AGREEMENT SUMMARY
BROKEN ARROW MUNICIPAL AUTHORITY

PROFESSIONAL CONSULTANT AGREEMENT

WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

1.0 Professional Consulting Firm:

1.1 Name: HDR Engineering, Inc.

1.2 Telephone No.: 972-960-4400

1.3 Address: 17111 Preston Road, Suite 300
Dallas, TX 75248-1232

2.0 Project Name/Location: Wastewater System Master Plan Update, Broken Arrow, OK

3.0 Statement of Purpose: CONSULTANT understands that the OWNER has retained their professional services to conduct an update to the OWNER's wastewater system master plan. The documents shall include, but not be limited to, the following: wastewater flow monitoring report, wastewater master plan report, and slides for presentation to OWNER's leadership.

4.0 Agreement Summary:

4.1 Agreement Amount:

Basic Services:	
Project Kickoff	$ 10,267.00
Wastewater Flow Monitoring	$ 250,416.00
Wastewater Collection System Evaluation	$ 194,798.00
Wastewater Treatment Evaluation	$ 107,751.00
Master Plan Development and Report	$ 85,693.00
TOTAL BASIC SERVICES	$ 648,925.00
Additional Services (requires BAMA authorization):	
Wastewater Flow Monitoring – 30-day Extension	$ 53,139.00
TOTAL ADDITIONAL SERVICES	$ 53,139.00
TOTAL AGREEMENT AMOUNT	$ 702,064.00

4.2 Agreement Time: 320 calendar days for final report submittal

4.3 Estimated Construction Cost: Not Applicable

5.0 Agreement Approved by the OWNER on: _____

AGREEMENT
FOR
PROFESSIONAL CONSULTANT SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY
AND
HDR ENGINEERING, INC.
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

This AGREEMENT, including Attachment A through Attachment E, between the Broken Arrow Municipal Authority (OWNER) and HDR Engineering, Inc., (CONSULTANT);

W I T N E S S E T H:

WHEREAS, OWNER intends to update its wastewater system master plan (PROJECT) for which, OWNER has requested that CONSULTANT provide certain professional services as required and,

WHEREAS, CONSULTANT is qualified and capable to provide the professional services required;

NOW, therefore, in consideration of the promises contained in this AGREEMENT, OWNER and CONSULTANT agree as follows:

ARTICLE 1 - EFFECTIVE DATE
This AGREEMENT shall be effective upon signature of both parties.

ARTICLE 2 - GOVERNING LAW
This AGREEMENT shall be governed by the laws of the State of Oklahoma and venue for any action concerning this AGREEMENT shall be in the District Court of Tulsa County, Oklahoma.

ARTICLE 3 - SERVICES TO BE PERFORMED BY CONSULTANT
CONSULTANT shall perform the SERVICES described in Attachment A, Scope of Services. CONSULTANT and OWNER agree CONSULTANT'S work performed under this AGREEMENT are performed as an independent contractor. If construction phase services are included, the CONSULTANT shall be the OWNER'S agent and representative to observe, record and report with respect to all services that are required or authorized by the construction documents. OWNER and CONSULTANT agree that the services to be performed under this AGREEMENT by the CONSULTANT shall be as an independent contractor.

ARTICLE 4 – ORGANIZATION OF SUBMITAL DOCUMENTS
CONSULTANT shall prepare the documents as described in Attachment B as part of this AGREEMENT.

ARTICLE 5 - COMPENSATION
OWNER shall pay CONSULTANT in accordance with Attachment C, Compensation and Additional Services.

ARTICLE 6 - OWNER'S RESPONSIBILITIES
OWNER shall be responsible for all matters described in Attachment D, OWNER'S Responsibilities and Special Conditions.

ARTICLE 7 - STANDARD OF CARE

CONSULTANT shall perform the SERVICES undertaken in a manner consistent with the prevailing accepted standard for similar services with respect to projects of comparable function and complexity, and with the applicable state laws, as well as the specific codes, regulations, design criteria and construction specifications adopted by the owner and other governing policies published and generally considered authoritative by CONSULTANT'S profession that are in effect at the time of performance of these SERVICES. CONSULTANT is obligated to perform professional services in accordance with the foregoing standard with respect to the laws, codes, regulations, design criteria and construction specifications that are applicable pursuant to this AGREEMENT.

ARTICLE 8 - LIABILITY

8.1 General. Having considered the potential liabilities that may exist during the performance of these SERVICES, the benefits of the PROJECT, and CONSULTANT'S fee for the SERVICES; and in consideration of the promises contained in this AGREEMENT, OWNER and CONSULTANT agree to allocate and limit such liabilities in accordance with Article 10.

8.2 Indemnification. CONSULTANT agrees to defend, indemnify, and hold harmless OWNER, and its agents and employees, from and against legal liability for all claims, losses, damages, and expenses to the extent such claims, losses, damages, or expenses are caused by the negligent or intentional acts, errors, or omissions of CONSULTANT, its agents or employees. In the event claims, losses, damages, or expenses are caused by the joint or concurrent negligence of OWNER and CONSULTANT, or their agents or employees, then they shall be borne by each party in proportion to each entity's own negligence.

8.3 Consequential Damages. OWNER shall not be liable to CONSULTANT for any special, indirect, or consequential damages resulting in any way from the performance of the SERVICES such as, but not limited to, loss of use, loss of revenue, or loss of anticipated profits.

8.4 Survival. Upon completion of all SERVICES, obligations, and duties provided for in this AGREEMENT, or if this AGREEMENT is terminated for any reason, the terms and conditions of this Article 8 shall survive.

