

**WATER QUALITY MONITORING PLAN
FOR THE
INDIAN CREEK WATER SUPPLY RESERVOIR
Carroll County, Georgia**

SAS 2009-00042



Prepared for:

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1.0 Background and Purpose of Water Quality Monitoring Plan

By letter dated June 19, 2019, the U.S. Army Corps of Engineers (USACE) requested that the Carroll County Water Authority (CCWA) prepare a monitoring plan to “include baseline water quality and biological sampling downstream of the proposed dam as well as long-term sampling during construction and operation of the reservoir.” The USACE requested that both U.S. Environmental Protection Agency (USEPA) and Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD) be consulted to provide input and that the plan be submitted to the USACE and USEPA for concurrent review. CCWA initiated coordination with EPD on August 13, 2019 and USEPA on August 21, 2019. The monitoring plan herein provides a reasonable strategy to establish measurable criteria to determine if there are adverse impacts to water quality and the integrity of the biological community as a result of the Indian Creek Reservoir and the associated Little Tallapoosa River withdrawal. CCWA asserts that the strategies outlined below will achieve this goal.

2.0 Monitoring Location

2.1 Watershed Features

The proposed Indian Creek Water Supply Reservoir Project takes place entirely within the Indian Creek watershed of Carroll County and is contained in the Upper Tallapoosa Basin (8-digit HUC 03150108; Figure 1). The Indian Creek 10-digit HUC (0315010810) and Little Tallapoosa River 8-digit HUC (03150108), are classified by the GADNR as high priority watersheds within the 2015 Georgia State Wildlife Action Plan (SWAP). The SWAP identifies these watersheds under “Map Class 1,” which is of “moderate global significance,” the lowest tier of high priority watershed designation within this plan. The proposed raw water intake and pump station are located along the Little Tallapoosa River. The Little Tallapoosa watershed (10-digit HUC 0315010810) lies almost entirely within Carroll County, and the river is currently the primary drinking water source for the City of Carrollton whose withdrawal is upstream of CCWA’s proposed withdrawal. According to the 2018 Integrated 305(b)/303(d) List for the Tallapoosa River Basin, the Little Tallapoosa River at the Raw Water Intake and Pump Station is listed as not supporting the designated use (Fishing) due to increased sediment load and fecal coliform contamination.

2.2 Monitoring Sites

CCWA proposes three sites, two in the Little Tallapoosa River and one in Indian Creek, for the physiochemical water quality and biological integrity monitoring. The sites are depicted on Figures 2a-b and include:

- Site 1: upstream of the proposed Little Tallapoosa River intake at Reavesville Road approximately 1/2 mile from the proposed intake (Lat: 33.501206°, Long: -85.252592°).
- Site 2: downstream of the proposed Little Tallapoosa River intake at Highway 100 approximately 2-3/4 miles from the proposed intake (Lat: 33.492581°, Long: -85.279248°).
- Site 3: downstream of the proposed Indian Creek Reservoir on Indian Creek at Teague Road on the upstream side of the road crossing approximately 1/4 mile from the Indian Creek Reservoir dam (Lat: 33.611736°, Long: -85.282425°).

3.0 Water Quality Monitoring Methodology

3.1 Water Quality Data Collection Sequence, Frequency and Duration

Water quality sampling will begin a minimum of 12 months prior to land disturbance at the reservoir site and will continue until after the later to occur of 10 years from initial land disturbance or 3 years after the reservoir is initially filled. Monitoring of activities associated with the construction of the Indian Creek Water Supply Project will be separated into three key phases: Baseline, Construction and Reservoir Filling, and After Initial Reservoir Filling. The Baseline Phase will be the collection of baseline data in order to establish a reference for current conditions upstream and downstream of the water supply intake (Sites 1 and 2) and downstream of the proposed reservoir (Site 3). The Construction and Reservoir Filling Phase will allow the collection of data during construction activities at the reservoir and during initial filling of the reservoir to normal pool (1161' msl). The After Initial Reservoir Filling Phase will be the collection of data following the reservoir being initially filled and during typical operations of the reservoir.

Water quality data collection sequence, frequency and duration are summarized in Table 1 below.

Table 1. Physicochemical Water Quality and Biological Monitoring for Indian Creek Water Supply Reservoir Monitoring Sites 1, 2, and 3.

