting from the scenic value of the waterway.



Photograph 20. Whitaker Bayou along Ringling School of Art and Design's seawall, facing downstream. Note vegetative debris and trash in the Bayou.

4. **Channel Limitations and Dredging:** The shallow nature of much of Whitaker Bayou from just upstream of the Dr. Martin Luther King, Jr., bridge crossing downstream to the U.S. 41 (Tamiami Trail) bridge crossing has been documented in previous sections and accompanying photographs. Dredging this stretch of the Bayou would be necessary to make it accessible to non-motorized and small motorized vessels at all tides.

   WilsonMiller Stantec contracted with Coastal Tech to obtain a Preliminary Opinion of Cost to dredge Whitaker Bayou from the Dr. Martin Luther King, Jr. Bridge, downstream to the Bayou's terminus at Sarasota Bay, a distance of about 3,800 feet, to a depth of 3 feet (below mean water elevation). The conceptual geometry of the channel cut leaves distances between the top of the cut and existing structures assumed to be adequate to protect the integrity of those structures (mainly seawalls). However, Coastal Tech was not asked to provide a detailed analysis of the structural integrity of the abutting structures so we do not know that the proposed buffers would be sufficient to protect existing structures. The information Coastal Tech developed and presented for WilsonMiller Stantec's use is entirely conceptual and is not based on any specific proposal to dredge the waterway or on any design work performed by Coastal Tech. Rather, the purpose of the analysis was get a perspective on potential dredging costs under an assumed set of criteria. Actual costs may vary considerably if the City or County decides to move forward with dredging and will ultimately be based on what is found during permit preparation and review periods and market conditions at the time of bidding. Also, it is quite possible that the sediments to be

dredged (especially the finer components) will be contaminated and require special (and costly) provisions for analytical tests, containment and disposal.

For conceptual planning purposes, Coastal Tech estimates the base project costs for excavating and disposing of an assumed 5,000 cubic yards of soil would be:

- approximately $160,000, if the soil is more of the sandy grain-size and with the least requirements for special handling measures, ranging to

- approximately $250,000, if the soil is more fine-grained and requires a more substantial Sediment Management Plan and BMPs.

These are estimates for construction costs only and do not include any charges for professional design, permitting or construction phase oversight and do not include any potential cost for temporary use and restoration of upland property for construction access/staging or dewatering sites. A conservative estimate of permitting costs for a dredging project of this magnitude is 20% of estimated constructed costs.

Summary

Private ownership of most of the property along Whitaker Bayou makes it economically infeasible for local government or non-government, non-profit organizations to purchase land or easements to create an uninterrupted greenway corridor along the majority of the Bayou. The City of Sarasota owns several parcels adjacent to Whitaker Bayou that can be converted to pocket parks providing limited access to the waterfront. The City could also enhance an existing uninterrupted corridor along the Bayou between 32nd Street and Myrtle Street.

WilsonMiller Stantec looked at ways of connecting Sarasota County's proposed Bus Rapid Transit (BRT) System with the Bayou, but discovered that while connections are feasible, the route would align with the Bayou only intermittently and would require side trips through residential neighborhoods and along heavily traveled roads which would greatly reduce the natural greenway experience.

WilsonMiller Stantec also considered enhancements to the City of Sarasota's Blueway network within Whitaker Bayou. The City's proposed addition of a small boat launch at Dr. Martin Luther King, Jr. Park would be a nice amenity, but its use may be limited by the short reach between the ramp and the Bay thus reducing the nature experience in quiescent waters, the lack of scenic diversity, and the restricted navigability upstream of the Park. Dredging the waters downstream of the Park to enhance navigability during all tides is expensive (with many of the costs still unknown) and would do nothing to offset the other limitations noted previously.

Developing a greenway along Whitaker Bayou and/or attempting to enhance the Blueway experience within the downstream sections of the Bayou do not appear to be cost effective endeavors at this time due to the limitations noted.

SECTION 8

PUBLIC OUTREACH

8. PUBLIC OUTREACH

Although WilsonMiller Stantec has not approached the neighbors for input, we have presented study objectives and preliminary results to and sought input from the North Trail Redevelopment Committee, New College Coastal Ecology Class, the Science and Environment Council of Sarasota County, personnel at the Ringling College of Art and Design and the Sarasota Bay Estuary Program's Management and Policy Committees which include representatives from the Southwest Florida Water Management District, and the Florida Department of Environmental Protection.

SBEP and WilsonMiller Stantec staffs discussed the conceptual plans for the Whitaker Bayou LID improvement areas with local SWFWMD management staff in late November 2011. SWFWMD staff was open to the potential projects and suggested that the permitting requirements should be minimal. Submittals to SWFWMD would need to include phasing of the projects due to the multiple site locations spread over a significant area.

SECTION 9

LITERATURE CITED

9. LITERATURE CITED

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SECTION 10

TABLE

Table 1. Pipe Sizes and Whitaker Bayou Drainage Basins

Drainage Basin	Outfall Pipe Diameter, inches	Drainage Basin Area, acres	Pipe Material
Main Channel	N/A	76.3	
M1	15	0.9	RCP
M2	15	4.2	RCP
M4	15	3.1	RCP
M6	24	7.0	HDPE
M7	36	53.9	RCP
M8	48	81.0	RCP
M9	15	4.0	RCP
M10	18	4.9	HDPE
M11	10	4.5	PVC
M13	42	7.2	RCP
M14	15	4.2	RCP
M15	30	1.8	PVC
M16	30	14.2	RCP
M17	18	7.8	HDPE
M18	24	0.8	RCP
M19	24	1.6	RCP
M20	18	4.9	RCP
M22	24	3.4	CMP
M23	0	2.2	UNK
M24	24	1.3	CMP
M25	12	0.4	CMP
M26	12	4.7	RCP
M27	0	5.2	RCP
M28	15	3.5	CMP
M29	15	1.3	CMP
M30	15	2.4	CMP
M32	15 / 24	18.2	RCP
M33	15	2.4	CMP
M34	18	1.8	RCP
M35	15	2.9	CMP
M36	18	1.0	CMP
M37	18	1.6	RCP
M38	18	1.3	RCP
M39	18	1.5	RCP
M40	36	21.3	CMP
M41	15	1.0	CMP
M42	0	24.5	UNK
M43	15	0.5	CMP
M44	15	1.3	CMP
M45	18	1.5	RCP
M46	12	0.7	CMP
M47	15	5.3	CMP

Table 1. Pipe Sizes and Whitaker Bayou Drainage Basins

Drainage Basin	Outfall Pipe Diameter, inches	Drainage Basin Area, acres	Pipe Material
M48	18	0.7	CMP
M49	30	36.7	RCP
M50	15	2.2	RCP
M51	15	0.5	RCP
M52	15	1.0	CMP
M53	15	4.3	CMP
M54	15	2.8	CMP
M55	24 / 48	100.4	RCP
M57	15	1.4	CMP
M58	15	2.6	CMP
M59	15	1.8	CMP
M60	24	3.1	HDPE
M61	15	1.4	CMP
M62	12	1.7	CMP
M63	15	6.8	CMP
M64	12	0.8	CMP
M65	24	21.9	CMP
M66	12	2.0	CMP
M67	36	52.8	RCP
M69	15 / 30	31.7	CMP / RCP
M70	24	11.9	RCP
M71	6	6.8	PVC
M72	12	2.4	CMP
M73	54	97.9	RCP
M74	18	17.3	RCP
M75	42	9.0	RCP
OLF	0	29.0	
D1	18	3.8	RCP
D2	15	3.9	RCP
D3	12 / 15	0.7	PVC / RCP