ARTICLE 9 - INSURANCE

During the performance of the SERVICES under this AGREEMENT, CONSULTANT shall maintain the following insurance:

(1) General Liability Insurance, with a combined single limit of $1,000,000 for each occurrence and $1,000,000 in the aggregate;
(2) Automobile Liability Insurance, with a combined single limit of not less than $1,000,000 for each person, not less than $1,000,000 for each accident and not less than $1,000,000 for property damage; and
(3) Professional Liability Insurance, with a limit of $1,000,000 annual aggregate.

CONSULTANT shall furnish OWNER certificates of insurance, which shall include a provision that such insurance shall not be canceled without at least thirty (30) days written notice to OWNER. All PROJECT sub-consultants shall be required to name OWNER and CONSULTANT as certificate holders on their certificate of insurance for the PROJECT and shall be required to indemnify OWNER and CONSULTANT to the same extent. CONSULTANT shall be held responsible to submit certificates of insurance for sub-consultants to OWNER prior to the sub-consultant's release to commence work.

ARTICLE 10 - LIMITATIONS OF RESPONSIBILITY
CONSULTANT shall not be responsible for: (1) construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the construction of the PROJECT; or (2) procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to CONSULTANT in Attachment A, Scope of Services.

ARTICLE 11 - LIMITATIONS OF RESPONSIBILITIES FOR ACTS OF OTHERS
CONSULTANT shall not at any time supervise, direct, control or have authority over any work performed by any employee, contractor or other agent of OWNER. CONSULTANT shall not be responsible for the acts or omissions of any employee, contractor or other agent associated with the PROJECT except for its own employees, subcontractors and other agents.

ARTICLE 12 - OPINIONS OF COST AND SCHEDULE
Since CONSULTANT has no control over the cost of labor, materials, or equipment furnished by others, or over the resources provided by others to meet PROJECT schedules, CONSULTANT'S opinion of probable costs and of PROJECT schedules shall be made on the basis of experience and qualifications as a professional. CONSULTANT does not guarantee that proposals, bids, or actual PROJECT costs will conform to OWNER'S cost estimates or that actual schedules will conform to OWNER'S projected schedules.

ARTICLE 13 - REUSE OF DOCUMENTS
All documents, including, but not limited to, drawings, specifications, and details, reports, etc. prepared by CONSULTANT pursuant to this AGREEMENT are instruments of service in respect to the PROJECT. They are not intended or represented to be suitable for reuse by CONSULTANT or others on extensions of the PROJECT or on any other project. Any reuse or adaptation without prior written verification by the OWNER for the specific purpose intended will be at CONSULTANT'S sole risk and without liability or legal exposure to the OWNER. CONSULTANT shall defend, indemnify, and hold harmless the OWNER against all claims, losses, damages, injuries, and expenses, including attorney's fees, arising out of or resulting from such reuse.

ARTICLE 14 - OWNERSHIP OF DOCUMENTS AND INTELLECTUAL PROPERTY
Except as otherwise provided herein, engineering documents, drawings, and specifications prepared by CONSULTANT as part of the SERVICES shall become the property of OWNER. CONSULTANT shall retain its rights in its standard drawing details, specifications, data bases, computer software, and other proprietary property. Rights to intellectual property developed, utilized, or modified in the performance of the SERVICES shall remain the property of CONSULTANT, but shall be provided to the OWNER, at no additional expense to the OWNER.

ARTICLE 15 - TERMINATION
This AGREEMENT may be terminated by either party upon written notice in the event of substantial failure by either party to perform in accordance with the terms of this AGREEMENT. The non-performing party shall have fifteen (15) calendar days from the date of the termination notice to cure or to submit a plan for cure acceptable to the other party.

OWNER may suspend performance of this AGREEMENT for OWNER'S convenience upon written notice to CONSULTANT. Upon restart, an equitable adjustment may be made to CONSULTANT'S compensation, if the period of suspension has created an economic hardship for the CONSULTANT.

ARTICLE 16 - DELAY IN PERFORMANCE
Neither OWNER nor CONSULTANT shall be considered in default of this AGREEMENT for delays in performance caused by circumstances beyond the reasonable control of the non-performing party. For purposes of this AGREEMENT, such circumstances include, but are not

limited to, abnormal weather conditions such as floods, earthquakes, fire; civil disturbances such as war, riots, or other civil epidemic; power outages, strikes, lockouts, work slowdowns, or other labor disturbances; sabotage; judicial restraint, and inability to procure permits, licenses, or authorizations from any local, state, or federal agency for any of the supplies, materials, accesses, or services required to be provided by either OWNER or CONSULTANT under this AGREEMENT.

Should such circumstances occur, the non-performing party shall, within a reasonable time of being prevented from performing, give written notice to the other party describing the circumstances preventing continued performance and the efforts being made to resume performance of this AGREEMENT.

ARTICLE 17 - WAIVER
A waiver by either OWNER or CONSULTANT of any breach of this AGREEMENT shall be in writing. Such a waiver shall not affect the waiving party's rights with respect to any other or further breach.

ARTICLE 18 - SEVERABILITY
The invalidity, illegality, or unenforceability of any provision of this AGREEMENT or the occurrence of any event rendering any portion or provision of this AGREEMENT void shall in no way affect the validity or enforceability of any other portion or provision of this AGREEMENT. Any void provision shall be deemed severed from this AGREEMENT, and the balance of this AGREEMENT shall be construed and enforced as if this AGREEMENT did not contain the particular portion or provision held to be void. The parties further agree to amend this AGREEMENT to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this Article shall not prevent this entire AGREEMENT from being void should a provision which is of the essence of this AGREEMENT be determined void.

