



City of Broken Arrow
Meeting Agenda
Broken Arrow Municipal Authority

Chairperson Craig Thurmond

Vice Chair Scott Eudey

Trustee Mike Lester

Trustee Johnnie Parks

Trustee Debra Wimpee

Tuesday, October 17, 2017

Council Chambers
220 S. 1st Street
Broken Arrow, OK

TIME: Immediately following the City Council Meeting which begins at 6:30 p.m.

1. Call to Order

2. Roll Call

3. Consideration of Consent Agenda

- A. [17-1705](#) Approval of Broken Arrow Municipal Authority Meeting Minutes of October 3, 2017
- Attachments: [10-03-2017 BAMA Minutes](#)
- B. [17-2788](#) Acceptance of the new five year Oklahoma Pollution Discharge Eliminations System (OPDES) permit as issued by the Oklahoma Department of Environmental Quality for the City of Broken Arrow, Lynn Lane Wastewater Treatment Plant
- Attachments: [OPDES permit](#)
- C. [17-2778](#) Acknowledgement of submittal of the Broken Arrow Municipal Authority's Water Supply Report for the month of September 2017
- Attachments: [Total Water Report-Sep 2017](#)
- D. [17-2789](#) Approval of and authorization to execute an Agreement for Professional Engineering Services for Haikey Creek Operation and Maintenance Capital Equipment Replacements with Holloway, Updike, and Bellen, Inc., for the design of the Fiscal Year 2018 Capital Equipment Replacement Project
- Attachments: [171017 RMUA Captial Equipment Replacement Design Contract](#)
- E. [16-1591](#) Approval of the Broken Arrow Municipal Authority Claims List for October 17, 2017
- Attachments: [10-17-17 BAMA CL](#)

4. Consideration of Items Removed from Consent Agenda

5. Public Hearings, Appeals, Presentations, Recognitions, Awards - - NONE

6. General Authority Business - - NONE

7. Executive Session - - NONE

8. Adjournment

NOTICE:

If you wish to speak at this evening's meeting, please fill out a "Request to Speak" form. The forms are available from the City Clerk's table or at the entrance door. Please turn in your form prior to the start of the meeting. Topics are limited to items on the currently posted agenda, or relevant business.

All cell phones and pagers must be turned OFF or operated SILENTLY during meetings.

Exhibits, petitions, pictures, etc., shall be received and deposited in case files to be kept at the Broken Arrow City Hall. If you are a person with a disability and need some accommodation in order to participate in this meeting, please contact the City Clerk at 918-259-2400 Ext. 5418 to make arrangements.

POSTED this ____ day of _____, _____, at _____
a.m./p.m.

City Clerk



City of Broken Arrow

Fact Sheet

File #: 17-1705, Version: 1

**Broken Arrow Municipal Authority
Meeting of: October 17, 2017**

To: Chairman and Authority Members
From: Office of the City Clerk
Title: Approval of Broken Arrow Municipal Authority Meeting Minutes of October 3, 2017

Background: Minutes recorded for the Broken Arrow Municipal Authority meeting.

Cost: \$0

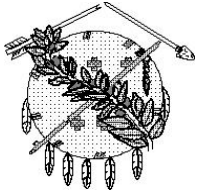
Prepared By: Lisa Blackford, City Clerk

Reviewed By: Russell Gale, Assistant City Manager of Administration
Beth Anne Childs, City Attorney

Approved By: Michael L. Spurgeon, City Manager

Attachments: Broken Arrow Municipal Authority minutes of October 3, 2017

Recommendation: Approval of the minutes of October 3, 2017 for the Broken Arrow Municipal Authority meeting



City of Broken Arrow
Minutes
Broken Arrow Municipal Authority

City Hall
220 S 1st Street
Broken Arrow OK
74012

Chairperson Craig Thurmond
Vice Chair Scott Eudey
Trustee Mike Lester
Trustee Johnnie Parks
Trustee Debra Wimpee

Tuesday, October 3, 2017

Council Chambers

1. Call to Order

Vice Chair Scott Eudey called the meeting to order at approximately 7:26 p.m.

2. Roll Call

Present: 4 - Debra Wimpee, Johnnie Parks, Mike Lester, Scott Eudey
Absent: 1 - Craig Thurmond

3. Consideration of Consent Agenda

Vice Chair Eudey asked if there were any items to remove from the Consent Agenda. There were none.

MOTION: A motion was made by Mike Lester, seconded by Debra Wimpee.

Move to approve the Consent Agenda

The motion carried by the following vote:

Aye: 4 - Debra Wimpee, Johnnie Parks, Mike Lester, Scott Eudey

A. 17-1702 **Approval of Broken Arrow Municipal Authority Meeting Minutes of September 19, 2017**

B. 17-2677 **Approval of and authorization to execute Resolution No. 1058, a Resolution agreeing to file application with the Clean Water State Revolving Fund (CWSRF), with the loan proceeds being for the purpose of paying for costs related to acquisition, installation, and inspection of automated water meters and related appurtenances; approving the payment of an application fee; designating legal and financial professionals to assist in the application process and approving contracts for such services; authorizing the Chairman and Secretary to execute certain application documents; and containing other provisions related thereto**

C. 17-2731 **Approval of and authorization to execute a Professional Consultant Agreement with Holloway, Updike and Bellen, Inc., for Belt Filter Press Feed Pumps (Project No. 185418) and Belt Filter Press Feed Flow Meters (Project No. 185419)**

D. 17-2728 **Approval of and authorization to execute a Professional Consultant Agreement with Holloway, Updike and Bellen, Inc., for the Design to Replace Corroded Piping at Greens Lift Station (Project No. 185426)**

E. 17-2725 **Approval of and authorization to purchase one (1) 19,500 pound crew cab work truck and chassis as bid pursuant to the Oklahoma Statewide Contract**

F. 16-1588 **Approval of the Broken Arrow Municipal Authority Claims List for October 03, 2017**

4. Consideration of Items Removed from Consent Agenda

There were no items removed from the Consent Agenda. No action was required or taken.

5. Public Hearings, Appeals, Presentations, Recognitions, Awards

There were no Public Hearings, Appeals, Presentations, Recognitions, or Awards.

6. General Authority Business

A. 17-2719

Consideration, discussion, and possible award of the lowest responsible bid to Crossland Heavy Contractors, Inc., and approval of and authorization to execute a construction contract for Lynn Lane Wastewater Treatment Plant Headworks Improvements (Project No. 165420 and 165423)

Director of Engineering and Construction Alex Mills reported the Digester Rehabilitation was underway, and the above project was the second and larger project being undertaken in an effort to update the Lynn Lane Wastewater Treatment Plant. He stated HDR Engineering was retained by BAMA to create the design including a new Headworks Facility. He stated the project was advertised for bids on August 2nd and August 9th, and opened on September 12th. He stated two bids were received, both compliant and responsive (bid tabulation attached). He reported the bids submitted were comprised of a base bid and an Additive Alternate for cleaning associated with the project. He noted Crossland Heavy Contractors had the low bid with a base bid of \$9,665,220.00 and an Additive Alternate A bid of \$117,000.00 for a total bid of \$9,772,220.00. He explained this was well below the engineer's estimate of \$11,624,060.00, and award was recommended for Crossland Heavy Contractors. He stated, with approval of the award, mobilization between now and the end of the year was anticipated with an estimated 18 months construction time. He asked if there were questions.

Trustee Mike Lester asked what the difference was between the bidders. Mr. Mills reported the higher bid was at budget at \$11,379,000.00. Trustee Johnnie Parks asked what bond was intended for funding of this project. Mr. Mills responded funding was via a loan from the Oklahoma Water Resource Board. Vice Chair Eudey asked if this would help address the current odor issues. Mr. Mills responded it should significantly reduce the odor problem. There were no other questions.

MOTION: A motion was made by Debra Wimpee, seconded by Johnnie Parks.

Move to award of the lowest responsible bid to Crossland Heavy Contractors, Inc., and approval of and authorization to execute a construction contract for Lynn Lane Wastewater Treatment Plant Headworks Improvements (Project No. 165420 and 165423)

The motion carried by the following vote:

Aye: 4 - Debra Wimpee, Johnnie Parks, Mike Lester, Scott Eudey

7. Executive Session

There was no Executive Session.

8. Adjournment

The meeting adjourned at approximately 7:31 p.m.

MOTION: A motion was made by Johnnie Parks, seconded by Debra Wimpee.

Move to adjourn

The motion carried by the following vote:

Aye: 4 - Debra Wimpee, Johnnie Parks, Mike Lester, Scott Eudey

Attest:

Chairman

Secretary



City of Broken Arrow

Fact Sheet

File #: 17-2788, Version: 1

**Broken Arrow Municipal Authority
Meeting of: 10-17-2017**

**To: Chairman and Authority Members
From: Utilities Department**

Title: Acceptance of the new five year Oklahoma Pollution Discharge Eliminations System (OPDES) permit as issued by the Oklahoma Department of Environmental Quality for the City of Broken Arrow, Lynn Lane Wastewater Treatment Plant

Background:

The Broken Arrow Municipal Authority owns and operates the Lynn Lane WWTP under an existing five year permit No. OK 0040053 issued by ODEQ. The permit is renewed every five years. The current permit expired on February 28, 2017.

Staff had submitted a permit renewal application to ODEQ on August 23, 2016. Staff had worked closely with ODEQ Municipal Discharge Permitting staff during the application review process. A draft permit was issued on August 1, 2017 and ODEQ requested the publication of the draft permit be made available for public comments. The draft permit received no comments.

The new five year OPDES permit issued on October 1, 2017 shall expire on September 30, 2022. The new permit has additional requirements:

1. Year round disinfection of the treated effluent discharged. The previous permit required only seasonal disinfection (May-September).
2. More stringent monitoring, testing and reporting requirements for the Category 3 treated effluent supplied to the Indian Springs Country Club for irrigation of the golf course.

The Indian Springs Country Club is given two years from the issuance date of September 28, 2017 to make necessary improvements to receive, store, test and use Category 3 reclaimed water. Should the golf course fail to comply with the disinfection and testing of the reclaimed water within the two year period, an engineering report shall be submitted by ISCC to ODEQ within nine months of the permit issuance date outlining the proposed improvements to be made.

Plant staff will work closely with Indian Springs Country Club staff to ensure effluent extracted from the Lynn Lane WWTP and reused for irrigation complies with the new OPDES permit requirements.

Cost: \$0

Prepared By: Anthony Daniel, Utilities Director

Reviewed By: Assistant City Manager-Operations

Legal Department

Approved By: Michael L. Spurgeon, City Manager

Attachments: New five year OPDES permit No. OK 0040053

Recommendation:

Acknowledge acceptance of the new five year OPDES permit as issued by the ODEQ for the City of Broken Arrow Lynn Lane WWTP



SCOTT A. THOMPSON
Executive Director

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

MARY FALLIN
Governor

September 28, 2017

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Craig W. Thurmond, Mayor
City of Broken Arrow
P.O. Box 610
Broken Arrow, OK 74013

Re: DEQ Application for Renewal, Permit to Discharge OPDES Permit No. OK0040053
City of Broken Arrow, Lynn Lane Wastewater Treatment Plant, Tulsa County, Oklahoma
Facility ID No. S20409

Dear Mayor Thurmond:

Your new OPDES permit is enclosed. All public notice requirements have been met and public comment periods have expired. The draft permit received no comments; therefore, the final permit has not been changed. The effective and expiration dates of this final permit appear on the cover page.

On October 22, 2015, the EPA published the “National Pollutant Discharge Eliminations System (NPDES) Electronic Reporting” final rule, with an effective date of December 21, 2015, which requires the electronic reporting and sharing of Clean Water Act National Pollutant Discharge Elimination System (NPDES) program information. Under the final rule, NPDES-regulated entities are required to submit NPDES program data to the designated initial recipient, as defined in 40 CFR 127.2(b). For this rule, the term “initial recipient” means the governmental entity, either the state or EPA, who first receives the electronic NPDES program data listed in Appendix A to 40 CFR part 127.

DEQ has developed or is developing electronic systems so that NPDES-regulated entities can submit the required electronic DMRs and other reports to DEQ as the initial recipient. Please see Part I, Section D and III.B.5 of your permit for electronic reporting requirements. Instructions on how to access and use the appropriate electronic reporting tool can be found on DEQ’s website at <http://www.deq.state.ok.us/wqdnew/ereporting/index.html>. Assistance is also available by contacting DEQ at (405) 702-8100 or email deqreporting@deq.ok.gov.

Should you have any questions regarding the final permit, please contact the Municipal Permits Section at the letterhead address or telephone (405) 702-8100. Should you have any questions regarding compliance with the conditions of this permit, please contact the Municipal Wastewater Enforcement Section at the same address and phone number.

Sincerely,

Micheal Jordan, P.E., Manager
Municipal Discharge and Stormwater Permit Section
Water Quality Division

KP/tj CG/ST/BB/TA

Enclosures

c: Anthony C. Daniel, Director of Utilities
Evelyn Rosborough, EPA Region 6 (6WQ-CA) w/permit

707 NORTH ROBINSON, P.O. BOX 1677, OKLAHOMA CITY, OKLAHOMA 73101-1677

printed on recycled paper with soy ink



**AUTHORIZATION TO DISCHARGE UNDER THE
OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM**

PERMIT NUMBER: OK0040053

ID NUMBER: S20409

PART I

In compliance with the Oklahoma Pollutant Discharge Elimination System Act (OPDES Act), Title 27A O.S. § 2-6-201 *et seq.*, and the rules of the State of Oklahoma Department of Environmental Quality (DEQ) adopted thereunder {See OAC 252:606}; the Federal Clean Water Act, Public Law 95-217 (33 U.S.C. 1251 *et seq.*), Section 402; and NPDES Regulations (40 CFR Parts 122, 124, and 403),

City of Broken Arrow – Lynn Lane Wastewater Treatment Plant
P.O. Box 610
Broken Arrow, OK 74013

is hereby authorized to discharge treated wastewater from a facility located at approximately

SE¼, SE¼ of Section 11, Township 17 North, Range 14 East, Indian Meridian
Tulsa County, Oklahoma
or at 13874 S. 177th East Ave, Broken Arrow, OK 74013

to receiving water: the Arkansas River at the point located at approximately

Latitude: 35° 57' 40.756" N [GPS: NAD 1983 CONUS]
Longitude: 95° 46' 55.079" W [GPS: NAD 1983 CONUS]

Planning Segment No. 120410 (Water Body I.D. No. 120410010080_10)

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, III, and IV hereof.

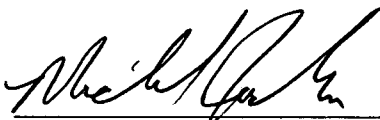
This permit replaces and supersedes the previous permit issued on February 1, 2012.

The issuance date of this permit is September 28, 2017.

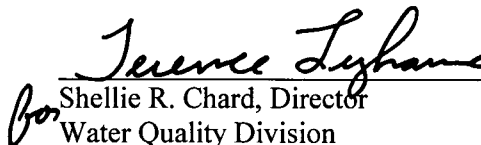
This permit shall become effective October 1, 2017.

This permit and authorization to discharge shall expire at midnight September 30, 2022.

For the Oklahoma Department of Environmental Quality:



Micheal Jordan, P.E., Manager
Municipal Discharge and Stormwater Permit Section
Water Quality Division



Shellie R. Chard, Director
Water Quality Division

A. Effluent Limitations and Monitoring Requirements (Outfall 001)

Beginning the effective date of the permit through the expiration date of the permit, the permittee is authorized to discharge treated wastewater in accordance with the following limitations:

| Effluent Characteristic | | Discharge Limitations | | | | Monitoring Requirements | |
|--|------------|------------------------|--|-------------|------------|-------------------------|-------------------|
| | | Mass Loading (lbs/day) | Concentrations (mg/l unless otherwise specified) | | | Frequency | Sample Type |
| | | Monthly Avg. | Monthly Avg. | Weekly Avg. | Daily Max. | | |
| Flow (mgd) [STORET: 50050] | Year round | --- | Report | --- | Report | Daily | Totalized |
| Biochemical Oxygen Demand -5 Day (BOD₅) [STORET: 00310] | Year round | 2001.6 | 30 | 45 | --- | 5/week | 12-hour composite |
| Total Suspended Solids [STORET: 00530] | Year round | 2001.6 | 30 | 45 | --- | 5/week | 12-hour composite |
| Total Dissolved Solids [STORET: 70300] | Year round | 77,929 | 1168 | --- | 1168 | 1/month | 12-hour composite |
| Mercury, total (µg/l) [STORET: 71900] | Year round | 0.0635 | 0.952 | --- | 1.90 | 1/month | 12-hour composite |
| E. coli (MPN/100 ml) [STORET: 51040] | May – Sep | --- | 126 ^a | --- | 406 | 2/week | Grab |
| | Oct - Apr | --- | 630 ^a | --- | 2030 | 1/week | Grab |
| Total Residual Chlorine (TRC)^b [STORET: 50060] | Year round | --- | Instantaneous Maximum: No Measurable ^c | | | Daily | Grab |
| pH (standard unit) [STORET: 00400] | Year round | --- | 6.5 – 9.0 | | | Daily | Grab |

^a Monthly data for E. coli is reported as geometric mean of all samples in that month.

^b If no chlorine is used for an entire reporting period, the permittee shall report a value of “zero” for the daily maximum and enter “No chlorine used this reporting period” in the comments section on the DMR for that reporting period in lieu of the indicated testing. For any week in which chlorine is used, the indicated testing shall be done until the chlorine is no longer in use and at least one subsequent test verifies that the effluent meets the total residual chlorine limit.

^c No measurable is defined as less than 0.1 mg/l.

Other Year Round Requirements:

- There shall be no discharge of floating solids or visible foam in other than trace amounts.
- There shall be no discharge of a visible sheen of oil or globules of oil or grease on or in the water. Oil and grease shall not be present in quantities that adhere to stream banks and coat bottoms of water courses or which cause deleterious effects to the biota.
- All monitoring and reporting requirements shall also be in compliance with Part III of this permit.

Sampling Location: Samples taken in compliance with permit limits and monitoring requirements specified above shall be taken at Outfall 001 located in the NE¼, SE¼, SE¼ of Section 11, Township 17 North, Range 14 East, I.M., Tulsa County, Oklahoma.

B. Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfall TX1)

During the period beginning the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from Outfall TX1 (functionally identical to Outfall 001). Such discharges shall be limited and monitored by the permittee as specified below.

The permittee is encouraged to perform required biomonitoring activities as early in the reporting period as is practical to ensure sufficient time remains in the reporting period should retests/repeat tests be necessary.

All laboratory analyses for the biomonitoring parameters specified in this permit must be performed by a laboratory certified by the Oklahoma Department of Environmental Quality for those parameters.

1. Fathead Minnow (*Pimephales promelas* [*P. promelas*])**Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfall TX1)**

| Effluent Characteristic | | | Reporting/Monitoring Requirements ^a | | |
|--|--------------------------------|--|--|--------------------------------|-------------|
| Test | Critical Dilution ^c | Parameter | 48-hour Min | Testing Frequency ^b | Sample Type |
| <i>Pimephales promelas</i> (fathead minnow), 48-hour acute LC ₅₀ static renewal, freshwater | 100% | Pass/Fail Survival [TIM6C] | Report | 1/quarter | 24-hr comp |
| | | LC ₅₀ Effluent Conc [TAM6C] | Report | | |
| | | % Mortality at 100% Effluent [TJM6C] | Report | | |

^a See Part II, Section E, Whole Effluent Toxicity Limit, for additional monitoring and reporting conditions.

^b A valid WET test shall be reported for each reporting period.

^c All acute WET testing shall use the dilution series specified in Part II, Section E, Item 1.

P. promelas whole effluent toxicity reporting and monitoring requirements apply beginning December 1, 2017, and the first reporting period is December 1, 2017 to February 28, 2018.

Whole Effluent Toxicity Limit and Monitoring Requirements (Outfall TX1)

| Effluent Characteristic | Reporting/Monitoring Requirements ^a | | |
|--|--|------------------------|-------------|
| | 48-hour Min | Testing Frequency | Sample Type |
| Whole Effluent Toxicity Limit (fatheads only) [STORET 22414] | >100% | 1/quarter ^b | 24-hr comp |

^a See Part II, Section F, Whole Effluent Toxicity Limit, for additional monitoring and reporting conditions.

^b Results of retests conducted pursuant to prior test failure shall not be substituted on DMRs in lieu of routine test results (see Part II, Section E, Item 2.a).

Whole effluent toxicity reporting and monitoring requirements apply beginning the effective date of the permit.

Compliance with the Whole Effluent Toxicity Limit is required beginning the effective date of the permit.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section E, Item 4.

Whole effluent toxicity concurrent testing provision: Concurrent analysis of ammonia and pH is required on all effluent samples, including static renewals, collected for fathead minnow WET testing or retesting. Reporting of results shall be in accordance with the following requirements:

Concurrent Effluent Testing for Acute WET Tests – Reporting Requirements (Outfall TX1)

| Effluent Characteristic | Concentration | | | Monitoring Requirements | |
|---|---------------|--------------|-----------|-------------------------|---|
| | Daily Min. | Monthly Avg. | Daily Max | Monitoring Frequency | Sample Type |
| Ammonia, (NH ₃ -N) (mg/l) ^{a,b} [STORET 00610] | Report | Report | Report | 1/quarter | 24 hr comp ^b |
| pH (std units) ^{a,b} [STORET 00400] | Report | N/A | Report | 1/quarter | Measured in each composite effluent sample, including static renewals, just prior to first use ^b |

^a Report only those effluent samples collected for WET testing of the Fathead minnow species. Samples collected for WET testing purposes, including static renewals, shall be of sufficient volume to allow for the required concurrent analyses in addition to the WET testing itself. Samples sent directly to WET testing laboratories shall not undergo any preservation other than refrigeration to maintain a temperature at or below 6°C but not frozen prior to arrival and processing at the WET testing laboratory.

^b Two sets of samples for concurrent analyses are required for ammonia and pH:

Concurrent ammonia analyses must be performed on composite samples that are properly preserved and delivered directly to a State certified analytical laboratory. These results shall be included in the results for Outfall 001.

A second concurrent analysis is required for the sample that is sent to the WET testing laboratory and for the table above. Just prior to first use of each composite sample for WET testing purposes, the biomonitoring laboratory shall take an adequately-sized portion of each composite sample, acidify it in accordance with preservation requirements in 40 CFR 136, and have it analyzed for ammonia (NH₃-N) at a state certified laboratory. The pH measurement required for the above table must be taken just prior to the acidification step. These pH and ammonia readings should NOT be included in the results for Outfall 001.

Sampling location: Samples taken in compliance with the monitoring requirements specified above for Outfall TX1 shall be taken at the same location as for Outfall 001.

2. *Daphnia Pulex* (*D. pulex*)**Whole Effluent Toxicity Reporting and Monitoring Requirements for *Daphnia Pulex* (Outfall TX1)**

| Effluent Characteristic | | | | Reporting/Monitoring Requirements ^a | | |
|-------------------------|--|--------------------------------|--|--|--------------------------------|-------------|
| Test | | Critical Dilution ^d | Parameter | 48-hour Min | Testing Frequency ^f | Sample Type |
| Routine Testing | Daphnia pulex, 48-hour acute LC ₅₀ static renewal, freshwater | 100% | Pass/Fail Survival [TIM3D] | Report | 1/quarter ^e | 24-hr comp |
| | | | LC ₅₀ Effluent Conc [TAM3D] | Report | | |
| | | | % Mortality at 100% Effluent [TJM3D] | Report | | |
| Retesting | Retest #1 [22415] ^b | | | Report | As required ^c | 24-hr comp |
| | Retest #2 [22416] ^b | | | Report | | |

^a See Part II, Section F, Whole Effluent Toxicity Testing, for additional monitoring and reporting conditions.

^b Applies to daphnids according to results of test failure triggering monthly retests.

^c Monthly retesting required only if routine test for reporting period fails. Fill out ONLY these two retest parameters on retest DMRs, do not change the original results, and put the current submission date in the lower right hand corner of the DMR.

^d All acute tests shall use the dilution series specified in Part II, Section F, Item 1.

^e Results of retests conducted pursuant to prior test failure shall not be substituted on DMRs in lieu of routine test results (see Part II, Section F, Item 2.a).

^f See provision for monitoring frequency reduction after the first year (Part II, Section F, Item 5).

D. pulex whole effluent toxicity reporting and monitoring requirements apply beginning December 1, 2017, and the first reporting period is December 1, 2017 to February 28, 2018.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section F, Item 4.

Sampling location: Samples taken in compliance with the monitoring requirements specified above for Outfall TX1 shall be taken at the same location as for Outfall 001.

C. Sanitary Sewer Overflows

Any bypass in the collection system [sanitary sewer overflow (SSO)] shall be reported in accordance with Permit Part III.B.6.

D. Reporting of Monitoring Results

Monitoring results shall be reported in accordance with the provisions of Part III.B.5 of the permit. Monitoring results obtained during the previous month shall be summarized and electronically reported on an electronic Discharge Monitoring Report (eDMR) form due to the Oklahoma Department of Environmental Quality, Water Quality Division, Wastewater Compliance Tracking Section no later than the 15th day of the month following the completed monthly test. If no discharge occurs during the reporting period, an eDMR form stating "No Discharge" shall be electronically submitted according to the above schedule. Instructions on how to register as a Preparer or Signatory for eDMRs, as well as how to prepare and submit eDMRs, can be found on DEQ's website at <http://www.deq.state.ok.us/wqdnew/ereporting/index.html>. Assistance is also available by contacting DEQ at (405) 702-8100 or deqreporting@deq.ok.gov.

The first report is due on November 15, 2017.

E. Category 3 Reclaimed Water

1. Authorized Land Application Site for Category 3 Reclaimed Water

| Site ID | Legal Description | Method of Irrigation | Total Area (Acres) | Irrigated Area (Acres) |
|---------|--|----------------------|--------------------|------------------------|
| LA1 | N½ of Section 10, N½ of Section 11, and N½, SE¼ of Section 11, Township 17N, Range 14E, I.M., Tulsa County | Sprinkler | 230 | 200 |

2. Limits and Monitoring Requirements

The Monthly Operation Reports (MORs) for the site listed above for the following parameters shall be maintained by the supplier at the Lynn Lane Wastewater Treatment Plant, retained for three (3) years, and made available to the DEQ upon request.

Beginning the effective date and lasting through the expiration date of the permit, the City of Broken Arrow – Lynn Lane Wastewater Treatment Plant (the supplier) is authorized to supply Category 3 reclaimed water, treated wastewater from the chlorine contact basin located at the facility, for irrigation at the golf course owned and operated by ISCC Managing Group, LLC dba Indian Springs Country Club (the user), in accordance with OAC 252:656 and OAC 252:627, and the following limitations:

| Parameter | Limits and Monitoring Requirement ^a | Measurement Frequency | Sample Type | Monitoring Location |
|-----------------------|---|-----------------------|-------------------|---|
| Flow | Record (mgd) | Daily ^b | Totalized | Flow meters at irrigation site ^c |
| E. coli | Monthly geometric mean < 126 MPN/100 ml Single sample maximum < 406 MPN/100 ml | 3/week | Grab | Chlorine contact basin |
| Chlorine Disinfection | Free available chlorine ≥ 0.20 mg/l, or Combined chlorine residual ≥ 0.50 mg/l | Every 12 hours | Grab | Chlorine contact basin |
| BOD ₅ | < 20 mg/l | 1/week ^d | 12-hour composite | Chlorine contact basin |

^a When there is no supply of reclaimed water for the entire day, report "0" for the flow in the MOR and write "No Supply" in the comments column.

^b In accordance with OAC 252:656-25-2(h), flow measurement shall be accomplished by flow meters, or the calibration of pumps and installation of run-time meters.

^c The readings of flow meters at the irrigation site communicated by the user to the supplier.

^d Results of samples taken from the discharge may be used to comply with the requirement.

3. Additional Disinfection Requirements for Reclaimed Water Stored in Ponds at the Golf Course

Beginning two (2) years from the effective date and lasting through the expiration date of the permit, the permittee must demonstrate the following disinfection requirements are met for the reclaimed water pumped out of the storage ponds for irrigation at Site LA1.

| Parameter | Limits | Measurement Frequency | Monitoring Location |
|-----------------------|---|-----------------------|---------------------|
| Chlorine Disinfection | Free available chlorine ≥ 0.20 mg/l, or Combined chlorine residual ≥ 0.50 mg/l | Every 12 hours | Storage ponds |

4. Restrictions for Category 3 Reclaimed Water

In accordance with OAC 252:627-3-3(b), the City of Broken Arrow - Lynn Lane WWTP, as the supplier, shall ensure that Category 3 reclaimed water is not used:

- a. from any cell that receives raw sewage;
- b. on public use areas that have a high potential for skin to ground contact (e.g., football fields, sports complexes, and playgrounds);
- c. on golf courses unless irrigation takes place when the public is not allowed to access the sites;
- d. on any food crop that may be consumed raw;
- e. for spray irrigation on orchards or vineyards;
- f. at rates that allow a discharge from the permitted irrigation site;
- g. within one hundred feet (100') of the permitted boundary site;
- h. at a rate that exceeds the nitrogen and phosphorus rates for the crop at the site;
- i. at a rate that results in phytotoxicity;
- j. during periods of precipitation or while the soil is saturated or frozen;
- k. on land having a slope greater than five percent (5%);
- l. where there are berms or other barriers that would cause the pooling or ponding of reclaimed water at the site, nor shall any berms or barriers impede the natural flow of stormwater from the site;
- m. on public use areas during times of use; and
- n. on sod farms unless a period of thirty (30) days has elapsed between the last application of Category 3 reclaimed water and harvesting of sod.

5. Compliance Schedule for Disinfection of Reclaimed Water Stored in Ponds at the Golf Course

The permittee shall achieve compliance with the disinfection requirements for reclaimed water stored in pond(s) located at the golf course in accordance with the following schedule:

| Task | Due Date |
|--|---|
| a. Evaluate water reuse system operation and option(s) to meet disinfection required for reclaimed water being stored in pond. | Six (6) months from the effective date of the permit. |
| b. Submit an evaluation report and monitoring data to the DEQ to show whether disinfection requirements are met. | Nine (9) months from the effective date of the permit. |
| c. If the evaluation report shows potential non-compliance with the disinfection requirements that will become effective two (2) years after the effective date of the permit, the permittee shall submit to the DEQ an engineering report providing plan(s) and timetable to achieve compliance with disinfection requirements. | Twelve (12) months from the effective date of the permit. |
| d. The permittee shall complete necessary modification to the water reuse system. | Eighteen (18) months from the effective date of the permit. |
| e. The permittee shall achieve compliance with the disinfection requirements for the reclaimed water pumped out of the storage ponds for irrigation. | Two (2) years from the effective date of the permit. |

PART II - OTHER PERMIT REQUIREMENTS**A. CONTRIBUTING INDUSTRIES AND PRETREATMENT REQUIREMENTS**

1. The The permittee shall operate an industrial pretreatment program in accordance with Section 402(b)(8) of the Clean Water Act, the General Pretreatment Regulations (40 CFR Part 403) and the provisions of the subsequently approved industrial pretreatment program submitted by the permittee. A Publicly Owned Treatment Works (POTW) facility is defined in 40 CFR 403.3(o) as any devices and systems used in storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature. It includes sewers, pipes and other conveyances if they convey wastewater to a POTW. The term also means a municipality as defined in the Act, which has jurisdiction over the Indirect Discharges to and from such treatment works. The POTW pretreatment program was approved on September 24, 1993, November 1, 2001, and July 16, 2014, to incorporate the latest 40 CFR Part 403 regulations adopted by DEQ effective June 15, 2007. Any non-substantial modifications [as defined under 40 CFR 403.18(b)] to the POTW pretreatment program received and implemented in accordance with 40 CFR 403.18(d) shall be considered incorporated as of the date of approval by DEQ. The current POTW pretreatment program is hereby incorporated by reference and shall be implemented in a manner consistent with the following requirements:
 - a. Industrial user information shall be updated at a frequency adequate to ensure that all industrial users are properly characterized at all times;
 - b. The frequency and nature of industrial user compliance monitoring activities by the permittee shall be commensurate with the character, consistency and volume of waste. However, in keeping with the requirements of 40 CFR 403.8(f)(2)(v), the permittee must inspect and sample the effluent from each Significant Industrial User at least once a year. This is in addition to any industrial self-monitoring activities;
 - c. The permittee shall enforce and obtain remedies for noncompliance by any industrial users with applicable pretreatment standards and requirements;
 - d. The permittee shall control through permit, order, or similar means, the contribution to the POTW by each Industrial User to ensure compliance with applicable Pretreatment Standards and requirements. In the case of Industrial Users identified as significant under 40 CFR 403.3(t), this control shall be achieved through permits or equivalent individual control mechanisms issued to each such user. Such control mechanisms must be enforceable and contain, at a minimum, the following conditions:
 - (1) Statement of duration (in no case more than five years);
 - (2) Statement of non-transferability without, at a minimum, prior notification to the POTW and provision of a copy of the existing control mechanism to the new owner or operator;
 - (3) Effluent limits based on applicable general pretreatment standards, categorical pretreatment standards, local limits, and State and local law;
 - (4) Self-monitoring, sampling, reporting, notification and record keeping requirements, including an identification of the pollutants to be monitored, sampling location, sampling frequency, and sample type, based on the applicable general pretreatment standards in 40 CFR 403, categorical pretreatment standards, local limits, and State and local law; and
 - (5) Statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements and any applicable compliance schedule. Such schedules may not extend the

compliance date beyond federal deadlines

- e. The permittee shall evaluate, at least once every two years, whether each Significant Industrial User needs a plan to control slug discharges. If the POTW decides that a slug control plan is needed, the plan shall contain at least the minimum elements required in 40 CFR 403.8(f)(2)(v);
 - f. The permittee shall provide adequate staff, equipment, and support capabilities to carry out all elements of the pretreatment program; and
 - g. The approved program shall not be modified by the permittee without the prior approval of the DEQ.
2. The permittee shall continue to enforce specific limits to implement the provisions of 40 CFR Parts 403.5(a) and (b), as required by 40 CFR Part 403.5(c). Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

The permittee shall, within sixty days of the effective date of this permit, (1) submit a **WRITTEN CERTIFICATION** that a technical evaluation has been performed demonstrating that the existing technically based local limits (TBLL) are based on the current state water quality standards and are adequate to prevent pass through of pollutants, inhibition of or interference with the treatment facility, worker health and safety problems, and sludge contamination, **OR** (2) submit a **WRITTEN NOTIFICATION** that a technical evaluation revising the current TBLL and a draft sewer use ordinance which incorporates such revisions will be submitted within 12 months of the effective date of this permit.

