

# Infrastructure Associated with Indian Creek Reservoir

## Alternatives Analysis

**Prepared for:**  
**Carroll County Water Authority**  
**January 2018**

## Infrastructure Alternatives Analysis: Executive Summary

Carroll County Water Authority's water supply project consists of:

1. Reservoir on Indian Creek,
2. Raw water intake and pump station on the Little Tallapoosa River,
3. Water treatment facility, and
4. Raw water pipeline from the Little Tallapoosa River intake to the reservoir.

The location of each component is interdependent. CCWA first selected the reservoir site because it is the component with the least flexibility in location and has the largest potential impact. The next components to be sited are the water treatment facility and the raw water intake on the Little Tallapoosa River. While each have some flexibility, logistics limit their location as well. Finally, the raw water pipeline was sited to connect the reservoir and preferred intake site.

The selection of the final location of each infrastructure component was made based on environmental and practicability considerations. CCWA worked alongside Krebs Engineering and Schnabel Engineering to select practicable alternate locations for the water treatment plant, raw water intake and pump station and the raw water pipeline. Eco-Tech Consultants, Inc. ("Eco-Tech") was then engaged to assess the potential environmental impacts for the alternatives for each component. Eco-Tech's report, including figures showing the alternate locations of each infrastructure component and an assessment of potential environmental impacts is attached hereto. In addition to the environmental considerations, CCWA also considered the cost of the alternates for each component. Below is a brief synopsis of CCWA's selection of each component.

### Water Treatment Plant:

CCWA identified three (3) water treatment plant sites adjacent to the Indian Creek Reservoir which were logistically feasible:

- Alternative- A: 66.2 acres
- Alternative-B: 37.2 acres
- Alternative-C: 59.8 acres

Eco-Tech identified potential impacts to aquatic resources for each alternative which, if reduced to a comparative analysis, results in a site ranking from least impacts to most of B, C and A. From a cost standpoint, CCWA considered land acquisition costs, proximity to the reservoir, access roads, and the potential cost of mitigating for environmental impacts. The cost considerations result in a site ranking from least costly to most of B, C and A. Based on these analyses, CCWA selected Alternative-B as the preferred alternative.

### Raw Water Intake and Pump Station on the Little Tallapoosa River

CCWA identified two (2) raw water intake and pump station sites along the Little Tallapoosa River.

- Alternative-1: upstream location
- Alternative-2: downstream location

CCWA's main considerations for selection of these sites was the ability to preserve water quality and intake functionality while avoiding environmental impacts. Alternative-2 was selected as the preferred alternative because its location in the bend of the Little Tallapoosa River should provide a deeper pool with lower

turbidity for the intake. Additionally, Alternative-2 has less potential for impacts to aquatic resources. Eco-Tech's analysis and maps of the sites are included in its report attached hereto.

#### Raw Water Pipeline

CCWA identified two (2) pipeline routes which connect the Indian Creek Reservoir and the selected raw water intake and pump station on the Little Tallapoosa River.

- Alternative-A: 48,507 linear feet
- Alternative-B: 48,353 linear feet

CCWA selected Alternative-B as the preferred alternative because it has lower potential for environmental impacts (no parallel impacts unlike Alternative-A) and because it is shorter and therefore less costly than Alternative-A.

#### Preferred Alternative Jurisdictional Determination

Following selection of the preferred water treatment plant site (Alternative-B), raw water intake and pump station (Alternative-2) and raw water pipeline (Alternative-B), CCWA engaged Eco-Tech to conduct a jurisdictional waters determination on the selected sites and engaged R.S. Webb & Associates to prepare a Phase I cultural resource assessment of the selected pipeline route. Copies of these reports are included under separate tabs in this Section 404 Permit application.

# **ALTERNATIVES ANALYSIS**

## **FOR THE**

# **INFRASTRUCTURE OF THE INDIAN CREEK RESERVOIR**

**Carroll County, Georgia**

**SAS 2009-00042**



**Prepared for:**

Carroll County Water Authority  
556 Old Bremen Road  
Carrollton, GA 30117



**Prepared by:**

Eco-Tech Consultants, Inc.  
1220 Kennestone Circle, Suite 100  
Marietta, GA 30067



**January 2018**

## **1.0 INTRODUCTION**

Eco-Tech Consultants, Inc. (Eco-Tech) was retained to provide an analysis of potential environmental impacts associated with project infrastructure supporting the proposed Indian Creek Water Supply Reservoir. Various alternatives were investigated for the proposed water treatment facility, raw water intake and pump station site, and the raw water pipeline corridor (Figure 1). The proposed reservoir will be designed as a pumped-storage facility and will require the diversion of raw water from the Little Tallapoosa River to the reservoir site. Three water treatment facility sites (Figure 2), two raw water intake and pump station sites (Figure 3), and two raw water pipeline routes (Figures 4, 4a, & 4b) were investigated for potential “waters of the United States” (streams, wetlands, and open waters) impacts. All potential infrastructure sites and pipeline routes were investigated in the field for the presence of waters of the United States with the exception of Water Treatment Facility Alternative-A (WTF Alt-A), which was inaccessible due to private property access constraints.

Detailed design and construction plans have not yet been prepared for each of these project infrastructure components. As such, no determination of potential impact extent (linear feet and/or acreage) can be calculated at this time. Some impacts may be avoidable through designed avoidance and minimization measures while others are clearly not avoidable due to location, topography, and existing infrastructure.

Siting of the infrastructure alternatives was dependent upon several factors including location of the proposed reservoir, location of suitable pool features within the Little Tallapoosa River capable of supporting a submerged intake, existing roadway and other utilities, topography, existing right-of-way (ROW), and existing property boundaries. The raw water pipeline corridor is also dependent upon the location of the least environmentally damaging alternative raw water intake. As such, the preferred water treatment facility was selected first, followed by the preferred raw water intake and pump station. Any potential pipeline alignment that was dependent upon selection of a non-preferred intake location was eliminated from further consideration.