ARTICLE 19 - INTEGRATION
This AGREEMENT represents the entire and integrated AGREEMENT between OWNER and CONSULTANT. It supersedes all prior and contemporaneous communications, representations, and agreements, whether oral or written, relating to the subject matter of this AGREEMENT.

ARTICLE 20 - SUCCESSORS AND ASSIGNS
To the extent permitted by Article 22, OWNER and CONSULTANT each binds itself and its successors and assigns to the other party to this AGREEMENT.

ARTICLE 21 - ASSIGNMENT
Neither OWNER nor CONSULTANT shall assign its duties under this AGREEMENT without the prior written consent of the other party. Unless otherwise stated in the written consent to an assignment, no assignment will release or discharge the assignor from any obligation under this AGREEMENT. Nothing contained in this Article shall prevent CONSULTANT from employing independent sub-consultants, associates, and sub-contractors to assist in the performance of the SERVICES. However, third party entities must comply with Article 9.

ARTICLE 22 - THIRD PARTY RIGHTS
Nothing in this AGREEMENT shall be construed to give any rights or benefits to anyone other than OWNER and CONSULTANT.

ARTICLE 23 - COMPLETION
CONSULTANT shall complete the services within the time frame outlined on Attachment E, Project Schedule, subject to conditions which are beyond the control of the CONSULTANT.

ARTICLE 24 - IMMIGRATION COMPLIANCE

24.1 CONSULTANT shall demonstrate that he:

24.1.1 Has complied, and shall at all times during the term of this AGREEMENT, comply in all respects with all immigration-related laws, statutes, ordinances and regulations including without limitation, the Immigration and Nationality Act, as amended, the Immigration Reform and Control Act of 1986, as amended, and the Oklahoma Taxpayer and Citizen Protection Act of 2007 (Oklahoma HB 1804) and any successor laws, ordinances or regulations (collectively, the Immigration Laws"); and

24.1.2 Has properly maintained, and shall at all times during the term of this AGREEMENT, maintain any and all employee records required by the U.S. Department of Homeland Security ("DHS"), including, without limitation, properly completed and maintained Form I-9s for each of the CONSULTANTs employees; and

24.1.3 Has verified the employment eligibility for all employees hired on or after July 1, 2008, through DHS's E-Verify system, and shall at all times continue to verify the employment eligibility of all employees hired during the term of this AGREEMENT; and

24.1.4 Has required, and will at all times during the term of this AGREEMENT, require any sub-contractor utilized, hired or sub-contracted for by CONSULTANT for the completion or undertaking of any duties, tasks or responsibilities under this AGREEMENT, to comply the requirements and obligations imposed by the Immigration Laws and set forth in Paragraph (I), parts (a), (b) and (c), above, with regards to each of the sub-contractor's employees.

24.2 CONSULTANT will indemnify, defend and hold harmless OWNER against any loss, cost, liability, expense (including, without limitation, costs and expenses of litigation and reasonable attorney's fees) demands, claims, actions, causes of action, liabilities, suits, damages, including special and consequential damages that arise from or in connection with, directly or indirectly, CONSULTANTs failure, deliberate or negligent, to fulfill its obligations and representations regarding verifying the employment eligibility of its employees and the employees of any subcontractor utilized by CONSULTANT as set forth more fully in Paragraph 24.1 above.

ARTICLE 25 - COMMUNICATIONS

Any communication required by this AGREEMENT shall be made in writing to the address specified below:

OWNER: Broken Arrow Municipal Authority
485 N. Poplar Avenue
Broken Arrow, OK 74012
Contact: Emily Rowland, P.E.
Environmental Division Manager

CONSULTANT: HDR Engineering, Inc.
17111 Preston Road, Suite 300
Dallas, TX 75248-1232
972-960-4400
Contact: Joel Cantwell, P.E.
Vice President, Project Manager

Nothing contained in this Article shall be construed to restrict the transmission of routine communications between representatives of OWNER and CONSULTANT.

IN WITNESS WHEREOF, the General Manager of the Broken Arrow Municipal Authority, Oklahoma has hereunto set his hand, for and on behalf of the Broken Arrow Municipal Authority and the CONSULTANT has signed, or caused his name to be signed, and seal affixed by proper authority, the day and year first above-written and these presents have been executed in triplicate counterparts.

OWNER:
Broken Arrow Municipal Authority

By: _____
Michael L. Spurgeon,
General Manager

Date: _____

CONSULTANT:
HDR Engineering, Inc.

By: _____
Lucas A. Bathurst,
Vice President, Area Manager

Date: December 30, 2024

(CORPORATE SEAL, IF APPLICABLE)

Attest: _____
Secretary [Seal]

Date: _____

Attest: _____
Jenifer Rayshell, Admin. Assistant

Date: December 30, 2024

Approved as to form:

D. Graham Parker
Assistant City Attorney

VERIFICATION

State of _)
) §
County of _)

Before me, a Notary Public, on this 30th day of December, 2024, personally appeared Lucas A. Bathurst, known to be to be the (President, Vice-President, Corporate Officer, Member, or Other: _____) of HDR Engineering, Inc., and to be the identical person who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same as his/her free and voluntary act and deed for the uses and purposes therein set forth.

My Commission Expires:
June 08, 2026

_____
Notary Public

MARIELA MEDINA
Notary ID - 13375783-4
My Commission Expires
June 08, 2026

ATTACHMENT A
TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY (OWNER)
AND
HDR ENGINEERING, INC. (CONSULTANT)
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

SCOPE OF SERVICES

The following scope of services shall be made a part of the AGREEMENT dated the _____ day of _____, 202__.