All specific prohibitions or limits developed under this requirement are deemed to be conditions of this permit. The specific prohibitions set out in 40 CFR Part 403.5(b) shall be enforced by the permittee unless modified under this provision.

3. The permittee shall analyze the treatment facility influent and effluent for the presence of the toxic pollutants listed in 40 CFR 122 Appendix D (NPDES Application Testing Requirements) Table II at least once per year and the toxic pollutants in Table III at least once per quarter (once every three months). If, based upon information available to the permittee there is reason to suspect the presence of any toxic or hazardous pollutant listed in Table V, or any other pollutant, known or suspected to adversely affect treatment plant operation, receiving water quality, or solids disposal procedures, analysis for those pollutants shall be performed at least once per quarter (once every three months) on both the influent and the effluent.

The influent and effluent samples collected shall be composite samples consisting of at least 12 aliquots collected at approximately equal intervals over a representative 24 hour period and composite according to flow. Sampling and analytical procedures shall be in accordance with guidelines established in 40 CFR 136. The effluent samples shall be analyzed to a level as required in item 6 below. Where composite samples are inappropriate, due to sampling, holding time, or analytical constraints, at least 4 grab samples, taken at equal intervals over a representative 24 hour period, shall be taken.

4. The permittee shall prepare annually a list of Industrial Users which during the preceding twelve months were in significant noncompliance with applicable pretreatment requirements. For the purposes of this Part, significant noncompliance shall be determined based upon the more stringent of either criteria established at 40 CFR Part 403.8(f) (2) (vii) [rev. 7/24/90] or criteria established in the approved POTW pretreatment program. This list is to be published annually in the largest daily newspaper in the municipality during the month of **October**.

In addition, during the **month of October** the permittee shall submit an updated status report to DEQ

containing the following information:

- a. An updated list of all significant industrial users. For each industrial user listed the following information shall be included:
 - (1) Standard Industrial Classification (SIC) code and categorical determination;
 - (2) Control document status. Whether the user has an effective control document, and the date such document was last issued, reissued, or modified, (indicate which industrial users were added to the system (or newly identified) within the previous 12 months);
 - (3) A summary of all monitoring activities performed within the previous 12 months. The following information shall be reported:
 - (a) total number of inspections performed;
 - (b) total number of sampling visits made;
 - (4) Status of compliance with both effluent limitations and reporting requirements. Compliance status shall be defined as follows:
 - (a) Compliant (C) - no violations during the previous 12 month period;
 - (b) Non-compliant (NC) - one or more violations during the previous 12 months but does not meet the criteria for significantly non-compliant industrial users;
 - (c) Significant Noncompliance (SN) - in accordance with requirements described in d. above; and
 - (5) For significantly noncompliant industrial users, indicate the nature of the violations, the type and number of actions taken (notice of violation, administrative order, criminal or civil suit, fines or penalties collected, etc.) and current compliance status. If ANY industrial user was on a schedule to attain compliance with effluent limits, indicate the date the schedule was issued and the date compliance is to be attained;
 - b. A list of all significant industrial users whose authorization to discharge was terminated or revoked during the preceding 12 month period and the reason for termination;
 - c. A report on any interference, pass through, upset or POTW permit violations known or suspected to be caused by industrial contributors and actions taken by the permittee in response;
 - d. The results of all influent and effluent analyses performed pursuant to permit Part II.A.3 above;
 - e. A copy of the newspaper publication of the significantly non-compliant industrial users giving the name of the newspaper and the date published;
 - f. The monthly average water quality based effluent concentration necessary to meet the state water quality standards as developed in the approved technically based local limits.
5. The permittee shall provide adequate notice of the following:
- (1) Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to Sections 301 and 306 of the CWA and/or Sections 40 CFR 405-499 if it were directly discharging those pollutants; and
 - (2) Any substantial change in-the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the

permit.

Adequate notice shall include information on (i) the quality and quantity of effluent to be introduced into the treatment works, and (ii) any anticipated impact of the change on the quality or quantity of effluent to be discharged from the POTW.

6. All effluent monitoring conducted in accordance with permit Part II.A.3 above shall meet the Minimum Quantification Levels (MQLs) shown in the tables on pages 18 through 21.

B. REOPENER CLAUSE

This permit may be reopened for modification or revocation and reissuance to require additional monitoring and/or effluent limitations where actual or potential exceedances of State water quality criteria are determined to be the result of the permittee's discharge to the receiving water(s), or a revised Total Maximum Daily Load is established for the receiving water(s), or when required as technology. Modification or revocation and reissuance of the permit shall follow regulations listed at 40 CFR 124.5.

C. BIOSOLIDS/SEWAGE SLUDGE REQUIREMENTS

Biosolids/sewage sludge disposal practices shall comply with the Federal regulations for landfills, biosolids/sewage sludge, and solid waste disposal established at 40 CFR Part 257, 503, and the DEQ rules governing Sludge Management (OAC 252:515 and OAC 252:606) as applicable.

The sludge disposal shall also comply with the requirements of the amended Sludge Disposition Plan approved by the Department of Environmental Quality on February 17, 2017 that allows the permittee to landfill biosolids/sewage sludge either at the American Environmental Landfill (Landfill Permit No.3007521) located in part of Section 36, Township 20 North, Range 10 East, I.M., Osage County, Oklahoma, or at the Waste Management Quarry Landfill (Landfill Permit No. 3551020) located in the E½, NE¼ of Section 6, Township 14 North, Range 18 East, I.M., Muskogee County, Oklahoma.

The permittee is required to maintain all records relevant to sewage biosolids/sewage sludge disposal for the life of the permit. These records shall be made available to the ODEQ upon request.

The permittee shall give 120 days prior notice to DEQ of any change planned in the biosolids/sewage sludge disposal practice.

D. POLLUTION PREVENTION REQUIREMENTS

1. The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing program) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:
 - a. The influent loadings, flow and design capacity;
 - b. The effluent quality and plant performance;
 - c. The age and expected life of the wastewater treatment facility's equipment;
 - d. Bypasses and overflows of the tributary sewerage system and treatment works;
 - e. New developments at the facility;
 - f. Operator certification and training plans and status;
 - g. The financial status of the facility;
 - h. Preventative maintenance programs and equipment conditions; and
 - i. An overall evaluation of conditions at the facility.
2. The permittee shall prepare the following information on the biosolids/sewage sludge generated by the facility:

- a. An annual quantitative tabulation of the ultimate disposition of all biosolids/sewage sludge (including, but not limited to, the amount beneficially reused, landfilled, and incinerated).
- b. An assessment of technological processes and an economic analysis evaluating the potential for beneficial reuse of all biosolids/sewage sludge not currently beneficially reused including a listing of any steps which would be required to achieve the biosolids/sewage sludge quality necessary to beneficially reuse the biosolids/sewage sludge.
- c. A description of, including the expected results and the anticipated timing for, all projects in process, in planning and/or being considered which are directed towards additional beneficial reuse of biosolids/sewage sludge.
- d. An analysis of one composite sample of the biosolids/sewage sludge collected prior to ultimate reuse or disposal shall be performed for the pollutants listed in Part IV, Element 1, Section III, Table 3 of the permit.
- e. A listing of the specific steps (controls/changes) which would be necessary to achieve and sustain the quality of the biosolids/sewage sludge so that the pollutant concentrations in the biosolids/sewage sludge fall below the pollutant concentration criteria listed in Part IV, Element 1, Section III, Table 3 of the permit.
- f. A listing of, and the anticipated timing for, all projects in process, in planning, and/or being considered which are directed towards meeting the biosolids/sewage sludge quality referenced in (e) above.

The permittee shall certify in writing, within three years of the effective date of the permit, that all pertinent information is available. This certification shall be submitted to:

Oklahoma Department of Environmental Quality
Water Quality Division
Municipal Permits Section
P. O. Box 1677
707 North Robinson Street
Oklahoma City, Oklahoma 73101-1677

E. WHOLE EFFLUENT TOXICITY TESTING – *Pimephales promelas* (Fathead Minnow)

1. Scope and Methodology

- a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section, which apply individually and separately to the outfalls listed below. No samples or portions of samples from one outfall may be composited with samples or portions of samples from another outfall. The permittee shall biomonitor for *Pimephales promelas* in accordance with the WET testing frequencies prescribed in Part I. Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

The permittee is encouraged to perform required biomonitoring activities as early in the reporting period as is practical to ensure sufficient time remains in the reporting period should retests/repeat tests be necessary.

All laboratory analyses for the biomonitoring parameters specified in this permit must be performed by a laboratory certified by the Oklahoma Department of Environmental Quality for those parameters.

Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

- Monthly: No less than 20 days and no more than 40 days.
- Quarterly: No less than 2 months and no more than 4 months.
- Semi-annually: No less than 4 months and no more than 8 months.

APPLICABLE TO OUTFALL(S): 001

REPORTED ON DMR AS OUTFALL(S): TX1

CRITICAL DILUTION: 100%

EFFLUENT DILUTION SERIES (ALL TESTS): 32%, 42%, 56%, 75%, 100%

SAMPLE TYPE: Defined at Part I

TEST SPECIES/METHODS: 40 CFR 136, except for changes required by EPA, Region 6.

Pimephales promelas (fathead minnow) acute static renewal 48-hour definitive toxicity test, Method 2000.0, EPA-821-R-02-012 (October 2002), or latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

- b. Acute test failure – Acute test failure (LC_{50} test) is defined as 50% or more lethality (toxicity) at 48 hours to test organisms at any effluent concentration. The 48-hour LC_{50} effluent value must be >100% to indicate a passing test. Any 48-hour LC_{50} effluent value of 100% or less (or equivalently, a survival value of less than 50.1% in any test dilution) will constitute a test failure.
- c. The conditions of this item are effective beginning with the effective date of the WET limit, as established in Part I of this permit. When a whole effluent toxicity test results in an LC_{50} value of 100% or less (i.e., greater than or equal to 50% lethality (toxicity) in any effluent dilution), the permittee shall be considered in violation of this permit, and the frequency of testing for that species will increase to monthly until such time as compliance with the LC_{50} whole effluent toxicity limit is demonstrated for that test species for a period of three (3) consecutive months, at which time the permittee may return to the testing frequency for each species stated in Part I of this permit. Testing conducted pursuant to this provision shall be reported in accordance with Item 3 of this section.
- d. Reopener clause – This permit may be reopened to require chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity. Accelerated or intensified testing may be required in accordance with Section 308 of the Clean Water Act.
- e. Upon becoming aware of the failure of any test, the permittee shall notify a DEQ Water Quality Division biomonitoring coordinator immediately, and in writing within 5 working days of the test failure with a summary of the results of and any other pertinent circumstances associated with the failed test.

2. Testing Requirements due to Acute Test Failure

Upon becoming aware of the failure of any test, the permittee shall notify DEQ Water Quality Division biomonitoring coordinator immediately, and in writing within 5 working days of the test failure with a summary of the results of and any other pertinent circumstances associated with the failed test.

Beginning with the effective date of the WET limit, as established in Part I of this permit, the following testing requirements due to acute test failure apply:

- a. When there is an acute test failure for either species during routine testing, at least three additional monthly tests for the affected species are required (Part II, Section F.1.c above). The additional tests shall be conducted monthly during subsequent consecutive months until there are three consecutive months of passing tests at which time the frequency of testing shall return to that stated in Part I of the permit.
- b. A full laboratory report for the failed routine test and all additional tests shall be provided and submitted to DEQ in accordance with procedure outlined in Item 3.
- c. If the permittee cannot pass three tests in a row within the next six months, DEQ will review the test results and may require a Toxicity Identification Evaluation (TIE) be done to determine the cause of the toxicity. If the TIE cannot detect the problem, another Toxicity Reduction Evaluation (TRE) may be required.

3. Required Toxicity Testing Conditions

- a. Test acceptance – The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:
 - (1) The toxicity test control (0% effluent) must have survival equal to or greater than 90%.
 - (2) The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for the Fathead minnow survival test.
 - (3) The percent coefficient of variation between replicates shall be 40% or less in the critical dilution unless significant toxic effects are demonstrated in that dilution for the Fathead minnow survival test.

If the above criteria or criteria listed in Item 1.a is not met the test will be considered invalid. Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40% for replicates tested at the critical dilution. A repeat test shall be conducted and the biomonitoring enforcement coordinator notified, within the reporting period of any test determined to be invalid.

- b. The permittee shall follow the requirements listed below in determining success or failure of a WET test:

The statistical analyses in the Fathead minnow survival test, used to determine the LC_{50} shall be in accordance with the methods described in EPA-821-R-02-012, or most recent update thereof.

- c. The permittee shall use dilution water that meets the following standards:
 - (1) Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness and alkalinity to the closest downstream perennial water where the toxicity test is conducted on an effluent discharge to a receiving stream classified as intermittent or to a receiving stream with no flow due to zero flow conditions.
 - (2) If the receiving water is unsatisfactory as a result of instream toxicity (fails to meet the test acceptance criteria in Item 3.a), the permittee must submit the test results exhibiting receiving

water toxicity with the full test report required in Item 4 below and may thereafter substitute synthetic dilution water for the receiving water in all subsequent tests, provided the unacceptable receiving water test met the following stipulations:

- (a) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;
 - (b) the test indicating receiving water toxicity was carried out to completion (i.e., 48 hours); and
 - (c) the synthetic dilution water had a pH, hardness and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.
- d. The permittee shall collect samples that are representative of their effluent by following the criteria listed below:
- (1) Unless grab sampling is specifically authorized in Part I of the permit, the permittee shall collect two flow-weighted 24-hour composite samples representative of the flows during normal operation from the outfall(s) listed at Item 1.a above. If grab sampling is authorized, all the requirements listed below for composite sampling also pertain to grab sampling. In such cases, collection of the grab sample is considered equivalent to collection of the last portion of a composite sample. Unless otherwise specified in Part I of the permit, a 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals representative of a 24-hour operating day and combined proportional to flow or a sample continuously collected proportional to flow over a 24-hour operating day.
 - (2) The first composite effluent sample shall be used to initiate each test. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 36 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to maintain a temperature at or below 6°C but not frozen during collection, shipping, and/or storage.
 - (3) The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.
 - (4) If it is anticipated that flow from the outfall being tested may cease prior to collection of the second effluent sample, the permittee must ensure that the first composite effluent sample is of sufficient volume to complete the required testing with daily renewal of effluent. The abbreviated effluent composite sample collection duration, the static renewal protocol associated with an abbreviated sample collection, and a summary of the circumstances justifying collection of an abbreviated sample must be adequately documented in the full test report required in Item 4 of this section. DEQ reserves the right to require a retest and/or consider the permittee in violation of this permit if the basis offered for justification of an abbreviated sample is insufficient, flawed, or in any way reflects an effort on the part of the permittee to avoid test failure by use of an abbreviated sample.

4. Reporting

- a. The permittee shall provide a full laboratory report of the results of all tests conducted pursuant to

this section in accordance with the Report Preparation Section of EPA-821-R-02-012 for every valid or invalid toxicity test initiated, whether carried to completion or not, including any test which is considered invalid, is terminated early for any reason, or which indicates receiving water toxicity. The permittee shall retain each full report pursuant to the records retention provisions of Part III of this permit. The permittee shall submit to DEQ full laboratory test reports for all tests initiated, regardless of whether the tests are carried to completion. The reports shall be postmarked or received no later than the 15th day of the month following completion of the test.

- b. A valid test for each species (excluding retests) must be reported on the DMR for each reporting period specified in Part I of this permit. DMRs must be postmarked or received by the 15th day of the month following completion of any test to DEQ. The full report for the test (see Item 3.a above) shall be submitted along with the DMR. If monthly retesting is required as a result of a WET limit permit violation, several copies of the blank DMR for the applicable reporting period shall be made in advance of completing and submitting the DMR so that the DMR copies may be used to report results of the required retests for that reporting period. If more than one valid test (excluding retests) is performed on a species during a reporting period, the permittee shall report the lowest survival test results as the 48-hour minimum for each species tested.
- c. If any test results in anomalous findings (i.e., it indicates an interrupted dose response across the dilution series), DEQ recommends that the permittee contact a DEQ biomonitoring coordinator for a technical review of the test results prior to submitting the full test report and DMR. A summary of all tests initiated during the reporting period, including invalid tests, repeat tests and retests, shall be attached to the reporting period DMR for DEQ review.

A test is a REPEAT test if it is performed as the result of a previously invalid test. A test is a RETEST if it is performed as the result of a previously failed test, the exception being where the test is the first (valid) test of a reporting period, in which case it is reported as such on the DMR for that period.

(1) The reporting period test summary attached to the DMR shall be organized as follows:

- (a) Invalid tests (basis for test invalidity must be described)
- (b) Valid tests (other than retests) initiated during current reporting period
- (c) Valid retests for tests failed during previous reporting period (if not submitted in the previous reporting period test summary)
- (d) Valid retests for tests failed during current reporting period.

(2) The following information shall be listed in the reporting period test summary for each valid test in categories (b) through (d) in Item 4.b(1) above:

- (a) Test species
- (b) Date of test initiation at laboratory
- (c) Results of all concurrent effluent analyses specified in Part I of this permit
- (d) All test result parameters for the test species specified in Item 4.c below.

- d. The permittee shall report the following results for all VALID routine toxicity tests (excluding retests) on the DMR(s) for that reporting period in accordance with Item 4.b above and Part III of this permit.

Pimephales promelas (Fathead Minnow)

- (1) Parameter TIM6C: If the Fathead minnow 48-hour LC_{50} for survival is equal to or less than 100%, report a "1"; otherwise, report a "0".
 - (2) Parameter TAM6C: Report the Fathead minnow 48-hour LC_{50} value for survival.
 - (3) Parameter TJM6C: Report the Fathead minnow 48-hour percent mortality in the 100% effluent concentration.
- e. The permittee shall report the results for all toxicity retests on the DMR(s) for the reporting period in which retesting is required postmarked or received no later than the 15th day of the month following completion of the retest. Results of all required retests shall be reported on a copy of the DMR for the reporting period (see Item 4.b above). The full laboratory report for the retest (see Item 4.a above) shall be submitted along with the retest DMR. Even if a retest cannot be conducted before the end of the reporting period for which it is required (due to test initiation interval requirements), the retest results shall still be reported for the reporting period in which retesting is required. Should retest failures necessitate the continuation of retesting into subsequent reporting periods, the results of the first test in any reporting period will be reported using the parameter STORET codes listed in Items 4.c above. If retesting is not required during a given reporting period, the permittee shall leave these DMR fields blank.
- f. Whole effluent toxicity limit – The permittee shall report the lowest LC_{50} for this species for the 7-day minimum under STORET No. 22414 on the DMR for the reporting period in accordance with Part III of this permit.

F. WHOLE EFFLUENT TOXICITY TESTING – *Daphnia pulex***1. Scope and Methodology**

- a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section, which apply individually and separately to the outfalls listed below. No samples or portions of samples from one outfall may be composited with samples or portions of samples from another outfall. The permittee shall biomonitor for *Daphnia pulex* in accordance with the WET testing frequencies prescribed in Part I. Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

The permittee is encouraged to perform required biomonitoring activities as early in the reporting period as is practical to ensure sufficient time remains in the reporting period should retests/repeat tests be necessary.

All laboratory analyses for the biomonitoring parameters specified in this permit must be performed by a laboratory certified by the Oklahoma Department of Environmental Quality for those parameters.

Provisions for performance-based monitoring frequency reductions are contained in Item 5 of this section.

Intervals between test initiation dates shall be a function of the required testing frequency, as follows:

- Monthly: No less than 20 days and no more than 40 days.
- Quarterly: No less than 2 months and no more than 4 months.
- Semi-annually: No less than 4 months and no more than 8 months.

APPLICABLE TO OUTFALL(S): 001
REPORTED ON DMR AS OUTFALL(S): TX1
CRITICAL DILUTION: 100%
EFFLUENT DILUTION SERIES (ALL TESTS): 32%, 42%, 56%, 75%, 100%
SAMPLE TYPE: Defined at Part I
TEST SPECIES/METHODS: 40 CFR 136, except for changes required by EPA, Region 6.

Daphnia pulex acute static renewal 48-hour definitive toxicity test, Method 2021.0, EPA-821-R-02-012 (October 2002), or latest update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

- b. Acute test failure – Acute test failure (LC_{50} test) is defined as 50% or more toxicity at 48 hours to test organisms at any effluent concentration. The 48-hour LC_{50} effluent value must be >100% to indicate a passing test. Any 48-hour LC_{50} effluent value of 100% or less will constitute a test failure.
- c. Reopener clause – This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

2. Testing Requirements due to Test Failure

Upon becoming aware of the failure of any test, the permittee shall notify DEQ Water Quality Division biomonitoring coordinator immediately, and in writing within 5 working days, of the test failure with a summary of the results of, and any other pertinent circumstances associated with, the failed test.

- a. Whenever there is a test failure for *Daphnia pulex* during routine testing, the frequency of testing for *Daphnia pulex* shall automatically increase to, or continue at, as appropriate, the WET testing frequency prescribed in Part I for the remaining life of the permit. In addition, two (2) additional monthly tests (retests) of *Daphnia pulex* are required. The two additional tests shall be conducted monthly during the next two consecutive months. The permittee shall not substitute either of the two additional tests for routine toxicity testing. A full laboratory report for the failed routine test and both additional tests, if required, shall be prepared and submitted to DEQ in accordance with procedures outlined in Item 4 of this section.
- b. Persistent toxicity – If either of the two additional tests results in an LC_{50} value less than or equal to 100%, persistent toxicity is exhibited. Then the permittee shall initiate a Toxicity Reduction Evaluation (TRE) as specified in Item 6 of this section. The TRE initiation date will be the test completion date of the first failed retest. The permittee may request a temporary exemption to this TRE-triggering criterion only if the permittee is under a compliance schedule defined in an OPDES permit or an enforcement order to effect aquatic toxicity reduction measures.
- c. Intermittent toxicity – If both additional tests result in an LC_{50} value of greater than 100%, persistent toxicity is not exhibited. However, if any routine test failure occurs within 18 months of a prior test failure, intermittent toxicity is exhibited, and the permittee may be required by DEQ to initiate a TRE, as described in Item 6 of this section, based on the severity and pattern of such toxic effect over time.

- d. Suspension of retesting requirements during a TRE – Retesting requirements in Item 2.a are temporarily suspended upon submittal of a TRE Action Plan. Such suspension of retesting requirements applies only to the species under evaluation by a TRE and only to the period during which a TRE is being performed.

3. Required Toxicity Testing Conditions

- a. Test acceptance – The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

- (1) The toxicity test control (0% effluent) must have survival equal to or greater than 90%.
- (2) The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for the *Daphnia pulex* survival test.
- (3) The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant toxicity is exhibited in the *Daphnia pulex* survival test.

If the above criteria or criteria listed in Item 1.a is not met the test will be considered invalid. Test failure may not be construed or reported as invalid due to a coefficient of variation value for toxicity of greater than 40% for replicates tested at the critical dilution. A repeat test shall be conducted and the biomonitoring enforcement coordinator notified, within the reporting period of any test determined to be invalid.

- b. The permittee shall follow the requirements listed below in determining success or failure of a WET test:

The statistical analyses in the *Daphnia pulex* survival test, used to determine the LC₅₀ shall be in accordance with the methods described in EPA-821-R-02-012 or most recent update thereof.

- c. The permittee shall use dilution water that meets the following standards:

- (1) Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness and alkalinity to the closest downstream perennial water where the toxicity test is conducted on an effluent discharge to a receiving stream classified as intermittent or to a receiving stream with no flow due to zero flow conditions.
- (2) If the receiving water is unsatisfactory as a result of instream toxicity (fails to meet the test acceptance criteria in Item 3.a), the permittee must submit the test results exhibiting receiving water toxicity with the full test report required in Item 4 below and may thereafter substitute synthetic dilution water for the receiving water in all subsequent tests, provided the unacceptable receiving water test met the following stipulations:
 - (a) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;
 - (b) the test indicating receiving water toxicity was carried out to completion (i.e., 48 hours); and
 - (c) the synthetic dilution water had a pH, hardness and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge,

provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

- d. The permittee shall collect samples that are representative of their effluent by following the criteria listed below:

- (1) Unless grab sampling is specifically authorized in Part I of the permit, the permittee shall collect two flow-weighted 24-hour composite samples representative of the flows during normal operation from the outfall(s) listed at Item 1.a above. If grab sampling is authorized, all the requirements listed below for composite sampling also pertain to grab sampling. In such cases, collection of the grab sample is considered equivalent to collection of the last portion of a composite sample. Unless otherwise specified in Part I of the permit, a 24-hour composite sample consists of a minimum of 12 effluent portions collected at equal time intervals representative of a 24-hour operating day and combined proportional to flow or a sample continuously collected proportional to flow over a 24-hour operating day.
- (2) The first composite effluent sample shall be used to initiate each test. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 36 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to maintain a temperature at or below 6°C but not frozen during collection, shipping, and/or storage.
- (3) The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.
- (4) If it is anticipated that flow from the outfall being tested may cease prior to collection of the second effluent sample, the permittee must ensure that the first composite effluent sample is of sufficient volume to complete the required testing with daily renewal of effluent. The abbreviated effluent composite sample collection duration, the static renewal protocol associated with an abbreviated sample collection, and a summary of the circumstances justifying collection of an abbreviated sample must be adequately documented in the full test report required in Item 4 of this section. DEQ reserves the right to require a retest and/or consider the permittee in violation of this permit if the basis offered for justification of an abbreviated sample is insufficient, flawed, or in any way reflects an effort on the part of the permittee to avoid test failure by use of an abbreviated sample.

4. Reporting

- a. The permittee shall provide a full laboratory report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA-821-R-02-012 for every valid or invalid toxicity test initiated, whether carried to completion or not, including any test which is considered invalid, is terminated early for any reason, or which indicates receiving water toxicity. The permittee shall retain each full report pursuant to the records retention provisions of Part III of this permit. The permittee shall submit to DEQ full laboratory test reports for all tests initiated, regardless of whether the tests are carried to completion. The reports shall be postmarked or received no later than the 15th day of the month following completion of the test.
- b. A valid test must be reported on the DMR for each reporting period specified in Part I of this permit, unless the permittee is performing a TRE, which may increase the frequency of testing and reporting. A DMR must be postmarked or received by the 15th day of the month following completion of any valid test to DEQ. The full report for the test (see Item 4.a above) shall be submitted along with the DMR. If toxicity is experienced, at least two copies of the blank DMR for

the applicable reporting period shall be made in advance of completing and submitting the DMR so that the DMR copies may be used to report results of the required retests (22415, 22416). Under no circumstances shall the monitoring/reporting period dates at the top of the DMR form be altered.

- c. If any test results in anomalous LC_{50} findings (i.e., it indicates an interrupted dose response across the dilution series), DEQ recommends that the permittee contact its DEQ biomonitoring coordinator for a technical review of the test results prior to submitting the full test report and DMR. A summary of all tests initiated during the reporting period, including invalid tests, repeat tests and retests, shall be attached to the reporting period DMR for DEQ review.

A test is a REPEAT test if it is performed as the result of a previously invalid test. A test is a RETEST if it is performed as the result of a previously failed test, the exception being where the test is the first (valid) test of a reporting period, in which case it is reported as such on the DMR for that period.

- (1) The reporting period test summary attached to the DMR shall be organized as follows:

- (a) Invalid tests (basis for test invalidity must be described)
- (b) Valid tests (other than retests) initiated during current reporting period
- (c) Valid retests for tests failed during previous reporting period (if not submitted in the previous reporting period test summary)
- (d) Valid retests for tests failed during current reporting period.

- (2) The following information shall be listed in the reporting period test summary for each valid test in categories (b) through (d) in Item 4.b(1) above:

- (a) Test species
- (b) Date of test initiation at laboratory
- (c) Results of all concurrent effluent analyses specified in Part I of this permit
- (d) All test result parameters for the test species specified in Item 4.c below.

- d. The permittee shall report the following results for all VALID routine toxicity tests (excluding retests) on the DMR(s) for that reporting period in accordance with Item 4.b above and Part III of this permit.

- (1) Parameter TIM3D: If the *Daphnia pulex* 48-hour LC_{50} for survival is equal to or less than 100%, report a "1"; otherwise, report a "0".
- (2) Parameter TAM3D: Report the *Daphnia pulex* 48-hour LC_{50} value for survival.
- (3) Parameter TJM3D: Report the *Daphnia pulex* 48-hour percent mortality in the 100% effluent concentration.

- e. The permittee shall report the following results for all VALID toxicity retests on the DMR(s) for that reporting period.

- (1) Retest #1 [STORET 22415]: If the first monthly retest following failure of a routine test results in a 48-hour LC_{50} for survival equal to or less than 100%, report a "1"; otherwise, report a "0".

- (2) Retest #2 [STORET 22416]: If the second monthly retest following failure of a routine test results in a 48-hour LC₅₀ for survival equal to or less than 100%, report a "1"; otherwise, report a "0".

Results of all retests shall be reported on a copy of the DMR for the reporting period (see Item 4.b above) in which the triggering routine test failure is experienced. Such retest results (using STORET codes 22415 and 22416 only) shall be postmarked or received no later than the 15th day of the month following completion of the retest. The full report for the retest (see Item 4.a above) shall be submitted along with the retest DMR. Even if a retest cannot be conducted before the end of the reporting period for which it is required (due to test initiation interval requirements), the retest results shall still be reported for the reporting period in which the triggering test failure is experienced. Under no circumstance shall the monitoring/reporting period dates for a supplemental retest DMR ever be modified. The permittee shall indicate the retest date in the comments section of the supplemental DMR and insert the date the DMR is submitted in the lower right hand corner. In this manner, both retests are reported for the same reporting period as the failed routine test triggering the retests. If retesting is not required during a given reporting period, the permittee shall leave the DMR retest fields blank.

5. Monitoring Frequency Reduction

- a. The permittee may apply for a testing frequency reduction upon the successful completion of the first year of testing for *Daphnia pulex* with no toxic effects demonstrated in any of the effluent dilutions. Certification in accordance with Item 5.b of this section shall be submitted with the time of such application for monitoring frequency reduction. If granted, the monitoring frequency may be reduced to a minimum of once per 6 months (once each during the periods June 1 through September 30 and December 1 through March 31).
- b. Certification – The permittee must certify in writing that no test failures have occurred for the species for which the monitoring frequency reduction is being requested and that all tests meet all test acceptability criteria in Item 3.a above. In addition, the permittee must provide a summary of all tests initiated during the period of certification including test initiation dates, test acceptability parameters, LC₅₀ concentrations, percent mortality at the 100% effluent dilution, and coefficients of variation for the control and 100% effluent dilution. If the certification is approvable, DEQ will issue a letter of confirmation of the monitoring frequency reduction. A copy of the confirmation letter will be forwarded to DEQ's Permit Compliance Tracking unit to update the permit reporting requirements. DEQ may refuse to approve the certification if it determines that, during the period for which the certification is submitted, there were errors in meeting test acceptability requirements, errors in statistical interpretation affecting test results reported on DMRs, late submissions of test reports or submissions of substantively incomplete test reports. If the certification is not approved, the permittee shall continue biomonitoring at a frequency of once per quarter until the permit is reissued.
- c. Survival failures after a monitoring frequency reduction – If any survival endpoint test is failed at any time after the granting of a monitoring frequency reduction, two monthly retests are required in accordance with Item 2 above and the monitoring frequency for the affected test species shall be increased to the WET testing frequency prescribed in Part I until the permit is reissued. If the permittee is performing a TRE this section does not apply.