## **2.0 METHODS**

A desktop assessment of potential waters of the U.S. was conducted for WTF Alt-A using available Geographic Information System (GIS) data sets, topographic mapping, and proposed boundary shapefiles, supplied by Schnabel Engineering, to complete the potential aquatic impact analysis. Eco-Tech downloaded the most recent available United States Geological Survey (USGS) 7.5-minute, 1:24,000-scale quadrangle maps, aerial photographs, Natural Resources Conservation Service Soil Survey (SSURGO) Data, National Wetland Inventory (NWI) Maps, and National Hydrography Dataset (NHD) datasets for the respective alternative sites study areas. Prior to wetland and stream field investigations conducted within the remaining alternatives, Eco-Tech reviewed the documents prepared during previous permitting efforts, including the Jurisdictional Waters Determination (Eco-South 2008/Revised 2011), as well as available GIS data sets listed above.

Wetland field investigations were conducted in 2011 and 2017 within each alternative site, except WTF-A, using the three-factor approach described in the 1987 *Corps of Engineers Wetlands Delineation Manual*, Part 328 of Title 33 Code of Federal regulations, and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)*. The

Regional Supplement provides a more precise framework for wetland delineation and region-specific indicators of wetland hydrology, hydric soils, and hydrophytic vegetation. Soils, hydrology, and vegetative characteristics were examined within each surveyed wetland area.

Eco-Tech personnel evaluated the plant communities of each assessed area by recording the absolute percent covers of observed plant species in each of the four classified strata (when present): tree, sapling/shrub, herbaceous, and woody vine. The wetland indicator status for each plant species, based on the most current 2016 National Wetland Plant List, was then used to determine dominance using the 50/20 Rule.

Soil profiles were observed in order to determine the presence of an aquic moisture regime (hydric). Soil samples were analyzed with Munsell Soil Color Charts (2000) to identify the hue, value, and chroma of soil samples. Hydric soil indicators were based upon the National Technical Committee for Hydric Soils *Field Indicators of Hydric Soils in the United States* (USDA, Natural Resources Conservation Service. Version 8.1, 2017). Presence of a depleted matrix (Indicator F3) was the most commonly noted indicator of hydric soils in all project areas. Eco-Tech evaluated wetland hydrology and made note of both primary and secondary indicators as defined by the Regional Supplement (USACE 2012).

Stream field investigations were conducted by Eco-Tech staff according to the North Carolina Division of Water Quality's *Methodology for Identification of Intermittent and Perennial Streams and Their Origins* (version 4.11). This manual provides a numerical rating system used to objectively identify ephemeral, intermittent and perennial streams (NC. Division of Water Quality, 2010). Eco-Tech observed a minimum of 100 feet of channel in order to objectively evaluate the flow regime of each linear feature encountered based on 26 geomorphic, hydrologic, and biological characteristics. Flow regime evaluations were conducted along the upstream extent of each reach or along their interception with the project area's boundary. Numerous photos were collected at the evaluation site along with pertinent field notes in order to document the present condition of the linear feature in question.

### **3.0 WATER TREATMENT FACILITY ALTERNATIVES**

Three water treatment facility alternatives, varying in parcel size from 37.2 acres to 66.2 acres, were identified within the immediate vicinity of the proposed Indian Creek Water Supply Reservoir.

Water Treatment Facility (WTF) Alternative-A is a 66.2-acre parcel located approximately 0.2-mile northeast of the proposed dam location. It is generally bound by Johnson Road to the north, Teague Road to the west, and Brock Road to the south. It is largely comprised of a loblolly pine (*Pinus taeda*) plantation with small mixed mature hardwood drainages sloping northwest to southeast. Several small forested roads lead to a farm pond approximately 3.2 acres in size. Field investigations were not completed within WTF Alternative-A due to private property access constraints. Based on available mapping and recent aerial photography the site is likely to contain one ephemeral stream, one intermittent stream feeding the pond, one scrub-shrub wetland around the pond margin, one open water wetland (farm pond), and one perennial stream draining the pond (Figure 2). Construction of the proposed water treatment facility, associated roadways, parking areas, and other utilities may result in impacts to any or all aquatic resources present within the site.

WTF Alternative-B is a 37.2-acre parcel located approximately 0.2-mile southwest of the proposed dam location. It is generally bound by the proposed reservoir to the north, and Thompson Road to the south. It is largely comprised of early successional natural regenerated forest with small mature hardwood drainages sloping southeast to west. Thompson Road is a gated, unimproved roadway forming the southern boundary of the site. The site's northern boundary is directly adjacent to the proposed reservoir's normal pool boundary but uphill from any aquatic resources, including ephemeral stream heads, delineated within the proposed normal pool. Field investigations confirmed there are no existing aquatic resources within WTF Alternative-B (Figure 2). Construction of the proposed water treatment facility, associated roadways, parking areas, and other utilities would not impact on-site aquatic resources.

WTF Alternative-C is a 59.8-acre parcel located approximately 0.5-mile southwest of the proposed dam location. It is generally bound by the proposed reservoir to the north, and bisected by Thompson Road. It is largely comprised of loblolly pine plantation with small mixed mature hardwood drainages sloping southeast to northwest. Field investigations identified three ephemeral streams that drain into the proposed reservoir within WTF Alternative-C (Figure 2). Construction of the proposed water treatment facility, associated roadways, parking areas, and other utilities may result in impacts to any or all aquatic resources present within the site.

Early coordination conducted with the Georgia Department of Natural Resources (GDNR) and United States Fish and Wildlife Service (USFWS) on December 12, 2017 did not reveal any records of federally listed species within a 3-mile radius of the proposed reservoir site. As such, no impacts to federally listed species are anticipated in association with any of the three water treatment facility alternatives.

Table 1 provides a summary of potential aquatic resource impacts within each water treatment facility alternative.