Monitoring Phase	Start	Frequency and Duration	
		Physicochemical Water Quality	Biological Integrity
Phase 1- Baseline Data	Begins a minimum of 12 months prior to commencing land disturbance at the reservoir site.	Continuous sampling every 15 minutes during Phase 1 and 2.	One sampling event within the 12 months prior to commencing land disturbance at reservoir site.
Phase 2- Construction and Reservoir Filling	Begins with the start of land disturbance at the reservoir site.		Annual sampling.
Phase 3- After Initial Reservoir Filling	Begins once the reservoir is initially filled to the normal pool elevation of 1161' msl.	Continuous sampling every 15 minutes until the later occurrence of 10 years after the start of Phase 2 or 3 years after initial reservoir filling.	Sampling will occur until the later occurrence of 10 years after the start of Phase 2, or 3 years after initial reservoir filling. Annual sampling for the first three years of Phase 3 and every other year thereafter until the end of Phase 3.

3.2 Parameters

3.2.1 Physicochemistry

Physicochemistry water quality monitoring stations will be maintained at the three proposed monitoring sites, which includes the existing United States Geological Survey (USGS) stream gage at Site 2 (USGS 02413210) and two new gages which CCWA will contract with USGS to install and monitor. Data from all three gages will be continuously recorded every 15 minutes for pH, dissolved oxygen (DO), temperature, and flow and posted electronically such that EPD may view the current and previous conditions.

3.2.2 Biological

Biological monitoring of benthic macroinvertebrates, periphyton, physical habitat, and fish will be maintained at Sites 1-3. Benthic macroinvertebrate and physical habitat samples will be collected

according to *Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia* (GADNR, 2007), and periphyton samples will be collected concurrently with benthic macroinvertebrates and physical habitat samples following *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Section 6* (USEPA 1999; EPA 841-B-99-002), except changes in procedure will occur following the stream protocols amended by GADNR where applicable (GADNR 2007). Collection of fish data and specimens will occur according to *Standard Operating Procedures for Conducting Biomonitoring on Fish Communities in Wadeable Streams in Georgia* (GADNR, 2005). Field samples will be collected during optimal periods based upon seasonal biotic activity (Fish: May-November and Macroinvertebrates, Physical Habitat, and Periphyton: October-February). In addition to physicochemical data collected at the designated USGS stream gage stations (See section 2.2), *In situ* water quality measurements will be taken for water temperature, dissolved oxygen (DO), pH, turbidity, and specific conductance.

3.3 Performance Standards

3.3.1 Physicochemistry

The performance standards for physicochemistry parameters will fall within the specific water quality criteria based upon the EPD and USEPA approved Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03.

3.3.2 Biological

A reference condition will be established based upon integrity scores for MBI and IBI from the baseline data obtained during Phase 1. Index scores falling within 10% of the baseline score will be considered as having not deviated from the established reference baseline. The reasoning for this criteria is for the integrity scores to be sustained. Given the chronological site based approach for establishment of reference communities, the natural variation in ecosystem process would need to be accounted, and assuming index scores deviating less than 10% from baseline scores would be a part of natural fluctuations in natural communities.

4.0 Monitoring Site Evaluation

4.1 Annual Reporting

Annual reports will be prepared and submitted by April 1st of the following calendar year to summarize the previous years data. Physicochemical parameters between January 1st and December 31st will be reported as having been met or specific periods of not meeting the criteria will be reported. Index scores from biological monitoring will be reported as having sustained or having deviated from baseline scores (>10%).

4.2 Final Evaluation

After the later to occur of 10 years from initial land disturbance or 3 years after the initial reservoir filling to 1161' msl, the data will be evaluated to determine if the standards set in the plan are being met. If the standards are being met, monitoring will cease except for the parameter of flow. The dam and associated spillway system will be designed and constructed such that there are sufficient means to strategically release water to address potential water quality deficiencies throughout the lifetime of the dam.

5.0 Remediation Measures

If performance standards are not met as summarized herein, flow conditions downstream of the dam can be adjusted by altering the rate and depth of the discharges from the reservoir.

6.0 References

Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. U.S. Environmental Protection Agency; Office of Water; Washington, D.C.

Georgia Department of Natural Resources Wildlife Resources Division Fisheries Management Section. 2005. Standard Operating Procedures for Conducting Biomonitoring on Fish Communities in Wadeable Streams in Georgia. GADNR.

Georgia Department of Natural Resources Environmental Protection Division Watershed Protection Branch. 2007. Macroinvertebrate Biological Assessment of Wadeable Streams in Georgia Standard Operating Procedures. GAEPD.

Georgia Department of Natural Resources. 2015. Georgia State Wildlife Action Plan. Social Circle, GA: Georgia Department of Natural Resources.

Georgia Rules. (2000). *Regulations for Water Quality Control*. Chapter 391-3-6-. 03, Water Use Classifications and Water Quality Standards.

