

**EXHIBIT A**  
**TO THE AGREEMENT BETWEEN OWNER AND ENGINEER**  
**FOR PROFESSIONAL DESIGN AND BIDDING SERVICES**

**Townsend Water Treatment Plant Lagoon 2 Project**

**DESCRIPTION OF ENGINEERING SERVICES AND RELATED MATTERS**

This is an exhibit attached to and made part of the supplemental agreement to the On-Call Professional Services Agreement dated January 29, 2014 and amended December 20, 2016 between the City of Greensboro (OWNER) and CDM Smith Inc. (ENGINEER) for professional services.

**1. BASIC SERVICES**

**The Basic Services of the ENGINEER as described in the Agreement are amended and supplemented as follows, to be referred to as the PROJECT:**

**PROJECT OBJECTIVES AND DESCRIPTION**

The OWNER has requested that the ENGINEER provide professional services associated with improvements to the Townsend Water Treatment Plant (WTP) to add a second lagoon (Townsend WTP Lagoon 2 Project). The Townsend WTP currently has a single lagoon. This has created problems complying with NPDES (discharge) permit requirements and does not allow maintenance shutdowns for repairs. A second lagoon will allow maintenance and cleaning to assist with NPDES compliance. It will also increase reliability of the WTP.

The ENGINEER shall carry out a typical phased approach to design of improvements, including: data gathering and preliminary engineering, preparation of design documents, permitting, and bidding support. The ENGINEER will work with the OWNER's PM, the Water Resources Department, the Water Supply Division, and the WTP operations staff to design new facilities that meet the goals of the OWNER's stakeholder departments.

The second lagoon is to be located generally as shown on Figure 1. If this location is found to not be feasible due to wetlands or other reason, then the scope and cost of this project will require modification. Consequently, the tasks below are planned to investigate and resolve possible permitting issues such as wetlands early in the project.

The piping will allow parallel operation of the two lagoons so either can be taken off-line for maintenance while the other remains in service. ENGINEER has allowed for instrumentation such as level meters to monitor the lagoon level by the plant SCADA system.

The ENGINEER's project scope of work includes the following major tasks:

- Task 010 – Project and Quality Management
- Task 100 - Preliminary Engineering for the Second Lagoon Including Geotechnical Evaluation and Survey
- Task 200 - Final Design of the Second Lagoon and Related Piping and Instrumentation

- Task 300 - Permitting
- Task 400 - Competitive Bidding and Award of the Project

The project tasks are described in more detail in the scope of services below:

## **SCOPE OF SERVICES**

### **TASK 010 PROJECT AND QUALITY MANAGEMENT**

This task covers managing the project team, coordinating the work, tracking budget/work progress, invoicing and accounting, providing regular updates to the OWNER, managing scope compliance, managing regulatory compliance, oversight of technical products, and quality control and assurance checks on work and deliverables. Accounting and administrative support to achieve the tasks listed.

### **TASK 100 PRELIMINARY DESIGN, GEOTECHNICAL INVESTIGATION AND SURVEY**

The Preliminary Design Phase will include project kickoff, data collection, site evaluation, initial interviews with operations staff, and hydraulic analysis, geotechnical investigation, survey of the site, and preparation of preliminary concept drawings of the improvements. Through this process the ENGINEER and OWNER collaborate to develop a working basis for the design of the proposed improvements.

The following is a summary of key steps within this phase of the project:

#### **101 Project Kickoff**

- The ENGINEER's team and the OWNER's staff will hold a joint Project Kick-off Meeting. The meeting will establish project goals and critical success factors, facilitate the transfer of information needed to begin the work, and include a walkthrough of the affected facilities.
- The OWNER will provide CADD files of the Townsend WTP site including piping, electrical and other underground utilities in the lagoon area.
- The OWNER will provide previous report, studies, records, and data needed for the ENGINEER to complete a preliminary design sufficiently.

