CITY OF HIGH POINT
AGENDA ITEM

Title: **PMP Study and Evaluation of Rehabilitation Alternatives for Arnold Koonce City Lake Dam Schnabel Engineering South, PC**

From: Terry Houk – Public Services Director
Derrick Boone – Public Services Asst. Director

Meeting Date: April 5, 2021

Public Hearing: N/A

Advertising Date: N/A
Advertised By: On-Call

Attachments: Attachment A- Proposal

PURPOSE:
To contract with Schnabel Engineering South, PC to perform engineering services associated with the evaluation of alternatives to upgrade Arnold Koonce City Lake Dam to meet NC DEQ Dam Safety requirements.

BACKGROUND:
Arnold Koonce City Lake Dam is nearly 100 years old and was constructed well before modern dam safety standards were developed. As such, the dam does not meet NC DEQ Dam Safety requirements for stability or spillway capacity, and it has several other dam safety-related deficiencies. The scope of the project will be for Schnabel Engineering South, PC to prepare a site-specific Probable Maximum Precipitation (PMP) study to develop updated PMP values for use as the basis in analyzing and developing alternatives to upgrade the Arnold Koonce City Lake Dam to meet NC DEQ Dam Safety requirements and for use in the future design of the selected alternative.

BUDGET IMPACT:
Funds for this project are available in the 2020-2021 Budget.

RECOMMENDATION / ACTION REQUESTED:
The Public Services Department recommends approval and asks for the Council to award the professional engineering services to Schnabel Engineering South, PC in the amount of $92,500.

Arnold Koonce City Lake Dam

Schnabel ENGINEERING

SCHNABEL ENGINEERING SOUTH, P.C.

April 2, 2018
Revised March 15, 2021

Mr. Derrick Boone
Assistant Public Services Director
City of High Point
211 South Hamilton, Room 206
High Point, NC 27260

Subject: **P4821083, Revised Proposal for Additional Engineering Services, Evaluation of Rehabilitation Alternatives for City Lake Dam, High Point, North Carolina**

Dear Mr. Boone:

SCHNABEL ENGINEERING SOUTH, P.C. (Schnabel) is pleased to submit this revised proposal for additional engineering services associated with the evaluation of alternatives to upgrade City Lake Dam to meet NC DEQ Dam Safety requirements. This proposal has been prepared based on our discussions with the City during the alternatives evaluation review meeting on February 13, 2018, and revised based on our conference call with the City on February 24, 2021.

BACKGROUND

City Lake Dam is nearly 100 years old and was constructed well before modern dam safety standards were developed. As such, the dam does not meet NC DEQ Dam Safety requirements for stability or spillway capacity and it has several other dam safety-related deficiencies. As a result, the City contracted with Schnabel to perform a feasibility level evaluation to assess options to rehabilitate or replace the City Lake Dam to meet current dam safety criteria. Our objective for that study was to develop technically feasible and cost-effective solutions for addressing the identified deficiencies and for providing the City with reliable long-term infrastructure that minimizes short-term and long-term impacts to the park and surrounding community.

Several supporting tasks were performed to better define the limitations of the existing dam with respect to current dam safety criteria and support the development of rehabilitation alternatives, including a detailed topographic survey of the site, a subsurface investigation of the spillway and right embankment, and updated hydrology and hydraulic analyses and dam stability analyses.

Three alternatives, two rehabilitation options and one replacement option, were presented in our draft Alternatives Analysis Report dated January 31, 2018. The rehabilitation alternatives include modifying the existing spillway crest using either Obermeyer crest gates (Alternative 1) or a piano key weir (Alternative

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2). Both rehabilitation alternatives also include post-tensioned anchoring of the existing concrete gravity dam to address stability concerns, raising the right embankment and abutments by three feet to reduce the required width of the new spillway, removal of the downstream apron and replacement with a more suitable stilling basin, and removal and replacement of the downstream training walls. The replacement alternative consists of a roller compacted concrete (RCC) dam with a PK weir constructed downstream of the existing dam (Alternative 3).

During our alternatives evaluation review meeting with the City on February 13, 2018, we recommended that the City consider performing a site-specific Probable Maximum Precipitation (PMP) study for the site. Based on our recent experience with other site-specific PMP studies in the region, there is the potential that the HMR 51/52 PMP values used in our initial study could be reduced significantly using more recent storm data and developments in meteorology since the HMR documents were published in the 1970s. Such a reduction in the PMP values for the City Lake watershed could have a significant effect on the proposed alternatives. Based on this information, the City requested that Schnabel move forward with preparing an additional scope of services for performing a site-specific PMP study and updating the engineering analyses and alternatives presented in our draft Alternatives Analysis Report accordingly.

