

Forsyth County Board of Commissioners

General Services Agreement

Task Order No. 23

Task Order No. 23 is an attachment to the General Services Agreement ("AGREEMENT") between CH2M HILL, Inc. ("ENGINEER") and the Forsyth County Board of Commissioners ("OWNER"), dated June 1, 2013, for a PROJECT described as follows: Lake Lanier Water Quality Sampling.

Article 1. SCOPE OF WORK AND SCHEDULE

In January 2021, the Army Corps of Engineers approved the Lake Lanier storage contract with the Georgia Environmental Protection Division (EPD). In turn, the OWNER will sign a sub agreement with the EPD allowing OWNER to construct its own raw water intake in Lake Lanier. The ENGINEER has completed some portion of the detailed design of the Lake Lanier intake and pump station. The OWNER would like to perform water quality sampling at the intake site to determine the ideal depth(s) for the intake screens.

Task 1– Project Kickoff and Field Sampling Plan

The ENGINEER and OWNER will collaboratively identify water quality concerns upon which to focus the source water quality assessment. These issues typically include: pH, temperature, dissolved oxygen, conductivity, oxidation-reduction potential (ORP), turbidity, phycocyanin, algae enumeration and identification, geosmin, 2-Methylisoborneol (MIB), UV-254 transmittance, manganese (total and dissolved), iron (total and dissolved), total hardness, phosphate, total organic carbon, dissolved organic carbon, sulfate, and alkalinity.

The first step in identifying the source of potential water treatment issues is to develop and implement a sampling plan to effectively characterize source water at the proposed intake location. A project kickoff meeting will be held to discuss a field sampling plan, as well as to discuss the project schedule and milestones. The field sampling plan will be included as a section of the summary Technical Memorandum (Task 4) and will guide field monitoring (Task 2).

- ENGINEER will develop a draft field sampling and quality assurance plan for OWNER review.
- ENGINEER will facilitate a project kickoff meeting.
- ENGINEER will finalize the field sampling plan based on feedback from the OWNER.

Task 2– Field Monitoring

After approval of the field sampling and quality assurance plan, field monitoring will be conducted in accordance with the Plan.

It is anticipated that field monitoring will include the following:

- Collection of water quality samples in one location on the lake at the site of the potential intake identified by the OWNER as 2,328,053.308, 1,525,471.820. Based on online bathymetry maps of Lake Lanier, this location has a depth of ~50 feet at full pool (~15 meters).

- The location will be accessed via boat and identified using global positioning system (GPS). The boat will be stabilized to the most reasonable extent possible during sampling to ensure the same location is accessed each time.
- One ENGINEER staff will be accompanied by one sub-consultant boat captain when conducting the water quality monitoring.
- Collection of water quality samples will occur at least two times per month for a consecutive 12-month period, for a total of 24 monitoring events.
- During times of lake turnover (~late September to late-October) and stratification (~early April to ~early May), collection of water quality samples may be increased to occur on a weekly basis, for up to an additional 6 monitoring events.
- A Secchi disk will be used to provide a quantitative measurement of water clarity.
- Grab samples will be collected using a Van Dorn sampler.
- For all sample events, in situ measurements (see Exhibit 1 for a list of parameters) will be collected using a calibrated handheld water quality meter. In situ measurements will be recorded at one-meter increments, from the bottom of the reservoir to the surface of the reservoir.
- Grab samples for algae and chlorophyll-a will be only be collected at one location near the surface of the reservoir.
- Grab samples for all other water quality parameters (see Exhibit 1) will be collected from five reservoir elevations, one near the surface, one near the bottom, and up to three other depths as determined in collaboration between the ENGINEER and the OWNER. Based on the results of the initial samples, the number of samples collected at the lower elevations may be reduced.

Exhibit 1. Water quality monitoring methodology and sampling event summary.

Parameter	Analysis Method	Number of Reservoir Sample Depths/ Event ¹	Number of Duplicate Samples for 30 Events (10%)	Total Number of Samples for 30 Events
In Situ Measurements				
Depth	YSI EX01	1	N/A	30
Dissolved Oxygen	YSI EX01	~15	N/A	~450
Temperature	YSI EX01	~15	N/A	~450
Conductivity	YSI EX01	~15	N/A	~450
Oxidation reduction potential	YSI EX01	~15	N/A	~450
pH	YSI EX01	~15	N/A	~450
Turbidity	YSI EX01	~15	N/A	~450
Laboratory Analysis				
Algae	SM10200	1	3	33
Chlorophyll-a	M10200H	1	3	33
Alkalinity	SM2320B	5	3	153

Parameter	Analysis Method	Number of Reservoir Sample Depths/ Event ¹	Number of Duplicate Samples for 30 Events (10%)	Total Number of Samples for 30 Events
Ammonia	E350.1	5	3	153
Geosmin	SM6040D	5	3	153
Total Hardness	SM2340B	5	3	153
Dissolved Iron and Manganese	E200.8	5	3	153
Total Iron and Manganese	E200.8	5	3	153
MIB	SM6040D	5	3	153
Nitrate	E353.2	5	3	153
Nitrite	E353.2	5	3	153
Dissolved Organic Carbon	SM5310B	5	3	153
Total Organic Carbon	SM5310B	5	3	153
Orthophosphorus	E365.1	5	3	153
Total Phosphorus	E365.1	5	3	153
Phycocyanin		5	3	153
Sulfate	E300	5	3	153
UV-254 Transmittance	SM5910B	5	3	153

¹ Based on location provided by the OWNER, depth of reservoir at full pool is ~48 feet (~15 meters)

Task 3 – Data Analysis

Data analysis will include reservoir profiles for each water quality parameter collected as applicable. To evaluate the data collected, ENGINEER will perform a statistical analysis on the data using the commercial software to generate isopleths from vertical profiles. The results of the statistical analysis will be used to characterize the variability in the water quality at the depth under consideration for the future intake.

