

(for use with 1910-1, 1996 Edition)

This is EXHIBIT A, part of the Agreement between Owner and Engineer for Professional Services dated December 15, 2014.

Engineer's Services

Article 1 of the Agreement is ~~amended and~~ supplemented to include the ~~following agreement of the parties provisions of this Exhibit.~~ Engineer shall provide Basic and Additional Services as set forth below.

If a reasonable reading of this Agreement is that a service is to be provided as a Basic Service, the listing of a similar service in this Agreement is not intended to limit the performance of that service as a Basic Service. Without limiting the Owner's other rights and remedies, it is agreed that services that are needed because of the failure of the Engineer to comply with this Agreement or with its duties to the Owner shall be performed or provided by the Engineer without charge. Where the Agreement states that a service will be done or goods will be provided, it will be construed to require the Engineer to do the service or provide the goods, unless the context requires otherwise.

PART 1 -- BASIC SERVICES Applies:

A1.01 Study and Report Phase

A. Engineer shall:

1. Consult with Owner to define and clarify Owner's requirements for the Project and available data.
2. Advise Owner as to the necessity of Owner's providing data or services of the types described in Exhibit B which are not part of Engineer's Basic Services, and assist Owner in obtaining such data and services.
3. Identify, consult with, and analyze requirements of governmental authorities having jurisdiction to approve the portions of the Project designed or specified by Engineer, including but not limited to mitigating measures identified in the environmental assessment.
4. Identify and evaluate (see attached scope of work) alternate solutions available to Owner and, after consultation with Owner, recommend to Owner those solutions which in Engineer's judgment meet Owner's requirements for the Project.
5. Prepare a report (the "Report") which will, as appropriate, contain schematic layouts, sketches and conceptual design criteria with appropriate exhibits to indicate the agreed-to requirements, considerations involved, and those alternate solutions available to Owner which Engineer recommends. This Report will be accompanied by Engineer's opinion of Total Project Costs for each solution which is so recommended for the Project with each component separately itemized, including the following, which will be separately itemized: opinion of probable Construction Cost, allowances for contingencies and for the estimated total costs of

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design, professional, and related services provided by Engineer and, on the basis of information furnished by Owner, allowances for other items and services included within the definition of Total Project Costs.

6. Perform or provide the following additional Study and Report Phase tasks or deliverables: The number of review and final copies and schedule are discussed in attached scope of work.

7. Furnish (see attachment) review copies of the Report to Owner within (see attachment) days of authorization to begin services and review it with Owner.

8. Revise the Report in response to Owner's and other parties' comments, as appropriate, and furnish (see attachment) final copies of the revised Report to the Owner within (see attachment) days after completion of reviewing it with Owner.

B. Engineer's services under the Study and Report Phase will be considered complete on the date when the final copies of the revised Report have been delivered to Owner.

A1.02 Preliminary Design Phase

A. After acceptance by Owner of the Report, selection by Owner of a recommended solution and indication of any specific modifications or changes in the scope, extent, character, or design requirements of the Project desired by Owner, and upon written authorization from Owner, Engineer shall:

1. On the basis of the above acceptance, selection, and authorization, prepare Preliminary Design Phase documents consisting of final design criteria, preliminary drawings, outline specifications and written descriptions of the Project.

2. Provide necessary field surveys and topographic and utility mapping for design purposes. Utility mapping will be based upon information obtained from utility owners.

3. Advise Owner if additional reports, data, information, or services of the types described in Exhibit B are necessary and assist Owner in obtaining such reports, data, information, or services.

4. Based on the information contained in the Preliminary Design Phase documents, submit a revised opinion of probable Construction Cost and any adjustments to Total Project Costs known to Engineer, which will be itemized as provided in paragraph A1.01.A.5.

5. Perform or provide the following additional Preliminary Design Phase tasks or deliverables:

6. Furnish the Preliminary Design Phase documents to and review them with Owner.

7. Submit to Owner (see attachment) final copies of the Preliminary Design Phase documents and revised opinion of probable Construction Cost within (see attachment) days after authorization to proceed with this phase.

B. Engineer's services under the Preliminary Design Phase will be considered complete on the date when final copies of the Preliminary Design Phase documents have been delivered to Owner.

A1.03 Final Design Phase

A. After acceptance by Owner of the Preliminary Design Phase documents and revised opinion of probable Construction Cost as determined in the Preliminary Design Phase, but subject to any Owner-directed modifications or changes in the scope, extent, character, or design requirements of or for the Project, and upon written authorization from Owner, Engineer shall:

1. On the basis of the above acceptance, direction, and authorization, prepare final Drawings indicating the scope, extent, and character of the Work to be performed and furnished by Contractor. Specifications will be prepared, where appropriate, in general conformance with the 16-division format of the Construction Specifications Institute.

2. Provide technical criteria, written descriptions, and design data for Owner's use in filing applications for permits from or approvals of governmental authorities having jurisdiction to review or approve the final design of the Project and assist Owner in consultations with appropriate authorities.

3. Advise Owner of any adjustments to the opinion of probable Construction Cost and any adjustments to Total Project Costs known to Engineer, itemized as provided in paragraph A1.01.A.5.

4. Perform or provide the following additional Final Design Phase tasks or deliverables:

5. Prepare and furnish Bidding Documents for review and approval by Owner, its legal counsel, and other advisors, as appropriate, and assist Owner in the preparation of other related documents.

6. Submit (see attachment) final copies of the Bidding Documents and a revised opinion of probable Construction Cost to Owner within (see attachment) days after authorization to proceed with this phase.

B. In the event that the Work designed or specified by Engineer is to be performed or furnished under more than one prime contract, or if Engineer's services are to be separately sequenced with the work of one or more prime Contractors (such as in the case of fast-tracking), Owner and Engineer shall, prior to commencement of the Final Design Phase, develop a schedule for performance of Engineer's services during the Final Design, Bidding or Negotiating, Construction, and Post-Construction Phases in order to sequence and coordinate properly such services as are applicable to the work under such separate prime contracts. This schedule is to be

prepared and included in or become an amendment to Exhibit A whether or not the work under such contracts is to proceed concurrently.

C. The number of prime contracts for Work designed or specified by Engineer upon which the Engineer's compensation has been established under this Agreement is (see attachment).

D. Engineer's services under the Final Design Phase will be considered complete on the date when the submittals required by paragraph A1.03.A.6 have been delivered to Owner.

A1.04 Bidding or Negotiating Phase

A. After acceptance by Owner of the Bidding Documents and the most recent opinion of probable Construction Cost as determined in the Final Design Phase, and upon written authorization by Owner to proceed, Engineer shall:

1. Assist Owner in advertising for and obtaining bids or negotiating proposals for the Work and, where applicable, maintain a record of prospective bidders to whom Bidding Documents have been issued, attend pre-Bid conferences, if any, and receive and process Contractor deposits or charges for the Bidding Documents.
2. Issue Addenda as appropriate to clarify, correct, or change the Bidding Documents.
3. Consult with Owner as to the acceptability of subcontractors, suppliers, and other individuals and entities proposed by Contractor for those portions of the Work as to which such acceptability is required by the Bidding Documents.
4. Perform or provide the following additional Bidding or Negotiating Phase tasks or deliverables: (see attachment)
5. Attend the Bid opening, prepare Bid tabulation sheets, and assist Owner in evaluating Bids or proposals and in assembling and awarding contracts for the Work.

As part of Basic Services, the Engineer shall perform the paragraph A1.04 services for two rounds of bids if the Owner, in its discretion, decides to bid a second round.

B. The Bidding or Negotiating Phase will be considered complete upon commencement of the Construction Phase or upon cessation of negotiations with prospective Contractors (except as may be required if Exhibit F is a part of this Agreement).

A1.05 Construction Phase

A. Upon successful completion of the Bidding and Negotiating Phase, and upon written authorization from Owner, Engineer shall:

1. General Administration of Construction Contract. Consult with Owner and act as Owner's representative as provided in the General Conditions. The extent and limitations of

the duties, responsibilities and authority of Engineer as assigned in said General Conditions shall not be modified, except as Engineer and Owner may otherwise agree in writing. All of Owner's instructions to Contractor will be issued through Engineer, who shall have authority to act on behalf of Owner in dealings with Contractor to the extent provided in this Agreement and said General Conditions except as otherwise provided in writing.

2. Resident Project Representative (RPR). Provide the services of an RPR at the Site to assist the Engineer and to provide more extensive observation of Contractor's work. Duties, responsibilities, and authority of the RPR are as set forth in Exhibit D. The furnishing of such RPR's services will not extend Engineer's responsibilities or authority beyond the specific limits set forth elsewhere in this Agreement.

3. Selecting Independent Testing Laboratory. Assist Owner in the selection of an independent testing laboratory to perform the services identified in paragraph B2.01.0.

4. Pre-Construction Conference. Participate in a Pre-Construction Conference prior to commencement of Work at the Site.

5. Baselines and Benchmarks. As appropriate, establish baselines and benchmarks for locating the Work which in Engineer's judgment are necessary to enable Contractor to proceed.

6. Visits to Site and Observation of Construction. In connection with observations of Contractor's work in progress while it is in progress:

a. Make visits to the Site at intervals appropriate to the various stages of construction, as Engineer deems necessary based on Engineer's exercise of professional judgment, in order to observe as an experienced and qualified design professional the progress and quality of the Work. However, those visits shall be made at least (see attachment) unless the Owner otherwise agrees. Such visits and observations by Engineer, and the Resident Project Representative, if any, are not intended to be exhaustive or to extend to every aspect of Contractor's work in progress or to involve detailed inspections of Contractor's work in progress beyond the responsibilities specifically assigned to Engineer in this Agreement and the Contract Documents, but rather are to be limited to spot checking, selective sampling, and similar methods of general observation of the Work based on Engineer's exercise of professional judgment as assisted by the Resident Project Representative, if any. Based on information obtained during such visits and such observations, Engineer will determine in general if Contractor's work is proceeding in accordance with the Contract Documents, will determine if the Work is being performed in a manner indicating that the Work when completed will be in accordance with the Contract Documents, and will endeavor to guard the Owner against defects and deficiencies in the Work. ~~and~~ Engineer shall keep Owner informed in writing of the progress of the Work.

b. The purpose of Engineer's visits to, and representation by the Resident Project Representative, if any, at the Site, will be to enable Engineer to better carry out the duties and responsibilities assigned to and undertaken by Engineer during the Construction Phase, and, in addition, by the exercise of Engineer's efforts as an experienced and qualified design professional, to provide for Owner a greater degree of confidence that the completed

Work will conform in general to the Contract Documents and that the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents has been implemented and preserved by Contractor. Engineer shall not, during such visits or as a result of such observations of Contractor's work in progress, supervise, direct, or have control over Contractor's work, nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by Contractor, for safety precautions and programs incident to Contractor's work, or for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's furnishing and performing the Work. Accordingly, Engineer neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor's failure to furnish and perform its work in accordance with the Contract Documents.

7. Defective Work. Recommend to Owner that Contractor's work be disapproved and rejected while it is in progress if, on the basis of such observations, Engineer believes that such work will not produce a completed Project that conforms generally to the Contract Documents or that it will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents.