#### **102 Geotechnical Evaluation and Drilling/Subs**

- Engineer will review available geotechnical information from the plant site and develop a geotechnical exploration program based upon the proposed lagoon location. Up to 8 total geotechnical borings have been included in this scope. ENGINEER will engage a drilling subcontractor, but will remain responsible for observing and logging subsurface conditions, selecting laboratory testing, performing geotechnical engineering analyses, and preparing a geotechnical report. The geotechnical report will contain the recommendations for design and construction, including geotechnical analyses for the proposed lagoon.

103 Hazard Classification

- ENGINEER's geotechnical engineers experienced in the design and construction of similar impoundments will prepare a jurisdictional determination request and related information to submit NCDEQ Dam Safety. ENGINEER anticipates that an on-site meeting may be required with NCDEQ as part of the review process. ENGINEER will document the jurisdictional determination from NCDEQ in the Preliminary Design Memorandum.

104 Floodplain/Wetland Evaluation

- ENGINEER will delineate wetland boundaries according to the 1987 US Army Corps of Engineers (USACE) Wetland Delineation Manual and Rapanos significant nexus determination forms. Wetland boundaries will be flagged in the field for confirmation by USACE and classified based on the NC Wetland Assessment Method. During the wetland delineation visit, ENGINEER will also classify any streams within the proposed facilities footprint as jurisdictional or non-jurisdictional. It is assumed that the wetland and stream boundaries can be evaluated in 1 day. Upon completion of the site visit, ENGINEER will contact a representative of USACE to schedule a site visit to approve the delineation. This task includes a one day site visit with the USACE representative to verify and approve ENGINEER's delineation. Upon confirmation by USACE, ENGINEER will prepare a preliminary planning level map using GPS coordinates for submission to USACE. If the OWNER desires to secure a Jurisdictional Determination (JD) map signed by USACE, ENGINEER will engage a licensed surveyor to survey the delineation flagging and will incorporate this information in the overall project survey. This licensed survey is not included in this scope of work. The wetland delineation and stream determination will be used for Clean Water Act permitting and during preliminary design. ENGINEER work to minimize the impacts to wetlands and streams during preliminary design to satisfy USACE and NCDEQ requirements to minimize environmental impacts.
- ENGINEER will also evaluate the impacts of the proposed work on floodways and 100-year floodplains to determine regulatory requirements during preliminary design. ENGINEER will identify floodplains and floodways using the most recent available floodplain mapping through the NC Floodplain Mapping Program.

105 Permitting Requirements – Permitability Analysis

- ENGINEER will include in the Preliminary Design Technical Memorandum a discussion of local, state, and federal permitting requirements. This will include a list of permits and approval requirements based on the information collected during the initial evaluations. Where necessary, ENGINEER will discuss the proposed project with the applicable regulatory agencies to fully define the permit requirements and to identify the major permitting issues that must be resolved.
- ENGINEER will conduct a desktop evaluation of potential impacts the lagoon may have on known archaeological resources and federally protected (threatened and endangered) species. This evaluation will be GIS-based and will include research through the US Fish and Wildlife Service, NC Natural Heritage Program, and NC Historic Preservation Office records.

Specific field surveys for protected species or archaeological resources are not included in this scope of services; however, habitat will be assessed during the wetland delineation field visit.

- ENGINEER will collect data on the presence of wetlands, streams, floodplains, and other environmental features and will document these features on a map. ENGINEER will prepare a summary of findings regarding the likelihood that the lagoon project will impact archaeological resources and federally protected species. The summary and map will be provided in the Preliminary Design Technical Memorandum.

#### 106    Hydraulic Analysis

- Will conduct a hydraulic analysis of piping into and out of the second lagoon in order to allow parallel operation. This will involve head loss calculations and pipe sizing.

