RESOLUTION NO. 17-02-19

A RESOLUTION OF THE TOWN COMMISSION OF THE TOWN OF LAKE PARK, FLORIDA, AUTHORIZING THE DEVELOPMENT OF A NEW STORMWATER MASTER PLAN WITH WATER RESOURCE MANAGEMENT ASSOCIATES (WRMA); AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Town of Lake Park, Florida ("Town") is a municipal corporation of the State of Florida with such power and authority as has been conferred upon it by the Florida Constitution and Chapter 166, Florida Statutes; and

WHEREAS, the Town is empowered to enter into contractual arrangements with public agencies, private corporations or other persons, pursuant to Florida Statutes; and

WHEREAS, the Town has previously determined a need to develop a new stormwater master plan; and

WHEREAS, pursuant to the Consultants Competitive Negotiation Act (CCNA) the Town entered into a contract on November 7, 2018 with Water Resources Management Associates for stormwater engineering services (the "Consultant"); and

WHEREAS, in the course of developing its new stormwater master plan, the Town requires the professional services of the Consultant; and

WHEREAS, based on this need, the Consultant has provided a proposal to the Town for the development of a stormwater master plan; and

WHEREAS, the cost of the proposal is $119,570.00; and

WHEREAS, the work associated with the proposal will be governed by the terms and conditions of the Town's contract with the Consultant; and

WHEREAS, the Town Manager has recommended to the Town Commission of Lake Park that it is in the best interest of the Town to accept the Consultant's proposal for the development of a new stormwater master plan.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COMMISSION OF THE TOWN OF LAKE PARK, FLORIDA AS FOLLOWS:

Section 1. The whereas clauses are true and correct and are incorporated herein.

Section 2. The Commission hereby authorizes the development of a new stormwater master plan with the Consultant, and directs the Town Manager to execute purchase orders or other documents needed to effectuate the purchase of the professional services of the Consultant as

required by the Town, and detailed within the Consultant's proposal, a copy of which is attached hereto and incorporated herein as Exhibit "A".

Section 3. This Resolution shall become effective immediately upon execution.

The foregoing Resolution was offered by Commissioner Michaud, who moved its adoption. The motion was seconded by Commissioner Lynch and upon being put to a roll call vote, the vote was as follows:

	AYE	NAY
MAYOR MICHAEL O'ROURKE	✓	
VICE-MAYOR KIMBERLY GLAS-CASTRO	✓	
COMMISSIONER ERIN FLAHERTY	✓	
COMMISSIONER ANNE LYNCH	✓	
COMMISSIONER ROGER MICHAUD	✓	

The Town Commission thereupon declared the foregoing Resolution 17-02-19 duly passed and adopted this 6 day of February, 2019.

TOWN OF LAKE PARK, FLORIDA

BY: _____
MICHAEL O'ROURKE
MAYOR

ATTEST:

_____
VIVIAN MENDEZ
TOWN CLERK

TOWN OF LAKE PARK (TOWN SEAL) SEAL FLORIDA

Approved as to form and legal sufficiency:

BY: _____
THOMAS J. BAIRD
TOWN ATTORNEY

WRMA
WATER RESOURCES | ENGINEERING

December 27, 2018

Town of Lake Park
Public Works Department
Attention: Richard Scherle
640 Old Dixie Highway
Lake Park, FL 33403

RE: Scope of Service and Cost Proposal for Town of Lake Park Stormwater Master Plan

Dear Richard,

Water Resources Management Associates, Inc. (WRMA) is pleased to submit for your consideration the attached Scope of Services, Project Approach, Price Proposal and Proposed Project Schedule.

The enclosed "Project Approach" was instrumental to the preparation of the proposed Scope of Services and reflects our understanding of the level of effort involved in developing a new Stormwater Masterplan for the Town.

Our understanding of the Scope is based on meetings we have had with both you and other Town of Lake Park staff, existing As-Built records previously provided to WRMA, as well as existing technical reports and documentation your office provided.

Our proposed fee reflects our efforts to be cost effective, while providing the necessary direct labor hours to complete each task as is described. We anticipate you may have some comments or proposed changes to the scope of services or project schedule and we are willing to fine tune any element you wish to discuss.

The Proposed Scope of Services provides for a Comprehensive and detailed Stormwater Masterplan approach that takes into consideration multiple aspects of the Town's Master Planning objectives and provides a long term road map to actively manage the Town's Stormwater Assets.

Please contact me at your convenience to discuss this price proposal.

Sincerely,

Raul Mercado, PE, CFM
Principal-in-Charge

Enclosed (4):
Stormwater Masterplan Approach
Stormwater Masterplan Scope of Services
Stormwater Masterplan Project Schedule
Stormwater Masterplan Price Proposal

WRMA

TOWN OF LAKE PARK
PROPOSED SCOPE OF SERVICES
STORMWATER MASTERPLAN

WATER RESOURCES MANAGEMENT ASSOCIATES, INC.

TASK ITEM AND DESCRIPTION	Sr. Prj Mgr	Sr Engineer	Associate Engineer Prj Mgr	Staff Engineer	Sr Scientist Analyst	Sr GIS/RS Analyst	Admin	Total Hours (hrs)	Total Labor Cost (hrs x rate)	Task Subtotal Cost
	$ 125.00	$ 115.00	$ 110.00	$ 85.00	$ 110.00	$ 95.00	$ 65.00			
1.0 PROJECT MANAGEMENT										$ 16,390.00
1.1 Meetings	24		24				2	50	$ 5,770.00	
1.2 Billing							12	12	$ 780.00	
1.3 Bi-Weekly Updates	24		24				4	52	$ 5,900.00	
1.4 QA/QC		32					4	36	$ 3,940.00	
2.0 OUTREACH AND COMMUNICATIONS										$ 8,595.00
2.1 Development of an Outreach Plan	4		4	4			8	20	$ 1,800.00	
2.2 Meetings with Town Officials	8		2				1	11	$ 1,285.00	
2.3 Meetings with Agencies	8		2				1	11	$ 1,285.00	
2.4 Meetings with Stakeholders	8		2				1	11	$ 1,285.00	
2.5 Development of Educational Materials & Events				4			40	44	$ 2,940.00	
3.0 DATA COLLECTION AND MANAGEMENT										$ 8,060.00
3.1 Data Collection			8					8	$ 880.00	
3.2 Data Cataloguing			8					8	$ 880.00	
3.3 LiDAR Data Management			8	4		4		16	$ 1,600.00	
3.4 GIS/CAD Basemap Development	4		32	8				44	$ 4,700.00	
4.0 WATER RESOURCES ENGINEERING MODELING SCIENCE										$ 23,240.00
4.1 Model Selection	4		4					8	$ 940.00	
4.2 Model Development Hydrology	8		20	8		4		40	$ 4,260.00	
4.2 Model Development Hydraulics	8		20	8				36	$ 3,880.00	
4.4 Model Calibration	16		16	16				48	$ 5,120.00	
4.5 Water Quality Assessment										
4.5.1 NPDES/MS4 Review	8		16		16			40	$ 4,520.00	
4.5.2 Compliance Review	8		16		16			40	$ 4,520.00	
5.0 CLIMATE CHANGE AND SEA LEVEL RISE ASSESSMENT										$ 4,960.00
5.1 Vulnerability Analysis	4		2		16			22	$ 2,480.00	
5.2 Adaptation Analysis	4		2		16			22	$ 2,480.00	
6.0 OPERATIONS AND MAINTENANCE (O&M) PROGRAM REVIEW										$ 6,590.00
6.1 O&M Stormwater Inspection Program Review	2		24	4			1	31	$ 3,295.00	
6.2 O&M Stormwater Rehabilitation Practices Review	2		24	4			1	31	$ 3,295.00	
7.0 COMMUNITY RATING SYSTEM (CRS) PROGRAM REVIEW										$ 3,890.00
7.1 Current Program Activities	8		8				1	17	$ 1,945.00	
7.2 CRS Additional Acitivities Support	8		8				1	17	$ 1,945.00	
8.0 STORWATER UTILITY ADMINISTRATION & FUNDING SOURCES										$ 12,505.00
8.1 Stormwater Utility Program Review	8		16	2			1	27	$ 2,995.00	
8.2 Stormwater Utility Fee Structure Review	8		24	2			1	35	$ 3,875.00	
8.3 Alternative Funding Analysis	8		40	2			1	51	$ 5,635.00	
9.0 ALTERNATIVES ANALYSIS										$ 24,940.00
9.1 H&H Level of Service Modeling Analysis	16		40	4				60	$ 6,740.00	
9.2 FEMA Floodplain Review	8		4					12	$ 1,440.00	
9.3 Development of Alternatives	16		20	4				40	$ 4,540.00	
9.4 Evaluation of Alternatives	16		20	4				40	$ 4,540.00	
9.5 Conceptual Regulatory Permitting	4		4					8	$ 940.00	
9.6 Alternative Design Prioritization & Recommendations	16		40	4				60	$ 6,740.00	
10.0 STORMWATER MASTER PLAN REPORT										$ 10,400.00
10.1 Draft Stormwater Masterplan (SWMP) Report	24		16	8			4	52	$ 5,700.00	
10.2 Final Stormwater Masterplan (SWMP) Report	16		16	8			4	44	$ 4,700.00	
SUBTOTAL DIRECT LABOR	$ 37,500.00	$ 3,680.00	$ 56,540.00	$ 8,330.00	$ 7,040.00	$ 760.00	$ 5,720.00	1,104	$ 119,570.00	
TOTAL COST									**$ 119,570.00**	