**Table 1.** Summary of Potential Aquatic Resource Impacts within the Water Treatment Facility Alternative Sites in Carroll County, Georgia.

Alternative	Size (acres)	Waters of the U.S.	Potential Aquatic Impacts
WTF Alternative-A	66.2	Ephemeral Stream	3 Stream Reaches One Wetland One Open Water Wetland
		Intermittent Stream	
		Scrub-Shrub Wetland	
		Open Water Wetland	
		Perennial Stream	
WTF Alternative-B	37.2	--	No Aquatic Resources
WTF Alternative-C	59.8	Ephemeral Stream	3 Ephemeral Streams
		Ephemeral Stream	
		Ephemeral Stream	

Based on resources identified in the field and at a desktop level assessments the WTF Alternative-B has been selected as the least environmentally damaging practicable alternative.

#### 4.0 RAW WATER INTAKE AND PUMP STATION ALTERNATIVES

Two raw water intake and pump station alternatives, varying in size from approximately 5 to 7 acres, were identified along the most direct path from the Indian Creek Water Supply Reservoir and the Little Tallapoosa River.

Raw Water Intake (RWI) and Pump Station Alternative-A is located along the Little Tallapoosa River approximately 8 miles south of the proposed dam location. It is generally bound by Reavesville Road to the west, Lee Hunt Road to the north, and the Little Tallapoosa River to the south. It is largely comprised of grazed pasture lands and mature riparian mixed hardwood forest. Field investigations were originally completed in 2011 and re-verified in spring of 2017, confirming the presence of one forested/emergent wetland along the forest edge of the grazed pasture. Roadside drainage features convey stormwater along the east shoulder of Reavesville Road into a small depressional feature along the right bank of the Little Tallapoosa River (Figure 3). Due to its location, avoidance of this wetland may prove difficult during construction of any proposed intake, pump station, or associated utilities. Construction of the proposed raw water intake and pump station, associated roadways, parking areas, and other utilities may result in impacts to any or all aquatic resources present within the site.

RWI Alternative-B is located along the Little Tallapoosa River approximately 7.8 miles south of the proposed dam location and approximately 0.4-mile downstream of RWI Alternative-A. It is generally bound by Wyatt Road to the north and the Little Tallapoosa River to the south. It is largely comprised of a pine plantation overgrown with early successional sweetgum (*Liquidambar styraciflua*) and tulip poplar (*Liriodendron tulipifera*) saplings. The bank along the Little Tallapoosa River is dominated by Chinese privet (*Ligustrum sinense*). Field investigations identified the presence of one perennial stream that crosses under an existing forest road just before its confluence with the Little Tallapoosa River (Figure 3). Pending design of the proposed pump station, this feature may be avoided but the construction of the proposed raw water intake and pump station, associated roadways, parking areas, and other utilities may result in impacts to any or all aquatic resources present within the site.

Early coordination conducted with the GDNR and USFWS on December 12, 2017 did not reveal any records of federally listed species within a 3-mile radius of the proposed pipeline alternative corridors. As such, no impacts to federally listed species are anticipated in association with either of the raw water intake and pump station alternatives. Both intake sites are located on the same reach of the Little Tallapoosa River, thus any impacts to state listed fauna would be comparable.

Table 2 provides a summary of potential aquatic resource impacts within each raw water intake and pump station alternative.



**Table 2.** Summary of Potential Aquatic Resource Impacts within the Raw Water Intake (RWI) and Pump Station Alternative Sites in Carroll County, Georgia.

Alternative	Waters of the U.S.	Avoidable?	Notes
RWI Alternative-A	Forested/Emergent Wetland	No	Upstream Site (2011) Requires longer pipeline
RWI Alternative-B	Perennial Stream	Potentially	Downstream Site (2017) Appears to provide a more suitable pool feature for intake siting

Both raw water intake and pump station alternatives contain one water of the U.S. However, based on its location and size, it is assumed that the forested/emergent wetland present within the Alternative-A site may be unavoidable during project construction. Conversely, the impacts to the perennial stream within Alternative-B may be avoidable or limited to a short culvert/crossing impact. Based on resources identified in the field the Raw Water Intake and Pump Station Alternative-B has been selected as the least environmentally damaging practicable alternative.

## 5.0 RAW WATER PIPELINE CORRIDOR ALTERNATIVES

Initially, the project team identified 5 preliminary raw water pipeline corridor alignments suitable for transporting raw water from the two intake alternatives to the Indian Creek Water Supply Reservoir. Three of these alignments originated at RWI Alternative-A and two from RWI Alternative-B. Upon selection of RWI Alternative-B as the preferred intake site, raw water pipeline routes associated with RWI Alternative-A were eliminated from further consideration. These routes are illustrated in red on Figure 4.

Raw Water Pipeline (RWP) Alternative-A is a 48,507-foot long corridor connecting the preferred intake to the Indian Creek Water Supply Reservoir. The majority of its alignment follows existing ROW to minimize environmental impacts and encroachment of private property boundaries. Where this alignment deviates from the existing ROW, the current land use is primary grazed cattle pasture with narrow mixed hardwood stream management zones. Field investigations confirms that RWP Alternative-A bisects a total of 8 streams and 6 wetlands. Additionally, the RWP Alternative-A corridor runs parallel to an intermittent stream adjacent to Ridgeview Parkway. In total the RWP Alternative-A corridor would potentially impact three perennial streams including Indian Creek, six intermittent streams, one forested wetland, four emergent wetlands, and one open water wetland. It is anticipated that any unavoidable impacts would be temporary in nature, with a potential to directionally bore the constructed pipeline under these aquatic resources. However, for the purposes of this analysis it is assumed that construction of the proposed raw water pipeline could potentially impact any and all of 15 aquatic resources within RWP Alternative-A.

