

9 Conclusions and Recommendations

9.1 Operational Recommendations

1. Increase SWMS Maintenance Activities

The number and types of maintenance activities indicated in the proposed O&M Plan represent the minimum level of maintenance effort needed to properly maintain the City's SWMS.

2. Implement the CMMS and Improve SWMS Documentation

The City does not currently have a CMMS system and has had issues with NPDES MS4 permit documentation. As an interim measure, an MS-Excel CMMS system has been developed for the City's use along with SOPs and documentation protocols to help improve documentation of SWMS assets and maintenance activities performed.

3. Increase Stormwater Department Staffing

Based on the labor needs to perform the minimum level of maintenance on the City's SWMS, ten additional FTE positions will be needed. The Arcadis departmental financial model assumes these positions would be added over a three-year period.

4. Modernize and Increase the Capital Equipment Fleet

- The current Stormwater Department fleet consists of 24 light vehicles and heavy equipment, of which 5 (21%) appear beyond their useful life. It is recommended that a detailed fleet analysis be conducted to determine an appropriate operational life for each fleet item based on maintenance data and usage rates, and to plan for future replacement needs and costs.
- Based on the equipment needs to perform the minimum level of maintenance on the City's SWMS, five fleet items need to be replaced and one additional vector truck and one additional backhoe are needed. The addition of more energy efficient light vehicles (i.e., EVs) should be considered for activities that only involve visual inspections.

5. Increase Available Canal Storage Volume

- Include an adjustable weir in the Concha Dam replacement design to allow the City to decrease canal water elevations by approximately 1.5 feet. This will increase the storage capacity of the canal system available at the beginning of a storm event and will reduce peak discharges to the South Prong of the St. Sebastian River. The adjustable weir should be designed so that stored stormwater in the canals will slowly discharge through the weir and the canal storage volume will recover within 14 days following a storm event. Decreasing the peak discharge will also improve downstream water quality by reducing the dilution effect of the fresh water on salinity levels in the St. Sebastian River and the Indian River Lagoon.
- Replace the wood stoplogs on the Hardee Dam with new ones, and lower the control elevation in the Collier Canal by 1.5 feet. Hardee Dam current control elevation of 15.06 ft NGVD29 based on the 2006 *Collier Canal Stormwater Retrofit* Permit Drawings provided in Appendix I.

6. Coordinate Maintenance of the Hardee Dam Spillway with SJRWMD

The SJRWMD was granted a conservation easement dated January 17, 2002, from Collier Club, Inc. and the Collier Club Homeowner's Association during the development of the Collier Club property. According to the easement document, the purpose of the conservation easement is to "assure that the Property will be retained

forever in its existing natural condition and to prevent any use of the Property that will impair or interfere with the environmental value of the Property”.

Unfortunately, the conservation easement includes the flow path from the Hardee Dam, which has been in place for decades, and based on discussions with City staff, the SJRWMD considers the easement area a “natural area” and does not intend to maintain the original grades and cross section of the flow path. Over time, the flow path will fill in with sediment and vegetation, which will reduce or completely stop the discharge flow from the Hardee Dam during storm events. Without the discharge flow over the dam, the only other way for water to escape from the Collier Canal North is to increase stage to approximately elevation 14 feet, NAVD88 and discharge south through the 48-inch diameter culvert under Sebastian Blvd. This represents a significant reduction of discharge capacity from the Collier Canal North and modeling results indicate that flooding in the area draining to the canal would increase during the 10-year or larger storm events.

After reviewing the easement document, it appears that two problems exist, and it is recommended that these problems be brought to the attention of the SJRWMD:

1. The area of the conservation easement is not natural, as it is a flow way from the Hardee Dam, which was likely constructed in the 1950's or 1960's when the Collier Canal North was constructed during the development of the Sebastian Highlands. An inherent conflict exists between the competing uses of drainage and conservation of existing condition.
2. The easement document contains conflicting prohibitions in Section 2, as prohibitions 2.(c) and (d) appear to directly conflict with 2.(f).
 - 2.(c). Removing, trimming or destroying trees, shrubs, or other vegetation.
 - 2.(d). Excavating, dredging or removing loam, peat, gravel, soil, rock or other material substances in such a manner as to affect the surface.
 - 2.(f). Activities detrimental to drainage, flood control, water conservation, erosion control, soil conservation, or fish and wildlife habitat preservation.

It is also recommended that an additional analysis be performed, but if the intention was to maintain the flow way according to the lines and grades present at the time the conservation easement was recorded, that would not appear to be contrary to the terms of the easement and would likely be sufficient for ongoing drainage maintenance.