TOWN OF LAKE PARK
STORMWATER MASTERPLAN PROJECT APPROACH

INTRODUCTION

The Town of Lake Park, originally born as Kelsey City, was the first zoned municipality in Florida (1923). With an area of 2.5 square miles and a population of approximately 9,000 people, the Town of Lake Park is composed of residential areas on the Town's Eastern boundary and an industrial area to the West along 10th street and Dixie Highway. The Town's development started in earnest in the 1950's and by the 1980's was considered to be fully developed.

During the period between 1950 and 1980, town ordinances, specifically for the regulation of drainage, did not exist. Resultantly, drainage infrastructure was installed by developers and the town as was needed. In 1980, the town identified a need for a comprehensive stormwater drainage improvement program and a Comprehensive Plan for the Town was subsequently adopted in May of 1980. Later in 1986, a Stormwater Masterplan (SWMP) was prepared with the objective of developing a stormwater "atlas" (map) of drainage facilities and to assist the department of public works in prioritizing operations and maintenance activities. The Plan was updated in 1993 and again in 1996 with recommended improvements to the system estimated at $6.37 Million (1996 Dollars).

In 2008, the Town of Lake Park established a stormwater utility to partially finance the Town's stormwater program. The dedicated utility established a user fee based on the amount of impervious surface area of a typical residential unit, which consists of approximately 5,202 square feet. The current user fee is $10.00 per Equivalent Stormwater Unit (ESU).

The current Town's stormwater drainage system consists mostly of grassed swales for conveyance of runoff to catch basins and underground pipes discharging through 10 major outfalls to the Intracoastal Waterway (IWW) and the C-17 Canal. It has been over 20 years since the last drainage masterplan was updated. Public works has noted that the aging drainage infrastructure is failing at a faster rate. Development, climate change and environmental stressors pose a challenge to the drainage system capacity to handle storm events of both small and large magnitude.

To address these new challenges, the Town has identified a need to update and/or develop a new Stormwater Masterplan using recently updated system infrastructure maps which are composed of field collected survey data coupled with the application of new GIS based LiDAR topography data, state-of-the-art hydrologic and hydraulic modeling technology, and sustainable planning approaches including Green Infrastructure best management practices and Low Impact Development (LID) techniques for management of stromwater runoff.

CURRENT STORMWATER MASTERPLAN RELATED ACTIVITIES

In preparation for the development of new stormwater masterplan the Town is currently in the process of finalizing the acquisition of surveyed As-Built data for the existing drainage system infrastructure with the objective of developing a GIS-based atlas of the drainage system, as well as performing a storm sewer CCTV condition assessment of portions of the existing system.

STORMWATER MASTER PLAN GOALS

The new SWMP is intended to provide the Town of Lake Park with a Long-Range stormwater management planning tool or "Road Map" that will allow for the rehabilitation of the existing drainage system infrastructure over the next 20 years and will provide the Town with a forward looking approach and a framework through which sustainable re-development practices can be employed as the town progresses through its natural growth and re-development cycle. The Stormwater Masterplan will entail the examination of the existing As-Built data, mathematically-analyze the performance of the stormsewer and drainage swale infrastructure, conceptualize alternatives, make recommendations for rehabilitation and develop a "Phased" Capital Improvement Program (CIP) for project implementation based on an analysis of current and projected funding sources (Annual Utility Revenues, Bonding, Grants, etc.).

WRMA APPROACH TO STORMWATER MASTER PLANNING

The development of a SWMP is very specific to the physical characteristics, environmental, social and financing factors of the watershed setting in which the drainage system infrastructure operates and is funded. WRMA has studied these drivers and their influence on the Town's development to prepare a SWMP proposal.

Physical Characteristics

The drainage system of the Town is influenced by the following factors:

- An urban setting of older residential areas east of Old Dixie Hwy, south of Northlake Blvd, north of Silver Beach Rd, and west of U.S. 1. Commercial and light industrial land uses west of Old Dixie Hwy, and East of the C-17 Canal, and multi-story waterfront development east of U.S. 1 along the Intracoastal Waterway. Common to all these areas is the lack of open space for stormwater management facility siting;

- Mild to flat topographic gradients for drainage;

- The Town's drainage infrastructure is aged and in many cases does not provide adequate drainage capacity due to dated design procedures and increased stormwater runoff from increased impervious area (development);

- A tide-control tailwater condition for discharge along the Intracoastal Waterway;

- The regional C-17 Canal that receives stormwater discharge from upstream watershed areas and from Town canals. High tailwater elevations in the C-17 Canal during severe storm events limit the Town's system capacity to drain stormwater from Town streets;

- The older existing drainage system is "grandfathered" and is not required to meet the current stormwater regulations. However, new developments and re-developments in the Town are subject to the current stormwater regulations. Compliance is a challenge because the Town has scarce open land available to construct conventional detention/retention facilities.

Environmental Factors

The Town's highly urbanized watershed area is conducive to the discharge of pollutant-laden sediments that affect the water quality of the receiving water bodies (C-17 Canal and Intracoastal Waterway). The Town currently participates as part of an NPDES permit consortium led by the Northern Palm Beach County Improvement District. Per a Water Quality Monitoring Plan, the Town is required to perform quarterly sampling at four locations for five test parameters, including Chlorophyll-A, Dissolved Oxygen (DO), Total Phosphorus (TP), Total Nitrogen (TN), and Total Suspended Solids (TSS).

There is a need to enhance the Town's stormwater management program in order to better comply with the National Pollutant Discharge Elimination System (NPDES) / MS4 Permit monitoring regulation targets.