RWP Alternative-B is a 48,353-foot long corridor connecting the preferred intake to the Indian Creek Water Supply Reservoir. It shares approximately 90% of its route with RWP Alternative-A, except for an approximate 1-mile section of cross county alignment between Sandy Flat Road and Brickyard Road. The majority of its alignment follows existing ROW to minimize environmental impacts and encroachment of private property boundaries. Where this alignment deviates from the existing ROW, the current land use is primary grazed cattle pasture with narrow mixed hardwood stream management zones. Field investigations confirms that RWP Alternative-B bisects a total of 8 streams and 6 wetlands. In total the

RWP Alternative-B corridor would potentially impact three perennial streams including Indian Creek, four intermittent streams, one ephemeral stream, one forested wetland, and five emergent wetlands. It is anticipated that any unavoidable impacts would be temporary in nature, with a potential to directionally bore the constructed pipeline under these aquatic resources. However, for the purposes of this analysis it is assumed that construction of the proposed raw water pipeline could potentially impact any and all of 14 aquatic resources within RWP Alternative-B.

Early coordination conducted with the GDNr and USFWS on December 12, 2017 did not reveal any records of federally listed species within a 3-mile radius of the proposed pipeline alternative corridors. As such, no impacts to federally listed species are anticipated in association with either of the raw water pipeline corridor alternatives. Both pipeline routes are largely along the same alignment, thus any impacts to state listed fauna would be comparable.

Table 3 provides a summary of potential aquatic resource impacts along the raw water pipeline alternatives.

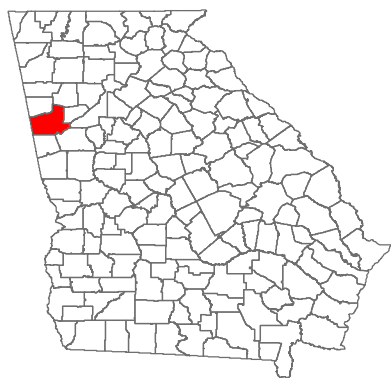
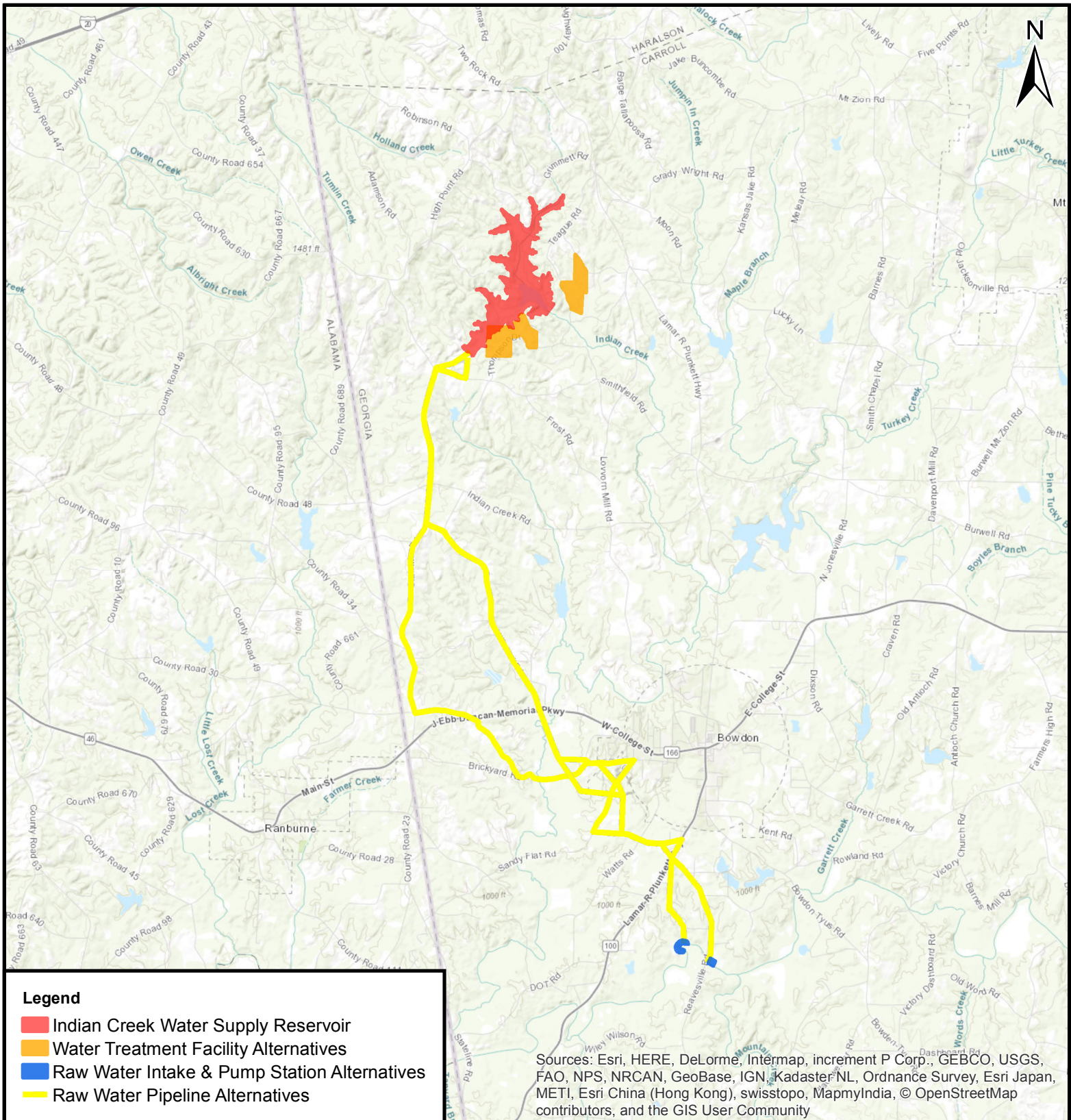
**Table 3.** Summary of Potential Aquatic Resource Impacts along the Raw Water Pipeline (RWP) Corridor Alternatives in Carroll County, Georgia.

