Utility Committee Meeting

AGENDA

May 1, 2018
City Hall

I **CALL TO ORDER**

II. **MATTERS BEFORE COMMITTEE**

1. Approval - Water Treatment Plant Gutter Repair
2. Approval - Sewer Service Policy Amendment - Gerald Atha
3. Approval - Sewer Service Policy Amendment - Mazzawi Trust
4. Approval - Watershed Protection Plan

III. **ADJOURN**

Utility Committee Meeting

AGENDA

May 1, 2018

Item:

Approval - Water Treatment Plant Gutter Repair

Department:

Additional Information:

Financial Impact:

Budgeted Item:

Recommendation / Request:

Viewing Attachments Requires Adobe Acrobat. Click here to download.

Attachments / click to download

Gutter Repair Info

To: Utility Committee, City Council

From: Chris Bailey, Central Services Manager

Department: Water Treatment Plant

Date: 04/23/18

Description: A request is being made to contract the Garland Company to make repairs to both external and internal gutter systems, and soffit panels at the Water Treatment Plant. This repair estimate is for $15,986.00.

Budget Account/Project Name: Capital Improvement Program (CIP)

Funding Source: Capital Improvement Program (CIP)

Budget Allocation: $150,000.00

Budget Available: $150,000.00

Requested Expense: $15,986.00 **Company of Purchase:** Garland Company

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Recommendation:

Staff recommends the approval of the request to contract the Garland Company to make repairs to both external and internal gutter systems, and soffit panels at the Water Treatment Plant. This repair estimate is for $15,986.00. This process follows Procurement Policy by using state/national contract guidelines.

Background:

It is the practice of the City of Monroe to continually repair and maintain existing buildings and facilities.

Attachment(s):

Quote & Specifications – 3 pages

Garland/DBS, Inc.
3800 East 91st Street
Cleveland, OH 44105
Phone: (800) 762-8225
Fax: (216) 883-2055

ROOFING MATERIAL AND SERVICES PROPOSAL

Water Treatment Facility Bldg. C Repairs
City of Monroe
25 E. Marble St.
Monroe, GA 30655

Date Submitted: 03/26/2018
Proposal #: 25-GA-180306
MICPA # 14-5903
Georgia General Contractor License #: GCCO003281

Purchase orders to be made out to: Garland/DBS, Inc.

Please Note: The following budget/estimate is being provided according to the pricing established under the Master Intergovernmental Cooperative Purchasing Agreement (MICPA) with Cobb County, GA and U.S. Communities. This budget/estimate should be viewed as the maximum price an agency will be charged under the agreement. Garland/DBS, Inc. administered a competitive bid process for the project with the hopes of providing a lower market adjusted price whenever possible.

Scope of Work: Base Bid
Gutter Repair

1. Pressure wash the internal gutters to remove all dirt and debris from the gutter areas.
2. Prime the internal gutter using Rust Go VOC Primer in one coat at a rate of ¼ gal per square.
3. Seal all internal gutter joints including the joints upslope from the gutter using Uni-Bond Tape.
4. Coat the joint tape using White Knight Plus Base Coat Gray at a rate of 2 gal per square and to extend 2” over the 4” tape on each side.
5. Coat the internal gutter using White Knight Plus Top Coat Gray in one coat at a rate of 2 gal per square.
6. Clean all coping joints over the internal gutter to remove dirt and old materials.
7. Seal all coping joints over the gutter using Uni-Bond Tape and coat it with White Knight Plus Top Coat Gray at 2 gal per square. (This is only applied to the top and rear of coping, not the face).

Coping Install

8. Install new metal coping on top of the block walls located on each side of the entrance. To be formed using 24 gauge RMER SS Flat Stock.

Exterior Wall

9. Pressure wash the front wall exterior only, to remove dirt and any staining.
10. Replace the failed sealants with new Greenlock XL sealants.
11. Apply one coat of Seal-A-Pore over the exterior of the wall at 1 gal per sq.
12. Remove any debris from all conductor heads on the exterior front of the building.

Proposal Price Based Upon Market Experience:	**$**	**9,860**

Garland/DBS Price Based Upon Local Market Competition:

1	**Veteran Builders**	**$**	**9,860**
2	Eskola LLC	$	13,149
3	Pride Roofing Inc.	$	16,856

Scope of Work: Alternate Bid #1

Metal Roof Gutters

1. Clean all joints in the exterior front and rear gutter joints using a wire brush to remove the dirt and debris.
2. Seal all joints in the exterior gutter joints with a 3 course repair using Tuff Stuff Aluminum Stone urethane sealant reinforced with Gar-Mesh.
3. Reattach all loose gutter hangers on the exterior gutter.

Proposal Price Based Upon Market Experience:	**$**	**2,691**

Garland/DBS Price Based Upon Local Market Competition:

1	**Eskola LLC**	**$**	**2,691**
2	Veteran Builders	$	3,909
3	Pride Roofing Inc.	$	2,691

Scope of Work: Alternate Bid #2

1. Reattach the existing soffit panels that have begun to fall.

Proposal Price Based Upon Market Experience:	**$**	**902**

Garland/DBS Price Based Upon Local Market Competition:

1	**Pride Roofing**	**$**	**902**
2	Veteran Builders	$	2,217
3	Eskola LLC	$	3,272

Total Price All Sections:

1	**Veteran Builders**	**$**	**15,986**
2	Eskola LLC	$	19,112
3	Pride Roofing	$	20,449

Potential issues that could arise during the construction phase of the project will be addressed via unit pricing for additional work beyond the scope of the specifications. This could range anywhere from wet insulation, to the replacement of deteriorated wood nailers. Proposal pricing valid through 12/31/2018.

Clarifications/Exclusions:

1. Sales and use taxes are excluded. Please issue a Tax Exempt Certificate.
2. Plumbing, Mechanical, Electrical work is excluded.
3. Masonry work is excluded.
4. Temporary protection is excluded.
5. Any work not exclusively described in the above proposal scope of work is excluded.

If you have any questions regarding this proposal, please do not hesitate to call me at my number listed below.

Respectfully Submitted,

Joe Slovasky

Joe Slovasky
Garland/DBS, Inc.
(216) 430-3523

Utility Committee Meeting

AGENDA

May 1, 2018

Item:

Approval - Sewer Service Policy Amendment - Gerald Atha

Department:

Additional Information:

Financial Impact:

Budgeted Item:

Recommendation / Request:

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Attachments / click to download

Sewer Service Policy Amendment - Atha

From: Rodney Middlebrooks, Water, Sewer, Gas, Stormwater Director

Department: Sewer

Date: May 1, 2018

Description: Amendment to Sewer Service policy – Hwy 83

Budget Account/Project Name: n/a

Funding Source: 2018 operating budgets: n/a

Budget Allocation:	n/a	Allocated in each dept.	n/a
Budget Available:	n/a	Allocated in each dept.	n/a
Requested Expense:	n/a	Company of Purchase:	n/a

Recommendation:

Staff recommends that the Utility Committee approve the variance to the policy, allowing the identified property along Hwy 83 to connect to the City of Monroe Sewer system with a gravity line, pending approvals by Walton County for the development.

Background:

The City has been approached by a development group and current landowner about the possibility of allowing the development located at Hwy 83, County Parcel Number C1650056. The 38.30-acre parcel is owned by Gerald Atha and is zoned County R1 single family. The parcel adjoins the existing Winfield Place subdivision and was originally planned as a later phase of the development, which is also served by City sewer but is also outside of the City limits and electric service territory. The City sewer main runs directly through this parcel.

In 2005 the Monroe Utilities Network approved policy changes to end the practice of MUN (now City) to provide new sewer services outside the city limits unless within the city's electric service territory. If within these boundaries a new sewer service may be tapped onto the existing sewer main/line adjacent to their property but the City will not allow any additional extension of sewer lines to any subdivisions or properties. One of the ideas behind the policy is to prevent additional sewer pump stations to be utilized for out-of-city developments as they are costly to maintain and operate.

Attachment(s): General overview of proposed development

Baldpates General Contracting
310 N. Broad Street
Monroe, GA 30655
Brent Youngblood
770-856-9388
Brent@baldpates.com

Dear Council Members,

Hwy 83 Development Plan Parcel # C1650056

BGC has contracted for the purchase of the above parcel of land off Hwy 83 to the east of the city of Monroe. This parcel is located outside of the city limits of Monroe. The city's sewer main runs directly through this parcel of land entering approximately 400 lf off the front left side of the property and running diagonally to the front of the property and exiting the property at the front right corner. In order to get the density of lots needed to make this a viable project we will have to have Monroe's permission to utilize the sewer on the property. All sewer on the property will be gravity fed to the sewer main.

Upon initial inspection of the parcel on Hwy 83 it appears that 20-25 acres will be usable for lot development. Due to the slope of the land the rear portion of the property may require some raising to provide the slope necessary to reach the sewer line at the front of the property.

We will pursue a Residential Neighborhood Development Overlay District (RND) with Walton County. We will contribute 10-18 acres of community greenspace in return for a lot layout of 1/3-1/4 acre lot size with 70-85 foot of road frontage. Upon discussing the property with our buyers 1 will not purchase property with road frontage of more than 70 feet and the other no more than 85 feet due to the cost of pad prep and landscaping that is needed to keep the homes in the price range of 225-300k.

If Monroe city council approves our sewer tie in we should be able to have our plan for submittal to Walton County within 3 weeks. Our preliminary plat will include a community area at the front of the property that can be used for a pavilion or clubhouse and the rear of the property will have a large greenspace that can be used as a walking trail. If approved our lot density will put our lot count at 50-90 lots.

BGC is moving our headquarters to Monroe May or June of this year to 310 N. Broad Street, Monroe, GA from our current location in Jersey, GA. We hope to be allowed to complete this project on Hwy 83 this year. We currently have about 40-50 people in our staff and look forward to calling Monroe our home. The city council's help in this matter is appreciated.

Sincerely,

Brent Youngblood

Co-owner

Utility Committee Meeting

AGENDA

May 1, 2018

Item:

Approval - Sewer Service Policy Amendment - Mazzawi Trust

Department:

Additional Information:

Financial Impact:

Budgeted Item:

Recommendation / Request:

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Attachments / click to download

Sewer Service Policy Amendment - Mazzawi

From: Rodney Middlebrooks, Water, Sewer, Gas, Stormwater Director

Department: Sewer

Date: May 1, 2018

Description: Amendment to Sewer Service policy – Hwy 83 - Mazzawi Tract

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Budget Account/Project Name: n/a

Funding Source: 2018 operating budgets: n/a

Budget Allocation:	n/a	Allocated in each dept.	n/a
Budget Available:	n/a	Allocated in each dept.	n/a
Requested Expense:	n/a	Company of Purchase:	n/a

Recommendation:

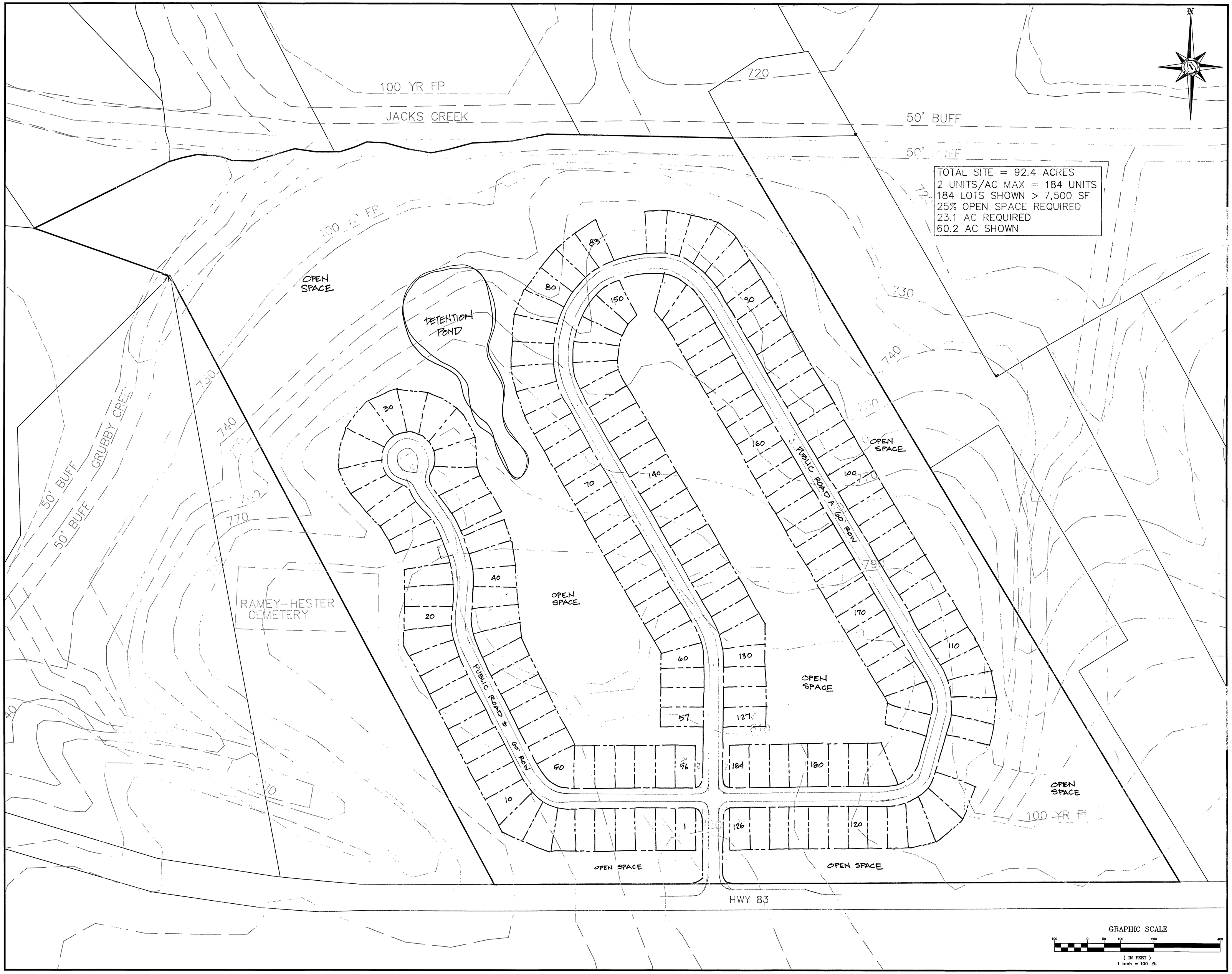
Staff recommends that the Utility Committee approve the variance to the policy, allowing the identified property along Hwy 83 to connect to the City of Monroe Sewer system with a gravity line, pending approvals by Walton County for development.

Background:

The City has been approached by a development group and current landowner about the possibility of allowing the development located at Hwy 83, County Parcel Number C1650058. The 92.40-acre parcel is owned by the Mazzawi Trust and is zoned County A1 agriculture. The parcel is outside of the City limits and electric service territory. The City sewer main runs directly through this parcel. There are 184 lots proposed in the concept plan, however the approvals and rezoning must occur at the County level.

In 2005 the Monroe Utilities Network approved policy changes to end the practice of MUN (now City) to provide new sewer services outside the city limits unless within the city's electric service territory. If within these boundaries a new sewer service may be tapped onto the existing sewer main/line adjacent to their property but the City will not allow any additional extension of sewer lines to any subdivisions or properties. One of the ideas behind the policy is to prevent additional sewer pump stations to be utilized for out-of-city developments as they are costly to maintain and operate.

Attachment(s): General overview of proposed development – Concept Plan



Hayes | James
ENGINEERS, PLANNERS & SURVEYORS
4145 SHACKLEFORD ROAD
SUITE 300
NORCROSS, GEORGIA 30093
TEL: (770) 923-1600
FAX: (770) 923-4202

GDP HOLDINGS, INC.
6300 POWERS FERRY RD.,
SUITE 600-221
ATLANTA, GA 30339
Phone: (404) 228-6949

Contact: SCOTT APPLING
(770) 380-1283

No.	Description	By	App.	Date
	ISSUE			

Project Title

STARLIGHT

Project Location

Address	GEORGIA HIGHWAY 83
City, State Zip	MONROE, GA 30655
Land Lot	136
District-Section	3
County	WALTON

Project No.	18-021-SFD
Drawn By:	CS
Checked By:	####
Initial Issue Date:	04-18-2018

Sheet Title

CONCEPTUAL PLAN

Sheet Number

1 of 1

Utility Committee Meeting

AGENDA

May 1, 2018

Item:

Approval - Watershed Protection Plan

Department:

Additional Information:

Financial Impact:

Budgeted Item:

Recommendation / Request:

Viewing Attachments Requires Adobe Acrobat. Click here to download.

Attachments / click to download

Watershed Protection Plan

To: City Council, Committee, City Administrator

From: Rodney Middlebrooks, Director of Water & Gas

Department: Stormwater

Date: 4/24/2018

Description: Approval of the Watershed Protection Plan

Budget Account/Project Name: n/a

Funding Source: n/a

Budget Allocation: n/a

Budget Available: n/a

Requested Expense: n/a **Company of Purchase:** n/a

Recommendation:
Staff recommends the APPROVAL to adopt and enact the recommendations set forth in the Watershed Protection Plan.

Background: The purpose of this document is to present a comprehensive Watershed Protection Plan that will ensure future health and monitoring of streams and creeks in the City of Monroe. The overall goal of the WPP is to provide guidance for the City to move towards meeting and maintaining water quality standards and the designated uses of these resources. The tools and strategies set forth in this WPP can be used by local government as a framework for adopting and enforcing policy, regulations, ordinances, Best Management Practices (BMPs), and public outreach programs. The data collected during the Watershed Assessment phase of the study is to provide recommendations to the City that will assist them in making environmentally responsible decisions during future growth and expansion of the City.

Attachment(s):
Documents(s) - Watershed Protection Plan

215 North Broad Street ♦ Monroe, GA 30656 ♦ 770.267.7536

WATERSHED PROTECTION PLAN FOR MONROE, GEORGIA

Prepared for

City of Monroe
215 North Broad Street
Monroe, Georgia 30655

Prepared by

Professional Service Industries, Inc.
95 Chastain Road, Suite 301
Kennesaw, GA 30144
Telephone (770) 424-6200

PSI PROJECT NO. 0517107-1

February 9, 2018

Andrew Peiken, C.E.
Principal Consultant

Elizabeth Noakes
Department Manager |
Principal Consultant

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1.0 Watershed Protection Plan

1.1 Introduction

1.1.1 Purpose of the Watershed Protection Plan

The main purpose of this document is to present a comprehensive Watershed Protection Plan (WPP) that will ensure future health and monitoring of streams and creeks in Monroe, Georgia (the City). The overall goal of the WPP is to provide guidance for the City to move towards meeting and maintaining water quality standards and the designated uses of these resources. The tools and strategies set forth in this WPP can be used by local government as a framework for adopting and enforcing policy, regulations, ordinances, Best Management Practices (BMPs), and public outreach programs. Protection of Monroe's valuable water resources will aid in increasing the quality of life of the City's residences, as well as ensure that the City is an attractive area for future economic growth.

1.1.2 Background

The City currently operates the 3.4 million gallon per day (MGD) Jacks Creek wastewater treatment plant (WWTP) that discharges into Jacks Creek and ultimately the Apalachee River under requirements set forth by a National Pollution Discharge Elimination System (NPDES) permit. No. GA0047171. The GAEPD has reissued the City's NPDES permit in December 2012, which included a requirement to conduct a Watershed Assessment and adopt a GAEPD approved watershed protection plan for the WWTP service area.

The City of Monroe contracted with Professional Service Industries, Inc. (PSI), Kennesaw, Georgia (see PSI Proposal No. 513-82990 dated November 16, 2012), to assist in the creation of a WPP.

1.1.3 Objectives

The objective of this WPP is to utilize data collected as outlined in the Watershed Monitoring Plan (WMP) and the Watershed Assessment (WA) phase of the study to provide recommendations to the City that will assist them in making environmentally responsible decisions during future growth and expansion of the City. Recommended tools will include stormwater management ordinances, riparian buffer ordinances, watershed ordinances, residential BMPs, erosion/sediment control ordinances, and community education and outreach. The success of the WPP is based on the commitment and involvement of the community members. These stakeholders include landowners, local government officials, business and industry representatives, developers, religious organizations, schools, and environmental groups. Regional stakeholders include county/state/federal government agencies and soil/water conservation districts. It is the objective of this WPP to present these tools to the City and to provide an implementation plan to involve the relevant stakeholders in a beneficial partnership. This WPP focuses only on the service area directly affected by the City's WWTP.

