



US Army Corps  
of Engineers®  
Savannah District

# HARTWELL LAKE DRAFT INTEGRATED WATER SUPPLY STORAGE REALLOCATION REPORT AND ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT EFFECT

SOUTH CAROLINA AND GEORGIA

## APPENDIX G: REQUESTORS' WATER DEMAND ANALYSES



**DRAFT**  
**February 2024**

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## 1.0 Water Demand Analysis for Requestors

### 1.1 Inventory of Existing Water Demand and Supply

As seen in Table 1, ARJWS currently serves customers in three South Carolina counties: Anderson (174,000) serving all residents except those served by Piedmont/Pelzer and Pioneer RWD; Pickens (25,000) serving Clemson, Central, and Dacusville; and Northern Abbeville (<1,000). Their gallons per capita per day equals 116.5. The City of Lavonia, Georgia, currently serves 8,190 customers in Franklin County. Their gallons per capita per day equals 56. Pioneer RWD serves a population service area of 18,500 in two South Carolina counties: Anderson and Oconee. Their gallons per capita per day equals 108. Currahee Club does not have a gallon per capita per day estimate because it provides commercial services for irrigating a golf course and property owner association grounds.

**Table 1: 2020 Populations Served by Requestor**

| Requestor              | Population County Service Areas  | Population Served | Residential Gallons per Capita per Day (gpcd) |
|------------------------|--|-------------------|---|
| <b>ARJWS</b>           | Anderson, Pickens, Abbeville, City of Clemson, and Clemson University (students, faculty, staff) | 251,159           | 60  |
| <b>City of Lavonia</b> | Franklin and Hart  | 8,190             | 56  |
| <b>Pioneer RWD</b>     | Anderson, Oconee   | 18,500            | 92  |
| <b>Currahee Club</b>   | Currahee Club  | N/A               | N/A   |
| <b>Total</b>           |  | <b>277,849</b>    |   |

Requestors with current Corps water supply storage contract agreements include AJWRS and the City of Lavonia. In 2020, the dependable yield under the current Corps contract agreement with AJWRS exceeded average daily water use whereas the average daily water use for the City of Lavonia exceeded their dependable yield under their current Corps contract agreement. Pioneer RWD and Currahee Club do not have dependable yields under a Corps agreement. The City of Lavonia and Pioneer RWD made water supply contract agreements with non-Federal entities to meet their 2020 average daily water use. Their water treatment plant is not expandable beyond 1.5 MGD. Currahee Club depends on rainfall and groundwater wells to fill their irrigation pond with infrequent and rare purchases from the City of Toccoa. See Table 2.

**Table 2: 2020 Average Daily Usage, Dependable Yield Under Current Corps Contract, and Non-Federal Water Supply Sources Used by Requestor**

| Requestor       | 2020 Average Daily Water Use (MGD) | Dependable Yields Under Current Corps Contract (MGD) | Dependable Yields Under Non-Federal Contracts (MGD) |
|-----------------|------------------------------------|--|---|
| AJRWS           | 21.3                               | 30   | 0   |
| City of Lavonia | 1.4                                | 0.2  | 1.5   |
| Pioneer RWD     | 2.0                                | 0.0  | 2.5   |
| Currahee Club   | 0.3                                | 0.0  | 0.0   |

## 1.2 Inventory of Future Water Demand

Table 3 displays the projected water demands by requestor from 2020 to 2072. AJWRS's projected demands increase from 21.3 MGD in 2020 to 47.3 MGD in 2072. City of Lavonia's projected demands increase from 1.4 MGD in 2020 to 3.2 MGD in 2072. Pioneer RWD's projected demands increase from 1.7 MGD to 6.0 MGD in 2072. Currahee Club's projected demands remain the same from 2020 to 2072.