The town of Lake Park eastern boundary is a 0.8 mile coastline along the Intracoastal Waterway under the influence of tides and Sea Level Rise. Using the sea level in 1992 as a reference point, and based on information from the Southeast Florida Regional Climate Compact, NOAA and the U.S. Army Corps of Engineers, predict that in 2020 the sea level will have risen by 6 to 12 inches; in 2060 by 14 to 34 inches; and by 2100, 31 to 81 inches.

Climate Change impact on stormwater management is manifested as a function of increased precipitation intensities, and extreme hydrologic conditions (more severe droughts, and higher intensity flooding events).

Incorporation of climate change impacts into municipal Capital Improvement Program (CIP) development decisions is still a relatively new concept, as local governments have previously adopted a "wait and see" attitude with ever increasing information on climate change effects and how these may or may not impact their core program missions. However, there are existing management planning tools and approaches for guidance regarding "vulnerability" assessments that can be applied. To date, three closely-related approaches are often used to assist elected officials and infrastructure managers consider and prepare for future climate impacts: *vulnerability assessment, risk assessment, and adaptation assessment.*

Vulnerability Assessment begins with the identification of existing stressors facing municipal and transportation systems and projects how climate change will impact and/or introduce new stressors in the future. The findings of the assessment can then be ranked to assess, prioritize, and address vulnerabilities.

Risk Assessment evaluates the likelihood and consequence of climate-related impacts on municipal transportation and civil infrastructure. Risk assessment tools are rooted in engineering applications that will quantify the product of the probabilities of exposure and;

Adaptation Assessment identifies, plans, prioritizes, implements, and measures civil/transportation infrastructure management options available for effectively adapting to climate change impacts. This assessment addresses ways to reduce civil/transportation infrastructure vulnerability, increase resilience and/or highlight regions of retreat.

Social Factors

With the exception of the waterfront area, the Town's inner core is made up of older residential and commercial neighborhoods in need of revitalization.

The Town efforts to revitalization include a 1996 Community Redevelopment Plan subsequent to the creation of a Lake Park Community Redevelopment Agency. The plan, which included a 308 Acre CRA boundary consisting of older central portions of the Town around Old Dixie Avenue and Park Avenue, was updated in January 2010 by Civic Design Associates. The 2010 Plan expressed a clear vision for downtown and proposed a series of redevelopment initiatives that were partially implemented.
The Town of Lake Park is currently interested in developing Mixed-Use Districts for the Federal Highway corridor. The study area incorporates the east and west side of Federal Highway between Silver Beach Road (to the south), Palmetto Drive (to the north), 2nd Street (to the west) and Lake Shore Drive (to the east). Both sides of the corridor require the creation of land development regulations, and the Town has recently adopted changes to the Comprehensive Plan for the east side of the corridor to establish the Federal Highway/Intracoastal Mixed-Use District

The Town commissioned Redevelopment Management Associates (RMA) to prepare a "Vision" for the Federal Highway corridor Mixed Use District. A report titled "Vision Lake Park" was prepared on August 2017 by RMA.

The vision established for the Town for the Mixed-Use District project is to encourage infill redevelopment and streetscape improvements along the Federal Highway Corridor and to achieve the following goals:

- Achieve a sense of place;
- Physical and functional integration from west side of Federal Highway to Lake Shore Drive;
- Enhanced of pedestrian, bicycle and vehicular accessibility and connectivity (Complete Streets Vision and Design);
- Overall development pattern that is compatible with surrounding neighborhoods and enhances character of the community;
- Preservation of potentially historic resources;
- Enhanced existing public spaces, waterfront and marina;
- Diversify the Town's tax base to better position the Town in the future, in its ability to provide services to its residents;

RMA reviewed the FDOT Complete Street Design Standards for U.S. 1 as well as the recommendations for the U.S. 1 Corridor in North Palm Beach that will be considered for the proposed improvements to the U.S. 1 Corridor in the Town of Lake Park

WRMA has studied the 2010 CRA and 2017 RMA reports and determined the following baseline data:

- The majority of residents in Lake Park (56.4%) worked in service industry jobs. Retail trade (20.1%) and Finance, Insurance, and Real Estate (4.3%) make up the second and third highest employee sectors;
- There were approximately 6,660 local jobs and a resident workforce of 3,978. This information indicated that businesses must look outside the Town of Lake Park to find employees;

- The percentage of renters in the Town was 50.5%;
- The Federal Highway Mixed Use Study Area has a high percentage of residents who rent rather than own their homes;
- Education levels with the mixed use study area were in line with the surrounding area and county average;
- Based on recent migration trends, it was observed the influx of young people aged 18-35 to Lake Park. These trends are very positive for revitalization of the area and for the attraction of new residents;
- The Town of Lake Park Community Redevelopment Agency has already successfully attracted investors and is in the process of issuing Requests for Proposal (RFP's) for redevelopment of commercial and residential parcels;
- An emerging arts scene coupled with affordable housing opportunities and access to waterfront have recently made the Town of Lake Park an attractive area for millennials and younger generations;
- The Kelsey Theater performing arts venue, along with the Palm Beach Dance Academy and artist-friendly Brewhouse Gallery are creating a "grassroots" music and arts scene;
- Successful events in downtown, Kelsey Park and Lake Park Harbor Marina are aiding in the "Renaissance" of Lake Park. Implementation of the mixed use vision will help downtown Lake Park anchor and complement the Mixed-Use District rather than compete with it;
- Regulation plays a big role in development and whether or not a project gets off the ground. A streamlined process focused on business friendliness and responsiveness can go a long way in the project initiation process;
- Areas in which the Town of Lake Park has regulatory influence over investment, including in the mixed use study area, include Floor Area Ratio, Residential Density, Lot Coverage, Design Standards, Signage, Parking Requirements, Building Heights, and Setbacks as well as design theme and overall vision for the district;
- The local real estate market has demonstrated the most activity in the retail sector. Retail is not only strong in Lake Park and the Federal Highway Mixed Use Study Area but throughout Palm Beach County;
- There is a demand for new product in the market as there has been no new multi-family product over the past 5 years in Lake Park or the Federal Highway Mixed Use Study Area.

Financing Factors

- The Stormwater Management Utility fee, in operation since 2008, was developed without taking into account the expenditures of a long-term and comprehensive CIP and its funding mechanism;
- The stormwater financial projections in the 1999 SWMP indicated that the current stormwater utility rate structure cannot generate sufficient income to fund the $6.37 Million (1996) CIP program recommended at that time;
- According to the Bureau of Labor Statistics consumer price index, prices in 2018 are 51.28% higher than prices in 1999. The dollar experienced an average inflation rate of 2.20% per year during this period. A Capital Improvement Program cost of $6,370,000 in 1999 is equivalent in purchasing power to $9,636,747.06 in 2018, a difference of $3,266,747.06 over 19 years.

APPROACH

WRMA agrees with the statement that as Palm Beach County continues to grow, the Town of Lake Park has an opportunity to capture new investment.

"...More companies and people are moving into Palm Beach County, and Lake Park has the potential to capture some of the economic growth occurring throughout the county; and position itself as an affordable market to live, work, and play".

Just as there is an opportunity for a mixed-use environment that will support office, retail, and multi-family product, there is also the opportunity for the development of a Town Stormwater Masterplan that can be a vehicle through which:

(1) The Town's stormwater infrastructure can be transformed into a resilient drainage system that enables Town Mangers to pro-actively manage system elements through modern digital infrastructure management systems, and;

(2) Enables town government officials to incorporate green infrastructure elements and best management practices through adoption of sustainable, resilient and environmentally friendly drainage regulations and policies that are "in-line" with the Town of Lake Park's Existing Master Plan vision.