1.1.4 Data Sources

Various sources of information have been utilized in the identification of environmental stressors, watershed characterization, sampling methodologies, and data interpretation. Internet sources include the websites of the Georgia Environmental Protection Division (GAEPD), United States Environmental Protection Agency (USEPA, Envirofacts.com), US Fish and Wildlife

Service (USFWS), and the United States Geological Survey (USGS). Reference material was obtained from USGS maps and gauging stations, GAEPD water quality monitoring reports, GAEPD permit databases, Monroe water treatment plant discharge monitoring reports, GEAPD river basin studies, National Wetland Inventory (NWI) maps, and United States Department of Agriculture (USDA) County Soil Surveys. Sources of information also included personal communication with GAEPD, USEPA, Monroe government, Georgia Department of Health, and the Georgia Forestry Commission personnel.

Data collected during the monitoring and assessment phase of the study was presented and interpreted in the Monroe Watershed Assessment report dated September 21, 2016. These documents were developed following GADNR guidelines (GADNR 2004 and 2005) and were "concurred" with by the GADNR Watershed Monitoring Program prior to proceeding with this WPP. Data from the Watershed Assessment report are summarized in this WPP and can be found in its entirety in the 2016 document.

This WPP was developed following strategies and methodologies per the following resources: Georgia Department of Natural Resources "Watershed Assessment and Protection Plan Guidance: Phase III. Watershed Protection Plans" (GADNR, 2015).

2.0 Watershed Characterization

2.1 Current and Future Service Area

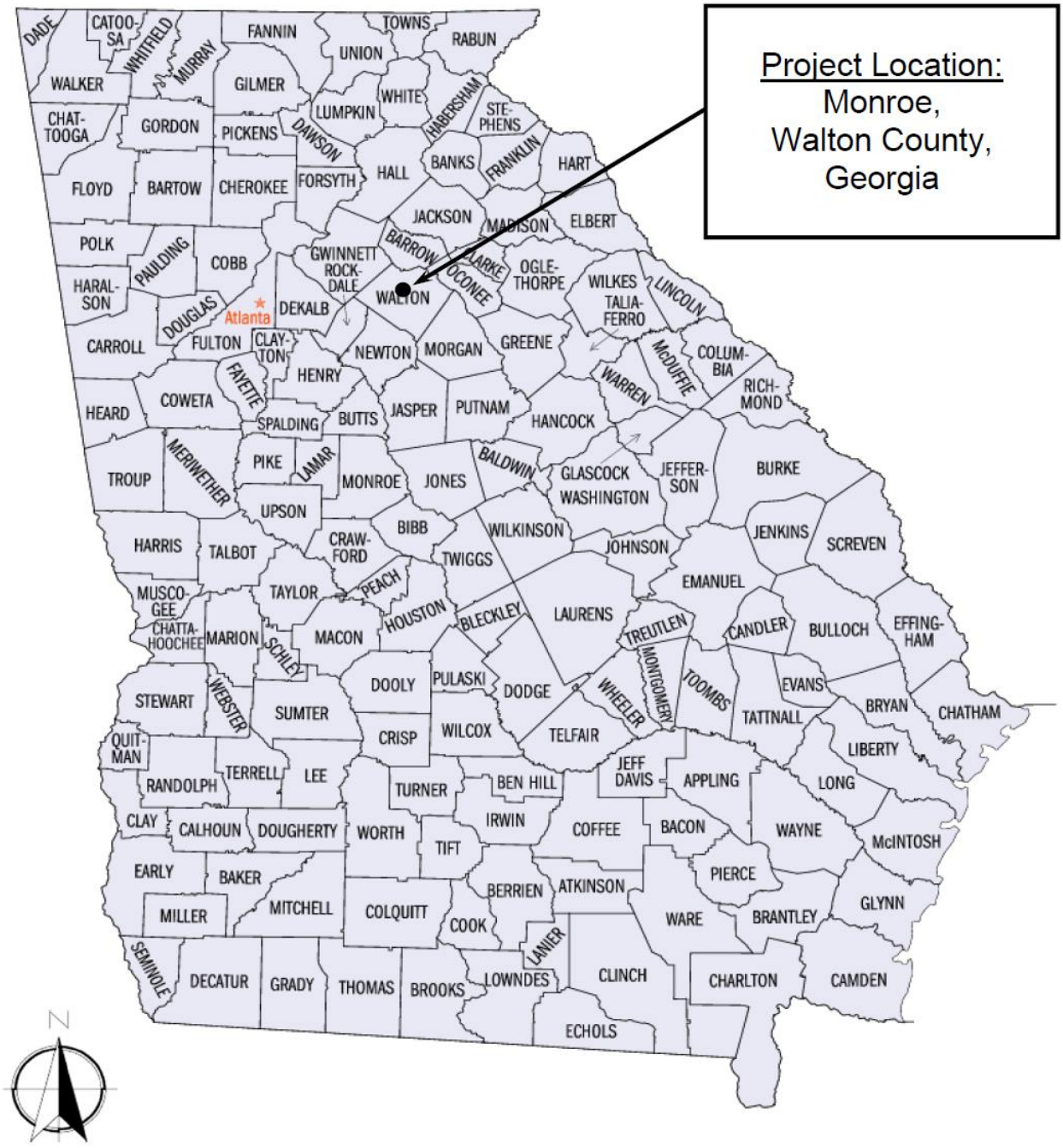
Monroe is located in the central region of Walton County, Georgia (33.7934 N, -83.7124 W) (see **Figure 1**). Its city limits are bordered (approximately) by John Deere Road to the north; Jim Daws Road to the northeast; the Monroe Walton County Airport to the southeast; Vine Street to the south; Monroe Jersey Road to the southwest; and West Spring Street to the west. The current City limits include a total area of 10.5 mi^2. The population includes 13,234 permanent residents (per the 2010 U.S. Census). Growth in the next 25 years is predicted to increase the population to 16,098 (per the 2005 Comprehensive Plan for Walton County). There are approximately 5,742 households, which are estimated to increase to 7,195 in the next 25 years.

The City's existing area serviced by its current WWTP comprises approximately 10.5 mi^2 of land. There is no future expansion of the City's service area predicted at this time. **Figure 2** indicates the current city limits and sewer service area.

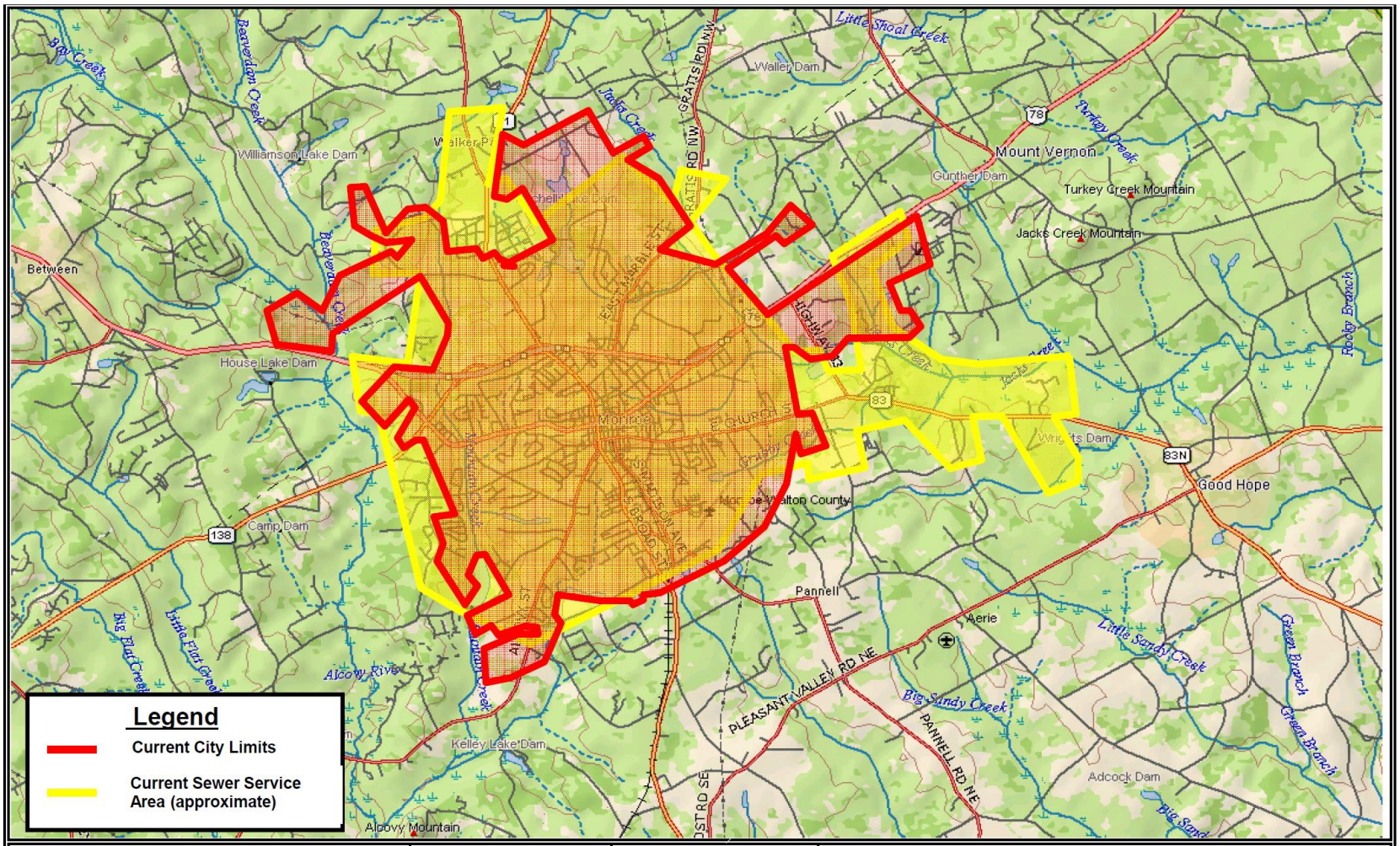
According to the Comprehensive Plan, current land use within the Monroe city limits include (approximately): 34% agriculture/forestry, 28% residential, 12% undeveloped, 6% industrial, 5% transportation/utility, 5% commercial, 4% public/institutional, 4% park/recreational, 2% multi-family residence, and <1% government. One of the biggest contributors to water quality degradation within a watershed is conversion of land use from undeveloped use (including agriculture/forestry/park) to developed use. Future development in the northeastern quadrant (along Highway 78 East) is predicted to change land use from agriculture/transportation/utility to industrial. Within the northwest corridor (Highway 78 West/North Broad Street/West Spring Street), land use is predicted to change from agriculture/residential to commercial. **Figure 3** indicates changes in future land use.

Future growth and conversion of land use to residential will likely have negative effects on water quality. Increased impervious surfaces will increase storm flows to existing streams and tributaries. Conversion of agriculture to residential may reduce sediment transport to the streams; however, stream bank erosion may increase in severity. Agricultural sources of nutrients and fecal coliform will likely be replaced by urban sources (i.e. fertilizer, herbicides/pesticides, landscape waste, domestic animal waste, etc.). Reduction in DO is likely (from already naturally low levels) and will be dependent on the oxygen demand of constituents flushed to the streams. Watershed management strategies and Best Management Practices (BMPs) will have to be adopted and enforced by the City to mitigate these changes in land use. These strategies will be discussed in full in the WPP under separate cover.

Monroe is bisected by two of Georgia's major river basins. The city is located at the northeast boundary of the Ocmulgee River basin and the northwest boundary of the Oconee River basin (see **Figure 4**). Tributaries in its western portion flow west toward the Alcovy River while the easterly tributaries flow east toward the Apalachee River.



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Phone: (770) 424-6200 Kennesaw, GA 30144 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 1/23/13	**FIGURE 1. PROJECT LOCATION MAP**
	APPROVED: PW	PROJECT NO.: 5131056	MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA



Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 1/23/2013	**FIGURE 2. CITY LIMITS AND SEWER SERVICE AREA** *Map Source: DeLorme Topo USA 7.0*
	APPROVED: PW	PROJECT NO.: 5131056	MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA

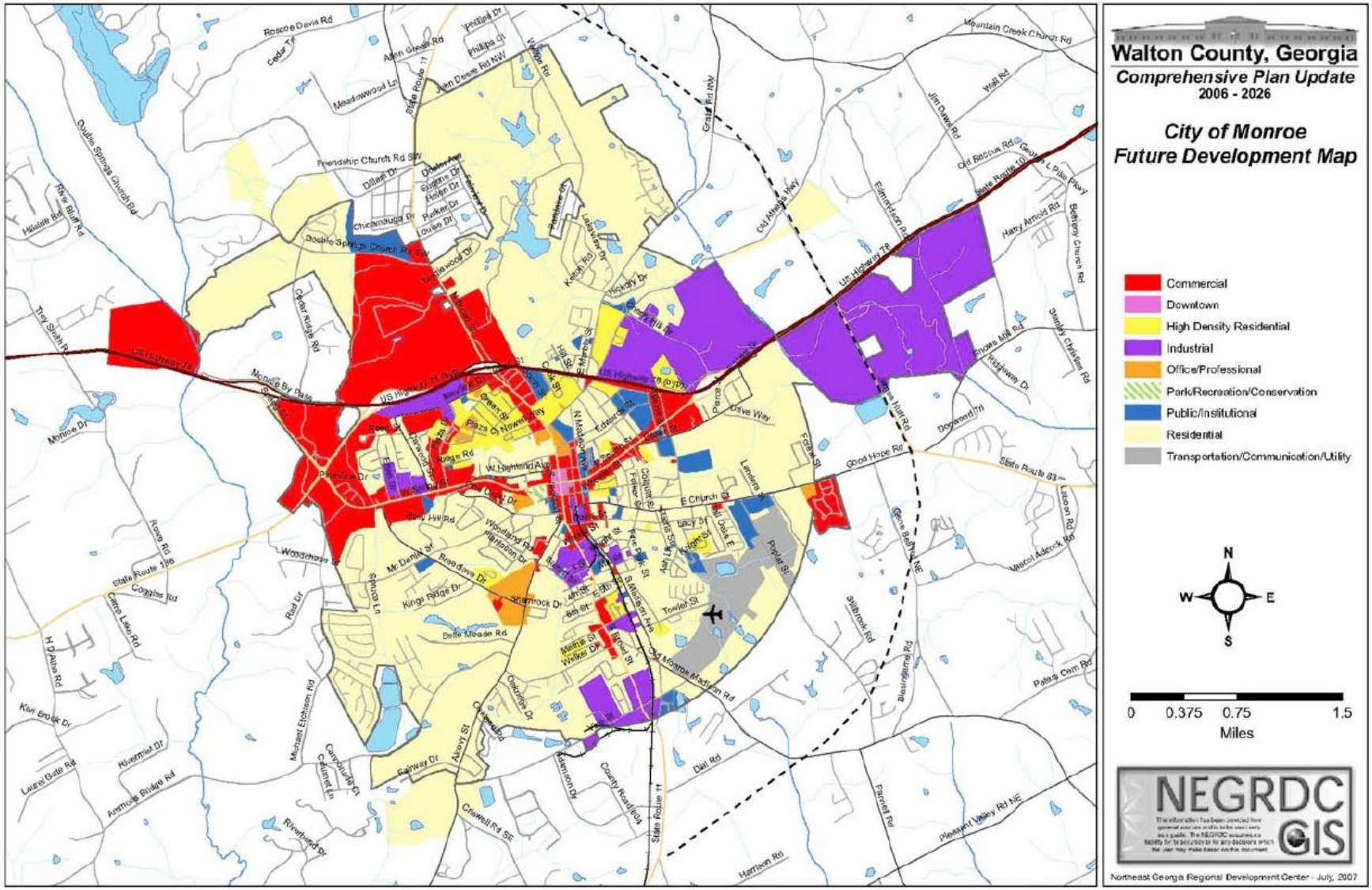
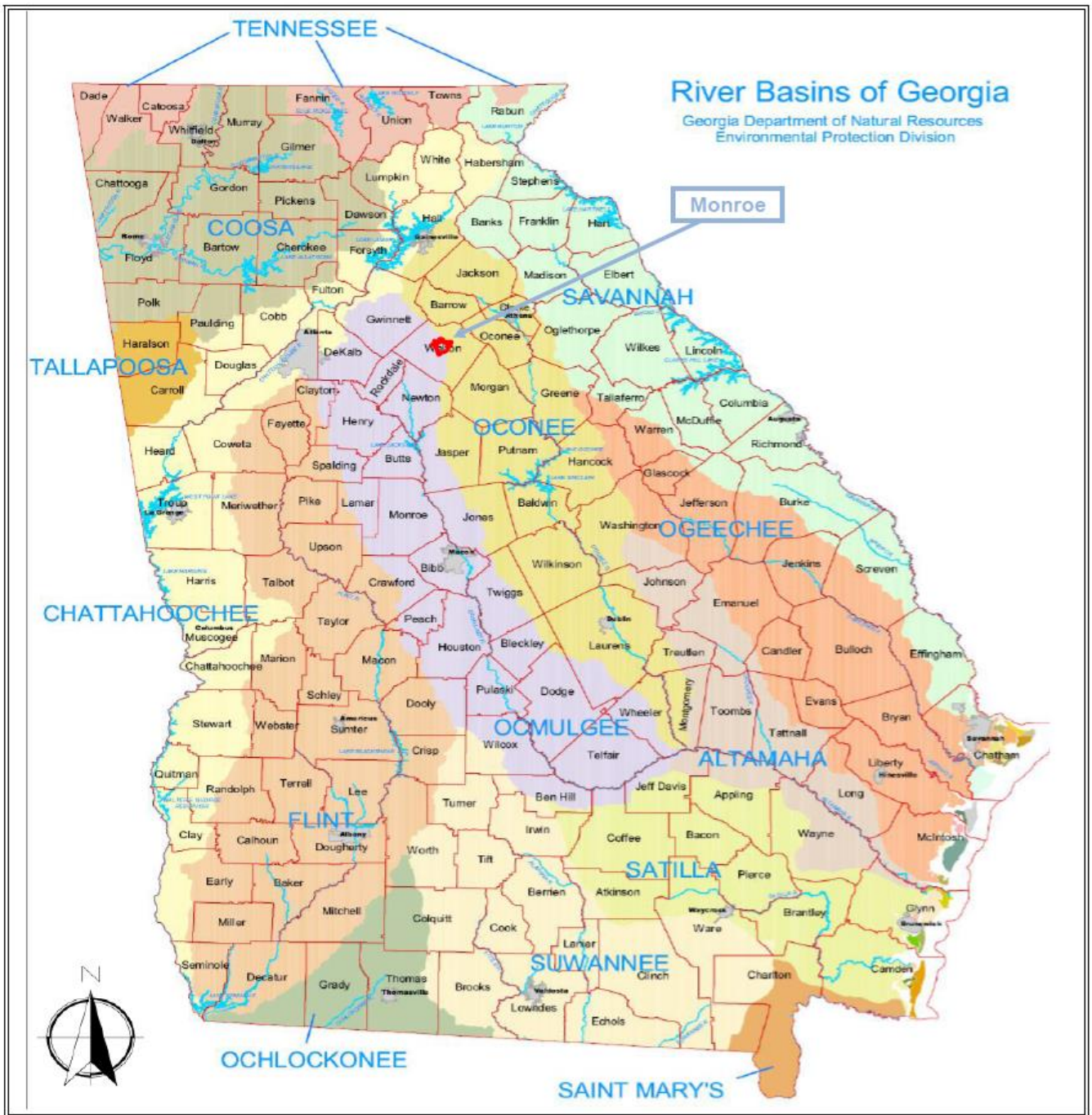


Figure 3. Future Land Use Map



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Phone: (770) 424-6200 Kennesaw, GA 30144 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 1/23/13	**FIG 4. OCMULGEE & OCONEE RIVER BASINS** *SOURCE: GADNR/EPD*
	APPROVED: PW	PROJECT NO. 5131056	MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA

The Ocmulgee River basin is located in the Piedmont and Coastal Plain physiographic provinces of Georgia and drains approximately 6,085 square miles. The Ocmulgee River basin originates in DeKalb and Gwinnett Counties as the Alcovy, Yellow, and South Rivers, which join at Jackson Lake and form the present day Ocmulgee River. The Ocmulgee River meanders south and east where it joins the Little Ocmulgee River and Oconee River to form the Altamaha River. It ultimately discharges to the Atlantic Ocean.