SECTION 11

FIGURES*

***NOTE THAT FIGURE 5 IS WITHIN THE REPORT ON PAGE 4-3**

UNIVERSITY PKWY

TRIBUTARY "A"

TRIBUTARY "B"

OLD BRADENTON RD

N TAMIAMI TRL

MYRTLE ST

TRIBUTARY "C"

TRIBUTARY "D"

17TH ST

LEGEND

- Major Roads
- Roads
- Channel
- Pipes
- Whitaker Main Channel
- Basin

Transportation Corridors

- Old Bradention Road
- Proposed Bus Rapid Transit Route
- Martin Luther King Way

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WHITAKER BAYOU

FIGURE 1 - MAIN CHANNEL

JANUARY 2012

N

Feet

0 300 600

LEGEND

- Outfall Pipes
- Major Roads
- Basin

Drainage Basins

- MAIN
- D1
- D2
- D3
- M1
- M2
- M4
- M6
- M7
- M8
- M9
- M10
- M11
- M13
- M14
- M15
- M16
- M17
- M18
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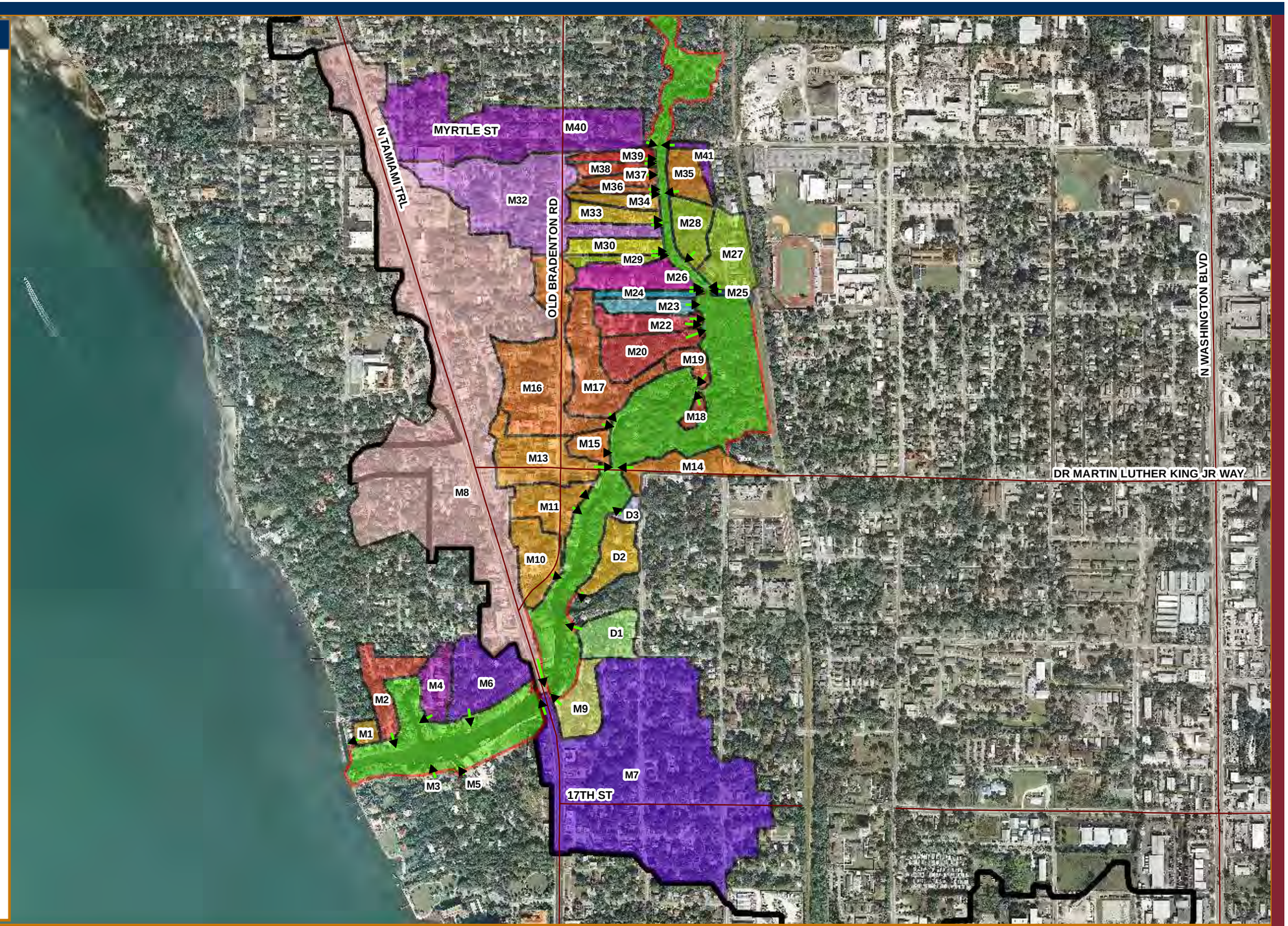
- M40
- M41