6. Toxicity Reduction Evaluation (TRE)

- a. Within ninety (90) days of confirming toxicity in the retests for a test species, the permittee shall submit to DEQ a TRE Action Plan and Schedule for conducting a Toxicity Reduction Evaluation. The TRE Action Plan shall specify the approach and methodology to be used in performing the

TRE. A Toxicity Reduction Evaluation is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The TRE Action Plan shall lead to the successful elimination of effluent toxicity and include the following:

(1) Specific Activities

DEQ requires that a thorough audit of the design, operation and maintenance of the entire plant be done at the **outset** of the Toxicity Identification Evaluation (TIE) and/or TRE, rather than later in the process.

The plan shall detail the specific approach the permittee intends to utilize in conducting the TRE. The approach may include toxicity characterizations, identifications and confirmation activities, source evaluation, treatability studies, or alternative approaches. When the permittee conducts Toxicity Characterization Procedures, the permittee shall perform multiple characterizations and follow the procedures specified in the documents "Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures" (EPA-600/6-91/003) and "Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I" (EPA-600/6-91/005F), or alternate procedures. When the permittee conducts Toxicity Identification Evaluations and Confirmations, the permittee shall perform multiple identifications and follow the methods specified in the documents "Methods for Aquatic Toxicity Identification Evaluations, Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/080) and "Methods for Aquatic Toxicity Identification Evaluations, Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity" (EPA/600/R-92/081), as appropriate.

The documents referenced above may be available through the

National Technical Information Service (NTIS)

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Rd., Alexandria, VA 22312
orders@ntis.gov
(800) 553-NTIS (6847), or at the

National Service Center for Environmental Publications (NSCEP)

U.S. EPA/NSCEP
P.O. Box 42419
Cincinnati, Ohio 45242-0419
1-(800) 490-9198
E-mail: nscep@bps-lmit.com

(2) Sampling Plan (e.g., locations, methods, holding times, chain of custody, preservation, etc.)

The effluent sample volume collected for all tests shall be adequate to perform the toxicity test, toxicity characterization, identification and confirmation procedures, and conduct chemical specific analyses when a probable toxicant has been identified. Where the permittee has identified or suspects specific pollutant(s) and/or source(s) of effluent toxicity, the permittee

shall conduct, concurrent with toxicity testing, chemical specific analyses for the identified and/or suspected pollutant(s) and/or source(s) of effluent toxicity. Where toxicity was demonstrated within 48 hours of test initiation, each composite sample shall be analyzed independently. Otherwise, the permittee may substitute a composite sample, comprised of equal portions of the individual composite samples, for the chemical specific analysis.

- (3) Quality Assurance Plan (e.g., QA/QC implementation, corrective actions, etc.)
- (4) Project Organization (e.g., project staff, project manager, consulting services, etc.)
- b. The permittee shall initiate the TRE Action Plan within thirty (30) days of submitting the plan and schedule. The permittee shall assume all risks for failure to achieve the required toxicity reduction.
- c. The permittee shall submit to DEQ a quarterly TRE Activities Report with the Discharge Monitoring Report in months to be specified in their TRE plan, containing the following information:
 - (1) all data and/or substantiating documentation which identifies the pollutant(s) and/or source(s) of effluent toxicity;
 - (2) all studies/evaluations and results on the treatability of the facility's effluent toxicity; and
 - (3) all data which identifies effluent toxicity control mechanisms that will reduce effluent toxicity to the level necessary to meet no significant toxicity at any dilution.
- d. The permittee shall submit to DEQ a Final Report on Toxicity Reduction Evaluation Activities no later than twenty-eight (28) months after confirming toxicity in the retests. The final report shall provide information pertaining to the specific control mechanism selected that will, when implemented, result in reduction of effluent toxicity to a 48-hour LC₅₀ effluent value of greater than 100%. The final report will also provide a schedule for implementing the selected control mechanism.
- e. Quarterly testing during the TRE is the minimum monitoring requirement. DEQ recommends that permittees performing a TRE not rely on quarterly testing alone. Failure to identify the specific chemical compound causing toxicity test failure will normally result in a permit limit for whole effluent toxicity per federal regulations at 40 CFR 122.44(d)(1)(v).

MINIMUM QUANTIFICATION LEVELS (MQLs)

| | <u>MQL (µg/l)</u> | <u>EPA METHOD</u> |
|---|-------------------|---------------------------|
| <u>METALS AND CYANIDE</u> | | |
| Antimony (Total) ¹ | 60 | 200.7 |
| Arsenic (Total) ¹ | 0.5 | 206.5 |
| | | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Beryllium (Total) ¹ | 5 | 200.7 |
| Cadmium (Total) | 1 | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Chromium (Total) ¹ | 10 | 200.7 |
| Chromium (3+) ¹ | 10 | 200.7 |
| Chromium (6+) ¹ | 10 | 200.7 |
| Copper (Total) | 1 | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Lead (Total) | 0.5 | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Mercury (Total) ¹ | 0.05 | 245.1 revision 3.0 (1994) |
| Molybdenum (Total) | 30 | 200.7 |
| Nickel (Total) ¹ [Freshwater] | 10 | 200.7 |
| Nickel (Total) [Marine] | 5 | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Selenium (Total) ¹ | 5 | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Silver (Total) | 0.5 | 200.7 revision 4.4 (1994) |
| | | 200.8 revision 5.4 (1994) |
| | | 200.9 revision 2.2 (1994) |
| Thallium (Total) ¹ | 0.5 | 279.2 revision |
| Zinc (Total) ¹ | 20 | 200.7 |
| Cyanide (Total) ¹ | 10 | 335.4 |
| <u>DIOXIN</u> | | |
| 2,3,7,8-Tetrachlorodibenzo- P-Dioxin (TCDD) ^{2,4} | 0.00001 | 1613 |
| <u>VOLATILE COMPOUNDS</u> | | |
| Acrolein ³ | 50 | 624 |
| Acrylonitrile ³ | 50 | 624 |
| Benzene ³ | 10 | 624 |

MINIMUM QUANTIFICATION LEVELS (MQLs)

| | <u>MQL (µg/l)</u> | <u>EPA METHOD</u> |
|--|-------------------|-------------------|
| Bromoform ⁴ | 10 | 624 |
| Carbon Tetrachloride ⁴ | 10 | 624 |
| Chlorobenzene ⁴ | 10 | 624 |
| Chlorodibromomethane ⁴ | 10 | 624 |
| Chloroethane | 50 | 624 |
| 2-Chloroethylvinyl Ether ³ | 10 | 624 |
| Chloroform ⁴ | 10 | 624 |
| Dichlorobromomethane ⁴ | 10 | 624 |
| 1,1-Dichloroethane ⁴ | 10 | 624 |
| 1,2-Dichloroethane ⁴ | 10 | 624 |
| 1,1-Dichloroethylene ⁴ | 10 | 624 |
| 1,2-Dichloropropane ⁴ | 10 | 624 |
| 1,3-Dichloropropylene ⁴ | 10 | 624 |
| Ethylbenzene ⁴ | 10 | 624 |
| Methyl Bromide [Bromomethane] | 50 | 624 |
| Methyl Chloride [Chloromethane] | 50 | 624 |
| Methylene Chloride ⁴ | 20 | 624 |
| 1,1,2,2-Tetrachloroethane ⁴ | 10 | 624 |
| Tetrachloroethylene ⁴ | 10 | 624 |
| Toluene ⁴ | 10 | 624 |
| 1,2-Trans-Dichloroethylene ⁴ | 10 | 624 |
| 1,1,1-Trichloroethane ⁴ | 10 | 624 |
| 1,1,2-Trichloroethane ⁴ | 10 | 624 |
| Trichloroethylene ⁴ | 10 | 624 |
| Vinyl Chloride ⁴ | 10 | 624 |
| <u>ACID COMPOUNDS</u> | | |
| 2-Chlorophenol ⁴ | 20 | 625 |
| 2,4-Dichlorophenol ⁴ | 20 | 625 |
| 2,4-Dimethylphenol ¹ | 20 | 625 |
| 4,6-Dinitro-o-Cresol | 50 | 625 |
| [12 methyl 4,6-dinitrophenol] ⁴ | | |
| 2,4-Dinitrophenol ⁴ | 50 | 625 |
| 2-Nitrophenol ⁴ | 20 | 625 |
| 4-Nitrophenol ⁴ | 50 | 625 |
| p-Chloro-m-cresol | 20 | 625 |
| [4 chloro-3-methylphenol] ¹ | | |
| Pentachlorophenol ⁴ | 50 | 625 |
| Phenol ⁴ | 20 | 625 |
| 2,4,6-Trichlorophenol ⁴ | 20 | 625 |

MINIMUM QUANTIFICATION LEVELS (MQLs)

| | <u>MQL (µg/l)</u> | <u>EPA METHOD</u> |
|---|-------------------|-------------------|
| <u>BASE/NEUTRAL COMPOUNDS</u> | | |
| Acenaphthene ⁴ | 20 | 625 |
| Acenaphthylene ⁴ | 20 | 625 |
| Anthracene ⁴ | 20 | 625 |
| Benzidine ³ | 50 | 625 |
| Benzo(a)Anthracene ⁴ | 20 | 625 |
| Benzo(a)Pyrene ⁴ | 20 | 625 |
| 3,4-Benzofluoranthene ⁴ | 20 | 625 |
| Benzo(ghi)Perylene | 20 | 625 |
| Benzo(k)Fluoranthene ⁴ | 20 | 625 |
| Bis(2-Chloroethoxy) Methane ⁴ | 20 | 625 |
| Bis(2-Chloroethyl) Ether ⁴ | 20 | 625 |
| Bis(2-Chloroisopropyl) Ether ⁴ | 20 | 625 |
| Bis(2-Ethylhexyl) Phthalate ⁴ | 20 | 625 |
| 4-Bromophenyl Phenyl Ether ⁴ | 20 | 625 |
| Butylbenzyl Phthalate ⁴ | 20 | 625 |
| 2-Chloronaphthalene ⁴ | 20 | 625 |
| 4-Chlorophenyl Phenyl Ether ⁴ | 20 | 625 |
| Chrysene ⁴ | 20 | 625 |
| Dibenzo (a,h) Anthracene | 20 | 625 |
| 1,2-Dichlorobenzene ⁴ | 20 | 625 |
| 1,3-Dichlorobenzene ⁴ | 20 | 625 |
| 1,4-Dichlorobenzene ⁴ | 20 | 625 |
| 3,3'-Dichlorobenzidine | 20 | 625 |
| Diethyl Phthalate ⁴ | 20 | 625 |
| Dimethyl Phthalate ⁴ | 20 | 625 |
| Di-n-butyl Phthalate ⁴ | 20 | 625 |
| 2,4-Dinitrotoluene ⁴ | 20 | 625 |
| 2,6-Dinitrotoluene ⁴ | 20 | 625 |
| Di-n-octyl Phthalate ⁴ | 20 | 625 |
| 1,2-Diphenylhydrazine ³ | 20 | 625 |
| Fluoranthene ⁴ | 20 | 625 |
| Fluorene ⁴ | 20 | 625 |
| Hexachlorobenzene ⁴ | 10 | 625 |
| Hexachlorobutadiene ⁴ | 20 | 625 |
| Hexachlorocyclopentadiene ⁴ | 20 | 625 |
| Hexachloroethane | 20 | 625 |
| Indeno (1,2,3-cd) Pyrene | 20 | 625 |
| (2,3-o-phenylene pyrene) | | |
| Isophorone ⁴ | 20 | 625 |
| Naphthalene ⁴ | 10 | 625 |
| Nitrobenzene ⁴ | 20 | 625 |

MINIMUM QUANTIFICATION LEVELS (MQLs)

| | <u>MQL (µg/l)</u> | <u>EPA METHOD</u> |
|-------------------------------------|-------------------|-------------------|
| N-nitrosodimethylamine | 50 | 625 |
| N-nitrosodi-n-propylamine | 20 | 625 |
| N-nitrosodiphenylamine | 20 | 625 |
| Phenanthrene ⁴ | 20 | 625 |
| Pyrene ⁴ | 20 | 625 |
| 1,2,4-Trichlorobenzene ⁴ | 20 | 625 |

PESTICIDES

| | | |
|--|------|-----|
| Aldrin ¹ | 0.05 | 608 |
| Alpha-BHC ¹ | 0.05 | 608 |
| Beta-BHC ¹ | 0.05 | 609 |
| Gamma-BHC (Lindane) ¹ | 0.05 | 608 |
| Delta-BHC ¹ | 0.05 | 608 |
| Chlordane ¹ | 0.2 | 608 |
| 4,4'-DDT ¹ | 0.05 | 608 |
| 4,4'-DDE (p,p-DDX) ¹ | 0.05 | 608 |
| 4,4'-DDD (p,p-TDE) ¹ | 0.05 | 608 |
| Dieldrin ¹ | 0.05 | 608 |
| Alpha-endosulfan ¹ | 0.05 | 608 |
| Beta-endosulfan ¹ | 0.05 | 608 |
| Endosulfan sulfate ¹ | 0.05 | 608 |
| Endrin ¹ | 0.05 | 608 |
| Endrin aldehyde ¹ | 0.05 | 608 |
| Heptachlor ¹ | 0.05 | 608 |
| Heptachlor epoxide ¹ (BHC-hexachlorocyclohexane) | 0.05 | 608 |
| PCB-1242 ¹ | 0.25 | 608 |
| PCB-1254 | 0.25 | 608 |
| PCB-1221 | 0.25 | 608 |
| PCB-1232 | 0.25 | 608 |
| PCB-1248 | 0.25 | 608 |
| PCB-1260 | 0.25 | 609 |
| PCB-1016 | 0.25 | 608 |
| PCB, total | 0.25 | 608 |
| Toxaphene ¹ | 0.3 | 608 |

¹ Based on Contract Required Quantitation Level (CRQL) developed pursuant to 40 CFR Part 122

² Dioxin National Strategy

³ No CRQL developed pursuant to 40 CFR Part 122 established

⁴ CRQL basis, equivalent to MQL

MQL based on 3.3 times LOD published in 40 CFR 136, Appendix B

FACT SHEET

FOR THE DRAFT AUTHORIZATION TO DISCHARGE TO WATERS OF THE UNITED STATES UNDER THE OKLAHOMA POLLUTANT DISCHARGE ELIMINATION SYSTEM (OPDES).

Permit Number: OK0040053

Facility I.D. Number: S20409

Applicant: City of Broken Arrow
P.O. Box 610
Broken Arrow, OK 74013

Issuing Office: Oklahoma Department of Environmental Quality (DEQ)
Water Quality Division
707 North Robinson
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Prepared By: Kelly Pham, P.E., Permit Writer
Municipal Permits Section
Water Quality Division

Date Prepared: May 8, 2017

Reviewed By: Micheal Jordan, P.E., Manager
Municipal Discharge and Stormwater Permit Section
Water Quality Division

Michael B. Moe, P.E., Engineering Manager
Wastewater Group
Water Quality Division

In accordance with 40 CFR 124.8 and 124.56, this fact sheet describes the applicant's facility operation and sets forth the principal facts and the significant factual, legal, methodological, and policy questions considered in preparing the draft permit. Also set forth are any calculations or other necessary explanations of the derivation of specific effluent limitations and conditions or standards for sewage sludge use or disposal, including a citation to the applicable performance standard, or standard for sewage sludge use or disposal as required by 40 CFR 122.44. In accordance with 40 CFR 122.44(l), proposed permit limits for reissued permits are based on the more stringent of applicable technology-based limitations, applicable water quality-based limitations, or limitations in the previous permit.

Citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations. Citations to OAC 252 and OAC 785 refer to promulgated regulations listed at Titles 252 and 785, Oklahoma Administrative Code.

I. PERMITTING BACKGROUND

A. CHRONOLOGY OF PERMITTING ACTIVITIES

The following is a chronology of permitting activities since issuance of the previous OPDES permit:

August 17, 2017: Facility public notice.
August 4, 2017: DEQ public notice.
August 1, 2017: Response to facility's comments and draft permit package sent to applicant for public notice.
July 14, 2017: Comment letter received from EPA
July 13, 2017: Comments on draft permit and fact sheet received from applicant.
June 14, 2017: Draft permit package transmitted to EPA electronically for review.
June 14, 2017: Draft permit package sent to applicant for courtesy review.
April 24, 2017: Chloride and sulfate analytical results received from applicant.
April 4, 2017: Request for chloride and sulfate analytical results sent to applicant.
March 24, 2017: Received variance request and revised effluent irrigation agreement.
March 2, 2017: Revised Form 2M1 received.
February 7, 2017: Site visit regarding reclaimed water; requested additional information during site visit.
January 30, 2017: Selection of new bacteriological indicator and revised Form 2M1 received from applicant.
January 20, 2017: Copy of effluent contract for irrigation received via email.
December 19, 2016: Extension request granted.
December 16, 2016: Request for time extension to deadline to respond to DEQ letter dated 11/29/2016 received.
November 29, 2016: Request for additional information sent to applicant.
November 18, 2016: Site visit conducted.
November 17, 2016: Administrative review of permit application completed.
November 8, 2016: Certification of public notice of filing of application and revised signatory page received.
October 18, 2016: Notice of incomplete application sent to applicant.
August 29, 2016: OPDES permit application (Form 2M1) received.
February 1, 2012: Previous OPDES permit issued.

B. PROPOSED PERMITTING ACTION

It is proposed that Permit No.OK0040053, which was effective March 1, 2012, and expired February 28, 2017, and for which application for renewal was timely submitted prior to permit expiration, be reissued for a five year term in accordance with regulations promulgated at 40 CFR 122.46(a) and OAC 252:606-1-3(b).

II. APPLICANT ACTIVITY

A. DESCRIPTION AND LOCATION OF FACILITY

The City of Broken Arrow operates a municipal wastewater treatment facility, Lynn Lane Wastewater Treatment Plant (WWTP), located in part of the SE¼, SE¼ of Section 11, Township 17 North, Range 14 East, Indian Meridian (I.M.), Tulsa County, Oklahoma or at 13874 S. 177th East Ave, Broken Arrow, OK 74013. Under SIC Code 4952, this facility provides biological treatment of domestic sewage for the City of Broken Arrow, population of approximately 98,800.

B. WASTEWATER GENERATION AND TREATMENT

1. Treatment Plant

a. Wastewater

The facility's design average daily flow of 8.0 million gallons per day (mgd) is consistent with the State Water Quality Management Plan (WQMP). Biological treatment of the waste stream into this Publicly Owned Treatment Works (POTW) facility, which is comprised primarily of domestic sewage, is by a conventional activated sludge treatment process including extended aeration with oxidation ditch and aerobic digesters. Treated wastewater is allowed sufficient contact time in the chlorine contact basin for disinfection. Sodium bisulfite is used to remove excess chlorine in treated wastewater before it is discharged into the Arkansas River via Outfall 001. Effluent flow measurement is accomplished by a HydroRanger flow meter with totalizing capability.

b. Biosolids/Sludge

The biosolids/sewage sludge wasted from the activated sludge process is thickened and then pumped to aerobic digesters. Aerobic digestion is used to reduce the volatile solids content of the sludge. Digested sludge is belt pressed to cake to be hauled to American Environmental Landfill and the Waste Management Quarry Landfill for disposal in accordance with the Sludge Disposal Plan approved by the DEQ on February 17, 2017.

2. Industrial Contributions

The facility receives significant industrial wastewaters and has been required to develop and implement an industrial pretreatment program in accordance with Section 402(b)(8) of the Clean Water Act and the General Pretreatment Regulations per 40 CFR Part 403.

3. Reclaimed Water for Land Application

The City of Broken Arrow-Lynn Lane WWTP, known as "Supplier", supplies Category 3 reclaimed water after complete treatment in the conventional wastewater treatment system in accordance with OAC 252:627 to ISCC Managing Group, LLC dba Indian Springs Country Club, known as "User", for irrigation at the golf course located in the N½ of Section 10, N½ of Section 11, and N½, SE¼ of Section 11, Township 17 North, Range 14 East, I.M., Tulsa County, Oklahoma. As provided in the effluent contract for irrigation, the supply of Category 3 reclaimed water is provided during May through September every year.

The location of the permitted irrigation site, monitoring requirements, and restrictions for the use of Category 3 reclaimed water are presented in Section VIII.

III. DISCHARGE INFORMATION

A. DISCHARGE LOCATION

Outfall 001 is a bankside discharge from a 24" diameter pipe through a concrete headwall into a perennial stream. Effluent sampling for compliance testing is taken at Outfall 001 with the use of an auto sampler. The physical location of the outfall and the point designated for sampling are shown in the table below.

Sampling Point and Outfall Location

| Outfall | Location | | | Receiving Stream |
|---|-----------------------------|---|---|------------------|
| | General Location | Legal Description | Latitude/Longitude | |
| Outfall 001 (physical location and sampling point) | West of the aeration basins | NE¼, SE¼, SE¼ of Section 11, Township 17 North, Range 14 East, I.M., Tulsa County, Oklahoma | 35° 57' 40.756" N 95° 46' 55.079" W (GPS: 1983 NAD) | Arkansas River |

B. DISCHARGE DESCRIPTION AND CHARACTERISTICS

A summary of biomonitoring (Whole Effluent Toxicity) testing data is provided in Section V.D.1.f(2). Data for pollutants present in the facility's effluent at measurable levels is summarized in the following table for Outfall 001.

| Effluent Characteristic | Number of Samples | MQL (µg/l unless otherwise specified) | Concentration (µg/l unless otherwise specified) | |
|--|-------------------|--|--|---------|
| | | | Average | Maximum |
| Arsenic, total ^a | 15 | 0.5 | 3.124 | 17.7 |
| Copper, total ^a | 15 | 1 | 5.356 | 39.2 |
| Selenium, total ^a | 15 | 5 | 2.636 | 5.52 |
| Zinc, total ^a | 15 | 20 | 31.824 | 53.1 |
| Bis (2-ethylhexyl) phthalate ^a | 3 | 10 | 6.246 | 11.6 |
| Chloride (mg/l) ^b | 2 | 10 | 73.1 | 74.2 |
| Sulfate (mg/l) ^b | 2 | 10 | 85.8 | 86.7 |
| Total Dissolved Solids (mg/l) ^c | 59 | 10 | 441.6 | 660 |

^a Based on data provided in the application received on 08/29/16.

^b Based on supplemental data received on 04/24/17.

^c Based on DMR data for the period from 03/2012 through 03/2017.

The previous permit had limits for mercury (0.952 µg/l monthly average and 1.90 µg/l daily maximum). Based on DMR data for the period from 03/2012 through 03/2017, mercury was unmeasurable in all samples. Analyses were performed using detection limit of 0.1 µg/l for some samples and that of 0.2 µg/l for others. The DEQ MQL for mercury was changed from 0.2 µg/l to 0.05 µg/l effective September 1, 2016 in accordance with OAC 252:690, Appendix B. However, the samples collected from the effluent discharge for the 09/2016-03/2017 period were still tested using detection limit of 0.2 µg/l. Neither the discharge flow, nor the receiving stream's flow, nor the water quality standards for mercury have changed; and the facility has been in compliance with permit limits for mercury. Thus, re-evaluation of limitation for mercury is not needed. Limits for mercury in the previous permit shall remain in the renewed permit. The facility shall have all future testing for mercury performed using a detection limit of 0.05 µg/l or lower, in accordance with Part II the permit.

IV. TECHNOLOGY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

POTWs treating domestic sewage are required by 40 CFR 133 to provide secondary or secondary-equivalent treatment. The Oklahoma definition of secondary treatment, which sets minimum requirements for developing wasteload allocations for municipalities in the State's Water Quality Management Plan (WQMP), is defined at OAC 252:606-5-2(2). The definitions are dependent on the type of treatment system and whether the receiving

stream flow is perennial or intermittent. Since the Lynn Lane Wastewater Treatment Plant operated by City of Broken Arrow is a mechanical plant discharging to a perennial stream, secondary treatment is defined according to OAC 252:606-5-2(2)(B) as indicated below:

Mechanical - Perennial

- ◆ 5-day Biochemical Oxygen Demand (BOD₅)
 - A monthly average effluent concentration of 30 mg/l BOD₅
 - A weekly average effluent concentration of 45 mg/l BOD₅
- ◆ Total Suspended Solids (TSS)
 - A monthly average effluent concentration of 30 mg/l TSS
 - A weekly average effluent concentration of 45 mg/l TSS
- ◆ pH
 - A pH range between 6.5 and 9.0 standard units, inclusive.

For an influent waste stream composed primarily of domestic sewage, compliance with the 85% minimum monthly average percent removal criteria for BOD₅/CBOD₅ and TSS is implied if the effluent is in compliance with the concentration standards for secondary treatment.

V. WATER QUALITY-BASED EFFLUENT LIMITATIONS AND CONDITIONS

A. GENERAL

Section 101 of the Clean Water Act (CWA) states that "... it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited..." A permit containing technology-based permit limitations alone may not adequately protect the quality of a specific receiving stream. Thus, additional water quality-based effluent limitations and/or conditions are considered in the draft permit using narrative and numerical standards contained in the Oklahoma Water Quality Standards (OWQS), as amended (OAC 785:45), and implementation criteria contained in OACs 785:46 and 252:690, promulgated by the Oklahoma Water Resources Board (OWRB) and Department of Environmental Quality (DEQ), respectively. This is to ensure that no point-source discharge results in instream aquatic toxicity, a violation of applicable narrative or numerical State water quality standards, or aquatic bioaccumulation which threatens human health.

B. RECEIVING STREAM DESIGNATED USES AND ANTIDEGRADATION PROVISIONS

Outfall 001 discharges to the Arkansas River (WBID 120410010080_10) in Stream Segment 120410 of the Middle Arkansas River Basin. As designated in Appendix A of the OWQS, the designated beneficial uses of the Arkansas River in this stream segment are:

- Emergency Public and Private Water Supplies (OAC 785:45-5-11)
- Fish and Wildlife Propagation (OAC 785:45-5-12)/Warm Water Aquatic Community
- Agriculture (OAC 785:45-5-13)
- Secondary Body Contact Recreation (OAC 785:45-5-17)
- Navigation (OAC 785:45-5-18)
- Aesthetics (OAC 785:45-5-19)
- Fish Consumption (OAC 785:45-5-20)

While it is indicated that the Arkansas River in this segment is designated with Secondary Body Contact Recreation use, it is remarked with footnote (2) in Appendix A of the OWQS that criteria for the beneficial use of Primary Body Contact Recreation (PBCR) apply regardless of the recreation use designated. Therefore,

criteria for the protection of PBCR are applicable to the discharge from the Lynn Lane WWTP.

The Arkansas River is not designated as an Outstanding Resource Water (ORW), High Quality Water (HQW), or Sensitive Water Supply (SWS) in Appendix A of the OWQS. Neither is it designated in Table 1 of Appendix B of the OWQS as an area of ecological and/or recreational significance or in Table 2 of Appendix B as an area containing federally-listed endangered species.

C. WATER QUALITY STANDARDS IMPLEMENTATION

1. Water Quality Standards Implementation Process

To achieve the objectives stated in Section V.A above, each pollutant present at measurable levels in the facility's effluent, for which there are one or more applicable numerical water quality criteria, is screened against the applicable criteria to determine whether the pollutant has reasonable potential (RP) to exceed any of the criteria. The screens are performed in accordance with the OWQS, OWQS implementation criteria in OAC 785:46 and OAC 252:690, and the Continuing Planning Process (CPP) document. In the RP screening process, the 95th percentile effluent concentration, or estimate thereof if the effluent data set is not sufficiently large to determine it directly, is used to compute an instream concentration according to the regulatory mixing zone equations defined in OAC 785:46. The computed instream concentrations are then compared with the applicable criteria to determine whether RP is exhibited. If RP is exhibited, in accordance with 40 CFR 122.44(d)(1)(vi) and OAC 252:690, a wasteload allocation and criterion long term average is computed for each applicable criterion. Water quality-based permit limitations are calculated for each pollutant exhibiting RP for all applicable criteria. The most stringent of the resulting monthly average permit limitations is established in the draft permit for each pollutant requiring such limitations.

2. Summary of Regulatory Parameters

Regulatory receiving water flows are established in OAC 785:46. Effluent regulatory flows, as well as regulatory effluent and background pollutant concentrations are established in OAC 252:690, Subchapter 3. Definitions and values for these terms are as follows:

a. Effluent and Upstream Receiving Water Regulatory Flows

- $Q_{e(D)}$ POTW design flow rate. The flow rate used must be consistent with that in the WQMP. The design flow rate specified in the permit application and the approved design flow for this facility in the State WQMP is 8.0 mgd.
- $Q_{u(7Q2)}$ Upstream 7Q2 flow rate. This is the annual 7-day, 2-year low flow of the receiving stream. Where flow data published in the USGS publication, Statistical Summaries of Streamflow in and near Oklahoma Through 2007 by John M. Lewis and Rachel A. Esralew (<http://pubs.usgs.gov/sir/2009/5135/>), is available, minor adjustments for known upstream or downstream perennial flows, as appropriate, may be utilized to estimate the 7Q2 for a specific location upstream or downstream of the USGS gauging station. If streamflow is intermittent, if USGS 7Q2 data is not available, or if the applicant has not developed a site-specific 7Q2, a default value of 1 cfs (0.6463 mgd) is assumed.
- $Q_{u(LTA)}$ Upstream long-term average flow rate. This is the mean annual flow of the receiving stream. Where flow data published in the USGS publication, Statistical Summaries of Streamflow in and near Oklahoma Through 2007 by John M. Lewis and Rachel A. Esralew (<http://pubs.usgs.gov/sir/2009/5135/>), is available, minor adjustments for known upstream or downstream perennial flows, as appropriate, may be utilized to estimate the mean annual flow for a specific location upstream or downstream of the USGS gauging station. If published mean annual flow data is not available, it may be approximated by multiplying

the receiving water's drainage area at the point of discharge by the mean annual runoff per unit area published in the CPP.

$Q_{u(STA)}$ Upstream short-term average flow rate. This flow rate, used only in the sample standard (SS) agriculture screen, is a function of $Q_{u(LTA)}$. The equation is $Q_{u(STA)} = 0.68 \times Q_{u(LTA)}$.

Upstream flows for this facility are based on published data for USGS gauging station 07164500, located on the Arkansas River, and approximately 20 miles upstream from the facility's point of discharge (POD). There are no significant perennial flows between the gauging station and the facility's POD; thus, it is not necessary to adjust upstream 7Q2 flow rate. The incremental drainage area from the gaging station to the facility's POD is insignificant compared to the reported drainage area at the gaging station 07164500, which is approximately 75,000 square miles; thus, adjustment to the upstream long-term average flow is determined unnecessary.

Upstream Regulatory Flows (mgd)

| Flowstream | $Q_{u(7Q2)}$ | $Q_{u(LTA)}$ | $Q_{u(STA)}^a$ |
|--|--------------|--------------|----------------|
| Arkansas River at Gauging Station 07164500 | 513.16 | 5658.36 | 3847.68 |

^a $Q_{u(STA)} = 0.68 \times Q_{u(LTA)}$

b. Dilution Ratios (Q^*)

Q^* Ratio of effluent flow to stream flow, also known as dilution capacity. The Q^* ratios for municipal discharges, as well as their values, are defined in the following table:

Q^* Values (Outfall 001)

| Q* Ratio | Corresponding Water Quality Screens | Implementation Reference | Value |
|-------------------------|-------------------------------------|--------------------------|---------|
| $Q_{e(D)} / Q_{u(7Q2)}$ | Type of WET Testing | OAC 252:690-3-31 | 0.01559 |
| | Chronic Toxicity | OAC 252:690-3-53(1)(B) | |
| $Q_{e(D)} / Q_{u(LTA)}$ | Human Health/Fish Flesh | OAC 252:690-3-66(2) | 0.00141 |
| | Human Health/Fish Flesh and Water | OAC 252:690-3-73(2) | |
| | Raw Water Column | | |
| | Agriculture/Yearly Mean Standard | OAC 252:690-3-81(1)(B) | |
| $Q_{e(D)} / Q_{u(STA)}$ | Agriculture/Sample Standard | OAC 252:690-3-81(2)(B) | 0.00208 |

c. Characterization of Pollutant Effluent Concentrations

For purposes of determining whether water quality-based effluent limitations are required, one of two methods for determining C_{95} is employed, depending on the size of the effluent data set (i.e., number of data points).