The Oconee River basin is located in the Piedmont and Coastal Plain physiographic provinces of Georgia and drains approximately 5,330 square miles. The headwaters of the basin include the confluence of the North and Middle Oconee Rivers (at the Clarke/Oconee County lines) which join to form the Oconee River. The Oconee River is joined by the Apalachee River at the Morgan/Greene County line and the Little River at Lake Sinclair. The Oconee River then travels in a southern direction where it joins the Ocmulgee River to become the Altamaha River which eventually drains into the Atlantic Ocean near Brunswick, Georgia. The total length of the Oconee River (from the headwaters to the confluence with the Ocmulgee) is 285 miles.

The United States Geological Survey (USGS) has divided the Ocmulgee River basin into three sub basins and the Oconee River Basin into two. The sub basins are identified by a unique hydrologic unit code (HUC). The sub basins are identified as:

<u>Ocmulgee River Basin</u>

- Upper Ocmulgee River (HUC 03070103)
- Lower Ocmulgee River (HUC03070104)
- Little Ocmulgee River (HUC 03070105)

<u>Oconee River Basin</u>

- Upper Oconee River (HUC 03070101)
- Lower Oconee River (HUC 03070102)

Monroe is located between the Upper Ocmulgee River sub basin (HUC 03070103) and the Upper Oconee River sub basin (HUC 03070101). The entire city service area is located in the Southern Outer Piedmont (45b) sub-ecoregion of Georgia.

2.2 Watershed Assessment Summary

The WA indicated that portions of the Monroe watershed were experiencing reductions in in-situ water quality and biological stream health. As a result, fish and benthic macroinvertebrate populations and their associated habitat were at a level that were described as “unhealthy” and in need of improvement. There was a direct correlation between degraded water quality, low habitat assessment scores, and low biological scores.

It was recommended that riparian zone destruction continue to be avoided and improved upon by re-vegetating those impacted areas and enforcing the State’s erosion and sediment control laws. PSI observed incidents of riparian zone impacts.

Samples collected during rain events exhibited increases in metals, turbidity, TSS, phosphorous, nitrates, and fecal coliform/*E. coli.* There were obvious indications of stormwater damage at most streams including silty/sandy bottoms, mid-stream sand deposits, infrequency

of pools, and stream bank erosion. Therefore, it was recommended that stormwater BMPs and MS4 maintenance continue to be enforced or improved.

Although fecal coliform/*E. coli* increase significantly during rain events, it was also present in elevated levels during dry-weather periods. Many of the streams flow through agricultural land, a potential contributor to fecal coliform/*E. coli.* Additionally, PSI observed multiple sanitary sewer lines crossing streams and a dry weather discharge from an unidentified pipe at JC-1. Dry-weather stream walks (part of an Illicit Discharge Detection and Elimination Program) were recommended.

3.0 Legal Authority

3.1 Political Jurisdiction

Monroe political jurisdiction is limited to within the current City limits. The Monroe government is comprised of the Mayor, City Administrator, and eight councilmen. The City Council is responsible for appointing boards and commissions including: Historic Preservation, Housing Authority, Planning, Downtown Development, Library Board, and Board of Health. The Mayor and City Council are responsible for adopting ordinances, policy, zonings, and bylaws while the City Administrator and the individual department heads are responsible for their enforcement.

The Code Department is responsible for enforcing city ordinances and zoning. Solid Waste is responsible for curbside waste and recycling. Streets & Transportation is responsible for maintenance as well as street sweeping. Utilities is responsible for all utilities including stormwater (detention pond inspections, community education, permitting), wastewater collection and treatment (WWTP, industrial pretreatment, permitting, watershed assessment), drinking water, and other utilities.

Outside the City's jurisdiction (therefore outside the City limits), Walton County has political jurisdiction. The business of Walton County is directed by the Board of Commissioners. This Board has legislative authority (e.g., to enact ordinances and adopt budgets) and executive powers (e.g., to administer policies and appoint county employees). The Board consists of seven commissioners, one elected from each of the six voting wards and the chairman. The chairman is selected by the majority vote of all the commissioners.

3.1.1 Relevant Stakeholders

The city is strongly urged to engage the stakeholders and resources identified below. Working with these stakeholders and agencies will maximize the effectiveness and efficiency of the City's WPP.

Responsible Parties:

Monroe Government:
John Howard, Mayor (jhoward@monroega.gov)
Logan Propes, City Administrator (lpropes@monroega.gov
Rodney Middlebrooks, Director of Water, Sewer, and Gas

City Hall:
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City Council:
Lee Malcom, Commissioner
Ross Bradley, Commissioner
Norman Garrett, Commissioner
Larry Bradley, Commissioner
David Dickerson, Commissioner
Wayne Adcock, Commissioner
Nathan Little, Commissioner
Myosha Crawford, Commissioner

Walton County Development Authority
Morris Jordan, Chairman
132 E Spring St
Monroe, Georgia
Phone (770) 267-6594

Walton County
Leta Talbird (County Clerk)
303 South Hammond Drive, Suite 330
Monroe, GA
Phone: (770) 267-1301

Keck & Wood, Inc. (City Engineer) or current
(678) 417-4006

Northeast Georgia Regional Commission
Jim Dove, Director
305 Research Drive
Athens, GA 30605-2725
Phone: (706) 369-5650

GAEPD Watershed Outreach Programs (Rivers Alive, Adopt-A-Stream, Project WET, River of Words)
http://www.georgiaadoptastream.org/

Metropolitan North Georgia Water Planning District
40 Courtland Street, NE
Atlanta, GA 30303
Phone: (404) 463-3256

Georgia Soil and Water Conservation Commission – Region IV
3014 Heritage Road, Suite 1
Milledgeville, GA 31061
Phone: (478) 445-5766

TMDL Implementation and Watershed Planning and Protection Resources
http://epd.georgia.gov/tools-total-maximum-daily-load-tmdl-implementation-and-watershed-planning

Non-Point Source Pollution Management Grants
http://epd.georgia.gov/section-319h-georgias-nonpoint-source-implementation-grant

3.1.2 Local Zoning Authorities

The Mayor and City Council is responsible for zoning and rezoning, annexation, variances, plan approvals, and zoning certifications.

3.1.3 Local Resources

The City is encouraged to work with Walton County to improve stream health by ensuring that complementary ordinances and development standards are in place that will protect streams, riparian buffers, and wetlands. The City should have an open dialog with Walton County and other interested stakeholders in north central Georgia to make sure that water issues are communicated to all levels of local authority.

The Walton County Chamber of Commerce is charged with working alongside Monroe to develop a diversified industrial base and pro-business environment in Walton County. It attracts investment, forges relationships, and serves as a catalyst for the positive processes that support business visions, relocation and expansion. The Commerce helps businesses with site selection, connecting with existing support businesses, and providing available incentives.

The Northeast Georgia Regional Commission (NEGRC) provides professional advice and assistance to its 12-county member governments including Monroe. NEGRC encourages cooperation in the areas of comprehensive planning (land use, environmental, transportation, and other), community and economic development, historic preservation, local government

administration and management, aging services, geographic information system services, workforce investment, and coordinated transportation.

The Altamaha Riverkeepers are a grassroots organization dedicated to the protection, defense and restoration of the Altamaha River including its tributaries the Ocmulgee, the Oconee and the Ohoopee. They monitor pollution and polluters throughout the watershed through a program of water sampling and analysis. They also monitor land-based activities that impact the health of the river including forestry and agriculture practices, wetlands destruction and development. The Altamaha Riverkeepers respond to citizen complaints about pollution, identify locations where chemical and biological pollutants are discharged into waterways, and determine whether violations have occurred. If violations have occurred, they may alert authorities to the problem and work with them to reduce or eliminate the problem. In cases where the regulatory agencies refuse to act, they may take action to rally public support and if necessary, resort to legal action.

The UGA Cooperative Extension takes research-based agricultural information to the public. County agents and specialists throughout the state share information on issues like water quality, profitability in agribusiness, family wellness and life skills. County agents provide soil and water test kits and instruction, advice on safe pesticide use, provide publications and computer programs and teach consumers skills to improve quality of life.

3.2 Existing Codes and Regulations

3.2.1 Ordinances

The City's Code of Ordinances are managed by the online legal publisher, Municode (https://www.municode.com/library/ga/monroe/codes/code_of_ordinances). The latest list of Codes was reviewed for environmental ordinances currently being enforced. Environmental ordinances relevant to this WPP are listed in **Table 1** below.

3.2.2 Land Use Plans

The "Joint City-County Comprehensive Plan 2006-2026: Walton County, Between, Good Hope, Jersey, Loganville, Monroe, Social Circle and Walnut Grove" dated August 2007 was prepared by the Northeast Georgia Regional Development Center. This Plan uses historical data and projections to analyze factors such as land use, transportation, economic development, population, housing, and natural resources to determine future needs. Current land use can be summarized as 34% agriculture/forestry, 28% residential, 12% undeveloped, 6% industrial, 5% transportation/utility, 5% commercial, 4% public/institutional, 4% park/recreational, 2% multi-family residence, and <1% government. Future development in the northeastern quadrant (along Highway 78 East) is predicted to change land use from agriculture/transportation/utility to industrial. Within the northwest corridor (Highway 78 West/North Broad Street/West Spring Street), land use is predicted to change from agriculture/residential to commercial. See **Appendix A** for Land Use Maps.

Monroe's natural resources provide attractiveness of the area for development. With approximately 34% of the City being agricultural/forested land, there is great potential for changes in land use that will affect local streams' water quality. Many of the streams near Monroe are already on the State's list of impaired waters (see **Section 7.0** below), although only one of these is in Monroe.

Changes in land use from agricultural/forested land to commercial/residential land has had a profound effect in certain areas within the County. Formerly natural land has become increasingly paved with roads, parking areas, and buildings. In the county, most land is well below the 25% impervious surface threshold set by Georgia's Environmental Planning criteria; however, the Monroe/Alcovy River watershed is nearing the 10% point where it will be considered impacted. Further, since several of these watersheds are in rapidly developing parts of the county, the county should monitor impervious surface percentage to insure compliance with the watershed protection ordinances.

The Comprehensive Plan presents the County and city members with goals to establish good planning principles to strive for orderly growth. The core vision is to balance residential and economic growth with the preservation of natural resources and rural land. Land use goals include: maintain small town heritage and community character of the city, develop county-wide land use and development regulations, develop subdivision regulations, discourage development in environmentally sensitive areas (natural and cultural), enforce existing land use ordinances and regulations (i.e. environmental conservation and floodplains), control the use of septic tanks, upgrade the wastewater system, regulate new road development standards, adopt and enforce State erosion and sediment control laws, support beautification efforts, and public education.

The Plan states that only Walton County, Between, and Walnut Grove have adopted a wetlands protection ordinance consistent with the requirements of Georgia's Environmental Planning Criteria. The ordinance ensures proper coordination between each jurisdiction and the Army Corps of Engineers. The remaining jurisdictions, including Monroe, have not adopted wetlands protection despite the presence of wetlands within their jurisdictions. Each was given an indefinite extension to the rules mandating adoption of this ordinance by the Department of Community Affairs on October 10, 2004 due to reevaluation of the rules by the Department of Natural Resources.

Significant groundwater recharge areas are located in unincorporated Walton County, Between, Monroe, and Social Circle. Recharge areas in eastern Walton County are largely unaffected by development. Unfortunately, the groundwater recharge areas in western Walton County are located in developed and developing areas. Only Walton County and Between have adopted a groundwater recharge area protection ordinance consistent with the requirements of Georgia's Environmental Planning Criteria.

The following Quality Community Objectives were specifically identified in the county-wide plan to protect natural resources: Open Space Preservation- New development should be designed to minimize the amount of land consumed, and open space should be set aside from development for use as public parks or as greenbelt/wildlife corridors; Natural and Cultural Resources- Encourage voluntary resource preservation through conservation easements. Protect critical lands by developing conservation subdivisions. Facilitate habitat preservation and active living by greenway and/or trails networks. Protect riparian areas by enforcing buffers. Protect rural and environmentally sensitive areas from the encroachment of incompatible uses by directing all new development to appropriate areas. Protect tree canopy. Require appropriate buffers and landscaping between incompatible uses. Cluster development to encourage land use efficiency, natural resources protection, and transportation choices. Concentrate growth in suitable locations while preserving sensitive or otherwise critical areas through transfer of development rights. Minimize unusable commercial space and impervious surfaces by allowing

flexibility in parking regulations and shared parking where appropriate. Facilitate efficiency of service provision by encouraging infill development.

See **Appendix A** for existing and future land use maps.

Table 1. Environmental Protection Ordinances, Monroe, Georgia			
Environmental Protection Ordinance	**Location of Ordinance**	**Description**	**Comparable EPA/EPD Regulation**
Solid Waste	Monroe Chapter 82, Article I, Sections 82-1 to 82-8	Allows for the proper storage and disposal of commercial and residential waste.	Waste Management
Streets, Sidewalks and Other Public Places	Monroe Chapter 86, Article I, Sections 86-1 to 82-9	Prohibits the destruction or injury of trees and shrubs growing on public property or streets of the city. Regulates soil erosion and sedimentation controls for those construction or land clearing activities that are exempt from City soil erosion and sedimentation requirements. The City code enforcement office must approve BMPs.	Tree Protection; Erosion Control "Georgia Water Quality Control Act",
Utilities	Monroe Chapter 98, Articles IV-V, Sections 98-141 to 98-208	Prohibits the discharge of waste or wastewater to streams or natural outlets within the city. Prohibits the dumping of human waste or objectionable waste onto public or private property. Regulates the public sewerage system and what can be discharged to it. Requires connection to the municipal septic sewerage system if served by a sewer line. Only allows for existing private septic tanks if properly functioning. Provides the Health Officer to regulate septic tanks. Prohibits septic tank discharge into any natural outlet. Prohibits illegal discharge into the municipal sewerage system. Prohibits discharge of wastes into the storm sewer system. Regulates industrial pre-treatment of wastewater discharged to the municipal sewerage system. Regulates fats/oils/grease discharged to the municipal sewerage system.	Sewer Use; Industrial Pre-treatment; Septic Tank
Animal Control	Monroe Chapter 10, Article II, Sections 10-41 to 10-63	Regulates domestic animals (including livestock, horses, and fowl) ownership within city limits. Regulates manure storage and disposal. Requires animal to be removed immediately. Prohibits animal or livestock from running at large.	Livestock, Leash Law, Fowl

Environment: **Soil Erosion and Sedimentation Control** **Stormwater Runoff** **Floodplain Management** **Conservation Subdivision** **Litter Control** **Illicit Discharge/Illegal Connection** **Stream Buffer** **Tree Management**	Monroe Chapter 42, Articles I-VII, Sections 42-1 to 42-327	Establishes a 50-foot stream buffer along state waters for land disturbing activities. An additional 25-foot impervious cover setback is also established. Establishes Best Management Practices to control erosion and sedimentation on land disturbing sites. Requires land-disturbing activities within City limits to have a state issued permit (through the City code enforcement officer). Establishes minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff and nonpoint source pollution associated with new development and redevelopment (enforced by the City code enforcement officer). Development must comply with the Georgia Stormwater Management Manual and a post-development stormwater runoff plan is required. Protects stream channels from bank and bed erosion and degredation. Regulates filling, grading, dredging, and development in sensitive flood zones including wetlands. Promotes Conservation Subdivisions with at least 40% open/greenspace; protects environmentally sensitive areas including floodplains, buffer zones, slopes, wetlands, and habitat of threatened or endangered species. Prohibits littering on public or private property including roads and waterways. Prohibits the discharge of non-stormwater into the city's municipal stormwater sewer system. Prohibits placement of sanitary sewage systems (septic tanks) within flood areas. Recognizes the ecological importance of the City's trees and vegetation. Establishes a Tree Board.	Stream Buffer; Erosion Control "Georgia Water Quality Control Act"; Wetland Protection; Tree Protection; Subdivisions; Floodplains; Water Quality; Litter

3.2.3 New Development Plans

The Joint Comprehensive Plan highlights the importance of protecting Monroe's natural and cultural resources from uncontrolled conversion of land use. Traditional neighborhood development patterns should be encouraged, including use of a more human scale development, compact development, mixing of uses within easy walking distance of one another, and facilitating pedestrian activity. The City should strive to maintain the traditional, small scale development neighborhoods. This may be more achievable in in-town developments, as development in the outer reaches of the city are generally large-lot based and distant from local services. In-town (infill) developments should be encouraged to minimize the conversion of forested land at the city periphery.

The City currently enforces a Conservation Subdivision ordinance.

3.2.4 Storm Water Management Plans

The Federal government requires the operators of small municipal separate storm sewer systems (MS4) participate in the NPDES program. Stormwater requirements are divided into two groups: Phase I (medium-large users, pop. 100,000+) and Phase II (small users in urbanized areas, pop. <100,000). Monroe is not included in the Georgia Phase I or II MS4 list; however, Walton County is included in the Phase II requirement.

It should be noted that Monroe is in the process of applying for membership in the Georgia Department of Community Affairs "WaterFirst Community Program". This program is voluntary in nature and aims to increase the quality of life through protection of it water resources. In order to be designated a WaterFirst Community, the city must have achieved excellence as recommended by the WaterFirst Review Committee, and determined by the Commissioner of the Department of Community Affairs, in seven areas: Watershed Assessment; Stormwater Master Planning; Wastewater Treatment and Management; Water Supply Planning; Water Supply Protection; Water Conservation; and Water Reclamation and Reuse. This Watershed Protection Plan will contribute to the City's goal of being designated a WaterFirst Community in 2017.

The city Environment Ordinance requires developers submit a stormwater management plan in order to receive land disturbing and building permits.

3.2.5 Water and Sewer Upgrades

The City started completing loops in the existing water system in 2014 and has begun rehabilitating approximately 2-miles of sanitary sewer lines each year. Unspecified upgrades to the sewer system are also anticipated over the next few years as funds become available.

3.2.6 Green Space Programs

There is currently no official greenspace program in effect or planned at this time; however, personal communication with City government employees has indicated at least some interest. Formerly natural land has become increasingly paved with roads, parking areas, and buildings. In the county, most land is well below the 25% impervious surface threshold set by Georgia's Environmental Planning criteria; however, the Monroe/Alcovy River watershed is nearing the 10% point where it will be considered impacted. The City contributes four representatives to the

joint Monroe-Walton County Recreation Commission. This commission provides, conducts and supervises public playgrounds, playfields, and other public recreation properties.

The Joint Comprehensive Plan highlights the importance of protecting Monroe's natural and cultural resources, wildlife management areas, and forested/agricultural land. It fosters the enhancement of existing and future recreation facilities to promote tourism while at the same time complementing the community's character. With modest residential growth expected over the next 25-years, particularly near water bodies, there is great need to guide and direct growth while protecting the natural and cultural resources.

The Joint Comprehensive Plan recommends multiple objectives including Open Space Preservation and Environmental Protection objectives. The Open Space Objective states that new development should be designed to minimize the amount of land consumed, and open space should be set aside from development for use as public parks or as greenbelts/wildlife corridors. Compact development ordinances are one way of encouraging this type of open space preservation. The Environmental Protection Objective states that environmentally sensitive areas should be protected from negative impacts of development, particularly when they are important for maintaining traditional character or quality of life in the community or region. Whenever possible, the natural terrain, drainage, and vegetation of an area should be preserved.

Walton County runs a countywide Parks and Recreation Department that includes the Monroe city limits. There are currently seven city/county parks within city limits totaling approximately 150 acres.

Another method of green space preservation is through the use of Conservation Easements. Conservation easements are an arrangement between a private landowner and the City whereas the development rights of the property are donated to a qualified conservation organization, land trust, or the City itself. The landowner is provided tax incentives for the donation. Easement areas are provided permanent protection from development and maintained as open space. A proper green space program should incorporate land use restrictions by means of conservation subdivision regulations, conservation easements, and sensitive land overlay districts. New development should be encouraged in or near previously developed land and discouraged near sensitive land (rural farmland, wetlands, water bodies, woodlands, pasture, etc.). Neighborhoods should have interconnected streets and sidewalks and be served by nearby open spaces, parks, greenbelts, schools, and amenities. Greenways also serve as natural wildlife corridors, providing habitat for nesting, foraging, and reproduction of animals normally displaced by urbanization of an undeveloped area.