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WHITAKER BAYOU

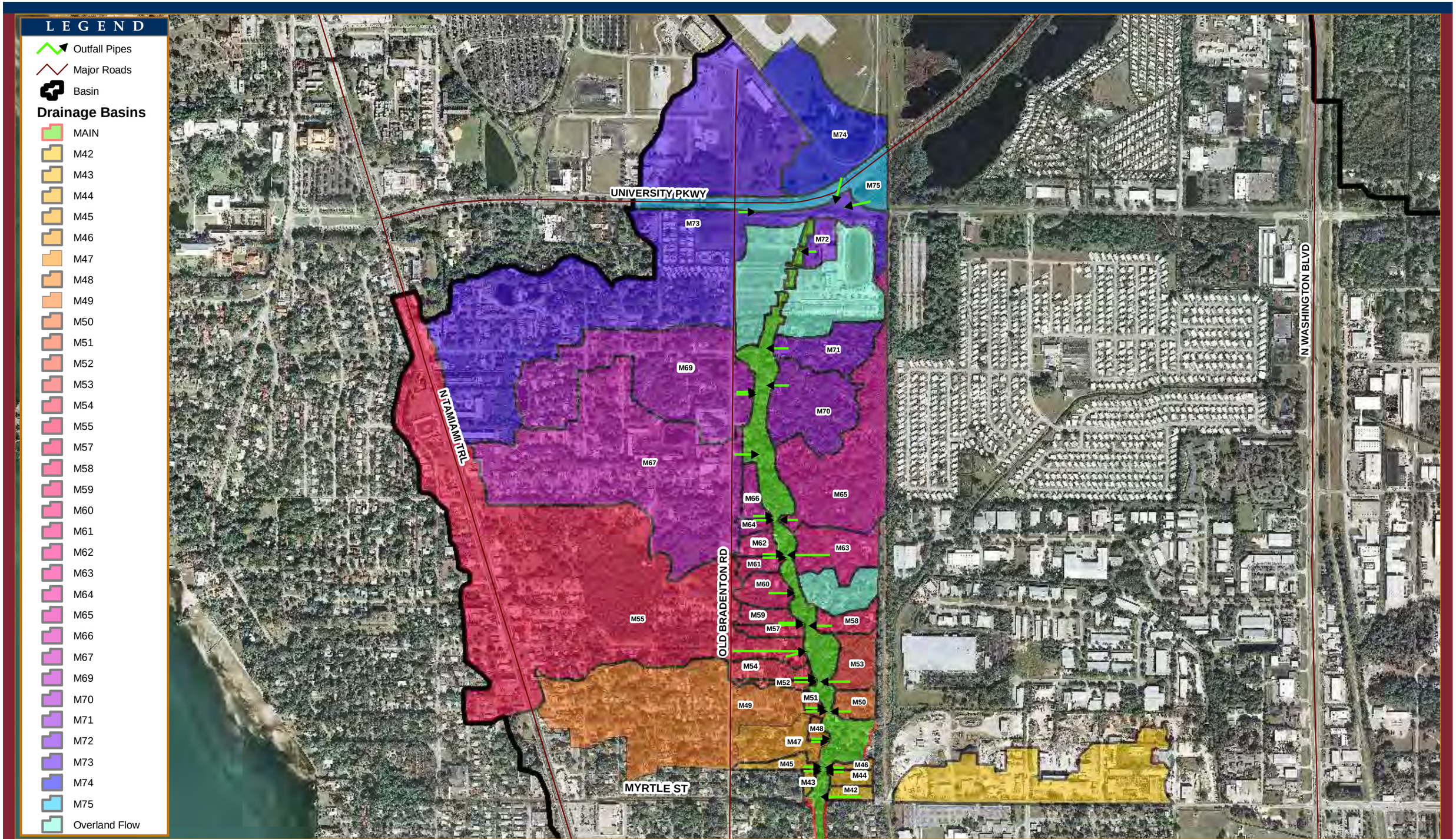
FIGURE 2A - DRAINAGE BASINS AND OUTFALL PIPES SOUTH OF MYRTLE ST

JANUARY 2012

N

Feet

0 400 800



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WHITAKER BAYOU

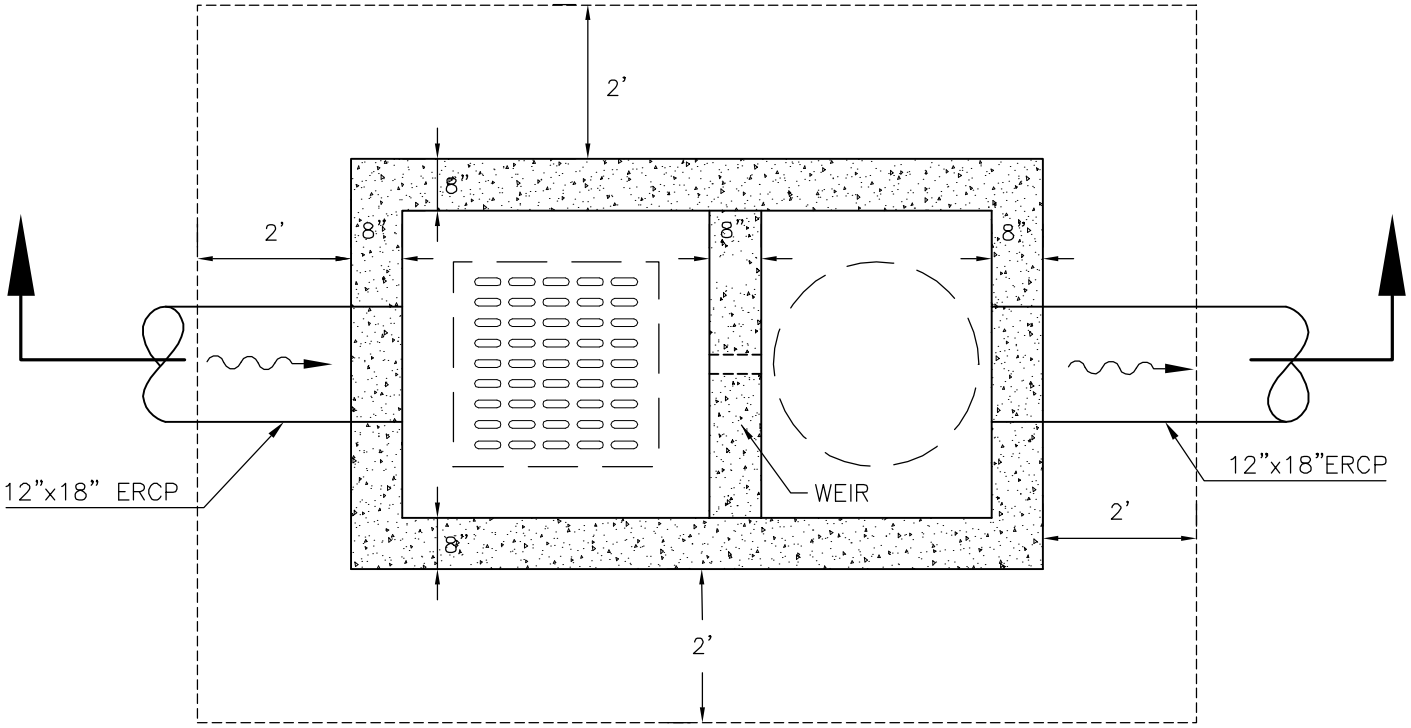
FIGURE 2B - DRAINAGE BASINS AND OUTFALL PIPES NORTH OF MYRTLE ST

JANUARY 2012

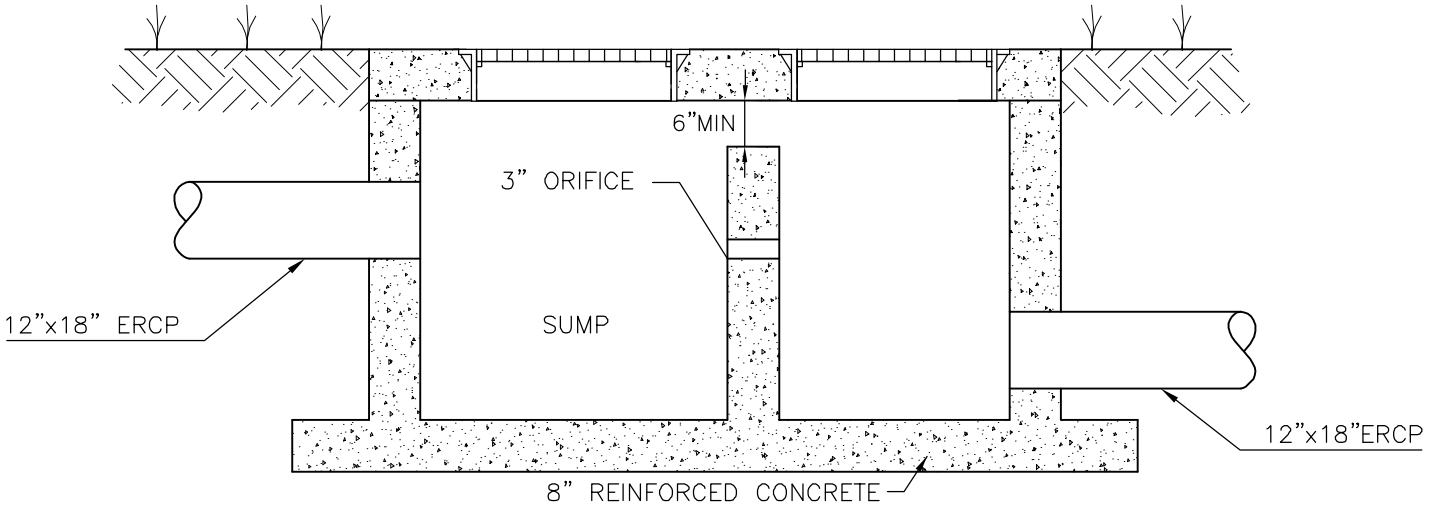
N

Feet

0 400 800



PLAN



SECTION

NOTE:

REFER TO F.D.O.T. STANDARD INDEX NO. 200 FOR CONCRETE REINFORCEMENT.

1. WALL THICKNESS SHALL NOT BE DECREASED.
2. PIPE LENGTH CALLOUT FROM CENTER OF INLET CHAMBER.
3. CAST-IN-PLACE STRUCTURAL DESIGN TO BE SUBMITTED TO ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

BAFFLE BOX DETAIL

FIGURE 3

PROJECT: WHITAKER BAYOU

CLIENT: SARASOTA BAY ESTUARY PROGRAM

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SCALE: N.T.S.	DATE: JAN 2012
SEC: TWP: RGE:	REV NO:
PROJECT NO. 215510014	INDEX NO:
DRWN BY/EMP NO. SRJ	SHEET NO: X09

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Bioswale Shrubs

Blechnum serrulatum (BLS)
'Swamp Fern'
4'-5' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Juncus effusus (JEF)
'Soft Rush'
1'-2' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Lachnanthes caroliniana (LAC)
'Redroot'
1'-2' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Serenoa repens (SRX)
'Saw Palmetto'
6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Spartina bakeri (SPB)
'Cordgrass'
4'-6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Tripsacum dactyloides (TRD)
'Fakahatchee Grass'
5'-6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Bioswale Trees

Acer rubrum (AR)
'Red Maple'
40'-50' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Myrica cerifera (MC)
'Wax Myrtle'
20' Ht. Approx.

Hydrophytic Needs/Tolerance Level

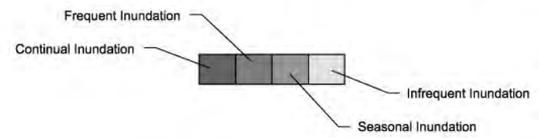
Taxodium distichum (TA)
'Bald Cypress'
60'-70' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Sabal palmetto (SPX)
Up to 60' Ht. Approx.
'Cabbage Palm'

Hydrophytic Needs/Tolerance Level

Hydrophytic Needs / Tolerance Level Key



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CLIENT: SARASOTA BAY ESTUARY PROGRAM
PROJECT: COASTAL BIOSWALES
PROJ START DATE: 4/11
HORIZONTAL SCALE: AS SHOWN
VERTICAL SCALE: N/A

TITLE: LANDSCAPE PLANT PALETTE
FIGURE 4A
CROSS REF. NUMBER:
PROJECT NUMBER: 215510014
INDEX NUMBER: 215510014–0X1
SHEET NUMBER: LX–1

Blechnum serrulatum (BLS)
'Swamp Fern'
