

REQUEST FOR QUALIFICATIONS (RFQ)

**PROFESSIONAL ENGINEERING & MANAGEMENT SERVICES
PLANS, SPECIFICATIONS, AND BID DOCUMENTS
LAKE LURE DAM, APPURTENANCES, AND POWERHOUSE
NCID No. RUTHE – 003
Lake Lure, Rutherford County, North Carolina**

SUBMIT TO:

**TOWN HALL
Town of Lake Lure
2948 Memorial Highway
Post Office Box 255
Lake Lure, North Carolina 28746
Attn: Mr. Ron Nalley, Town Manager**

**STATEMENT OF QUALIFICATIONS
MUST BE RECEIVED
AT LAKE LURE TOWN HALL NO LATER THAN
CLOSE OF BUSINESS ON JUNE 1, 2018**

April 11, 2018

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Introduction

The Town of Lake Lure, NC is soliciting Statements of Qualifications for professional engineering services from qualified engineering consulting firms interested in contracting with the Town to prepare design and construction contract documents and perform construction observation and administration services for a multi-phase, multi-year project to renovate the Lake Lure Dam and its appurtenant infrastructure including a hydroelectric generation powerhouse facility. This document presents brief summaries of the history and design of Lake Lure Dam and hydroelectric generation facilities; location, descriptions, and characteristics of the dam; information concerning the recently completed two-phase dam safety inspection; the anticipated schedule and scope of project activities to be performed by the selected consultant. Also provided are prescriptive guidelines for preparation and submittal of Statements of Qualifications and the Town's process for evaluating firms based on their submittals and selection of a best-qualified consultant to perform the project.

Lake Lure Dam Design and Construction History

Early in the nineteen hundreds while visiting the Chimney Rock in the Rocky Broad River Gorge, an ailing Dr. Lucius B. Morse visualized a mountain resort town containing a large central lake located on the Rocky Broad River at the Tumbling Shoals. The lake was later named Lake Lure by Dr. Morse' Wife Elizabeth. The resort was to be developed by Chimney Rock Mountains, Inc.

In 1925, Mees and Mees Hydraulic Engineers, Inc. of Charlotte, North Carolina began design of the dam and oversight of the early site access and surveying work. Design work continued throughout 1925 and 1926 when construction began in earnest on the dam and hydroelectric power generation facilities. The dam was completed and brought to normal pool level in 1927, the same year that the Town of Lake Lure was incorporated. The hydroelectric power generation facilities were completed in 1928 and electricity began to be sold to Blue Ridge Power Company, predecessor to Duke Power Company that still buys generated electricity from Lake Lure today.

On October 24, 1929 both companies holding mortgages on property owned by the Town of Lake Lure, NC foreclosed as a result of the Great Depression. Construction work on the dam and powerhouse were never completed as evidenced by existing access conditions and unfinished convenience facilities. The Carolina Mountain Corporation operated the Power Plant from 1931 until 1965 when the Town of Lake Lure acquired the dam, lake, and all property still owned by Carolina Mountain Corporation. The Town of Lake Lure is unique in that the General Assembly of North Carolina has authorized great liberties in the manner in which the town is governed and managed. The acquisition of the dam, hydroelectric generation facilities, and associated held property was completed on July 26, 1965.

Design Description of the Lake Lure Dam

Lake Lure Dam is a reinforced concrete multi-arch buttress dam that is a modification of the Ambursen Dam developed in 1903 by Nils F. Ambursen, a Norwegian-American civil engineer/inventor working in Hyde Park, Boston, Massachusetts. He promptly filed a patent and created the Ambursen Hydraulic Construction Company in Boston, Massachusetts through which he would build more than one hundred (100) dams throughout the eastern United States including North and South Carolina prior to leaving the company in 1917. The Ambursen Dam utilizes reinforced concrete flat-slabs on the front face to transfer the weight and lateral load of retained

water to massive reinforced concrete buttresses that have sloped upstream faces. While Ambursen was at work on the east coast, John S. Eastwood was designing modifications to the Ambursen Dam in California using reinforced-concrete arches as the upstream face as opposed to reinforced-concrete flat slabs. Because concrete is stronger in compression than tension the multi-arch dams required even less concrete than the Ambursen Dam. However, the multiple arches were much more difficult to form and required a longer construction time. Eastwood constructed about fifteen dams prior to 1925 in the western United States and completed over sixty (60) in his life time.