#### 107    Development of Conceptual Design

- The ENGINEER will develop a preliminary conceptual design of the second lagoon and associated piping. This will include plan of the entire lagoon and key section views of the berm. A piping plan will also be prepared.

#### 108    Survey

A survey of the 14 acre area around the lagoons will be prepared showing topography, wetland boundaries, boring locations, pipes and other utilities, drainage ditches, streams, woods lines, trees greater than 12 inches in diameter, railroad tracks, structures, roads, slabs, utilities, or any other features or landmarks that may affect construction of new lagoon or pipelines.

The survey will be suitable for preparation of design drawings.

#### 109    Preliminary Design Technical Memorandum

A technical memorandum (TM) will be prepared to present the findings of the above tasks. The preliminary design TM will include the preliminary drawings (10% design level) including a P&I diagram, a site plan, and general lagoon layout.

#### 110    Technical Review of Preliminary Design Technical Memorandum

ENGINEER's Technical Reviewers will review a draft of the Preliminary Design Technical Memorandum including 10% preliminary design drawings. Technical review comments will be each be recorded and addressed

#### 111    Draft and Final Preliminary Design Technical Memorandum Submittals

The draft Preliminary Design Technical Memorandum will be submitted to OWNER for review. A workshop will be held to gather the OWNERS comments on the Preliminary Design Technical Memorandum. OWNER review comments will be each be recorded and addressed. A final Preliminary Design Technical Memorandum will be submitted to the OWNER.

## **TASK 200      FINAL DESIGN**

The ENGINEER shall develop the final design of the facilities at the Townsend WTP, which are anticipated to include:

- Townsend WTP Lagoon 2.
- The lagoon's associated piping network.
- Geotechnical and site civil discipline work to support a complete design of all items listed above.
- Associated research, permitting, and bidding of all items listed above.

Items not listed in this Task 200, are not included in the ENGINEER'S assumptions of the scope for the final design of this project.

Final design tasks to be provided by the ENGINEER are described as follows:

### **201      Design Drawings**

- The ENGINEER shall prepare Contract Documents to include final drawings and specifications showing the scope, extent, and character of the work to be performed and furnished by contractor. Anticipated drawings include cover sheet, site plan, piping plan, topography plan, stormwater and erosions control drawings, detail sheets, instrumentation and electrical drawings for level meter and other appurtenant instruments for the second lagoon and detail sheets.

### **202      Design Specifications (Div 2 – 50)**

- Specifications shall be prepared, where appropriate, in general conformance with the 2 – 50 division format of the Construction Specifications Institute. The Contract Documents shall include the following:
  - Civil and Process mechanical drawings – site plan, grading, storm water and erosion control, piping, lagoon berm design, lagoon liner details
  - Instrumentation – Level meter and appurtenant instrumentation
  - Electrical as needed wiring for instruments
  - Prepare construction bid documents to include general and special conditions, bid advertisement, measurement and payment descriptions, special requirements for construction, and technical specifications
- The OWNER will provide the Division 0 standard procurement and contract documents. The OWNER'S standard technical specifications will be utilized as appropriate, prior to utilizing the ENGINEER'S technical specifications. The anticipated list of drawings is comprised of civil, mechanical, electrical, and instrumentation disciplines.

### **203      Geotechnical Design Specifications, Drawings, etc.**

- The proposed lagoon will be an above grade impoundment, requiring drawings and specifications to address the dam safety features such as foundation treatment, fill materials, placement and compaction, internal drainage, finished slope grades, surface

treatments, etc. The drawings and specifications will be prepared in general conformance with applicable codes and the OWNER standards.

204 Front End and Contract Administration Sections (Div 0 and Div 1)

- Specifications shall be prepared, where appropriate, in general conformance with the Divisions 0 and 1 format of the Construction Specifications Institute. This task includes MBE coordination.

205 Team Coordination Meetings

- The ENGINEER shall conduct team coordination meetings to track the ENGINEER team's progress throughout the entire project.
- Any issues or updates will be discussed at this time and addressed accordingly. This will allow the team to stay up to date and coordinated on the project.

