



Project funded by the Palm Beach
Metropolitan Planning Organization

PRELIMINARY FEASIBILITY ANALYSIS

Palm Beach County Multi-Modal Intracoastal Waterway Access Study: *The C-51 Coastal Connection*

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Treasure Coast Regional Planning Council
and the Intergovernmental Working Group

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PRELIMINARY FEASIBILITY ANALYSIS

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

FORWARD

This planning feasibility study presents preliminary findings and identifies areas in need of further analysis. The professionals engaged in the study have provided concepts, issues, and estimates for consideration. The assumptions and conditions suggest this could be a feasible project if appropriate funding and permitting are secured.





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I. EXECUTIVE SUMMARY

I. EXECUTIVE SUMMARY

Transportation mobility of all modes is a priority of the Palm Beach Metropolitan Planning Organization (MPO). Accordingly, in central Palm Beach County, there is an opportunity to reintroduce a historic boating connection via the C-51 regional canal - between properties west of the S-155 Drainage structure and waterways east of the structure (primarily the Intracoastal Waterway). The concept is supported by several local governments who have been working together for more than a year to explore the idea. The concept hinges on the construction of a boat lift with a staging canal on the "Spillway Park" property located in Lake Worth. The project would service properties primarily in Lake Worth, Lake Clarke Shores, and West Palm Beach, with enhanced boating access benefits extended to other properties in unincorporated Palm Beach County, Glen Ridge and others beyond.

A Project Team with applicable marine planning, water management, intergovernmental coordination, real estate appraisal, permitting and engineering credentials was engaged to conduct a reconnaissance-level, preliminary project assessment using readily available information. The analysis acknowledges that a second level of more extensive and thorough due diligence is needed for a complete project evaluation. The main goal of these services is to enable the Client to decide whether the project is feasible and thus warrant further analysis to proceed to more detailed design, permitting, funding, and construction phases.

A newly installed boat lift at Spillway Park would enable passage of small-sized marine vessels (not exceeding roughly 25 feet, 3½ tons dry weight, and approximately 5½ feet height above the waterline) from area canals and inland freshwater bodies including Lake Clarke to the Intracoastal Waterway (ICW). The property examined is roughly 4.5 acres total on 6 parcels (including land and submerged land), while the boat lift itself would occupy only a small portion, including the S-155 Structure, the Spillway Park, parking, 2 fishing docks and connecting catwalks, park benches, small buildings and a restroom.

Properties which could gain reasonably easy access to the ICW and deepwater are located west of the structure along C-51 in Lake Worth and West Palm Beach, and about 2 miles north and south of the C-51 on waterways primarily in Lake Clarke Shores. About 1,400 residential, commercial, and industrial properties in this area were studied for valuation, totaling almost 1,100 acres. Current property assessed land value of such land is approximately \$192 million. While more than half of the properties are

residential and could increase in value (mostly in Lake Clarke Shores), other opportunities in addition to value increase for commercial and industrial lands could result from the project, most notably the West Palm Beach golf course properties, and commercial/industrial properties in Lake Worth.

A limited examination of comparable taxable property value data suggests that waterfront property gaining ICW and ocean access could appreciate as much as 20 to 40 percent. This corresponds to an increase in property tax base of \$38 to \$77 million (however recognizing that property tax increases are governed by Florida's "Save Our Homes" constitutional provision). The Intergovernmental Committee has expressed significant interest in an expanded economic impact analysis for the project, which is beyond the scope of this feasibility study.

Four factors are considered for possible boating opportunities or limitations: (1) Size of adjacent waterbodies, (2) Proximity to boating attractions or destinations, (3) Bridge or other waterbody obstructions (data on 19 are presented), and (4) Anticipated types of marine vessels. Findings include: Ocean access via the ICW is about 8.6 miles north, or 6.9 miles south; overhead obstructions are as low as 4'5" in one section of Lake Clarke Shores (a sewer pipe which could be raised), whereas more permanent bridges such as the CSX Railroad or I-95 might allow 6 ½ feet of clearance depending on stormwater level. A variety of motorized boats with low overhead clearance would be available to the consuming public- 13 examples under 6½ feet are provided.

Upon initial review, the project objective could be met while meeting site development requirements (such as zoning, land use designation, setbacks, and height restrictions, etc.) for Lake Worth, and if changes are made to the north canal bank, which is in West Palm Beach. The conceptual layout presumes no disruption of Spillway Park's amenities, except for possible re-configuration of the fishing pier on the south side of the canal. Available parking (40 spaces) would be unaffected; traffic analysis was not included in this analysis.

The lift would need to be operated by trained staff. Based only on staffing assumptions and annual maintenance/inspections, a rough estimate of operating costs could range from \$140,000 - 240,000 per year. Funding analysis is outside of the scope of this study; however, certain grant opportunities are being discussed by the intergovernmental working group; it is unclear whether those would apply to capital or operating costs, or both. One means of partially funding the project is through lift fees, which for discussion



I. EXECUTIVE SUMMARY

could generate between \$109,000 and \$218,000 based on some reasonable assumptions about hours of operation, seasons, and boating demand, and various other factors.

The operation of the facility could be roughly dawn to dusk, which could vary from 8 to 14 hours depending on daylight and season; inclement weather including high water discharge periods would trigger closing procedures and notice to users. A range of other operational factors are briefly introduced but not thoroughly analyzed which include insurance, parking, desire for boating amenities beyond the lift, and use of restrooms.

To inform the future design and layout, three comparable projects in Florida, one in Washington State, and a few other technologies are summarized. A range of useable boat lift technologies for smaller vessels anticipated in this project can be categorized as (a) gantry system (meaning bridge train with overhead lifts), (b) fork truck, (c) travel lift, (d) rail car on monorail, or (e) a combination of above technologies (including slings).

A gantry train lift system is considered most feasible for this project. Considering the navigational constraints posed mainly by overhead obstructions on the adjacent waterways, a lift system which accommodates up to 30-foot, 5-ton boat will be more than adequate. A conceptual cross section of such structure together with a site layout that includes a 25-foot wide canal for vessel entry, exit, and staging is provided. The cost of such a project including “soft costs” and construction could be in the range of \$1 million and take approximately 3½ years to be operational.

An analysis of environmental conditions which require permitting concludes that environmental permits/authorizations are likely to be reasonably attainable. Approvals from the U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), and the Florida Department of Environmental Protection (FDEP) would likely take 12 to 18 months to acquire. An amendment to the existing property agreements with the South Florida Water Management District (SFWMD) will be required, with approval by the SFWMD Governing Board. County officials are being notified of the project through the cooperative project team working group, and the Lake Worth Drainage District operations staff has been briefed on the project.

A preliminary application meeting with key permitting agencies was conducted in October 2014. At the conceptual stage, no insurmountable issues with permitting were identified. A key permitting issue will be to obtain Section 408 approval from the USACE. Section 408 review

typically requires detailed analyses including hydraulic studies (conducted concurrent with engineering design); these analyses can be time-consuming and costly. Other permitting issues most likely will include mangrove mitigation, and possible constraints from FFWCC on the number of lifts allowed per day to comply with the Manatee Protection Plan.

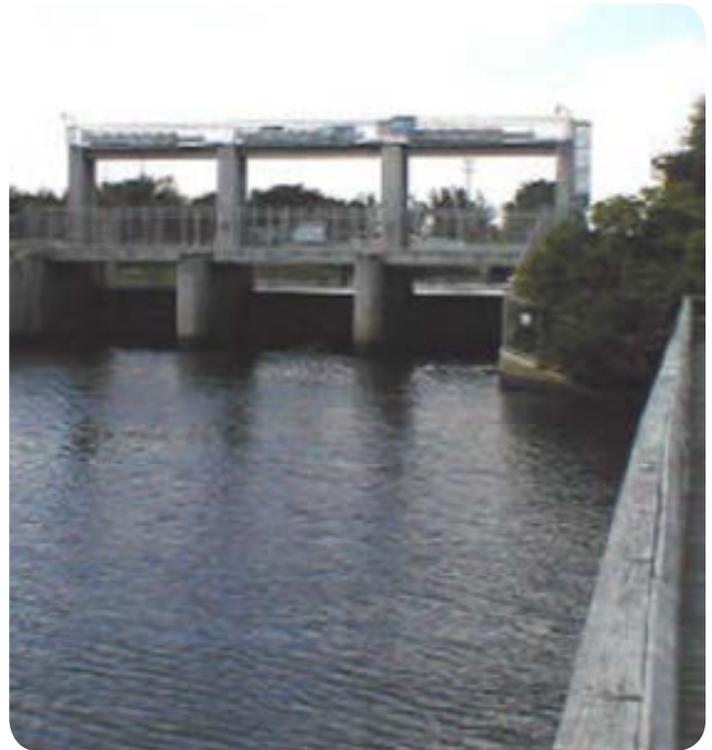


Figure 1. Existing Spillway S-155 Structure (Photo date unknown presumed circa 2002) “This control structure replaced what was locally known as the Palm Beach Locks in the early 1980s. The locks were constructed here because at the time the C-51 was called the West Palm Beach Canal and was used as a navigable waterway to transport vegetables from the rich agricultural lands inland eastward to the port in Palm Beach.”



II. SITE SUITABILITY AND FEASIBILITY

A. Conceptual Development Program

The conceptual development program is to design and build a boat lift which will accommodate eastbound and westbound motorized boating traffic on the C-51 Canal and provide other facilities for non-motorized vessels to portage around the S-155 Structure. The lift should not disrupt the vital operations and maintenance of the S-155 Structure, which is operated by the SFWMD. As well, the functions of the Spillway Park (benches, picnicking, fishing docks, rest room, and parking) should remain as unimpacted as possible.

The greatest boating demand would likely be for pleasure/sightseeing, recreational fishing, dinner cruises, ski boats, and day-trips in and around the ICW, with less than 25 percent of the use demand for ocean access (due partially to size vessel limitations, and partially the long distance to ocean inlets). While transit to the Bahamas or other long-distance locations would become possible, these are considered very remote and thus a very small amount of the demand.

Non-motorized vessels (kayaks, etc.) should also be accommodated as they sometimes use the waterbody and portage under current park layout; however, they are also assumed to be a small portion of the demand. A boat ramp is not included in the development program. It is assumed that no significant additional vehicular traffic will be attracted by the project (thus not warranting more parking spaces); however, it is plausible that a boat owner who is meeting crew or guests could ask them to meet at the boat lift at Spillway Park (thus they would leave a car behind for a day of boating).

While this canal accommodated barge and commercial traffic in its past, that use is not anticipated in this development program. Marine law enforcement vessels would presumably use the boat lift as desired. The conceptual layout does not include a boat ramp at Spillway Park; there are opportunities for such facilities within 1/2 mile of the Spillway.

B. General Site Information, Location, Compatibility

The general location of the project site (Figure 2) is along the C-51 Canal, which borders the Cities of West Palm Beach and Lake Worth. The City of Lake Clarke Shores is nearby to the west.

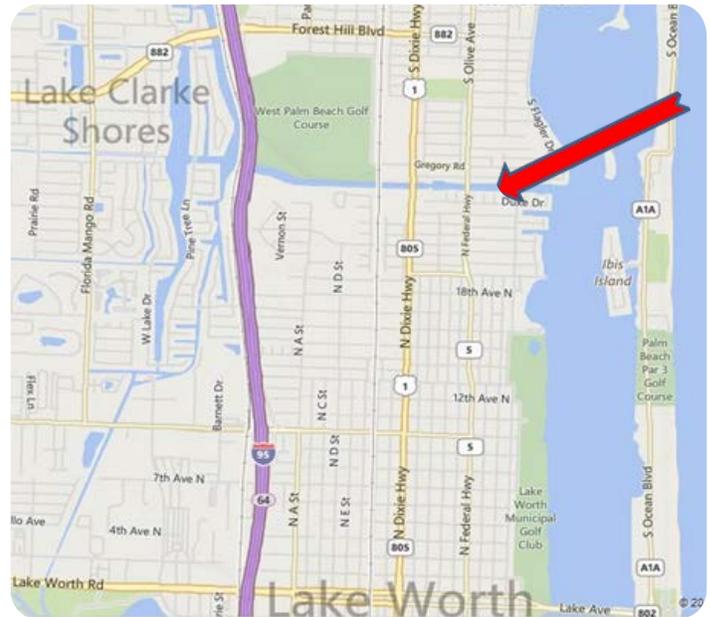


Figure 2. General Location Map

The project is located adjacent to the S-155 Structure at the Spillway Park on the C-51 Canal located between S. Dixie Highway (US-1) and N Federal Highway/Olive Road located in Eastern Palm Beach County. It is within C-51 East Drainage Basin (shown in Appendices A and B). It is notable that marine navigation for recreational boats and commerce (barges moving agricultural products) was once accommodated at the site by means of a tidal lock.

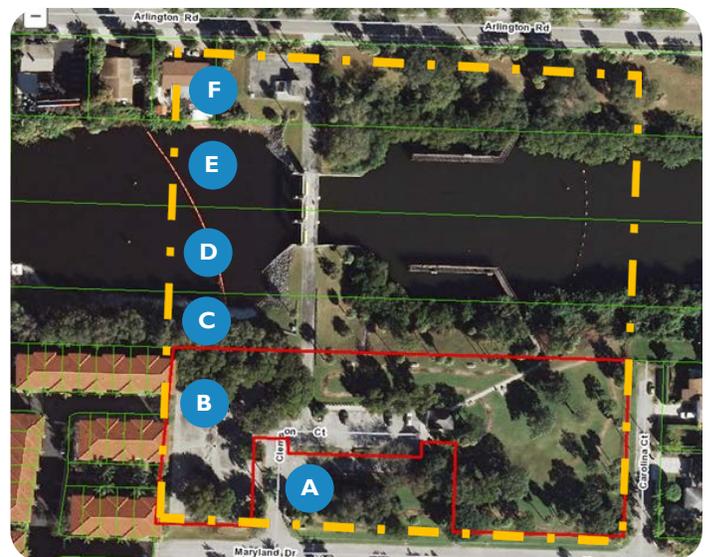


Figure 3. Project Site Including Spillway Park and the SFWMD Property

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II. SITE SUITABILITY AND FEASIBILITY

Property ownership of the subject site is shown in **Figure 3**. The project area is roughly 4.5 acres total (including land and submerged land). It includes the S-155 Structure, the Spillway Park, parking, 2 fishing docks and connecting catwalks, park benches, small buildings and a restroom. It consists of 6 parcels labeled A through E as follows:

Parcel Label	Parcel Control Number	Owner	Size(c) (acres)	Municipal Location	Zoning	Other relevant site information
A	None	City of Lake Worth	.5 (est.)	Lake Worth	Public Right-of-Way (b)	Provides site access from Maryland Drive
B	38434415130000140	SFWMD	2.06	Lake Worth	Public Recreation and Open Space (Lake Worth) (b)	An executed agreement between SFWMD and City of Lake Worth outlines responsibilities and maintenance at Spillway Park
C	38434415000003010	SFWMD	1.78 (total)	Lake Worth	Medium Density-Multi Family (MF-30) (Lake Worth) (b)	Canal bank and submerged land
D	38434415000003160	SFWMD	7.36 (total)	Lake Worth	Single Family Residential (SFR) (Lake Worth) (b)	Mostly submerged - includes fishing dock
E	74434415000003170	SFWMD	7.02 (total)	West Palm Beach	SF7-Single Family Low Density (74 - West Palm Beach) (a)	Mostly submerged - includes fishing dock
F	74434415050020070	SFWMD	1.48	West Palm Beach	SF7-Single Family Low Density (74 - West Palm Beach) (a)	Provides access from Arlington Road; includes a paved area, small utility building (144 sq. ft.) and chain link fence

SOURCE: Palm Beach Property Appraiser, City of Lake Worth.

NOTES: SFWMD

(a) **SOURCE:** Property Appraiser Data

(b) City data and city staff

(c) Parcel acreages do not sum to the site total, since parcel lines do not correspond to the project site boundaries. The total of parcel acreage sums to much more area than is needed for the project.

The vegetation, trees, and other landscaping were not inventoried for this analysis. However a vegetative evaluation should be conducted during site design to identify any possible impacts, relocation, or removal, which would be subject to applicable local ordinances and state regulations (if any) to maintain the aesthetics, canopy, and pleasant park setting of Spillway Park.

C. Benefitting Properties, Navigation Parameters, and Boating Demand

This section identifies nearly 1,400 properties that would benefit from additional boating access, examines some of the characteristics of the adjacent waterways, and describes a sampling of the types of boats and anticipated users of the waterway.



