Pollutant Reduction Plan

In compliance with Corrective Action (F) of FDEP Consent Order OGC Case No. 20-0851

Billy Creek and Manuel Branch

City of Fort Myers

12 July 2021

→ **The Power of Commitment**

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1. Introduction

On behalf of the City of Fort Myers (the City), GHD presents this Pollutant Reduction Plan (PRP) for the Billy Creek and Manuel Branch Watersheds. The City is located within Lee County in southwest Florida and is comprised of approximately 31.8 square miles of land and 8.6 square miles of water.

The City of Fort Myers was established in 1886. The population of the City, based on 2019 US Census data, is estimated to be 87,103, which has increased by approximately 80.7% since 2000. According to information from the Lee County Economic Development Department, there were an estimated 35,093 households in the City in 2019, with an estimated household size of 3.02 people. The projected 2024 population is estimated to be 98,440, with an estimated 40,063 households. The City consists of primarily urban, built-up land. **Figure 1** illustrates the current and future land use distributions within the City. The location and boundaries of the City of Fort Myers are depicted on **Figure 2**.

		Fort Myers	Allocation	Existing	Remaining
Residential Acreage	By Future Land Use Category	Intensive Development	250	192	58
		Central Urban	230	211	19
		Urban Community	0	0	0
		Suburban	85	80	5
		Outlying Suburban	0	0	0
		Sub-Outlying Suburban	0	0	0
		Commercial	39	0	39
		Industrial Development	0	34	(34)
		Public Facilities	0	0	0
		University Community	0	0	0
		Destination Resort	0	0	0
		Burnt Store Marina Village	0	0	0
		Industrial Interchange	0	0	0
		General Interchange	0	0	0
		General/Commercial Interchange	0	0	0
		Industrial/Commercial Interchange	0	0	0
		Unversity Village Interchange	0	0	0
		New Community	0	0	0
		Airport	0	0	0
		Tradeport	0	0	0
		Rural	0	0	0
		Rural Community Preserve	0	0	0
		Coastal Rural	0	0	0
		Outer Islands	0	0	0
		Open Lands	0	0	0
		Density Reduction/Groundwater Resourse	0	0	0
		Conservation Lands Upland	0	0	0
		Wetlands	0	0	0
		Conservation Lands Wetland	0	0	0
Total Residential			604	517	87
Commercial			150	67	83
Industrial			300	176	124
Non Regulatory Allocations					
Public			350	300	50
Active Agriculture			0	101	(101)
Passive Agriculture			0	81	(81)
Conservation (wetlands)			748	748	0
Vacant			45	207	(162)
Total			2,197	2,197	0
Population Distribution			5,744	4,941	803

Figure 1 ***City of Fort Myers Current and Future Land Use***

*Source – https://leegov.com/dcd/planning/districts/district?c=FortMyers

The City has taken a proactive approach to preventing pollution associated with the aging infrastructure and the anticipated increased demand on utilities due to population growth. To that end, measures have been implemented by the City to eliminate potential point sources within their control or responsibility that could contribute to the introduction of anthropogenic pollutants to the City's surface water bodies, specifically fecal indicator bacteria (FIB). With the assistance of local stakeholders, the City's goal is to reduce or eliminate the concentrations of FIB in Billy Creek and Manuel Branch, thereby improving water quality in some of the City's watersheds. This PRP discusses historical trends of FIB in two of the City's watersheds, Billy Creek and Manuel Branch, the current study that serves to identify previously unknown or potential point sources, and management measures to address identified areas of concern.

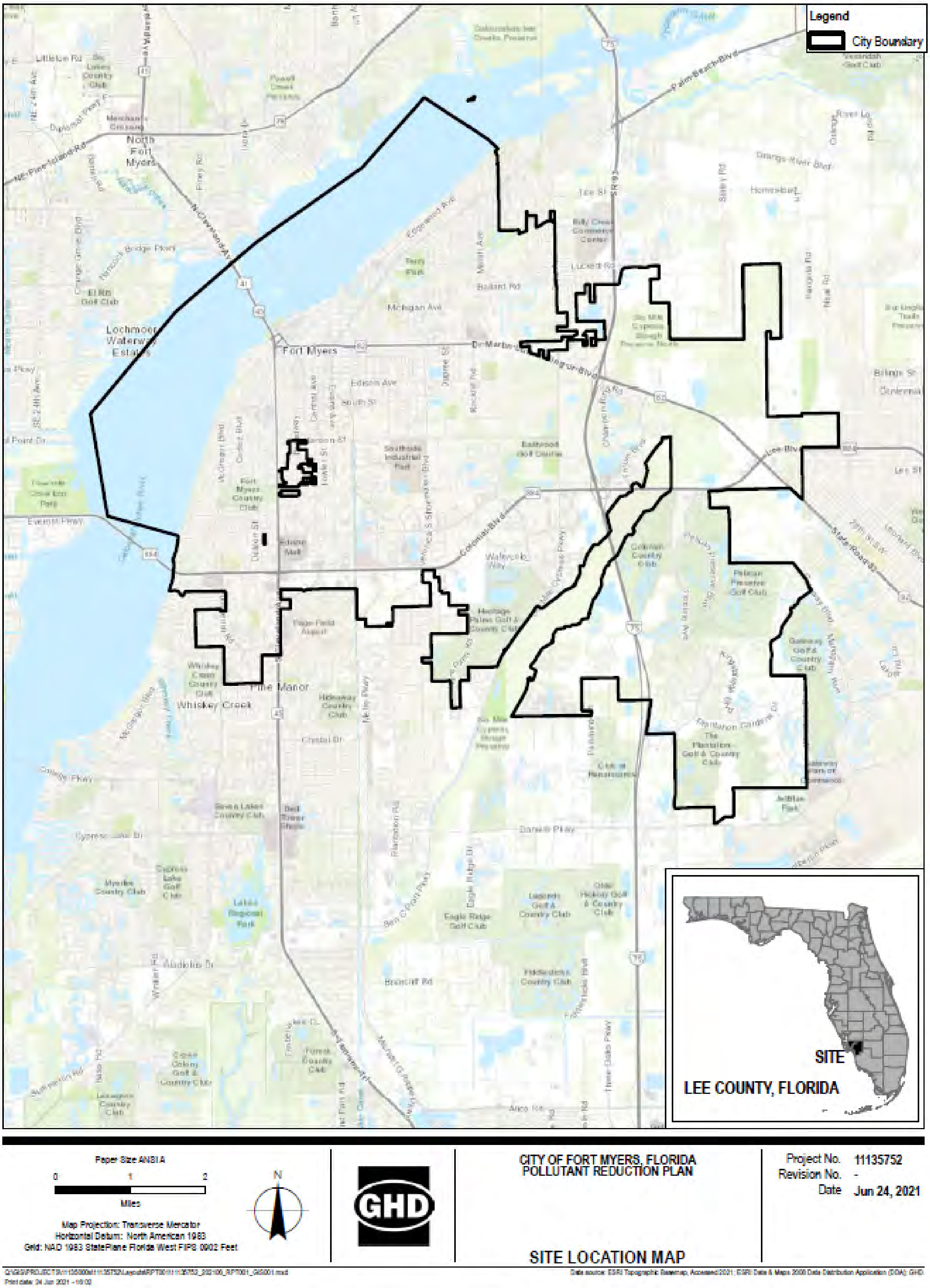


Figure 2 ***Site Location Map***

1.1 Problem Statement and Project Objective

The City is the operator/co-permittee of the Florida Department of Environmental Protection (FDEP) issued National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit (FLS000035). As a portion of monthly MS4 permit sampling, samples were collected for E. coli and Enterococci bacteria in the City's watersheds to provide background levels and to identify potential sources. As identified in the sampling, Billy Creek and Manuel Branch watersheds have demonstrated periodic elevated concentrations of fecal indicator bacteria. This PRP has been prepared in accordance with guidance provided in the July 2018 FDEP document titled "Restoring Bacteria-Impaired Waters: A Toolkit to Help Local Stakeholder Identify and Eliminate Potential Pathogen Problems (Toolkit)." As described herein, the plan utilizes an iterative approach to identifying and managing/eliminating identified sources of FIB.

2. Background

Chapter 62-302 of the Florida Administrative Code (FAC) defines quantitative limits for various water quality constituents. This chapter also defines various classes of surface waters, dependent on their use. Class III waters are defined as surface waters suitable for fish consumption, recreation, propagation and maintenance of a healthy, well balanced population of fish and wildlife. Within the City of Fort Myers, Billy's Creek and Manuel's Branch are defined as Class III surface waters and FDEP numeric limits are established for, among other parameters, Enterococci and Escherichia coli bacteria. Class III numeric limits established in FAC 62-302 for these bacteria follows:

– Escherichia Coli (Fresh water): Counts shall not exceed a monthly geometric mean of 126 cfus nor exceed the ten percent threshold value (TPTV) of 410 in 10% or more of samples during any 30-day period. Monthly geometric means shall be based on a minimum of 10 samples taken over a 30-day period.
– Enterococci (Marine water): Counts shall not exceed monthly geometric mean of 35 cfus nor exceed the ten percent threshold value of 130 in 10% or more of the samples or more of the samples during any 30-day period. Monthly geometric means shall be based on a minimum of 10 samples taken over a 30-day period.

The monthly samples collected for E. coli and Enterococci bacteria in the Billy's Creek and Manuel's Branch have demonstrated exceedances of the FDEP limits, as discussed in Section 3.1. However, it is noted that the FDEP exceedance value is only used for comparison purposes due to limited sampling frequency. Further, it should be noted that Enterococci does not have a limit in a fresh water setting and E. coli does not have a limit in a marine setting.

After respective surface water samples are collected and analyzed for their microbial content, the FDEP recommends a series of potential follow activities (or triggers) commensurate with the levels of microbial pathogens encountered, as identified in the FDEP's August 2018 *Restoring Bacteria-Impaired Waters, A Toolkit to Help Local Stakeholders Identify and Eliminate Potential Pathogen Problems (Toolkit), Version 3.0*, in **Appendix A**. According to the Toolkit, Course of Action Triggers and responses are as follows:

– Possible emergency: Results in the range of hundreds of thousands of colony forming units (cfu)/100 milliliter (mL). As interpreted by GHD for the purpose of this analyses, this category would result with any values of either E. coli or Enterococci counts greater than 100,000 cfu/100mL. Any stormwater or ambient water samples in this range, barring any inflation at the time of sampling (e.g., biofilm disturbance), should be immediately revisited. Any value above 100,000cfu/100mL is the first indication of a likely hot spot from one of the following: a potential sanitary sewer overflow (SSO); illegal dumping; an illicit connection; or a failing Onsite Sewage Treatment and Disposal Systems (OSTDS). It is recommended that a eturn trip to the site be acoomplished as soon as possible toinvestigate the contributing area for signs of the potential source source. Further, it is recommended that a resample at the original site be obtained and that samples be taken throughout the contributing area to narrow down the locational origin. Acetaminophen and HF183 analyses of the samples is recommended to confirm or deny the presence of an anthropogenic source.
– Very concerning level: Results in the range tens of thousands of cfu/100mL. As interpreted by GHD for the purspose of these analyses, this category would result with any values of either E. coli or Enterococci counts greater than or equal to 10,000 cfu/100mL but less than 100,000 cfu/100mL. If the actual count is what is

confirmed after reviewing laboratory QA/QC and sample dilution information, and, barring any inflation at the time of sampling (biofilm disturbance), a result in the tens of thousands indicates a hot spot and the above protocol is recommended.

– Difficult to discern: Results in the range of high hundreds to low thousands of cfu/100mL. As interpreted by GHD for the purspose of these analyses, this category would result with any values of either E. coli or Enterococci counts greater than or equal to 800 cfu/100mL but less than 10,000 cfu/100mL. FIB results in the high hundreds and low thousands do not warrant immediate action, but it is recommended that these be revisited areas after higher priority areas are remediated. It is further recommended that susteptible areas be sampled for source-specific indicators when trying to identify sources and their origins in waters where FIB results are common in this range.
– Low-level exceedances: Mid-hundreds of cfu/100mL. As interpreted by GHD for the purspose of these analyses, this category would result with any values of either E. coli or Enterococci counts greater than or equal to 410 cfu/100mL and less than 800 cfu/100mL. FIB results in the mid-hundreds are not usually associated with persistent contributions of untreated human waste and don't warrant immediate action, however, similar to the above category, it is suggested that a plan to reassess and address these locations after higher priority areas are remediated. It is further recommended that susteptible areas be sampled for source-specific indicators when trying to identify sources and their origins in waters where FIB results are common in this range.

For the purpose of this PRP, concentrations of fecal coliform or E.Coli of 410 cfu/100mL or greater are considered an exceedance and are assigned to an action trigger category.

As discussed above, the use of analysis of HF183 and acetaminophen are used to confirm or deny whether elevated concentrations of FIB are associated with anthropogenic sources. The HF183 DNA fragment from the 16S rRNA gene of Bacteroides is primarily associated with human fecal material and is used to identify human fecal bacteria in ambient water. Established guidelines for interpreting HF183 results do not exist. However according to a 2016 FDEP presentation entitled *Microbial source tracking: interpretation of qPCR results,* GEU/100 mL detection in the millions can be considered a “high” signal, above ten thousand GEU/100 mL as a “moderate” signal, and less than ten thousand genomic editing unit (GEU)/100 mL can be interpreted as a “low” signal.

The pharmaceutical acetaminophen is a chemical marker that is used as a human waste indicator in microbial source tracing. Based on a study conducted in Lexington, Kentucky that compared the concentration of acetaminophen before and after wastewater treatment, influent concentrations to the wastewater treatment plant (untreated sewage) were in the range of 78 – 122 micrograms per liter (ug/L) while concentrations in effluent (treated sewage) were below 0.1 ug/L.

3. The Watersheds

Billy Creek and Manel Branch discharge to the Caloosahatchee River. The river runs from Lake Okeechobee through a series of locks to San Carlos Bay at Fort Myers. The Caloosahatchee estuary consists of both fresh and marine water segments. The freshwater segment extends westward from Lake Okeechobee to the Franklin Lock (S-79), and the marine segment extends from the Franklin Lock to Shell Point, adjacent to San Carlos Bay. Fort Myers waterways and freshwater canals flow into the estuary/marine segment of the Caloosahatchee River.

The estuary and its associated watershed have been subjected to hydrologic, land use, and other anthropogenic modifications for more than a century that have reduced the water quality in the estuary and several related river tributaries. The FDEP basin management plan (BMAP) has determined that one of the root causes of estuary water quality decline is the increased nitrogen content of the upstream river waters and has required reductions in total nitrogen throughout the watershed.

The 2020 update to the Caloosahatchee River Basin Management Action Plan (BMAP – FDEP) indicates that 83% of the estuarine portion of the Caloosahatchee River watershed is defined as Urban lands (FDEP, 2020). Urban storm water runoff into canals and surface waters can be a significant source of nitrogen in storm water runoff. To help address resulting nitrogen impairment, the FDEP adopted total maximum daily loads (TMDLs) for total nitrogen (TN) in the Caloosahatchee watershed. Specific watershed nitrogen loads developed in the total maximum daily load (TMDL) study were used to identify where nutrients can be reduced through regulatory and non-regulatory programs (FDEP TMDL, 2009). As identified in the 2020 update to the FDEP BMAP, the City has completed several projects aimed at reducing the nitrogen content of Billy Creek and Manuel Branch. Surface water quality enhancement projects have been completed by the City at over ten specific locations and have included construction of the Billy Creek filter marsh and the Ford Street preserve (FDEP 2020). Although nitrogen has been a long-term focus of the TMDLs, the MS4 permit monitoring also includes FIB, which has been identified as an issue for Billy Creek and Manuel Branch.

In addition to being an active stakeholder in the FDEP BMAP program, the City also maintains a series of ten water quality stations that are sampled monthly for a comprehensive list of parameters in excess of their obligations related to their MS4. Analytical results for nutrients, enterococcus, E.coli, organic strength and field parameters (pH, specific conductance, dissolve oxygen, temperature and turbidity) are uploaded monthly to the FDEP Win/Storet data base.

The FDEP has developed a spatial map for the entire State that uniquely identified all surface water basin and sub basin drainage segments. A **W**ater **B**ody **Id**entification number (**WBID**) is an assessment unit that is intended to represent Florida's waterbodies at the watersheds or sub-watershed scale. WBIDs have a unique identification number that is tracked by the department and have a geographic delineation as a polygon layer. The assessment units are drainage and sub drainage basins, lakes, lake drainage areas, springs, rivers and streams, segments of rivers and streams, coastal, bay and estuarine waters in Florida. The polygons roughly delineate the drainage basins surrounding the waterbody assessment units. The WBIDs are used in the annual impaired waters assessment, implementation of TMDLs and Basin Management Action Plans BMAPs as well as other applications. Billy Creek is identified as WBID 3240J. The Billy Creek watershed consists of sub drainage basins 3240J3 (Ford Street Canal), and 3240J4 (Shoemaker and Zapato Canals). Manuel Branch is identified as WBID 3240V.

3.1.1 Billy Creek

Billy Creek's headwaters are located in Laredo Lakes within Lee County and the creek discharges to the Caloosahatchee River south of Ward Island, as illustrated in **Figure 3**. The eastern extent of Billy Creek is located within Lee County, and the creek enters City boundaries on the west side of Ortiz Avenue.

The Ford Street, Shoemaker, and Zapato Canals are tributaries of Billy Creek, which are located within the boundaries of the City of Fort Myers. **Figure 4** depicts the Billy Creek sub-watersheds.

Based on a review of historical aerial photographs, obtained from the University of Florida (UF) and Florida Department of Transportation (FDOT) collections, areas within the Billy Creek watershed consisted of a mixture of wooded lowlands, apparent agricultural fields, and residential neighborhoods from at least 1944. Increased residential development is evident along the Creek and its tributaries in the 1960s, and the watershed areas appears to be developed in a similar fashion to present-day configurations by the 1990s. Historical aerial photographs of the Billy Creek watershed are included as **Appendix B**.

Present-day land use is depicted on **Figures 5** through **8**.

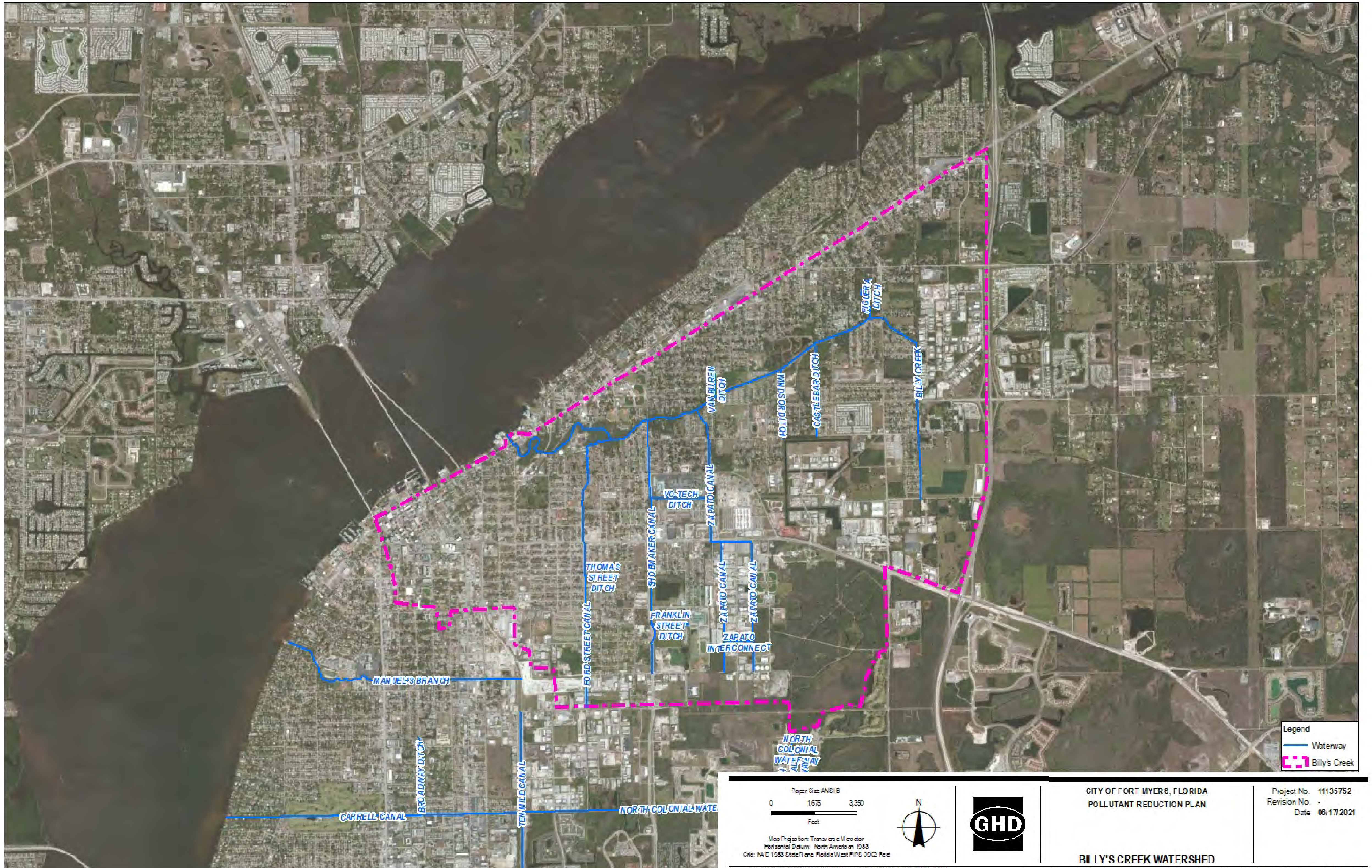


Figure 3 *Billy Creek Watershed*

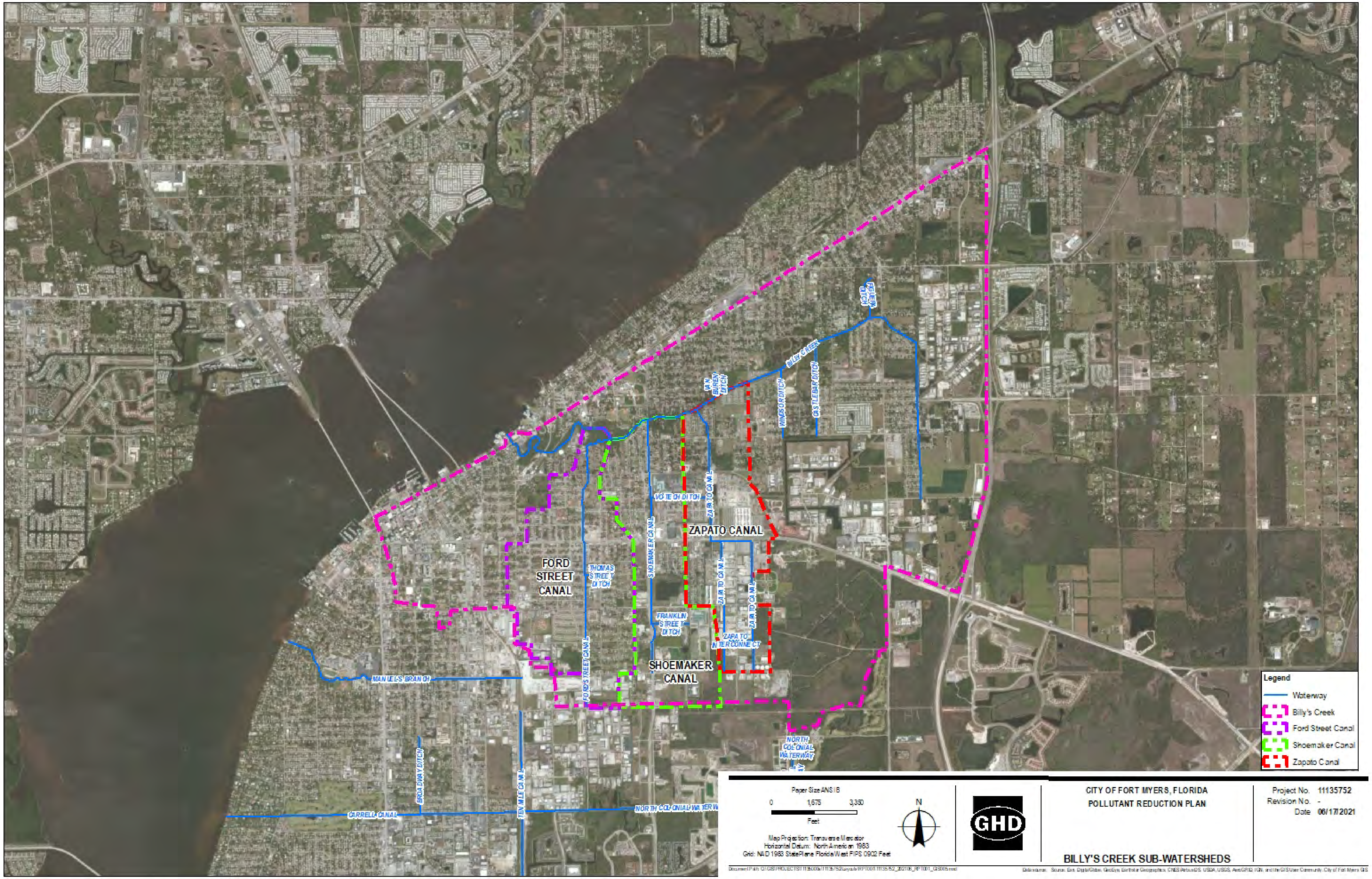


Figure 4 *Billy Creek Sub-Watersheds*

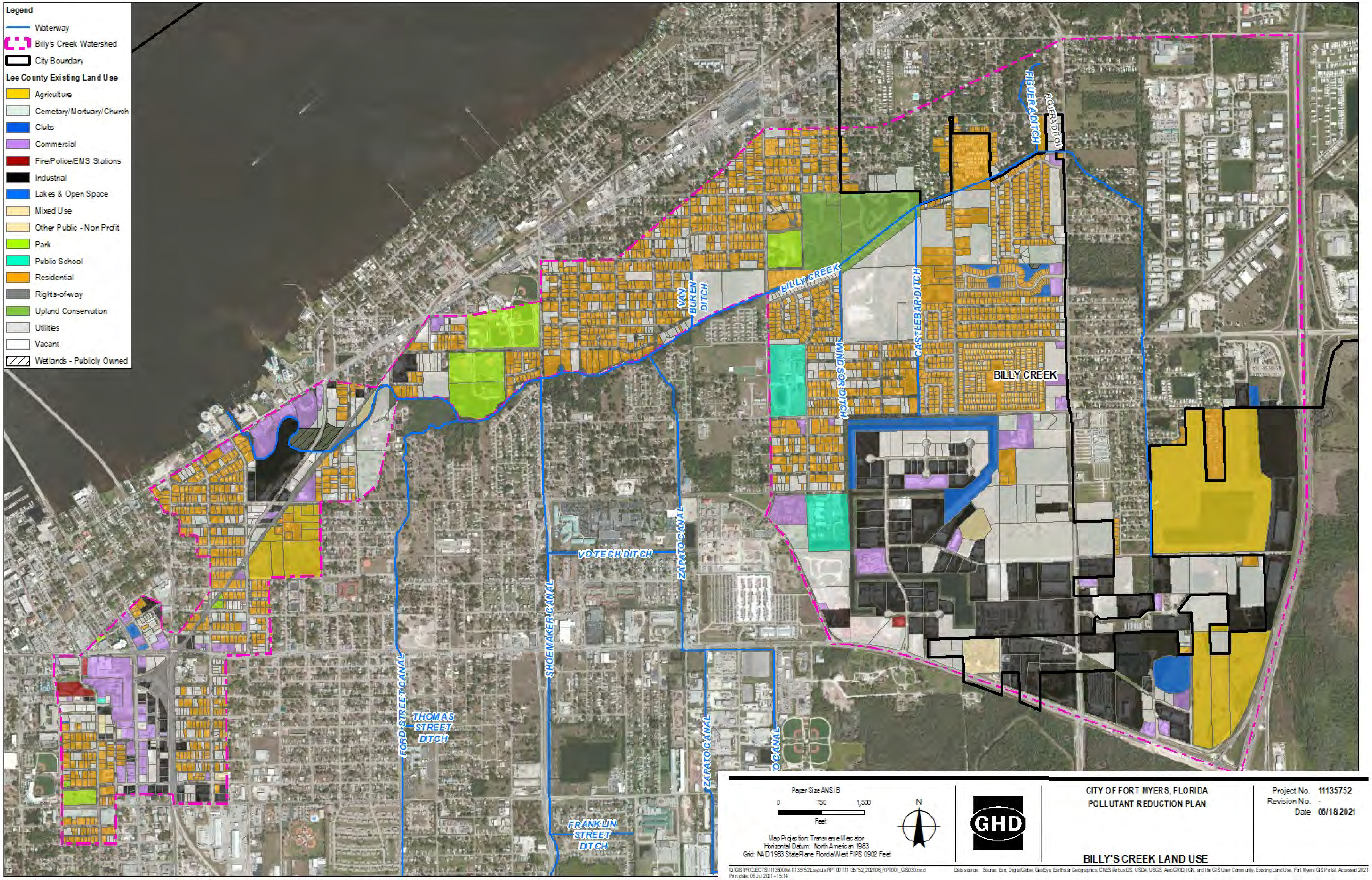


Figure 5 *Billy Creek Land Use*

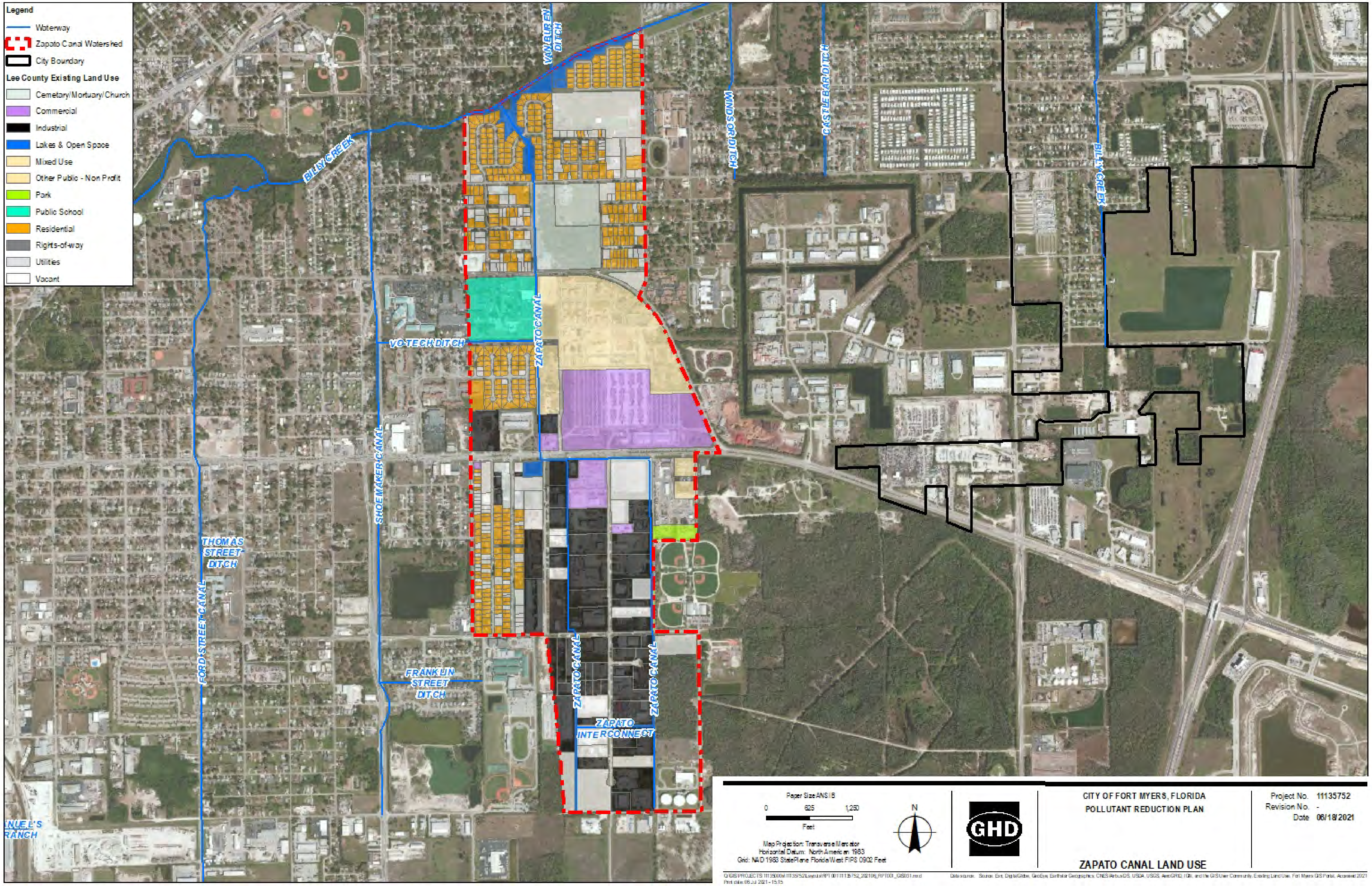


Figure 6 *Zapato Canal Land Use*

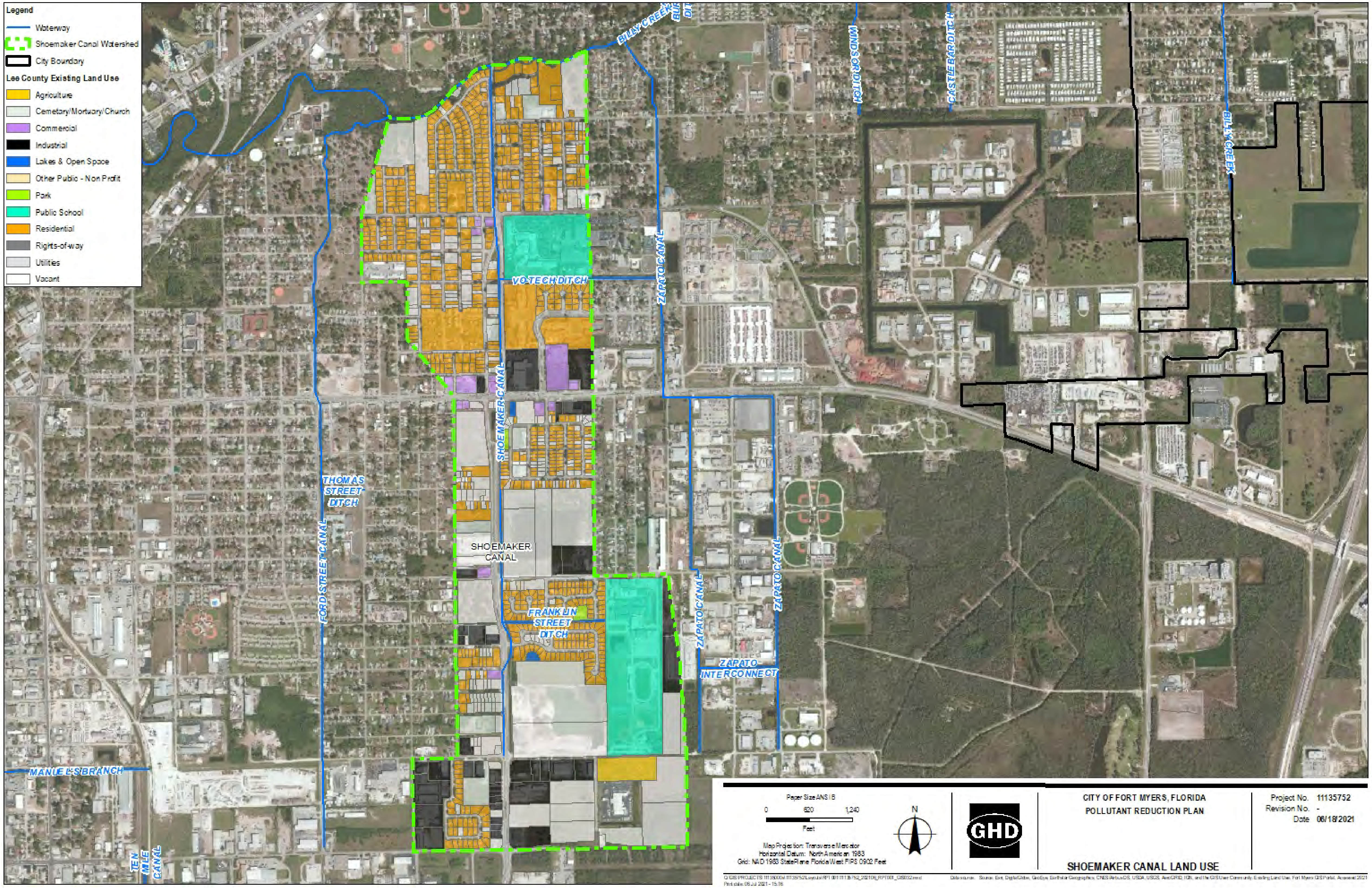


Figure 7 *Shoemaker Canal Land Use*

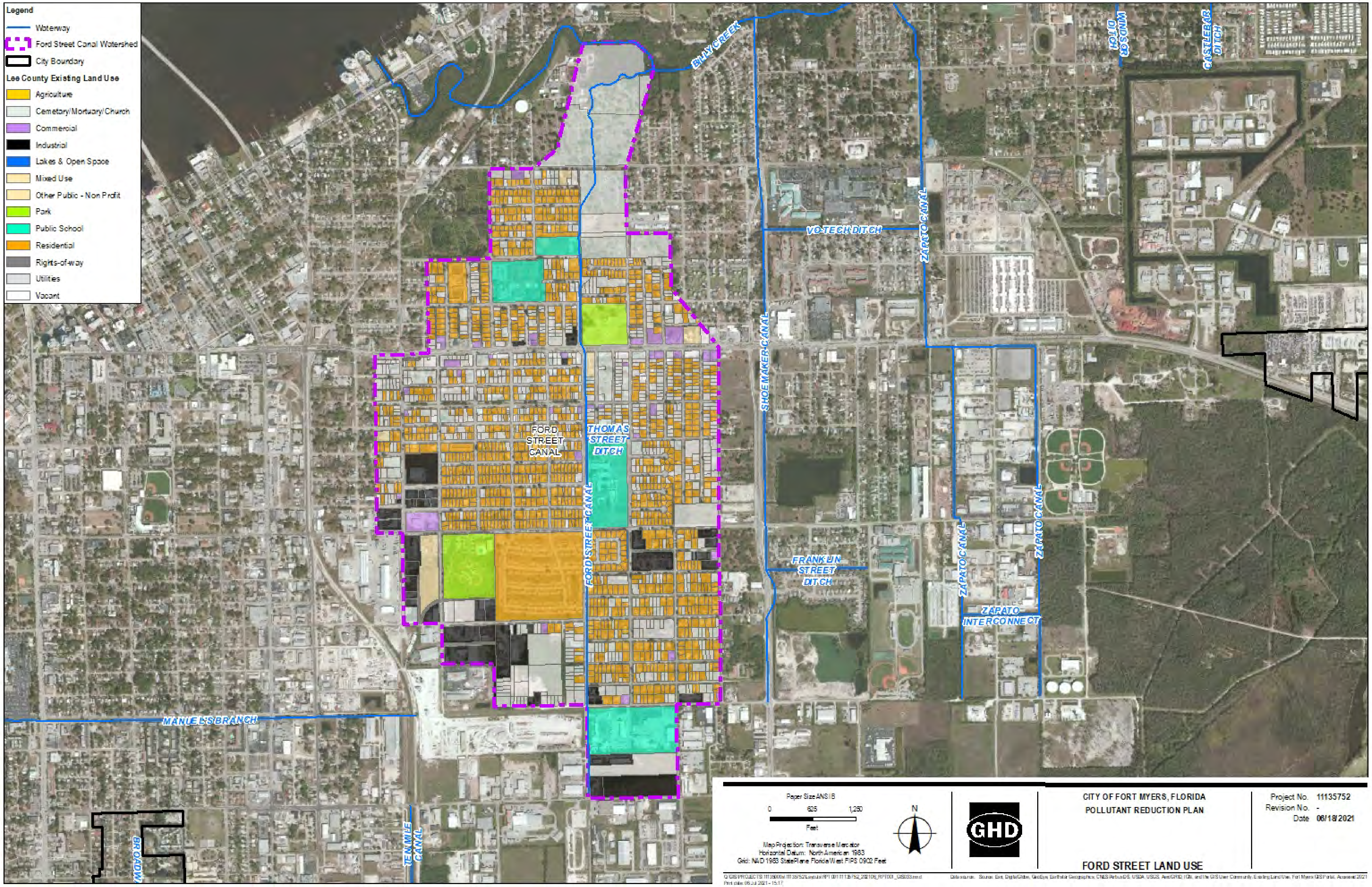


Figure 8 Ford Street Land Use

Much of the land encompassed within the Billy Creek watershed are comprised of residential properties, parks, schools, and cemeteries. Commercial properties are spread out along the watershed, with the majority commercial properties located along Dr. Martin Luther King Jr. Boulevard, in the central portion of the watershed, and Palm Beach Boulevard/First Street, located within the western portion of the watershed. Industrial properties are located in the southern portion of the watershed and in a small area on the western-central portions of the watershed. A few agricultural areas are located near the headwaters of the creek.

3.1.2 Manuel Branch

Manuel's Branch sub drainage segment, identified as WBID 3240V, discharges into the estuary segment of the Caloosahatchee River, and is illustrated in **Figure 9**. The watershed extends westward from the southern extent of Ford Street canal to the discharge point at the Caloosahatchee River. However, while used as a point of reference, it should be noted that Ford Street Canal drains north and is not hydraulically connected to Manuel Branch.

Based on a review of historical aerial photographs, obtained from UF and FDOT collections, areas within the Manuel Branch watershed consisted of a mixture of wooded lowlands, apparent agricultural fields, and residential neighborhoods from at least 1944. Increased residential development is evident along the creek and its tributaries in the 1960s, and the watershed areas appears to be developed in a similar fashion to the present-day configuration by the 1980s. Historical aerial photographs of the Manuel Branch watershed are included as **Appendix C**.

Present-day land use is depicted on **Figure 10**.

The eastern portion of the Manuel Branch watershed currently consists of a mixture of industrial and commercial properties. The central and western portions of the watershed are developed with residential properties, a hospital, parks, and school properties. A commercial thoroughfare is located along Cleveland Avenue. Much of the area encompassed by the Manuel Branch watershed is built-up, and significant growth is not anticipated.

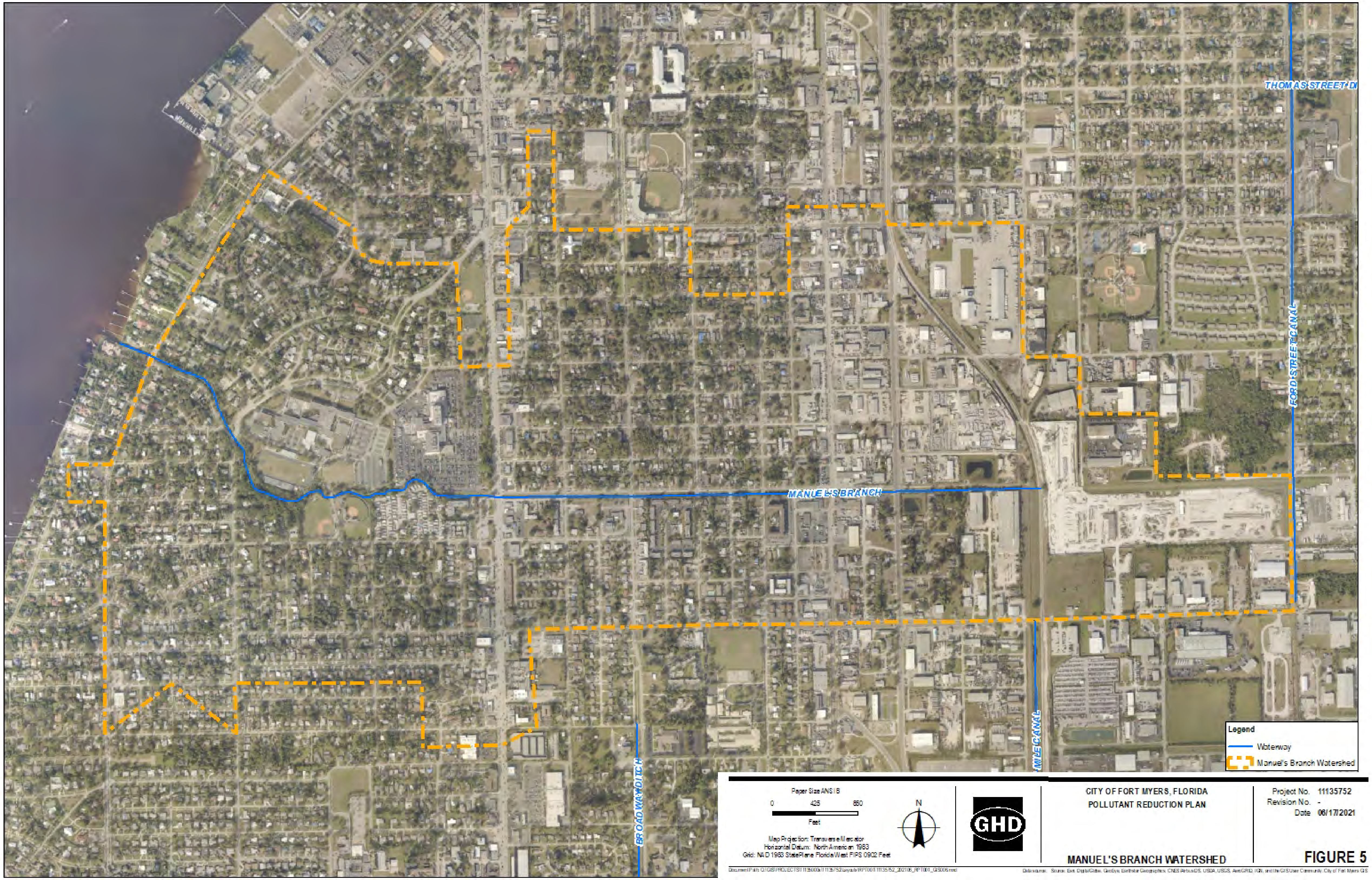


Figure 9 ***Manuel Branch Watershed***

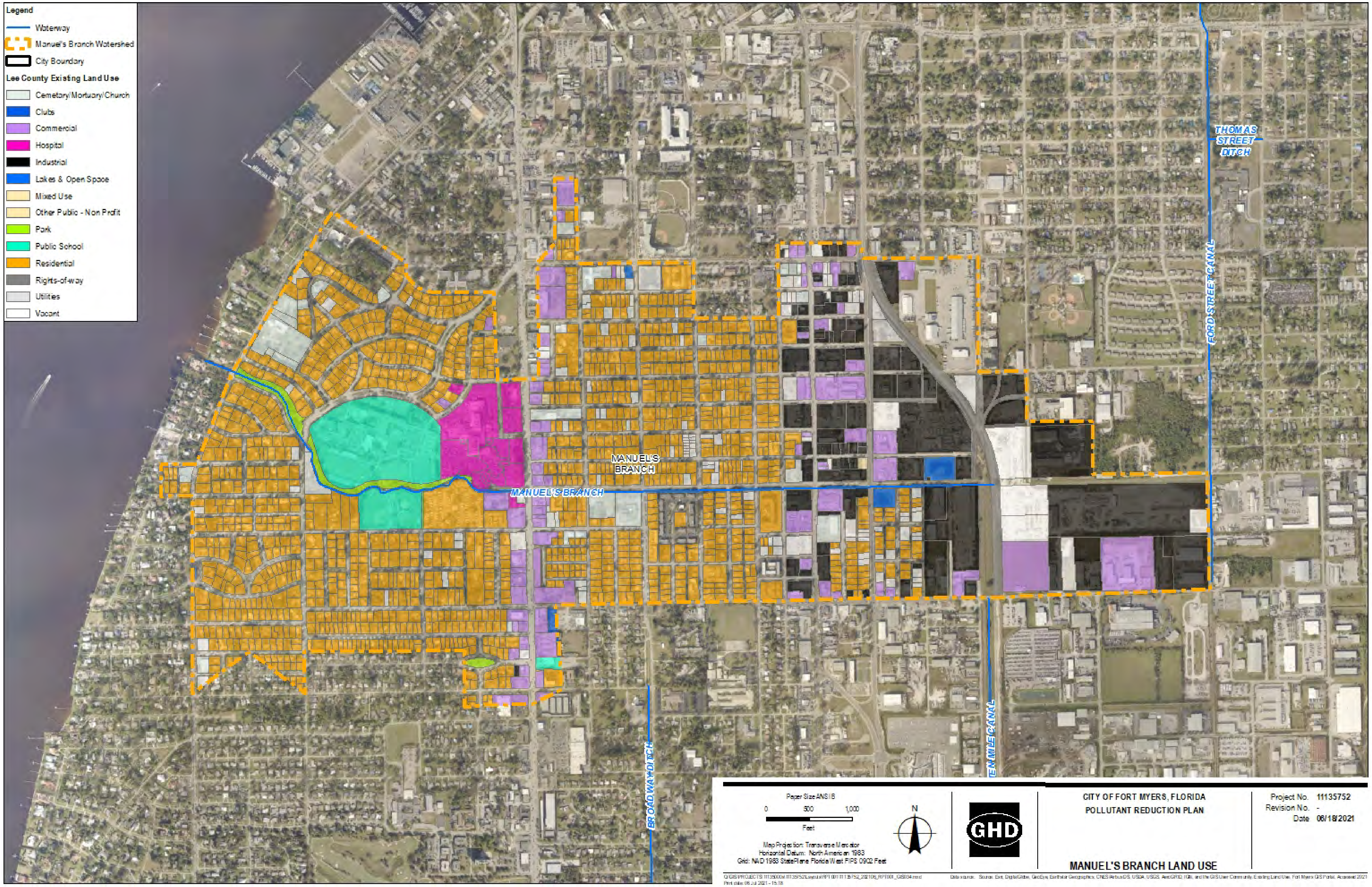


Figure 10 Manuel Branch Land Use

4. Potential Source Identification

4.1 Historical Data

As described below, historical data pertaining to specific conductance, fecal coliform, and E. coli were evaluated for each watershed. To establish a baseline background conditions, it is necessary to review publicly available historical data from various online database resources that are both reputable and generally accepted in the industry of water quality monitoring as valid. Historical data, was obtained from the Coastal & Heartland National Estuary Partnership, USF Water Institute CHNEP Wateratlas website (https://chnep.wateratlas.usf.edu/), included data from the following sources:

- Lee County Environmental Laboratory (LEE_WQ);
- FDEP South District (STORET_21FLFTM);
- FDEP Historic Data from Legacy STORET (LEGACYSTORET_21FLA and LEGACYSTORET_21FLSFWM); and,
- The City of Fort Myers (WIN_21FLCOFM).

Average specific conductance values were calculated for each sample location were compared to criteria in Chapter 62-302.200(29) and (30) Surface Water Quality Standards, which define “Predominately fresh waters” as surface water with specific conductance of less than 4,580 umhos/cm and “Predominately marine waters” as surface water bodies with specific conductance of greater than or equal to 4,580 microohms per centimeter (umhos/cm) and “Predominately marine waters” as surface water bodies with specific conductance of greater than or equal to 4,580 umhos/cm.

Much of the historical sampling was analyzed for fecal coliform; therefore, a general 1:1 ratio of fecal coliform to E. coli was assumed for this report. Further, the 1:1 ratio was applied for determining equivalent trigger level categories for analysis of historical trends. However, studies to estimate the proportion of E. coli in fecal coliform have indicated values of 77%, 80%, and 84.3% (Comparison of thermotolerant coliforms and Escherichia coli densities in freshwater bodies, Hachich, Di Bari, Christ, Lamparelli, Ramos, and Sato 2012). Additional analysis was performed comparing historical precipitation data, obtained from the Florida Climate Center (https://climatecenter.fsu.edu/climate-data-access-tools/downloadable-data) to identify trends in fecal bacteria in each watershed.

4.1.1 Billy Creek

Historical data is available for Billy Creek dating to 1974. Historical sample locations are illustrated in **Figure 11** below.

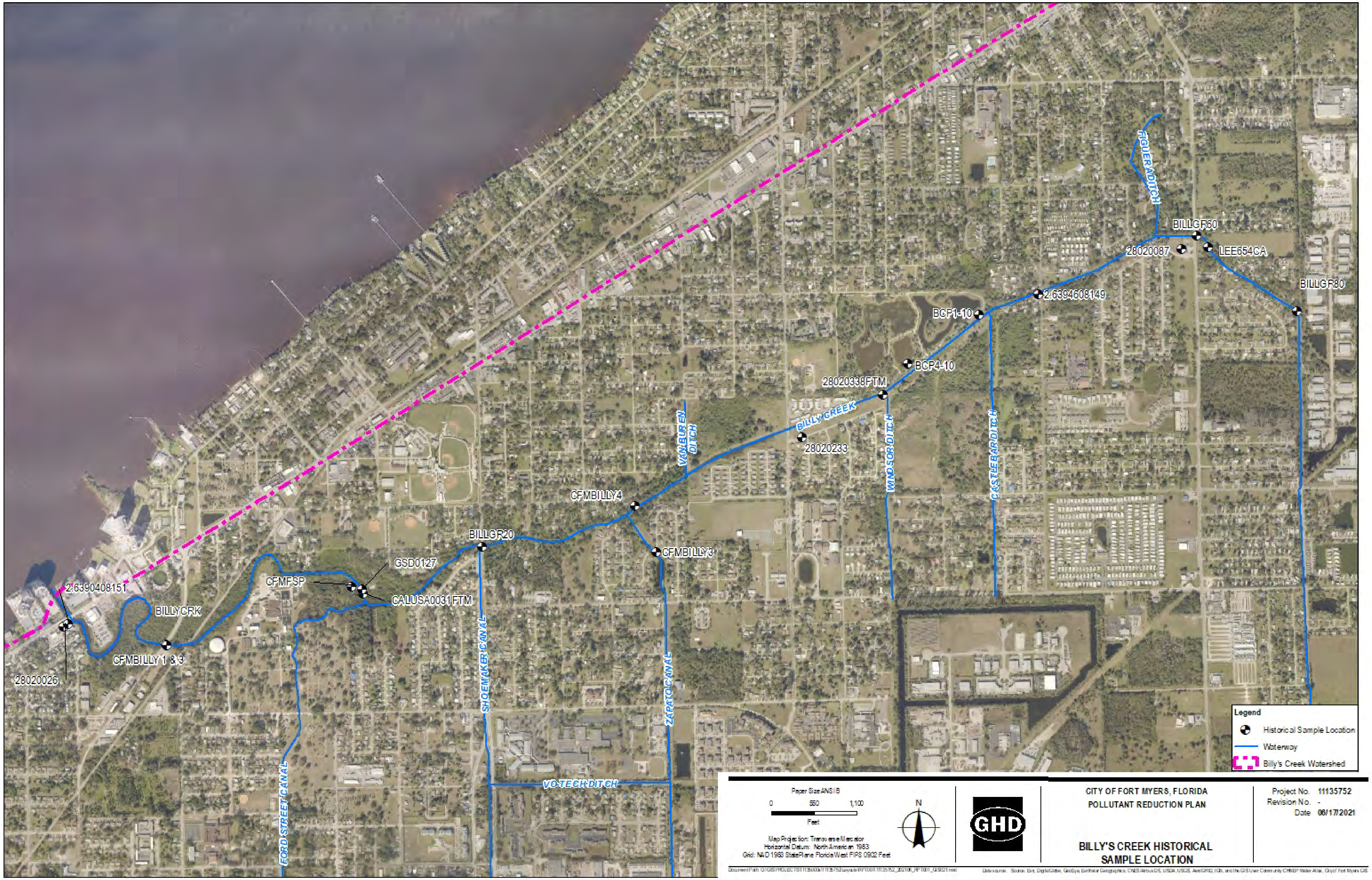


Figure 11 Billy Creek Historical Sample Location Map

Average specific conductance for sample locations within Billy Creek ranges from 556.4 umhos/cm at the BCP4-10 location to 15,508.9 umhos/cm at the 28020026 sample location. With the exception of location 28020026, average specific conductance values were below 4,580 umhos/cm; therefore, sample locations are classified as predominantly freshwater per Chapter 62-302. **Table 1** summarizes specific conductance for Billy Creek.

Table 4.1 Historical Data – Billy Creek Specific Conductance Averages

Station ID	Station Name	Characteristic	Average Result
LEE654CA	Billy's Creek At Ortiz Rd (WBID 3240J)	Specific conductance	675 umhos/cm
BILLGR60	Billy Creek- Ortiz	Specific conductance	633.6 umhos/cm
28020087	Billy Creek At Sr808 / South-East / Lower Florida	Specific conductance	1756.1 umhos/cm
BCP1-10	Upstream Of Weir In Billy Creek @ Inlet To Preserve	Specific conductance	595.6 umhos/cm
BCP4-10	Discharge From Weir Of Marsh #2 To Billy Creek	Specific conductance	556.4 umhos/cm
28020338FTM	Billys Creek @ Windsor Drive	Specific conductance	827 umhos/cm
28020233	Billy's Cr @ Marsh Ave, Ft Myers / Southeast / Lower Florida Area	Specific conductance	791.4 umhos/cm
CFMBILLY4	Billy's Creek Just Upstream Of Zapato Street Discharge	Specific conductance	732 umhos/cm
CFMBILLY3	Zapato St Discharge Into Billy Creek	Specific conductance	810.7 umhos/cm
BILLGR20	Discharge From Weir Of Marsh #2 To Billy Creek	Specific conductance	2897.1 umhos/cm
CALUSA0031FTM	Billy Creek @ Great Calusa Blueway	Specific conductance	3001.1 umhos/cm
G3SD0127	Billy Creek Cm	Specific conductance	2108 umhos/cm
CFMFSP	W Side Of Boardwalk Approx 75' N Of TEE	Specific conductance	689 umhos/cm
BILLYCRK	Billy Cr. Near The Ft. Myers Southern Railway B / /	Specific conductance	4174.6 umhos/cm
28020026	Billy Cr Sr 80 Br Ne Ft Myers / South-East / Lower Florida	Specific conductance	15508.9 umhos/cm

Based on the above specific conductance values, historical data was analyzed for the presence of E. coli due to the waterbody being classified as predominantly fresh water. Historical data is presented in table format, and is characterized utilizing the Course of Action Triggers, as identified by the FDEP's Toolkit*.*

Because it is the FDEP statutory surface water standard, for the purpose of this PRP, a concentration of fecal coliform or E.coli of greater than or equal to 410 cfu/100mL or greater arewill be concidered considered an exceedance and are assigned to an action trigger catagory. Utilizing a baseline of 410 cfu/100mL, annual percent exceedances were calculated for historical sample locations with datasets incorporating significant numbers of samples collected over time, as illustrated in **Tables 2** and **3** below.