- ENGINEER will compile and analyze the data collected in Task 2 and will prepare a short memorandum each quarter to summarize results. The memorandum will include copies of the raw field data, field data sheets, and laboratory reports.
- ENGINEER will present the results in quarterly workshops with the OWNER.

Task 4 – Technical Memorandum

A Technical Memorandum will be prepared once sampling has been completed to summarize the data analysis completed in Task 3. It will also include a review of other water quality monitoring efforts in Lake Lanier (if available), characterization of the source water, and provide bands of acceptable depths for the intake screens. It is anticipated that the Technical Memorandum will be incorporated into the intake design report.

- ENGINEER will prepare an electronic copy of the draft Technical Memorandum for OWNER review.
- Technical Memorandum will be presented at a workshop.
- Technical Memorandum will then be finalized based on comments and feedback from the OWNER.

ASSUMPTIONS

- All project meetings will occur virtually, though Jacobs local staff could attend in person.
- OWNER will provide 1 round of consolidated comments on the field sampling and quality assurance plan.
- EPD and/or USACE approval is not required on the field sampling and quality assurance plan.
- ENGINEER will hire a known sub-contractor to provide a boat and captain for all sampling events on the lake.
- OWNER will cover all laboratory costs of all water chemistry samples.
- OWNER will provide bottles and coolers needed for water chemistry samples.
- ENGINEER will pick up sample bottles and coolers at the Antioch WTP prior to each sampling event.
- No additional water quality parameters will be required other than those listed in Exhibit 1.
- ENGINEER will hand deliver water chemistry samples to one local laboratory during each monitoring event.
- ENGINEER will ship samples to up to two laboratories during each monitoring event.
- ENGINEER is not responsible for the accuracy of the data provided by the water quality laboratory(s).
- ENGINEER has included a line item for OWNER-controlled contingency to cover up to two failed sampling events that occur due to equipment failure and or unforeseen weather after mobilizing, provided these events are outside the control of the ENGINEER. These are estimated at ~\$1,550/event that covers labor (\$800/event), boat captain (\$550/event), and insitu meter (\$200/event).
- OWNER will provide data from other reservoir monitoring programs, as available.
- OWNER will provide 1 round of consolidated comments on the summary Technical Memorandum.

DELIVERABLES

- Monthly progress reports.
- Meeting summary from the project kickoff.
- Field sampling and quality assurance plan.
- Up to 4 memorandums summarizing data collection and trends that will be submitted on a quarterly basis. Memorandums will include raw field data, field data sheets, and laboratory reports.
- Up to 4 quarterly workshops and meeting summaries to discuss water quality results.
- Electronic copy of the Technical Memorandum.
- Workshop to review the Technical Memorandum.
- Up to 5 printed and electronic copies of the final Technical Memorandum.

SCHEDULE

Upon notice to proceed, it is assumed that ENGINEER will complete the scope of services within a 16-month period. ENGINEER will complete each milestone associated with the Scope of Services in accordance with the samples and analysis methods outlined in Exhibit 1 and the schedule outlined below:

Project Schedule

Milestone	Timeline
NTP	
Kick-off Meeting	1 weeks after NTP
Field Sampling Plan	4 weeks after NTP
Field Monitoring	12 months
Data Analysis	4 weeks after all laboratory analysis received
Technical Memorandum	4 weeks after Data Analysis
Close-Out	Immediately following approval of Technical Memorandum

Article 2. COMPENSATION

Compensation by OWNER to ENGINEER will be as follows:

Cost-reimbursable basis, as defined in the General Services Agreement between OWNER and ENGINEER dated June 1, 2013, and updated January 2, 2029, using the ENGINEER's per diem rates for the calendar year in which the work is performed.

The total time and materials not-to-exceed cost for services associated with the Tasks in this Task Order are as follows:

Cost Summary

Task	Hours	Budget
1– Project Kickoff and Field Sampling Plan	110	\$16,000
2– Field Monitoring	377	\$65,000
3 – Data Analysis	200	\$33,000
4 – Technical Memorandum	144	\$23,000
OWNER-controlled Contingency*	16	\$3,100
Total:	847	\$140,100

*Additionally, ENGINEER is including \$3,100 of OWNER-controlled contingency to cover unforeseen events during sampling as described in the Assumptions. ENGINEER's use of the OWNER-controlled contingency is subject to the approval of the OWNER.

ENGINEER reserves the right to reallocate labor hours and the associated budget among the Tasks as necessary in order to achieve the most efficient project delivery. The total cost for Task Order No. 23 will not exceed **\$140,100** unless changed by written amendment signed by both Parties.

OTHER PROVISIONS

As provided in the General Services Agreement; this Task Order will become part of the referenced AGREEMENT when executed by both parties.

For the OWNER, **Forsyth County Board of Commissioners.**

Dated this _____ day of _____, 202__


By: _____

Name

Title

For **CH2M HILL, Inc,**

Dated this 12th day of November, 2021

By:  _____ Client Account Manager

Name

Title