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STORMWATER MANAGEMENT ELEMENT

Description of the City of North Port Multi-Purpose Stormwater System

The City of North Port is located in southeast Sarasota County in the southern portion of the Big Slough Watershed, which covers approximately 195 square miles, in southwest Florida. The headwaters of the Big Slough Watershed initiate in the Mosaic (a phosphate mining company) land holdings in Desoto County. Flows from the watershed are mostly conveyed by the Big Slough Canal which extends in a southwesterly direction from Desoto County through unincorporated portions of Manatee and Sarasota Counties before traversing through the City of North Port. The portion of the Big Slough Canal that traverses through the City is also known as the Myakkahatchee Creek. The Myakkahatchee Creek discharges to the lower Myakka River just above the Myakka River's mouth at Charlotte Harbor which then connects to the Gulf of Mexico. The current land use within the watershed north of the City boundary is predominantly agricultural with some mining activities scattered therein.

Within the City of North Port boundaries, there are 84 miles of manmade canals constructed by General Development Corporation (GDC) in the 1970's. These canals form a grid pattern and are interconnected with each other and with the Myakkahatchee Creek. The R-36 Canal runs parallel to and along the City's northern border with Sarasota County and is the primary east-west canal north of the I-75 corridor. This R-36 Canal also continues along the western border of the City and conveys flow in a north-south direction. There are two main east-west oriented canals located south of the I-75 corridor; the Snover Canal (to the north) and the Cocoplum Canal (located to the south). These two canals are interconnected with multiple canals that run in a north-south direction. The western ends of both the Snover Canal and the Cocoplum Canal discharge to the Myakkahatchee Creek at separate locations along the creek. Water levels within the Cocoplum Canal can stage up and flow either westward into the Myakkahatchee Creek or southward to neighboring Charlotte County via multiple water control structures. These structures discharge to canals within Charlotte County that outfall to the Charlotte Harbor estuary system and ultimately to the Gulf of Mexico.

The City's canal system is designed to accommodate several needs: water quality treatment, stormwater conveyance and attenuation; and a source for potable water supply. Within the Myakkahatchee Creek/ canal grid system, GDC installed sixty-nine (69) water control structures of which thirty-three (33) are gated structures. The control elevations of these structures are designed so that water is retained in the canals in a step-down-elevation-system configuration; meaning the water levels in the canal segments between structures progressively decrease in elevation from north to south and from east to west. This system configuration allows both retention of stormwater runoff for water quality treatment and storage for potable water use.

The City's water treatment plant is located at the point of convergence of the Cocoplum Canal with the Myakkahatchee Creek (southwest end of the drainage system). In 2006, the City was issued a consumptive water use permit (WUP) to withdraw water from either the Myakkahatchee Creek or the Cocoplum Canal. Through manual opening of gates water can be slowly released

from the canal grid system to supplement flow in the Myakkahatchee Creek, or as an alternative, the permit authorizes the water treatment plant to directly draw from the Cocoplum Canal.

Background and History of North Port Flooding

The City has experienced severe flooding from unnamed storms, tropical depressions and hurricanes occurring in: March 1987; Sept 1988; June 1992, 1995, and 2003; and August 2004. Given the City of North Port is located in the lower elevations and bottom end of the Big Slough/Myakkahatchee Creek watershed, the City's current flooding and water quality conditions are not solely caused by City's development and growth but are additionally caused by the accumulated upstream runoff from Sarasota, Manatee and Desoto County portions of the watershed. Most repetitive severe flooding to date has been experienced in the North Port Estates area (north of the I-75 corridor) and areas immediately adjacent to Myakkahatchee Creek. Construction of the I-75 corridor in 1977 further exacerbated flooding within the Estates by causing restrictions to natural flows including a damming effect caused by the raised elevation of the highway and the limited number of floodways provided beneath the highway. Modifications made (concurrent with the highway construction) to the natural crossing at Myakkahatchee Creek have been questioned by the Estates community in the past in regards to the I-75 bridge crossing's capacity to safely pass upstream historical flows beneath the highway. This question can be better analyzed and satisfactorily addressed by the Big Slough Watershed Study.