**Table 3: 2020-2072 Projected Water Demands by Requestor**

| Projected Demands                       | 2020         | 2030         | 2040         | 2050        | 2060         | 2072        |
|---|--------------|--------------|--------------|-------------|--------------|-------------|
| <b>AJWRS</b>                            |              |              |              |             |              |             |
| Residential                             | 16.66        | 18.78        | 20.95        | 23.1        | 25.15        | 27.3        |
| Clemson University                      | 3.2          | 3.6          | 4.02         | 4.43        | 4.83         | 5.35        |
| Industrial                              | 8.35         | 8.54         | 9.45         | 10.49       | 12.02        | 14.01       |
| <b>Total</b>                            | <b>28.21</b> | <b>31.16</b> | <b>34.42</b> | <b>38.0</b> | <b>42.00</b> | <b>47.3</b> |
| <b>City of Lavonia</b>                  |              |              |              |             |              |             |
| Residential                             | 0.69         | 0.78         | 0.86         | 0.92        | 0.99         | 1.08        |
| Commercial                              | 0.17         | 0.19         | 0.21         | 0.23        | 0.25         | 0.29        |
| Industrial                              | 0.14         | 1.04         | 1.04         | 1.05        | 1.06         | 1.07        |
| Water Lost to Production & Distribution | 0.4          | 0.79         | 0.79         | 0.8         | 0.8          | 0.76        |
| <b>Total</b>                            | <b>1.4</b>   | <b>2.8</b>   | <b>2.9</b>   | <b>3.0</b>  | <b>3.1</b>   | <b>3.2</b>  |
| <b>Pioneer RWD</b>                      |              |              |              |             |              |             |
| Residential (91.55%)                    | 1.5563       | 2.0141       | 2.5634       | 3.2958      | 4.2113       | 5.493       |
| Commercial (8.35%)                      | 0.1420       | 0.1837       | 0.2338       | 0.2988      | 0.3841       | 0.501       |
| Agricultural (.10%)                     | 0.0017       | 0.0022       | 0.0028       | 0.0036      | 0.0046       | 0.006       |
| <b>Total</b>                            | <b>1.7</b>   | <b>2.2</b>   | <b>2.8</b>   | <b>3.6</b>  | <b>4.6</b>   | <b>6.0</b>  |
| <b>Currahee Club</b>                    |              |              |              |             |              |             |
| Residential                             | 0.0          | 0.0          | 0.0          | 0.0         | 0.0          | 0.0         |

|                   |            |            |            |            |            |            |
|-------------------|------------|------------|------------|------------|------------|------------|
| <b>Commercial</b> | 0.5        | 0.5        | 0.5        | 0.5        | 0.5        | 0.5        |
| <b>Industrial</b> | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        |
| <b>Total</b>      | <b>0.5</b> | <b>0.5</b> | <b>0.5</b> | <b>0.5</b> | <b>0.5</b> | <b>0.5</b> |

### 1.3 Water Supply Deficits and Surpluses Based on Projected Demands Versus Current Supplies

Under the existing conditions, all current water supplies would remain constant overtime unless there is an upgrade already planned to occur like in the case of Pioneer RWD. In the existing condition, as seen in Tables 4, the average daily water use or projected demands begin to exceed dependable yields or all current supplies including current Corps contract agreements, current non-Federal contract agreements, and Currahee Club's groundwater supply as early as 2030.

**Table 4: 2020-2072 Water Supply Deficits and Surpluses with Current Water Supply**

| Year                                     | 2020 | 2030  | 2040  | 2050  | 2060   | 2072   |
|--|------|-------|-------|-------|--------|--------|
| <b>AJWRS</b>                             |      |       |       |       |        |        |
| <b>Projected Demands</b>                 | 28.2 | 31.2  | 34.4  | 38.0  | 42.0   | 47.3   |
| <b>All Current Supplies</b>              | 30.0 | 30.0  | 30.0  | 30.0  | 30.0   | 30.0   |
| <b>Net Based on All Current Supplies</b> | 1.8  | (1.2) | (4.4) | (8.0) | (12.0) | (17.3) |
| <b>City of Lavonia</b>                   |      |       |       |       |        |        |
| <b>Projected demands</b>                 | 1.4  | 2.8   | 2.9   | 3.0   | 3.1    | 3.2    |
| <b>All Current supplies</b>              | 1.7  | 1.7   | 1.7   | 1.7   | 1.7    | 1.7    |
| <b>Net based on current supplies</b>     | 0.3  | (1.1) | (1.2) | (1.3) | (1.4)  | (1.5)  |
| <b>Pioneer RWD</b>                       |      |       |       |       |        |        |
| <b>Projected demands</b>                 | 1.7  | 2.2   | 2.8   | 3.6   | 4.6    | 6.0    |
| <b>All Current supplies</b>              | 2.5  | 3.2   | 3.2   | 3.2   | 3.2    | 3.2    |
| <b>Net based on current supplies</b>     | 0.8  | 1.0   | 0.4   | (0.4) | (1.4)  | (2.8)  |
| <b>Currahee Club</b>                     |      |       |       |       |        |        |
| <b>Projected demands</b>                 | 0.3  | 0.5   | 0.5   | 0.5   | 0.5    | 0.5    |
| <b>All Current supplies</b>              | 0.3  | 0.3   | 0.3   | 0.3   | 0.3    | 0.3    |
| <b>Net based on current supplies</b>     | 0    | (0.2) | (0.2) | (0.2) | (0.2)  | (0.2)  |