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II. SITE SUITABILITY AND FEASIBILITY

I. Benefitting Properties

The construction of this project will potentially increase real estate value and enhance boating opportunities to certain properties west of the S-155 Structure. While a countless number of properties could potentially use the canal waterways to pass through a new boat lift at the S-155 Structure, the properties anticipated to gain reasonably easy access to the ICW and deepwater are shown in Figure 4 and are generally described as:

- West of the S-155 Structure 1.5 to 2.0 miles into Lake Clarke Shores and bounded by Prarie Road;
- North about 2.2 miles to Southern Boulevard; and
- South about 2.1 miles to Lake Worth Road.

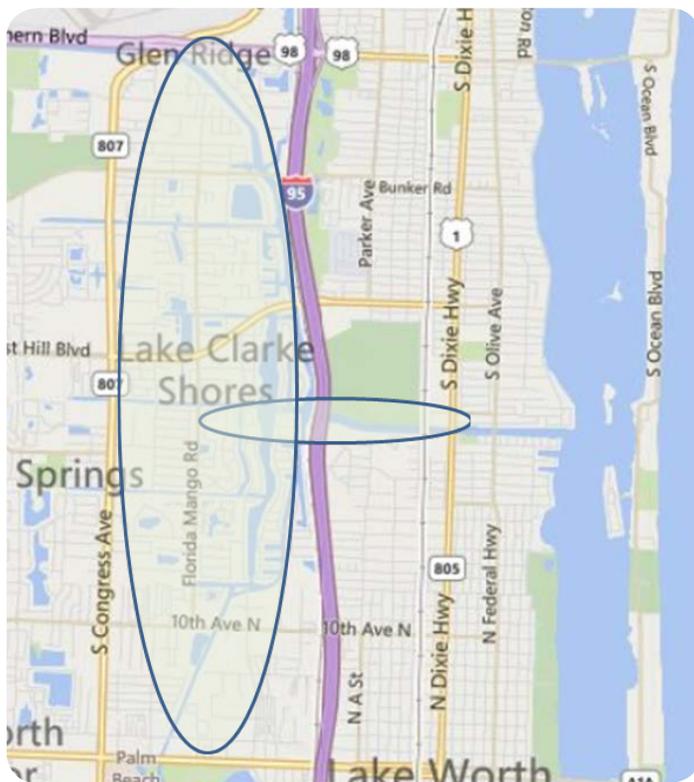


Figure 4. General Location of Properties Gaining Deepwater and ICW Access

Benefitting properties were chosen according to three criteria:

1. Reasonably close to the C-51, meaning no more than about 2 miles north or south;
2. Not constrained by a very low overhead bridge or other impediment to navigation; and

3. Potential to benefit with some improvements. This includes some properties which are separated from the water by easements and vegetation (e.g. Florida Power and Light or SFWMD), or which connect to a shallow water body (e.g. drainage ditch), or which would need dredging to make it navigable.

Using the three criteria above to define the study area, 1,388 parcels were selected to investigate classifications, valuation, and other characteristics. Shown in Figure 5, the parcels are located mostly in Lake Worth, Lake Clarke Shores, and West Palm Beach, with a few in Glen Ridge and unincorporated Palm Beach County. If these criteria were made less restrictive, even more properties could benefit. In other words, properties fronting canals that are further than 2 miles north or 2 miles south might desire to travel the distance and use the new boat lift facility. It is also possible that additional boat ramps could be added in the benefitting properties vicinity; however, an analysis of such candidate properties is not included in this study.

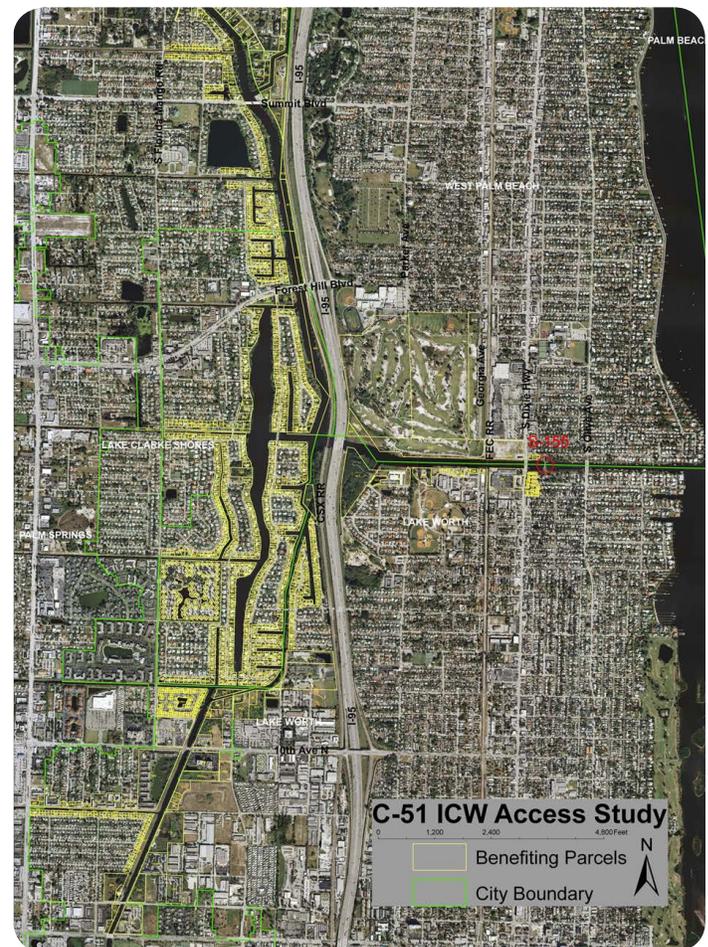


Figure 5. Benefitting Parcels Selected for Study

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II. SITE SUITABILITY AND FEASIBILITY

MAP NOTES:

1. In Lake Clarke Shores, east of Florida Mango Road and north of Summit Boulevard, approximately 15 properties south of a secondary canal may be constrained by what appears to be an electric utility easement; however, these have been included in the potential benefitting property mapping. Constraints over the use of the easement should be further researched to determine if this property should be excluded from consideration.
2. In Lake Clarke Shores, properties along a secondary drainage canal, which parallel French Avenue are included in the area of study; however, they may not gain navigable access without deepening the canal to render it navigable.
3. If a townhouse or condominium development lies adjacent to a connecting waterway, all properties were included in the study, under the assumption that shared dockage is now or could be made available to benefit the residents/owners.

As shown in **Table 2** (next page), the 1,388 properties comprise a total area of 1,086 acres, with property assessed land value of \$191.9 million. The majority of properties are in Lake Clarke Shores (768 parcels valued at \$124.1 million).

The data show that just over half (approximately 522 acres) of the benefitting properties are residential, and (except for a few parcels) are valued substantially higher than the commercial and industrial lands. Though this disparity in value is usually not the case, the presumption is that these parcels of interest are not in prime locations for commercial and industrial uses that usually cause its land value to exceed residential property.

While the Lake Clarke Shores properties with significant tax assessed land value are predominantly residential and expected to remain residential, the opportunities for value appreciation through marine commercial or marine industrial uses are located primarily in Lake Worth and West Palm Beach. The West Palm Beach golf course and redevelopment property just east of it provide a considerable opportunity to benefit from increased boating access to South Florida waterways.



Palm Beach County Multi-Modal Intracoastal Waterway Access Study

II. SITE SUITABILITY AND FEASIBILITY

Table 2. Benefitting Properties West of the Water Control Structure S-155

SOURCE: Palm Beach County Property Appraiser data, September 2014.

NOTES: Townhouse parcels do not include townhouse unit assessed land value. Therefore, the “total assessed land value” amount is by the nature of the data lower than actual due to the lack of land assessment information.

	No. Properties	Total Acreage	Total Assessed Land Value	Average Site Size (SF)	Average Assessed Land Value	Average Assessed Value/SF
Lake Clarke Shores						
Single-Family Residential	478	380.7	\$123,579,287	13,086	\$122,853	\$9.89
Vacant Residential	7	2.2	\$595,858	13,886	\$85,123	\$5.64
Townhouse	283	9.1	N/A	1,407	N/A	N/A
Public Facilities	8	48.8	\$436,720	265,595	\$54,590	\$1.41
Sub-Total	768	392.0	\$124,175,145	N/A	N/A	N/A
Unincorporated Palm Bch Cnty						
Single-Family Residential	222	59.5	\$16,844,559	11,667	\$75,876	\$6.87
Townhouse	156	N/A	N/A	1,355	N/A	N/A
Multi-Family Residential	7	28.1	\$4,101,274	161,036	\$694,458	\$3.75
Vacant Residential	12	14.1	\$1,300,210	51,082	\$108,351	\$2.49
Vacant Industrial	2	1.4	\$307,987	31,246	\$153,994	\$4.86
Improved Industrial	0	0.0	\$0	0	\$0	\$0.00
Vacant Commercial	2	1.5	\$486,612	32,583	\$243,306	\$7.47
Improved Commercial	3	23.3	\$1,015,318	253,830	\$495,237	\$1.19
Public Facilities	8	33.2	\$5,294,720	160,526	\$588,302	\$1.94
Sub-Total	412	161.1	\$29,350,680	N/A	N/A	N/A
West Palm Beach						
Single-Family Residential	2	0.3	\$198,967	7,083	\$99,484	\$14.05
Vacant Commercial	1	0.7	\$153,000	30,475	\$153,000	\$5.02
Improved Commercial	2	0.7	\$426,034	14,412	\$213,017	\$15.26
Public Facilities	6	183.0	\$5,889,971	1,328,773	\$981,662	\$1.57
Sub-Total	11	184.7	\$6,667,972	N/A	N/A	N/A
Glen Ridge						
Single-Family Residential	27	35.0	\$3,653,283	56,455	\$135,307	\$2.39
Townhouse	0	N/A	N/A	N/A	N/A	N/A
Multi-Family Residential	0	N/A	N/A	N/A	N/A	N/A
Vacant Residential	1	1.5	\$113,470	65,776	\$113,470	\$1.73
Vacant Industrial	0	0.0	N/A	N/A	N/A	N/A
Improved Industrial	0	0.0	\$0	N/A	N/A	N/A
Vacant Commercial	1	2.1	\$249,176	93,105	\$249,176	\$2.68
Commercial	1	6.4	\$2,804,417	277,665	\$2,804,417	\$10.10
Public Facilities	0	0.0	\$0	0	N/A	N/A
Sub-Total	30	45.0	\$6,820,346	N/A	N/A	N/A
Lake Worth						
Single-Family Residential	67	15.6	\$6,642,845	10,117	\$99,147	\$10.33
Townhouse	57	N/A	N/A	N/A	N/A	N/A
Multi-Family Residential	1	9.9	\$2,880,000	430,747	\$2,880,000	\$6.69
Vacant Residential	5	13.3	\$1,139,400	115,860	\$227,880	\$1.93
Vacant Industrial	5	17.8	\$2,275,607	155,237	\$455,121	\$3.94
Improved Industrial	10	2.8	\$753,340	12,340	\$101,098	\$8.19
Vacant Commercial	1	0.7	\$153,000	30,475	\$153,000	\$5.02
Commercial	5	12.9	\$3,889,214	93,969	\$674,647	\$8.70
Public Facilities	16	230.2	\$7,140,576	589,793	\$420,034	\$1.06
Sub-Total	167	303.2	\$24,873,982	N/A	N/A	N/A
Overall Totals	1388	1086.04	\$191,888,125	N/A	N/A	N/A



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II. SITE SUITABILITY AND FEASIBILITY

Potential Appreciation of Value from Improved Boating Access

A cursory study of appraised land value data gives an estimated range of possible land value appreciation from the additional boating access to benefitting properties. From the study of representative properties, in the opinion of project team member and Certified Appraiser Bruce Ownby, the range of appreciation for residential land value is approximately 20 to 40 percent. This is a reasonable range to apply to industrial and commercial land values as well. The increase in site value is of course contingent on a number of factors such as the distance to the ICW, the nature of the waterway and the number of fixed bridges.

Accepting this finding, the property tax base for the local governments involved in this project could potentially increase somewhere in the range of \$38 to \$77 million. If such increase were realized, it would be subject to Florida's "Save Our Homes" constitutional provision; hence the potential increase in property taxes would be governed accordingly.

This opinion is supported by investigation of tax appraised land values in two areas as follows:

1. An area comprised of 246 parcels downstream of the S-155 structure was selected to examine property value characteristics, as shown in **Table 3**.

Table 3. Selected Downstream Properties for Valuation Comparison

	No. Properties	Total Acreage	Total Assessed Land Value	Average Site Size (SF)	Average Assessed Land Value	Average Assessed Value/SF
Lake Worth						
Single-Family Residential	113	32.8	\$45,037,366	11,640	\$466,228	\$32.99
Vacant Residential	3	0.2	\$163,499	9,901	\$163,499	\$16.51
Public Facilities	2	3.8	\$0	83,742	\$0	\$0.00
Sub-Total	118	36.8	\$45,200,865	N/A	N/A	N/A
West Palm Beach						
Single-Family Residential	124	15.2	\$27,494,549	12,528	\$518,765	\$38.84
Vacant Residential	1	0.3	\$594,559	11,252	\$594,559	\$52.84
Public Facilities	3	2.3	\$0	33,392	\$0	\$0.00
Sub-Total	128	17.8	\$28,089,108	N/A	N/A	N/A
Overall Totals	246	54.6	\$73,289,973			

SOURCE: Palm Beach County Property Appraiser data, September 2014.
SF= square foot.



Palm Beach County Multi-Modal Intracoastal Waterway Access Study

II. SITE SUITABILITY AND FEASIBILITY

Comparing property value upstream and downstream of the S-155 structure, for Lake Worth properties the disparity in value per square foot is West- \$10.33 for single family, versus East- \$16.51 to 32.99 (single family and vacant residential). And for West Palm Beach, West - \$14.05, versus East- \$38.80 to \$52.84 (single family and vacant residential).

A desire for increased access to waterways is a demand expressed in numerous venues, including waterway and multi-modal planning projects conducted by the Treasure Coast Regional Planning Council, the Palm Beach Metropolitan Planning Organization, and local governments. In addition to the improved ICW access proposed by this project, according to the Intergovernmental Working Group, there is a lack of boat ramps serving the communities interested in this project, with only three boat ramps in the vicinity upstream serving the Lake Clarke Shores area up to the Hilton Palm Beach Airport Hotel just north of Southern Boulevard. There also remain limited opportunities to either expand existing boat ramps or construct new ramps due to land constraint.

Four considerations are included in this study for possible opportunities or limitations. They are:

- Size of the waterbody (depth and width);
- Proximity to boating attractions or destinations;
- Bridge or other waterbody obstructions; and
- Anticipated types of marine vessels.

Size of Waterbody

Regarding the size of the waterbody, the C-51 Canal and adjoining waterbodies are more than ample for small marine vessels (motorized and non-motorized). They are currently used for boating. While the depth of C-51 Canal is reportedly 23 feet in some areas, there are a few areas included in the benefitting properties mapped area which may be depth-constrained (less than 3 feet of water depth during certain times of the year). Those depth-constrained areas could be dredged to improve navigation and expand access. In general, the waterbody size is not a limiting factor given the size of boats anticipated to be used.

Proximity to Boating Attractions or Destinations, Anticipated Demand

A basic question asked of this project is: Will there be a demand to use it? Based on the Intergovernmental Working Group's investigation for the last couple of years, and resident preferences voiced to local elected officials, the answer appears to be "yes."

In part this is based on the good location of the S-155 access point to the ICW and its many attractive amenities and destinations ranging from spoil islands to waterfront dining and entertainment. It is assumed the greatest boating demand would be for pleasure/sightseeing, dinner cruises, ski boats, day-trips in and around the ICW, with less than 25 percent of demand for ocean access (due partially to the size of vessel to be accommodated, and partially the long distance to closest ocean inlets). While transit to the Bahamas or other long-distance locations would become possible, it is not anticipated to be much of the demand.

Once a boat is placed in the water downstream of the S-155 Structure, the distance to the ICW is approximately one-half mile. For those desiring ocean access, as further described below in Figure 6, the closest inlets are 8.6 miles north, or 6.9 miles south. At slow sightseeing/cruising speed (4 knots), each inlet is therefore about 2 hours by boat. However, it is noted the ICW in this area is a not a slow speed zone; therefore, much faster transit is possible.



Figure 6. Distance to Ocean Inlets

II. SITE SUITABILITY AND FEASIBILITY

C-51 at ICW intersection (No. 1)	Distance to Closest Inlet - North (Lake Worth Inlet aka Palm Beach Inlet) (No. 2)	Distance to Closest Inlet - South (South Lake Worth aka Boynton Inlet) (No. 4)
0	8.6 miles	6.9 miles
	1.9 hours at 4 kn (4.6 mph)*	1.5 hours at 4 kn (4.6 mph)*

SOURCE: Approximate distance calculation using Bing maps online.