Big Slough Watershed Study

Currently, a Big Slough Watershed Study is being conducted by Ardaman and Associates under a cooperative funding agreement with the Southwest Florida Water Management District (SWFWMD) and the City of North Port. The study which began in 2003 is expected to be completed in late 2008 to mid 2009. Included in the scope of the study is a detailed watershed computer model created to simulate the hydraulic conditions of the Big Slough Watershed. The model has been calibrated to simulate historic storm conditions and can be used as a tool to predict the level of flooding within the City under various storm events. Draft 100-year floodplain maps have been prepared and after SWFWMD staff completes the QA/QC review of the model, the process will begin to formally adopt the maps. This adoption process includes meetings for public comment on the new flood maps with the expressed purpose to identify any additional areas of impacts, errors or concern. The State adopted flood maps will ultimately be submitted to FEMA for flood map amendment. Until such time as SWFWMD and FEMA approve the updated maps, the existing 1981 Flood Insurance Rate Maps (FIRM's) shall continue to apply.

In addition to flood mapping, work is progressing using the Big Slough Watershed computer model to evaluate best management practices (BMPs) to develop a collection of potential stormwater improvement project alternatives all engineered to eliminate/reduce flooding or improve water quality within the City. Viable BMP stormwater improvement projects will be selected and refined to include planning level cost estimates for each project. Input from regulatory agencies such as SWFWMD, US Army Corporation of Engineers (ACOE), and

Florida Fish and Wildlife Conservation Commission (FFWCC) will be solicited early in this process to determine if the proposed projects are considered permissible.

The larger stormwater improvement projects are expected to be costly and likely to take five (5) to ten (10) years or more to fund, design, permit, construct and place in operation. Implementation of these projects may require cooperation with Charlotte, Desoto, Manatee and Sarasota Counties, Federal, State and local agencies in regards to acquisition of large tracts of land, funding, public workshops, rigorous review and permitting.

Stormwater Improvement Program to Relieve Flooding

The BMP stormwater projects resulting from the Big Slough Watershed Study will provide locally needed and regionally beneficial improvements including lowering of flood stages and enhanced water quality within: upstream flows from the Big Slough Watershed; Myakkahatchee Creek; the City's canal system; downstream Charlotte County; the Myakka River; Charlotte Harbor; and the Gulf of Mexico.

The following are drainage improvement projects or combinations of drainage projects that may be proposed from the Big Slough Watershed BMP analysis:

1. *Acquisition of Properties for Development of Regional Stormwater Detention and Water Quality Treatment Systems.*

These surface water type reservoir systems can serve the multiple purpose of attenuation of flood waters, water quality treatment and provision of an additional reliable potable surface water source that can serve the region. Flood waters that are diverted to the reservoir can be slowly released back to the City's drainage system after the storm has passed. Land acquisition and wetland impacts will be the main issues associated with this BMP option.

2. *Diversion of Flood Waters from the City's R-36 Canal System in a Southwesterly Direction to Deer Prairie Slough.*

Historically, a significant portion of the City's watershed drains to the Deer Prairie Slough. This flow path was altered with GDC's construction of the City's canal system. This flow diversion option will require extensive hydraulic, hydrologic and wetland analysis to assure no adverse downstream or upstream effects.

3. *Redirection of Flood Waters among the Existing Canal System.*

This alternative explores the redistribution of flow within the City's drainage system and will require extensive hydraulic analysis to assure no adverse downstream or upstream effects.

4. *Constrain Flow Entering City of North Port at Big Slough Canal.*

The objective of this BMP is to constrain the volume of water coming from offsite areas through the Big Slough canal prior to entering the City of North Port. The BMP would involve real estate acquisition, maintenance activities, dam construction and removal of existing hydraulic structures (culverts). Upstream flooding and potential of over hydration of upstream wetlands will need to be evaluated. Negotiations will also need to be conducted with upstream land owners.

5. *Construct Additional Conveyance Capacity within the City's Primary Drainage System.*

Additional conveyances can be constructed in the form of one or more of the following: (a) new bypass canal, (b) additional connectivity between existing canals, (c) widening existing waterways (d) dredging of existing waterways, and (d) upsizing of restrictive culvert pipes. These options can increase downstream flow and will require extensive hydraulic analysis to assure no adverse downstream flooding or hydrobiological effects in the receiving water body.

6. *Evaluation of Need for Water Control Structures and Addition of Telemetry Controls and Gate Automation.*

Using the Big Slough Watershed model, a recommendation will be made regarding whether all or some of the existing control structures are needed and if there are flow restrictions in the control structures that can be corrected. The number of gates per control structure will also be evaluated. Addition of telemetry controls for remote sensing of water levels, and automatic operation of key water control structures at strategic locations will be evaluated.