206 Engineer's Opinion of Probable Construction Costs

- The ENGINEER shall prepare an opinion of probable construction costs (OPCC) for the 30% design deliverable. The OPCC will be updated at the completion of the 90% design phase, and the final Bid Set submittal.

207 Quality Assurance and Deliverables

- The ENGINEER will conduct internal reviews for the 30%, 60% and final design documents.

**TASK 300 PERMITTING**

The ENGINEER shall assist the OWNER in securing permits associated with the project including the following subtasks:

301 Regulatory Review

- The ENGINEER will finalize the list of permits and approval requirements based on the information collected during the initial site assessment and preparation of the PER. ENGINEER will develop a permitting tracking table to address the major issues identified and to facilitate the permit acquisition process.

### 302 Prepare and Submit Permit Applications

Applications for the required permits and approvals shall be prepared for submittal to the respective agencies. This scope of services assumes that the following permits and approvals will be required:

- NCDEQ DEMLR Sediment and Erosion Control/NPDES Stormwater Permit for Construction Activities
- NCDEQ DWR Public Water Supply Authorization to Construct Permit
- USACE – Section 404/10 Department of the Army Permit and corresponding DWR Section 401 Water Quality Certification (for impacts to streams and wetlands)
- City of Greensboro TRC Internal Department Site Plan Review
- City of Greensboro Floodplain Development Permit
- City of Greensboro Utility Construction Plans Review

It is assumed that regulatory flood hazard area modeling and evaluations will not be required and a no-rise certificate will not be needed. The OWNER will pay all permitting fees. It is assumed that stormwater detention/treatment will not be required for the site; however, this will be confirmed with City Stormwater staff at the beginning of the project. This scope includes preparation of a Nationwide Permit for USACE; an Individual Permit is not included.

### 303 Agency Meetings and Coordination

ENGINEER will coordinate with the regulatory agencies as necessary throughout the permit application and review process. This shall include up to two regulatory agency meetings. As part of this subtask, once the permit applications are submitted, ENGINEER shall maintain contact with the regulatory agencies to monitor and, where possible, facilitate the review process.

## **TASK 400 BIDDING AND AWARD**

The ENGINEER shall perform the following services related to Bidding and Award. This Scope of Services assumes that the design will be distributed in one bid package. The ENGINEER assumes that a pre-qualification process for bidders is not included.

### 401 Review of Contract Documents by Engineering and Inspections Department and MWBE Office

- The City has a special group within the Engineering and Inspections Department that assists with reviewing and managing the bidding process. The ENGINEER will submit the plans and specifications to this group for review. The ENGINEER will assist OWNER (Water Resources Department) by working with the Engineering and Inspections Department to resolve any issues with the Contract Documents related to bidding policies and front-end documents. This review shall also include a special review of the contract documents by the MWBE Office for compliance with the City's MWBE program and policies and recommendation as to potential work packages for the purpose of identifying MWBE subcontracting opportunities.

### 402 Final Documents for Bid Advertisement

- The ENGINEER will assist OWNER in advertising for the construction bid.

#### 403 Pre-Bid Meeting

- The OWNER and the ENGINEER will participate in a pre-bid meeting prior to advertising the bids and opening the bid.

#### 404 Addenda and Substitutions

- The ENGINEER will assist the OWNER by preparing addenda as appropriate to interpret, clarify, or further define the Contract Documents. Addenda will be issued by the ENGINEER. Consult with and advise the OWNER to determine the acceptability of substitute materials and equipment proposed by Contractor(s) when substitution prior to the award of contracts is allowed by the Contract Documents.

#### 405 Bid Opening and Recommendation to Award

- The ENGINEER will attend the bid opening and assist with the review of the bids and qualification statements. The ENGINEER will assist in the evaluation of bids or proposals, and assist the OWNER in contract award processes.