There are multiple sources for greenspace preservation including the GAEPD. The Georgia Greenspace Commission establishes a framework within which developed and rapidly developing counties, and their municipalities, can preserve community greenspace. It promotes the adoption, by such counties and cities, of policies and rules which will enable them to preserve at least 20 percent of their land areas as connected and open greenspace which can be used for informal recreation and natural resource protection. The bill creates a Georgia Greenspace Trust Fund, which may include appropriated state funds, federal funds, donated funds, and any interest income. The Department of Natural Resources administers the Fund.

The Georgia Greenspace Program Web site contains information on the status of program, grant information, implementation guidance and much more (http://ganet.org/dnr/greenspace/).

Currently, the City's *Conservation Subdivision and Open Space Development Ordinance* (Article VII. Sec. 42-240) promotes most of the Open Space, Greenspace, Conservation Easement/Subdivision recommendations discussed above.

4.0 Pollution Management

4.1 Baseline Watershed Conditions

As part of the Watershed Assessment, four monitoring locations were strategically chosen for their location within the sewer service area, their drainage area, and their susceptibility to changes in land use. The monitoring locations and their specific characteristics are as follows:

- **JC-1 Jack's Creek @ Snows Mill Road**
  Located downstream of the intersection of Jack's Creek and Snows Mill Road. This location drains the northeast portion of the City (11.8 square miles). Land use in this area is a mixture of residential, commercial, industrial, and undeveloped land. The downstream reach of this stream is on the GAEPD 303(d) list for impairment due to fecal coliform. (33.806507N, -83.663004W).
- **KFC-1 Kelly Fishpond Creek @ Dean Hill Road**
  Located downstream of the intersection with Dean Hill Road. This location drains the south central portion of the City (4.8 square miles). Land use in this area is a mixture of residential, commercial, and industrial. This drainage area includes a high concentration of CERCLA, LAS, NPDES, landfills, and industrial stormwater dischargers. (33.748429N, -83.729459W).
- **GC-1 Grubby Creek @ Highway 83 East**
  Located downstream of the intersection with Highway 83 East. This location drains the southeastern portion of the City (2.2 square miles). Land use in this area is a mixture of residential, commercial, and industrial. This drainage area includes a high concentration of CERCLA, LAS, NPDES, landfills, and industrial stormwater dischargers. Also includes the Monroe-Walton County Airport. (33.796579N, -83.656138W).
- **MC-1 Mountain Creek @ Lynn Ammons Bridge Road**
  Located downstream of the intersection of Mountain Creek and Lynn Ammons Bridge Road. This location drains the western portion of the City (6.7 square miles). Land use in this area is a mixture of residential, commercial, professional, industrial, and undeveloped land. This stream is on the GAEPD 303(d) list for biota (fish) impairment. (33.765716N, -83.735819W).

The WA indicated that portions of the Monroe watershed were experiencing reductions in in-situ water quality and biological stream health. As a result, fish and benthic macroinvertebrate populations and their associated habitat were at a level that were described as "unhealthy" and in need of improvement. There was a direct correlation between degraded water quality, low habitat assessment scores, and low biological scores.

It was recommended that riparian zone destruction continue to be avoided and improved upon by re-vegetating those impacted areas and enforcing the State's erosion and sediment control laws. PSI observed incidents of riparian zone impacts.

Samples collected during rain events exhibited increases in metals, turbidity, TSS, phosphorous, nitrates, and fecal coliform/*E. coli.* There were obvious indications of stormwater damage at most streams including silty/sandy bottoms, mid-stream sand deposits, infrequency of pools, and stream bank erosion. Therefore, it was recommended that stormwater BMPs and MS4 maintenance continue to be enforced or improved.

Although fecal coliform/*E. coli* increase significantly during rain events, it was also present in elevated levels during dry-weather periods. Many of the streams flow through agricultural land, a potential contributor to fecal coliform/*E. coli.* Additionally, PSI observed multiple sanitary sewer lines crossing streams and a dry weather discharge from an unidentified pipe at JC-1. Dry-weather stream walks (part of an Illicit Discharge Detection and Elimination Program) were recommended.

4.2 Pollutant Sources

Pollutant sources may include both point and non-point discharges. Examples of point-sources are direct effluent discharges, construction/land disturbance, and municipal/industrial stormwater, all of which are regulated by GAEPD and NPDES permits. There are three permitted NPDES surface water dischargers in the Monroe sewer service area including: Jacks Creek WWTP (Permit # GA0047171), Park Place Nursing Home (Permit # GA0049921), and Universal Rundle Corporation (#GA0030961 and land application permit #GAU050085). There are currently four permitted industrial storm water dischargers in Monroe including: Monroe Recycling, Warrior Roofing, Thomas Concrete Plant #900, and Ernst Enterprise Plant.

Non-point sources include residential stormwater, agriculture, malfunctioning septic tanks, and forestry practices. Walton County is listed as a GAEPD Phase II permitted MS4 discharger with 100,000-250,000 residents. Although there are no Confined Animal Feeding Operations that require a permit, there are scattered locations of domesticated animals within the city limits.

Potential pollutant sources were identified by reviewing Watershed Assessment results, comparing permitted dischargers and land use in the City, and visual observations made during the year-long assessment. Based on the 2014-2015 Watershed Assessment, the following pollutant sources were suspected and listed in **Table 2**:

Table 2. Suspected Pollutant Sources, Monroe Watershed Assessment 2014-2015			
Pollutant / Water Quality Impairment	**Location of Impairment**	**Observation**	**Suspected Pollutant Sources**
Elevated Turbidity During Rain Events	MC-1, GC-1 & JC-1	Turbidity levels remained below 26 NTU at all stream locations, indicating commonly acceptable levels. However, turbidity levels increased moderately (when compared to baseline levels) after rain events at the following stream locations: MC-1, GC-1 & JC-1. Sedimentation is likely due to urban/agricultural stormwater runoff and land clearing activities. Riparian zones act as a protective buffer, filtering out suspended and dissolved materials from stormwater. When these zones are cleared, the result is sedimentation of nearby streams. *<u>Note:</u> The GAEPD recognizes that much of the sediment load in streams of the Ocmulgee and Oconee River Basins is "legacy" sediment: a result of centuries of poor farming and land use practices. The GAEPD also states that even though farming and agricultural land use is greatly decreased, modern deposition of sediment should be controlled by regulating land disturbance activities, unpaved road maintenance, and controlling urban stormwater runoff.*	Urban runoff Rural and Agricultural runoff Riparian zone destruction Legacy sedimentation Poor erosion & sedimentation BMPs
Low Macro-invertebrate, Fish, and Habitat Scores	MC-1, GC-1 & KFC-1	Low macroinvertebrate and fish community scores are typically due to poor water quality, sedimentation of stream beds, removal of in-stream habitats and food sources, and riparian zone destruction. Water quality sampling indicated some potential problems: elevated total phosphorous, nitrate, and copper. Habitat assessment scores were in the "poor" to "marginal" range. Riparian zones, the vegetative buffer zones around streams, were mostly intact except around JC-1 and GC-1 where they showed some negative impacts. Stream turbidity was not measured as being a significant issue; however, stream bank erosion, in-stream sediment deposition, and stream "straightening" was noted as a problem at all four streams. These are direct impacts of elevated storm flows that impact streams and in-stream habitats utilized by the animals living there. Significant land-clearing activity was not noted.	Urban runoff Rural and Agricultural runoff Riparian zone destruction Legacy sedimentation Stormwater Flows

Table 2. Suspected Pollutant Sources, Monroe Watershed Assessment 2014-2015 (continued)			
Pollutant / Water Quality Impairment	**Location of Impairment**	**Observation**	**Suspected Pollutant Sources**
Fecal Coliform/ *E. coli*	MC-1, GC-1, KFC-1 & JC-1	Elevated fecal coliform levels were measured at all monitoring locations. Sources can include malfunctioning septic tanks, leaking city sewer lines and WWTP discharges. Sources can also be natural: local wildlife/waterfowl and domestic farm animals. Until more specific sampling is performed, no specific cause can be pinpointed. <u>Note:</u> *The GAEPD recognizes that fecal coliform is a problem in the Ocmulgee River Basin (see GAEPD TMDL Evaluation for 72 Stream Segments in the Ocmulgee River Basin for Fecal Coliform, January 2007); however, they have not been able to verify whether the impairment is due to point or non-point sources. Potential sources include WWTPs, sanitary sewer overflows, municipal storm sewer systems, agriculture, landfills, wildlife, agriculture, land application systems, livestock access to streams, and leaking septic systems. They state that point sources will regulate discharge through individual NPDES permits. Non-point discharges aren't easily regulated, but can be mitigated through the use of proper BMPs and management strategies.*	Leaking city sewer system Malfunctioning septic tanks Domestic farm animals Wildlife and waterfowl Urban runoff
Nutrients	MC-1, GC-1, KFC-1 & JC-1	There were measurable amounts of nutrients detected at most of the sample locations; however, none of the concentrations were measured above commonly acceptable levels. Nutrient samples (specifically total phosphorous and nitrate) collected during or immediately after rain events were significantly higher than samples collected during baseline (dry) conditions. Total phosphorous and nitrate levels are common constituents of fertilizers, indicating non-point urban and agricultural runoff of fertilizer as a likely source. The highest number of elevated readings was observed at MC-1.	Urban runoff Agricultural runoff

Table 2. Suspected Pollutant Sources, Monroe Watershed Assessment 2014-2015 (continued)			
Pollutant / Water Quality Impairment	**Location of Impairment**	**Observation**	**Suspected Pollutant Sources**
Metals	GC-1 & JC-1	Elevated levels of copper were observed at GC-1 & JC-1. Possible sources include municipal WWTPs, industry (metal galvanization/ finishing/plating, paint and textiles, tire vulcanization, electronics), construction, landfills, litter (batteries, scrap metal, car parts, etc.), urban runoff (algaecides, road runoff), and natural sources (soils and atmospheric deposition). GC-1 is within the drainage area of an inert landfill; however, this landfill only accepts landscape and construction wood debris. Significant amounts of copper would not be expected from this landfill. JC-1 is within the drainage area of the Park Place Nursing Home (NPDES point discharge) and MPC Generating (industrial stormwater discharger). Neither of these sources are likely sources of significant amounts of copper; therefore, non-point pollution and/or natural sources are the likely sources. *<u>Note:</u> The GAEPD recognizes that metals are a problem in Georgia's streams (see GAEPD river basin TMDL plans); however, they have not been able to verify whether the impairment is due to point or non-point sources. They state that point sources will regulate metals discharge through individual NPDES permits. Non-point discharges aren't easily regulated, but can be mitigated through the use of proper BMPs and management strategies. Management strategies include: new development, existing development, site development, watershed management, and roads/ highways/bridges.*	Municipal and Industrial Discharges Natural conditions: 1) Atmospheric deposition, 2) soils Urban runoff

4.3 Pollutant Load Reductions

State and/or Federal water quality exceedences included metals (copper) and bacteria (fecal coliform). Other impairments were based on ecological indices such as aquatic insect/fish assemblages.

Section 3.0, Table 5 of the September 21, 2016 Watershed Assessment Report lists the in-situ physical and chemical water quality results of sampling in Monroe. Those parameters outside of acceptable State/Federal criteria are highlighted in the table. The ecological conditions are summarized in **Section 4.0** of the Watershed Assessment Report. Due to the relatively small drainage area of Monroe and the small streams within its service area, water quality modeling was not appropriate, therefore standard pollutant load reductions (typically provided in terms of lb./acre) were not determined.

In order to ensure that this WPP can be used as a useful tool to measure the success of reductions in pollutant load (both source and non-source), we are suggesting a simplified approach. After the BMPs recommended in **Section 5.0** have been put into place, results of yearly chemical analyses and bi-annual ecological analyses will be compared to acceptable criteria (see State/Federal water quality criteria in the Watershed Assessment Report, **Table 3**) to determine whether the waterbodies comply with their designated uses. Yearly results should also be compared to prior-years' results as a measure of success of the BMPs. Trends (either positive or negative) can also be identified and alterations can be made to the BMPs accordingly.

5.0 Best Management Practices

Based on **Section 4.2** of this WPP, the following BMPs are suggested to improve and protect the City's water resources from future degradation due to development and growth. BMPs may be implemented locally, or may be adopted county-wide if appropriate. BMPs may be structural (storm water structures, stream buffers or non-structural (public awareness and inspections) in nature.

One of the greatest threats to water quality in Monroe is the conversion of land use from forested land to commercial/residential land use. The increase in impervious surfaces will direct stormflows and contaminants into streams and wetlands. These stormflows can increase stream temperatures, accelerate stream bank erosion, and transport contaminants deposited onto the impervious surfaces (i.e. metals, oils, fuel, nutrients, and fecal coliforms). The City should utilize the resources of the GAEPD Non-point Source Program (NPSP), which provides assistance with both non-point source pollution management grants and environmental education and outreach. Contacts can be found on the GAEPD NPSP website. The following BMPs will be adopted by the City to mitigate the anticipated changes in future land use.

5.1 BMPs

- Adoption of the WPP:

The City will adopt the recommendations as provided in this WPP and agree to implement them through BMPs, ordinances, zoning, and enforcement. The WPP should be regularly updated as new problems arise or if water quality changes are observed (both positive and negative).

- Sewer Line Stream Crossing Inspections:
  City personnel will schedule annual inspections of sewer line stream crossings and/or sewer lines directly abutting streams, wetlands, and/or ponds. Elevated fecal coliform readings in stream segments within the City sewer service area point to possible sewer leaks. Erosion of the stream bank causes previously sound pipes to sag and separate. Only routine inspections will catch these ever changing conditions caused by storm water scour and erosion. Stream crossings and stream/wetland/pond-abutting lines will be identified and cataloged for yearly inspections. The goal is to inspect 25% of these identified sites yearly so that the entire sewer system is inspected on a 4-year rotating basis. See **Appendix A – Maps** for a map of the City's sewer lines overlaid with stream, wetland, and pond locations. These are approximate locations and should be ground truthed prior to commencement of the inspections.

- Street Sweeping:
  City personnel will schedule routine street sweeping of roads within its jurisdiction as manpower allows. This BMP does not set a numerical goal for number or miles of streets swept; however, particular attention should be paid to roads that cross streams or contain drop inlets that discharge to streams. Sewer lines general follow the street system, therefore the sewer line map in **Appendix A** should be helpful in prioritizing those roads.

- Public Education and Outreach:
  Many of the pollutant sources identified in **Section 4.2** can be effectively reduced through public education and outreach activities. Septic system management, fertilizer use, land-clearing activities, illegal dumping, and stream bank erosion are all issues that the general public can become more educated about. Public understanding concerning these important issues will certainly result in better environmental decision making which will ultimately translate into improved water quality in Monroe. Education is not limited to developers and public figures, but must include the general public. Government agencies are not adequately staffed to ensure proper enforcement of the ordinances listed above and rely on the general public to be their "eyes and ears".

  Monroe will enact the following public education activities:

  Storm Drain Stenciling – Storm drains are a major contributor to non-point stormwater pollution to rivers and streams. Household cleaners, motor oil and transmission fluid, paints, solvents, lawn/landscape clippings, trash and debris, fertilizers, and pesticides/herbicides are some of the pollutants associated with storm drains. Most of these can be controlled through public education and outreach. One inexpensive method of education is through storm drain stenciling. This can be accomplished by using permanent paint to identify the storm drains and alert the public that the drain discharges into a local waterbody. A stencil can be fabricated (or purchased on-line at www.crstencils.com, www.dasmanufacturing.com) and used as a template for multiple storm drains. A typical stencil would say the following: "DUMPING POLLUTES – DRAINS TO OUR STREAMS", etc. Below are examples of a stenciled storm drain and a template.

  Another alternative is by the purchase of pre-printed storm drain markers that are permanently glued to storm drains. There are multiple companies that produce these and can be found on the internet by searching for "storm drain markers". The following are examples of these markers.

The City will identify and prioritize all storm drain areas within the city limits. These areas will be prioritized according to location, susceptibility, and influence on the City's storm system. Priority will be given to drains near single and multi-family housing, "high risk" commercial institutions (i.e. car repair shops, car washes, paint stores, agriculture supply stores, etc.), and any other locations where hazardous wastes are stored and there is a likelihood unauthorized dumping will occur. Not all drains within a priority area need to be marked – a representative number of drains should be marked to educate those in the area. After priority areas have been identified, representative drains will be stenciled/marked. This can be completed by City personnel, but would be most productive if assisted by the general public (i.e. school children, neighborhood groups, Boy/Girl Scouts, etc.). Typically, drain markings are accompanied by "door hangers" to help educate the public about the markers/stencils (an example can be printed free from the USEPA website: www.epa.gov/npdes/pubs/cu_door_hanger.pdf).

Stream Clean-up Events – *The City participates in* the "Keep America Beautiful" *Great American Cleanup* event each spring. In 2016, the City collected 16,680 pounds of trash, including 147 scrap tires. Additionally, the City marked Arbor Day by conducting a volunteer cleanup of Childer's Park in Monroe, where the stream bed was cleaned and new trees were planted. The City will continue participation in the *Great American Cleanup* event on a yearly basis.

This Protection Plan is not requiring additional cleanup events beyond those already conducted by the City. However, if the City is interested in further volunteer efforts that concentrate on the City's waterways, the "Adopt-A-Stream Program" (sponsored by the GADNR) and the "Keep Georgia Beautiful Program" (sponsored by the Department of Community Affairs sponsor a statewide event called "Rivers Alive" that target cleanups across all waterways in Georgia including streams, rivers, lakes, beaches and wetlands. The mission of Rivers Alive is to create awareness of and involvement in the preservation of Georgia's water resources through waterway cleanups. A state-wide cleanup is held each October and is coordinated through Rivers Alive. Results of the clean-up are submitted to the GADNR to help them monitor pollution in Georgia. This program carries almost no cost to it, and if the City can schedule the event through Rivers Alive by a specific deadline, Rivers Alive will provide free T-shirts, radio public service announcements, educational posters, banners, press release, and invitation letters. Additional information can be found at the Rivers Alive website (http://www.riversalive.com/index.htm?2.45).

Whichever cleanup the City participates in, results will be included in the City's yearly WPP summary letter to the GAEPD (see **Section 10**). The City will participate in at least one program (or sponsor their own) on a yearly basis.

Brochures – The City will distribute brochures to its citizens that include materials on watershed protection, water quality, stream buffers, wetland protection, Adopt-a-Stream, illegal dumping, erosion and sediment control, stormwater runoff, non-point pollution, agricultural runoff, and other conservation programs deemed important to fulfilling the BMPs identified in the WPP. These materials do not need to be produced in-house; there are many sources of free (or low cost) materials including the GAEPD, USEPA, Georgia Adopt-A-Stream, and the Altamaha Riverkeeper. These can be printed in-house or sent to a professional printer. Many are customizable using Monroe information. The following include a small sample of the "free" materials available from various sources:

- Upper Chattahoochee Riverkeeper, "Stay Out of Trouble" Brochure of Land Disturbance Activities (http://www.getthedirtout.org/pdf/GTDO_Permbroc_v03.pdf)
- USEPA, "Stormwater and the Construction Industry: Maintain your BMPs!" poster (http://www.epa.gov/npdes/pubs/posterside1.pdf)
- GAEPD, "Erosion Prevention and Sediment Control in Georgia" – a development guide (http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/dirt2_book.pdf)
- GAEPD, "Land Development Provisions To Protect Georgia Water Quality" (http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/nicholsfinal.pdf)
- USEPA, How Do I Get Stormwater Permit Coverage For My Construction Site? (http://www.epa.gov/npdes/pubs/cgp_state_brochure.pdf)
- USEPA, Website with customizable brochures, posters, handouts, etc. (http://cfpub1.epa.gov/npdes/stormwatermonth.cfm)
- USEPA, "Make Your Home the Solution to Stormwater Pollution" – homeowner's tips (http://www.epa.gov/npdes/pubs/solution_to_pollution.pdf)
- USEPA, "10 Things You Can Do To Prevent Stormwater Runoff Pollution" – a bookmark (www.epa.gov/npdes/pubs/nps_month_bookmark.pdf)
- USEPA, "Take the Stormwater Runoff Challenge" – a placemat for middle school students (www.epa.gov/npdes/pubs/stormwaterplacemat.pdf)
- Georgia Soil and Water Conservation, "Best Management Practices for Georgia Agriculture" (http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/Agriculture_Best_Management_Practices_March_2007.pdf)
- USEPA, "Protecting Water Quality From Urban Runoff" (www.epa.gov/npdes/pubs/nps_urban-facts_final.pdf)
- USEPA, "Stormwater Pollution Found In Your Area!" – a door hanger (www.epa.gov/npdes/pubs/cu_door_hanger.pdf)
- Georgia Adopt-a-Stream (www.riversalive.org)
- Altamaha River Keeper (http://www.altamahariverkeeper.org/index.asp) (email: stewards@altamahariverkeeper.org)

5.2 Implementation Schedule

Submission of the WPP: This should be completed by **February 2018**. City officials, such as the Mayor, should personally send the WPP to the GAEPD Watershed Branch with a letter stating

that the City supports the WPP and intends to adopt the WPP and make it part of their Municipal Codes.