Alternative	Length (linear feet)	Waters of the U.S.	Impact Type	Potential Aquatic Impacts
RWP Alternative-A	48,507	Perennial Stream	Perpendicular	8 Stream Crossings 6 Wetland Crossings 14 Total Crossings  1 Parallel Stream Impact  <b>15 Total Impacts</b>
		Forested Wetland	Perpendicular	
		Intermittent Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Perennial Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Intermittent Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Emergent Wetland	Perpendicular	
		Open Water Wetland	Perpendicular	
		Perennial Stream	Perpendicular	
		Intermittent Stream	Parallel	
		Intermittent Stream	Perpendicular	
		Intermittent Stream	Perpendicular	
		Intermittent Stream	Perpendicular	
RWP Alternative-B	48,353	Perennial Stream	Perpendicular	8 Stream Crossings 6 Wetland Crossings 14 Total Crossings  <b>14 Total Impacts</b>
		Forested Wetland	Perpendicular	
		Intermittent Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Perennial Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Intermittent Stream	Perpendicular	
		Emergent Wetland	Perpendicular	
		Emergent Wetland	Perpendicular	
		Emergent Wetland	Perpendicular	

		Perennial Stream	Perpendicular	
		Ephemeral Stream	Perpendicular	
		Intermittent Stream	Perpendicular	
		Intermittent Stream	Perpendicular	

Both raw water pipeline alternatives would potentially impact several waters of the U.S., including stream and wetlands. However, RWP Alternative-A would potentially result in a parallel impact to several hundred linear feet of intermittent stream during project construction. The perennial stream within Alternative-B may be avoidable or limited to a short culvert/crossing impact. Based on resources identified in the field the RWP Alternative-B has been selected as the least environmentally damaging practicable alternative.





## Figure 1 Infrastructure Alternatives Analysis Project Location Map

Carroll County Water Authority  
Indian Creek Water Supply Reservoir  
Carroll County, Georgia



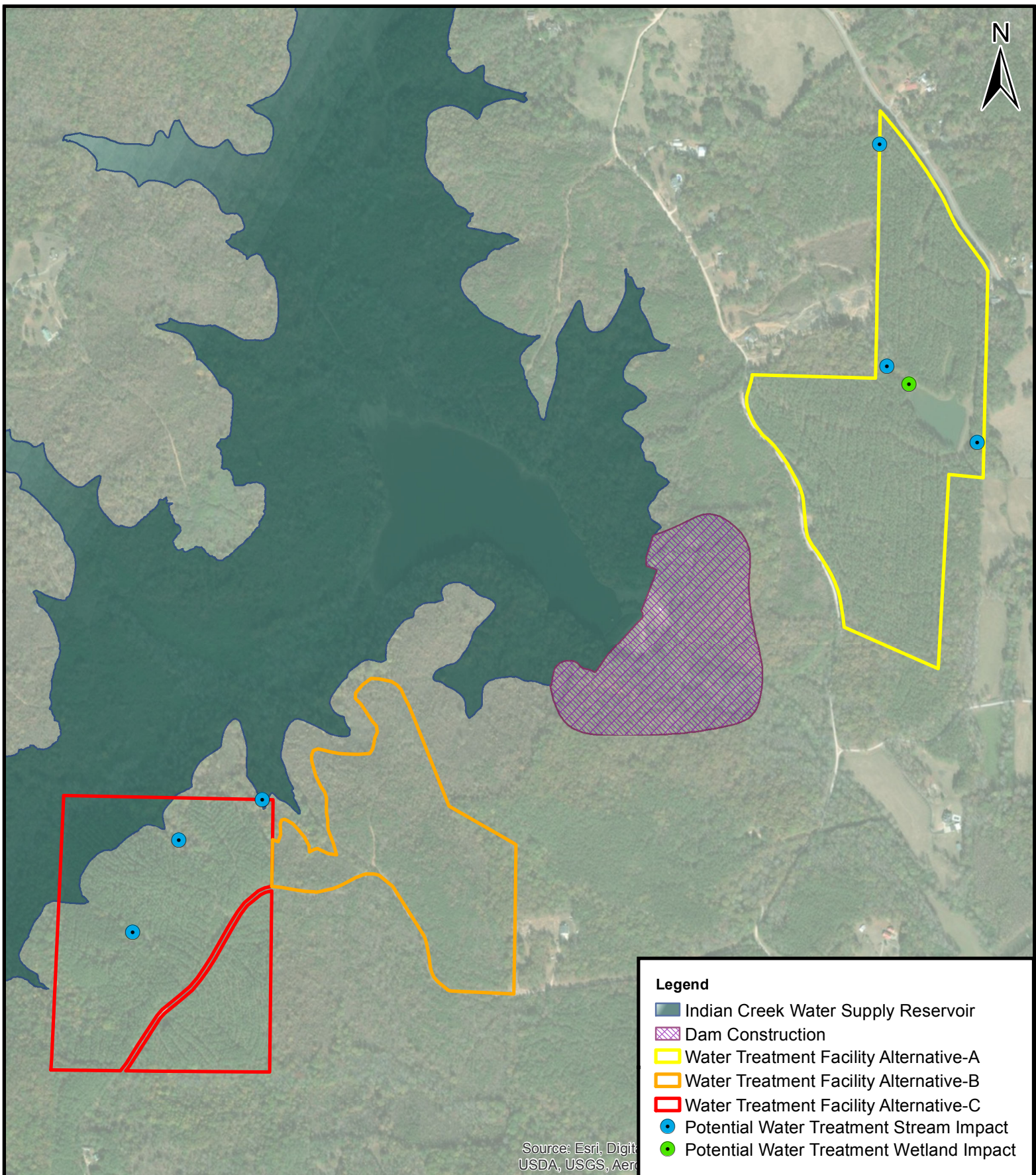
0 0.375 0.75 1.5 2.25 3  
Miles  
Imagery Source: USGS 7.5' Topographic Quadrangle  
(Bowdon East, Bowdon West, Graham, Roopville,  
Tallapoosa South, GA)  
Print Date: 1/8/2018