8. Clarifications and Interpretations; Field Orders. Issue necessary clarifications and interpretations of the Contract Documents as appropriate to the orderly completion of Contractor's work. Such clarifications and interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents. Engineer may issue Field Orders authorizing minor variations from the requirements of the Contract Documents but shall promptly send all such Field Orders to the Owner's representative.

9. Change Orders and Work Change Directives. Recommend Change Orders and Work Change Directives to Owner, as appropriate, and prepare Change Orders and Work Change Directives as required.

10. Shop Drawings and Samples. Review and approve or take other appropriate action in respect to Shop Drawings and Samples and other data which Contractor is required to submit, but only for conformance with the information given in the Contract Documents and compatibility with the design concept of the completed Project as a functioning whole as indicated in the Contract Documents and for the purpose of determining that if the Work is performed as shown by the submittals, it will be in compliance with the Contract Documents. Such reviews and approvals or other action will not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions and programs incident thereto. Engineer has an obligation to meet any Contractor's submittal schedule that has earlier been acceptable to Engineer. The Engineer shall determine what aspects of the Work shall be the subject of submittals, and shall not knowingly permit such aspects to proceed in the absence of approved submittals.

11. Substitutes and "or-equal." Evaluate and determine the acceptability of substitute or "or-equal" materials and equipment proposed by Contractor, but subject to the provisions of paragraph A2.02.A.2 of this Exhibit A.

12. Inspections and Tests. Require such special inspections or tests of Contractor's work as deemed reasonably necessary, and receive and review all certificates of inspections, tests, and approvals required by Laws and Regulations or the Contract Documents. Engineer's review of such certificates will be for the purpose of determining that the results certified indicate compliance with the Contract Documents and will not constitute an independent evaluation that the content or procedures of such inspections, tests, or approvals comply with the requirements of the Contract Documents. When it is reasonable to do so, Engineer shall be entitled to rely on the results of such tests.

13. Disagreements between Owner and Contractor. Render formal written decisions on all claims of Owner and Contractor relating to the acceptability of Contractor's work or the interpretation of the requirements of the Contract Documents pertaining to the execution and progress of Contractor's work. In rendering such decisions, Engineer shall be fair and not show partiality to Owner or Contractor and shall not be liable in connection with any decision rendered in good faith in such capacity.

14. Applications for Payment. Based on Engineer's observations as an experienced and qualified design professional and on review of Applications for Payment and accompanying supporting documentation:

a. Determine the amounts that Engineer recommends Contractor be paid. Such recommendations of payment will be in writing and will constitute Engineer's representation to Owner, based on such observations and review, that, to the best of Engineer's knowledge, information and belief, Contractor's work has progressed to the point indicated, the quality of such work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents and to any other qualifications stated in the recommendation), and the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe Contractor's work. In the case of unit price work, Engineer's recommendations of payment will include final determinations of quantities and classifications of Contractor's work (subject to any subsequent adjustments allowed by the Contract Documents). The responsibilities of Engineer contained in paragraph A1.05.A.6.a are expressly subject to the limitations set forth in paragraph A1.05.A.6.b and other express or general limitations in this Agreement and elsewhere.

b. By recommending any payment, Engineer shall not thereby be deemed to have represented that observations made by Engineer to check the quality or quantity of Contractor's work as it is performed and furnished have been exhaustive, extended to every aspect of Contractor's work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in this Agreement and the Contract Documents. Neither Engineer's review of Contractor's work for the purposes of recommending payments nor Engineer's recommendation of any payment including final payment will impose on Engineer responsibility to supervise, direct, or control Contractor's work in progress or for the means, methods, techniques, sequences, or procedures of construction or safety precautions or programs incident thereto, or Contractor's compliance with Laws and Regulations applicable to Contractor's furnishing and performing the Work.

It will also not impose responsibility on Engineer to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or to determine that title to any portion of the work in progress, materials, or equipment has passed to Owner free and clear of any liens, claims, security interests, or encumbrances, or that there may not be other matters at issue between Owner and Contractor that might affect the amount that should be paid.

15. Contractor's Completion Documents.

a. Receive and review maintenance and operating instructions, schedules, and guarantees.

b. Receive bonds, certificates, or other evidence of insurance not previously submitted and required by the Contract Documents, certificates of inspection, tests and approvals, Shop Drawings, Samples and other data approved as provided under paragraph A1.05.A.10, and the annotated record documents which are to be assembled by Contractor in accordance with the Contract Documents to obtain final payment. The extent of such Engineer's review will be limited as provided in paragraph A1.05.A.10.

c. Engineer shall transmit these documents to Owner.

16. Substantial Completion. Promptly after notice from Contractor that Contractor considers the entire Work ready for its intended use, in company with Owner and Contractor, conduct an inspection to determine if the Work is Substantially Complete. If after considering any objections of Owner, Engineer considers the Work Substantially Complete, Engineer shall deliver a certificate of Substantial Completion to Owner and Contractor.

17. Additional Tasks. Perform or provide the following additional Construction Phase tasks or deliverables: (see attachment)

18. Final Notice of Acceptability of the Work. Conduct a final inspection to determine if the completed Work of Contractor is acceptable so that Engineer may recommend, in writing, final payment to Contractor. Accompanying the recommendation for final payment, Engineer shall also provide a notice in the form attached hereto as Exhibit E (the "Notice of Acceptability of Work") that the Work is acceptable (subject to the provisions of paragraph A1.05.A.14.b) to the best of Engineer's knowledge, information, and belief and based on the extent of the services provided by Engineer under this Agreement.

19. Time for Performance. The Engineer shall perform all of Engineer's tasks in the Construction Phase within a reasonable time, considering, among other relevant factors, the Contractor's Contract Time, schedules that the Engineer has indicated as acceptable, and the time that is appropriate for the tasks to be done to the level of professional skill and care that are required.

B. Duration of Construction Phase. The Construction Phase will commence with the execution of the first Construction Agreement for the Project or any part thereof and will terminate upon written recommendation by Engineer for final payment to Contractors. If the Project involves more than one prime contract as indicated in paragraph A1.03.C, Construction Phase services may be rendered at different times in respect to the separate contracts.

C. Limitation of Responsibilities. Engineer shall not be responsible for the acts or omissions of any Contractor, or of any of their subcontractors, suppliers, or of any other individual or entity performing or furnishing any of the Work. Engineer shall not be responsible for failure of any Contractor to perform or furnish the Work in accordance with the Contract Documents.

A1.06 Post-Construction Phase

A. Upon written authorization from Owner, Engineer, during the Post-Construction Phase, shall:

1. Provide assistance in connection with the testing and adjusting of Project equipment or systems.
2. Assist Owner in training Owner's staff to operate and maintain Project, equipment, and systems.
3. Assist Owner in developing procedures for control of the operation and maintenance of, and record keeping for Project equipment and systems.
4. Together with Owner, visit the Project to observe any apparent defects in the Work, assist Owner in consultations and discussions with Contractor concerning correction of any such defects, and make recommendations as to replacement or correction of Defective Work, if present.
5. Perform or provide the following additional Post-Construction Phase tasks or deliverables: none.

6. In company with Owner or Owner's representative, provide an inspection of the Project within one month before the end of the Correction Period to ascertain whether any portion of the Work is subject to correction.

B. The Post-Construction Phase services may commence during the Construction Phase and, if not otherwise modified in this Exhibit A, will terminate at the end of the Correction Period.

PART 2 -- ADDITIONAL SERVICES

A2.01 Additional Services Requiring Owner's Authorization in Advance

A. If authorized in writing by Owner, Engineer shall furnish or obtain from others Additional Services of the types listed below. These services will be paid for by Owner as indicated in Article 4 of the Agreement.

1. Preparation of applications and supporting documents (in addition to those furnished under Basic Services) for private or governmental grants, loans or advances in connection with the Project; preparation or review of environmental assessments and impact statements; review and evaluation of the effects on the design requirements for the Project of any such statements and documents prepared by others; and assistance in obtaining approvals of authorities having jurisdiction over the anticipated environmental impact of the Project.

2. Services to make measured drawings of or to investigate existing conditions or facilities, or to verify the accuracy of drawings or other information furnished by Owner.

3. Services resulting from significant changes in the scope, extent, or character of the portions of the Project designed or specified by Engineer or its design requirements including, but not limited to, changes in size, complexity, Owner's schedule, character of construction, or method of financing; and revising previously accepted studies, reports, Drawings, Specifications, or Contract Documents when such revisions are required by changes in Laws and Regulations enacted subsequent to the Effective Date of this Agreement or are due to any other causes beyond Engineer's control.

4. Services resulting from Owner's request to evaluate additional Study and Report Phase alternative solutions beyond those identified in paragraph A1.01.A.4.

5. Services required as a result of Owner's providing incomplete or incorrect Project information with respect to Exhibit B.

6. Providing renderings or models for Owner's use.

7. Undertaking investigations and studies including, but not limited to, detailed consideration of operations, maintenance, and overhead expenses; the preparation of feasibility studies, cash flow and economic evaluations, rate schedules, and appraisals; assistance in obtaining financing for the Project; evaluating processes available for licensing, and assisting Owner in obtaining process licensing; detailed quantity surveys of materials, equipment, and labor; and audits or inventories required in connection with construction performed by Owner.

8. Furnishing services of Engineer's Consultants for other than Basic Services.
9. Services attributable to more prime construction contracts than specified in paragraph A1.03.C.
10. Services during out-of-town travel required of Engineer other than for visits to the Site or Owner's office.
11. Preparing for, coordinating with, participating in and responding to structured independent review processes, including, but not limited to, construction management, cost estimating, project peer review, value engineering, and constructibility review requested by Owner; and performing or furnishing services required to revise studies, reports, Drawings, Specifications, or other Bidding Documents as a result of such review processes.
12. Preparing additional Bidding Documents or Contract Documents for alternate bids or prices requested by Owner for the Work or a portion thereof.
13. Determining the acceptability of substitute materials and equipment proposed during the Bidding or Negotiating Phase when substitution prior to the award of contracts is allowed by the Bidding Documents.
14. Assistance in connection with Bid protests, rebidding, or renegotiating contracts for construction, materials, equipment, or services, except when such assistance is required by Exhibit F or other provisions of this Agreement.
15. Providing construction surveys and staking to enable Contractor to perform its work other than as required under paragraph A1.05.A.5, and any type of property surveys or related engineering services needed for the transfer of interests in real property; and providing other special field surveys.
16. Providing Construction Phase services beyond the Contract Times set forth in Exhibit C.
17. Providing assistance in resolving any Hazardous Environmental Condition in compliance with current Laws and Regulations.
18. Preparing and furnishing to Owner Record Drawings showing appropriate record information based on Project annotated record documents received from Contractor.
19. Preparation of operation and maintenance manuals.
20. Preparing to serve or serving as a consultant or witness for Owner in any litigation, arbitration or other dispute resolution process related to the Project.
21. Providing more extensive services required to enable Engineer to issue notices or certifications requested by Owner under paragraph 6.01.G of the Agreement.

22. Other services performed or furnished by Engineer not otherwise provided for in this Agreement.

A2.02 Required Additional Services

A. Engineer shall perform or furnish, without requesting or receiving specific advance authorization from Owner, the Additional Services of the types listed below. Engineer shall advise Owner in writing promptly after starting any such Additional Services.

