



AGENDA

Lake Park Town Commission
Town of Lake Park, Florida
Commission Workshop
Wednesday, May 3, 2017,
Immediately Following the
Regular Commission Meeting
Lake Park Town Hall
535 Park Avenue

Michael O'Rourke	—	Mayor
Kimberly Glas-Castro	—	Vice-Mayor
Erin T. Flaherty	—	Commissioner
Anne Lynch	—	Commissioner
Roger Michaud	—	Commissioner
.....		
John O. D'Agostino	—	Town Manager
Thomas J. Baird, Esq.	—	Town Attorney
Vivian Mendez, CMC	—	Town Clerk

PLEASE TAKE NOTICE AND BE ADVISED, that if any interested person desires to appeal any decision of the Town Commission, with respect to any matter considered at this meeting, such interested person will need a record of the proceedings, and for such purpose, may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. *Persons with disabilities requiring accommodations in order to participate in the meeting should contact the Town Clerk's office by calling 881-3311 at least 48 hours in advance to request accommodations.*

- A. **CALL TO ORDER/ROLL CALL**
- B. **PLEDGE OF ALLEGIANCE**
- C. **SPECIAL PRESENTATIONS/REPORTS**
Workshop Presentation of Stormwater Utility Projects and Discussion Funding Schedule
- D. **PUBLIC COMMENT:**
This time is provided for addressing items that do not appear on the Agenda. Please complete a comment card and provide it to the Town Clerk so speakers may be announced. Please remember comments are limited to a TOTAL of three minutes.
- E. **TOWN ATTORNEY, TOWN MANAGER, COMMISSIONER COMMENTS:**
- F. **REQUEST FOR FUTURE AGENDA ITEMS:**
- G. **ADJOURNMENT:**

Next Scheduled Regular Commission Meeting will be held on Wednesday, May 17, 2017



Town of Lake Park Town Commission

Agenda Request Form

Meeting Date: May 3, 2017

Agenda Item No.

Agenda Title: Workshop Presentation of Stormwater Utility Projects and Discussion of Funding Schedule

- SPECIAL PRESENTATION/REPORTS [] CONSENT AGENDA
- [] BOARD APPOINTMENT [] OLD BUSINESS
- [] PUBLIC HEARING ORDINANCE ON ____ READING
- [] NEW BUSINESS
- OTHER: Discussion and Comments to Staff for Future Commission Action

Approved by Town Manager *J. R. Galt* Date: 4-27-17
J. R. Galt
 David Hunt / Public Works Director

Originating Department: Public Works	Costs: To be Discussed Funding Source: Stormwater Utility Acct. # <input checked="" type="checkbox"/> Finance <u><i>BKR</i></u>	Attachments: - Excerpt from the 1999 Revised "Engineering Investigation and Report, Comprehensive Storm Drainage Improvements Program" - Power Point Presentation
Advertised: Date: <u>April 26, 2017</u> <u>Public Notice</u> <input type="checkbox"/> Not Required	All parties that have an interest in this agenda item must be notified of meeting date and time. The following box must be filled out to be on agenda.	Yes I have notified everyone _____ or Not applicable in this case ____ Please initial one.

Summary Explanation/Background:

This workshop has been called to discuss a five year funding mechanism that will allow for capital equipment purchases, capital improvement projects, and professional services required to maintain the Town's compliance with the various regulatory agencies that control the quantity and quality of stormwater runoff that enters the Waters of the United States. The

current Stormwater Utility rate of \$6.50 per Equivalent Stormwater Unit (ESU) has seen only a \$0.50 increase in the nine years since its inception. The funds generated by the utility were instrumental in providing major pieces of equipment and the staff to perform the tasks mandated by the Environmental Protection Agency (EPA) and Florida Department of Environmental Protection (FDEP) permit. The maintenance equipment is coming to the end of its wear cycle and a budgeting plan needs to be implemented to prepare for replacements.

The Master Drainage Plan, last updated in 1999, noted the deficiencies of the town's drainage system and recommended remedies and anticipated costs. Many of the projects mentioned in the report have yet to be addressed. The Stormwater Utility is the logical funding source for these infrastructure improvements that would be implemented over a 15 to 20 year time period.

The expenditures listed below could be addressed across a four to five year time period if increases to the utility rate were phased in to eventually arrive at an ESU rate of \$12.00 per month. A single-family property (or condominium) owner currently pays \$78.00 per year on their non-ad valorem tax bill. In order to implement a long range improvement schedule, this annual amount would eventually rise to \$144.00 per year per household.

Staff is requesting Commission input as to the preferred mechanism for implementation of the rate adjustment. An agenda item will be brought back at a future meeting for the Commission to approve a Resolution establishing a four to five year rate schedule. This will need to be accomplished in June so that the Town can meet the County Property Appraiser's deadline for adjustments to the Non-Ad Valorem tax roll.

Stormwater Utility Authorization and Responsibilities (as background):

Federal, state, and regional governmental authorities recognize that the proper management of stormwater runoff resulting from rainstorms and/or high tides is essential to the maintenance of a high quality street system and to the prevention of damage to real and personal property resulting from flooding. In **1980**, the Town officially recognized the need for a comprehensive storm drainage improvement program by adopting a Comprehensive Plan in conformance with Chapter 163 of Florida Statutes. The *Drainage* sub-element of this Plan is required to contain a summary of the data, analyses, and support documentation necessary to form the basis for the future drainage goals, objectives, and policies.

In **1986**, the "Engineering Investigation and Report - Comprehensive Storm Drainage Improvements Program" was prepared to comply with the Comprehensive Plan. This study indicated that Lake Park's drainage system, integrating ground surface percolation along with a positive underground pipe drainage system, was not developed by using a long-range master plan. To the contrary, the system was the cumulative result of piecemeal development which occurred over several decades and had been maintained more or less on an emergency basis. A core conclusion of the study was that most of the existing drainage system did not have sufficient capacity to adequately dispose of surface runoff produced from a 3-year storm event. **1999** was the last year that the master drainage plan was revised.

FDEP implemented the stormwater element of the federal National Pollutant Discharge Elimination System (NPDES) mandated in the Clean Water Act, Code of Federal Regulations (CFR) Section 402. In 1996, FDEP issued a permit authorizing the 40 governmental entities in Palm Beach County to discharge stormwater to Waters of the United States in accordance with approved Stormwater Management Programs (SWMP), effluent limitations, and monitoring requirements.