The following drainage improvement projects were initiated by the City in FY 2006/2007:

1. *Replacement/Rehabilitation of Water Control Structures.*

Existing water control structures are thirty (30) to forty (40) years old. Aging, functionality and structural integrity conditions vary between structures, but many are in dire need of rehabilitation. Delays in the rehabilitation schedule increase the possibility and risk for a potential massive failure of older deteriorated structures; especially during a severe storm event or any event where there is exposure to harsh environmental conditions. Water control structure failures can trigger other catastrophic mishaps such as downstream flooding and perhaps even washout of bridges. Consequently, the City retained a structural engineer to evaluate and prioritize, for rehabilitation or replacement, the twelve (12) worst water control structures. The evaluation of all twelve (12) structures was performed and completed in 2007. Three (3) of the structures were rehabilitated in 2007. The replacement/rehabilitation program will continue indefinitely and be an ongoing effort that will include a long term maintenance schedule for all water control structures within the City.

2. *Selective Dredging of Canals and Silted Areas in the Myakkahatchee Creek to Improve Conveyance.*

Dredging of the silted and heavily vegetated areas within the canal system and the Myakkahatchee Creek will restore conveyance capacity to acceptable conditions. Of the 84 miles of major manmade canals within the City, staff has identified nineteen (19) canal segments (thirty-six (36) miles in length) for further detailed evaluation and prioritization (siltation and vegetation removal.) The hierarchy priority for removal of deposits is based on the severity of the silt deposits and vegetative growth in relation to their size, location, and adverse impact on conveyance capacity. Once dredging of these segments is executed, canal side banks will be stabilized (where needed) to avoid exacerbating the siltation problem. Dredging is an ongoing maintenance effort; expensive, but important for the community to sustain.

3. *Initiated an Effort to Clear the Myakkahatchee Creek of Fallen Debris and Overhanging Vegetation.*

Fallen and overhanging debris or vegetation restricts water flows. Consequently, the Myakkahatchee Creek segment between Price Blvd and Snover Waterway was cleared in 2007. A continuance of this effort is scheduled for a targeted segment of the creek north of Snover Waterway in 2008.

4. *Improvements to the Local Roadside Swale System to Relieve Chronic Nuisance Flooding from Local Neighborhoods.*

The City has prioritized improvement projects that reduce localized street flooding. These projects include re-grading of roadside swales and installation of culvert crossings at intersections to allow stormwater to cross under the road through buried concrete pipes, instead of just sheet flowing over the asphalt. This effort will reduce flooding and road deterioration conditions. This improvement program began in 2006 and is an ongoing effort.

5. *Modification of Local Regulations to Encourage Low Impact Development (LID) Concepts.*

Low Impact Development (LID) concepts mitigate adverse effects on the public drainage system (and ultimately receiving waters) caused by the quantity and quality of stormwater runoff flowing from properties. LID principals stress and encourage conservation too. A partial list of LID concepts include: the use of pervious pavements; “green” roofs; Florida-friendly landscaping; bioswales; rain cisterns; and reuse of captured runoff within stormwater detention ponds. LID concepts are currently being touted and encouraged by staff and have been incorporated within some recent local development projects. However, the City intends to incorporate a LID requirement within the maximum extent practicable in the new Unified Land Development Code (ULDC) which is currently under review and revision.

Water Quality Improvement Program

Recall that the Myakkahatchee Creek and the interconnected canal system form one source for the City's drinking water supply. Consequently, any stormwater detention projects planned or implemented in association with this source ideally should provide the dual benefit of flood control and improvement in quality of the City's drinking supply.

In the mid-1990's, EPA delegated to the Florida Department of Environmental Protection (FDEP) the implementation of the stormwater element of the federal National Pollutant Discharge Elimination System (NPDES) program. This program places limits on stormwater pollutants discharging into the waters of the United States by issuing Municipal Separate Storm Sewer System (MS4) permits and holds local governments responsible for the quality of water that is released from the permitted drainage system. The City of North Port is a co-permittee in an MS4 permit along with Sarasota County, City of Sarasota, City of Venice, Town of Longboat Key and FDOT. MS4 permit conditions are ongoing and renewed on a five (5) year cycle. The current permit cycle expired on April 1, 2007. The recent draft MS4 permit adds a new condition that requires the City of North Port and its co-permittees to achieve Total Maximum Daily Loads (TMDLs) targeted at identified constituents which adversely impact local receiving waters. A TMDL represents the maximum amount of a given pollutant that a water body can assimilate and still meet water quality standards and its designated uses. TMDLs will require development and implementation of a Basin Management Action Plan, or BMAP, to reduce the pollutant loading.