#### 1.4 Water Supply Deficits and Surpluses with Future Water Supply

With requested future water supply, estimated average daily water use would be met for the City of Lavonia and the Currahee Club. However, AJRWS and Pioneer RWD may see a deficit in 2072. See Table 5 and Table 6.

**Table 5: 2072 Average Daily Use and Future Water Supply Requests**

| Requestor       | 2072 Average Daily Water Use (MGD) | Future Water Supply |
|-----------------|------------------------------------|---------------------|
| AJRWS           | 47.3                               | 46                  |
| City of Lavonia | 3.2                                | 3.2                 |
| Pioneer RWD     | 6.0                                | 5.0                 |
| Currahee Club   | 0.5                                | 0.8                 |

**Table 6: 2020-2072 Water Supply Deficits and Surpluses with Future Water Supply**

| Year                               | 2020 | 2030 | 2040 | 2050 | 2060 | 2072  |
|------------------------------------|------|------|------|------|------|-------|
| <b>AJRWS</b>                       |      |      |      |      |      |       |
| Projected demands                  | 28.2 | 31.2 | 34.4 | 38.0 | 42.0 | 47.3  |
| Future Water Supplies              | 30.0 | 46   | 46   | 46   | 46   | 46    |
| Net based on Future Water Supplies | 1.8  | 14.8 | 11.6 | 8.0  | 4.0  | (1.3) |
| <b>City of Lavonia</b>             |      |      |      |      |      |       |
| Projected demands                  | 1.4  | 2.8  | 2.9  | 3.0  | 3.1  | 3.2   |
| Future Water Supplies              | 1.7  | 3.2  | 3.2  | 3.2  | 3.2  | 3.2   |
| Net based on Future Water Supplies | 0.3  | 0.4  | 0.3  | 0.2  | 0.1  | 0.0   |
| <b>Pioneer RWD</b>                 |      |      |      |      |      |       |
| Projected demands                  | 1.7  | 2.2  | 2.8  | 3.6  | 4.6  | 6.0   |
| Future Water Supplies              | 2.5  | 5.0  | 5.0  | 5.0  | 5.0  | 5.0   |
| Net based on Future Water Supplies | 0.8  | 2.8  | 2.2  | 1.4  | 0.4  | (1.0) |
| <b>Currahee Club</b>               |      |      |      |      |      |       |
| Projected demands                  | 0.3  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5   |
| Future Water Supplies              | 0.3  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8   |

|                                    |   |     |     |     |     |     |
|------------------------------------|---|-----|-----|-----|-----|-----|
| Net based on Future Water Supplies | 0 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
|------------------------------------|---|-----|-----|-----|-----|-----|

## 2.0 Water Supply Needs Analysis

As seen in Appendix G, Water Demand Analyses were completed by each requestor and reviewed and approved by the Water Management and Reallocation Studies (WMRS) Planning Center of Expertise (PCX). Requestors completed their water demand projections based on actual 2020 water usage in October 2021.