In 2008, the Stormwater Utility was established to fund the costs of operating and maintaining the Town's SWMP and to provide for financing necessary repairs, replacements, and improvements. The funds generated by the creation of the utility were used for the purchase and operation of capital items, such as a vacuum-jet truck and street sweeper used in support of the requirements dictated by the Municipal Separate Storm Sewer System (MS4) NPDES permit.

Stormwater maintenance programs also support the Community Rating System (CRS) that is a part of the National Flood Insurance Program (NFIP). CRS Activity 540 gains credit points that count toward discounts on residents' and businesses' flood insurance premiums.

Operations in Support of Legal Mandates:

On an annual basis, the Stormwater Utility currently collects approximately \$525,000 in user fees based upon the amount of impervious area on a property. \$160,000 of this amount goes toward personnel and \$110,000 supports the General Fund services. The remainder goes toward operating expenses, including regulatory compliance and system maintenance and repairs. The vacuum-jet truck and street sweeper that provide the majority of services to the drainage system were purchased with loans in 2009 and 2007 respectively. They are at the end of their normal life-cycle.

While inspecting and maintaining the system, Public Works has identified age related degradation of the storm drainage system. This deterioration has led to an inability to provide adequate mitigation of the damaging effects of uncontrolled and unplanned stormwater runoff from both a water quality and water quantity standpoint. It is time to re-evaluate the system's effectiveness, quantify its deficiencies, and prepare for the capital improvements necessary to remain compliant with the NPDES permit and to protect property and roadways from water related damages. The following table lists the anticipated expenses that will need to be addressed in the next five years:

SPECIFIC TASKS TO BE PERFORMED IN THE FIRST FIVE YEARS OF A LONG RANGE PLAN	ESTIMATED COSTS FOR NEW PROJECTS
Refurbish vacuum truck (extend life for three more years)	\$ 90,000
Complete Earmin River outfall project	75,000

Prepare digital atlas based upon survey data	25,000
Video drain lines	37,800
Complete video drain line project	95,000
Prepare Master Drainage Plan using field data collected from survey* and video analysis; Plan was last updated in 1999 *(\$100k for the survey was budgeted and approved in FY'17)	200,000
Establish GIS system (software licensing, equip.)	13,700
Purchase replacement street sweeper	175,000
10th & Bayberry drainage improvement project	90,000
Continue to build GIS system	25,000
Transfer to reserves in anticipation of major capital expenditures	100,000
Engineering and design for the 4,300 foot Date Palm Dr. drainage line repair project	75,000
Phase I of the Date Palm Dr. drainage line project	495,000
Phase II (completion) of Date Palm Dr. drainage line project	125,000
Purchase replacement vacuum-jet truck	350,000
Commence engineering for misc. drainage improvement projects (Based upon Master Drainage Plan recommendations)	45,000
TOTAL FIVE YEAR CAPITAL EXPENDITURES	\$ 2,016,500

The current monthly rate assessed to a single family home is \$6.50. This is the cost of one ESU which is equal to 5,202 square feet of impervious area. This rate was last adjusted by \$0.50 in 2009. In order to accomplish the required tasks outlined above, the monthly rate will need to be adjusted by \$5.50, phased in across a four to five year period, resulting in an overall annual increase of \$66.00 to a homeowner's Non-Ad Valorem (NAV) tax bill.

Since the Stormwater Utility rate has remained stable for such an extended period of time, several of the 'big ticket' expense items have been postponed but these expenditures cannot be delayed much longer. The first six items in the table need to be addressed in the next two years at a cost of over \$500,000. The utility could fulfill these responsibilities if the first of four increases was larger than the subsequent three. For example, an additional \$30.00 increase (\$2.50 per month) the first year would only necessitate a \$12.00 per year (\$1.00 per month) increase for each of the remaining three years. This would allow for repair projects to move forward simultaneously with capital equipment purchases. Construction projects would be underway by 2020.

An alternative approach to achieving an annual homeowner's rate of \$144.00 would be to add \$13.20 (\$1.10 per month) each year for the next five years to the NAV. If this approach was approved, none of the capital improvement projects, such as the 10th Street and Bayberry Drive drainage project and the remediation of the 60" Date Palm drain line would be able to proceed until year six or 2023.

Current Stormwater Utility fees merely cover operating expenses. There are no funds available for capital expenditures. Over two million dollars are needed in the next five years to address immediate concerns. By addressing the rate adjustment now, sufficient funds would be available for the second, five year plan that would be primarily for intensive capital infrastructure improvement programs. Drainage project priorities will be established based upon the new Master Drainage Plan that will remain relevant for the next fifteen years. Stormwater construction projects will coincide with street improvements. Revenue Bonds can be considered to accelerate the rate of replacement and repairs.

Further Action Resulting from Workshop:

Based upon the Workshop discussion, staff shall prepare (at a minimum) three different funding options for consideration that will address the capital and operational needs of the Stormwater Utility. These options will be presented for discussion and approval at the June 7, 2017 Regular Commission Meeting. A Resolution will be prepared that sets the Equivalent Stormwater Unit (ESU) for the next five years.



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**ENGINEERING INVESTIGATION AND REPORT
COMPREHENSIVE STORM DRAINAGE
IMPROVEMENTS PROGRAM**

TOWN OF LAKE PARK

**MARCH, 1986
REVISED AUGUST, 1993
REVISED AUGUST, 1999**

September 30, 1999

Ms. Therese C. Leary
Town Manager
Town of Lake Park
535 Park Avenue
Lake Park, FL 33403

RE: UPDATE OF 1986 MASTER DRAINAGE PLAN
TOWN OF LAKE PARK
BOA PROJECT NO. 98-1035

Dear Ms. Leary:

In accordance with the Town Commission's previous authorization, we have updated the 1986 Engineering Investigation and Report, Comprehensive Storm Drainage Improvements Program for the Town, more commonly referred to as the Master Drainage Plan. The Master Drainage Plan was last updated in August, 1993. The principal revisions made to the attached plan, dated August, 1999, are as follows:

1. Since the 1993 Master Drainage Plant Update, the Town has constructed certain improvements to the drainage system. These drainage improvements include the Neighborhood Target Area - Phase I Project (Park Avenue to Evergreen Drive and Sixth Street to Ninth Street); the Park Avenue Project (Sixth Street to Tenth Street); the Ninth Street Project (Park Avenue to Evergreen Drive); and the Bayberry Drive Project (Third Street to Fourth Street and Fourth Street - Bayberry Drive to Cypress Drive). These drainage improvements have been included in the 1999 updated plan.
2. The drainage improvements recommended in the 1986 Master Drainage Plan and in the 1993 update were based on a 3-year frequency storm event which is consistent with the Town codes. In accordance with the Town Commission's previous direction at workshop meetings, this same level of service (LOS) has been included in the 1999 updated plan.
3. The 1986 Master Drainage Plan included an estimated cost of \$6,633,100 for constructing all of the recommended improvements. This estimated cost has been revised in the 1999 updated plan to reflect the following:
 - a. Construction costs based on 1999 dollars.
 - b. The drainage system improvements which were recommended in the 1986 plan which have been constructed.