The City is currently looking at ways to control pollutants through source reduction. Behavior modification through education is an effective means of preventing contaminants from entering waterbodies, as well as an economical alternative to structural or physical removal of contaminants that have infiltrated stormwater discharges.

In its effort to reduce nitrogen and phosphorus loading to the waterways, the City has recently adopted a Fertilizer Ordinance with an effective date of December 14, 2007. The Ordinance places restrictions on types of allowable fertilizers and application rates. At least 50% of the nitrogen content in the fertilizers needs to be in the slow release form. No turf fertilization will be allowed during the rainy season which is defined locally as occurring June 1st through September 30th. A fertilizer free zone is required adjacent to water bodies and conveyances and rotary fertilizer spreaders must have a deflector shield to avoid introduction of fertilizer granules into any waterway. Commercial and institutional fertilizer applicators must be certified by March 13, 2008 through a training program offered by the Sarasota County Extension Service. In addition to certifying commercial and institutional applicators, efforts are currently underway to educate the public on the proper use of fertilizers too. Pamphlets with the details of the importance of the ordinance are available to citizens and staff has posted this information on the City website and contacted local fertilizer suppliers and outlets.

Improperly maintained septic systems are known to leach into and contaminate the City's waterways. Consequently, the City is also looking at ways to expand the City's central sewer system and to reduce dependency on septic systems. Residents are encouraged to conduct frequent and routine inspection and maintenance of their septic systems to prevent pollution

before it happens. Current land planning mechanisms are in place to discourage the proliferation of septic systems. Local ordinances require homeowners to decommission septic systems and connect to central sewer service when it becomes available. Within designated Conservation Restriction Zones (CRZs) on-site alternative wastewater treatment systems such as Aerobic Treatment Units (ATUs) are required instead of the conventional septic systems. These ATU systems are expected to provide a greater level of treatment and reduce the adverse impacts of conventional septic systems on the environment. An example of a CRZ is the area of close proximity to the Myakkahatchee Creek.

The City has a water quality sampling program to monitor key pollutants entering and leaving City boundaries at strategic locations within the Creek and interconnected drainage system. Under a cooperative funding agreement with the Southwest Florida Water Management District (SWFWMD), this program will be expanded in early 2008 to include a more detailed study to further identify the source of pollutants within the various canal segments and to evaluate methods to improve water quality within the system.

Stormwater Improvement Funding Study

The City Commission is committed to considering and evaluating dedicated funding source alternatives for funding stormwater program elements associated with the Big Slough Watershed Study, National Pollutant Discharge Elimination System (NPDES) MS4 Permit compliance, maintenance and rehabilitation of stormwater control structures and infrastructure, water quality improvements, and flood control. In 2007, a consultant, URS Corporation, was retained to assist in the development of this long-term funding solution for the City. The work will consist of the following steps:

1. Conceptualization of a comprehensive stormwater management vision that:
 - a. Takes stock of the existing program;
 - b. Integrates community values and expectations on levels of service standards;
 - c. Incorporates current and anticipated regulatory requirements; and
 - d. Establishes the operational and financial needs of an enhanced stormwater management program consistent with community expectations.
2. Development of an integrated stormwater management program that:
 - a. Defines specific work activities that will be accomplished in future years to meet community expectations;
 - b. Establishes firm costs for these services; and
 - c. Develops a viable long-term funding plan to provide adequate revenues to fund annual operations and capital investments.
3. Implementation of the stormwater funding plan to include:
 - a. Required financial analyses;
 - b. Assistance with the development of the master account files for the customer base;
 - c. Staff training; and
 - d. Public education and related support needs.

In 2008, a series of stakeholder meetings will be held to receive input from the community and to establish priorities and align expectations for an improved stormwater management program. The funding study is scheduled to be completed and before the City Commission for final consideration in late 2008 to early 2009.

Stormwater Level of Service (LOS)

The stormwater level of service (LOS) standard is a useful tool for evaluating the performance of stormwater management systems and prioritizing major capital improvement needs according to the severity of the service level deficiency. There are two major components to stormwater LOS:

- (1) Quality of stormwater discharge;
- (2) Quantity of discharge and acceptable flooding.