4'-5' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Canna flaccida (CAF)
'Golden Canna'
4' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Cladium jamaicense (CLA)
'Saw Grass'
4'-10' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Coreopsis floridana (COF)
'Tickseed'
2' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Crinum americanum (CRA)
'Swamp Lily'
3'-4' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Eleocharis cellulosa (ELC)
'Gulf Coast Spikerush'
4'-5' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Equisitum hyemale (EQH)
'Scouringrush Horsetail'
3' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Hibiscus grandiflorus (HIB)
'Swamp Rosemallow'
9'-12' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Lachnanthes caroliniana (LAC)
'Redroot'
1'-2' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Lythrum alatum (LYA)
'Purple Loosestrife'
3'-5' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Muhlenbergia capillaris (MUC)
'Muhly Grass'
3'-4' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Pontederia cordata (POC)
'Pickerelweed'
2'-3' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Serenoa repens (SRX)
'Saw Palmetto'
6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Spartina bakeri (SPB)
'Cordgrass'
4'-6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Tripsacum dactyloides (TRD)
'Fakahatchee Grass'
5'-6' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Myrica cerifera (MYC)
'Wax Myrtle'
Ht. Approx.

Hydrophytic Needs/Tolerance Level

Betula nigra (BN)
'River Birch'
Up to 75' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Taxodium distichum (TA)
'Bald Cypress'
60'-70' Ht. Approx.

Hydrophytic Needs/Tolerance Level

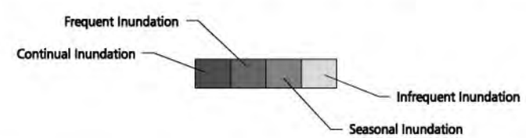
Acer rubrum (AR)
'Red Maple'
40'-50' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Sabal palmetto (SPX)
'Cabbage Palm'
Up to 60' Ht. Approx.

Hydrophytic Needs/Tolerance Level

Hydrophytic Needs / Tolerance Level Key



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DRAWN BY:		
CHECKED BY:		
CONTRACT ADMIN. BY:		
WM APPROVED BY:		

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6900 Professional Parkway East, Suite 100 - Sarasota, Florida 34240-8414 - Phone 941-907-6900 - Fax 941-907-6910 - Web-Site www.wilsonmiller.com

CLIENT: SARASOTA BAY ESTUARY PROGRAM
PROJECT: UPLAND BIOSWALES
DATE: 03/09
HORIZONTAL SCALE: N/A
VERTICAL SCALE: N/A
SEC. TWP. RGE.
CROSS REFERENCE, FILE NO.:
PROJECT NUMBER: S8015-001-000
TITLE: LANDSCAPE PLANT PALETTE FIGURE 4B
INDEX NUMBER: B-S8015-001-000
SHEET NUMBER: X-03