NOTES: *4 kn speed is merely an example of slow/sightseeing speed; faster speeds are permitted outside of slow speed zones.

Bridge or Other Waterbody Obstructions

An investigation of obstructions to boating navigation near the S-155 Structure found a variety of bridges and water or wastewater pipes which limit boating opportunities, primarily by limiting the size and height of the vessel. Near the structure, the lowest constraint for overhead clearance is approximately 6 ½ feet, while other obstructions further away from S-155 Structure in Lake Clarke Shores (more than 0.75 miles) may be as low 4 feet 5 inches. Eighteen upstream structures and one downstream structure are described for overhead/vertical clearance, and in some cases horizontal clearance. None of the structures are presumed to pose horizontal clearance issues; however,

if barge traffic were accommodated on this waterway, horizontal clearance would need to be verified.

Due to the limited scope and budget of this phase, the project team field investigated obstructions only along the C-51 Canal. Overhead obstruction measurements along waterbodies north and south of Lake Clarke Shores were provided by others and are believed to be accurate, but they have not been field verified by this project team. An inspection by boat throughout the study area is recommended to confirm dimensions.

These are current day conditions, some of which may be subject to future alterations, reconstruction, or improvements which may increase overhead clearance. Some of the overhead clearance obstructions (for example, the utility pipe “1” in the Table 4 and pictured in Figure 7) can be raised to yield greater overhead clearance for boaters. However, some of the obstructions should be accepted as the controlling height, which cannot be changed; such examples include the CSX railroad bridge (approximately 6’8” at the lowest point on the day of observation), and the I-95 bridge (approximately 6’8” at the lowest point on the day of observation).

Because the upstream water body is subject to seasonal and storm condition fluctuations, these constraints are approximations and are dynamic. Water level fluctuations of plus or minus 10 to 12 inches are possible if not commonplace; for extreme storm or drought conditions this range could be larger; such data were not collected for this limited study.



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Table 4 presents the dimensions for overhead clearance, and horizontal clearance (where possible), based on field data obtained in July through October of 2014 (and as otherwise noted).

Table 4. Obstructions in the Study Area Limiting Boat Size for Navigation (Overhead Clearance)

STRUCTURE (EAST TO WEST, THEN SOUTH TO NORTH)	OVERHEAD/VERTICAL AND HORIZONTAL CLEARANCE (IF AVAILABLE)	ESTIMATED CLEARANCE AT CONTROL STAGE
A. Federal/Olive Highway Bridge (brackish)	12' 3"	N/A
B. South Dixie Highway Bridge	7' 7 1/2" vertical clearance.	7' 1 1/2"
C. Water Main Pipeline	Visual estimate 15 feet	14' 6"
D. FEC Railroad Bridge at Mile Post 304.05	9'1" vertical clearance. Horizontal clearance not measured.	8' 7"
E. I-95 Bridge	2 lowest points observed- 6'8" (west) vertical clearance, and 7'9" (east)	6' 2"
F. Tri-Rail/CSX Railroad bridge	6' 8" vertical clearance; 7 paces, or 18 feet horizontal clearance between bridge pilings	6'2"
G. Lake Worth Road bridge	5' 3"	4'4"
H. 2nd Avenue N (vehicle bridge)	6' 8"	5'9"
I. 7th Avenue N (sewer force main)	5'4"	4'5"
J. 10th Avenue N (foot bridges)	6'0"	5'2"
K. 10th Avenue N (vehicle bridge)	5'10"	4'11"
L. Boutwell Road (vehicle bridge)	Impassable, unless altered	
M. Mediterranean Road East (vehicle bridge)	7'6"	6' 8"
N. Keller Road/17th Avenue N (vehicle bridge)	7'3"	6' 5"
O. Pine Tree Lane (at West Palm Beach Canal)	Impassable, unless altered.	
P. Pine Tree Lane (north vehicle bridge)	6'10"	6' 0"
Q. Forest Hill Boulevard (vehicle bridge)	7'7"	6' 9"
R. Summit Boulevard (vehicle bridge)	7'5"	6' 7"
S. Electric utility line	Assumed no limitation for boats in this analysis.	

(10) The field observations for structures B through F on July 24, 2014 were in conditions when the canal water level on the landward side of S-155 Structure was judged as "average to high" for wet season conditions, with recent rain and discharging water over the spillway. According to SFWMD DBHYDRO data, the stage was approximately 7.98 feet NGVD around noon on July 24, which means it could increase another 6 inches for typical operation (to 8.5 NGVD which is the control stage). In the drier seasons, when boating is at its peak, lower water levels could reasonably be assumed meaning that overhead bridge clearance could increase by 6 inches or more.

(11) Bridge clearances for structures A through F were observed and measured in a field visit July 24, 2014 from 1030 – 1230 hours. According to a local resident and visual water marks, this was a low to mid-tide condition on the seaward side of the S-155 Structure. Clearances for structures G through K were provided by staff of Lake Clarke Shores in August 2014 (field observations). Clearances for structures L through S were provided by Lake Clarke Shores staff in September 2014 (field observations).

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(12) The difference between columns 2 and 3 is the difference between measured field observations on the observed dates, and the control elevation for the basin (8.5 NGVD). For example, the water stage upstream of the S-155 Structure was 7.61 NGVD on Sept. 14, 2014, therefore the difference between column 1 and 2 for structures G through K is about 10 5/8 inches. A conservative number for overhead clearance during the wet season is provided in column 3. However the figures in column 2 were observed in the field during the wet season. Clearances through the dry season would likely be greater.

(13) String and plumb-bob used to measure during July 24, 2014 field visit.

(14) Visual estimate, and based on typical water main pipe sections (18 or 20 feet- ductile iron).

(15) Source: All Aboard Florida Environmental Assessment, Appendix A- Bridge Aerial Photography. Available [online] at <https://www.fra.dot.gov/Page/P0590>, July 22, 201



Figure 7. 7th Avenue North Sewer Pipe, Lake Worth. Overhead clearance could be as low as 4 feet 5 inches, at the control water elevation, which is 8.5 feet, NGVD.

These obstructions are further described in Figure 8 below, showing higher clearances in green (greater than 5'4" and less than 6'8", marginal or low clearances in amber (less than 5'4"), and impassable obstructions in red.

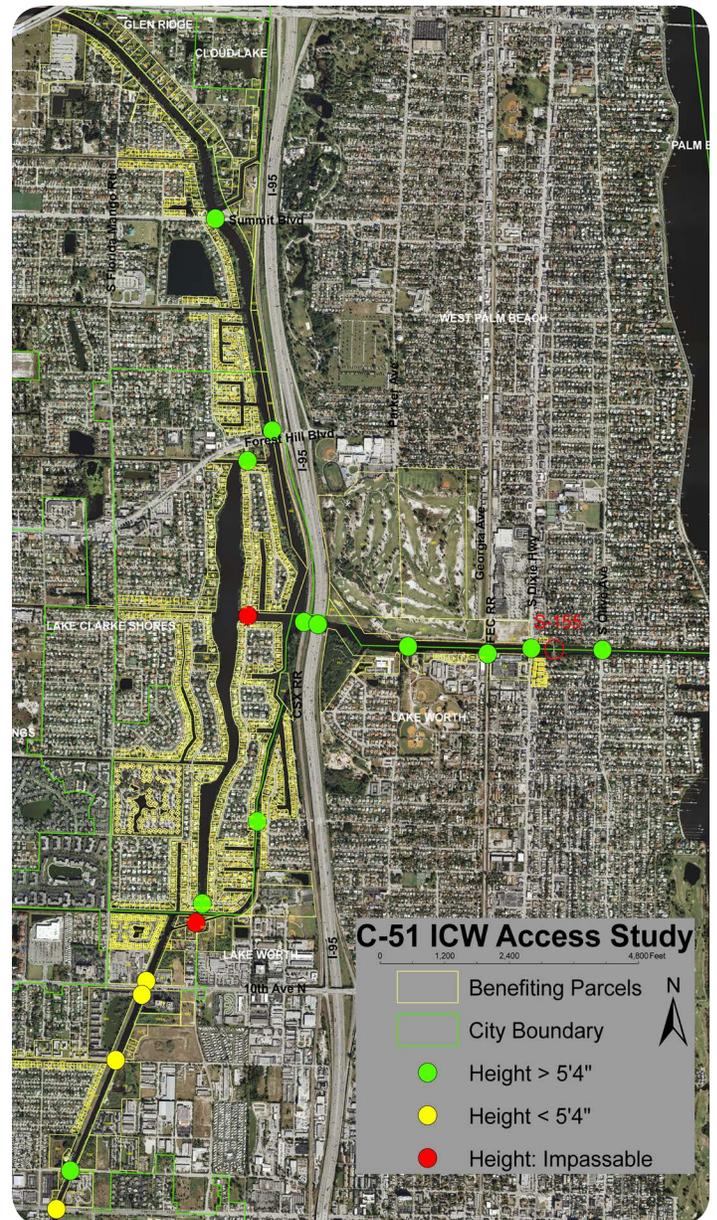


Figure 8. Navigation Obstructions Color Coded by Overhead Clearance

Anticipated Types of Marine Vessels

With some assumptions and familiarity of area boaters, typical conditions, and suitable marine vessels, the project team researched selected types of motorized vessels which would be candidates to use the boat lift. Corresponding dimensions and weight were also factored into the conceptual design.

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By designing a boat lift that accommodates up to 30-foot vessels, at 5 tons (dry weight), a wide range of typical vessels which do not exceed the overhead clearance constraints could use the lift (see **Table 5**). This weight and size is subject to refinement during future design phases; cruising weight (which will include the weight of fuel and water, and other gear) must be considered.

Other important considerations include boats equipped with gear or features that are removable or which fold flat for lower overhead clearance. For example, pictured below is the Tiara Pursuit, a 24-foot outboard cuddy cabin, which has a relatively low overhead clearance (approximately 4 1/2 feet), and which can be further reduced with a convenient feature (windshield folds down).



Pursuit 24' (folding windshield), ~ 4 1/2 feet above waterline.



Pontoon, 5 feet above waterline.



Chris Craft, 24', ~ 6'5" above waterline.



Boston Whaler, 19', 5' above waterline.

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(Rows highlighted in blue identify vessels with bridge clearance of 6'8" or less.)

Type	Height Above Waterline (a)	Dry Weight	Length	Cost (b)	Draft (c)	Beam	Model/Source Information (d)
Center Console	5'0" w/o Top	1,900 lbs.	19'	\$37K	12"	8'0"	Boston Whaler Montauk (OB) http://www.bostonwhaler.com/
	6'5" w/o Top	4,484 lbs.	23'6"	\$88K	16"	8'4"	Chris Craft Catalina (OB) http://www.chriscraft.com/
	9'2" w/ T-Top						
	7'0" w/o Top 8'6" w T-Top	4,300 lbs.	24'9"	\$101K	20"	8'6"	Grady White Fisherman 257 (OB) http://www.gradywhite.com/
	7'2" w/o Top 8'8" w/ T-Top	7,600 lbs.	32'1"	\$220K	23"	9'2"	Donzi 32 ZF Open (OB) http://www.donzimarine.com
Cuddy Cabin	6'9"	4,315 lbs.	22'	\$48K	29"	9'3"	Duffy 22 Cuddy Cabin (Electric) http://www.duffyboats.com/
	4'7"	3,900 lbs.	20'10"	\$65K	18"	8'6"	Regal 2250 Cuddy Cabin (IO) http://www.regalboats.com/
	7'1" w/ Hard Top		23'7"		21"	8'6"	Campion Explorer 682ISC (IO) http://www.campionboats.com/
Pontoon	4'5"	1,650 lbs.	19'5"	\$21K	12"	8'6"	Avalon LS Cruise (OB) http://www.avalonpontoons.com/
	5'0"	3,475 lbs.	23'6"	\$48K	13"	8'6"	Hurricane Fundeck 2336 (OB) http://www.hurricaneboats.com/
	5'0"	4,882 lbs.	25'4"	\$29K	14"	8'6"	Suntracker Regency 220DLX (OB) http://www.suntrackerboats.com/
High Performance		9,500 lbs.	35'	\$400K	35" (Drive Down)	8'6"	Fountain Lightning 35 (IO) http://www.fountainpowerboats.com/
	6'2"	9,900 lbs.	37'6"	\$340K	26"	8'0"	Cigarette Top Gun 38 (IO) https://www.cigaretteracing.com/
Walkaround Cabin	5'9" 8' w/ T-Top	2,900 lbs.	20'4"	\$58K	15"	8'1"	Grady White Adventure 208 (OB) http://www.gradywhite.com/
	6'5" 8'8" w/ T-Top	4,538 lbs.	23'5"	\$112K	20"	9'3"	Grady White Gulfstream 232 (OB) http://www.gradywhite.com/
	8'2" w/ enclosed Wheelhouse	7,525 lbs.	30'6"	\$158K	29"	9'3"	Shamrock 270 Mackinaw (IB) http://www.shamrockboats.com/
Dual Console/Bow Rider	3'10"	2,100 lbs.	17'10"	\$28K	14"	7'5"	Glastron GT 180 (OB) http://www.glastron.com/
	5'7"	2,810 lbs.	20'4"	\$57K	15"	8'1"	Grady White Freedom 205 (OB) http://www.gradywhite.com/
	6'4" w/o Top	3,550	24'6"	\$113K	21"	8'6"	Edgewater 245cx Dual Console (OB)
	8' w/ T-Top						http://www.ewboats.com/
Flats	3'8"	1305 lbs.	20'2"	\$41K	11"	8'	Action Craft 2020 (OB) http://www.actioncraft.com/

NOTES

- (a) Generally referred to as bridge clearance by manufacturers. Does not reflect options or accessories such as antennas, out riggers, etc.
 - (b) Where possible, the cost reflects the 2014 Manufacturer's Suggested Retail Price, obtained from the Manufacturer's web site.
 - (c) The draft reflects the depth of the hull in the water with the outboard or Inboard/Outboard drives raised unless otherwise noted.
 - (d) Abbreviations following the boat model name identify the type of motor and drive configuration.
- OB - outboard motor; IO -inboard motor with an external, adjustable drive; IB - inboard motor with a fixed drive shaft.

Figure 9. Examples of Potential Which Could Use the Lift



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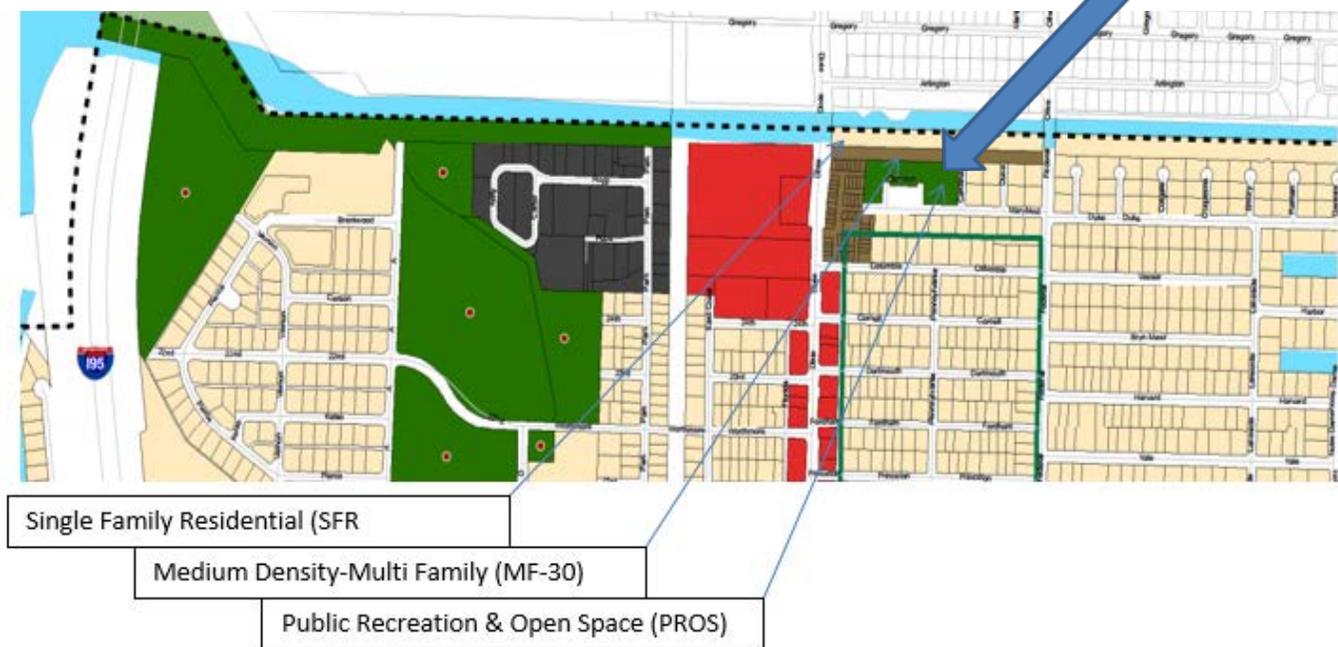
D. Zoning, Land Use, Parking and Roads

Lake Worth Zoning and Land Use

The most relevant land use and zoning classifications applicable to the project are those of the City of Lake Worth. Depending on the final design, the City of Lake Worth's zoning districts and land use classifications are consistent with the intended use (boat lift). The footprint of the conceptual design (presented in section J) is primarily in parcels labeled D (zoned single family) but could involve parcel C (zoned multi-family) and parcel B (zoned "Public Recreation and Open Space", or PROS). (See **Table I**)

Boat docks and lifts are permitted as conditional uses in the PROS category and are allowed in the single family residential category. In the multi-family residential zoning category boat lifts are permitted as a conditional land use permit if less than 7,500 square feet; limited dockage and marinas are also allowed as a conditional land use permit if greater than 7,500 square feet.