Haralson



Carroll





**Figure 2**  
**Infrastructure Alternatives Analysis**  
**Water Treatment Facility Potential Impact Map**

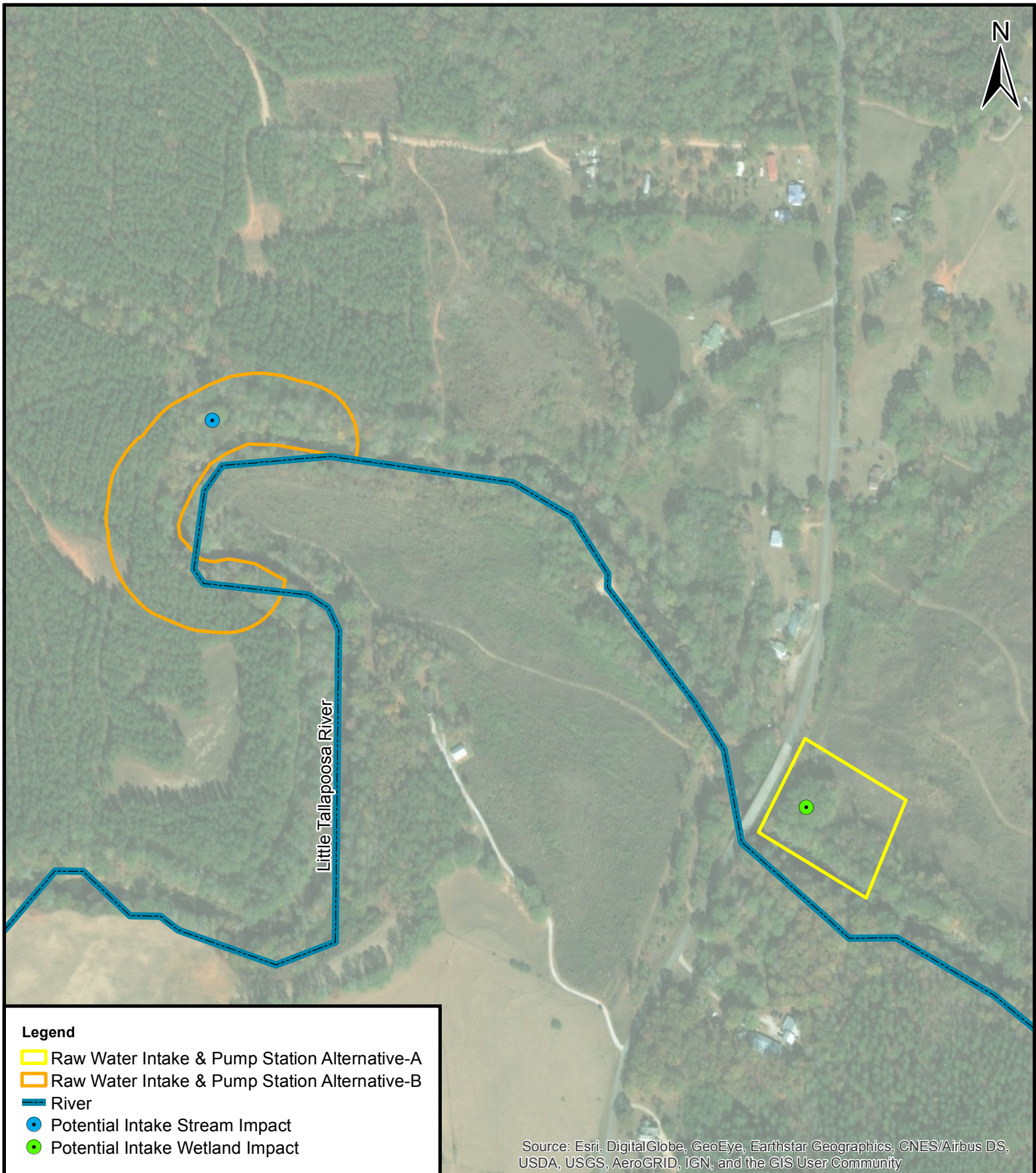
Carroll County Water Authority  
 Indian Creek Water Supply Reservoir  
 Carroll County, Georgia