1. Services in connection with Work Change Directives and Change Orders to reflect changes requested by Owner so as to make the compensation commensurate with the extent of the Additional Services rendered.

2. Services in making revisions to Drawings and Specifications occasioned by the acceptance of substitute materials or equipment other than "or-equal" items; and services after the award of the Construction Agreement in evaluating and determining the acceptability of a substitution which is found to be inappropriate for the Project or an excessive number of substitutions.

3. ~~Services resulting from significant delays, changes, or price increases occurring as a direct or indirect result of materials, equipment, or energy shortages.~~

4. Additional or extended services during construction made necessary by (1) emergencies or acts of God endangering the Work, (2) an occurrence of a Hazardous Environmental Condition, (3) Work damaged by fire or other cause during construction, (4) a significant amount of defective, neglected, or delayed work by Contractor, (5) acceleration of the progress schedule involving services beyond normal working hours, or (6) default by Contractor.

5. Services (other than Basic Services during the Post-Construction Phase) in connection with any partial utilization of any part of the Work by Owner prior to Substantial Completion.

6. Evaluating an unreasonable claim or an excessive number of claims submitted by Contractor or others in connection with the Work.

**ATTACHMENT TO EXHIBIT A
SCOPE OF SERVICES FOR
DAM INSPECTIONS, MAINTENANCE AND REHABILITATION PROJECT**

PROJECT BACKGROUND, PURPOSE AND SCOPE OVERVIEW

The City of Durham's Department of Water Management (City) operates and maintains two raw water supply reservoirs controlled by Little River Dam and Lake Michie Dam, serving over 268,000 customers. Lake Michie Dam was constructed on the Flat River between 1924 and 1927. The dam is a composite structure consisting of a 550-ft long concrete gravity section and a 390-ft long earthen embankment section. The 300-ft long uncontrolled ogee spillway is located in the center of the concrete gravity dam and has a crest elevation of 341 ft mean sea level (MSL), approximately 92-ft above the riverbed.

Little River Dam was constructed on the Little River between 1984 and 1987. The dam is a 95-ft high composite structure consisting of a 300-ft long concrete gravity gated spillway section with nine bays, and a 1,200-ft long zoned earthen embankment section. The spillway controls the normal lake level at 355 ft. MSL.

Services to be performed for this project include: (1) perform annual dam safety inspections, and update the Operation and Maintenance (O&M) Plan and Emergency Action Plan (EAP); (2) develop a 50-year plan for rehabilitation and capital improvements and a preventive maintenance program, and (3) perform engineering evaluation services related to the reservoir facilities.

This project is divided into four (4) Phases:

- Phase 1 – Annual Dam Safety Inspections, O&M Plan updates and EAP updates
- Phase 2 – Condition Assessment and Rehabilitation Plan
- Phase 3 – Preventive Maintenance Plan
- Phase 4 – Engineering Evaluations

DETAILED SCOPE OF SERVICES

Phase 1 – Annual Dam Safety Inspections, O&M Plan Updates and EAP Updates

Task 1-1 – Dam Inspections

Both Lake Michie Dam and Little River Dam are classified as high-hazard by NC-DENR Dam Safety. The objective of the Dam Inspection task is to observe, document, and evaluate the conditions of both the concrete and embankment sections of the dams, the abutments, spillways, gates, intake and outlet structures, and other appurtenances to identify and prioritize potential dam safety, long-term reliability, and/or O&M issues. This scope of work includes the annual inspection of Little River and Lake Michie dams and appurtenance structures for a period of five years.

The visual inspection for each dam will be coordinated with the City of Durham personnel, and performed by a Professional Engineer registered in the State of North Carolina. We will begin the inspections by

**City of Durham – Dam Inspections, Maintenance, and Rehabilitation Contract
Attachment to Exhibit A – Scope of Work**

conducting an interview with the operations and maintenance personnel to review the performance of each dam since the last dam safety inspection, discuss recent repairs or maintenance activities, review the recommendations of the previous annual NC-DENR inspection reports, and review instrumentation data collected during the previous year.

Following the interview, we will perform an on-site visual inspection of the dams and appurtenant structures. It is assumed that the inspections will take one day for each site. We will coordinate with City personnel at least two weeks in advance to set the date for the inspections. For each dam, we prepare a checklist of items in advance to guide the review and document our observations and findings. We have found that there is great benefit for the dam operation and maintenance personnel to accompany our engineers during the dam inspections. The on-site staff are generally the most knowledgeable about site conditions and changes in conditions that may have occurred. For gated spillways, we suggest that one or more of the gates be at least partially exercised during the inspection to verify operation. Whenever possible, we prefer to perform the inspections when the spillway is not flowing, so that the spillway condition may be observed in the dry.

For each dam, we will prepare an inspection report to summarize our interviews with the maintenance staff, our observations and findings from the field inspection, our review of previous inspection reports, and evaluation of available instrumentation data. The report will include photographs taken during our inspection and the completed inspection checklist. The report will identify any O&M issues observed and recommendations for engineering studies and/or dam repairs, as appropriate.

Schnabel will retain the services of CH Engineering to perform survey of the monuments at Little River and Lake Michie Dams. It is our understanding that there are six monuments along the crest of Lake Michie dam, either on the earthen embankment or the non-overflow portion of the concrete dam. There are 34 monuments at Little River dam as identified on the original drawing G-20. The current O&M recommends that the survey monuments at Little River be surveyed every five years and the monuments at Lake Michie are surveyed every three years. Both sites will be surveyed during the first annual inspection (2014) and Lake Michie will also be surveyed during the fourth inspection (2017).

It is anticipated that the first inspection will be performed in January or February of 2015. The remaining four inspections will most likely be performed in the late summer or early fall of 2015, 2016, 2017 and 2018. It is expected that the inspections will be attended by two of Schnabel's dam engineering staff and the final reports will be signed and sealed by a Professional Engineer licensed in North Carolina. A meeting will be held to review the reports and discuss the recommendations with the City. A final report will be prepared to incorporate the comments received. Five hard copies and one digital copy of the final reports will be provided.

It is expected that the first year inspection (February 2015) will be performed in conjunction with the asset condition assessment discussed below. For cost purposes, we have included the cost of the physical inspection for the first as part of the Condition Assessment described below. So the cost for the first year only reflects the review of data and cost to prepare the inspection report.

Task 1-2 – O&M Manual Updates and Training

O&M Manuals provide guidance and instruction to project personnel for day-to-day operation, maintenance and inspection of the dams. The current O&M Manuals have been reviewed by Schnabel.

**City of Durham – Dam Inspections, Maintenance, and Rehabilitation Contract
Attachment to Exhibit A – Scope of Work**

We will coordinate with the City of Durham staff to update the O&M's annually. The annual O&M update will be performed in conjunction with the annual dam safety inspections for a period of five years. It is anticipated that the annual updates will be limited to minor changes in data, procedures and equipment. This may include revisions to add information for rehabilitated or replaced equipment, updating annual inspection photos and data, referencing new documents such as reports or drawings, adding maintenance records, and updating emergency contact information. We will update the links and formatting for the digital (html) version of the O&M so that the new data is accessible in that format. If more significant revisions required, we will discuss the level of effort necessary to incorporate the specific changes and will negotiate an appropriate change order to perform the update. Out of scope modifications would include re-writing portions of the manual text or incorporating new sections or appendices. We have anticipated that a single pdf of the revised O&M manual will be provided. It is expected that up to six hard copies of the revised manual will be provided. This will be handled by preparing an errata sheet and providing copies of revised pages and appendices only. Training will be limited to a single annual meeting with the City of Durham to review the edits and to show personnel where the new or revised information is located on the digital version of the report.

Task 1-3 – EAP Updates and Training

Schnabel will review the Emergency Action Plans for Lake Michie and Little River dams to identify areas that may require updates. When reviewing the EAP, we will focus on two primary components. The first is to update the notification flow charts and other contacts and/or contractors listed in the EAP to ensure inclusion of appropriate individuals. The second component is identifying significant changes in the inundation impact areas, such as new bridges, new floodplain development, and/or changes in channel geometry and flood control structures and facilities. We have not included the cost of additional breach analyses that may need to be performed to model the effects of new downstream development. Should revisions to the breach analysis be required, we will discuss it with the City of Durham and provide a scope of services for the work at that time. We will coordinate with the City of Durham staff to ensure that the EAP updates include modifications to the dam or operations that may impact the breach scenarios used for the original EAP and infrastructure changes that may impact access to dam during emergencies.

It is expected that the annual EAP update will be performed in conjunction with the O&M updates and the annual inspections. The revisions are typically handled by issuing revised sheets to all document holders along with an errata sheet that summarizes the updates. Modifications are typically limited to changed contact names, phone numbers, material suppliers, etc. If more significant updates are necessary, the entire report could be reissued.

We expect that the first year update will be performed in February of 2015. For this first update, we have assumed that a meeting will be held with the City of Durham staff and Emergency responders identified in the EAPs. This meeting will include a discussion regarding the contents and organization of the existing EAPs. At the same meeting, we will provide an EAP “tabletop” training and simulation workshop to satisfy the requirement of the current plan. Training and simulation workshops are a valuable way to inform all the key individuals what their roles and responsibilities would be under various emergency scenarios. This meeting will also satisfy the requirement to perform a training exercise every five years.

Phase 2 – Condition Assessment and Rehabilitation Plan

Dam and raw water pumping station assets at Lake Michie Dam and Little River Dam will be evaluated in terms of their physical condition and operating performance. The assessments will be used to determine the likelihood and consequence of failure (components of risk) for each asset. The Engineer will develop planning estimates of the costs to repair deficiencies observed, and will develop a prioritization of repairs. Assets relating to the dam, including intakes, gates and flumes, will be assessed by Schnabel Engineering; assets relating to the raw water pumping stations will be assessed by Brown and Caldwell (Subconsultant).

Task 2-1: Condition Assessment

1. The project manager from Schnabel and B&C will attend a project kickoff meeting with the City within 14 days following the notice to proceed. The meeting will review the scope of work, project schedule, and administrative items.
2. Upon issuance of Notice to Proceed, Schnabel will develop a Condition Assessment work plan that includes a health and safety plan for the proposed work. We will coordinate with our subconsultant Brown and Caldwell (B&C) to develop a comprehensive plan to cover the full scope of services.
3. Review Available Information. Schnabel will request information from the City which is required to complete the condition assessment and rehabilitation plan activities, and will coordinate with the City to obtain this information. We will distribute the information to subconsultants and subcontractors as needed. Data request is expected to include, at a minimum:
 - o Record drawings not previously provided to Engineer
 - o Pump curves and other pump, motor and standby generator record data
 - o Available manufacturers' operation and maintenance manuals
 - o Operation and maintenance data including pump run (hours) data
 - o Maintenance records
 - o Instrumentation data
 - o Previous analyses performed for the dams including subsurface investigations, hydrology, hydraulics, and stability analyses for both the earthen embankments and concrete structures.

We are in receipt of the O&M manuals for both Lake Michie and Little River. There is a significant amount of information provided electronically within those documents. Schnabel will also review the files of the NCDENR Dam Safety Office to see if additional reports or previous analyses are available. In cases where records are available in hard-copy only, Engineer will arrange to make scanned copies of these records and will make electronic copies of the information available to the City.