Lake Worth zoning categories for the subject properties are depicted below:



(1) The prior classification of Parcel B was "Single Family Residential," which also expressly permitted public indoor neighborhood recreation and service facilities, public outdoor neighborhood recreation, and boat docks and boat lifts." SOURCE: Section 23.3-7. SF-R - Single-Family Residential, Lake Worth Zoning Code.

(2) Boat lifts are conditional uses permitted in zoning categories P, PROS, and CON. Boat Repair and Maintenance, Boat Detailing-Conditional in I-POC; Boat Detailing – Conditional in AI; New and used boat sales and rentals- conditional in MU-DH, MU-W, and I-POC (AI=Artisanal Industrial; MU-DH=Mixed Use- Dixie Highway; MU-W= Mixed Use- West; I-POC= Industrial – Park of Commerce). Source: Lake Worth permitted use table.

See www.lakeworth.org/files/files/forms/community/LDRpercent20Permittedpercent20Usepercent20Table.pdf. The City's Conservation zoning district speaks more directly to permitted marine uses, namely "Marine uses, kayak, canoe and other non-motorized watercraft, Marine research and education, Marinas and associated uses, Limited dockage." Source: Lake Worth Land Development Regulations at - <http://www.lakeworth.org/files/files/businesspercent20tab/LDRs/Conservationpercent20District.pdf>.

(3) The City's Conservation zoning district speaks more directly to permitted marine uses, namely "Marine uses, kayak, canoe and other non-motorized watercraft, Marine research and education, Marinas and associated uses, Limited dockage." Source: Lake Worth Land Development Regulations at- <http://www.lakeworth.org/files/files/businesspercent20tab/LDRs/Conservationpercent20District.pdf>. Consultation with Lake Worth staff, September 2014 and January 2015.

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Height restrictions from the zoning code are: 35 feet in the PROS category, 30 feet with some bonuses available in the Multi-Family category, and 30 feet in the single family category. The boat lift structure is not expected to exceed 30 feet in height.

It is unclear whether set back requirements would pertain to the proposed design; this will be clarified during the development review process through the City of Lake Worth.

As for City of Lake Worth Future Land Use designations, they are consistent and should not pose any conflicts, meaning PROS, the three parcels' designation are public

recreation and open space, multi-family residential, and single family residential, respectively.

West Palm Beach Zoning and Land Use

Depicted below on the north side of the C-51 Canal, which is partially included in the project site and neighboring areas of interest are the relevant zoning categories in the City of West Palm Beach, which include Recreation and Open Space (ROS), (which is the golf course); residential planned development (RPD- the property to the east); Neighborhood Commercial (NC), (which is the restaurant); and Single Family (SF7), (which includes the SFWMD property serving the S-155 structure).

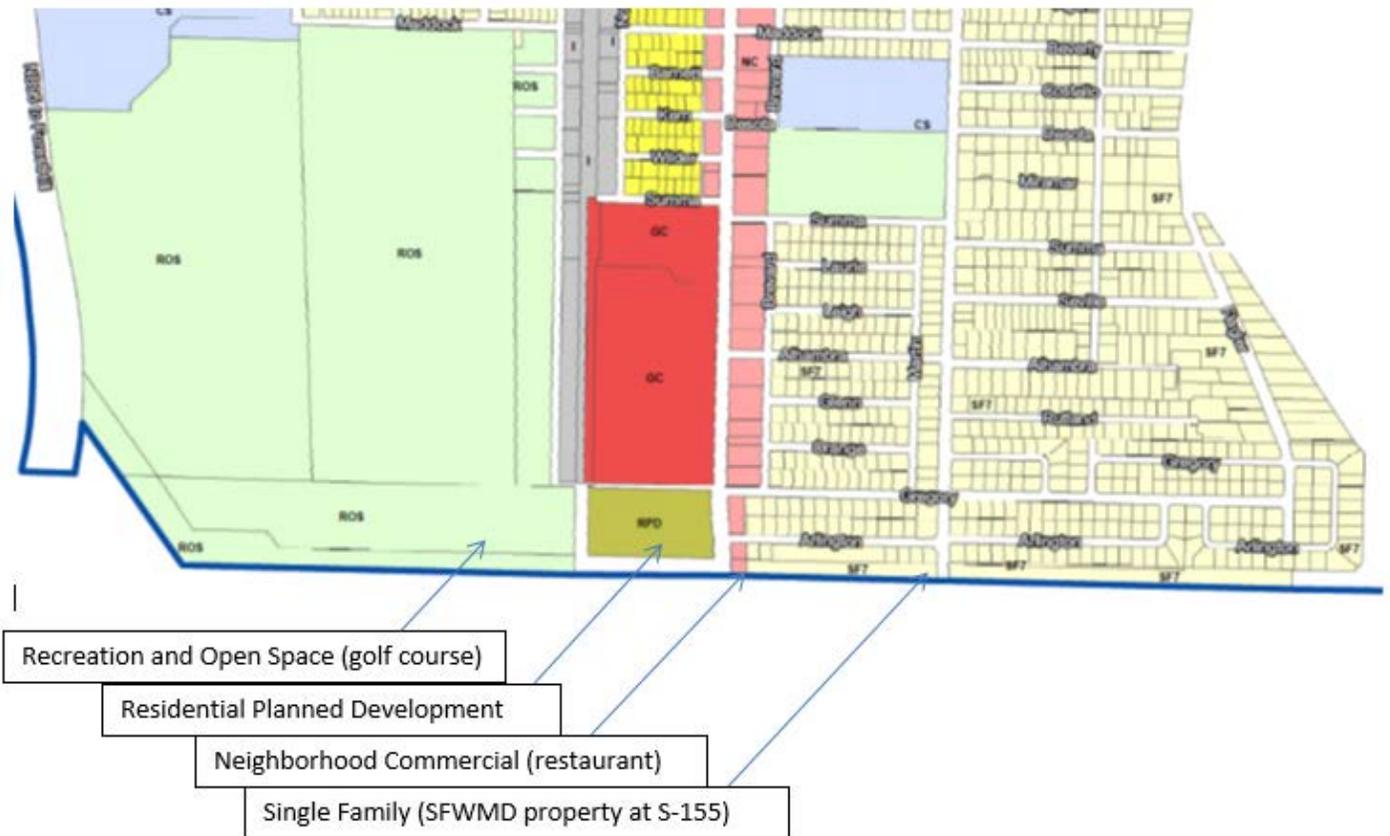


Figure 10. West Palm Beach Zoning and Land Use

(18) COMMUNITY SERVICE (CS): The Community Service (CS) designation is intended to designate parcels with institutional or governmental related uses that benefit and serve the public with a maximum FAR of 1.0. Permitted uses such as: government offices; schools; hospitals, medical clinics, medical centers, and medical offices; community centers; recreation services and facilities; low impact utilities; transportation services; solid waste management facilities, public safety facilities; child care facilities; adult day care facilities; group homes, nursing homes, and congregate living facilities; religious uses; and cemeteries.

SOURCE: West Palm Beach Comprehensive Plan, Revised 12/9/10, Land Use Element, pg. 4.
See <http://wpb.org/planning/wp-content/uploads/sites/37/2013/02/2-FLUE-Element-Final-Rd-20101.pdf>.



Figure 11. West Palm Beach Future Land Use Designations

As shown above, the corresponding categories in the West Palm Beach Future Land Use designations are Community Service (CS), Multi-Family (MF), Commercial (C), and Single Family (SF).

Parking and Traffic

Based on the site sketch from the property agreement between Lake Worth and SFWMD, and verified from a site visit, there are 40 standard vehicle parking spaces on the site, including 2 ADA spaces. The conceptual design (Section J) does not impact any of the parking area for Spillway Park, thus no spaces would be removed. The operation of the boat lift could generate additional parking demands. Additional parking demand could result from:

- a. Two staff persons operating the facility.
- b. Boater's crew. In the event a boater were to meet friends, family, other crew at Spillway Park, those parties could conceivably drive a vehicle to the Park, join the boat for an outing, and thus leave a parked car behind. It is also feasible that the owner might retrieve the car after operating hours of the boat lift. Consideration should be given for these conditions, which include mooring boats overnight in the event they do not arrive during lift operating hours.

E. Permitting Requirements

Prior to conducting the informal pre-application meeting described in Section IV below, this section presents research on natural resources which may require permitting, and then lists five Federal, state, and local agencies anticipated to be involved in the permitting/approval process. The longest permitting process among the agencies could take 18 months (U.S. Army Corps of Engineers), while the fees for the various permitting applications could be nominal (less than \$1,000).

I. Environmental Conditions Requiring Permitting

To determine if there are wetlands or other surface waters that might require environmental permits, existing wetland maps and soil maps were reviewed. The USACE has a National Wetlands Inventory (NWI) that maps wetlands. Many wetlands shown on NWI maps were drawn using interpretation from aerial photographs, soil maps, and other sources. Some NWI maps are many years old and may reflect historical conditions that no longer exist. The NWI maps have no regulatory jurisdictional significance. However, in some cases, they can be an informative tool in preliminary environmental planning. The NWI indicates no wetlands in the area, other than the C-51 Canal, which is mapped as estuarine/marine deepwater habitat (Figure 12) and would be considered an "other surface water". Impacts to other surface waters typically require environmental permits but not wetland mitigation.

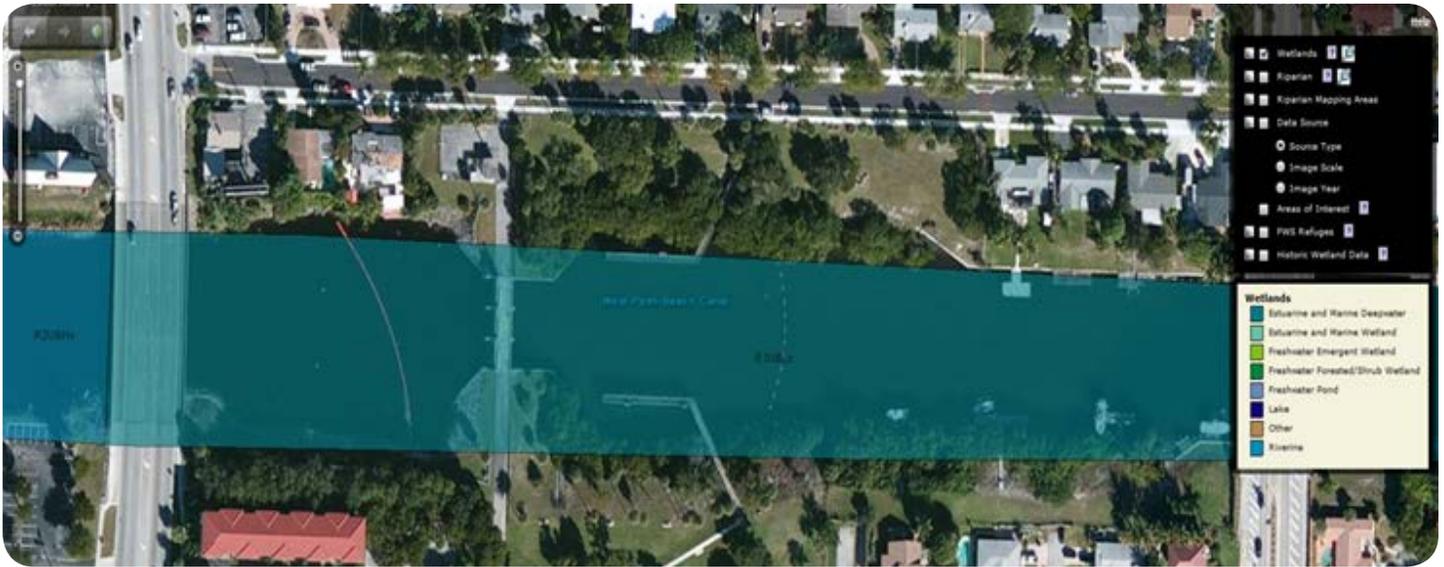


Figure 12. National Wetlands Inventory for the Project Site

(19) <http://www.fws.gov/wetlands/>

(20) <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

According to the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey, the soils just south of the C-51 canal, including the canal banks and Park, are mapped as Urban land and St. Lucie-Paola-Urban land complex (**Figure 13**). These soil types are not considered hydric soils by NRCS and would therefore not likely meet the definition of wetlands.

Mangroves are present along the shoreline on the downstream side of the S-155 Structure. Impacts to some of these mangroves would be unavoidable. Mangrove impacts would require permitting and mitigation. While not yet determined if mangrove mitigation is required, it is anticipated to be relatively minimal meaning less than \$30,000 at a mitigation bank or payment into an in-lieu fee program. Though this is not an itemized cost in **Table 8**, it is likely part of the contingency included in the overall total project cost estimate.



Figure 13. NRCS Soil Survey for Project Site

(Legend: 41 = Urban land; 48 = St. Lucie-Paola-Urban land complex; 99 = water.)

The project site is within manatee habitat. According to the County’s Manatee Protection Plan, the C-51 canal east of the spillway and the nearby portions of the Lake Worth Lagoon are within a “Conditional” boat facility siting category (**Figure 14**). This is a boat facility siting category that represents relatively moderate manatee use, recommending that a moderate increase in dockage and boat slips can occur without significantly impacting manatees. The Manatee Protection Plan places constraints on the number of new boat slips allowed. Facilities located in Conditional areas are allowed up to six slips for every 100 feet of shoreline owned. It does not control the actual number of boats using the waterways. Further analysis regarding potential manatee regulations will be required as part of the permitting process.

(21) *The Manatee Protection Plan has been approved by the Board of County Commissioners, the Florida Fish and Wildlife Conservation Commission, and the U.S. Fish and Wildlife Service. Palm Beach County has incorporated the Manatee Protection Plan into its Comprehensive Plan.*
http://www.pbcgov.com/erml/coastal/manatees/manatee_protection.htm

(22) *The Manatee Protection Plan defines a slip as “a space designed for the mooring or storage of a single watercraft, which includes wet or dry slips, anchorage, mooring buoy, beached or blocked, hoist, floating platforms, davits, boat lifts, or a parking space for a boat ramp.”*

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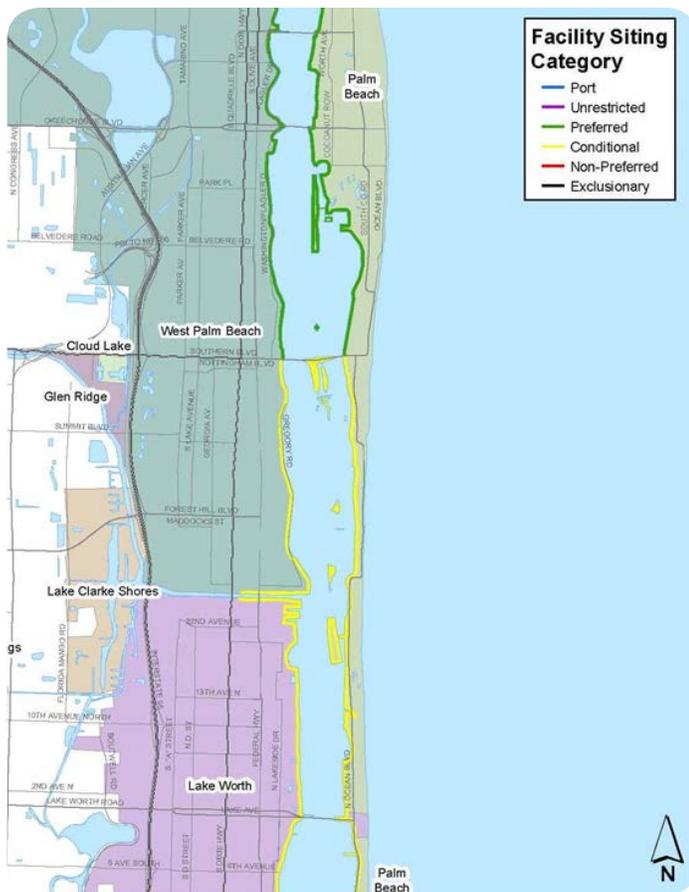


Figure 14. Palm Beach County Boat Facility Siting Plan Map, Lake Worth Central.