While the downtown Park Avenue area provides some opportunities for drainage improvements, the Town of Lake Park has some unique characteristics such as wide Right-of-Ways along many residential corridors. The wide residential corridors provide some unique opportunities for the Town to implement Green Infrastructure elements which can promote sustainability as well as provide physical interception and treatment of stormwater runoff, while also providing some aesthetic enhancement to these residential corridors when coupled with pedestrian and bicycle friendly streetscaping improvements.

Through CRA efforts and other public outreach efforts, the Town's Green Streets stormwater enhancement program can attract both investment and prospective homeowners to Lake Park, particularly millennials and first-time homeowners. The Town's Stormwater Masterplan should provide for a functional modern rehabilitation of the Town's drainage system while also supporting economic re-development in both residential and commercial areas.

Demand for additional drainage capacity will continue to grow particularly in areas with re-development potential such as those recommended by the Community Redevelopment Agency (CRA). Therefore the Town's Stormwater Masterplan needs to be both *progressive* and *proactive* in order to satisfy future development needs.

Progressive – Green Infrastructure for Climate Change Abatement

The proposed SWMP will both utilize and promote Green Infrastructure and Low Impact Development (LID) approaches in stormwater management design and drainage policy, rather than the standard end-of-pipe treatment approach which typically requires vacant land for construction of detention/retention facilities. The proposed SWMP would also adhere to innovative approaches to address climate change, including:

- Performing Vulnerability and Adaptability assessment for use in stormwater CIP planning and implementation;

- Decentralizing stormwater infrastructure to create opportunities to build resilience and redundancy into urban planning and design, helping communities better prepare for extreme weather events;
- Integrating **B**est **M**anagement **P**ractices (BMPs) in stormwater management Town-wide through new stormwater design standards, education and incentive programs for homeowners and developers who incorporate green infrastructure BMP elements into their properties and re-development plans, thereby allowing communities to simultaneously manage stormwater for both everyday and extreme rainfall events. Example BMPs include green roofing, rainwater harvesting, infiltration systems in combination with traditional conveyance and end of pipe infrastructure. Rain water harvesting can be done on almost any scale, even up to providing low cost rain barrels to capture downspout runoff for residential and commercial property owners.
- Emphasizing structural improvements such as stormwater treatment practices, non-structural practices such as enhanced tree canopy, impervious cover disconnection, a zoning overlay district/ordinance impacting new development or a combination of both structural and non-structural practices (hybrid techniques).

Low Impact Development (LID) is a planning and design approach that aims to mimic naturalized water balances. It combines infiltration, evaporation and transpiration while limiting runoff.

Transpiration is the biological process in which plants pull moisture out of the soil by their roots and release water vapor to the atmosphere through small openings in their leaves. Everyday plants release quantities of water vapor. Growing plants can transpire up to 10 times as much water as they hold in their stems and leaves.

Green roofs are vegetated roof systems that combine plants, engineered growing media, drainage layers and traditional waterproof roof membranes . They appear as rooftop gardens but in essence function to capture stormwater runoff that would otherwise be discharged through roof gutter letdowns.

Bioretention and rain gardens are other vegetated systems at the ground level that allow stormwater to soak directly into the soil media. These systems restore evapo-transpiration and treat (clean) stormwater by filtering it as it flows through the engineered soil media.

Pervious pavements allow stormwater runoff to infiltrate directly through the pavement layer into the underlying soils thus reducing the volume of stormwater runoff captured and conveyed through the drainage system. Permeable pavements can be used for low traffic roadways and driveways, parking lots and pedestrian walkways. Some of the most commercially successful systems include permeable interlocking pavers, grass pavers, pervious concrete, porous asphalt and recycled materials.

The goal of LID is to reduce the frequency with which the City's stormwater system releases runoff into the downstream end of pipe conveyance system.

Traditional end of pipe systems use centralized infrastructure such as the system of swales and pipes in the Town of Lake Park, to provide drainage, flood control and pollution management at the end of a sewer line (pond, canal, Intracoastal Waterway). The traditional swale, culvert, pipe conveyance and end of pipe infrastructure systems are being re-imagined to create a complete treatment train; stormwater is managed and treated at all points along its path through the urban environment, rather

than only at the end of line. These treatment trains systems can include exfiltration trenches, micro-bioretention and rain gardens. Infiltration chambers use pipes and/or cells to hold back stormwater and remove nutrients. The treatment train concept is to mimic the way nature handles rainwater in the natural water cycle; it does not mean replacing paved roads with a park, but rather incorporating green infrastructure BMPs into the design of the roadway so that runoff from the paved areas can be intercepted and treated as opposed to typical capture and conveyance through a storm drain system of inlets and pipes.
Incorporating green infrastructure BMPs can carry numerous ancillary benefits from improving surrounding property values, to reducing the "heat island" effect in urban areas. The use of natural systems can often be less costly than utilizing structural approaches to stormwater management.

Some cities and towns provide incentives (tax reductions, credits) to install rain barrels on private property. The proposed SMWP goal for Climate Change abatement could be to provide green infrastructure for 10% of the impervious surface area over the next 20 years, capable of capturing one inch of rain during storms. Such a goal would not only reduce the total volume of runoff to be conveyed and treated at a lower cost but also could offset the projected increase of rainfall intensity caused by climate change in extreme storm events. Such a potential reduction in total runoff volume is significant if you consider that the stormwater runoff volume produced by a 3 Year/One hour storm event today may in 20 years be more equivalent to the current runoff volume produced by a 5 Year/One hour storm event.

Proactive – Early Stakeholder participation
Stakeholder support is critical to the success of the SWMP and to ensure that the SWMP recommendations are implemented in a timely fashion. Therefore, the development of the SWMP must involve Town stakeholders from the outset.

The Master Plan Outreach and Communication Element needs to be developed as the strategic and operational guidance document for the Town of Lake Park Stormwater Management Program. Developed through a collaborative, stakeholder-inclusive process, the Master Plan will build upon the program mission and stakeholder-defined goals to articulate strategic objectives. The objectives translate into manageable and measurable stormwater initiatives, services, activities, and projects. Stormwater utility resources are aligned, prioritized, budgeted, and utilized to implement program goals and objectives.

The stakeholders are involved in the SWMP process through two committees. The ***Stormwater Technical Advisory Committee (TAC)*** and ***Stormwater Policy Committee (SWPC)*** are created to involve the public, local officials and other stakeholders in the SWMP project. Meetings are held throughout the course of the project to keep the committees informed of the project status and to obtain feedback from the stakeholders.

The objective of the TAC is to routinely review and discuss important technical issues and advise the SWPC accordingly. TAC meetings are conducted through the duration of the project.

The objective of the SWPC is to review policy direction for the Stormwater Management Program and to support proposed SWMP implementation funding needs .

The SWMP must have broad public acceptance and support to be successful. Therefore, the project effort must include an aggressive Public Outreach and Education campaign structured to engage citizens and elected officials in the SWMP process. This includes educating elected officials and decisions makers to the importance of managing stormwater quality and its relationship to tangible measures such as the improvement of quality of life, promoting economic development and attracting prospective business owners, homeowners and tourism.

The public outreach and education program will include public meetings/workshops and interaction with the SWMP webpage on the City's website and an online flood complaint input form. The public outreach education program will provide important feedback throughout the SWMP process, as well as keeping the community involved and aware of the SWMP progress.