Ms. Therese C. Leary
September 30, 1999
Page 2

- c. The use of high density polyethylene (HDPE) piping for the drainage system in lieu of reinforced concrete pipe (RCP) which was used in the 1986 plan. This is in accordance with the Town Commission's direction at previous workshop meetings.

The revised estimated cost for constructing all of the recommended improvements as described in the 1999 updated plan is \$6,365,950.

4. Beginning in late 1986, many Florida municipalities have established or are in the process of establishing stormwater Management Utilities (SMU) as a mechanism for financing comprehensive stormwater management programs to deal with the important issues of water quality and water quantity (flooding). The 1999 updated plan includes a recommendation that a feasibility report be prepared for the Town to develop a rationale and implementation plan for the funding of a comprehensive stormwater Management Utility program.
5. The 1986 Master Drainage Plan included a discussion of alternative financing opportunities for implementing the recommended improvements. This discussion has been updated in the 1999 plan to reflect the bond rates which are currently available.
6. A discussion of the National Pollutant Discharge Elimination System (NPDES) program as it relates to stormwater discharges has been updated to the 1999 updated plan. It is not known at this time what the final EPA conclusions and requirements will be regarding stormwater discharges within Palm Beach County and more particularly, the Town of Lake Park.
7. A discussion has been added to the 1999 updated plan regarding landscaping in the drainage swale area.

We wish to thank the Town personnel who have assisted in the 1999 Master Drainage Plan update. Should you have any questions or require any additional information, please contact me.

Very truly yours,

BARKER, OSHA & ANDERSON , INC.

Jeffrey D. Renault, P.E.

JDR:kcc

SECTION I

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The Town of Lake Park is a municipal corporation located in the northern part of the heavily urbanized area of eastern Palm Beach County. The Town has a current population of approximately 7,000 persons and occupies an area of approximately 2.5 square miles (1,618 acres). Existing land uses within the Town include single family residential, medium to high-density residential, commercial, light industrial, institutional and governmental. While the original plats describing portions of the present Town were filed in March, 1921, the majority of the Town's growth has occurred since the mid 1950's.

During the time in which the Town began to experience more intense development, local ordinances of the Town requiring provision of adequate storm drainage facilities by land developments were not in existence and, as a result, serious inadequacies were created which remain to the present time. On May 7, 1980, the Town Commission of Lake Park officially recognized the need for a comprehensive storm drainage improvements program by adoption of a Comprehensive Plan for the Town in conformance with Section 163.190 of Florida Statutes.

The proper management of stormwater runoff resulting from rainstorms and/or high tides is essential to the maintenance of a high quality urban living environment. A properly designed and maintained stormwater drainage system is essential to maintaining a high quality street system as well as keeping real and personal property damage to a minimum in the wake of flooding.

The scope of the investigation covered by this report is the entire area within the corporate limits of the Town of Lake Park. (Northlake Boulevard to Silver Beach Boulevard and Lake Worth to SFWMD Canal C-17). The objectives of the 1986 engineering investigation and report were as follows:

- 1) Conduct the necessary field surveys, measurements and inspections to accurately depict the existing stormwater drainage system within the study area at that time.
- 2) Conduct field investigations to accurately identify those portions of the study area with existing stormwater drainage problems.
- 3) Conduct field investigations of the study area to determine the condition of the existing stormwater drainage system.
- 4) Compile the necessary information regarding topography, hydrology and soil conditions of the study area.
- 5) Analyze the study area to determine which areas contribute stormwater runoff to specific drainage facilities and also to determine which areas were not served by the existing stormwater drainage system at that time.
- 6) Analyze the existing stormwater drainage system to determine the capacity of the system and the adequacy of the system to collect and transport the stormwater runoff imposed on the system by the design storm event.
- 7) Where the existing stormwater drainage system was found to be inadequate to handle the imposed design storm event or where the system did not presently exist, the system was supplemented in the analysis with additional structures and drainage pipes.

8) Recommend rehabilitation and/or improvements to the existing stormwater drainage system in order to provide sufficient capacity to handle the design storm event.

9) Prepare a preliminary opinion of probable cost for the recommended rehabilitation and/or improvements to the system.

10) Review the analysis, conclusions and recommendations of the study with the appropriate Town personnel and regulatory agencies.

11) Present to and discuss with the Town Commission the results of the engineering investigation and report.

The objectives of the August, 1999 revisions to the report are as follows:

1) Incorporate into the report the storm drainage system improvements constructed within the Town since the last update in August, 1993.

2) Review and incorporate Town and regulatory agencies requirements pertaining to storm drainage which have been adopted since 1993.

3) Review and revise the recommended improvements and opinion of probable cost based on the improvements constructed since 1993 and on current construction costs anticipated for the work.

4) Present to and discuss with the Town Commission the results of the updated engineering investigations and report.

A comprehensive stormwater drainage study must include a review and consideration of topography, hydrology and soil conditions within the study area. These factors, which are presented and discussed in the report, have a direct relationship to the quantity of stormwater runoff which must be accommodated in a properly designed stormwater drainage system.

A most pressing problem in Lake Park at this time is that the inadequate, or in many areas nonexistent, storm drainage system results in ponding (flooding) of waters from rainfall. Ponding in itself is not necessarily undesirable, but when it occurs in such locations as along roadways and in parking areas it can disrupt the flow of traffic, create potentially hazardous situations and damage streets and nearby property.

The area of Town lying to the east of the Florida East Coast Railroad right-of-way is drained by a combination of systems, including ground surface percolation and positive underground gravity drainage through a series of conduits to outfalls into South Lake and Lake Worth. The remaining area contains limited positive drainage with surface waters ultimately reaching outfalls either westward into the Earman River (C-17) or southward along the Old Dixie Highway to the City of Riviera Beach Outfall No. 1 into Lake Worth.