Adoption of the WPP: This should be implemented as soon as possible after the WPP has been approved by the GAEPD. City officials, as well as the City attorney, will meet and hold public meetings (if necessary) to receive input and ultimately adopt the measures included herein. This should be completed by **June 2018**.

Public Education and Outreach:

Storm Drain Marking – Marking is relatively inexpensive and will not require special funding to implement. The City installed approximately 300 of these markers already throughout the city limits. An additional 200 markers will be installed in high priority areas. The City should begin the storm drain marking program immediately after the WPP is accepted by the GAEPD. Storm drains will be prioritized (see **Section 5.1**) and a representative number of those in the high priority areas will be marked. Due to the large area of the Monroe service area, 25% of the chosen drains will be marked yearly so that 100% of the chosen drains will be marked by **December 2022**. The yearly 25% inspections will then be repeated.

Stream Clean-up Events – The City will participate in at least one clean up event, ranging from a simple stream walk to a larger coordinated Rivers Alive, Keep America Beautiful, or Adopt-a-Stream program. The results are two-fold: public education and the removal of trash from the City's uplands and waterways. The City will commence its first stream clean-up event by **December 2019** and repeat yearly thereafter.

Brochures - This educational outreach should commence immediately after adoption of this WPP by the City. To make these materials easily assessable to the City's citizens, they may distribute at City Hall or mailed with monthly water/sewer/utility bills. Alternately, a brochure, insert, or published article may be included in the City's monthly newsletter, *In The Know Monroe*. This newsletter is mailed to approximately 9,000 citizens. The City will include a printed brochure or a printed article at least semi-annually. This activity will commence by **January 2019**. As an alternative (and more environmentally friendly), electronic distribution of brochures can substitute for paper distribution.

Sewer System Stream Crossings - City personnel will schedule annual inspections of sewer line stream crossings and/or sewer lines directly abutting stream segments beginning in **January 2019**. At least 25% of the stream crossings will be inspected annually. Therefore, by **December 2022**, 100% of the stream crossings will have been inspected at least once.

Street Sweeping - City personnel will schedule routine street sweeping of roads directly abutting stream segments or that discharge to the storm sewer system beginning in **January 2019**.

5.3 Exemptions

Agricultural, silvicultural, and farming practices are typically exempt from the provisions as set forth in the WPP. However, agricultural activities must follow generally accepted farming practices, including those established by the Georgia Soil and Water Conservation Commission. Silviculture activities must follow BMPs as set forth by the Georgia Forestry Commission. Non-agricultural projects performed on agriculturally zoned land are not exempted from these provisions.

Additionally, owners of property of record held prior to adoption of the stream buffer provision of this WPP may apply for an exemption if the previously held land becomes unbuildable or unusable based on provisions of the WPP. Established and continued land use existing prior to adoption of the WPP provisions may be exempt from those provisions. Existing structures that are in violation of the newly adopted provisions are exempt and may be re-built if destroyed providing they are re-built with the same amount of “non-conformity” as the previous structure. Existing development projects that have City or County approved building plans are also exempt from the provisions set forth in the WPP.

It should be noted that exemptions allowed by the City or County do not reduce or remove any State or Federal requirements (i.e. 25-foot State stream buffer).

6.0 Funding

6.1 Watershed Protection Plan Implementation Cost Estimate

Costs for the WPP can be divided into two main areas: BMPs and Long Term Monitoring.

The BMPs described in **Section 5.0** are mostly public outreach related, with relatively few hard costs associated with them. The City should have the ability to comply with this WPP using current staff assignments. Production of educational flyers and brochures can be completed using in-house copying services. If funding is available, outsourcing of the printing can be completed for a more "finished" look. As a cost saving measure, a bi-annual article can be published in the weekly newsletter, *In the Know Monroe*, instead of printed brochures. Storm drain marking can be accomplished fairly inexpensively (approximately $1,000 for 200 4" storm drain markers). Public outreach and litter cleaning outings can primarily be volunteer driven events and would not require significant City funding.

The long term monitoring required by this WPP is something that is less flexible when it comes to cost. The chemical monitoring (see **Section 9.0**) will be required on a yearly basis and should be completed by a qualified consulting firm or laboratory (or in-house if capabilities are present). Cost will be based on labor, supplies/equipment, and laboratory costs. It is estimated that the yearly cost for chemical/bacterial sampling/monitoring/laboratory/reporting will be approximately $19,500 per year. The ecological monitoring will be required on a rotating basis (twice per 5-year period) and should be completed by a Certified Ecologist or similar professional. It is estimated that the cost for ecological monitoring/reporting will be approximately $11,000 per year it is requried. Therefore, the City will incur approximately $19,500 in yearly costs when only chemical monitoring is required and $30,500 those years that both chemistry and ecological is required.

On a yearly basis, the City will be required to submit an "Annual Water Quality and Biological Monitoring Report" to the GAEPD Watershed Protection Branch. This report is described in detail in **Section 10**. This report can be generated in-house or by a qualified environmental consultant. It is estimated that the annual cost for this report will be approximately $2,000.

6.2 Funding Sources

6.2.1 User Fees

Costs for implementing the WPP can be funded by applying a user fee to those consumers using the product in question. In this case, the product is the city sewer system and the consumer is the homeowner and business owner. The WPP is a direct requirement for operation of the City's WWTP and is enforced through its NPDES permit to discharge treated waste. Therefore, those consumers using the City sewer system should bear the cost of this requirement. The cost can be assessed through an equitable distribution of fees based on municipal water and sanitary sewer use (gallons/month). Another method for determining equitable fees is to assess the property owner's contribution to stormwater runoff by measuring the amount of impervious surface within their property. The larger the impervious surface (i.e. driveways, sidewalks, roof tops, parking lots, roads, etc.), the more the property owner is theoretically contributing to stormwater runoff (and potential non-point source of pollution). The implementation of user fees in this manner will provide a stable revenue source to fund the yearly monitoring requirements and BMPs.

6.2.2 Section 319 Programs

The Clean Water Act (CWA) was amended in 1987 to establish the section 319 Nonpoint Source Management Program. Under section 319(h), State, Territories, and Indian Tribes receive grant money which support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. Applications for funding are processed through the GAEPD Nonpoint Source Program (http://epd.georgia.gov/section-319h-georgias-nonpoint-source-implementation-grant). Note: 319 funding cannot be used for programs required by a Federal or State permits. Therefore, many of the programs in this WPP may not qualify.

6.2.3 State Revolving Funds

The Clean Water State Revolving Fund (CWSRF) programs provide more than $4.5 billion annually to fund water quality protection projects for wastewater treatment, nonpoint source pollution control, and watershed and estuary management. Funding includes low interest rates loans and partnerships with other funding sources that spread project costs over a repayment period of up to twenty years. This Federal loan program is administered by the Georgia Environmental Facilities Authority (GEFA).

6.2.4 USDA Environmental Quality Incentives Program

The Environmental Quality Incentives Program (EQIP) was reauthorized in the Farm Security and Rural Investment Act of 2002 to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants install or implement structural and management practices on eligible agricultural land. EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years.

6.2.5 USDA Conservation Reserve Enhancement Program

The Conservation Reserve Enhancement Program (CREP) encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, filterstrips, or riparian buffers. CREP addresses high-priority conservation issues of both local and national significance, such as impacts to water supplies, loss of critical habitat for threatened and endangered wildlife species, soil erosion, and reduced habitat for fish populations. CREP is a community-based, results-oriented effort centered around local participation and leadership. Farmers receive an annual rental payment for their participation. CREP is administered by the USDA Farm Service Agency (FSA).

6.2.6 Other Funding Sources

GADNR Land and Water Conservation Fund – (LWCF)

The GADNR, authorized under the Georgia Land Conservation Act (O.C.G.A. Sec 36-22-4), provides funding in the form of loans or grants for the protection of conservation lands. Protection includes improving water quality, preserving wetlands and flood plains, erosion control, stream bank and riparian buffer protection, prime agricultural/forest sites, and protection of areas vital to recreation and outdoor activities. Loans are considered on a continuous basis while grant applications are due by July 15th of every year.

GADNR Greenspace Trust Fund

The Georgia Greenspace Commission, which reviews and approves community greenspace programs submitted by eligible counties and municipalities, established the Georgia Greenspace Trust Fund, which may include appropriated state funds, federal funds, donated funds, and any interest income. The Department of Natural Resources administers the Fund (http://ganet.org/dnr/greenspace/).

Special Purpose Local Option Sales Tax (SPLOST)

Special Purpose Local Option Sales Tax (SPLOST) is a 1% sales tax on all consumer goods that must be approved by voters in a referendum. The City or County will assess this tax in order to cover the cost of implementing the WPP. Typically, the SPLOST has a limited lifetime (unless extend through a voter referendum) or when the sales tax nets a specific dollar amount in receipts. One benefit of a SPLOST is that the funds are available immediately – there are no loans and no interest to be paid. Excess funds can be invested and used to fund the project even after the SPLOST has expired.

Ad Valorem Tax

Ad Valorem Tax is a viable source of funding for public works projects. The use of this kind of tax may result in lower out-of-pocket expenditures by City property owners when compared to User Fees (see **Section 4.2.1**). Ad Valorem Taxes are deductible on Federal and State returns.

Local Funds

Funding for the Watershed Assessment may draw from local funds, such as the General Operating Fund.

7.0 State 303(d) Management Measures

7.1 State 303(d) Listed Stream Segments

The GAEPD assess its water bodies every two years for compliance with water quality standards as required by the Federal Clean Water Act. Water quality standards are applied dependent on the designated uses (i.e. fishing, drinking water, recreation, wild and scenic) of the surface water from an environmental and economic standpoint. Water bodies are assessed and placed into one of five categories: 1) meeting designated uses, 2) data indicates that at least one designated use is being met, but there is insufficient evidence to determine that all uses are being met, 3) there is insufficient data or other information to make a determination as to whether or not the designated use is being met, 4a) data indicates that at least one designated use is not being met, but TMDLs have been completed, 4b) data indicates that at least one designated use is not being met, but there are actions (other than a TMDL) that are predicted to lead to future compliance, 4c) data indicates that at least one designated use is not being met, but the impairment is not caused by a pollutant, 5) data indicates that at least one designated use is not being met and TMDLs need to be completed.

These water bodies are listed on Georgia's 305(b) list and published bi-annually in Water Quality in Georgia. The 305(b) list serves as a report to Congress (and the general public) on water quality conditions of the United States. Category 5 water bodies on the 305(b) list must be placed on the 303(d) list.

An on-line review of the GAEPD website (Georgia 2016 305(b)/303(d) List Documents, www.gaepd.com/Documents/305b.html), determined that there are currently ten GAEPD 303(d) impaired listed streams and/or rivers not supporting their designated uses in Walton County. However, the majority of these are not proximate to Monroe or do not receive surface water input from the city. Only those streams that are located within the sewer service area or receive surface water from the city are discussed below. **Table 3** lists the impaired reachs' proximity to Monroe.

Table 3. GAEPD 305(b)/303(d) 2016 List, Not Supporting Designated Uses, Monroe, Georgia

Stream Name	Reach/Location	Use	Evaluation	Criterion Violated	Extent	Miles/direction from Monroe, GA
Alcovy River	Mountain Creek to Big Flat Creek	Drinking Water	4a	Fecal Coliform	7 miles	2.5 miles southwest
Jacks Creek	Grubby Creek to Indian Creek	Fishing	5	Fecal Coliform	9 miles	0.1 miles east
Mountain Creek	Headwaters to Sewage Treatment Pond #2	Fishing	4a	Biota (Fish)	5 miles	Within City Limits

Note:
[a] Category 4a – data indicates that at least one designated use is not being met, but TMDLs have been completed.
Category 4b – data indicates that at least one designated use is not being met, but there are actions (other than a TMDL) that are predicted to lead to future compliance.
Category 4c – data indicates that at least one designated use is not being met, but the impairment is not caused by a pollutant.
Category 5 – data indicates that at least one designated use is not being met and TMDLs need to be completed.

As can be seem in **Table 3**, Mountain Creek (impacted for Biota (fish) is located within city limits. The Jack's Creek stream segment (impacted for Fecal Coliform) is located 0.1 miles downstream from city limits, although it receives drainage from the city just upstream of the impacted stream segment.

7.2 State 303(d) Listed Stream and TMDL Monitoring and Management

Those water bodies on the 303(d) list are required to have a Total Maximum Daily Load (TMDL) evaluation for the constituent(s) determined to be the cause of the water quality designed use violation. The TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet the water quality standards set forth for its designated use. Once a TMDL is determined for a water body, a water quality-based clean-up plan must be developed that aims to reduce the pollutant of concern and return the water quality back to its designated use. Clean-up plans may include: imposing Waste Load Allocations (WLA) to point source dischargers (i.e. NPDES); identification of non-point sources (i.e. urban/agricultural/storm water runoff) by implementing long-term monitoring plans; reduction of non-point sources through the use of Best Management Practices (BMP); repair of malfunctioning sewer collection systems; participation in regional watershed management plans; and encouraging public education and outreach programs.

Table 4 lists the TMDLs for those impacted streams listed in **Table 3**.

Table 4. GAEPD TMDLs, near Monroe, Georgia

Stream Name	Reach/ Location	Criterion Violated	WLA[a]	LA[b]	TMDL[c]	% Reduction
Alcovy River	Mountain Creek to Big Flat Creek	Fecal Coliform	ND	1.03×10^{13} (counts/30 days)	1.80×10^{13} (counts/30 days)	36
Jacks Creek	Grubby Creek to Indian Creek	Fecal Coliform	3.73×10^{11} (counts/30 days)	1.87×10^{12} (counts/30 days)	2.50×10^{12} (counts/30 days)	35
Mountain Creek	Headwaters to Sewage Treatment Pond #2	Biota (Fish)	0	179.3 (tons/year) Sediment load	179.3 (tons/year) Sediment load	53.5

[a] WLA – Waste Load Allocation, load applied to point sources. Equal to the sum of the load from all NPDES facilities in the drainage basin of the impaired segment.

[b] LA – Load Allocation, load applied to non-point sources

[c] TMDL – Total Maximum Daily Load. Equal to the total amount of pollutant that can be assimilated by the impaired segment while maintaining quality standards (WLA + LA).

ND – Not Determined

The TMDL Implementation Plans were referenced for recommended management measures to help reduce pollutant loads:

For fecal coliform, the GAEPD recommends: 1) compliance with NPDES permit limits; 2) adoption of Natural Resources Conservation Service (NRCS) conservation practices; and 3) BMPs appropriate to reduce non-point sources (agricultural livestock, leaking sewers, malfunctioning septic systems, land application systems, landfills, etc.). NPDES permitted discharges should have fecal coliform limits set at the 200 colonies/100 mL warm-weather limit. Non-point sources can be reduced by limiting animal access to streams, regulating manure storage, and regulating land use activities. Urban sources can be reduced by minimizing use of

storm sewer systems, repair leaking or illicit sanitary sewer systems, enforce existing storm water NPDES permits, and encourage public awareness about the impact of various human activities.

For biota (fish), the GAEPD recommends plans be implemented to control sedimentation of streams. Major contributors of stream sediment include unimproved roads, row crops, and construction activities. Minor contributors include quarries, pasture, and wetlands. Much of the sediment in streams in this watershed can be attributed to poor historical farming practices, and streams should repair themselves over time if current day sediment loads are maintained at acceptable levels. Management practices that can help maintain acceptable levels include: 1) compliance with NPDES permit limits; 2) adoption of Natural Resources Conservation Service (NRCS) conservation practices; 3) implementation of Georgia Forestry Commission (GFC) BMPs for forestry, 4) compliance with state mining regulations, 5) adopt prudent unpaved road maintenance practices, 6) enforce erosion and sedimentation control plans for land disturbing activities, and 7) evaluate the effect of storm flow on stream bank erosion.

7.3 State 303(d) Responsible Parties

The GAEPD Water Protection Branch is currently working with the NRCS, Georgia Forestry Commission, the Georgia Soil and Water Conservation Commission, the cities of Glenwood, Wrightsville and local governments to implement programs as recommended in the individual TMDL Implementation Plans. The City of Monroe is not required to participate in these implementation plans.

Some NPDES permits (including wastewater discharge permits or construction stormwater permits) may include restrictions due to the TMDL (biota-Fish) for Mountain Creek.

7.4 State 303(d) Funding

The City of Monroe is not required to participate in these implementation plans at this time.

7.5 State 303(d) Implementation Schedule

According to the GAEPD rotating basin management plan, the Ocmulgee and Oconee River Basins will be next published in 2016. At this time, streams may be added or removed from the 303(d) list. If any of the streams within the Monroe service area are added to this list, then appropriate measures may be required to comply with the resulting TMDL. Most management measures described in **Section 7.2** are ongoing under the responsibility of parties described in **Section 7.3**.

The City of Monroe is not required to participate in these implementation plans at this time.

8.0 Protection Plan Milestones

8.1 Management Measures

8.1.1 Long-term Milestones

The ultimate long-term milestone of the WPP is compliance with State water quality criteria and protection of the City's water resources. BMPs, ordinances, and land-use control measures will have a direct, measurable effect on the water quality on these resources. Yearly water quality sampling and biannual biological assessments will assist the City in determining the success of this WPP. Long-term trends should be analyzed to determine whether water quality standards continue to be met, water quality is improving, or water quality is degrading. This WPP is a "living document", meaning it can be adjusted as long-term data becomes available. The City should be flexible and willing to go in a different direction if the long-term data indicates a change should be made. Whatever changes are made, the long-term monitoring plan (see **Section 9.0**) should be continued or improved upon as the major source of information on the health of Monroe's streams.

8.1.2 Short-term Milestones

The development of short-term milestones will ensure that the WPP is on schedule and the recommendations contained herein are being implemented sufficiently to increase the effectiveness of the WPP. Based on the BMPs discussed in **Section 5.1** above, the following milestones are proposed:

Adoption of the WPP: Adoption of the WPP will be completed by **December 2018**.

Public Education and Outreach:

Storm Drain Stenciling – The number of drains marked should be documented. The goal is to have 25% of prioritized drains marked the first year after the WPP was approved by the GAEPD and the remaining 75% marked by **December 2022** (25% per year). Any new drain markings, either due to a new drain or to update previously marked drains (due to weathering or vandalism) should be documented on an annual basis.

Stream Clean-up Events – These events may be scheduled to coincide with other State events, however, there should be at least one held each calendar year. A good measure of success is the number of participants. Although the amount of trash collected each year should decrease as the waterbodies become cleaner, the number of participants should increase as education (especially of the younger generations) is an ongoing and perpetual event. Therefore, success of this BMP will measured by a yearly increase in the number of documented participants. The first event should be completed by **December 2018** and yearly thereafter.

Brochures – A printed brochure will be included in the weekly newsletter, In the Know Monroe, semi-annually beginning in **January 2019**.

Sewer System Stream Crossings: City personnel should schedule annual inspections of sewer line stream crossings and/or sewer lines directly abutting stream segments beginning in **January 2019**. Due to the size of Monroe, the monitoring of 25% of stream crossings per year

should not put additional stress on existing workloads. Therefore, the City will have inspected 100% of the system in 4-years (by **December 2023)**. Repeat the 25% inspections annually.