SOURCE: Palm Beach County Manatee Protection Plan, 2007.

As the C-51 Canal, the canal bank, and property comprising Spillway Park are owned by SFWMD, the Park has operated since 1986 under an agreement between SFWMD and Lake Worth (see Appendix C.) The Agreement has been amended in the past, and another amendment would be required to construct and operate the boat lift. The agreement embodies elements and conditions similar to SFWMD's Right-of-Way permits.

2. Environmental Permits Required

The project would require coordination and/or permits from the following agencies:

- **USACE**
 - o **Type of Permit:** A federal permit under Section 404 of the Clean Water Act and Section 10 of the

Rivers and Harbors Act of 1899 would be required from the USACE as the project would occur in Waters of the United States. The project would not likely meet the criteria of any of the Nationwide or General Permits considering the canal system that may need to be excavated. The project would likely require a Standard Permit. No permit fees are required for this type of permit.

- o **Key Challenges:** The USACE would consult with environmental agencies such as the United States Fish and Wildlife Service, the Florida Fish and Wildlife Conservation Commission, and the National Marine Fisheries Service for potential impacts to manatees and other protected species. Because the project would result in more boat traffic in manatee habitat, the environmental agencies would review the project for compliance with the MPP. Also, because the project would affect a Central & South Florida canal, the USACE would conduct a Section 408 review. Section 408 reviews are typically lengthy and require additional technical analyses such as hydraulic analyses.

- o **Processing Time:** Consultation with the reviewing environmental agencies and public noticing is typically very slow, and it is likely that USACE would have multiple Requests for Additional Information (RAIs). Permit processing would likely take 12 to 18 months from submittal of the initial permit application.

- **USCG**

- o **Type of Permit:** The C-51 Canal meets the definition of a navigable water as defined by 33 CFR Section 2.36. Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946 placed navigable waters under the control of the USCG to protect interference of navigability by bridges or other obstructions. Given the project does not include a new bridge and would only affect small motorboats, the project may require no permit or it may qualify for an Advanced Approval under 33 CFR Section 115.70.

- o **Key Challenges:** The USCG may require a Navigation Evaluation, which requires a detailed inventory of upstream and downstream structures, types and sizes of vessels utilizing the waterway, and collection of other data. The USCG may evaluate the effects of increased boat traffic on both sides of the C-155 spillway (upstream and downstream).

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o **Processing Time:** Coordination/approval would likely take 6 to 12 months.

- **FDEP**

o **Type of Permit:** An environmental resources permit (ERP) under Part IV of Chapter 373, Florida Statutes would be required from the State as the project would occur in Other Surface Waters. Under the delegation of authority, this project would more likely be processed by the FDEP than the SFWMD as the project would likely consist of a docking structure and would not be a plan for larger development such as a residential community. Due to the unique nature of the project, it would not likely qualify for an Exemption or a Notice General Permit. Notice General Permits specifically cannot be utilized if a project occurs within any easement or other property conveyance (this project is located within a SFWMD Right-of-Way [R/W]). The project would likely require an Individual Permit. The permit fee would be \$420.

o **Key Challenges:** FDEP may require the excavated soil/sediment from the canal or park be tested for contaminants prior to offsite disposal; if contamination is found, the material may need to be handled and disposed of as hazardous waste. Given the likelihood of impacts to mangroves at the project area, avoidance and minimization measures will need to be demonstrated during permitting process and appropriate mitigation proposed.

o **Processing Time:** It is likely that FDEP would have multiple "Requests for Additional Information" letters. Permit processing would likely take 8 to 12 months from submittal of the initial permit application.

- **SFWMD**

o **Type of Permit:** Coordination with the SFWMD is integral with Federal Section 408 review (as described above); a hydraulic analysis is needed for such review. In addition, since the SFWMD owns the C-51 Canal and Park, an amendment to the existing Agreement and/or a Right-of-Way Occupancy permit or similar authorization would be required from the SFWMD. The Right-of-Way Permitting Program provides an evaluation process for requests to connect with and/or make use of Works and Lands of the District, considering its impact on the District's operations and maintenance requirements, quality of title implications, environmental review, assessment of potential liability implications and compatibility

with future recreational proposals. There would be no permit fee.

o **Key Challenges:** The applicant must clearly demonstrate that the proposed project would not affect the SFWMD's ability to access their property and operate and maintain the S-155 spillway. The SFWMD has the authority to dismantle structures within their right-of-way as needed, including but not limited to, flooding or other emergency conditions. The boat lift would need to be designed in a way to minimize the likelihood that it would ever need to be removed, even in the event of an emergency.

o **Processing Time:** An existing Agreement and the long history of a cooperative use of the park between the Lake Worth and SFWMD would presumably improve the likelihood and speed of approval. Authorization would likely take less than six months.

- **Local Governments**

o Neither the Palm Beach County Department Environmental Resources Management nor the Lake Worth Drainage District (LWDD) have a regulatory program for this type of project, hence no environmental permits are anticipated to be needed. County officials are being notified of the project through the cooperative project team working group, and the LWDD operations staff has been briefed on the project. The County would review the project for compliance with the MPP.

o Based on the project's conceptual layout options to date, development review processes of the City of Lake Worth and City of West Palm Beach would be triggered before building permits would be issued.

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

II. SITE SUITABILITY AND FEASIBILITY

F. Operations and Maintenance

For this analysis, the project team has assumed that the City of Lake Worth would be the owner, builder, operator, and permit applicant. The operation and maintenance could be outsourced to a private party under contract.

The project site has a long history of cooperation between the City of Lake Worth, the SFWMD, and USACE. A February 14, 1986 agreement between the SFWMD and the City of Lake Worth (and subsequently amended 3-10-92, and 6-7-05) recognized that what are now the park lands “. . . together with the Palm Beach Lock and Spillway have served as an informal public fishing area for over fifty (50) years.” So the District and the USACE “in recognition of these many years of public fishing access, have installed downstream fishing catwalks (piers) in conjunction with the construction of Structure 155 (new control structure which replaces the Palm Beach Lock and Spillway).”

According to the agreement, the SFWMD and USACE installed these Park amenities including basic support facilities (building security lighting and rest room). Except for turf maintenance, the City of Lake Worth assumed responsibility for maintaining the completed facilities.

The agreement includes a provision that the City may, at its option, make additional improvements to park (subject to SFWMD approval). The City is responsible to enforce rules and regulations for park use by the public. See Appendix C for copy of agreement and site sketch.

Operation

The intended operation of the facility could be roughly dawn to dusk, which would vary by season. This could be as long as 14 hours (0500 to 1900 hours) during parts of the year but could be reduced to 8 or 10 hours during winter. The boat lift machinery would only be operated by trained staff. Policing and security should be considered, but it is not part of the scope of this analysis. This could include the possibility of boaters traveling in international waters (e.g., Bahamas) and therefore fulfilling US Customs requirements at other locations in Palm Beach County.

The facility should be prepared to close for inclement weather conditions including sometimes rapidly changing high water discharge conditions, and clearly convey such closures by signage or other effective means.

If a fee-based system is used, a simple and easy payment method should be devised. Suggestions include annual permits or the swipe of a key card.

While an operations analysis is beyond the scope of this analysis, various costs and possible fees are presented below. Assuming the facility might always be staffed by 2 persons or staffed by 2 persons just at peak times (weekends and holidays), operate from 12 to 14 hours per day year round, and is regularly inspected to ensure a safely functioning lift and canals, the facility could cost between \$140,000 to \$240,000 per year.

Table 6. Operating Expense Range

EXPENSE	\$ (000) ANNUAL
Staff: 2 @ 14 hour/day	215
Staff: 1.25 @ 12 hours/day (weekends, holidays +)	115
Inspections/Maintenance	25
Range	140-240

Regarding operating income, there are several scenarios under consideration by the project’s working group. If the facility’s operation were paid by fees only, the Table 7 below gives a range of reasonable assumptions for discussion. Assuming the facility is open no more than 12 hours/ day (peak), and 9 hours/day (off-peak), with 27 – 35 lifts per day year round, the facility might cover most operating expenses (insurance and other considerations not included) with a lift fee below \$15/lift.

Table 7. Operating Revenue Range (annual)

	BOAT LIFTS			REVENUE		
	Peak time lifts	Off-peak time lifts	annual	revenue @ \$10/ lift	revenue @ \$15/ lift	revenue @ \$20/ lift
# days	116	249	365			
hours	12	9				
lifts/hour	3	3				
Total potential lifts & revenue	4,167	6,723	10,899	\$108,990	\$163,485	\$217,980

NOTES: Off peak is defined as weekday or non-holiday.



Liability and Insurance

The question of liability for a publicly-owned and operated boat lift facility should be investigated further. While public entities own and operate many boating facilities including marinas with maintenance facilities, boat ramps, etc., to date this project team has not identified other comparable public facilities other than the Port of Edmonds, Washington (described below).

Since numerous private boat lift facilities continue to operate successfully, the question of liability is therefore arguably manageable. For comparison, Tequesta Insurance provides general liability for a smaller privately operated boat lift than could serve this project. By way of example, for approximately \$950 annual premium, about \$1M coverage is provided.

That municipalities are protected by sovereign immunity which sets a cap on damages is another consideration which supports the planned operation of this project. Further, staff that will be specifically trained in the safe operation of the lift should be another factor that will minimize liability considerations.

Annual Maintenance

As with any heavy machinery, periodic maintenance to guarantee safe operation will be required. For comparison, a smaller boat lift in Palm Beach County than could serve this project pays approximately \$400 for an annual inspection, which is provided by a certified crane operators company and required to maintain insurance.

In addition to regular maintenance of the boat lift structure and operation, it would be advisable to conduct periodic in-the-water inspection of the canal, seawalls, and other constructed portions of the project. Such costs have not been researched for this analysis; however, a rough estimate of \$25,000/year for planning purposes is included in the annual maintenance costs above.

G. Cost and Funding

1. Project Capital Cost

Preliminary “order of magnitude” cost estimates are provided below (2. Funding).

2. Funding

While outside of the scope of this study, several grant opportunities are being investigated by the intergovernmental working group and supported by the Treasure Coast Regional Planning Council staff, which may include Federal Economic Development Administration funds, (wherein infrastructure projects in economically distressed areas compete for funds), and additional funding from the Palm Beach Metropolitan Planning Organization. To date, it does not appear funding from the Florida Department of Transportation is available for the project.

While preliminary findings conclude the project would probably not qualify for funding from the Florida Inland Navigation District, another potential funding source may be the Florida Boating Improvement Program which application process usually opens in February of each year.

H. Additional Due Diligence Recommended

Although necessary for the project to advance into a subsequent detailed design phase, full due diligence is not included in this assessment. Only readily available sources were used within a short time period, limited scope and budget.

Should permitting and detailed design proceed, a standard list of development/construction due diligence would be performed as required for permitting, development review, and construction which could include items such as:

- Review of any usage constraints imposed by the Manatee Protection Plan;
- Evaluation of mitigation options for mangrove impacts;
- Geotechnical analysis of soils and subsurface features;
- Review of previous recent environmental assessments (if any);
- Traffic impact analysis (however thought to be non-applicable);
- Investigation of alterations of utilities to serve the site (electric, phone, cable, natural gas, sewer and water);
- Hydraulic analysis of the newly proposed canal, and typical flow conditions;
- Current boundary and topographic surveys; and
- Consideration of excavation and dredging permit requirements including testing sediment for contamination.

III. COMPARABLE PROJECTS, CONCEPTUAL DESIGN, TIMELINE, AND COSTS

A. Comparable Projects

Preliminary research was conducted on comparable projects which may offer some applicability to this project. More than five such systems are summarized below. One publicly operated system has been identified, while the rest are privately owned and operated.

Various boat lift technologies for smaller vessels anticipated in this project can be categorized as:

- a. Gantry system - Bridge train, meaning overhead lifts
- b. Fork truck operation
- c. Travel lift
- d. Rail car on monorail
- e. Combination of above



Figure 15. Example of an overhead bridge train, with a 30 ton capacity

SOURCE: Florida Handling Systems, Inc.

(24) See <http://myfwc.com/media/2710850/2013-2014-Boating-Improvement-Program-Report.pdf>.

(25) Source: <http://portofedmonds.org/marina/boat-launch/>.

(26) Source: <http://portofedmonds.org/marina/boat-launch/>.

Another example of a bridge train combined with slings and providing architectural appeal is pictured below:



Figure 16. Example of a bridge train combined with slings and providing architectural appeal

SOURCE: Florida Handling Systems, Inc.



Figure 17. An example of a smaller capacity travel lift

SOURCE: http://img.nauticexpo.com/images_ne/photo-g/all-wheel-steering-travel-lifts-remotely-controlled-32061-394769.jpg

A survey a several operation systems is provided below, summarizing projects in (1) Port of Edmonds, WA, (2) Manatee River, Bradenton, (3) Fort Myers Beach (at Bayside Estates), and (4) Juno Isles, Palm Beach County.

(1) The Port of Edmonds, WA uses a combination sling and overhead gantry system (pictured below). It "...operates one of the few public sling launches on Puget Sound..." It "... can handle 10' to 26' trailered boats, with a 9' maximum beam, and 10,000 pounds maximum allowable weight." The facility is open for lifts 7 days per week, 0700- 1700. It is unknown

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III. COMPARABLE PROJECTS, CONCEPTUAL DESIGN, TIMELINE, AND COSTS

how the facility is staffed; construction cost or fees were not obtained. To ensure maximum weight capacity is not exceeded, the Port provides the following units of measure to sum up, so patrons calculate their own weight:

“Dry Weight: the manufacturer’s weight without any consumables, passengers, or cargo. Dry weight is when all tanks, fuel, water, and holding tanks have not been filled. Any attachments, the amount or type of fuel in your tank, and water tanks can affect the weight of your boat.”

Water Weight: approximately 8.35 lbs per US gallon

Gasoline Weight: 6.0 to 6.3 lbs per US gallon

Diesel Weight: approximately 7.15 lbs per US gallon”



Figure 18. A gantry lift system with sling cradle serves at Port Edmunds, WA.

(2) A gantry lift system, with rigid cradle serves a residential area along the Manatee River, Bradenton, FL. In the aerial photo below, the system is located in the upper right corner. Other information about cost, fees, operation, etc. has not been obtained to date. It is unknown how the facility is staffed; construction cost or fees were not obtained (request pending with Florida Handling Systems).



Figure 19 (bottom left). Aerial photo of Manatee River, Bradenton, FL with boat lift system located in upper right corner.



Figure 20a. Figures 20a and 20b. A privately operated overhead gantry system with rigid cradle serves a residential area along Manatee River, Bradenton, FL.

(3) Fort Meyers Beach (at Bayside Estates), a privately operated gantry system is in place which lifts a boat, moves it across a dam, then drops it back in the water on the other side. The lift system accommodates boat transfer between freshwater on the east side to and from saltwater on the west side.

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

III. COMPARABLE PROJECTS, CONCEPTUAL DESIGN, TIMELINE, AND COSTS



Figure 21. Aerial photo of Bayside Estates Lift System

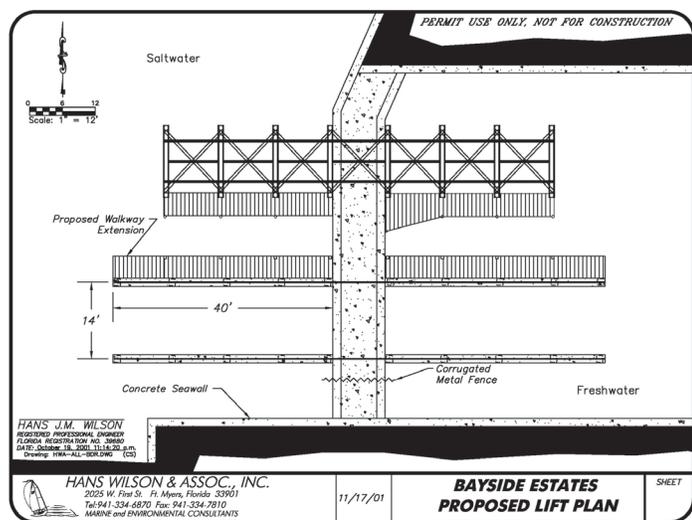


Figure 22. Lift Plan for Bayside Estates (subsequently constructed and in operation).