1.0 PROJECT UNDERSTANDING

The Broken Arrow Municipal Authority (OWNER) owns and operates its wastewater system, which serves an area over 55 square miles and consists of approximately 700 miles of gravity pipelines, 25 miles of force mains, and 29 lift stations. The system also includes two wastewater treatment plants (WWTPs): the Lynn Lane WWTP serves the Lynn Lane and Adams Creeks sewersheds and the Haikey Creek WWTP serves the Haikey Creek basin. The Lynn Lane WWTP is owned and operated by the OWNER, while the Haikey Creek WWTP is owned by the Regional Metropolitan Utility Authority (RMUA) and operated by the City of Tulsa.

HDR Engineering, Inc. (CONSULTANT) completed the OWNER's first comprehensive Wastewater System Master Plan in 2018. The project included systemwide flow monitoring, development of the wastewater system piping network in GIS, development and calibration of a hydraulic model, and analysis of the collection and treatment facilities, resulting in a prioritized capital improvements plan to address deficiencies and convey and treat the future build-out flows. In the years since the master plan completion, the OWNER has implemented many of the highest priority improvements. Additional studies have also been undertaken in the Adams Creek sewershed to determine if a future WWTP will be constructed in that basin, which would eliminate several lift stations and reduce the load on the Lynn Lane WWTP. The OWNER is likely moving forward with this new WWTP.

The purpose of this Wastewater System Master Plan Update project is to revisit the previous plan to determine the effectiveness of the improvements that have been implemented and to re-prioritize needs throughout the system to drive the next round of capital improvements. Similar to the previous plan, the project will include flow monitoring, hydraulic model updates and calibration, assessment of the collection and treatment facilities, and a 20-year capital improvements plan.

2.0 SCOPE OF SERVICES

A. PROJECT KICKOFF MEETING. The mixed in-person/virtual meeting will include key members of OWNER and CONSULTANT staff and will focus on the scope of work, schedule, deliverables, communication protocols, and fieldwork and data collection coordination. The CONSULTANT will submit a written summary of the meeting for review by OWNER.

B. WASTEWATER FLOW MONITORING. The flow monitoring program is to provide essential hydraulic performance information necessary to calibrate the hydraulic model

calibration and to identify areas of hydraulic overloading, capacity restrictions and excessive inflow and infiltration (I/I). The flow monitoring program consists of gravity flow and rain gauge monitoring.

1. *Site Selection.* The CONSULTANT will identify strategic locations for flow metering throughout the wastewater collection system. The CONSULTANT will assist in selecting targeted monitoring locations for use in calibrating the hydraulic model and will make recommendations for suitable flow meter equipment and rain gauges. It is assumed that 22 gravity flow metering locations will be identified.

    a. *Meter Locations.* The CONSULTANT will identify the target locations for the proposed flow meters and rain gauges. The CONSULTANT will consider the locations and data collected during previous or ongoing short term flow monitoring, as well as permanent flow metering, when recommending locations.

    b. *Site Investigations.* The CONSULTANT will perform site investigations for the purpose of determining the viability of each targeted location. The investigation includes an evaluation of the hydraulic conditions, access, safety and other issues that may affect the data quality or sensor survival.

    If a location is identified as being unsuitable, the CONSULTANT shall investigate up to two alternate sites (upstream or downstream) for consideration. The CONSULTANT shall also check for debris in the manhole that could impact data quality.

2. *Flow Monitoring Equipment Installation*. The CONSULTANT will provide for proper installation and setup of the complete monitoring system. Wireless telemetry will be used to convey data from the flow meters and rain gauges. The flow meters and rain gauges shall be synchronized and programmed to collect data at certain intervals.

    a. Gravity Flow Meters. Based on the results of the site investigations, the CONSULTANT shall select equipment suited for the application to provide accurate and reliable flow data. The CONSULTANT shall use flow meters designed to measure flow in sanitary sewer pipes under free-flow and surcharged conditions. The primary depth sensor shall be ultrasonic with a resolution to the nearest 0.01 foot. Each site shall also include level measurement redundancy by means of a pressure sensor. The primary velocity sensor shall use Doppler technology.

    b. Wireless Telemetry. Remote Terminal Units (RTU) shall be provided at each flow monitoring and rain gauge location to remotely collect the data. In the event that certain sites are not conducive for remote telemetry, the CONSULTANT shall manually collect the data throughout the monitoring period.

    c. Pipe Cleaning. In the event that the monitoring location needs to be cleaned to facilitate quality monitoring, and an alternate site is not suitable, the CONSULTANT shall request sewer cleaning to be performed by OWNER staff.

    d. Flow Monitor Installation. The sensors shall be securely attached to the pipe by means of metal bands or anchoring hardware designed specifically for that purpose. A typical installation shall include the primary ultrasonic depth sensor mounted at the crown of the pipe, a redundant pressure transducer depth sensor mounted in the invert, and a Doppler velocity sensor mounted near the invert.

The data logger and sensor cables shall be firmly secured to the manhole walls or steps.

e. Data Recording Interval. All flow meter and rain gauges shall be synchronized in time to the same clock and shall be programmed to collect depth and velocity data at five (5) minute intervals.

f. Initial Depth and Velocity Confirmations. Upon installation and activation of each flow meter, the CONSULTANT shall take manual depth and velocity readings using independent instrumentation to confirm that the in-situ monitor yields data representative of actual field conditions. Field crews shall also take manual velocity readings of the flow cross-section (velocity profile) in order to derive an average velocity. All measurements, adjustments, and efforts undertaken during site visits shall be recorded on the maintenance log.

g. The CONSULTANT shall prepare and submit for approval an electronic Site Installation Report. The Site Installation Report shall include a general site location map, a sketch of the installation, the physical characteristics including the pipe diameter, pipe material, manhole depth and other attribute information.