Table 2 Historical Data – Billy Creek

Bacteria Counts						
Fecal Coliform	All Samples	< 400 cfu/100 mL	400-800 cfu/100 mL	800-10,000 cfu/100 mL	10,000-100,000 cfu/100 mL	>100,000 cfu/100 mL
Number of Samples	759	420	179	158	2	0
Percentage of Samples	100%	55%	24%	21%	<1%	0%
E. Coli	All Samples	< 400 cfu/100 mL	400-800 cfu/100 mL	800-10,000 cfu/100 mL	10,000-100,000 cfu/100 mL	>100,000 cfu/100 mL
Number of Samples	347	220	47	78	2	0
Percentage of Samples	100%	63%	14%	22%	1%	0%

Table 3 Historical Data – Billy Creek Percent Exceedances

Station ID	Constituent	Year	Percent of Exceedances
BILLGR60	Fecal Coliform	1996	50%
BILLGR60	Fecal Coliform	1997	16.7%
BILLGR60	Fecal Coliform	1998	70%
BILLGR60	Fecal Coliform	1999	9.1%
BILLGR60	Fecal Coliform	2000	41.7%
BILLGR60	Fecal Coliform	2001	61.5%
BILLGR60	Fecal Coliform	2002	54.5%
BILLGR60	Fecal Coliform	2003	72.7%
BILLGR60	Fecal Coliform	2004	90%
BILLGR60	Fecal Coliform	2005	27.2%
BILLGR60	Fecal Coliform	2006	30%
BILLGR60	Fecal Coliform	2007	41.7%
BILLGR60	Fecal Coliform	2008	58.3%
BILLGR60	Fecal Coliform	2009	78.6%
BILLGR60	Fecal Coliform	2010	75%
BILLGR60	Fecal Coliform	2011	100%
BILLGR60	Fecal Coliform	2012	100%
BILLGR60	Fecal Coliform	2013	53.8%
BILLGR60	Fecal Coliform	2014	75%
BILLGR60	Fecal Coliform	2015	83.3%
BILLGR60	Fecal Coliform	2016	100%
BILLGR60	Fecal Coliform	2017	81.8%
BILLGR60	Fecal Coliform	2018	100%
BILLGR60	Fecal Coliform	2019	100%
BILLGR60	Fecal Coliform	2020	100%
BCP1-10	Escherichia coli	2017	45.5%
BCP1-10	Escherichia coli	2018	53.8%
BCP1-10	Escherichia coli	2019	25%
BCP1-10	Escherichia coli	2020	36.4%
BCP4-10	Escherichia coli	2017	12.5%
BCP4-10	Escherichia coli	2018	0%
BCP4-10	Escherichia coli	2019	8.3%
BCP4-10	Escherichia coli	2020	9.1%

Station ID	Constituent	Year	Percent of Exceedances
CFMBILLY4	Fecal Coliform	2005	33.3%
CFMBILLY4	Fecal Coliform	2006	50%
CFMBILLY4	Fecal Coliform	2007	41.7%
CFMBILLY4	Fecal Coliform	2008	42.9%
CFMBILLY4	Fecal Coliform	2009	41.7%
CFMBILLY4	Fecal Coliform	2010	83.3%
CFMBILLY3	Fecal Coliform	2005	18.2%
CFMBILLY3	Fecal Coliform	2006	33.3%
CFMBILLY3	Fecal Coliform	2007	41.7%
CFMBILLY3	Fecal Coliform	2008	8.3%
CFMBILLY3	Fecal Coliform	2009	25%
CFMBILLY3	Fecal Coliform	2010	50%
CFMBILLY3	Escherichia coli	2017	11.1%
CFMBILLY3	Escherichia coli	2018	8.3%
CFMBILLY3	Escherichia coli	2019	25%
CFMBILLY3	Escherichia coli	2020	18.2%
BILLGRO20	Fecal Coliform	1996	30%
BILLGRO20	Fecal Coliform	1997	8.3%
BILLGRO20	Fecal Coliform	1998	16.7%
BILLGRO20	Fecal Coliform	1999	9.1%
BILLGRO20	Fecal Coliform	2000	27.3%
BILLGRO20	Fecal Coliform	2001	8.3%
BILLGRO20	Fecal Coliform	2002	10%
BILLGRO20	Fecal Coliform	2003	50%
BILLGRO20	Fecal Coliform	2004	66.7%
BILLGRO20	Fecal Coliform	2005	66.7%
BILLGRO20	Fecal Coliform	2006	40%
BILLGRO20	Fecal Coliform	2007	41.7%
BILLGRO20	Fecal Coliform	2008	15.4%
BILLGRO20	Fecal Coliform	2009	21.4%
BILLGRO20	Fecal Coliform	2010	50%
BILLGRO20	Fecal Coliform	2011	50%
BILLGRO20	Fecal Coliform	2012	50%
BILLGRO20	Fecal Coliform	2013	76.9%
BILLGRO20	Fecal Coliform	2014	50%
BILLGRO20	Fecal Coliform	2015	33.3%
BILLGRO20	Fecal Coliform	2016	33.3%
BILLGRO20	Escherichia coli	2018	81.8%
BILLGRO20	Escherichia coli	2019	40%
BILLGRO20	Escherichia coli	2020	40%
CFMFSP	Escherichia coli	2017	62.5%
CFMFSP	Escherichia coli	2018	54.5%
CFMFSP	Escherichia coli	2019	66.7%
CFMFSP	Escherichia coli	2020	27.3%

Trend graphs, which inlcude catagorization of sample concentrations into action trigger levels are included with analiysis below.

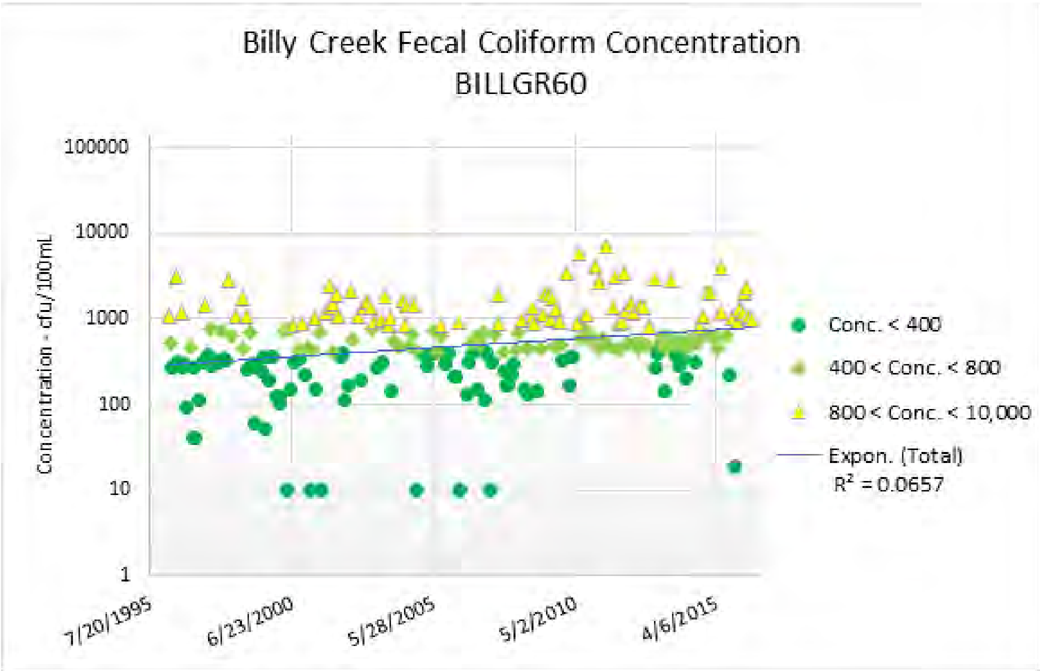


Figure 12 ***Billy Creek Fecal Coliform Concentration (BILLGRO60)***

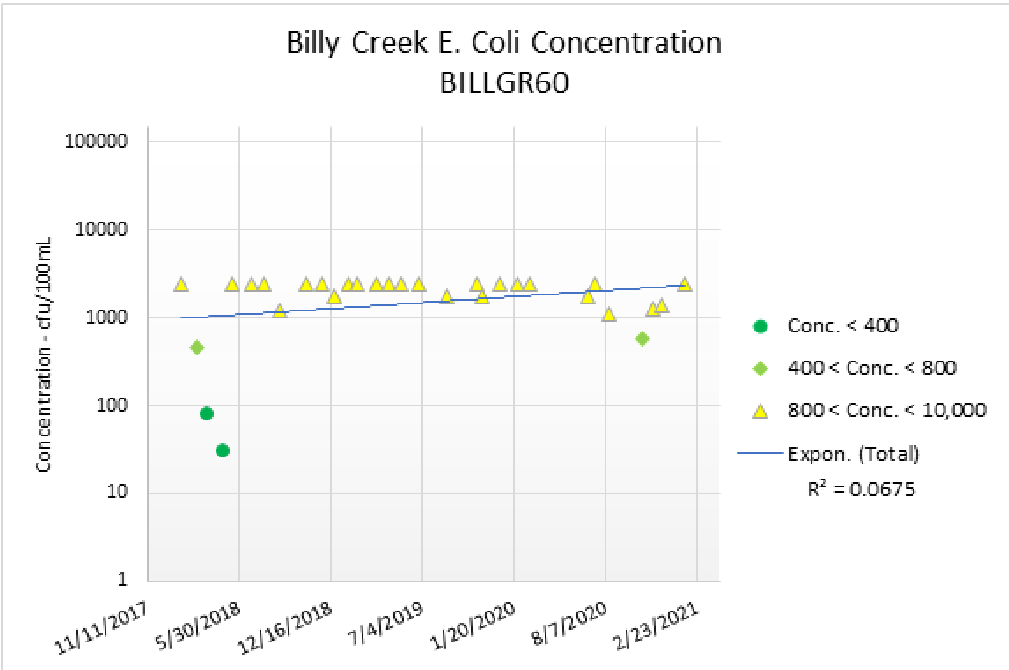


Figure 13 ***Billy Creek E. coli Concentration (BILLGRO60)***

Concentrations of Fecal Coliform at the BILLGRO60 location, described as located at Ortiz Avenue, generally demonstrated an increasing trend between 1995 and 2015/2016. E. coli have historically been primarily in the “Difficult to Discern” action trigger category. Trends have remained relatively consistent at this location since 2017.

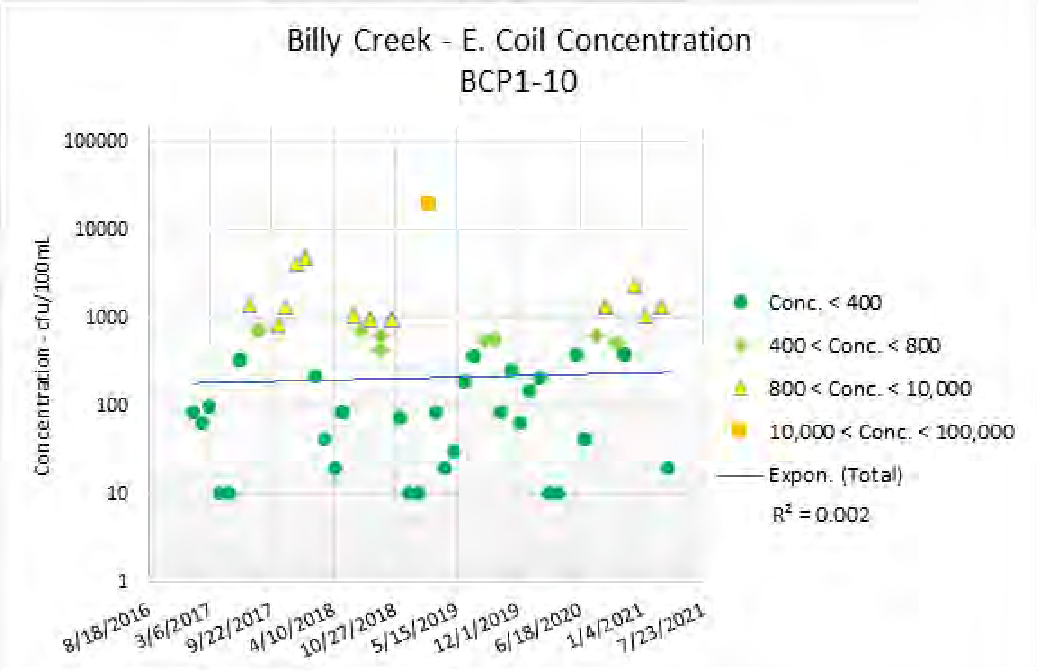


Figure 14 ***Billy Creek E. coli Concentration (BCP1-10)***

Concentrations of E. coli at the BCP1-10 location, described as upstream of the weir in Billy Creek at the inlet to the preserve, has historically predominantly been below the lowest concentrations listed within the action trigger catagories (i.e, >410 cfu/100mL). The concentraion of E. coli in the sample collected on February 13, 2019 was catagorized as in the “Very Concerning Level” action trigger levels; however subsequent sampling was below the lowest threshold level and is interpretted to be the result of a one-time event as opposed to an on-going point source.

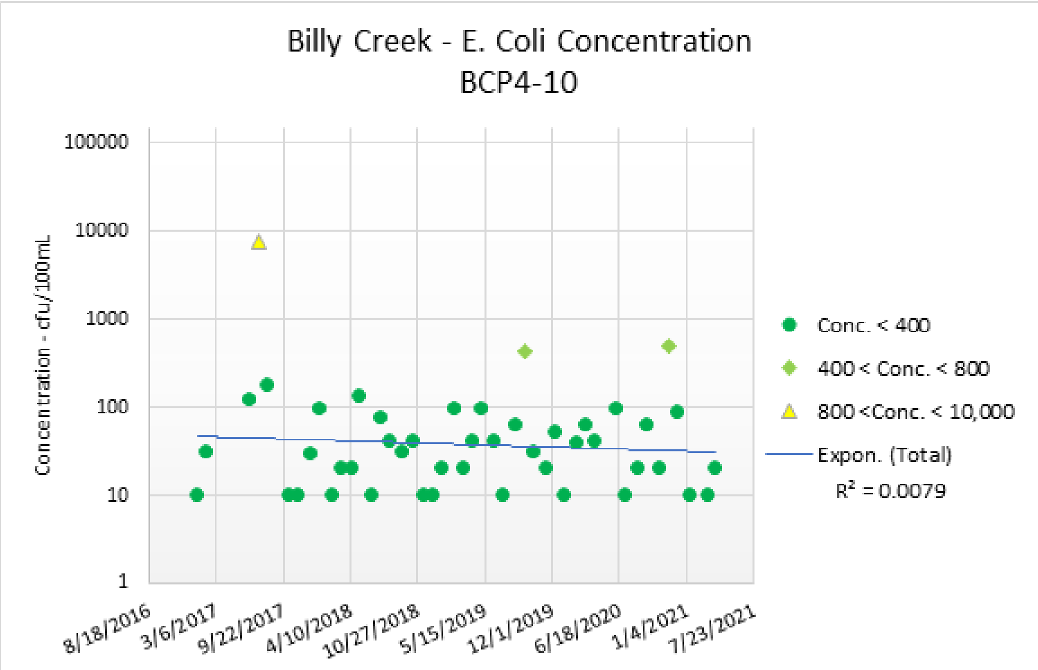


Figure 15 ***Billy Creek E. coli Concentration (BCP4-10)***

Concentrations of E. coli at the BCP4-10 location, described as discharge from the weir of marsh #2 to Billy Creek, has historically predominantly been below the lowest concentrations listed within the action trigger catagories (>410 cfu/100mL). The concentraion of E. coli in the sample collected on February 13, 2019 was catagorized as within the “Difficult to Discern” action trigger levels; however subsequent sampling was below the lowest threshold level and is interpretted to be the result of a one-time event as opposed to an on-going point source.

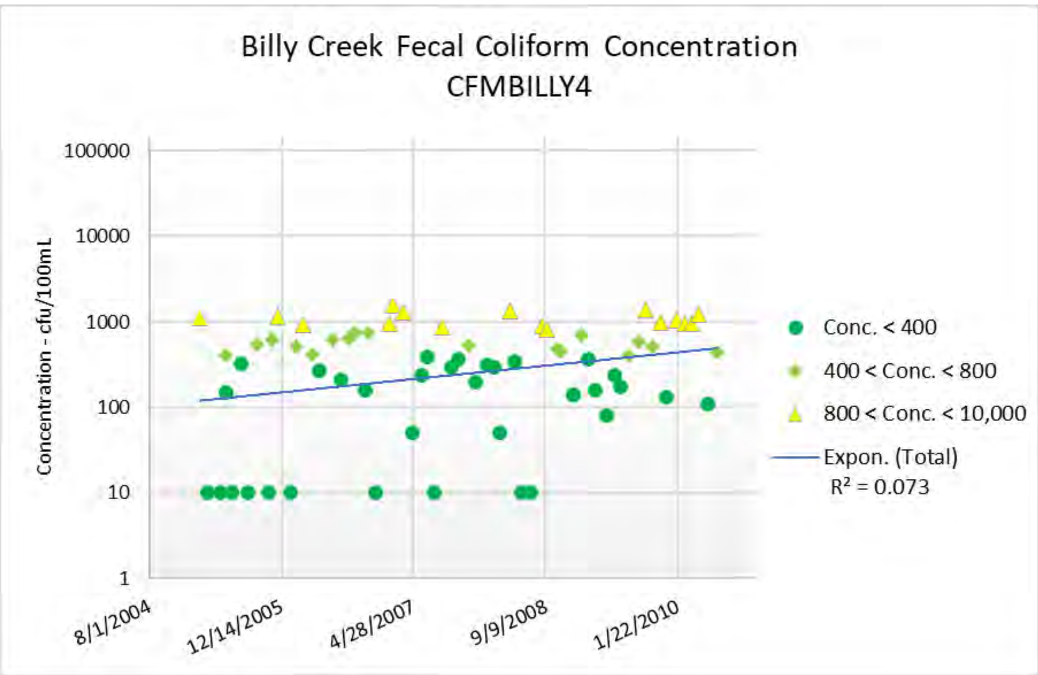


Figure 16 ***Billy Creek Fecal Coliform Concentration (CFMBILLY4)***

Concentrations of Fecal Coliform, collected from the CFMBILLY4 location, described as Billy Creek discharge just upstream of Zapato Street discharge, were predominately below the action trigger catagories, with an approximate equal distribution in the "Low Level Exceedance" and "Difficult to Discern" catagories. The trend at the CFMBILLY4 location slightly increased through the sampling duration (February 2005 through June 2010).

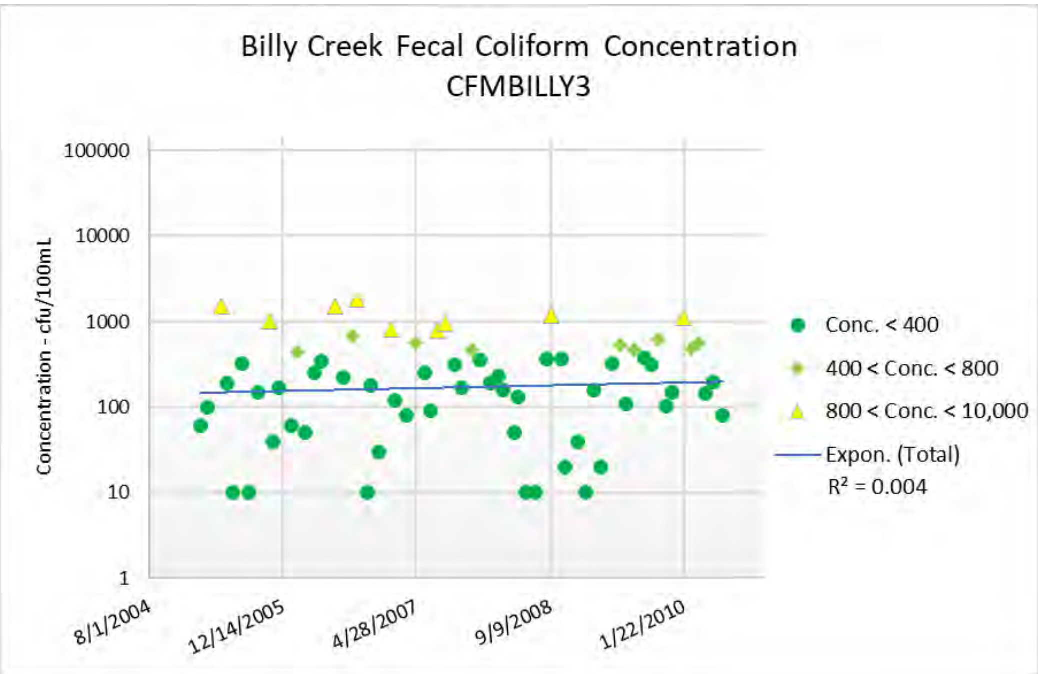


Figure 17 ***Billy Creek Fecal Coliform Concentration (CFMBILLY3)***

Concentrations of Fecal Coliform, collected from the CFMBILLY3 location, described as Zapato Street canal discharge to Billy Creek, were predominately below the action trigger catagories, with an approximate equal distribution in the "Low Level Exceedance" and "Difficult to Discern" catagories. The trend at the CFMBILLY4 location slightly increased through the sampling duration.

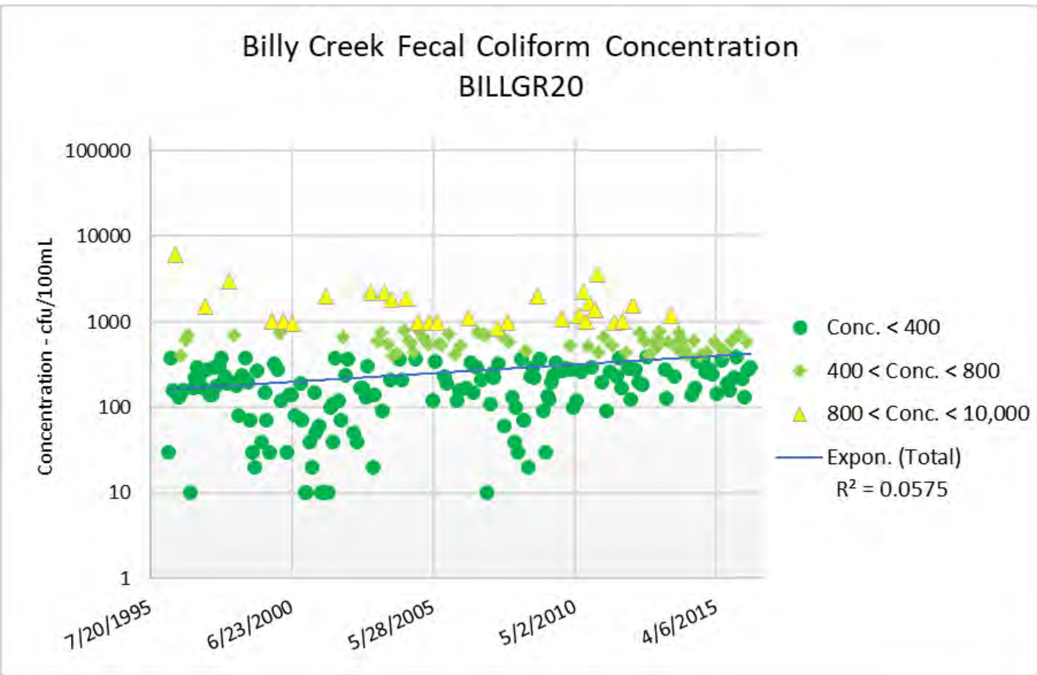


Figure 18 ***Billy Creek Fecal Coliform Concentration (BILLGRO20***

Concentrations of Fecal Coliform, collected from the BILLGR20 location, described as Billy Creek - Palmetto, were predominately below the action trigger catagories, with an approximate equal distribution in the “Low Level Exceedance” and “Difficult to Discern” catagories. However, an increase in concentrations of Fecal Coliform in the “Difficult to Discern” category is observed generally between 2010 and 2012. The trend at the BILLBG20 location slightly increased through the sampling duration (i.e., March 1996 through June 2016).

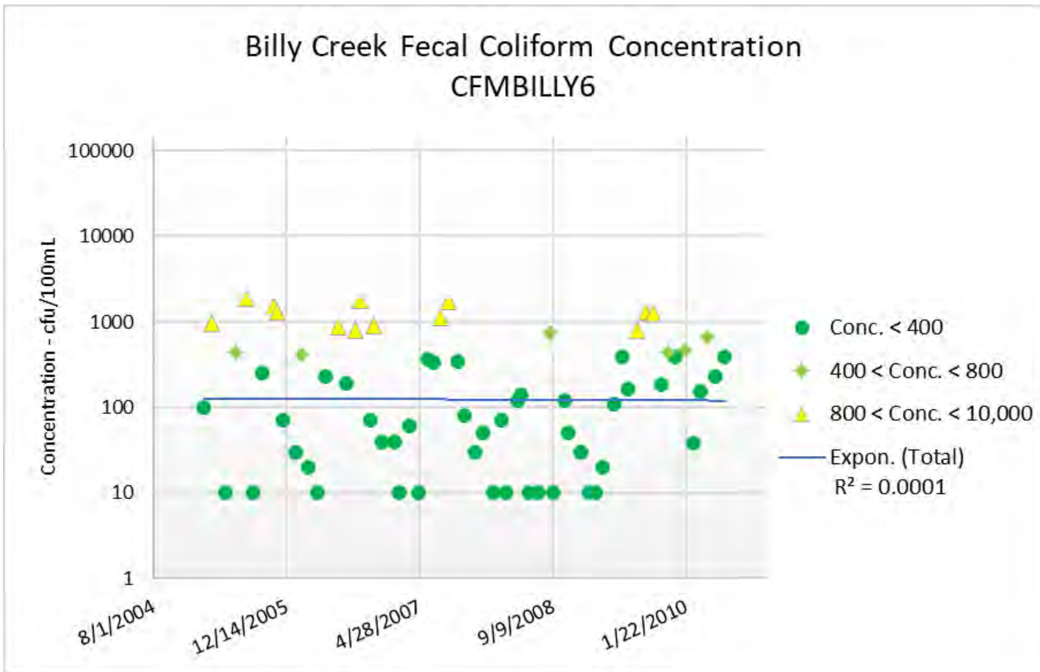


Figure 19 ***Billy Creek Fecal Coliform Concentration (CFMBILLY6)***

Concentrations of Fecal Coliform, collected from the CFMBILLY6 location, described as Billy Creek just upstream of Ford Street discharge DUP, were predominately below the action trigger catagories, with an approximate equal distribution in the “Low Level Exceedance” and “Difficult to Discern” catagories. The trend at the CFMBILLY6 location remained relatively constant during the sampling duration (i.e., February 2005 through June 2010).

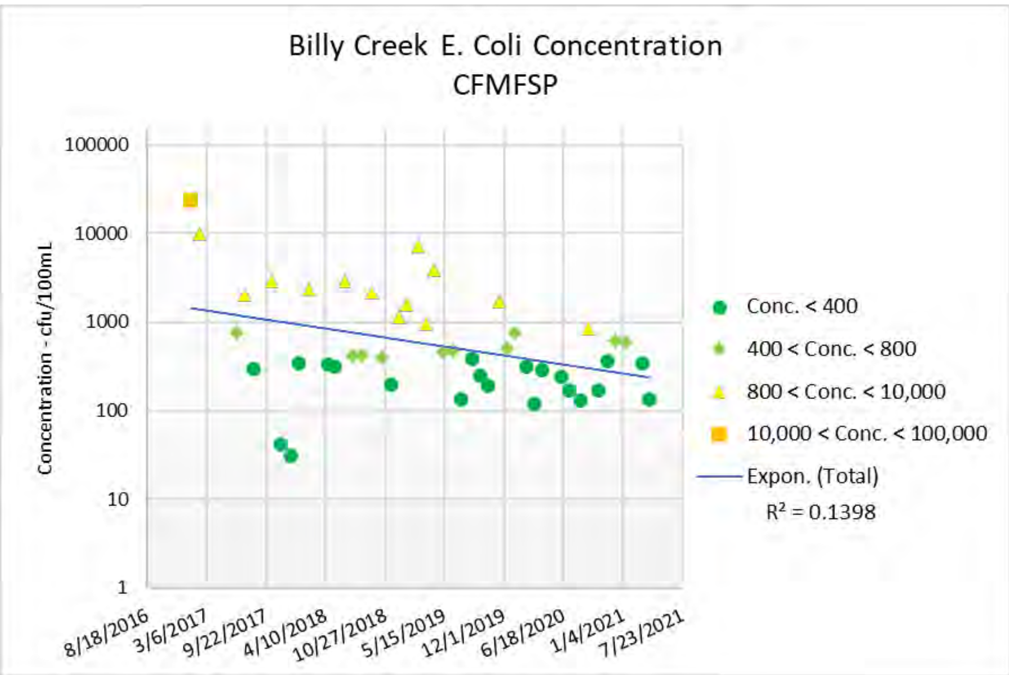


Figure 20 *Billy Creek E. coli Concentration (CFMFSP)*

Concentrations of E. coli, collected from the CFMFSP location, described as the west side of the boardwalk approximately 75 feet north of TEE, were intially elevated and in the “Very Concerning” and “Difficult to Discern” action trigger catagories. Concentrations were consistenly in the “Difficult to Discern” action trigger category from December 2018 and April 2019. However, a decresing trend is apparent, particularly between July 2019 and 2021.

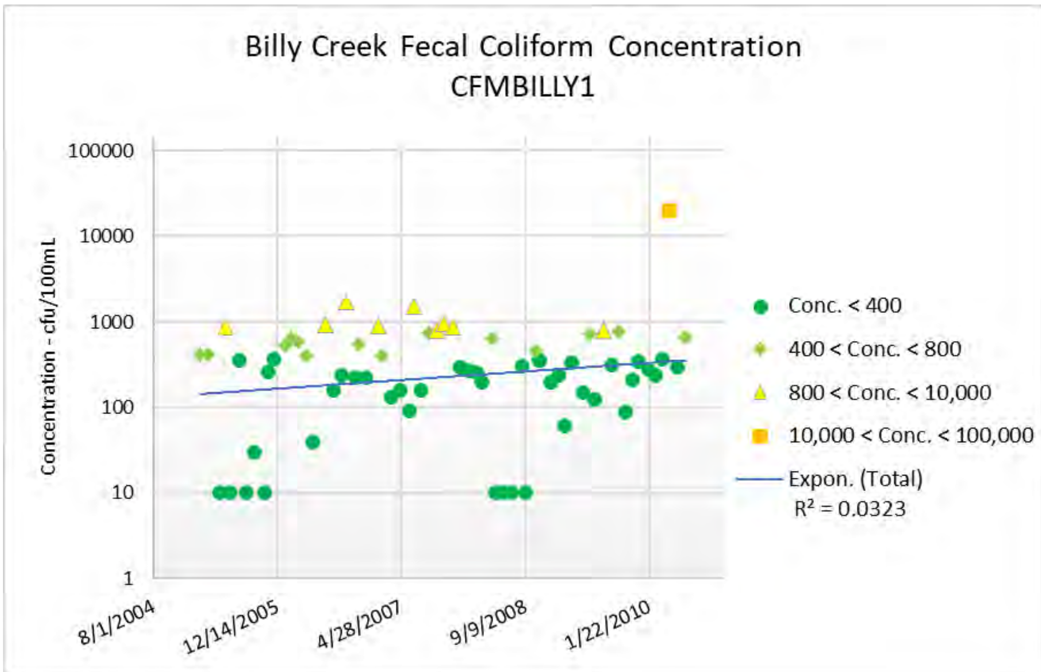


Figure 21 *Billy Creek Fecal Coliform Concentration (CFMBILLY1)*

Concentrations of Fecal Coliform, collected from the CFMBILLY1 location, described as Billy Creek at Seaboard Street, were predominately below the action trigger catagories, with an approximate equal distribution in the “Low Level Exceedance” and “Difficult to Discern” catagories. The trend at CFMBILLY1 slightly increased during the sampling duration (i.e., February 2005 through June 2010). The concentraion of Fecal Coliform in the sample collected on April 12, 2010 was catagorized as within the “Very Concerning Level” action trigger levels; however, subsequent sampling was below the lowest threshold level and is interpretted to be the result of a one-time event as opposed to an on-going point source.

Based on a review of publicy available historical data collected from sample locations within Billy Creek, concentrations of fecal coliform and E. coli have predominately been below the threshold for action trigger category assignment. Data collected between 2017 and 2021 indicate increasing trends in the eastern portion of the creek, downstream of the portion of the creek located within Lee County and beyond City boundaries. Concentrations downstream exhibit generally decreasing trends. Elevated concentrations falling into the "Very Concerning" action trigger category may be the result of one time or short-term events, insufficent dilution at the laboratory, or a disturbance during sample collection.

No significant trends were identified when comparing precipitation data to FIB concentrations.

4.1.2 Manuel Branch

Historical data was available for Manuel Branch dating to 1973. Historical sample locations are illustrated in **Figure 22**.

Average specific conductance for sample locations within Manuel Branch ranges from 484.7 umhos/cm at the G3D0078 location to 7913.2 umhos/cm at the 28020225 sample location. With the exception of location 28020225, average specific conductance values were below 4,580 umhos/cm, and sample locations are classified as predominantly freshwater per Chapter 62-302, as illustrated in **Table 5**.

Table 5 Historical Data – Manuel Branch Conductivity Averages

Station ID	Station Name	Characteristic	Average Result Value
28020289FTM	Manuels Branch Site 4	Specific conductance	619.6 umhos/cm
G3D0078	Manuel Branch @ Broadway	Specific conductance	484.7 umhos/cm
28020288FTM	Manuels Branch Site3	Specific conductance	558.3 umhos/cm
28020287FTM	Manuels Branch Site 2	Specific conductance	625.4 umhos/cm
28020249FTM	Manuel's Branch Upstream Of The Weir Near The School/Park	Specific conductance	1088.9 umhos/cm
CFMMANUEL	Manuel's Branch At Control Structure Behind Ft Myers High	Specific conductance	974.7 umhos/cm
LEE664US	Manual's Branch Upstream Of Cortez Blvd (WBID 3240I)	Specific conductance	705.2 umhos/cm
G1SD0070	Manuel Branch @ Neighborhood Park	Specific conductance	757.3 umhos/cm
28020225	Manual Branch At Mcgregor Blvd(Sr867)	Specific conductance	7913.2 umhos/cm

Historical data is present in table format, which is characterized utilizing the Course of Action Triggers.

Table 6 Historical Data Statistics – Manuel Branch

Bacteria Count						
Fecal Coliform	All Samples	< 400 cfu/100 mL	400-800 cfu/100 mL	800-10,000 cfu/100 mL	10,000-100,000 cfu/100 mL	>100,000 cfu/100 mL
Number of Samples	127	33	28	66	0	0
Percentage of Samples	100%	26%	22%	52%	0%	0%
E. Coli	All Samples	< 400 cfu/100 mL	400-800 cfu/100 mL	800-10,000 cfu/100 mL	10,000-100,000 cfu/100 mL	>100,000 cfu/100 mL
Number of Samples	59	8	11	38	1	1
Percentage of Samples	100%	14%	19%	64%	2%	2%

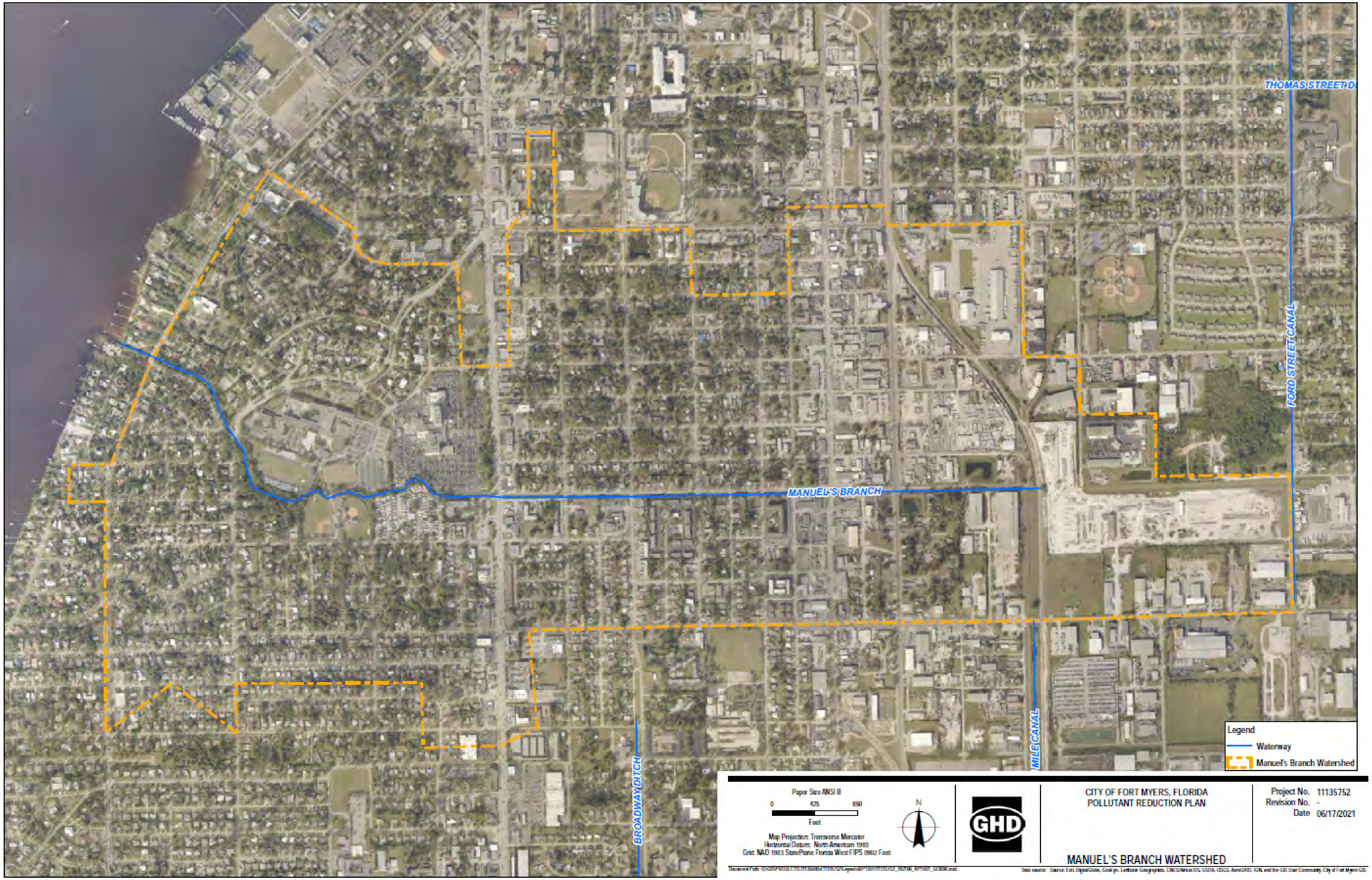


Figure 22 Manuel Branch Historical Sample Locations

Utilizing a baseline of 410 cfu/100mL, annual percent exceedances were calculated for historical sample locations with datasets incorporating significant numbers of samples collected over time, as illustrated in **Table 7**.

Table 7 Annual Percent Exceedances

StationID	Characteristic	Year	Percent of Exceedances
28020289FTM	Fecal Coliform	2003	50%
G3SD0078	Escherichia coli	2018	60%
28020288FTM	Fecal Coliform	2003	83.3%
28020287FTM	Fecal Coliform	2003	83.3%
28020249FTM	Fecal Coliform	1999	100%
28020249FTM	Fecal Coliform	2000	83.3%
28020249FTM	Fecal Coliform	2001	100%
28020249FTM	Fecal Coliform	2002	66.7%
28020249FTM	Fecal Coliform	2007	100%
CFMMANUEL	Fecal Coliform	2005	45.5%
CFMMANUEL	Fecal Coliform	2006	50%
CFMMANUEL	Fecal Coliform	2007	75%
CFMMANUEL	Fecal Coliform	2008	81.8%
CFMMANUEL	Fecal Coliform	2009	91.7%
CFMMANUEL	Fecal Coliform	2010	83.3%
CFMMANUEL	Escherichia coli	2017	72.7%
CFMMANUEL	Escherichia coli	2018	91.7%
CFMMANUEL	Escherichia coli	2019	100%
CFMMANUEL	Escherichia coli	2020	81.8%
G1SD0070	Escherichia coli	2020	100%
28020225	Fecal Coliform	1992	100%
28020225	Fecal Coliform	1993	100%
28020225	Fecal Coliform	1999	75%

Trend graphs, which inlcude catagorization of sample concentrations into action trigger levels are included with analyisis below.

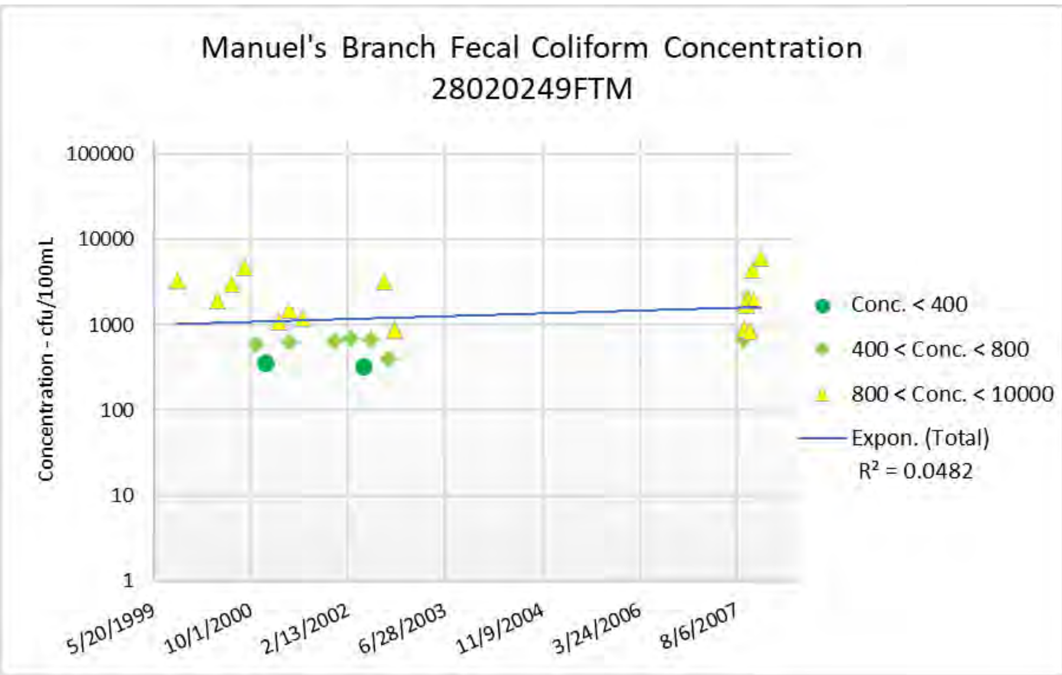


Figure 23 ***Manuel Branch Fecal Coliform Concentration (28020249FTM)***

Samples collected at the 28020249FTM sample location were generally in the "Difficult to Discern" action trigger category. A general increasing trend was noted in the samples collected (i.e., between September 1999 and December 2007); however, a significant gap in data is noted between October 2002 and September 2007.

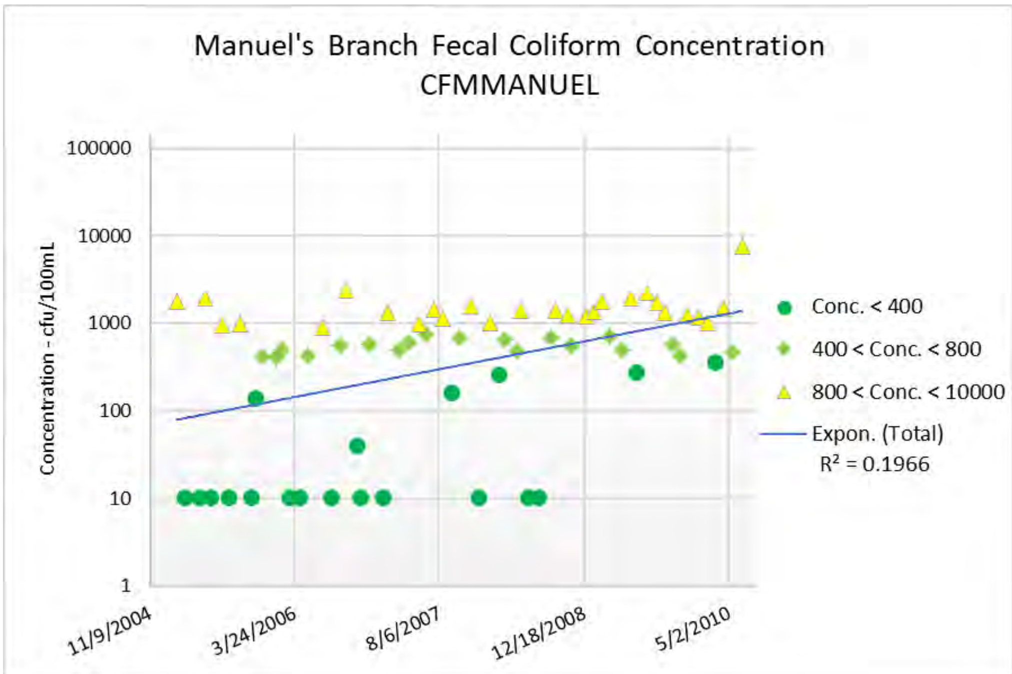


Figure 24 ***Manuel Branch Fecal Coliform Concentration (CFMMANUEL)***

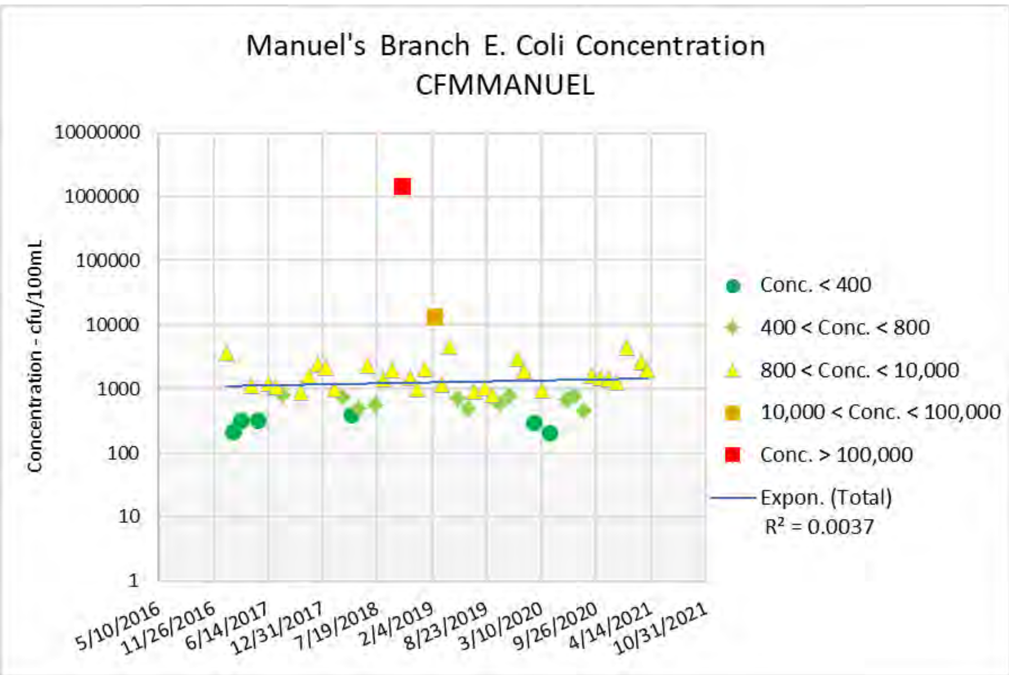


Figure 25 *Manuel Branch E. coli Concentration (CFMMANUEL)*

Samples of fecal coliform collected at the CFMMANUEL sample location were generally distributed between below the exceedance level, the “Low Level Exceedance”, and the “Difficult to Discern” action trigger categories. An increasing trend was noted in the samples collected between February 2005 and June 2010. Concentrations of E. coli generally fell in the “Difficult to Discern” action trigger category. A slight increasing trend is noted. The concentration of E. Coli measured on October 16, 2018 fell in the “Possible emergency” action trigger category, and the E. coli concentration in the sample collected on February 13, 2019 was within the “Very concerning level” action trigger category.

Based on a review of available historical data collected from sample locations within Manuel Branch, concentrations of Fecal Coliform and E. coli have predominately been in the “Low Level Exceedance” and “Difficult to Discern” action trigger category assignments. A slightly increasing trend is observed in the most-recent samples, collected at the CFMMANUEL sample location. Elevated concentrations falling into the “Very Concerning” action trigger category may be the result of one time or short-term events, insuffcent dilution at the laboratory, or a disturbance during sample collection.

No significant trends were identified when comparing precipitation data to FIB concentrations.

5. Current Microbial Source Tracing (MST) Sampling

GHD is currently assisting the City with MST sampling. Sampling activities, performed to identify on-going and/or previously unidentified point sources, were initiated in April 2021 and will be continued until water quality goals are achieved. An iterative sampling approach is utilized to assess for and delineate potential sources of FIB during MST. Grab samples are collected on a monthly basis in accordance with FDEP surface water sampling Standard Operating Procedures (SOPs) at pre-determined stations collectively located in the Billy Creek and Manuel Branch watersheds. E. coli samples are collected from the shore or from canal crossings/overpasses using sterilized sample bottes obtained from the laboratory. The sample bottle is attached to the extended sampling pole and submerged into the water approximately 12 inches, open end first. The bottle is then inverted into the direction of any observed flow and filled. This technique is designed to preserve the best sample quality as there are no intermediate containers used in the sample collection process. Sample collection personnel wear un-powdered surgical gloves during sampling.

GHD field personnel adhere to procedures and protocols identified in the FDEP SOPs. To verify compliance with these procedures, the GHD quality assurance officer will conduct a one-time audit of the field sampling procedures. GHD's QA Officer will use the FDEP surface water sampling audit checklist to confirm adherence to the SOPs. Any variances form the SOPs will be discussed with the field sampling team and will be included in the QA/QC field documentation report. Corrective actions taken to affect compliance with the SOPs will be discussed with the GHD project manager and implemented by the field team. Field duplicates will be collected at a frequency of 1:20 samples collected. Surface water grab sampling procedures outlined within this document adhere to those procedures identified in the FDEP surface water sample collection document FS 2100.

No preservative is used for the microbial test except preservation with wet ice. Samples are immediately placed on wet ice and delivered to the contracted laboratory (Benchmark – NELAC certification number E84167). The holding time for E. coli is 6 hours from collection until deliver to the laboratory. Samples for acetaminophen and HF-183 are collected from pre-determined locations and/or action trigger locations on a quarterly basis.

Benchmark Laboratory performs E. coli tests using Quanti-tray MPN protocol. The test method employed by the lab is Standard Methods 9223B. As part of their quality control program, the lab performs a Method Blank analysis at the beginning of each analytical batch in addition to laboratory replicates at a frequency of 1 for every 10 samples (as sample volume allows). Prior to analysis, each sample is checked for chlorine presence. The incubation time for Total coliform/ E. coli by Quanti Tray is 24+/- 4 hours. Color testing is accomplished by use of a certified IDEXX color comparator prior to counting positive/negative wells.

Based on sample results, expedited follow-up sample collection may be warranted to assess for elevations caused by disturbances during sampling or additional sample locations may be added to further delineate potential source areas.

Source specific tests (DNA markers) will be collected on a quarterly basis at pre-determined locations or based on field observations and/or monthly E. coli results. Samples will be collected in a similar manner using 250 milliliter clean sample bottles obtained from the contract laboratory Source Molecular, Miami, Florida. There is no preservative for these tests except immediately placing on ice and maintaining a temperature of 6 degrees centigrade until delivery to the lab. Holding time for these tests is 48 hours from time of collection until sample processing begins at the lab. All Source Molecular analytical methods are in- house procedures – FDEP has not promulgated in the FAC analytical methods for the DNA market testing to date. The US EPA has developed an analytical procedure for completing DNA marker tests but it has not yet been formally approved by the FDEP.

DNA marker testing for human and animal DNA (quantitative polymerase chain reaction or qPCR) will be completed for Human (HF-183 marker– PMA-qPCR) for differentiation of inactive DNA versus live human bacteria using *Source Molecular* laboratory protocol. Two additional DNA marker testing procedures that may be proposed include:

- Sewage Marker (University of Wisconsin Milwaukee Branch Protocol – marker BAC-V4V5 – 1)
- H8 (human e-coli marker – protocol developed by Harwood, et al, University of South Florida)

Acetaminophen samples will be also be collected on a quarterly basis or based on field observations and/or monthly E. coli results in one-liter amber glass bottles and preserved with hydrochloric acid (HCL). Samples will be analyzed by method L-220 by Eurofins Eaton Analytical in South Bend, Indiana with a non-interference reporting limit of 0.00049 parts per billion.

Chain of custody (COC) will start with the laboratory, and a copy of the COC will be supplied with the sample kit confirming the number of sample bottles received and a reference to the cleanliness.

Sampling personnel will enter sample location details (GPS coordinates, ambient conditions, collection time and date, etc.) on the field collection form. A copy of this field collection form is provided in **Appendix E**. A completed copy of the COC will be returned to the laboratory as well. Information to be included on the COC will include sample location, sample matrix, testing requirements, date and time of sampling, and any field observations noted that may be of use to the lab. For instance, if a bird rookery is observed in the proximity of a sampling station, the lab might be advised to adjust the degree of sample dilution. The COC will be signed by the field personnel indicating the samples have been hand delivered/relinquished to the lab or its field courier representative.

In addition to the microbial, acetaminophen and HF-183 testing, all locations will be field sampled for pH, specific conductivity, temperature, and turbidity. The multi-meter(s) used to obtain the field data including turbidity, pH, temperature, specific conductance, and dissolved oxygen is calibrated (or at a minimum calibration confirmed) daily prior to use. The calibration form located in **Appendix F** is used daily to document calibrations results. If meter parameters cannot be calibrated due to apparent malfunction, the meter will not be used to collect the data and will be examined and repaired as needed prior to any further use. Accurate calibration is dependent on use of fresh standard solutions. Commercially available and certified pH 4,7, and 10 buffers, low level conductivity standards and turbidity standards are used to calibrate the meters. Date and time of opening new standard solutions is written on the bottles and standards are never used that have gone beyond their expiration date. The field meters will be calibration verified or re-calibrated daily and the data will be entered onto the multi meter calibration check list.

Quarterly reports will be submitted to the FDEP, which will detail monthly E. Coli sample results, quarterly MST sampling, and any follow-up or delineation sampling performed during the quarter. Analytical data will be uploaded to an Excel spreadsheet, and field notes, laboratory data sheets, and a narrative summary of sampling activities will be provided. Each report will also provide details regarding observation during sampling and regular reconnaissance of the watersheds. Additionally, reports will provide details of action items to address the potential sources identified within the PRP and additional potential sources identified during sampling and reconnaissance.

5.1 April 2021 Sampling Results

GHD personnel collected surface water samples on April 1 and 2, 2021 from twenty-one (21) locations along the Billy Creek and Manuel Branch watersheds. These locations were selected by the City where stormwater discharges occur. Sample locations were selected and confirmed following a reconnaissance of the watersheds and a preliminary Maps on Table meeting. This initial meeting was attended by City staff and GHD on March 26, 2021. Features of interest located during this session included sanitary sewer lines and associated canal crossings, evidence of concentrated wildlife and/or domestic animals, evidence of vagrant activity, and septic tank locations within the watersheds.

There was no obvious evidence of recently dumped human garbage or wastes at any of the sites sampled during the April 2021 event.

The sampling and laboratory analyses (by Benchmark Analytical Laboratories, North Port, Florida; Source Molecular, Miami Lakes, Florida; and, Jupiter environmental Laboratories, Jupiter, Florida) were performed in general conformance with the FDEP field sampling and laboratory analysis quality assurance protocols codified in Chapter 62-160 FAC and SOP for Field Activities (FDEP SOP-001/01).

Samples were placed in accredited laboratory-provided containers, labeled and iced prior to being transported by GHD the day of collection to the accredited laboratories for analyses under documented legal COC. Samples from each location were analyzed for E. coli by SM 9223B). Additionally, samples collected were analyzed for the presence of human genetic material (HF183 by quantitative Polymerase Chain Reaction (qPCR)) DNA analytical technology and acetaminophen by EPA 1694 Personal Care Products.