Proactive – Asset Management-based Stormwater System Planning
Development of the Stormwater Masterplan includes:

- Collection of available data including existing As-Built surveys of stormwater infrastructure;
- Reviewing existing drainage infrastructure inventories;
- Reviewing existing O&M maintenance records;
- Furthering development of GIS and unique asset identification systems;
- Introducing Lifecycle Asset Management Principles to stormwater O&M practices;
- Hydrologic and hydraulic modeling and analysis;
- Initiate the development of a condition assessment and rehabilitation program;
- Provide a framework for stormwater CIP project planning and development;
- and projecting Capital and O&M financial projections for ongoing and future CIP stormwater efforts.

The goal of stormwater master planning is to provide the Town with long-range stormwater management system planning which takes into account proposed or future conditions within entire drainage basins. The preferred methodology for long term proactive planning of stormwater asset rehabilitation is the application of Asset Management systems and principles.

The intent of proactive asset management is to ensure the long -term sustainability of the stormwater utility by helping a utility manager make informed decisions about when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy.

The assets that make up the drainage system infrastructure lose value over time as the system elements age through their expected service life and the materials begin to deteriorate. Proactive maintenance delivered through asset management systems can prolong the expected service life. As more system elements deteriorate, it may become difficult to deliver the desired drainage level of service (LOS) that the Town's customers want and expect. The costs related to the operation and maintenance of the drainage system will increase as stormwater assets age. By developing a stormwater asset management program, the Town can begin to proactively manage the system and provide Town managers and elected officials the financial data needed to properly plan and allocate short and long term funding for the utility's O&M and Capital costs.

There are five core components of asset management.

- Asset Inventory;
- Level of Service;
- Critical Assets;
- Life Cycle Costing;
- Long-term Funding Strategy.

Taking an Asset Inventory. The first core component of asset management is the asset inventory. This component is probably the most straightforward. It is also, arguably, the most important as it underlies all other aspects of asset management. The questions to be answered are:

- What stormwater assets are owned by the Town of Lake Park ?
- Where are they?
- What condition are they in?
- What is their remaining useful life?

Prioritizing Your Assets. The Town's stormwater utility program has a limited budget. Prioritizing the Town's assets will ensure that limited funds for rehabilitation or replacement of the most important or otherwise "critical" assets are properly applied. Critical stormwater assets are those with a high consequence of failure.

Developing an Asset Management Plan. Financial Planning for the rehabilitation and replacement of the Town's stormwater assets. This includes developing O&M and Capital budgets and calculating required reserves. This component may also include identifying alternative funding sources (grants).

Implementing the Asset Management Plan. Once the Town has determined the funding required to be set aside each year and how much additional funding will be needed moving forward, the utility administrators will need to work with the Town management , regulators and customers to implement asset management systems and strategies.

Although is not the intent of this project to develop a comprehensive Asset Management program, the proposed SWMP will be developed using core fundamental asset management principles which will provide a framework that can be built upon and enhanced as the Town begins to modernize the management of stormwater infrastructure.

Proposed Stormwater Masterplan (SWMP)
Based on data and research of the Town's physical, social, environmental, technical and financial drivers, WRMA has prepared a scope of work proposal for the development of a new Stormwater Masterplan.

The Town of Lake Park Stormwater Master Plan will be developed based on five (5) core objectives:

1) **Project Management**
   Quality Assurance and Quality Control

2) **Outreach & Communication**
   Stakeholders (POA's, Elected officials, Residents), Regulatory Permitting, Development of Educational Outreach Initiatives and Campaigns

3) **Water Resources Engineering Science: H&H Modeling, Stormwater Management, Drainage LOS and Flood control**
   LiDAR data processing, groundwater, surface water & water quality Hydrologic & Hydraulic modeling, drainage/flood level of service (LOS)
4) **Sustainability & Resiliency**
   Climate change: Nuisance flooding, flooding LOS, coastal, surge, Sea Level Rise
   Stormwater Innovations: Green infrastructure initiatives, Low Impact Development (LID)

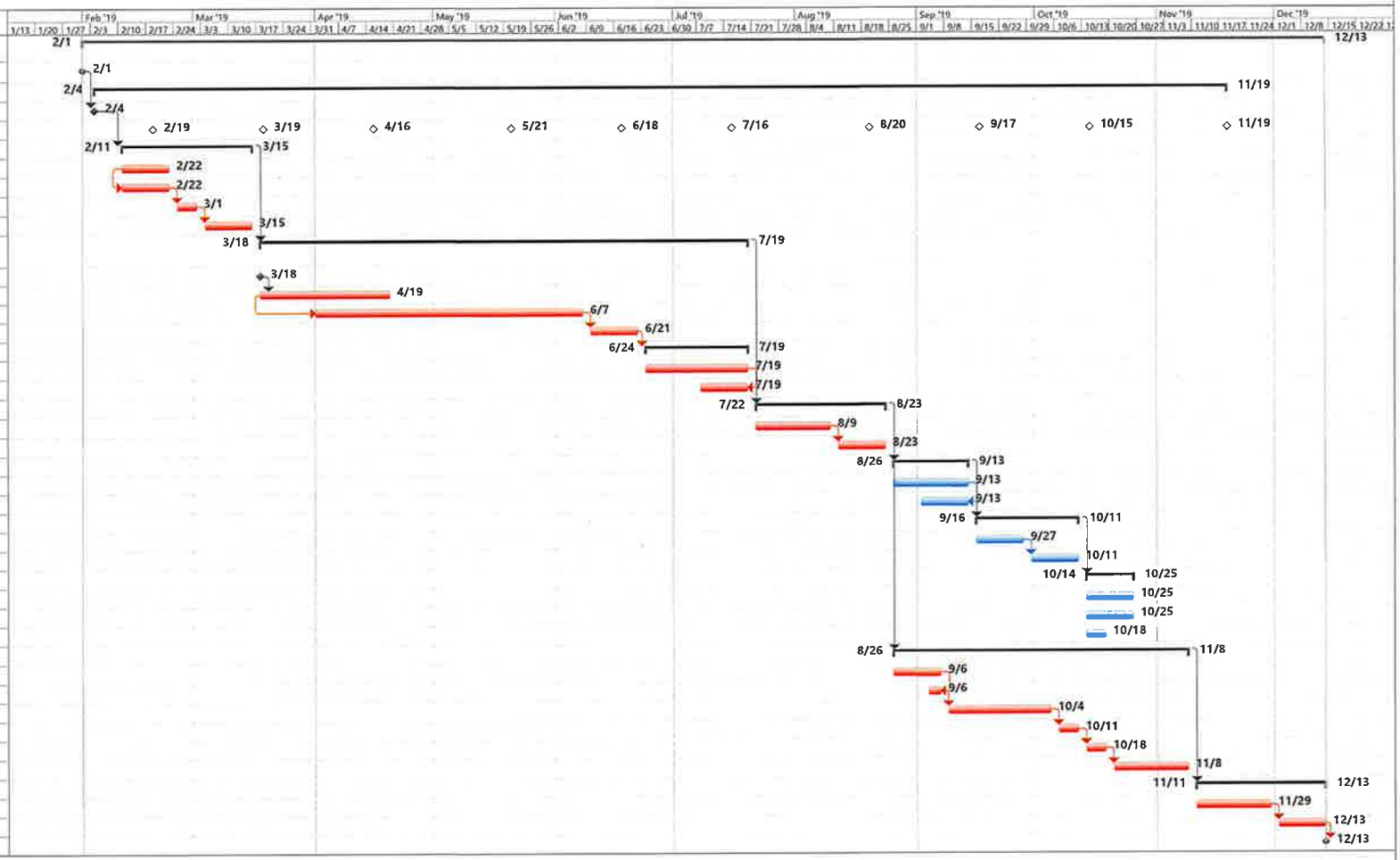
5) **Asset Management**
   GIS based asset inventory development, Initiation and Development of an Asset Condition Assessment Program and a development of a Sewer Rehabilitation, Repair & Replacement Program (SR^3 Program), Capital Planning & Budget formulation

Project Delivery
WRMA will perform all activities proposed in the attached Scope of Services and Project Schedule.