#### 406 Post-Bid Services, Validation, Reference Checks, etc.

- The ENGINEER will follow up with the OWNER post-bid to ensure specified services have been met. This will occur through validations, reference checks, etc.

### **TASK 500 ADDITIONAL SERVICES**

This task is a general allowance for the addition of work to the ENGINEERS scope that is not explicitly stated in TASKS 000 – 400 or changes in the assumptions which are the basis for the above scope of work. Work and the associated fees under this task will only be used with express written authorization by the OWNER's Project Manager and agreement by the ENGINEER. The upper limit of the Contingency allowance is provided in Article 5 of this Exhibit.

## **2. ADDITIONAL SERVICES BY AMENDMENT AND ASSUMPTIONS**

The OWNER reserves the right to amend this Agreement so that the ENGINEER may furnish services related to the project that are not currently part of the Basic Services and are beyond the funding limitations of Task 500. These additional services will be paid for by the OWNER in an amount and by a method to be determined at the time the services are requested.

The following items are currently not included in the Basic Services of this contract:

- Services extending beyond the time-frame described herein. Construction Phase services and observation of construction work
- SCADA and Instrumentation and Control programming.
- Piping modifications beyond those shown in the Alternative 1 Figure attached to the end of this document, the pipe connecting to and from the proposed lagoon.
- A new building to house instruments or other equipment



- Evaluations of operational procedures or customized operational manuals for operating procedures (however, O&M manuals for equipment provided by manufacturers will be provided by the Contractor).
- Pre-qualification process for bidders or vendors.
- More than one bid package.
- Support associated with pre-purchasing of equipment or preparing documents which are separate from the Bid Documents to be used for a pre-purchase equipment selection process.
- Integration or SCADA programming services, or troubleshooting of systems during construction and/or startup.
- Change to an alternative with less wetland impact. If the proposed location shown in the Alternative 1 figure is found to not be feasible due to wetlands or other reason, then the scope and cost of this project will require modification.
- It is assumed that the ENGINEER will prepare documents for one construction package, and all equipment will be specified under that package.
- In the event that additional improvements are to be included based on the results of the TRC Review and the Client Workshop, this Agreement may be amended to increase the engineering scope of services and related costs, as described in Article 2.
- Based on the ENGINEER'S understanding of the project, it is assumed that no structural, architectural, fire prevention, or building mechanical (HVAC, plumbing) drawings are required.

### **3. OWNER'S RESPONSIBILITIES**

Furnish to ENGINEER, as requested by ENGINEER for performance of Services as required by the Contract Documents, the following:

- Available data, calculations, permits, CADD drawings prepared by OTHERS relating to the design of the proposed facilities (including original lagoon drawing and any other drawings of work in the area of the lagoons);
- Access to the Townsend Water Treatment Plant facilities as needed;
- Timely review and input on deliverables;
- Other required information not covered herein.

OWNER shall be responsible for, and ENGINEER may rely upon, the accuracy and completeness of all reports, data, drawings, and other information furnished pursuant to this paragraph. ENGINEER may use such reports, data and information in performing or furnishing services under this Scope of Work.

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 consultants as OWNER deems appropriate with respect to such examination) and render decisions pertaining thereto.

Bear all costs incident to compliance with the requirements of the OWNER's Responsibilities.

Bear all costs incident to permitting applications and bidding phase services, including reproduction of plans and specifications for bidders and plan rooms.