C_{95} 95th percentile maximum likelihood effluent concentration for purposes of determining whether effluent limitations are required.

Method 1:

In accordance with OAC 252:690-3-4, at least 10 data points are required to calculate the standard deviation, and in accordance with OAC 252:690-3-8(a), if at least 10 data points are available, C_{95} is calculated directly from the effluent data set, assuming a log-normal distribution, according to the following equation:

$$C_{95} = \text{EXP}(\ln(x)_{\text{avg}} + 1.645 \times s_{\ln(x)})$$

$$\text{where } \ln(x)_{\text{avg}} = \frac{\left(\sum_{i=1}^N \ln(x_i) \right)}{N} \text{ and } s_{\ln(x)} = \sqrt{\frac{N \sum_{i=1}^N (\ln(x_i))^2 - \left(\sum_{i=1}^N \ln(x_i) \right)^2}{N(N-1)}}$$

In the above equations, $\ln(x)_{\text{avg}}$ represents the arithmetic average of the set of log-transformed data points, and $s_{\ln(x)}$ represents the standard deviation of the set of log-transformed data points.

In accordance with OAC 252:690-3-2(1), Robust Regression on Order Statistics (ROS) will be used to estimate the unmeasurable quantities if the data set has at least three measurable data points. However, if the data set has fewer than three measurable data points, Robust ROS will not be used and the DEQ will use ½ of the MQL to estimate the unmeasurable quantities.

Method 2:

In accordance with OAC 252:690-3-8(a), if less than 10 effluent data points are available; C_{95} must be estimated from the mean effluent concentration, as follows:

$$C_{95} = C_{\text{mean}} \times 2.135, \text{ where } C_{\text{mean}} \text{ is calculated as the arithmetic mean.}$$

In accordance with OAC 252:690-3-2(1), the DEQ will use ½ of the MQL to estimate the unmeasurable quantities for the calculation of C_{mean} .

$C_{95(M)}$ 95th percentile maximum likelihood effluent concentration for purposes of determining whether additional effluent monitoring is required.

In accordance with OAC 252:690-3-90, where the effluent data set is comprised of fewer than 10 data points, a determination of whether further effluent monitoring of a pollutant is warranted in the absence of a requirement for effluent limitations by using the "TSD method." The TSD method is based on the methodology in Section 3.3.2 of Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-001. The 95th percentile effluent concentration calculated using the TSD method is referred to as $C_{95(M)}$.

$C_{95(M)}$ is calculated according to the following equation:

$$C_{95(M)} = C_{\text{max}} \times \text{RPF}_{95(M)}$$

$\text{RPF}_{95(M)}$ is calculated, assuming a log-normal distribution, according to the following equation:

$$\text{RPF}_{95(M)} = \frac{\text{EXP}\left[1.645 \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right]}{\text{EXP}\left[z_N \sqrt{\ln(1 + CV^2)} - 0.5 \ln(1 + CV^2)\right]}$$

where z_N is the upper k^{th} percentile of the normal distribution, $k = 0.05^{1/N}$ (for the 95% confidence level), and CV is assumed to equal 0.6.

The values of z_N and the resulting value of $RPF_{95(M)}$ for values of N from 1 to 9 are shown in the following table:

| N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| z_N | -1.645 | -0.760 | -0.336 | -0.068 | 0.124 | 0.272 | 0.390 | 0.489 | 0.574 |
| $RPF_{95(M)}$ | 6.199 | 3.795 | 3.000 | 2.585 | 2.324 | 2.141 | 2.006 | 1.898 | 1.811 |

CV Relative variability of a data set. In accordance with OAC 252:690-3-7, CV is defined as the standard deviation of a data set divided by its arithmetic average where at least 10 effluent data points are available.

$$CV = \frac{s_x}{C_{avg}}$$

Standard deviation of a data set s_x is calculated according to the following equation:

$$s_x = \sqrt{\frac{N \sum_{i=1}^N (x_i^2) - \left(\sum_{i=1}^N x_i \right)^2}{N(N-1)}}$$

Where fewer than 10 data points are available, a default CV value of 0.6 is assumed.

Values of C_{95} , $C_{95(M)}$, and CV are summarized for quantifiable pollutants with applicable water quality criteria in the following table:

C_{mean} , C_{max} , C_{95} , $C_{95(M)}$, and CV Values for Quantifiable Pollutants (Outfall 001)

| Effluent Characteristic | No. of Data Points (N) | MQL ($\mu\text{g/l}$ unless otherwise specified) | Concentration ($\mu\text{g/l}$ unless otherwise specified) | | | | CV ^a |
|-------------------------------|------------------------|--|--|----------|-----------|------------------|-----------------|
| | | | C_{mean} | C_{95} | C_{max} | $C_{95(M)}$ | |
| Arsenic, total ^b | 15 | 0.5 | 3.124 | 7.57 | 17.7 | N/A ^c | 1.022 |
| Copper, total | 15 | 1 | 5.356 | 29.9 | 39.2 | N/A ^c | 1.127 |
| Selenium, total ^b | 15 | 5 | 2.636 | 3.69 | 5.52 | N/A ^c | 0.289 |
| Zinc, total | 15 | 20 | 31.824 | 56.5 | 53.1 | N/A ^c | 0.326 |
| Bis (2-ethylhexyl) phthalate | 3 | 10 | 6.246 | 13.34 | 11.6 | 34.80 | --- |
| Chloride (mg/l) | 2 | 10 | 73.1 | 156.1 | 74.2 | 281.6 | --- |
| Sulfate (mg/l) | 2 | 10 | 85.8 | 183.1 | 86.7 | 329.0 | --- |
| Total Dissolved Solids (mg/l) | 59 | 10 | 441.6 | 565.0 | 660 | N/A ^c | 0.149 |

^a A coefficient of variation (CV) is calculated only where an effluent data set consists of at least ten data points, of which at least three must be measurable. A CV value of 0.6 is assumed where a data set is of insufficient size to calculate a CV directly (see OAC 252:690-3-7).

^b Effluent data set was comprised of both measurable and unmeasurable quantities and there are fewer than three (3) measurable data points. In calculating summary statistics for the effluent data set, a value equal to one-half the detection limit was assumed for the unmeasurable quantities in accordance with OAC 252:690-3-2(1).

^c Determination of $C_{95(M)}$ value is unnecessary since sufficient data points are available. Summary statistics are calculated directly from the effluent data set.

d. Pollutant Background Concentrations

C_b Upstream or background concentration of a pollutant. Site specific data is used where available. Where such data is not available, and in streams where $Q_{u(7Q2)} = 0$ in the absence of known upstream toxicants, background concentrations are assumed to be zero. For the agriculture screens, C_b is computed using the segment average YMS and SS values for the receiving stream segment published in Appendix F to OAC 785:45 according to the following equation: $C_b = 2 \times YMS - SS$. Background levels are described in the following table:

Background Concentrations of Pollutants Present in Effluent (Outfall 001)

| Pollutant | No. of Data Points (N) | Background Concentration (C _b) (mg/l unless otherwise specified) | Data Source |
|------------------------------|------------------------|--|-------------------------|
| Arsenic, total | --- | Assumed zero ^a | --- |
| Copper, total | --- | Assumed zero ^a | --- |
| Selenium, total | --- | Assumed zero ^a | --- |
| Zinc, total | --- | Assumed zero ^a | --- |
| Bis (2-ethylhexyl) phthalate | --- | Assumed zero ^a | --- |
| Chloride | | 448 | Calculated ^b |
| Sulfate | | 108 | Calculated ^b |
| Total Dissolved Solids (TDS) | --- | 1056 | Calculated ^b |

^a No background data available. Background level is assumed to be zero in accordance with OAC 252:690-3-11(c).

^b Since no site-specific background data is available, background is calculated from segment-averaged YMS and SS criteria in accordance with OAC 252:690-3-16(a).

e. Other Applicable Terminology

C_{criterion} Numerical water quality criterion for a specific pollutant. For some pollutants, aquatic toxicity criteria are pH- or hardness-dependent. In such cases, in accordance with OAC 785:46-5-8, site-specific pH or hardness data, if available, may be used. If site-specific pH or hardness data is not available, the segment averaged pH or hardness from OAC 785:46, Appendix B, is used. Where a specific pollutant screen exhibits reasonable potential, C_{criterion} is used to calculate the wasteload allocation. Criteria applicable to Outfall 001 are as follows:

- ◆ Fish and wildlife propagation (F&WP/WWAC) use
 - C_A: Acute toxicity criterion
 - C_C: Chronic toxicity criterion
- ◆ Fish consumption use
 - C_{FF}: Human health criterion for the consumption of fish flesh
- ◆ Agriculture use
 - C_{YMS}: Yearly mean standard
 - C_{SS}: Sample standard

C_d Instream concentration of a specific pollutant, according to the appropriate mixing equation.

D. WATER QUALITY-BASED REQUIREMENTS

1. Criteria for Protection of the Fish and Wildlife Propagation Use

a. DO and DO-Demanding Substances (Outfall 001)

OAC 785:45-5-12(f)(1) requires that where DO-demanding substances are present in an effluent at significant levels, a wasteload allocation (WLA) must be established according to certain seasonal criteria dependent on the receiving water's aquatic community subcategory. In determining the WLA for DO-demanding substances, the prescribed level of secondary treatment for the facility (see Section IV) is modeled to determine if it meets the aforementioned seasonal criteria. If the model indicates that a more stringent WLA than secondary is required to meet these criteria, the more stringent WLA (often referred to as a "tertiary" level of treatment) will be used once it is granted technical approval by EPA Region 6. It is then promulgated as an amendment to the State WQMP. The approved WLA for DO-demanding substances for this facility at a design average flow of 8.0 mgd is shown in the following table:

DO-Based WLA (Outfall 001)

| Season | Level of Treatment | WLA Parameters (in mg/l) | |
|------------|--------------------|--------------------------|-----|
| | | BOD ₅ | TSS |
| Year round | Secondary | 30 | 30 |

For purposes of establishing permit limitations for DO-demanding substances, the seasonal monthly average limit (MAL) in the draft permit for each effluent characteristic is set equal to the corresponding WLA concentration shown in the table above. The corresponding weekly average limit (WAL) is set equal to 1.5 times the seasonal WLA concentration in accordance with 40 CFR 122.45(d)(2).

b. pH (Outfall 001)

OAC 785:45-5-12(f)(3) states "pH values shall be between 6.5 and 9.0 in waters designated for fish and wildlife propagation; unless pH values outside that range are due to natural conditions." This pH range is established in the draft permit.

c. Oil and Grease (Outfall 001)

In accordance with OAC 758:45-5-12(f)(4), a narrative condition prohibiting the discharge of any visible sheen or globules of oil or grease or in quantities that adhere to stream banks and coat bottoms of water courses or which cause deleterious effects to the biota will be included in the draft permit.

d. Toxicity from Halogenated Oxidants (Outfall 001)

OAC 785:46-3-1(c) states "Toxicity from halogens (e.g., chlorine, bromine, and bromo-chloro compounds) will be controlled by dehalogenation rather than WET testing. However, use of dehalogenation shall not exempt an effluent from the WET testing requirements of this Subchapter." Chapter 2, Part III of the CPP implements this narrative criterion as follows: The requirement of OAC 785:46-3-1(c) for dehalogenation is typically implemented as "no measurable amount" in the effluent. For chlorine, "no measurable amount" is defined by the DEQ to be less than 0.1 mg/l.

e. Ammonia Toxicity (Outfall 001)

(1) Criterion and Implementation

Interim implementation for controlling ammonia toxicity is described in OAC 785:46 and OAC 252:690. OAC 785:46-5-3(b)(3) states "For regulatory purposes, there is a reasonable potential for chronic toxicity if concentrations of ammonia outside the chronic regulatory mixing zone exceed 6 mg/l." For POTWs, OAC 252:690-3-20 through 3-23 requires that where seasonal DO-based monthly average ammonia limits are established, those limits must be compared with toxicity-based monthly average ammonia limits determined using the interim 6 mg/l chronic toxicity criterion, the conservative substance mixing zone equations for chronic toxicity, and a monitoring frequency of 3 per week.

(2) Determination of Toxicity-Based Limits

The toxicity based ammonia limitation implementation discussed above relates to the control of chronic toxicity outside the chronic mixing zone. Since $Q^* = 0.01559$, chronic toxicity is not applicable to the discharge from this facility, in accordance with OAC 252:690-3-31.

(3) Ammonia Monitoring

The previous permit has concurrent testing required for ammonia on all composite samples collected for WET testing of the fathead minnow species. This concurrent testing requirement for ammonia will be carried to the draft permit.

f. Whole Effluent Toxicity (Outfall TX1)

(1) Criterion and Implementation

Whole effluent toxicity (WET) testing is the most direct measure of potential aquatic toxicity, since it incorporates the effects of synergism of effluent components and receiving stream water quality characteristics. OAC 785:45-5-12(f)(6)(A) states "Surface waters of the state shall not exhibit acute toxicity and shall not exhibit chronic toxicity outside the chronic regulatory mixing zone. Acute test failure and chronic test failure shall be used to determine discharger compliance with these narrative aquatic life toxics criteria." This narrative toxicity criterion is implemented according to procedures described at OAC 785:46, Subchapter 3, OAC 252:690-3-17 through 3-43, and Chapter 3 of the CPP.

Two types of WET tests are used to implement the narrative toxicity criterion. The 48-hour acute test is used to protect against acute toxicity, and the 7-day chronic test is used to protect against chronic toxicity outside the chronic regulatory mixing zone. Two test species are used: a vertebrate species, *Pimephales promelas* (or Fathead minnow); and an invertebrate species, *Daphnia pulex* (for acute testing) or *Ceriodaphnia dubia* (for chronic testing).

(2) WET Testing Historical Summary

Outfall TX1 is functionally identical to Outfall 001. The previous permit required **acute** WET testing of both the *Daphnia pulex* and fathead minnow species on a quarterly basis. The previous permit used a 7Q2 flow of 449 mgd for the Arkansas River upstream of the Broken Arrow POTW, which resulted in a Q^* value < 0.054 . The critical dilution was 100% and a 0.75 dilution series was used. The previous permit has biomonitoring requirement for *Daphnia pulex* and WET limits for *Pimephales promelas*. WET testing summary is provided in the following table. The LC_{50} value is shown **underlined in bold face** where a test failed.

**Summary of Acute WET Test Results by Species (Outfall TX1)
March 2012 through February 2017**

| <i>Daphnia pulex</i> | | | <i>Pimephales promelas</i> (Fathead minnow) | | |
|----------------------|-------------------------------|-----------|---|-------------------------------|-----------|
| Reporting period | LC ₅₀ ^a | WET/22414 | Reporting period | LC ₅₀ ^a | WET/22414 |
| 03/01/12 - 05/31/12 | > 100% | N/A | 03/01/12 - 05/31/12 | > 100% | > 100% |
| 06/01/12 - 08/31/12 | > 100% | N/A | 06/01/12 - 08/31/12 | > 100% | > 100% |
| 09/01/12 - 11/30/12 | > 100% | N/A | 09/01/12 - 11/30/12 | > 100% | > 100% |
| 12/01/12 - 02/28/13 | > 100% | N/A | 12/01/12 - 02/28/13 | > 100% | > 100% |
| 03/01/13 - 05/31/13 | > 100% | N/A | 03/01/13 - 05/31/13 | > 100% | > 100% |
| 06/01/13 - 08/31/13 | > 100% | N/A | 06/01/13 - 08/31/13 | > 100% | > 100% |
| 09/01/13 - 11/30/13 | > 100% | N/A | 09/01/13 - 11/30/13 | > 100% | > 100% |
| 12/01/13 - 02/28/14 | > 100% | N/A | 12/01/13 - 02/28/14 | > 100% | > 100% |
| 03/01/14 - 05/31/14 | > 100% | N/A | 03/01/14 - 05/31/14 | > 100% | > 100% |
| 06/01/14 - 08/31/14 | > 100% | N/A | 06/01/14 - 08/31/14 | > 100% | > 100% |
| 09/01/14 - 11/30/14 | > 100% | N/A | 09/01/14 - 11/30/14 | > 100% | > 100% |
| 12/01/14 - 02/28/15 | > 100% | N/A | 12/01/14 - 02/28/15 | > 100% | > 100% |
| 03/01/15 - 05/31/15 | > 100% | N/A | 03/01/15 - 05/31/15 | > 100% | > 100% |
| 06/01/15 - 08/31/15 | > 100% | N/A | 06/01/15 - 08/31/15 | > 100% | > 100% |
| 09/01/15 - 11/30/15 | > 100% | N/A | 09/01/15 - 11/30/15 | > 100% | > 100% |
| 12/01/15 - 02/28/16 | > 100% | N/A | 12/01/15 - 02/28/16 | > 100% | > 100% |
| 03/01/16 - 05/31/16 | > 100% | N/A | 03/01/16 - 05/31/16 | > 100% | > 100% |
| 06/01/16 - 08/31/16 | > 100% | N/A | 06/01/16 - 08/31/16 | > 100% | > 100% |
| 09/01/16 - 11/30/16 | > 100% | N/A | 09/01/16 - 11/30/16 | > 100% | > 100% |
| 12/01/16 - 02/28/17 | > 100% | N/A | 12/01/16 - 02/28/17 | > 100% | > 100% |

^a LC₅₀'s reported in percent effluent. An LC₅₀ ≤ 100 % constitutes a test failure.

(3) Reasonable Potential

(a) Criteria for Reasonable Potential

According to 40 CFR 122.44(d)(1)(v), when the permitting authority determines that a discharge causes, has the reasonable potential (RP) to cause, or contributes to an in-stream excursion above a narrative criterion within an applicable State water quality standard for whole effluent toxicity, the permit must contain effluent limits for whole effluent toxicity.

In accordance with the narrative criteria established in OAC 785:46-3-5 and cited by reference in OAC 252:690-3-18, RP exists whenever persistent lethality is demonstrated. In addition, the OAC 785:46-3-5 states that the permitting authority may deem RP to be demonstrated whenever intermittent toxicity or persistent toxicity occurs. Persistent toxicity (lethality and/or sublethality) is defined in OAC 252:690-1-2 as repeat failure (failure of the routine test plus one of the two monthly retests) of an acute or chronic WET test and intermittent toxicity is defined as two or more lethal or sublethal effect test failures of a routine acute or chronic WET test within any 18-month period. OAC 252:690-3-19(a) requires a toxicity reduction evaluation (TRE) when persistent toxicity is demonstrated. DEQ may also incorporate a WET limit or chemical-specific effluent limits into a permit when RP is established per OAC 690:3-19(b). In accordance with OAC 252:690-3-19(c) the effective date of a WET limit for the affected species may be deferred up to three years from the effective date of the permit.

(b) Application of Criteria to the Draft Permit and Permitting Actions

As shown in the summary of WET testing above, there was no acute test failure for any of the test species (fathead minnow and *Daphnia pulex*). Therefore, there is no RP demonstrated for fathead minnow and *Daphnia pulex*.

The draft permit will continue to have (1) WET limit for fathead minnows with concurrent testing for ammonia and pH, and (2) biomonitoring for *Daphnia pulex*.

(4) Whole Effluent Toxicity Testing Requirements

(a) Type of WET Testing Required

In accordance with OAC 252:690-3-31, the type of WET test(s) required is based on the value of Q^* , as follows:

- ◆ Where $Q^* < 0.054$, acute testing only is required.
- ◆ Where $Q^* > 0.3333$, chronic testing only is required.
- ◆ Where $0.054 \leq Q^* \leq 0.3333$, both acute and chronic testing are required.

Since Q^* is 0.01559, only acute testing is required.

(b) Critical Dilutions

In accordance with OAC 252:690-3-35, the acute critical dilution (ACD) is 100%.

(c) Dilution Series

A 0.75 dilution series is used for all WET testing. Where it is practical to do so, the critical dilution is bracketed. The purpose of doing so is to evaluate dose response both above and below the critical dilution. For critical dilutions between 76% and 95%, OAC 252:690, Appendix D, Table D-2, requires that a 100% effluent dilution be added to the dilution series to bracket the critical dilution. In accordance with OAC 252:690-3-33, the dilution series for each type test are as follows (critical dilutions are shown underlined in bold face):

Acute test: **100%**, 75%, 56%, 42%, and 32%, plus a dilution water control.

(d) Frequency of WET Testing

In accordance with OAC 252:690-3-41, the permittee will be required to perform quarterly testing of both test species.

Since there was no test failure for *Daphnia pulex* during the previous permitting period, the facility will be subject to a one year "trial period" of quarterly acute testing prior to the permittee being eligible for a WET testing frequency reduction for *Daphnia pulex* in accordance with OAC 252:690-3-41(b).

In accordance with OAC 252:690-3-42(4), WET testing frequency reduction is not applicable to fathead minnows due to established WET limit.

(e) Concurrent Testing Requirements

In accordance with OAC 252:690-3-25, the draft permit will include a provision for concurrent testing of ammonia and pH on all composite samples collected for WET testing of the fathead minnow species. The draft permit will not specify any concurrent testing requirements for daphnid testing.

2. Aquatic Toxicity and Human Health/Fish Flesh Criteria for Protection of the Fish and Wildlife Propagation and Fish Consumption Uses

a. Criteria and Implementation

(1) Aquatic Toxicity – Fish and Wildlife Propagation Use (Outfall 001)

Acute and chronic aquatic toxicity numerical criteria are specified at OAC 785:45-5-12(f)(6)(G) and are implemented according to procedures in OAC 785:46, Subchapter 5, OAC 252:690-3-51 through 3-57, and Chapter 3 of the CPP.

Aquatic toxicity numerical criteria are hardness-dependent for certain metals. The equations for calculating hardness-dependent criteria (for those metals present at quantifiable levels in the combined discharge) and the resulting acute and chronic criteria are as follows:

Hardness-dependent Aquatic Toxicity Criteria for the Arkansas River

| Effluent Characteristic | Acute Toxicity Criteria | | Chronic Toxicity Criteria | |
|-------------------------|--|--------------------|--|--------------------|
| | Equation | Value ^a | Equation | Value ^a |
| Copper, total | $C_{\text{acute}} = e^{(0.9422 (\ln (\text{hardness})) - 1.3844)}$ | 42.54 | $C_{\text{chronic}} = e^{(0.8545 (\ln (\text{hardness})) - 1.386)}$ | 26.34 |
| Zinc, total | $C_{\text{acute}} = e^{(0.8473 (\ln (\text{hardness})) + 0.8604)}$ | 239.39 | $C_{\text{chronic}} = e^{(0.8473 (\ln (\text{hardness})) + 0.7614)}$ | 216.82 |

^a Based on average background water hardness of 232.73 mg/l determined from site specific data collected during the 03/2012-02/2013 monitoring period.

(2) Protection of Human Health – Fish Consumption Use (Outfall 001)

Criteria for the protection of human health for the consumption of fish flesh apply only to receiving waters not designated as habitat-limited aquatic communities. Additional human health/fish flesh criteria are recommended by EPA in the National Recommended Water Quality Criteria (NRWQC). NRWQC criteria are not binding upon individual states, however.

OWQS and NRWQC criteria for the protection of human health for the consumption of fish flesh are specified at OAC 785:45-5-20(b) and Publication No. EPA 822-Z-99-001, respectively, and are implemented according to the procedures in OAC 785:46, Subchapter 7, OAC 252:690-3-64 through 3-70, and Chapter 3 of the CPP.

b. Determination of Reasonable Potential and Wasteload Allocation

(1) Reasonable Potential and WLA Equations

(a) Aquatic Toxicity – Fish and Wildlife Propagation Use (Outfall 001)

❖ Acute Toxicity

For determining whether there is reasonable potential to exceed acute toxicity numerical

criteria for discharges to streams, OAC 785:46-5-3(b)(2) defines a pollutant's concentration at the edge of the acute regulatory mixing zone (C_d) as:

$$C_d = C_b + \frac{Q_{e(D)}}{64.63} (C_{95} - C_b), \text{ where } Q_{e(D)} \text{ is expressed in mgd.}$$

In order for C_d to fall in the range between C_b and C_{95} , the value for $Q_{e(D)}$ used in the equation must be less than or equal to 64.63 mgd. If the actual $Q_{e(D)} > 64.63$ mgd, a value of 64.63 mgd is used in the reasonable potential equation.

Should a pollutant's acute toxicity screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion. For discharges to streams, the acute toxicity wasteload allocation is calculated in accordance with OAC 252:690-3-55(1)(A), as follows:

$$WLA_A = C_b + \frac{64.63}{Q_{e(D)}} (C_A - C_b), \text{ where } Q_{e(D)} \text{ is expressed in mgd.}$$

As with the reasonable potential equation, if the actual $Q_{e(D)} > 64.63$ mgd, a value of 64.63 mgd is used in the WLA equation.

❖ *Chronic Toxicity*

For determining whether there is reasonable potential to exceed chronic toxicity numerical criteria, OAC 785:46-5-3(b)(2) defines a pollutant's maximum concentration at the boundary of the chronic regulatory mixing zone (C_d) as:

$$C_d = C_b + 1.94 Q^* \frac{(C_{95} - C_b)}{(1 + Q^*)}, \text{ for } Q^* \leq 0.1823$$

$$C_d = C_b + \frac{(C_{95} - C_b)}{(6.17 - 15.51 Q^*)}, \text{ for } 0.1823 < Q^* < 0.3333$$

$$C_d = C_{95}, \text{ for } Q^* \geq 0.3333$$

Should a pollutant's chronic toxicity screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion. For discharges to streams, the chronic toxicity wasteload allocation is calculated in accordance with OAC 252:690-3-55(1)(B), as follows:

$$WLA_C = C_b + \left(\frac{1 + Q^*}{1.94 Q^*} \right) (C_C - C_b), \text{ for } Q^* \leq 0.1823$$

$$WLA_C = C_b + (6.17 - 15.51 Q^*) (C_C - C_b), \text{ for } 0.1823 < Q^* < 0.3333$$

$$WLA_C = C_C, \text{ for } Q^* \geq 0.3333$$

(b) Protection of Human Health – Fish Consumption Use (Outfall 001)

OAC 785:46-7-3(b)(1) defines the reasonable potential equation for a pollutant's instream concentration C_d after complete mixing as follows:

$$C_d = \frac{(C_{95} Q^* + C_b)}{(1 + Q^*)}$$

The human health/fish flesh wasteload allocation is calculated in accordance with OAC 252:690-3-68, as follows:

$$WLA_{FF} = C_{FF} + \frac{(C_{FF} - C_b)}{Q^*}$$

Should a pollutant's OWQS human health/fish flesh screen exhibit reasonable potential, a water quality-based limit is required for that pollutant and a wasteload allocation is calculated for each applicable criterion. Where a discharge is located less than five miles upstream of a PWS intake (see Section III.A), OAC 252:690-3-68 requires that a human health/fish flesh wasteload allocation equal to the criterion be established for any pollutant detected in the discharge to which a human health/fish flesh criterion applies. Since there is no PWS intake within five miles of this discharge the WLA equation above is used.

In accordance with EPA Region 6 policy, pollutants are screened for reasonable potential to exceed NRWQC human health/fish flesh consumption criteria and, if reasonable potential is exhibited, effluent monitoring of those pollutants is required as a permit condition in lieu of establishing effluent limitations.

(2) Results of Reasonable Potential Screening

(a) Aquatic Toxicity – Fish and Wildlife Propagation Use (Outfall 001)

Results of the acute and chronic toxicity screens for Outfall 001, using $Q_{e(D)} = 8.0$ mgd, C_{95} values reflected in Section V.C.2.c, pollutant background levels reflected in Section V.C.2.d, and any hardness-dependent metals criteria reflected in Section V.D.2.a(1), are shown in the table below. Any required WLAs are also shown.

Results of Acute and Chronic Toxicity Screens (Outfall 001)
(concentrations in $\mu\text{g/l}$ unless otherwise specified)

| Effluent Characteristic | Acute Toxicity | | | | Chronic Toxicity | | | |
|-------------------------|----------------|--------|--------------|---------|------------------|--------|--------------|---------|
| | C_d | C_A | $C_d > C_A?$ | WLA_A | C_d | C_C | $C_d > C_C?$ | WLA_C |
| Arsenic, total | 0.94 | 360 | No | N/A | 0.23 | 190 | No | N/A |
| Copper, total | 3.70 | 42.54 | No | N/A | 0.89 | 26.34 | No | N/A |
| Selenium, total | 0.46 | 20 | No | N/A | 0.11 | 5 | No | N/A |
| Zinc, total | 6.99 | 239.39 | No | N/A | 1.68 | 216.82 | No | N/A |

(b) Protection of Human Health – Fish Consumption Use (Outfall 001)

Results of the OWQS and NRWQC human health/fish flesh screens for Outfall 001, using $Q^* = 0.00141$, C_{95} values reflected in Section V.C.2.c, and background levels reflected in Section V.C.2.d, are shown in the table below. Any required OWQS WLAs are also shown.

Results of OWQS and NRWQC Human Health/Fish Flesh Screens (Outfall 001)
 (concentrations in µg/l unless otherwise specified)

| | State Human Health/Fish Flesh Criteria | | | | NRWQC Criteria | | |
|------------------------------|--|-----------------|------------------------------------|-------------------|----------------|--------------------|---------------------------------------|
| | C _d | C _{FF} | C _d > C _{FF} ? | WLA _{FF} | C _d | C _{NRWQC} | C _d > C _{NRWQC} ? |
| Arsenic, total | 0.01 | 205 | No | N/A | --- | --- | --- |
| Bis (2-ethylhexyl) Phthalate | 0.02 | 22 | No | N/A | --- | --- | --- |

c. Permit Limitations

Permit limitations are not required since reasonable potential to exceed water quality criteria is not demonstrated for any of the measurable pollutants.

3. Mineral Constituent Criteria for Protection of the Agriculture Use (Outfall 001)

a. Criteria and Implementation

Yearly mean standard (YMS) and sample standard (SS) criteria for surface waters designated for the Agriculture use are specified at OAC 785:45-5-13 and Appendix F thereto, and are implemented according to procedures in OAC 785:46, Subchapter 9, OAC 252:690-3-79 through 3-85, and Chapter 3 of the CPP. OAC 785:46-9-2 requires that where segment-averaged YMS and SS values in OAC 785:45, Appendix F, are available and are adequate to represent the receiving stream in question, they shall be used as the criteria for protection of the Agriculture use. The statistical relationship between background, YMS, and SS values for mineral constituents described at OAC 252:690-3-16(a) as shown below is used to calculate site-specific background.

$$C_b = 2 \times C_{YMS} - C_{SS}$$

The results are shown in the following table.

Background, YMS Criterion and SS Criterion for Outfall 001
 (concentration expressed in mg/l)

| Pollutants | YMS Criterion | SS Criterion | C _b |
|---|---------------|--------------|----------------|
| Chloride ^a | 629 | 810 | 448 |
| Sulfate ^a | 140 | 172 | 108 |
| Total Dissolved Solids (TDS) ^a | 1419 | 1782 | 1056 |

^a Criteria and background are based on segment-averaged data (segment 120410).

b. Determination of Reasonable Potential, Wasteload Allocation, and Criteria Long Term Average

(1) Reasonable Potential, Wasteload Allocation, and Criteria Long Term Average Equations

(a) Yearly Mean Standard

OAC 785:46-9-5(b) and (c) define the reasonable potential equation for a POTW discharge's instream pollutant concentration C_{d(YMS)} after complete mixing as follows:

$$C_{d(YMS)} = \frac{(C_{95} Q^* + C_b)}{(1 + Q^*)}, \text{ where } Q^* = Q_{e(D)} / Q_{u(LTA)}$$

In accordance with OAC 785:46-9-5(c), $C_{d(YMS)}$ is compared against the higher of the YMS criterion or 700 mg/l for TDS. $C_{d(YMS)}$ is compared against the higher of the YMS criterion or 250 mg/l for chloride and sulfate.

When reasonable potential is demonstrated, wasteload allocation and criteria long term average concentrations must be determined. OAC 252:690-3-83(1) defines a pollutant's YMS wasteload allocations, WLA_{YMS} , as follows:

$$WLA_{YMS} = C_{YMS} + \frac{(C_{YMS} - C_b)}{Q^*}, \text{ where } Q^* = Q_{e(D)} / Q_{u(LTA)}$$

In accordance with OAC 252:690-3-84(a), YMS criteria long term average, LTA_{YMS} , is defined as follows:

$$LTA_{YMS} = WLA_{YMS}$$

(b) Sample Standard

OAC 785:46-9-5(b) and (d) define the reasonable potential equation for a pollutant's instream concentration $C_{d(SS)}$ after complete mixing as follows:

$$C_{d(SS)} = \frac{(C_{95} Q^* + C_b)}{(1 + Q^*)}, \text{ where } Q^* = Q_{e(D)} / Q_{u(STA)}$$

In accordance with OAC 785:46-9-5(d), $C_{d(SS)}$ is compared against the higher of the SS criterion or 700 mg/l for TDS. $C_{d(SS)}$ is compared against the higher of the SS criterion or 250 mg/l for chloride and sulfate.