3. *Rainfall Monitoring.*

a. Rainfall Measurement. The CONSULTANT shall measure the contribution from rainfall using a network of eight (8) rain gauges that will be geographically distributed over the study area. The rain gauges will be placed on accessible public facilities such as utility pumping stations, fire stations, schools or other flat roof facilities. OWNER may be requested to assist in securing locations for rain gauge placement.

b. Rain Gauge Equipment. The rain gauge equipment shall consist of a data logger and rain gauge tipping bucket. The equipment shall be able to measure 0.01 inches resolution. The tipping bucket shall be a corrosion resistant funnel collector with tipping bucket assembly. The rain gauges shall be placed on accessible public facilities such as utility pump stations, fire stations, schools and other flat roof facilities. OWNER may be requested to assist in securing locations of rain gauge placement.

4. *Data Collection and Web Hosting.*

a. Wireless Remote Data Collection. The CONSULTANT shall utilize a host software support application program for remote wireless flow meter and rain gauge data collection. On a daily basis, all data recorded and stored in the RTU shall be collected by the host system. The CONSULTANT shall install, operate, maintain and remove the telemetry upon the completion of the monitoring period and shall repair any disturbed areas resulting from the wireless telemetry installations.

5. *Flow Monitor Service and Maintenance.*

a. Flow Monitoring Period. The flow monitoring shall be conducted for a period to acquire sufficient wet-weather information. The goal of this program is to obtain representative dry weather information and between four to six “impact” rain events of varying intensities for use in calibrating the hydraulic model. “Impact” refers to rain events that cause a significant observed response at the monitoring

location. The scheduled base flow monitoring period is expected to be 60-days, with budgetary provisions for period extensions.

b. Period Extension: The monitoring period may be extended, upon request, on a monthly basis as an Additional Service. If the flow monitoring period is extended, the entire project schedule will be extended by the same amount of time.

c. Equipment Operation and Maintenance (O&M). The CONSULTANT's qualified field crews shall visit each monitor installation, as appropriate, to perform necessary maintenance to the equipment. It is anticipated that each site will be visited twice per month. All measurements, adjustments, and efforts undertaken during site visits shall be logged in a maintenance log specific to that site.

d. Uptime Requirement. The CONSULTANT shall collect useable flow data a minimum of 95-percent of the time throughout the monitoring period. The CONSULTANT shall submit an uptime table each month demonstrating compliance with the uptime requirement, including a thorough explanation of the reasons for not meeting the up-time requirement at any site.

   1) Monitor uptime shall be defined as the number of five (5) minute measurement intervals where a flow value can be calculated from a measured depth and a measured or inferred velocity for a common time interval divided by the total number of measurement intervals in the reporting period. The CONSULTANT shall clearly identify all inferred velocity data or other data derived from inferred data in all reports and other deliverables.

   2) In the event the uptime requirement has not been met, the CONSULTANT shall extend the monitoring period for an equivalent period of time at no extra cost to the Owner.

e. Flow Monitor Field Confirmation. During scheduled field service visits, the CONSULTANT shall perform independent depth and velocity measurements for comparison against the meter depth and velocity readings. The field service crew shall also obtain hydraulic profiles by measuring velocity at predetermined locations and integrating the measurements to derive an average velocity. Up to five (5) independent confirmations with hydraulic profile measurements shall be obtained within the first 60-day monitoring period, and up to three (3) times during the 30-day extension period, if authorized. All measurements, adjustments, and efforts undertaken during site visits shall be logged on the maintenance logs.

f. Rain Gauge Field Confirmation. During scheduled field service visits, the CONSULTANT shall perform test tips to ensure the rain gauge equipment is operating to manufacturer's standards. All measurements, adjustments, and efforts undertaken during site visits shall be logged on maintenance logs.

6. *Equipment Removal.*

a. Notification. The CONSULTANT will coordinate with OWNER at least two weeks before the end of the scheduled monitoring period to discuss extending the monitoring period if needed.

b. Site Restoration. The CONSULTANT shall remove all the flow meters at the completion of the flow-monitoring period and shall repair any damage or disturbance from the installation and operation of the flow meters or rain gauges.

7. *Data Analysis and Reporting.*

a. Data Review. The CONSULTANT shall review the flow and rainfall monitoring data at least twice a week. Trained data analysts experienced in processing and analyzing flow and rainfall data shall use various analytical tools, such as hydrographs, scattergraphs, and flow balancing methods to verify the accuracy and precision of the flow data.

1) The analysis of the data shall include the identification of data gaps, anomalies and monitor performance issues. Any equipment service needs shall be immediately conveyed to the field service crews.

2) The data shall be processed and edited in accordance with the field confirmations to produce final data sets for each site. All data processing efforts shall ensure that the raw data is preserved.

b. Rainfall Data. Experienced data analysts shall review rainfall data from the rain gauges upon receipt.

c. Data Delivery. The following shall be submitted to OWNER within 60 days of the end of the monitoring period:

1) Hydrographs including depth, velocity, continuity-derived flow and rainfall

2) Scattergraphs of processed depth-velocity readings with discernable calibration measurements overlain

3) An Uptime Report of all sites, including the basis for failure in meeting uptime requirements and any data quality issues

4) Five-minute flow, depth, velocity, and rainfall data in a tabular format

d. Final Data Delivery and Report. A Wastewater Flow Monitoring Report shall be submitted to BAMA, outlining the flow monitoring process, collection and calibration of flow data, and all data collected and processed during the flow monitoring period.

Four (4) hard copies and an electronic PDF of the Wastewater Flow Monitoring Report shall be submitted to OWNER within 60 days after the initial data delivery.