One of the first efforts in the 1986 engineering investigation was to generate a drainage system map which accurately depicted the existing storm drainage system in order to analyze the capacity of the existing system and to make specific recommendations for improvements. An inventory of the Town's existing stormwater drainage system was made and presented in the report. The inventory of existing drainage facilities has been updated in this report to include the drainage system improvements which have been constructed since the 1993 report update. These system improvements include the Drainage Improvements in the NTA - Phase I, the Park Avenue Drainage Improvements, the Ninth Street Drainage Improvements and the Bayberry Drive Drainage Improvements. The stormwater drainage systems within the Town which are operated by Palm Beach County and the State of Florida were considered only where they impacted the Town's drainage system.

One of the most serious drainage problems in Lake Park at this time is that associated with Lake Shore Drive and its surrounding environs. Because of the conditions described in the report, this area experiences frequent flooding. Another area of major concern is along Second Street from Palmetto Road to Silver Beach Road. Other areas in Lake Park experiencing similar problems as a result of inadequate or nonexistent storm drainage facilities are the Newman Road - Reed Road - Miller Road area near Silver Beach Road and Old Dixie Highway, the Crescent Circle area, Tenth Court at the southern end, Magnolia Drive and Laurel Drive east of Tenth Street, Ninth Street at Cypress Drive, various locations along Park Avenue, and numerous intersections where standing water disrupts the flow of traffic and heavily contributes to the deterioration of road surfaces. Exhibits showing the extent of the problem areas are presented.

An important element of the Town's drainage system is the use of grassed swales. Swales can be used to remove from the streets and temporarily store large amounts of stormwater runoff thus maintaining traffic flow and safety. Properly constructed swales, by reducing the rapid concentrations of flow at the downstream positive discharge systems, reduce the loading in those systems and the magnitude and cost of improvements to those facilities. Grass swales are relatively easy to maintain and replace if necessary. In addition, swales can enhance the appearance of an area.

However, over a period of time the grass swales will lose their original contour as a result of sediments being washed from the roadways into the swales. Without periodic maintenance, the swale capacity continues to decrease forcing more and more of the stormwater runoff to be transported along the roadway which contributes to the premature deterioration of the roadways and creates hazardous driving conditions. Other factors leading to a reduction in swale capacity and effectiveness is allowing landscaping to be planted in the swale area, particularly along the swale invert, and allowing the swale areas to be covered with impervious material.

Another problem related to the storm drainage system is the deterioration of joints and pipes in the system which eventually leads to the formation of "sink holes". These "sink holes" can create a substantial traffic hazard, nuisance and potential liability to the Town.

Much of the Town's existing drainage system is not the result of a long range master plan for the implementation of a well integrated ground surface percolation and positive underground piping storm drainage system. On the contrary, it is the cumulative result of piecemeal development which has occurred over several decades and which has been maintained on more or less an emergency basis.

The regulations and policies of the Town of Lake Park, Palm Beach County, the State of Florida and the South Florida Water Management District as regards a stormwater drainage system are discussed in the report. The regulations and policies of these governmental agencies were incorporated in the engineering investigation and recommended stormwater drainage system improvements.

The Town's existing storm drainage system, where it exists, generally includes grassed swales, drainage inlets and underground gravity drainage pipes with positive discharge to various water bodies. In order to reduce the potential for flooding, each of the elements of the stormwater drainage system must have sufficient capacity to convey the runoff from the design storm event.

The amount of storm runoff or loading was calculated for each portion of the existing stormwater drainage system using the Rational Method of analysis. The parameters involved in this method and the determination of their values are presented and discussed in the report.

One of the objectives of the study was to retain and utilize the existing drainage structures, pipes, and outfalls to the greatest extent possible. It quickly became apparent during the study that most of the existing system did not have sufficient capacity to handle the 3 year design storm. Therefore, either the existing system had to be replaced with pipes of greater capacity or the runoff in the system had to be reduced.

Because the Town is substantially developed in the areas under investigation, the use of surface retention/detention facilities is not feasible. The solution recommended in this study is to use exfiltration trenches, also referred to as French drains or seepage trenches, along the new drainage pipes constructed. The exfiltration trenches, by percolating a portion of the runoff into the surrounding soils, reduced the runoff in the drainage pipes, and allowed most of the existing pipes to remain in the recommended drainage system. The exfiltration trenches also remove the pollutants from the "first flush" of a storm event from the runoff discharged to the surface waters which is both desirable and also required to meet current standards for water quality.

A typical calculation for determining the runoff, required trench length and exfiltration amount is presented. Only the calculated required length of trench is included in the recommended system and estimated cost.

After the runoff was calculated for each pipe in the system and corrected for exfiltration trench if applicable, the hydraulic gradient was determined for each pipe run using the Manning equation. The hydraulic grade line is the elevation, under design conditions, to which the stormwater will rise into various inlets and manholes. The hydraulic gradient elevation was calculated for each drainage structure in the system to be sure it did not exceed the inlet grate and/or manhole top elevation for the design storm.

The existing inlets were retained and used in the recommended system where possible. Additional inlets are included in the recommended drainage system at low points along the roadways, at junctions of two or more drainage pipes, at changes in alignment of drainage pipes, at locations along the swales where the swale capacity is exceeded by the runoff being carried and at locations where exfiltration trenches had to be added to the system to reduce the hydraulic loading on the existing drainage pipes so that they could be retained in the recommended system.

The final element of the drainage system that was reviewed was the grassed swales. A typical cross-section of the swale and street for a 60-foot wide right-of-way is included in this report. The capacity of the swales which is a function of the cross-sectional area, the slope along the swale and the roughness was checked throughout the system. Sample calculations showing the swale performance in the existing system and in the recommended system are presented and discussed. A recommendation is made relative to the location of landscaping in the swale areas.

The recommended drainage system, based on an engineering analysis of the system, is presented and discussed. The inlets, manholes, pipes, and outfalls in the existing drainage system were retained in the recommended system to the greatest extent possible.

The drainage system was analyzed on the basis of 26 separate drainage basins, where each of the drainage basins had its own outfall. The limits of the drainage basins are shown. The conclusions and recommended improvements for each of the drainage basins are discussed in the report.

The total estimated cost of constructing the recommended drainage system improvements is \$6,365,950.00. The estimated costs are presented by drainage basin in terms of 1999 dollars based on current engineering estimates of construction costs. The estimated cost also includes

an allowance for cleaning, evaluating and repairing those older portions of the existing drainage system which are recommended to be retained in the final drainage system. The estimated cost also includes an allowance for removing or plugging those portions of the existing drainage system which could not be utilized in the final system so that future settlement problems with these facilities could be avoided.