SOURCE: Courtesy of Hans Wilson & Associates, September 2014.

(4) The Juno Isles Boat Owners organization operates a small lift; this is a private boat owners association operating the structure on private property in Juno Isles, Palm Beach County, FL. The lift accommodates about 50 waterfront property owners of the approximately 99 in the Juno Isles neighborhood association. Because of a water control structure which operates as a dam/spillway, freshwater is held in the neighborhood canals to maintain navigable water depths in the 5-6 foot range (typical conditions). Overhead clearance constraints include two water mains (approx. 5 feet), and one bridge downstream (less than 5 feet at high tide).

Size Limit: Vessels not more than 27 feet length , Beam 9 ½ feet, Draft 5 ½ feet.

Weight Limit: 3 tons (rated); 6 ton (theoretical).

Cost: While much of the infrastructure was already in place from prior operations over 20 years ago (concrete pilings), the current lift structure was built by Florida Handling Systems for roughly \$30,000.

Various pictures showing the structure and operations are provided below.



Figure 23. Photo of Juno Isles Lift Structure



Figure 24. Close up photo of Juno Isles Lift Structure

(27) In certain instances, 30 foot maximum may be accommodated.

(28) Based on field visit and interpretation of reported information.

(29) See www.floridahandlingsystems.com/cranes-and-hoists-overview/transverse-boat-lifts.



Figure 25 (above). Photos of Juno Isles Lift Structure. Photos clockwise from top: Photo 1-Spillway wall at Juno Isles, Photo 2-Weight capacity of Juno Isles Lift Structure, and Photo 3-Photo of Cradle Structure

According to other preliminary research, several other boat lift systems may warrant further investigation for this project’s desired objectives and cost comparisons. These include The Minuteman Dockside lift which is a rotary type of lift which lifts from one body of water, then rotates the boat and drops it in another body. It is reportedly used at a private dry stack facility on Marco Island (5 Ton capacity), and in Cape Coral over a dam structure. A public system may be in operation in Tampa which is operated by the boat owner, and using a universal type cradle built into a long boat house that lifts and travels over a dam. There may have been a publicly operated boat lift in Chokoloskee, FL, however definitive information about that system is not available at this time.

B. Conceptual Layout

Prior to the pre-application meeting described in Section IV. below, a conceptual layout was proposed, based on a variety of assumptions, constraints and opportunities, consideration of the project objectives, and review of the “Plans for Construction of C-51 East End and S-155,” (USACE, Jacksonville District, 1982). The conceptual layout and cross section are presented in **Figures 26 and 27** (following page). The layout uses the overhead gantry system.

Among other features, some highlights of the conceptual layout are:

- Minimal disruption of Spillway Park amenities, activities; parking is not diminished;
- Accommodates up to 30-foot, 5-ton boat;
- 25 foot wide canal for entry, exit, and staging;
- Floating docks for people and non-motorized vessels (e.g., kayak portage);
- Prefabricated steel boat lift gantry crane;
- Transfer across approximate 5-10 foot difference in water surface elevation;
- Maintain approximately 13 foot wide roadway for maintenance vehicles for S-155 Structure; overhead clearance at 18 feet assumed not to impede any maintenance equipment; and
- Minimizes impact to adjacent property since the canal layout will avoid the existing S-155 substructure and wingwalls.

(30) Contact Dream Harbours Consulting LLC, Frank Donohue, Naples, FL. Marina, Dry Storage & Boat Yard Design. President, Marine Industries Association of Florida.

(31) Ibid.

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

III. COMPARABLE PROJECTS, CONCEPTUAL DESIGN, TIMELINE, AND COSTS



Figure 26 (above). Conceptual Layout

NOTES: WSEL - Water surface elevation.

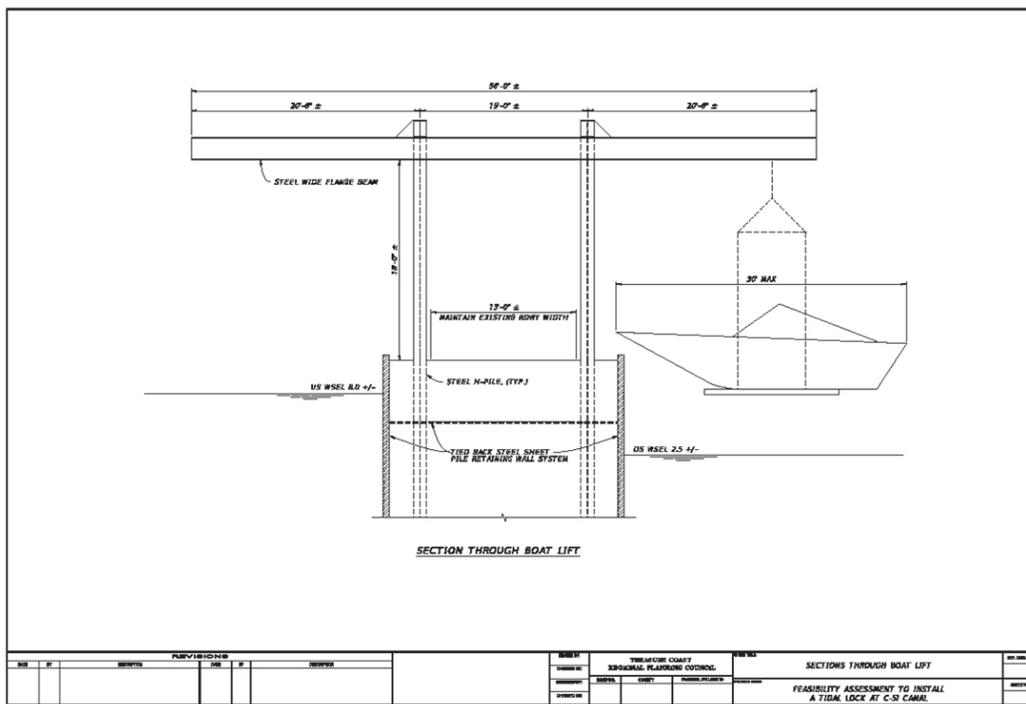


Figure 27. Cross Section of Boat Lift

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III. COMPARABLE PROJECTS, CONCEPTUAL DESIGN, TIMELINE, AND COSTS

Per **Table 8** below, the preliminary estimate of the construction of the boat lift, including earthworks and canal construction, and “soft-costs” such as permitting, engineering, and design is \$1 million.

Table 8. Preliminary Estimate of Project Completion & Construction Cost

TASK	COST
Planning	\$50,000
Survey	\$50,000
Geotech	\$50,000
Permitting	\$50,000
Design	\$75,000
Construction	\$650,000*
CEI & As-Builts	\$75,000
TOTAL	\$1,000,000

C. Permitting and Construction Timeline

As shown in **Figure 28** (below), a preliminary estimate of the timeline for planning, survey and geotechnical engineering, design and development review, permitting, procurement and construction totals approximately 3 ½ years to be operational. If administrative, procurement, and financing decisions are complete by the end of 2014, counting from January 2015 ribbon cutting for the project could occur in July 2018.

NOTES: * Construction is comprised of \$350,000 for the lift; \$75,000 mechanical, electrical, & plumbing (aka MEP); \$225,000 for earthwork, dewatering, excavation, and foundation. Construction cost estimating courtesy of Florida Handling Systems, Inc.

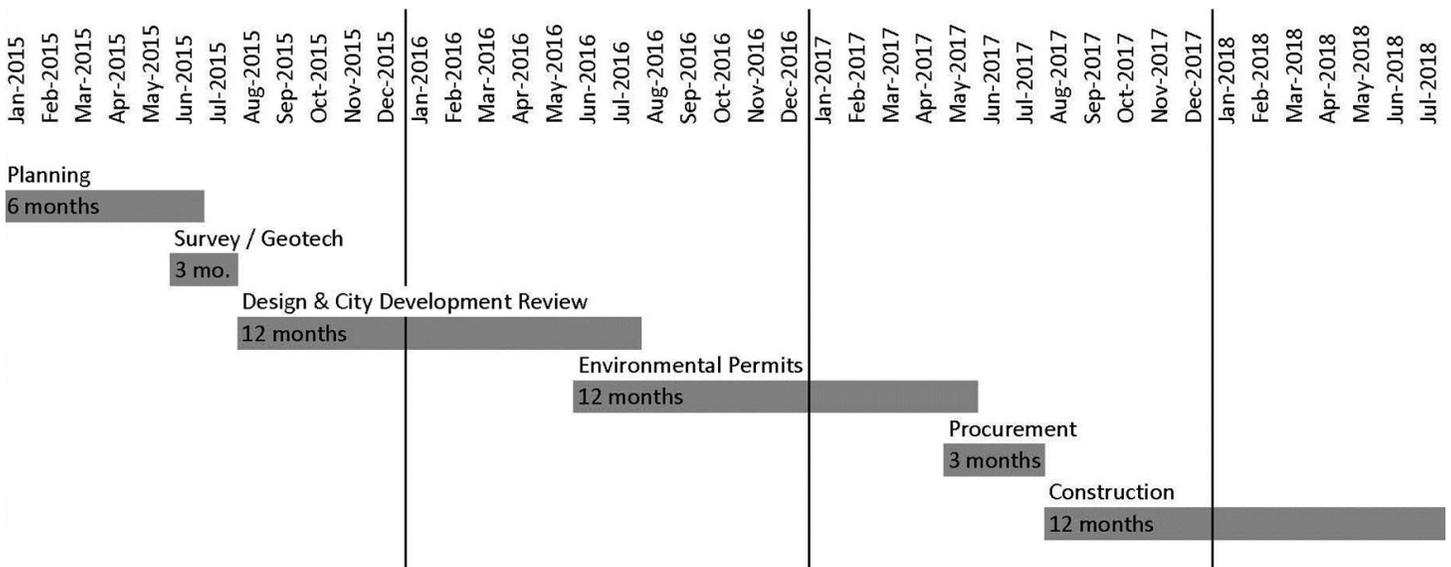


Figure 28. Estimated Project Timeline



IV. INFORMAL PRE-APPLICATION MEETING FINDINGS

An informal, preliminary application meeting was conducted with representatives from the U.S. Army Corps of Engineers (USACE), the Florida Department of Environmental Protection (FDEP), and the South Florida Water Management District (SFWMD) on October 21, 2014. The meeting occurred at the SFWMD headquarters office in West Palm Beach. The project was represented by Jim Karas (Community and Marine Planning, Facilitation, and Advocacy) and Kim DeLaney (Treasure Coast Regional Planning Council) as well as John Abbott and Jill King of Keith and Schnars. Representatives of the City of Lake Worth, City of West Palm Beach, Town of Lake Clarke Shores, and Palm Beach County were also in attendance.

The meeting was designed to further introduce the project to the agencies, get a preliminary determination of feasibility, and address initial concerns/issues that may exist prior to possibly proceeding with design and submittal for permitting approvals. The ultimate goal of the meeting was to obtain a “Go/No Go” by the agencies for the project before any further investment of time and financial commitment is made.

Key issues outlined by the various agencies include the following:

SFWMD

a. **Hydraulic study.** One of the most important issues conveyed was the necessity of a hydraulic study. This will be necessary for the approval of the SFWMD and the USACE permit. This study will determine whether the project will go through the USACE’s Section 408 review, which could significantly lengthen the permitting timeframes. The SFWMD and the applicant would coordinate this process. The applicant would conduct the study and the SFWMD would submit the hydraulic study package to the USACE for the applicant.

b. **Agreement modification.** There is an existing agreement between the SFWMD and the City of Lake Worth for the operations and maintenance of the Spillway Park. The SFWMD offered to determine if this agreement should be amended, or if a Right-of-Way Occupancy Permit is needed, or if another authorization is needed. (Subsequent to the meeting SFWMD confirmed that an amendment to the agreement would suffice.)

c. **Safety issues.** The SFWMD expressed concerns as to how the project would be operated to ensure the safety of motorized and non-motorized vessels/canoes/kayaks. The SFWMD stated that during storm events and high discharge flows, there have been safety issues with boaters/non-motorized vessels at other facilities in the past. The SFWMD made recommendations for effective staging areas in the form of three-pile dolphin pilings to allow vessels to tie up to while waiting to utilize the lift structure.

The SFWMD expressed concerns as to how the project would be designed to effectively maintain the existing weed control structures and allow the SFWMD to maintain their weed removal operations. The SFWMD indicated that abundant weeds and trash are sometimes present, and that the operator of the boat lift might have to do daily maintenance.

d. **Operations and maintenance.** The SFWMD expressed concerns as to how the project would be designed to ensure the necessary operations and maintenance of the S-155 spillway structure, including major overhauls that occur approximately every 12 years. The SFWMD stated they primarily work from the south side of the canal because there is more room for staging in that area, but they might be able to work from the northern side if some improvements were made (including, but not limited to, driveway improvements to accommodate the turning radius of large vehicles).

e. **Fee for lift usage.** SFWMD generally cannot collect fees on SFWMD property. The SFWMD offered to discuss with their attorneys the potential of a concession on their property by the applicant for usage of lift by vessels.

FDEP, FFWCC

a. **Upland ownership.** The FDEP expressed they would need the agreement or some form of documentation that the applicant has the authority to construct and operate the lift structure on SFWMD land prior to permit issuance.

b. **Florida Fish and Wildlife Conservation Commission (FFWCC).** Given the “conditional” status for facility siting in the project location, close coordination will be necessary to determine how the agency will evaluate the project and how many vessels would be allowed to utilize the structure per day. The recommendation was made to coordinate with agency

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IV. INFORMAL PRE-APPLICATION MEETING FINDINGS

on similar past projects and how those were evaluated. The recommendation was made to propose manatee education signage at structure.

c. **Dredging and sediment testing.** The agency expressed that appropriate best management practices must be proposed for excavation and dredging.

d. **Potential mangrove impacts.** If mangrove trees are impacted from the project, these impacts will need minimized and remaining impacts mitigated. The USACE also expressed this concern and indicated that appropriate mitigation would need to be proposed and the preference would be a mitigation bank. Mitigation banks may not be currently available.

USACE

a. **Coordination with partner agencies.** The project would entail coordination with National Marine Fisheries Service and the U.S. Fish and Wildlife Service, which can lengthen permitting. The recommendation was made to submit as soon as possible to allow sufficient review time. The recommendation was made that noise/vibration abatement measures be considered during construction to minimize impacts to species.

b. **Section 408 Review.** If this review is necessary, it is a separate and lengthy process out of the Jacksonville office and greatly diminishes the feasibility of the project. The results of the hydraulic study will in large part determine if the process through the USACE will be a 208 or 408 review.

c. **Potential mangrove impacts.** The USACE stressed that a mitigation bank is preference for mitigation. If there is no bank in the service area, mitigation would need to be in lieu of fee and follow the 2008 mitigation rule.

d. **Species concerns.** The recommendation was made to upgrade the fishing pier to have monofilament line disposal containers. The recommendation was made to determine the closest FWC personnel to respond to marine turtle/manatee injuries that may result from the operation of new structure.

A. Follow up/Action Items for the Applicant

1. Determine design of structure to extent practicable so the hydraulic study can be conducted.

2. Schedule teleconference/meeting with FFWCC to discuss project and how the agency will evaluate the project.

3. Clarify how the boat lift might be funded through fees or other mechanisms; discussion with the SFWMD is necessary in this regard to understand potential legal limitations.

4. Advance the permitting discussion with the SFWMD, including amending the existing Spillway Park agreement which SFWMD has confirmed would satisfy the conditions of operation, including the continuing right-of-way occupancy.

B. Summary

One of the most significant factors affecting permitting feasibility is the hydraulic study. However that is contingent upon the final structure design. This study would determine how the SFWMD and the USACE would permit the project. In determining the final design and the daily lift operations, the applicant will need to coordinate with the FFWCC. The final design may be affected by FFWCC's recommendations. As the project area is located within a "conditional" area for the new facility siting criteria, it was encouraged that a meeting be scheduled with the FFWCC to determine their issues and concerns. FFWCC's determination could affect the daily number of authorized vessels utilizing the lift structure.

Other concerns expressed by the SFWMD included the operations and maintenance of the S-155 spillway structure, along with boater safety and weed/debris control and removal. Possible impact to mangroves is an issue which can be resolved through appropriate mitigation. Overall the agencies were positive about the feasibility of permitting for the project within a 12-month time period, although there are several issues that need further evaluation and resolution.

C. Alternative Conceptual Layout Suggestions

Some possible conceptual layout modifications were discussed at the pre pre-application conference which are intended to allay some agency concerns during the subsequent permitting process. These should be evaluated further if the project advances to more detailed design.