0 212.5 425 850 1,275 1,700  
 Feet

Imagery Source: ESRI Imagery  
 Print Date: 1/10/2018





**Figure 3**  
**Infrastructure Alternatives Analysis**  
**Raw Water Intake & Pump Station Potential Impact Map**

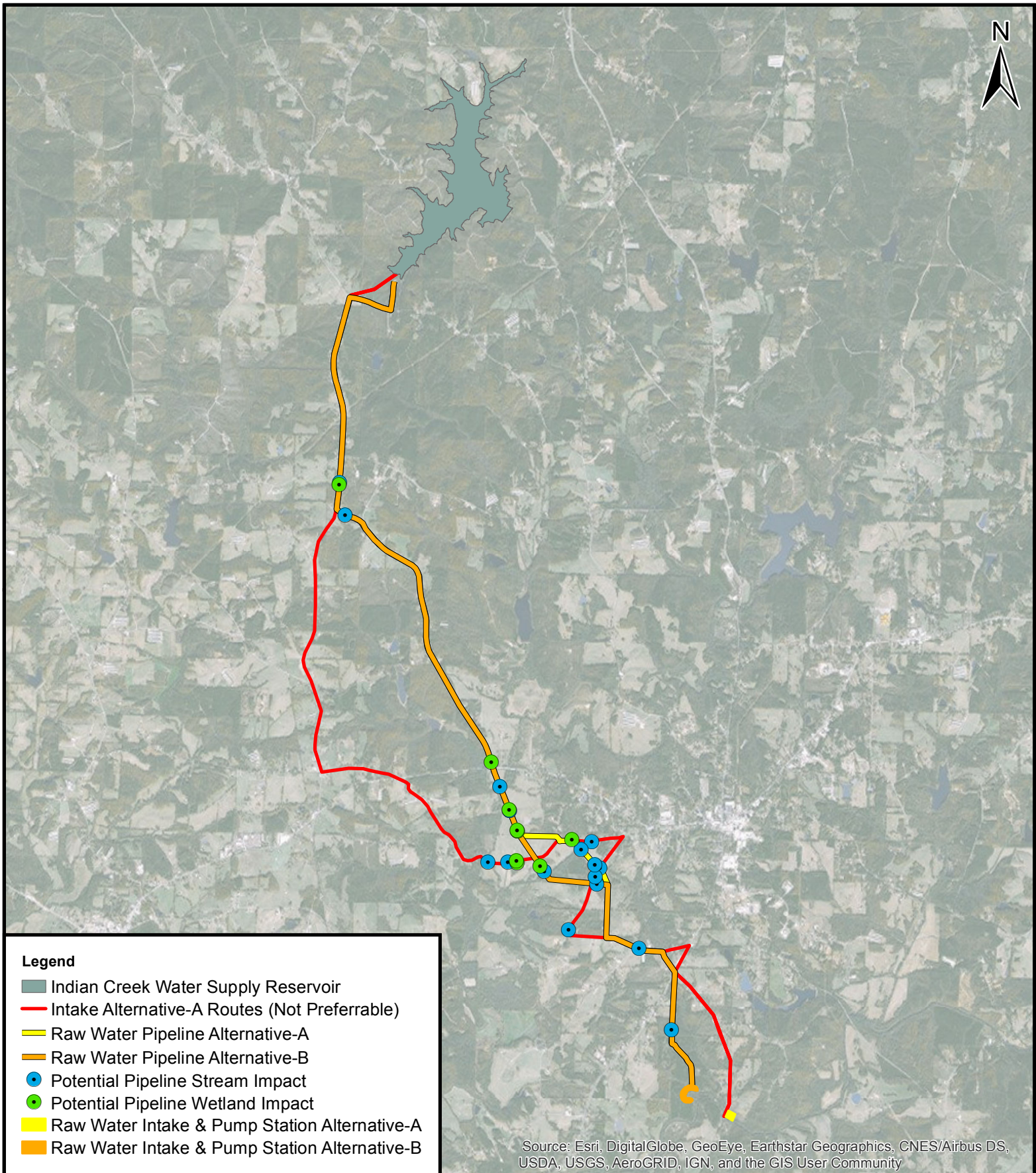
Carroll County Water Authority  
Indian Creek Water Supply Reservoir  
Carroll County, Georgia



0 100 200 400 600 800  
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Imagery Source: ESRI Imagery  
Print Date: 1/10/2018





**Figure 4**  
**Infrastructure Alternatives Analysis**  
**Raw Water Pipeline Potential Impact Map**

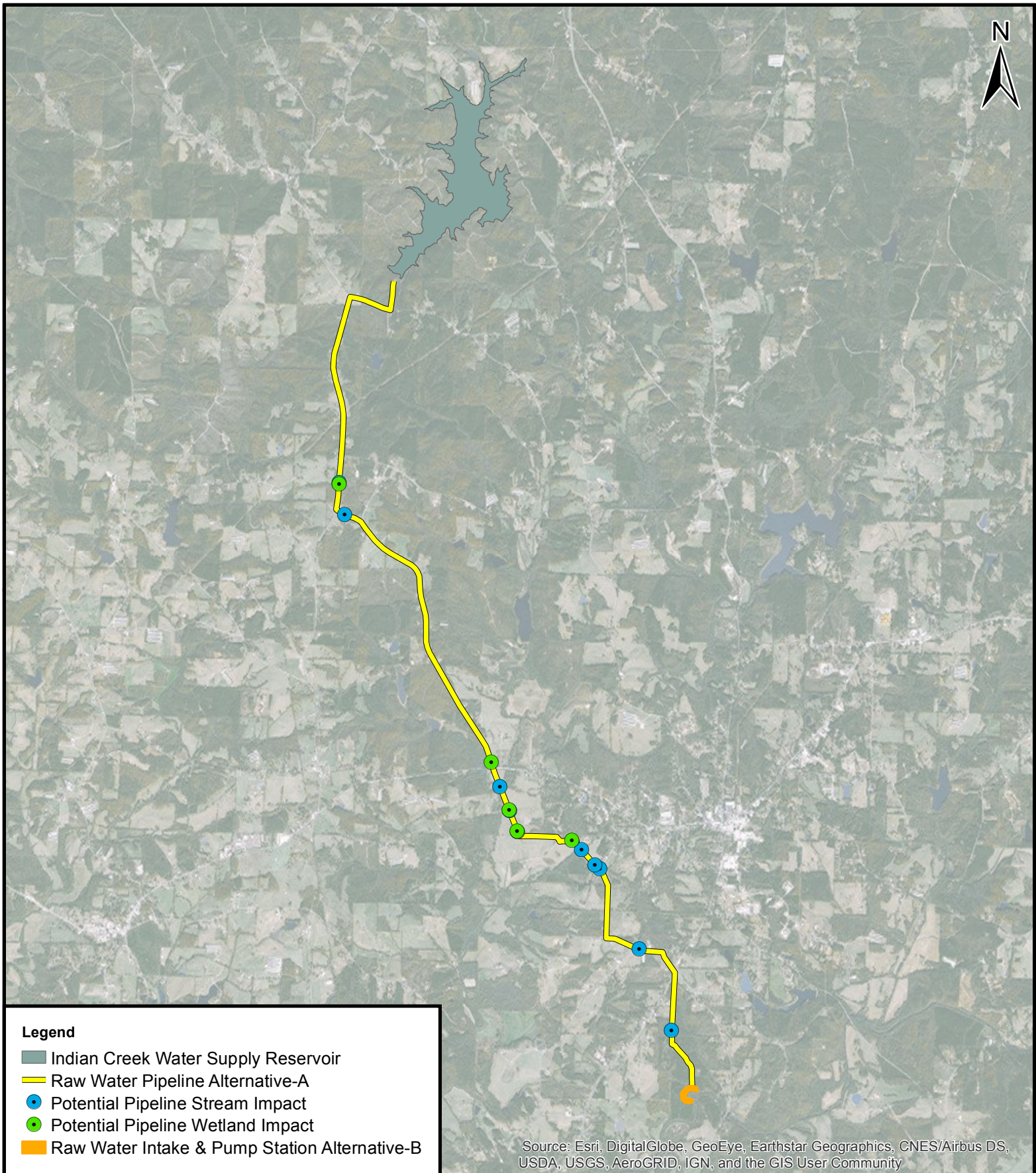
Carroll County Water Authority  
 Indian Creek Water Supply Reservoir  
 Carroll County, Georgia