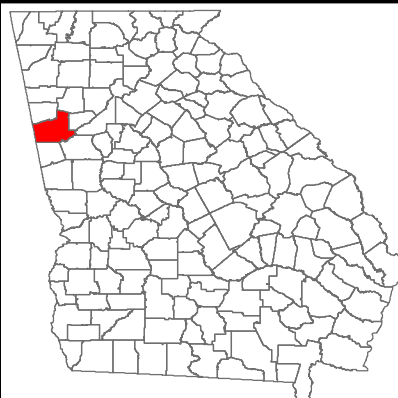
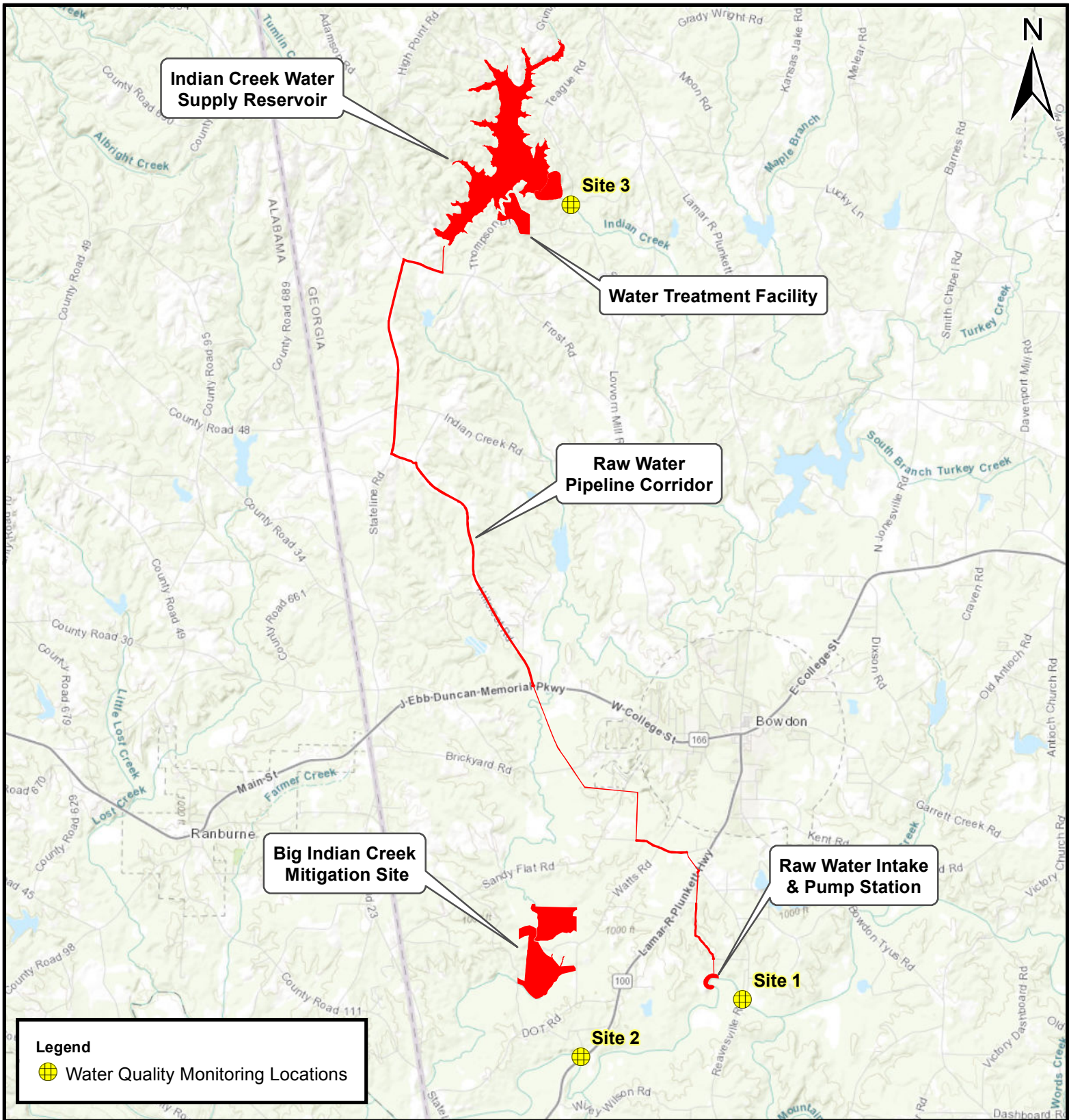
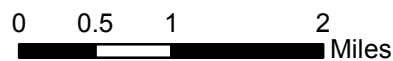