These potential modifications, which are illustrated in **Figure 29**, include:

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IV. INFORMAL PRE-APPLICATION MEETING FINDINGS

1. Relocation of the upstream and downstream safety/debris booms with attention to:

- Directing boat and non-motorized marine traffic onto the south bank of the canal as much as possible.
- Directing weeds and other floating debris away from the boating canal as much as possible.
- Maintaining safe distance for any floating vessels from the S-155 which may be drawn toward the structure from high velocity water.
- Allowing convenient SFWMD regular and frequent removal of weeds and debris. This may involve directing debris removal to the north canal bank, thus involving site road improvements for easier truck access.

2. Addition of dolphin pilings to accommodate waiting vessels (toward the south canal bank - upstream side).

3. Addition of an alternative weed/debris removal area in tandem with a relocated floating boom, and expansion of turning radius for enhanced vehicle access (on the north bank of the canal- upstream side).

4. Direction of boat traffic toward the south bank of the canal to avoid turbulent water (downstream side), to navigate under a newly installed archway bridge on the existing fishing pier with enough vertical clearance to access the boat lift canal. (see arrow label "A" on **Figure 29**).

It should be noted that the feasibility of these four modifications has not been evaluated for permitting, costs, or impacts to the timeline. In particular, the fourth concept would result in boat traffic passing close to the fishing pier, thus requiring substantial reconstruction/reinforcement of the pier. Also, the addition of a bridge over passing boat traffic may trigger additional USCG permitting, and require dredging along the south canal bank.

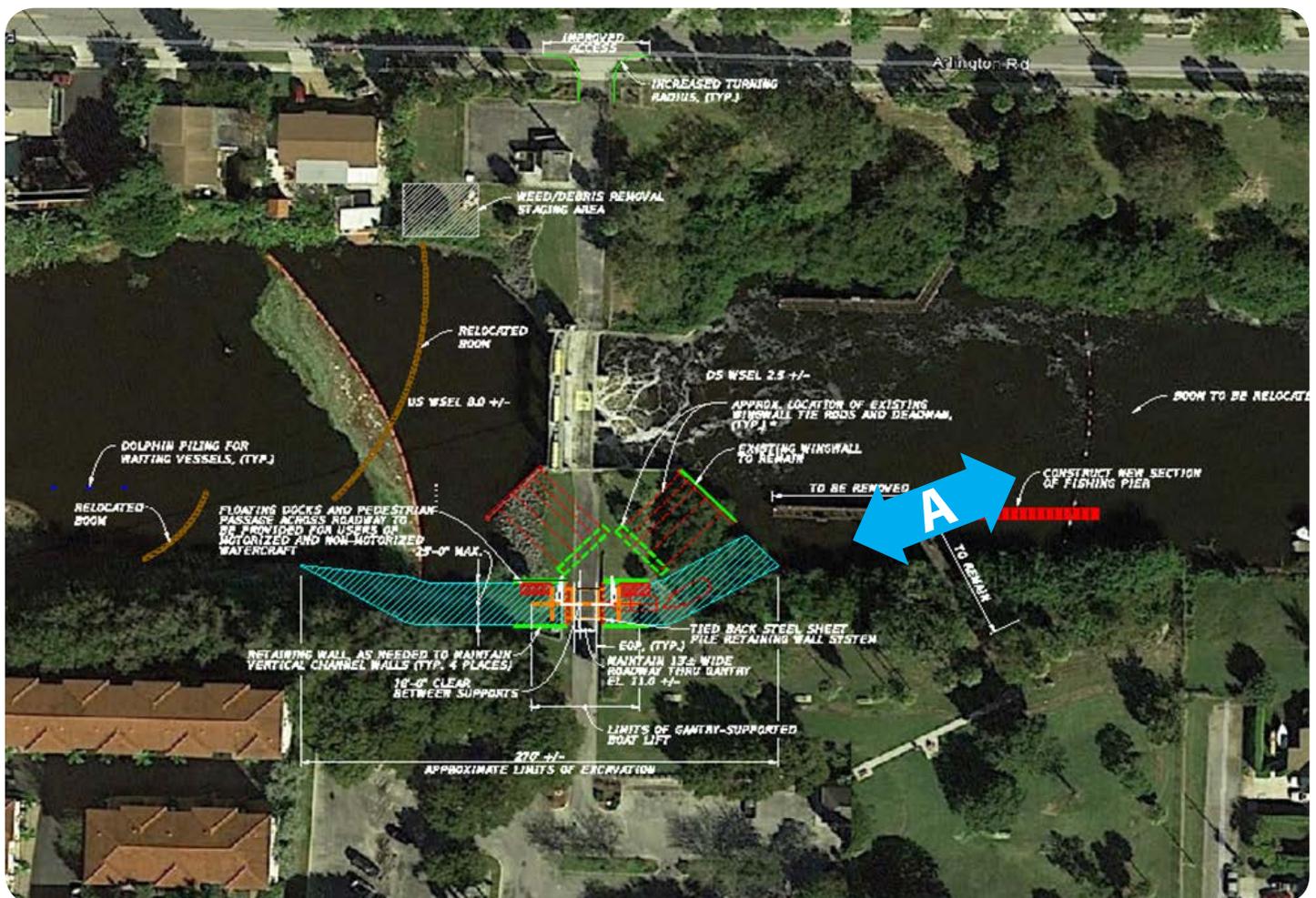
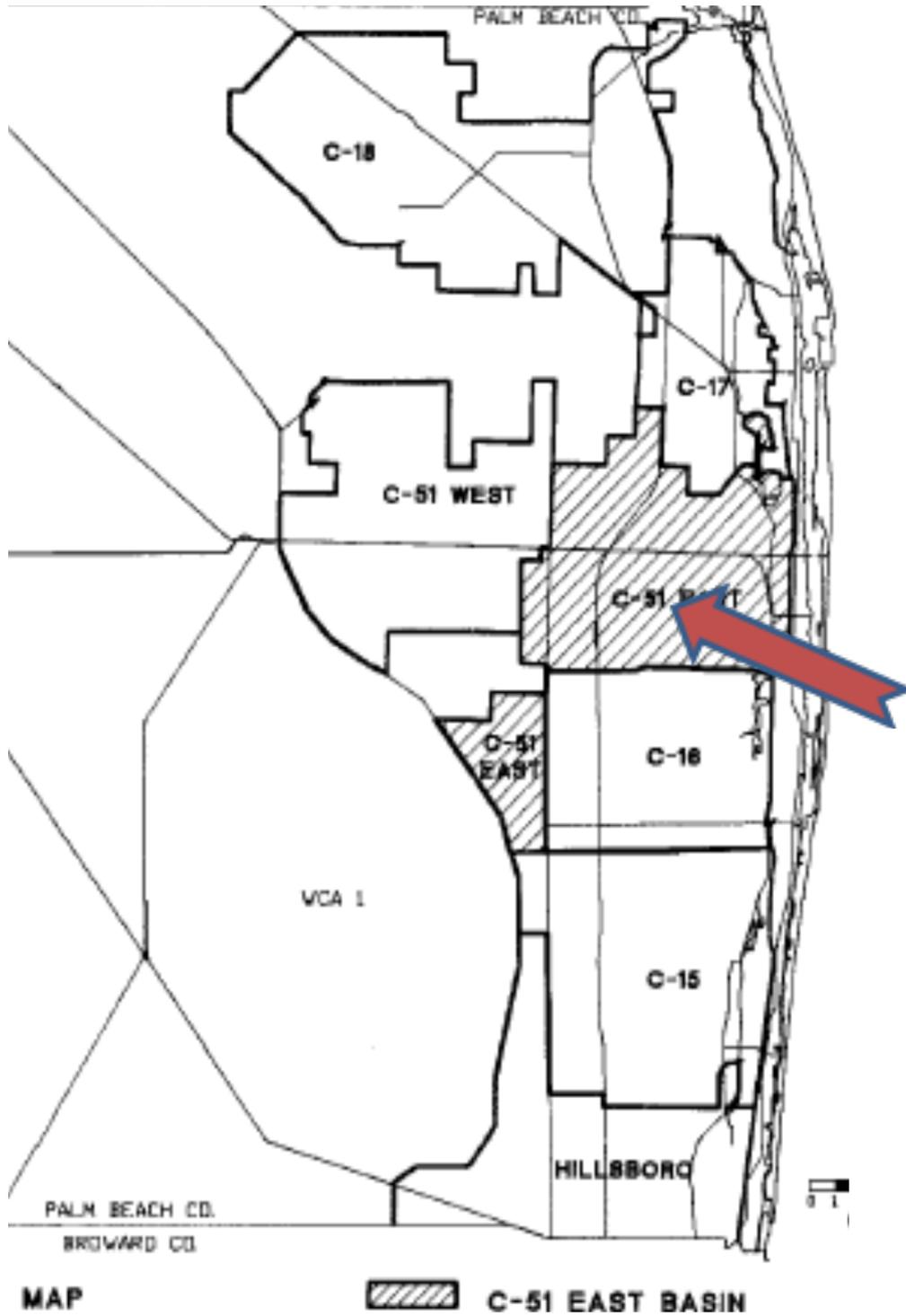


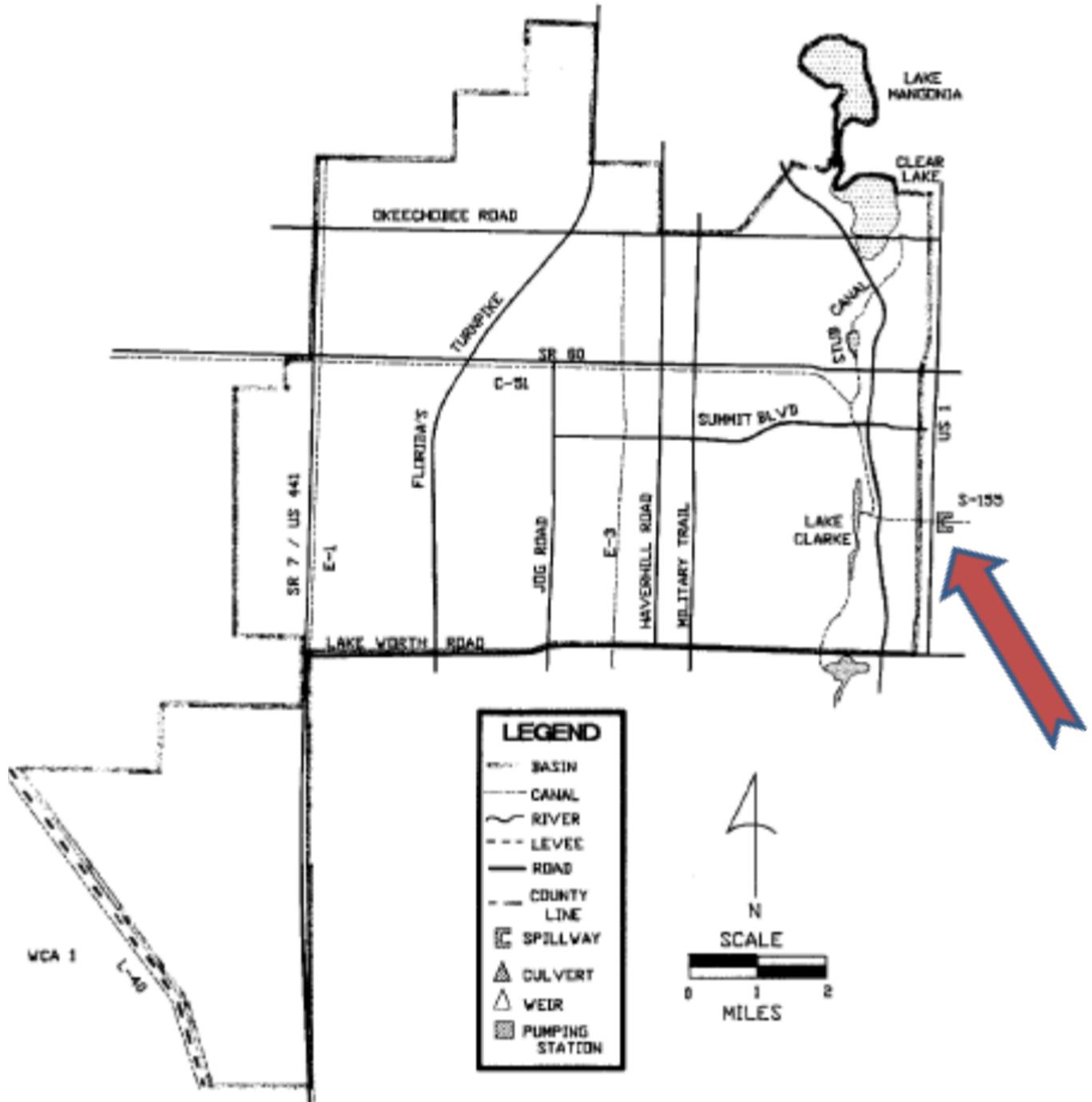
Figure 29. Alternative Conceptual Layout Suggestions Resulting from the Pre-Application Conference

APPENDIX A- Location of the C-51 East Basin



APPENDIX B - C-51 East Basin, including S-155 East of Lake Clarke

C-51 EAST BASIN



APPENDIX C – Agreement Between SFWMD and City of Lake Worth for Spillway Park

Pertains to use, maintenance, alternation, etc., and includes a site sketch with parking and ingress/egress.

AGREEMENT

THIS AGREEMENT, made and entered into this 14TH day of FEBRUARY, 1986, by and between the SOUTH FLORIDA WATER MANAGEMENT DISTRICT, a public corporation of the State of Florida, hereinafter designated as "DISTRICT" and the CITY OF LAKE WORTH, FLORIDA, a municipal corporation existing under the Laws of the Sate of Florida, hereinafter designated "CITY".

WITNESSETH:

WHEREAS, the DISTRICT is the owner of certain lands lying along the south side of the West Palm Beach Canal (C-51) between U.S. Highway 1 (Dixie Highway) and Federal Highway (Olive Avenue) within the Lake Worth city limits; and

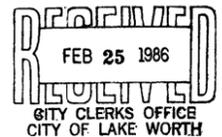
WHEREAS, these lands together with the Palm Beach Lock and Spillway have served as an informal public fishing area for over fifty (50) years; and

WHEREAS, the DISTRICT and the U.S. Army Corps of Engineers, in recognition of these many years of public fishing access, have installed downstream fishing catwalks (piers) in conjunction with the construction of Structure 155 (new control structure which replaces the Palm Beach Lock and Spillway); and

WHEREAS, the DISTRICT and the CITY are now desirous of entering into an agreement for the development, use, operation, and maintenance of a public park at Structure 155, said site to be hereinafter referred to as SPILLWAY PARK.

NOW, THEREFORE, in consideration of the mutual promises and covenants exchanged between the parties, DISTRICT and CITY AGREE TO THE FOLLOWING:

1. DISTRICT will construct and install the basic support facilities at SPILLWAY PARK as shown in the general plan of development (Exhibit "A") attached to this Agreement and which



by this reference is made a part hereof. CITY will furnish to the DISTRICT the manufacturer's name and specifications for security lighting and rest room fixtures and equipment commonly used and stocked by the CITY. To the fullest extent practicable, the DISTRICT agrees to incorporate said fixtures and equipment into the plans and installation for the proposed security lighting and rest room. All costs associated with development of the basic support facilities referenced above shall be the sole responsibility of the DISTRICT.

2. Except for turf maintenance, CITY will be solely responsible for maintaining the completed facilities in a neat, well-kept, clean, and safe condition satisfactory to the DISTRICT. The respective areas of turf maintenance will be determined later by mutual agreement of the parties at SPILLWAY PARK on the limits or boundaries for such maintenance. DISTRICT acknowledges that the CITY does not have the equipment necessary to maintain some areas of the turf and that this agreement does not obligate the CITY to acquire such equipment. All costs associated with the operation and maintenance of the completed facilities will be the sole responsibility of the CITY.

3. CITY may, at its option, make additional improvements to SPILLWAY PARK; however, no such improvements shall be made until the size, design, and location of same have been approved in writing by the DISTRICT.

4. CITY will establish and enforce rules and regulations governing use of SPILLWAY PARK by the general public. In addition to the southerly fishing pier and the portion of S-155 lying within the city limits of Lake Worth, said rules and regulations will be applicable also to the area bounded by water on the north, the easterly right-of-way line for Dixie Highway on the west, the southernmost right-of-way line for Canal 51 on the south, and the westerly right-of-way line for



Federal Highway (Olive Avenue) on the east. Copies of the proposed rules and regulations and any subsequent additions or deletions thereto shall be submitted for review and comment by the DISTRICT prior to adoption by the CITY.