Field parameters measured at the time of sample collection included temperature, specific conductance, dissolved oxygen (DO), pH and turbidity. Measuring these parameters and recording them lend to the representativeness and reproducibility of the samples and the conditions under which they are collected.

All samples were prepared and analyzed within respective method holding times. The method blank results were non-detect. All reported laboratory control sample (LCS) analyses demonstrated acceptable accuracy. Laboratory duplicate analyses were performed for some analytes. The matrix spike (MS) results were evaluated per the laboratory limits. The MS analyses performed were acceptable, demonstrating good analytical accuracy and are, therefore, deemed valid.

Concentrations of E. coli in the April 2021 samples ranged from not detected with a method detection limit (MDL) of 10 cfu/100 mL at Veronica Shoemaker-1 to 4,106 cfu/100mL at Manuel-2. Individual concentrations of E. coli in samples collected during the April 2021 event at the Ford Street-3, CFM_Marsh, CFM_Manuel, and Manuel-2 were within the "Difficult to Discern" action trigger category, and the remaining concentrations could be categorized as "Low-level exceedances". HF 183 was not detected in the samples collected from CFM_Cemetery, Veronica Shoemaker-1, and CFM Billy-3. HF183 values were reported as 77.6 GEU per 100mL and 11,200 GEU per 100mL at CFM_Manuel and Manuel-2, respectively. Concentrations of acetaminophen were below the laboratory MDL of 2.00 μg/L at each of the sample locations. Based on follow-up correspondence from the FDEP, it was requested that a laboratory be used for acetaminophen testing that had a MDL of 0.008 μg/L or less for source tracing.

Therefore, it was determined that subsequent source tracing samples would be analyzed by Eurofins Eaton Analytical, who reported an MDL of 0.00049 μg/L.

The laboratory analytical results of the sampling event, the presence of E. Coli in the “Difficult to Discern” Action Trigger category, coupled with a “moderate” signal detection of HF183 at the Manuel-2 location suggested the possibility of new or ongoing point sources of contaminants.

Based on a review of sanitary sewer infrastructure locations, it was determined that a sanitary sewer line trends parallel to the north bank of Manuel Branch between the Manuel-2 and Manuel-3 sample locations. The results of the sampling event suggested that the sanitary sewer line is a possible source of contaminants. As a part of the City Master Plan, GHD understands the portion of the sewer line situated alongside the north bank of Manuel Branch, between Evans and Central is slated for improvements. The City is expediting construction of this project to resolve the potential problems associated with the bacteria. All utility improvements on the south side of the canal have reportedly been completed.

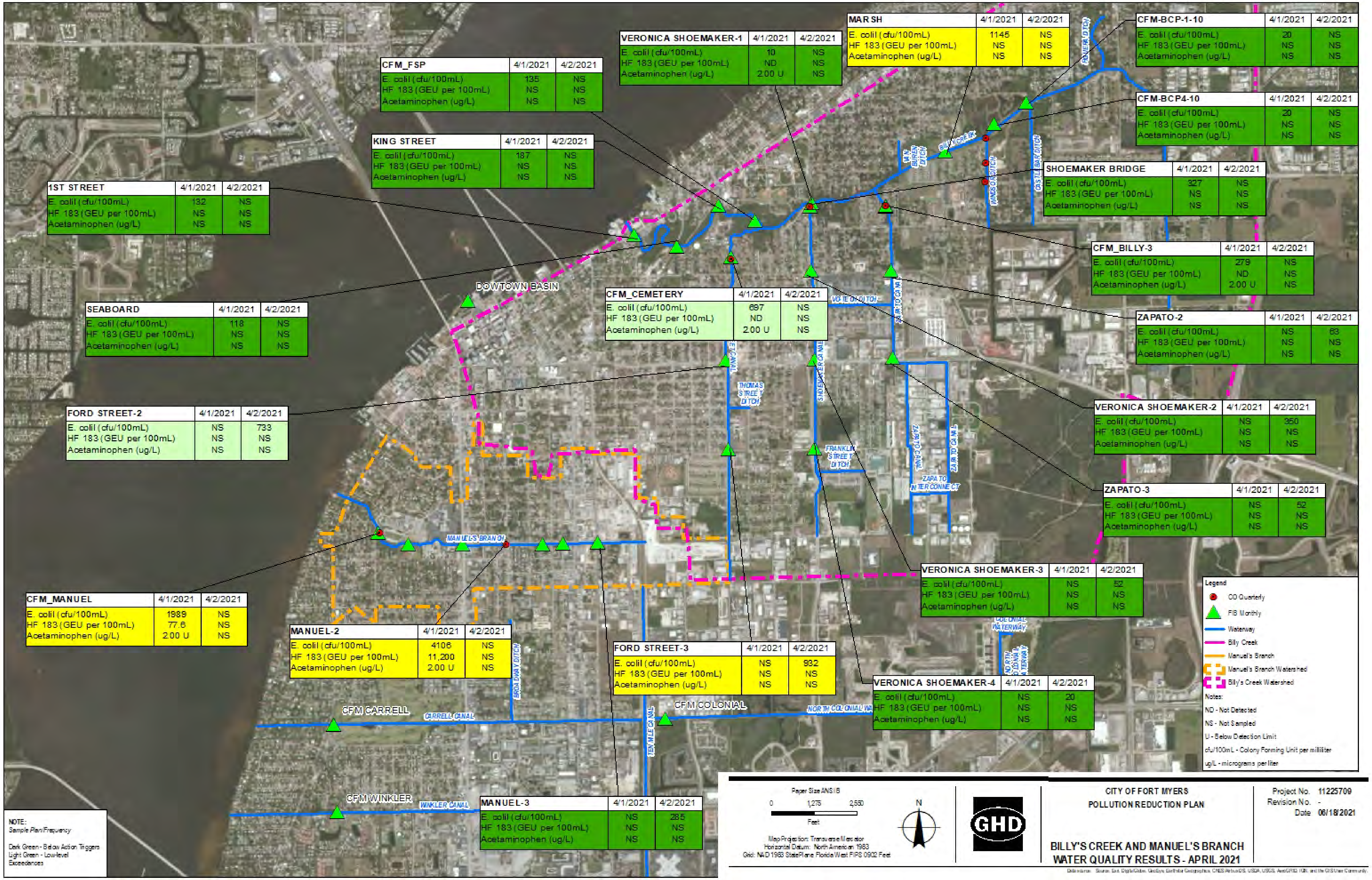


Figure 26 Water Quality Results April 2021

5.2 May 2021 Sampling Results

In consideration of the April 2021 sample results, surface water samples were collected from twenty-seven (27) locations on May 12 and 13, 2021, with twenty-one (21) locations within the Billy Creek watershed, and six (6) locations along Manuel Branch. Additional sample locations were selected to address potential concern associated with a City-owned lift station located along Ballard canal in the Billy Creek Watershed, and to further delineate a possible new or ongoing point source between Manuel-2 and Manuel-3 along Manuel Branch. Samples were analyzed for the presence of E. coli by Benchmark Analytical Laboratories, North Port, Florida and results were compared to the action trigger categories.

Concentrations of E. coli in the May 2021 samples ranged from not detected with an MDL of 10 cfu/100 mL at Veronica Shoemaker-4 to 24,196 cfu/100mL at the Seaboard sample location. Concentrations of E. coli in samples collected at the Seaboard, CFM Cemetery, and Ford Street 2 locations were within “Very Concerning Level” action trigger category. The locations were resampled on an expedited basis and the results of Seaboard and CFM Cemetery were within the “Low-level exceedances” category, while Ford Street results were within the “Difficult to Discern” category.

Individual concentrations of E. coli in samples collected during the May 2021 event at the Ballard 1, Ballard 2, CFM_FSP, and CFM_Manuel were within the "Difficult to Discern” action trigger category, and the remaining concentrations could be categorized as “Low-level exceedances”.

Based on the results of the May sampling event, follow-up sampling at locations with concentrations of E. coli in the “Difficult to Discern” action trigger category was planned for the June sample event. Additionally, delineation sampling was planned to address a possible point source in the Ballard canal, between Ballard-2 and Ballard-3.

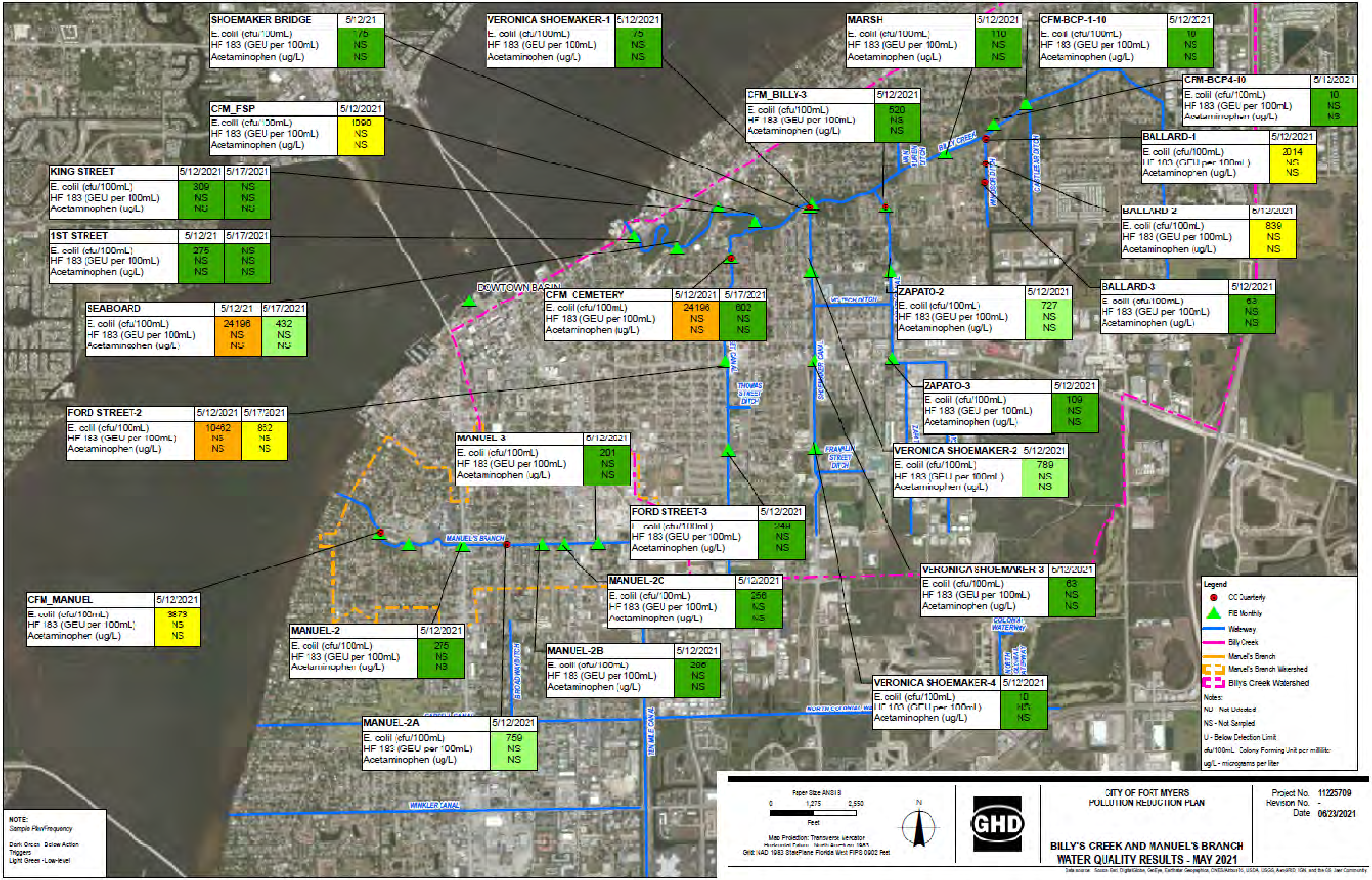


Figure 27 Water Quality Results May 2021

6. Maps on Table and Walk the Watersheds

A virtual Project Overview and Maps on Table (MOT) event was held on May 19, 2021, wherein stakeholder interests from the City, the FDEP, the Florida Department of Transportation (FDOT), Lee County, the Lee County Department of Human and Veterans Services, the Florida Department of Health (FDOH), the Calusa Waterkeepers, the South Florida Water Management District, and Billy's Creek Preserve, LLC identified points and/or areas of interest to address during the Walk the Watersheds (WTW) event. The Maps on Table (MOT) event was utilized to initiate intentional communication across stakeholder groups and to assist in breaking down agency silos. Additionally, the stakeholders' extensive local knowledge of the watersheds provided invaluable insight into possible sources of FIB contribution. A virtual tour including predetermined sample locations, watershed areas, and project scope provided a firsthand experience for stakeholders to visualize the project. City staff were able to interact with citizen and stakeholder participants and address all questions and concerns that were presented by them at the MOT. The project team worked to solicit comments from all participants so that all voices were heard during the event.

Photograph 1 – Maps on Table Participants

A total of 51 areas of interest were marked on the map and were prioritized based on the potential for contribution as a potential point source.

Feedback after the MOT was solicited from participants. Project team members were contacted by Lee County staff who expressed their positive impression of the organization and execution of the event.

Follow-up desktop reviews were also conducted by GHD and City staff, to prioritize area of concern identified during the MOT and to identify additional potential contributing sources for follow-up during the WTW. Organized routes were constructed using the information collected above and stops were strategically placed to efficiently traverse the areas of interest.

The next step in evaluating potential areas of concern in the Billy Creek and Manuel Branch watersheds was to conduct the WTW event with stakeholders. The project team received input from Anita Nash with the FDEP to ensure that the WTW event was planned in a manner that best captured the spirit of collaboration that is the keystone of the FDEP process. In addition, with differing COVID restrictions across entities and mindful of individuals varying personal comfort levels, stakeholders were polled prior to the event to determine the feasibility of group travel arrangements.

Based on the results of the poll, arrangements were made by the City to utilize an available police department passenger van so stakeholders could observe points of interest as a group, and conversations pertaining to challenges and remedial actions could organically flow. To accommodate individuals that were required to or preferred to travel separately, route maps were provided with pre-established meeting areas. Stakeholders were able to enjoy lunch and converse on Day 1 at Shady Oaks Park, and at the GHD offices during a debrief on Day 2.

Photograph 2 – WTW Manuel Branch

Photograph 3 – Day 1 WTW Shady Oaks Park

Both physical (i.e., paper) maps and digital maps were provided for the WTW. Participants were able to reference the 51 points/areas identified during the MOT and relative infrastructure as well as contribute to the dataset by adding additional "markups" from field observations. GHD performed digital collection through the use of ArcGIS Collector during both days of the WTW event. A total of 89 points were collected with notes, photos, and priority rankings were assigned, as illustrated on **Figures 28** and **29** and detailed in **Appendix G.**

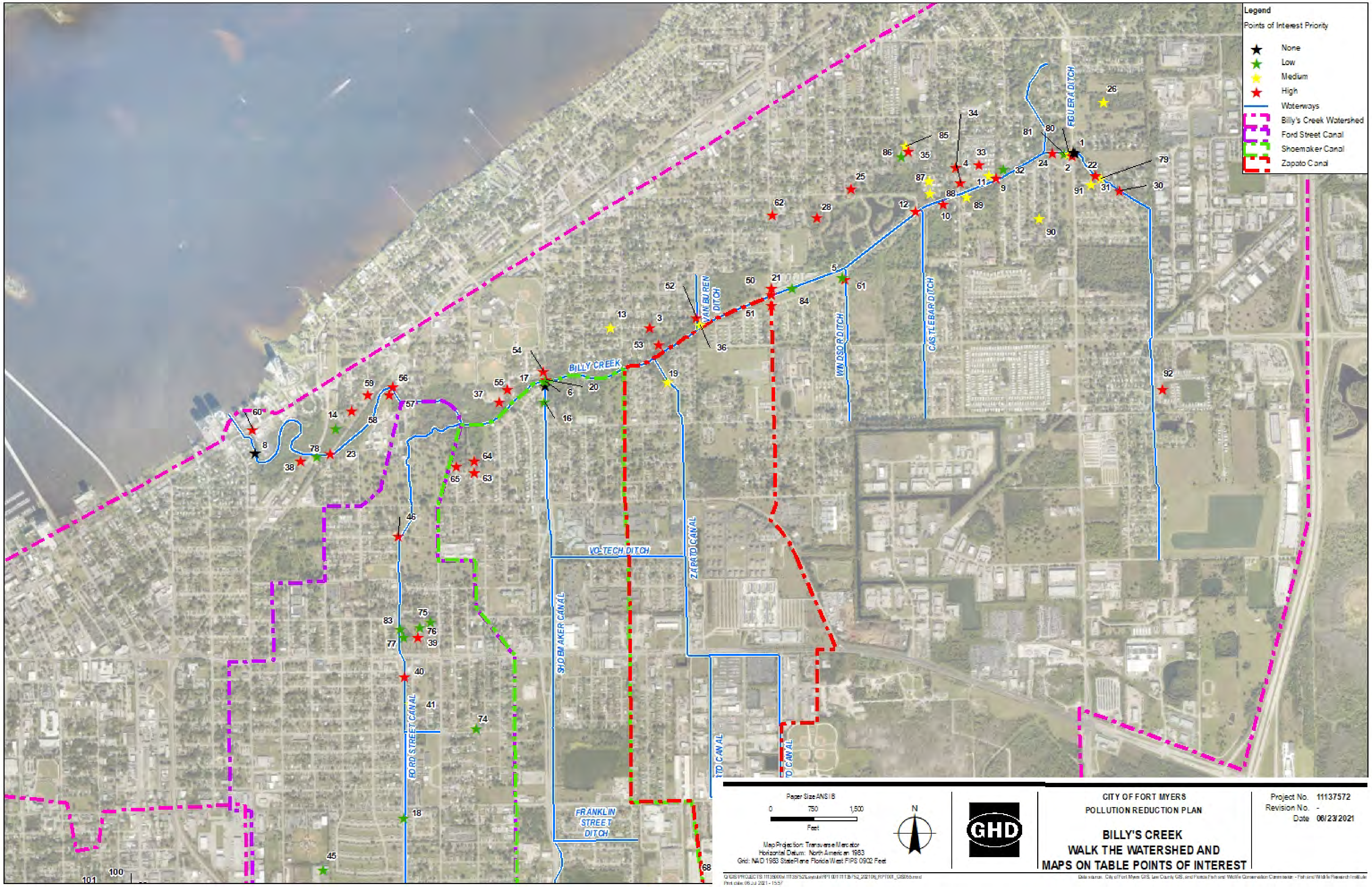


Figure 28 Billy Creek Walk the Watershed and Maps on Table Points of Interest

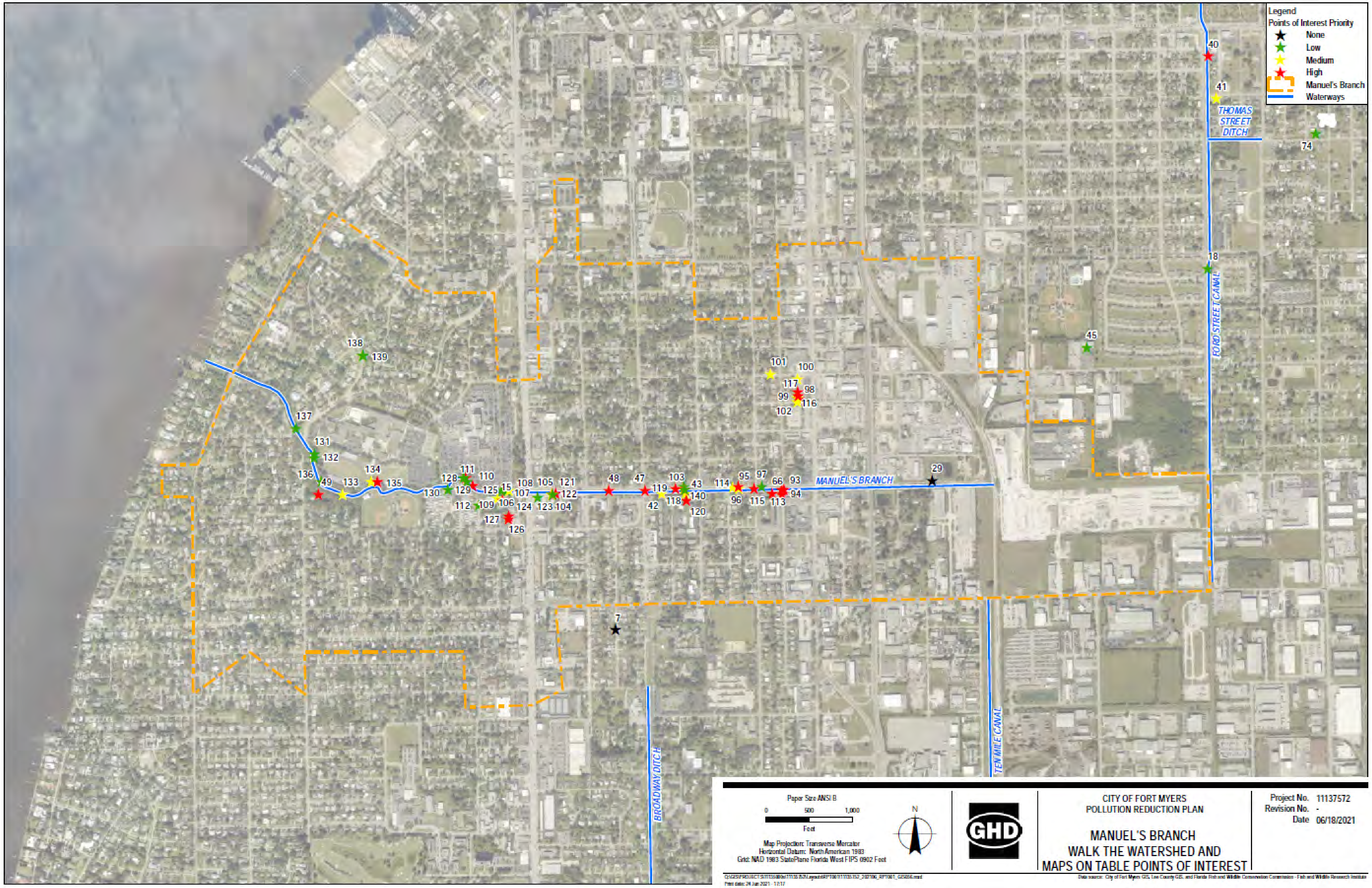


Figure 29 Manuel Branch Walk the Watershed and Maps on Table Points of Interest

Day 1 of the WTW was attended by the following stakeholders:

- Richard Thompson and Wes Anderson with the City of Fort Myers;
- Anita Nash with the FDEP;
- Ginny Kish with the FDOH;
- Matt Wallace with the Lee County Department of Human and Veterans Services;
- John Cassani and Nonnel Galaviz-Johnson with the Calusa Waterkeepers;
- Jerry Miller with Billy's Creek Preserve, LLC;
- Rick Armstrong with the Lee County Laboratory; and,
- GHD staff

Day 1 of the WTW was focused on identifying potential microbial sources along the Billy Creek Watershed. Day 1 commenced with a kick-off meeting, which incorporated a safety debrief, distribution of WTW binders containing maps and field forms, and an overview of the day's activities. Observations made on May 26, 2021 included, but were not limited to the following:

- A presumed illicit discharge of industrial wastewater was identified at a private-party batch plant.
- An unknown white film was identified in the drainage ditch adjacent to the private-party batch plant.
- Coyote scat and boar activity was noted along the bank of the ditch running parallel to Rockhill Road.
- Areas of significant trash dumping were observed in and along many of the conveyances to Billy Creek and in and along Billy Creek.
- Reuse irrigation sprinkler heads were observed to be broken in Clemente Park. Wes Anderson with the City was able to verify that the sprinkler heads were in the process of being repaired. Additionally, homeless activity was noted in the Park, which was confirmed to be known and addressed by the Department of Human and Veterans Services.
- Windshield surveys were conducted of older (pre-1980s) neighborhoods along the Creek. City staff were able to confirm that infrastructure improvements had already been made or were planned to be completed in these neighborhoods.
- Low-elevation manholes were opened at select locations. No evidence of discharges were noted at these locations.
- Several City and privately-owned lift stations were visited. City staff was able to confirm that either repairs had been made to or replacement of aged and leaking lift stations had been performed, and that lift stations were routinely inspected by City staff. No obvious discharges were observed at the lift stations visited during the WTW.
- Windshield surveys were conducted to identify illicit activity within mobile home parks along the watershed. Follow-up action items were identified for mobile home parks located in the Lee County portion of the watershed, which included further inspections to be completed by the FDOH and County Code Enforcement.

Day 2 of the WTW, was attended by the following stakeholders:

- Richard Thompson and Wes Anderson with the City of Fort Myers;
- Jennifer Carpenter and Anita Nash with the FDEP
- Ginny Kish with the FDOH;
- Lisa Kreiger and Maria Romero with the Lee County Division of Natural Resources;
- Jerry Miller with Billy's Creek Preserve, LLC; and,
- GHD staff

Day 2 of the WTW was focused on identifying potential microbial sources along the Manuel Branch Watershed. Day 2 of the WTW commenced with an overview of the prior day's activities and dialogue pertaining to community involvement strategies that could be effective in bacteria reduction in the watersheds. Observations made on May 27, 2021 included, but were not limited to:

- Areas of significant trash dumping were observed in and along Manuel Branch.

- A pipe crossing, previously identified during desktop review, was observed along Manuel Branch. City staff was able to confirm that the pipe was an active lateral that serviced an apartment complex located adjacent to Manuel Branch. Evidence of breaches within the lateral were noted near the south bank of Manuel Branch. The pipe was cleaned and was videoed during the WTW, and joint displacements were observed. City staff was able to confirm that the pipe was scheduled to be lined in the upcoming weeks.
- An open dumpster and presumed illicit dumping of fish parts to the ground surface near a drainage ditch discharging to Manuel Branch was observed during a windshield survey of the watershed. FDEP and City staff discussed management practices with the owner of the fish market, and an action item was established to schedule later inspections with County Code Enforcement.
- Evidence of coyote and domestic dog scat was observed along Manuel Branch.
- Trash was observed along the employee parking area at Lee Memorial Hospital. A follow-up action item to coordinate with Lee Memorial for clean-up was established.
- A visual assessment of the Tropical Trailer Park was conducted. City staff was able to relay the results of prior microbial source tracing, which identified the trailer park as a source of bacteria to the watershed. City staff was also able to confirm that, due to the results of the prior investigation, lift stations within the trailer park were subsequently reconstructed.
- A potential area of bacteria accumulation was observed at a weir located near the Fort Myers High School athletic fields, which was identified for follow-up testing.

A debrief meeting was held at the end of Day 2. Stakeholders were able to see, though use of real-time GIS data input, how their participation had assisted the City in identifying and vetting potential source areas.

During the WTW event, very often when an issue was observed, City staff made phone calls to see that it was addressed and, in most instances remedial efforts were already in progress.

Based on observations during the WTW, additional microbial source tracing samples were planned at the following locations for the June 2021 sampling event:

- In the canal adjacent to the illicit wastewater discharge where a white film was noted
- Upstream of a weir on Manuel Branch, near Fort Myers High School, where bubbles had collected near the bank of the Branch

Additionally, based on the use of reclaimed water on park land adjacent to the watersheds, sampling for acetaminophen to address potential false positives associated with reclaimed water run-off was deemed warranted.

7. Potential Bacteria Sources and Reduction Strategies

Based on information collected through background research, a review of historical data, extensive MS4 permit monitoring and reporting and initial MST sampling results, preliminary reconnaissance of the watersheds, and the MOT and WTW stakeholder events, potential sources of bacteria to the watersheds have already been identified and were grouped as follows:

- Aging or degraded wastewater infrastructure (public infrastructure and private connections, lift stations, and on-site storage, disposal, and treatment systems)
- Stormwater run-off (illicit commercial discharges and/or activities, trash, pet waste)
- Public contributions (sewer blockages, trash, pet waste, homeless activity)
- Natural sources (wildlife, E. coli growth in sediments and soil)

The City is implementing management plans to address and reduce pollution from potential sources, as discussed below.

7.1 Wastewater

Wastewater infrastructure located within the Billy Creek and Manuel Branch watersheds are depicted in **Figures 30** and **31**. With the exception of a few areas, the majority of the Billy Creek and Manuel Branch watershed discharge to sanitary pipes that flow to Wastewater Treatment Plants (WWTPs). Potential sources of bacteria from wastewater include slow and continuous leaks from infrastructure, treatment failure in WWTPs, and sanitary sewer overflows (SSOs). SSOs can occur as the result of heavy rainfall, wherein there is an influx of stormwater or groundwater to the sewer lines, breaches or blockages in sewer lines, malfunctioning equipment, which may be the result of a power loss, or removed caps from laterals. According to the EPA, SSOs can be reduced through the following actions:

Sewer cleaning and routine maintenance

Repair of leaking lines

Upgrading or enlarging the sewerage system

Limits on fats, oils, and greases to the system

Expanding the capacity of the treatment works

Public education on fats, oils, and greases clogs

The City's management actions to address potential contributions of bacteria from wastewater are detailed below.

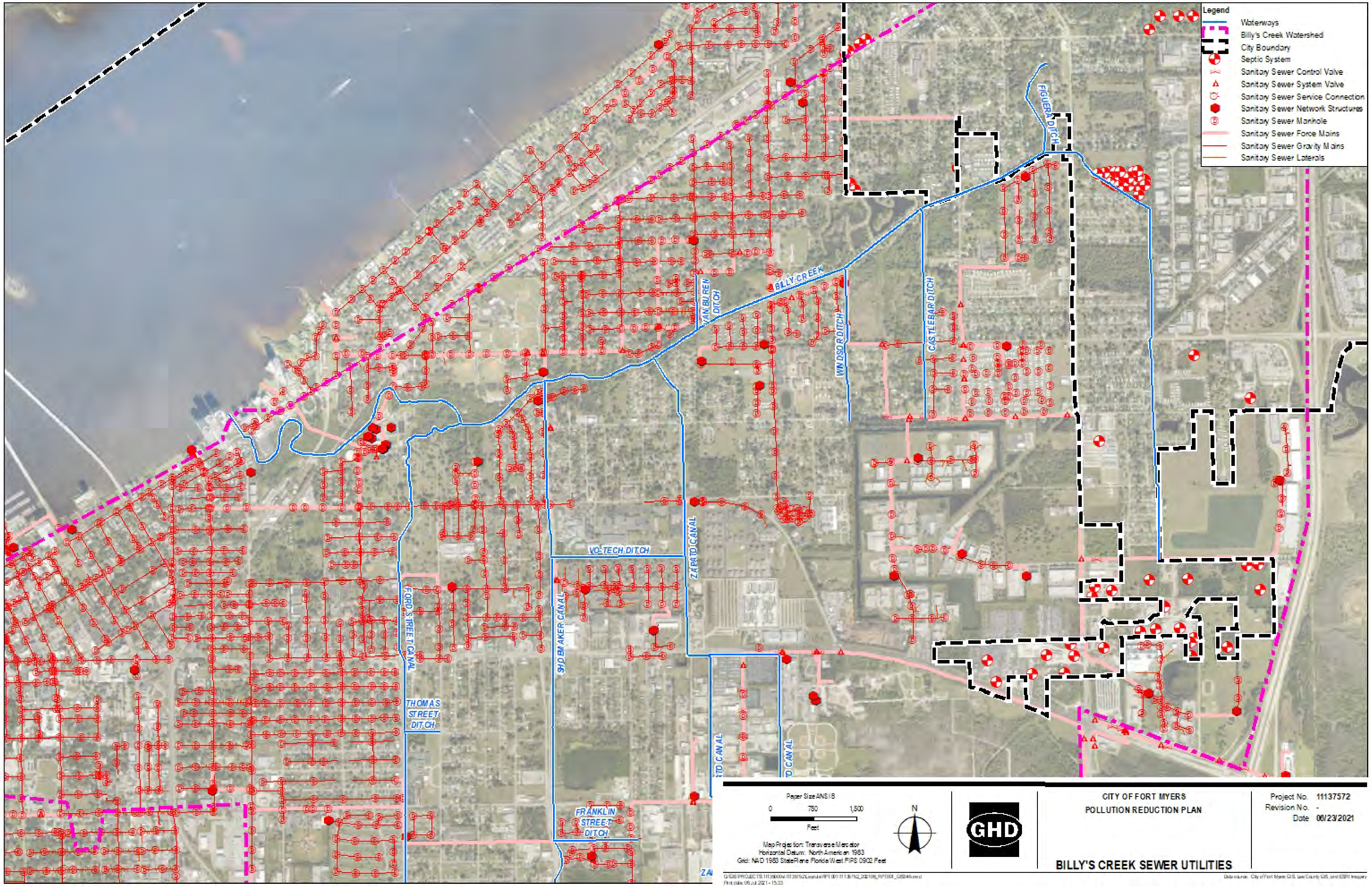


Figure 30 Billy Creek Wastewater Map

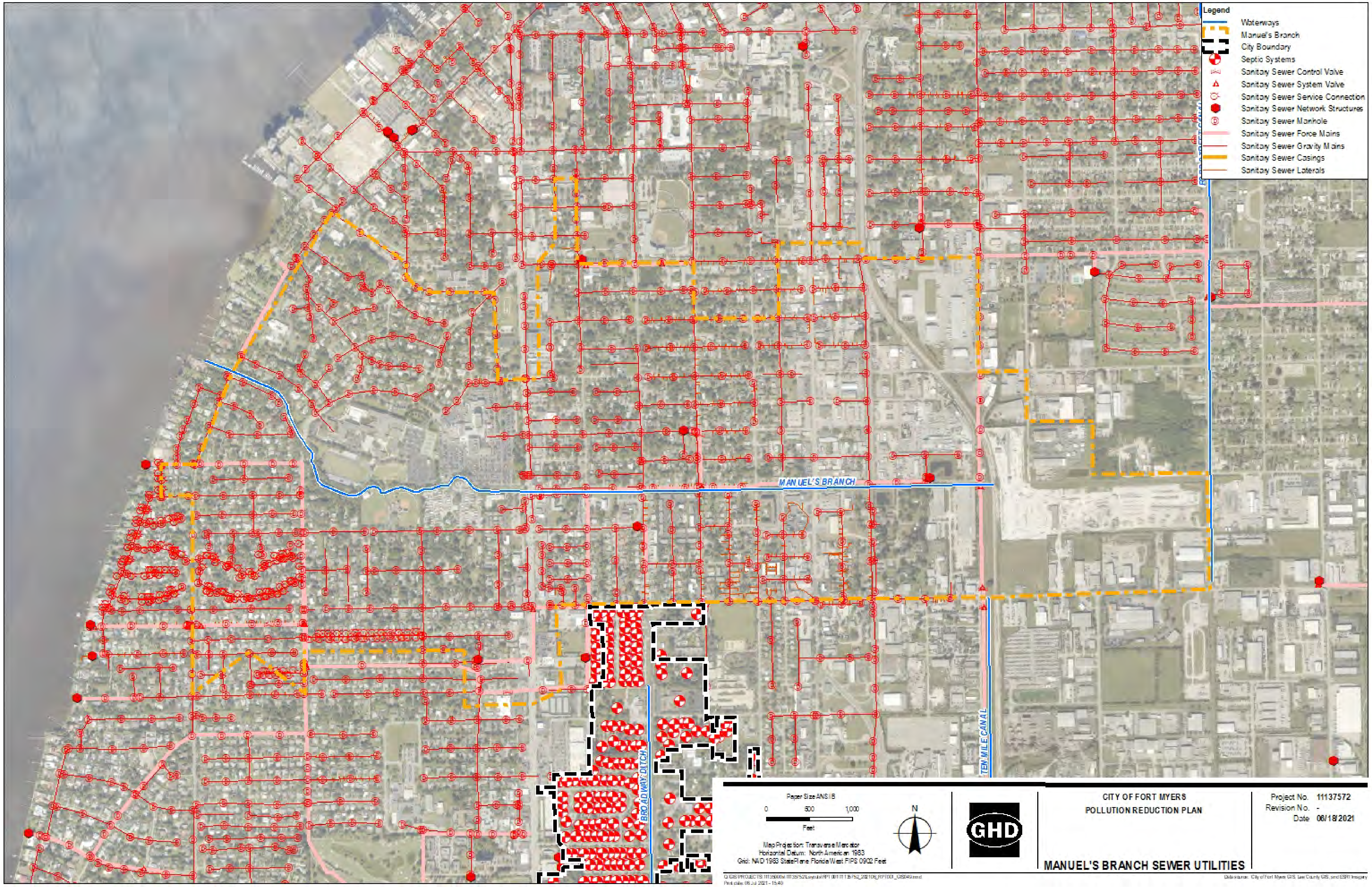


Figure 31 Manuel Branch Wastewater Map

7.1.1 Sanitary Sewer

The City currently maintains over 422 miles of sanitary sewer lines, 183 lift stations, and 21,058 service connections. The City prepared a Sanitary Sewer Master Plan in December 2005, which provided a series of short-term (5-year) and long term (20-year) planned projects, in consideration of the condition of the existing infrastructure and the planned increased capacity due to projected growth of the City. The City's sewer collection system, which consists of gravity connection mains that route flow to lift stations then through force mains and gravity flow transmission lines to the two WWTPs [South Advanced Wastewater Treatment Plant (AWWTP) and Central AWWTP], also incorporates connections from the Lee County service area. According to the Sanitary Sewer Master Plan, an interlocal agreement is in place, wherein sewerage from Lee County is treated at the City-owned WWTPs.

Projected daily sewer flows to the City's two WWTPs were estimated as follows:

Table 8 Projected Daily Sewer Flows

	2002	2009	2024
South AWWTP	**7.07**	**9.51**	**12.05**
City Flow	2.97	5.02	6.62
County Flow	4.10	4.48	5.42
Central AWWTP	**6.20**	**8.35**	**12.49**
City Flow	3.60	5.53	9.17
County Flow	2.61	2.28	3.32

Projects proposed and/or completed within the Billy Creek and Manuel Branch watersheds since the development of the 2005 Master Plan are listed below.

Table 9 Planned Sanitary Sewer Projects

Improvement	Planned Date	Location
18 in Gravity Sewer	2009	On Michigan Ave from Shoemaker to Raleigh St
15 in Gravity Sewer	2009	On Michigan Ave from Zapato to Shoemaker
36 in Gravity Sewer	2009	On Palm Ave from South St to Indian st, turn east to Raliegh St and north to Michigan Ave
18 in Gravity Sewer	2009	On north half of Rockfill road, between MLK and Edison
21 in Gravity Sewer	2009	On south half of Rockfill road, between MLK and Edison
Lift Station Pump Upgrade	Short Term <5 Years	Lafayette and Cranford
Lift Station Pump Upgrade	Short Term <5 Years	Suntrust and Amery
Lift Station Pump Upgrade	Short Term <5 Years	Edison and Rockfill
18 in Gravity Sewer	2009	On Lafayette from Crawford to Palm Ave, south to Edison, east to Ford, south to Franklin, east to Canal, north to Edison and east to Rockfill
15 in Gravity Sewer	2009	On north half of Rockfill to MLK, east to Ortiz and south on Ortiz outside of the watershed to Lee County Gov Building
18 in Gravity Sewer	Long Term (ETA 2024)	On Cranford @ River, south to Edison, east to Raleigh, north to Central Plant
Lift Station Pump Upgrade	Long Term (ETA 2024)	Ballard and Ortiz
10 in Force Main	Long Term (ETA 2024)	On south half of Rockfill road, between MLK and Edison
16 in Force Main	Long Term (ETA 2024)	On MLK from Otiza to Park 82 Dr
24 in Force Main	Long Term (ETA 2024)	On Ortiz from Ballard to High Cotton Ln, east to Park 82 Dr, South to MLK and east outside of the watershed to Colonial

Many of the listed projects were completed between 2010 and 2021. The force mains and gravity lines between Edison and Canal are scheduled to start construction before the end of the calendar year.

Additionally, the following utility Capital Improvement Projects are planned:

- **Prospect Avenue Neighborhood (Phase I)**: Installation of a gravity sewer main for unserved homes. | Ward 1
- **Prospect Avenue Neighborhood (Phase II)**: Replacement of the aging gravity sewer main and existing waterline, improvements to the storm drainage and sidewalk installation in the Prospect Avenue neighborhood. | Ward 1
- **Madison Avenue & Van Buren Neighborhood**: Replace gravity sewer, water services, drainage, roadway and sidewalk improvements. | Ward 1
- **Billie, High and Kunze Street Drainage & Utility Improvements**: Replace gravity sewer, water services, drainage, roadway and sidewalk improvements. | Ward 1
- **Cleveland Grove Neighborhood (Patrick/Turner/Kentucky)**: Replace gravity sewer, water services, drainage, roadway and sidewalk improvements. | Ward 1. This project was completed at the end of 2020.
- **Marsh Neighborhood Utility Project**: Replace gravity sewer, water lines, drainage, roadway and sidewalk improvement in the area bounded by Marsh Avenue, Prospect Avenue, Glenwood Avenue, and Woodside Avenue. | Ward 1
- **New York Avenue Utilities**: New sewer services and drainage improvements to be done on New York Avenue from Nuna Avenue to the west end. | Ward 1
- **Second Street Drainage Design**: Roadway and minor sewer restoration of aging old clay pipe at Second and Evans Avenue intersection north to Avalon Place. | Ward 2.
- **Evans (Ella Piper to Providence) Avalon Utility Improvements**: Replacement of the existing sanitary sewer, waterline, roadway and drainage improvements on Evans Avenue and Avalon. | Ward 2
- **Phase III-C Area 8 Utility Improvements**: Replacement of the sanitary sewer in the area. Further, the waterline will be replaced along with minor storm drainage improvements. | Ward 3 & 4
- **Jeffcott Neighborhood Phase III-C Area 4**: Replacement of the sanitary sewer in the area, and along the waterline minor storm drainage. | Wards 3 & 4
- **US41 Utility Replacement**: Evaluate and replace existing utilities (WM, FM and gravity sewer) in the US41 ROW from Winkler Avenue to Victoria Avenue. | Wards 3, 4 & 5. This project is currently under construction.
- **Downtown Phase III – Area A Utility Improvements (MidTown):** Replacement of the existing utilities, drainage and roadway and including Streetscape elements in the reconstruction. Project includes Union Street from Broadway to Central and Jackson Street from SR82 to Victoria. | Ward 4
- **Phase IV Area B-1 Linhart Avenue/Magnolia St/Holly Road**: New water, sewer and drainage improvements and sidewalks. | Ward 4. This project is currently under construction.
- **Poinciana Sewer Improvement at Lift Station #2**: Replacement of existing 8” gravity sewer along Poinciana Avenue, between McGregor Blvd and Cortez Blvd due to infiltration into the system. | Ward 4
- **Inflow & Infiltration (I & I) Analysis**: Complete flow monitoring at City lift stations to determine areas where large amounts of I & I exist. | Citywide
- **Lift Station No. 84, 87, & 89 Improvements**: Complete improvements to the existing lift stations. | Citywide
- **Lift Station Flow Chart**: Creation of flow path and routing of existing lift stations. | Citywide

The City is currently developing a Utility Master Plan. As a portion of the updated Utility Master Plan, improved asset management of the City’s entire utility infrastructure systems will be implemented. The City will utilize the Utility Master Plan to enable better informed decisions on the City’s sanitary sewer assets with respect to identifying and prioritizing maintenance activities, required repairs and replacements, and proposed improvements to the City’s infrastructure such as WWTPs, lift stations, force mains, gravity mains, manholes, and laterals.

Management strategies will be developed following a physical condition assessment and calculations of estimated useful life consumed/remaining and probability of failure. Utilizing this information, the City's Utility Master Plan will provide details regarding the need and timing of upgrades and additional infrastructure, potential future interlocal asset needs, recommendations for rehabilitation to address inflow and infiltration into the system, and a priority ranking of needed improvements.

The City has already completed a number of projects to address aging residential sanitary sewer connections. When potential sources stemming from failed private connections occur, as noted during the WTW, are identified during sampling and/or reconnaissance, the City notifies the private entity and either advises the owner of the necessary repair or work with the private entity to repair the connection.

Currently, lift stations are inspected on a regular basis, with dedicated City staff visiting and inspecting each of the City's lift stations two to three times a week. City-owned lift stations are supplied with emergency back-up power through either on-site generators, or the use of portable generators that are transported to the lift station during power outages.

Additional management plan items for the PRP will include continued regular inspections and maintenance of the sewer system, and coordination with the City Sewer Department and Lee County (as needed) when sampling or reconnaissance indicate leaking infrastructure or an SSO.

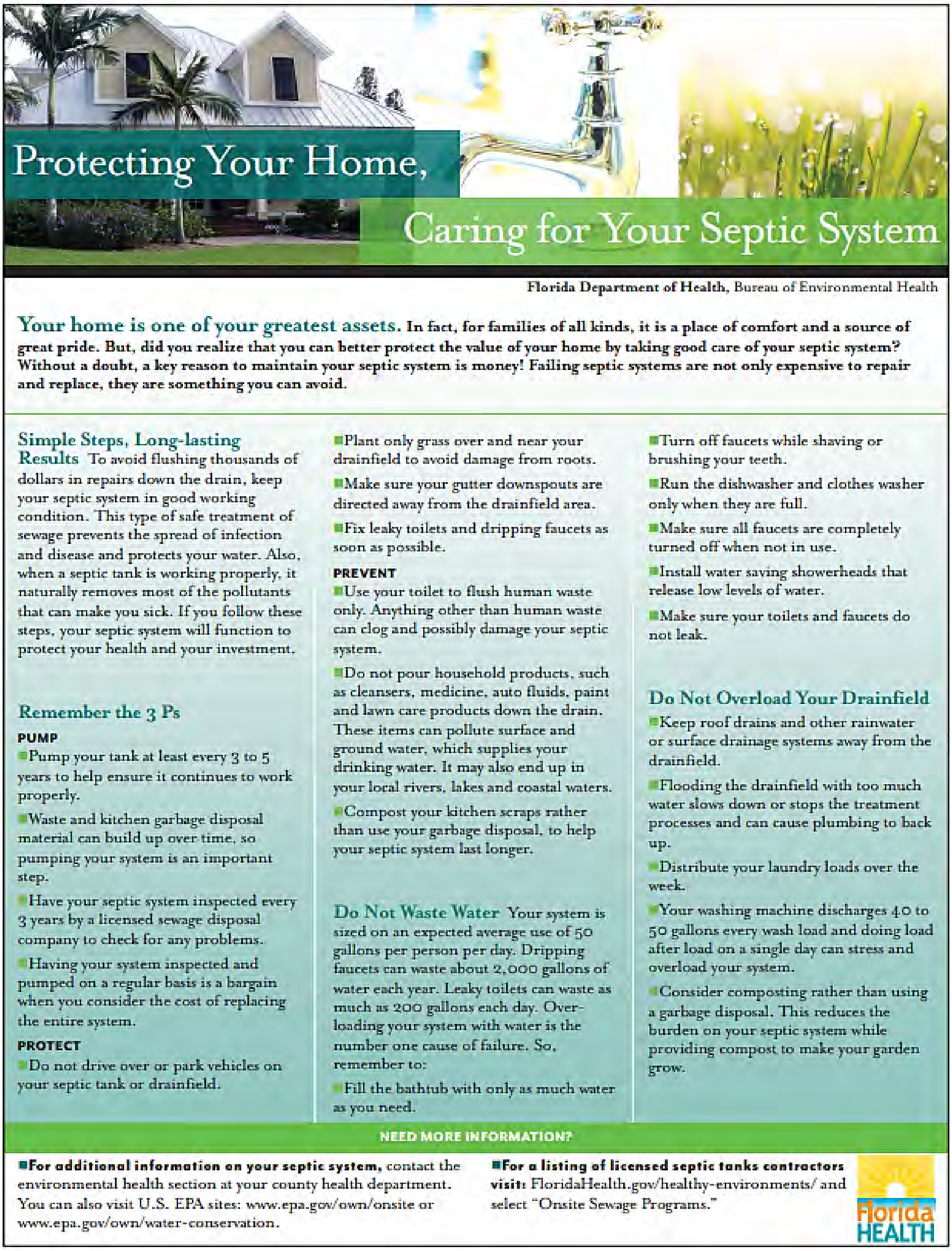
7.1.2 Private Lift Stations

During a prior MST study, the City identified that a source of FIB within Manuel Branch was a lift station that was in disrepair within the Tropical Trailer Park, located immediately adjacent to the south bank of the waterway. After discovery of the source, the City worked with the property owner to rebuild the lift stations within the trailer park.

When potential sources stemming from failed private lift stations occur, as within the Tropical Trailer Park, as identified during sampling and/or reconnaissance, the City will notify the private entity and will either advise of the necessary repair or will work with the private entity to repair the lift station.

7.1.3 On-Site Storage, Disposal, and Treatment Systems (OSDTS)

There are no OSDTS identified in the Manuel Branch watershed. OSDTS located within the Billy Creek watershed are within the Lee County Utilities Service Area, and are regulated by the FDOH in Lee County. OSDTS failure can be caused by unsuitable soil, flooding, improper design and installation, and inadequate maintenance, which may result in bacterial contribution in the watershed through ponding and subsequent runoff or leaching to the groundwater. FDOH guidance for the maintenance of OSTDS is included as **Figure 32**.



Protecting Your Home, Caring for Your Septic System

Florida Department of Health, Bureau of Environmental Health

Your home is one of your greatest assets. In fact, for families of all kinds, it is a place of comfort and a source of great pride. But, did you realize that you can better protect the value of your home by taking good care of your septic system? Without a doubt, a key reason to maintain your septic system is money! Failing septic systems are not only expensive to repair and replace, they are something you can avoid.

Simple Steps, Long-lasting Results To avoid flushing thousands of dollars in repairs down the drain, keep your septic system in good working condition. This type of safe treatment of sewage prevents the spread of infection and disease and protects your water. Also, when a septic tank is working properly, it naturally removes most of the pollutants that can make you sick. If you follow these steps, your septic system will function to protect your health and your investment.

Remember the 3 Ps

PUMP

- Pump your tank at least every 3 to 5 years to help ensure it continues to work properly.
- Waste and kitchen garbage disposal material can build up over time, so pumping your system is an important step.
- Have your septic system inspected every 3 years by a licensed sewage disposal company to check for any problems.
- Having your system inspected and pumped on a regular basis is a bargain when you consider the cost of replacing the entire system.

PROTECT

- Do not drive over or park vehicles on your septic tank or drainfield.
- Plant only grass over and near your drainfield to avoid damage from roots.
- Make sure your gutter downspouts are directed away from the drainfield area.
- Fix leaky toilets and dripping faucets as soon as possible.

PREVENT

- Use your toilet to flush human waste only. Anything other than human waste can clog and possibly damage your septic system.
- Do not pour household products, such as cleansers, medicine, auto fluids, paint and lawn care products down the drain. These items can pollute surface and ground water, which supplies your drinking water. It may also end up in your local rivers, lakes and coastal waters.
- Compost your kitchen scraps rather than use your garbage disposal, to help your septic system last longer.

Do Not Waste Water Your system is sized on an expected average use of 50 gallons per person per day. Dripping faucets can waste about 2,000 gallons of water each year. Leaky toilets can waste as much as 200 gallons each day. Overloading your system with water is the number one cause of failure. So, remember to:

- Fill the bathtub with only as much water as you need.
- Turn off faucets while shaving or brushing your teeth.
- Run the dishwasher and clothes washer only when they are full.
- Make sure all faucets are completely turned off when not in use.
- Install water saving showerheads that release low levels of water.
- Make sure your toilets and faucets do not leak.

Do Not Overload Your Drainfield

- Keep roof drains and other rainwater or surface drainage systems away from the drainfield.
- Flooding the drainfield with too much water slows down or stops the treatment processes and can cause plumbing to back up.
- Distribute your laundry loads over the week.
- Your washing machine discharges 40 to 50 gallons every wash load and doing load after load on a single day can stress and overload your system.
- Consider composting rather than using a garbage disposal. This reduces the burden on your septic system while providing compost to make your garden grow.

NEED MORE INFORMATION?

- **For additional information on your septic system,** contact the environmental health section at your county health department. You can also visit U.S. EPA sites: www.epa.gov/owm/onsite or www.epa.gov/owm/water-conservation.
- **For a listing of licensed septic tanks contractors visit:** FloridaHealth.gov/healthy-environments/ and select "Onsite Sewage Programs."

Florida HEALTH

Figure 32 FDOH Guidance for OSTDS Maintenance

Where potential point sources are identified from possible OSDTS failure, the City will coordinate with the FDOH for inspection.

7.2 Stormwater

Introduction of FIB through stormwater is considered a "non-point" source, which is typically intermittent and rain-driven, and can be caused by:

- Urban run-off
- Pet and wildlife waste

– Overflow from OSTDS

Although, sediment accumulation from run-off may impede flow within the waterways and can allow for bacteria to persist and regrow, natural sources of E. coli are considered low risk, and management of natural sources are not included in this PRP.

The City (in collaboration with the Department of Transportation and Water Management District) regularly maintains 37 miles of canals and ditches and 150 miles of stormwater pipes. Stormwater infrastructure located within the Billy Creek and Manuel Branch watershed is depicted in **Figures 33** and **34**.

Stormwater may include trash, nutrients, heavy metals, oils, bacteria, etc. The City complies with stormwater requirements through stormwater management for development and MS4 permit sampling. The goal of the City's stormwater program is to increase water quality. Many of the City's stormwater improvement projects aim to generally improve water quality and may reduce bacteria.

The City's maintenance program includes mowing and maintenance of canal/ditch banks. Additionally, trash cleanup activities are performed along the banks on a routine basis. The City coordinates approximately 8 to 10 cleanup events a year with local stakeholders and volunteers.

City improvements to the stormwater system in Billy Creek and Manuel Branch include:

– Construction and on-going maintenance of the 56-acre Billy Creek Preserve and Filter Marsh, designed to improve water quality in Billy Creek (https://www.sfwmd.gov/sites/default/files/documents/nr_2010_0706_billy_creek_award.pdf)
– Armoring of the Ford Street Canal for erosion control
– Exotic and invasive vegetation removal
– Construction and on-going maintenance of the Ford Street Preserve wetland system
– Removal of an excess of 12,000 cubic yards of sediment during Phase I of a dredging and restoration project in Billy Creek

Planned stormwater improvement projects include an update of the Stormwater Master Plan, the final Phase of the Billy Creek dredging and restoration project and City-wide armoring of canals. It is recommended that potential bacteria reduction be considered as a part of selection of any stormwater improvements recommended in the Master Plan.