Pilot Project
Following the completion of the Stormwater Master Plan, WRMA recommends that the Town undertakes the implementation of a pilot project to showcase the SWMP green infrastructure approach to Stormwater Management.

TOWN OF LAKE PARK
STORMWATER MASTER PLAN

ID	Task Name
0	**Town of Lake Park SWMP**
1	**Notice To Proceed (NTP)**
2	**Meetings, Outreach & Communication**
3	Kickoff Meeting
4	Monthly Progress Meetings
15	**3.0 Data Gathering**
16	3.1 Data Collection
17	3.2 Data Cataloguing
18	3.3 LiDAR Data Processing
19	3.4 GIS Basemap Development
20	**4.0. Engineering Modeling Science**
21	4.1 Model Selection
22	4.2 Model Development Hydrology
23	4.3 Model Development Hydraulics
24	4.4 Model calibration
25	4.5 Water Quality Assesst.
26	4.5.1 NPDES/MS4 Review
27	4.5.2 Compliance Review
28	**5.0 Climate Change & SLR**
29	5.1 Vulnerability Analysis
30	5.2 Adaptation Analysis
31	**6.0 O&M Program Review**
32	6.1 O&M Stormwater Insp. Program Review
33	6.2 O&M Stormwater Rehab.Practice Review
34	**7.0 CRS Program Review**
35	7.1 Current Program Activities
36	7.2 Additional Activities Support
37	**8.0 Stormwater Utility & Funding**
38	8.1 Stormwater Utility Program Review
39	8.2 Stormwater Utility Fee Structure Review
40	8.3 Alternative Funding Analysis
41	**9.0 Alternative Design Analysis**
42	9.1 H&H LOS Analysis
43	9.2 FEMA Floodplain Review
44	9.3 Development of Alternatives
45	9.4 Evaluation of Alternatives
46	9.5 Conceptual Regulatory Permiting
47	9.6 Prioritization & Recommendations
48	**10. SWMP Techical Report**
49	10.1 Draft SWMP Report
50	10.2 Final SWMP Report Preparation
51	Final SWMP Report Submittal



WRMA
WATER RESOURCES MANAGEMENT ASSOCIATES

Project: Town of Lake Park SWMP
EOR: Raul Mercado, PE
Date: Thu 12/27/18

Task — Milestone/Meeting ◆ — Project Summary — Inactive Task — Critical

PROPOSED SCOPE OF SERVICES
FOR TOWN OF LAKE PARK
STORMWATER MASTERPLAN

TASK 1.0 PROJECT MANAGEMENT

WRMA Project Management Approach

WRMA's assigned Project Manager will be *Raul Mercado, PE, CFM*. He will be responsible for:

- Management of the terms and conditions of the contract (or each Task Order/Service Authorization as assigned);
- Providing project technical support as required;
- WRMA Team staff selection for work assignments;
- Providing direction for development work assignment scope of services and fee proposals ;
- Maintaining consistent quality performance;
- Troubleshooting problems that may arise;
- Providing miscellaneous consulting services not part of regular work assignments;
- Maintaining effective communications between Town and WRMA Team staff;

Michael Mercado, PE, Assistant Project Manager, will assist the project manager in the day to day execution of the contract assigned Tasks. The WRMA Assistant Project Manager will be available to discuss all aspects of project status in the event the Project Manager is unavailable.

1.1 Meetings

WRMA has included an estimate of man hours required for miscellaneous meetings which we be required over the course of this task order for project status updates or face to face meetings at the request of the Town. The methods of progress updates will be chosen based on the Town's requirements. This may include, for example, periodic meetings and phone calls to the Town's project manager for notification of the project's progress.

1.2 Billing

WRMA will invoice the Town for direct labor hours and expenses for services provided to the Town per the Town of Lake Park's invoicing procedure. Direct labor hours for administrative documentation and preparation of invoices has been accounted for in this Scope of Services.

1.3 Bi-Weekly Updates

The WRMA team shall prepare bi-weekly or monthly written progress reports to provide documented status of the project. WRMA utilizes Microsoft Project software to create timelines and schedules for individual projects. WRMA will track project progress and provide updated schedules at the request of the Town.

1.4 Quality Assurance and Quality Control

WRMA shall perform QA/QC review of all project deliverables. The QA/QC plan provides for:

- *Clear assignments of responsibilities to all WRMA project team members* to ensure the right people will be available at the right time to review and comment on the project design and plans production;
- *Project reviews* to ensure that WRMA will address all of the critical issues on the project in accordance with the Town's expectations and to ensure the project design meets current standards, is appropriate for the project scope, and is cost effective for construction;
- *QC document tracking procedures* to allow for monitoring, review, and improvement of the quality control process;
- *Time Management* for maintaining the project schedule and keeping the Town well informed on the project progress;

TASK 2.0 OUTREACH AND COMMUNICATIONS

2.1 Development of an Outreach Plan

Outreach is an essential task, and effective communication will be absolutely necessary to the success of this project. The purpose of the Outreach & Communications Task is to identify and engage the project's stakeholders, and to provide a foundation and establish expectations for all project communications. WRMA will establish a detailed outreach plan identifying stakeholders, agencies and methods for communicating with the public concerning development of the Town's stormwater masterplan. Communication techniques may include development of marketing materials and social media campaigns, web pages on the Town's web domain discussing the elements and outreach events planned as part the SWMP development, including meeting dates for technical committees as well as educational materials.

2.2 Meetings with Elected Officials

WRMA will conduct a one-on-one meetings with each Commissioner. Each Commissioner will be given the opportunity of appointing citizens to the Stormwater Technical Committees. WRMA will prepare presentations to inform selected officials at project progress milestones or to address areas of immediate flooding concern. WRMA will perform one-on-one meetings with each Commissioner to review pending Alternatives Analysis Capital Improvement Plan (CIP) project development in his or her district per approved communication protocol. WRMA will attend full Commission meetings to further explain how alternatives were screened and ultimately selected as recommendations.

2.3 Meetings with Regulatory Agencies

WRMA will conduct meetings with regulatory agencies as required. Regulatory agencies which may be involved in the development of the SWMP may include:

- South Florida Water Management District (SFWMD)
- The Federal Emergency Management Agency (FEMA) (and their consultants)
- The Florida Department of Environmental Protection (FDEP)
- Palm Beach County
- Participating Palm Beach County National Pollutant Discharge and Elimination Systems
- (NPDES) Consortium and consultants (Northern Palm Beach County Improvement District)
- Neighboring Municipalities

2.4 Meetings with Stakeholders

Stakeholder support is critical to the success of the SWMP and to ensure that the SWMP recommendations are implemented in a timely fashion. WRMA will identify all key stakeholders at all levels that will impact the outcome of the project and maintain their engagement throughout the life of the project. Stakeholders will be consulted, asked to provide input, obtain their "buy in" and continued support towards project completion and implementation of the SWMP.