4. Schnabel and B&C will develop forms which will be used by field assessment teams to record asset nameplate data and condition ratings. Schnabel will submit draft assessment forms to City staff for review, and will produce final assessment forms based on City input.

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We anticipate that the primary assets to be assessed in the field are those currently documented in the NEXGEN AM computerized maintenance management system (CMMS). However, we understand that additional assets will need to be identified during field activities and added to the NEXGEN AM asset inventory. The assessment data forms will be formatted in Microsoft Excel to facilitate upload of data into NEXGEN AM.

5. Pre-Condition Assessment Workshop. Schnabel and B&C will meet with City Engineering, Operations and Maintenance staff prior to the field activities to discuss operability and observed deficiencies at each of the facilities to be assessed, prior rehabilitation projects, and other information relevant to the condition assessments. We will also discuss the City's plan for long-term usage of Dam/Pumping Station assets and establish asset level of service requirements, to be used in evaluating whether assets are capable of meeting the required level of service. Schnabel and B&C will note City staff comments about observed deficiencies or problems anticipated to be encountered during assessment activities. Schnabel will prepare a meeting summary documenting the discussion and decisions of this Workshop.
6. Condition Assessment/Inspections. Schnabel will perform inspections and condition assessments for the dam related assets including structures, embankment, intakes and gates, and associated facilities. Brown and Caldwell will perform condition assessments for raw water pumping station equipment and structures.

Only above-ground structures will be inspected – direct inspection would not be performed on piping, flumes or below-ground portions of valves, except as otherwise stated below.

Inspections and Condition Assessment will be performed as follows:

- a. Perform appropriate safety briefing for inspection staff prior to each site visit.
- b. Photograph facilities and assets to capture the site layout, building elevations and potential issues that have been observed.
- c. Inventory missing asset descriptive information for NEXGEN AM.
- d. Perform visual assessment for each facility inspected. Use appropriate personal protective equipment (PPE) provided by Engineer for visual inspections of assets in locations which are defined as confined-space entry or permit-required confined space entry.
- e. Perform inspections of each operational pump, to include comparison of observed pressure readings to published curves to determine actual flow ratings, and vibration testing. Pump flow testing services to be performed by subcontracted technician. Based on the outcome of these initial tests, B&C may recommend additional tests to diagnose observed issues, including internal inspection of the shaft sleeves, wear rings and impeller condition; these follow-up tests may be authorized by the City as an additional service, if the inspections show that these services are warranted.
- f. Provide a condition score and performance score for concrete and steel structures, mechanical equipment, electrical equipment, standby generators, and ancillary systems.
- g. Perform structural assessment of the Lake Michie pump house and Little River pump house, making visual assessments of the building, concrete walls and floor, ventilation systems, lighting, windows and weatherproofing. At Lake Michie, in locations where asbestos materials are suspected, up to 30 material samples will be collected for testing

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by a subcontract laboratory. Lead paint testing at Lake Michie will be performed on-site using an XRF. For structures with significant visible degradation, structural integrity testing could be performed as an additional service. Lead and asbestos testing services will be performed by a subcontractor.

- h. A subcontractor will perform an inspection of the Lake Michie and Little River pump house roofs, Little River intake structure roof, and Little River stop log building roof, including:
 - i. Preparation of a scaled roof plan drawing in AutoCAD indicating the locations of penetrations, types of membrane and types of roof deck.
 - ii. Examine reasonably accessible, exposed surfaces of the system to locate specific problems and evaluate the overall needs of the areas.
 - iii. Take digital photographs to highlight areas of concern and illustrate discrepancies due to age, application, design or material performance. Photograph locations will be shown on the plan.
 - iv. Collect core samples of unconfirmed areas to determine conditions and composition of roof system at the core location. In addition to reporting the type of components of the roof system, typical comments relate to adhesion, delamination, deterioration, moisture content and anticipated service life. All openings in the system will be repaired with compatible materials. Core samples will not be taken where deemed inappropriate due to possible warranty issues, questionable conditions/materials, etc.
 - v. Summarize necessary or desired remedial procedures based on conditions determined through careful review of the roof system and building interior/exterior.
- i. Assess observed condition of the Lake Michie pump house elevator to determine repair/rehabilitation needs and estimate remaining service life. Elevator inspection to be performed by subcontractor. City will be advised of deficiencies impacting safety or requiring immediate repairs, as well as preliminary planning-level opinions of probable cost for elevator repairs and rehabilitation.
- j. Perform technical review of current seismic criteria, stability analyses and hydraulic capacity analyses for both Little River and Lake Michie Dams. We will not perform analyses to verify these items, it is expected that our work will be limited to review of existing reports and analyses. Some cursory calculations may be performed to provide a quick independent check of previous results. A summary technical memo will be prepared for each dam to document the results and to indicate if the dams currently meet NCDENR Dam Safety criteria.
- k. An underwater inspection will be performed by a subcontractor to assess the condition of the upstream face of both dams. The inspection will be limited to the portion that is visible underwater (above sediment level). A Schnabel representative will be present to observe the underwater inspection, take notes, and provide real-time direction and feedback to the diver during the inspection. It is anticipated that at Little River, the inspection will include all 9 spillway gates, the exposed portions of the upstream face of the dam, submerged portions of the intake tower and the sluice gates on the intake tower. At Lake Michie, the underwater inspection will include the upstream face of the concrete dam, the two gates used for the low level outlet (72-inch and 36-inch) and the bar screens upstream of the water supply intakes. The divers will flush sediment away from the gates upstream of the low level outlets so that an inspection can be performed.

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Based on historical photographs and drawings, it appears that the divers will not be able to access the area behind the existing bar screens to view the current condition of the sluice gates for the 60-inch and 42-inch flumes. Video documentation and a written report of all inspections will be included. The divers will perform an assessment of the existing screens and develop a workplan to access the gates behind the screens. It is expected that a separate future task order will be issued to perform that underwater inspection, once the scope of work and cost estimate is provided by the diving firm.

- I. Complete assessment forms will be completed for each facility and asset inspected. We will record descriptive information and asset condition assessment.

During Condition Assessment, the City responsibilities are expected to include:

- o Engineer's inspection teams will require support from two DWM staff, approximately 4 consecutive days to provide facility access, operate pumps and equipment, operate valves and gates, open electrical panels, and return facilities to automatic operation at the conclusion of each assessment. DWM staff will also shut off ventilation and lights and properly secure facility doors and gates.
 - o DWM staff will provide Engineer a list of confined-space entry and permit-required confined-space locations where condition assessments/inspections will be performed.
7. Condition and Performance Rankings. After completion of on-site assessment of each facility, Schnabel and B&C will assign a score ranging from 1 to 5 for each asset using the Condition and Performance (C&P) Ranking criteria below:
 - o Condition Ranking
 - 1-Excellent
 - 2-Slightly Visible Degradation
 - 3-Visible Degradation
 - 4-Integrity of Component Moderately Compromised
 - 5-Integrity of Component Severely Compromised
 - o Performance Ranking
 - 1-Component Functioning as Intended
 - 2-In-Service, but Higher than Expected O&M
 - 3-In-Service, but Function is Impaired
 - 4-In-Service, but Function is Highly Impaired
 - 5-Component not Functioning as Intended

These Condition and Performance (C&P) rankings will be categorized into five regions corresponding to the urgency for rehabilitation. Schnabel and B&C will use the C&P rankings for the facility assets to develop a program of rehabilitation and/or O&M activities to mitigate these risks.

- o Region 1 - Good Condition and Performance
- o Region 2 - Moderate Condition and Performance
- o Region 3 - Poor Condition Ranking
- o Region 4 - Poor Performance Ranking

- Region 5 – Poor Condition and Performance

Task 2-2: Rehabilitation Plan

1. Schnabel and B&C will develop a risk model to assess the criticality of the Lake Michie and Little River reservoir/dam/pump station facilities. The model will be in a Microsoft Excel format and will be developed with input from City staff. Risk will be expressed as a function of the “likelihood” that an asset will fail to meet its level of service requirement and the “consequence” this asset failure would have on the City’s level of service:

$$\text{RISK} = \text{Likelihood of Failure} \times \text{Consequence of Failure}$$

- The Condition and Performance rankings for each dam and pump station asset (as determined during the Task 2 condition assessments) will represent the “Likelihood of Failure” side of the equation.
- “Consequence of Failure” comparative rankings for each system at both facilities will be developed in one workshop with City staff following a pairwise comparison approach, assessing the relative consequence of system consequence of failure, considering factors such as redundancy, emergency operation, ease of maintenance/repair, and vulnerability to catastrophic failure, as a record to assist prioritization of repairs and rehabilitation projects.
- Risk score will be the basis for prioritization of rehabilitation projects and operations and maintenance actions.

Schnabel and B&C will analyze the criticality assessment findings and develop the following prioritized lists of actions to address the observed condition and performance deficiencies for two types of projects:

- Capital improvement projects, including direct replacements, repair/rehabilitation, mothball/removal and repair projects
 - Repair work which can be undertaken by DWM staff
2. Failure Modes Analysis. Schnabel and B&C will document a brief, structured failure mode analysis for assets associated with the two dams and raw water pump stations, to rank and prioritize possible causes of failures of the assets and identify appropriate preventative measures. Schnabel and B&C will prepare a written summary of the Failure Modes Analysis to be included with the Rehabilitation Plan Report.
 3. A separate Potential Failure Mode Analysis (PFMA) will be performed for both dams to evaluate dam safety considerations. The risk model and failure mode analysis discussed above in items 1 and 2 will be focused on failure of individual components including gates, screens, valves and ancillary equipment. This PFMA exercise will evaluate catastrophic failure modes for the both dams. Example failure modes include failure of the concrete dam along a lift line, failure due to internal erosion of the embankment, slope stability failures, overtopping of the dam leading to erosion and failure of the embankment, and others. Unusual and extreme loading conditions including flood and seismic events will be considered during this exercise. It is assumed that this will be performed as a two day workshop utilizing Schnabel staff and Durham Engineering and Operations staff.

From a risk perspective, these events will be documented separately since they are typically associated with very low probability events with very high consequence. The risk matrix developed for these failure modes will be performed on a semi-qualitative basis considering input from the City on the ranking criteria for evaluation of consequences. Identification of the failure modes for each dam will be necessary to verify that appropriate surveillance, monitoring, maintenance and risk reduction measures are employed at each site. Failure modes that represent higher than acceptable risk may warrant further evaluation or mitigation.

4. Schnabel and B&C will develop preliminary planning-level opinions of probable cost for design and construction of recommended repair/refurbishment projects. City staff will provide examples of bids for recent City of Durham dam/pumping station projects to assist with tailoring cost estimates. Our team will provide preliminary planning-level opinions of probable cost for proposed capital improvement projects only, and not for repair projects. Schnabel and B&C will participate in one meeting with City staff to discuss the recommended repair/refurbishment projects and costs.
5. In the Report, we will propose a 50-year prioritized rehabilitation and replacement plan for the two dams and the raw water pump station, addressing both projects related to addressing current condition/performance deficiencies, and service life replacements within the planning horizon. The rehabilitation plan will incorporate a 10-year capital improvement plan (CIP) to address deficiencies identified. Two alternatives for the CIP will be provided: (1) scheduling high-risk, high-priority projects within 10-year CIP based on condition, and (2) constant annual funding for 10-year CIP.