0 1,450 2,900 5,800 8,700 11,600  
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Imagery Source: ESRI Imagery  
 Print Date: 1/10/2018





**Figure 4a**  
**Infrastructure Alternatives Analysis**  
**Raw Water Pipeline Alternative-A Potential Impact Map**

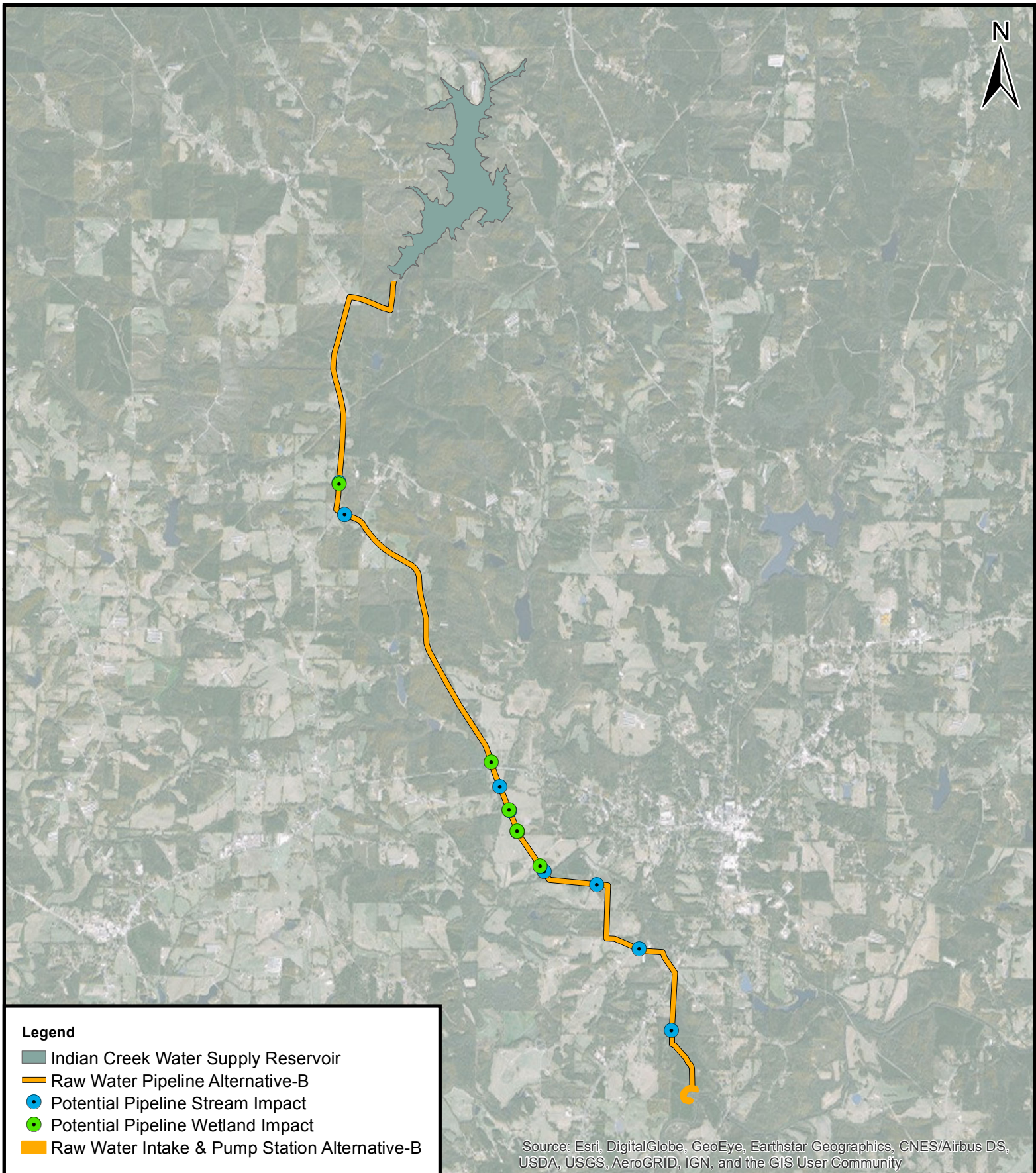
Carroll County Water Authority  
 Indian Creek Water Supply Reservoir  
 Carroll County, Georgia



0 1,450 2,900 5,800 8,700 11,600  
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Imagery Source: ESRI Imagery  
 Print Date: 1/10/2018





**Figure 4b**  
**Infrastructure Alternatives Analysis**  
**Raw Water Pipeline Alternative-B Potential Impact Map**

Carroll County Water Authority  
 Indian Creek Water Supply Reservoir  
 Carroll County, Georgia



0 1,450 2,900 5,800 8,700 11,600  
 Feet

Imagery Source: ESRI Imagery  
 Print Date: 1/10/2018