The last known Multi-Arch Dam constructed in the United States was in about 1965. Although we do not know of any connection between Mees and Mees Hydraulic Engineers, Inc. of Charlotte, North Carolina, designers of Lake Lure Dam, and John Eastwood of California, there is no doubt that the multi-arch design advocated by Eastwood influenced the design of Lake Lure Dam. The massive buttresses of Lake Lure Dam, like all other Multi-Arch Dams and Ambursen Dams, bear directly on bedrock since the buttresses eventually have to support all vertical and horizontal live and dead loads of the structure. As such, the primary mode of failure of all types of slab-and-buttress dams is failure as a result of sliding or lateral movement. However, Factors of safety against all modes of failure must be determined to confirm that unique subsurface conditions such as steeply sloping, thinly bedded bedrock formations as well as many other highly faulted bedrock configurations do not create more critical potential failure conditions.

Characteristics of Lake Lure and Lake Lure Dam

Lake Lure and Lake Lure Dam are located within the limits of the Town of Lake Lure in northwest Rutherford County, North Carolina on the Rocky Broad River at approximately **N 35.425 Degrees Latitude, West 82.183 Longitude**. Lake Lure has a surface area of about 670 acres at the crest of the Ogee Spillways and an area of about 746 acres at the Normal Water Surface Elevation (NWSE) of approximately 990.0 (± 0.4) feet. The maximum lake area at the top of the reinforced concrete guard rails on the bridge that crosses the dam is approximately 910 acres. The design storage (spillway crest elevation 980.00 feet) is approximately 12,619 acre-feet, the storage volume at the Normal Water Surface Elevation (990.0 feet) is approximately 32,295 acre-feet, and the maximum storage at the maximum lake elevation is approximately 44,914 acre-feet. Lake Lure has a length of about 12,000 feet (2.27miles), extending from the Town Marina near Town Hall on the west to Lake Lure Dam near the east town limits. Additional pertinent dam design data is presented in tabular form below.

Dam Design Information

Length of Dam = 480 feet	Structural Height of Dam = 124 feet
Length of Bridge Deck = 520 feet	Hydraulic Height of Dam = 122 feet
Spillway Crest Elevation = 980 feet	Top of Flood Gates = 992.5 feet
Effective Spillway Length = 88 feet	Three (3) Radial Gates & One Trash Gate
Top Elevations of Multiple Arches:	Low Level – Bays No. 4 & 5 – El. 995.4 feet
	Intermediate – Bays No. 9 – 13 – El. 997.4 feet
	High Level – Bays No. 6, 7, & 8 – El. 1003.4 feet
Bottom Elev. of Tailrace = Elev. 881.0 feet	Turbine Room Elev. = 901.0 feet
Main (Generator) Floor = Elev. 914.0 feet	Approximate Roof Elev. = 945.0 feet
North Carolina Dam Safety Classification:	<u>Very Large --- High Hazard</u>

Spillway Design Flood (SDF): Probable Maximum Precipitation (PMP) Flood
Available Spillway Capacity: 0.33 PMP Storm Event - - Flood Elev. = 1009 feet
Required Spillway Discharge = 72,230 cubic feet per second (cfs)

The 2-Phase Dam Safety Inspection Program

In August 2016 the Town Council of Lake Lure voted unanimously to retain a qualified dam engineer/consultant, or engineering firm, to conduct an *independent consultant dam safety inspection* of Lake Lure Dam and its appurtenant infrastructure that includes a hydroelectric generation powerhouse. The Town engaged a well-qualified civil engineer with substantial experience in the inspection, design and rehabilitation of dams. The inspection project was performed in two phases extending over a 14 month period culminating with the issuance of the Final, Phase II Inspection Report in early February 2018.

The Town accepted the findings and conclusions of the inspection engineer's Phase II Report and committed to implement the recommended remedial measures in a timely manner. These remedial measures form the basis for this project.

The 4-Phase Remediation Program

The remediation of Lake Lure Dam will be performed in 4 phases over a 4-year time frame. The anticipated schedule of this remediation program is as follows:

Phase I

Begin Design of Phase I Construction Project	July 2018
Submit Plans and Specification to State for Review	October 2018
Finalize Design Plans and Bid Project	November 2018
Complete Phase I Construction	September 2019

Phase II

Begin Design of Phase II Construction Project	November 2018
Submit Plans and Specifications to State for Review	April 2019
Finalize Design Plans and Bid Project	May 2019
Complete Phase II Construction	August 2020

Phase III

Begin Design of Phase III Construction Project	June 2020
Submit Plans and Specification to State for Review	September 2020
Finalize Design Plans and Bid Project	October 2020
Complete Phase III Construction	September 2021

Phase IV

Begin Design of Phase IV Construction Project	November 2021
Submit Plans and Specifications to State for Review	April 2021
Finalize Design Plans and Bid Project	May 2021
Complete Phase IV Construction	August 2022