Table 5 summarizes the short-term milestones and their schedules:

Table 5. Milestone Schedule, Monroe Watershed Protection Plan	
Measure/BMP	**Schedule**
Submittal of the WPP to the GAEPD	February 2018
Adoption of the Watershed Protection Plan	Begin immediately after GAEPD acceptance of the Protection Plan. Complete by June 2018.
Storm Drain Stenciling	Begin immediately after GAEPD acceptance of the Protection Plan. Stencil 25% of prioritized storm drains per year until 100% have been marked by December 2022. Annually thereafter: monitor 25% of prioritized drains and re-mark or re-paint as necessary.
Stream Clean-up Events	Begin immediately after GAEPD acceptance of the Protection Plan. The first event should be completed by December 2019. Repeat annually thereafter.
Brochures	Printed brochures or a published article will be distributed to citizens via the newsletter, *In the Know Monroe,* semi-annually beginning December 2018.
Sewer System Stream Crossings	Begin January 2019. 25% of the sewer system (including stream crossings and near-stream pipes or manholes) should be inspected yearly. 100% of the system will have been inspected by December 2023. Repeat 4-year cycle.
Water Quality Stream Monitoring	Begin long-term monitoring in 2019. Repeat annually thereafter.
Biological Stream Monitoring	Begin long-term monitoring in 2019. Repeat so that 2 monitoring events are completed every 5-years thereafter.
Annual Certification Statement and Annual Report	Submit annually beginning June 30, 2019 updating the status of the implementation of the WPP (including BMPs that have been or will be implemented. The June 30, 2020 report should include the status of the WPP implementation as well as the 2019 water quality and biological monitoring) and annually thereafter.
Modification to Watershed Protection Plan	Re-evaluate in January 2023 and every 5-years thereafter.

9.0 Long-term Monitoring Plan

9.1 Purpose and Objectives

Water quality monitoring can provide valuable information on the relative impact of point and/or non-point sources of pollution in a given study area. Historical water quality analysis can provide a baseline for comparison with future measurements. The comparison of historical data with current data can show whether increased development and land use in an area is having an impact on water quality and aquatic resources. The purpose of the long-term monitoring plan is to provide guidance for a consistent, scientifically reproducible study of three key indicators including water, habitat, and aquatic community health. The objective is to maintain a database of scientific results of the three indicators that can be used as a tool for comparison year after year. If conducted consistently, data can be analyzed to determine whether existing BMPs are improving water quality or whether new BMPs must be put into place to meet acceptable water quality standards.

9.1.1 Stream Improvement and BMP Effectiveness

As described in **Section 4.3 Pollutant Load Reductions**, the objective of the WPP is to bring the streams into compliance according to their designated uses by the implementation of BMPs. Stream health as measured by the three key indicators – water quality, habitat quality, and aquatic community health – should improve as the BMPs are adopted, implemented, and enforced.

Impairments were noted during the Watershed Assessment to elevated fecal coliform/*E. coli,* elevated metals (copper), and poor habitat/macroinvertebrate/fish community scores. Because there are limited direct dischargers into these streams (upstream of the monitoring locations), the likely sources are limited to non-point discharges and natural causes. Elevated fecal coliform may be natural, but may also be due to urban runoff. Elevated metals may be due to urban run-off, but the GAEPD has no indication this is the case in this region, per GEAPD TMDL implementation plans.

If contamination is not due to natural causes, the BMPs should improve metals and fecal coliform. Poor fish and macroinvertebrate scores are typically tied to sedimentation of streams. Implementation of the BMPs listed in this WPP may not improve these scores if they are due to natural causes, but they should not get worse than baseline levels.

9.1.2 Responsible Parties

City officials, including City government and wastewater treatment personnel, will be the primary parties responsible for implementing the long-term monitoring as described in this WPP. It would be advisable to subcontract the yearly chemical water quality and bi-annual ecological monitoring to a qualified environmental consultant with experience with this type of monitoring.

9.1.3 Long Term Monitoring Locations

Water Quality Monitoring

The five monitoring locations were strategically chosen for their location within the sewer service area, their drainage area, and their susceptibility to changes in land use. The monitoring locations and their specific characteristics are as follows:

- **JC-1 Jack's Creek @ Snows Mill Road**
  Located downstream of the intersection of Jack's Creek and Snows Mill Road. This location drains the northeast portion of the City (11.8 square miles). Land use in this

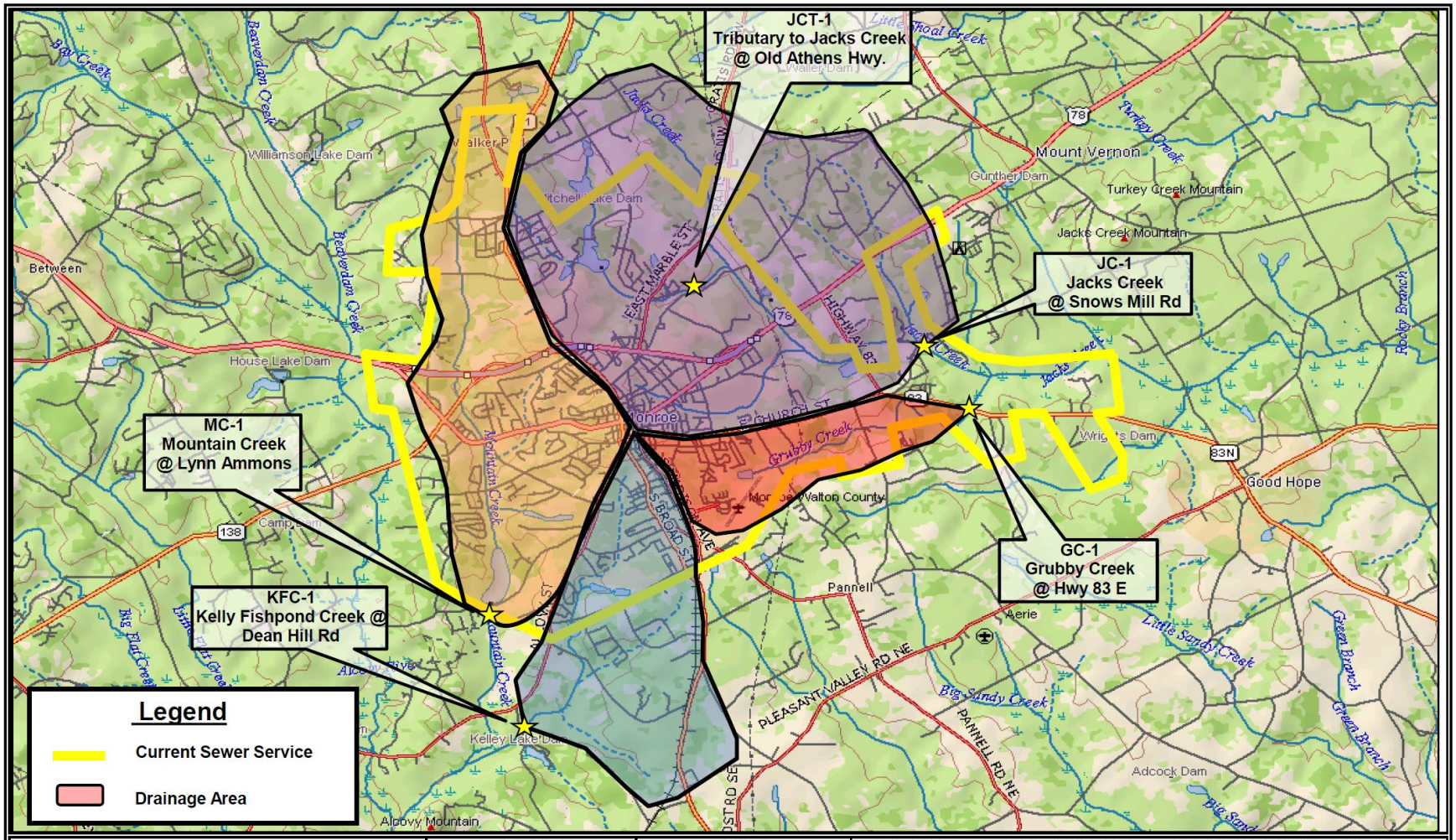
area is a mixture of residential, commercial, industrial, and undeveloped land. The downstream reach of this stream is on the GAEPD 303(d) list for impairment due to fecal coliform. (33.806507N, -83.663004W).

- **JCT-1* Jack's Creek Tributary @ Old Athens Highway**
  Located on a tributary to Jack's Creek, north of the Old Athens Highway at a powerline right-of-way. The drainage area of this creek is entirely located within the Monroe service area. Land use in this area is a mixture of residential, agriculture, and undeveloped land. The downstream reach of this stream is on the GAEPD 303(d) list for impairment due to fecal coliform. (33.815398N, -83.6999W).
- **KFC-1 Kelly Fishpond Creek @ Dean Hill Road**
  Located downstream of the intersection with Dean Hill Road. This location drains the south central portion of the City (4.8 square miles). Land use in this area is a mixture of residential, commercial, and industrial. This drainage area includes a high concentration of CERCLA, LAS, NPDES, landfills, and industrial stormwater dischargers. (33.748429N, -83.729459W).
- **GC-1** Grubby Creek @ Highway 83 East**
  Located downstream of the intersection with Highway 83 East. This location drains the southeastern portion of the City (2.2 square miles). Land use in this area is a mixture of residential, commercial, and industrial. This drainage area includes a high concentration of CERCLA, LAS, NPDES, landfills, and industrial stormwater dischargers. Also includes the Monroe-Walton County Airport. (33.796579N, -83.656138W).
- **MC-1 Mountain Creek @ Lynn Ammons Bridge Road**
  Located downstream of the intersection of Mountain Creek and Lynn Ammons Bridge Road. This location drains the western portion of the City (6.7 square miles). Land use in this area is a mixture of residential, commercial, professional, industrial, and undeveloped land. This stream is on the GAEPD 303(d) list for biota (fish) impairment. (33.765716N, -83.735819W)

***This location was added to the WPP after completion of the original WA at the request of the GAEPD. Biological monitoring (i.e. fish and macroinvertebrate) is not proposed for JCT-1.**

****Due to the small drainage area (<10 square kilometers/3.86 square miles) of GC-1, the GAEPD does not require biological monitoring (i.e. fish and macroinvertebrate). As such, biological analysis is not proposed for GC-1 as part of this WPP.**

Detailed maps of the four water quality sampling locations can be found in **Figure 5** and **Appendix C – Sampling Location Maps**.



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 1/22/2018	**FIGURE 5. SAMPLING LOCATIONS AND DRAINAGE AREAS** *Map Source: DeLorme Topo USA 7.0*
	APPROVED: EN	PROJECT NO.: O517107	MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA

Biological Monitoring

Biological monitoring will be conducted at JC-1, KFC-1, and MC-1 as described above and mapped in **Figure 5**. The exact length of each sampling reach will be based upon the specific SOPs and the actual habitats encountered (each reach must contain at least one type of each habitat). Biological monitoring will include habitat assessment, pebble count, macroinvertebrate community assessment, and fish community assessment. Specific methods to be followed are found in **Section 9.1.7**.

9.1.4 Long Term Monitoring Schedule

Water Quality Monitoring

Water quality will be monitored during critical conditions if possible. Critical conditions relate to low stream flow concurrent with high air and stream temperatures. Aquatic life is more prone to stress during these critical conditions, and are more likely to be susceptible to environmental stressors such as point and non-point pollution. Low stream flow tends to concentrate the point and non-point inputs, while the higher temperatures tend to decrease in-stream dissolved oxygen levels and increase toxicity of certain compounds (i.e. un-ionized ammonia). Every attempt will be made to collect samples during these critical conditions, however, extreme drought conditions currently experienced in Georgia may require that some sampling events occur at non-critical time periods. Non-critical conditions relate to increased stream flows concurrent with lower air and stream temperatures. These conditions are usually associated with the late fall to early spring time period. Increased stream flows and stream depths during this time will ensure that adequate samples can be collected at locations that tend to run dry during the summer months.

There is a USGS monitoring station in close proximity to the Monroe area identified as 02208450 Alcovy River above Covington, Georgia, 7.0 miles south of Monroe. This site has been monitored since 1972 for a variety of physical parameters, nutrients, metals, and bacteria. This site is currently on the “Real Time” data network which allows instantaneous access to precipitation, flow, and gauge height data via the USGS website (www.nwis.waterdata.usgs.gov).

Review of historical data reveals that the driest months are May through October. The wettest months occur between January and April. This is important, as rain events tend to increase storm water (non-point) inputs into the watershed, in essence “flushing” the City’s impervious and semi-impervious surfaces and depositing the accumulated material into the City’s streams and rivers. In addition, storm water also tends to collect biological pollution, such as *E. coli* and fecal coliform, and direct these stressors into the watershed. Sources of the biological pollution tend to originate from agricultural runoff and malfunctioning septic discharges and wastewater plants, which tend to fail during periods of heavy rainfall.

Review of USGS gage number 02215500 historical data reveals that the lowest average stream flows and gauge heights occur during the months from June to November. These low flow conditions directly correlate with higher stream temperatures. In terms of precipitation, there are spikes in precipitation during the warm weather months of June – September and the cold weather months of December - March. This is important, as rain events tend to increase storm water (non-point) inputs into the watershed, in essence “flushing” the City’s impervious and semi-impervious surfaces and depositing the accumulated material into the City’s streams and rivers. In addition, storm water also tends to collect biological pollution, such as *E. coli* and fecal coliform, and direct these stressors into the watershed. Sources of the biological pollution tend to originate from agricultural runoff and malfunctioning septic discharges and wastewater plants, which tend to fail during periods of heavy rainfall.

It is anticipated that two dry weather water quality sampling events will occur during the dry weather critical condition period from May to September. **One of these dry events will occur concurrently with the fish community assessment.** A third dry weather water quality sampling event will occur between October and February, **concurrent with the macroinvertebrate community assessment.** The three dry weather sampling events will use grab sampling techniques. A dry weather event will be defined as a period of at least 72-hours since the last recorded rainfall. In addition to the three dry weather events, one wet weather sampling event will occur. A wet weather event will be defined as a period of rain of at least 0.2 inches and at least 72-hours since the last recorded rainfall. It is anticipated that the wet weather event will occur during the wettest part of the year, January to April; however, this sampling event may take place any time during the year if low stream flows prohibit sampling during the recommended wet period. The wet weather sampling event will use composite sampling techniques (automated or manual). Rainfall will be monitored using a rainfall gauge located at the Jack's Creek WWTP. During these four sampling events, the in-situ and surface water sample measurements and parameters as summarized in **Section 9.1.6** should also be collected and analyzed.

Fecal coliform and E. coli sampling will follow GAEPD guidelines which include the need for a geometric mean of four (4) samples collected in a 30-day period at intervals not less than 24-hours. It is anticipated that two (2) geometric means (derived from eight individual samples) will be determined. Both geometric means will be determined from data collected during the critical condition period from May to October. The four individual samples will be collected on a regular schedule regardless of weather conditions, however, they will not overlap the time period at which the fecal coliform State criteria changes from 200 MPN/100 mL to 1000 MPN/100 mL (October/November) and 1000 MPN/100 mL to 200 MPN/100 mL (April/May).

Biological Monitoring

Georgia's peak reproduction and emergence period for aquatic insects is usually during the spring and fall seasons. However, the majority of the insects present in the stream benthos at this time will be too small to be captured in sufficient numbers to accurately characterize the community. Therefore, aquatic macroinvertebrate sampling is typically conducted in the late fall through winter season. The GAEPD Index Period for insect sampling is October through February; therefore, macroinvertebrate sampling must be conducted during this timeframe. Due to the potential for dry stream beds in the hottest part of summer, it would be preferential to sample later in the index period, January-February, to allow a healthy population of macroinvertebrates to re-colonize the streams. Note that one of the dry-weather water quality sampling events (as well as the routine in-situ water quality) described above will be conducted concurrently with the macroinvertebrate assessment.

Fish community assessments are typically conducted in the spring to fall seasons (April to October). Sampling success is highly dependent on water temperature and flow. In colder temperatures, fish tend to migrate to deeper water or under heavy cover where they are more difficult to capture by seining or electrofishing methods. In high flow conditions (usually early spring and late fall), high turbidity levels and increased movement of stunned fish due to current reduces the visibility and ability of netters to capture the fish subjects. Additionally, the late spring to fall periods represents the "worse-case-scenario", when water levels are at their lowest and pollution concentrations are at their highest levels. Since the slow moving streams in and around Monroe may go dry during the summer months (late June-September), it is recommended that fish be assessed during the spring months (April - mid June), but may extend into to the later summer months (through October) if necessary. Note that one of the dry-

weather water quality sampling events (as well as the routine in-situ water quality) described above will be conducted concurrently with the fish assessment.

A habitat assessment and pebble count should take place concurrently with the macroinvertebrate community assessment.

Biological sampling should take place two times every five years; however, sampling shall not be done in consecutive years and not more than three years apart. One assessment of each type (macroinvertebrate, fish, and habitat) is required during those years that require it.

Long Term Monitoring Schedule Overview

Water quality sampling schedule is summarized in **Table 6** below:

Table 6. Water Quality Sampling Schedule, Monroe Watershed Protection Plan

Sampling Location	Water Quality (In-situ)	Water Quality (Dry Weather)	Water Quality (Wet Weather)	Fecal Coliform & *E. coli*
JC-1 Jack's Creek @ Snows Mill Road	Each sampling event	2x (May-Sept)[1, 4] 1x (Oct-Feb)[2, 4]	1x (Jan-April)[3, 5]	8x (May-Oct)
JCT-1 Jack's Creek Tributary @ Old Athens Hwy.	Each sampling event	2x (May-Sept)[1, 4] 1x (Oct-Feb)[2, 4]	1x (Jan-April)[3, 5]	8x (May-Oct)
KFC-1 Kelly Fishpond Creek @ Dean Hill Road	Each sampling event	2x (May-Sept)[1, 4] 1x (Oct-Feb)[2, 4]	1x (Jan-April) [3, 5]	8x (May-Oct)
GC-1 Grubby Creek @ Highway 83 East	Each sampling event	2x (May-Sept)[1, 4] 1x (Oct-Feb)[2, 4]	1x (Jan-April) [3, 5]	8x (May-Oct)
MC-1 Mountain Creek @ Lynn Ammons Bridge Road	Each sampling event	2x (May-Sept)[1, 4] 1x (Oct-Feb)[2, 4]	1x (Jan-April) [3, 5]	8x (May-Oct)

[1] Sampling may take place during any time of the year if low stream flows prohibit sampling during May-Sept. One dry weather sampling event must take place concurrent with fish sampling (excluding GC-1).
[2] One dry weather sampling event must take place concurrent with macroinvertebrate sampling (excluding GC-1).
[3] Sampling may take place during any time of the year if low stream flows prohibit sampling during Jan-April.
[4] Of the 4 metals on the water quality list, only dissolved copper is required to be sampled during dry weather events.
[5] All four metals (copper, lead, zinc, cadmium) are required to be sampled during the wet weather events.

The biological monitoring schedule is summarized in **Table 7** below:

Table 7. Long Term Biological Monitoring Schedule, Monroe Watershed Protection Plan				
Sampling Location	**Macro-invertebrate**	**Fish**	**Habitat Assessment**	**Pebble Count**
JC-1 Jack's Creek @ Snows Mill Road	October – February	April-October	Concurrent with both macro and fish	Concurrent with macro
JCT-1 Jack's Creek Tributary @ Old Athens Hwy.	NA[1]	NA[1]	NA[1]	NA[1]
KFC-1 Kelly Fishpond Creek @ Dean Hill Road	October – February	April-October	Concurrent with both macro and fish	Concurrent with macro
GC-1 Grubby Creek @ Highway 83 East	NA[2]	NA[2]	NA[2]	NA[2]
MC-1 Mountain Creek @ Lynn Ammons Bridge Road	October – February	April-October	Concurrent with both macro and fish	Concurrent with macro

[1] Note: Per GAEPD personal correspondence, biological monitoring is not required at this location.
[2] Note: due to the small drainage area (<10 square kilometers/3.86 square miles) of GC-1, biological monitoring is not required.