The Rehabilitation Plan will address the recommended capital rehabilitation projects, repairs to be completed by City staff; preliminary planning-level opinions of probable cost for capital rehabilitation projects; risk assessment approach and findings; and the proposed 10-year CIP and 50-year rehabilitation plan.

Separate Condition Assessment appendices documenting the Lake Michie and Little River facilities, will be prepared, each anticipated to include the following information:

- o Brief summary of the condition assessment – date, personnel, etc.
- o Record drawing (provided by City) showing general site information and layout
- o Tabulated inventory of asset data
- o Tabulated results of condition and performance rankings by asset type and class. Tables will classify condition and performance assets by region
- o List of observed deficiencies and further recommended actions
- o Tables comparing actual pump capacities with current estimated flows
- o Observed safety issues
- o Condition assessment forms and site photos

Reports will be provided in draft format for review by the City. A meeting will be held with representatives from Schnabel and B&C to review the reports and discuss the recommendations with the City. A final report will be prepared to incorporate the comments received. Up to five hard copies and one digital copy of the final reports will be provided.

Phase 3 – Lake Michie and Little River Facilities Preventive Maintenance (PM) Program

Schnabel and B&C will assist the City's Operations and Maintenance staff to develop a preventive maintenance program for the Lake Michie and Little River facilities. This Phase will include development of Equipment Management Plans (EMP) for the pump station assets and an update to the Operation and Maintenance Plan for the dam assets. For all types of assets, PM procedures will be developed and incorporated into the NEXGEN AM CMMS as discussed below.

Task 3-1: Development of Equipment Management Plans

For the raw water pumping station assets, B&C will collaborate with DWM to develop EMPs for Lake Michie and Little River raw water pumping stations, mechanical and electrical systems, monitoring equipment and operational components for each classification of asset that will provide the long term recommendations for maintenance and inspection over the life time of the asset. These plans will also list the types of PM and predictive maintenance (PdM) activities, that should be completed but not the details for each activity. They will also include rehabilitation and inspection frequencies. Level of effort is based upon the following 10 EMP maintenance plans:

1. Lake Michie Pumps and Turbines
2. Lake Michie Control Valves
3. Lake Michie Pump Station Civil Structure
4. Little River Pumps and Turbines
5. Little River Control Valves
6. Little River Destratification System
7. Little River Pump Station Civil Structure
8. Standby Generator
9. Raw Water Valves (Both Facilities)
10. Air Compressors (Both Facilities)

Equipment within a system (for example, Lake Michie raw water pumps) will be collected under a single maintenance plan.

Task 3-2: Development of Preventive Maintenance and Predictive Procedures

Schnabel and B&C will collaborate with DWM staff to develop standard preventive maintenance and predictive procedures for Lake Michie and Little River raw water pumping stations, mechanical and electrical systems, monitoring equipment and operational components, including accompanying operations and maintenance forms, task check list, schedules, estimated hours to complete the task and parts/materials lists. Level of effort is based on 15 initial standard procedures for the pumping station assets. For the dam assets, it is assumed that 10 initial standard procedures will be developed. Dam assets may include the spillway gates at Little River, drain systems at Michie and Little River, instrumentation at both dams, etc. The initial standard procedures to be developed will be selected by mutual agreement between Schnabel and DWM. These procedures will be formatted to incorporate into NEXGEN AM. Services to develop additional standard procedures can be authorized by amendment to this Scope of Services. We will make a recommendation for additional standard PM and PdM procedures (beyond the 25 proposed) to be developed in the future.

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It is expected that Schnabel and B&C will attend a one day workshop to review and discuss the recommended PM program. Based on an assessment of current DWM staff skills and skills/training requirements for implementing the PM Program for the dam and raw water pump stations, Schnabel and B&C will identify appropriate training for City staff to achieve necessary skills to implement the PM Program.

Task 3-3: PM Documentation

Schnabel and B&C will prepare the NEXGEN AM asset data, which is anticipated to contain asset inventory and condition assessment data included in the assessment activities, including photographs, nameplate data, and PM requirements. Asset data will be provided in Microsoft Excel format for upload by NEXGEN into the NEXGEN AM system.

Schnabel will compile the work of Phase 3 into a Long-Term Maintenance Management Plan. The City's existing electronic O&M will be revised to add the Long Term Maintenance Management Plan and standard maintenance procedures as hyperlinked documents.

Phase 4 – Engineering Evaluations

Task 4-1: Preparation of Plans and Specifications for Tree Removal at Michie

There are numerous large trees on the Lake Michie embankment that need to be removed as part of long term maintenance of the embankment. The following scope of work will be performed for this task:

1. A site topographic survey of the limits of the earthen embankment will be prepared by a subcontractor to serve as the basemap for the proposed work. A Schnabel representative will meet the subcontractor at the site to discuss the limits of the survey and identify any key features that need to be shown on the survey.
2. Schnabel will develop a plan view of the site to show the limits of disturbance, site access, staging areas and the location of erosion and sediment control features.
3. Typical sections and details will be prepared for the work including restoration details for the embankment.
4. Technical specifications will be prepared for the clearing and grubbing and replacement of earthfill, topsoil and establishment of grass cover for disturbed areas. It is assumed that borrow for filling excavated stumps will be brought in from off-site by a contractor.
5. We will prepare a schedule and cost opinion for the proposed work, which we assume will be bid to an outside contractor.
6. A soil erosion and sediment control plan will be prepared for the proposed disturbance.
7. Schnabel will coordinate with the NCDENR Office of Dam Safety and Land Quality Regional Office to obtain approval for the proposed dam work and E&S Plan.
8. We will attend one meeting with the City to review the plans and discuss the proposed work.
9. We will prepare bid documents based on front end document templates provided by the City. We will attend a pre-bid conference with prospective contractors and issue addenda based on questions received from prospective bidders. We will review bids received and issue a recommendation of award.
10. During construction, Schnabel will attend a project kickoff meeting with the contractor. We will review technical submittals by the contractor. We have assumed that four submittals will be provided and 3 hours for each review. We will provide an individual for part time observation of

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construction. It is expected that a total of six visits will be provided plus travel expenses. We will review pay applications from the contractor and plan to perform a final inspection of the project upon completion. We will prepare final record drawings based on completed submittals and survey provided by the contractor. These drawings will be submitted to the City and to NCDENR Dam safety along with project close out documentation.

Task 4-2: Evaluation of Sluice Gate and Intake Screen at Little River

Schnabel will review the results of the Little River Intake structure underwater inspection to view the condition of the damaged sluice gate, screens and trash rake system. For the sluice gate, we will evaluate the ability to repair the gate to functional condition. It is our understanding that the gate is stuck in its current position. We will discuss the gate with operation staff to hopefully understand what issue or issues may have caused the failure. If replacement or repair of individual components is necessary, they will be identified. In addition, we will make recommendations regarding readjustment of the gate and operator.

We will also evaluate the current condition of the screens and trash rake system at the Little River intake tower. It is our understanding that this system has not been functional for some time. We will review the available drawings and underwater inspection of this equipment. City of Durham Operations and Engineering staff will be consulted to discuss the need for the screens and rake system and their preferences for its future use.

Schnabel will prepare a written report discussing our observations and recommendations for refurbishment of the damaged sluice gate. It is anticipated that the repairs would be performed by an underwater contractor. We will prepare a cost estimate for the recommended improvements. The report will also discuss our findings relative to the current condition and future use of the intake screen and rake system. Cost estimates to implement recommended modifications for the system will be included. The cost of design, permitting, or oversight for any recommended repairs has not been included in this scope of work.

It is anticipated that a future project amendment will be issued to provide plans and specifications for the recommended improvements approved by the City. The amendment will also include bidding and construction services similar to those identified in 4-1, items 9 and 10.

Project Management

Schnabel will provide management of internal staff resources and coordination with the City of Durham, subconsultants, and subcontractors to assure timely completion of the project. We will also maintain communication to keep the City and team partners up to date on project progress. The following activities are expected:

1. Participate in a project kick-off meeting with the City and B&C project manager to review project objectives scope and schedule, data requirements, project team roles and communication, invoicing requirements, and other administrative items.
2. Monitor project activities, schedule and budget expenditures, and prepare monthly invoices. We will prepare a monthly status report letter to accompany each invoice.

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3. During Phases 2 and 3, Schnabel's project manager will participate in a one-hour monthly internal team meeting with Brown and Caldwell to review project progress, discuss upcoming tasks and compare schedule and budget with the original workplan. Level of effort is based on eight team meetings.
4. Our project manager will also participate in a one-hour monthly progress meeting with the City's project manager to review project progress, discuss upcoming tasks, and compare schedule and budget against the original workplan. Level of effort is based on eight monthly progress meetings during Phases 2 and 3.

SCHEDULE

Phase 1

As discussed previously, the Annual Inspections, O&M Updates and EAP Updates will be performed at the same time. It is expected that the first year inspection will be performed around February of 2015 and the remaining four annual inspections will be prepared around October of 2015, 2016, 2017 and 2018. Inspection reports will be provided in draft format for review by the City within 30 days following the inspection. The EAP update and O&M update will be completed within 60 days following the inspections. Final copies of all reports will be issued within two weeks following receipt of comments from the City on the draft reports.

Phase 2 and 3

It is expected that the entire duration for condition assessment and development of the preventive maintenance plan will take approximately 12 months. However, this schedule is dependent on scheduling and coordination with the City. Our initial assumptions for project activities and durations are allocated as follows:

- Project Initiation, Information Review and Level of Service Workshop – Month 1
- Field condition assessments – Month 2 and 3.
- Preparation of the Rehabilitation Plan – Months 3 through 9.
- Equipment Management Plans – Month 8
- Standard Preventive Maintenance Procedures – Months 9 through 11
- PM Program Documentation – Month 12

It is our understanding that the City would like to have the prioritization and cost opinions produced so that CIP estimates can be provided for the August/September 2015 timeframe for budgeting purposes.

Phase 4

It is expected that draft plans and specifications for tree removal at Lake Michie will be completed within 3 months following notice to proceed with this task from the City. Final documents and permit applications will be completed within 6 weeks following comments from the City on the draft documents.

Our report summarizing the evaluation of sluice gate, screens and rake system at Little River will be completed within two months following the underwater inspection of those facilities. The underwater inspections will be coordinated and scheduled with the City.