### 2.1 Anderson Regional Joint Water System (ARJWS)

The ARJWS has increased the volume of water it has withdrawn from Hartwell Lake over time, with potable demand going from 15.4 MGD (5,617 MGY) in 1990 to a peak of 28.2 MGD (10,293 MGY) in 2020. This represents an average annual growth rate of two percent between 1990 and 2020. This increase is the result of several factors; foremost is the population increase in the ARJWS service area. Population growth is projected at an annual rate of one percent per year through 2035 (*Appalachian Council of Governments*). Anderson County population projects after 2035 increase at 1 percent per year. Water usage is projected in direct proportion to the projected population growth. Additionally, increases in industrial activity are expected to compound the growing water demand. In 2020, ARJWS provided a non-potable supply of approximately 8.35 MGD for industrial use and production. ARJWS expects a growth in water demand of twenty-five percent per 5 years by future industry. As seen in Table 7, total average daily water use in 2020 for potable and non-potable supply equaled 28.2 MGD. Based on those estimates, an ultimate average capacity of 47.3 MGD is projected to be needed for the ARJWS service area in 2072. Although AJWRS’s current Corps contracted water supply reallocation of 30 MGD (24,620 acre-feet) met their 2020 demand of 28.2 MGD, without an increase in water supply storage from Hartwell Lake, they can expect to experience deficits as early as 2030. This would limit potential future economic development. Their new request of an additional 16 MGD (13,226 acre-feet) would meet estimated demand until 2072.

**Table 7: ARJWS Projected Water Supply Deficits and Surpluses**

| Year   | 2020 | 2030  | 2040  | 2050  | 2060   | 2072   |
|--|------|-------|-------|-------|--------|--------|
| <b>2020-2072 Water Supply Deficits and Surpluses with Current Water Supply</b> |      |       |       |       |        |        |
| Projected Average Daily Water Demands (MGD)                                    | 28.2 | 31.2  | 34.4  | 38.0  | 42.0   | 47.3   |
| Projected Average Daily Water Supplies (MGD)                                   | 30.0 | 30.0  | 30.0  | 30.0  | 30.0   | 30.0   |
| Net Average Daily Water Surplus/ (Deficit) (MGD)                               | 1.8  | (1.2) | (4.4) | (8.0) | (12.0) | (17.3) |
| <b>2020-2072 Water Supply Deficits and Surpluses with Future Water Supply</b>  |      |       |       |       |        |        |

|   |      |      |      |      |      |       |
|---|------|------|------|------|------|-------|
| <b>Projected Average Daily Water Demands (MGD)</b>      | 28.2 | 31.2 | 34.4 | 38.0 | 42.0 | 47.3  |
| <b>Projected Average Daily Water Supplies (MGD)</b>     | 30.0 | 46   | 46   | 46   | 46   | 46    |
| <b>Net Average Daily Water Surplus/ (Deficit) (MGD)</b> | 1.8  | 14.8 | 11.6 | 8.0  | 4.0  | (1.3) |

## 2.2 Pioneer Rural Water District (Pioneer RWD)

Pioneer RWD’s 2020 average daily water demand of 1.7 MGD serves a population of 18,500 in northwest Anderson and southern Oconee Counties in South Carolina. Future increases in water demand are projected based on historical increases in population, commercial/industrial development, and water use trends. Pioneer RWD water demand increased an average of about three percent annually between 2003 and 2020. Pioneer RWD’s population had an average annual growth of 2.7 percent over the past 20 years. Additionally, Oconee County’s 400-acre Golden Corner Commerce Park on SC Highway 59 will accelerate industrial development and the demand of water in the future.

Under a temporary water sales agreement with ARJWS, who has a reallocation agreement with the Corps for water supply storage in Hartwell Lake, Pioneer RWD pumps raw water from Hartwell Lake and treats it. Their current plant capacity to treat raw water is 2.5 MGD while their maximum daily withdrawal could be up to 3.2 MGD. By 2030, they have plans to increase that capacity to at least 3.2 MGD. They also have a water sales agreement with Seneca Light & Water. Seneca Light & Water extracts water from Lake Keowee. They distribute finished treated water to Pioneer RWD for peak summer seasonal emergency supplies at a maximum withdrawal of 1.44 MGD. Water supplies for seasonal uses were not included in the projected average daily water supplies. In the NAA, without additional water supply from the Corps to meet annual average daily water supply needs, as seen in Table 8, water demand exceeds water supply amounts around 2044. With additional future water supply of 5.0 MGD from the Corps, in the FWP condition, their demand for water would be met through 2064. During peak demand, deficits would be greater than average demand.