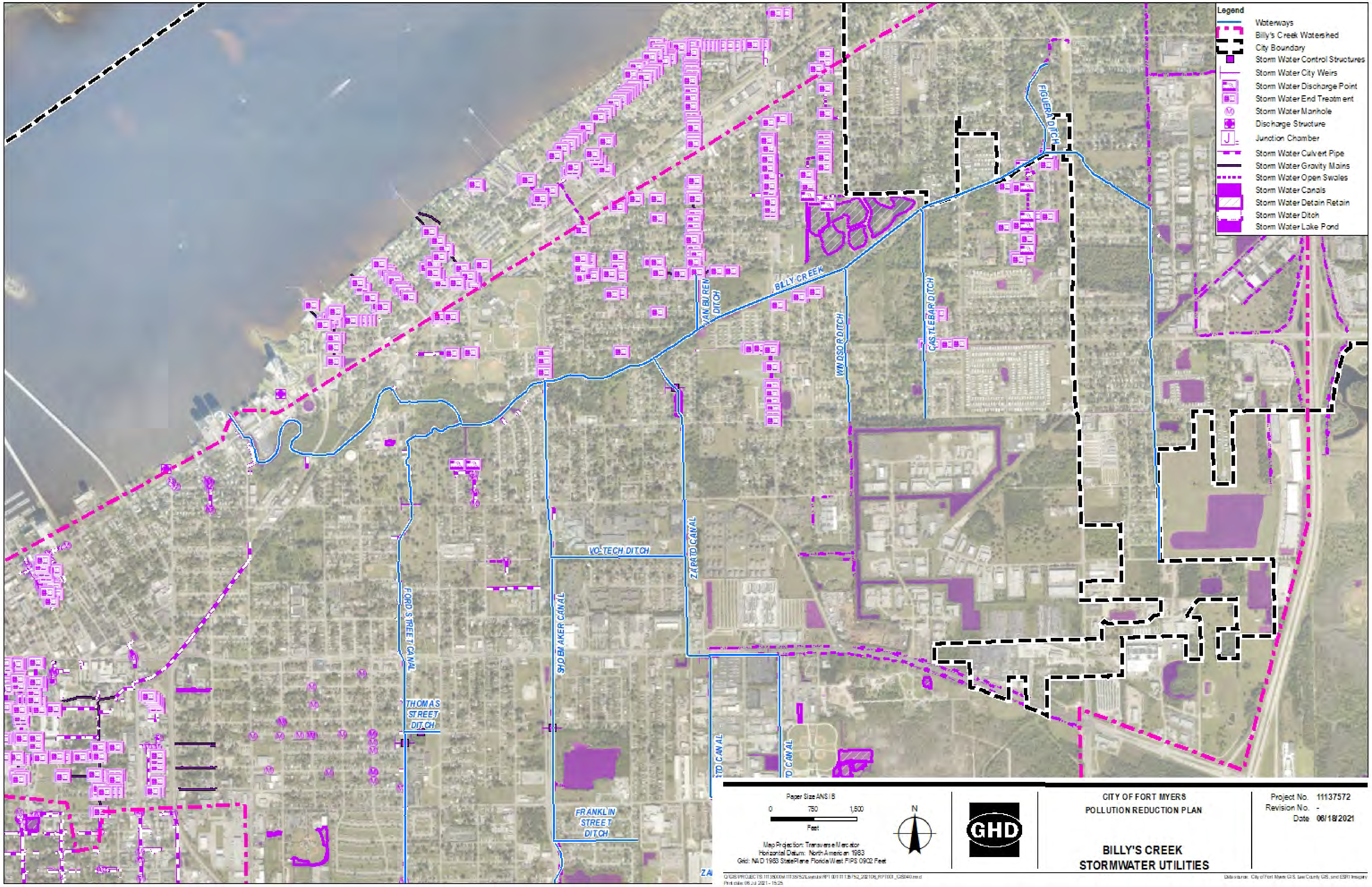


Figure 33 ***Billy Creek Stormwater Infrastructure***

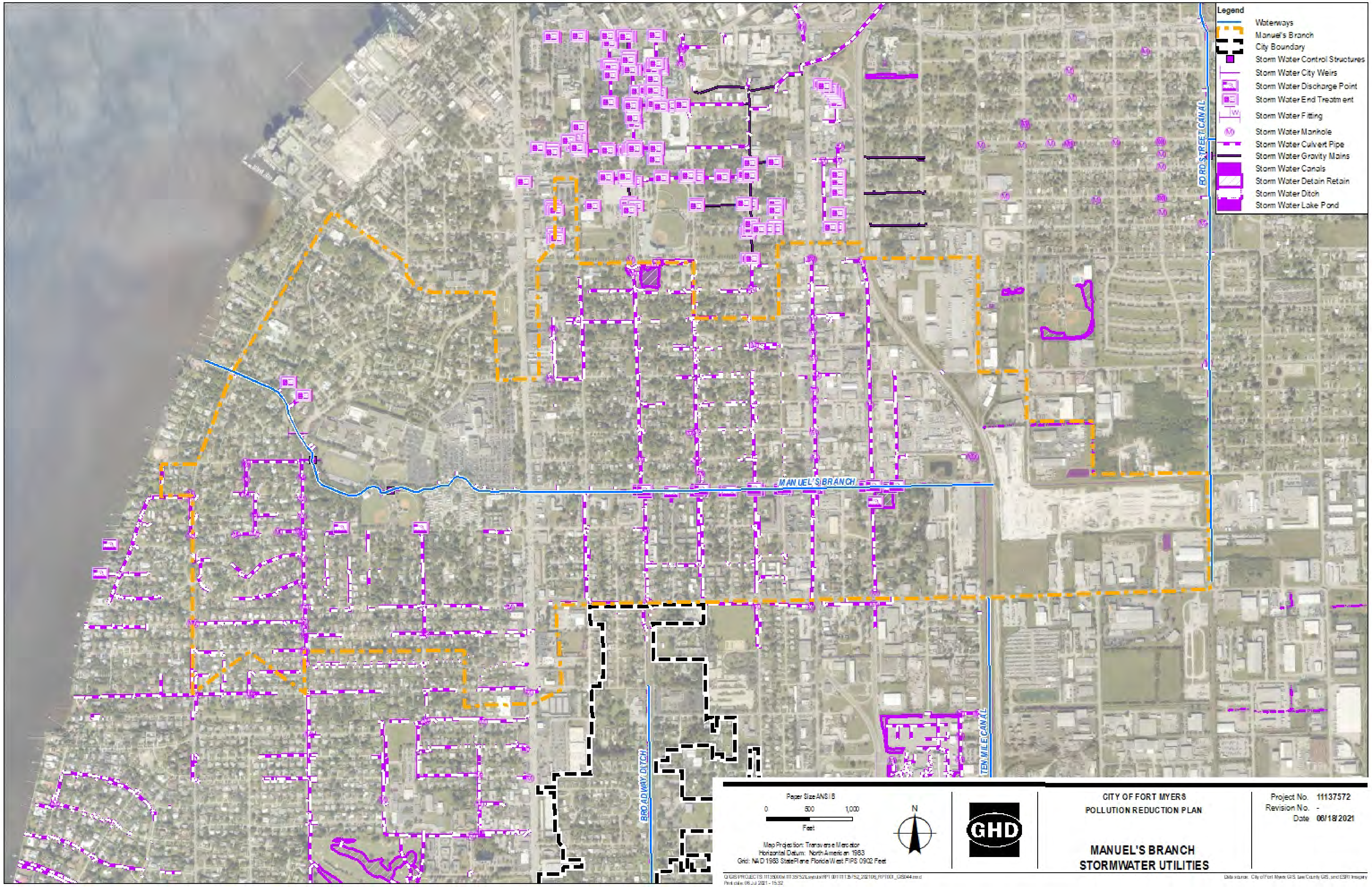


Figure 34 *Manuel Branch Stormwater Infrastructure*

7.3 Commercial and Industrial

Potential contributions of FIB from commercial and industrial businesses located along the watersheds can include:

- Illicit discharges
- Improper disposal of waste or trash
- Malfunctioning or improperly maintained grease traps

Specifically, improper maintenance of dumpsters can contribute to non-point source FIB in watersheds. Best management practices associated with the utilization of dumpsters for disposal of waste include:

- Keeping dumpster lids shut to prevent the collection of rainwater
- Keeping drain ports plugged

Stained surface areas adjacent to dumpsters may indicate the need for better maintenance.

As discussed in Section 3.6, potential contributions of FIB were identified at an industrial and a commercial business. Photographs of activities observed are included below.

Photograph 4 – Wastewater discharge at industrial property

Photograph 5 – Improper disposal of fish parts

Follow-up action items for the identified potential sources were as follows:

- A presumed illicit discharge of industrial wastewater was identified at a private-party batch plant facility. Following the WTW, the FDEP was notified of the illicit discharge.
- An open dumpster and presumed illicit dumping of fish parts to the ground surface near a drainage ditch discharging to Manuel Branch was observed during a windshield survey of the watershed. FDEP and City staff discussed management practices with the owner of the fish market. Code Enforcement was contacted following the WTW to perform a follow-up inspection.
- Trash was observed along the employee parking area at Lee Memorial Hospital. Lee Memorial was contacted regarding clean-up of this area.

Future management actions related to potential FIB contribution from business will include:

- When identified, potential illicit discharges from commercial and industrial businesses will be reported to the appropriate regulatory agency.
- The City will coordinate with Code Enforcement to assist in educating commercial and industrial businesses on proper waste disposal where potential sources from dumping are identified.
- Currently, commercial businesses that would be expected to maintain grease traps are not identified in the watershed areas. However, Lee County ordinance Chapter 30 Article XIII establishes requirements for the discharge of grease wastewater in incorporated and unincorporated areas of Lee County.
- During sampling and reconnaissance activities, observation of dumpster conditions will be made, as appropriate, and follow-up actions will be conducted where needed.

7.4 Public

Potential contributions of FIB from public actions located along the watersheds can include:

- Blockages from FOGs, and other household items

- Improper disposal of waste or trash
- Improper disposal or accumulations of pet waste
- Contribution through homeless activity

7.4.1 Oils, Fats, and Greases

Blockages from FOGs and other common household items (i.e., baby wipes, flushable wipes, sanitary pads, and tampons) can contribute to SSOs. During the MOT, neighborhoods with known histories of blockages were identified. Public education regarding the proper disposal of FOGs and other potential sources of sanitary sewer blockages will be conducted through a social marketing campaign, as detailed in Section 4.4.2. An example resource for proper disposal guidance can be found at - https://www.safehome.org/resources/down-the-drain-guide/.

7.4.2 Trash

Accumulations of trash along watersheds may contribute to FIB through surface run-off. Additionally, trash in waterbodies can impede flow allowing for accumulation or re-growth of bacteria. During the WTW, many areas of improper disposal of household-type trash were observed in both the Billy Creek and Manuel Branch watersheds.

Photograph 6 – Trash observed along Billy Creek

Photograph 7 – Trash observed within Manuel Branch

Photograph 8 – Dumping near dumpster adjacent to Manuel Branch

The City has enacted regulatory and maintenance activities to reduce improper disposal of waste/trash. City of Fort Myers Ordinance Subpart A Chapter 70 states that it is a violation to: “Burn, deposit on or bury in, or cause to be deposited on or buried in, any land, public square, street, alley, vacant lot or unoccupied lot, the waters of the Caloosahatchee River, Manuel's Branch, Billy Creek or any other creek, watercourse or ditch within the city limits, any solid waste, recyclables, hazardous waste or other noxious, malodorous or offensive matter.”

The City utilizes street sweeping and regular maintenance of canals and ditches to decrease the amount of trash adjacent to and within the waterways. Additionally, City staff coordinates cleanups, routinely working with groups such as Keep Lee Beautiful, Friends of Billy Creek, Adopt a Canal to perform 8-10 cleanups per year.

Public education regarding the impacts of trash to water quality and proper disposal is proposed to be conducted by the City through a social marketing campaign, as detailed in Section 9.1. As a portion of the community outreach efforts, the City will work with local stakeholder organizations and communities to performing trash clean-up events. Additional trash cans may be installed along areas of the watershed where resources for trash disposal are not readily available or accessible.

7.4.3 Pet Waste

Accumulations of pet or domestic animal waste along watersheds may also contribute to FIB through surface run-off. An area of dog waste accumulation was observed near the southern bank of Manuel Branch during the WTW.

Photograph 9 – Dog waste encountered along Manuel Branch

Content from the Lee County pet waste campaign (http://dontfeedthemonster.info/pet-waste-info/) is shown below.

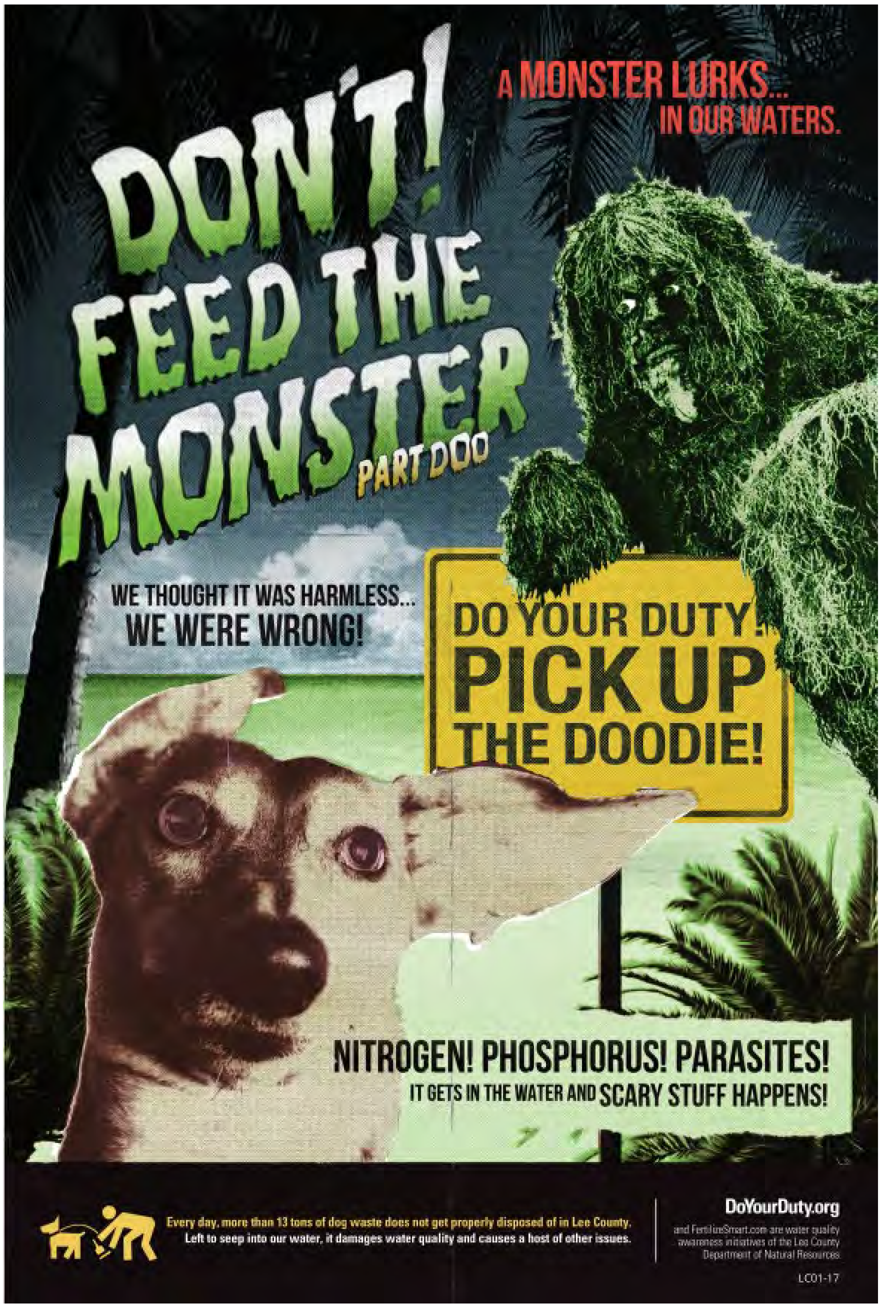


Figure 35 ***Lee County Pet Waste Campaign***

Similar public education regarding proper disposal of pet waste will be conducted through a social marketing campaign, as detailed in Section 4.4.2. Pet waste stations are located at City parks; however, it is recommended that the City consider installing additional pet waste stations along areas of the watershed where resources for pet waste disposal are not available.

7.4.4 Homeless Activity

Homeless activity can potentially be associated with point source and non-point source contributions of FIB to watersheds. Evidence of homeless activity was observed within City parks in the Billy Creek watershed, and adjacent to portions of the Creek, particularly adjacent to and under bridges.

Photograph 11 – Homeless activity beneath Ortiz Bridge

The City will coordinate with the Lee County of Human and Veteran Services when homeless activity is encountered within the watersheds.

8. Natural Sources

Bacteria sources can be found associated with natural sources. While these contributions are recognized as sources of FIB, they are considered low risk, and management actions associated with natural sources of FIB are not addressed in this PRP. Natural sources of FIB include wildlife and E. coli naturally growing in sediment. Coyote scat and boar rooting was observed along canal banks associated with the Billy Creek watershed, and coyote scat was noted along the north bank of Manuel Branch.

Photograph 12 – Coyote scat located along Manuel Branch

Wild bird activity is reportedly common in the Billy Creek Preserve and the Ford Street Filter Marsh. Muscovy ducks were observed in Manuel Branch, and it was reported that additional Muscovy duck activity was common along Manuel Branch at the Heritage Park Rehabilitation and Healthcare facility.

Photograph 13 – Muscovy duck within Manuel Branch

Evidence of wildlife will be recorded during sampling and reconnaissance events.

9. Community Engagement Recommendations

The City is currently developing a Public Outreach and Education Plan to affect behavior change in the stakeholder populations within the Billy Creek and Manuel Branch watersheds with a goal of addressing the human behaviors that result in the areas of concern identified above.

9.1 Social Marketing

In Section 3.1.2.2 of the Toolkit, the FDEP suggests the use of Social Marketing and states "Social marketing is more complicated and integrates public education into strategies proven to change behavior that will reduce FIB loading to a waterbody. Be sure to research effective and audience-sensitive social marketing before choosing a strategy."

Social marketing borrows from commercial marketing techniques for the purpose of social engagement to influence a target audience in order to change their social behaviors to benefit society as a whole. Social marketing can target the environment, public health, safety, or community development, and is a methodology for creating change. Some basic components of a social marketing plan include:

- **Messages & Communications** should use audience members whenever possible to make messages easy to remember and to choose appropriate channels to reach individuals.
- **Incentives / Disincentives** are tangible or intangible motivators. Disincentives may be useful when motivation is low while incentives can be used as a reward for change. Both should be significant to the audience.
- **Prompts** are signs, slogans, and reminders that cue people to model desired behaviors. Prompts should be noticeable, clear, and close to the time and place that the behavior occurs.
- **Social Norms** are based on an understanding of what the audience thinks their peers think, do, and use personal contact to reinforce invisible, desired behaviors.
- **Feedback** shares the effect of participation with participants and should be combined with goal setting and commitment. Individual and/or group feedback may be used.
- **Commitment** asks people to do something and makes them more likely to enact behavior change. Written, public commitments make the most impact.

To increase the public's awareness of how their behaviors can impact the water quality in Billy Creek and Manuel Branch, the City will develop a high-level narrative that will be used as the starting point for all discussions between the City and stakeholders (e.g., politicians, review agencies, public, etc.) and augmented via the use of secondary messaging, as appropriate, to add further supporting details.

As part of preparing the Public Outreach and Education plan, stakeholders will be identified along with their anticipated motivators that will affect behavior change. From here, the stakeholders will then be classified in relationship to the program so that specific messaging strategies can be developed for future implementation. Stakeholders will fall into the following general categories based on their interest, oversight, involvement or presence in the Billy Creek and Manuel Branch watersheds:

- Elected Officials
- City of Fort Myers Departments
- Regulatory Agencies
- Businesses
- Area Landowners
- Residents
- Educational Organizations
- Non-Government Organizations (NGOs)
- Community Based Organizations

– Chambers of Commerce

From this group of stakeholders, the City will identify community leaders to convene an advisory panel that can assist in the development of Stakeholder Profiles for identified key demographic groups that reside within the watersheds. Stakeholder profiles will outline the key drivers, issues, and stakeholder perspectives of the various neighborhoods that comprise the watersheds.

The City will then develop a Public Outreach and Education Plan to establish the messaging objectives tailored to the perspectives of the neighborhood stakeholders. A number of messages and engagement techniques will be included within the plan to ensure the appropriate level of engagement with the target stakeholders.

The Public Outreach and Education Plan will include recommendations with examples for the following activities:

– Individual Stakeholder Meetings
– Public Meetings, Signature Events and Open Houses
– Suggestions for Website Resources & Development
– Social Media Strategy
– Press Releases & Media Sources
– Citizen Reporting Strategy
– Subject Specific Educational Materials
– Implementation, Communications, Measuring, and Monitoring Strategies

The goals of the Public Outreach and Education Plan are as follows:

– To develop a comprehensive program that utilizes, to the greatest extent possible, existing public information that promotes behavior change for activities that contribute to pollution in the targeted watersheds;
– To increase awareness, generate support, and affect a positive change in the public's attitudes and habits regarding water quality in the targeted watersheds;
– To build a network of public and private partners that will work together to promote the reduction of pollution within the watersheds; and
– To examine other best management practices that could be incorporated into the plan to address water quality.

The City has committed to initiating the outlined community engagement actions and working to develop community outreach resources. There are several grant opportunities that the City has identified that would provide funding for activities identified in the Public Outreach and Education Plan. Completion and implementation of the Public Outreach and Education Plan is anticipated to occur in 2021/2022.

10. Conclusions and Next Steps

Elevated concentrations of E. coli have historically been persistent in Billy Creek in Manuel Branch. Actions taken by the City in recent years have aimed at reducing the input of anthropogenic sources of FIB into the watersheds, which include repair and replacement of aging sewer collection infrastructure, assistance with replacement of private sanitary sewer connections, and stormwater improvements to reduce non-point source contribution through run-off. To further reduce concentrations of E. coli in Billy Creek and Manuel Branch, as noted in this report, the City plans to:

– Continue to perform monthly MST sampling to identify and delineate point-source contributions of FIB to the watersheds
– Address potential point-source areas in an expedited manner
– Conduct regular reconnaissance of the watershed and devise and complete follow-up action items by coordinating with the appropriate regulatory or government agency for corrective action (i.e., Code Enforcement, Department of Business and Professional Regulation, Department of Human and Veterans Affairs, Lee County, etc.)

- Complete asset management activities for the sewer collection system, thereby assigning priority to possible future failures in the system
- Continue regular routine inspection and maintenance of the City's lift stations
- Complete stormwater improvement programs to reduce non-point source contributions from run-off and E. coli accumulation and regrowth in sediment

The City also understands that communication and coordination with the public and stakeholder groups is key to the success of implementation of the PRP. To that end, as noted in Section 9, the City will perform the following tasks to increase stakeholder collaboration and community involvement:

- Coordinate with other local stakeholders to address possible point-source contributions that fall under their jurisdiction (i.e., Lee County, FDOH)
- Address non-point source contributions through community outreach/social marketing, educational programs, and trash clean-ups

Natural sources are recognized as a potential source of FIB to Billy Creek and Manuel Branch and may elevate concentrations of E. coli in the watersheds; however, the purpose of this PRP is to identify and eliminate anthropogenic sources of FIB.

Through the use of source identification techniques as outlined in this PRP, timely management actions and community engagement/participation, the City expects to improve water quality in Billy Creek and Manuel Branch. While a direct measurement of the decrease of bacterial loads cannot be established, the degree of program success, in terms of microbial content of areal surface waters within each watershed, will be apparent when comparing future trends to historical data. Re-evaluation of these trends will be on-going, and the City will coordinate with the FDEP to determine when concentrations of E. coli within the watersheds have decreased to the point where MST activities are no longer warranted.

Over the course of the next five years, the City plans to use a similar approach to identifying and addressing potential sources of FIB in each of the City's watersheds.

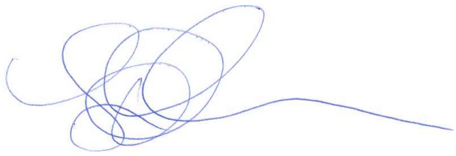
11. References

- https://www.census.gov/quickfacts/fortmyerscityflorida
- https://leegov.com/dcd/planning/districts/district?c=FortMyers
- *Restoring Bacteria-Impaired Waters: A Toolkit to Help Local Stakeholder Identify and Eliminate Potential Pathogen Problems (Toolkit)*, FDEP, July 2018
- Florida Administrative Code 62-302
- *Microbial source tracking: interpretation of qPCR results,* FDEP, 2016
- *Use of acetaminophen and sucralose as co-analytes to differentiate sources of human excreta in surface waters,* Currens, 2019
- *Caloosahatchee River Basin Management Action Plan,* FDEP, 2020
- https://ufdc.ufl.edu/aerials
- https://www.fdot.gov/gis/aerialmain.shtm
- https://chnep.wateratlas.usf.edu/
- *Comparison of thermotolerant coliforms and Escherichia coli densities in freshwater bodies*, Hachich, 2012
- https://climatecenter.fsu.edu/climate-data-access-tools/downloadable-data
- *FS 2100 Surface water sample collection*, FDEP
- *Chapter 62-160 FAC and SOP for Field Activities (FDEP SOP-001/01),* FDEP
- https://cityftmyers.com/DocumentCenter/View/12804/Fort-Myers-Sewer-Master-Plan-PDF
- https://cityftmyers.com/1884/Capital-Improvement-Projects
- http://www.floridahealth.gov/environmental-health/onsite-sewage/index.html

– https://cityftmyers.com/1483/Stormwater
– https://www.sfwmd.gov/sites/default/files/documents/nr_2010_0706_billy_creek_award.pdf
– Lee County ordinance Chapter 30 Article XIII
– https://www.safehome.org/resources/down-the-drain-guide/
– City of Fort Myers Ordinance Subpart A Chapter 70
– http://fertilizesmart.com/pet-waste-info/

All of Which is Respectfully Submitted,

GHD



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Appendices

Appendix A

FDEP’s August 2018 Restoring Bacteria-Impaired Waters, A Toolkit to Help Local Stakeholders Identify and Eliminate Potential Pathogen Problems (Toolkit), Version 3.0

Restoring Bacteria-Impaired Waters

A Toolkit to Help Local Stakeholders Identify and Eliminate Potential Pathogen Problems

developed by the
Water Quality Restoration Program
Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection

Version 3.0, August 2018

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1.0 Context

1.1 Purpose

This guidance is intended to help local stakeholders identify and eliminate pathogen sources in surface waters. It is based on the Florida Department of Environmental Protection's (DEP) use of fecal indicator bacteria (FIB) to indicate potential pathogens in surface waters, and it guides the subsequent development of strategies to identify and eliminate their sources. Protecting public health is paramount.

Keys to restoring bacteria-impaired waters include the following:

- Focus on identifying and reducing health risks.
- Gather, evaluate, and interpret relevant data.
- Build collaborative relationships among key stakeholders, especially local wastewater and stormwater utilities and local government leaders.
- Conduct mapping and field studies, such as Walk the Watershed (WTW) exercises, to uncover potential pathogen sources in the watershed.
- Prioritize hot spots based on water quality data and risk of human contact.
- Monitor and investigate problems.
- Ensure that entities with appropriate authority act in a timely way to locate and eliminate sources.
- Track and catalog identified sources.
- Select effective restoration strategies.
- Prioritize and increase source control measures and infrastructure operation, maintenance, and replacement practices to minimize future problems.
- Pursue local revenue generation opportunities and state and federal financial assistance to build or refurbish local infrastructure.
- Ask DEP for help.

Reference documents are listed as appendices. Electronic copies can be obtained by contacting Anita Nash at anita.nash@dep.state.fl.us. References in the guidance documents to fecal coliform also generally apply to *Enterococci* and *Escherichia coli (E. coli),* which are other indicator bacteria. Hyperlinks in the document provide fast access to supporting information and email addresses. **Appendix H** contains a list of the complete urls.

This Toolkit and its references are not an interpretation of DEP rules; rather, they offer guidance to help local stakeholders protect public health. The documents will be updated from time to time. Check the DEP website for the most recent versions.

1.2 Document Outline

Section 1 provides the context necessary to understand the Toolkit and use it effectively to restore bacteria-impaired waters.

Section 2 contains describes steps to identify the sources of pathogens and develop effective restoration strategies.

Section 3 describes management actions, including structural solutions, that stakeholders can use to remove likely pathogen sources and prevent reoccurrence.

The **Appendices** contain detailed references and resources to save stakeholders' time.

1.3 DEP's Watershed Management Approach

The following is a general overview of the watershed management approach, from the adoption of standards through the identification of water quality problems and establishment of restoration goals and implementation actions:

- DEP adopts surface water quality standards to protect the beneficial uses of Florida's rivers, lakes, springs, estuaries, and coastal waters (Chapter 62-302, Florida Administrative Code [F.A.C.]).

- The agency uses available monitoring data to assess whether those waters meet the standards or are impaired because of a particular pollutant or pollutants (Chapter 62-303, F.A.C.). Contact DEP for more information about impaired waters and water quality standards and assessments.

- For waters that do not meet water quality standards, DEP typically adopts a total maximum daily load (TMDL). A TMDL sets a restoration target by determining the maximum amount of a specific pollutant the waterbody can assimilate while maintaining water quality standards and designated uses (Chapter 62-304, F.A.C.). Ideally, DEP and local stakeholders can begin to reduce or eliminate the sources of the pollution problem so that a TMDL is not necessary.

- Restoration is a collaborative process between DEP and local stakeholders to identify the sources of the water quality problems and take actions necessary to reduce or eliminate them. In the case of bacteria, restoration can be accomplished by following the guidance in this Toolkit. In some cases—and typically with other water quality problems (nutrients, for example)—DEP adopts enforceable restoration plans, called basin management action plans or BMAPs, in response to TMDLs.

- Once effective strategies have been integrated into a restoration plan, local stakeholders proceed, with DEP's help, to make the investments and take the actions that will achieve the necessary water quality improvements.

- Stakeholders measure the effectiveness of the specific actions laid out in the restoration plan.

- Stakeholders adapt, changing the plan and the actions as necessary based on measured results and newly developed technologies or approaches.

    - Stakeholders continuously reassess the quality of local surface waters.

Reminder:

The ten percent threshold values (TPTVs) for Class III waters are:

- *E. coli* at 410 colony-forming units per 100 milliliters (cfu/100mL) in fresh waterbodies, or

- Enterococci at 130 cfu/100mL in marine waterbodies.

Please see the rule for the rest of the details (**Appendix A**).

1.4 Coordinating with DEP

The lead person for the restoration plan should contact the DEP municipal separate storm sewer system (MS4) Phase I regional coordinator up front to make DEP aware that a restoration plan is being developed. Entities can also contact Anita Nash, Environmental Consultant, in the DEP Water Quality Restoration Program (WQRP) (at anita.nash@dep.state.fl.us), to help develop restoration plans, WTW exercises, monitoring plans, and more. Staying in touch with DEP throughout the process of identifying and eliminating potential pathogen sources will improve your chances for success.

1.5 Recommended Approach

The guidance in this document is intended for MS4 Phase I coordinators and other local leaders working on developing and implementing restoration plans. The recommendations listed in this section are further detailed in later sections and appendices. **Figure 1** illustrates the iterative process used to locate and address specific FIB sources.

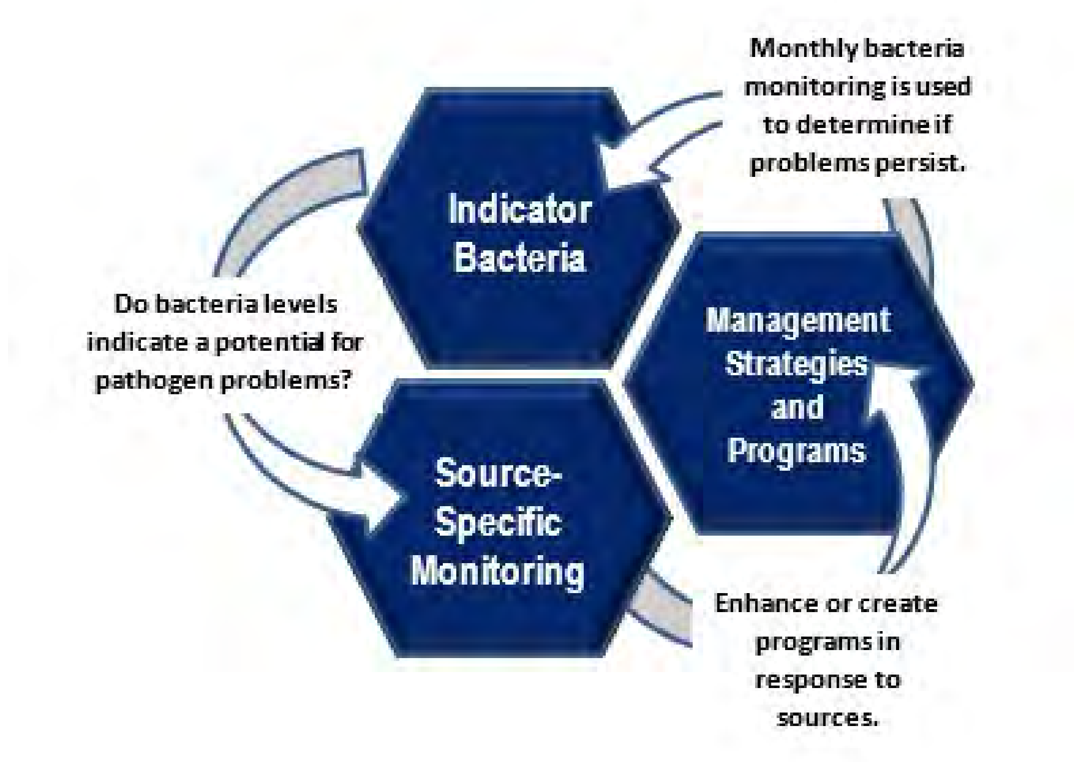

Figure 1. Iterative process for locating and addressing specific FIB sources

MS4 Phase I coordinators will perform some tasks directly and will coordinate with other responsible parties to ensure completion of other tasks. All activities and results should be documented for MS4 Phase I reporting to track progress.

1. Evaluate the existing water quality data. Is the waterbody currently impaired based on the indicator bacteria?

   - If the answer is no, notify the MS4 Phase I regional coordinator and move on to addressing another area.

   - If enough data are not available to determine impairment, gather the data. **Sections 2.5.2.1** through **2.5.2.3** describe monitoring plans and source-specific analytes. DEP does not recommend the collection of fecal coliform samples, even when implementing fecal coliform TMDLs. Instead, sample for the bacteria indicator associated with the waterbody type, either *E. coli* or Enterococci, per the current standard.

   - If the answer is yes, develop the geographic information system (GIS) database described briefly below and in more detail in **Section 2.3, Compiling and Evaluating Data**.

2. Develop and maintain a comprehensive GIS database. The database will be an ongoing record to be updated and maintained over the long term. If GIS layers are not available, develop them as you carry out field exercises. For example, private lift station inventories are not common, but these lift stations may be a source of bacteria (see **Section 3.1.2.1, Private Lift Stations**).

3. Evaluate existing water quality data and develop a monitoring plan if the dataset is insufficient. In addition to local data, check DEP's databases, the Florida Storage and Retrieval (STORET) Database and the DEP Watershed Information Network (WIN), for additional water quality information, such as source-specific data. As part of the data evaluation, consider the following:

    - **Indicator bacteria data:** Are stations adequately distributed throughout the watershed to determine which portions of the WBID are the hot spots (see **Section 2.5.2.1, Selecting Water Quality Sampling Station Locations**)?

    - **Source-specific data:** Even a few positive samples for untreated human waste will influence future steps and motivate participants. Although these analyses are more expensive, quantitative polymerase chain reaction (qPCR) microbial source tracking (MST) results provide a more direct linkage to the type of waste in the waterbody compared with bacteria indicator tests. Use a suite of source-specific analytes when looking for untreated human waste because it is the most dangerous waste source. DEP recommends the addition of the chemical tracers acetaminophen, naproxen, and ibuprofen because they indicate untreated waste when present in waterbodies and stormwater. It is recommended that Walk the Waterbody field investigations be completed before deciding which sources to monitor.

    - **Trend data:** Regular monitoring should be conducted monthly. Evaluate data to determine a range that is "high" for the waterbody. The response should include field investigations soon after analysis and additional sampling to determine the persistence and origin of sources. Ask the lab to notify you the next day if preliminary FIB results, measured in cfu/100mL, are in the tens of thousands or higher. In the case of a high exceedance, investigate as soon as possible to identify the cause and eliminate it. Monitor the site for any repeated exceedances. See **Section 2.3.1, Evaluating FIB Results,** to determine if it is a potential emergency.

4. Evaluate financial and staff resources to see if they meet monitoring and investigative needs. Reevaluate regularly and budget for projected needs.

5. Conduct the Maps on the Table (MOT) event and WTW field event **(**see the summary in **Section 2.5.1, WTW Process**, and the instructions and tools in **Appendix C, Source Identification**). Complete the resulting action items, including the following:

- Confirm the elimination of illicit pipes and discharges.
- Finish walking sections of the watershed.
- Further investigate unknown discharges.
- Sample for source-specific indicators near observations.
- Expand pet waste ordinances and focus public service announcements (PSAs) in areas noted for uncontained pet waste.
- Install pet waste disposal sites.
- Increase the frequency of inspections and necessary maintenance or replacement of sanitary sewer conveyances, focusing on impaired watersheds, especially if the pipes frequently overflow.

6. Determine if intensive source-specific monitoring is needed:
   - If source-specific tests indicate untreated human waste is present, were the origins of the waste sources identified and eliminated? If they were not located, plan intensive source-specific monitoring.
   - Is the waterbody exceeding the TPTV for indicator bacteria during repetitive (trend) monitoring?
     - *If yes, plan intensive source-specific monitoring of the waterbody and stormwater conveyances.*
     - *If no, continue trend monitoring and watch the trends over the next five years, or at least until a DEP impaired waters assessment determines the waterbody is no longer impaired. Act fast if the number of exceedances of the* TPTV *increases.*
7. Conduct intensive source-specific monitoring sub-basin by sub-basin until monitoring results indicate that each is free of untreated human waste or efforts are exhausted.
8. Revisit mystery hot spots as new technologies become available.

To save time, see the appendices for WTW forms, PowerPoint presentations, GIS symbology, examples, and contact lists.

2.0 Understanding the Basin

The first step in preparing a restoration plan is to gain an understanding of the basin. This section outlines the types of information and data that should be reviewed by the stakeholders to familiarize themselves with the basin and to begin identifying potential FIB sources. It also discusses the types of stakeholders typically involved in a plan to reduce FIB.

2.1 Causes of FIB Impairments

Surface waters across Florida, periodically or persistently, are contaminated by human and other animal wastes (feces). FIB commonly originate in the enteric (intestinal) systems of warm-blooded animals and are indicative of the possible presence of pathogens. Human waste can carry pathogens that cause disease.[1] Many researchers have concluded that pathogenic viruses in human feces are the principal cause of waterborne gastrointestinal illness.[2] Therefore, bacteria TMDL implementation must prioritize human waste sources to reduce risks to human health.

Human waste can enter surface waters from such activities as degraded sewer infrastructure, failing onsite sewage treatment and disposal systems (OSTDS) (septic tanks and drain fields), homeless camps, and direct illicit connections from homes or businesses.[3,4,5] Contamination commonly ends up in local stormwater systems, where it is conveyed and discharged to surface waters.

In agricultural areas, uncontained animal waste can migrate into surface waters via runoff. Cattle manure and other livestock waste also contains pathogens harmful to humans.[6] Plans for restoration must prioritize the elimination of contamination by cattle. Wastes from dogs and other domestic animals and livestock are not a natural part of the environment and, like most fecal sources, may cause an imbalance in nature, pose health risks to swimmers, and pollute seafood.

There also are natural sources of fecal wastes, such as birds and other wildlife, that end up in stormwater systems or directly in surface waters. Natural sources are less likely to threaten

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[1] U.S. Environmental Protection Agency (EPA). 2017. *National Water Quality Inventory: Report to Congress.* Available: https://www.epa.gov/sites/production/files/2017-12/documents/305brtc_finalowow_08302017.pdf.

[2] See, for example, *Human health risk implications of multiple sources of fecal indicator bacteria in a recreational waterbody* (Soller, J.A., M.E. Schoen, A. Varghese, A.M. Ichida, and A.B. Boehm et al., December 1, 2014, *Water Research* 66: 254–264, https://doi.org/10.1016/j.watres.2014.08.026), which cites various other reference sources.

[3] U.S. Geological Survey (USGS) Fact Sheet. 1998. *Fecal-indicator bacteria in surface waters of the Santee River Basin and coastal drainages, North and South Carolina, 1995–98.* FS 085-98. Available: https://pubs.usgs.gov/fs/1998/0085/report.pdf.

[4] Bicki, T.J., R.B. Brown, M.E. Collings, R.S. Mansell, and D.F. Rothwell. 1984. *Impact of on-site sewage disposal systems on surface and ground water quality.* Report LC170. Tallahassee, FL: Florida Department. of Health and Rehabilitative Services.

[5] Steele, J., J. Griffith, R. Noble, and K. Schiff. 2017. *Tracking human fecal sources in an urban watershed during wet weather.* Technical Report 1002. Southern California Coastal Water Research Project.

[6] LeJeune, J.T., T.E. Besser, and D.D. Hancock. 2001. Cattle water troughs as reservoirs of Escherichia coli O157. *Applied and Environmental Microbiology* 67(7): 3053–3057.

human health. Balanced populations of wildlife and natural densities of native wildlife, such as bird rookeries, should not be altered because of TMDL implementation. While these should be noted when explaining all potential contributors to the impairment of a waterbody, the TMDL focuses on remediating the anthropogenic causes of FIB in excess of the state criterion.

Trash and litter contribute to bacteria impairments by transporting waste and impeding flow. These changes in flow create shaded, stagnant pockets of water and increase surface areas. Each of these factors promotes bacteria proliferation. Litter and trash should be frequently removed until effective social marketing efforts and well-placed and properly designed trash receptacles help to eliminate trash buildup in streams and stormwater conveyances.

Poorly managed dumpsters can contribute to pollutants in stormwater runoff. Open dumpster lids and missing drain plugs allow rain to wash over the trash inside the dumpster. Rainwater then flows from the dumpster, carrying bacteria and food sources to the stormwater conveyance system. Closed lids and careful disposal practices prevent litter and food waste from lying around dumpsters and entering stormwater ponds and ditches.

Ultraviolet (UV) rays from the sun provide natural treatment by killing bacteria and pathogens suspended in the water column. Constructed stormwater infrastructure laden with litter or shaded by overgrown and excess plants creates conditions that reduce the effectiveness of the treatment and conveyance design. These areas should be identified and maintenance carried out more frequently.

Additionally, the buildup of silt and debris may impede flow and prevent the stormwater system from flushing, causing stagnant conditions in which bacteria can proliferate. Overgrown man-made conveyances and stormwater ponds should be managed to provide maximum UV treatment while maintaining structural integrity, flood attenuation, and nutrient treatment capabilities, as designed.

2.2 Prioritizing FIB-Impaired Watersheds

All Florida counties and many cities extend into multiple watersheds. If a number of waterbodies are not meeting the FIB criterion, then watersheds may need to be prioritized to focus the use of limited financial and staff resources. Of course, some bacteria-reducing actions bring about change across an entire municipality and therefore may benefit all of the watersheds in the municipality. In this case, the prioritization of watersheds is not necessary. However, site-specific restoration activities are often also needed to address all anthropogenic sources of bacteria. Many different factors may be considered to guide the prioritization of watersheds. **Figure 2** describes one optional method for prioritizing waterbodies.

Start with all of the waterbodies to which the city or county contributes stormwater that are not meeting the FIB criterion. Next, review the available data and score the waters by the magnitude of exceedances and by the frequency of exceedances. Ambient water quality data can be downloaded from two state water quality databases: the STORET Database and WIN. **Appendix B, Prioritization and Decision Matrix**, contains an Excel workbook that you can use to perform the following scoring method. **Figure 3** provides a visual aid to accompany the description below.

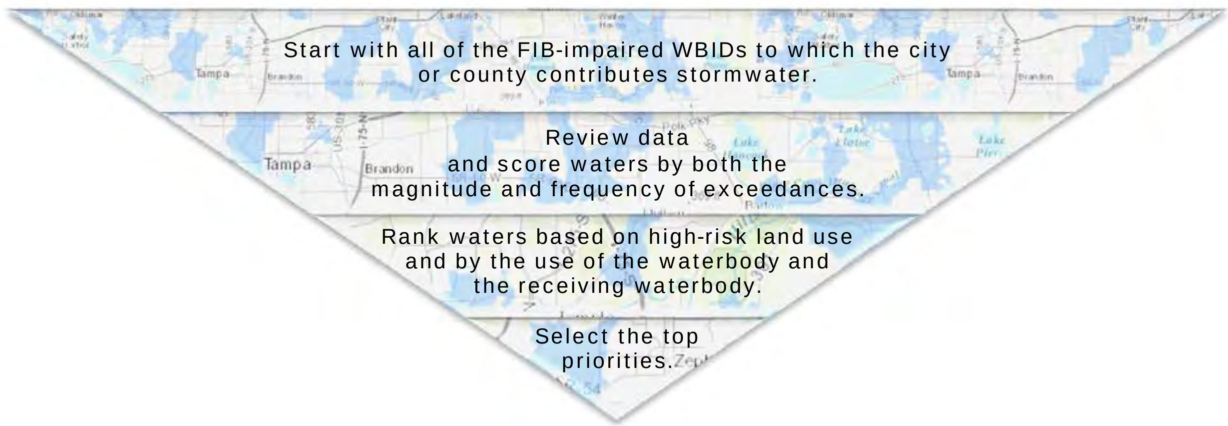

Figure 2: Example of method to prioritize FIB-impaired waterbodies

A simple way of scoring the magnitude of exceedances on a scale of 1 to 100 is by calculating the median of exceedances for the past seven and a half years (the length of DEP's verified period for assessment), subtracting the criterion, dividing by the median of exceedances, and multiplying by 100.

To calculate the exceedance frequency score, divide the number of exceedances by the total number of data points for the same period of record used above, and multiply by 100.

Average the two scores, and then multiply by the following confidence intervals (this applies more weight to the watersheds when more data are available):

- For 5 to 10 total samples, multiply by 0.65.
- For 11 to 19 total samples, multiply by 0.75.
- For 20 to 29 total samples, multiply by 0.8.
- For 30 or more samples, multiply by 1.0.

Now you have a score for the waterbody. DEP identifies waterbodies such as a tributary or segment of a waterbody with a waterbody identification (WBID) number. Score all of the WBIDs. The highest priority WBIDs in the second tier are those with the highest scores. You may see a natural break point from which to continue. If many or all of the waters score similarly, the next step may help differentiate them.

Waterbody name [ ]

WBID [ ] WBID Class [ ]

Data period [ ]

(Insert dates. 7.5 years of data is recommended.)

Appliciable FIB criterion: [ ] A

Total Number of Samples: [ ] B

Median of exceedances: [ ] C

Total number of exceedances: [ ] D

Magnitude of exceedances indicator calcuation:

C - A = [ ] ÷ C = [ ] E

E x100 = [ ] F

(Round F to whole number)

Frequency of exceedances indicator calculation:

D ÷ B = [ ] x 100 = [ ] G

(Round G to whole number)

Average the indicators:

F + G = [ ] ÷ 2 = [ ] H

(Round H to whole number)

Calculate the WBID's weighted score:

Number of samples	Confidence compensation weight (I)
5 - 10	0.65
11 - 19	0.75
20 - 29	0.8
30 or more	1.0

H x I = [ ] J

(Round J to whole number)

Figure 3: Visual representation of mathematical calculations described above

Consider the land uses and the age of the infrastructure in the watersheds. Those with the highest risk land uses should be scored or ranked as a high priority. This type of evaluation is not necessarily a numerical evaluation. A drive through the watersheds and a quick look at the aerial photos of each watershed may provide enough information to perform this part of the evaluation.

Additionally, waterbodies where humans are in contact with the water directly should score high because of the potential risk to human health. Similarly, waterbodies contributing to receiving waters that humans come in contact with should also score high. Sort the top-ranking WBIDs according to the potential sources (for example, land use, the age of sewer systems and OSTDS, and the behavior of residents) and the potential for human contact (such as swimming, beaches, kayaking, and fishing).

Remember, don't delay restoration by attempting to prioritize with 100 % confidence. Just begin restoration (on any impaired WBID) as soon as possible.

Waterbodies shared by multiple municipalities are best served when all parties collaborate. For example, if a watershed's neighbors are developing a restoration plan on your second-worst WBID, you may strongly consider bumping your second-place WBID to first place and working with them to develop a restoration plan at the same time. Or, if you are already working on reducing nutrients in a watershed, then it may make sense to continue with the same watershed and consider FIB reductions simultaneously.

2.3 Compiling and Evaluating Data

To gain a better understanding of the watershed, it is useful to compile existing data from all stakeholders in the basin. Stakeholders should become familiar with the adopted TMDL report before developing a restoration plan. The TMDL report provides a good starting point toward understanding the extent of the impairment, potential sources, and required reductions needed to meet the water quality criterion. Keep in mind that additional local investigations will be needed to understand the issues and sources of the impairment (see **Section 3.0, Management Actions**). Final DEP TMDL reports sorted by basin group and waterbody are available online.

2.3.1 Evaluating FIB Results

Evaluate FIB results by order of magnitude. Use historical FIB data to guide future sampling strategies, identify hot spots, and look for correlations to rainfall and seasonality, including seasonal differences in how the waterbody is used. Notate the range of results to expect. Evaluate new FIB data as soon as possible. Can your lab provide reliable preliminary results? Upon request, some labs call the samplers if results appear to range in the hundreds of thousands to trigger immediate follow-up actions (see **Section 2.5.2.4, Triggered Follow-Up Monitoring**, and **Section 2.5.2.5, Intensive Source Identification Monitoring**).

Possible emergency: Results in the range of hundreds of thousands of cfu/100mL

Wastewater influent *E. coli* and Enterococci counts are in the hundreds of thousands constitute a possible emergency. Any stormwater or ambient water samples in this range, barring any inflation at the time of sampling (biofilm disturbance), should be considered worthy of an immediate revisit. This is the first indication of a hot spot, a potential sanitary sewer overflow (SSO), illegal dumping, an illicit connection, or a failing OSTDS! If you collected human waste–specific tracers and markers with this sample, good. See if they are also present. Return to the site as soon as possible and investigate the contributing area for signs of the source. Resample the original site and take samples throughout the contributing area to narrow down the locational origin. It is best to add source-specific tracers and markers.

Very concerning level: Results in the range tens of thousands of cfu/100mL

FIB in the range of tens of thousands in stormwater and waterbody should grab the attention of restoration coordinators. First check the qualifiers to see if dilution in the lab wasn't enough. Is the actual count known to be higher than the reported value? If so, this site may have been in the hundreds of thousands and should be resampled, and visual field investigations should be conducted. If the actual count is what is reported and, barring any inflation at the time of sampling (biofilm disturbance), a result in the tens of thousands indicates a hot spot!

Difficult to discern: Results in the range of high hundreds to low thousands of cfu/100mL

FIB results in the high hundreds and low thousands don't warrant immediate action, but plan to address them when higher priority areas are remediated. Sample for source-specific indicators when trying to identify sources and their origins in waters where FIB results are common in this range.

Low-level exceedances: Mid-hundreds of cfu/100mL

FIB results in the mid-hundreds are not usually associated with persistent contributions of untreated human waste and don't warrant immediate action, but plan to address them when higher priority areas are remediated. Sample for source-specific indicators when trying to identify sources and their origins in waters where FIB results are common in this range.

2.3.2 Evaluating Source-Specific Lab Results

Evaluating source-specific lab results requires a lot of background information. **Appendix C, Source Identification,** summarizes current discussions on the topic and is based on DEP lab capabilities; thus further research will be needed for interpreting data from other labs. Persistence in the environment, resuspension ability, and dissolvability should be covered in a more detailed document specific to this topic.

Pay attention to qualifiers. For example, "U" qualified data means the result was not detected in the sample, even if a value was reported with the "U" qualifier. Source-specific indicators are best used as guides to prioritize resources to address the highest risk sources identified as contributors to the waterbody.

Some chemical tracers are present in untreated human sewage (acetaminophen, naproxen, ibuprofen) and some in both treated and untreated human sewage (i.e., sucralose). "I" qualified data signal the presence of chemical tracers.

MST qPCR biological markers are specific to the enteric systems of certain species. Unqualified qPCR results in the hundreds of thousands and tens of thousands usually indicate the presence of waste. HF-183 in this range usually means the presence of untreated human waste, unless there is a reuse or effluent discharge nearby, and then the source of the HF-183 hit cannot be distinguished without the presence of other untreated sewage indicators. DEP does not consider "I" qualified HF-183 to be a hit. The greater the magnitude of an unqualified hit, the greater the proportion of sewage.

2.3.3 GIS Data Collection

Next, initiate discussions with stakeholders, informing them of the bacteria impairment and the need for their assistance during the restoration process. Ask them what they know about problematic areas, what they suggest, and what types of data they possess. Build a GIS database to create an informative map project. Computer-aided drafting (CAD) files, paper maps, prior studies, existing water quality data, and word of mouth can be informative, too.

View all available data together in one place to begin identifying potential sources such as areas with repetitive and persistent problems. It is a good idea to host a MOT meeting (see **Section 2.5.1, WTW Process**) to bring stakeholders together, make notations on the maps, and discuss the potential sources of the FIB impairment. Rarely have departments and municipalities viewed stormwater maintenance areas, sanitary sewer lines, and OSTDS failure areas on the same map as water quality monitoring hot spots. Interesting discoveries are made through this effort. For instance, a ditch may not be on the maintenance maps because each municipality mistakenly thinks it belongs to the neighboring municipality. Or, perhaps, the Florida Department of Health (FDOH) knows there is a neighborhood with frequent OSTDS repair permit requests, and the city knows a water quality hot spot is just downstream, but they have not previously discussed these related items with one another.

Continue to update the mapping database and use it to track information throughout the investigative and implementation process. The GIS database is a valuable tool that will help decision makers select appropriate projects to address sources. DEP recognizes that displaying all these layers on a single map may not create a clear visual, and it can be time consuming to create a symbology that works. Thus, DEP is including its GIS symbology package and recommended transparency levels as part of **Appendix C, Source Identification**.

The following types of data should be added to the GIS database, as available:

- Stormwater infrastructure and hydrology:

  - National Hydrography Dataset (NHD) or similar waterbody layers – NHD layers are available at this website.

  - Stormwater infrastructure – Canals, ditches, treatment ponds, outfalls, inlets, and control structures. Stormwater infrastructure information should be acquired through the managing entities—for example, cities, counties, water management districts (WMDs), and water control districts (WCDs).

- WBID boundaries – A polygon layer is available from DEP at this website.

- Stormwater basins – Polygons outlining the contributing areas to stormwater outfalls. One of these sub-basins may be a neighborhood or parcels along a street. Typically, a WBID comprises many smaller stormwater basins. These units are vital for hot spot monitoring and source tracking. Often, this layer is created by a county or city; if it does not exist, ask stormwater infrastructure maintenance crews to help. Funding can be acquired to study and develop the layer (see **Section 3.2.4, Revenue Generation and Financial Assistance Opportunities**).

- Water quality sampling stations – Location of stations and associated water quality data. Use symbols to notate any spots requiring further investigation. Stations uploaded to STORET are available here, and WIN stations are available here.

Potential contaminant sources:

- Human waste disposal:

  - Sanitary sewer infrastructure – Location of pipes, pipe material, manholes, lift stations, valves, and wastewater treatment facilities, as well as information on any recent past problems and upgrades. Include public (utility owned) and private sanitary sewer components. Notate where and when inspections and upgrades have or will occur.

  - SSO database – Location of SSO, impact to surface waters, the amount of sewage spilled, the cause of the overflow, and the correction of the root cause.

  - Private sanitary sewer lift stations and conveyances – Location of private sewer infrastructure such as private lift stations, private conveyances, and package plants. Check with local municipalities for available information.

  - OSTDS – FDOH maintains a layer showing the location of septic systems (septic tank plus drainfield), available here. If you find errors in this layer, submit your updates to health@flhealth.gov to improve the layer.

- OSTDS Repair Permits – Use this layer to look for patterns in failure areas. Patterns can indicate low-lying systems in floodplains or older systems that are aging out. FDOH created this layer at the request of DEP in early 2018. This will narrow down your field explorations in response to hot spots. For example, in neighborhoods with many repair permits, pay attention to parcels without repair permits to see if their system is failing or has been direct-piped. Ask FDOH for field work assistance. You can find a February 2018 shapefile or FDOH Repair Permits in **Appendix C,** or contact your local county FDOH environmental office for more recent information.

- Mobile home parks – The mobile home parks GIS layer is found here. Rate the parks based on their appearance regarding general maintenance. Those that appear to be neglected should be further checked for illicit connections and signs of SSOs.

- Age of developments, neighborhoods, and mobile home parks – A layer of parcels can be acquired from the county property appraiser or through the Florida Department of Revenue Map Data directory. You can symbolize parcels based on effective year built (referring to the main building onsite). This tells you the likely age of private sanitary sewer components, such as laterals from home to utility pipes or from buildings to private lift stations, as well as conveyances between buildings. It also indicates the age of OSTDS. Keep in mind that it does not tell you whether OSTDS have been replaced or which components have been upgraded.

- Agricultural and domestic animals:
  - Livestock operations and hobby farms – Production farms (usually large, for-profit operations) are under the jurisdiction of the Florida Department of Agriculture and Consumer Services (FDACS). Contact FDACS and ask for the Notice of Intent (NOI) to Implement Best Management Practices (BMPs) layer. This will let you know which operations have committed to implementing BMPs and which ones have not yet committed. Hobby farms may be addressed through a collaboration between FDACS and MS4 team members.
  - Dog walks (official and unofficial) – Include rights-of-way along ditches, empty lots, and green areas in apartment complexes and dog parks.
  - Businesses servicing animals – Include veterinarians, pet boarding and grooming facilities, and pet supply stores.

- Food sources for bacteria and bacterial runoff:

  - Food service businesses, fruit-processing facilities, seafood-processing facilities, bait shops, and restaurants – Bacteria levels can be increased near these sites if they have poor disposal practices. These areas also have a high potential for bacteria-laden runoff.

- Risk-of-contact land use:

  - Swimming beaches and recreational use areas – Include the FDOH-monitored Healthy Beaches Program, DEP's layer of public beach accesses; local and state managed parks with swimming in natural waterbodies; and fishing and kayaking sites.

- Logistics and orientation:

  - A base map with aerial photos and street names.

  - North arrow.

  - Legend and scale on 8.5" x 11" sheets of paper.

- Tracking progress:

  - As you identify potential sources and eliminate them, it is helpful to create a layer of these locations. In the attributes, notate dates and describe what was found and when, and what was done to remediate the source. This will help you track sources and remediation activities.

Free GIS Resources:

If GIS resources are not available in your municipality, you may be able to find useful free web-based GIS tools to help you. They are not as comprehensive as ArcMap, but you can use them to assist you with field navigation and to capture points and notes. Some stakeholders reported using the following resources during source identification efforts:

- DEP's **Numeric Nutrient Criteria (NNC) Tracker** is a web-based map. You can turn off the NNC layers and add and download WBIDs and other state GIS layers. You can place markers on the map and upload your own GIS layers. The map can be bookmarked and saved, including your changes, but DEP recommends backing up your GIS layers in case the system goes down.

- Create a **Google** account and generate maps. You can upload GIS KMZ and KML files with fewer than 1,000 features (sanitary sewer and stormwater conveyances cannot be uploaded here, but you can track many other things!). You can upload a WBID boundary, log in with a smart phone, and navigate around the basin and determine whether you are inside or outside the watershed. You can capture notes and create a layer from points, lines, and polygons you create in the field or on your computer and then download the files for your records.

- **CommunityWalk** allows users to create points; upload notes, photos, and audio; and share the map with others.

2.4 Identifying Restoration Partners

The title of this section includes the word "partners" to indicate that source location and elimination activities are most successful when parties work together. If you are leading this effort, consider the value of facilitator training to enable you to organize productive meetings, listen effectively, motivate engagement, and generate the types of relationships required for a successful restoration plan. Your solicitations for support will go far beyond the section/department/municipality where you are employed. For example, MS4 Phase I permits require permittees to work with other cities, counties, state agencies, divisions of each of the preceding, and sanitary sewer utilities. Citizen groups have been known to provide support as well.

Use this section during all steps of the restoration process, to think about land uses, activities, infrastructure, and potential sources of untreated human waste in the contributing area. If any of the items listed below are present, then enlist the support of the corresponding stakeholders. Each category in **Appendix G, Complete List of Restoration Partners**, lists each of the items below along with at least one stakeholder, the benefit of involving them, the types of data they can contribute, activities and tools they can use to identify the origin of FIB loading, the source of their authority, and responsibilities related to FIB load reductions.