Quality of Stormwater Discharge

Level of service criteria for stormwater quality should be consistent with the pollutant load reduction goals established by the State and Federal water quality regulations. Development activities (excluding currently platted single-family lots) shall not violate the water quality standards as required by SWFWMD and set forth in Chapters 62-4, 62-302, 62-520, 62-522 and 62-550, F.A.C., including any antidegradation provisions of paragraphs 62-4.242(1)(a) and (b), subsections 62-4.242(2) and (3), and Rule 62-302.300, F.A.C. The surface water management facilities shall also comply with the requirements of the future Statewide Water Quality Treatment Rule upon its adoption by the Florida Department of Protection (FDEP) and SWFWMD. In addition, the City shall also implement a stormwater quality management plan consistent with the NPDES requirements as documented in the forthcoming NPDES MS4 permit.

Quantity of Discharge and Acceptable Flooding

Existing System – The existing primary canal and ditch drainage system was designed by GDC for a 10-year frequency, 5-day duration, storm event. Over a thirty (30) to forty (40) year time period, the City’s canal system has accumulated silt deposits which have reduced the conveyance capacity in several locations. The City currently has a program to remove this siltation and to restore the canals to their original design capacity. The recommendations from the Big Slough Watershed Study (still ongoing) will address whether the existing level of service for the primary drainage system needs to be upgraded to handle a storm event larger than the 10-year frequency, 5-day duration, storm event as established by GDC. Existing LOS is also being examined by stakeholders taking part in the current Stormwater Funding Improvement Study. Will the community’s desires and expectations for stormwater LOS change with respect to existing street flooding once the associated costs for change are known? This answer (and answers to other pertinent questions) must be determined first. These answers are expected in 2008.

New Developments – In the existing City of North Port Comprehensive Plan and Unified Land Development Code (ULDC), the City follows the SWFWMD criteria for permitting new surface water management systems which is a design storm event with a 25-year frequency, 24-hour

duration. For the design storm event, the new surface water management system must provide sufficient storage volume so that the post-development peak discharge rate is no greater than the pre-development peak discharge rate. SWFWMD is currently considering revising rule language to require designing for a more intense storm event for areas of known flooding. Upon such time that SWFWMD revises their design storm standards the City shall adopt those new standards within 6 months.

Summary of Work Tasks Associated with State Funding for a Modern Stormwater Program

The City of North Port has been designated through the Community Budget Issue Requests (CBIRS) program and lobbying efforts in Tallahassee for State reimbursement of expenditures associated with the establishment of a modern stormwater program. The first award in 2005 was for \$450,000. In 2006, an additional \$500,000 was granted. In 2007, \$400,000 was added, providing a running total of \$1,350,000. An equal amount must be matched, advanced, and expensed (up to \$2,700,000 total) by the City prior to any State reimbursement. However, smaller increment amounts may be expensed and determined eligible for reimbursement. The State of Florida is aware of the timeline for completing the work and recuperating expenses. The following is a summary of the key work tasks associated with the CBIR reimbursement awards.

Task No. 1 - Citywide Flood Control and Water Quality Improvement Projects

Conduct citywide watershed modeling and planning to: (a) establish levels of service (LOS) for flood control and water quality; (b) identify LOS deficiencies; (c) develop best management practices (BMPs) and preliminary cost estimates to achieve the desired LOS; (d) develop and pursue funding methods and other sources to implement the program; (e) perform preliminary engineering design, final engineering design, permitting, and associated cost estimates of each design; (f) bid and construct projects; (g) monitor system to determine if desired LOS is achieved.

Task No. 2 - Improve and Rehabilitate the Primary Stormwater Conveyance System

Perform an engineering evaluation to identify and document the: (a) rehabilitative improvement needs associated with water control structures; (b) targeted areas for removal of silt within the primary stormwater conveyance system of manmade canals interconnected with Myakkahatchee Creek.); (c) staffing, operations and maintenance (O&M) resources necessary to perform the work; (d) priority for scheduling and implementing the work. The rehabilitation of three (3) smaller control structures was completed in FY 2006/2007. At least one or more structures are targeted for rehabilitation in each subsequent fiscal year.

Task No. 3 - Improve and Rehabilitate the Secondary Stormwater Conveyance System

(a) Identify and prioritize improvement projects to reduce localized street flooding; (b) re-grade roadside swales; (c) install culvert crossings beneath streets and intersections where water sheet flows over the asphalt are causing flooding and road deterioration.