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LEGEND

Major Roads

Basin

Transportation Corridors

Old Bradention Road

Proposed Bus Rapid Transit Route

Martin Luther King Way

Whitaker Project Areas

*** Conceptual Projects**

MLK Park Area *

32nd Street *

Cocoanut Avenue *

North Water Tower Park *

Newtown Estates Canal

Robert L. Taylor Complex

Booker Elementary School Wetland

Spring Oaks Canal *

N Sarasota Sidewalk Area *

12th Street and N Shade Area*

47th Street East

Booker Middle School and Wetland*

MLK and Tuttle East

Northgate Center Canal

Middle Avenue

Tuttle Ave and Myrtle Street

Tuttle and MLK West

18th Street

Myrtle Street East

Tri Par Estates Canal

47th Street M67

Whitaker Greenway

SWIRP Project Areas

BASIN

Whitaker Bayou

Phillippi Creek

Hudson Bayou

UNIVERSITY PKWY
OLD BRADENTON RD
N WASHINGTON BLVD
N TUTTLE AVE
Tri Par Estates Canal
47th Street M67
47th Street East
North Water Tower Park
Middle Avenue
Spring Oaks Canal
Northgate Center Canal
Booker Middle School Wetland
Myrtle Street East
N TAMIAMI TRL
Cocoanut Avenue
Robert L. Taylor Complex
Tuttle Ave and Myrtle Street
Newtown Estates Canal
Tuttle and MLK West
32nd Street
MLK and Tuttle East
N LOCKWOOD RIDGE RD
MLK Park Area
DR MARTIN LUTHER KING JR WAY
Booker Elementary Wetland
N Sarasota Sidewalk Area
18th Street
17TH ST
12th Street and N Shade Area
N TUTTLE AVE
N BENEVA RD

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tel 941.907.6900
fax 941.907.6910

WHITAKER BAYOU

FIGURE 6 - POTENTIAL PROJECT AREAS

JANUARY 2012

N

Feet

0 1,000 2,000

UNIVERSITY PKWY
N TAMIAMI TRL
OLD BRADENTON RD
US 301
MYRTLE ST
N SHADE AVE
47TH ST
N TUTTLE AVE
N LOCKWOOD RIDGE RD
DR MARTIN LUTHER KING JR WAY
17TH ST
12TH ST
N BENEVA RD

1
2
3
4
5
6
7
8

LEGEND

- North Trail - Untreated
- Major Roads
- channel
- Watershed

Whitaker Project Areas

- Whitaker Greenway
- 1 -North Water Tower Park
- 2 - MLK Park Area
- 3 - Cocoanut Avenue
- 4 - 32nd Street
- 5 - Spring Oaks Canal
- 6 - Booker Middle School & Wetland
- 7 - N Sarasota Sidewalk Area
- 8 -12th Street and N Shade Area

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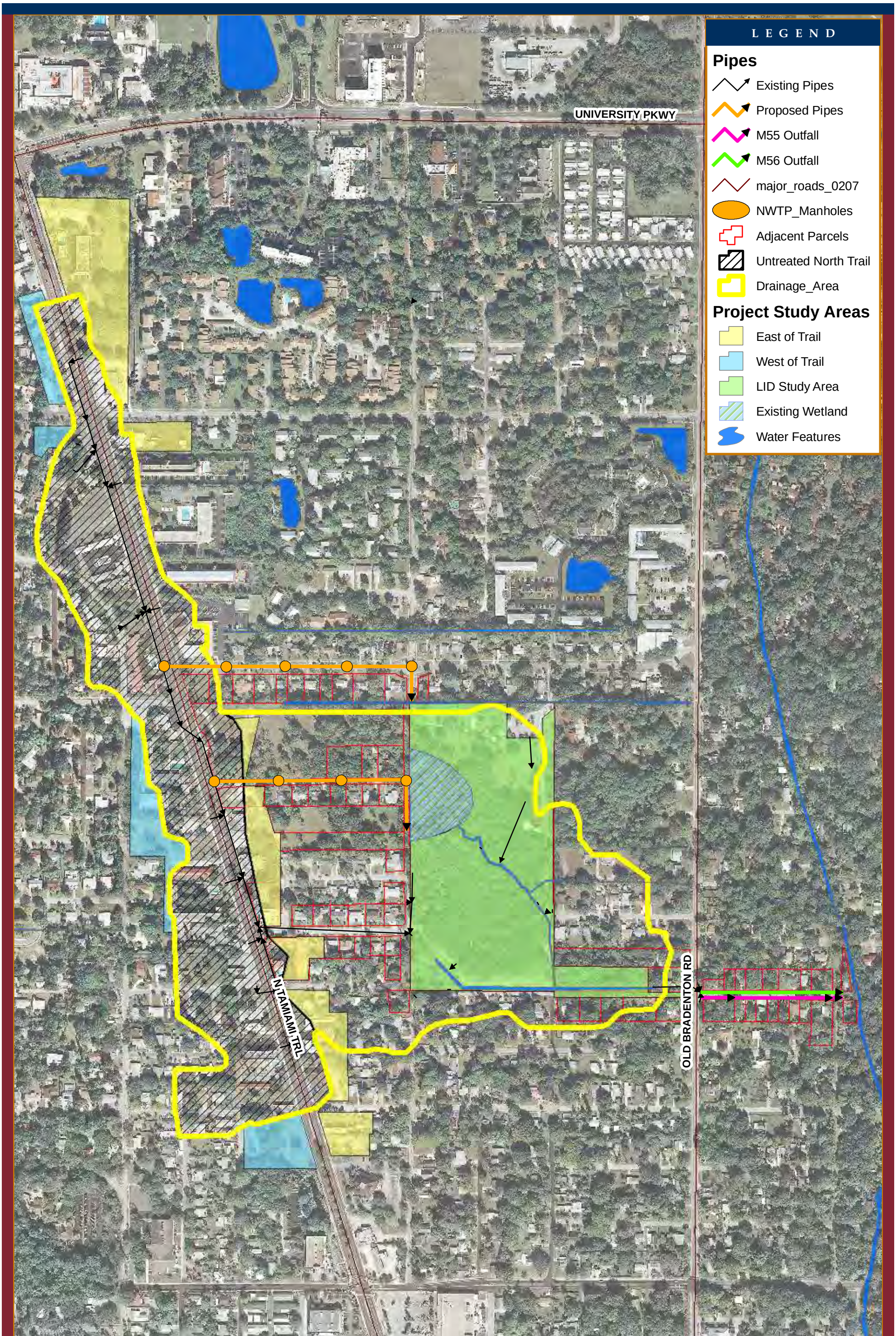
fax 941.907.6910

WHITAKER BAYOU - CONCEPTUAL PROJECTS

FIGURE 7 - LOCATION MAP

JANUARY 2012

N



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WHITAKER BAYOU

FIGURE 8 - NORTH WATER TOWER PARK

JANUARY 2012

N

Feet

0 200 400

DR MARTIN LUTHER KING, JR WAY

OLD BRADENTON ROAD

RIVERSIDE DR

COCOANUT AVE

0 15 30 60

LEGEND

DENOTES SHORELINE RESTORATION/SLOPE STABLIZATION

DENOTES ROADWAY CORRIDOR/CONNECTIVITY ENHANCEMENTS

REV NO.	REVISION DESCRIPTION	REV. DATE	DRN BY/EMP. #

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ISSUE DESCRIPTION:
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LEAD TECHNICIAN:

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CLIENT: SARASOTA BAY ESTUARY PROGRAM
PROJ: WHITAKER BAYOU LID

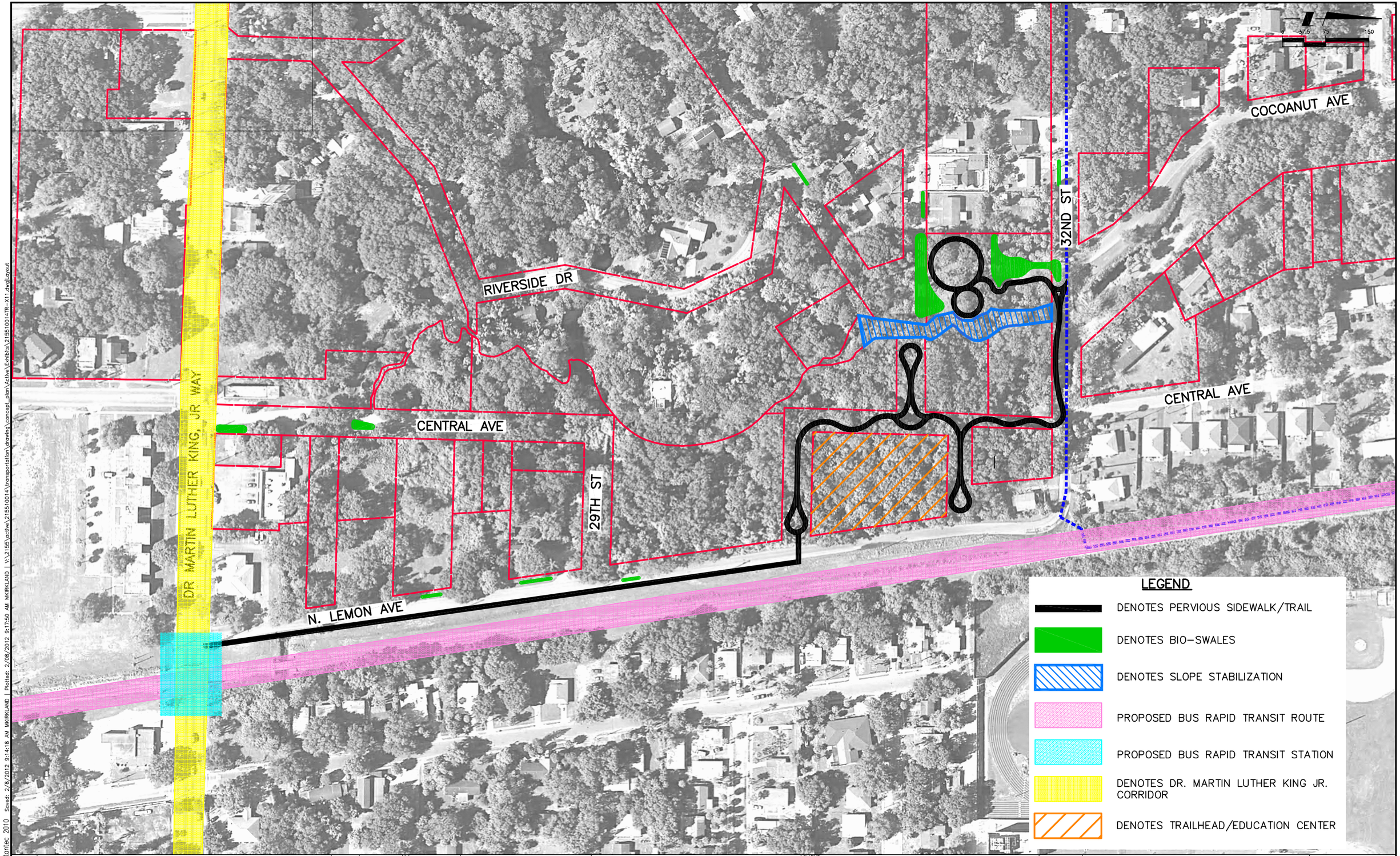
START DATE: 08/10
HORIZ. SCALE: 1"= 60'
VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN
DR. MARTIN LUTHER KING JR. PARK
FIGURE 9

CROSS REF. NUMBER:
PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X10
SHEET NO.: X10



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CLIENT: SARASOTA BAY ESTUARY PROGRAM
PROJ: WHITAKER BAYOU LID

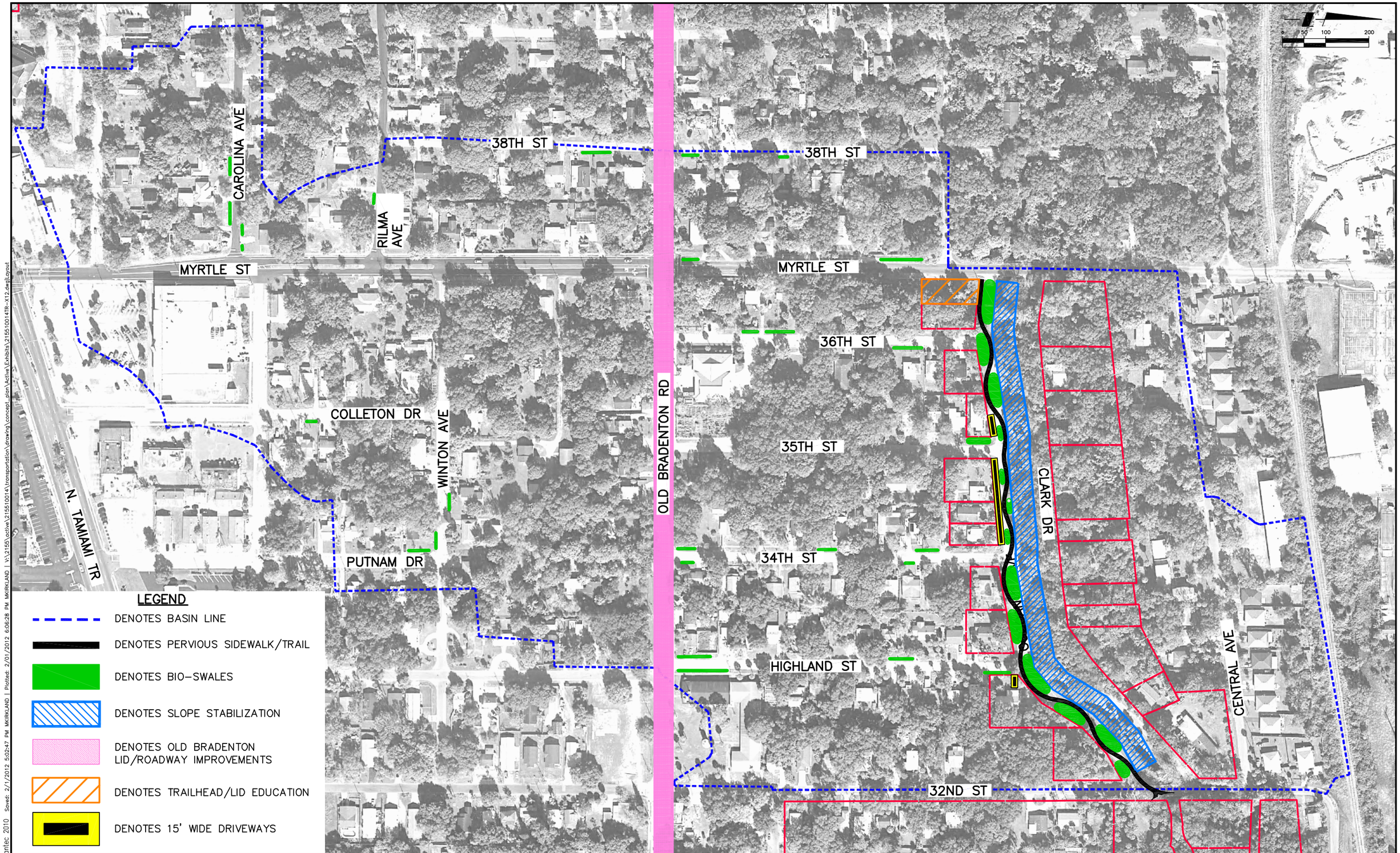
START DATE: 08/10
HORIZ. SCALE: 1"=150'
VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN 32ND STREET FIGURE 10