Are any of the following located in the watershed of the impaired waterbody?

- Phase I MS4 Conveyances (**Appendix G1**).
- OSTDS such as Septic Tanks or Cluster Systems (**Appendix G2**).
- Mobile Home Parks, Lodging and Recreational Vehicle Parks, Recreational Camps, Migrant Farmworker Housing (**Appendix G3**).
- Sanitary Sewer Utility–Owned Conveyances and Components (**Appendix G4**).
- Roadway Stormwater Conveyances (**Appendix G5**).
- Restaurants, Hotels, and Apartment Complexes (**Appendix G6**).
- Gas Stations that Sell Hot Food, Roadside Food Trucks, Donut Shops, and Coffee Shops (**Appendix G7**).

- Production Agriculture (agricultural operations operated as a business) (**Appendix G8**).
- Nonproduction Agriculture such as Hobby Farms (**Appendix G9**).
- Pathogen Transporters such as Sharps (hypodermic needles), Blood (vials of blood samples), Medical Waste, and Numerous Houseflies (**Appendix G10**).
- Any Anthropogenic Sources (**Appendix G11**).
- Watershed Protection Agencies (**Appendix G12**).
- Watershed Protection Activists and Others (**Appendix G13**).
- Potentially Dangerous Neighborhoods (**Appendix G14**).
- Military Bases (**Appendix G15**).
- Homelessness (**Appendix G16**).

2.5 Tools for Source Identification

The following subsections summarize source identification tools that DEP and stakeholders have found useful. This information is provided to help stakeholders select the tools that work best in their basin. There is no single measure that can be used to identify FIB sources, and an implementation plan should use multiple tools to determine the likely sources in the basin. The results of these assessment methods will provide the basis for selecting management actions (**Section 3.0**) and developing and documenting the restoration plan (**Section 4.0**). The data collected using the tools in this section should be compiled and analyzed along with the previously gathered GIS data to track progress and determine the next steps for restoration.

As you read this section, keep in mind that new tools are continually being developed to identify bacteria sources in waterbodies. A few options are described here, but there may be many other excellent alternatives. Please write to us and let us know about methods you have used so we can share them in the next version of this document. Feel free to contact DEP (at anita.nash@dep.state.fl.us, kevin.coyne@dep.state.fl.us, or puja.jasrotia@dep.state.fl.us) to discuss any of the tools you are considering.

2.5.1 WTW Process

The WTW is an informed field reconnaissance effort to gain a better understanding of a watershed, including the hydrology of the basin and its contributing branches, where infrastructure (sewer and stormwater) is located, and what potential sources are contributing bacteria to the waterbody. Examples of indications of untreated human waste are sewage odor;

illicit pipes discharging toilet paper, sewage, or kitchen waste; toilet paper, sanitary use plastics, and scum on the rim of a low-elevation sanitary sewer manhole lid or lift station; an unnatural, greasy film on the water's surface; white-grey bacteria coating sediment and plants under water; and pooling water or vibrant tall grass at an OSTDS drainfield.

Of similar concern to human waste is livestock waste. Pet waste is of a lesser concern for pathogen transmission but is most evident during the WTW field exercise.

The WTW process is an inexpensive initial step to identify observable sources while building collaboration among watershed stakeholders. **Appendix C, Source Identification,** contains a detailed document on the WTW process. Feel free to contact DEP (at anita.nash@dep.state.fl.us or kevin.coyne@dep.state.fl.us) for guidance about the process as needed. A summary of WTW steps are as follows:

- A representative from the entity leading the WTW, referred to here as the lead, identifies stakeholders with jurisdictional authority in the watershed. For additional information, see the TMDL report for a specific waterbody and **Appendix G, Complete List of Restoration Partners**.

- The lead gathers and reviews available data. See **Section 2.3, Compiling and Evaluating Data,** for a list of the types of data that may be helpful.

- The lead compiles a GIS database and then creates large-format maps in preparation for the MOT meeting. See **Appendix C, Source Identification**, for a GIS symbology package and guidance on which components of the stormwater and sanitary sewer to provide for this exercise.

- The lead reviews the available monitoring data and determines whether more data are needed to identify hot spots.

- The lead reviews recent SSO information.

- The lead hosts the MOT meeting, as follows:

  - To ensure interested parties attend, notice the public meeting. Call and send invitations directly to the staff of necessary divisions and departments requesting confirmation of their participation. **Appendix G, Complete List of Restoration Partners,** contains guidance on which participants to include in the meeting.

  - All jurisdictional entities should be represented. Other stakeholders and citizens should be given the opportunity to provide input at this meeting, or at a second MOT meeting geared toward citizen participation. The impairment and WTW process are introduced, and a review of existing data is presented. Participants are then strategically broken into groups of six or less per table.

- Next, the lead calls out potential sources, and all participants are asked to mark the maps to document the locations of these potential sources based on recent observations. For example, this may include areas where storm sewer and sanitary sewer lines may be close together, areas of homeless activity, routes used intensively for dog walking, large stormwater culverts and ponds discharging to surface water, areas where businesses may be releasing waste, etc.

- A note taker at each table is asked to capture the information on a notepad in such a way to tie the notes to the locations marked on the map by participants.

- Each table presents its notes and locations to the room to further discussion and to share knowledge. This process results in the identification of specific areas for field investigation.

- The meeting concludes with a discussion of logistics for the WTW field event.

- After the meeting is a good time for key representatives to choose monitoring locations for a one-time, watershedwide monitoring effort to precede the WTW field event.

- The lead will combine the notes from the MOT meeting into one list and will transfer locations to one map.

- MOT reconnaissance is carried out as follows:

  - *The lead takes the compiled MOT documentation into the field to conduct a preliminary reconnaissance of the watershed before the group field investigation. Unless the watershed is too large, the entire watershed and waterbody should be covered during the one-day group field event. Therefore, a lot of planning is essential.*
  - *Determine whether areas noted during the MOT warrant investigation during the group field event. Investigate locations from the MOT that are difficult to access or where more information is needed before taking the group to the site.*
  - *Choose a route for the field event.*
  - *Choose a lunch break location with shade and restrooms. Because of time constraints (30 minutes for lunch is ideal), restaurants may not be the best option for a lunch stop. Parks along the waterbody are ideal to continue participant focus on the FIB issue.*

- A one-time water quality monitoring event throughout the watershed, approximately 11 sites per WBID, is recommended approximately 2 weeks before the WTW field event. These results (preliminary results are acceptable) should be used in conjunction with past results to help focus activities on the WTW field day. Monitor for *E. coli* bacteria in Class III fresh waters and Enterococci in Class III marine waters. Monitoring for more specific analytes can be helpful but is more expensive. It is okay to reserve the use of these analytes for a more targeted monitoring event later.

- The WTW field day! The field day is a single all-day event carried out as follows:

  - All key jurisdictional stakeholders need to be represented. Typically, field staff with local knowledge participate, and in the case of public works the supervisors also usually come along.

  - All representatives will ride in one vehicle (usually a 12-passenger van). Trolleys can be used, too. The vehicle stops frequently, and participants get out, walk, make observations, take notes and photos, and note locations on the maps.

  - Collaboration, stronger relationships, and a better understanding of each other's needs and abilities occur between individuals from participating agencies. This happens primarily in the van and to a certain extent in the field, making it vital for entities to be represented and riding in the van for the entire day. Staff on call often follow the van in a utility work truck, but their supervisors ride along in the van to participate in conversation.

  - Citizens are rarely encouraged or allowed to participate in the field event for safety and insurance reasons. However, citizen input is invaluable. Citizens will have the opportunity to attend a follow-up meeting.

  - The team drives and walks the watershed and waterbody making observations, taking photographs, documenting global positioning system (GPS) points, and making notes about problems that may be potential or confirmed FIB sources. The team should investigate any potential sources. This can include identifying sewer infrastructure (such as manholes and pump stations, and sewer lines crossing creeks) and inspecting for signs of recent overflows, MS4 conveyances that need cleaning, failing septic tanks, evidence of wildlife, heavy tree cover or vegetated ditches, evidence of homeless populations, and pet and livestock sources. Recommended locations to be added to the monitoring plan should also be noted. Care should be taken to ensure that only appropriate representatives access private property, unless the property owner has offered access to the entire team.

  - While in the field, participants call and report problems to appropriate agencies if immediate responses are needed to address problematic observations such as an illicit connection, SSO, or dangerous substance spill. This provides immediate responses while allowing the team to continue investigating the watershed.

- Following the event, the lead drafts a report to summarize the WTW efforts and findings. Near the end of the report is a table of action items to address anthropogenic potential and confirmed sources. Responsible entities are noted for each action item. Sometimes the lead is unsure of the responsible entity, and in that case one should be delegated. If the issue is later determined to fall under the jurisdiction of another entity, the table should be updated, and comments should be used to explain the update.

- Follow-up activities often include the need for further field investigations, sometimes by boat, of areas that could not be explored during the big field event. Follow-up investigations can usually be carried out by one or two people. Sometimes follow-up actions include additional monitoring targeting an area of concern. Many follow-up activities consist of two parts. The first addresses an immediate need, such as removing trash that impedes flow or removing an illicit connection. The second part consists of long-term programmatic improvements, such as prescribing an increased frequency of trash removal at a specific location or increasing the frequency of illicit connection investigations in an area.

- Participating entities have the opportunity to review and edit or correct the report before it is finalized.

- The lead should track action items as problems are fixed and as programs are enhanced or developed, noting the date the action item was completed or initiated and the magnitude of the change, such as increasing street sweeping from monthly to weekly.

- A follow-up meeting is recommended to present the results of this effort. Citizens are encouraged to participate in the meeting and provide feedback.

Collaboration and the exchange of information will continue to occur long after the field event as a result of these efforts. Participants generally report stronger relationships and experience a shared understanding and ownership of the bacteria problem and the restoration efforts. Many recommend WTW for all their impaired creeks, and they often remark that this exercise should be repeated at least every five years or more often.

2.5.2 Pollution Assessment Monitoring and Investigative Field Work

The assessment and direct identification of FIB sources are complicated by many variables inherent in the use of indicator organisms and by the dynamic nature of microbial populations in various substrates and environmental conditions. The following discusses briefly discusses monitoring strategies, station selection considerations, and the collection of source-specific data, both chemical and biological, which is key to assessing and developing corrective actions for FIB-impaired waterbodies. **Appendix C, Source Information,** provides more information on using chemical analytes such as acetaminophen, ibuprofen, naproxen, and sucralose. This section discusses investigative tools used along with monitoring.

2.5.2.1 Selecting Water Quality Sampling Station Locations

Depending on the monitoring strategy and goals, consider these suggestions when choosing station locations to bracket or divide the watershed into smaller contributing areas.

Four levels of specificity:

- The **first level of specificity** is a broad scan of the waterbody. The contributing area is most or all the watershed:
    - A sampling point at the mouth of the river, the center of an estuary or lake, or the discharge of a lake.
    - Bracket jurisdictions; place stations at city and county boundaries.
- The **second level of specificity** breaks the full watershed into a few smaller contributing areas:
    - Bracket tributaries and outfalls by sampling upstream and downstream of their convergence. Or, for a single tributary or single outfall, sample the main river just upstream of the convergence and sample the tributary just upstream of the convergence.
    - Bracket the areas where reverse tidal flow occurs.
- The **third level of specificity** answers a question within a small contributing area:
    - Bracket areas based on potential source types. For example, sample downstream and upstream of a livestock farm, or sample downstream and upstream of a neighborhood serviced by sanitary sewer if the surrounding area uses OSTDS.
    - Bracket neighborhoods by sampling upstream and downstream of outfalls or canals.
    - An alternative to bracketing is to sample water directly from an outfall or tributary when there is no chance of water from the river mixing with sample water. Think about the target contributing area that you want the sample results to represent when making this decision.

- The **fourth level of specificity** identifies the parcel where a source originates. Fourth-level stations are used during intensive source identification efforts:
    - Bracket parcels by sampling next to the corner of property boundaries.
    - Bracket a section of an MS4 conveyance between manholes.
- First- and second-level stations often make good repetitive or trend monitoring stations. In some cases, previously monitored stations are not ideal for monitoring for bacteria, and so it is important to assess the characteristics of these sites and decide whether to move the sampling location or keep the existing one. Ideal stations to represent the waterbody (i.e., repetitive or trend monitoring) should have the following conditions:
    - Steady flow.
    - Regular flushing.
    - Deeper than 10 centimeters (cm).
    - Open without floating, emergent, and submergent plants.
- Second- and third-level stations are used to identify hot spots.
- For all levels, the sampler should prepare to acquire the water sample without disturbing the sediment, seawall, culvert, plant life, and trash. Often, this is difficult closer to headwaters and in stormwater conveyances (fourth level). Disturbing them can disturb the biofilms growing on surfaces in the water and suspend bacteria in the sample water, thus inflating the results. The results are not representative of the water column in the waterbody, which is what the water quality criterion is written to address. A peristaltic pump with a quarter-inch diameter tube attached to the end of a grab pole works to extract samples from difficult-to-reach or shallow areas, such as inside a stormwater manhole during intensive source tracking.

2.5.2.2 Repetitive (Trend) Monitoring

FIB results from regular interval monitoring, commonly called "trend" monitoring, should be used to measure progress towards meeting the TMDL and water quality targets. Many sampling entities monitor ambient water quality monthly (recommended) or quarterly, year after year. Think of it as checking the pulse of the waterbody. This repetitive sampling can be plotted to determine the general range of bacteria levels. Statistically significant trends can be determined using a very large amount of data, but statistical trends are not necessary to gain a sense of recent conditions.

Water quality may spike occasionally, while remaining low around the criterion on a regular basis. If results remain high or continue to climb, there may be a persistent problem. The high results may be source related or caused by poor sampling conditions or techniques. For instance, if plants or sediment are disturbed, biofilms from these surfaces may come loose and become suspended in the sample water. Thus, it is important to review monitoring stations and techniques and determine if improvements can be made at the time of sampling. Once this concern is satisfied and if high results persist, further source identification efforts are necessary to restore the waterbody.

The first step in preparing a monitoring plan should be to gather information on existing sampling from the stakeholders conducting the monitoring in the watershed. Important monitoring information includes the station name, station location, parameters sampled, frequency of sampling, period of record, and organization.

When developing a trend monitoring plan, several key items should be considered, including the following:

- The parameter(s) addressed in the TMDL implementation plan. Florida no longer assesses waterbodies for fecal coliform. For fecal coliform TMDLs, it is almost always more useful to monitor instead for the applicable FIB described in the current state rule (see **Appendix A, FIB Criteria**).
- Goals and objectives for the monitoring, such as the following:
  - To identify sources.
  - To determine the success of the TMDL implementation plan core (such as *E. coli* or Enterococci) and supplemental parameters that should be assessed related to the impairment.
- Monitoring frequency (monthly is ideal for repetitive monitoring).
- Any important assumptions made in the development of the TMDL.
- The time of day you plan to monitor may need to correspond with activities in the watershed and tidal influence.

2.5.2.3 When to Sample

- Consider how to include all responsible entities.
- Explore how to share resources.
- The data collected as part of the monitoring plan are required to meet DEP standard operating procedure (SOP) requirements for quality assurance/quality control (QA/QC). The most current version of these procedures is available

online. DEP will determine the usability of the data received following the guidelines in *Process for Assessing Data Usability* (DEP-EA 001/07). A QA/QC plan and calibration logs should also accompany the records of the monitoring program. Ambient water quality data should be uploaded to the state's new water quality database, WIN. Data collected from monitoring performed to trace hits to a source's origin should be flagged as such, so it is not mistaken as ambient water quality data for assessment purposes.

Table 1: Example of sampling parameters for a FIB monitoring plan

Water Quality Indicators	Field Parameters
Enterococci, *E. coli*, or fecal coliform (see water quality criteria to determine what parameters will be assessed) Example of additional parameters: Human waste indicators – Sucralose, acetaminophen, qPCR HF-183 (MST marker)	Dissolved oxygen Dissolved oxygen saturation pH Conductance or salinity Temperature Turbidity Air temperature Cloud cover Rainfall Tide stage Canopy cover Water flow condition Wind

- A useful document to consult while preparing the monitoring plan is the EPA document, *Elements of a State Water Monitoring and Assessment Program*, which includes the following 10 essential elements for a monitoring plan:
  - Monitoring program strategy.
  - Monitoring objectives.
  - Monitoring design.
  - Core and supplemental indicators of water quality.
  - Quality assurance.
  - Data management.
  - Data analysis/assessment.
  - Reporting.
  - Programmatic evaluation.

- o General support and infrastructure.

- An example of a water quality monitoring plan can be found in Section 4.2 of the Lower St. Johns River Tributaries BMAP.

2.5.2.4 Triggered Follow-Up Monitoring

One option for gathering additional data is to adopt responsive monitoring protocols. For example, conduct immediate follow-up sampling and field investigations triggered by high FIB monitoring results. This technique is used in the Lower St. Johns River Tributaries BMAP and follows the protocol outlined in the Lower St. Johns Tributaries Pollution Assessment Manual (see **Appendix C, Source Identification**). In this protocol, fecal coliform samples are collected monthly at set stations in the tributaries, and if the preliminary FIB results of the samples are greater than 5,000 counts per 100 milliliters (mL) (assumed to be mainly from human sources), crews return to the field immediately and collect additional samples upstream and downstream of the location of the recent high-count station in an effort to locate the source. This responsive targeted monitoring continues until the source is identified or the high results no longer persist. An enhanced variation of this approach is to immediately follow up by monitoring for source-specific analytes and FIB.

DEP is looking for documentation to support the development of response thresholds for *E. coli* and Enterococci and will update this document as they are identified. See **Section 2.3.1, Evaluating FIB Results,** for ranges and corresponding responses.

2.5.2.5 Intensive Source Identification Monitoring

An intensive source-specific water quality monitoring strategy is the most efficient way to determine the presence of high-risk sources and trace them to their origin so they can be eliminated. DEP recommends the use of a suite of source-specific indicators—MST biological markers, chemical markers, and *E. coli* or Enterococci—as appropriate for the waterbody.

Start with a hot spot. Map the contributing watershed area to decide where to place stations so that you can use the results to follow the source to its origin.

Use subsequent sampling events and select water quality sampling station locations that represent small sections of the watershed (**Section 2.5.2.1**). Gather samples from downstream to upstream during each sampling event (during the end of outgoing tides in tidally influenced areas), so that the samples represent the contributing area upstream. Each round of sampling should target the contributing area of the previous round's hot spot(s) to further narrow down the contributing area containing the suspected source. Evaluate the full suite of results, field staff observations, photos, institutional knowledge, and the GIS database you have been building (e.g., stormwater conveyances, sanitary sewer components, and OSTDS map layers) for each sample to determine where to sample and investigate next.

Field investigations range from broad to intensive: windshield surveys, walking surveys, smoke tests, dye traces, and closed-circuit television (CCTV) inspections (see **Section 2.5.2.12, CCTV,**

Dye Traces, and Smoke Tests). Communicate and coordinate investigations with all authorities in the contributing areas. Once a source is identified, the appropriate entity will use its authority to ensure the problem is remediated (by the property owner) and report back to the restoration coordinator for tracking. Call DEP as needed for guidance on intensive source identification monitoring.

2.5.2.6 When to Sample

Strategies for any monitoring plan should consider the following concepts:

- Seasonal human use of the watershed or waterbody such as colleges, vacation homes, retiree neighborhoods, and parks.
- High- and low-use time of day and week; for example, in bedroom communities, on weekday mornings, more families flush and shower than mid-day during the week.
- The end of an outgoing tide to represent upstream water quality.
- Seasonal bird populations, such as nesting rookeries, or animals that are fed by seasonal vacationers (for example, Muscovy ducks, seagulls, and geese).
- Part-time livestock populations on farms or at fairgrounds and other arenas.

2.5.2.7 Human Waste–Specific Chemical Analytes

Acetaminophen, ibuprofen, and naproxen are very effective in indicating the presence of untreated human waste in ambient water samples. Sucralose is also useful but should be used in contributing areas where no sources of untreated sewage are present because it is found in treated and untreated human sewage. Entities are adding these analyses to their TMDL implementation monitoring plans. **Appendix C, Source Identification,** contains more information.

2.5.2.8 MST

If you suspect that human or animal waste is contributing to the FIB impairment, MST, along with chemical tracers, can be very useful in confirming a source. MST tests for specific bacteria known to be common in the enteric system of specific animals or humans. It was used for source assessments in the Hillsborough River and Lower St. Johns River Tributaries Basins. Studies in these basins used human, ruminant, and horse indicators. **Appendix C, Source Identification,** contains examples of MST studies used in BMAP documents.

Users of MST analysis should be aware that a lack of hits for bacteria from a specific animal in a few samples does not rule out that species as a source. A lot of data is needed to draw conclusions to rule out sources. Rather, MST is best used to confirm a source. Because it is expensive, managers may consider using MST monitoring at identified hot spots and as a part of the suite for intensive source identification monitoring. A quantitative MST test is called qPCR. An accompanying test for propidium monoazide (PMA) is available that helps identify the proportion of MST from live versus dead cells. Additional information on MST may be found at websites for laboratories that offer this analysis, the USGS website, and vendor laboratories.

2.5.2.9 EPA Sanitary Beach Surveys

EPA developed two types of beach sanitary surveys, the Routine On-Site Sanitary Survey and the Annual Sanitary Survey, to assist with short- and long-term beach assessments. The Routine On-Site Sanitary Survey is performed while water quality samples are taken. The Annual Sanitary Survey records information about factors in the surrounding watershed that might affect water quality at the beach, such as information on septic tanks and land use. Both surveys are available in paper and electronic (an app for tablets) formats. More information is available here.

2.5.2.10 Optical Brighteners

Optical brighteners such as those found in laundry detergents fluoresce under UV light. There are methods for deploying a material, such as cotton, over time and later testing it for brighteners that cling to cotton. Optical brighteners may not be the best option in Florida's dark-colored rivers because humic and tannic acids overshadow the fluorescing brightener, interfering with the results.

2.5.2.11 Sewage-Sniffing Dogs

Yes, you read that correctly. At least one company trains dogs to sniff out sewage sources. They walk the dogs along creeks and ditches to identify problem locations. Alternatively, water samples can be gathered from multiple locations, each in a separate container, and then brought to a parking lot. The samples are placed on the ground, lids off, and the dogs signal which samples contain sewage. The latter option may be safer for the dogs because Florida waterbodies can contain dangerous reptiles. Using the dogs for this purpose also makes for interesting press stories and brings awareness to the community about the impairment and restoration efforts.

2.5.2.12 CCTV, Dye Traces, and Smoke Tests

The sanitary sewer industry uses three test methods of identifying leaks into or out of their sanitary sewer conveyances: CCTV, dye traces, and smoke tests. The same techniques can be applied to underground stormwater conveyances.

CCTV is a remote control–operated vehicle with a video camera which that is driven through sanitary sewer or stormwater pipes to help technicians visually inspect the condition of the pipes. CCTV inspections can reveal breaks and failing infrastructure, blocked infrastructure, flowing and nonflowing segments, and illicit connections, all underground. CCTV is time consuming and somewhat costly, so DEP recommends narrowing down the origin of a source to a relatively small area, through an intensive source identification monitoring strategy, and inspecting short segments of stormwater pipes where no additional sampling can be performed to zero in on the origin of a source.

Dye traces are performed using food-grade dye manufactured for tracing leaking conveyance systems or confirming connectivity. The dye is usually green or red.

Smoke tests are performed by blowing smoke into sanitary sewer conveyances and watching the storm grates and inlets and neighboring yards for rising smoke. This indicates cross-connectivity. The test is usually used to determine where rainwater infiltration is overloading the sanitary sewer system during rain events.

So as not to alarm people, consider informing the public and municipality managers of planned dye traces and smoke tests.

2.5.2.13 Thermal Imaging

Additionally, in the Lower St. Johns River Tributaries Basin (see **Appendix C, Source Identification**), thermal imaging was used to identify inputs that could be FIB sources to several creeks. This process uses the differences in temperatures between the warmer inputs and the cooler creeks in winter. The warmer inputs to the creeks can come from a variety of sources, including natural sources such as groundwater, residential sources such as water from heat pumps, and illicit connections conveying pollutants. In association with the thermal imagery, it is helpful to conduct sampling before and after the flyover to help correlate FIB counts to the anomalies found through the imaging.

2.5.2.14 Decision Matrix and Ranking Tool

A decision matrix and ranking tool assists local stakeholders in determining the level of impairment in a waterbody and guides management actions to address FIB impairments. This decision-support tool incorporates fecal coliform levels, the presence and relative magnitude of human fecal contamination, and other potential sources of human pathogens. **Appendix B, Prioritization and Decision Matrix,** provides more detailed information on the tool and how to develop a site-specific matrix.

2.5.2.15 Wildlife Surveys

In some areas, wildlife can be a significant FIB source, especially in watersheds with significant acreages of wetlands, upland forest, or wooded corridors. While wildlife is a contributing source of FIB loading to a waterbody, this is considered a background concentration. Stakeholders are not asked to remove or discourage native wildlife in and near waterbodies. However, it is helpful to record instances or indicators of wildlife to help correlate potential sources with FIB concentrations.

Wildlife surveys can be used to help determine what portion of the FIB impairment might be attributable to natural conditions. Information on and methods for conducting these surveys are provided at the following websites:

- University of Florida Institute of Food and Agricultural Sciences (UF–IFAS) Extension Electronic Data Information Source (EDIS), Wildlife Conservation and Ecology website.
- Florida Monitoring Program: Point Count Method to Survey Birds (M.E. Hostetler and M.B. Main).
- *Breeding Season Survey Techniques for Seabirds and Colonial Waterbirds throughout North America* (M. Steinkamp, B. Peterjohn, V. Byrd, H. Carter, and R. Lowe), **Appendix C**.

3.0 Selecting Management Actions

Once the watershed has been evaluated using one or more of the tools described in **Section 2.0** to identify potential sources, the responsible stakeholders must implement management actions to address these sources. If an assessment of existing efforts by stakeholders in the basin demonstrates that current practices are sufficient to address the potential sources, then this should be documented (**Sections 3.2.1** and **2.5.1**), and repetitive water quality monitoring (**Section 2.5.2.2**) should continue at Level 1 or Level 2 stations (**Section 2.5.2.1**) to keep an eye on water quality.

However, if additional work is needed to address the impairment, the stakeholders should develop a restoration plan that describes the additional management actions that will be implemented and timelines for completion. The sections below include examples of the projects and programs that have been used in other basins to reduce FIB loading. The identified FIB source guides the most appropriate management actions to be taken.

3.1 Projects and Activities

Many different types of activities can be implemented to address potential FIB sources. Once the potential sources have been evaluated, the appropriate projects to address those sources can be identified. The following sections discuss examples of management actions to address FIB.

3.1.1 Structural Activities

Several types of stormwater and sanitary sewer structural projects can help to reduce FIB loading. Flood control projects are one option. Not only do these projects reduce the amount of nonpoint source pollution to a waterbody after a rain event, they also prevent flooding in septic tank areas, alleviating conditions that may cause septic tank failures. In addition, flooding can cause infiltration of the sanitary sewer system, leading to overflows. Therefore, controlling flooding also benefits the sewer system.

Several types of standard stormwater treatment BMPs, such as wet ponds and swales, can reduce FIB loading. These projects capture and treat stormwater before it is discharged to surface waters.

Upgrades to the sanitary sewer system can reduce FIB levels. Replacing and upgrading old sewer lines, rehabilitating or relining manholes, rebuilding pump stations, and replacing air release valves (ARVs) are types of projects that make the system more efficient and reduce the likelihood of an SSO from faulty infrastructure.

If large numbers of OSTDS are failing, a solution may be developed that is more effective than individual repairs. For example, drain field enhancements, such as adding treatment tanks or supplementing the drain field media, can be done to improve treatment. Mounding drain fields removes them from the surficial groundwater table and potentially flooded areas. The Florida Onsite Sewage Nitrogen Reduction Strategies Study describes a few affordable options for enhancing OSTDS. Work closely with FDOH to ensure the proposed OSTDS modifications can be permitted before constructing. Experts at the Florida Onsite Wastewater Association, Inc. can assist with OSTDS-friendly solutions. If necessary, phasing out septic tanks may be an option if sanitary sewer is available.

3.1.2 Nonstructural Activities

The following sections outline several types of nonstructural activities that address FIB loading.

3.1.2.1 Inspection and Maintenance Programs

Implementing inspection and maintenance programs can proactively identify and prevent problems with infrastructure before the problems result in water quality issues. If these programs already exist, consider the benefits of shifting inspection schedules to target the impaired watershed as soon as possible and increase maintenance frequency where the need is apparent.

Private lift station inspections
Private lift stations are sanitary sewer pump stations that are not utility owned. They can be a significant source of pathogens. A private lift station inspection program is an effective way to ensure the stations are maintained and operating correctly. Inspect a statistically significant number of private lift stations in the basin and note their condition. Use these data to gauge how soon an inventory and inspection program should be developed, if it doesn't already exist, or to decide if an existing program needs to be revised. Entities can adopt local ordinances requiring certified operators to maintain private lift stations.

Sanitary sewer system inspections
For sanitary sewer systems, inspections should include the pipes, manholes, ARVs, and lift stations. These important components of the collection system all need to be inspected and maintained regularly to prevent breaks and overflows of sewage. Any part of the system identified as compromised (i.e., tuberculated pipe, leaking ARVs, broken lift station components, etc.) should be rehabilitated, repaired, or replaced to prevent failures.

Stormwater conveyance system inspections
Stormwater conveyance systems should also be inspected regularly to ensure they are free of trash and debris. All ditches, canals, ponds, pipes, inlets, catch basins, and outfall structures that make up the stormwater system should be maintained regularly. During the inspection and maintenance efforts, note all potential illicit discharges and investigate to ensure that the connection is not contributing FIB to the conveyance system. Entities can add natural creeks to their illicit discharge detection and elimination (IDDE) inspection schedules if necessary, based on the results of field investigations.

OSTDS inspection program
An inspection and maintenance program is also important for OSTDS to ensure they are functioning properly and to identify any repairs needed on the systems. FDOH–Duval County has been inspecting OSTDS in FIB-impaired WBIDs for many years via EPA 319 grants

distributed through DEP (see **Section 3.2.4, Revenue Generation and Financial Assistance Opportunities**).

Frequent communication across programs
Increase collaboration with inspection entities such as local code enforcement, FDOH, the Florida Department of Business and Professional Regulation (DBPR) (Division of Hotels and Restaurants), FDACS, UF–IFAS Extension Offices, and wastewater managers to strengthen the plan's effectiveness. This can be done through frequent discussions initiated by the lead restoration coordinator. Work to make other programs aware of the impairment and restoration efforts for the watershed and share ideas.

3.1.2.2 Social Marketing

Public education and outreach are useful tools to inform the public about FIB sources and how to prevent these sources from impacting waters in a particular area. Social marketing is more complicated and integrates public education into strategies proven to change behavior that will reduce FIB loading to a waterbody. Be sure to research effective and audience-sensitive social marketing before choosing a strategy. Consider hiring social marketing professionals to run successful campaigns. The following are examples of public education materials and a successful social marketing campaign:

- PSAs on local cable or commercial television and radio stations. PSAs can be developed locally—for example, the "Think About Personal Pollution" campaign by the City of Tallahassee. PSAs are available through the University of Central Florida (UCF) Stormwater Management Academy. One example of a PSA about dog waste was developed by the City of Dunedin after a WTW exercise on Cedar Creek.

- Informational pamphlets and/or presentations on pollution prevention, septic tank maintenance, and pet waste management. The Stormwater Education Tool Box is available online from the UCF Stormwater Management Academy.

- Websites that provide information on reducing FIB pollution for homeowners and businesses.

3.1.2.3 Ordinances

Adopting and implementing rules or ordinances can give local governments the additional authority needed to achieve FIB reductions.

A septic tank ordinance to address FIB loading involves several different measures. It could require inspections on a set schedule, and a requirement that the tanks must be pumped out every five years with a notice to local government that this maintenance occurred. The ordinance could require a greater distance between the septic system drain field and the groundwater table and/or surface waters to reduce bacterial loading that travels directly from the septic system to groundwater or surface water. The ordinance might also require septic tanks in certain areas to be advanced treatment systems, which provide a higher level of wastewater treatment. Another option is to require septic tanks to be connected to the sanitary sewer system, where sewer lines are available. This can occur when a septic tank has failed, when a property with a septic tank has changed ownership, or in areas near impaired waterbodies where a sewer system would provide better treatment.

A pet waste management ordinance is another important step to address FIB pollution. It requires residents to pick up and properly dispose of pet waste. To help implement this ordinance, local governments could provide pet waste stations with bags and trash cans in areas where residents typically walk their dogs. Local governments could also implement a fine for not complying with the ordinance as an incentive for residents to pick up after their pets.

3.1.2.4 Fats, Oils, and Grease (FOG) Program

FOG generated during food preparation builds up in sanitary sewer lines. Without proper maintenance, these lines clog, eventually leading to the occurrence of SSOs. Creating a FOG Program can help to reduce the amount of commercial grease dumped into the sewer system, preventing clogs and reducing the number of SSOs and FIB discharges to the watershed. This program would be required for food service establishments, which would need to pump out their systems regularly. Failure to meet the pump-out requirement would result in enforcement actions, such as an initial notice of violation, followed by a cease and desist order, and finally the emergency suspension of service for establishments that fail to comply with the requirement.

3.1.2.5 Root Cause Program

When an SSO is reported, the assumption made about the cause of the overflow may be incorrect. To properly address the problem and prevent future issues, it is important to identify the root (actual) cause of the SSO. A Root Cause Program would allow the utility to determine the best short- and long-term corrective actions to prevent the problem from reoccurring. In areas where this program has been established, a committee should be formed to meet periodically to determine the root cause of the SSOs. The purpose of this committee is to identify key issues across the system to better prioritize resources for the maintenance, repair, and replacement of sewer infrastructure and to prevent future issues with the system.

3.2 Project Selection Process

While all of the management actions described above are useful to reduce FIB loading, the stakeholders will need to choose a combination of these activities based on the conditions in the watershed. Management actions must be selected to address the potential sources identified during the basin evaluation process. Projects are often most effective in areas that do not already have stormwater treatment and in areas with older sewer or septic tank infrastructure that could be upgraded or replaced. Adding stormwater treatment to flood-prone areas would help to reduce FIB loading from stormwater runoff and any septic tanks in the area, while also reducing the amount of infiltration in the sanitary sewer system. The stakeholders should analyze the costs and benefits of the projects to select the most cost-effective options. Once the projects have been selected, a timeline for project implementation should be determined, in coordination with DEP, to provide a reasonable schedule to achieve water quality benefits.

Chapter 11 of the Lower St. Johns River Tributaries BMAP provides a good example of how all of the above considerations come together to form a plan for restoration activities.

3.2.1 Summary of Potential Sources and Management Actions

To determine if the identified management actions are sufficient to address the potential FIB sources in the watershed, the information on sources and actions should be summarized in a format that aids in evaluation. Each stakeholder should provide information on past and current projects and programs, as well as any planned projects and programs that could reduce FIB loading. These efforts should be matched to the potential FIB source(s) addressed. Summarizing the existing and planned management actions compared with the confirmed and potential sources in the watershed is helpful in identifying any sources that are not adequately addressed.

Tables 2 through **6**, which are based on tables in the Lower St. Johns River Tributaries BMAP, illustrate how the efforts in the basin can be summarized. These tables list the responsible entities, as well as the potential sources and types of management actions to address those sources. Under each entity, the following symbols can be placed in the tables to explain the level of effort:

- A check mark ("√") denotes an activity that the entity currently implements or plans to implement in the near future.
- A dash ("-") denotes an activity that the entity currently does not implement in the basin but could be an option for the entity to implement if additional actions are needed.
- An "X" denotes an activity that is not the responsibility of the entity (note those boxes can also be shaded to help illustrate what activities are and are not the entity's responsibility).

Table 2: OSTDS sample summary of efforts table

Source/Action	Entity 1	Entity 2	Entity 3	Entity 4
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Septic System Upgrade	√	√	X	X
Public Education (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X

Table 3: Sewer system sample summary of efforts table

Source/Action	Entity 1	Entity 2	Entity 3	Entity 4
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	√
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
ARV Inspection and Rehabilitation	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
SSO Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√

Table 4: Stormwater sample summary of efforts table

Source/Action	Entity 1	Entity 2	Entity 3	Entity 4
Flood Control Capital Projects	√	X	√	X
Private Lift Station Inventory	√	X	√	X
Private Lift Station Inspection Program	X	X	X	X
Capital Projects/Stormwater Water Quality BMPs	√	X	-	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	-	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	√	X
Illicit Connection Detection and Removal	√	X	√	X
Public Education and Outreach	√	X	√	X
Surface Water Sampling for Conditions and Trends	√	X	√	X
Program Implementation	√	X	√	X

Table 5: Pet waste management sample summary of efforts table

Source/Action	Entity 1	Entity 2	Entity 3	Entity 4
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X

Table 6: Special source assessment sample summary of efforts table

Source/Action	Entity 1	Entity 2	Entity 3	Entity 4
Intensive Water Quality Sampling to Track Sources	√	X	X	X
MST	√	X	X	√

3.2.2 State of Oregon Implementation Matrix Template

To organize source information and project information, the Oregon Implementation Matrix is a good example to follow. Oregon's guidance for developing TMDL implementation plans includes an implementation tracking matrix to assist in describing, tracking, and reporting on TMDL implementation efforts. The Oregon guidance document contains a fecal coliform example of the matrix that serves as another useful evaluation tool for stakeholders.

The matrix includes columns for information on the pollutant sources, strategies to control the source, specific projects to address the source, expected resources needed, how implementation will be measured, timeline and milestones, and status of the activity. The matrix is found in

Appendix D of the report *TMDL Implementation Guidance for State and Local Government-Designated Management Agencies*.

3.2.3 Evaluation of Management Actions

Summarizing the existing and planned actions will help stakeholders identify what more needs to be done to address the FIB impairment. All of the stakeholder activities should be organized by the type of source the projects address. Data gaps or uncertainties related to the FIB sources should be identified, and studies planned to address these needs should be included in the TMDL implementation plan.

3.2.4 Revenue Generation and Financial Assistance Opportunities

Investigating sources of potential pathogen problems and, especially, financing infrastructure upgrades to resolve them is expensive. DEP and other federal and state agencies have a variety of programs to assist in the effort.

DEP's Clean Water State Revolving Fund provides low-interest loans to plan, design, and build or upgrade infrastructure. Since the program's inception, more than $1.8 billion, or nearly 40 % of the program's total assistance, has been awarded to local communities for the construction or rehabilitation of sewer system infrastructure. As much as $200 million in loans is typically available each year. The Small Community Wastewater Program helps smaller, poorer communities with grants to plan, design, and build wastewater management facilities. More than $10 million typically is available each year. The highest priority in both programs is public health protection where need is **documented**. Conducting field investigations and source tracking monitoring strategies can help develop the necessary documentation.

DEP's Division of Water Restoration Assistance produces a guidance document, *Water Resource Funding in Florida*, available here, that summarizes these programs and a host of other state, regional, federal, and even potential private sources of wastewater and stormwater assistance, along with contact information.

Various technical assistance programs are also available to help communities better operate and maintain their wastewater and stormwater system and evaluate resource needs, including the Florida Rural Water Association, the Southeast Rural Community Assistance Project, the Florida Stormwater Association, and the Florida Water Environment Association Utility Council.

4.0 Developing and Documenting the Implementation Plan

Many people who will use this document are developing a bacteria pollution control plan (BPCP). The specific elements required in these plans should be discussed with your MS4 permit contact at DEP.

The purpose of this section is to outline the elements that should be included in a TMDL implementation plan. This information will help stakeholders prepare a comprehensive plan to address the FIB impairment to meet the TMDL.

4.1 TMDL Implementation Plan Elements

To ensure that the restoration plan includes all the necessary information to show how FIB sources will be removed or reduced, data gaps will be filled, and the waterbody will be monitored to show progress towards the TMDL, certain elements must be included. A helpful tool for preparing a restoration plan is the EPA *Handbook for Developing Watershed Plans To Restore and Protect Our Waters*, which outlines the elements essential for a watershed plan, as follows:

- Identify the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in the watershed-based plan.

- Describe the nonpoint source management measures that will need to be implemented to reduce sources and identify the critical areas where those measures will be needed to implement the plan.

- Estimate the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied on to implement the plan.

- Develop an information/education component to enhance public understanding of the project and encourage early and continued public participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

- Develop a reasonably expeditious schedule for implementing the nonpoint source management measures identified in the plan.

- Describe interim, measurable milestones for determining whether nonpoint source management measures or other control actions are being implemented.

- Develop a set of criteria to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards and, if not, the criteria for determining whether the watershed-based plan needs to be revised or, if a nonpoint source TMDL has been established, whether the TMDL needs to be revised.

- Develop a monitoring component to evaluate the effectiveness of efforts over time, measured against the state's FIB criteria.

Developing a TMDL implementation plan takes time and dedication. Unlike nutrients and other nonpoint source pollutants, bacteria are very dynamic. A thorough investigation of the watershed, a strong understanding of potential sources, and programs developed to address each potential source are the essential ingredients for an initial restoration plan. Progress toward restoration must be evaluated, and plans must be updated and adapted to meet current needs. It can be overwhelming when one thinks of how many components in a watershed are in need of upgrades and inspections, but don't fret. Having a plan and moving step by step through it will lead to success. Contact DEP (at anita.nash@dep.state.fl.us and kevin.coyne@dep.state.fl.us) for more information.

5.0 Appendices

The additional documents referenced in this report, listed below, may be useful to review when preparing a FIB watershed restoration plan. These documents can be obtained by contacting DEP.

- Appendix A – FIB Criteria
- Appendix B – Prioritization and Decision Matrix
    - Hillsborough Decision Matrix.
    - Prioritizing FIB-Impaired WBIDs.
- Appendix C – Source Identification
    - Walk the WBID.
    - FDOH Repair Permits GIS Layer.
    - DEP Interpretation of HF-183 Human MST Marker, Sucralose, and Acetaminophen Results.
    - DEP Study Design and Unofficial SOPs for Source Identification Monitoring.
    - Lower St. Johns Tributaries Pollution Assessment Manual 2006.
    - Mammalian Survey Techniques.
    - Bird Surveys.
    - Thermal Imaging Report.
    - EPA MST Guide.
    - GIS – MOT Layer List and Symbology Package.
- Appendix D – Management Strategies
    - Pet Waste Ordinances.
    - Scoop the Poop Alachua County PSA Information.
- Appendix E – Evaluating Progress
    - Annual BMAP Report Template Example.

  - Detailed Description of Statistical Analysis of Bacteria.

- Appendix F – Funding
  - Creating a Sustainable Watershed Funding Plan 2008.
  - Sample Watershed Funding Plan.
  - Grant Sources: DEP Water Restoration Assistance Handout.

- Appendix G – Complete List of Restoration Partners
  - Appendix G1 – Phase I MS4 Conveyances:

    The entity to involve: Phase I MS4 permit coordinators for all counties and cities in the watershed.

    Jurisdictional authority: MS4 coordinators are responsible for managing the quality of stormwater conveyed to waters of the state that must meet water quality criteria. They are also responsible for reporting on the activities of multiple divisions in the municipality. They have the authority to address violations of local and state regulations pertaining to stormwater by initiating warnings and, if necessary, fines. They can also refer violations to appropriate departments.

    Source identification activities are, in part, field inspections. "Programs" and "inspections" are mentioned throughout because some problems can be improved by increasing the frequency of maintenance or reprioritizing areas for inspection and maintenance. MS4 Phase I coordinators should recommend increases or reprioritization of contributing areas by providing supporting evidence (i.e., notes about observations and photos) as needed. Additional information can be obtained by contacting the WQRP and MS4 Phase I regional coordinators at DEP (at anita.nash@dep.state.fl.us or NPDES-stormwater@dep.state.fl.us).

    Information and data they may possess: GIS shapefiles illustrating the location of stormwater conveyances, maintenance schedules and the frequencies of trash removal from conveyances, sediment removal, IDDE inspection schedules, knowledge of local ordinances and state regulations to protect water quality, and private lift station inspection inventories and inspection frequencies.

    When to engage in the implementation process: From beginning to end.

    How the entity can help: May lead the implementation process, develop monitoring plans, conduct source tracking efforts, enforce the permit and related ordinances, refer enforcement actions to other agencies as appropriate, and coordinate public education efforts where observations indicate need.

- Appendix G2 – OSTDS such as Septic Tanks or Cluster Systems

The entity to involve: FDOH.

Jurisdictional authority: Once a source is identified on a property serviced by an OSTDS, FDOH is responsible for ensuring that the property owner eliminates the illicit connection or repairs the failing drainfield. If the owner cannot afford to remediate the issue, a financial assistance plan should be developed and used (see Section 3.2.4, Revenue Generation and Financial Assistance Opportunities). If the owner refuses to remediate the issue, FDOH may take legal enforcement actions against the owner. In some cases, FDOH may remediate the issue and charge the owner or obtain funding after the work is completed.

FDOH is also responsible for issuing installation or repair permits for OSTDS. In cases where an OSTDS is failing and sanitary sewer is available, FDOH may reject an application for a repair permit, forcing the homeowner to hook up to sanitary sewer.

Information and data they may possess: Statewide GIS layers of septic tanks and repair permits. However, the county or city may maintain a more accurate or up-to-date layer.

When to engage in the implementation process: MOT; WTW and other field events.

How the entity can help: An FDOH OSTDS inspector should attend the WTW field event because that individual has the authority to investigate if sewage is smelled or directly observed. Additionally, when you get persistent human waste indicator hits and narrow the source location to a relatively small contributing area, serviced only by OSTDS, document that the source is persistent and cannot be attributed to pet waste or another non-OSTDS source. Report the source to the county FDOH environmental division and request field assistance to locate the contributing pipe or failing drainfield. FDOH may conduct an OSTDS inspection on a site where drainfield failure or direct pipe is observed or raw sewage is smelled, indicated by persistent human source–specific sampling results, or where drainfield failure or a direct pipe is suspected and the property owner grants permission to inspect the system.

Note that if a human waste source is suspected, rather than confirmed, FDOH must first gain permission from property owners to access private property.

Chapter 64E-6, F.A.C. (Standards for Onsite Sewage Treatment and Disposal Systems), states:

> A sanitary nuisance is defined as: 386.01 Sanitary nuisance.—A sanitary nuisance is the commission of any act, by an individual, municipality, organization, or corporation, or the keeping, maintaining, propagation, existence, or permission of anything, by an individual, municipality,

organization, or corporation, by which the health or life of an individual, or the health or lives of individuals, may be threatened or impaired, or by which or through which, directly or indirectly, disease may be caused.

- Appendix G3 – Mobile Home Parks, Lodging and Recreational Vehicle Parks, Recreational Camps, Migrant Farmworker Housing

  The entity to involve: FDOH county office.

  Jurisdictional authority: In Florida, mobile home parks, lodging and recreational vehicle parks, and recreational camps are all potential FIB sources. FDOH's Mobile Home Parks Program inspects approximately 5,500 housing facilities enrolled in the program to reduce the risk of injury and illness, with a focus on the following: proper sewage disposal to minimize the risk of diseases such as hepatitis, Salmonella, and Shigella; safe drinking water to minimize the risks of diseases such as Giardia and Cryptosporidium; safe solid waste collection and disposal to minimize rat and roach infestations, reservoirs for mosquitoes, and associated diseases, as well as vectors that transmit rabies and diseases associated with ticks.[7] Also of concern is maintaining safe and disease-free swimming pools, where applicable.

  Migrant farmworker housing may require restoration work. According to FDOH, up to 200,000 migrant and seasonal farmworkers and their families travel to and provide labor in Florida each year.[8] FDOH's Migrant Farmworker Housing Program seeks to reduce the risk of communicable disease transmission and injury among migrant farmworkers by establishing procedures for permitting and inspecting migrant housing. Informational brochures on the program are available in English and Spanish.

  County Health Departments are responsible for complying with the Migrant Labor Camp Program rule and procedures. They provide plan review and permitting, preinspection and routine inspections, investigations, education, and the application of state laws and rules.[9]

  How the entity can help: County Health Departments receive and investigate environmental health and sanitation complaints about these facilities. They provide complainants with information on report findings and corrective actions taken.

- Appendix G4 – Sanitary Sewer Utility–Owned Conveyances and Components

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[7] FDOH. *Mobile Home Parks*. Accessed on May 31, 2018. Available: http://www.floridahealth.gov/environmental-health/mobile-home-parks/index.html.

[8] FDOH. *Migrant Farmworker Housing*. Accessed on May 31, 2018. Available: http://www.floridahealth.gov/environmental-health/migrant-farmworker-housing/index.html.

[9] FDOH. *Migrant Farmworker Housing*. Accessed on May 31, 2018. Available: http://www.floridahealth.gov/environmental-health/migrant-farmworker-housing/index.html.

The entities to involve: Sanitary sewer utility (or utilities).

Jurisdictional authority: Per Florida statute, sanitary sewer utilities are responsible for maintaining sanitary sewer conveyances, lift stations, and other components owned by the utility. The sanitary sewer utility should work closely with county FDOH staff and stormwater permittees on a program to identify properties where OSTDS are failing and a timeline to convert from septic to sanitary sewer. In some municipalities, the utility may have authority, through a local ordinance, to convert a home from septic to sewer. The cost of hook-up services may be fronted by the utility and charged to the property owner, or a hardship funding source may cover it.

Information and data they may possess: Many utilities have a GIS layer of their infrastructure. These professionals can share their knowledge of the age of the infrastructure, conveyance and manhole construction materials in each neighborhood, conveyance inspection schedules, inspection methods, repair and replacement plans, causes of SSOs, and common locations of SSOs. Sanitary sewer representatives can provide information about utility-owned lift stations, such as inspection frequency, what happens if an overflow is impending, whether they are equipped with back-up generators to prevent SSOs during power outages, how staff are notified immediately when there is a problem, and how quickly they respond once notified.

When to engage in the implementation process: MOT; WTW and other field events, as well as inspections of sanitary sewers in response to human waste source–specific monitoring results.

How the entity can help: Whether the utility is owned by a municipality or a private company, or is a co-operative, sanitary sewer utility leaders and field staff are invaluable in source detection and elimination. They are most familiar with the industry and can expeditiously inspect and identify a sewage problem.

During a WTW field event, the utility is usually willing to pop manhole covers for staff to observe the inside. The construction materials of manholes and conveyances can indicate their age and potential for structural degradation. The depth of conveyances varies depending on many factors. Therefore, stormwater conveyances may be higher or lower or at similar elevations as the sanitary sewer conveyances. This knowledge helps everyone think through the possibility of cross-contamination.

After the WTW event, especially if monitoring results suggest a leak, the utility may also be willing and able to inspect a portion of its conveyance system using smoke testing and CCTV inspections.

- Appendix G5 – Roadway Stormwater Conveyances

The entities to involve: City and county public works departments, Florida Department of Transportation (FDOT).

Jurisdictional authority: Authorities include the maintenance and management of stormwater conveyances, illicit connection detection programs, and notification of the responsible entity when illicit sources of human waste are identified. Per MS4 Phase I permits, mowing and maintenance crews are trained to identify and report illicit connections to stormwater systems. Leaking sanitary sewer utility pipes are reported to the utility for immediate repair. Sewage conveyed from homes to stormwater systems should be directed to the county FDOH. Team members can also report illicit connections to the local MS4 permit contact, code enforcement, or DEP. The MS4 Phase I permit requires documentation of IDDE Program activities and requires permittees to take legal actions, if necessary.

Information and data they may possess: GIS layers of conveyances, stormwater manholes, inlets, and outfalls. Knowledge of the flow direction and connectedness of stormwater conveyances above ground and underground may be in GIS format but is more likely relayed by word of mouth. These entities retain maintenance schedules and information on the frequencies of trash removal from conveyances, sediment removal, plant removal along and inside stormwater infrastructure, and street sweeping. Other important knowledge includes IDDE inspection schedules and areas, as well as problem sites, such as recurring potholes indicative of broken underground pipes, areas with excessive litter, areas with flooding problems, areas with siltation buildup and erosion, and nuisance odor areas indicating the degradation of biological waste.

When to engage in the implementation process: Information gathering. Managers and staff who mow rights-of-way, maintain conveyances, or are contract managers for these practices are beneficial at the MOT event and during the WTW and other field investigations. When tracing sources by monitoring human waste–specific source tracking parameters, engage these teams to provide input on contribution areas, flow direction, connectivity, and field investigations.

How the entities can help: Per the MS4 Phase I permit, maintenance frequency may be increased in areas demonstrating the need for more frequent activities. Local roadway departments and FDOT may be well suited to aid in watershed-focused IDDE efforts before or after the WTW field event. These teams can provide traffic safety and open manholes so monitoring staff can safely collect samples from underground conveyances. In response to indications of human waste in underground stormwater conveyances, crews (with access to the necessary equipment) may be able to use CCTV to inspect stormwater conveyances.

- Appendix G6 – Restaurants, Hotels, and Apartment Complexes

The entity to involve: DBPR, Division of Hotels and Restaurants.

Jurisdictional authority: The Division of Hotels and Restaurants issues permits to hotels, most restaurants, and multi-unit housing such as apartment complexes. These permits, in part, address health and safety. DBPR works with permit holders to remediate and prevent future issues for the following situations: trash and litter around dumpsters and anywhere onsite, food waste exposed to rain (rodent attractants), grease recycling containers with grease drips on the outside or spills on the ground, private lift stations, missing sewer clean-out caps, and privately owned sanitary conveyances. DBPR has the authority to legally enforce permit requirements.

Information and data they may possess: Knowledge of restaurants, hotels, and apartment complexes with a history of problems.

When to engage in the implementation process: MOT; WTW and other field events.

How the entity can help: When observations of concern are made at hotels, restaurants, and apartment complexes, assign follow-up activities to DBPR. If source tracking points to any of these properties, ask DBPR to assist during field investigations. Contact FDACS Division of Food Safety (DFS) to get in touch with your local FDACS Food Safety field representative.

- Appendix G7 – Gas Stations that Sell Hot Food, Roadside Food Trucks, Donut Shops, and Coffee Shops

The entity to involve: FDACS DFS.

Jurisdictional authority: DFS issues permits to some food service providers that do not have a DBPR permit. Examples are gas stations with a small hot bar (such as pizza or fried chicken), food trucks, and some coffee and donut shops. These permits are less environmentally comprehensive than DBPR permits for restaurants. For instance, they do not address sanitary sewer components. However, they do cover rodent attractants near dumpsters and in the general vicinity, such as grease spills and dumped food. DFS can legally enforce permits.

Information and data they may possess: Knowledge of areas of concern with a history of problems.

When to engage in the implementation process: MOT; WTW and other field events.

How the entity can help: When issues of concern are observed on DFS-permitted facilities, assign follow-up activities to DFS. If you are unsure if the facility has a permit from FDACS' DFS or the DBPR Division of Hotels and Restaurants, report the observation to either of the two agencies and they will forward it to the other if necessary.

- Appendix G8 – Production Agriculture (agricultural operations operated as a business)

  The entities to involve: FDACS Office of Agricultural Water Policy (OAWP) and UF–IFAS Extension Offices.

  Jurisdictional authority: Both OAWP and UF–IFAS may work directly with producers to identify appropriate BMPs and cost-share funding to implement BMPs. Outside of BMAPs or springs priority focus areas (PFAs), participation in the BMP Program is voluntary because there are no requirements for producers to implement BMPs.

  Information and data they may possess: FDACS maintains a GIS database of production agricultural operations enrolled in the BMP Program.

  When to engage in the implementation process: MOT; WTW field event.

  How the entities can help: If livestock or manure are observed near waterbodies or conveyances on production agricultural operations (businesses), OAWP may work with producers after the WTW field event to educate them on the benefits of enrolling in the BMP Program. The goal is for producers to sign an NOI to implement BMPs. OAWP will assist producers by prescribing appropriate BMPs, finding cost-share funds, and following up once BMPs are in place.

  In some regions, UF–IFAS Extension Offices are available to team up with OAWP for this task. These agencies may also work together to host public education events. Note that producers are not required to participate in the BMP Program outside of BMAP areas and springs protection zones but may sign up voluntarily.

- Appendix G9 – Nonproduction Agriculture such as Hobby Farms

  The entities to involve: UF–IFAS Extension Offices and MS4 Phase I permit coordinators for counties and cities.

  Jurisdictional authority: UF–IFAS and MS4 permit coordinators may work with the owners of hobby farms to reduce impacts to waterbodies through public education.

  Information and data they may possess: Knowledge of areas with hobby farms.

  When to engage in the implementation process: MOT; WTW field event.

  How the entities can help: May host public outreach events for small parcels with livestock, such as ranchettes, to discuss hobby farm BMPs, including manure management and waterbody impairments.

- Appendix G10 – Pathogen Transporters such as Sharps (hypodermic needles), Blood (vials of blood samples), Medical Waste, and Numerous Houseflies

  The entities to involve: FDOH and local code enforcement.

Jurisdictional authority: FDOH and code enforcement are concerned with any uncontained human medical waste and evidence of drug use. Medical waste containing animal blood, such as from a veterinarian's office, is a code enforcement issue, not an FDOH issue. FDOH should be called when animal manure or another biological waste is drawing numerous houseflies. If the fly nuisance originates from a farm business, FDACS OAWP should also be called to assist the owner with BMP planning.

Information and data they may possess: Knowledge of areas of concern with a history of problems.

When to engage in the implementation process: MOT; WTW field event.