5. CITY may, at its option, contract for the services of a caretaker at SPILLWAY PARK. The terms of any caretaker contract shall be submitted to the DISTRICT for review and comment, but all work and costs associated with the contracting and use of said services will be the sole responsibility of the CITY. The DISTRICT will have no responsibility whatsoever for such caretaker.

6. To the extent allowed by Florida law the CITY shall indemnify, defend, save and hold the DISTRICT harmless from any and all actions, claims, demands for judgments for death, personal injury or property damage caused by any acts or omissions arising out of the operation and maintenance of SPILLWAY PARK by the CITY, its agents, employees or contractors or its use by the general public. Should any death, injury or damage contemplated in this provision be caused by or arise from any negligent act on the part of the DISTRICT, its agents, or employees, then this provision shall not be applicable and the CITY shall not be liable as set forth above.

7. DISTRICT shall have the right of access to SPILLWAY PARK at any time to inspect and fulfill the DISTRICT's operation and maintenance responsibilities for Canal 51 and Structure 155.

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

APPENDIX C

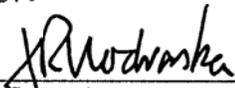
IN WITNESS WHEREOF, the parties hereto have set their hands and seals on the day, month and year first above written.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT, BY ITS GOVERNING BOARD

(Corporate Seal)

By:  _____
Chairman

ATTEST:

By:  _____
Secretary

CITY OF LAKE WORTH, FLORIDA

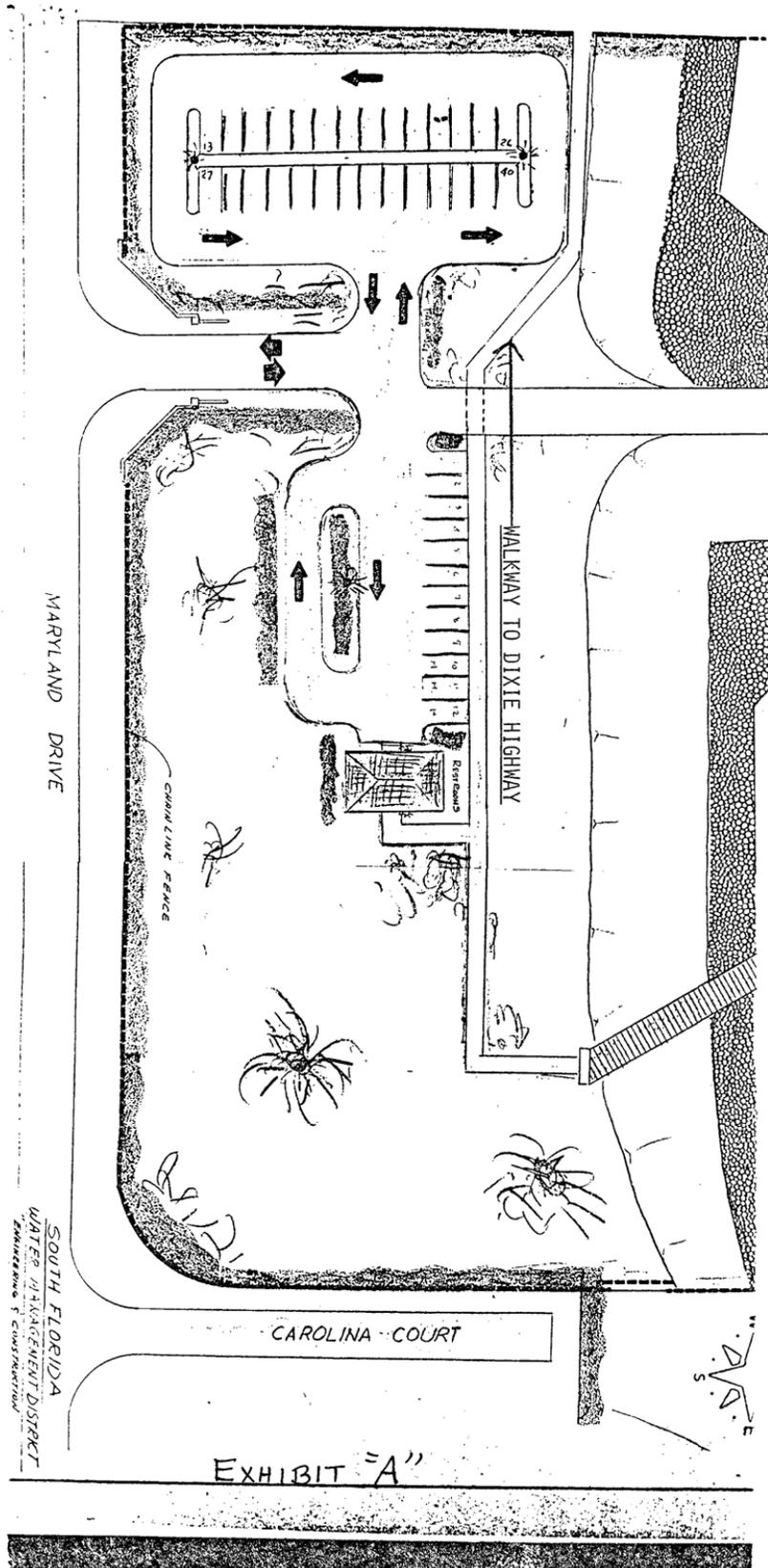
(Corporate Seal)

By:  _____
Mayor

ATTEST:

By:  _____
City Clerk





SOUTH FLORIDA
WATER MANAGEMENT DISTRICT
ZONING AND CONSTRUCTION

EXHIBIT "A"

AG# 307-A

AMENDMENT TO AGREEMENT

THIS AMENDMENT TO AGREEMENT, made and entered into this 10th day of March, 1992, by and between the SOUTH FLORIDA WATER MANAGEMENT DISTRICT, a public corporation of the State of Florida, hereinafter designated as "DISTRICT" and the CITY OF LAKE WORTH, FLORIDA, a municipal corporation existing under the Laws of the State of Florida, hereinafter designated "CITY".

WITNESSETH:

WHEREFORE, the District and the City have entered into an agreement dated February 14th 1986 for the operation of a City Park.

WHEREFORE, the DISTRICT is the owner of certain lands lying along the south side of the West Palm Beach Canal (C-51) between U.S. Highway 1 (Dixie Highway) and Federal Highway (Olive Avenue) within the Lake Worth city limits as described in the aforesaid agreement, and

WHEREFORE, the City of Lake Worth (the City) has been informed by the South Florida Water Management District that the Army Corps of Engineers will perform maintenance on the S-155 structure and bulkhead repairs downstream of the structure and further that the City understands that the work will not interfere with the normal operation of the City Park at that location.

Now THEREFORE, in consideration of the benefits to be conferred for the public, and the parties hereto, the District and the City agree that the District shall certify to the Corps that they may enter on to the described property and perform maintenance



on the S-155 structure and bulkhead repairs downstream of the structure utilizing a portion of the property subject to the agreement of February 14, 1986.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals on the day, month and year first above written.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

By: Charles R. Rinaldi
Charles R. Rinaldi
Deputy Director
Department of Land Management



CITY OF LAKE WORTH, FLORIDA

By: Ronald E. Eshline
Mayor

ATTEST:

By: Barbara A. Joseph
City Clerk

Legal Form Approved
BY: [Signature] DATE 3/10/92

SECOND AMENDMENT TO AGREEMENT

THIS SECOND AMENDMENT TO AGREEMENT, made and entered into this 7 day of JUNE, 2005, by and between the SOUTH FLORIDA WATER MANAGEMENT DISTRICT, a public corporation of the State of Florida, hereinafter designated as "DISTRICT" and the CITY OF LAKE WORTH, FLORIDA, a municipal corporation existing under the Laws of the State of Florida, hereinafter designated "CITY".

WITNESSETH:

WHEREFORE, the District and the City initially entered into an Agreement dated February 14th 1986 for the operation of a City Park, now known as Spillway Park. In the Agreement, the District agreed to construct the facilities at Spillway Park and the City agreed to maintain the facilities, except for turf maintenance.

WHEREFORE, the District and the City amended the agreement on March 10, 1992. In the Amended Agreement, the District and City agreed that the District should certify to the Corps that it may enter Spillway Park to perform maintenance on the S-155 structure and bulkhead repairs.

WHEREFORE, the City and District seek to modify Item 3 of the Agreement to allow the City to maintain and make improvements to Spillway Park's fishing pier without prior written approval from the District as long as the City does not alter the fishing pier's location along the south side of Canal 51, size, or clearance above the water. If the City plans to alter the fishing pier's location, size, or clearance above water, the City shall receive written authorization from the District prior to implementing its plan.

WHEREFORE, the City and District agree that the constant copying and handling of the Agreement's Exhibit A have made it nearly illegible. Thus, Amended Exhibit A, attached and incorporated hereto, has been updated to replace the Agreement's Exhibit A.

NOW THEREFORE, in this Second Amendment to the Agreement, in consideration of the benefits to be conferred for the public, the District and City agrees 1) that Amended Exhibit A, attached and incorporated hereto, replaces the Exhibit A in the Agreement and 2) that the City does not need prior written approval from the District to maintain or improve the existing fishing pier located on the south side of Canal 51 as long as the fishing pier's location, size, or clearance above the water is not altered.

IN WITNESS WHEREOF, the parties hereto have set their hands and seals on the day, month and year first above written.

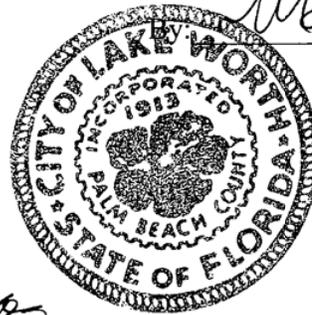


South Florida Water Management District

By: John J. Dunne

City of Lake Worth, Florida

Corporate Seal

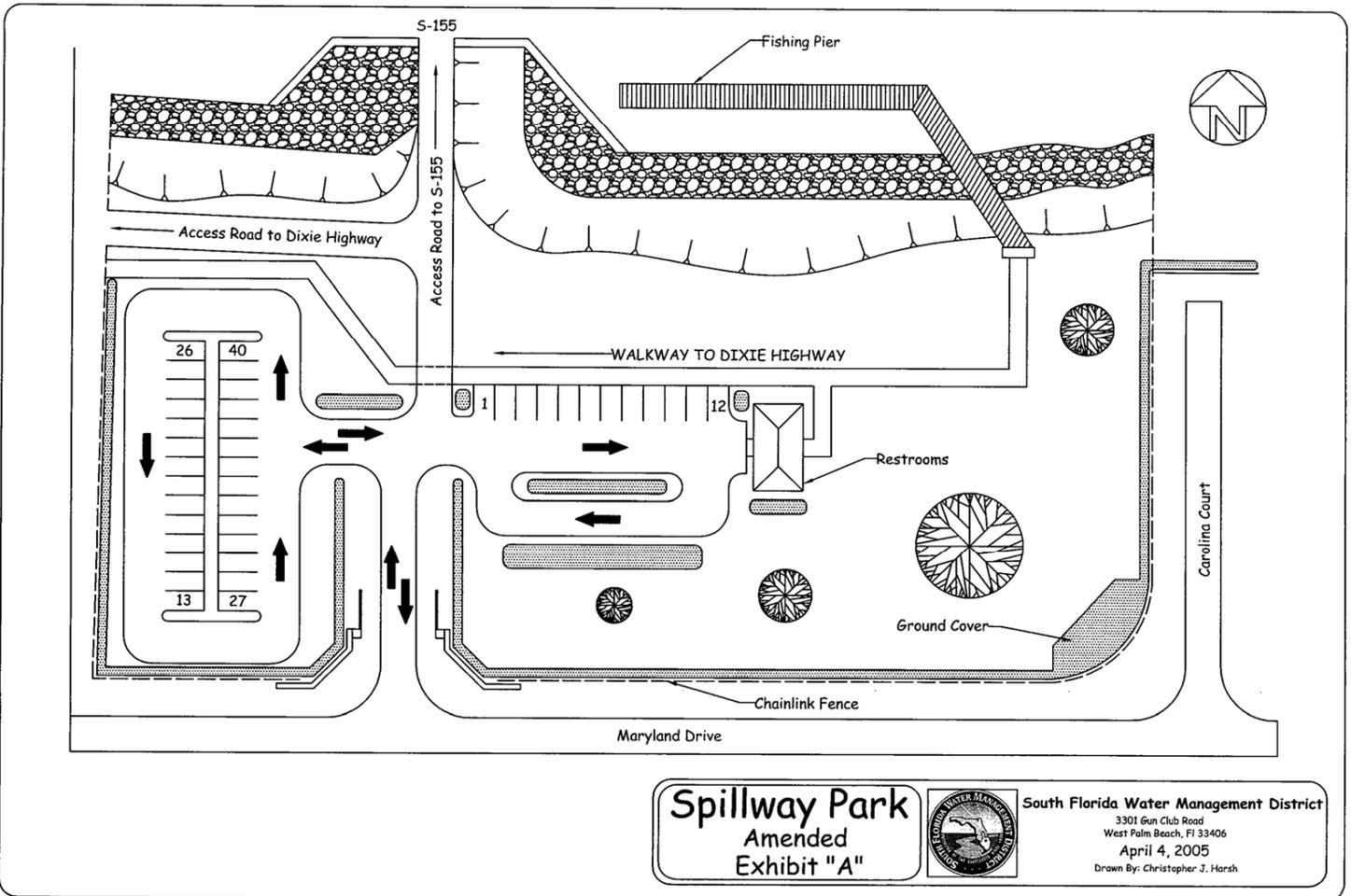


Wendy J. [Signature]

Attest:
By: Camela Lopez
City Clerk

Palm Beach County Multi-Modal Intracoastal Waterway Access Study

APPENDIX C



SOURCES

Boats with dimensions, weight, height above waterline, etc. Sources provided in **Table 5**.

BOAT LIFTS

Edmonds, Washington, city operated boat lift using slings. See <http://portofedmonds.org/marina/boat-launch/>

Juno Isles Boat Association, Juno Isles, FL

Material Handling Systems, Inc. www.mhscrane.com/index.html. Cranes and monorail, other hauling systems, including marine and shipyard applications

Columbus McKinnon Corporation *“Columbus McKinnon is a leading worldwide designer, manufacturer, and marketer of material handling systems and services, which efficiently and ergonomically move, lift, position, or secure material.”*
www.cmworks.com/contactus/

Florida Handling Systems: www.floridahandlingsystems.com/cranes-and-hoists-overview/transverse-boat-lifts.
Contact the project team for FHS contacts

Mariners Cove Homeowners Association, Palm Beach Gardens. Represented by Florida Lift Tech, Loxahatchee, FL, (561) 248-0880

Rothensee, Germany Boat Lift. Much larger and not comparable to this application. Uses float chambers.
See http://en.wikipedia.org/wiki/Rothensee_boat_lift

Hans Wilson, P.E., Marine Engineers & Environmental Consultants, 1938 Hill Avenue, Fort Myers, FL 33901
www.hanswilson.com

Cooper, Richard and Jim Lane. Technical Memorandum No. 244- An Atlas of Eastern Palm Beach County Surface Water Management Basins. Water Resources Division, Resource Planning Department, South Florida Water Management District. June 1988

Florida Boating Improvement Program. See annual report at:
<http://myfwc.com/media/2710850/2013-2014-Boating-Improvement-Program-Report.pdf>

Howard, Willie. *“A new path to ocean for central Palm Beach County boaters west of the ICW?”* Palm Beach Post, September 9, 2013

Lake Worth Comprehensive Plan and Zoning Ordinance

LOCKS AND DAMS

St. Lucie Lock and Dam. General information at: <http://www.saj.usace.army.mil/Missions/CivilWorks/Navigation/NavigationLocks/StLucieLock.aspx> . Photo at: <http://www.florida-backroads-travel.com/images/lbStLucieLock.jpg>

See <http://www.offshoreblue.com/cruising/okeechobee-locks.php> for a description and basic dimensions of the St. Lucie, Moore Haven, Ortona, Port Mayaca, and W.P. Franklin Locks

Palm Beach County Property Appraiser

Palm Beach County Planning and Zoning

Palm Beach County Comprehensive Plan

Palm Beach County Manatee Protection Plan, 2007. Available [online] http://www.pbcgov.com/erm/coastal/manatees/manatee_protection.htm, October 1, 2014

South Florida Water Management District. Technical Memorandum (TM #1) Summary of Data Collection www.sfwmd.gov/portal/page/portal/...pdf/apprv_report_1.pdf

US Department of the Army Jacksonville District, Corps of Engineers, “Plans for Construction of C-51 East End and S-155,” 1982

West Palm Beach Comprehensive Plan and Zoning Ordinance