Alternative opportunities available to the Town of Lake Park for financing the proposed stormwater drainage improvements are presented and discussed including issuing of General Obligation Bonds of the Town, levying of special assessments by the Town against benefited properties, utilizing existing funds of the Town, establishing a Stormwater Management Utility (SMU), utilizing low interest loan funds available through the State of Florida revolving loan program or a combination of these alternatives.

END OF SECTION

SECTION II
INTRODUCTION

The Town of Lake Park is a municipal corporation located in Palm Beach County, Florida and has a population of approximately 7,000 persons based on the 1990 census count. The Town occupies an area of approximately 2.5 square miles, located in Sections 19, 20 and 21, Township 42S, Range 43W. The Town is governed by a five member Town Commission which includes an elected Mayor and operates under a Town Manager form of government.

Much of the Town was designed and platted as a real estate development project of the East Coast Finance Corporation. Its original name was Kelsey City, after the Boston and West Palm Beach financier Henry Kelsey. The original plats describing portions of the present Town were filed in March, 1921. With the onset of the Great Depression in 1929, Lake Park's growth and development languished through the 1930s, 1940s, and early 1950s. The town's population increased from 489 in 1950, to 3,589 in 1960, to 6,993 in 1970, to an estimated 7,000 persons in 1990 based on the census count.

Today the Town of Lake Park exists as a small urban community within the northern part of the heavily urbanized area of eastern Palm Beach County. It is bounded by the waters of Lake Worth on the east, the Village of North Palm Beach along most of the northern corporate limits, a small enclave of unincorporated County land on the northwest corner, the City of Palm Beach Gardens along a 1,400 - foot stretch of the western Town limits,

unincorporated county land along the majority of western Lake Park, and the City of Riviera Beach along the Town's southern limits at Silver Beach Road. Exhibit A, appended to this report, is a location map of the Town of Lake Park and depicts its position relative to adjacent municipalities, major highways and surface water surface bodies of the region.

During the mid to late 1950-60 period when the Town began to experience more intense development, local ordinances of the Town requiring provision of adequate storm drainage facilities by land developments were not in existence and as a result serious inadequacies were created which remain to the present time. This, together with the lack of a comprehensive storm drainage plan which would apply to the developing areas, further intensified the creation of haphazard and inadequate storm drainage facilities for a community destined to become highly urbanized within a relatively short period of time.

On May 7, 1980 the Town Commission of Lake Park officially recognized the need for a comprehensive storm drainage improvements program by adoption of a Comprehensive Plan for the Town in conformance with Section 163.190 of Florida Statutes. The plan was recognized and approved by the State of Florida, South Florida Water Management District, and other agencies having jurisdiction over the planning program adopted by the Town. Implementation of the needed storm drainage improvements program was given the highest capital improvements priority recommendation.

The proper management of storm water runoff resulting from rainstorms and/or high tides is essential to the maintenance of a high quality urban living environment. Water which flows across various types of surfaces, ranging from grassy lawns to paved parking lots and roofs covered with a variety of materials, is capable of incorporating any number and quantity of materials and transporting them either into surface waters or into the groundwater system. The effectiveness of a drainage system is directly related to the cost effectiveness of maintaining a high quality street system. Where water collects and stands on the paved surface, the paving material deteriorates often leading to the formation of potholes. This, in turn creates a traffic hazard by interrupting the normal flow of traffic. Finally, a well designed and maintained drainage system is essential in keeping real and personal property damage to a minimum in the wake of flooding.

END OF SECTION

SECTION III

AUTHORIZATION, SCOPE AND OBJECTIONS

In 1985, the Town Commission of Lake Park recognized the need to address the inadequacies of the existing storm drainage system in the Town and the resultant problems which existed. The Town Commission subsequently authorized Barker, Osha & Anderson, Inc. to conduct an engineering investigation and analysis of the existing storm drainage system and to prepare a comprehensive storm drainage report based on their findings and recommendations. That report was presented to and approved by the Town Commission in March 1986. In 1992 the Town Commission of Lake Park authorized Barker, Osha & Anderson, Inc. to review and update, as necessary, the 1986 Comprehensive Storm Drainage Report. In 1998 the Town Commission of Lake Park again authorized Barker, Osha & Anderson, Inc. to review and update, as necessary, the Comprehensive Storm Drainage Report.

The scope of the investigation covered by this report is the entire area within the corporate limits of the Town of Lake Park. The study area extends from Northlake Boulevard to Silver Beach Road and from Lake Worth to the Earman River (Canal C-17). The study area is depicted in Exhibit 1, appended to this report.

The objectives of the 1986 engineering investigation and report were as follows:

- 1) Conduct the necessary field surveys, measurements and inspections to accurately depict the existing stormwater drainage system within the study area which was owned, operated and maintained by the Town of Lake Park at that time.
- 2) Conduct field investigations to accurately identify those portions of the study area with existing stormwater drainage problems both during and after storm events.

- 3) Conduct field investigations of the study area to determine the condition of the existing stormwater drainage system, both above ground and below ground, to aid in making recommendations for rehabilitation and/or improvements to the system.
- 4) Compile the necessary information regarding topography, hydrology and soil conditions of the study area as required for the engineering analysis.
- 5) Analyze the study area to determine which areas were contributing stormwater runoff to specific drainage facilities and also to determine which areas were not served by the existing stormwater drainage system at that time.
- 6) Analyze the existing stormwater drainage system to determine the capacity of the system and the adequacy of the system to collect and transport the stormwater runoff imposed on the system by the design storm event.
- 7) Where the existing stormwater drainage system was found to be inadequate to handle the imposed design storm event or where the system did not presently exist, the system was supplemented in the analysis with additional structures and drainage pipelines.
- 8) Recommend rehabilitation and/or improvements to the existing stormwater drainage system in order to provide sufficient capacity to handle the design storm event.
- 9) Prepare a preliminary opinion of probable cost for the recommended rehabilitation and/or improvements to the system.
- 10) Review the analysis, conclusions and recommendations of the study with the appropriate Town personnel and regulatory agencies.
- 11) Present to and discuss with the Town Commission the results of the engineering investigation and report.

The objectives of the August 1999 revisions to the report are as follows:

- 1) Incorporate into the report the storm drainage system improvements constructed within the Town since the last update in August 1993.
- 2) Review and incorporate Town and regulatory agencies requirements pertaining to storm drainage which have been adopted since 1993.
- 3) Review and revise the recommended improvements and opinion of probable cost based on the improvements constructed since 1993 and on current construction costs anticipated for the work.
- 4) Present to and discuss with the Town Commission the results of the updated engineering investigations and report.