How the entities can help: They will work with property owners to remediate the immediate problem and develop a plan to prevent it in the future. Many times, after initial remediation is completed, staff will add the site to their periodic inspection schedule until a clean history is noted.

- Appendix G11 – Any Anthropogenic Sources

The entity to involve: County and city code enforcement.

Jurisdictional authority: Enforcement of county or city ordinances.

Information and data they may possess: Code enforcement staff are trained to make observations beneficial to the WTW field event, and they know local and state regulations.

When to engage in the implementation process: WTW field event.

How the entity can help: Staff are rarely available to participate but should be notified in advance of the WTW field event date and its purpose. Carry code enforcement's phone number and call them from the field if something urgent is observed. Often, the MS4 coordinator is also familiar with county and city codes and can stand in for code enforcement during the field event.

- Appendix G12 – Watershed Protection Agencies

The entities to involve: WMDs, DEP, WCDs, National Estuary Program (NEP).

Jurisdictional authority: WMDs – Water consumption, water treatment projects and initiatives, irrigation schedules, flood control. DEP – Water quality assessments, permits regulating stormwater discharges to waters of the state. WCDs – Flood control, water quality in stormwater conveyances; maintenance of stormwater conveyances. NEP – Restoring and maintaining healthy estuaries and bays; water treatment projects and initiatives.

Information and data they may possess: Knowledge of some history of the watershed and modifications to the waterbody; laws and regulations on waters of the state and federal waters; may suggest participants and partners who can assist in the restoration effort; knowledge of hydrology and water quality–related subjects.

When to engage in the implementation process: From the very beginning.

How the entity can help: During the MOT and WTW events, staff will ask valuable questions from a watershed management perspective. DEP may be able to assist with monitoring plan development, monitoring efforts, data analysis, minor GIS support, and WTW planning. All the entities in this category may be able to provide outreach assistance and assistance with public education materials.

- Appendix G13 – Watershed Protection Activists and Others

The entities to involve: Environmental concern groups and citizens such as The Nature Conservancy, Audubon Society, River Keeper, Friends of (waterbody name), Bream Fishermen's Association, local politicians, universities, citizens, homeowner associations, and neighborhood outreach coordinators employed by municipalities.

Jurisdictional authority: Not applicable.

Information and data they may possess: Environmental concern groups and citizens, both organized and unorganized, are often very observant and can provide information about site-specific issues and concerns.

When to engage in the implementation process: MOT; post-WTW field event.

How the entity can help: May provide support with public education, litter pick-up events, and dog waste campaigns. Universities may be able to assist with a portion of the water quality monitoring, laboratory analysis, and data interpretation. They may also assist in organizing and running think tanks for specific problems.

- Appendix G14 – Potentially Dangerous Neighborhoods

The entity to involve: Florida Fish and Wildlife Conservation Commission (FWCC) officers or another law enforcement entity.

Jurisdictional authority: Environmental and standard law enforcement.

Information and data they may possess: Some law enforcement officers may also be trained in environmental law, such as FWCC officers.

When to engage in the implementation process: In advance of the WTW field event.

How the entity can help: If an area of the watershed is known for illegal activity and is potentially dangerous, remember, the safety of the field team is the highest priority. With an advance request, law enforcement will sometimes escort and accompany the team.

- Appendix G15 – Military Bases

  The entity to involve: Military base.

  Jurisdictional authority: Military base stormwater and sanitary sewer management.

  Information and data they may possess: Knowledge of base operations and history of the area.

  When to engage in the implementation process: MOT; WTW field event.

  How the entity can help: Notify and invite participation from military base stormwater and sanitary sewer system managers. The event will inform them about the FIB impairment and associated concerns. If allowed, they may choose to invite a select group of participants to come on base to make observations.

- Appendix G16 – Homelessness

  The entity to involve: Florida Department of Children and Families (DCF) Office on Homelessness, local homeless coalitions, and continuum of care lead agencies.

  Jurisdictional authority: The Office on Homelessness is responsible for coordinating resources and programs across all levels of government, and with private providers that serve the homeless. It also manages targeted state grants to support the implementation of a local homeless service continuum of care plans.

  Information and data they may possess: Knowledge of homeless camps.

  When to engage in the implementation process: Before MOT and after WTW. Determine through discussion whether their participation in MOT or WTW will be the best use of their time or would benefit the team. After field events, provide them a list of locations where homeless camps and activities were observed and encourage their teams to reach out to people in need of services. Their services to the homeless population are of significant value in their involvement with the WTW and general restoration process.

  How the entity can help: The lead agency can coordinate with other service providers to assist the homeless in the basin with the goal of providing them with health care, food, and shelter.

- **Appendix H – Complete List of Website Addresses**

  - City of Dunedin YouTube PSA about dog waste: https://www.youtube.com/watch?v=U9FxFBRElSA.

  - City of Tallahassee Think about Personal Pollution Campaign website: http://www.tappwater.org/.

  - CommunityWalk website: http://www.communitywalk.com/.

- DBPR websites:
  - *Hotels and Restaurants: http://www.myfloridalicense.com/DBPR/about-us/department-divisions/.*
  - *DBPR field reps: http://publicfiles.dep.state.fl.us/DEAR/BMAP/Fecal%20Toolkit/APX_C_Source_ID_Tools/Walk_The_WBID/.*
- DCF websites:
  - *DCF Office on Homelessness: http://www.myflfamilies.com/service-programs/homelessness.*
  - *DCF contacts: http://www.myflfamilies.com/service-programs/homelessness/local-homelessness-contacts.*
  - *Contacts for regional lead agencies who coordinate services: http://www.dcf.state.fl.us/programs/homelessness/docs/leadagencies.pdf.*
- DEP websites:
  - *BMAPs: https://floridadep.gov/dear/water-quality-restoration/content/basin-management-action-plans-bmaps.*
  - *FIB Toolkit Appendices: http://publicfiles.dep.state.fl.us/DEAR/BMAP/Fecal%20Toolkit/.*
  - *Final DEP TMDL documents: https://floridadep.gov/dear/water-quality-evaluation-tmdl/content/final-tmdl-reports.*
  - *Florida STORET Database public access website: http://prodenv.dep.state.fl.us/DearSpa/public/welcome.*
  - *Lower St. Johns River Tributaries BMAP: https://floridadep.gov/sites/default/files/lsjr-tribs-fecal-bmap.pdf.*
  - *NNC Tracker: http://fdep.maps.arcgis.com/home/item.html?id=da661fe32e9d49b6a0c2706a42d4782c.*
  - *QA/QC SOPs and quality manuals: https://floridadep.gov/dear/quality-assurance/content/dep-sops.*
  - *Process for Assessing Data Usability (DEP-EA 001/07): http://mytest.sfwmd.gov/portal/page/portal/xrepository/pdf2/usability_doc.pdf.*
  - *Program for MS4s: https://floridadep.gov/water/stormwater/*

- *Surface Water Quality Standards, Chapter 62-302, F.A.C.:* *https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-302*.
- *Impaired Surface Waters Rule (IWR), Chapter 62-303, F.A.C.:* *https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-303*.
- *TMDLs, Chapter 62-304, F.A.C.:* *https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-304*.
- *TMDL Program: https://floridadep.gov/dear/water-quality-evaluation-tmdl/content/total-maximum-daily-loads-tmdl-program*.
- *WBID shapefiles: http://geodata.dep.state.fl.us/datasets/waterbody-ids-wbids*.
- *Water Resource Funding:* *https://floridadep.gov/wra/wra/documents/water-resource-funding-florida*.
- *Watershed Assessment Section: https://floridadep.gov/dear/watershed-assessment-section*.
- *WIN:* *http://prodenv.dep.state.fl.us/DearWin/public/welcomeGeneralPublic?calledBy=GENERALPUBLIC*.

- FDACS websites:
  - *OAWP: http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy*.
  - *Division of Food Safety: https://www.freshfromflorida.com/Divisions-Offices/Food-Safety*.
- FDOH websites:
  - *Environmental health directors statewide list of county contacts:* *http://publicfiles.dep.state.fl.us/DEAR/BMAP/Fecal%20Toolkit/APX_C_Source_ID_Tools/Walk_The_WBID/*.
  - *FDOH nitrogen reduction study:* *http://www.floridahealth.gov/%5C/environmental-health/onsite-sewage/research/nitrogen-reduction.html*.
  - *OSTDS: http://www.floridahealth.gov/%5C/environmental-health/onsite-sewage/ostds-statistics.html*.
  - *Migrant Farmworker Housing Program:* *http://www.floridahealth.gov/environmental-health/migrant-farmworker-housing/index.html*.

- *Migrant Farmworker Housing Program informational brochure (English):* *http://www.floridahealth.gov/environmental-health/migrant-farmworker-housing/_documents/migrantframworkerenglish.pdf*.
- *Migrant Farmworker Housing Program informational brochure (Spanish):* *http://www.floridahealth.gov/environmental-health/migrant-farmworker-housing/_documents/migrantframwokerspanish.pdf*.
- *Mobile Home Parks Program:* *http://www.floridahealth.gov/environmental-health/mobile-home-parks/index.html*.
- *FDOH Repair Permit February 2018 GIS layer*.

o Canine Services, LLC website: http://www.ecsk9s.com/home.html.

o Environmental emergency call lines – Statewide list: http://publicfiles.dep.state.fl.us/DEAR/BMAP/Fecal%20Toolkit/APX_C_Source_ID_Tools/Walk_The_WBID/.

o EPA websites:

- *Elements of a State Water Monitoring and Assessment Program:* *https://archive.epa.gov/water/archive/web/html/statemonitoring.html*.
- *Handbook for Developing Watershed Plans To Restore and Protect Our Waters:* *https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/handbook-developing-watershed-plans-restore-and-protect*.

o *Florida Monitoring Program: Point Count Method to Survey Birds* (M.E. Hostetler and M.B. Main): http://edis.ifas.ufl.edu/uw140.

o Florida Onsite Wastewater Association, Inc. website: http://www.fowaonsite.com/services.

o Florida Rural Water Association website: http://www.frwa.net/.

o Florida Stormwater Association website: http://www.florida-stormwater.org/.

o Florida Water Environment Association Utility Council website: http://fweauc.org/.

o Google: https://accounts.google.com/SignUp?hl=en.

o Oregon Department of Environmental Quality website on TMDL implementation guidance for state and local government–designated management agencies: https://digital.osl.state.or.us/islandora/object/osl:20723/datastream/OBJ/view.

- Southeast Rural Community Assistance Project website: http://sercap.org/.
- UCF Stormwater Management Academy website: http://stormwater.ucf.edu/.
- UF–IFAS Extension, EDIS, Wildlife Conservation and Ecology website: http://edis.ifas.ufl.edu/department_wildlife_ecology_and_conservation.
- USGS Microbial Source-Tracking and Detection Techniques website: http://water.usgs.gov/owq/microbial.html.

- **Appendix I – Glossary of Terms**

ARV: Air release valves are often attached to metal sanitary sewer pipes to release corrosive sewer gases. They are usually located at high points in a sanitary sewer conveyance (this gas rises), which frequently coincides with bridges. The sewer gas released often smells bad and can cause source identification inspectors to suspect a sewer leak. Many ARVs are checked for liquid leaks regularly by the utility that owns them; however, it is good practice to inspect them to see if liquid is dripping from them.

Back-up generator: A generator used by sanitary sewer utilities during power outages to keep sanitary sewer lift stations and pressure mains flowing.

Conveyances: Man-made structures above (ditch or canal) or below ground (pipes or troughs made of various materials [such as vitrified or red clay, polyvinyl chloride [PVC], concrete, etc.]), used to move liquid, often by gravity flow; sometimes they are pressurized. The term conveyance applies to both stormwater and sanitary sewer systems.

Curb Inlet: An opening where stormwater enters the underground stormwater conveyances in the curb of a street.

Force Main: Pressurized sanitary sewer pipe that receives sewage from smaller pipes in which sewage is moved upgradient by pressure created by pumps.

Grate: A metal covering of an entrance to the stormwater conveyances underground. Water passes through holes in the grate.

Gravity Main: Sanitary sewer pipe that receives sewage from smaller pipes in which sewage is moved downgradient by gravity.

Hot or **Hit:** A way to refer to a monitoring site with lab results indicating raw sewage—for example, "During Rounds 2 and 3, Site C4 was hot. Acetaminophen and *E. coli* results were at levels consistent with wastewater treatment plan influent."

Illicit Connection: A pipe discharging something (such as sewage) other than stormwater, air conditioner condensate, or dechlorinated pool water to a natural waterbody, canals, or the MS4 system. The term potential illicit connection (PIC) is used when an outfall is observed but the observer is uncertain whether the outfall is illicit (illegal) or allowed. Illicit connections may occur without a pipe—for example, a ditch or trench, surface flow, or leak.

Lateral: A small pipe, 2 to 4 inches in diameter, that conveys sewage from a home or business to the sanitary sewer main conveyance.

Lift Station: A lift station, also called a pump station, is an underground holding tank or well containing a pump that turns on when triggered by a float in the well. The purpose is to gather sewage or stormwater by gravity. When a certain volume is gathered, the pump pushes the liquid to a higher elevation, allowing the liquid to flow by gravity to the next low point. Eventually sewage will enter a wastewater treatment facility, or stormwater will discharge to a stormwater system or waterbody. Sanitary sewer lift stations often stink when the pump is active.

Outfall: A pipe that discharges stormwater into a waterbody.

Manhole: Often a circular metal lid flush with the ground that covers an access to sanitary sewer (raw sewage conveyance) or storm sewer (stormwater conveyance).

OSTDS: Onsite sewage treatment and disposal system. One example is a septic system (septic tank and drainfield).

Pressure pipe: A conveyance used to move liquid sewage uphill, usually under pressure. Facilities usually know immediately if one of these is leaking, and so it is expected that the sources being followed are probably not pressure pipes.

Private: Components of stormwater conveyances or sanitary sewer conveyances not managed by a utility or municipality.

Pump Station: Stormwater or sanitary sewer station in which a pump is used to move liquid.

Sewage: This term is confusing when it is not explained or preceded by an adjective, as follows:

> ***Sewage****: Animal or human waste.*
>
> ***Raw sewage****: Untreated sewage; human waste that is not disinfected.*
>
> ***Influent*** *to a wastewater treatment plant is untreated sewage, or raw sewage.*

Treated sewage*: Effluent; human waste that is disinfected at a wastewater treatment plant. Effluent from a functioning drainfield could be considered treated sewage, although it is not exposed to a measured level of disinfectant.*

Wastewater reuse water *is treated effluent and is sometimes mixed with stormwater before being used for lawn irrigation.*

Sewer: This term is confusing when it is not explained or preceded by an adjective, as follows:

Sanitary sewer = *Raw sewage conveyance.*

Storm sewer = *Stormwater conveyance.*

SSO: Sanitary sewer overflow, in other words, a sewer spill or sewage leak from a sanitary sewer conveyance.

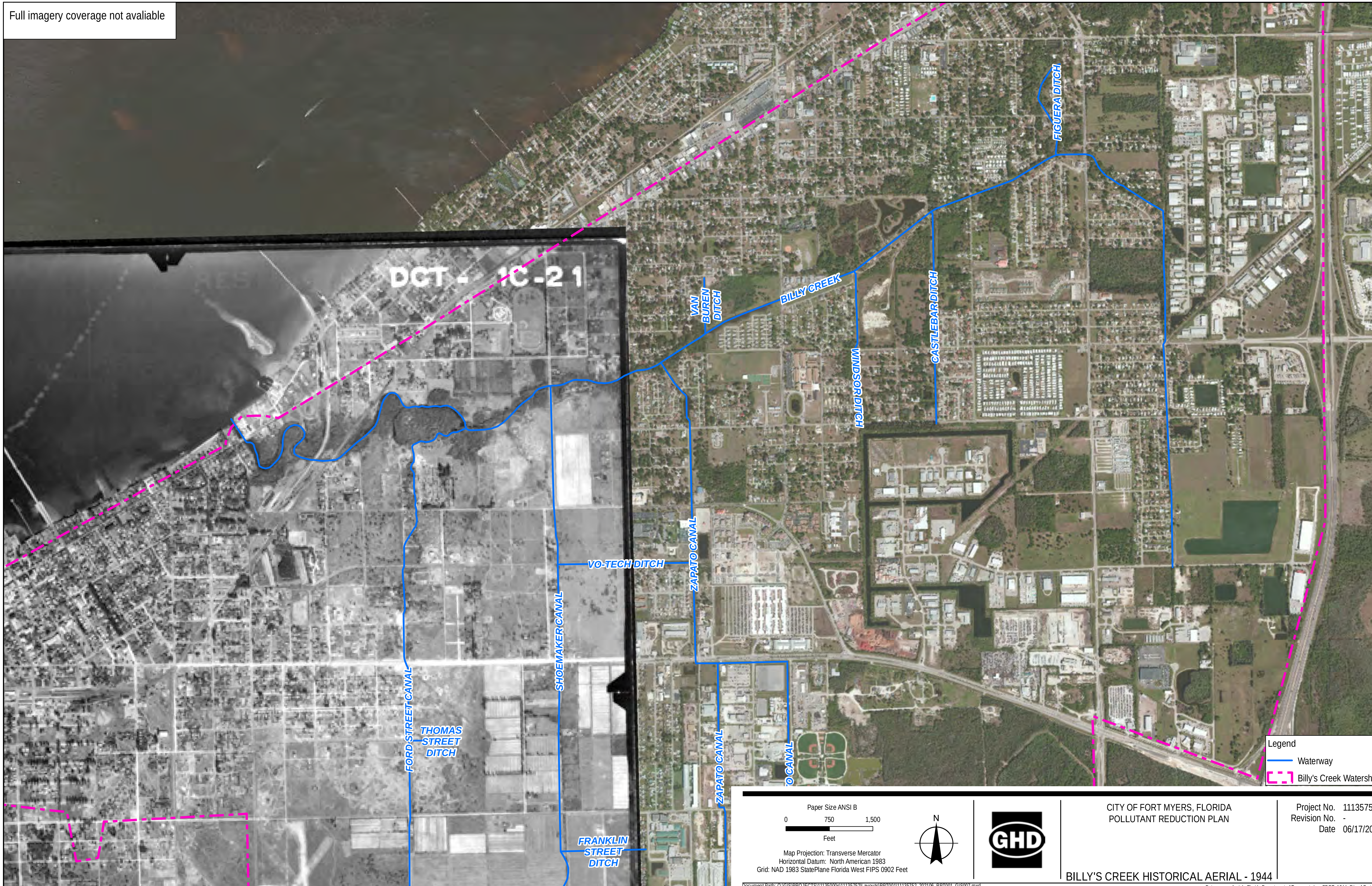
- **Appendix J – List of Acronyms and Abbreviations**

ARV	Air Release Valve
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BPCP	Bacterial Pollution Control Plan
CAD	Computer-Aided Drafting
CCTV	Closed-Circuit Television
CFU	Colony-Forming Unit
cm	Centimeter
DBPR	Florida Department of Business and Professional Regulation
DCF	Florida Department of Children and Families
DEP	Florida Department of Environmental Protection
DFS	Division of Food Safety
DMR	Discharge Monitoring Report
E. coli	Escherichia coli
EDIS	Electronic Data Information Source
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FIB	Fecal Indicator Bacteria
FOG	Fats, Oils, and Grease
FWCC	Florida Fish and Wildlife Conservation Commission
GIS	Geographic Information System
GPS	Global Positioning System
IDDE	Illicit Discharge Detection and Elimination
IWR	Impaired Surface Waters Rule
mL	Milliliter
MOT	Maps on the Table
MS4	Municipal Separate Storm Sewer System
MST	Microbial Source Tracking
NEP	National Estuary Program
NHD	National Hydrography Dataset
NNC	Numeric Nutrient Criteria
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OAWP	FDACS Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PFA	Priority Focus Area
PIC	Potential Illicit Connection
PMA	Propidium Monoazide

PSA	Public Service Announcement
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
qPCR	Quantitative Polymerase Chain Reaction
SOP	Standard Operating Procedure
SSO	Sanitary Sewer Overflow
STORET	STOrage and RETrieval (Database)
TMDL	Total Maximum Daily Load
TPTV	Ten Percent Threshold Value
UCF	University of Central Florida
UF–IFAS	University of Florida Institute of Food and Agricultural Sciences
USGS	U.S. Geological Survey
UV	Ultraviolet
WBID	Waterbody Identification (Number)
WCD	Water Control District
WIN	Watershed Information Network
WMD	Water Management District
WQRP	Water Quality Restoration Program
WTW	Walk the Waterbody/Watershed/WBID

Appendix B

Billy Creek Historical Aerial Photographs



Paper Size ANSI B

0 750 1,500

Feet

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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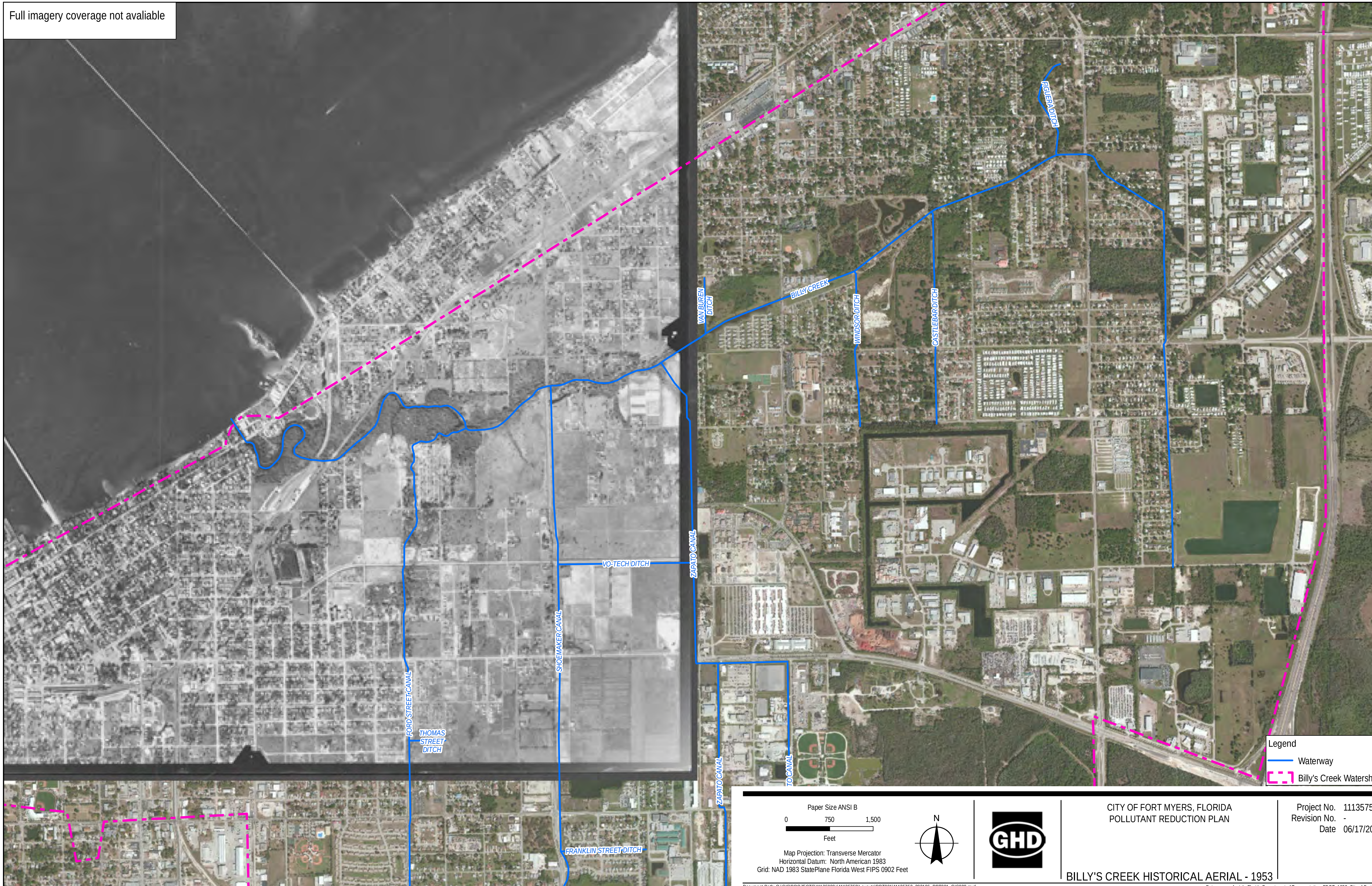
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

BILLY'S CREEK HISTORICAL AERIAL - 1944

Project No. 11135752
Revision No. -
Date 06/17/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS007.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1944, City of Fort Myers GIS



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Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

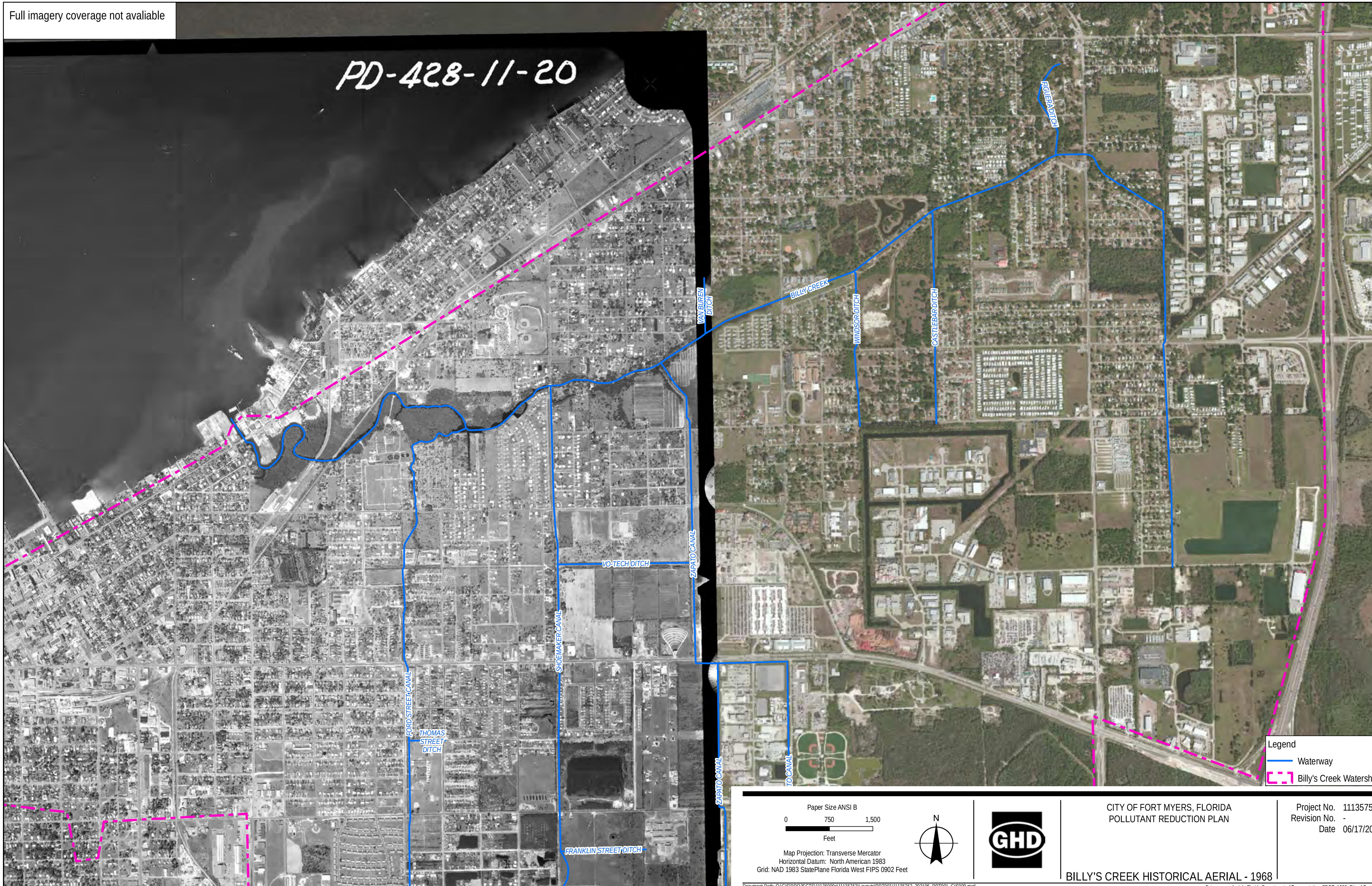
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

BILLY'S CREEK HISTORICAL AERIAL - 1953

Project No. 11135752
Revision No. -
Date 06/17/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS008.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1953, City of Fort Myers GIS



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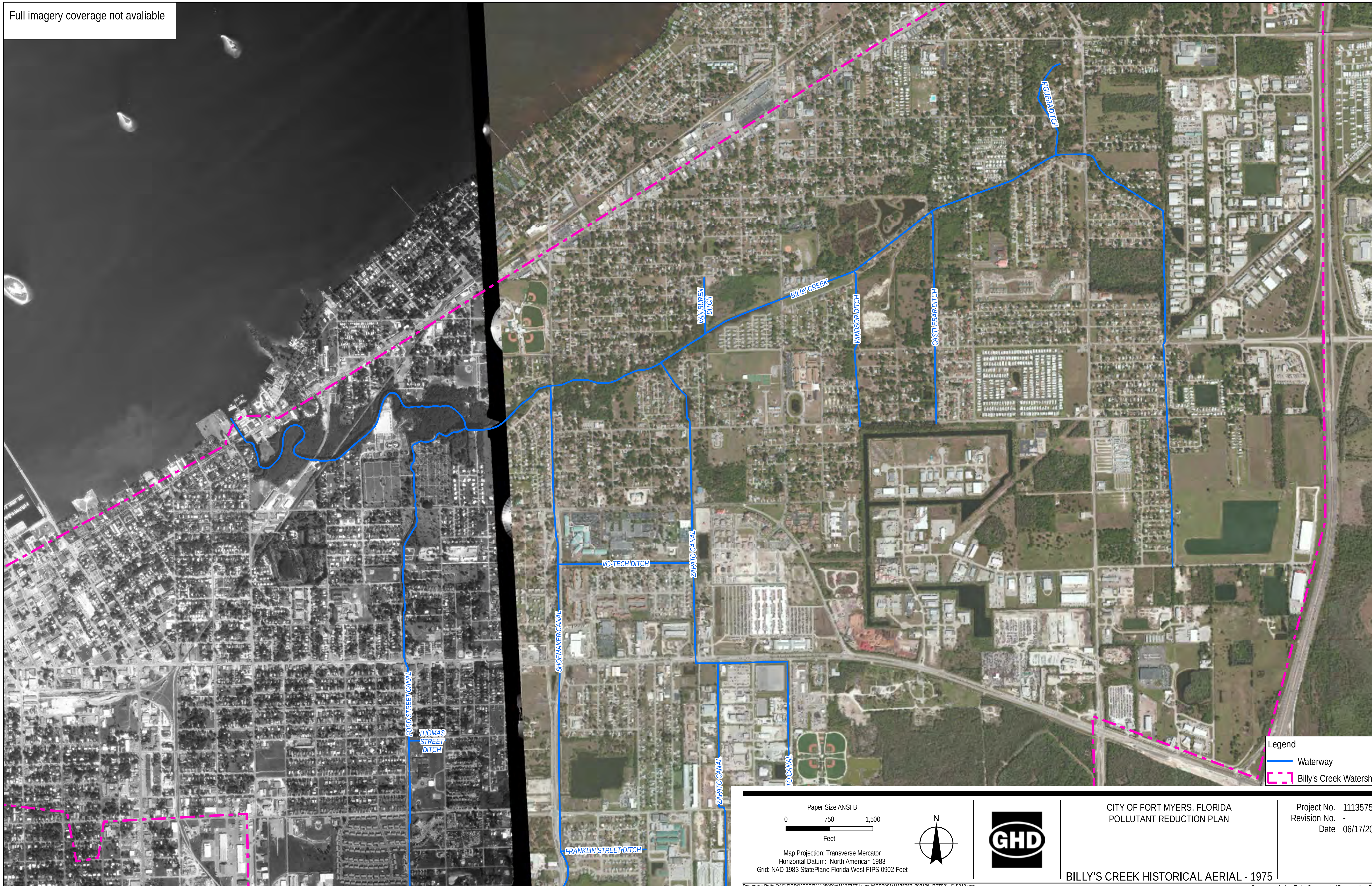
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

BILLY'S CREEK HISTORICAL AERIAL - 1968

Project No. 11135752
Revision No. -
Date 06/17/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS009.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1968, City of Fort Myers GIS



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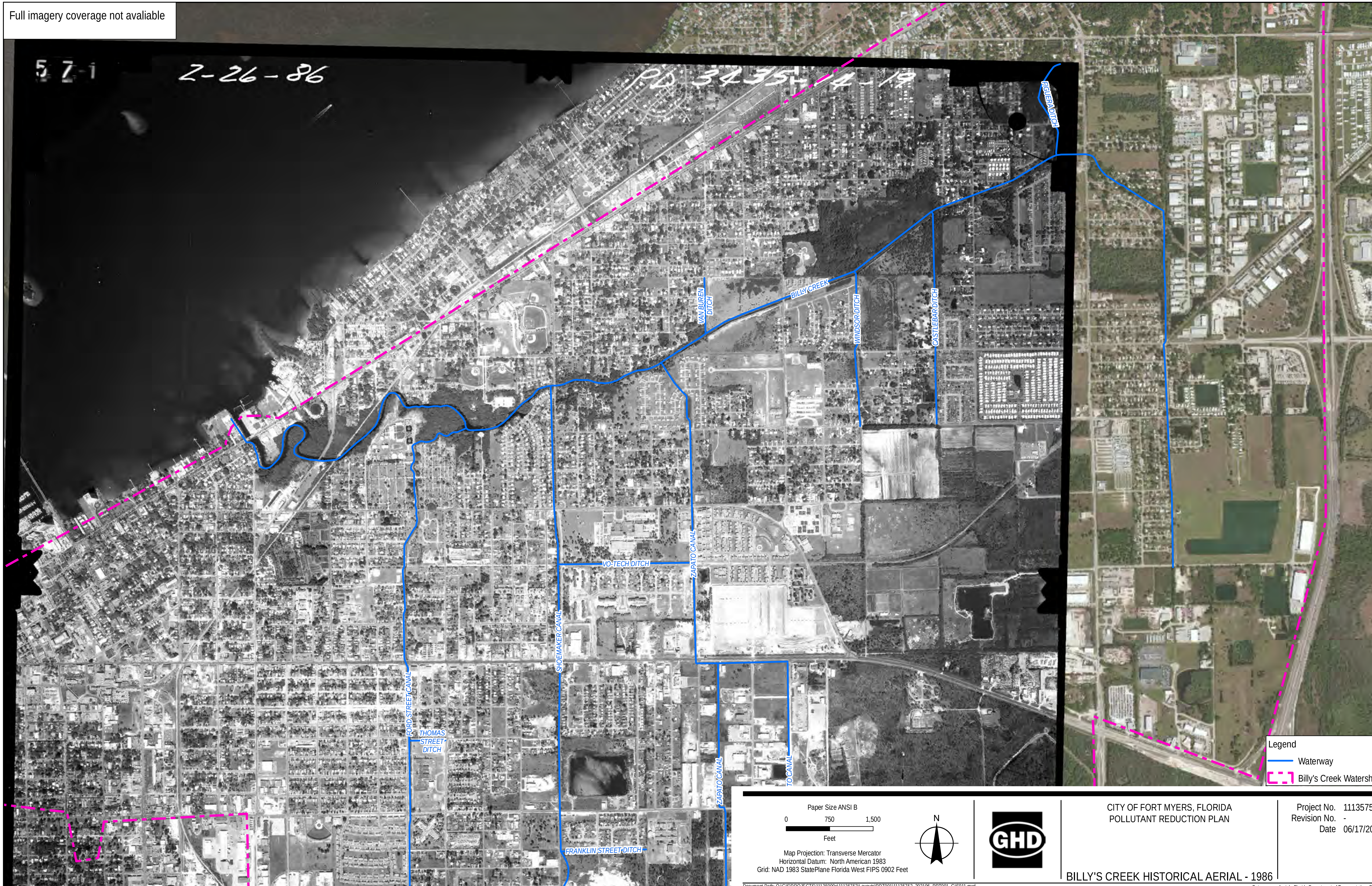
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

Project No. 11135752
Revision No. -
Date 06/17/2021

BILLY'S CREEK HISTORICAL AERIAL - 1975

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS010.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1975



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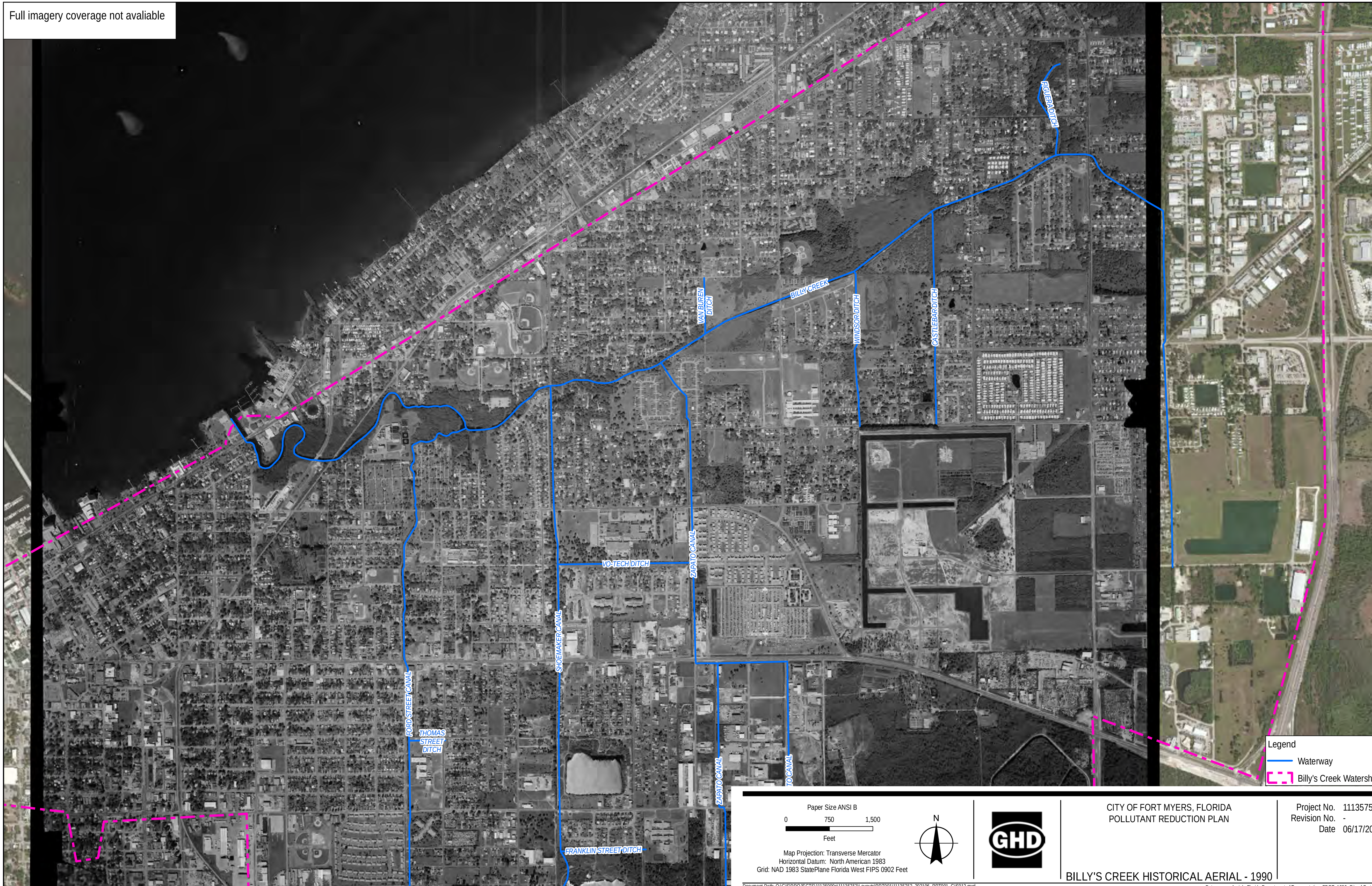
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

BILLY'S CREEK HISTORICAL AERIAL - 1986

Project No. 11135752
Revision No. -
Date 06/17/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS011.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1986



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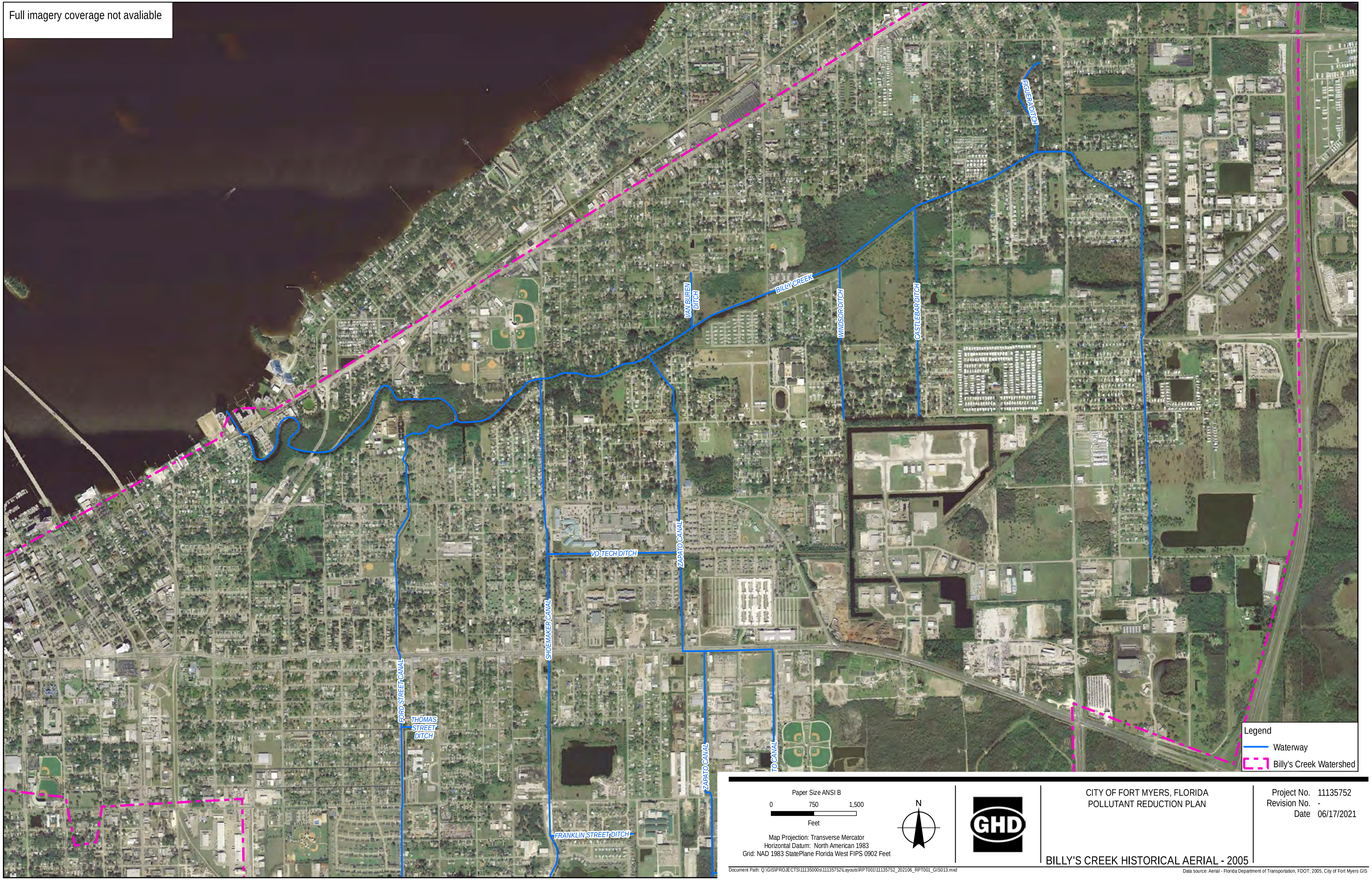
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

Project No. 11135752
Revision No. -
Date 06/17/2021

BILLY'S CREEK HISTORICAL AERIAL - 1990

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS012.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 1990, City of Fort Myers GIS



Paper Size ANSI B

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Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

Project No. 11135752
Revision No. -
Date 06/17/2021

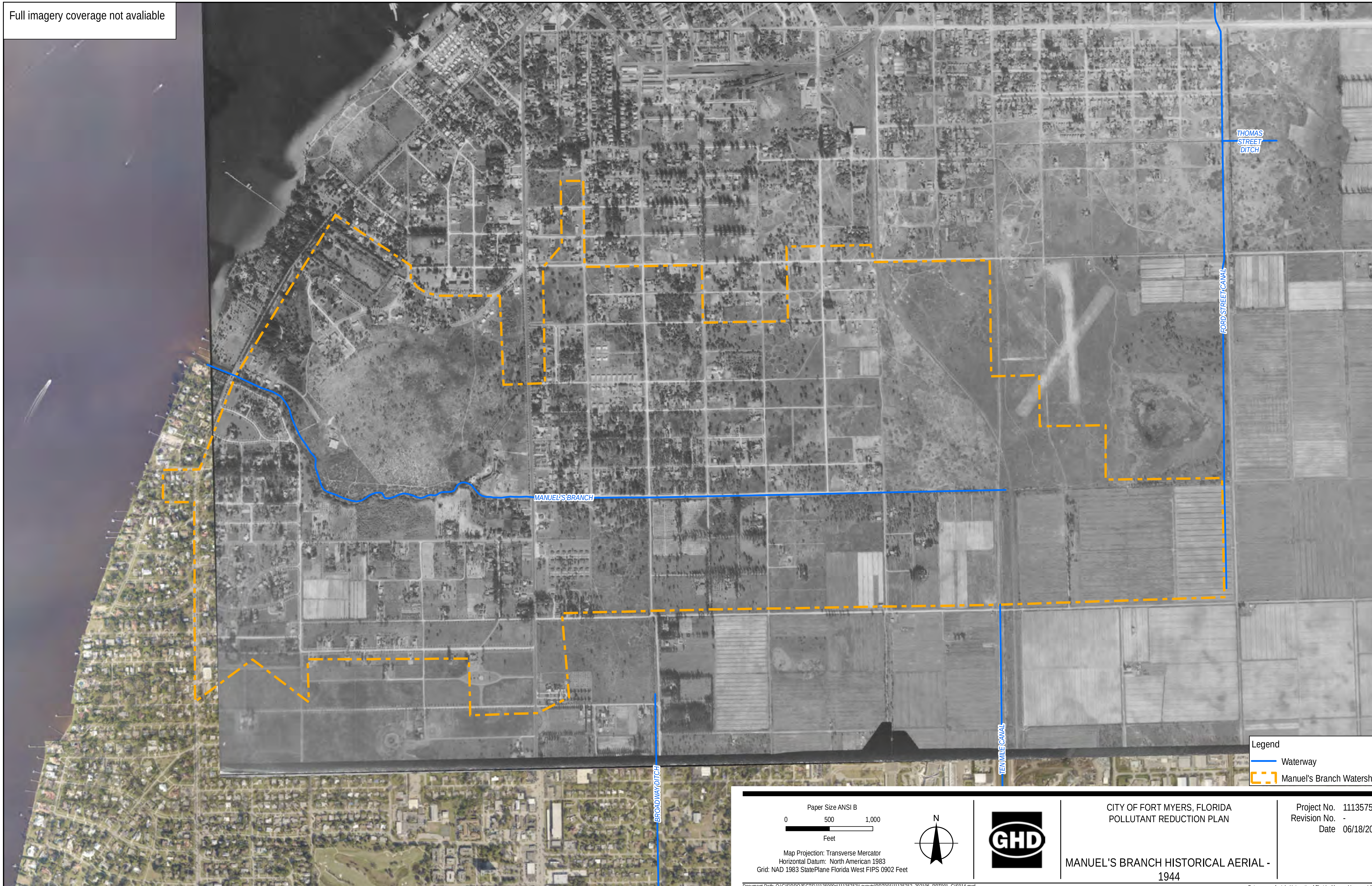
BILLY'S CREEK HISTORICAL AERIAL - 2005

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS013.mxd

Data source: Aerial - Florida Department of Transportation, FDOT; 2005, City of Fort Myers GIS

Appendix C

Manuel Branch Historical Aerial Photographs



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Map Projection: Transverse Mercator
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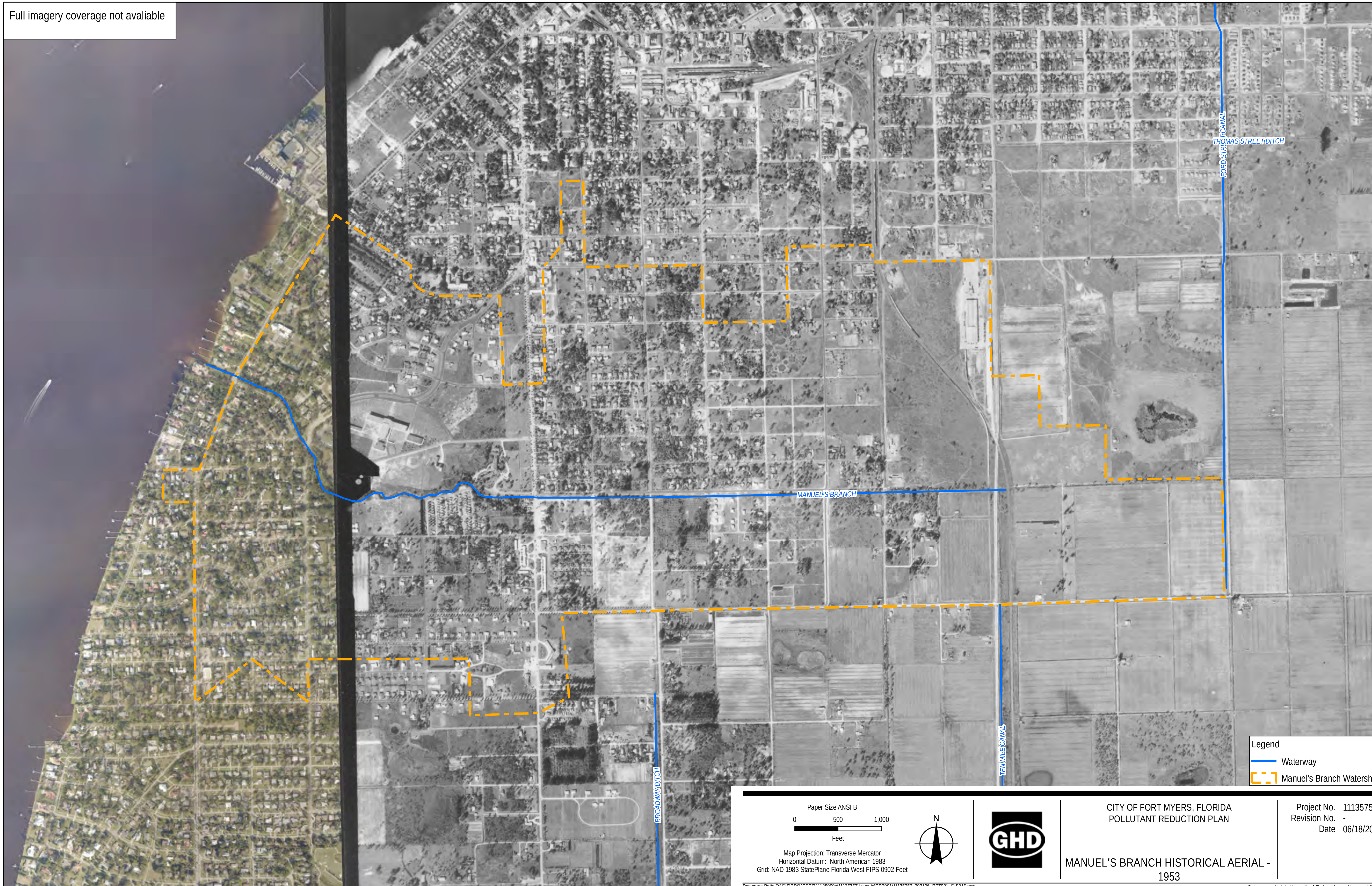
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1944

Project No. 11135752
Revision No. -
Date 06/18/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS014.mxd

Data source: Aerial - University of Florida; Map and Imagery Library; 1944



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Horizontal Datum: North American 1983
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CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1953

Project No. 11135752
Revision No. -
Date 06/18/2021

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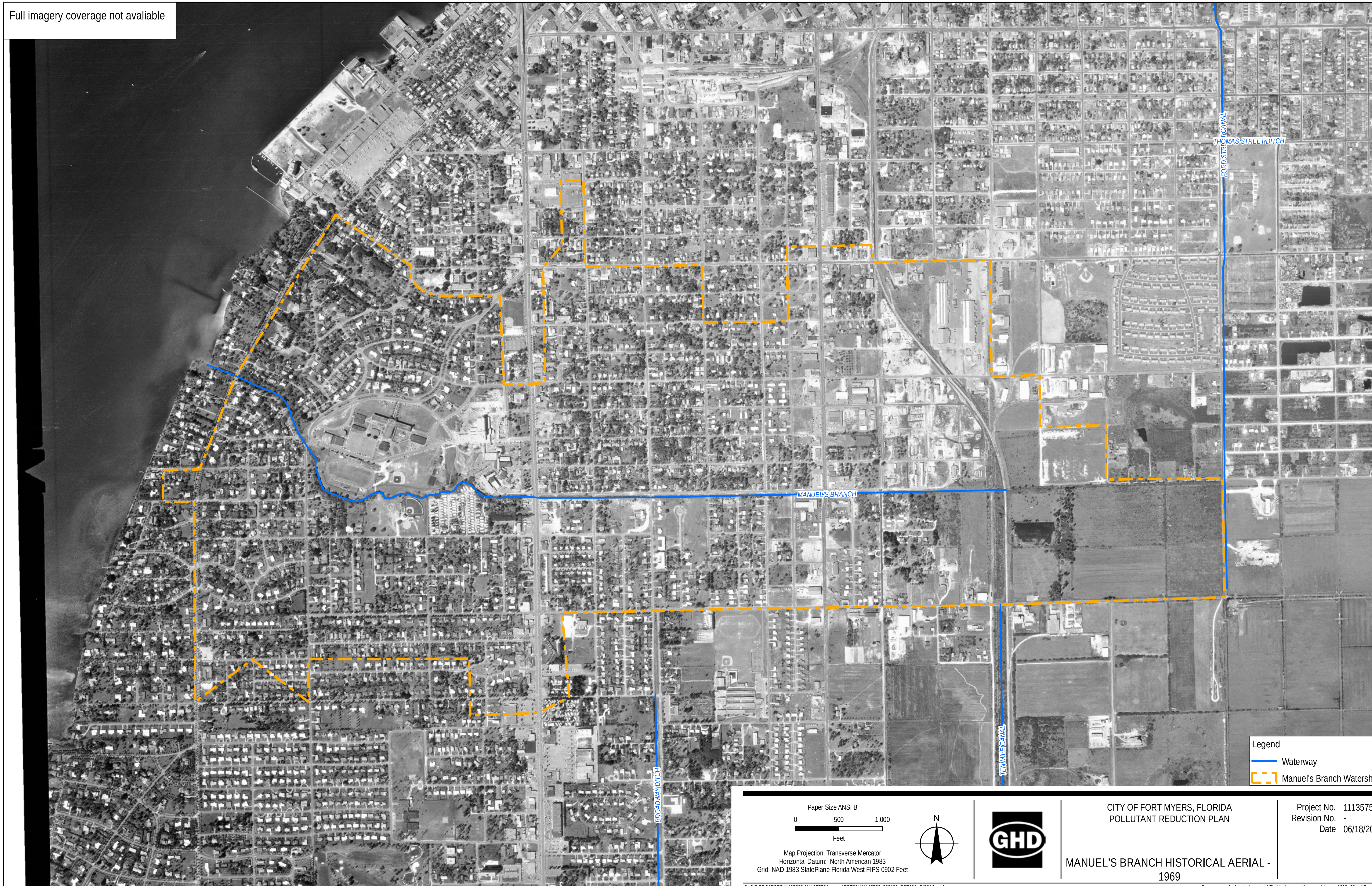
Data source: Aerial - University of Florida; Map and Imagery Library; 1953