ATTACHMENT TO EXHIBIT A: COMPENSATION

Project Task	Schnabel Estimated Hours	Schnabel Estimated Lump Sum Cost	B&C Estimated Hours	B&C Estimated Lump Sum Cost	Sub- Consultant / Sub Contractor Cost
Phase I:					
Task 1-1: Dam Safety Inspections					
February 2015 Dam Safety Inspection	94	\$14,500			
February 2015 Monument Survey at Little River					\$7,900
February 2015 Monument Survey at Lake Michie					\$2,360
October 2015 Dam Safety Inspection	122	\$19,500			
October 2016 Dam Safety Inspection	122	\$20,085			
October 2017 Dam Safety Inspection	122	\$20,688			
October 2017 Monument Survey at Lake Michie					\$2,600
October 2018 Dam Safety Inspection	122	\$21,308			
Task 1-2: O&M Updates					
February 2015 O&M Update	88	\$14,400			
October 2015 O&M Update	88	\$14,832			
October 2016 O&M Update	88	\$15,277			
October 2017 O&M Update	88	\$15,735			
October 2018 O&M Update	88	\$16,207			
Task 1-3: EAP Updates					
February 2015 EAP Update	46	\$6,600			
February 2015 EAP Table Top Exercise	56	\$9,180			
October 2015 EAP Update	46	\$6,798			
October 2016 EAP Update	46	\$7,002			
October 2017 EAP Update	46	\$7,212			
October 2018 EAP Update	46	\$7,428			
ESTIMATED TOTAL FOR PHASE 1	1,308	\$216,752			\$12,860

City of Durham
Exhibit B – Compensation

Project Task	Schnabel Estimated Hours	Schnabel Estimated Lump Sum Cost	B&C Estimated Hours	B&C Estimated Lump Sum Cost	Sub- Consultant / Sub Contractor Cost
Phase 2:					
Task 2-1: Condition Assessment					
Item 1 to 5 - Project Initiation Activities	193	\$34,000	100	\$21,900	
Item 6k - Underwater Inspection	74	\$11,300			\$34,500
Item 6j - Review of Dam Safety Analyses	92	\$14,700			
Item 6e - Pump Performance Testing			32		\$8,400
Item 6h - Roof Inspections			40		\$5,100
Item 6g - Asbestos/Lead Paint Testing			8		\$2,100
Item 6i - Lake Michie Elevator Inspection			12		\$2,100
Item 6 and 7 - Field Condition Assessments	84	\$16,130	184	\$41,400	\$4,300
Task 2-2: Rehabilitation Plan					
Item 1 - Risk Assessment	48	\$8,500	56	\$10,100	
Item 2 - Failure Mode Analysis	40	\$7,900	48	\$9,000	
Item 3 - Dam Safety Potential Failure Mode Analysis	188	\$34,700			
Item 4 - Preliminary Planning Level Opinions of Project Costs	88	\$14,900	126	\$17,900	
Item 5 - Preparation of Rehabilitation Plan	334	\$56,400	333	\$68,100	
ESTIMATED TOTAL FOR PHASE 2:	1,141	\$198,530	939	\$168,400	\$56,500
Phase 3::					
Task 3-1: Equipment Management Plans	24	\$5,200	192	\$34,700	
Task 3-2: Develop PM Procedures	234	\$35,100	359	\$69,200	
Task 3-3: PM Documentation	166	\$26,800	136	\$30,900	
ESTIMATED TOTAL FOR PHASE 3:	424	\$67,100	687	\$134,800	\$0

City of Durham
 Exhibit B – Compensation

Project Task	Schnabel Estimated Hours	Schnabel Estimated Lump Sum Cost	B&C Estimated Hours	B&C Estimated Lump Sum Cost	Sub-Consultant / Sub Contractor Cost
Phase 4:					
Task 4-1: Tree Removal at Lake Michie	331	\$48,700			\$5,600
Task 4-2: Sluice Gate Evaluation at Little River	92	\$14,500			
ESTIMATED TOTAL FOR PHASE 4:	423	\$63,200			\$5,600
Project Management	192	\$36,500	140	\$26,300	
TOTAL FOR PROJECT	3,488	\$582,082	1,766	\$329,500	\$74,960
ESTIMATED TOTAL COST FOR PROJECT					\$986,542

(for use with 1910-1, 1996 Edition)

This is EXHIBIT B, consisting of 3 pages, part of the Agreement between Owner and Engineer for Professional Services dated December 15, 2014

Owner's Responsibilities

Article 2 of the Agreement is amended and supplemented to include the following agreement of the parties.

B2.01 In addition to other responsibilities of Owner as set forth in this Agreement, Owner shall:

A. Provide Engineer with all criteria and full information as to Owner's requirements for the Project, including design objectives and constraints, space, capacity and performance requirements, flexibility, and expandability, and any budgetary limitations; and furnish copies of all design and construction standards which Owner will require to be included in the Drawings and Specifications; and furnish copies of Owner's standard forms, conditions, and related documents for Engineer to include in the Bidding Documents, when applicable.

B. Furnish to Engineer any other available information pertinent to the Project including reports and data relative to previous designs, or investigation at or adjacent to the Site.

C. Following Engineer's assessment of initially-available Project information and data and upon Engineer's request, furnish or otherwise make available such additional Project related information and data as is reasonably required to enable Engineer to complete its Basic and Additional Services. Such additional information or data would generally include the following:

1. Property descriptions.
2. Zoning, deed, and other land use restrictions.
3. Property, boundary, easement, right-of-way, and other special surveys or data, including establishing relevant reference points.
4. Explorations and tests of subsurface conditions at or contiguous to the Site, drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site, or hydrographic surveys, with appropriate professional interpretation thereof.
5. Environmental assessments, audits, investigations and impact statements, and other relevant environmental or cultural studies as to the Project, the Site, and adjacent areas.
6. Data or consultations as required for the Project but not otherwise identified in the Agreement or the Exhibits thereto.

D. Give prompt written notice to Engineer whenever Owner observes or otherwise becomes aware of a Hazardous Environmental Condition or of any other development that affects the scope or time of performance of Engineer's services, or any defect or nonconformance in Engineer's services or in the work of any Contractor.

E. Authorize Engineer to provide Additional Services as set forth in Part 2 of Exhibit A of the Agreement as required.

F. Arrange for safe access to and make all provisions for Engineer to enter upon public and private property as required for Engineer to perform services under the Agreement. Nothing in this Agreement is intended to require ENGINEER to go onto public or private property in an unsafe manner or when it is unsafe to do so.

G. Examine all alternate solutions, studies, reports, sketches, Drawings, Specifications, proposals, and other documents presented by Engineer (including obtaining advice of an attorney, insurance counselor, and other advisors or consultants as Owner deems appropriate with respect to such examination) and render in writing timely decisions pertaining thereto.

H. Provide reviews, approvals, and permits from all governmental authorities having jurisdiction to approve all phases of the Project designed or specified by Engineer and such reviews, approvals, and consents from others as may be necessary for completion of each phase of the Project.

I. Provide, as required for the Project:

1. Accounting, bond and financial advisory, independent cost estimating, and insurance counseling services.
2. Legal services with regard to issues pertaining to the Project as Owner requires, Contractor raises, or Engineer reasonably requests.
3. Such auditing services as Owner requires to ascertain how or for what purpose Contractor has used the moneys paid.
4. Placement and payment for advertisement for Bids in appropriate publications.

J. Advise Engineer of the identity and scope of services of any independent consultants employed by Owner to perform or furnish services in regard to the Project, including, but not limited to, cost estimating, project peer review, value engineering, and constructibility review.

K. Furnish to Engineer data as to Owner's anticipated costs for services to be provided by others for Owner so that Engineer may make the necessary calculations to develop and periodically adjust Engineer's opinion of Total Project Costs.

L. If Owner designates a construction manager or an individual or entity other than, or in addition to, Engineer to represent Owner at the Site, define and set forth as an attachment to this

Exhibit B the duties, responsibilities, and limitations of authority of such other party and the relation thereof to the duties, responsibilities, and authority of Engineer.

M. If more than one prime contract is to be awarded for the Work designed or specified by Engineer, designate a person or entity to have authority and responsibility for coordinating the activities among the various prime Contractors, and define and set forth the duties, responsibilities, and limitations of authority of such individual or entity and the relation thereof to the duties, responsibilities, and authority of Engineer as an attachment to this Exhibit B that is to be mutually agreed upon and made a part of this Agreement before such services begin.

N. Attend the pre-bid conferences, bid openings, pre-construction conferences, construction progress and other job related meetings, and Substantial Completion and final payment inspections.

O. Provide the services of an independent testing laboratory to perform all inspections, tests, and approvals of Samples, materials, and equipment required by the Contract Documents, or to evaluate the performance of materials, equipment, and facilities of Owner, prior to their incorporation into the Work with appropriate professional interpretation thereof.

P. Provide inspection or monitoring services by an individual or entity other than Engineer (and disclose the identity of such individual or entity to Engineer) as Owner determines necessary to verify:

1. That Contractor is complying with any Laws and Regulations applicable to Contractor's performing and furnishing the Work.
2. That Contractor is taking all necessary precautions for safety of persons or property and complying with any special provisions of the Contract Documents applicable to safety.

Q. Provide Engineer with the findings and reports generated by the entities providing services pursuant to paragraphs B2.01.O and P.

R. Perform or provide the following additional services: Items as specifically identified in the attachment to Exhibit A.

(for use with 1910-1, 1996 Edition)

This is EXHIBIT C, consisting of 4 pages, part of the Agreement between Owner and Engineer for Professional Services dated December 15, 2014.

Payments to Engineer for Services and Reimbursable Expenses

Article 4 of the Agreement is amended and supplemented to include the following agreement of the parties:

ARTICLE 4 -- PAYMENTS TO THE Engineer

C4.01 For Basic Services Having A Determined Scope --
Lump Sum Method of Payment

A. Owner shall pay Engineer for Basic Services set forth in Exhibit A, except for services of Engineer's Resident Project Representative and Post-Construction Phase services, if any, as follows:

1. A Lump Sum amount of \$ 986,542 based on the following assumed distribution of compensation:

		Lump Sum Amount	
Phase 1	Annual Dam Safety Inspections, O&M Updates and EAP Updates	\$ 229,612	
Phase 2	Condition Assessment and Rehabilitation Plan	\$ 423,430	
Phase 3	Lake Michie and Little River Facilities Preventive Maintenance (PM) Program	\$ 201,900	
Phase 4	Engineering Evaluations	\$ 68,800	
Phase 5	Project Management	\$ 62,800	

A detailed cost breakdown including hours is provided in the Attachment to Exhibit A.

[insert explanation of table, including a "not-to-exceed" scope of work table, if necessary, for scope covered by Appendix 2 to Exhibit C, Standard Hourly Rate Schedule]

2. Engineer may alter the distribution of compensation between individual phases noted herein to be consistent with services actually rendered, but shall not exceed the total Lump Sum amount unless approved in writing by the Owner.

3. The Lump Sum includes compensation for Engineer's services and services of Engineer's Consultants, if any. Appropriate amounts have been incorporated in the Lump Sum to account for labor, overhead, profit, and Reimbursable Expenses.

Sheet C-1

(Exhibit C - Basic Services With Determined Scope -- Lump Sum Method)

4. The portion of the Lump Sum amount billed for Engineer's services will be based upon Engineer's reasonable estimate of the proportion of the total services actually completed during the billing period to the Lump Sum.

5. The Lump Sum is conditioned on Contract Times to complete the Work not exceeding 12 months. Should the Contract Times to complete the Work be extended beyond this period, the total compensation to Engineer shall be appropriately adjusted as the parties may agree by an amendment to this contract. Except to the extent provided in an amendment, the Owner shall not be obligated to pay any compensation greater than the Lump Sum.

6. If more prime contracts are awarded for Work designed or specified by Engineer for this Project than identified in Exhibit A, the Engineer shall be compensated an additional amount equal to \$ N/A for all Basic Services for each prime contract added.