When reasonable potential is demonstrated, wasteload allocation and criteria long term average concentrations must be determined. OAC 252:690-3-83(2) defines a pollutant's SS wasteload allocations, WLA_{SS} , as follows:

$$WLA_{SS} = C_{SS} + \frac{(C_{SS} - C_b)}{Q^*}, \text{ where } Q^* = Q_{e(D)} / Q_{u(STA)}$$

In accordance with OAC 252:690-3-84(b), SS criterion long term average, LTA_{SS} , is calculated assuming a log-normal distribution and using a 99% probability basis according to the following equation. A CV of 0.6 is used in the absence of an effluent data set sufficiently large to calculate a CV.

$$LTA_{SS} = WLA_{SS} \times \exp \left(0.5 \ln \left(1 + \frac{CV^2}{4} \right) - 2.326 \sqrt{\ln \left(1 + \frac{CV^2}{4} \right)} \right)$$

(2) Screening Results

Results of the YMS and SS screens for Outfall 001, using $Q_{e(D)}$, $Q_{e(LTA)}$, and $Q_{u(STA)}$ values in Section V.C.2.a, C_{95} value in Section V.C.2.c, and background levels and YMS and SS criteria reflected in Section V.D.3.a, are shown in the following tables.

(a) Yearly Mean Standard

Results of Yearly Mean Standard Reasonable Potential Screen
(Concentrations in mg/l)

| Pollutant | C _{d(YMS)} | Criterion | | | C _{d(YMS)} >Max(C _{YMS} , Default)? | WLA _{YMS} |
|-----------|---------------------|------------------|---------|---------------------------------|---|--------------------|
| | | C _{YMS} | Default | Max(C _{YMS} , Default) | | |
| Chloride | 447.6 | 629 | 250 | 629 | No | N/A |
| Sulfate | 108.1 | 140 | 250 | 250 | No | N/A |
| TDS | 1055.3 | 1419 | 700 | 1419 | No | N/A |

(b) Sample Standard

Results of Sample Standard Reasonable Potential Screen
(Concentrations in mg/l)

| Pollutant | C _{d(SS)} | Criterion | | | C _{d(YMS)} >Max(C _{SS} , Default)? | WLA _{SS} |
|-----------|--------------------|-----------------|---------|--------------------------------|--|-------------------|
| | | C _{SS} | Default | Max(C _{SS} , Default) | | |
| Chloride | 447.4 | 810 | 250 | 810 | No | N/A |
| Sulfate | 108.2 | 172 | 250 | 250 | No | N/A |
| TDS | 1055.0 | 1782 | 700 | 1782 | No | N/A |

c. Permit Limitations

Based on the results of the YMS and SS screens shown in the tables above, reasonable potential is not demonstrated at Outfall 001 for chloride, sulfate, and TDS. Thus, further limitation evaluation is not required.

4. Bacterial Criteria for Protection of the Primary Body Contact Recreation and Public and Private Water Supply Uses

a. Bacteria Limitation – Primary Body Contact Recreation (PBCR) Use (Outfall 001)

The previous permit contained effluent limits for fecal coliform. However, fecal coliform is no longer used as an indicator for bacterial criteria and has been deleted from Oklahoma's Water Quality Standards as of September 12, 2014. In accordance with the revised OAC 252:690-3-86, either E. coli or enterococci are now the only valid bacteriological indicators. E. coli has been chosen by the permittee via correspondence received 01/30/2017 as limit indicator.

The Arkansas River (Waterbody ID 120410010080_00) immediately downstream from the facility's point of discharge is impaired for bacteria. The Total Maximum Daily Load (TMDL) completed for the Arkansas River (TMDL I.D. 35681) establishes a wasteload allocation for bacteria in the discharge from the City of Broken Arrow wastewater treatment plant. The following bacteria limits are applicable to the facility's discharge through Outfall 001.

- In accordance with OAC 252:690-3-86(a)(2), the draft permit will have a E. coli monthly average limit (MAL) of 126 MPN/100ml, expressed as a geometric mean, and a daily maximum limit (DML) of 406 MPN/100ml for streams, in effect for the "recreational period" of May 1 through September 30.
- Additionally, in accordance with OAC 252:690-3-86(b), from October 1 through April 30; E. Coli

monthly average limit of 630 MPN/100ml, expressed as a geometric mean, and the daily maximum limit of 2030 MPN/100ml (for streams) stated in OAC 252:690-3-86(c)(2) apply to permittees that discharge to waterbodies that are impaired for bacteria.

- In accordance with OAC 252:690-3-89(a)(3), the draft permit will have a bacteria monitoring frequency of twice a week during the months of May through September to protect the PBCR beneficial use and a bacteria monitoring frequency of once a week during the months of October through April to protect the Secondary Body Contact Recreation (SBCR) beneficial use since the receiving stream is impaired for bacteria.

b. Total Coliform – Public and Private Water Supply (PPWS) Use (Outfall 001)

Since this receiving stream is not designated with PPWS used, permitting action to protect this use is not necessary.

5. Criteria for Protection of the Aesthetics Use (Outfall 001)

a. General

Nutrient loading in Oklahoma's surface waters, particularly of phosphorus, has become an area of concern. OAC 785:45-5-9(d) states "Nutrients from point source discharges or other sources shall not cause excessive growth of periphyton, phytoplankton, or aquatic macrophyte communities which impairs any existing or designated beneficial use." This narrative criteria is echoed in the State of Oklahoma's general antidegradation policy as applied to beneficial uses (OAC 785:45-3-2(d)) as "No water quality degradation which will interfere with the attainment or maintenance of an existing or designated beneficial use shall be allowed."

b. Nutrient Limitations and Monitoring Requirements

The previous permit for the Broken Arrow WWTF contained no nitrate or phosphorus limits or reporting requirements. According to data published by the OWRB in its 2015 Beneficial Use Monitoring Program (BUMP) Report, the trophic condition of the Arkansas River downstream of the Broken Arrow WWTF discharge is stable. Thus, in the judgment of the permit writer, monitoring of effluent nutrient levels is not warranted at this time. The permit will, however, contain a narrative condition for control of solids to protect the Aesthetics use.

c. Floatable Solids and Foam

In accordance with OAC 785:45-5-9(b), a narrative condition prohibiting the discharge of floating solids or visible foam in other than trace amounts will be included in the permit.

E. MONITORING REQUIREMENTS

1. Effluent Monitoring Requirements (Outfall 001)

a. General

In accordance with OAC 252:690-3-90, where reasonable potential to exceed an applicable criterion is not exhibited, the background is unknown and there are fewer than 10 effluent data points to characterize the effluent, further effluent monitoring may be warranted based on use of the TSD method for computing $C_{95(M)}$ (see Section V.C.2.c). The TSD procedure accounts for the inherent uncertainty in characterizing an effluent distribution from a small data set.

b. Applicability

Water quality-based limitations are not required for any priority pollutants.

Effluent data sets comprised of 10 or more data points exist for the following pollutants: total arsenic, total copper, total selenium, total zinc, and total dissolved solids.

All other pollutants detectable in the discharge which have State of Oklahoma water quality criteria are screened for reasonable potential using $C_{95(M)}$ in place of C_{95} to determine which of them may require effluent monitoring (see Section V.C.2.c).

c. Results of Reasonable Potential Screening Using $C_{95(M)}$

Where the instream concentration after mixing (C_d), calculated using $C_{95(M)}$ in place of C_{95} , exceeds an applicable criterion for a pollutant, a short term effluent monitoring requirement (sufficient to collect a minimum of ten data points) is established in the permit for that pollutant in accordance with OAC 252:690-3-90. Reasonable potential may then be reassessed with the larger effluent data set and the permit may be reopened, if necessary, to add appropriate effluent limitations. Results of the reasonable potential screens using $C_{95(M)}$ are shown in the following tables:

(1) Aquatic Toxicity Criteria

Not applicable since the reasonable potential screenings were performed using data sets comprised of more than ten (10) data points provided for each of the applicable pollutants.

(2) Human Health/Fish Flesh Criteria

**Results of Human Health / Fish Flesh Reasonable Potential Screens for
 Additional Effluent Monitoring using $C_{95(M)}$ - Outfall 001
 (concentrations in $\mu\text{g/l}$)**

| Effluent Characteristic | C_d | C_{FF} | $C_d > C_{FF}$? |
|------------------------------|-------|----------|------------------|
| Bis (2-ethylhexyl) Phthalate | 0.06 | 22 | No |

(3) YMS and SS Agriculture Criteria

**Results of Agriculture YMS and SS RP Screens for
 Additional Effluent Monitoring using $C_{95(M)}$ - Outfall 001
 (concentrations in mg/l)**

| Effluent Characteristic | YMS Criteria | | | SS Criteria | | |
|-------------------------|--------------|-----------|-------------------|-------------|----------|------------------|
| | C_d | C_{YMS} | $C_d > C_{YMS}$? | C_d | C_{SS} | $C_d > C_{SS}$? |
| Chloride | 447.8 | 629 | No | 447.7 | 810 | No |
| Sulfate | 108.3 | 140 | No | 108.5 | 172 | No |

Based on the results of the reasonable potential screens using $C_{95(M)}$, additional effluent monitoring is not required for any pollutant.

2. Background Monitoring Requirements (Monitoring Point 999)

OAC 252:690-3-10 requires that, where available, background levels be included in reasonable potential assessments and in calculating wasteload allocations.

a. Assessment for Aquatic Toxicity and Human Health/Fish Flesh Criteria

In general, if water quality-based limits derived from aquatic toxicity, human health, or raw water column criteria are established in a permit for a pollutant based on an assumed zero background (or a partial background data set consisting of less than 10 data points), background monitoring for that pollutant will be required. There are two exceptions to this requirement, both of which exclude background concentration as a component in the wasteload allocation equation. These exceptions are as follows:

- where permit limits are based on a chronic toxicity criterion in an effluent-dominated discharge situation, and
- where permit limits are based on a raw water column or human health/fish flesh and water criterion and the associated wasteload allocation was set equal to that criterion because the discharge is in close proximity to a PWS intake (not applicable to this facility).

Where permit limits for a pollutant are not required and the background is unknown (assumed zero), background monitoring may be justified for the purpose of reassessing whether there is reasonable potential to exceed an applicable criterion. In such cases, OAC 252:690-3-12 requires that the background trigger to criterion (BT/C) ratio be used to determine whether background monitoring is warranted for a pollutant. The trigger background concentration for a criterion is defined in OAC 252:690-1-2 as “the background concentration necessary to trigger reasonable potential for a substance to exceed an applicable criterion given a specified mean effluent concentration.” As described in Appendix J of OAC 252:690, the procedure involves calculating a BT/C ratio for each applicable criterion and comparing each such ratio with an associated threshold value, $(BT/C)_{max}$, which is a function of the magnitude of each criterion. Where the BT/C ratio > 1.0 , the C_{95} concentration is less than the criterion and there is no possibility of exhibiting reasonable potential to exceed that criterion at any background level which is less than or equal to the criterion. Where the BT/C ratio ≤ 1.0 , the C_{95} concentration is at least as high as the criterion and, depending on the magnitude of the criterion, background monitoring may be justified. If the BT/C ratio $\leq (BT/C)_{max}$ for any of the applicable criteria for a pollutant, then background monitoring for that pollutant is required. In order for $(BT/C)_{max}$ to be appropriately more sensitive to criteria of smaller magnitude, at which a measurable background level of a pollutant may have a relatively greater impact in the determination of reasonable potential, the value of the $(BT/C)_{max}$ threshold value function increases as the magnitude of a criterion decreases within the range of 1 to 1000 $\mu\text{g/l}$.

(1) Calculation of $(BT/C)_{max}$

The value of $(BT/C)_{max}$ for each applicable criterion is an inverse function of the criterion's magnitude with two break points (or “hinges”), one at 1.0 $\mu\text{g/l}$ and the other at 1,000.0 $\mu\text{g/l}$. It is calculated as follows:

$$(BT/C)_{max} = 1.0, \text{ where the criterion} \leq 1.0 \mu\text{g/l.}$$

$$(BT/C)_{max} = \frac{1}{2^{\log(\text{criterion})}}, \text{ where the criterion} > 1.0 \mu\text{g/l and} \leq 1,000.0 \mu\text{g/l.}$$

$$(BT/C)_{max} = 0.125, \text{ where the criterion} > 1,000.0 \mu\text{g/l.}$$

(2) Calculation of BT/C Ratios

Background trigger concentrations are first calculated for all applicable criteria and the BT/C concentration is then calculated by dividing the criterion-specific background trigger concentration by the applicable criterion. Values of $Q_{e(D)}$, Q^* , C_{95} , C_A , C_C , and C_{FF} are as previously defined.

(a) Acute Toxicity Criteria

$$BT/C_{Acute} = \frac{\left(\frac{64.63 C_A - Q_{e(D)} C_{95}}{64.63 - Q_{e(D)}} \right)}{C_A}, \text{ where } Q_{e(D)} < 64.63 \text{ mgd.}$$

BT/C_{Acute} is not defined for values of $Q_{e(D)} \geq 64.63$ mgd.

(b) Chronic Toxicity Criteria

For discharges to streams, the following equations are used:

$$BT/C_{Chronic} = \frac{\left(\frac{(1 + Q^*) C_C - 1.94 Q^* C_{95}}{1 - 0.94 Q^*} \right)}{C_C}, \text{ where } Q^* \leq 0.1823$$

$$BT/C_{Chronic} = \frac{\left(\frac{(6.17 - 15.51 Q^*) C_C - C_{95}}{5.17 - 15.51 Q^*} \right)}{C_C}, \text{ where } 0.1823 < Q^* < 0.3333$$

$BT/C_{Chronic}$ is not defined for $Q^* \geq 0.3333$ (effluent-dominated discharge situations), since the background level is not a component of the chronic toxicity reasonable potential equation.

(c) Human Health/Fish Flesh Criteria

$$BT/C_{FF} = \frac{(1 + Q^*) C_{FF} - Q^* C_{95}}{C_{FF}}$$

(3) Summary of Background Monitoring Requirements

Summary of Background Monitoring Requirements (Outfall 001)

| Effluent Characteristic | Effluent limit required? | Background assumed zero? | BT/C ratio procedure applicable? | BT/C Ratio Assessment | | | | Background monitoring required? |
|------------------------------|--------------------------|--------------------------|----------------------------------|-----------------------|------------|-----------------------|--------------------------------------|---------------------------------|
| | | | | Type Criterion | BT/C Ratio | (BT/C) _{max} | BT/C ratio ≤ (BT/C) _{max} ? | |
| Arsenic, total | No | Yes | Yes | Acute | >1 | 0.170 | No | No |
| | | | | Chronic | >1 | 0.206 | No | |
| | | | | FF | >1 | 0.201 | No | |
| Copper, total | No | Yes | Yes | Acute | >1 | 0.323 | No | No |
| | | | | Chronic | 0.996 | 0.374 | No | |
| Selenium, total | No | Yes | Yes | Acute | >1 | 0.406 | No | No |
| | | | | Chronic | >1 | 0.616 | No | |
| Zinc, total | No | Yes | Yes | Acute | >1 | 0.192 | No | No |
| | | | | Chronic | >1 | 0.198 | No | |
| Bis (2-ethylhexyl) Phthalate | No | Yes | Yes | FF | >1 | 0.394 | No | No |

b. Assessment for Agriculture Criteria

Where background data is not available for mineral constituents, background concentrations are calculated from historical YMS and SS data in Appendix F of OAC 785:45 (see Section V.D.3). In addition, the agriculture beneficial use of the Arkansas River (WBID 120410010080) is fully supported according to the 2015 BUMP Report. Therefore, background monitoring for these mineral constituents is not warranted.

F. BIOSOLIDS/SEWAGE SLUDGE REQUIREMENTS

Biosolids/sewage sludge disposal practices shall comply with the Federal regulations for landfills, biosolids/sewage sludge, and solid waste disposal established at 40 CFR Part 257, 503, and the DEQ rules governing Sludge Management (OAC 252:515 and OAC 252:606) as applicable.

The sludge disposal shall also comply with the requirements of the amended Sludge Disposition Plan approved by the Department of Environmental Quality on February 17, 2017 that allows the permittee to landfill biosolids/sewage sludge at the following facilities:

- ◆ American Environmental Landfill (Landfill Permit No. 3557021), which is located in part of Section 36, Township 20 North, Range 10 East, I.M., Osage County, Oklahoma.
- ◆ Waste Management Quarry Landfill, (Landfill Permit No. 3551020), which is located in the E½, NE¼ of Section 6, Township 14 North, Range 18 East, I.M., Muskogee County, Oklahoma.

The permittee is required to maintain all records relevant to sewage biosolids/sewage sludge disposal for the life of the permit. These records shall be made available to the ODEQ upon request.

The permittee shall give 120 days prior notice to DEQ of any change planned in the biosolids/sewage sludge disposal practice.

G. 303(d) LIST ASSESSMENT

1. Water Quality Assessment and Causes of Impairment

The facility discharges to the Arkansas River in Segment 120410 of the Middle Arkansas River Basin. The Category 5 303(d) list, in Appendix C of the 2014 Integrated Report, indicates that this stream segment of the Arkansas River (Waterbody ID 120410010080_00) that is immediately downstream from the facility's point of discharge, is impaired for enterococcus.

2. 303(d) List-Related Permitting Actions

Where impairments are listed, EPA Region 6 policy requires that the draft permit include WQ-based limits or a monitoring and reporting requirement for the listed pollutants if present in the discharge, and a re-opener clause as permit conditions. Therefore, the following permitting actions are taken according to the listed impairments.

a. Enterococcus

A Total Maximum Daily Load (TMDL) development process was completed and approved for bacteria in November 2008. The completed TMDL (TMDL ID 35681) has established a bacterial waste load allocation for the Broken Arrow WWTP. In accordance to the DEQ Water Quality Standards Implementation OAC 252:690-3-86, either *E. coli* or enterococci can be implemented for bacterial impairments. *E. coli* has been chosen by the permittee via email correspondence received 01/30/2017 as limit parameter. Therefore, the *E. coli* limits described in section V.B.4 are applied to this permit. Additional permit limits for enterococcus are not needed.

b. Re-opener Clause

A re-opener clause is included in the permit to allow for modification and/or reissuance to require additional monitoring and/or effluent limitations where actual or potential exceedances of State water quality criteria are determined to be the result of the permittee's discharge to the receiving water(s), or a revised TMDL is established for the receiving water(s). Modification and/or reissuance of the permit shall follow regulations listed at 40 CFR 124.5.

H. ANTIDEGRADATION REQUIREMENTS

Because no antidegradation restrictions are listed in Appendix A of the OWQS for the stream segment of the Arkansas River, to which the Lynn Lane WWTP discharges (see Section V.B), implementation of the State's antidegradation policy, as described at OAC 785:46, Subchapter 13, indicates that no special requirements beyond Tier 1 protection (maintenance and protection of designated uses, as herein described) are necessary.

I. PROTECTION OF ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT

The stream segment of the Arkansas River, to which the Lynn Lane WWTP discharges, is considered by the U.S. Fish and Wildlife Service (USFWS) to be a sensitive area for endangered or threatened species. Since there is no proposed increase in the facility's design average daily flow nor a change in location of the point of discharge, no adverse impact on endangered or threatened species or their critical habitat is expected.

VI. GROUNDWATER PROTECTION

For municipal facilities, permits issued through the Water Quality Division's Construction Permit Section for plant design and construction (pursuant to the requirements of OAC 252:656) and land application of non-industrial

wastewater and/or biosolids (pursuant to the requirements of OAC 252:621 and OAC 252:606, respectively) are considered sufficient to protect groundwater quality.

VII. DRAFT PERMIT EFFLUENT LIMITATIONS

A. GENERAL

In accordance with 40 CFR 122.44(a), (d) and (l), pollutant limitations and monitoring requirements are established in the draft permit based on the more stringent of technology-based, water quality-based, or previous permit requirements. Both concentration and mass (loading) limits are established unless it is impractical to specify loading limits because of the units in which concentration limits are expressed (e.g., standard units for pH). Such loading limitations are calculated using the facility's design average daily flow according to the following equation:

$$\text{Mass loading limit (in lbs/day)} = \text{Concentration limit (in mg/l)} \times Q_{e(D)} \text{ (in mgd)} \times 8.34$$

The facility's approved design average daily flow of 8.0 mgd is used to calculate all loading limits.

B. EFFLUENT LIMITATIONS - OUTFALL 001

Beginning the effective date and lasting through the expiration date of the permit, the facility is authorized to discharge treated wastewater in accordance with the following limits and reporting requirements.

1. Effluent Concentration Limitations and Reporting Requirements

| Effluent Characteristic ^a | | Water Quality Standards | | | | Previous Permit | | | | Draft Permit | | | |
|---|------------|-------------------------|-----------------|------------|-----------|-----------------|-----------------|------------|-----------|--------------|-----------------|------------|-----------|
| | | Daily Min | Monthly Avg | Weekly Avg | Daily Max | Daily Min | Monthly Avg | Weekly Avg | Daily Max | Daily Min | Monthly Avg | Weekly Avg | Daily Max |
| BOD ₅ | Year round | --- | 30 | 45 | --- | --- | 30 | 45 | --- | --- | 30 | 45 | --- |
| TSS | Year round | --- | 30 | 45 | --- | --- | 30 | 45 | --- | --- | 30 | 45 | --- |
| TDS | Year round | --- | --- | --- | --- | --- | 1168 | --- | 1168 | --- | 1168 | --- | 1168 |
| Mercury, total (µg/l) | Year round | --- | --- | --- | --- | --- | 0.952 | --- | 1.90 | --- | 0.952 | --- | 1.90 |
| Fecal Coliform ^b (colonies/100 ml) | May - Sep | --- | --- | --- | --- | --- | 200 (geo. mean) | --- | 400 | --- | --- | --- | --- |
| E. coli ^{b, c} (MPN/100 ml) | May - Sep | --- | 126 (geo. mean) | --- | 406 | --- | --- | --- | --- | --- | 126 (geo. mean) | --- | 406 |
| | Oct - Apr | --- | 630 (geo. mean) | --- | 2030 | --- | --- | --- | --- | --- | 630 (geo. mean) | --- | 2030 |
| Total Residual Chlorine (TRC) ^d | Year round | --- | --- | --- | < 0.1 | --- | --- | --- | < 0.1 | --- | --- | --- | < 0.1 |
| pH (standard units) | Year round | 6.5 | --- | --- | 9.0 | 6.5 | --- | --- | 9.0 | 6.5 | --- | --- | 9.0 |

^a Units are mg/l, unless otherwise specified.

^b Fecal coliform limits have been replaced by E. coli limits due to changes in the Water Quality Standards (OAC 785:45).

^c E. coli bacteriological indicator and reporting unit of Most Probable Number (MPN)/100 ml were chosen by the permittee via correspondence received 01/30/2017.

^d If no chlorine is used for an entire reporting period, the permittee shall report a value of "zero" for the daily maximum and enter "No chlorine used this reporting period" in the comments section on the DMR for that reporting period in lieu of the indicated testing. For any

week in which chlorine is used, the indicated testing shall be done until the chlorine is no longer in use and at least one subsequent test verifies that the effluent meets the total residual chlorine limit.

2. Monthly Average Mass Loading Limitations and Reporting Requirements

| Effluent Characteristic ^a | | Water Quality Standards | Previous Permit | Draft Permit |
|--------------------------------------|------------|-------------------------|-----------------|--------------|
| Flow (mgd) | Year round | --- | Report | Report |
| BOD ₅ | Year round | 2001.6 | 2001.6 | 2001.6 |
| TSS | Year round | 2001.6 | 2001.6 | 2001.6 |
| TDS | Year round | 77,929 | 77,929 | 77,929 |
| Mercury, total | Year round | 0.0635 | 0.0635 | 0.0635 |

^a Units are lbs/day, unless otherwise specified.

3. Monitoring Requirements and Sample Types

| Effluent Characteristic ^a | | Previous OPDES Permit | | Draft Permit | |
|--------------------------------------|------------|-----------------------|-------------------|-----------------------|-------------------|
| | | Measurement Frequency | Sample Type | Measurement Frequency | Sample Type |
| Flow | Year round | Daily | Totalized | Daily | Totalized |
| BOD ₅ | Year round | 5/week | 12-hour composite | 5/week | 12-hour composite |
| TSS | Year round | 5/week | 12-hour composite | 5/week | 12-hour composite |
| TDS | Year round | 1/month | 12-hour composite | 1/month | 12-hour composite |
| Mercury, total | Year round | 1/month | 12-hour composite | 1/month | 12-hour composite |
| Fecal Coliform | May - Sep | 3/week | Grab | Replaced by E. coli | |
| E. coli | May - Sep | --- | --- | 2/week ^b | Grab |
| | Oct - Apr | --- | --- | 1/week ^c | Grab |
| Total Residual Chlorine (TRC) | Year round | Daily | Grab | Daily | Grab |
| pH | Year round | Daily | Grab | Daily | Grab |

^a Monitoring frequencies for flow and DO-based parameters are in accordance with OAC 252:606, Appendix A, Table 1-3 for activated sludge facilities and based on facility's design capacity of 8.0 mgd.

^b E. coli monitoring frequency for PBCR in accordance with OAC 252:690-3-89(a)(3)(A).

^c E. coli monitoring frequency for SBCR in accordance with OAC 252:690-3-89(a)(3)(B).

4. Sampling Point

Effluent samples for compliance testing shall be taken at the auto-sampler located on the bank of the Arkansas River at Outfall 001.

C. BIOMONITORING – OUTFALL TX1

Outfall TX1 is designated for biomonitoring reporting purposes. It is functionally identical to Outfall 001.

1. Previous Permit

The previous permit required only acute WET testing and contained biomonitoring requirements for *Daphnia pulex* and WET limits for *Pimephales promelas* (fathead minnows). The monitoring requirements are restated in the following tables:

a. *Daphnia pulex*

Previous Permit's WET Monitoring and Reporting Requirements

| Effluent Characteristic | | | | Reporting and Monitoring Requirements | | |
|-------------------------|--|-------------------|---|---------------------------------------|-------------------|-------------|
| Test | | Critical Dilution | Parameter | 48-hour Min | Testing Frequency | Sample Type |
| Routine Testing | <i>Daphnia pulex</i> , 48-hour acute LC ₅₀ static renewal, freshwater | 100% | Pass/Fail Survival [TIM3D] | Report | 1/quarter | 24-hr comp |
| | | | LC ₅₀ Effluent Concentration [TAM3D] | Report | | |
| | | | % Mortality at 100% Effluent [TJM3D] | Report | | |
| Retesting | Retest #1 [22415] | | | Report | As required | 24-hr comp |
| | Retest #2 [22416] | | | Report | | |

b. Fathead Minnows

Previous Permit's WET Limit

| Effluent Characteristic | Reporting/Monitoring Requirements ^a | | |
|--|--|------------------------|-------------|
| | 48-hour Min | Testing Frequency | Sample Type |
| Whole Effluent Toxicity Limit (fatheads only) [STORET 22414] | >100% | 1/quarter ^b | 24-hr comp |

Previous Permit's WET Monitoring and Reporting Requirements

| Effluent Characteristic | | | | Reporting/Monitoring Requirements | | |
|--|------|-------------------|--|-----------------------------------|-------------------|-------------|
| Test | | Critical Dilution | Parameter | 48-hour Min | Testing Frequency | Sample Type |
| <i>Pimephales promelas</i> (fathead minnow), 48-hour acute LC ₅₀ static renewal, freshwater | 100% | | Pass/Fail Survival [TIM6C] | Report | 1/quarter | 24-hr comp |
| | | | LC ₅₀ Effluent Conc [TAM6C] | Report | | |
| | | | % Mortality at 100% Effluent [TJM6C] | Report | | |

2. Draft Permit

During the period beginning the effective date of the permit and lasting through the expiration date, the permittee is authorized to discharge from Outfall TX1 (functionally identical to Outfall 001). The discharge consists of treated wastewater from a municipal treatment system. Such discharge shall be limited and monitored by the permittee as specified below.

The permittee is encouraged to perform required biomonitoring activities as early in the reporting period as is practical to ensure sufficient time remains in the reporting period should retests/repeat tests be necessary.

All laboratory analyses for the biomonitoring parameters specified in this permit must be performed by a laboratory certified by the Oklahoma Department of Environmental Quality for those parameters.

a. WET Reporting and Monitoring Requirements for *Daphnia pulex*

**Whole Effluent Toxicity Reporting and Monitoring Requirements
 (Outfall TX1)**

| Effluent Characteristic | | | | Reporting/Monitoring Requirements ^a | | |
|-------------------------|--|--------------------------------|--|--|--------------------------------|-------------|
| Test | | Critical Dilution ^d | Parameter | 48-hour Min | Testing Frequency ^f | Sample Type |
| Routine Testing | <i>Daphnia pulex</i> , 48-hour acute LC ₅₀ static renewal, freshwater | 100% | Pass/Fail Survival [TIM3D] | Report | 1/quarter ^e | 24-hr comp |
| | | | LC ₅₀ Effluent Conc [TAM3D] | Report | | |
| | | | % Mortality at 100% Effluent [TJM3D] | Report | | |
| Retesting | Retest #1 [22415] ^b | | | Report | As required ^c | 24-hr comp |
| | Retest #2 [22416] ^b | | | Report | | |

^a See Part II, Section E, Whole Effluent Toxicity Testing, for additional monitoring and reporting conditions.

^b Applies to daphnids according to results of test failure triggering monthly retests.

^c Monthly retesting required only if routine test for reporting period fails. Fill out ONLY these two retest parameters on retest DMRs, do not change the original results, and put the current submission date in the lower right hand corner of the DMR.

^d All acute tests shall use the dilution series specified in Part II, Section F, Item 1.

^e Results of retests conducted pursuant to prior test failure shall not be substituted on DMRs in lieu of routine test results (see Part II, Section F, Item 2.a).

^f See provision for monitoring frequency reduction after the first year (Part II, Section F, Item 5).

D. pulex whole effluent toxicity reporting and monitoring requirements apply beginning December 1, 2017, and the first reporting period is December 1, 2017 to February 28, 2018.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section F, Item 4.

Sampling Location: Samples taken in compliance with the monitoring requirements specified above for Outfall TX1 shall be taken at the same location as for Outfall 001.

b. WET Reporting and Monitoring Requirements for Fathead minnow

Whole Effluent Toxicity Reporting and Monitoring Requirements (Outfall TX1)

| Effluent Characteristic | | | | Reporting/Monitoring Requirements ^a | | |
|--|------|--------------------------------|--|--|--------------------------------|-------------|
| Test | | Critical Dilution ^c | Parameter | 48-hour Min | Testing Frequency ^b | Sample Type |
| <i>Pimephales promelas</i> (Fathead minnow), 48-hour acute LC ₅₀ static renewal, freshwater | 100% | | Pass/Fail Survival [TIM6C] | Report | 1/quarter | 24-hr comp |
| | | | LC ₅₀ Effluent Conc [TAM6C] | Report | | |
| | | | % Mortality at 100% Effluent [TJM6C] | Report | | |

^a See Part II, Section F, Whole Effluent Toxicity Limit, for additional monitoring and reporting conditions.

^b A valid WET test shall be reported for each reporting period.

^c All acute WET testing shall use the dilution series specified in Part II, Section E, Item 1.

P. promelas (fathead minnow) whole effluent toxicity reporting and monitoring requirements apply beginning December 1, 2017, and the first reporting period is December 1, 2017 to February 28, 2018.

Whole Effluent Toxicity Limit and Monitoring Requirements (Outfall TX1)

| Effluent Characteristic | Reporting/Monitoring Requirements ^a | | |
|---|--|------------------------|-------------|
| | 48-hour Min | Testing Frequency | Sample Type |
| Whole Effluent Toxicity Limit (fatheads only) [STORET 22414] | >100% | 1/quarter ^b | 24-hr comp |

^a See Part II, Section E, Whole Effluent Toxicity Limit, for additional monitoring and reporting conditions.

^b Results of retests conducted pursuant to prior test failure shall not be substituted on DMRs in lieu of routine test results (see Part II, Section E, Item 2.a).

Whole effluent toxicity reporting and monitoring requirements apply beginning the effective date of the permit.

Compliance with the Whole Effluent Toxicity Limit is required beginning the effective date of the permit

WET Concurrent Testing Provisions:

In accordance with OAC 252:690-3-30, where there is reason to believe certain substances may cause or contribute to whole effluent toxicity, the permit may require testing of those substances concurrently with WET testing. Specific concurrent testing requirements for ammonia are described at OAC 252:690-3-25.

Concurrent analysis of ammonia and pH is required for each individual effluent sample collected for acute WET testing or retesting of the Fathead minnow species. Reporting of concurrent testing results shall be in accordance with the following requirements.