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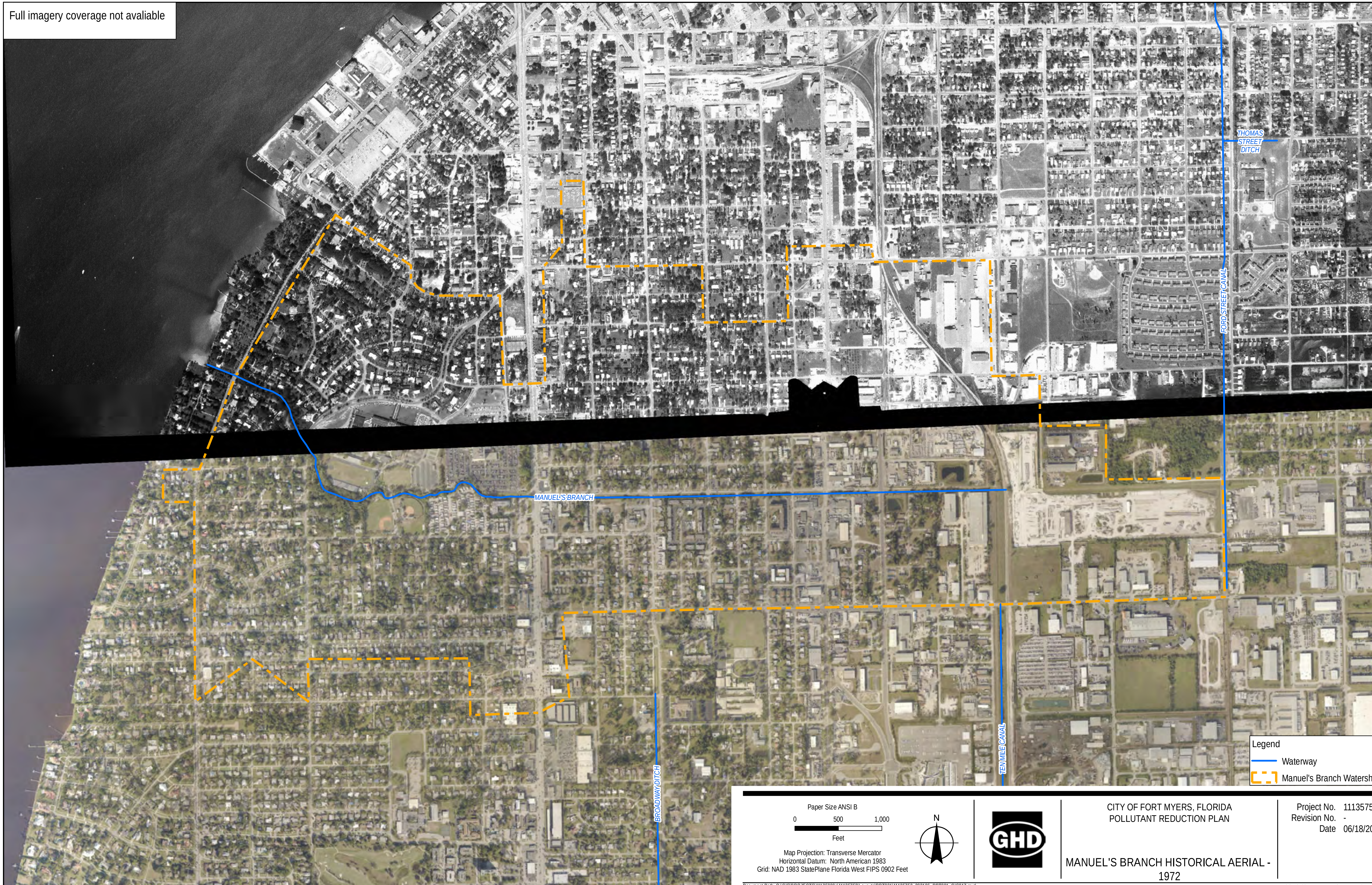
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1969

Project No. 11135752
Revision No. -
Date 06/18/2021

Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS016.mxd
Print date: 24 Jun 2021 - 16:26

Data source: Aerial - University of Florida; Map and Imagery Library; 1969, City of Fort Myers GIS



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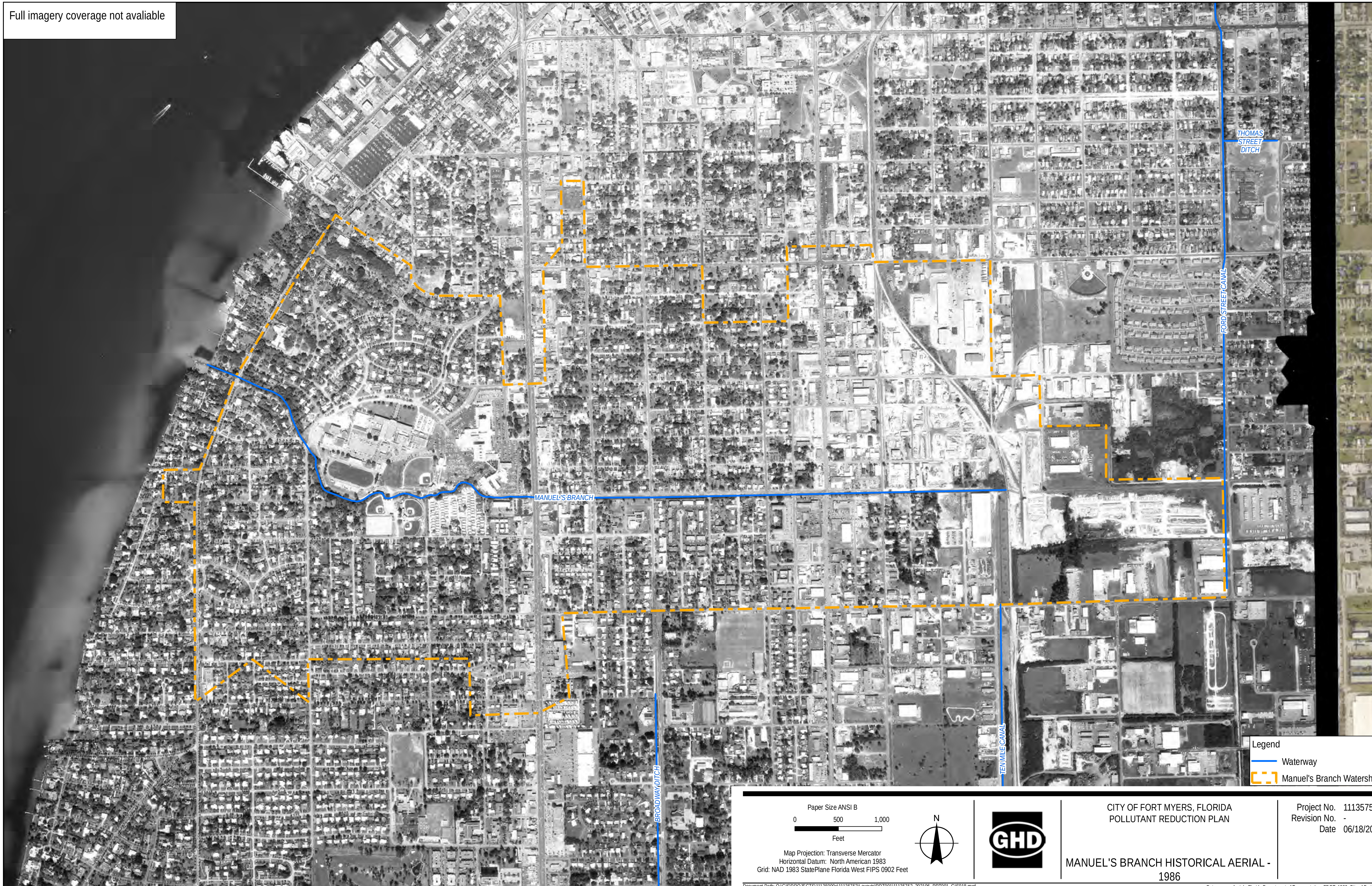
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1972

Project No. 11135752
Revision No. -
Date 06/18/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS017.mxd

Data source: Aerial - Florida Department of Transportation, FDOT, 1972



Paper Size ANSI B

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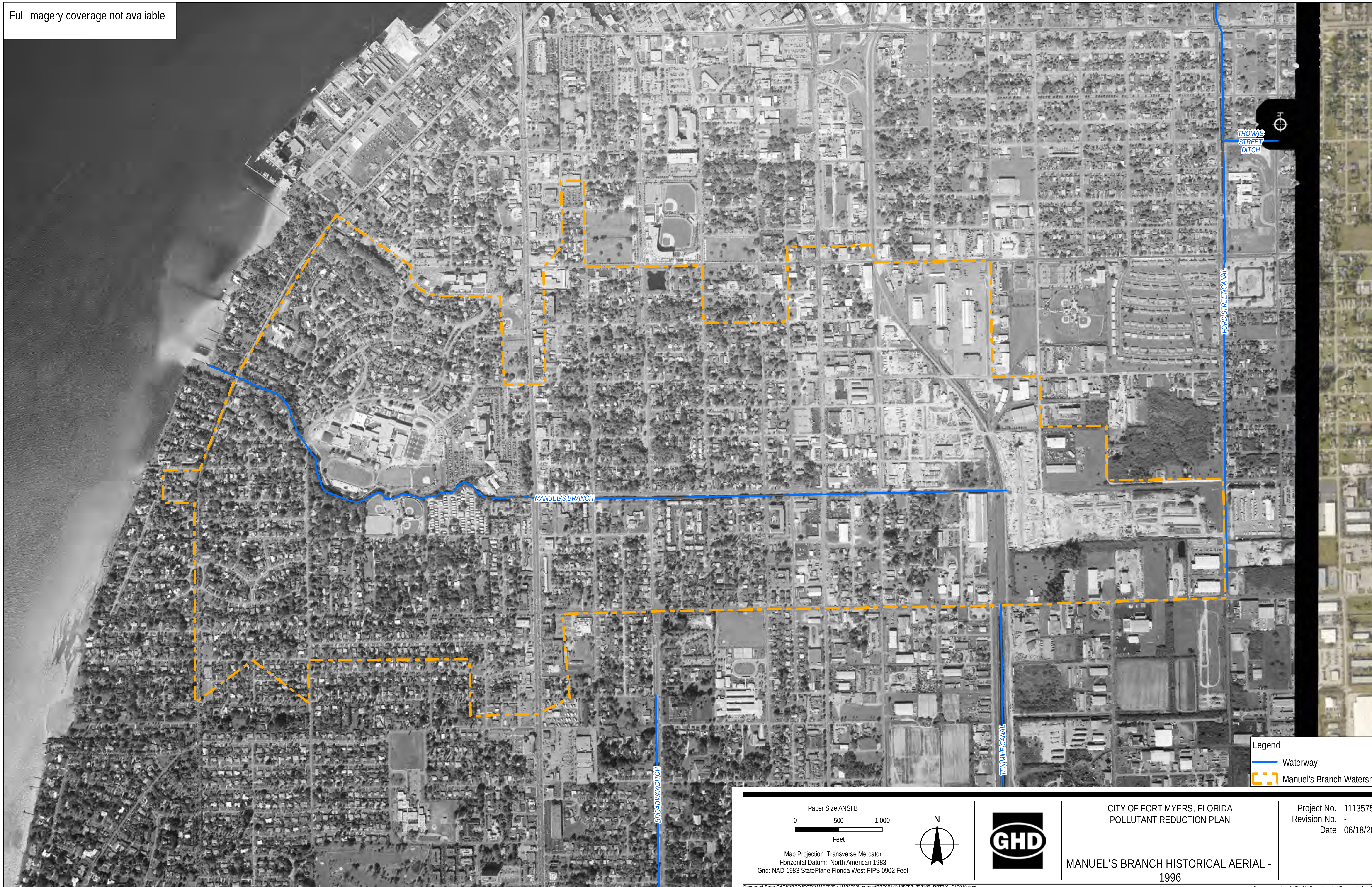
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1986

Project No. 11135752
Revision No. -
Date 06/18/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS018.mxd

Data source: Aerial - Florida Department of Transportation, FDOT, 1986, City of Fort Myers GIS



Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 StatePlane Florida West FIPS 0902 Feet

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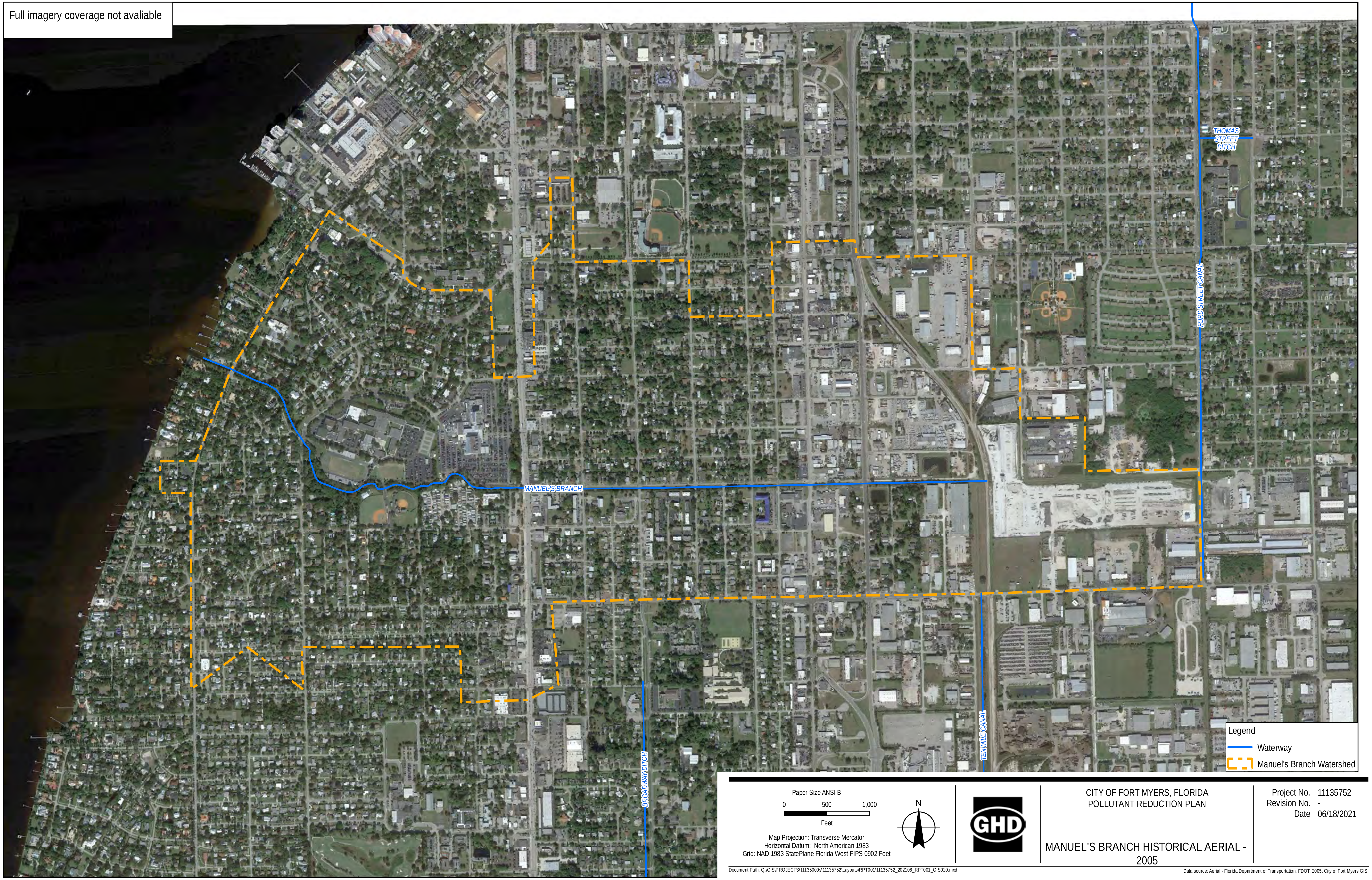
CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 1996

Project No. 11135752
Revision No. -
Date 06/18/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS019.mxd

Data source: Aerial - Florida Department of Transportation, FDOT, 1996



Map Projection: Transverse Mercator
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CITY OF FORT MYERS, FLORIDA
POLLUTANT REDUCTION PLAN

MANUEL'S BRANCH HISTORICAL AERIAL - 2005

Project No. 11135752
Revision No. -
Date 06/18/2021

Document Path: Q:\GIS\PROJECTS\11135000s\11135752\Layouts\RPT001\11135752_202106_RPT001_GIS020.mxd

Data source: Aerial - Florida Department of Transportation, FDOT, 2005, City of Fort Myers GIS

Appendix D

Fecal Coliform and E. Coli Historical Data Tables

Table 1 Historical Data – Billy CR SR 80 BR NE Ft Myers/South-East/Lower Florida

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	5/17/1973 0:00	Fecal Coliform	85	
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	9/10/1974 0:00	Fecal Coliform	99990	
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	3/31/1975 0:00	Fecal Coliform	10	
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	10/27/1975 0:00	Fecal Coliform	230	
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	6/22/1992 0:00	Fecal Coliform	172	
28020026	BILLY CR SR 80 BR NE FT MYERS / SOUTH-EAST / LOWER FLORIDA	12/3/1992 0:00	Fecal Coliform	3505	

*Data Source - LEGACYSTORET_21FLA

Table 2 Historical Data – Billy Creek at SR808/South-East/Lower Florida

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020087	BILLY CREEK AT SR808 / SOUTH-EAST / LOWER FLORIDA	9/10/1974 0:00	Fecal Coliform	78	
28020087	BILLY CREEK AT SR808 / SOUTH-EAST / LOWER FLORIDA	3/31/1975 0:00	Fecal Coliform	60	
28020087	BILLY CREEK AT SR808	7/25/2007 0:00	Fecal Coliform	680	cfu/100ml

*Data Source - LEGACYSTORET_21FLA

Table 3 Historical Data – Billy Creek at SR808/South-East/Lower Florida

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020233	BILLY'S CR @ MARSH AVE, FT MYERS	7/25/2007 0:00	Fecal Coliform	440	cfu/100ml

*Data Source - LEGACYSTORET_21FLFTM

Table 4 Historical Data – Billys Creek @ Windsor Drive

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020338FTM	BILLYS CREEK @ WINDSOR DRIVE	10/18/2005 0:00	Fecal Coliform	10	cfu/100ml

*Data Source - LEGACYSTORET_21FLFTM

Table **5** Historical Data – Upstream of weir in Billy Creek @ inlet to preserve

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	1/12/2017 10:50	Escherichia coli	84	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	2/8/2017 11:05	Escherichia coli	63	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	3/8/2017 10:00	Escherichia coli	96	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	4/12/2017 10:00	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	5/10/2017 11:03	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	6/14/2017 12:26	Escherichia coli	336	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	7/13/2017 12:10	Escherichia coli	1439	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	8/9/2017 11:45	Escherichia coli	733	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	10/11/2017 11:42	Escherichia coli	857	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	11/8/2017 11:33	Escherichia coli	1374	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	12/13/2017 11:30	Escherichia coli	4106	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	1/10/2018 11:20	Escherichia coli	4884	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	2/14/2018 11:08	Escherichia coli	213	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	3/14/2018 11:15	Escherichia coli	41	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	4/17/2018 12:10	Escherichia coli	20	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	5/9/2018 11:45	Escherichia coli	85	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	6/13/2018 11:05	Escherichia coli	1046	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	7/11/2018 11:30	Escherichia coli	749	cfu/100ml

BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	8/8/2018 12:05	Escherichia coli	987	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	9/12/2018 11:25	Escherichia coli	631	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	9/12/2018 11:35	Escherichia coli	441	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	10/16/2018 10:45	Escherichia coli	987	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	11/14/2018 11:35	Escherichia coli	75	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	12/12/2018 11:30	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	1/9/2019 11:20	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	2/13/2019 11:20	Escherichia coli	19863	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	3/13/2019 11:40	Escherichia coli	84	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	4/10/2019 11:25	Escherichia coli	20	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	5/8/2019 11:20	Escherichia coli	30	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	6/12/2019 11:35	Escherichia coli	187	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	7/10/2019 11:10	Escherichia coli	368	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	8/14/2019 11:15	Escherichia coli	546	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	9/11/2019 12:20	Escherichia coli	594	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	10/9/2019 10:50	Escherichia coli	85	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	11/13/2019 10:50	Escherichia coli	246	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	12/11/2019 11:10	Escherichia coli	63	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	1/8/2020 10:50	Escherichia coli	148	cfu/100ml

BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	2/12/2020 11:10	Escherichia coli	206	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	3/11/2020 11:20	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	4/8/2020 11:15	Escherichia coli	10	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	6/10/2020 11:40	Escherichia coli	374	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	7/8/2020 11:50	Escherichia coli	41	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	8/12/2020 11:55	Escherichia coli	631	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	9/9/2020 12:30	Escherichia coli	1334	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	10/14/2020 12:15	Escherichia coli	528	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	11/12/2020 11:40	Escherichia coli	379	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	12/10/2020 11:45	Escherichia coli	2359	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	1/13/2021 12:15	Escherichia coli	1081	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	3/10/2021 12:15	Escherichia coli	1376	cfu/100ml
BCP1-10	Upstream of weir in Billy Creek @ inlet to preserve	4/1/2021 13:45	Escherichia coli	20	cfu/100ml

*Data Source - WIN_21FLCOFM

Table **6** Historical Data – Discharge from Weir of Marsh #2 to Billy Creek

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	1/12/2017 10:35	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	2/8/2017 10:50	Escherichia coli	31	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	6/14/2017 12:10	Escherichia coli	120	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	7/13/2017 11:50	Escherichia coli	7701	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	8/9/2017 11:28	Escherichia coli	173	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	10/11/2017 11:23	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	11/8/2017 11:12	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	12/13/2017 11:10	Escherichia coli	30	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	1/10/2018 11:01	Escherichia coli	97	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	2/14/2018 10:50	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	3/14/2018 10:50	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	4/17/2018 11:40	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	5/9/2018 11:30	Escherichia coli	135	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	6/13/2018 10:50	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	7/11/2018 11:10	Escherichia coli	74	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	8/8/2018 11:45	Escherichia coli	41	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	9/12/2018 11:05	Escherichia coli	31	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	10/16/2018 10:25	Escherichia coli	41	cfu/100ml

BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	11/14/2018 11:15	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	12/12/2018 11:15	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	1/9/2019 11:05	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	2/13/2019 11:00	Escherichia coli	95	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	3/13/2019 11:20	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	4/10/2019 11:10	Escherichia coli	41	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	5/8/2019 11:00	Escherichia coli	98	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	6/12/2019 11:15	Escherichia coli	41	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	7/10/2019 10:50	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	8/14/2019 11:05	Escherichia coli	62	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	9/11/2019 12:00	Escherichia coli	435	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	10/9/2019 10:35	Escherichia coli	31	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	11/13/2019 10:30	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	12/11/2019 10:50	Escherichia coli	51	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	1/8/2020 10:32	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	2/12/2020 10:50	Escherichia coli	40	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	3/11/2020 11:05	Escherichia coli	63	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	4/8/2020 11:00	Escherichia coli	41	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	6/10/2020 11:20	Escherichia coli	98	cfu/100ml

BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	7/8/2020 11:30	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	8/12/2020 11:40	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	9/9/2020 12:10	Escherichia coli	63	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	10/14/2020 11:55	Escherichia coli	20	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	11/12/2020 11:20	Escherichia coli	504	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	12/10/2020 11:30	Escherichia coli	86	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	1/13/2021 12:00	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	3/10/2021 12:00	Escherichia coli	10	cfu/100ml
BCP4-10	Discharge from Weir of Marsh #2 to Billy Creek	4/1/2021 13:35	Escherichia coli	20	cfu/100ml

*Data Source - WIN_21FLCOFM

Table **7** Historical Data – Discharge from Weir of Marsh #2 to Billy Creek

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BILLGR20	BILLY CREEK- Palmetto	3/14/1996 0:00	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/9/1996 12:38	Fecal Coliform	380	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/7/1996 11:24	Fecal Coliform	160	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/11/1996 12:31	Fecal Coliform	6030	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/18/1996 0:00	Fecal Coliform	130	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/20/1996 0:00	Fecal Coliform	400	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/19/1996 0:00	Fecal Coliform	160	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/16/1996 0:00	Fecal Coliform	620	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/13/1996 0:00	Fecal Coliform	700	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/11/1996 0:00	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/28/1997 0:00	Fecal Coliform	170	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/11/1997 0:00	Fecal Coliform	220	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/5/1997 0:00	Fecal Coliform	290	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/2/1997 0:00	Fecal Coliform	230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/20/1997 0:00	Fecal Coliform	170	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/25/1997 0:00	Fecal Coliform	1530	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/23/1997 0:00	Fecal Coliform	280	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/21/1997 0:00	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/17/1997 0:00	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/15/1997 0:00	Fecal Coliform	290	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/12/1997 0:00	Fecal Coliform	180	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/17/1997 0:00	Fecal Coliform	300	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/14/1998 0:00	Fecal Coliform	380	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/25/1998 9:40	Fecal Coliform	230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/24/1998 0:00	Fecal Coliform	190	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/22/1998 0:00	Fecal Coliform	3010	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/19/1998 0:00	Fecal Coliform	200	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/16/1998 0:00	Fecal Coliform	700	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/21/1998 0:00	Fecal Coliform	180	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/13/1998 0:00	Fecal Coliform	80	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/30/1998 0:00	Fecal Coliform	240	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/21/1998 0:00	Fecal Coliform	230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/19/1998 0:00	Fecal Coliform	380	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	12/17/1998 0:00	Fecal Coliform	200	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/19/1999 0:00	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/15/1999 0:00	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/18/1999 0:00	Fecal Coliform	20	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/15/1999 0:00	Fecal Coliform	270	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/14/1999 0:00	Fecal Coliform	40	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/19/1999 0:00	Fecal Coliform	150	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/12/1999 0:00	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/16/1999 0:00	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/14/1999 0:00	Fecal Coliform	1020	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/10/1999 9:45	Fecal Coliform	320	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/27/1999 10:00	Fecal Coliform	280	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/27/2000 0:00	Fecal Coliform	740	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/27/2000 0:00	Fecal Coliform	740	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/10/2000 0:00	Fecal Coliform	120	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/13/2000 10:19	Fecal Coliform	1020	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/24/2000 10:30	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/30/2000 10:30	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/22/2000 11:12	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/11/2000 9:03	Fecal Coliform	950	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/8/2000 8:00	Fecal Coliform	80	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/19/2000 8:54	Fecal Coliform	190	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/6/2000 10:14	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/21/2000 8:15	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/4/2001 9:45	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/15/2001 9:25	Fecal Coliform	40	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/13/2001 9:45	Fecal Coliform	20	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/5/2001 10:15	Fecal Coliform	150	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/1/2001 9:50	Fecal Coliform	50	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/12/2001 9:15	Fecal Coliform	60	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/2/2001 10:00	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/19/2001 9:40	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/5/2001 9:45	Fecal Coliform	2000	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/10/2001 10:10	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/25/2001 9:36	Fecal Coliform	100	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	11/26/2001 10:00	Fecal Coliform	110	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/4/2001 10:05	Fecal Coliform	40	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/3/2002 9:50	Fecal Coliform	380	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/12/2002 9:50	Fecal Coliform	120	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/18/2002 9:45	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/10/2002 9:35	Fecal Coliform	650	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/16/2002 9:40	Fecal Coliform	240	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/10/2002 9:50	Fecal Coliform	370	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/15/2002 9:52	Fecal Coliform	50	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/8/2002 10:52	Fecal Coliform	40	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/18/2002 10:52	Fecal Coliform	170	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/17/2002 10:43	Fecal Coliform	170	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/28/2003 10:26	Fecal Coliform	130	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/6/2003 10:23	Fecal Coliform	300	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/25/2003 11:23	Fecal Coliform	2230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/23/2003 9:40	Fecal Coliform	20	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/12/2003 10:40	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/25/2003 11:02	Fecal Coliform	600	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/31/2003 9:33	Fecal Coliform	750	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/21/2003 9:50	Fecal Coliform	90	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/25/2003 9:40	Fecal Coliform	2200	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/29/2003 9:37	Fecal Coliform	540	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/25/2003 9:13	Fecal Coliform	210	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/15/2003 9:20	Fecal Coliform	1820	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/6/2004 9:45	Fecal Coliform	400	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/25/2004 10:35	Fecal Coliform	430	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/24/2004 10:20	Fecal Coliform	360	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/27/2004 9:00	Fecal Coliform	210	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/20/2004 8:30	Fecal Coliform	780	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/24/2004 9:12	Fecal Coliform	1860	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/29/2004 9:03	Fecal Coliform	600	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/22/2004 8:15	Fecal Coliform	570	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/14/2004 9:21	Fecal Coliform	440	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/14/2004 10:20	Fecal Coliform	370	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/15/2004 8:54	Fecal Coliform	990	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	12/9/2004 10:16	Fecal Coliform	790	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/27/2005 10:02	Fecal Coliform	660	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/3/2005 10:18	Fecal Coliform	640	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/24/2005 10:13	Fecal Coliform	550	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/19/2005 9:41	Fecal Coliform	970	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/25/2005 10:29	Fecal Coliform	120	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/29/2005 10:27	Fecal Coliform	340	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/22/2005 9:31	Fecal Coliform	970	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/22/2005 10:02	Fecal Coliform	560	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/8/2005 10:31	Fecal Coliform	530	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/13/2005 10:18	Fecal Coliform	230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/17/2005 9:12	Fecal Coliform	190	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/13/2005 9:30	Fecal Coliform	720	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/27/2006 9:25	Fecal Coliform	420	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/23/2006 9:30	Fecal Coliform	120	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/25/2006 9:35	Fecal Coliform	160	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/16/2006 9:59	Fecal Coliform	530	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/31/2006 9:59	Fecal Coliform	170	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/23/2006 11:30	Fecal Coliform	1100	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/21/2006 9:26	Fecal Coliform	330	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/26/2006 10:33	Fecal Coliform	150	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/28/2006 9:34	Fecal Coliform	290	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/15/2006 8:51	Fecal Coliform	740	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/24/2007 9:45	Fecal Coliform	210	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/27/2007 10:07	Fecal Coliform	720	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/27/2007 10:00	Fecal Coliform	700	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/13/2007 9:25	Fecal Coliform	10	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/24/2007 9:09	Fecal Coliform	110	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/21/2007 10:04	Fecal Coliform	250	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/18/2007 9:57	Fecal Coliform	220	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/22/2007 9:39	Fecal Coliform	840	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/7/2007 9:30	Fecal Coliform	320	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/30/2007 9:42	Fecal Coliform	650	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/26/2007 9:47	Fecal Coliform	60	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/27/2007 9:54	Fecal Coliform	980	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	1/23/2008 9:50	Fecal Coliform	580	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/26/2008 10:04	Fecal Coliform	130	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/31/2008 9:47	Fecal Coliform	40	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/21/2008 9:27	Fecal Coliform	100	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/15/2008 9:39	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/26/2008 9:33	Fecal Coliform	370	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/31/2008 9:39	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/31/2008 9:39	Fecal Coliform	70	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/28/2008 10:19	Fecal Coliform	460	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/25/2008 9:41	Fecal Coliform	20	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/28/2008 10:03	Fecal Coliform	230	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/19/2008 10:51	Fecal Coliform	290	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/9/2008 9:57	Fecal Coliform	220	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/13/2009 9:48	Fecal Coliform	2000	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/13/2009 9:48	Fecal Coliform	2000	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/9/2009 10:14	Fecal Coliform	360	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/9/2009 10:14	Fecal Coliform	360	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/31/2009 9:39	Fecal Coliform	90	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/27/2009 9:49	Fecal Coliform	30	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/26/2009 9:56	Fecal Coliform	136	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/17/2009 10:14	Fecal Coliform	124	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/14/2009 9:43	Fecal Coliform	200	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/6/2009 10:02	Fecal Coliform	236	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/3/2009 9:49	Fecal Coliform	336	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/27/2009 9:26	Fecal Coliform	290	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/16/2009 9:49	Fecal Coliform	1080	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/10/2009 12:00	Fecal Coliform	265	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/12/2010 10:23	Fecal Coliform	286	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/24/2010 10:04	Fecal Coliform	527	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/23/2010 9:58	Fecal Coliform	275	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/20/2010 11:51	Fecal Coliform	100	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/27/2010 9:45	Fecal Coliform	120	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/22/2010 10:21	Fecal Coliform	1180	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/21/2010 9:57	Fecal Coliform	260	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/24/2010 9:48	Fecal Coliform	2300	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	9/21/2010 9:42	Fecal Coliform	1000	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/20/2010 9:50	Fecal Coliform	520	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/10/2010 9:33	Fecal Coliform	1640	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/2/2010 9:23	Fecal Coliform	298	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/26/2011 9:43	Fecal Coliform	1400	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/22/2011 10:02	Fecal Coliform	3600	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/10/2011 9:17	Fecal Coliform	440	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/13/2011 10:01	Fecal Coliform	194	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/17/2011 9:40	Fecal Coliform	667	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/13/2011 9:36	Fecal Coliform	92	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/28/2011 9:28	Fecal Coliform	258	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/29/2011 9:51	Fecal Coliform	527	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/26/2011 9:42	Fecal Coliform	980	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/31/2011 10:09	Fecal Coliform	229	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/16/2011 9:57	Fecal Coliform	373	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/19/2011 9:49	Fecal Coliform	171	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/12/2012 9:23	Fecal Coliform	1000	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/17/2012 9:49	Fecal Coliform	440	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/12/2012 9:49	Fecal Coliform	283	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/16/2012 10:03	Fecal Coliform	123	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/15/2012 9:30	Fecal Coliform	1560	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/18/2012 9:42	Fecal Coliform	273	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/25/2012 10:49	Fecal Coliform	194	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/8/2012 10:00	Fecal Coliform	740	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/11/2012 10:21	Fecal Coliform	185	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/4/2012 9:48	Fecal Coliform	593	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/1/2012 9:41	Fecal Coliform	393	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/6/2012 9:22	Fecal Coliform	420	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/31/2013 9:37	Fecal Coliform	567	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/26/2013 10:14	Fecal Coliform	600	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/26/2013 9:53	Fecal Coliform	507	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/26/2013 9:53	Fecal Coliform	507	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/22/2013 10:06	Fecal Coliform	760	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/20/2013 9:32	Fecal Coliform	587	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/25/2013 10:31	Fecal Coliform	273	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	7/8/2013 9:05	Fecal Coliform	129	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/8/2013 9:26	Fecal Coliform	580	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/10/2013 10:30	Fecal Coliform	1200	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/28/2013 9:54	Fecal Coliform	233	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/20/2013 9:57	Fecal Coliform	493	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/17/2013 9:40	Fecal Coliform	740	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/21/2014 11:04	Fecal Coliform	620	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/10/2014 10:25	Fecal Coliform	427	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/11/2014 10:36	Fecal Coliform	480	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/8/2014 9:13	Fecal Coliform	413	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/29/2014 10:17	Fecal Coliform	140	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/25/2014 9:08	Fecal Coliform	600	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/15/2014 9:29	Fecal Coliform	169	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/12/2014 10:15	Fecal Coliform	345	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/9/2014 10:23	Fecal Coliform	407	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/20/2014 9:17	Fecal Coliform	367	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/20/2014 9:19	Fecal Coliform	263	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/15/2014 9:32	Fecal Coliform	440	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/20/2015 9:41	Fecal Coliform	280	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/24/2015 9:37	Fecal Coliform	243	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/24/2015 10:40	Fecal Coliform	573	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/22/2015 9:46	Fecal Coliform	146	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/28/2015 9:41	Fecal Coliform	500	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	6/16/2015 10:51	Fecal Coliform	350	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	7/28/2015 9:32	Fecal Coliform	460	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	8/25/2015 9:31	Fecal Coliform	191	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	9/22/2015 9:56	Fecal Coliform	160	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	10/27/2015 9:29	Fecal Coliform	607	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	11/25/2015 8:53	Fecal Coliform	220	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	12/28/2015 9:46	Fecal Coliform	387	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	1/28/2016 9:56	Fecal Coliform	725	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	2/29/2016 9:37	Fecal Coliform	217	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	3/29/2016 9:41	Fecal Coliform	131	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	4/27/2016 9:18	Fecal Coliform	587	cfu/100ml
BILLGR20	BILLY CREEK- Palmetto	5/16/2016 9:28	Fecal Coliform	280	cfu/100ml

BILLGR20	BILLY CREEK- Palmetto	6/20/2016 9:59	Fecal Coliform	295	cfu/100ml

*Data Source - LEE_WQ

Table **8** Historical Data – BILLGR20

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BILLGR20		1/25/2018 9:26	Escherichia coli	2420	cfu/100ml
BILLGR20		2/26/2018 9:22	Escherichia coli	2420	cfu/100ml
BILLGR20		3/22/2018 9:32	Escherichia coli	1300	cfu/100ml
BILLGR20		4/25/2018 9:18	Escherichia coli	1986	cfu/100ml
BILLGR20		5/16/2018 9:29	Escherichia coli	1986	cfu/100ml
BILLGR20		6/28/2018 9:26	Escherichia coli	461	cfu/100ml
BILLGR20		7/24/2018 9:34	Escherichia coli	291	cfu/100ml
BILLGR20		8/27/2018 9:52	Escherichia coli	548	cfu/100ml
BILLGR20		10/22/2018 9:33	Escherichia coli	365	cfu/100ml
BILLGR20		11/27/2018 9:26	Escherichia coli	649	cfu/100ml
BILLGR20		12/26/2018 9:28	Escherichia coli	517	cfu/100ml
BILLGR20		1/24/2019 10:11	Escherichia coli	2420	cfu/100ml
BILLGR20		2/11/2019 9:42	Escherichia coli	579	cfu/100ml
BILLGR20		3/28/2019 9:22	Escherichia coli	124	cfu/100ml
BILLGR20		4/23/2019 10:00	Escherichia coli	194	cfu/100ml
BILLGR20		5/21/2019 10:05	Escherichia coli	2420	cfu/100ml
BILLGR20		6/26/2019 9:56	Escherichia coli	222	cfu/100ml
BILLGR20		8/29/2019 9:41	Escherichia coli	613	cfu/100ml
BILLGR20		10/30/2019 9:38	Escherichia coli	185	cfu/100ml
BILLGR20		11/13/2019 10:05	Escherichia coli	387	cfu/100ml
BILLGR20		12/19/2019 9:43	Escherichia coli	118	cfu/100ml
BILLGR20		1/28/2020 9:28	Escherichia coli	250	cfu/100ml
BILLGR20		2/26/2020 8:19	Escherichia coli	326	cfu/100ml
BILLGR20		4/29/2020 9:24	Escherichia coli	448	cfu/100ml
BILLGR20		5/26/2020 9:43	Escherichia coli	1106	cfu/100ml
BILLGR20		6/29/2020 8:48	Escherichia coli	86	cfu/100ml
BILLGR20		7/16/2020 8:39	Escherichia coli	132	cfu/100ml
BILLGR20		8/17/2020 9:34	Escherichia coli	1203	cfu/100ml
BILLGR20		10/29/2020 9:12	Escherichia coli	120	cfu/100ml
BILLGR20		11/18/2020 9:24	Escherichia coli	119	cfu/100ml
BILLGR20		12/8/2020 9:17	Escherichia coli	649	cfu/100ml
BILLGR20		1/28/2021 8:58	Escherichia coli	649	cfu/100ml

*Data Source - WIN_21FLEECO

Table **9** Historical Data – Billy Creek - Ortiz

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BILLGR60	BILLY CREEK- Ortiz	3/14/1996 0:00	Fecal Coliform	1060	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/9/1996 11:40	Fecal Coliform	520	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/7/1996 10:26	Fecal Coliform	270	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/11/1996 11:20	Fecal Coliform	3120	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/18/1996 0:00	Fecal Coliform	310	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/20/1996 0:00	Fecal Coliform	1160	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/19/1996 0:00	Fecal Coliform	260	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/16/1996 0:00	Fecal Coliform	290	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/13/1996 0:00	Fecal Coliform	90	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/11/1996 0:00	Fecal Coliform	470	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/28/1997 0:00	Fecal Coliform	40	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/11/1997 0:00	Fecal Coliform	270	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/5/1997 0:00	Fecal Coliform	40	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/2/1997 0:00	Fecal Coliform	110	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/20/1997 0:00	Fecal Coliform	300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/25/1997 0:00	Fecal Coliform	1410	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/23/1997 0:00	Fecal Coliform	370	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/21/1997 0:00	Fecal Coliform	750	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/17/1997 0:00	Fecal Coliform	280	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/15/1997 0:00	Fecal Coliform	340	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/12/1997 0:00	Fecal Coliform	300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/17/1997 0:00	Fecal Coliform	310	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/14/1998 0:00	Fecal Coliform	720	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/25/1998 10:00	Fecal Coliform	340	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/24/1998 0:00	Fecal Coliform	320	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/22/1998 0:00	Fecal Coliform	2780	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/19/1998 0:00	Fecal Coliform	630	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/21/1998 0:00	Fecal Coliform	1090	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/30/1998 0:00	Fecal Coliform	1730	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/21/1998 0:00	Fecal Coliform	460	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/19/1998 0:00	Fecal Coliform	1070	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/17/1998 0:00	Fecal Coliform	250	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/19/1999 0:00	Fecal Coliform	680	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	2/15/1999 0:00	Fecal Coliform	290	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/18/1999 0:00	Fecal Coliform	60	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/15/1999 0:00	Fecal Coliform	270	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/14/1999 0:00	Fecal Coliform	240	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/19/1999 0:00	Fecal Coliform	360	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/12/1999 0:00	Fecal Coliform	50	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/16/1999 0:00	Fecal Coliform	190	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/14/1999 0:00	Fecal Coliform	350	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/10/1999 10:15	Fecal Coliform	360	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/27/1999 11:15	Fecal Coliform	120	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/27/2000 0:00	Fecal Coliform	100	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/10/2000 0:00	Fecal Coliform	120	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/13/2000 10:40	Fecal Coliform	720	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/24/2000 10:45	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/30/2000 10:46	Fecal Coliform	780	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/22/2000 11:30	Fecal Coliform	150	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/11/2000 9:21	Fecal Coliform	830	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/8/2000 8:00	Fecal Coliform	310	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/20/2000 9:00	Fecal Coliform	430	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/19/2000 9:21	Fecal Coliform	340	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/6/2000 10:27	Fecal Coliform	880	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/21/2000 8:15	Fecal Coliform	220	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/4/2001 10:00	Fecal Coliform	480	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/15/2001 9:50	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/13/2001 10:15	Fecal Coliform	420	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/5/2001 10:40	Fecal Coliform	1030	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/1/2001 10:30	Fecal Coliform	150	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/12/2001 9:30	Fecal Coliform	690	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/2/2001 10:30	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/19/2001 10:19	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/5/2001 10:08	Fecal Coliform	1200	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/10/2001 10:40	Fecal Coliform	2400	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/25/2001 9:52	Fecal Coliform	1400	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/26/2001 10:20	Fecal Coliform	1480	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/4/2001 10:30	Fecal Coliform	400	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	1/3/2002 10:10	Fecal Coliform	1900	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/12/2002 10:10	Fecal Coliform	1080	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/18/2002 10:00	Fecal Coliform	360	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/10/2002 9:50	Fecal Coliform	390	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/16/2002 10:56	Fecal Coliform	110	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/10/2002 10:05	Fecal Coliform	160	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/17/2002 9:45	Fecal Coliform	2100	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/15/2002 10:10	Fecal Coliform	580	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/8/2002 11:10	Fecal Coliform	1050	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/18/2002 11:24	Fecal Coliform	190	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/17/2002 11:06	Fecal Coliform	1340	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/28/2003 10:49	Fecal Coliform	1560	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/25/2003 12:15	Fecal Coliform	1390	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/23/2003 10:10	Fecal Coliform	750	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/12/2003 11:10	Fecal Coliform	910	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/25/2003 11:32	Fecal Coliform	260	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/31/2003 10:06	Fecal Coliform	980	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/21/2003 10:20	Fecal Coliform	300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/25/2003 9:52	Fecal Coliform	1870	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/29/2003 9:56	Fecal Coliform	860	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/25/2003 9:34	Fecal Coliform	1000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/15/2003 9:39	Fecal Coliform	144	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/6/2004 10:03	Fecal Coliform	540	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/24/2004 10:50	Fecal Coliform	480	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/27/2004 9:15	Fecal Coliform	1630	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/20/2004 8:50	Fecal Coliform	830	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/24/2004 9:30	Fecal Coliform	1420	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/29/2004 9:20	Fecal Coliform	490	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/22/2004 8:27	Fecal Coliform	660	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/14/2004 9:44	Fecal Coliform	1450	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/14/2004 11:23	Fecal Coliform	420	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/15/2004 9:13	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/3/2005 10:59	Fecal Coliform	370	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/24/2005 10:35	Fecal Coliform	280	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/19/2005 10:06	Fecal Coliform	370	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	5/25/2005 10:57	Fecal Coliform	720	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/29/2005 10:44	Fecal Coliform	380	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/22/2005 9:57	Fecal Coliform	400	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/22/2005 10:29	Fecal Coliform	850	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/8/2005 10:57	Fecal Coliform	640	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/13/2005 10:41	Fecal Coliform	380	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/17/2005 9:35	Fecal Coliform	290	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/13/2005 9:48	Fecal Coliform	380	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/27/2006 9:47	Fecal Coliform	210	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/23/2006 9:47	Fecal Coliform	210	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/25/2006 9:57	Fecal Coliform	910	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/16/2006 10:22	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/31/2006 10:24	Fecal Coliform	130	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/23/2006 11:57	Fecal Coliform	300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/21/2006 9:44	Fecal Coliform	510	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/26/2006 11:51	Fecal Coliform	390	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/28/2006 9:58	Fecal Coliform	640	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/15/2006 9:08	Fecal Coliform	150	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/24/2007 10:07	Fecal Coliform	520	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/27/2007 10:27	Fecal Coliform	680	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/27/2007 10:21	Fecal Coliform	110	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/13/2007 9:50	Fecal Coliform	390	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/24/2007 9:27	Fecal Coliform	10	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/21/2007 10:18	Fecal Coliform	310	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/18/2007 10:21	Fecal Coliform	650	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/22/2007 10:09	Fecal Coliform	880	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/7/2007 9:50	Fecal Coliform	1900	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/30/2007 10:10	Fecal Coliform	410	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/26/2007 10:13	Fecal Coliform	240	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/27/2007 10:10	Fecal Coliform	160	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/23/2008 10:15	Fecal Coliform	160	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/26/2008 10:30	Fecal Coliform	220	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/31/2008 10:06	Fecal Coliform	290	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/21/2008 9:46	Fecal Coliform	420	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/15/2008 9:54	Fecal Coliform	690	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	6/26/2008 9:53	Fecal Coliform	990	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/31/2008 10:04	Fecal Coliform	150	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/28/2008 10:46	Fecal Coliform	460	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/25/2008 10:00	Fecal Coliform	130	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/28/2008 10:19	Fecal Coliform	1090	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/19/2008 11:15	Fecal Coliform	1360	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/9/2008 10:22	Fecal Coliform	890	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/13/2009 10:08	Fecal Coliform	140	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/13/2009 10:08	Fecal Coliform	140	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/9/2009 10:37	Fecal Coliform	450	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/9/2009 10:37	Fecal Coliform	450	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/31/2009 10:06	Fecal Coliform	1110	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/27/2009 10:06	Fecal Coliform	2000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/26/2009 10:14	Fecal Coliform	1930	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/17/2009 10:42	Fecal Coliform	960	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/14/2009 10:07	Fecal Coliform	1700	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/6/2009 10:25	Fecal Coliform	480	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/3/2009 10:14	Fecal Coliform	1300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/27/2009 9:47	Fecal Coliform	940	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/16/2009 10:18	Fecal Coliform	487	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/10/2009 11:45	Fecal Coliform	327	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/12/2010 10:44	Fecal Coliform	3400	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/24/2010 10:22	Fecal Coliform	163	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/23/2010 10:15	Fecal Coliform	353	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/20/2010 12:08	Fecal Coliform	353	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/27/2010 10:01	Fecal Coliform	900	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/22/2010 10:38	Fecal Coliform	5800	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/21/2010 10:20	Fecal Coliform	600	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/24/2010 10:20	Fecal Coliform	760	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/21/2010 10:03	Fecal Coliform	1117	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/20/2010 10:13	Fecal Coliform	647	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/10/2010 10:19	Fecal Coliform	580	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/2/2010 9:41	Fecal Coliform	593	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/26/2011 10:04	Fecal Coliform	4100	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/22/2011 10:22	Fecal Coliform	453	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	3/10/2011 9:39	Fecal Coliform	2700	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/13/2011 10:31	Fecal Coliform	600	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/17/2011 10:02	Fecal Coliform	527	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/13/2011 9:57	Fecal Coliform	7100	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/28/2011 9:48	Fecal Coliform	480	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/29/2011 10:11	Fecal Coliform	1367	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/26/2011 10:01	Fecal Coliform	3100	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/31/2011 10:38	Fecal Coliform	433	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/16/2011 10:23	Fecal Coliform	900	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/19/2011 10:14	Fecal Coliform	920	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/12/2012 9:46	Fecal Coliform	3400	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/17/2012 10:04	Fecal Coliform	1250	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/12/2012 10:07	Fecal Coliform	520	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/16/2012 10:25	Fecal Coliform	1500	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/15/2012 9:49	Fecal Coliform	1180	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/18/2012 10:00	Fecal Coliform	513	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/25/2012 11:20	Fecal Coliform	440	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/8/2012 10:23	Fecal Coliform	1406	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/11/2012 10:59	Fecal Coliform	531	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/4/2012 10:13	Fecal Coliform	1350	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/1/2012 10:03	Fecal Coliform	500	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/6/2012 9:48	Fecal Coliform	800	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/31/2013 10:00	Fecal Coliform	2900	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/26/2013 10:36	Fecal Coliform	270	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/26/2013 10:17	Fecal Coliform	380	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/26/2013 10:17	Fecal Coliform	380	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/22/2013 10:27	Fecal Coliform	520	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/20/2013 9:55	Fecal Coliform	633	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/25/2013 10:59	Fecal Coliform	440	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/8/2013 9:24	Fecal Coliform	144	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/8/2013 9:43	Fecal Coliform	620	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/10/2013 10:47	Fecal Coliform	2800	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/28/2013 10:16	Fecal Coliform	527	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/20/2013 10:15	Fecal Coliform	373	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/17/2013 10:08	Fecal Coliform	280	cfu/100ml

BILLGR60	BILLY CREEK- Ortiz	1/21/2014 11:22	Fecal Coliform	567	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/10/2014 10:44	Fecal Coliform	330	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/11/2014 10:54	Fecal Coliform	447	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/8/2014 9:41	Fecal Coliform	200	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/29/2014 10:48	Fecal Coliform	487	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/25/2014 9:31	Fecal Coliform	607	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/15/2014 9:50	Fecal Coliform	300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/12/2014 10:40	Fecal Coliform	520	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/9/2014 10:46	Fecal Coliform	800	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/20/2014 9:35	Fecal Coliform	1067	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/20/2014 9:46	Fecal Coliform	660	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/15/2014 9:53	Fecal Coliform	2000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/20/2015 9:56	Fecal Coliform	2000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/24/2015 9:59	Fecal Coliform	600	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/24/2015 11:00	Fecal Coliform	633	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/22/2015 10:12	Fecal Coliform	440	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/28/2015 10:11	Fecal Coliform	4000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/16/2015 11:19	Fecal Coliform	1167	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	7/28/2015 9:54	Fecal Coliform	633	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	8/25/2015 9:48	Fecal Coliform	640	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	9/22/2015 10:21	Fecal Coliform	220	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	10/27/2015 9:55	Fecal Coliform	1017	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	11/25/2015 9:11	Fecal Coliform	19	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	12/28/2015 10:09	Fecal Coliform	913	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	1/28/2016 10:13	Fecal Coliform	1333	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	2/29/2016 9:55	Fecal Coliform	1180	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	3/29/2016 9:59	Fecal Coliform	2000	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	4/27/2016 9:40	Fecal Coliform	2300	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	5/16/2016 9:43	Fecal Coliform	1050	cfu/100ml
BILLGR60	BILLY CREEK- Ortiz	6/20/2016 10:16	Fecal Coliform	980	cfu/100ml

*Data Source - LEE_WQ

Table **10** Historical Data – BILLGR20

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BILLGR60		1/25/2018 9:39	Escherichia coli	2420	cfu/100ml
BILLGR60		2/26/2018 9:42	Escherichia coli	461	cfu/100ml
BILLGR60		3/22/2018 9:57	Escherichia coli	79	cfu/100ml
BILLGR60		4/25/2018 9:36	Escherichia coli	30	cfu/100ml
BILLGR60		5/16/2018 9:46	Escherichia coli	2420	cfu/100ml
BILLGR60		6/28/2018 9:43	Escherichia coli	2420	cfu/100ml
BILLGR60		7/24/2018 9:59	Escherichia coli	2420	cfu/100ml
BILLGR60		8/27/2018 10:37	Escherichia coli	1203	cfu/100ml
BILLGR60		10/22/2018 10:02	Escherichia coli	2420	cfu/100ml
BILLGR60		11/27/2018 10:09	Escherichia coli	2420	cfu/100ml
BILLGR60		12/26/2018 9:48	Escherichia coli	1733	cfu/100ml
BILLGR60		1/24/2019 10:33	Escherichia coli	2420	cfu/100ml
BILLGR60		2/11/2019 10:10	Escherichia coli	2426	cfu/100ml
BILLGR60		3/28/2019 9:51	Escherichia coli	2420	cfu/100ml
BILLGR60		4/23/2019 10:16	Escherichia coli	2420	cfu/100ml
BILLGR60		5/21/2019 10:26	Escherichia coli	2420	cfu/100ml
BILLGR60		6/26/2019 10:20	Escherichia coli	2420	cfu/100ml
BILLGR60		8/29/2019 10:02	Escherichia coli	1733	cfu/100ml
BILLGR60		10/30/2019 10:00	Escherichia coli	2420	cfu/100ml
BILLGR60		11/13/2019 10:23	Escherichia coli	1733	cfu/100ml
BILLGR60		12/19/2019 10:00	Escherichia coli	2420	cfu/100ml
BILLGR60		1/28/2020 10:02	Escherichia coli	2420	cfu/100ml
BILLGR60		2/26/2020 8:38	Escherichia coli	2420	cfu/100ml
BILLGR60		6/29/2020 9:07	Escherichia coli	1733	cfu/100ml
BILLGR60		7/16/2020 8:58	Escherichia coli	2420	cfu/100ml
BILLGR60		8/17/2020 9:56	Escherichia coli	1120	cfu/100ml
BILLGR60		10/29/2020 9:36	Escherichia coli	582	cfu/100ml
BILLGR60		11/18/2020 9:44	Escherichia coli	1300	cfu/100ml
BILLGR60		12/8/2020 9:36	Escherichia coli	1414	cfu/100ml
BILLGR60		1/28/2021 9:19	Escherichia coli	2420	cfu/100ml

*Data Source - WIN_21FLEECO

Table **11**   Historical Data – Billy Cr. Near The Ft. Myers Southern Railway Br. Near S.R

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
BILLYCRK	BILLY CR. NEAR THE FT. MYERS SOUTHERN RAILWAY BR. NEAR S.R.	9/27/1994 0:00	Fecal Coliform	300	cfu/100ml