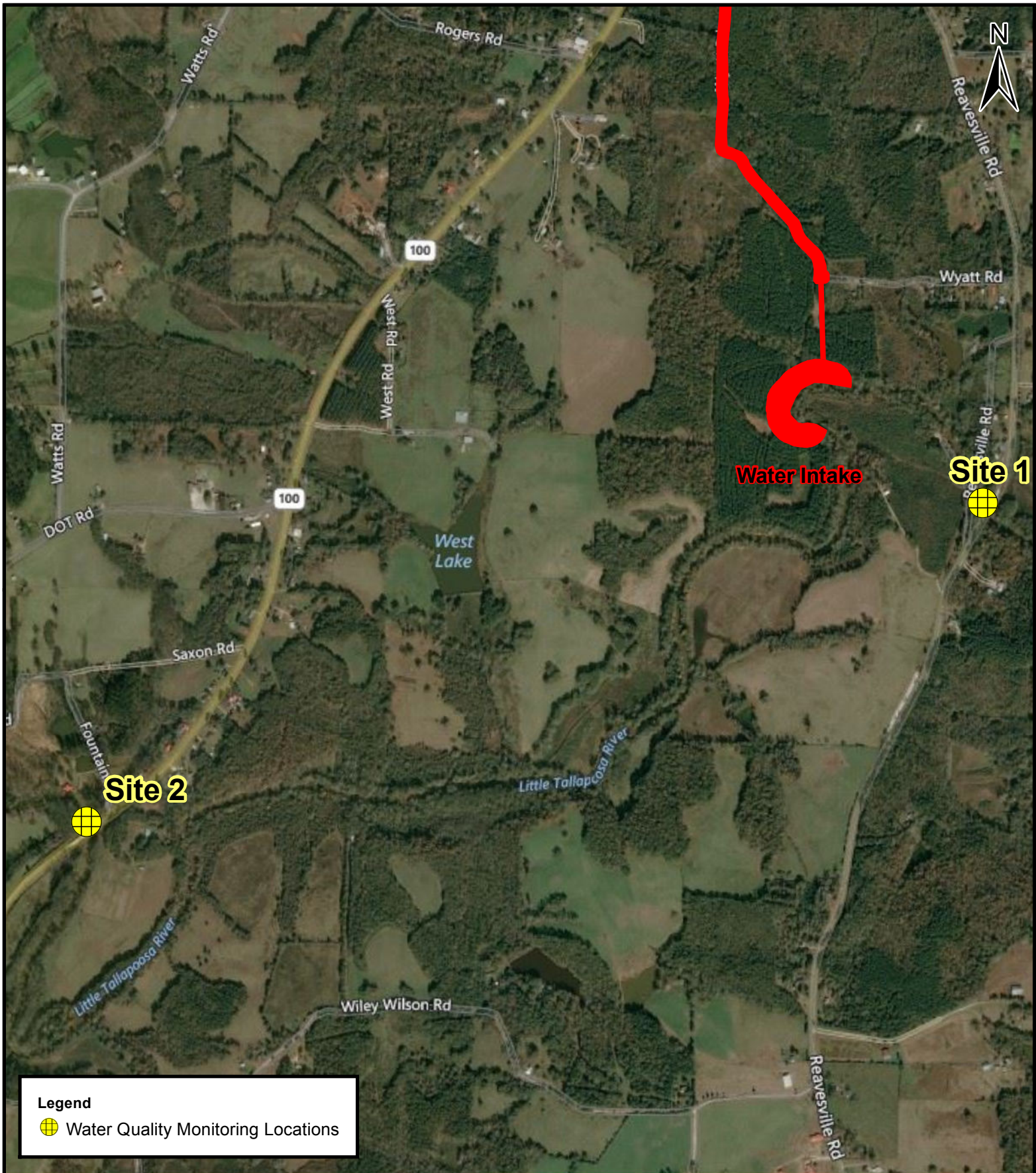
Figure 1 Project Location Map

Carroll County Water Authority
 Indian Creek Water Supply Reservoir
 Water Quality Monitoring Plan
 Carroll County, Georgia



Imagery Source: USGS Topographic Quadrangle
 (250K Rome, Atlanta, Greenville, Athens, Phenix Macon)
 Print Date: 9/10/2019