Example Stakeholders

Town Elected Officials
Town Employees
The General Public/Citizen Committees
The Town's business owners
Homeowners Associations
Property Owners Associations

Advisory Committees

Two project advisory committees will be created (if not already in effect). The *Stormwater Technical Advisory Committee (STAC)* and the Stormwater *Policy Committee (SPC)* will met periodically to review findings and refine recommendations that will address long-term solutions, taking into account other priorities of the Town.

FEMA Related Activities

WRMA will address, if necessary, floodplain management and mapping issues related to the deployment of FEMA's updated DFIRM maps in 2017 by Palm Beach County. WRMA will assist with Activity 510—Floodplain Management Planning as discussed in the Coordinator's Manual: National Flood Insurance Program Community Rating System (2013) and the requirements of a program for Public Information as noted in the Coordinator's Manual: National Flood Insurance Program Community Rating System .

2.5 Development of Educational Materials & Events

WRMA will develop educational materials discussing important project developments concerning the SWMP development. Education materials may include promotional pamphlets and other informational brochures concerning the project development as well as advertisements for advisory committee meeting dates and other Town Events.

Task 2 Deliverables:

- Outreach Plan Outline

TASK 3.0 DATA COLLECTION AND MANAGEMENT

3.1 Data Collection

WRMA will review the adequacy of previously collected data to prepare the SWMP H&H tasks and make recommendations, if necessary, for additional data acquisition.

3.2 Data Cataloguing

WRMA will apply Asset Management (AM) principles for inventory and cataloguing of the stormwater management/ drainage system linear and control structures assets (I.e. all assets will have an ID).

3.3 LiDAR Data Management

WRMA will obtain and process (if necessary) the recently acquired and Palm Beach County-distributed Light Detection and Ranging (LiDAR) datasets for the development of a project base map inclusive of linear assets and control structures .

H&H Model Parameterization

WRMA will identify data input parameters for the development of the Hydrologic and Hydraulic Model to be prepared as part of Task 4. Parameters may include the following:

- Watershed Boundaries Including Canals, Lakes, etc.
- Drainage Basin Delineation
- FEMA Flood Profiles and Floodplain Maps
- Identify areas of known flooding.
- Identify characteristics of land cover.
- Identify stormwater sewer networks and point source discharges.
- Identify potential inflow/ infiltration points.

3.4 GIS/CAD Basemap Development

WRMA will develop a basemap to be incorporated into the hydrologic and hydraulic model. The information to be included in the basemap may include:

- Location (digitized in a format compatible with the Town's GIS)
- Type of Structure, Material, Function
- Dimensions as Needed for Modeling
- Invert Elevations as Needed for Modeling
- General Condition Information
- Other Data as may be Appropriate and Available

Task 3 Deliverables:

- Data Collection and Management Technical Report

TASK 4.0 WATER RESOURCES ENGINEERING MODELING SCIENCE

4.1 Software & Model Selection

WRMA, in consultation with the Town's Project Manager, will perform selection of software and H&H models for the Town's SWMP. WRMA will prepare a model selection matrix for the major categories of models to be provided including stormwater models, pollutant-loading models, sea-level-rise models, and hydroperiod/water budget models.

4.2 Model Development Hydrology

WRMA will develop hydrologic parameters for stormwater modeling including design storm rainfall volumes, sub-basin stage-storage, starting water levels, directly connected impervious area (DCIA) and non-directly connected impervious area (NDCIA), rainfall-runoff response), applying automated GIS methodology. WRMA will select a methodology for modeling infiltration, percolation, evapo-transpiration.

4.3 Model Development Hydraulics

WRMA will select hydraulic parameters for cross-sections for swales and channels from survey and LiDAR. WRMA code relevant hydraulic parameters for existing structures. WRMA will develop a preliminary H&H model and provide the modeling results for review to the Town Project Manager with an analysis of the results.

4.4 Model Calibration

WRMA will assess model performance through calibration analysis.

4.5 Water Quality Assessment

4.5.1 NPDES/MS4 Review

WRMA will review the Town's MS4 NPDES permit, which establishes the Town's baseline approach to water quality. The review will inlcude:

- Review of pollutant-loading model for the Palm Beach County-wide effort;
- Review of available water quality data at a basin level (major waterbodies and based on FDEP WBIDs (Final TMDLs, Draft TMDLs, and BMAPs –listing data);
- If applicable, review 303(d), verified impaired, and planning lists for the Town's, final TMDLs, Draft TMDLs, and BMAPs –listing data;
- Identify areas adversely impacted by erosion, sedimentation, and siltation on a watershed basis.

4.5.2 Compliance Review

WRMA will perform a compliance review of the Town's stormwater management monitoring data. The review will include:

- Review monitoring data from current monitoring stations within the Town's basins;
- Pollutant Loading Estimates and Trend Analyses (Pollutant loading model selected to estimate TN, TP, BOD, and TSS loads from the Town's basins);
- Assess opportunities for the Town's Lake Worth Lagoon Initiatives (Funding source).

Task 4 Deliverables:

- Hydrologic and Hydraulic Modeling Technical Report
- Water Quality Assessment Technical Report

TASK 5.0 CLIMATE CHANGE AND SEA LEVEL RISE ASSESSMENT

5.1 Sea Level Rise Vulnerability Analysis

WRMA will perform a vulnerability analysis to assess the impacts of climate change and sea level rise. The findings will be considered throughout the development of the SWMP. WRMA will identify vulnerable areas. WRMA will assess the effectiveness and longevity of the Towns stormwater infrastructure as it relates to sea level rise.

5.2 Sea Level Rise Adaptation Analysis

WRMA will recommend tools for infrastructure mitigation, adaptation and policy formulation to address SLR impacts. Infrastructure improvements may consider pumping solutions, costal hardening of public/private property , regulatory fixes and standard design practices for SLR mitigation.

Task 5 Deliverables:

- Sustainability Assessment Report

TASK 6.0 OPERATIONS AND MAINTENANCE (O&M) PROGRAM REVIEW

6.1 O&M Stormwater Inspection Program Review

WRMA will review the Town's Stormwater Operations and Maintenance (O&M) Program.
WRMA will review the Town's stormwater/drainage system standards details, constructions methods, and materials lists, and provide recommendations for enhanced standards. WRMA will review stormwater continuing services construction contracts and provide recommendations. WRMA will review drainage system maintenance activities to identify opportunities to maximize CRS Activity 540 credit points.

6.2 O&M Stormwater Rehabilitation Practices Review

WRMA will apply Asset Management practices to assess the adequacy of the Town's O&M activities related to stormwater management and recommend proactive O&M measures. WRMA will review the Town's repair and replacement rehabilitation program including review of the process for acquisition of stormwater system condition assessment (CCTV) data.

Task 6 Deliverables:

- O&M Program Review Technical Report

TASK 7.0 COMMUNITY RATING SYSTEM (CRS) PROGRAM REVIEW

7.1 Current Program Activities

WRMA will perform a review of the Town's CRS Program with regard to new guidelines/scoring and recent requirements, including the Town's 2017 DFIRM Floodplain Management Plan Update. WRMA will review the Town's CRS program and provide technical support and expert guidance to maximize the Town's CRS classification and to effectively leverage SWMP activities for CRS points with the goal of achieving a lower rating (currently at 8). If possible WRMA will assist with CRS audit/verification visit to enhance the Towns' CRS classification. WRMA will identify key opportunities for CRS points. WRMA will

leverage the Town's SWMP development tasks for key opportunities to earn CRS points. WRMA will assist with coordination of HMGP project submittals with the Local Mitigation Strategy Group.