CROSS REF. NUMBER:
PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X11
SHEET NO.: X11



LEGEND

- DENOTES BASIN LINE
- DENOTES PERVIOUS SIDEWALK/TRAIL
- DENOTES BIO-SWALES
- DENOTES SLOPE STABILIZATION
- DENOTES OLD BRADENTON LID/ROADWAY IMPROVEMENTS
- DENOTES TRAILHEAD/LID EDUCATION
- DENOTES 15' WIDE DRIVEWAYS

△REV NO.	REVISION DESCRIPTION	REV. DATE	DRN BY/EMP. #

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CLIENT: SARASOTA BAY ESTUARY PROGRAM
PROJ: WHITAKER BAYOU LID

START DATE: 08/10
HORIZ. SCALE: 1"=200'
VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN
COCOANUT AVENUE
FIGURE 11

CROSS REF. NUMBER:
PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
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INDEX NO.: 215510014TR-X12
SHEET NO.: X12

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SEWARD DR

ASHBERRY DR

SEWARD CIR

SEWARD DR

SPRING OAKS CT

INDUSTRIAL BLVD

A

A

B

B

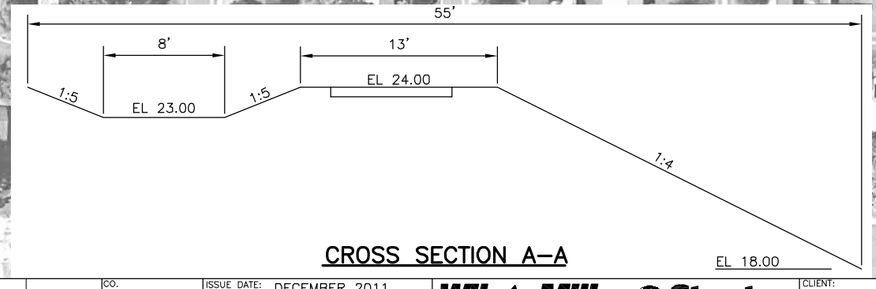
0 37.5 75 150

LEGEND

DENOTES PERVIOUS SIDEWALK/TRAIL

DENOTES BIO-SWALES

DENOTES SLOPE STABILIZATION



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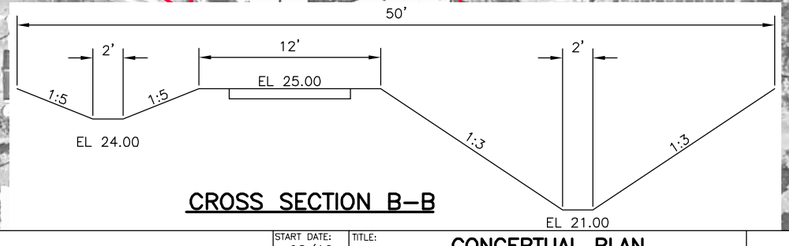

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CLIENT: SARASOTA BAY ESTUARY PROGRAM

PROJ: WHITAKER BAYOU LID

START DATE: 08/10

HORIZ. SCALE: 1"=150'

VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN SPRING OAKS CANAL FIGURE 12

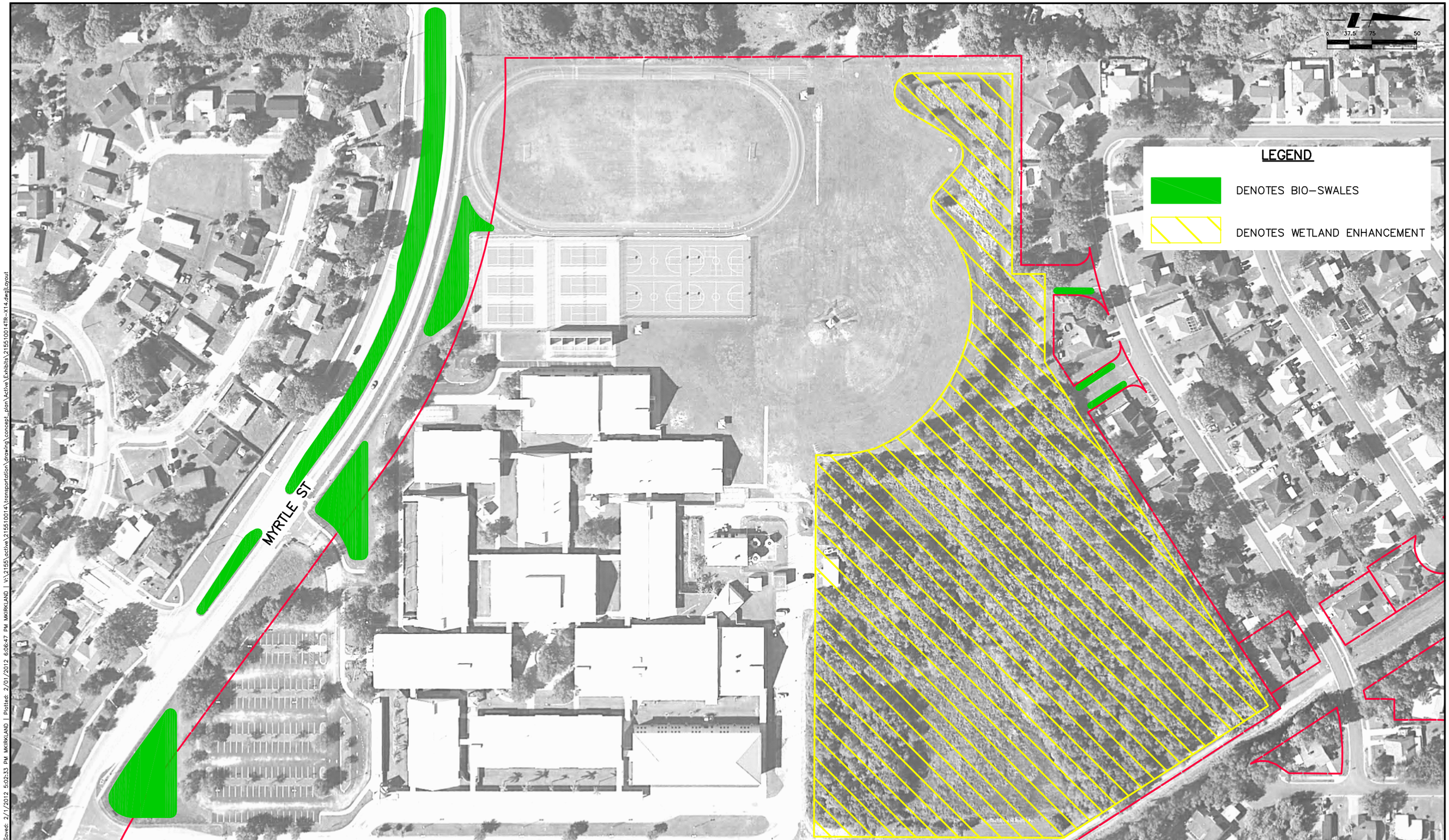
CROSS REF. NUMBER:

PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X13

SHEET NO.: X13



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PROJ: WHITAKER BAYOU LID

START DATE: 08/10
HORIZ. SCALE: 1"=150'
VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN
BOOKER MIDDLE SCHOOL, WETLAND
FIGURE 13

CROSS REF. NUMBER:
PROJECT NUMBER: 215510014

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FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X14
SHEET NO.: X14

25TH ST

BOOKER AVE

24TH ST

N EUCLID AVE

23RD ST

CHILK AVE

22ND ST

0 25 50 100

LEGEND

DENOTES BIO-SWALE PLANTINGS (SHRUBS AND TREES)

DENOTES SLOPE STABILIZATION

DENOTES ADDITIONAL BIO-SWALES

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CLIENT: SARASOTA BAY ESTUARY PROGRAM

PROJ: WHITAKER BAYOU LID

START DATE: 08/10

HORIZ. SCALE: 1"= 100'

VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN
N. SARASOTA SIDEWALK AREA
FIGURE 14

CROSS REF. NUMBER:

PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X15

SHEET NO.: X15

N LIME AVE

N LIME AVE

N SHADE AVE (R/W)

8TH ST

10TH ST

11TH ST

12TH ST

15TH ST

17TH ST

N EUCLID AVE

0 62.5 125 250

LEGEND

DENOTES PERVIOUS SIDEWALK/TRAIL

DENOTES BIO-SWALES

DENOTES SLOPE STABILIZATION

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ISSUE DATE: DECEMBER 2011

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CLIENT: SARASOTA BAY ESTUARY PROGRAM

PROJ: WHITAKER BAYOU LID

START DATE: 08/10

HORIZ. SCALE: 1"=250'

VERT. SCALE: N/A

TITLE: CONCEPTUAL PLAN
12TH STREET & N. SHADE AVENUE
FIGURE 15

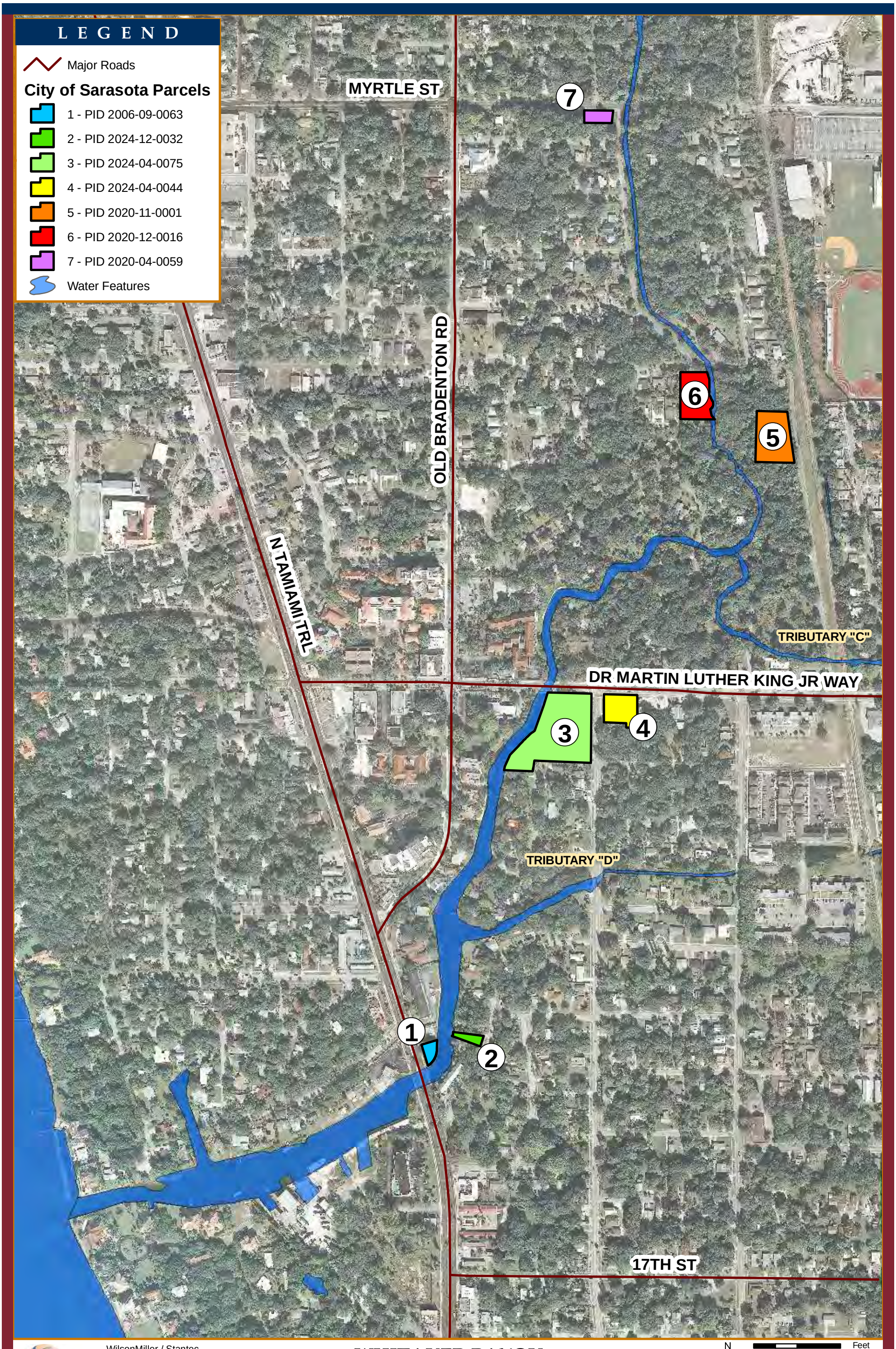
CROSS REF. NUMBER:

PROJECT NUMBER: 215510014

MOLLY CHARLENE WILLIAMS, P.E.
FLORIDA LICENSE NO. 54281

INDEX NO.: 215510014TR-X16

SHEET NO.: X16



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WHITAKER BAYOU

FIGURE 16 - CITY OF SARASOTA PARCELS
JANUARY 2012

N

0 200 400 Feet