C. WASTEWATER COLLECTION SYSTEM EVALUATION

1. *Collection System Model Update*

a. *Data Collection.* Data collection will be required in support of updating the physical model and load allocation.

- For the physical model, collect updated GIS information, atlas sheets, as-built drawings for piping and lift stations, etc., provided by OWNER for the existing wastewater facilities including all physical attributes of the collection system. Improvements implemented since the previous master plan are especially needed.

- For updating load allocations, collect existing and future land use information, Census (tract, block and block group level), population and

land use projections, zoning data and available load allocation information including existing sewer basins and sub-basins, and major users.

b. *Model Network Update.* The CONSULTANT will utilize the information provided in the Data Collection task to update the model network and loading with new infrastructure since the model creation.

- New infrastructure from OWNER's GIS and lift station information will be imported into the hydraulic model network.

- For new infrastructure constructed since the initial model development and not yet incorporated into OWNER's GIS data, the CONSULTANT will supplement the GIS data with as-builts, if needed, to update the collection system piping network for all pipes 10-inch diameter and larger, as well as smaller pipes that serve as collectors in OWNER's system. CONSULTANT will notify OWNER if there are areas of the system for which no documentation exists, and OWNER will provide survey information (horizontal coordinates, invert elevation, and rim elevation) to CONSULTANT.

- For lift stations constructed since the model creation, the CONSULTANT will use lift station as-builts and pump curves to manually enter new lift station information into the model. OWNER will provide pump curve and/or pump testing information, as well as pump operational data (pump on/off levels) for any new lift stations. It is assumed that lift stations in the current hydraulic model are valid; OWNER will notify CONSULTANT of any changes to existing lift station geometry, pump capacity or lift station operation.

- Once the model network is updated, the CONSULTANT will run continuity checks on the piping network to validate gravity flow throughout the system. Although not anticipated at this time, the CONSULTANT will notify OWNER if survey data is needed for missing pipe invert/rim elevations in any critical areas of the network. Survey services can be provided by the OWNER or by an amendment to the Agreement.

c. *Design Rainfall Event Determination.* The CONSULTANT will review OWNER's current design rainfall event (5-year return frequency and 6-hour duration) for use in the master planning effort as well as options for determining capacity criteria in the system. The CONSULTANT will review the design storm against current climate trends and existing system performance and recommend updates to the design storm and/or capacity criteria, if necessary.

d. *Updated Flow and Load Allocations.* These items will be created by the CONSULTANT based on flow monitoring data, the data collection effort and any updated planning information from OWNER. Historical data (up to 10 years) will be evaluated to establish typical dry weather flows to plants, pump stations, and neighboring system influent wastewater characteristics associated with different design flow and load scenarios, including average day, maximum month, and maximum day conditions.

Review OWNER-provided population projections for the sewer sub-basins and determine future population projections that are recommended for the project. Load allocation will be performed for both the existing system and build-out conditions.

The flow monitoring data, and additional collected data, will be used to define the following:

- Response unit hydrograph for each sub-basin
- Existing system-wide flow pattern or peaking factor for diurnal variation
- Infiltration rates for each sub-basin
- Existing system-wide average flows at the WWTPs
- Existing system-wide wet weather flow in response to storm event
- Major users to be defined as point flows

e. *Dry Weather Flow Calibration*. Utilizing the flow monitoring data, CONSULTANT will calibrate the dry weather model so that dry weather hydrographs for each sub-basin correspond with observed flow monitoring and WWTP historical and observed flow records. Flow is generally comprised of three key elements: base wastewater flow, groundwater infiltration and rainfall-dependent infiltration/inflows. The hydrographs generated from the flow monitoring will be used to estimate these three components for each sub-basin. The CONSULTANT will conduct a quality control check of the calibration. It is assumed that up to 22 locations will require re-calibration.

f. *Wet Weather Flow Calibration*. Utilizing the flow monitoring data, and the dry weather flow calibration task, CONSULTANT will calibrate the wet weather model so that wet weather hydrographs for each modeled sub-basin correspond with observed flow monitoring. Additionally, the model will be validated to observed problem areas under the selected design rainfall event, especially if there is a lack of significant wet weather events during the flow monitoring period. Results will also be compared to historical and observed WWTP flows. The CONSULTANT will conduct a quality control check of the calibration. It is assumed that up to 22 locations will require re-calibration.

g. *Rainfall Data.* To support wet weather calibration, the CONSULTANT will provide Doppler rainfall services using data compiled by NEXRAD Doppler radar. The resolution will be one (1) pixel per one (1) square kilometer with a temporal resolution of five to six (5 to 6) minutes per spatial depiction. The NEXRAD Doppler radar will be “atmospheric truthed” to adjust the radar’s Z-R relationship (rainfall to reflectivity) to the atmosphere at the time of the rainfall event. Additionally, manual rain gauge network will be used to “ground truth” the Doppler radar results. Experienced data analysts will review rainfall data from the rain gauges upon receipt. It is assumed that up rainfall data processing will be performed on up to three rainfall events.

2. *Collection System Capacity Analysis*. Conduct model runs for the existing and buildout conditions at dry and design rainfall event flows. Use the planning assumptions previously determined by OWNER (design rainfall event and capacity criteria) to identify capacity constrained locations. Determine system capacity, overflow locations and overflow quantities. It is assumed that OWNER's current philosophy of allowing surcharging to one foot above the pipe crown during the design storm will be maintained and surcharging greater than one foot above the pipe crown will trigger the need for an improvement.

3. *Collection System Improvement Analysis*. CONSULTANT will conduct model runs to determine collection system improvements needed to handle buildout wastewater flows. It assumed that the system configuration selected in the previous master plan is still in effect (diversion of a portion of the Haikey Creek basin to the Lynn Lane basin) except that the buildout flows in the Adams Creek basin will be conveyed to the proposed Adams Creek WWTP site. Needed collection system improvements will be identified in graphical and tabular form by pipe diameter, length, and estimated construction cost in current year dollars.