7. Obtain TMDL Load Reduction Credits for BMAP Activities

To date, 16 projects have been completed by the City or are currently underway, resulting in load reduction credits of 5,223 lbs./year of TN (15.7% of required reduction) and 620 lbs./year of TP (10.3% of required reduction). While the City's performance appears to be lower than the overall progress reported for CIRL Project Zone SEB, it should be noted that the City has not yet received reduction credits for seven completed projects, including the Stormwater Park. That single project may account for a significant part of the City's required reduction goals. It is recommended that the City continues to obtain TMDL load reduction credits for BMAP activities.

8. Establish a Certification Program for Private Systems

Ensuring that privately-owned BMPs are properly operated and maintained is very important, as they typically discharge into the City's SWMS. For this reason, it is recommended that the City establish a program for annual certifications for all privately-owned stormwater systems. Such a program may include:

- A certification fee, additional revenue to the City's Stormwater Department, to offset processing costs
- Requiring an annual inspection report by a Florida-licensed professional engineer and accompanying digital time-stamped photographs.
- Requiring a certification form, signed and sealed by a Florida-licensed professional engineer documenting that the system is properly maintained and operating as designed and permitted.
- The City has a certification program in its existing Stormwater Fee Credit program for private systems exceeding SJRWMD standards, which could be used to incorporate this recommended maintenance certification for private systems.

9. Reduce Costs Where Possible

- On vacant parcels that have "Quarter Round" installed, the City crews must hand clean the Front Yard swale to prevent damage to the PVC, which is labor-intensive and costly to the City. It is recommended that the City considers removing the "Quarter Round" in these vacant parcels at the next cleaning and eliminate the need for hand cleaning, as the conveyance benefits of the PVC pipe quarters are outweighed by the additional maintenance costs to the City, estimated at approximately \$140,000 per year.
- It is recommended that the City considers the need to identify other funding sources for activities unrelated to the SWMS such as sidewalk replacements.

10. SWMS Survey Information Needs

- Continue the development of a City-wide survey monument network that is needed to allow for rapid elevation checks of SWMS components.
- Perform a full bathymetric survey of all canals, waterways, and retention/detention ponds in the SWMS to verify whether dredging is needed to restore the original design grades and storage and conveyance capacity.

9.2 Policy and Local Ordinance Recommendations

Policy 1-2.3.2 – Incorporate Innovative Techniques in the Land Development Code – In accordance with this policy, it is recommended that the City considers allowing the use of stormwater harvesting tanks as a method for residential and commercial properties to meet their required stormwater detention volumes. Such systems should be designed to recover no more than half their available volume within 24 hours following a storm event and recover their full volume within 72 hours.

Code of Ordinances - Section 54-2-7.15(d)

Paragraphs (2) and (3) of this Code section establish that the property owner is responsible for the maintenance of all drainage features on a property, including front yard swales, driveway culverts, side yard swales, and back yard ditches to maintain the proper flow of surface water. For several years, the City has contracted with an outside contractor for the mowing and maintenance of the side yards and back yards. Consider revising the Code to reflect the change in maintenance responsibility.

Code of Ordinances - Sec. 54-3-12.5. - Exemptions.

The City's stormwater system does not have sufficient storage and conveyance capacity to prevent localized flooding in a 10-year storm event, as evidenced by modeling results. The system is operating beyond its design capacity, and in order to improve existing drainage issues, it is recommended that the City consider amending its Land Development Code exemptions as discussed below.

Sec. 54-3-12.5. currently provides that the following activities shall be exempt from the surface water management permitting requirements herein established:

(a) Any maintenance, alteration, renewal, repair, use or improvement of an existing structure which does not change or affect the rate or volume of stormwater runoff, or the construction of any structure or addition thereto which does not create an impervious surface exceeding ten percent of the site or 5,000 square feet, whichever is less.

The clause “*or the construction of any structure or addition thereto which does not create an impervious surface exceeding ten percent of the site or 5,000 square feet, whichever is less.*” could be deleted or modified, as it allows for the addition of up to 5,000 square feet (SF) of impervious area without any offsetting storage. The rainfall depth for the 25yr-24hr storm event is 9.17 inches, and in that storm a 5,000 SF concrete slab (or structure) would result in approximately 3,821 cubic feet (28,580 gallons) of runoff, with no storage requirement. The City’s SWMS does not have the capacity to convey or store such additional runoff loads, so detention storage of at least the 25-year, 24-hour runoff volume could be required for any additional impervious area.

Code of Ordinances - Sec. 54-3-12.10. - Type "A" permit, stormwater management (drainage)

The requirements for the Type “A” stormwater permit should be modified to include detention storage of at least the 25-year, 24-hour runoff volume as explained above. Per Sec. 54-3-12.1. – Applicability, this requirement would then be applicable to all new construction, development or redevelopment requiring updated code compliance