

**Section A**  
**Executive Summary**

# Section A. Executive Summary

## Objective

The purpose of the study is to map existing storm water conveyance and control structures and identify the extent of roadway flooding along the main creeks and streams of the watersheds for both major and minor storm events. Flood prone areas were to be identified and conceptual improvement projects were proposed to reduce roadway flooding to acceptable levels of service (LOS) as defined by the Lee County Comprehensive Plan.

In addition to identifying the water quantity aspects of the project, a water quality model was applied to each of the watersheds to investigate the water quality aspects of the watershed based on existing and future land use conditions. Upon review of the results, Best Management Practices (BMPs) were developed for the watersheds that exceeded the limits of the LOS criteria established by the Florida Department of Environmental Protection.

This study is considered a Master Watershed Plan. A Master Watershed Plan documents and analyzes the watershed as a whole and along the limits of the main creek. The information provided by the Master Watershed Plan examines the entire watershed and has the ability to forecast development and the resulting runoff so that communities can begin to solve their existing problems and prevent the creation of new ones. Based on the results of the Master Watershed Plan, areas of flooding are identified so that further detailed studies can be made to provide solutions to those areas. Therefore, a Master Watershed Plan is used as a planning tool to identify projects and additional areas of study for further detailed analysis.

The modeling completed in this report is based on the information that was provided by several sources and data collected by AECOM. The information that was used is documented in Section B under Data Collection and within each watershed description in Section C. The results of the modeling are based on the assumptions presented in this report and were determined on a Master Planning level and should not be taken as exact.

## Background

The study area includes 21 watersheds between US 41 and SR 31 which are located in and around the focus area. Six (6) of the watersheds were studied in lesser detail to provide tailwater and basin transfer conditions for the remaining fifteen (15) basins. The detailed analysis concentrated on the portions of those watersheds in Lee County from the Charlotte County line south to the Caloosahatchee River. However, because almost half of the total 120 square miles of those watersheds lie within Charlotte County, the study had to recognize and attempt to quantify the southerly flows to Lee County from the Charlotte County area. North Fort Myers has historically experienced frequent flooding in the vicinity of the creeks and low lying areas. Many structures (roads, dikes/berms, bridges, houses, etc.) constructed in the study area without permits have added to the already poor drainage by blocking or diverting historic flow patterns. The combination of natural hydrologic conditions and human intervention pose unique challenges in effective storm water management and flood control in the North Fort Myers area.

## Study Findings

Fifteen (15) watersheds were modeled with an existing condition model and a future condition model. The remaining six (6) watersheds were used to provide tailwater and basin transfer information to the modeled watersheds. The main differences between the models are the land use designation where the existing condition represents today's land use whereas the future condition represents the designated land use for the year 2030.

These models were compared to the levels of service criteria for roadway flooding as defined by the Lee County Comprehensive Plan and are as follows:

- County roads shall meet or exceed a 5-year, 24-hour storm event
- Evacuation routes shall meet or exceed a 25-year, 3-day storm event
- Major collectors and arterial roadways shall have no more than 6 inches of water for a 25-year, 3-day storm event
- Finished floor elevations of structures shall meet or exceed a 100-year, 3-day storm event

Based on these criteria, the following is a list of the roadways by watershed that do not meet the LOS criteria. Other roadways were identified in Section C of this report but are not listed below because the roadway met the LOS criteria for its roadway classification. Local roads, that are not County maintained, do not have a LOS criteria, but for the purpose of this study, local roads were evaluated with the LOS criteria for County roads.

- Powell Creek – Mellow Drive
- Marsh Point Creek – Twin Brook Road
- Cohn Branch – Jones Road
- Daughtrey Creek – East Branch – Slater Pines Drive, Canton Lane
- Chapel Branch – Leetana Road and Rich Road
- Bayshore Creek – Rich Road and Keola Lane
- Popash Creek – Heather Lane and Nalle Road
- Stroud Creek – Skis Road, Quail Hollow Road, and Nalle Road
- Palm Creek – Ruden Road
- Owl Creek – Fox Hill Road and SR 31
- Unnamed 2 Creek – SR 31

In addition to the roadway flooding, a water quality model based on land use designations was conducted on each of the watersheds using the Harvey Harper Methodology (HHM). This method was developed for the Florida Department of Environmental Protection (FDEP) under FDEP Contract No. SO108 and is titled Evaluation of Current Stormwater Design Criteria within the State of Florida dated June 2007 and prepared by Harvey H. Harper, PhD, PE and David M. Baker, PE. This model tested for Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Total Phosphorus (TP), Total Kjeldahl Nitrogen (TKN), Lead (Pb), Copper (Cu), and Zinc (Zn). The following watersheds did not meet the LOS criteria based on Florida Department of Environmental Protection (FDEP) Rule 62-302.530.

- Yellow Fever Creek – East Branch – BOD
- Marsh Point Creek – BOD and Copper

## Proposed Projects

The proposed projects presented in this report include culvert replacement and addition, raising roadway elevations at the creek crossings, conveyance improvements such as re-grading and widening ditches or swales, and creation of storage facilities such as ponds. The process of selection of a proposed project is detailed in each watershed under Section C of this report. The following table lists the watershed, improvement identification number, type of improvement, location, and approximate probable cost estimate. Details of each project are located in its respective watershed detail section in Section C of this report. The total estimate of probable costs for these improvements is approximately \$33,204,600.