**Table 8: Pioneer RWD Projected Water Supply Deficits and Surpluses**

| Year   | 2020 | 2030 | 2040 | 2050  | 2060  | 2072  |
|--|------|------|------|-------|-------|-------|
| <b>2020-2072 Water Supply Deficits and Surpluses with Current Water Supply</b> |      |      |      |       |       |       |
| <b>Projected Average Daily Water Demands (MGD)</b>                             | 1.7  | 2.2  | 2.8  | 3.6   | 4.6   | 6.0   |
| <b>Projected Average Daily Water Supplies (MGD)</b>                            | 2.5  | 3.2  | 3.2  | 3.2   | 3.2   | 3.2   |
| <b>Net Average Daily Water Surplus/(Deficit) (MGD)</b>                         | 0.8  | 1.0  | 0.4  | (0.4) | (1.4) | (2.8) |

| 2020-2072 Water Supply Deficits and Surpluses with Future Water Supply |                  |     |     |     |     |     |       |
|--|------------------|-----|-----|-----|-----|-----|-------|
| Projected<br>Daily Water Demands<br>(MGD)                              | Average          | 1.7 | 2.2 | 2.8 | 3.6 | 4.6 | 6.0   |
| Projected<br>Daily Water Supplies<br>(MGD)                             | Average          | 2.5 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0   |
| Net<br>Water Surplus/<br>(Deficit)<br>(MGD)                            | Average<br>Daily | 0.8 | 2.8 | 2.2 | 1.4 | 0.4 | (1.0) |

### 2.3 City of Lavonia

In addition to their current 0.2 MGD contract with the Corps at Hartwell Lake, the City of Lavonia also can receive water supply from Hart County Water and Sewer Authority (HCWSA) and Crawford Creek Reservoir. With all those water supply sources combined, they can withdrawal a maximum of 3.0 MGD as permitted by Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD) most likely by 2030. The City of Lavonia prefers HCWSA’s Corps-contracted allocation of water stored in Lake Hartwell over Crawford Creek Reservoir. The City of Lavonia and HCWSA have a temporary agreement until such time that there is a new water supply storage Agreement between the Corps and the City of Lavonia. That temporary agreement allows Lavonia to withdraw and treat water from Hartwell Lake, sell it to HCWSA, and purchase up to 1.5 MGD of raw water from HCWSA’s allocation from the Corps. The City of Lavonia serves populations in Franklin and Hart Counties with those water allocations. The City of Lavonia is especially dependent on HCWSA in the summer months when water supply from Crawford Creek becomes unreliable. The Crawford Creek Reservoir, owned by the City of Lavonia, can produce 1.5 MGD outside of the summer months but has water quality issues resulting from increased levels of manganese and algae, which cause the water to have a repugnant taste and odor. Since the chemistry of water from Crawford Creek differs from Hartwell Lake water supply, both sources cannot be used at the same time because the water plant cannot be operated efficiently with ever changing doses of chemicals. Hence, Hartwell Lake is the primary source of water supply for the City of Lavonia. The City of Lavonia requested an additional 3.0 MGD from Hartwell Lake, which is equivalent to 2,472 acre-feet of water supply storage, so that they can have their own clean, permanent source of water. Without the additional 3.0 MGD from Hartwell Lake, the City of Lavonia experiences water deficits in 2030.

The City of Lavonia provides water to businesses and industries along the I-85 corridor in Hart and Franklin Counties. Due to estimated industrial, commercial, and residential growth, Lavonia’s water demand is estimated to increase from a maximum of 1.4 MGD in 2020 to 3.2 MGD in 2072. The City of Lavonia’s current Corps contracted water supply reallocation of 0.2 MGD (127 acre-feet) did not meet their 2020 demands of 1.4 MGD. However, their new request of an additional 3 MGD (2,472 acre-feet) from Hartwell Lake water supply storage would meet estimated demand out to 2072. Based on the City of Lavonia’s current Corps contract and temporary agreement to use HCWSA’s current Corps contracted water supply storage reallocation, the City of Lavonia would have a deficit as early as 2030. Table 9 shows that the daily average

demand for 2030 of 2.8 MGD would exceed 1.7 MGD from those current water supply sources. As a result, there is an immediate need for additional water supply storage in Hartwell Lake to meet water demand as early as 2030.