9.1.5 Monitoring Procedures

Water Quality Monitoring

Surface water sampling techniques are geared toward one goal: collecting a representative sample that is relatively free of external factors that can compromise the integrity of the sample. Quality assurance (QA) measures will be implemented by following methods used and approved by the GAEPD. Various guidance documents may be utilized in order to attain this goal, however, it is recommended that surface water and in-situ samples and measurements be collected following the Standard Operating Procedures (SOP) as outlined in the "Georgia Environmental Protection Branch Water Quality Assurance Manual, revised January 2005" (GADNR, 1999), or the most current version of the above document. The SOPs in this guidance document fulfill requirements as set forth by the Clean Water Act and published in "Title 40 of the Code of Federal Regulations (40 CFR)".

QA sampling measures will be followed from the point of sample/data collection to the point at which the samples are submitted for analyses at a GAEPD certified laboratory. QA measures included sample identification, sample collection, sample storage, sample custody, and field records. All sampling locations will be identified with a unique identification number that is used to track the sample from time of collection to time of analyses and reporting. All samples collected are tracked using a tag/label that includes the sample location, identification number, date and time of collection, initials of the sampler(s), and analyses to be performed. All field records will be written on bound, resin coated paper logbooks that are dedicated to the watershed project. This logbook shall remain on-file and available for review if requested. Custody is documented through the use of Chain-of-Custody forms, which document and trace

possession of samples from the moment of collection to the moment it is accepted by the laboratory (or other recipient). All information is to be written using waterproof and non-erasable ink.

Additional QA measures include sample procedures that reduced the risk of sample contamination. All sample containers (either supplied by the laboratory or purchased for the project) are cleaned to levels appropriate to the analyses required. Sample containers shall be of the proper type (glass, plastic, wide mouth, Whirlpak, etc.) per the specific analyses required. Sample preservation (if required) will be performed per the test method and consist of reagent grade chemicals only. In order to risk the possibility of field contamination, field filtering of samples shall be kept to a minimum, unless required by the test method. Most methods that require filtering of the sample allow the filtering to take place under the controlled conditions of the laboratory. Additionally, all personnel safety devices (gloves, etc.) shall be of the proper type per the test method. Sampling devices (scoops, pumps, tubing, bailers, etc.) shall be cleaned according to the SOP prior to collection of each sample.

All samples shall be cooled to proper storage temperature immediately after collection. Insulated coolers will be utilized to store and transport the samples to the laboratory for analyses. Temperatures will be maintained below 4 degrees Celsius (°C) by the use of zip lock bagged ice or ice packs. All samples shall be delivered to the laboratory so that the analysis is conducted within the proper holding times as specified by the test method. Samples will either be hand delivered to the laboratory or shipped priority overnight via postal courier (i.e. FedEx or UPS). All samples shall be accompanied by a filled out chain-of-custody and the cooler integrity verified by the use of a sample seals.

Biological Monitoring

The City will conduct the biomonitoring of habitat and macroinvertebrate ecological assemblages according to the Georgia Department of Natural Resources, GAEPD "Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia - Standard Operating Procedures Version 1.0, May 2007", (GADNR, 2007). This document represents the most current guidance available for bioassessments conducted in the Southern Outer Piedmont ecoregion that include the Monroe service area. This guidance document was modified from the USEPA's "Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, 1999, Second Edition, EPA 841-B-99-002" (USEPA, 1999). The GAEPD website (https://epd.georgia.gov/macroinvertebrate-bioassessment-standard-operating-procedures-sop-and-metric-spreadsheets) should be contacted yearly for the most updated protocols.

Fish community sampling protocols will follow: "Part I: Standard Operating Procedures for Conducting Biomonitoring on Fish Communities in Wadeable Streams in Georgia (GADNR 2005). Fish community scoring protocols will follow: "Part II: Scoring Criteria for the Index of Biotic Integrity and the Index of Well-Being to Monitor Fish Communities in Wadeable Streams in the Piedmont Ecoregion of Georgia (GADNR, 2005)". The WRD website (http://www.georgiawildlife.com/node/913) should be contacted yearly for the most updated protocols.

9.1.6 Monitoring Parameters

In-situ Physical Parameters

In-situ physical water quality parameters to be directly measured include pH, temperature (water and air), specific conductance (conductivity), salinity, dissolved oxygen (DO, both mg/L and %), turbidity, and flow. Testing instruments must be calibrated daily prior to use using traceable

calibration solutions per manufacturer's specifications. The sampling methods to be followed are EPA approved and are summarized in the GAEPD QA manual.

Table 8 summarizes the parameter, EPA test method, GAEPD QA manual page number, detection limit, sample volume required, preservation, and holding time:

Table 8. In-situ Physical Measurements, Monroe Protection Plan

Parameter	EPA Method	GAEPD Manual Page #	Detection Limit	Sample Volume (mL)	Container Type	Preservative	Hold Time
pH	4500HB	Section 9, page 74	0.1 SU	100	plastic	None	Instant
Temperature (water and air)	2550B	Section 9, page 71	0.5°C	1000	plastic	None	Instant
Conductivity/ Salinity	120.1	Section 9, page 72	1.0 us/cm	100	plastic	None	28 days
DO	4500OG	Section 9, page 75	0.1 mg/L and 0.1%	300	amber glass	None	Instant
Turbidity	180.1 v2.0	Section 9, page 75	1.0 NTU	100	plastic	None	48 hours
Flow	305-X-03-004	Section 4, page 42	1.0 CFS	na	na	Na	Instant

Surface Water Chemical Analyses Parameters

Surface water analytical parameters to be measured must include 5-day biological oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), total and ortho phosphorous, nitrogen (total, Kjeldahl, ammonia, nitrite, and nitrate), hardness, alkalinity, and dissolved metals (cadmium, lead, copper and zinc), fecal coliform and *E. coli*. Surface water samples will be collected using direct dipping methods (using the laboratory sample container). The sampling methods to be followed are EPA approved and are summarized in the GAEPD QA manual. **Table 9** summarizes the parameter, EPA test method, detection limit, sample volume required, container type, preservation, and holding time:

Table 9. Surface Water Quality Measurements, Monroe Protection Plan

Parameter	EPA Method	Detection Limit	Sample Vol. (mL)	Container Type	Preservative	Hold Time
5-Day BOD	5210B	2.4 mg/L	1000	amber glass	none	48 hours
COD	410.4 v2.0	10 mg/L	125	plastic	H_2SO_4	28 days
TSS	2540 D	5 mg/L	100	plastic	none	7 days
Phosphorous, total	365.1 v2.0	0.05 mg/L	50	plastic	H_2SO_4	28 days

Table 9. Surface Water Quality Measurements, Monroe Protection Plan (continued)						
Parameter	**EPA Method**	**Detection Limit**	**Sample Vol. (mL)**	**Container Type**	**Preservative**	**Hold Time**
Ammonia-N	350.1	0.2 mg/L	400	plastic	H_2SO_4	28 days
Phosphorous, ortho	365.1 v2.0	0.01 mg/L	50	plastic	none	48 hours
TKN	351.2 v2.0	0.5 mg/L	500	plastic	H_2SO_4	28 days
Nitrite-N	300.0 2.1	0.05 mg/L	50	plastic	none	28 days
Nitrate-N	300.0 2.1	0.05 mg/L	100	plastic	none	48 hours
Alkalinity-CaCO3	2320B	10 mg/L	100	plastic	H_2SO_4	14 days
Hardness-CaCO3	2340C	1 mg/L	100	plastic	H_2SO_4	6 months
Cadmium, dissolved	200.8 v5.4	0.7 µg/L	200	plastic	none	6 months[a]
Lead, dissolved	200.8 v5.4	1 µg/L	200	plastic	none	6 months[a]
Copper, dissolved	200.8 v5.4	5 µg/L	200	plastic	none	6 months[a]
Zinc, dissolved	200.8 v5.4	10 µg/L	200	plastic	none	6 months[a]
Fecal Coliform	SM9222D	2 MPN/100 mL	125	plastic	$Na_2S_2O_3$	8 hours
E. coli	SM9223D	1 MPN/100 mL	125	plastic	$Na_2S_2O_3$	8 hours

[a] Hold time valid only after filtration and preservation by the laboratory.

9.1.7 Biological Monitoring Parameters

Habitat

The Southern Outer Piedmont ecoregion (45b) can contain both high gradient (riffle/run) and low gradient (glide/pool) stream types. The GAEPD has adopted SOPs specifically designed to adequately characterize these stream types. Various habitat observations will be documented: bottom substrate; available cover; pool variability; channel alteration (manmade), sinuosity (meandering), and flow; sediment deposition; and bank vegetative protection, stability, and width. The habitat assessment will assist the City in the evaluation of the benthic macroinvertebrate community data collected in the study. Two project scientists will independently evaluate the habitat characteristics and will complete a habitat characterization sheet for each monitoring site. The scores from the two scientists will be averaged for the final habitat score of the monitoring site. The habitat score from each monitoring site may be compared to the habitat score of a GAEPD reference site (if available) to determine any differences in habitat quality. The habitat assessment will be conducted concurrently with the macroinvertebrate assessment.

Two project scientists should independently evaluate the habitat characteristics and complete a habitat characterization sheet for each monitoring site. The scores from the two characterization sheets should be averaged for the final habitat score of each monitoring site.

Additionally, stream channel cross section and pebble count will be conducted concurrently with the habitat assessment. All required GAEPD data forms will be submitted including cross section, physical characteristics/water quality, and stream reconnaissance form.

Macroinvertebrate Community

The three biological sampling locations (identified in **Section 9.1.3** and mapped in **Figure 5**) will be surveyed for the presence of water prior to sampling. If monitoring locations go dry, the survey should be delayed at least 30-days to allow the macroinvertebrate community to re-populate the stream.

Georgia's peak reproduction and emergence period for aquatic insects is usually during the spring and fall seasons. However, the majority of the insects present in the stream benthos at this time will be too small to be captured in sufficient numbers to accurately characterize the community. Therefore, aquatic macroinvertebrate sampling is conducted in late fall through winter season. The GAEPD Index Period for insect sampling is October through February.

Benthic macroinvertebrates will be collected according to GAEPD's specialized protocol in order to accurately evaluate these communities. The protocol contains SOPs specifically designed to sample the woody debris, undercut banks, exposed vegetal roots, sediment deposited areas, and leaf packs characteristic of this region. The method utilizes the "jab or kick" method of collection. At each monitoring site, 20 jab/kick subsamples are collected using a D-frame aquatic dip net, sampling from downstream to upstream. Samples will be collected from the four habitat types (woody debris/snags, undercut banks/rootwads, leaf packs, soft sediment/sand) and composited into one, homogenous sample that will represent that monitoring station. The macroinvertebrate samples will be preserved in 90% ethanol (and stored at 6°C) and sent to the laboratory for species identification/enumeration.

Results of the identification/enumeration will be analyzed and processed to include six individual metrics that include Coleoptera Taxa, % Oligochaeta, % Plecoptera, Shredder Taxa, Scraper Taxa, and Swimmer Taxa. Individually, the six measured metrics can indicate the general condition of the stream/river reach, providing information that will indicate short term or long term exposure to environmental stressors related to impaired water quality. Collectively, the six metrics will be summed to a final index score, ranging from 0 to 100. The relative ecological condition of the stream sampling site will then be rated (very poor to very good) based on the summed metrics score.

Fish Community

Fish community assessments are typically conducted in the spring to fall seasons (April to mid-October). This time period represents the "worse-case-scenario", when water levels are at their lowest and pollution concentrations are at their highest levels. As some streams go dry during the driest months of the summer, it is preferable that fish monitoring occur early spring (i.e. April - early June). However, if fish sampling cannot occur during the preferred period, it may be extended through mid-October. Water temperatures should remain above 10^{o}C for fish sampling.

The three biological sampling locations (identified in **Section 9.1.3** and mapped in **Figure 5**) will be surveyed for the presence of water prior to sampling. If monitoring locations go dry, the

survey should be delayed at least 30-days to allow the fish community to re-populate the stream.

Using the sampling procedures outlined in the GAEPD protocols, the Mean Stream Width (MSW) will be determined at each stream sampling site. The total sampling reach length will be determined by multiplying the MSW by 35. The upstream and downstream reach locations will be marked with flagging tape. The stream reaches will be sampled via backpack electroshocker. One scientist will carry the shocker and apply the charge while the second scientist nets the stunned fish. The scientists will move from downstream to upstream, sweeping the electrodes along the banks and in the main channel to shock the fish. All habitats (pools, glides, woody debris, undercut banks, root mats, etc.) within each monitoring station will be sampled. The net will be inspected for fish over 25 millimeters (mm) and transferred to a 5-gallon bucket of aerated fresh water for identification.

Fish will be identified to the species level when possible, counted, examined for external anomalies, mass weighed by species, and returned unharmed (whenever possible) to the stream. One fish from each species can be preserved in 10% buffered formalin and retained for a reference collection of fish collected during the study, although this is not required. Fish less than 25 mm in total length will be omitted during sample processing, as they are troublesome to identify and are usually representative of young fish that can lead to erroneous conclusions when analyzing the data.

Results of the identification/enumeration will be analyzed and processed to include the indices (indicators) of fish community health. In Georgia, the Index of Biotic Integrity (IBI) is the acceptable indices. The IBI is a multimetric (measure) index that includes characteristics of the fish community, population, and individual fish observations. It includes 13 metrics, which assess the three characteristics of fish population: 1) species richness/composition; 2) trophic dynamics/composition, and, 3) fish abundance/condition. Each of the 13 metrics will be scored (1 to 5) per GAEPD protocol and summed for a single IBI score (ranging from a low of 12 to a maximum score of 60).

10.0 Deliverables

Once the Watershed Protection Plan is approved by EPD, the City will submit to the State the following information by June 30th of each year:

a. Annual certification statement of WPP implementation following the language described in Part 1.C. of NPDES permit, signed by a City representative responsible for execution of the WPP.

b. Electronic submittal that includes:

- Long-term trend and bioassessment water quality monitoring data using GAEPD's Excel Watershed Assessment and Protection Plan Data Reporting Template, available on GAEPD's website at: http://epd.georgia.gov/watershed-assessment-and-protection-plan-guidance-documents
- Long-term habitat and biological monitoring data;
- Copies of all field data sheets, laboratory taxa lists,
- Completed Excel MMI workbook used to calculate MMI scores, and Excel spreadsheets used to calculate fish IBI scores; and
- Photographs of sample sites

c. Progress Report that includes:

- Discussion of the monitoring data and results;
- Evaluation of the data in terms of water quality, biological communities' health, and trends shown by comparing the current data to data collected in previous years;
- Specific actions or BMPs that have been implemented; and,
- Summary of any changes and/or revisions to the Watershed Protection Plan, if necessary.

Refer to GAEPD'S *Watershed Protection Plan Annual Reporting Requirements* guidance document for additional details as to the required submittals for annual reporting. This document can be downloaded from GAEPD's website at: http://epd.georgia.gov/watershed-assessment-and-protection-plan-guidance-documents.

11.0 References

Federal Water Pollution Control Act Amendments of 1972 as Amended by the Clean Water Act of 1977. Published in the Code of Federal Regulations “Title 40: Protection of Environment, Part 136-Guidelines Establishing Test Procedures for the Analyses of Pollutants” (40 CFR Part 136).

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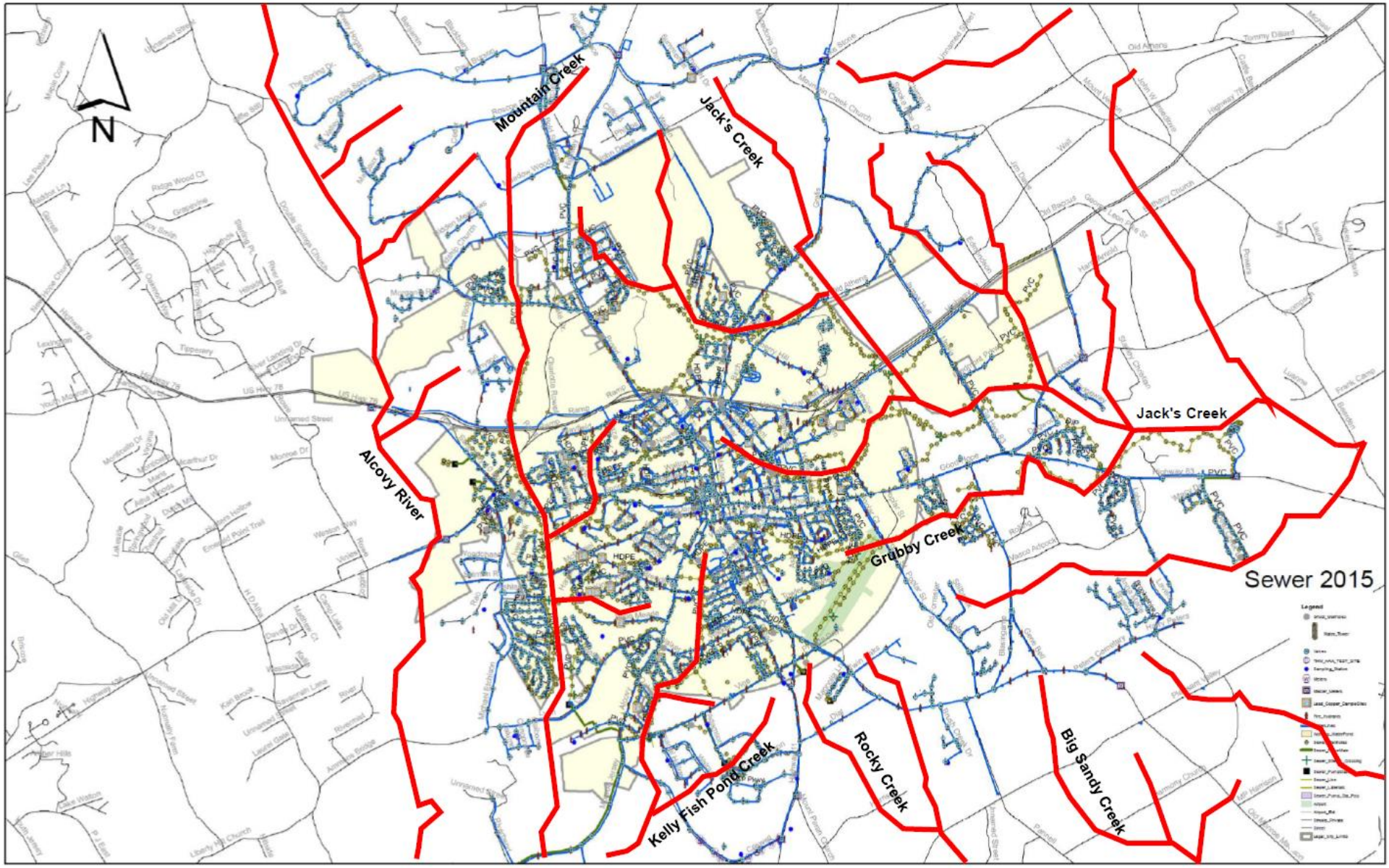
APPENDICES

Appendix A

Maps

Walton County, Georgia
Comprehensive Plan Update
2006 - 2026
Existing Land Use
City of Monroe
Agriculture
Forestry
Commercial
Government
Industrial
Multi-Family Residential
Park/Recreation/Conservation
Public/Institutional
Residential
Transportation/Communication/Utility
Undeveloped/Unused
Road Type
State Route
Ramp
County Road
City Street
Private Road
Unknown
N
E
S
W
0 0.2 0.4 0.6 0.8 1
Miles
Northeast Georgia Regional Development Center - 2006/2007
NEGRC