END OF SECTION

TOWN OF LAKE PARK

Stormwater System Update

May 3, 2017



Calvin, Giordano & Associates, Inc.
EXCEPTIONAL SOLUTIONS™

Stormwater System

At a Glance

- **Town is 1,122 Acres**
- **3055 Parcels**
- **409 Drainage Structures**
- **46,000 Linear Feet of Pipe**
- **9,503 Linear Feet of Exfiltration Trench**
- **10 Outfalls**

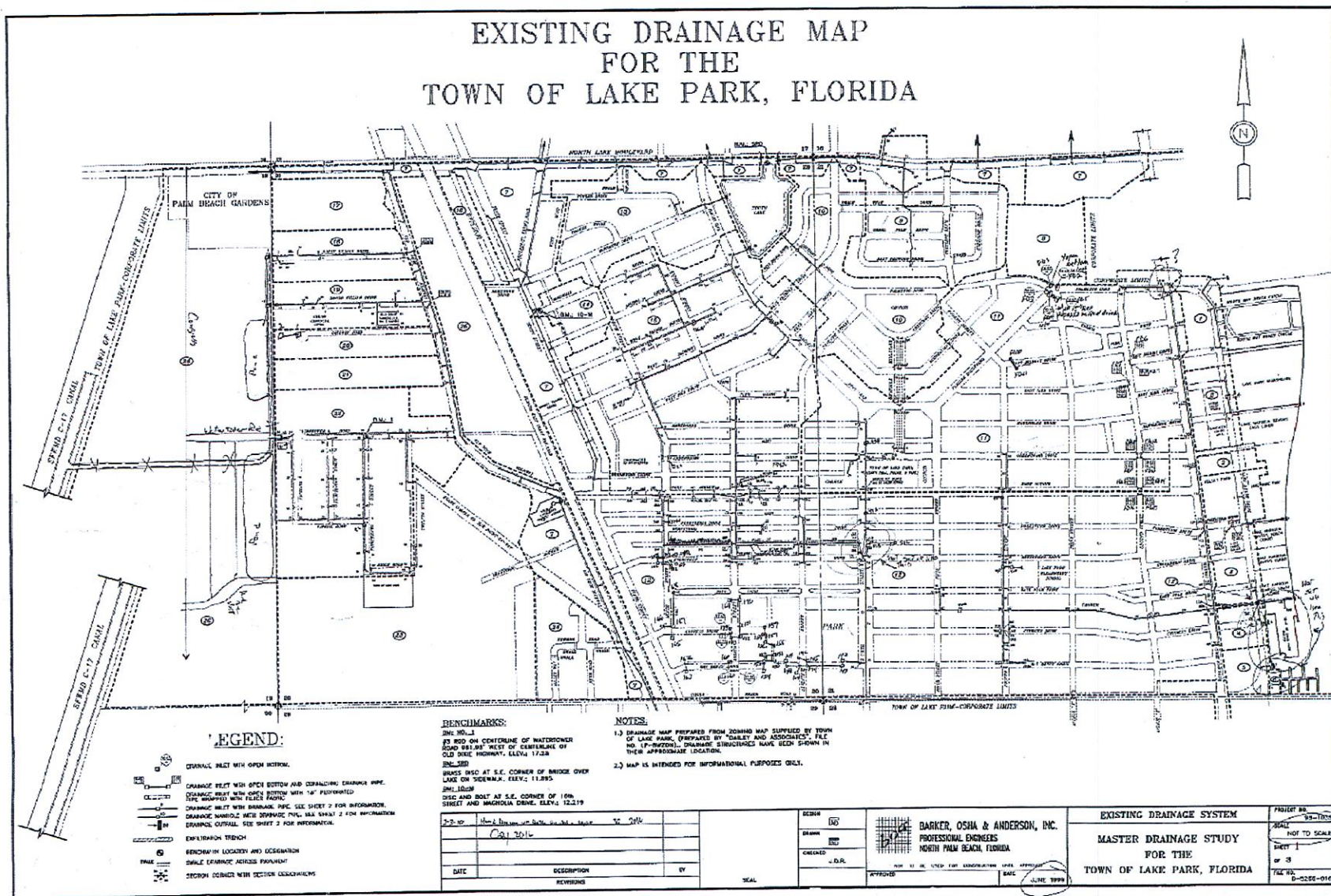
Stormwater System

EXISTING KNOWLEDGE BASE IS OLD

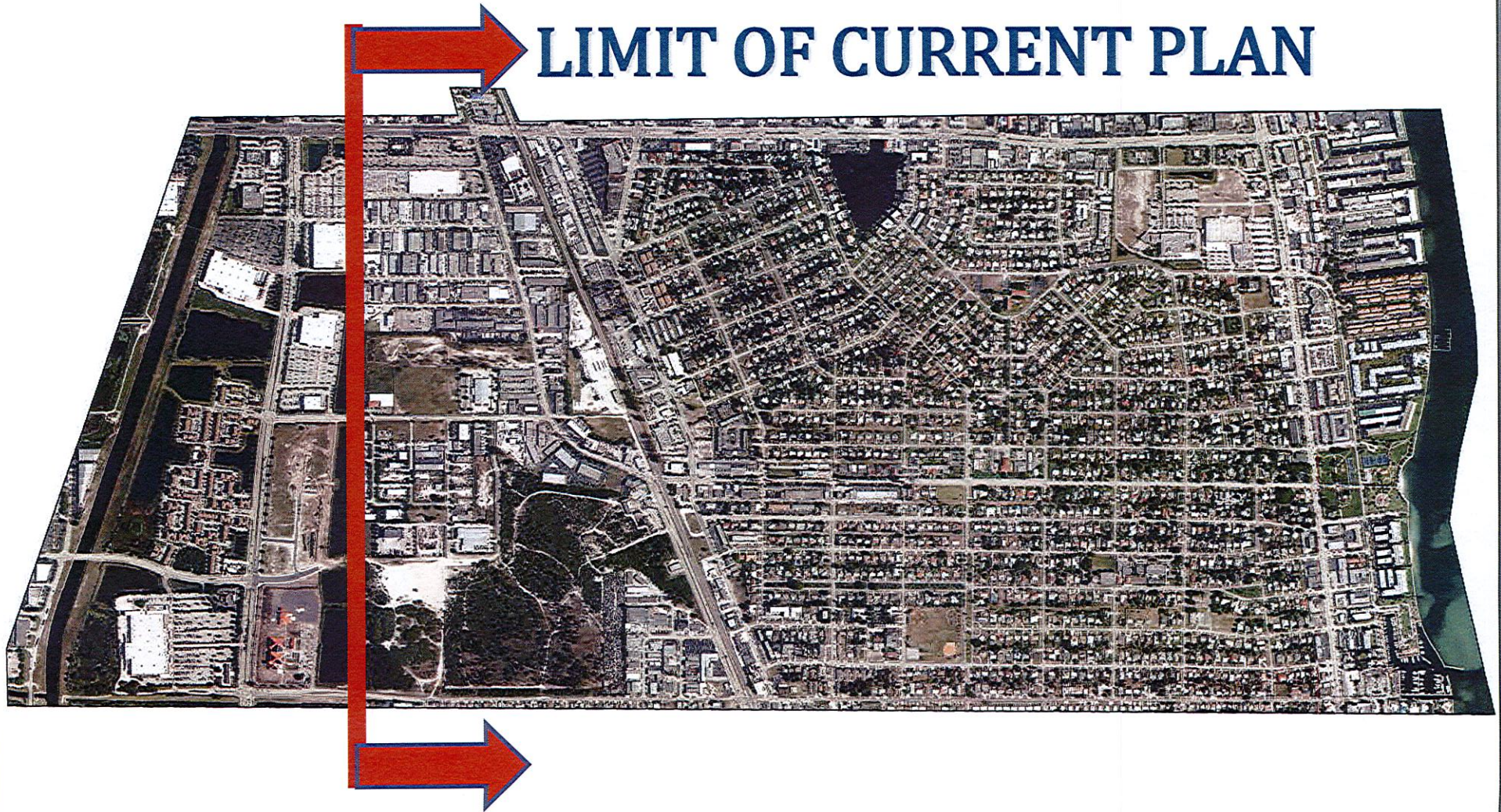
- **Original Date March, 1986**
- **Revised in August, 1993 and August 1996**
- **No Digital Data**
- **Survey Data on Old Datum of Unknown Quality**
- **Does not Encompass Whole Town**
- **Manual Updates by PW Staff**