**Concurrent Effluent Testing for Acute WET Tests – Reporting Requirements
Outfall TX1**

| Effluent Characteristic | Concentration | | | Monitoring Requirements | |
|---|---------------|-------------|-----------|-------------------------|---|
| | Daily Min | Monthly Avg | Daily Max | Monitoring Frequency | Sample Type |
| Ammonia, (NH ₃ -N) (mg/l) ^{a,b} [STORET 00610] | Report | Report | Report | 1/quarter | 24 hr comp ^b |
| pH (std units) ^{a,b} [STORET 00400] | Report | N/A | Report | 1/quarter | Measured in each composite effluent sample, including static renewals, just prior to first use ^b |

^a Report only those effluent samples collected for WET testing of the Fathead minnow species. Samples collected for WET testing purposes, including static renewals, shall be of sufficient volume to allow for the required concurrent analyses in addition to the WET testing itself. Samples sent directly to WET testing laboratories shall not undergo any preservation other than refrigeration to maintain a temperature at or below 6°C but not frozen prior to arrival and processing at the WET testing laboratory.

^b Two sets of samples for concurrent analyses are required for ammonia and pH:

Concurrent ammonia analyses must be performed on composite samples that are properly preserved and delivered directly to a state certified analytical laboratory. These results shall be included in the results for Outfall 001.

A second concurrent analysis is required for the sample that is sent to the WET testing laboratory and for the table above. Just prior to first use of each composite sample for WET testing purposes, the biomonitoring laboratory shall take an adequately-sized portion of each composite sample, acidify it in accordance with preservation requirements in 40 CFR 136, and have it analyzed for ammonia (NH₃-N) at a state certified laboratory. The pH measurement required for the above table must be taken just prior to the acidification step. These pH and ammonia readings should NOT be included in the results for Outfall 001.

WET testing summary reports: Reports of all WET testing initiated, regardless of whether such tests are carried to completion, shall follow the requirements of Part II, Section E, Item 4.

Sampling Location: Samples taken in compliance with the monitoring requirements specified above for Outfall TX1 shall be taken at the same location as for Outfall 001.

VIII. WASTEWATER REUSE

A. GENERAL

The permitted uses of the categories of the reclaimed water are described in OAC 252:627-1-6. The permit to supply is based on Category 3 reclaimed water after complete treatment in the activated sludge treatment system in accordance with OAC 252:627 and OAC 252:656. The generation and supply of Category 3 reclaimed water by the facility and the usage or reclaimed water by the Indian Springs Country Club is described in Section II.B.3 of the fact sheet.

B. VARIANCE

Reclaimed wastewater is required to be in compliance with fecal coliform limits specified Appendix A of OAC 252:627. On March 24, 2017, the facility submitted a request for variance from OAC 252:627 to allow testing for E. coli in place of fecal coliform. Equivalent E. coli limitations are established for reclaimed wastewater as specified in the following section.

C. REQUIREMENTS FOR CATEGORY 3 RECLAIMED WATER

1. Permitted Sites

According to the information provided by the City of Broken Arrow - Lynn Lane WWTP, "the supplier" of the reclaimed water, the land application of Category 3 reclaimed water is permitted only at the following golf course owned and operated by ISCC Managing Group, LLC dba Indian Springs Country Club, "the user" of the reclaimed water.

Authorized Irrigation Site for Category 3 Reclaimed Water

| Land Application Site | | Method of Irrigation | Total Area (Acres) ^a | Irrigated Area (Acres) ^a |
|-----------------------|--|----------------------|---------------------------------|-------------------------------------|
| Site ID | Legal Description | | | |
| LA1 | N½ of Section 10, N½ of Section 11, and N½, SE¼ of Section 11, Township 17N, Range 14E, I.M., Tulsa County | Sprinkler | 230 | 200 |

^a. Provided in Section III of Form 2M1 submitted by the City of Broken Arrow - Lynn Lane WWTP.

2. Limits and Monitoring Requirements

In accordance with Appendix A of OAC 252:627, the following limits and testing frequencies are established for the permit to supply Category 3 reclaimed water by the City of Broken Arrow - Lynn Lane WWTP to the golf course owned and operated by the Indian Springs Country Club listed above. The Monthly Operating Reports (MORs) shall be maintained by the supplier, the City of Broken Arrow - Lynn Lane WWTP, retained for three (3) years, and made available to the DEQ upon request.

Beginning the effective date and lasting through the expiration date of the permit, the treated municipal wastewater stored in the chlorine contact basin located at the Lynn Lane WWTP is authorized as Category 3 reclaimed water in accordance with the following limits and monitoring requirements.

| Parameter | Limits and Monitoring Requirement ^a | Measurement Frequency | Sample Type | Monitoring Location |
|-----------------------|---|-----------------------|-------------------|---|
| Flow | Record (mgd) | Daily ^b | Totalized | Flow meters at irrigation site ^c |
| E. coli | Monthly geometric mean < 126 MPN/100 ml Single sample maximum < 406 MPN/100 ml | 3/week | Grab | Chlorine contact basin |
| Chlorine Disinfection | Free available chlorine ≥ 0.20 mg/l, or Combined chlorine residual ≥ 0.50 mg/l | Every 12 hours | Grab | Chlorine contact basin |
| BOD ₅ | < 20 mg/l | 1/week ^d | 12-hour composite | Chlorine contact basin |

^a When there is no supply of reclaimed water for the entire day, report "0" for the flow in the MOR and write "No Supply" in the comments column.

^b In accordance with OAC 252:656-25-2(h), flow measurement shall be accomplished by flow meters, or the calibration of pumps and installation of run-time meters.

^c The readings of flow meters at the irrigation site communicated by the user to the supplier.

^d Results of samples taken from the discharge may be used to comply with the requirement.

3. Additional Monitoring Requirements for Storage Ponds at the Golf Course

The treated municipal wastewater from the Lynn Lane WWTP is pumped to ponds located on the golf course for storage before being distributed through the irrigation system. The facility is required to evaluate the operation of the wastewater reuse system and implement necessary modification to the system if needed to ensure the irrigated water meets disinfection requirements in accordance with the schedule specified in Section VIII.D of this fact sheet. The following limits and monitoring requirement for reclaimed water pumped out of the storage ponds for irrigation at the golf course will become effective two (2) years from the effective date of the permit.

| Parameter | Limit | Measurement Frequency | Monitoring Location |
|-----------------------|---|-----------------------|---------------------|
| Chlorine Disinfection | Free available chlorine ≥ 0.20 mg/l, or Combined chlorine residual ≥ 0.50 mg/l | Every 12 hours | Storage Ponds |

4. Restrictions for Category 3 Reclaimed Water

In accordance with OAC 252:627-3-3(b), the City of Broken Arrow – Lynn Lane WWTP (the supplier) shall ensure that Category 3 reclaimed water is not used:

- from a lagoon cell that receives raw sewage;
- on public use areas that have a high potential for skin to ground contact (e.g., football fields, sports complexes, and playgrounds);
- on golf courses unless irrigation takes place when the public is not allowed to access the sites;
- on any food crop that may be consumed raw;
- for spray irrigation on orchards or vineyards;
- at rates that allow a discharge from the permitted irrigation site;
- within one hundred feet (100') of the permitted boundary site;
- at a rate that exceeds the nitrogen and phosphorus rates for the crop at the site;
- at a rate that results in phytotoxicity;
- during periods of precipitation or while the soil is saturated or frozen;
- on land having a slope greater than five percent (5%);

- l. where there are berms or other barriers that would cause the pooling or ponding of reclaimed water at the site, nor shall any berms or barriers impede the natural flow of stormwater from the site;
- m. on public use areas during times of use.

D. COMPLIANCE SCHEDULE FOR DISINFECTION OF RECLAIMED WATER STORED IN PONDS LOCATED AT THE GOLF COURSE

The permittee shall achieve compliance with the disinfection requirements for the reclaimed water stored in the ponds located at the golf course in accordance with the following schedule:

| Task | Due Date |
|--|---|
| 1. Evaluate water reuse system operation and option(s) to meet disinfection required for reclaimed water being stored in ponds. | Six (6) months from the effective date of the permit. |
| 2. Submit an evaluation report and monitoring data to the DEQ to show whether disinfection requirements are met. | Nine (9) months from the effective date of the permit. |
| 3. If the evaluation report shows potential non-compliance with the disinfection requirements that will become effective two (2) years after the effective date of the permit, the permittee shall submit to the DEQ an engineering report providing plan(s) and timetable to achieve compliance with disinfection requirements. | Twelve (12) months from the effective date of the permit. |
| 4. The permittee shall complete necessary modification to the water reuse system. | Eighteen (18) months from the effective date of the permit. |
| 5. The permittee shall achieve compliance with the disinfection requirements for the reclaimed water pumped out of the storage ponds for irrigation. | Two (2) years from the effective date of the permit. |

IX. SUMMARY OF CHANGES FROM PREVIOUS PERMIT

The following changes were made in the draft permit relative to the previous OPDES permit:

- Fecal coliform limits in the previous permit have been replaced by E. coli limits due to changes in the Water Quality Standards (OAC 785:45).
- Bacterial limitation is added for the non-recreational period (October through April) with monitoring frequency of once per week due to bacteria impairment of the receiving stream, the Arkansas River.
- Requirements for Category 3 reclaimed water have been incorporated into the draft permit (see Section VIII).
- A two-year compliance schedule is added for the facility to achieve compliance with disinfection requirements for reclaimed water pumped out of storage ponds for irrigation at the golf course (see Section VIII.D).

X. ADMINISTRATIVE RECORD

The following sources were used to prepare the draft permit and constitute a part of its administrative record:

A. APPLICATIONS

OPDES Permit Application No. OK0040053 (Form 2M1), received August 29, 2016.

B. CLEAN WATER ACT CITATIONS

Sections 301, 303(d), 305(b), 402(a), and 402(o).

C. 40 CFR CITATIONS

40 CFR Parts 122, 124, and 136.

D. STATE LAW, STANDARDS, AND RULES AND REGULATIONS

Oklahoma Pollutant Discharge Elimination System (OPDES) Act, 27A O.S. §2-6-201 *et seq.*

OAC 252:606, Discharge Standards (DEQ).

OAC 252:690, Water Quality Standards Implementation (DEQ).

OAC 785:45, Oklahoma Water Quality Standards (OWRB).

OAC 785:46, OWQS Implementation (OWRB).

Oklahoma Continuing Planning Process (CPP) Document (DEQ).

E. MISCELLANEOUS

- Category 5 303(d) list, in Appendix C of the 2014 Integrated Report.
- 2015 Beneficial Use Monitoring Program Report (OWRB).
- WQMP amendment dated February 24, 1999 for DO-demanding substances.
- Permit file, OPDES Permit No. OK0040053, including selected biomonitoring laboratory reports.
- Integrated Compliance Information System (ICIS-OPDES), March 2012 through March 2017.
- EPA Region 6 revision to Post Third Round Biomonitoring Policy, dated June 30, 2000.
- USGS publication, Statistical Summaries of Streamflow in and near Oklahoma Through 2007 by John M. Lewis and Rachel A. Esralew (<http://pubs.usgs.gov/sir/2009/5135>).
- Part III and IV of OPDES Permit No. OK0040053.

XI. REVIEW BY OTHER AGENCIES AND FINAL DETERMINATION

A draft permit and draft public notice will be sent to the District Engineer, Corps of Engineers, State Historical Preservation Office and to the Field Supervisor of the U.S. Fish and Wildlife Service upon the publication of the notice. If comments are received from these agencies or other State or Federal agencies with jurisdiction over fish, wildlife, or public health, the permit may be denied or additional conditions may be included in accordance with regulations promulgated at 40 CFR 124.59.

The public notice describes the procedures for the formulation of final determinations.



City of Broken Arrow

Fact Sheet

File #: 17-2778, Version: 1

**Broken Arrow Municipal Authority
Meeting of: 10-17-2017**

To: Chairman and Authority Members
From: Utilities Department
Title:

**Acknowledgement of submittal of the Broken Arrow Municipal
Authority's Water Supply Report for the month of September 2017**

Background:

In an effort to provide the Authority and the Public more information with respect to our community's water usage, the Utilities Department Staff has prepared a Total Water Supply Report that records total daily water usage, as well as monthly water volume delivered to the community.

Over the course of the nine months of the year, the Maximum Water Plant Production Day was 17.4 million gallons per day (MGD) recorded on September 4, 2017. The Average Day usage through the end of September is 15.1 MGD. Total water treated at the plant up to the end of September is 455.8 million gallons (MG). Total water purchased from Tulsa for the month of September is 2.1 MG.

This report will be updated on a monthly basis. Staff recommends the Authority acknowledge submittal of the Report.

Cost: No cost
Prepared By: Anthony C. Daniel, Utilities Director
Reviewed By: Utilities Department
Assistant City Manager-Operations
Legal Department
Approved By: Michael L. Spurgeon, City Manager
Attachments: Monthly Report

Recommendation:

Acknowledge submittal of the Monthly Water Usage Report

Total Water Usage - 2017

| Day\Mon | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----|-----|-----|
| 1 | 8.9 | 9.4 | 8.8 | 9.5 | 9.5 | 12.1 | 12.7 | 11.5 | 15.6 | | | |
| 2 | 9.3 | 8.2 | 11.8 | 9.2 | 8.6 | 11.4 | 12.3 | 15.7 | 14.3 | | | |
| 3 | 9.1 | 8.2 | 11.3 | 9.2 | 9.0 | 11.1 | 12.5 | 15.2 | 14.7 | | | |
| 4 | 9.0 | 9.2 | 9.8 | 8.8 | 9.2 | 13.9 | 11.4 | 12.8 | 17.4 | | | |
| 5 | 8.1 | 9.0 | 9.3 | 8.8 | 10.5 | 12.4 | 12.8 | 14.0 | 14.7 | | | |
| 6 | 8.1 | 9.5 | 10.1 | 9.8 | 10.0 | 12.8 | 13.0 | 11.4 | 17.1 | | | |
| 7 | 9.6 | 9.6 | 8.6 | 10.6 | 12.3 | 13.4 | 15.5 | 13.3 | 15.5 | | | |
| 8 | 9.2 | 8.2 | 9.0 | 8.9 | 12.8 | 14.4 | 12.7 | 10.3 | 16.1 | | | |
| 9 | 10.2 | 8.1 | 9.3 | 10.7 | 13.5 | 16.9 | 12.4 | 14.1 | 15.5 | | | |
| 10 | 9.4 | 8.7 | 9.6 | 10.8 | 12.0 | 16.9 | 15.3 | 13.6 | 15.7 | | | |
| 11 | 8.4 | 10.1 | 7.7 | 12.8 | 9.9 | 19.1 | 16.1 | 11.7 | 17.1 | | | |
| 12 | 9.2 | 11.4 | 8.4 | 12.2 | 9.4 | 19.0 | 16.7 | 11.1 | 15.1 | | | |
| 13 | 8.6 | 9.1 | 8.7 | 10.9 | 10.7 | 17.6 | 17.1 | 11.3 | 16.4 | | | |
| 14 | 8.5 | 7.3 | 8.4 | 10.9 | 10.5 | 18.7 | 17.3 | 11.2 | 16.2 | | | |
| 15 | 8.8 | 7.9 | 8.1 | 12.0 | 12.8 | 18.6 | 12.6 | 13.4 | 16.9 | | | |
| 16 | 9.1 | 8.9 | 8.8 | 10.1 | 11.6 | 15.3 | 13.5 | 11.0 | 16.1 | | | |
| 17 | 8.9 | 9.3 | 9.1 | 10.1 | 11.2 | 13.1 | 14.9 | 9.7 | 13.9 | | | |
| 18 | 8.2 | 8.6 | 11.2 | 8.7 | 10.1 | 12.3 | 10.8 | 11.7 | 12.5 | | | |
| 19 | 8.6 | 9.1 | 10.2 | 10.2 | 10.0 | 15.6 | 14.0 | 11.9 | 12.0 | | | |
| 20 | 8.2 | 8.3 | 11.6 | 9.2 | 8.4 | 14.1 | 16.0 | 12.8 | 13.1 | | | |
| 21 | 8.4 | 9.0 | 11.8 | 8.8 | 9.8 | 15.3 | 14.4 | 13.9 | 13.6 | | | |
| 22 | 9.0 | 9.0 | 10.9 | 9.1 | 10.8 | 17.4 | 14.0 | 12.8 | 15.9 | | | |
| 23 | 8.5 | 9.5 | 9.7 | 9.7 | 10.4 | 16.9 | 14.8 | 15.2 | 15.1 | | | |
| 24 | 9.0 | 8.5 | 11.2 | 9.5 | 10.1 | 11.6 | 15.7 | 15.5 | 14.3 | | | |
| 25 | 9.3 | 8.1 | 8.3 | 9.6 | 11.3 | 13.8 | 16.1 | 14.9 | 16.2 | | | |
| 26 | 8.1 | 9.4 | 9.5 | 9.1 | 10.8 | 15.8 | 18.0 | 15.1 | 13.7 | | | |
| 27 | 8.8 | 8.5 | 10.1 | 8.9 | 11.2 | 16.8 | 14.4 | 14.6 | 12.8 | | | |
| 28 | 8.8 | 8.6 | 8.9 | 8.3 | 12.3 | 18.5 | 13.0 | 15.8 | 12.2 | | | |
| 29 | 8.6 | | 8.9 | 8.5 | 14.5 | 17.9 | 15.9 | 15.3 | 17.1 | | | |
| 30 | 9.5 | | 8.8 | 8.2 | 12.9 | 14.6 | 15.7 | 15.6 | 16.9 | | | |
| 31 | 8.9 | | 8.5 | | 13.9 | | 15.6 | 14.8 | | | | |
| Mon. Total | 274.3 | 248.7 | 296.4 | 293.1 | 340.0 | 457.3 | 447.2 | 411.2 | 453.7 | | | |

| | | | | | | | | | |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Plant Avg. Day | 8.8 | 8.9 | 9.6 | 9.8 | 11.0 | 15.2 | 14.4 | 13.3 | 15.1 |
| Monthly Purchase | 0.2 | 0.1 | 3.8 | 0.7 | 0.7 | 18.1 | 49.9 | 17.3 | 2.1 |
| Total Month | 274.5 | 248.8 | 300.2 | 293.8 | 340.7 | 475.4 | 497.1 | 428.5 | 455.8 |
| Total Avg. Day | 8.9 | 8.9 | 9.7 | 9.8 | 11.0 | 15.8 | 16.0 | 13.8 | 15.2 |

Verdigris Finished Water (MG): 3,221.9

Plant Annual Max. Day (MGD): 19.1

Tulsa Purchase Water (MG) ⁽¹⁾: 93.0

Plant Annual Avg. Day (MGD): 11.8

Total Finished Water (MG): 3,314.9

Plant Annual Min. Day (MGD): 7.3

Total System Annual Avg. Day (MGD): 12.1

Notes:

(1) Actual take is calculated from the billing records for the individual month.



City of Broken Arrow

Fact Sheet

File #: 17-2789, Version: 1

Broken Arrow Municipal Authority

Meeting of: 10-17-17

To: Chairman and Authority Members

From: Engineering and Construction Department

Title: Approval of and authorization to execute an Agreement for Professional Engineering Services for Haikey Creek Operation and Maintenance Capital Equipment Replacements with Holloway, Updike, and Bellen, Inc., for the design of the Fiscal Year 2018 Capital Equipment Replacement Project

Background:

The Capital Equipment Replacement project is for the annual replacement of equipment at the Regional Metropolitan Utility Authority (RMUA) Haikey Creek Wastewater Treatment Plant (HCWWTP). This project is to replace capital equipment identified in the strategic asset management plan. Equipment identified is HVAC control improvements for the Operations Building, drives for the gravity thickeners, repaint sweeps for the gravity thickeners and variable frequency drive controls at the lift station.

The design fee for this project is \$44,600.00 of which BAMA and TMUA each pay 50% (\$22,300.00). Funding for the improvements will be from the Utilities Department Wastewater Treatment Division's Capital budget.

Cost: \$22,300.00 (BAMA's Share)

Prepared By: Alex M. Mills, P.E., CFM, Director of Engineering and Construction

**Reviewed By: Utilities Department
Finance Department
Assistant City Manager - Operations**

Approved By: Michael L. Spurgeon, City Manager

Attachment: Professional Consultant Agreement

Recommendation:

Approve and authorize execution of the Agreement for Professional Engineering Services with Holloway, Updike, and Bellen, Inc., for the design of fiscal year 2018 capital equipment replacement project.

REQUEST FOR ACTION: CONTRACT

Version: 01/27/2014

AGENDA FOR: ☒ MAYOR ☐ COUNCIL AUTHORITY: ☐ RMUA ☐ DATE: October 3, 2017
Tulsa City Clerk's Office: 596-7513 or 596-7514

FOR INFORMATION CONTACT:

DEPARTMENT: WATER & SEWER

CONTACT NAME: MATT VAUGHAN

ADDRESS: 175 E. 2ND ST., SUITE 1400

TELEPHONE: 918-596-9845

CONTRACT TYPE: OTHER

CONTRACT #:

CONT. DOC. TYPE: CONTRACT

AMOUNT: \$44,600.00

PROJECT TITLE: HC O&M CAPITAL EQUIPMENT REPLACEMENTS

CONTRACTOR: HOLLOWAY, UPDIKE AND BELLEN

BID/TAC/PROJECT #: WPC 18-2

EXTENSION DAYS: _____

COMMODITY CODE: _____

RENEWAL, AMENDMENT, CHNG # _____ of x PERCENT: _____ TOTAL PERCENT: _____ COUNCIL DIST: _____

SUMMARY:

Submitted for your consideration is the Agreement for Professional Engineering Services between the Regional Metropolitan Utility Authority and Holloway, Updike and Bellen, Inc. in the amount of \$44,600.00.

The scope of the project consists of preliminary design, final design/bidding services, and general services during construction associated with WPC FY'18 Capital Equipment Replacements at the Haikey Creek Wastewater Treatment Plant.

PCSSC: 9.20.17

ESC: 10.11.17

RMUA: 11.15.17

BUDGET:

FINANCE DIRECTOR APPROVAL:

CHECKLIST

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

No Payments Involved
Purchase Order
Contract Encumbrance
Affidavit Needed?

FUNDING SOURCE(S):

3551-5455601-860061 - \$44,600.00

REQUEST FOR ACTION: *All department items requiring Council approval must be submitted through Mayor's Office.*

We recommend approval for the Agreement for Professional Engineering Services with Holloway, Updike and Bellen, Inc. in the amount of \$44,600.00. Please return one (1) executed copy to Water Pollution Control, 175 E. 2nd St. Suite 1400, Tulsa, OK 74103-3220.

CE: MV/bb

DEPARTMENT HEAD APPROVAL: _____

DATE: _____

CITY ATTORNEY APPROVAL: _____

BOARD APPROVAL: _____

MAYORAL APPROVAL: _____

OTHER: _____

FOR CITY COUNCIL OFFICE USE ONLY:

DATE RECEIVED: _____

COMMITTEE: _____ COMMITTEE DATE(S): _____

FIRST AGENDA DATE: _____

HEARING DATE: _____ SECOND AGENDA DATE: _____

APPROVED: _____

For City Clerk's Office Use Only (Agenda Date: MMDDYYYY; Sec #; Dept ##, Item ##, Sub-Item ##, Status: S=Synopsis):

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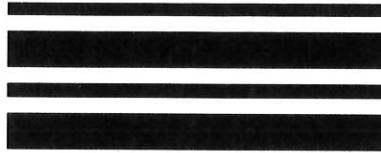
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CONTRACT



Contract #



Dept.



Doc Type:

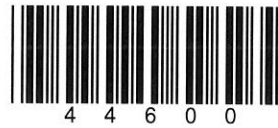


Amend/ Chg
Order #



Contract Document Type:

Amt:



CONTRACT

Contract Type:

OTHER

Project Title:

HC O&M CAPITAL EQUIPMENT REPLACEMENTS

Contractor:

HOLLOWAY, UPDIKE AND BELLEN

Bid/TAC/
Proj:



Ext
Days



Pct



Tot
Pct



----- For City Clerk's Office Use Only * Data For Scanning * Please Do Not Alter -----

NEXT FUNCTION: ACTION:

| COMP / ACCT / CNTR | | | ALTERNATE COMP / ACCT / CNTR | | |
|--------------------|---------|--------|------------------------------|---------|--------|
| 3551 | 5455601 | 860061 | 3551 | 54XXXXX | 860061 |

ACCT DESC: SEWAGE TREATMENT FACILITI ORIG APPROPRIATION: 594,000.00
CNTR DESC: REGIONAL METROPOLITAN UTILITY AUTHORITY LAST ACTIVITY: 10/02/2017

| | | | | | | | |
|-------|--------------|--------------|---|-------|--------------|--------------|---|
| | 1,480,156.98 | (ALLOTMENT |) | | 1,480,156.98 | (ALLOTMENT |) |
| - | 0.00 | (COMMITMENT |) | - | 0.00 | (COMMITMENT |) |
| - | 1,023,056.98 | (ENCUMBRANCE |) | - | 1,024,050.65 | (ENCUMBRANCE |) |
| - | 0.00 | (EXPENDITURE |) | - | 6.33 | (EXPENDITURE |) |
| ----- | | | | ----- | | | |
| = | 457,100.00 | (AVAIL BAL) | | = | 456,100.00 | (AVAIL BAL) | |

| | | | | | | | | | | | | | | |
|---|------------|------|-----|-----|-----|---|-----|-----|---|------|---|--------|----------|------|
| L | OVEREXPEND | | | A | | E | C G | | | | | | | |
| V | TOLERANCE | | | BDG | YTD | P | EST | | N | L R | | ACTIVE | INACTIVE | |
| L | POST | AMT | PCT | GRP | LTD | P | REV | EXP | C | COMM | S | P | STAT | DATE |
| 1 | Y | 9999 | 999 | | Y | Y | N | Y | Y | Y | 5 | 4 | 0 | |

AGREEMENT
FOR
PROFESSIONAL ENGINEERING SERVICES
FOR
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2

THIS AGREEMENT made and entered into this ____ day of ____, 20__ between the Regional Metropolitan Utility Authority, a Public Trust of the State of Oklahoma, hereinafter referred to as AUTHORITY, and Holloway, Updike, and Bellen, Inc., hereinafter referred to as ENGINEER, a corporation organized under the laws of the State of Oklahoma;

WITNESSETH:

WHEREAS, AUTHORITY intends to replace certain capital equipment identified in the strategic asset management plan, hereinafter referred to as the PROJECT; and,

WHEREAS, AUTHORITY requires certain professional services in connection with the PROJECT, hereinafter referred to as the SERVICES; and,

WHEREAS, ENGINEER is prepared to provide such SERVICES; and,

WHEREAS, funding for the PROJECT will be accounted for under Account Number 3551-5455601-860061;

NOW THEREFORE, in consideration of the promises contained herein, the parties hereto agree as follows:

- 1.0 SCOPE OF PROJECT: The scope of this PROJECT is described in Attachment A, SCOPE OF PROJECT, which is attached hereto and incorporated by reference as part of this AGREEMENT.
- 2.0 SERVICES TO BE PERFORMED BY ENGINEER. ENGINEER shall perform the SERVICES described in Attachment B, SCOPE OF SERVICES, which is attached hereto and incorporated by reference as part of this AGREEMENT.
- 3.0 AUTHORITY'S RESPONSIBILITIES. AUTHORITY shall be responsible for all matters described in Attachment C, RESPONSIBILITIES OF THE AUTHORITY, which is attached hereto and incorporated by reference as part of this AGREEMENT.
- 4.0 COMPENSATION. ENGINEER shall be paid in accordance with Attachment D, COMPENSATION, which is attached hereto and incorporated by reference as part of this AGREEMENT.

- 5.0 STANDARD OF PERFORMANCE. ENGINEER 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 laws and regulations published and in effect at the time of performance of the SERVICES. The PROJECT shall be designed and engineered in a good and workmanlike manner and in strict accordance with this AGREEMENT. All engineering work shall be performed by or under the supervision of Professional Engineers licensed in the State of Oklahoma, and properly qualified to perform such engineering services, which qualification shall be subject to review by AUTHORITY. Other than the obligation of the ENGINEER to perform in accordance with the foregoing standard, no warranty, either express or implied, shall apply to the SERVICES to be performed by the ENGINEER pursuant to this AGREEMENT or the suitability of ENGINEER 'S work product.
- 6.0 LIMITATIONS OF RESPONSIBILITY. ENGINEER shall not be responsible for construction means, methods, techniques, sequences, procedures, or safety precautions and programs in connection with the PROJECT.
- 7.0 OPINIONS OF COST AND SCHEDULE.
- 7.1 The Parties acknowledge that the ENGINEER has no control over the cost of labor, materials, equipment or services furnished by others, or over contractors', subcontractors', or vendors' methods of determining prices, or over competitive bidding or market conditions. ENGINEER 'S cost estimates shall be made on the basis of qualification and experience as a Professional Engineer.
- 7.2 Since ENGINEER has no control over the resources provided by others to meet construction contract schedules, ENGINEER'S forecast schedules shall be made on the basis of qualification and experience as a Professional Engineer.
- 8.0 LIABILITY AND INDEMNIFICATION. ENGINEER shall defend and indemnify AUTHORITY from and against legal liability for damages arising out of the performance of the SERVICES for AUTHORITY including but not limited to any claims, costs, attorney fees, or other expenses of whatever nature where such liability is caused by the negligent act, error, or omission of ENGINEER or any person or organization for whom ENGINEER is legally liable, including any subcontractors or consultants hired by ENGINEER to assist ENGINEER in its tasks under this AGREEMENT. Nothing in this paragraph shall make the ENGINEER liable for any damages caused by the AUTHORITY or any other Contractor of the AUTHORITY.
- 9.0 COMPLIANCE WITH LAWS. In performance of the SERVICES, ENGINEER shall comply with all applicable federal, state, and local laws, rules, regulations, orders, codes, criteria and standards. ENGINEER shall procure the permits, certificates, and licenses necessary to allow ENGINEER to perform the SERVICES. ENGINEER shall not be responsible for procuring permits, certificates, and licenses required for any construction unless such responsibilities are specifically assigned to ENGINEER in Attachment B, SCOPE OF SERVICES.

The Engineer certifies that it and all of its subcontractors to be used in the performance of this Agreement are in compliance with 25 O.S. Sec. 1313 and participate in the Status Verification System. The Status Verification System is defined in 25 O.S. Sec. 1312 and includes but is not limited to the free Employee Verification Program (E-Verify) available at

10.0 INSURANCE.

10.1 During the performance of the SERVICES under this AGREEMENT, ENGINEER shall maintain the following insurance, issued by an insurer authorized to transact business in Oklahoma:

10.1.1 General Liability Insurance with a bodily injury and property damage combined single limit of not less than \$1,000,000 for each occurrence.

10.1.2 Worker's Compensation Insurance in accordance with Oklahoma statutory requirements and Employers' Liability Insurance with limits of not less than \$100,000 for each occurrence.

10.1.3 Professional Liability Insurance in accordance with Title 18, Tulsa Revised Ordinances Section 104 and any amendments or successor provisions related thereto with prior acts endorsement for the insurance to remain in effect for two years after AUTHORITY acceptance of the PROJECT.

10.2 The ENGINEER shall provide proof of such coverage:

- (a) By providing Certificate(s) of Insurance prior to the execution of this contract; and
- (b) By submitting updated Certificate(s) of Insurance with each and every subsequent request for payment. The Certificate(s) should show that the policies are current and should be dated within 30 days of the payment request.

10.3 The Engineer shall not cause any required insurance policy to be cancelled or permit it to lapse. If the Engineer cancels, allows to lapse, fails to renew or in any way fails to keep any required insurance policy in effect, the Authority will suspend all progress and/or final payments for the project until the required insurance is obtained. Further, an Engineer who fails to keep required insurance policies in effect may be deemed by the Authority to be in breach of contract, ineligible to bid on future projects, ineligible to respond to invitations to submit to proposals and/or ineligible to engage in any new contracts.

11.0 OWNERSHIP AND REUSE OF DOCUMENTS.

11.1 All documents, including original drawings, estimates, specifications, field notes and data shall become and remain the property of the AUTHORITY.

11.2 AUTHORITY'S reuse of such documents without written verification or adaptation by ENGINEER for the specific purpose intended will be at AUTHORITY'S risk.

12.0 TERMINATION OR SUSPENSION OF AGREEMENT.

12.1 The obligation to continue SERVICES under this AGREEMENT may be terminated by either party upon fifteen days written notice to the other party in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party.

12.2 AUTHORITY shall have the right to terminate this AGREEMENT, or suspend performance thereof, for AUTHORITY'S convenience upon written notice to ENGINEER; and ENGINEER shall terminate or suspend performance of SERVICES under this Agreement on a schedule acceptable to AUTHORITY.