C4.02 For Basic Services Having An Undetermined Scope -- Standard Hourly Rates Method of Payment

A. Owner shall pay Engineer for Basic Services having an undetermined scope as follows:

1. Resident Project Representative Services. For services of Engineer's Resident Project Representative, if any, under paragraph A1.05A.2.a of Exhibit A, an amount equal to the cumulative hours charged to the Project by each class of Engineer's employees times Standard Hourly Rates for each applicable billing class for all Resident Project Representative services performed on the Project, plus Reimbursable Expenses and Engineer's Consultant's charges, if any. The total compensation under this paragraph is estimated to be \$ N/A based upon Contract Times as set forth in paragraph C4.01.

2. Post-Construction Phase Services. For Post-Construction Phase services under paragraph A1.06 of Exhibit A, an amount equal to the cumulative hours charged to the Project by each class of Engineer's employees times Standard Hourly Rates for each applicable billing class for all services

performed on the Project, plus Reimbursable Expenses and Engineer's Consultant's charges, if any. The total compensation under this paragraph is estimated to be \$ N/A.

C4.03 For Additional Services

A. Owner shall pay Engineer for Additional Services as follows:

1. General. For services of Engineer's employees engaged directly on the Project pursuant to paragraph A2.01 or A2.02 of Exhibit A, except for services as a consultant or witness under paragraph A2.01.A.20, an amount equal to the cumulative hours charged to the Project by each class of Engineer's employees times Standard Hourly Rates for each applicable billing class for all Additional Services performed on the Project, plus Reimbursable Expenses and Engineer's Consultant's charges, if any.

2. Serving as a Witness. For services performed by Engineer's employees as witnesses giving testimony in any litigation, arbitration, or other legal or administrative proceeding under paragraph A2.01.A.20, at the rate of \$ 1,680 per day or

any portion thereof (but compensation for time spent in preparing to testify in any such litigation, arbitration, or proceeding will be on the basis provided in paragraph C4.03.A.1). Compensation for Engineer's Consultants for such services will be on the basis provided in paragraph C4.06.

C4.04 For Reimbursable Expenses

A. When not included in compensation for Basic Services under paragraph C4.01, Owner shall pay Engineer for Reimbursable Expenses at the rates set forth in Appendix 1 to this Exhibit C.

B. Reimbursable Expenses include the following categories: transportation and subsistence incidental thereto; obtaining bids or proposals from Contractor(s); providing and maintaining field office facilities including furnishings and utilities; subsistence and transportation of Resident Project Representative and their assistants; toll telephone calls and telegrams; reproduction of reports, Drawings, Specifications, Bidding Documents, and similar Project-related items in addition to those required under Exhibit A, and, if authorized in advance by Owner, overtime work requiring higher than regular rates. In addition, if authorized in advance by Owner, Reimbursable Expenses will also include expenses incurred for computer time and the use of other highly specialized equipment.

C. The amounts payable to Engineer for Reimbursable Expenses will be the Project-related internal expenses actually incurred or allocated by Engineer, plus all invoiced external Reimbursable Expenses allocable to the Project, the latter multiplied by a Factor of 1.15.

D. The Reimbursable Expenses Schedule will be adjusted annually (as of

1/1/2016) to reflect equitable changes in the compensation payable to Engineer.

E. This part E applies does not apply. The amounts that might be charged as Reimbursable Expenses are included in compensation for Basic Services, so there is no separate charge for Reimbursable Expenses incurred while performing Basic Services.

C4.05 Standard Hourly Rates

A. Standard Hourly Rates are set forth in Appendix 2 to this Exhibit C and include salaries and wages paid to personnel in each billing class plus the cost of customary and statutory benefits, general and administrative overhead, non-project operating costs, and operating margin or profit.

B. The Standard Hourly Rates will be adjusted annually (as of 1/1/2016) to reflect equitable changes in the compensation payable to Engineer.

C4.06 For Engineer's Consultant's Charges

A. Whenever compensation to Engineer herein is stated to include charges of Engineer's Consultants, those charges shall be the amounts billed by Engineer's Consultants to Engineer times a Factor of 1.15.

C4.07 Factors

A. The external Reimbursable Expenses and Engineer's Consultant's Factors include Engineer's overhead and profit associated with Engineer's responsibility for the administration of such services and costs.

C4.08 Other Provisions Concerning Payment

A. Progress Payments. The portion of the amounts billed for Engineer's services which are related to the services identified in paragraphs C4.02 and C4.03, will be during the billing period based on the cumulative hours charged to the Project by each class of Engineer's employees times the Standard Hourly Rate for each class plus Reimbursable Expenses and Engineer's Consultant's charges, if any.

B. Extended Contract Times. Should the Contract Times to complete the Work be extended beyond the period identified in paragraph C4.01, payment for Engineer's services shall be continued based on the Standard Hourly Rates Method of Payment.

C. Estimated Compensation Amounts

1. Engineer's estimate of the amounts that will become payable for Basic Services are only estimates for planning purposes, are not binding on the parties, and

are not the minimum or maximum amounts payable to Engineer under the Agreement.

2. When estimated compensation amounts have been stated herein and it subsequently becomes apparent to Engineer that a compensation amount thus estimated will be exceeded, Engineer shall give Owner written notice thereof. Promptly thereafter Owner and Engineer shall review the matter of services remaining to be performed and compensation for such services. Owner shall either agree to such compensation exceeding said estimated amount or Owner and Engineer shall agree to a reduction in the remaining services to be rendered by Engineer, so that total compensation for such services will not exceed said estimated amount when such services are completed. If Engineer exceeds the estimated amount before Owner and Engineer have agreed to an increase in the compensation due Engineer or a reduction in the remaining services, the Engineer shall be paid for all services rendered hereunder only if the parties execute a written agreement to that effect.

This is Appendix 1 to EXHIBIT C, consisting of 1 pages, referred to in and part of the Agreement between Owner and Engineer for Professional Services dated December 15, 2014.

Reimbursable Expenses Schedule

Current agreements for engineering services stipulate that the Reimbursable Expenses are subject to review and adjustment per Exhibit C. Reimbursable expenses for services performed on the date of the Agreement are:

FAX	\$_____	/page		
8"x11" Copies/Impression	_____	/page		
Blue Print Copies	_____	/sq. ft.		
Reproducible Copies (Mylar)	_____	/sq. ft.		
Reproducible Copies (Paper)	_____	/sq. ft.		
Mileage (auto)	_____	IRS Prevailing Rate	/mile	
Field Truck Daily Charge	_____	/day		
Mileage (Field Truck)	_____	/mile		
Field Survey Equipment	_____	/day		
Confined Space Equipment	_____	/day	plus expenses	
Resident Project Representative	_____	/month		
Equipment				
Computer CPU Charge	_____	/hour		
Personal Computer Charge	_____	/hour		
CAD Charge	_____	/hour		
CAE Terminal Charge	_____	/hour		
VCR and Monitor Charge	_____	/day,	\$_____	/week, or
	\$_____	/month		
Video Camcorder	_____	/day,	plus \$_____	/tape
Electrical Meters Charge	_____	/week,	or \$_____	/month
Flow Meter Charge	_____	/week,	or \$_____	/month
Rain Gauge	_____	/week,	or \$_____	/month
Sampler Charge	_____	/week,	or \$_____	/month
Dissolved Oxygen Tester Charge	_____	/week		
Fluorometer	_____	/week		
Laboratory Pilot Testing Charge	_____	/week,	or \$_____	/month
Soil Gas Kit	_____	/day		
Submersible Pump	_____	/day		
Water Level Meter	_____	/day,	or \$_____	/month
Soil Sampling	_____	/sample		
Groundwater Sampling	_____	/sample		
Health and Safety Level D	_____	/day		
Health and Safety Level C	_____	/day		
Electronic Media Charge	_____	/hour		
Long Distance Phone Calls		at cost		
Meals and Lodging		at cost		

This is Appendix 2 to EXHIBIT C, consisting of 1 pages, and part of the Agreement between Owner and Engineer for Professional Services dated December 15 , 2014 .

Standard Hourly Rates Schedule

Current agreements for engineering services stipulate that the standard hourly rates are subject to review and adjustment per Exhibit C. Hourly rates for services performed on the date of the Agreement are, in dollars per hour:

Corporate Consultant	\$279.00/hr
Principal	252.00/hr
Senior Associate	215.00/hr
Associate	185.00/hr
Senior Engineer/Scientist	166.00/hr
Project Engineer/Scientist	134.00/hr
Senior Staff Engineer/Scientist	116.00/hr
Staff Engineer/Scientist/Technologist	98.00/hr
Senior Technician II (see note 3)	98.00/hr
Senior Technician I (see note 3)	77.00/hr
Technician III (see note 3)	69.00/hr
Technician II (see note 3)	59.00/hr
Technician I (see note 3)	49.00/hr
CADD III	111.00/hr
CADD II	102.00/hr
CADD I	88.00/hr
Clerical/Admin	73.00/hr

EXHIBIT D (4 pages)
**ARTICLE 14 DUTIES, RESPONSIBILITIES, AND LIMITATIONS OF AUTHORITY
OF RESIDENT PROJECT REPRESENTATIVE**

14.1 *Resident Project Representative pursuant to Paragraph 1.01C of the Agreement*

A. ENGINEER shall furnish a Resident Project Representative (“RPR”), assistants, and other field staff to assist ENGINEER in observing progress and quality of the Work. The RPR, assistants, and other field staff under this Exhibit D may provide full time representation or may provide representation to a lesser degree.

B. Through such additional observations of Contractor’s work in progress and field checks of materials and equipment by the RPR and assistants, ENGINEER shall endeavor to provide further protection for OWNER against defects and deficiencies in the Work. However, ENGINEER shall not, during such visits or as a result of such observations of Contractor’s work in progress, supervise, direct, or have control over the Contractor’s Work nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences, or procedures selected by Contractor, for safety precautions and programs incident to the Contractor’s work in progress, for any failure of Contractor to comply with Laws and Regulations applicable to Contractor’s performing and furnishing the Work, or responsibility of construction for Contractor’s failure to furnish and perform the Work in accordance with the Contract Documents. ~~In addition, the specific limitations set forth in section A.1.05 of Exhibit A of the Agreement are applicable.~~

C. The duties and responsibilities of the RPR are limited to those of ENGINEER in the Agreement with the OWNER and in the Contract Documents, and are further limited and described as follows:

1. *General:* RPR is ENGINEER’s agent at the Site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding RPR’s actions. RPR’s dealings in matters pertaining to the Contractor’s work in progress shall in general be with ENGINEER and Contractor, keeping OWNER advised as necessary. RPR’s dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with OWNER with the knowledge of and under the direction of ENGINEER.
2. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with ENGINEER concerning acceptability.
3. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
4. *Liaison:*
 - a. Serve as ENGINEER’s liaison with Contractor, working principally through Contractor’s superintendent and assist in understanding the intent of the Contract Documents.
 - b. Assist ENGINEER in serving as OWNER’s liaison with Contractor when Contractor’s operations affect OWNER’s on-Site operations.
 - c. Assist in obtaining from OWNER additional details or information, when required for proper execution of the Work.
5. *Interpretation of Contract Documents:* Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by ENGINEER.
6. *Shop Drawings and Samples:*
 - a. Record date of receipt of Samples and approved Shop Drawings.