**Table A.1. Study Area Proposed Projects**

<b>Watershed</b>	<b>Improvement Identification</b>	<b>Type of Improvement</b>	<b>Location</b>	<b>Preliminary Opinion of Probable Cost</b>
Yellow Fever Creek - East Branch	YFCEB BMP	Wet Detention Pond	Within the Watershed (Not Specific)	\$11,113,500
Marsh Point	Marsh Point 1	Add Two Culverts	Twin Brooks Road	\$48,100
	Marsh Point BMP	Wet Detention Pond	Within the Watershed (Not Specific)	\$5,845,700
Cohn Branch	Cohn Branch 1	Add One Culvert	Jones Road	\$29,600
Daughtrey Creek - East Branch	DCEB 1	Culvert Replacement	South of Rich Road	\$77,200
Chapel Branch	Chapel 1A	Raise Road	Leetana Road	\$5,413,500
	Chapel 1B	Dry Retention	North of Leetana Road	
	Chapel 2	Add Two Culverts	Rich Road	\$79,600
Bayshore Creek	Bayshore 1	Dry Retention	South of Nalle Grade and East of D&L Ranch Drive	\$5,698,100
Popash Creek	Popash 1	Culvert Replacement	Heather Lane	\$55,400
	Popash 2A	Culvert Replacement	Along Nalle Road, North of Heather Lane	\$33,540
	Popash 2B	Culvert Replacement	Along Nalle Road, North of Heather Lane	\$33,540

**Table A.1. (Continued) Study Area Proposed Projects**

<b>Watershed</b>	<b>Improvement Identification</b>	<b>Type of Improvement</b>	<b>Location</b>	<b>Preliminary Opinion of Probable Cost</b>
Popash Creek	Popash 2C	Culvert Replacement	Along Nalle Road, North of Heather Lane	\$33,540
	Popash 2D	Culvert Replacement	Along Nalle Road, North of Heather Lane	\$33,540
	Popash 2E	Culvert Replacement	Along Nalle Road, North of Heather Lane	\$33,540
	Popash 3	Adding Swale	Northside of Henderson Grade from Nalle Road to Creek	\$39,500
Stroud Creek	Stroud 1A	Adding Two Culverts	Skis Road	\$4,376,100
	Stroud 1B	Dry Retention	North of Skis Road and East of Ethel Drive	
	Stroud 1C	Raise Road	Skis Road	
Palm Creek	Palm 1A	Raise Road	Ruden Road	\$42,900
	Palm 1B	Culvert Replacement	Ruden Road	
Unnamed 2	Unnamed 2 Creek 1A	Culvert Replacement	Driveways along SR 31 south of N. River Road	\$72,567
	Unnamed 2 Creek 1B	Culvert Replacement	Driveways along SR 31 south of N. River Road	\$72,567
	Unnamed 2 Creek 1C	Culvert Replacement	Driveways along SR 31 south of N. River Road	\$72,567

**Benefits of the Proposed Projects**

The majority of proposed projects allow roadways to meet the LOS criteria or lessen the flooding of the roadway. Not all projects totally alleviate the roadway flooding, however the projects do show an overall benefit to the watershed. These projects provide benefits by:

- Allowing evacuation routes to be passable during major storm events
- Allowing county maintained roads to be passable during minor storm events
- Reducing flooding time
- Enhancing water quality
- Incidental reduction of neighborhood flooding

## **Recommendations**

Although not all flooding is addressed in this report, areas have been identified and each watershed represents a comprehensive gathering of information and modeling to aid in further detail study of those areas that were not addressed. As each project moves forward, a detailed study should be completed to develop a more comprehensive and site specific design of each project. Implementation of the recommendations provided in this report should provide secondary benefits to neighborhood level flooding. Corrections to the truck system are necessary before neighborhood deficiencies can be examined. However, detailed neighborhood level drainage studies should be conducted for those areas that have experienced flooding for areas that did not coincide with the results of this report.

The proposed projects suggested in this report should be included in the Capital Improvement Plan. Although these projects are a result of a master plan, the master plan provides an overview of the watershed and does identify areas that do not meet LOS criteria. Many of these areas were confirmed with observed flooding, and the goal of the proposed improvement projects is to meet the LOS criteria and improve the identified areas.

In addition to the projects, a recommended maintenance plan should be in place for each creek. This plan should include but not be limited to routine cleaning of the creek that includes removal of excessive and invasive vegetation, removal of sediment buildup in areas along the creek which includes all structures, and replacement of drainage facilities that are failing. A good maintenance plan will increase the longevity of the drainage facilities and will allow for maximum conveyance during storm events.

## **Format of the Report**

This report is divided into four sections. The first section is the Executive Summary, Section A, which is this section. The second section is General, Section B. This section provides information for the entire study area which includes an Introduction to the report, a description of the study area as a whole, and finally, the data collection that occurred in compiling the report based on the items represented in the scope of work. The third section is titled "Watersheds". This section gives a general methodology of how each watershed was analyzed and then each watershed is represented and further detailed to give a comprehensive review of each watershed. Finally, the last section, Report Conclusions, summarizes the entire report and provides further recommendations on implementing this plan.