#### **4. TIME PERIOD FOR PERFORMANCE**

The time periods for the performance of Engineering Team services as set forth in this Agreement are amended and supplemented as follows:

- All work described herein this Project Authorization will begin upon execution of this Task Authorization and notice provided by the City's staff that the Engineer may begin work.
- Tasks 100-200 will be completed in 7-months of notice-to-proceed (NTP). Schedule extensions related to the addition of authorized scope shall be determined at the time of authorization.
- Tasks 300-400 are estimated to require approximately 4-6 months from the date that the Construction Documents are completed and ready for permit submittal. Both OWNER and ENGINEER acknowledge that the permitting and bidding processes involve significant involvement from permitting agencies and other parties, which can cause delays in the completion of these tasks which are outside the control of the ENGINEER. The ENGINEER will make a sincere effort to maintain the schedule and minimize delays.
- Schedule assumes receipt of all previously requested data from OWNER by NTP. Delays in providing any additional information requested by the ENGINEER may result in impacts to the Project Schedule.

#### **5. METHOD OF PAYMENT**

The method of payment for services rendered by the ENGINEER shall be as set forth below:

- For the Basic Services performed under Article 1, the OWNER agrees to pay the ENGINEER a lump sum amount of \$ 379,615 for Tasks 100 through 400. The amounts listed in Table 5-1 are estimated values for reference only and the fee shall not be held to upper limits by task. The method of payment will be on a lump sum basis for all authorized tasks. Following Task 100, ENGINEER and OWNER will determine if any of the Task 100 permitting indicates the need for a change in the project to be agreed to by both parties.
- A contingency allowance for Additional Services (Task 500) of \$ 19,000 is included in the upper limit of this contract to allow the City's Project Manager the means to authorize scope changes that are deemed to add value or benefit to the City. This contingency will only be allocated to specific use by written authorization by the OWNER'S Project Manager.
- The total not to exceed (NTE) for this authorization is \$ 398,615.

##### Lump Sum Method of Payment

- Partial payments shall be made by the OWNER on a monthly basis in proportion to the percentage of work completed and the balance of payment made when Basic Services are completed. For invoice purposes only, the value of the various tasks is presented in the table below. Any remainder in the Additional Services Allowance, Task 500, at the completion of the contract performance will not be obligated to the ENGINEER, but rather retained by the OWNER.

**Table 5-1: Estimated Budget Breakdown for Invoice Purposes Only**

	<b>Task</b>	<b>Estimated Value (USD)</b>	<b>Estimated Totals (USD)</b>
Task 100	Project Management – Phase 1	\$ 12,800	
	Geotechnical Evaluation, Drilling, Hazard Classification	\$ 35,600	
	Floodplain, Wetland Evaluation, Phase 1 Permitting	\$ 20,237	
	Site Survey	\$ 35,175	
	Hydraulic Analysis and Preliminary Engineering	\$ 52,383	
	<b><i>Subtotal – Task 100 (Geotechnical, Permitting, Surveying and Preliminary Engineering)</i></b>	<b>-</b>	<b>\$ 156,195</b>
Task 200	Project Management – Phase 2	\$ 14,490	
	Final Design Drawings and Specifications	\$ 131,204	
	Construction Cost Estimating	\$ 6,951	
	Quality Reviews, Review Meeting with City and Related Work	\$ 22,875	
	<b><i>Subtotal – Task 200 (Final Design)</i></b>	<b>-</b>	<b>\$ 175,520</b>
Task 300	State and Federal Permitting	\$ 20,634	
	Quality Reviews, Review Meeting with City and Related Work	\$ 8,055	
	<b><i>Subtotal – Phase 3 (Post-Design Permitting)</i></b>	<b>-</b>	<b>\$ 28,689</b>
Task 400	Bid Package Preparation, Revisions, Pre-bid Meeting, Addenda, Bid Opening, Recommendation to Award	\$ 19,211	<b>\$ 19,211</b>
	Subtotal for Tasks 010 through 400		<b>\$ 379,615</b>
Task 500	Additional Services (as requested by City)	\$ 19,000	<b>\$ 19,000</b>
	<b>CONTRACT TOTAL, NTE</b>	<b>-</b>	<b>\$ 398,615</b>

## Alternative 1 – New, 2-acre Lagoon