COMPLETION OF DRAWINGS-OF-RECORD	October 2022
TOWN COUNCIL FORMAL ACCEPTANCE	October 2022

Reoccurring Scope of Work Activities – All Phases

The Scope of Work for this project will be performed in 4 distinct phases. Each Phase will include the following activities:

1. Preparation of a survey-control base map drawing showing the existing conditions within the limits of area in which the design will be performed. The base map must be completed by a registered land surveyor in the State of North Carolina and depict location coordinates for relevant property boundaries, utilities, survey control points, and structures. The site plan shall be prepared with contour intervals of two (2) feet and at a scale that allows representation of all details at the site including the dam remediation design plans and details.
2. Coordination with all relevant Town, County, State, and Federal Agencies from whom approvals and permits are required such as Pre-construction Notification Permits (USACOE), Erosion and Sedimentation Control Plans (Town, County, or State), etc.
3. Preparation of construction plans, specifications and bid documents, advertisements for bids, receipt and review of bids and bonds, consultation with Town Council concerning selection of contractor(s), and construction contract documents.
4. Coordination with the Town and its wastewater collection and treatment consultants regarding the interface design and construction activities associated with planned decommissioning of the existing sanitary sewer gravity sewer pipe that penetrates through the base of Bay 5 of the dam and the decommissioning and/or renovation of the existing sewage lift station and treatment plant located behind (downstream) from the dam.
5. Coordination with the Town and the NCDOT concerning planned closure of Buffalo Creek Bridge across the dam crest and the disposition of the bridge structure when the NCDOT has selected a final location for rerouting Buffalo Creek Road and constructed a replacement bridge. The 2017-18 Dam Safety Assessment Report determined that the reinforced-concrete bridge cannot simply be removed from the dam because it provides a significant portion of the dead weight necessary to provide desired stability factors of safety under certain loading conditions.

Phase-Specific Scope of Work Activities

Phase I

In addition to the five (5) reoccurring activities presented above, the Scope of Work for Phase I of the Dam Remediation Project includes seven (7) more activities that must be performed as follows:

1. Modification of Entrance Road to Access Bays No. 9 thru No. 13 (Right Abutment)
2. Packer-Controlled Deep Pressure Injection Grouting of Bays No. 9 thru No. 11
3. Design of a Subsurface Drainage System as a Backup for Pressure Injection Grouting
4. Design Surface Water Collection and Drainage Systems for Bays No. 12 and No. 13
5. Design Reinforcement and repairs for Powerhouse Floor Slabs and Walls
6. Design reinforcement repairs to Buttress No. 9 in Bay No. 8 (Shear Crack)
7. Design of Mud Room, Restroom, and Emergency Shower (Eye Wash) Facility

Phase II

In addition to the five (5) reoccurring activities presented above, the Scope of Work for Phase II of the Dam Remediation Project includes four (4) more activities that must be performed as follows:

1. Design of Downstream River-Crossing of the Left Abutment Access Roadway
2. Design of the Left Abutment Access Roadway to the Downstream Toe of the Dam
3. Design a Spillway Outlet Channel to Intercept the River Downstream of Access Road
4. Pressure Injection of the Powerhouse Penstock Room

Phase III

In addition to the five (5) reoccurring activities presented above, the Scope of Work for Phase III of the Dam Remediation Project includes five (5) more activities that must be performed as follows:

1. Design a Tie-Back Anchor System for the Left Abutment Wing Wall
2. Design a Packer-Controlled, Deep Pressure Injection Grouting Program for Bay No. 4
3. Design the Extension of Buttress No. 4 that will be the Inlet of the Spillway Channel
4. Design Surface Water Drainage Improvements for the Left Abutment
5. Design Safety Net Installations (Two Nets) for the Powerhouse and in Two Bays on Each Side of the Powerhouse (One Net Each) ---- If Roadway Bridge has been transferred to the Town

Phase IV

In addition to the five (5) reoccurring activities presented above, the Scope of Work for Phase IV of the Dam Remediation Project includes five (5) more activities that must be performed as follows:

1. Prepare guidelines and specifications for Pressure Washing and Pressure Injection Grouting of All Cold Joints or Construction Joints Exhibiting Evidence of Leakage
2. Dredging of the Tailrace from the Powerhouse to the New Access Road River Crossing
3. Packer-Controlled, Deep Pressure Grouting of Bay No. 5 (Old Sewer Line Penetration)
4. Plans and Specifications for any Remaining Safety Nets to be Installed---- If Roadway Bridge has been transferred to the Town
5. Plans for Heavily Reinforced Concrete Deck Slab for Abandoned Buffalo Creek Bridge--
-- If Roadway Bridge has been transferred to the Town

State Dam Safety Group Review and Approval of Plans and Specifications

All design plan, specifications and contract documents involving any excavation, modification and major repair to this dam must be reviewed and approved by the North Carolina Department of Environmental Quality, Division of Energy, Mineral, and Land Resources. NCDEQ-DEMLR review and approval of non-dam safety elements of this project such as the mud room and restroom

facilities; the access roadway / river crossing design; and surface drainage improvements at both the left and right abutments will be addressed during this project.