4. *Collection System Evaluation Results Meeting*. Conduct a meeting with OWNER and CONSULTANT staff to discuss the results of the capacity analysis and improvement analysis and achieve collective agreement on the results.

D. WASTEWATER TREATMENT EVALUATION

1. *Data Collection.* CONSULTANT will work with OWNER staff to collect data to support the wastewater treatment evaluation. The data will include:

   - As-built drawings for facilities that have been constructed at the treatment plants since the last master plan
   - Reports or studies related to the treatment plants that have been completed since the last mater plan
   - The latest RMUA capital improvements plan for the Haikey Creek WWTP
   - Plant operational data (spreadsheet format) for the last five years
   - Overall plant operations and maintenance manuals (if available)
   - Latest effluent discharge permits

2. *Planning Criteria.* Meet with INCOG to discuss the latest waste load allocation studies and potential future timing on more restrictive effluent discharge limits, such as nutrients. Based on the discussion with INCOG and nationwide industry trends, determine assumptions for future discharge permit limits. Also develop assumptions for future solids disposal and other drivers, such as future PFAS regulations.

   Using results from the flow monitoring and flow allocations, determine future build-out average and peak influent flows to both the Lynn Lane and Haikey Creek WWTPs as well as the potential future Adams Creek WWTP.

3. *Existing WWTP Evaluations*. Conduct a planning level evaluation of the existing Lynn Lane and Haikey Creek WWTPs (including the Haikey Creek Lift Station).

The evaluation will not include the potential new Adams Creek WWTP. CONSULTANT will visit each plant site and meet with the operational staff at each plant. CONSULTANT's evaluation will include the following:

a. *Condition Analysis.* Update the condition of each treatment unit by assigning a rating of Good, Fair, or Poor. The rating will be determined using a combination of visual inspection, facility/equipment age, and discussion with OWNER operational staff.

b. *Hydraulic Analysis*. Update the hydraulic profile model of each plant using Visual Hydraulics software to assess the current hydraulic capacity. Update the hydraulic profile figures for each plant showing the maximum flow capacity of each hydraulic segment.

c. *Process Analysis*. Update the BioWin model previously developed for Lynn Lane to re-evaluate the treatment process capacity for the plant, based on assumptions agreed upon by CONSULTANT and OWNER. For both plants, the capacity of each process will be determined by ODEQ regulations and/or industry standards. The overall process schematic for each plant will be updated from the previous master plan.

4. *Regulations Review*. A review of ODEQ's current and potential future wastewater design and construction, discharge and permitting regulations will be performed. Recommendations will be provided for future modifications to existing WWTPs to meet changing treatment standards.

5. *Treatment Expansion Evaluation.* Determine facilities and costs for meeting the wastewater treatment needs of the build-out flows developed in the previous modeling task. A site plan graphic and table of recommended improvements and costs will be developed for each plant. Other drivers will be considered, such as water reuse and chemical risk management. All construction cost estimates will be in current year dollars.

   For Haikey Creek WWTP improvements, OWNER and CONSULTANT will determine reasonable flow and cost splits between Broken Arrow and Tulsa for purposes of estimating the OWNER's share of costs. Recommended improvements and costs will be compared to the current Proposed Major Capital Improvements Program from RMUA. A reasonable determination will then be made for the OWNER's future capital costs related to the Haikey Creek WWTP.

6. *Treatment Evaluation Results Meeting*. Conduct a meeting with OWNER and CONSULTANT staff to discuss the results of the wastewater treatment evaluation and achieve collective agreement on the results.

E. MASTER PLAN DEVELOPMENT AND REPORT

1. *Capital Improvement Plan.* Based on the results of the collection system and treatment evaluations, prepare a 20-year capital improvement plan (CIP) identifying priorities and implementation schedule for overall wastewater system improvements. In addition to the identified capacity related improvements, the CIP will incorporate specific asset condition related improvements, if any, based on input from OWNER. The CIP will include recommendations for future condition assessment activities for important, aged pipelines or facilities.

Opinions of probable construction cost (OPCCs) will be developed for each project that represent Class 5 (conceptual level) estimates per AACE International. A wall poster will be developed that illustrates a map of the system improvements and a summary of the CIP projects. Project information sheets will be developed for each project recommended in the first 10 years of the CIP that includes a project description, need, triggers (flows, regulations, condition, etc.), OPCC, and estimated initiation year and duration.

If desired by OWNER as an additional service (not included in the current scope), CONSULTANT can customize its spreadsheet-based, non-proprietary CIP tool (EconH2O) to help the OWNER implement projects while providing the ability to move projects forward or backward in the timeline in response to changing conditions and increased/decreased fiscal year funding and other features to provide flexibility and control of the CIP. CONSULTANT would provide training to OWNER on use of the tool to allow ongoing updates and customization in-house. The tool can also be loaded with other elements of the OWNER's CIP (i.e., water system, roadway, stormwater) to provide even more flexibility and control.

2. *Draft Wastewater Master Plan Report*. Prepare the Wastewater System Master Plan Report (Report) to include the following:

   Executive Summary
   Chapter 1 – Introduction
   Chapter 2 – Existing Collection System & Flow Monitoring Summary
   Chapter 3 – Collection System Model Development
   Chapter 4 – Existing Collection System Capacity Evaluation
   Chapter 5 – Collection System Improvements Evaluation
   Chapter 6 – Existing Wastewater Treatment Evaluation
   Chapter 7 – Wastewater Treatment Improvements Evaluation
   Chapter 8 – Wastewater System Capital Improvements Plan

   Submit five (5) copies and a PDF of the draft Report to OWNER for review. Receive OWNER's review comments in writing and discuss the comments on a conference call.