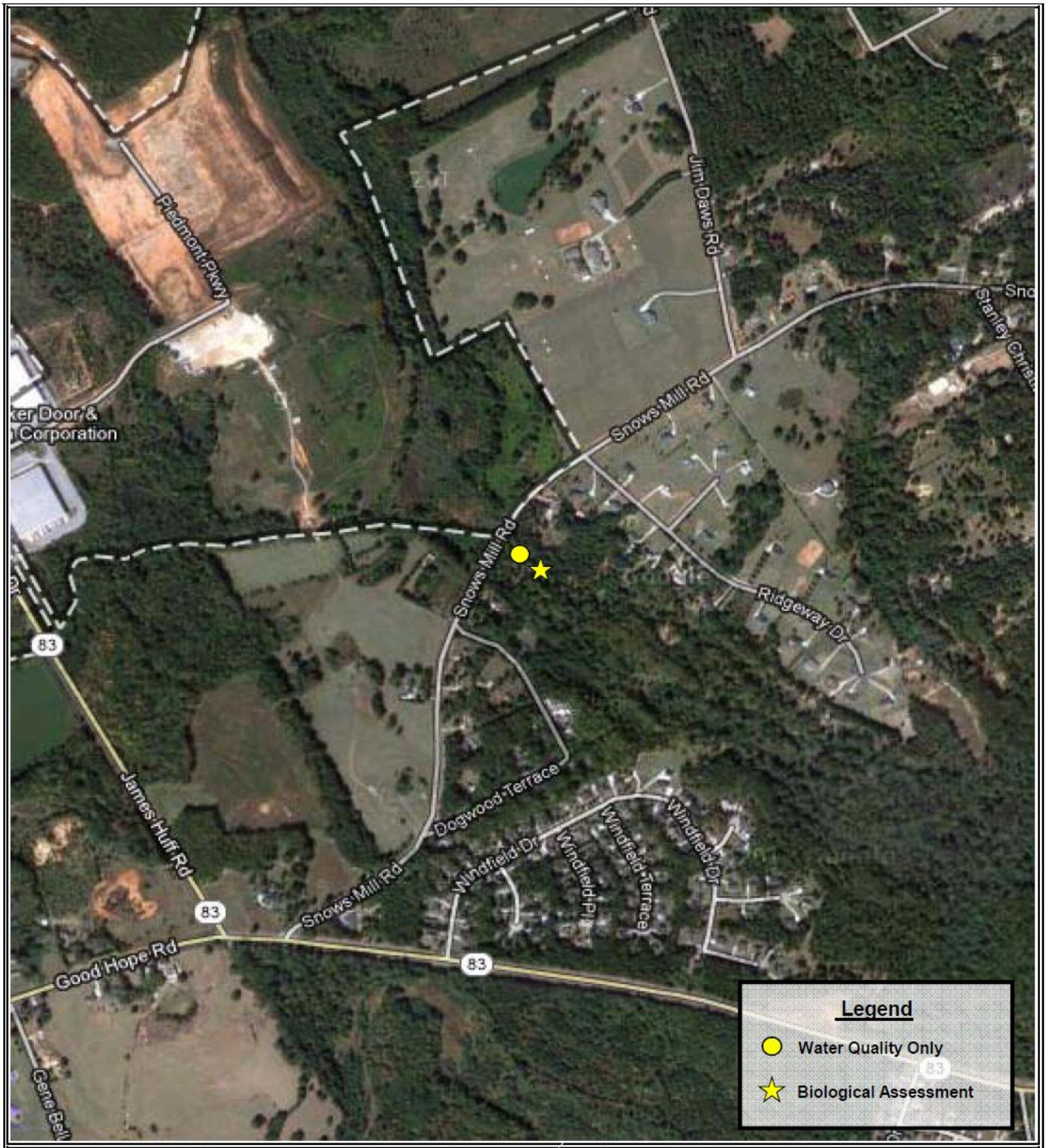
Walton County, Georgia
Comprehensive Plan Update
2006 - 2026
City of Monroe
Future Development Map
Commercial
Downtown
High Density Residential
Industrial
Office/Professional
Park/Recreation/Conservation
Public/Institutional
Residential
Transportation/Communication/Utility
N
E
S
W
0
0.375
0.75
1.5
Miles
NEGRDC GIS
Northeast Georgia Regional Development Center - July, 2007



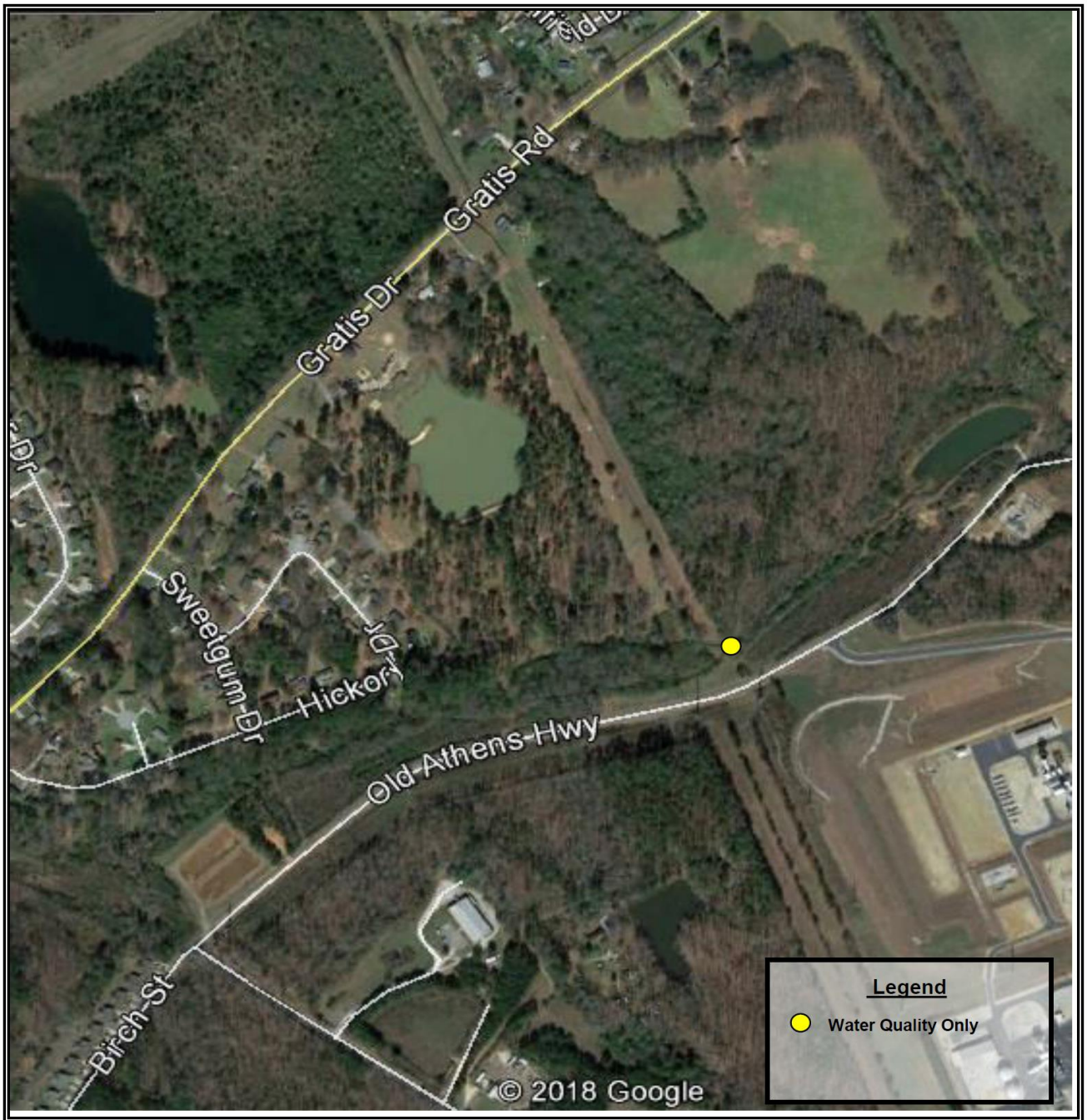
Sewer Lines (green), Water Lines (blue), and streams (red)

Appendix B

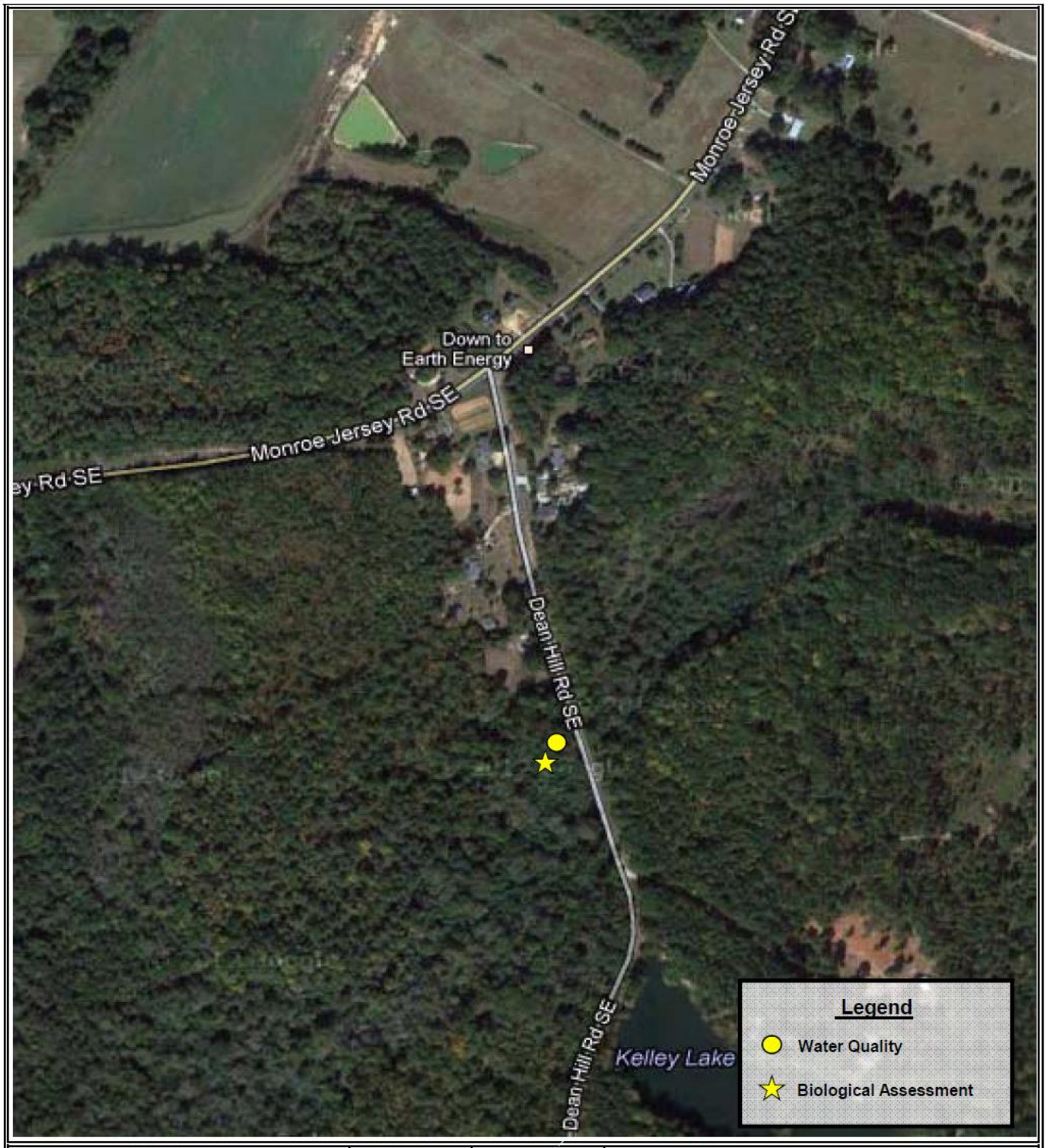
Sampling Location Maps



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 2/26/13	**MONROE SAMPLING LOCATIONS** **JC-1 Jack's Creek @ Snows Mill Road**
	APPROVED: PW	PROJECT NO. 5131056	*Map Source: Google Earth* MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 1/22/18	**MONROE SAMPLING LOCATIONS** **JCT-1 Jack's Creek Tributary @ Old Athens Highway** *Map Source: Google Earth* MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA
	APPROVED: EN	PROJECT NO. 517107	



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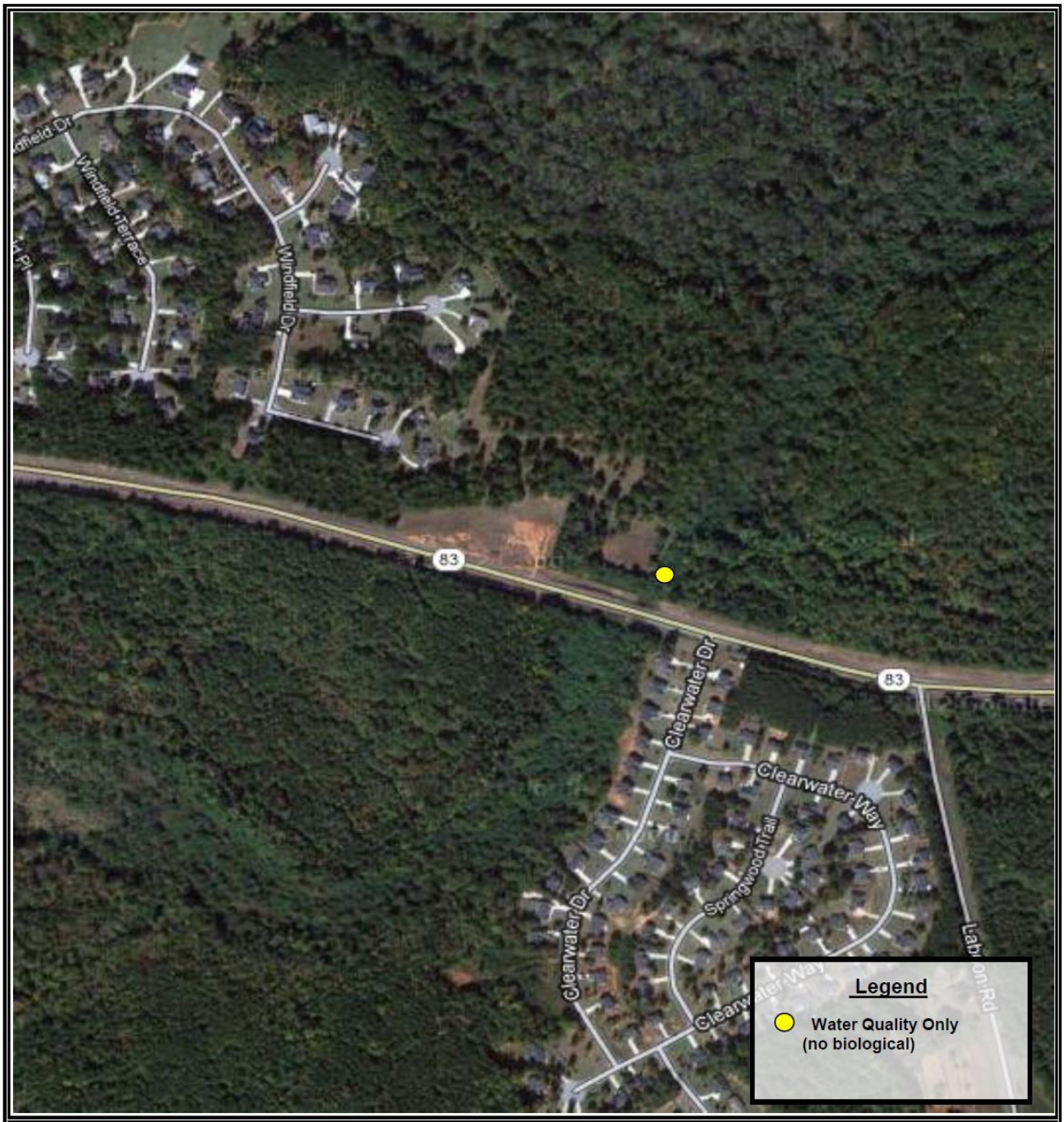
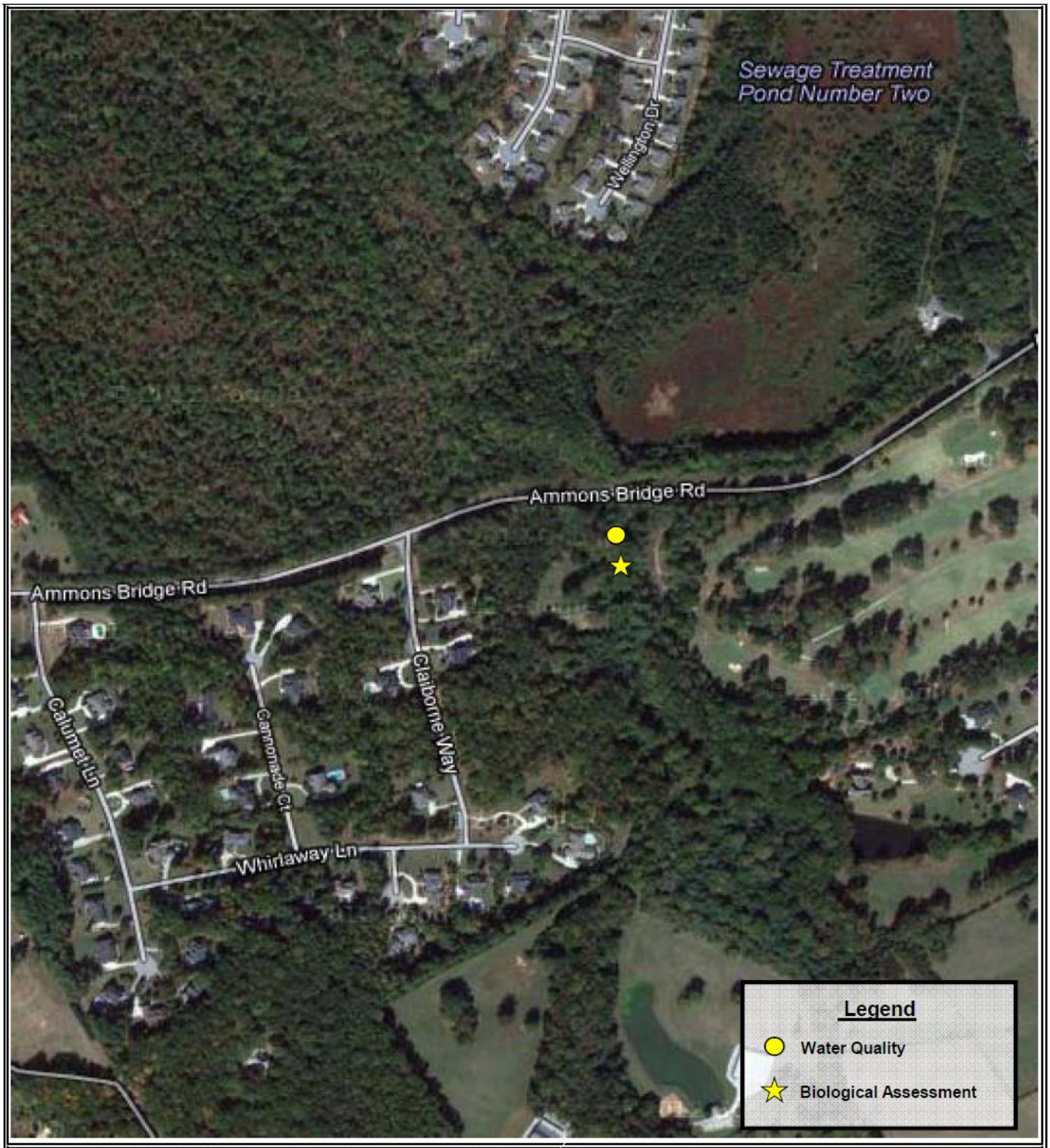
Engineering • Consulting • Testing

95 Chastain Road Kennesaw, GA 30144
Phone: (770) 424-6200 Fax: (770) 424-9982

DRAWN BY:	DATE:	MONROE SAMPLING LOCATIONS
ASP	2/26/13	KFC-1 Kelly Fishpond Creek @ Dean Hill Road
APPROVED:	PROJECT NO.	*Map Source: Google Earth*
PW	5131056	MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 2/26/13	**MONROE SAMPLING LOCATIONS** **GC-1 Grubby Creek @ Highway 83 East**
	APPROVED: PW	PROJECT NO. 5131056	*Map Source: Google Earth* MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA



psi Information To Build On Engineering • Consulting • Testing 95 Chastain Road Kennesaw, GA 30144 Phone: (770) 424-6200 Fax: (770) 424-9982	DRAWN BY: ASP	DATE: 2/26/13	**MONROE SAMPLING LOCATIONS** **MC-1 Mountain Ck @ Lynn Ammons Bridge Rd**
	APPROVED: PW	PROJECT NO. 5131056	*Map Source: Google Earth* MONROE WATERSHED ASSESSMENT MONROE, WALTON COUNTY, GEORGIA