Requirements of Statements of Qualifications

The Statement of Qualifications should be provided in the following format. The submittal should be no more than twenty five (25) double sided pages excluding résumés. Please provide 6 copies of the SOQ. The SOQ should include/address the following:

1. A transmittal letter and general description of the firm's capabilities and capacity.
2. A listing of relevant experience for projects previously completed, or projects currently underway. Key personnel, partnerships with other firms, performance dates, references and project cost must be included for each project.
3. A project approach must be provided and include all key services. The project approach should identify methods, key personnel involved with each stage, deliverables and sequence schedule. The project approach must demonstrate the firm's capabilities and expertise in the specialized technical areas, working with the public, ability to meet schedules, team building/partnering and public relations.
4. Résumés of the firm's key individuals proposed for this project and organization chart indicating any proposed subcontractors and/or parties to a joint venture.
5. Participation by local and/or minority business should be indicated by percentage and type of work to be performed.
6. The firm shall have been in business a minimum of ten (10) years or the responsible principal shall have had equivalent experience as a co-principal/partner/senior associate in another office for a minimum of ten (10) years.
7. The firm or team shall have successfully completed at least two projects having similar scope or complexity in the past five (5) years and provide descriptions and client contacts for these projects.
8. The firm shall have expertise and demonstrate experience within the following areas:
 - a. Design of new and/or the remediation of existing concrete dams of comparable size and design features as the Lake Lure Dam
 - b. Design of access roads and river crossings
 - c. Anchored retaining wall design
 - d. Design of surface water drainage systems
 - e. Geotechnical design including the use/application of packer-controlled, deep pressure grouting technology for seepage abatement and piezometric measurement
 - f. Structural engineering and concrete structure rehabilitation design including the use/application of pressure injection grouting to seal leaking concrete joints and cracks

- g. Effective and timely communication with federal, state and local government officials.
- h. Surveying & mapping
- i. Erosion and sedimentation control permitting per NCDENR regulations for pertinent land disturbance activities
- j. Construction cost estimating
- k. Preparation of construction contract documents
- l. Resident Engineering, inspection and administration during construction

Qualifications Evaluation / Selection Process

Evaluation of all statements of qualifications will be accomplished in the following manner:

1. A review committee will be composed of Town staff, elected officials and/or key project stakeholders
2. Review committee members will study each statement and rate them on a standardized form. The form will consist of the following categories:
 - a. Pertinent experience of the firm
 - b. Qualification of the firm members
 - c. Key personnel's professional background and expertise
 - d. Pertinent experience on similar projects
 - e. Capability to perform work
 - f. Demonstrated experience in specialized renovation of major (large) concrete dams
 - g. Project approach
 - i. Interest in undertaking the project
 - ii. Understanding of the project's unique characteristics.
 - iii. Acceptability of approach methods and deliverables.
 - iv. Ability to properly manage aspects of the project in order to stay on schedule and at cost.
 - h. Team Dynamics
 - i. Logical team make-up
 - ii. Successful inner team past partnerships, other firms
 - iii. Successful outer team past partnerships, government agencies & public
 - iv. Ability to commit resources
 - v. Past performance
 - vi. Capacity to perform the work in a reasonable time frame.

The review committee will select the most qualified firm based on the above criteria. If the committee determines that more than one firm is equally top-qualified, they may elect to short list these firms for further review. This review may consist of interviews.

Additional Requirements

The successful firm as selected by the review committee will be expected to execute a contractual agreement with the Town before providing the herein described professional services. Statements received will be reviewed and further information may be solicited from firms demonstrating the most-qualified credentials. For further information regarding this project, please contact Ron Nalley, Town Manager, at townmgr@townoflakelure.com.

Questions regarding selection or submittal requirements may be directed to Mr. Nalley. Statements of Qualification should be delivered to the Town of Lake Lure, Town Hall, 2948 Memorial Highway, Lake Lure, NC, 28746 or mailed to P.O. Box 255, Lake Lure, NC, 28746, and attention: Town Manager.

The deadline for receipt of submittals is June 1, 2018 5PM.

The Town will negotiate with the firm that is determined to be most qualified to complete all phases of the project. Failure to reach a contact agreement will result in the termination of negotiations with the selected firm, and opening negotiations with the second ranked firm. Proposing firms are solely responsible for the cost of preparing their statements of qualifications and for the cost of negotiations. The Town will not reimburse for any cost incurred prior to execution of a professional services contract.