12.2.1 COMPENSATION. (a) In the event of termination or suspension for AUTHORITY'S convenience, ENGINEER shall be compensated for all SERVICES performed up to the date of the notice of termination in accordance with provisions of Attachment D.

(b) Upon restart of a suspended PROJECT, ENGINEER shall be compensated in accordance with Attachment D, COMPENSATION and/or in accordance with agreed upon rate adjustments pursuant to an amendment to this AGREEMENT.

13.0 NOTICE.

13.1 Any notice, demand, or request required by or made pursuant to this AGREEMENT shall be deemed properly made if personally delivered in writing or deposited in the United States mail, postage prepaid, to the address specified below.

13.1.1 To ENGINEER: HOLLOWAY, UPDIKE AND BELLEN, INC.
Stephen Tolar, P.E., Vice President
905-A South 9th Street
Broken Arrow, Oklahoma 74012

13.1.2 To AUTHORITY: REGIONAL METROPOLITAN UTILITY
AUTHORITY
Attention: Matt Vaughan
175 East 2nd Street, Suite 1400
Tulsa, OK 74103

13.2 Nothing contained in this Article shall be construed to restrict the transmission of routine communications between representatives of ENGINEER and AUTHORITY.

14.0 UNCONTROLLABLE FORCES. Neither AUTHORITY nor ENGINEER shall be considered to be in default of this AGREEMENT if delays in or failure of performance shall be due to forces which are beyond the control of the parties; including, but not limited to: fire, flood, earthquakes, storms, lightning, epidemic, war, riot, civil disturbance, sabotage; inability to procure permits, licenses, or authorizations from any state, local, or federal agency or person for any of the supplies, materials, accesses, or services required to be provided by either AUTHORITY or ENGINEER under this AGREEMENT; strikes, work

slowdowns or other labor disturbances, and judicial restraint.

- 15.0 INTEGRATION AND MODIFICATION. This AGREEMENT includes Attachments A, B, C, and D and Exhibits 1, 2 and 3, and represents the entire and integrated AGREEMENT between the Parties; and supersedes all prior negotiations, representations, or agreements pertaining to the SCOPE OF SERVICES herein, either written or oral. This AGREEMENT may be amended only by a written instrument signed by each of the Parties.
- 16.0 DISPUTE RESOLUTION PROCEDURE. In the event of a dispute between the ENGINEER and the AUTHORITY over the interpretation or application of the terms of this AGREEMENT, the matter shall be referred to the City Engineer of Engineering Services for resolution. If the City Engineer of Engineering Services is unable to resolve the dispute, the matter may, in the Engineer's discretion, be referred to the Mayor for resolution. Regardless of these procedures, neither party shall be precluded from exercising any rights, privileges or opportunities permitted by law to resolve any dispute.
- 17.0 ASSIGNMENT. ENGINEER shall not assign its obligations undertaken pursuant to this AGREEMENT, provided that nothing contained in this paragraph shall prevent ENGINEER from employing such independent consultants, associates, and subcontractors as ENGINEER may deem appropriate to assist ENGINEER in the performance of the SERVICES hereunder.
- 18.0 APPROVAL. It is understood and agreed that all work performed under this AGREEMENT shall be subject to inspection and approval by the Engineering Services Department of the AUTHORITY, and any plans or specifications not meeting the terms set forth in this AGREEMENT will be replaced or corrected at the sole expense of the ENGINEER. The ENGINEER will meet with the City staff initially and monthly thereafter and will be available for public hearings and/or Regional Metropolitan Utility Authority presentations.
- 19.0 TIME OF ESSENCE. The Parties agree that time is deemed to be of the essence with respect to this Agreement, including but not limited to the commencement of the PROJECT, rate of progress of the PROJECT and completion date of the PROJECT.
- 20.0 GOVERNING LAW; JURISDICTION; VENUE. This AGREEMENT shall be deemed to have been executed by all parties hereto in Tulsa County, Oklahoma and accordingly, this AGREEMENT shall be governed by and construed in accordance with the laws of the State of Oklahoma. The Parties agree that any suit, action or proceeding with respect to this AGREEMENT shall be brought in the District Court of Tulsa County, Oklahoma. All parties hereby irrevocably waive any objections which they may now or hereafter have to the personal jurisdiction or venue of any suit, action or proceeding arising out of or relating to this AGREEMENT brought in any such court and hereby further irrevocably waive any claim that such suit, action or proceeding brought in such court has been brought in an inconvenient forum.
- 21.0 RELATIONSHIP OF PARTIES. The ENGINEER is, and shall remain at all times, an independent contractor with respect to activities and conduct while engaged in the performance of SERVICES for the AUTHORITY under this Agreement. No employees, subcontractors or agents of the ENGINEER shall be deemed employees of the AUTHORITY for any purpose whatsoever, and none shall be eligible to participate in any benefit program provided by the AUTHORITY for its employees. The ENGINEER shall be solely responsible for the payment of all employee wages and salaries, taxes, withholding

payments, fringe benefits, insurance premiums, continuing education courses, materials or related expenses on behalf of its employees, subcontractors and agents. Nothing in this AGREEMENT shall be construed to create a partnership, joint venture, or agency relationship among the Parties. No party shall have any right, power or authority to act as a legal representative of another party, and no party shall have any power to obligate or bind another party, or to make any representations, express or implied, on behalf of or in the name of the other in any manner or for any purpose whatsoever.

22.0 INVALIDITY. If any terms of this AGREEMENT shall be declared invalid, illegal, or unenforceable for any reason or in any respect, such invalidity, illegality, or unenforceability shall not affect any other provisions hereof and this AGREEMENT shall be construed as if such provision had never been contained herein.

23.0 THIRD PARTIES. This AGREEMENT is between AUTHORITY and ENGINEER and creates no right unto or duties to any other person. No person is or shall be deemed a third party beneficiary of this AGREEMENT.

24.0 HEADINGS. The headings used herein are for convenience only and shall not be used in interpreting this AGREEMENT.

25.0 BINDING EFFECT. This Agreement shall be binding upon AUTHORITY and ENGINEER and their respective successors, heirs, legal representatives and permitted assigns.

26.0 WAIVER. The rights and remedies of the parties to this AGREEMENT are cumulative and not alternative. Neither the failure nor any delay by any party in exercising any right, power or privilege under this Agreement will operate as a waiver of such right, power or privilege, and no single or partial exercise of any such right, power or privilege will preclude any other or further exercise of such right, power or privilege or the exercise of any other right, power or privilege. To the maximum extent permitted by applicable laws: (i) no claim or right arising out of this Agreement or the documents referred to in this Agreement can be discharged by one party, in whole or in part, by a waiver or renunciation of the claim or right unless in writing signed by the other parties; (ii) no waiver that may be given by a party shall be applicable except to the specific instance for which it is given; and (iii) no notice or demand on one party shall be deemed to be a waiver of any obligation of such party or of the right of the party giving such notice or demand to take further action without notice or demand as provided in this Agreement.

27.0 INTERPRETIVE MATTERS AND DEFINITIONS. The following interpretive matters shall be applicable to this AGREEMENT:

27.1 Unless the context otherwise requires: (a) all references to Sections are to Sections of or to this Agreement; (b) each term defined in this Agreement has the meaning assigned to it; (c) "or" is disjunctive but not necessarily exclusive; (d) words in a singular include the plural and vice versa. All references to "\$" or to dollar amounts shall be in lawful currency of the United States of America;

27.2 No provision of this Agreement will be interpreted in favor of, or against, any of the parties hereto by reason of the extent to which such party or its counsel participated in the drafting thereof or by reason of the extent to which any such provision is inconsistent with any prior draft hereof or thereof;

27.3 Any reference to any applicable laws shall be deemed to refer to all rules and regulations promulgated thereunder and judicial interpretations thereof, unless the context requires otherwise;

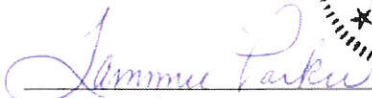
27.4 The word "including" means "including, without limitation" and does not limit the preceding words or terms; and

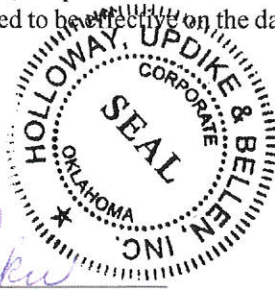
27.5 All words used in this AGREEMENT shall be construed to be of such gender, number or tense as circumstances require.

28.0 MULTIPLE COUNTERPARTS. This Agreement may be executed in several counterparts, each of which shall be deemed an original, but which together shall constitute one and the same instrument.


IN WITNESS WHEREOF, the parties have executed this AGREEMENT in multiple copies on the respective dates herein below reflected to be effective on the date executed by the Chairman of the Regional Metropolitan Utility Authority.

(SEAL)
ATTEST:


Tammie Parker, Secretary



Holloway, Updike and Bellen, Inc. (ENGINEER)


Stephen Tolar, Vice President

Date 9-21-2017

(SEAL)
APPROVED:

REGIONAL METROPOLITAN UTILITY
AUTHORITY

Secretary

Chairman

Date _____

APPROVED AS TO FORM:

RECOMMENDED:

Attorney for Regional Metropolitan
Utility Authority

Director of Water and Sewer Department

RECOMMENDED:

Broken Arrow Municipal Authority, Chairman

City of Broken Arrow, City Manager

ATTEST:

APPROVED AS TO FORM:

(Seal) City Clerk


Assistant City Attorney

AGREEMENT
FOR
PROFESSIONAL ENGINEERING SERVICES
FOR
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2

SCOPE OF PROJECT

ATTACHMENT A

- A. SCOPE OF PROJECT. The PROJECT shall consist of Professional services associated with the replacement of capital equipment located at the Haikey Creek Water Pollution Control Facility. Equipment to be replaced will be identified by the Authority's Strategic Asset Management Plan. This agreement includes services for the fiscal year 2018 PROJECT (See EXHIBIT 1 – FY 2018 Haikey Creek WPC Equipment Listing). Future amendments will make necessary provisions to add work associated with fiscal year 2019 and 2020.

It is hereby understood and agreed by the Parties that upon AUTHORITY'S determination of the services and materials needed for the PROJECT, and upon funding of the PROJECT, there will be construction and service contracts which must be entered into in order to consummate the PROJECT, including but not limited to services and or construction contracts for engineering, right-of-way acquisition, utilities relocations, construction, equipment, and other services or contracts related to the PROJECT.

AGREEMENT
FOR
PROFESSIONAL ENGINEERING SERVICES
FOR
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2
SCOPE OF SERVICES
ATTACHMENT B

- B. SCOPE OF SERVICES. The services to be performed by the ENGINEER under this AGREEMENT may consist of three (3) phases, as stated below. Further, it is understood and agreed that the date of commencement, rate of progress, and the time of completion of the work to be done hereunder are essential provisions of this AGREEMENT (See EXHIBIT 2 – PROJECT SCHEDULE); and it is further understood and agreed that the work which is the subject of this AGREEMENT shall commence upon execution of this AGREEMENT and after receipt of a Notice to Proceed.

The Basic Services of ENGINEER include, but are not necessarily limited to, the following tasks:

- (i) Utilizing professional knowledge and experience, identify, consider and evaluate the relevant field data required to perform its SERVICES under this Agreement.
- (ii) Designate in writing to AUTHORITY a representative to coordinate all information between ENGINEER and AUTHORITY.
- (iii) Designate a Quality Assurance / Quality Control (QA/QC) review team to provide QA/QC reviews for this PROJECT at the Final Design Phase of this PROJECT. Team shall consist of a principal of the firm not associated with day-to-day design work of this PROJECT; exceptions will be granted for single-principal firms.
- (iv) Document all meetings, conferences, coordination, and other activities, and send documentation to AUTHORITY within three (3) working days.
- (v) Attend initial conference with AUTHORITY and other administrative and regulatory agencies, including utility companies, to review PROJECT requirements and discuss scheduling of the PROJECT.
- (vi) Perform all necessary investigations for the PROJECT.

- (vii) Furnish engineering data, where necessary, for the coordination of the PROJECT with other local projects or with state or federal authorities.
- (viii) Prepare equipment specifications, overlay the existing record drawings with markings and text as needed to identify the extent of demolition and replacement, and add design details necessary for clarity.
- (ix) Engineer shall interview staff and perform market research necessary to identify multiple acceptable equipment vendors wherever possible.
- (x) Provide AUTHORITY with a budget analysis and cost estimates for all components of the PROJECT and verify that such cost estimates are within the estimates set forth in the PROJECT budget provided by the AUTHORITY to ENGINEER.

B.1 Phase No. 1. PRELIMINARY DESIGN. Prepare a preliminary plan and, cost estimate; and submit the preliminary plan to the AUTHORITY within 90 calendar days after the date specified in the Notice to Proceed. The Preliminary Design services to be performed by ENGINEER shall include, but are not limited to, the following:

- B.1.1 Workshop to establish critical design parameters.
- B.1.2 Search of existing plans and records.
- B.1.3 Initial contact with other AUTHORITY Departments, and other administrative and regulatory agencies.
- B.1.4 Perform field investigations, take photos, and document the extent of all equipment to be replaced.
- B.1.5 ENGINEER shall attend Plan-in-Hand meetings with the AUTHORITY.
- B.1.6 ENGINEER shall furnish 10 1/2-size copies of the Preliminary Design and other documents listed in B.1 at no additional cost to the AUTHORITY.

B.2 PHASE NO. 2. FINAL DESIGN. Final design shall include the preparation of final plans for the PROJECT together with all specifications and related contract documents required for the construction of the PROJECT by the AUTHORITY'S construction contractor; Final Design shall be in accordance with AUTHORITY'S Standards, detailed specifications, and approved Preliminary Plans prepared in Phase No. 1, and shall be submitted to the AUTHORITY within 120 calendar days after the date specified in the Notice to Proceed for Phase No. 2. The Final design tasks shall include the following:

- B.2.1 Final Field investigations. Engineer shall prepare and place temporary color coded tags on all equipment scheduled to be replaced. Tags shall identify each piece of equipment by name, by equipment number, and construction project number. The tags shall be a unique identifying color that clearly distinguishes between work associated with ongoing and proposed replacements.

B.2.2 Final detailed design of process, components, structures, appurtenances. Use record drawings to identify the extent of demolition and equipment replacement. Overlay record drawings with text, symbols, and digital photos or add other details necessary to identify the full extent of demolition and replacement. Original title block and project identification and record stamps on record drawings shall not be obscured by Engineer's overlain data, text, Engineer's title data, or details.

B.2.3 ENGINEER shall furnish 10 half size copies of the Final Design and other documents for review listed in B.2 at no additional cost to the AUTHORITY.

B.2.4 ENGINEER shall furnish 3 half size pre-advertisement review sets.

B.2.5 ENGINEER shall furnish 20 half size copies of plans and 20 copies of final bound bid books and eight USB 2.0 flash memory drives of the proposal for bidding purposes.

B.2.5.1 ENGINEER shall furnish 9 half size plan sets that contain all addendum changes in paper and 1 electronic copy.

B.2.5.2 ENGINEER shall attend and lead pre-bid conference(s), prepare addenda, furnish ENGINEER'S estimate(s) in a format acceptable to AUTHORITY, tabulate bids and recommend award of contract(s).

B.3 Phase No. 3. GENERAL SERVICES DURING CONSTRUCTION.

B.3.1 Provide assistance to AUTHORITY in awarding construction contract(s).

B.3.2 Attend and lead Pre-construction conference.

B.3.3 Review and approve, or take other appropriate action on, detailed construction drawings, shop drawings, and erection drawings submitted by contractors, such checking shall be only for conformance with the design concept of the PROJECT and compliance with the information given in the contract documents.

B.3.4 Provide periodic inspection of significant construction activities and milestones and regularly report progress to the AUTHORITY.

B.3.5 Review partial pay requests and substantiate completed work.

B.3.6 ENGINEER agrees to provide these services for a period of time estimated to equal the time necessary for construction of the PROJECT.

- B.3.7 Prepare for the AUTHORITY a set of drawings suitable for microfilming showing those changes made during the construction process based on marked-up prints, drawings and other data furnished by the Contractor and AUTHORITY to ENGINEER. Information regarding changes made during the construction process as described in the previous sentence will be provided under the terms of the Construction Contract Documents. Submit record drawing on CD(s) or other acceptable media in the format in which the PROJECT was designed.

AGREEMENT
FOR
PROFESSIONAL ENGINEERING SERVICES
FOR
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2
RESPONSIBILITIES OF THE AUTHORITY
ATTACHMENT C

- C. RESPONSIBILITIES OF THE AUTHORITY. The AUTHORITY agrees:
- C.1 Reports, Records, etc. To furnish, as required by the work, and not at expense to the ENGINEER:
- C.1.1 Records, reports, studies, plans, drawings, and other data available in the files of the AUTHORITY, which may be useful in the PROJECT.
- C.1.2 Standard drawings and standard specifications of existing equipment and their installations or construction to the extent available.
- C.2 Access. To provide access to public and private property when required in performance of ENGINEER'S services.
- C.3 Staff Assistance. To furnish the services of at least one of AUTHORITY'S employees or staff who has right of entry to, and who has knowledge of, AUTHORITY'S facilities relating to this PROJECT.
- C.3.1 To furnish legal assistance as required in the preparation, review and approval of construction documents.
- C.3.2 To furnish staff assistance in locating existing utilities and in expediting their relocation.
- C.4 Review. To examine all studies, reports, sketches, estimates, specifications, drawings, proposals and other documents presented by ENGINEER and render in writing decisions pertaining thereto within a reasonable time so as not to delay the SERVICES of ENGINEER.

AGREEMENT
FOR
PROFESSIONAL ENGINEERING SERVICES
FOR
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2
COMPENSATION
ATTACHMENT D

D. COMPENSATION. The AUTHORITY agrees to pay, as compensation for services set forth in Attachment B, the following fees, payable monthly as each Phase of the work progresses; and within 30 calendar days of receipt of invoice. ENGINEER shall submit monthly invoices based upon actual hours used and deliverables provided at the time of billing. (See Exhibit 3 - PROJECT Fee Schedule). Invoices shall be accompanied by such documentation as the AUTHORITY may require in substantiation of the amount billed. AUTHORITY shall have the right to withhold payment to ENGINEER until updated insurance certificates evidencing the required insurance coverage are submitted in the event that the insurance shown on the insurance certificate submitted with this Agreement expires before completion of the Project.

D.1 TOTAL COMPENSATION.

- D.1.1 For the work under Phase No. 1, PRELIMINARY DESIGN, Attachment B an amount not to exceed twelve thousand nine hundred and 00/100 Dollars (\$12,900.00).
- D.1.2 For the work under Phase No. 2, FINAL DESIGN, Attachment B an amount not to exceed ten thousand six hundred and 00/100 Dollars (\$10,600.00).
- D.1.3 For the work during the construction phase, as outlined under Phase No. 3, GENERAL SERVICES DURING CONSTRUCTION, Attachment B, and provided that the Construction Contractor completes all construction within the time for completion specified in the Construction Contract Documents, an amount not to exceed twenty-one thousand one hundred and 00/100 Dollars (\$21,100.00).

- D.2 COMPENSATION FOR LABOR COSTS, OVERHEAD COSTS, PROFIT, SUBCONSULTANTS AND SUBCONTRACTORS.
- D.2.1 Labor Costs. Labor Costs shall mean actual hourly rates for personnel assigned to the PROJECT based upon percentage of the SERVICES completed at the time of billing.
- D.2.2 Overhead Costs. Overhead costs shall mean a percentage applied to Labor Costs. Overhead Costs shall be calculated as 171% of raw labor costs.
- D.2.3 Profit. Profit shall mean a percentage of the combined Labor Costs and Overhead Costs. Profit shall be calculated as 10% of the combined total of Labor Costs and Overhead Costs.
- D.2.4 Subconsultants and Subcontractors. Services of subcontractors and other professional consultants shall be compensated for based upon the percentage of the work completed at the time of billing. Compensation includes actual cost plus 5%.
- D.3 Other Engineering Services. Other engineering services not included in the foregoing, when authorized in writing by the AUTHORITY as part of an executed Amendment to this agreement, shall be paid in accordance with the terms of such amendment.
- D.4 Travel and Subsistence Reimbursement. Travel and subsistence shall be reimbursed at actual costs. Local travel by personal or firm automobile shall not be compensated.
- D.5 Reproduction Reimbursement. Reproduction shall be reimbursed at actual cost, not to exceed budgeted amount and will not include payment of any markup, profit or overhead to the ENGINEER.
- D.6 Terminated Services. If this AGREEMENT is terminated, ENGINEER shall be paid for services performed to the effective date of termination.

AFFIDAVIT OF CLAIMANT

STATE OF OKLAHOMA)

CONTRACT #

) ss.

COUNTY OF TULSA)

The undersigned person, of lawful age, being first duly sworn on oath, says that all invoices to be submitted pursuant to this agreement with the Regional Metropolitan Utility Authority will be true and correct. Affiant further states that the work, services or material furnished will be completed or supplied in accordance with the plans, specifications, orders, requests or contract furnished or executed by the affiant. Affiant further states that (s)he has made no payment directly or indirectly to any elected official, officer or employee of the City of Tulsa or of any public trust where the City of Tulsa is a beneficiary, of money or any other thing of value to obtain payment of the invoice or procure the contract or purchase order pursuant to which an invoice is submitted. Affiant further certifies that (s)he has complied with all applicable laws regarding equal employment opportunity.

Company: Holloway, Updike and Bellen, Inc.

TIN: 73-0933101

Address: 905-A South 9th Street

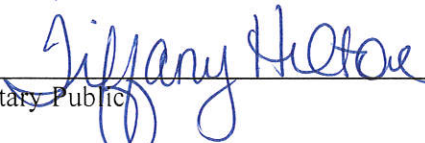
City, State, Zip: Broken Arrow, Oklahoma 74012

Phone: 918-251-0717

Signature: 

Title: Stephen Tolar, Vice President

Subscribed and sworn to before me this 21st day of September, 2017.


Notary Public

My commission expires:

10/01/20

Commission Number

04008955



THIS SIGNED AFFIDAVIT MUST BE RETURNED WITH THE AGREEMENT

INTEREST AFFIDAVIT

STATE OF OKLAHOMA)
)ss.
COUNTY OF TULSA)

I, Stephen Tolar, of lawful age, being first duly sworn, state that I am the agent authorized by Contractor, Engineer, Architect or provider of professional service ["Services Provider"] to submit the attached Agreement. Affiant further states that no officer or employee of the City of Tulsa either directly or indirectly owns a five percent (5%) interest or more in the Services Provider's business or such a percentage that constitutes a controlling interest. Affiant further states that the following officers and/or employees of the City of Tulsa own an interest in the Services Provider's business which is less than a controlling interest, either direct or indirect.

By 
Signature

Title Vice President

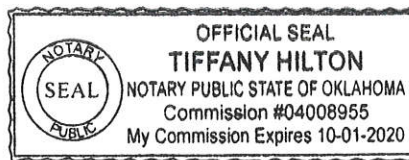
Subscribed and sworn to before me this 21st day of September, 20 17.


Notary Public

My Commission Expires: 10/01/20

Notary Commission Number: 04008955

County & State Where Notarized: Tulsa, Ok



The Affidavit must be signed by an authorized agent and notarized.

NON-COLLUSION AFFIDAVIT
(Required by Oklahoma law, 74 O.S. §85.22-85.25)

STATE OF OKLAHOMA)
)ss.
COUNTY OF TULSA)


I, Stephen Tolar, of lawful age, being first duly sworn, state that:
(Authorized Agent)

1. I am the authorized agent of Contractor, Engineer, Architect or provider of professional service ["Services Provider"] herein for the purposes of certifying facts pertaining to the existence of collusion between and among Services Provider and municipal officials or employees, as well as facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to which this statement is attached.
2. I am fully aware of the facts and circumstances surrounding the making of the contract to which this statement is attached, and I have been personally and directly involved in the proceedings leading to the awarding of such contract; and
3. Neither the Services Provider nor anyone subject to the Services Provider's direction or control has been a party:
 - a. to any collusion with any municipal official or employee as to quantity, quality, or price in the prospective contract, or as to any other terms of such prospective contract, nor
 - b. in any discussions between Services Provider and any municipal official concerning exchange of money or other thing of value for special consideration in the letting of a contract.

By: 
Signature

Title: Vice President

Subscribed and sworn to before me this 21st day of September, 2017.


Notary Public

My Commission Expires: 10/01/20

Notary Commission Number: 04008955

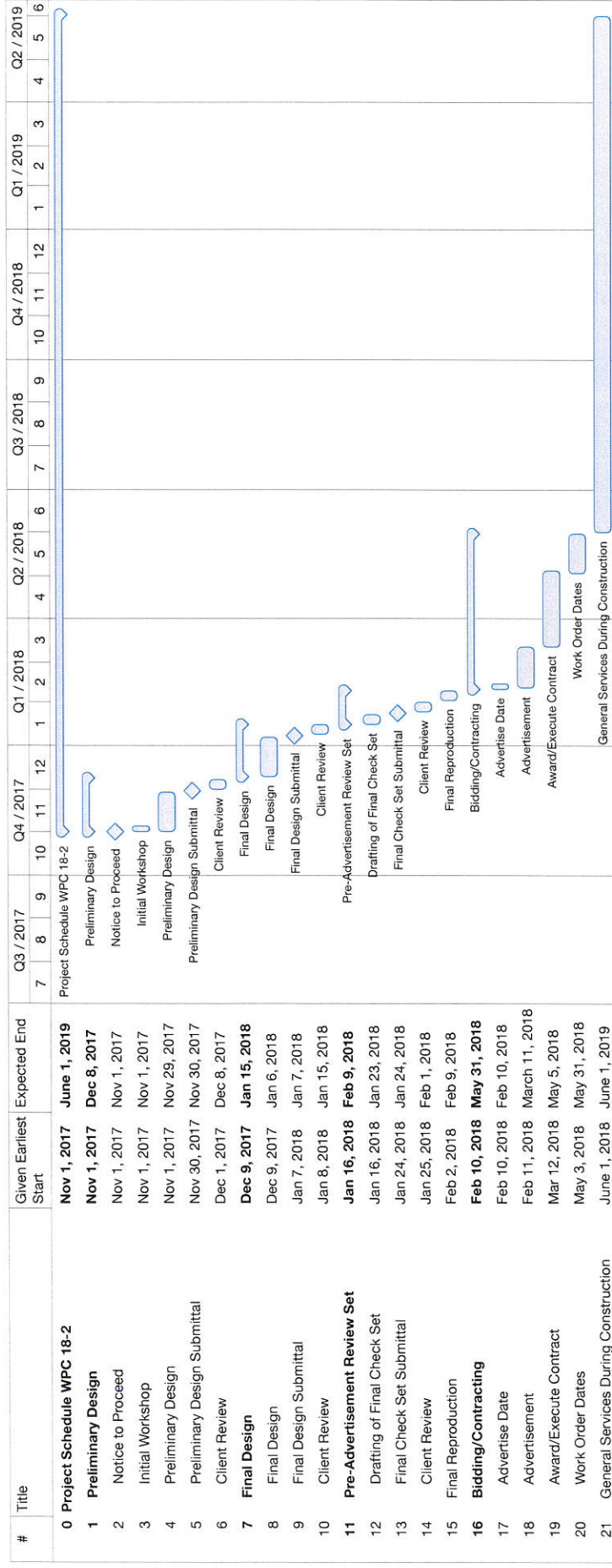
County & State Where Notarized: Subv, OK



The Affidavit must be signed by an authorized agent and notarized.

Exhibit 1
FY 2018 WPC Equipment Listing
RMUA Project No. WPC 18-2
Haikey Creek Operation & Maintenance Capital Equipment Replacements

| Equipment ID and Description | | Estimated Replacement Cost |
|------------------------------|---|----------------------------|
| Haikey Creek Plant | | |
| H001-OPS1-HVAC1 | Operation Building HVAC Controls Improvements | \$282,000 |
| H070-THK1-RDU01 | Thickener Drive Unit #1 (West) | \$87,000 |
| H070-THK1-RDU02 | Thickener Drive Unit #2 (East) | \$87,000 |
| H070-THK1-COL01 | Re-paint underwater sweep and above water bridge for GT#1 | \$63,000 |
| H070-THK1-COL02 | Re-paint underwater sweep and above water bridge for GT#2 | \$63,000 |
| H109-LFT1-VFD03 | New HCLS VFD #3 and Controls Rehab | \$113,000 |
| RMUA Totals: | | \$695,000 |





Holloway, Updike and Bellen
Consulting Engineers
Muskogee • Broken Arrow

EXHIBIT 3

PROJECT FEE SCHEDULE
HAKEE CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2

PRINCIPLE (P)

SR. DESIGNER (SD):

DRAFTER / TECHNICIAN (DT):

PROJECT REPRESENTATIVE (RPR):

CLERICAL (C):

Stephen Tolar
Jason Ray
Jamie Sharp
Jason Ray
Tiffany Erb

| Description: | Labor | | | | | Subcontracts | | Direct Expenses | Total |
|--------------|-------|----|----|-----|---|--------------|-----------------|-----------------|-------|
| | P | SD | DT | RPR | C | Survey Crew | Brown Engineers | | |

WPC18-2 Design, Bidding and Construction Phase
Services

Phase 1:

Preliminary Design:

| | | | | | | | | | |
|---|---|---|----|--|---|--|--|--|----|
| Project Management | 4 | | | | | | | | 8 |
| B.1.1 - Initial Workshop | 4 | 4 | | | | | | | 8 |
| B.1.2 - Research Existing Plans and Records | 4 | 4 | | | | | | | 8 |
| B.1.3 - Coordination with Authority/Regulatory Agencies | 2 | | | | | | | | 2 |
| B.1.4 - Site Inspection | 4 | | | | | | | | 4 |
| Civil/Process Design | 4 | 8 | 16 | | | | | | 28 |
| Electrical Design Coordination | 2 | | | | | | | | 2 |
| B.1.5 - Plan-in-Hand Meeting | 4 | | | | | | | | 4 |
| B.1.6 - Preliminary Submittal | | 4 | | | 1 | | | | 5 |

Total Hours:

| | | | | | | | | | |
|--|----|----|----|---|---|---|--|--|----|
| | 28 | 20 | 16 | 0 | 5 | 0 | | | 69 |
|--|----|----|----|---|---|---|--|--|----|

Direct Labor Rate:

| | | | | | | | | | |
|--|------|------|------|------|------|------|--|--|---------|
| | \$67 | \$46 | \$22 | \$46 | \$22 | \$51 | | | \$3,270 |
|--|------|------|------|------|------|------|--|--|---------|

Total Direct Labor:

| | | | | | | | | | |
|--|---------|-------|-------|-----|-------|-----|--|--|---------|
| | \$1,879 | \$929 | \$352 | \$0 | \$110 | \$0 | | | \$5,592 |
|--|---------|-------|-------|-----|-------|-----|--|--|---------|

Indirect Labor (171% of Direct Labor):

| | | | | | | | | | |
|--|---------|---------|-------|-----|-------|-----|--|--|-------|
| | \$3,213 | \$1,589 | \$602 | \$0 | \$188 | \$0 | | | \$886 |
|--|---------|---------|-------|-----|-------|-----|--|--|-------|

Profit (10% of Labor):

| | | | | | | | | | |
|--|-------|-------|------|-----|------|-----|--|--|---------|
| | \$509 | \$252 | \$95 | \$0 | \$30 | \$0 | | | \$3,000 |
|--|-------|-------|------|-----|------|-----|--|--|---------|

Subcontract:

| | | | | | | | | | |
|--|--|--|--|--|--|--|---------|--|-------|
| | | | | | | | \$3,000 | | \$150 |
|--|--|--|--|--|--|--|---------|--|-------|

Subcontract Profit (5%):

| | | | | | | | | | |
|--|--|--|--|--|--|--|-------|--|-----|
| | | | | | | | \$150 | | \$2 |
|--|--|--|--|--|--|--|-------|--|-----|

Direct Expenses:

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|-----|-----|
| | | | | | | | | \$2 | \$2 |
|--|--|--|--|--|--|--|--|-----|-----|

General/Misc

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

Subtotal Phase 1:

| | | | | | | | | | |
|--|---------|---------|---------|-----|-------|-----|---------|-----|----------|
| | \$5,602 | \$2,770 | \$1,049 | \$0 | \$327 | \$0 | \$3,150 | \$2 | \$12,900 |
|--|---------|---------|---------|-----|-------|-----|---------|-----|----------|



Holloway, Updike and Bellen
Consulting Engineers
Muskogee • Broken Arrow

EXHIBIT 3

PROJECT FEE SCHEDULE
HAKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2

PRINCIPLE (P)

SR. DESIGNER (SD):

DRAFTER / TECHNICIAN (DT):

PROJECT REPRESENTATIVE (RPR):

CLERICAL (C):