Stormwater System Map

EXISTING DRAINAGE MAP FOR THE TOWN OF LAKE PARK, FLORIDA

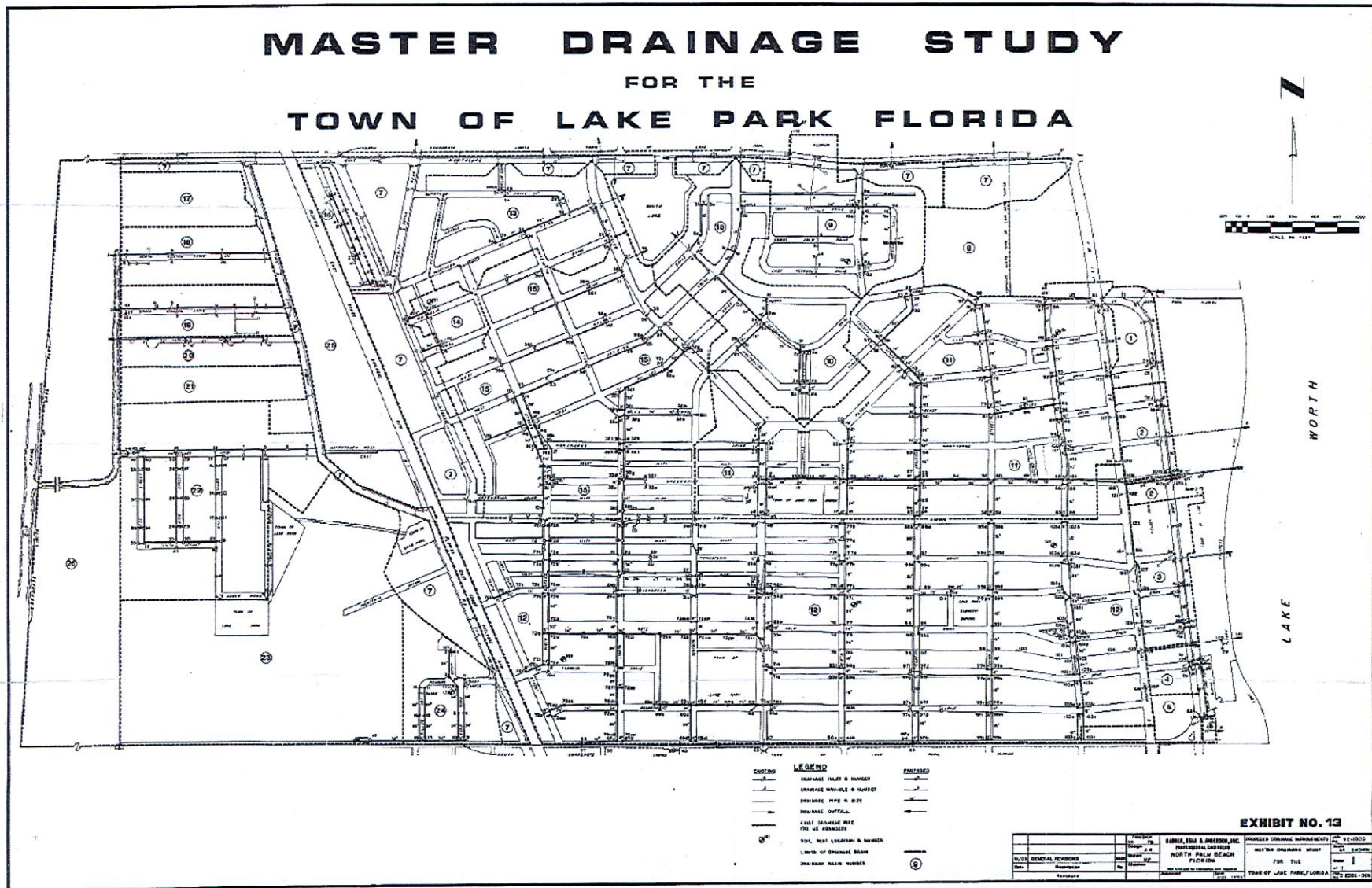


Stormwater System – Town Aerial



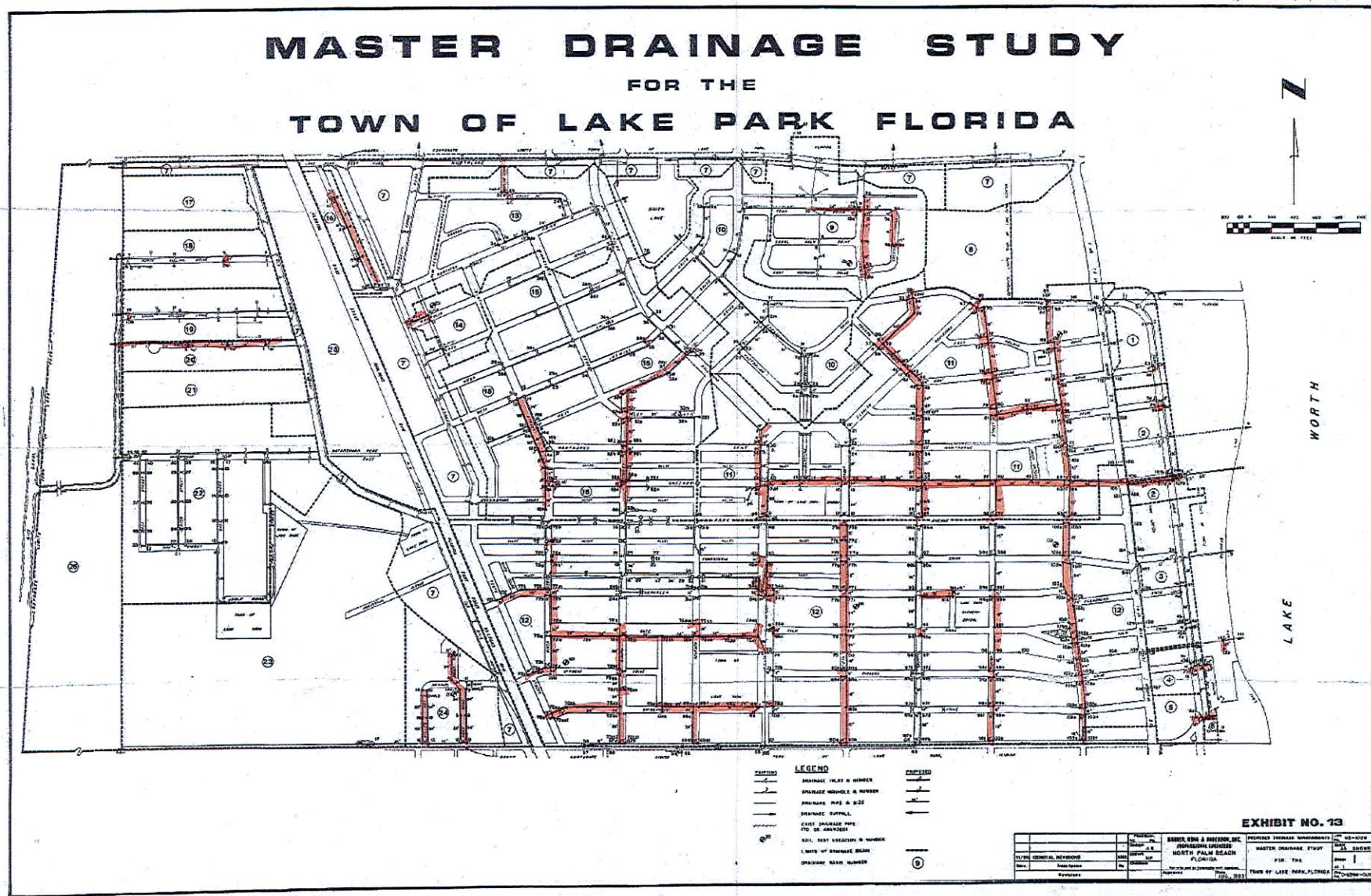
Town of Lake Park - Stormwater System - May 3, 2017

The Master Drainage Plan



Town of Lake Park - Stormwater System - May 3, 2017

The Master Drainage Plan



Town of Lake Park - Stormwater System - May 3, 2017

Stormwater System Needs

- **Field Survey of All Existing Drainage Structures**
 - Under way at this time
- **Review TV Inspection of 6,900 Linear Feet of pipe**
- **Televise 39,100 Linear Feet of pipe**
- **Create Stormwater Models of the 14 Outfall Systems**
- **Prepare New Master Drainage Plan for Town's Future**
- **5-Year Plans for Improvement**

Stormwater Utility Funding Issues:

Current Funding Supports Operations Only:

- **Major Equipment Maintenance Not Supported**
 - Vac-Truck Life Extension
 - Street Sweeper
- **Equipment Replacement Not Supported**
 - Vac-Truck/Street Sweeper Replacement Every 10 Years
- **Updating Stormwater Master Plan Not Supported**
- **Construction of Improvements Not Supported**

Where Do We Go From Here?

- **SWU Rate Adjustment Will Be Required to Accomplish Long Range Goals**
- **Need to Update Master Drainage Plan**
- **Need to Implement 5-Year Plans**
 - Includes Equipment
 - Includes Construction