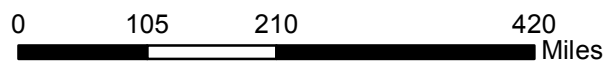




Legend
 Water Quality Monitoring Locations

Figure 2a
Water Quality Monitoring
Sites 1 & 2 Location Map

Carroll County Water Authority
 Indian Creek Water Supply Reservoir
 Water Quality Monitoring Plan
 Carroll County, Georgia



Imagery Source: Bing Maps Aerial
 Print Date: 9/10/2019

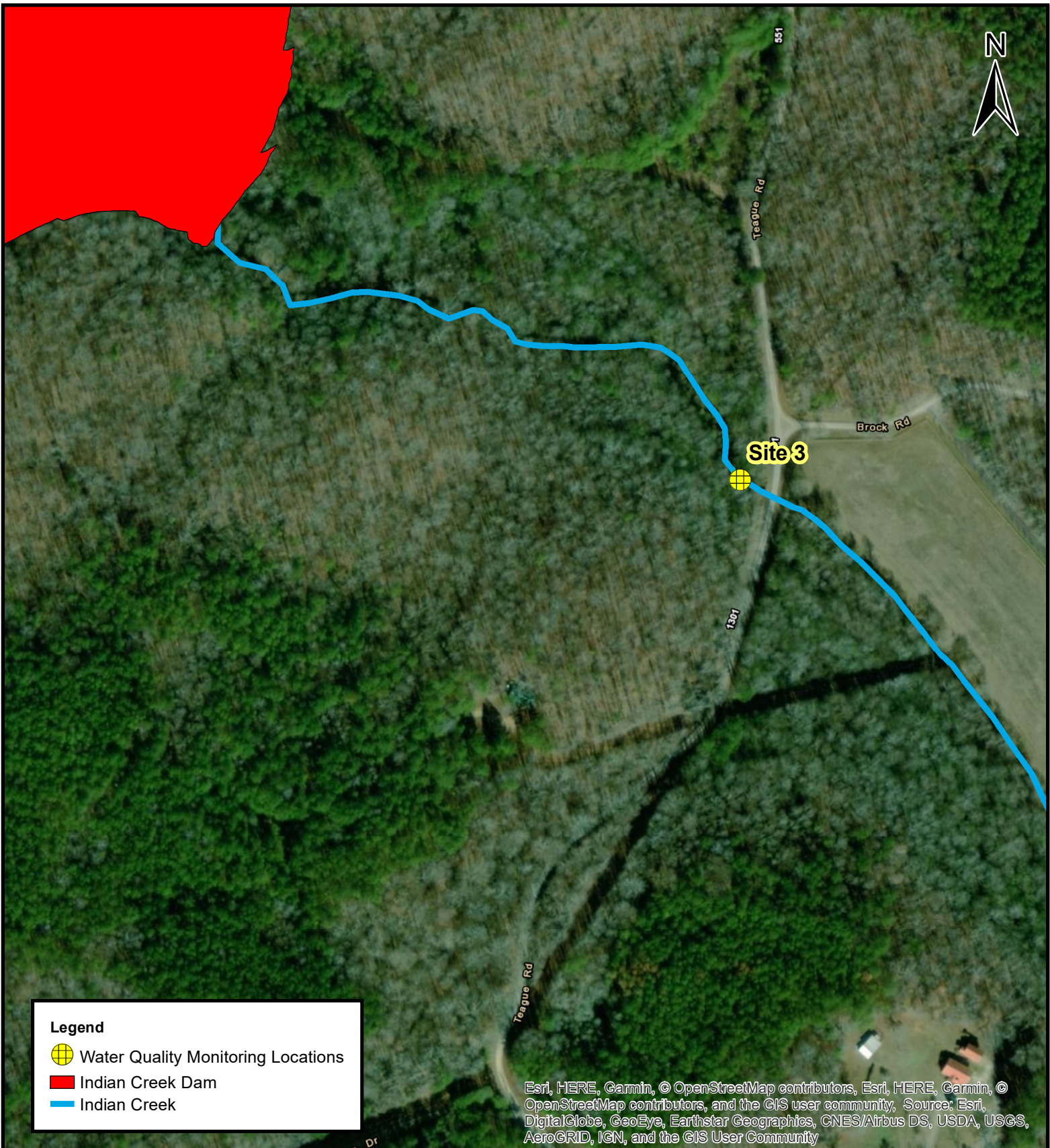
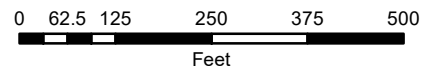


Figure 2b Water Quality Monitoring Site 3 Location Map

Carroll County Water Authority
Indian Creek Water Supply Reservoir
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Print Date: 9/11/19