OBJECTIVE AND SCOPE OF SERVICES

The primary objective of these additional services is to prepare a site-specific PMP study to develop updated PMP values for use as the basis in analyzing and developing alternatives to upgrade the dam to meet NC DEQ Dam Safety requirements and for use in the future design of the selected alternative. This study will be performed under the supervision of a Professional Engineer registered in the State of North Carolina.

Our proposed scope of services includes the following tasks:

Task 1 – Site-Specific PMP Study

Schnabel will subcontract with Applied Weather Associates (AWA) to perform a site-specific PMP study for the City Lake Dam watershed. The study and associated report will be prepared to meet the requirements of NC DEQ Dam Safety. The study will utilize data from the recently completely Commonwealth of Virginia PMP Study and other site-specific PMP studies that AWA has recently completed in the region (e.g., Lake Michie Reservoir in Durham, Hyco Reservoir in Caswell County, NC, etc.). AWA will provide a report documenting the methods, processes, and data used to derive the PMP values in the watershed. The results of this study will be used to update the hydrology and hydraulic analyses for the existing conditions and potential rehabilitation alternatives at City Lake Dam.

Following AWA’s completion of the study, we will hold a video conference call with NC DEQ Dam Safety to discuss the results of the site-specific PMP study.

Task 2 – Updates to Existing Conditions Engineering Analyses

Using the results of the site-specific PMP study, we will revise our hydrology and hydraulic models and analyses for the existing conditions to obtain updated values for the Spillway Design Storm (SDS, 3/4 PMP) and the depth of overtopping during this event, and an associated tailwater rating curve. The

updated SDS will be used in refining the rehabilitation alternatives discussed below, and our Alternatives Analysis Report will be updated with the revised analyses.

Two of the stability analysis load cases, LC3 – Infrequent Flood (200-year) and LC4 – Maximum Design Flood (3/4 PMP), presented in our draft Alternatives Analysis Report will be revised based on the results of the site-specific PMP study. The Alternatives Analysis Report will be updated with the revised analysis approach and results. The material properties and dam geometry used in our original analyses will remain the same.

Task 3 – Updates to Alternatives

Schnabel will update the three alternatives presented in our draft Alternatives Analysis Report based on the results of the site-specific PMP study. We will revise the hydraulic analyses to determine the top of dam elevations and spillway sizing required to safely pass the updated SDS (3/4 PMP), prepare updated conceptual design drawings (i.e., figures) and cost estimates for each alternative, and update each affected section of the Alternatives Analysis Report accordingly.

Our proposed scope for this task also includes another face-to-face (virtual or in-person) review meeting with City following the submission of our updated Alternatives Analysis Report.

EXCLUSIONS

Services not specifically identified above are not included in the scope of services under this agreement. The following services are not included in our proposed scope, but can be provided upon request:

- Attendance at meetings other than those listed above
- Site-specific climate change analysis
- Development of the annual exceedance probability of the deterministically-derived PMP depths
- Preparation of an updated Emergency Action Plan (EAP) or inundation mapping
- Environmental studies

SCHEDULE

AWA will complete the site-specific PMP study within 3 months from receipt of a signed agreement or written notice-to-proceed (NTP). Schnabel will provide the updated Alternatives Analysis Report to the City within 3 months of receipt of the site-specific PMP values (6 months from NTP).

PROJECT FEES

Our fees are summarized below and are for the specific scope of services detailed herein. The fee for work requested beyond the scope of services included herein will be based on a negotiated lump sum or our current unit prices at the time the work is authorized.

Breakdown of Fees

Task	Fee Type	Fee
Task 1 – Site-Specific PMP Study	Lump Sum	$53,800
Task 2 – Updates to Existing Conditions Engineering Analyses	Lump Sum	$12,000
Task 3 – Updates to Alternatives	Lump Sum	$26,700
Total Lump Sum Fee:		**$92,500**

PAYMENTS

Services will be billed monthly as a percentage of completion of the lump sum fee. Payment will be due on receipt of our invoices and will be considered past due 30 days after the invoice date. Interest will be charged at 1.5 percent per month on all overdue accounts. Payments will not be contingent upon receipt of funds from third parties.

GENERAL

The Standard Contract Terms and Conditions included in our Master Agreement for On-Call Professional Engineering Services (Master Agreement) dated March 14, 2018 will apply to the services proposed herein, and we understand the City will provide a Supplemental Service Agreement referencing the Master Agreement. This proposal is valid for 90 days from the date shown.

We appreciate the opportunity to submit this proposal for additional services and look forward to continuing to work with you on this project. Please contact us if you have any questions regarding this proposal.

Sincerely,

SCHNABEL ENGINEERING SOUTH, P.C.

Jonathan M. Pittman, PE
Senior Vice President

SLK:JMP:TJF