**Table 9: City of Lavonia Projected Water Supply Deficits and Surpluses**

| Year   | 2020 | 2030  | 2040  | 2050  | 2060  | 2072  |
|--|------|-------|-------|-------|-------|-------|
| <b>2020-2072 Water Supply Deficits and Surpluses with Current Water Supply</b> |      |       |       |       |       |       |
| Projected Average Daily Water Demands (MGD)                                    | 1.4  | 2.8   | 2.9   | 3.0   | 3.1   | 3.2   |
| Projected Average Daily Water Supplies (MGD)                                   | 1.7  | 1.7   | 1.7   | 1.7   | 1.7   | 1.7   |
| Net Average Daily Water Surplus/(Deficit) (MGD)                                | 0.3  | (1.1) | (1.2) | (1.3) | (1.4) | (1.5) |
| <b>2020-2072 Water Supply Deficits and Surpluses with Future Water Supply</b>  |      |       |       |       |       |       |
| Projected Average Daily Water Demands (MGD)                                    | 1.4  | 2.8   | 2.9   | 3.0   | 3.1   | 3.2   |
| Projected Average Daily Water Supplies (MGD)                                   | 3.0  | 3.2   | 3.2   | 3.2   | 3.2   | 3.2   |
| Net Average Daily Water Surplus/(Deficit) (MGD)                                | 1.6  | 0.4   | 0.3   | 0.2   | 0.1   | 0.0   |

## 2.4 Currahee Club

The Currahee Club is a premier lake and golf community nestled in the mountains of Georgia. Their request for 0.5 MGD, which is equivalent to 412 acre-feet of water supply storage, would sustain turf and landscape for golf course and common area irrigation. The Club’s existing irrigation system is vulnerable to droughts and its prospects for further development are limited by its current water supply sources. Currahee’s irrigation ponds are currently supplied by groundwater irrigation wells, site stormwater runoff, and a water line from the City of Toccoa water system. Groundwater wells and stormwater runoff have already proven insufficient to meet the Club’s water demands in and out of times of drought. The 0.3 MGD currently available limits irrigations to every other day with less than half of the Club’s 1,100 acres presently developed. Without an additional water supply source, water demands of 0.2 MGD will not be met for a potential future development of over 30 additional acres of common area and 20 additional acres for a new 9-hole, 3-par, golf course. As seen in Table 21, the water deficits with current water

supply begin in 2030 while the water surpluses exist through 2072 with a reliable future water supply storage source from the Corps.

**Table 10: Currahee Club Projected Water Supply Deficits and Surpluses**

| Year   | 2020 | 2030  | 2040  | 2050  | 2060  | 2072  |
|--|------|-------|-------|-------|-------|-------|
| <b>2020-2072 Water Supply Deficits and Surpluses with Current Water Supply</b> |      |       |       |       |       |       |
| Projected Average Daily Water Demands (MGD)                                    | 0.3  | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   |
| Projected Average Daily Water Supplies (MGD)                                   | 0.3  | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |
| Net Average Daily Water Surplus/(Deficit) (MGD)                                | 0    | (0.2) | (0.2) | (0.2) | (0.2) | (0.2) |
| <b>2020-2072 Water Supply Deficits and Surpluses with Future Water Supply</b>  |      |       |       |       |       |       |
| Projected Average Daily Water Demands (MGD)                                    | 0.3  | 0.5   | 0.5   | 0.5   | 0.5   | 0.5   |
| Projected Average Daily Water Supplies (MGD)                                   | 0.3  | 0.8   | 0.8   | 0.8   | 0.8   | 0.8   |
| Net Average Daily Water Surplus/(Deficit) (MGD)                                | 0    | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   |