- b. Receive Samples which are furnished at the Site by Contractor, and notify ENGINEER of availability of Samples for examination.
 - c. Advise ENGINEER and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by ENGINEER.
7. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to ENGINEER. Transmit to Contractor in writing decisions as issued by ENGINEER.
8. *Review of Work and Rejection of Defective Work:*
- a. Conduct on-Site observations of Contractor's work in progress to assist ENGINEER in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to ENGINEER whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise ENGINEER of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
9. *Inspections, Tests, and System Startups:*
- a. Consult with ENGINEER in advance of scheduled major inspections, tests, and systems startups of important phases of the Work.
 - b. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate OWNER's personnel, and that Contractor maintains adequate records thereof.
 - c. Observe, record, and report to ENGINEER appropriate details relative to the test procedures and systems startups.
 - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to ENGINEER.
10. *Records:*
- a. Maintain at the Site orderly files for correspondence, reports of job conferences, reproductions of original Contract Documents including all Change Orders, Field Orders, Work Change Directives, Addenda, additional Drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, Shop Drawing and Sample submittals received from and delivered to Contractor, and other Project related documents.
 - b. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to ENGINEER.
 - c. Record names, addresses and telephone numbers of all Contractors, subcontractors, and major suppliers of materials and equipment.
 - d. Maintain records for use in preparing Project documentation.
 - e. Upon completion of the Work, furnish original set of all RPR Project documentation to ENGINEER.

11. *Reports:*
 - a. Furnish to ENGINEER periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.
 - b. Draft and recommend to ENGINEER proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
 - c. Furnish to ENGINEER and OWNER copies of all inspection, test, and system startup reports.
 - d. Report immediately to ENGINEER the occurrence of any Site accidents, any Hazardous Environmental Conditions, emergencies, or acts of God endangering the Work, and property damaged by fire or other causes.
12. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
13. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to ENGINEER for review and forwarding to OWNER prior to payment for that part of the Work.
14. *Completion:*
 - a. Before ENGINEER issues a Certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.
 - b. Observe whether Contractor has arranged for inspections required by Laws and Regulations, including but not limited to those to be performed by public agencies having jurisdiction over the Work.
 - c. Participate in a final inspection in the company of ENGINEER, OWNER, and Contractor and prepare a final list of items to be completed or corrected.
 - d. Observe whether all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the Notice of Acceptability of the Work.

D. Resident Project Representative shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
2. Exceed limitations of ENGINEER's authority as set forth in the Agreement or the Contract Documents.
3. Undertake any of the responsibilities of Contractor, subcontractors, suppliers, or Contractor's superintendent.
4. Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.

5. Advise on, issue directions regarding, or assume control over safety precautions and programs in connection with the activities or operations of OWNER or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by ENGINEER.
7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize OWNER to occupy the Project in whole or in part.

EXHIBIT E (2 pages)

NOTICE OF ACCEPTABILITY OF WORK

Project: _____

Contractor: _____

Owner: City Of Durham

Owner's Construction Contract Identification:

Effective Date of the Construction Agreement:

Construction Contract Date:

Engineer:

The undersigned Engineer hereby gives notice to the above Owner and Contractor that the completed Work furnished and performed by the Contractor under the above Contract is acceptable, expressly subject to the provisions of the related Contract Documents and the terms and conditions set forth on the reverse side hereof.

ENGINEER

By: _____

Title: _____

Dated: _____, 20_____

(Reverse side of Notice)

CONDITIONS OF NOTICE OF ACCEPTABILITY OF WORK

The Notice of Acceptability of Work (“Notice”) on the front side of this sheet is expressly made subject to the following terms and conditions to which all persons who receive said Notice and rely thereon agree:

1. Said Notice is given with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. Said Notice reflects and is an expression of the professional judgment of the Engineer.
3. Said Notice is given as to the best of the Engineer’s knowledge, information, and belief as of the date hereof.
4. Said Notice is based entirely on and expressly limited by the scope of services the Engineer has been employed by the Owner to perform or furnish during construction of the Project (including observation of the Contractor’s work) under the Engineer’s Agreement with the Owner and under the Construction Contract referenced on the other side hereof, and applies only to facts that are within the Engineer’s knowledge or could reasonably have been ascertained by the Engineer as a result of carrying out the responsibilities specifically assigned to the Engineer under the Engineer’s Agreement with the Owner and the Construction Contract referenced on the other side hereof.
5. Said Notice is not a guarantee or warranty of the Contractor’s performance under the Construction Contract referenced on the other side hereof nor an assumption of responsibility for any failure of the Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents.

EXHIBIT F
ARTICLE 15 Construction Cost Limit

EXHIBIT G
ARTICLE 16 Insurance

16.1 *Insurance*

A. The limits of liability for the insurance required by paragraph 6.05.A and 6.05.B of the Agreement are as follows:

1. By ENGINEER:

	Required limits of liability
a. Workers' Compensation*	\\
(1) Each Accident	\$1,000,000
(2) Each Employee	\$1,000,000
(3) Policy Limit	\$1,000,000
*This policy must include a Waiver of Subrogation	
b. Employer's Liability --	\\
(1) Each Accident	\$1,000,000
(2) Disease, Policy Limit:	N/A
(3) Disease, Each Employee	\$1,000,000
c. General Liability --	\\
(1) Each Occurrence (Bodily Injury and Property Damage)	\$1,000,000
(2) General Aggregate:	\$2,000,000
d. Excess or Umbrella Liability	\\
(1) Each Occurrence:	N/A
(2) General Aggregate	\$1,000,000
e. Automobile Liability --	\\
Either [(1) and (2)], <i>or</i> (3)	\\
(1) Bodily Injury, each accident	\$1,000,000
(2) Property Damage, each accident	\$1,000,000
(3) Combined Single Limit (Bodily Injury and Property Damage, each accident)	\$1,000,000
f. Professional Liability, per claim	\\
(1) Maximum deductible	\$1,000,000
(2) Minimum aggregate limit	\$1,000,000

B. Engineer shall maintain professional liability insurance applicable to all of Engineer's services to which this Agreement applies, including coverage for all engineers, architects, and design professionals either employed by or contracted by Engineer to perform Engineer's services to which this Agreement applies. If Engineer's services to which this Agreement applies include Construction Phase services, that insurance must be in effect by the time the first of those services are performed and maintained continuously for a minimum of three full years after acceptance of the Work by Owner. If Engineer's services to which this Agreement applies do not include Construction Phase services, that insurance must be in effect by the time the first of those services are performed and maintained continuously for a minimum of three full years after the later of (i) the last providing of Engineer's services to which this Agreement applies, or (ii) the receipt by the Owner of the last invoice from Engineer for Engineer's services to which this Agreement applies.

2. By Owner: none
(end of Exhibit G)

EXHIBIT H

ARTICLE 17 Dispute Resolution

After the Owner has engaged a general contractor for construction work and during the construction administration phase of this Agreement only, the parties may avail themselves of the dispute resolution process adopted by the State Building Commission pursuant to G.S. 143-135.26(11) and G.S. 143-128(f1).

EXHIBIT I

Allocation of Risks

Exhibit I is not applicable

EXHIBIT J

ARTICLE 18 Special Provisions

18.1 (Compensation for Engineer's Errors)

A. If the Engineer creates plans or specifications containing an error that causes actual construction of a portion of Work that needs to be changed solely because of the Engineer's error, the Engineer shall pay the Owner all costs of correcting the error, including an amount to compensate the Owner for time spent by Owner's employees because of the error without regard to what other services those employees might have done for the Owner had the error not occurred.

1 (Unforeseen Conditions) An error shall not be grounds for payment under this Paragraph 18.1 if the error occurred because of physical conditions were:

- not in fact known to the Engineer,
- not in fact known to the Engineer's consultants,
- not readily apparent to the Engineer, and
- not readily apparent to the Engineer's consultants.

2 (Cost of Employees' Time) The cost of the employees' time will be calculated as follows: the time spent by any salaried employee of the Owner because of the error shall be compensated at an hourly rate equal to the employee's gross salary (using standards to determine gross salary for federal income tax purposes) during the applicable fiscal year of the Owner divided by the number of hours worked by that employee for the Owner during that fiscal year.

3 (Limits on Double Payments) If this Paragraph 18.1 is applied to compensate the Owner for an error, the Engineer shall not owe the Owner any other compensation to remove the erroneously built Work and replace it with correct Work. However, the payment of such compensation or the application of this Paragraph 18.1 shall not affect liability for personal injury or damage to property. (In the preceding sentence, "damage to property" excludes the damage suffered by the Owner for the cost of replacing the erroneously installed Work for which this Paragraph provides compensation, but it includes all other general, special, consequential, or other kinds of damage resulting from the error.)

4 (Limit on Use of Payment against Engineer) A payment by the Engineer pursuant to this Paragraph 18.1 shall be considered a compromise, and the City shall not introduce the fact of the payment in any legal action or proceeding except to the extent that compromises are admissible.

5 (Nonpayment Hereunder Not to Prevent Other Claims) If this Paragraph 18.1 is not applied so as to compensate the Owner for an error, this Paragraph 18.1 shall not be used to construe this Agreement so as to reduce any remedy that is available to the Owner because of that error. For example, to the extent an error is not compensated for because of the amount exceeds the insurance deductible, the Owner will not be deemed to have waived a claim therefor.

18.2 (Assignment of Subcontracts) All contracts between the Engineer and others to provide services on the Project, in which the services are expected to take more than one month to complete and the compensation is expected to exceed \$5,000, shall contain a provision allowing the Owner or a person designated by the Owner to assume the Engineer's rights under the contract so as to require continued performance according to the terms of the contract, provided, however, that neither the Owner nor the person designated by the Owner shall be liable for breaches or other events or occurrences that took place before it assumed the contract. The Engineer will demonstrate compliance with this Paragraph 18.2 when requested by the Owner.

(end of Exhibit J)



EXHIBIT K

Accessibility Letter of Compliance

Chapter 11, NC State Building Code, 2012
ICC/ANSI A117.1-2009



January 1, 2012

The Durham City-County Inspections Department requires independent verification of all accessible **site** elements and requirements, per the above referenced codes, for all projects which include site plans, within the city and county of Durham, North Carolina.

Chapter 2, section 201 of the 2009 ICC/ANSI A117.1 Standard and Commentary also states that . . . “compliance with the ADA should be verified independently.” This is important as the North Carolina Accessibility Code is NOT deemed compliant with the ADA standards.

To meet these requirements, each project must have a professional architect, surveyor, or engineer make an onsite evaluation of the project when completed, and verify compliance with the approved plans and the above codes, or simply, the North Carolina Accessibility Codes, then provide a sealed letter to this department confirming such.

Any discrepancies noted during the professional’s evaluation would need to be addressed to the contractor/owner/builder, and corrected, prior to a return visit by that professional to confirm corrections have been adequately made to achieve full compliance.

This on site evaluation should include, but not be limited too, slope and cross slope on accessible routes and accessible parking areas, ramps, travel distance, intermediate landings where appropriate, and access to required entrance(s) and other site elements.

A detailed analysis or description of the evaluation process is not necessary. A simple statement reflecting that the site evaluation has found the “as placed” or “as built” components to be in compliance with the applicable codes and the approved site plan. Please avoid terms such as “I think”, “I believe” or “I feel”. The evaluation should reveal to project to be in compliance or not.

Thank you for your assistance in this matter.

David Coward,
Chief Building Inspector