Table 12 Historical Data – Billy Creek @ Seaboard Street

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2005 9:40	Fecal Coliform	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/9/2005 10:11	Fecal Coliform	410	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/27/2005 10:22	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/18/2005 10:44	Fecal Coliform	860	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/8/2005 11:04	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/14/2005 11:21	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/9/2005 10:09	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/14/2005 10:55	Fecal Coliform	30	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2005 11:08	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/9/2005 9:54	Fecal Coliform	260	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/1/2005 10:08	Fecal Coliform	370	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/17/2006 9:49	Fecal Coliform	530	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/6/2006 10:29	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/6/2006 9:58	Fecal Coliform	580	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/11/2006 10:19	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/8/2006 11:29	Fecal Coliform	40	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/27/2006 9:32	Fecal Coliform	930	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/28/2006 9:37	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/29/2006 11:07	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/18/2006 9:54	Fecal Coliform	1740	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2006 10:20	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/8/2006 10:24	Fecal Coliform	540	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/6/2006 10:55	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/25/2007 9:50	Fecal Coliform	900	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2007 11:17	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/20/2007 11:03	Fecal Coliform	130	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/24/2007 11:35	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/29/2007 10:18	Fecal Coliform	90	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/19/2007 9:48	Fecal Coliform	1500	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/17/2007 10:56	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/16/2007 9:39	Fecal Coliform	750	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/17/2007 11:21	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/15/2007 10:48	Fecal Coliform	940	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	11/21/2007 10:15	Fecal Coliform	880	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/20/2007 10:22	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/29/2008 10:11	Fecal Coliform	270	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/27/2008 10:57	Fecal Coliform	250	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/18/2008 10:01	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/29/2008 9:47	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2008 10:20	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/10/2008 9:46	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/15/2008 10:38	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/26/2008 10:26	Fecal Coliform	300	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/11/2008 10:18	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/23/2008 10:25	Fecal Coliform	450	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/21/2009 10:37	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2009 9:51	Fecal Coliform	60	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/16/2009 11:03	Fecal Coliform	330	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/28/2009 10:31	Fecal Coliform	150	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/27/2009 10:30	Fecal Coliform	720	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2009 10:30	Fecal Coliform	124	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/21/2009 10:16	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/25/2009 10:17	Fecal Coliform	310	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/22/2009 10:42	Fecal Coliform	760	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/19/2009 10:16	Fecal Coliform	88	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/17/2009 10:09	Fecal Coliform	210	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/10/2009 9:48	Fecal Coliform	340	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/19/2010 10:20	Fecal Coliform	280	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2010 10:29	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/17/2010 10:53	Fecal Coliform	360	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/12/2010 10:09	Fecal Coliform	20000	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2010 10:50	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2005 9:40	Fecal Coliform	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/9/2005 10:11	Fecal Coliform	410	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	4/27/2005 10:22	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/18/2005 10:44	Fecal Coliform	860	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/8/2005 11:04	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/14/2005 11:21	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/9/2005 10:09	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/14/2005 10:55	Fecal Coliform	30	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2005 11:08	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/9/2005 9:54	Fecal Coliform	260	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/1/2005 10:08	Fecal Coliform	370	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/17/2006 9:49	Fecal Coliform	530	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/6/2006 10:29	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/6/2006 9:58	Fecal Coliform	580	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/11/2006 10:19	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/8/2006 11:29	Fecal Coliform	40	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/27/2006 9:32	Fecal Coliform	930	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/28/2006 9:37	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/29/2006 11:07	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/18/2006 9:54	Fecal Coliform	1740	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2006 10:20	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/8/2006 10:24	Fecal Coliform	540	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/6/2006 10:55	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/25/2007 9:50	Fecal Coliform	900	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2007 11:17	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/20/2007 11:03	Fecal Coliform	130	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/24/2007 11:35	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/29/2007 10:18	Fecal Coliform	90	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/19/2007 9:48	Fecal Coliform	1500	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/17/2007 10:56	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/16/2007 9:39	Fecal Coliform	750	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/17/2007 11:21	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/15/2007 10:48	Fecal Coliform	940	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/21/2007 10:15	Fecal Coliform	880	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/20/2007 10:22	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/29/2008 10:11	Fecal Coliform	270	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/27/2008 10:57	Fecal Coliform	250	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	3/18/2008 10:01	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/29/2008 9:47	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2008 10:20	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/10/2008 9:46	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/15/2008 10:38	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/26/2008 10:26	Fecal Coliform	300	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/11/2008 10:18	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/23/2008 10:25	Fecal Coliform	450	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/21/2009 10:37	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2009 9:51	Fecal Coliform	60	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/16/2009 11:03	Fecal Coliform	330	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/28/2009 10:31	Fecal Coliform	150	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/27/2009 10:30	Fecal Coliform	720	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2009 10:30	Fecal Coliform	124	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/21/2009 10:16	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/25/2009 10:17	Fecal Coliform	310	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/22/2009 10:42	Fecal Coliform	760	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/19/2009 10:16	Fecal Coliform	88	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/17/2009 10:09	Fecal Coliform	210	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/10/2009 9:48	Fecal Coliform	340	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/19/2010 10:20	Fecal Coliform	280	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2010 10:29	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/17/2010 10:53	Fecal Coliform	360	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/12/2010 10:09	Fecal Coliform	20000	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2010 10:50	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2005 9:40	Fecal Coliform	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/9/2005 10:11	Fecal Coliform	410	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/27/2005 10:22	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/18/2005 10:44	Fecal Coliform	860	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/8/2005 11:04	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/14/2005 11:21	Fecal Coliform	350	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	8/9/2005 10:09	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/14/2005 10:55	Fecal Coliform	30	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2005 11:08	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/9/2005 9:54	Fecal Coliform	260	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/1/2005 10:08	Fecal Coliform	370	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/17/2006 9:49	Fecal Coliform	530	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/6/2006 10:29	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/6/2006 9:58	Fecal Coliform	580	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/11/2006 10:19	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/8/2006 11:29	Fecal Coliform	40	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/27/2006 9:32	Fecal Coliform	930	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/28/2006 9:37	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/29/2006 11:07	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/18/2006 9:54	Fecal Coliform	1740	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2006 10:20	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/8/2006 10:24	Fecal Coliform	540	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/6/2006 10:55	Fecal Coliform	220	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/25/2007 9:50	Fecal Coliform	900	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2007 11:17	Fecal Coliform	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/20/2007 11:03	Fecal Coliform	130	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/24/2007 11:35	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/29/2007 10:18	Fecal Coliform	90	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/19/2007 9:48	Fecal Coliform	1500	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/17/2007 10:56	Fecal Coliform	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/16/2007 9:39	Fecal Coliform	750	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/17/2007 11:21	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/15/2007 10:48	Fecal Coliform	940	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/21/2007 10:15	Fecal Coliform	880	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/20/2007 10:22	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/29/2008 10:11	Fecal Coliform	270	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/27/2008 10:57	Fecal Coliform	250	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/18/2008 10:01	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/29/2008 9:47	Fecal Coliform	640	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2008 10:20	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/10/2008 9:46	Fecal Coliform	10	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	7/15/2008 10:38	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/26/2008 10:26	Fecal Coliform	300	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/11/2008 10:18	Fecal Coliform	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/23/2008 10:25	Fecal Coliform	450	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Fecal Coliform	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Fecal Coliform	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/21/2009 10:37	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2009 9:51	Fecal Coliform	60	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/16/2009 11:03	Fecal Coliform	330	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/28/2009 10:31	Fecal Coliform	150	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/27/2009 10:30	Fecal Coliform	720	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2009 10:30	Fecal Coliform	124	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/21/2009 10:16	Fecal Coliform	800	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/25/2009 10:17	Fecal Coliform	310	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/22/2009 10:42	Fecal Coliform	760	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/19/2009 10:16	Fecal Coliform	88	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/17/2009 10:09	Fecal Coliform	210	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/10/2009 9:48	Fecal Coliform	340	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/19/2010 10:20	Fecal Coliform	280	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2010 10:29	Fecal Coliform	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/17/2010 10:53	Fecal Coliform	360	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/12/2010 10:09	Fecal Coliform	20000	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2010 10:50	Fecal Coliform	290	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2010 10:22	Fecal Coliform	660	cfu/100ml

*Data Source - LEE_WQ

Table **13** Historical Data – Billy Creek @ Seaboard Street

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2005 9:40	Enterococcus Group Bacteria	320	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/9/2005 10:11	Enterococcus Group Bacteria	570	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/27/2005 10:22	Enterococcus Group Bacteria	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/18/2005 10:44	Enterococcus Group Bacteria	30	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/8/2005 11:04	Enterococcus Group Bacteria	2090	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/14/2005 11:21	Enterococcus Group Bacteria	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/9/2005 10:09	Enterococcus Group Bacteria	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/14/2005 10:55	Enterococcus Group Bacteria	300	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2005 11:08	Enterococcus Group Bacteria	1370	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/9/2005 9:54	Enterococcus Group Bacteria	430	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/1/2005 10:08	Enterococcus Group Bacteria	590	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/17/2006 9:49	Enterococcus Group Bacteria	1040	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/6/2006 10:29	Enterococcus Group Bacteria	820	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/6/2006 9:58	Enterococcus Group Bacteria	170	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/11/2006 10:19	Enterococcus Group Bacteria	150	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/8/2006 11:29	Enterococcus Group Bacteria	90	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/27/2006 9:32	Enterococcus Group Bacteria	270	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/28/2006 9:37	Enterococcus Group Bacteria	270	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	8/29/2006 11:07	Enterococcus Group Bacteria	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/18/2006 9:54	Enterococcus Group Bacteria	1520	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/26/2006 10:20	Enterococcus Group Bacteria	120	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/8/2006 10:24	Enterococcus Group Bacteria	960	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/6/2006 10:55	Enterococcus Group Bacteria	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/25/2007 9:50	Enterococcus Group Bacteria	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/8/2007 11:17	Enterococcus Group Bacteria	310	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/20/2007 11:03	Enterococcus Group Bacteria	100	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/24/2007 11:35	Enterococcus Group Bacteria	120	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/29/2007 10:18	Enterococcus Group Bacteria	80	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/19/2007 9:48	Enterococcus Group Bacteria	360	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/17/2007 10:56	Enterococcus Group Bacteria	250	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/16/2007 9:39	Enterococcus Group Bacteria	770	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/17/2007 11:21	Enterococcus Group Bacteria	320	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/15/2007 10:48	Enterococcus Group Bacteria	580	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/21/2007 10:15	Enterococcus Group Bacteria	160	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/20/2007 10:22	Enterococcus Group Bacteria	400	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/29/2008 10:11	Enterococcus Group Bacteria	860	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/27/2008 10:57	Enterococcus Group Bacteria	310	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	3/18/2008 10:01	Enterococcus Group Bacteria	150	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/29/2008 9:47	Enterococcus Group Bacteria	350	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2008 10:20	Enterococcus Group Bacteria	60	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/10/2008 9:46	Enterococcus Group Bacteria	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/15/2008 10:38	Enterococcus Group Bacteria	10	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	8/26/2008 10:26	Enterococcus Group Bacteria	200	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/11/2008 10:18	Enterococcus Group Bacteria	750	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/23/2008 10:25	Enterococcus Group Bacteria	170	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Enterococcus Group Bacteria	260	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/5/2008 10:01	Enterococcus Group Bacteria	260	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Enterococcus Group Bacteria	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/22/2008 10:23	Enterococcus Group Bacteria	420	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/21/2009 10:37	Enterococcus Group Bacteria	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2009 9:51	Enterococcus Group Bacteria	130	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/16/2009 11:03	Enterococcus Group Bacteria	270	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/28/2009 10:31	Enterococcus Group Bacteria	60	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/27/2009 10:30	Enterococcus Group Bacteria	380	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2009 10:30	Enterococcus Group Bacteria	30	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	7/21/2009 10:16	Enterococcus Group Bacteria	660	cfu/100ml

CFMBILLY1	Billy's Creek @ Seaboard Street	8/25/2009 10:17	Enterococcus Group Bacteria	1590	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	9/22/2009 10:42	Enterococcus Group Bacteria	280	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	10/19/2009 10:16	Enterococcus Group Bacteria	120	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	11/17/2009 10:09	Enterococcus Group Bacteria	173	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	12/10/2009 9:48	Enterococcus Group Bacteria	240	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	1/19/2010 10:20	Enterococcus Group Bacteria	180	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	2/17/2010 10:29	Enterococcus Group Bacteria	112	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	3/17/2010 10:53	Enterococcus Group Bacteria	520	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	4/12/2010 10:09	Enterococcus Group Bacteria	4000	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	5/13/2010 10:50	Enterococcus Group Bacteria	120	cfu/100ml
CFMBILLY1	Billy's Creek @ Seaboard Street	6/17/2010 10:22	Enterococcus Group Bacteria	140	cfu/100ml

*Data Source - LEE_WQ

Table **14** Historical Data – Zapato Street canal discharge to Billy's Creek

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/8/2005 10:00	Fecal Coliform	60	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/9/2005 10:43	Fecal Coliform	100	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/27/2005 10:51	Fecal Coliform	1520	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/18/2005 11:15	Fecal Coliform	190	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/8/2005 11:38	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	7/14/2005 11:59	Fecal Coliform	320	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	8/9/2005 10:41	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	9/14/2005 11:25	Fecal Coliform	150	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	10/26/2005 11:34	Fecal Coliform	1010	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	11/9/2005 11:14	Fecal Coliform	40	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	12/1/2005 10:31	Fecal Coliform	170	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	1/17/2006 10:10	Fecal Coliform	60	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/6/2006 10:53	Fecal Coliform	440	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/6/2006 10:25	Fecal Coliform	50	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/11/2006 10:47	Fecal Coliform	250	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/8/2006 10:51	Fecal Coliform	340	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/27/2006 9:58	Fecal Coliform	1510	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	7/28/2006 10:06	Fecal Coliform	220	cfu/100ml

CFMBILLY3	Zapato Street canal discharge to Billy's Creek	8/29/2006 11:50	Fecal Coliform	670	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	9/18/2006 10:26	Fecal Coliform	1840	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	10/26/2006 10:44	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	11/8/2006 11:02	Fecal Coliform	180	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	12/6/2006 12:00	Fecal Coliform	30	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	1/25/2007 10:25	Fecal Coliform	810	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/8/2007 12:08	Fecal Coliform	120	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/20/2007 11:49	Fecal Coliform	80	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/24/2007 12:51	Fecal Coliform	560	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/29/2007 10:48	Fecal Coliform	250	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/19/2007 10:18	Fecal Coliform	90	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	7/17/2007 11:28	Fecal Coliform	800	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	8/16/2007 10:05	Fecal Coliform	950	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	9/17/2007 12:05	Fecal Coliform	310	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	10/15/2007 11:29	Fecal Coliform	170	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	11/21/2007 10:57	Fecal Coliform	470	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	12/20/2007 10:49	Fecal Coliform	350	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	1/29/2008 10:38	Fecal Coliform	190	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/27/2008 11:34	Fecal Coliform	230	cfu/100ml

CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/18/2008 10:31	Fecal Coliform	160	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/29/2008 10:15	Fecal Coliform	50	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/13/2008 10:45	Fecal Coliform	130	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/10/2008 10:15	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	7/15/2008 11:17	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	8/26/2008 10:57	Fecal Coliform	370	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	9/11/2008 10:45	Fecal Coliform	1200	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	10/23/2008 10:59	Fecal Coliform	370	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	11/5/2008 10:28	Fecal Coliform	20	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	12/22/2008 10:55	Fecal Coliform	40	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	1/21/2009 11:09	Fecal Coliform	10	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/17/2009 10:16	Fecal Coliform	160	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/16/2009 12:26	Fecal Coliform	20	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/28/2009 11:02	Fecal Coliform	320	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/27/2009 11:18	Fecal Coliform	530	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/17/2009 11:06	Fecal Coliform	110	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	7/21/2009 11:27	Fecal Coliform	472	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	8/25/2009 11:20	Fecal Coliform	380	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	9/22/2009 11:21	Fecal Coliform	310	cfu/100ml

CFMBILLY3	Zapato Street canal discharge to Billy's Creek	10/19/2009 10:52	Fecal Coliform	627	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	11/17/2009 10:42	Fecal Coliform	104	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	12/10/2009 10:14	Fecal Coliform	151	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	1/19/2010 10:48	Fecal Coliform	1120	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	2/17/2010 10:55	Fecal Coliform	480	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	3/17/2010 11:19	Fecal Coliform	560	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	4/12/2010 10:35	Fecal Coliform	143	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	5/13/2010 11:33	Fecal Coliform	200	cfu/100ml
CFMBILLY3	Zapato Street canal discharge to Billy's Creek	6/17/2010 10:48	Fecal Coliform	80	cfu/100ml

*Data Source - LEE_WQ

Table **15** Historical Data – Zapato Street canal discharge to Billy's Creek

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY3	Zapato St discharge into Billy Creek	1/12/2017 10:15	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/8/2017 10:30	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/10/2017 10:30	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/14/2017 11:38	Escherichia coli	187	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/13/2017 11:20	Escherichia coli	1050	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/9/2017 10:55	Escherichia coli	379	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/11/2017 10:56	Escherichia coli	52	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/8/2017 10:45	Escherichia coli	275	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/13/2017 10:45	Escherichia coli	410	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/10/2018 10:30	Escherichia coli	441	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/14/2018 10:25	Escherichia coli	73	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/14/2018 10:25	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/17/2018 10:55	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/9/2018 10:55	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/13/2018 10:30	Escherichia coli	146	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/11/2018 10:50	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/8/2018 11:20	Escherichia coli	132	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/12/2018 10:40	Escherichia coli	145	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	10/16/2018 9:55	Escherichia coli	109	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/14/2018 10:45	Escherichia coli	160	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/12/2018 10:50	Escherichia coli	269	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/9/2019 10:40	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/13/2019 10:40	Escherichia coli	836	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/13/2019 11:00	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/10/2019 10:50	Escherichia coli	548	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/8/2019 10:30	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/12/2019 10:55	Escherichia coli	122	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/10/2019 10:30	Escherichia coli	145	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/14/2019 10:40	Escherichia coli	135	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/11/2019 11:40	Escherichia coli	428	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/9/2019 10:15	Escherichia coli	20	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/13/2019 10:10	Escherichia coli	108	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/11/2019 10:30	Escherichia coli	85	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/8/2020 10:12	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/12/2020 10:25	Escherichia coli	171	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/11/2020 10:45	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/8/2020 10:20	Escherichia coli	171	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	6/10/2020 10:55	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/8/2020 11:10	Escherichia coli	256	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/12/2020 11:15	Escherichia coli	350	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/9/2020 11:50	Escherichia coli	857	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/14/2020 11:30	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/12/2020 11:00	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/10/2020 11:15	Escherichia coli	933	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/13/2021 11:30	Escherichia coli	855	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/10/2021 11:30	Escherichia coli	512	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/1/2021 13:05	Escherichia coli	279	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/12/2017 10:15	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/8/2017 10:30	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/10/2017 10:30	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/14/2017 11:38	Escherichia coli	187	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/13/2017 11:20	Escherichia coli	1050	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/9/2017 10:55	Escherichia coli	379	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/11/2017 10:56	Escherichia coli	52	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/8/2017 10:45	Escherichia coli	275	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/13/2017 10:45	Escherichia coli	410	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	1/10/2018 10:30	Escherichia coli	441	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/14/2018 10:25	Escherichia coli	73	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/14/2018 10:25	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/17/2018 10:55	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/9/2018 10:55	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/13/2018 10:30	Escherichia coli	146	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/11/2018 10:50	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/8/2018 11:20	Escherichia coli	132	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/12/2018 10:40	Escherichia coli	145	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/16/2018 9:55	Escherichia coli	109	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/14/2018 10:45	Escherichia coli	160	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/12/2018 10:50	Escherichia coli	269	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/9/2019 10:40	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/13/2019 10:40	Escherichia coli	836	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/13/2019 11:00	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/10/2019 10:50	Escherichia coli	548	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/8/2019 10:30	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/12/2019 10:55	Escherichia coli	122	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/10/2019 10:30	Escherichia coli	145	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	8/14/2019 10:40	Escherichia coli	135	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/11/2019 11:40	Escherichia coli	428	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/9/2019 10:15	Escherichia coli	20	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/13/2019 10:10	Escherichia coli	108	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/11/2019 10:30	Escherichia coli	85	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/8/2020 10:12	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/12/2020 10:25	Escherichia coli	171	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/11/2020 10:45	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/8/2020 10:20	Escherichia coli	171	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/10/2020 10:55	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/8/2020 11:10	Escherichia coli	256	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/12/2020 11:15	Escherichia coli	350	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/9/2020 11:50	Escherichia coli	857	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/14/2020 11:30	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/12/2020 11:00	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/10/2020 11:15	Escherichia coli	933	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/13/2021 11:30	Escherichia coli	855	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/10/2021 11:30	Escherichia coli	512	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/1/2021 13:05	Escherichia coli	279	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	1/12/2017 10:15	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/8/2017 10:30	Escherichia coli	10	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/10/2017 10:30	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/14/2017 11:38	Escherichia coli	187	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/13/2017 11:20	Escherichia coli	1050	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/9/2017 10:55	Escherichia coli	379	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/11/2017 10:56	Escherichia coli	52	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/8/2017 10:45	Escherichia coli	275	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/13/2017 10:45	Escherichia coli	410	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/10/2018 10:30	Escherichia coli	441	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/14/2018 10:25	Escherichia coli	73	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/14/2018 10:25	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/17/2018 10:55	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/9/2018 10:55	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/13/2018 10:30	Escherichia coli	146	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/11/2018 10:50	Escherichia coli	41	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/8/2018 11:20	Escherichia coli	132	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/12/2018 10:40	Escherichia coli	145	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/16/2018 9:55	Escherichia coli	109	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	11/14/2018 10:45	Escherichia coli	160	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/12/2018 10:50	Escherichia coli	269	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/9/2019 10:40	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/13/2019 10:40	Escherichia coli	836	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/13/2019 11:00	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/10/2019 10:50	Escherichia coli	548	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	5/8/2019 10:30	Escherichia coli	63	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/12/2019 10:55	Escherichia coli	122	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	7/10/2019 10:30	Escherichia coli	145	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/14/2019 10:40	Escherichia coli	135	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/11/2019 11:40	Escherichia coli	428	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/9/2019 10:15	Escherichia coli	20	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/13/2019 10:10	Escherichia coli	108	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/11/2019 10:30	Escherichia coli	85	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/8/2020 10:12	Escherichia coli	98	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	2/12/2020 10:25	Escherichia coli	171	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/11/2020 10:45	Escherichia coli	30	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/8/2020 10:20	Escherichia coli	171	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	6/10/2020 10:55	Escherichia coli	41	cfu/100ml

CFMBILLY3	Zapato St discharge into Billy Creek	7/8/2020 11:10	Escherichia coli	256	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	8/12/2020 11:15	Escherichia coli	350	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	9/9/2020 11:50	Escherichia coli	857	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	10/14/2020 11:30	Escherichia coli	97	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	11/12/2020 11:00	Escherichia coli	301	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	12/10/2020 11:15	Escherichia coli	933	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	1/13/2021 11:30	Escherichia coli	855	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	3/10/2021 11:30	Escherichia coli	512	cfu/100ml
CFMBILLY3	Zapato St discharge into Billy Creek	4/1/2021 13:05	Escherichia coli	279	cfu/100ml

*Data Source - WIN_21FLCOFM

Table **16** Historical Data – Billy's Creek just upstream of Zapato Street discharge

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/8/2005 10:22	Fecal Coliform	1110	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/9/2005 10:25	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/27/2005 10:36	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/18/2005 10:59	Fecal Coliform	150	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/18/2005 11:28	Fecal Coliform	400	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/8/2005 11:27	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	7/14/2005 11:44	Fecal Coliform	320	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	8/9/2005 10:25	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	9/14/2005 11:10	Fecal Coliform	550	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	10/26/2005 11:22	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/9/2005 10:59	Fecal Coliform	620	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/1/2005 10:19	Fecal Coliform	1140	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	1/17/2006 9:59	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/6/2006 10:42	Fecal Coliform	510	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/6/2006 10:12	Fecal Coliform	920	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/11/2006 10:33	Fecal Coliform	410	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/8/2006 11:03	Fecal Coliform	270	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/27/2006 9:45	Fecal Coliform	620	cfu/100ml

CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	7/28/2006 9:50	Fecal Coliform	210	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	8/29/2006 11:29	Fecal Coliform	640	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	9/18/2006 10:11	Fecal Coliform	740	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	10/26/2006 10:56	Fecal Coliform	160	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/8/2006 10:44	Fecal Coliform	740	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/6/2006 12:20	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	1/25/2007 10:10	Fecal Coliform	950	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/8/2007 11:47	Fecal Coliform	1550	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/20/2007 11:24	Fecal Coliform	1300	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/24/2007 12:33	Fecal Coliform	50	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/29/2007 10:26	Fecal Coliform	240	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/19/2007 10:03	Fecal Coliform	390	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	7/17/2007 11:09	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	8/16/2007 9:55	Fecal Coliform	880	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	9/17/2007 11:39	Fecal Coliform	290	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	10/15/2007 11:10	Fecal Coliform	370	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/21/2007 10:29	Fecal Coliform	530	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/20/2007 10:36	Fecal Coliform	200	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	1/29/2008 10:24	Fecal Coliform	310	cfu/100ml

CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/27/2008 11:16	Fecal Coliform	290	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/18/2008 10:17	Fecal Coliform	50	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/29/2008 10:02	Fecal Coliform	1360	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/13/2008 10:33	Fecal Coliform	340	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/10/2008 10:01	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	7/15/2008 10:57	Fecal Coliform	10	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	8/26/2008 10:42	Fecal Coliform	900	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	9/11/2008 10:33	Fecal Coliform	810	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	10/23/2008 10:42	Fecal Coliform	480	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/5/2008 10:15	Fecal Coliform	460	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/5/2008 10:15	Fecal Coliform	460	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/22/2008 10:39	Fecal Coliform	140	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/22/2008 10:39	Fecal Coliform	140	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	1/21/2009 10:51	Fecal Coliform	690	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/17/2009 10:04	Fecal Coliform	370	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/16/2009 12:12	Fecal Coliform	160	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/28/2009 10:47	Fecal Coliform	80	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/27/2009 11:02	Fecal Coliform	240	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/17/2009 10:53	Fecal Coliform	176	cfu/100ml

CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	7/21/2009 11:06	Fecal Coliform	400	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	8/25/2009 11:02	Fecal Coliform	580	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	9/22/2009 11:08	Fecal Coliform	1380	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	10/19/2009 10:36	Fecal Coliform	520	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	11/17/2009 10:26	Fecal Coliform	980	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	12/10/2009 10:01	Fecal Coliform	131	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	1/19/2010 10:35	Fecal Coliform	1060	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	2/17/2010 10:42	Fecal Coliform	940	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	3/17/2010 11:07	Fecal Coliform	940	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	4/12/2010 10:23	Fecal Coliform	1217	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	5/13/2010 11:19	Fecal Coliform	108	cfu/100ml
CFMBILLY4	Billy's Creek just upstream of Zapato Street discharge	6/17/2010 10:36	Fecal Coliform	440	cfu/100ml

*Data Source - LEE_WQ

Table **17** Historical Data – W side of boardwalk approx 75' N of TEE

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMFSP	W side of boardwalk approx 75' N of TEE	1/12/2017 9:50	Escherichia coli	24196	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	2/8/2017 9:55	Escherichia coli	9804	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	6/14/2017 11:15	Escherichia coli	759	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	7/13/2017 10:55	Escherichia coli	2064	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	8/9/2017 10:30	Escherichia coli	292	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	10/11/2017 10:25	Escherichia coli	2909	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	11/8/2017 10:05	Escherichia coli	41	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	12/13/2017 10:20	Escherichia coli	31	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	1/10/2018 10:05	Escherichia coli	345	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	2/14/2018 10:00	Escherichia coli	2359	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	4/17/2018 10:20	Escherichia coli	331	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	5/9/2018 10:25	Escherichia coli	315	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	6/13/2018 10:00	Escherichia coli	2909	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	7/11/2018 10:30	Escherichia coli	426	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	8/8/2018 10:50	Escherichia coli	426	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	9/12/2018 10:15	Escherichia coli	2143	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	10/16/2018 9:20	Escherichia coli	402	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	11/14/2018 10:15	Escherichia coli	199	cfu/100ml

CFMFSP	W side of boardwalk approx 75' N of TEE	12/12/2018 10:20	Escherichia coli	1130	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	1/9/2019 10:10	Escherichia coli	1553	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	2/13/2019 10:15	Escherichia coli	7270	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	3/13/2019 10:35	Escherichia coli	959	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	4/10/2019 10:20	Escherichia coli	3873	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	5/8/2019 10:05	Escherichia coli	457	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	6/12/2019 10:25	Escherichia coli	479	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	7/10/2019 10:00	Escherichia coli	134	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	8/14/2019 9:55	Escherichia coli	388	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	9/11/2019 10:20	Escherichia coli	250	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	10/9/2019 9:50	Escherichia coli	189	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	11/13/2019 9:50	Escherichia coli	1723	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	12/11/2019 10:05	Escherichia coli	495	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	1/8/2020 9:50	Escherichia coli	744	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	2/12/2020 10:05	Escherichia coli	315	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	3/11/2020 10:05	Escherichia coli	121	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	4/8/2020 9:40	Escherichia coli	288	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	6/10/2020 10:35	Escherichia coli	243	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	7/8/2020 10:40	Escherichia coli	169	cfu/100ml

CFMFSP	W side of boardwalk approx 75' N of TEE	8/12/2020 10:45	Escherichia coli	132	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	9/9/2020 11:30	Escherichia coli	857	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	10/14/2020 11:10	Escherichia coli	171	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	11/12/2020 10:40	Escherichia coli	359	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	12/10/2020 10:50	Escherichia coli	620	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	1/13/2021 10:45	Escherichia coli	602	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	3/10/2021 10:55	Escherichia coli	345	cfu/100ml
CFMFSP	W side of boardwalk approx 75' N of TEE	4/1/2021 11:55	Escherichia coli	135	cfu/100ml

*Data Source - LEE_WQ

Table **18** Historical Data – Billy's Creek just upstream of Ford Street discharge DUP

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/8/2005 10:56	Fecal Coliform	100	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/9/2005 10:58	Fecal Coliform	960	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/27/2005 11:01	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/8/2005 11:51	Fecal Coliform	440	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	7/14/2005 12:13	Fecal Coliform	1870	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	8/9/2005 11:08	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	9/14/2005 11:40	Fecal Coliform	250	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	10/26/2005 11:45	Fecal Coliform	1510	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	11/9/2005 11:26	Fecal Coliform	1280	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/1/2005 10:45	Fecal Coliform	70	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	1/17/2006 10:20	Fecal Coliform	30	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/6/2006 11:04	Fecal Coliform	420	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/6/2006 10:37	Fecal Coliform	20	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/11/2006 11:01	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	5/8/2006 10:39	Fecal Coliform	230	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/27/2006 10:10	Fecal Coliform	860	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	7/28/2006 10:19	Fecal Coliform	190	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	8/29/2006 12:07	Fecal Coliform	800	cfu/100ml

CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	9/18/2006 10:36	Fecal Coliform	1750	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	10/26/2006 13:18	Fecal Coliform	70	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	11/8/2006 11:28	Fecal Coliform	890	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/6/2006 12:40	Fecal Coliform	40	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	1/25/2007 10:37	Fecal Coliform	40	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/8/2007 12:31	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/20/2007 12:15	Fecal Coliform	60	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/24/2007 13:10	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	5/29/2007 10:58	Fecal Coliform	360	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/19/2007 10:38	Fecal Coliform	330	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	7/17/2007 11:40	Fecal Coliform	1100	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	8/16/2007 10:15	Fecal Coliform	1730	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	9/17/2007 12:24	Fecal Coliform	340	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	10/15/2007 11:48	Fecal Coliform	80	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	11/21/2007 11:51	Fecal Coliform	30	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/20/2007 11:04	Fecal Coliform	50	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	1/29/2008 10:52	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/27/2008 11:57	Fecal Coliform	70	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/18/2008 10:42	Fecal Coliform	10	cfu/100ml

CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/29/2008 10:28	Fecal Coliform	120	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	5/13/2008 11:01	Fecal Coliform	140	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/10/2008 10:31	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	7/15/2008 11:43	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	8/26/2008 11:28	Fecal Coliform	750	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	9/11/2008 10:59	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	10/23/2008 11:54	Fecal Coliform	120	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	11/5/2008 10:42	Fecal Coliform	50	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/22/2008 11:09	Fecal Coliform	30	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/22/2008 11:09	Fecal Coliform	30	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	1/21/2009 11:28	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/17/2009 10:28	Fecal Coliform	10	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/16/2009 12:38	Fecal Coliform	20	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/28/2009 11:19	Fecal Coliform	110	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	5/27/2009 11:34	Fecal Coliform	390	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/17/2009 11:20	Fecal Coliform	164	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	7/21/2009 11:47	Fecal Coliform	800	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	8/25/2009 11:38	Fecal Coliform	1300	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	9/22/2009 11:35	Fecal Coliform	1250	cfu/100ml

CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	10/19/2009 11:14	Fecal Coliform	188	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	11/17/2009 10:54	Fecal Coliform	440	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	12/10/2009 10:25	Fecal Coliform	390	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	1/19/2010 12:04	Fecal Coliform	473	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	2/17/2010 11:08	Fecal Coliform	38	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	3/17/2010 11:54	Fecal Coliform	156	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	4/12/2010 10:50	Fecal Coliform	660	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	5/13/2010 11:43	Fecal Coliform	230	cfu/100ml
CFMBILLY6	Billy's Creek just upstream of Ford Street discharge DUP	6/17/2010 10:59	Fecal Coliform	393	cfu/100ml

*Data Source - LEE_WQ

Table **19** Historical Data – CFM Cemetery

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMCEMETERY	CFMCEMETERY	1/13/2021 11:15	Escherichia coli	910	cfu/100ml
CFMCEMETERY	CFMCEMETERY	3/10/2021 11:15	Escherichia coli	880	cfu/100ml
CFMCEMETERY	CFMCEMETERY	4/1/2021 12:20	Escherichia coli	697	cfu/100ml

*Data Source - WIN_21FLCOFM

Table 20 Historical Data – Caloosa/Manuel Branch/South-East/Lower Florida

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020114	CALOOSA R MANUEL BRANCH / SOUTH-EAST / LOWER FLORIDA	5/17/1973 0:00	Fecal Coliform	5	Not Provided
28020114	CALOOSA R MANUEL BRANCH / SOUTH-EAST / LOWER FLORIDA	5/17/1973 0:00	Fecal Coliform	5	Not Provided
28020114	CALOOSA R MANUEL BRANCH / SOUTH-EAST / LOWER FLORIDA	5/17/1973 0:00	Fecal Coliform	5	Not Provided

*Data Source - LEGACYSTORET_21FLA

Table **21** Historical Data – Manual Branch at McGregor Blvd (SR867)

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	3/24/1999 0:00	Fecal Coliform	240	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	4/20/1999 0:00	Fecal Coliform	240	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	5/19/1999 0:00	Fecal Coliform	1090	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	7/19/1999 0:00	Fecal Coliform	2600	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	8/16/1999 0:00	Fecal Coliform	3280	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	10/12/1999 0:00	Fecal Coliform	1500	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	11/15/1999 0:00	Fecal Coliform	1300	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	12/13/1999 0:00	Fecal Coliform	2000	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867)	1/19/2000 0:00	Fecal Coliform	3640	cfu/100ml
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	6/22/1992 0:00	Fecal Coliform	2960	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	6/22/1992 0:00	Fecal Coliform	2960	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	6/22/1992 0:00	Fecal Coliform	2960	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/3/1992 0:00	Fecal Coliform	1430	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/3/1992 0:00	Fecal Coliform	1430	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/3/1992 0:00	Fecal Coliform	1430	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/16/1993 0:00	Fecal Coliform	2580	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/16/1993 0:00	Fecal Coliform	2580	Not Provided
28020225	MANUAL BRANCH AT MCGREGOR BLVD(SR867) /	12/16/1993 0:00	Fecal Coliform	2580	Not Provided

*Data Source - STORET_21FLFTM and LEGACYSTORET_21FLA

Table **22** Historical Data – Manual Branch at McGregor Blvd (SR867)

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/8/2005 11:30	Fecal Coliform	1780	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/9/2005 9:35	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/27/2005 9:41	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/18/2005 10:09	Fecal Coliform	1950	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/8/2005 10:32	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	7/14/2005 10:08	Fecal Coliform	960	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	8/9/2005 9:20	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	9/14/2005 10:01	Fecal Coliform	990	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	10/26/2005 10:20	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/9/2005 9:20	Fecal Coliform	140	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/1/2005 9:30	Fecal Coliform	410	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	1/17/2006 9:17	Fecal Coliform	400	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/6/2006 9:55	Fecal Coliform	490	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/6/2006 9:25	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/11/2006 9:47	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/8/2006 9:50	Fecal Coliform	420	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/27/2006 9:03	Fecal Coliform	900	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	7/28/2006 9:06	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	8/29/2006 10:17	Fecal Coliform	550	cfu/100ml

CFMMANUEL	Manuel's Branch at coontrol structure behind high school	9/18/2006 9:20	Fecal Coliform	2370	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	10/26/2006 9:45	Fecal Coliform	40	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/8/2006 9:38	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/6/2006 9:55	Fecal Coliform	580	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	1/25/2007 9:14	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/8/2007 10:11	Fecal Coliform	1300	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/20/2007 9:55	Fecal Coliform	500	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/24/2007 10:53	Fecal Coliform	600	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/29/2007 9:36	Fecal Coliform	990	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/19/2007 9:06	Fecal Coliform	740	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	7/17/2007 10:20	Fecal Coliform	1430	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	8/16/2007 9:02	Fecal Coliform	1150	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	9/17/2007 10:23	Fecal Coliform	160	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	10/15/2007 9:54	Fecal Coliform	680	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/21/2007 9:33	Fecal Coliform	1580	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/20/2007 9:42	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	1/29/2008 9:34	Fecal Coliform	1020	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/27/2008 10:03	Fecal Coliform	260	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/18/2008 9:20	Fecal Coliform	650	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/29/2008 9:25	Fecal Coliform	480	cfu/100ml

CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/13/2008 9:50	Fecal Coliform	1390	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/10/2008 9:10	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	7/15/2008 9:57	Fecal Coliform	10	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	8/26/2008 9:44	Fecal Coliform	680	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	9/11/2008 9:38	Fecal Coliform	1400	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	10/23/2008 9:51	Fecal Coliform	1240	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/5/2008 9:27	Fecal Coliform	560	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/5/2008 9:27	Fecal Coliform	560	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/22/2008 9:48	Fecal Coliform	1200	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/22/2008 9:48	Fecal Coliform	1200	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	1/21/2009 9:42	Fecal Coliform	1350	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/17/2009 9:18	Fecal Coliform	1760	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/16/2009 10:32	Fecal Coliform	700	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/28/2009 9:46	Fecal Coliform	500	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/27/2009 9:51	Fecal Coliform	1930	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/17/2009 9:52	Fecal Coliform	276	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	7/21/2009 9:40	Fecal Coliform	2240	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	8/25/2009 9:40	Fecal Coliform	1700	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	9/22/2009 10:05	Fecal Coliform	1300	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	10/19/2009 9:41	Fecal Coliform	573	cfu/100ml

CFMMANUEL	Manuel's Branch at coontrol structure behind high school	11/17/2009 9:35	Fecal Coliform	420	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	12/10/2009 9:19	Fecal Coliform	1233	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	1/19/2010 9:47	Fecal Coliform	1160	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	2/17/2010 9:55	Fecal Coliform	1000	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	3/17/2010 9:46	Fecal Coliform	353	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	4/12/2010 9:36	Fecal Coliform	1467	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	5/13/2010 10:23	Fecal Coliform	467	cfu/100ml
CFMMANUEL	Manuel's Branch at coontrol structure behind high school	6/17/2010 9:55	Fecal Coliform	7500	cfu/100ml

*Data Source - LEE_WQ

Table **23** Historical Data – Manuel's Branch Upstream of the Weir Near the School/Park

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/16/1999 0:00	Fecal Coliform	3320	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	4/11/2000 0:00	Fecal Coliform	1940	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	6/26/2000 0:00	Fecal Coliform	3000	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	8/29/2000 0:00	Fecal Coliform	4700	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/31/2000 0:00	Fecal Coliform	600	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	12/19/2000 0:00	Fecal Coliform	360	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	2/19/2001 0:00	Fecal Coliform	1100	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	4/16/2001 0:00	Fecal Coliform	640	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	4/16/2001 0:00	Fecal Coliform	1500	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	6/26/2001 0:00	Fecal Coliform	1200	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	12/3/2001 0:00	Fecal Coliform	660	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	2/27/2002 0:00	Fecal Coliform	700	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	5/8/2002 0:00	Fecal Coliform	320	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	6/11/2002 0:00	Fecal Coliform	680	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	8/15/2002 0:00	Fecal Coliform	3200	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/9/2002 0:00	Fecal Coliform	400	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/8/2002 0:00	Fecal Coliform	860	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/5/2007 0:00	Fecal Coliform	680	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/13/2007 0:00	Fecal Coliform	900	cfu/100ml

28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/20/2007 0:00	Fecal Coliform	1800	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	9/26/2007 0:00	Fecal Coliform	1700	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/2/2007 0:00	Fecal Coliform	2150	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/8/2007 0:00	Fecal Coliform	1900	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/16/2007 0:00	Fecal Coliform	850	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/25/2007 0:00	Fecal Coliform	4400	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	10/30/2007 0:00	Fecal Coliform	1900	cfu/100ml
28020249FTM	Manuel's Branch upstream of the weir near the school/park	12/4/2007 0:00	Fecal Coliform	6000	cfu/100ml

*Data Source - STORET_21FLFTM

Table **24** Historical Data – Manuels Branch Site 2

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020287FTM	MANUELS BRANCH SITE 2	1/22/2003 0:00	Fecal Coliform	400	cfu/100ml
28020287FTM	MANUELS BRANCH SITE 2	3/17/2003 0:00	Fecal Coliform	1200	cfu/100ml
28020287FTM	MANUELS BRANCH SITE 2	5/21/2003 0:00	Fecal Coliform	600	cfu/100ml
28020287FTM	MANUELS BRANCH SITE 2	8/19/2003 0:00	Fecal Coliform	1900	cfu/100ml
28020287FTM	MANUELS BRANCH SITE 2	9/23/2003 0:00	Fecal Coliform	2000	cfu/100ml
28020287FTM	MANUELS BRANCH SITE 2	11/5/2003 0:00	Fecal Coliform	6000	cfu/100ml

*Data Source - STORET_21FLFTM

Table **25** Historical Data – Manuels Branch Site 4

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020289FTM	MANUELS BRANCH SITE 4	1/22/2003 0:00	Fecal Coliform	100	cfu/100ml
28020289FTM	MANUELS BRANCH SITE 4	3/17/2003 0:00	Fecal Coliform	1740	cfu/100ml
28020289FTM	MANUELS BRANCH SITE 4	5/23/2003 0:00	Fecal Coliform	600	cfu/100ml
28020289FTM	MANUELS BRANCH SITE 4	8/26/2003 0:00	Fecal Coliform	4900	cfu/100ml
28020289FTM	MANUELS BRANCH SITE 4	9/23/2003 0:00	Fecal Coliform	300	cfu/100ml
28020289FTM	MANUELS BRANCH SITE 4	11/5/2003 0:00	Fecal Coliform	100	cfu/100ml

*Data Source - STORET_21FLFTM

Table **26** Historical Data – Manuels Branch Site 3

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
28020288FTM	MANUELS BRANCH SITE3	1/22/2003 0:00	Fecal Coliform	100	cfu/100ml
28020288FTM	MANUELS BRANCH SITE3	3/17/2003 0:00	Fecal Coliform	1200	cfu/100ml
28020288FTM	MANUELS BRANCH SITE3	5/22/2003 0:00	Fecal Coliform	600	cfu/100ml
28020288FTM	MANUELS BRANCH SITE3	8/19/2003 0:00	Fecal Coliform	3000	cfu/100ml
28020288FTM	MANUELS BRANCH SITE3	9/23/2003 0:00	Fecal Coliform	2550	cfu/100ml
28020288FTM	MANUELS BRANCH SITE3	11/5/2003 0:00	Fecal Coliform	6000	cfu/100ml

*Data Source - STORET_21FLFTM

Table **27** Historical Data – Manuel Branch @ Broadway

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
G3SD0078	MANUEL BRANCH @ BROADWAY	1/30/2018 9:00	Escherichia coli	816	cfu/100ml
G3SD0078	MANUEL BRANCH @ BROADWAY	2/14/2018 8:30	Escherichia coli	920	cfu/100ml
G3SD0078	MANUEL BRANCH @ BROADWAY	4/2/2018 8:25	Escherichia coli	398	cfu/100ml
G3SD0078	MANUEL BRANCH @ BROADWAY	5/1/2018 9:15	Escherichia coli	344	cfu/100ml
G3SD0078	MANUEL BRANCH @ BROADWAY	5/30/2018 8:15	Escherichia coli	2420	cfu/100ml
G3SD0078	MANUEL BRANCH @ BROADWAY	7/6/2020 9:00	Escherichia coli	816	cfu/100ml

*Data Source - WIN_21FLFTM

Table **28** Historical Data – Manuel Branch @ Neighborhood Park

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
G1SD0070	Manuel Branch @ Neighborhood Park	1/29/2020 9:10	Escherichia coli	2420	cfu/100ml
G1SD0070	Manuel Branch @ Neighborhood Park	3/12/2020 8:45	Escherichia coli	2420	cfu/100ml
G1SD0070	Manuel Branch @ Neighborhood Park	9/2/2020 9:20	Escherichia coli	816	cfu/100ml
G1SD0070	Manuel Branch @ Neighborhood Park	11/30/2020 9:45	Escherichia coli	2420	cfu/100ml

*Data Source - WIN_21FLFTM

Table **29** Historical Data – Manuel Branch at Control Structure Behind Fort Myers High

StationID	StationName	SampleDate	Characteristic	Result_Value	Result_Unit
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	1/12/2017 9:05	Escherichia coli	3654	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	2/8/2017 9:15	Escherichia coli	209	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	3/8/2017 8:50	Escherichia coli	323	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	4/12/2017 9:05	Escherichia coli	1100	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	5/10/2017 9:35	Escherichia coli	323	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	6/14/2017 10:05	Escherichia coli	1198	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	7/13/2017 9:45	Escherichia coli	1054	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	8/9/2017 9:45	Escherichia coli	794	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	10/11/2017 9:45	Escherichia coli	857	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	11/8/2017 9:24	Escherichia coli	1607	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	12/13/2017 9:40	Escherichia coli	2382	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	1/10/2018 9:25	Escherichia coli	2098	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	2/14/2018 9:20	Escherichia coli	988	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	3/14/2018 9:25	Escherichia coli	754	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	4/17/2018 9:35	Escherichia coli	393	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	5/9/2018 9:25	Escherichia coli	487	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	6/13/2018 9:25	Escherichia coli	2282	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	7/11/2018 9:25	Escherichia coli	565	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	8/8/2018 10:05	Escherichia coli	1421	cfu/100ml

CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	9/12/2018 9:30	Escherichia coli	1989	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	10/16/2018 8:40	Escherichia coli	1.48E+06	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	11/14/2018 9:35	Escherichia coli	1483	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	12/12/2018 9:20	Escherichia coli	990	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	1/9/2019 9:25	Escherichia coli	2014	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	2/13/2019 9:30	Escherichia coli	12997	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	3/13/2019 9:30	Escherichia coli	1178	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	4/10/2019 9:25	Escherichia coli	4611	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	5/8/2019 9:20	Escherichia coli	717	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	6/12/2019 9:25	Escherichia coli	488	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	7/10/2019 9:25	Escherichia coli	908	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	8/14/2019 9:15	Escherichia coli	1046	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	9/11/2019 9:15	Escherichia coli	816	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	10/9/2019 9:15	Escherichia coli	591	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	11/13/2019 9:20	Escherichia coli	788	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	12/11/2019 9:10	Escherichia coli	2987	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	1/8/2020 9:05	Escherichia coli	1860	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	2/12/2020 9:05	Escherichia coli	298	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	3/11/2020 9:10	Escherichia coli	934	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	4/8/2020 9:05	Escherichia coli	199	cfu/100ml

CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	6/10/2020 9:40	Escherichia coli	697	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	7/8/2020 10:05	Escherichia coli	776	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	8/12/2020 10:15	Escherichia coli	457	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	9/9/2020 10:40	Escherichia coli	1576	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	10/14/2020 10:25	Escherichia coli	1450	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	11/12/2020 10:05	Escherichia coli	1391	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	12/10/2020 10:10	Escherichia coli	1250	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	1/13/2021 10:15	Escherichia coli	4352	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	3/10/2021 10:15	Escherichia coli	2613	cfu/100ml
CFMMANUEL	Manuel's Branch at control structure behind Ft Myers High	4/1/2021 10:00	Escherichia coli	1989	cfu/100ml

*Data Source - WIN_21FLCOFM

Appendix E

Field Collection Form

SURFACE WATER FIELD SHEET
Station Information

STATION ID:	
LOCATION:	
DATE/TIME:	
ALL TIMES ARE:	ETZ or CTZ (circle one)

WATERBODY TYPE: (Circle One)	Small Lake (>4 and <10HA) (collect samples in middle of open water)	Large Lake (>10HA) (collect samples at selected location point)
	Small Stream (collect samples in representative area)	Large River (collect samples in representative area)

Water Characteristics

TOTAL WATER DEPTH: ______________ (feet) Sample Depth: ______________
(Average of 2 measurements) (feet)

STREAM FLOW:	(Circle One if applicable)	No Flow	Flow within Banks	Flood Conditions		
WATER LEVEL:	(Circle One)	Low	Normal	High		
WATER SAMPLE COLLECTION DEVICE (Circle One)		Van Dorn	Direct Grab with Sample Bottle	Dipper	Other	________

Field Measurements **Meter ID#** **Field Measurements Read By:** (initials)

Time (24 hr.)	Surface Depth Collected (feet)	pH* (SU)	D.O.(mg./L)	D.O. (%)	Temp (ºC)	Conductivity (µmhos/cm)	Turbidity (NTU)
Time (24 hr.)	Bottom Depth Collected (feet)	pH (SU)	D.O.(mg./L)	D.O. (%)	Temp (ºC)	Conductivity (µmhos/cm)	Turbidity (NTU)

*pH of preserved sample: number of drops of sulfuric acid added in field to achieve pH of less than 2: ________

Samples immediately placed on ice? Yes No

WEATHER CONDITIONS: (circle) raining, clear, partly cloudy, windy

PERSONNEL ON SITE: ______________

____

REMARKS: ______________

Appendix F

Calibration Checklist

Field Instrument Calibration Records

INSTRUMENT (MAKE/MODEL#) __YSI Pro Plus___________ **INSTRUMENT #** ____________________
____

☒ **pH**

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A _pH 7.00 Buffer Capsule, US Enviro., Lot #_______, EXP.

Standard B __pH 4.00 Buffer CapsuleUS Envir. Lot #______, Exp.

Standard C ____

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS

☒ **CONDUCTIVITY**

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A 1000us/cm @ 25°C, Lot #__________Exp._______

Standard B ____

Standard C ____

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS

☒ **DO**

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A _Saturated Air Chamber/100%________________________

Standard B ____

Standard C ____

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS

INSTRUMENT (MAKE/MODEL#) Hach 2100Q **INSTRUMENT #** ______

☒ **TURBIDITY**

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A 20.0 ntu,Hach, Lot # , Exp.

Standard B 100 ntu, Hach, Lot # , Exp.

Standard C 800ntu,Hach, Lot # Exp.

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS

INSTRUMENT (MAKE/MODEL#) LaMotte 2020E **INSTRUMENT #** ___________________________

☒ **ORP**

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A 0.0ntu, AMCO Primary, Exp. 3/16, Lot # C364648

Standard B 1.0ntu, AMCO Primary, Exp. 10/16, Lot # C577685

Standard C ____

DATE (yy/mm/dd)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS

Appendix G

Maps on Table and Walk the Watersheds Points

ID	Type	Note	Priority
1	NA	Billy Creek Leaves county property and enters the city	NONE
2		City Has collection of data for this site over a couple of decades (Several constituents)	NONE
3	Sewer	Clay sewer lines old infrastructure	RED
4	OSTDS	Septic tank testing	GREEN
5	Lift station	Major grease issue. 2-3 weekly inspections. Low priority	GREEN
6	NA	Surface Water monitoring Site	GREEN
7	OSTDS	Boundaries of Hanson/Broadway/41 - these areas are not served by the city for sewer. Annexation of this area to eliminate the septic tanks by the Community Development Department.	NONE
8	NA	Kayaks	NONE
9	Private lift station, Mobile Home Park	Potential source tracking sampling and investigation. Goes to the County not the City	NONE
10	Public, OSTDS	Dixie's Plants; also animals - pets, maybe chickens	YELLOW
11	Discoloration	Staining on roadway (carwash)	GREEN
12	Trash	Retention wall, barrier that holds back trash and debris	YELLOW
13	Grease issue	Older infrastructure	YELLOW
14	Sediment	Dredging applied for has a flood control project, rather than fecal bacteria resolution - FID levels high post-dredging	GREEN
15	Ducks	Retirement residents feeding ducks	YELLOW
16	Stormwater	Stormwater conveyance area	GREEN
17	Sampling	Long term sampling at this location - check with county	NONE
18	Sampling	Road - bus dataset - check	GREEN
19		Dog kennel close proximity to the canal	YELLOW
20	Homeless Activity	Mattress under bridge	YELLOW
21	Homeless Activity	Mattress under bridge removed have not seen since	YELLOW
22	Homeless Activity	Seasonal homeless area under bridge @ Ortiz and Billy Creek	YELLOW
23	Homeless Activity	Mattresses under station - needs investigation	YELLOW
24	Trash	Ortiz Area - Convenience stores debris in Billy's Creek ex. soda bottles	YELLOW
25	Animals	Chicken coops	GREEN
26	Animals	Cows present	YELLOW
27	Homeless Activity	Homeless community	YELLOW
28	Homeless Activity	Homeless camp popups	YELLOW
29	New lift station	Low priority	GREEN
30	Animals	Feed bags (domestic animals - goats)	YELLOW
31	OSTDS	Trailer Park	YELLOW
32	Animal	Possible animals	GREEN
33	OSTDS	Mobile Home Park	YELLOW
34	OSTDS	Private Lift Station	YELLOW

ID	Type	Note	Priority
35	OSTDS	Mobile Home	YELLOW
36	Homeless Activity	Potential Homeless, Thick Vegetation	YELLOW
37	Animals	Potential Animals	YELLOW
38	Homeless Activity	Possible Homeless Camp	YELLOW
39	Animals	Possible Dogs	YELLOW
40	Trash	Also Erosion On The Bank	YELLOW
41	FOGS	BBQ Restaurant	GREEN
42	Stormwater	Staining On Wall	GREEN
43	Sewer	Pipe Crossing	YELLOW
44	Commercial	Crews Env	YELLOW
45	Commercial	Karle Env	GREEN
46	Animals	Potential Dog Waste	YELLOW
47	Sewer	Abandoned Pipe	GREEN
48	Sewer	Staining	GREEN
49	Animals	Dogs	YELLOW
50	Sewer	Low elevation manhole	GREEN
51	Sewer	Low elevation manhole	GREEN
52	Sewer	Low elevation manhole, on 5/26 New Stormwater Drainage Manholes/Structures Installed	GREEN
53	Sewer	Low elevation manhole, on 5/26 New Stormwater Drainage Manholes/Structures Installed	GREEN
54	Sewer	Low elevation manhole	GREEN
55	Sewer	Low elevation manhole	GREEN
56	Sewer	Low elevation manhole	GREEN
57	Sewer	Low elevation manhole	GREEN
58	Sewer	Low elevation manhole	GREEN
59	Sewer	Low elevation manhole	GREEN
60	Sewer	Low elevation manhole	GREEN
61	Sewer	Low elevation manhole	GREEN
62	Sewer	Low elevation manhole	GREEN
63	Sewer	Low elevation manhole	GREEN
64	Sewer	Low elevation manhole	GREEN
65	Sewer	Low elevation manhole	GREEN
66	Trash	Dumpster	RED
67	Industrial	Concrete wastewater illicit discharge	RED
68	Stormwater	Stormwater drain, concrete material disposal in area	YELLOW
70	Stormwater	Pipe outlet	GREEN
71	Industrial	Concrete plant illicit wastewater discharge	YELLOW
73	Industrial	White film on water (wastewater)	RED

ID	Type	Note	Priority
74	OSDTS, Trash	Lift station, needs emergency call number. Photo 2 possible overflow from lift remnants. Wes confirmed bleached algae. Station is private, but pumps to county	GREEN
75	Stormwater	Open water irrigation system, 4 broken heads just flooding out water.	GREEN
76	Animals	Animal noted	GREEN
77	Homeless Activity	Homeless population noted in area. already on the radar of Matt Wallace	YELLOW
78	Trash	Trash noted near Seaboard	YELLOW
79	Stormwater	Pipes leading into local canal	GREEN
80	Homeless Activity	Odor near bridge noted, debris and trash underneath	YELLOW
81	Stormwater	Old clay pipe leading to storm water canal	GREEN
82	Animals	Coyote scat and boar activity noted in the area	GREEN
83	Trash	Trash noted along canal	YELLOW
84	Animals	Birds seen along canal	GREEN
85	Stormwater	Car wash seen in mobile home park. most likely dumping wash water on ground	RED
86	Stormwater	Wet ditch seen	RED
87	Stormwater	Wet spot seen	RED
88	Stormwater	Swimming pool discharge	GREEN
89	OSTDS, Animals	Plant nursery	YELLOW
90	Stormwater	Habitat project, seeps into stormwater	GREEN
91	Stormwater	Drainage pipes into creek	GREEN
92	OSTDS, Animals	LAZY Js TRAILER PARK, known or being rowdy, sewage on ground, cats, duck poop complaints at clubhouse, horse in pasture. find out where storage goes?	RED
93	Trash	Vegetation growing in canal, trash noted in area	YELLOW
94	Trash	Large trash pile on pavement, trash in ditch next to road too call DBPR	RED
95	Trash	Debris and algae in canal	YELLOW
96	Animals	Coyote waste next to canal 4x piles on same block	GREEN
97	Animals	Duck seen in canal	GREEN
98	Commercial	Odorous dumpster. Ice with fish waste seen with flies around. fish scales and bones on ground. Boxes need to be in dumpster, close dumpster lid. Call sanitation and code enforcer	RED
99	Commercial	White/gray water pool outside business	YELLOW
100	Sewer	Redoing laterals and sewer lines for this business	GREEN
101	OSTDS	This neighborhood not on water or sewer	YELLOW
102	Animals	Notable piles of dog scat on road/along shoulder	YELLOW
103	Sewer	Manhole	GREEN
104	Animals	Dog scat and debris along bank	YELLOW
105	Trash	Debris in alley behind business on the same road as the canal	YELLOW

ID	Type	Note	Priority
106	Trash	Trash collection swale	YELLOW
107	Sewer	Pipe crossing canal	RED
108	Stormwater	Vegetation washing into canal. City has talked to hospital about their irrigation line	GREEN
109	Sewer	Lift station requires an emergency number	YELLOW
110	Stormwater	Discolored (white) material being dumped from opposite bank of canal into water	RED
111	Sewer	Lift station in mobile homes next to hospital	GREEN
112	Animals	Scat (dog? duck?) seen	GREEN
113	Trash	Trash and dumpster overflow	RED
114	Animals	Coyote feces	RED
115	Stormwater	How often does the City dredge and maintain vegetation, may need to increase frequency.	YELLOW
116	Commercial	Grease trap/ spills around container	YELLOW
117	Commercial	Food violations/ sanitation	YELLOW
118	Sewer	Poop smell from previous cleaning	GREEN
119	Public	Stained soil, possible dumping	YELLOW
120	Sewer	Signs of previous leaks from a private sewage line that connects to CFM across the canal.	RED
121	Sewer	Smell from canal	RED
122	Animals	Excessive dog poop	YELLOW
123	Sewer	Potholes from previous line leak	GREEN
124	Stormwater	Unknown drain pipe	YELLOW
125	Trash	Pipe crossing and trash build up	YELLOW
126	Public	Paint dumping Code enforcement call	YELLOW
127	Public	Oil dumping code enforcement call required	YELLOW
128	Animals	Ducks and cats	GREEN
129	Trash	Employee parking trash	YELLOW
130	Sewer	Lift station remediated	GREEN
131	Animals	Dog poop	YELLOW
132	Trash	Debris swale in canal	YELLOW
133	Stormwater	Blue/gray coloring on water	YELLOW
134	Stormwater	Excessive vegetation impeding branch flow	YELLOW
135	Stormwater	Consistent bubbles in the bottom (downstream) of the photo. suggestive of material in water	RED
136	Animals	Cat urine smell	YELLOW
137	Stormwater	Structure defines tidal area (marine to freshwater). Strong vegetation	GREEN
138	Sewer	Manhole	GREEN
139	Sewer	Divets seen along road. No obvious indicator of settling associated with underground pipe however	GREEN
140	Animals	Bird corpse seen along opposite shoulder	GREEN

Priority Rankings:

RED – Immediate follow-up or sampling required

YELLOW – Future follow-up utilizing management measures or monitoring of conditions through reconnaissance

GREEN – No additional action needed at this time

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→ The Power of Commitment