7.2 CRS Additional Activities Support
WRMA will assist the Town's CRS administrator with public outreach and infrastructure recommendations. WRMA will assist with Repetitive Loss Area Analysis (RLAA) analysis (if applicable). WRMA will Identify key opportunities to increase the Town's use of green infrastructure and sustainable stormwater BMPs/low-impact development (LID). WRMA will evaluate and identify appropriate state-of-the-art BMPs including rain gardens, permeable pavements, infiltration strips, bio-swales, etc. for inclusion in the Land Development Code. The BMPs will address runoff, flooding, and water quality issues.

Task 7 Deliverables:

- CRS Program Review Technical Report

TASK 8.0 STORWATER UTILITY ADMINISTRATION AND FUNDING SOURCES

8.1 Stormwater Utility Program Review
WRMA will review the structure of the current stormwater utility program including the number of users, the mechanism the assess the fee and the funding sources.

8.2 Stormwater Utility Fee Structure Review
WRMA will review the Town's Stormwater Utility, including the fee. Recommendations will be made for adjusting the fee Equivalent Stormwater Unit (ESU) calculation parameters and rate structure.

8.3 Alternative Funding Analysis
WRMA will assist the Town's stormwater program with identifying of alternative funding opportunities (grants, bonding, etc.).

Task 8 Deliverables:

- Stormwater Utility Review Technical Report

TASK 9.0 ALTERNATIVES ANALYSIS

9.1 Level of Service (LOS) H&H Modeling Analysis
WRMA will perform drainage level of service (LOS) analysis to assess the potential for flooding throughout the Town. Flooding will be assessed at the local level (Nuisance Flooding), at the basin level (Flooding LOS), and as a function of climate change (Coastal /Sea Level Rise, and increasing storm event intensities (flooding frequency and duration).

The following design (frequency/duration, yr/hr) storm events standards will be applied:

- LOS Design storm events: 3yr/24hr
- Road centerlines: 10 yr/24hr

- New Development: 25yr/3day (consistent with SFWMD technical guidelines)
- FFE: 100 yr/3day
- SLR projections, increasing storm event intensity

The flooding LOS will be calculated at the at the sub-basin scale when applicable. The LOS will be developed based on the results of the stormwater model and how those results translate to flood risk. Both roadway and structural flooding LOS will be established and analyzed.

9.2 FEMA Floodplain Review

Updated FEMA DFIRMS maps for the Town became effective on October 5, 2017 through the Palm Beach County map Revision process. WRMA will compare FEMA DFIRM 100-year Base Flood Elevation (BSE) elevations with WRMA calculated 100-year/3day storm event elevations.

If necessary, WRMA will provide data for any potential FEMA/DFIRM panel replacement. DFIRM revisions are typically determined by FEMA depending on the County-wide DFIRM process (FEMA's LOMR's or Physical Map Revision (PMR).

9.3 Development of Alternatives

WRMA will perform analysis of proposed rehabilitation alternatives based on a detail study of current and forecasted drainage LOS deficiencies. WRMA will study areas where known drainage infrastructure is lacking. WRMA will Identify problem areas within SFHA's.

9.4 Evaluation of Alternatives

WRMA will identify priority areas (flooding or water quality problems exist). WRMA will identify areas where intense growth is likely, land uses will be changed in future (Such as in the Vision, CRA planning area). WRMA will identify areas of non-priority (few problems currently exist, low to moderate growth is expected and land use changes are not likely). WRMA will identify areas and projects that can perform as stormwater management facilities.

WRMA will work with Town staff to create a matrix and methodology for the analysis of projects alternatives. WRMA will review (with regional regulators) current stormwater maintenance protocols for controlling elevations in the C-17 canal to reduce risk before storm events.

WRMA will formulate potential stormwater /drainage system rehabilitation strategies and evaluate their effectiveness in alleviating flooding and water quality problems. WRMA will calculate the expected damages avoided (Benefits) due to flooding for each alternative and compare the reduction in damages to the total cost of implementation to develop a FEMA-based cost/benefit ratio analysis. WRMA will formulate the Alternatives Analysis as an outline, and present the results to staff and elected officials at one-on-one meetings, workshops, and/or regular meetings.

9.5 Conceptual Regulatory Permitting with SFWMD

WRMA will meet and discuss pertinent permitting issues with SFWMD regulatory staff to allow for conceptual permitting of projects that result from the SWMP.

9.6 Alternative Design Prioritization & Recommendations

Flood damage will be estimated and a priority ranking system will be developed for problem areas based on the RLAA, LOS analysis, potential for harm to human, life, possible degradation of the environment, and magnitude of anticipated annual damages.

Traditional CIP prioritization of retrofit rehabilitation alternatives using the standard Benefit/Cost analysis is not sufficient as it does not take into account the condition of the pipe obtained in the current CCTV of the system. WRMA will apply Asset Management concepts of condition vs. criticality to prioritize proposed improvements. A C vs. C matrix will be developed that will incorporate (if available) the condition assessment results in addition to the financial B/C results and other social, environmental factors

- Revise the stormwater CIP with identified projects;
- Facilitate the prioritization of alternatives and development of recommendations;
- Identify capital improvement needs based on a 20-year time frame and recommend projects based on 5-year increments;
- Prepare cost estimates for engineering, construction, contingency, O&M costs, time phasing requirements;
- Cost/benefit ratio, and priority ranking will be included. A comprehensive view of design and O&M cycles will be considered.

The Town's existing funding and programming will be reviewed in concert with potential projects and a reasonable funding program will be considered as recommendations are developed. This will include:

- Consideration for potential rate increases;
- Presentation of final recommendations to Town staff;
- Assisting staff with the roll-out of projects to elected officials.

Task 9 Deliverables:

- LOS Modeling Technical Report
- FEMA Floodplain Review Technical Report
- Alternatives Analysis Technical Report

TASK 10.0 STORMWATER MASTER PLAN REPORT

10.1 Draft SWMP Report

WRMA will prepare a draft report of the SWMP. The SWMP document will include an executive summary, a summary list of recommendations, and a recommended action plan for implementation. WRMA will provide an action plan with list of responsible parties, estimated budgets, and schedule for completion.

The Draft SWMP report will culminate with a presentation of the preliminary rehabilitation design alternatives to the Town management and officials for public discussion and funding. A series of Master Plan workshops will be scheduled with stormwater staff and the advisory stormwater committees to help further define the objectives and measures for the Town's Stormwater Management Master Plan.

Stakeholder consensus must be achieved and funding identified prior to finalizing a long term (20 year) plan of SWMP recommendations.

Upon acceptance of a final Draft Report, WRMA finalize the remaining sections of the Final SWMP technical report. WRMA will provide both hardcopy and electronic copies of the full Draft SWMP report to the Town for comments. WRMA will address and review each set of comments

Deliverables:

- Draft SWMP Report and Supporting Documentation;
- Draft H&H Model Data;

10.2 Final SWMP Report

WRMA will finalize the SWMP and provide three hard copies and an electronic copy of the finalized SWMP report. WRMA will provide all model data and electronic data utilized in the production of the H&H model to the Town's Project Manager. The stormwater master plan update will be completed no later than 12 months from issuance of a notice to proceed.

Deliverables:

- Final SWMP Report and supporting Documentation;
- Final H&H Model Data;

PRICE PROPOSAL

Please see attached cost estimate for a breakdown of the direct labor hours and expenses related to the proposed Scope of Services.

Total Cost of Proposed Scope of Services: $ 119,570.00