- **Water Quality Requirements For Future Projects**

Where Do We Go From Here?

- Estimate of First Five Years of Long Range Goals
- This is NOT Funded at Current Rates

SPECIFIC TASKS TO BE PERFORMED IN THE FIRST FIVE YEARS OF A LONG RANGE PLAN	ESTIMATED COST
Refurbish vacuum truck (extend life for three more years)	\$90,000
Complete Earmin River outfall project	\$75,000
Prepare digital atlas based upon survey data	\$25,000
Video drain lines	\$37,800
Complete video drain line project	\$95,000
Prepare Master Drainage Plan using field data collected from survey and video analysis. (Plan was last updated in 1999)	\$200,000
Establish GIS system (software licensing, equip.)	\$13,700
Purchase replacement street sweeper	\$175,000
10th & Bayberry drainage improvement project	\$90,000
Continue to build GIS system	\$25,000
Transfer to reserves in anticipation of major capital expenditures	\$100,000
Engineering and design for the 4,300 foot Date Palm Dr. drainage line repair project	\$75,000
Phase I of the Date Palm Dr. drainage line project	\$495,000
Phase II (completion) of Date Palm Dr. drainage line project	\$125,000
Purchase replacement vacuum-jet truck	\$350,000
Commence engineering for misc. drainage improvement projects (Based upon Master Drainage Plan recommendations)	\$45,000
TOTAL FIVE YEAR CAPITAL EXPENDITURES – NOT CURRENTLY FUNDED	\$2,016,500