3. *Final Wastewater Master Plan Report*. Address comments received from OWNER and submit ten (10) copies and a PDF of the final Wastewater System Master Plan Report to OWNER.

4. *BAMA Meeting Presentation*. In conjunction with OWNER staff, present the results of the Master Plan in PowerPoint format during a BAMA meeting and answer questions as needed.

ATTACHMENT B
TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY (OWNER)
AND
HDR ENGINEERING, INC. (CONSULTANT)
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

ORGANIZATION OF SUBMITTAL DOCUMENTS

The CONSULTANT shall prepare the following documents as described as a part of the AGREEMENT dated the _____ day of _____, 202__.

The CONSULTANT shall submit in-full, in accordance with this AGREEMENT, the following documents. Unless otherwise stated, 1 reproducible paper original, 5 paper copies, and 1 PDF file for each document shall be submitted.

- Meeting summary for each project meeting (PDF only)
- Wastewater Flow Monitoring Report (4 paper copies)
- Wastewater Master Plan Report (10 paper copies)
- Wastewater Master Plan Presentation Slides

ATTACHMENT C
TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY (OWNER)
AND
HDR ENGINEERING, INC. (CONSULTANT)
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

COMPENSATION AND ADDITIONAL SERVICES

The following compensation shall apply and shall be made a part of the AGREEMENT dated the _____ day of _____, 202__.

1.0 BASIC COMPENSATION

The basic compensation for the CONSULTANT to perform all duties and responsibilities associated with the Scope of Services as described in Attachment A shall be in accordance with the following payment breakdown:

1.1 Project Kickoff Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $10,267 for the completion of the Project Kickoff. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

1.2 Wastewater Flow Monitoring Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $250,416 for the completion of the Wastewater Flow Monitoring. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

1.3 Wastewater Collection System Evaluation Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $194,798 for the completion of the Wastewater Collection System Evaluation. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

1.4 Wastewater Treatment Evaluation Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $107,751 for the completion of the Wastewater Treatment Evaluation. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

1.5 Master Plan Development and Report Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $85,693 for the completion of the Master Plan Development and Report. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

1.6 The OWNER may negotiate other professional services fees with the CONSULTANT at the OWNER'S discretion.

2.0 ADDITIONAL COMPENSATION

If authorized by OWNER in writing, the additional compensation for the CONSULTANT to perform all duties and responsibilities associated with the Scope of Services as described in Attachment A shall be in accordance with the following payment breakdown:

2.1 Wastewater Flow Monitoring 30-day Extension Payment: The OWNER shall pay the CONSULTANT a lump sum amount of $53,139 for extending the flow monitoring period. This amount includes all labor, material, overhead and profit associated with the Scope of Services.

3.0 REPRODUCTION

All charges for reproduction shall be included in Basic Compensation Fee of the CONSULTANT. No separate payment will be made for these expenses.

4.0 MILEAGE

All mileage costs shall be included in the Basic Compensation of the CONSULTANT. No separate payment will be made for these expenses.

5.0 DIRECT COSTS

All direct costs shall be included in the Basic Compensation of the CONSULTANT. No separate payment will be made for these expenses.

6.0 ADJUSTMENT CLAUSE

The rates and costs described in this AGREEMENT shall not be revised annually, unless mutually agreed upon by both parties in a future amendment.

ATTACHMENT D
TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY (OWNER)
AND
HDR ENGINEERING, INC. (CONSULTANT)
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

OWNER'S RESPONSIBILITIES AND SPECIAL CONDITIONS

The following list of special OWNER's responsibilities and contract special conditions shall be made a part of the AGREEMENT dated the _____ day of _____, 202__.

1.0 OWNER'S RESPONSIBILITIES

1.1 OWNER shall furnish to CONSULTANT all available information pertinent to the PROJECT including previous reports and any other data relative to design and construction of the PROJECT;

1.2 OWNER shall furnish to CONSULTANT all public utility information available relative to the design and construction of the PROJECT. CONSULTANT's topographical survey shall locate all utilities above and below ground for exact location;

1.3 OWNER shall furnish to CONSULTANT list of codes adopted by the municipality as well as subdivision regulations, design criteria and construction standards and specifications that may be pertinent to the design and construction of the PROJECT;

1.4 OWNER shall examine all studies, reports, sketches, estimates, specifications, plan drawings, proposals, and other documents presented by the CONSULTANT and render in writing decisions pertaining thereto within a reasonable time so as not to delay the SERVICES of the CONSULTANT.

2.0 SPECIAL CONDITIONS

2.1 None

ATTACHMENT E
TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES
BETWEEN
BROKEN ARROW MUNICIPAL AUTHORITY (OWNER)
AND
HDR ENGINEERING, INC. (CONSULTANT)
FOR
WASTEWATER SYSTEM MASTER PLAN UPDATE
PROJECT NO. 2554690

PROJECT SCHEDULE

The following schedule shall be made a part of the AGREEMENT dated the _____ day of _____, 202__.

1.0 WASTEWATER FLOW MONITORING:

Complete the Wastewater Flow Monitoring Report within 170 Calendar Days after Notice to Proceed.

2.0 WASTEWATER MASTER PLAN UPDATE:

Complete the Wastewater System Master Plan Report within 150 Calendar Days after completion of the Wastewater Flow Monitoring Report.

3.0 BAMA PRESENTATION:

Assist with the presentation to BAMA after completion of the Wastewater Master Plan Report (no time limit).