Stephen Tolar
Jason Ray
Jamie Sharp
Jason Ray
Tiffany Erb

| Description: | Labor | | | | | Subcontracts | | | Direct Expenses | Total |
|---|---------|---------|---------|------|-------|--------------|------|--------------------|-----------------|----------|
| | P | SD | DT | RPR | C | Survey | Crew | Brown Engineers | | |
| Phase 2: | | | | | | | | | | |
| Final Design: | | | | | | | | | | |
| Project Management | 4 | | | | 4 | | | | | |
| B.2.1 - Final Field Investigations | 2 | | | | | | | | | |
| B.2.2 - Final Detailed Design | | | | | | | | | | |
| Civil/Process Design | 4 | 8 | 12 | | | | | | | |
| Electrical Design Coordination | 1 | | | | | | | | | |
| B.2.3 - Final Design Submittal | | 2 | 2 | | 2 | | | | | |
| B.2.4 - Pre-Advertisement Review Set | | 4 | 2 | | 2 | | | | | |
| B.2.5 - Final Reproduction Coordination | | 4 | | | 2 | | | | | |
| C.2.5.1 - Bidding Services | 6 | 4 | 2 | | 2 | | | | | |
| Total Hours: | 17 | 22 | 18 | 0 | 12 | 0 | | | | 65 |
| Direct Labor Rate: | \$67 | \$46 | \$22 | \$46 | \$22 | \$51 | | | | |
| Total Direct Labor: | \$1,141 | \$1,022 | \$396 | \$0 | \$264 | \$0 | | | | \$2,823 |
| Indirect Labor (171% of Direct Labor): | \$1,951 | \$1,748 | \$677 | \$0 | \$451 | \$0 | | | | \$4,827 |
| Profit (10% of Labor): | \$309 | \$277 | \$107 | \$0 | \$71 | \$0 | | | | \$765 |
| Subcontracts: | | | | | | | | \$2,000 | | \$2,000 |
| Subcontract Profit (5%): | | | | | | | | \$100 | \$0 | \$100 |
| Direct Expenses: | | | | | | | | | | |
| General/Misc | | | | | | | | | \$86 | \$86 |
| Subtotal Phase 2: | \$3,401 | \$3,047 | \$1,181 | \$0 | \$786 | \$0 | | \$2,100 | \$0 | \$10,600 |



Holloway, Updike and Bellen
Consulting Engineers
Muskogee • Broken Arrow

EXHIBIT 3

PROJECT FEE SCHEDULE
HAIKEY CREEK OPERATION & MAINTENANCE
CAPITAL EQUIPMENT REPLACEMENTS
RMUA PROJECT NO. WPC 18-2

PRINCIPLE (P)

SR. DESIGNER (SD):

DRAFTER / TECHNICIAN (DT):

PROJECT REPRESENTATIVE (RPR):

CLERICAL (C):

Stephen Tolar
Jason Ray
Jamie Sharp
Jason Ray
Tiffany Erb

| Description: | Labor | | | | | Subcontracts | | Direct Expenses | Total |
|--------------|-------|----|----|-----|---|--------------|-----------------|-----------------|-------|
| | P | SD | DT | RPR | C | Survey Crew | Brown Engineers | | |

Phase 3:

Construction / Bidding Services:

| | | | | | | | | | |
|--|----|----|---|--|---|--|--|--|--|
| Project Management | 8 | | | | 4 | | | | |
| B.3.1 - Assistance with Award | 2 | | | | | | | | |
| B.3.2 - Lead Pre-Construction Conference | 2 | 1 | | | 8 | | | | |
| B.3.3 - Submittal Review | 4 | 12 | | | | | | | |
| B.3.4 - Monitor Construction Progress | 10 | 80 | | | | | | | |
| B.3.5 - Final Inspection | 2 | 2 | | | 1 | | | | |
| B.3.7 - Record Drawings | | 4 | 6 | | | | | | |

Total Hours:

28 99 6 0 13 0 0 146

Direct Labor Rate:

\$67 \$46 \$22 \$46 \$22 \$51

Total Direct Labor:

\$1,879 \$4,600 \$132 \$0 \$285 \$0

Indirect Labor (171% of Direct Labor):

\$3,213 \$7,865 \$226 \$0 \$488 \$0

Profit (10% of Labor):

\$509 \$1,246 \$36 \$0 \$77 \$0

Subcontracts:

\$500 \$25 \$0 \$0 \$0 \$0

Subcontract Profit (5%):

\$25 \$18

Direct Expenses:

\$18

General/Misc

Subtotal Phase 3:

\$5,602 \$13,711 \$393 \$0 \$851 \$0 \$0 \$0 \$21,100

Subtotal WPC 18-2 Services

\$44,600

Indirect Labor \$22,211 + Profit \$3,520 = Direct Labor \$12,989 M 2.98

Multiplier Calculation (M):



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

9/6/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an **ADDITIONAL INSURED**, the policy(ies) must have **ADDITIONAL INSURED** provisions or be endorsed. If **SUBROGATION IS WAIVED**, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

| | | |
|---|--|------------------------------------|
| PRODUCER Stephens Insurance 111 Center Street, Suite 1400 Little Rock, AR 72201 www.stephens.com | CONTACT NAME: | |
| | PHONE (A/C, No, Ext): 1-800-643-9691 | FAX (A/C, No): 501-377-2317 |
| INSURED Holloway, Updike and Bellen, Inc. P.O. Box 1543 Muskogee OK 74402 | INSURER(S) AFFORDING COVERAGE | |
| | INSURER A: Charter Oak Fire Insurance Company | |
| | INSURER B: Travelers Indemnity Company of America | |
| | INSURER C: Travelers Casualty & Surety Company of America | |
| | INSURER D: Travelers Property Casualty Company of America | |
| | INSURER E: | |
| INSURER F: | | |

COVERAGES**CERTIFICATE NUMBER:** 37590059**REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | TYPE OF INSURANCE | ADDL INSD | SUBR WVD | POLICY NUMBER | POLICY EFF (MM/DD/YYYY) | POLICY EXP (MM/DD/YYYY) | LIMITS |
|----------|--|--|----------|-------------------|-------------------------|-------------------------|--|
| A | <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER: | | | 680-006H440957 | 11/1/2016 | 11/1/2017 | EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 4,000,000 |
| B | <input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY | | | BA6737M076-16-GRP | 11/1/2016 | 11/1/2017 | COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ Medical Payments \$ 5,000 |
| B | <input checked="" type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB OCCUR <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$10,000 | | | CUP-001068T343 | 11/1/2016 | 11/1/2017 | EACH OCCURRENCE \$ 2,000,000 AGGREGATE \$ 2,000,000 |
| C | <input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below | Y/N <input checked="" type="checkbox"/> N | N/A | UB 1068T79-7-16 | 11/1/2016 | 11/1/2017 | <input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 500,000 E.L. DISEASE - EA EMPLOYEE \$ 500,000 E.L. DISEASE - POLICY LIMIT \$ 500,000 |
| D | Professional Liability | | | 106327272 | 7/1/2017 | 7/1/2018 | Each Occurrence \$2,000,000 Deductible per Claim \$75,000 |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

RMUA Project No. WPC 18-2 Water Pollution Capital Equipment Replacements.
Cancellation Provisions - General Liability, Automobile Liability, Workers Compensation and Umbrella - 30 Day Notice of Cancellation for all reasons other than non-payment of premium will be provided to the certificate holder.

CERTIFICATE HOLDER**CANCELLATION**

Regional Metropolitan Utility Authority
Attn: Matt Vaughan
175 East 2nd Street
Suite 890
Tulsa OK 74103

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Ted Grace

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ACORD 25 (2016/03)

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City of Broken Arrow

Fact Sheet

File #: 16-1591, **Version:** 1

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|-----------|-----------|-----------------------------|--------------------|------------------------------|---|--|
| | 5/31/2017 | 9659 | COWAN GROUP ENGINEERING LLC | PI 4371 | 3105 | 020-5305-438.70-16 5/31/2017 TOTAL - CUMULATIVE TOTAL - | 18,253.25 18,253.25 18,253.25 |
| | 7/01/2017 | 22 | ALLIED FENCE CO OF TULSA | PI 4066 | 204833 | 020-5305-438.40-28 7/01/2017 TOTAL - CUMULATIVE TOTAL - | 750.00 750.00 19,003.25 |
| | 7/12/2017 | 6626 | REXEL | PI 1688 | S115622203003 | 020-5405-434.60-45 7/12/2017 TOTAL - CUMULATIVE TOTAL - | 1,916.00- 1,916.00- 17,087.25 |
| | 8/08/2017 | 6478 | FORTILINE INC | PI 3874 | 4025021 | 020-5400-434.60-40 | 2,495.00 |
| | 8/08/2017 | 9129 | PROSOURCE OF TULSA LLC | PI 4176 | CG713982 | 020-5130-437.70-15 8/08/2017 TOTAL - CUMULATIVE TOTAL - | 196.80 2,691.80 19,779.05 |
| | 8/11/2017 | 1589 | SEWER EQUIPMENT OF AMERICA | PI 4167 | 0000159371 | 020-0000-141.00-00 8/11/2017 TOTAL - CUMULATIVE TOTAL - | 402.65 402.65 20,181.70 |
| | 8/17/2017 | 8679 | CORE & MAIN | PI 4082 | H651935 | 020-0000-141.00-00 8/17/2017 TOTAL - CUMULATIVE TOTAL - | 3,544.00 3,544.00 23,725.70 |
| | 8/24/2017 | 8679 | CORE & MAIN | PI 4083 PI 4084 | 1H651193 1H651193 | 020-0000-141.00-00 020-0000-141.00-00 8/24/2017 TOTAL - CUMULATIVE TOTAL - | 7,847.60 2,842.00 10,689.60 34,415.30 |
| | 8/25/2017 | 8679 | CORE & MAIN | PI 4085 PI 4086 | H667651 H708978 | 020-0000-141.00-00 020-0000-141.00-00 8/25/2017 TOTAL - CUMULATIVE TOTAL - | 792.00 4,552.00 5,344.00 39,759.30 |
| | 8/30/2017 | 90 | NAPA AUTO PARTS | PI 3941 | 221087852CR | 020-5120-437.60-20 | 99.98- |
| | 8/30/2017 | 724 | O'REILLY AUTOMOTIVE | PI 4260 PI 4261 | RP156186649 RP156186649 | 020-5120-437.60-23 020-5120-437.60-24 8/30/2017 TOTAL - CUMULATIVE TOTAL - | 960.87 799.99 1,660.88 41,420.18 |
| | 8/31/2017 | 90 | NAPA AUTO PARTS | PI 3943 PI 3944 | 2210878893CR 2210878933CR | 020-5120-437.60-20 020-5120-437.60-20 | 99.98- 103.98- |
| | 8/31/2017 | 400 | L & M OFFICE FURNITURE INC | PI 4108 | 75439 | 020-5205-419.70-19 8/31/2017 TOTAL - CUMULATIVE TOTAL - | 3,823.60 3,619.64 45,039.82 |
| | 9/01/2017 | 10953 | STRONGHAND LLC | PI 4375 PI 4376 | 1 1A | 020-5400-434.70-15 020-5400-434.70-15 9/01/2017 TOTAL - CUMULATIVE TOTAL - | 218,357.50 141,875.70- 76,481.80 121,521.62 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|----------|-------------------------------|-------------|---------------|--------------------|------------|--------|
| 9/05/2017 | 8679 | CORE & MAIN | PI 4087 | H707357 | 020-0000-141.00-00 | 528.00 | |
| 9/05/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4051 | 232225 | 020-0000-141.00-00 | 129.24 | |
| | | | PI 4052 | 232225 | 020-0000-141.00-00 | 295.20 | |
| | | | | | 9/05/2017 TOTAL - | 952.44 | |
| | | | | | CUMULATIVE TOTAL - | 122,474.06 | |
| 9/06/2017 | 4311 | UNITED FORD | PI 4003 | 292910 | 020-5400-434.60-20 | 21.20 | |
| | | | PI 4004 | 2929108 | 020-5400-434.60-20 | 21.20 | |
| | | | | | 9/06/2017 TOTAL - | 42.40 | |
| | | | | | CUMULATIVE TOTAL - | 122,516.46 | |
| 9/07/2017 | 92 | WHITE STAR MACHINERY & SUPPLY | PI 3061 | 07168110 | 020-5305-438.60-20 | 454.66 | |
| | | | | | 9/07/2017 TOTAL - | 454.66 | |
| | | | | | CUMULATIVE TOTAL - | 122,971.12 | |
| 9/08/2017 | 90 | NAPA AUTO PARTS | PI 4280 | 2210879610 | 020-5120-437.60-23 | 202.58 | |
| 9/08/2017 | 399 | LOCKE SUPPLY COMPANY | PI 3876 | 3238342500 | 020-5410-435.60-23 | 34.01 | |
| 9/08/2017 | 8679 | CORE & MAIN | PI 3825 | H753179 | 020-0000-141.00-00 | 6,326.40 | |
| | | | | | 9/08/2017 TOTAL - | 6,562.99 | |
| | | | | | CUMULATIVE TOTAL - | 129,534.11 | |
| 9/10/2017 | 10921 | TONTO ENVIRONMENTAL LLC | PI 4373 | 3 FINAL | 020-5405-434.40-28 | 92,896.89 | |
| | | | PI 4374 | 3 VENDOR PMTS | 020-5405-434.40-28 | 4,187.14 | |
| | | | | | 9/10/2017 TOTAL - | 88,709.75 | |
| | | | | | CUMULATIVE TOTAL - | 218,243.86 | |
| 9/12/2017 | 240 | GRAINGER | PI 3901 | 9553684854 | 020-5120-437.60-24 | 1,807.28 | |
| | | | | | 9/12/2017 TOTAL - | 1,807.28 | |
| | | | | | CUMULATIVE TOTAL - | 220,051.14 | |
| 9/15/2017 | 8679 | CORE & MAIN | PI 3826 | H808814 | 020-0000-141.00-00 | 2,304.00 | |
| | | | | | 9/15/2017 TOTAL - | 2,304.00 | |
| | | | | | CUMULATIVE TOTAL - | 222,355.14 | |
| 9/18/2017 | 94 | WHOLESALE TOOL COMPANY | PI 4228 | 01799180 | 020-5120-437.60-21 | 85.40 | |
| 9/18/2017 | 4997 | HARRIS CORPORATION PSPC | PI 4103 | 93270748 | 020-0000-141.00-00 | 647.50 | |
| 9/18/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4053 | 232225BO | 020-0000-141.00-00 | 331.29 | |
| | | | | | 9/18/2017 TOTAL - | 1,064.19 | |
| | | | | | CUMULATIVE TOTAL - | 223,419.33 | |
| 9/19/2017 | 90 | NAPA AUTO PARTS | PI 3983 | 2210880556 | 020-5120-437.60-24 | 564.69 | |
| 9/19/2017 | 240 | GRAINGER | PI 3902 | 9559652491 | 020-5120-437.60-24 | 1,807.28 | |
| 9/19/2017 | 1581 | MID CONTINENT CONCRETE CO | PI 3884 | 1581248 | 020-5305-438.60-27 | 312.00 | |
| 9/19/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4056 | 232456 | 020-0000-141.00-00 | 14.40 | |
| | | | PI 4057 | 232456 | 020-0000-141.00-00 | 745.00 | |
| | | | PI 4058 | 232456 | 020-0000-141.00-00 | 358.00 | |
| | | | | | 9/19/2017 TOTAL - | 3,801.37 | |
| | | | | | CUMULATIVE TOTAL - | 227,220.70 | |
| 9/20/2017 | 1249 | MYERS TIRE SUPPLY INC | PI 3906 | 73011615 | 020-5120-437.60-23 | 58.05 | |
| 9/20/2017 | 1581 | MID CONTINENT CONCRETE CO | PI 3886 | 1581469 | 020-5305-438.60-27 | 429.00 | |

| FUND | 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|-----------|----------|-------------|--------------|---------------------------------|---------------|---------------|--------------------|------------|
| 9/20/2017 | 4311 | | | UNITED FORD | PI 4005 | CM2933999 | 020-5406-434.60-20 | 81.42- |
| 9/20/2017 | 9700 | | | ADVANCED INDUSTRIAL SOLUTIONS | PI 4059 | 232456BO | 020-0000-141.00-00 | 173.40 |
| | | | | | | | 9/20/2017 TOTAL - | 579.03 |
| | | | | | | | CUMULATIVE TOTAL - | 227,799.73 |
| 9/21/2017 | 92 | | | WHITE STAR MACHINERY & SUPPLY | PI 4028 | 07168904 | 020-5305-438.60-20 | 471.88 |
| 9/21/2017 | 120 | | | CINTAS CORPORATION | PI 3843 | 5008872096 | 020-5120-437.60-23 | 102.38 |
| | | | | | PI 3844 | 5008872096 | 020-5130-437.60-23 | 58.79 |
| 9/21/2017 | 240 | | | GRAINGER | PI 3903 | 9562403056 | 020-5120-437.60-24 | 1,807.28- |
| 9/21/2017 | 1581 | | | MID CONTINENT CONCRETE CO | PI 3887 | 1581680 | 020-5305-438.60-27 | 328.00 |
| | | | | | PI 3888 | 1581681 | 020-5305-438.60-27 | 164.00 |
| 9/21/2017 | 5941 | | | LOWES | PI 4264 | 11873 | 020-5415-435.60-41 | 41.49 |
| 9/21/2017 | 8679 | | | CORE & MAIN | PI 3827 | H840814 | 020-0000-141.00-00 | 345.60 |
| | | | | | | | 9/21/2017 TOTAL - | 295.14- |
| | | | | | | | CUMULATIVE TOTAL - | 227,504.59 |
| 9/22/2017 | 8 | | | BRENTAG SOUTHWEST INC | PI 3848 | BSW887608 | 020-5405-434.60-34 | 2,412.00 |
| 9/22/2017 | 90 | | | NAPA AUTO PARTS | PI 4283 | 2210880843 | 020-5120-437.60-23 | 26.35 |
| 9/22/2017 | 179 | | | TRANS CONTINENTAL SUPPLY INC | PI 4037 | 1028047 | 020-5305-438.60-23 | 112.50 |
| | | | | | PI 4038 | 1028047 | 020-5406-434.60-23 | 75.00 |
| 9/22/2017 | 225 | | | SUMMIT TRUCK GROUP | PI 4039 | 411146384 | 020-5125-436.60-20 | 143.79 |
| 9/22/2017 | 240 | | | GRAINGER | PI 3907 | 9564178441 | 020-5410-435.60-45 | 326.52 |
| 9/22/2017 | 1409 | | | SMITH FARM & GARDEN CO | PI 3986 | 786405 | 020-0000-141.00-00 | 70.11 |
| | | | | | PI 3987 | 786405 | 020-0000-141.00-00 | 91.06 |
| | | | | | PI 4023 | 786406 | 020-5305-438.60-20 | 24.76 |
| 9/22/2017 | 1581 | | | MID CONTINENT CONCRETE CO | PI 3890 | 1581923 | 020-5305-438.60-27 | 156.00 |
| 9/22/2017 | 5090 | | | POTTERS INDUSTRIES LLC | PI 3914 | 91119901 | 020-0000-141.00-00 | 3,840.00 |
| 9/22/2017 | 5290 | | | HOLLOWAY, UPDIKE AND BELLEN INC | PI 3875 | 12 | 020-5415-435.70-16 | 350.00 |
| 9/22/2017 | 8679 | | | CORE & MAIN | PI 3824 | H658796 | 020-0000-141.00-00 | 6,168.00 |
| | | | | | PI 3830 | H850055 | 020-0000-141.00-00 | 585.57 |
| 9/22/2017 | 9569 | | | TWIN CITIES READY MIX INC | PI 4018 | 153350 | 020-5305-438.60-27 | 240.00 |
| | | | | | | | 9/22/2017 TOTAL - | 14,621.66 |
| | | | | | | | CUMULATIVE TOTAL - | 242,126.25 |
| 9/23/2017 | 204 | | | FENSCO INC | PI 3867 | 50624 | 020-0000-141.00-00 | 2,250.00 |
| 9/23/2017 | 420 | | | APAC-CENTRAL, INC | PI 3837 | 7001030561 | 020-5305-438.60-27 | 107.44 |
| | | | | | PI 3838 | 7001030561 | 020-5400-434.60-27 | 221.61 |
| | | | | | PI 3839 | 7001030561 | 020-5400-434.60-80 | 116.03 |
| | | | | | | | 9/23/2017 TOTAL - | 2,695.08 |
| | | | | | | | CUMULATIVE TOTAL - | 244,821.33 |
| 9/25/2017 | 8 | | | BRENTAG SOUTHWEST INC | PI 3849 | BSW887607 | 020-5410-435.60-34 | 788.63 |
| 9/25/2017 | 90 | | | NAPA AUTO PARTS | PI 3915 | 2210880963 | 020-0000-141.00-00 | 52.44 |
| | | | | | PI 3916 | 2210880963 | 020-0000-141.00-00 | 3.99 |
| | | | | | PI 3917 | 2210880963 | 020-0000-141.00-00 | 115.60 |
| | | | | | PI 3918 | 2210881028 | 020-0000-141.00-00 | 41.30 |
| | | | | | PI 3919 | 2210881028 | 020-0000-141.00-00 | 46.18 |
| | | | | | PI 4287 | 2210880997 | 020-5305-438.60-20 | 3.30 |
| | | | | | PI 4320 | 2210880962 | 020-5120-437.60-24 | 1,449.00 |
| 9/25/2017 | 120 | | | CINTAS CORPORATION | PI 3846 | 5008872079 | 020-5405-434.40-28 | 57.08 |
| 9/25/2017 | 168 | | | TULSA NEW HOLLAND | PI 4036 | 475763 | 020-5305-438.60-20 | 86.92 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|--------------------|-------------|--------------|--------------------------------|---------------|----------------|--------------------|------------|
| | 9/25/2017 | 225 | SUMMIT TRUCK GROUP | PI 3992 | 411146499 | 020-0000-141.00-00 | 78.31 |
| | | | | PI 3993 | 411146499 | 020-0000-141.00-00 | 42.10 |
| | | | | PI 4040 | 411146485 | 020-5400-434.60-20 | 1,044.80 |
| | 9/25/2017 | 240 | GRAINGER | PI 3904 | 9565029890 | 020-5120-437.60-24 | 1,807.28 |
| | 9/25/2017 | 244 | GREEN ACRE SOD FARMS DBA | PI 4120 | 107321 | 020-5305-438.60-23 | 24.00 |
| | 9/25/2017 | 255 | SAFETY GLOVE INC | PI 3988 | 85118600 | 020-0000-141.00-00 | 279.96 |
| | | | | PI 3989 | 85118600 | 020-0000-141.00-00 | 83.08 |
| | | | | PI 3990 | 85118600 | 020-0000-141.00-00 | 395.20 |
| | 9/25/2017 | 452 | GELCO UNIFORMS & SHOES INC | PI 3882 | 00206314 | 020-5400-434.60-10 | 125.00 |
| | 9/25/2017 | 1581 | MID CONTINENT CONCRETE CO | PI 3891 | 1582230 | 020-5305-438.60-27 | 156.00 |
| | | | | PI 4179 | 1582229 | 020-5415-435.60-27 | 468.00 |
| | 9/25/2017 | 4311 | UNITED FORD | PI 4008 | CM2929108 | 020-5400-434.60-20 | 21.20 |
| | 9/25/2017 | 5936 | CONTINENTAL BATTERY CO | PI 4098 | 10930925171227 | 020-5305-438.60-20 | 65.87 |
| | 9/25/2017 | 5941 | LOWES | PI 3955 | 01198 | 020-5305-438.60-23 | 16.02 |
| | | | | PI 3958 | 02758 | 020-5305-438.60-23 | 43.76 |
| | | | | PI 3960 | 02793 | 020-5415-435.60-41 | 42.74 |
| | | | | PI 3962 | 02820/ | 020-5405-434.60-23 | 38.57 |
| | | | | PI 3963 | 02829 | 020-5415-435.60-41 | 15.91 |
| | 9/25/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4048 | 231792 | 020-0000-141.00-00 | 151.20 |
| | | | | PI 4049 | 231792 | 020-0000-141.00-00 | 212.16 |
| | | | | PI 4050 | 231792 | 020-0000-141.00-00 | 180.00 |
| | | | | PI 4054 | 232225BO1 | 020-0000-141.00-00 | 283.68 |
| | 9/25/2017 | 9892 | GOODYEAR COMMERCIAL TIRE | PI 3868 | 2541009395 | 020-0000-141.00-00 | 3,574.83 |
| | | | | PI 3900 | 2541009395 | 020-5125-436.60-19 | 123.89 |
| | | | | PI 3908 | 2541009391 | 020-5130-437.60-19 | 253.14 |
| | 9/25/2017 | 10283 | FERGUSON ENTERPRISES, INC | PI 3899 | 0554443 | 020-5400-434.60-37 | 366.32 |
| | 9/25/2017 | 10317 | PDI DOOR & HARDWARE LLC DBA | PI 3978 | 2017086301 | 020-5415-435.60-41 | 1,163.85 |
| | 9/25/2017 | 10948 | WESTERN FIRST AID & SAFETY LLC | PI 4222 | BOO1371 | 020-0000-141.00-00 | 128.29 |
| 9/25/2017 TOTAL - | | | | | | | 13,787.20 |
| CUMULATIVE TOTAL - | | | | | | | 258,608.53 |
| | 9/26/2017 | 90 | NAPA AUTO PARTS | PI 3920 | 2210881110 | 020-0000-141.00-00 | 43.07 |
| | | | | PI 3921 | 2210881110 | 020-0000-141.00-00 | 68.43 |
| | | | | PI 4292 | 2210881089 | 020-5120-437.60-23 | .90 |
| | | | | PI 4293 | 2210881097 | 020-5125-436.60-20 | 11.99 |
| | 9/26/2017 | 141 | CUMMINS SOUTHERN PLAINS | PI 4096 | 02750757 | 020-5125-436.40-20 | 2,137.41 |
| | 9/26/2017 | 225 | SUMMIT TRUCK GROUP | PI 4041 | CM411146485 | 020-5400-434.60-20 | 910.58 |
| | | | | PI 4042 | 4111465796 | 020-5400-434.60-20 | 314.60 |
| | 9/26/2017 | 240 | GRAINGER | PI 3910 | 9566226313 | 020-5405-434.60-23 | 77.47 |
| | 9/26/2017 | 244 | GREEN ACRE SOD FARMS DBA | PI 4121 | 107324 | 020-5305-438.60-23 | 12.00 |
| | | | | PI 4122 | 107325 | 020-5305-438.60-23 | 18.00 |
| | | | | PI 4123 | 107326 | 020-5305-438.60-23 | 37.50 |
| | 9/26/2017 | 327 | HACH COMPANY | PI 4126 | 10649618 | 020-5400-434.60-23 | 456.77 |
| | 9/26/2017 | 1581 | MID CONTINENT CONCRETE CO | PI 3893 | 1582436 | 020-5305-438.60-27 | 78.00 |
| | 9/26/2017 | 2245 | DXP ENTERPRISES, INC | PI 4377 | 49106008 | 020-5405-434.60-45 | 543.54 |
| | 9/26/2017 | 5941 | LOWES | PI 3964 | 01561 | 020-5305-438.60-23 | 34.12 |
| | | | | PI 3966 | 02381 | 020-5405-434.60-23 | 18.99 |
| | | | | PI 3967 | 13784 | 020-5120-437.60-23 | 18.98 |
| | | | | PI 4266 | 01466 | 020-5305-438.60-23 | 11.88 |
| | | | | PI 4267 | 11714 | 020-5415-435.60-41 | 42.21 |
| | | | | PI 4268 | 13783 | 020-5415-435.60-41 | 14.15 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|-------------|--------------|--------------------------------|---------------|----------------|--------------------|------------|
| | 9/26/2017 | 7803 | P&K EQUIPMENT | PI 3985 | 2660799 | 020-5305-438.60-20 | 175.86 |
| | 9/26/2017 | 8679 | CORE & MAIN | PI 3828 | H788930 | 020-0000-141.00-00 | 9,405.00 |
| | 9/26/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4061 | 232529 | 020-0000-141.00-00 | 274.56 |
| | | | | PI 4062 | 232529 | 020-0000-141.00-00 | 1,102.34 |
| | 9/26/2017 | 9706 | WATER TECH INC | PI 4016 | 108460 | 020-5405-434.60-34 | 5,100.82 |
| | | | | PI 4017 | 60808 | 020-5410-435.60-34 | 7,233.03 |
| | 9/26/2017 | 9892 | GOODYEAR COMMERCIAL TIRE | PI 3869 | 2541009399 | 020-0000-141.00-00 | 1,851.32 |
| | | | | | | 9/26/2017 TOTAL - | 28,172.36 |
| | | | | | | CUMULATIVE TOTAL - | 286,780.89 |
| | 9/27/2017 | 90 | NAPA AUTO PARTS | PI 3923 | 2210881168 | 020-0000-141.00-00 | 90.40 |
| | | | | PI 3924 | 2210881168 | 020-0000-141.00-00 | 136.35 |
| | | | | PI 3925 | 2210881168 | 020-0000-141.00-00 | 19.30 |
| | | | | PI 3926 | 2210881204 | 020-0000-141.00-00 | 141.30 |
| | | | | PI 3927 | 2210881204 | 020-0000-141.00-00 | 43.89 |
| | | | | PI 3928 | 2210881204 | 020-0000-141.00-00 | 79.16 |
| | | | | PI 4295 | 2210881158 | 020-5120-437.60-23 | 5.98 |
| | | | | PI 4296 | 2210881164 | 020-5125-436.60-20 | 14.16 |
| | | | | PI 4297 | 2210881167 | 020-5125-436.60-20 | 14.99 |
| | | | | PI 4298 | 2210881167 | 020-5305-438.60-20 | 14.99 |
| | | | | PI 4300 | 2210881187 | 020-5125-436.60-20 | 14.00 |
| | | | | PI 4303 | 2210881196 | 020-5305-438.60-20 | 82.79 |
| | | | | PI 4304 | 2210881228 | 020-5125-436.60-20 | 11.99 |
| | | | | PI 4305 | 2210881229 | 020-5120-437.60-20 | 7.49 |
| | 9/27/2017 | 101 | WELDON PARTS TULSA | PI 4020 | 195857400 | 020-5125-436.60-20 | 5.86 |
| | 9/27/2017 | 120 | CINTAS CORPORATION | PI 3847 | 5008872097 | 020-5100-437.60-23 | 151.00 |
| | 9/27/2017 | 206 | FERGUSON PONTIAC GMC TRUCK | PI 3912 | 138420 | 020-5305-438.60-20 | 84.60 |
| | 9/27/2017 | 225 | SUMMIT TRUCK GROUP | PI 3995 | 411146640 | 020-0000-141.00-00 | 78.31 |
| | 9/27/2017 | 240 | GRAINGER | PI 3905 | 9567412391 | 020-5120-437.60-24 | 1,807.28 |
| | 9/27/2017 | 244 | GREEN ACRE SOD FARMS DBA | PI 4125 | 107410 | 020-5400-434.60-80 | 37.50 |
| | 9/27/2017 | 327 | HACH COMPANY | PI 4127 | 10652538 | 020-5400-434.60-23 | 215.60 |
| | 9/27/2017 | 399 | LOCKE SUPPLY COMPANY | PI 3877 | 3253120400 | 020-5405-434.60-23 | .62 |
| | 9/27/2017 | 4311 | UNITED FORD | PI 4011 | 2940993 | 020-5305-438.60-20 | 81.17 |
| | 9/27/2017 | 4358 | MCNEILUS TRUCK & MFG., INC | PI 3872 | 3778271 | 020-0000-141.00-00 | 155.86 |
| | | | | PI 4191 | 3778231 | 020-5125-436.60-20 | 1,677.04 |
| | 9/27/2017 | 5936 | CONTINENTAL BATTERY CO | PI 3829 | 10930927170950 | 020-0000-141.00-00 | 194.76 |
| | 9/27/2017 | 5941 | LOWES | PI 4270 | 12745 | 020-5406-434.60-23 | 19.74 |
| | 9/27/2017 | 9297 | JANDERSON INC DBA CARTRIDGE WO | PI 3894 | 16495 | 020-5130-437.60-03 | 128.00 |
| | 9/27/2017 | 9813 | JAMISON AUTO GLASS LLC | PI 3897 | 3513 | 020-5415-435.60-20 | 300.00 |
| | 9/27/2017 | 9892 | GOODYEAR COMMERCIAL TIRE | PI 3871 | 2541009424 | 020-0000-141.00-00 | 2,122.36 |
| | | | | PI 3913 | 2541009423 | 020-5305-438.60-19 | 617.00 |
| | 9/27/2017 | 10233 | PETROLEUM TRADERS CORP | PI 3922 | 1177326 | 020-0000-141.00-00 | 14,579.06 |
| | 9/27/2017 | 10903 | THE SCHEMMER ASSOCIATES INC | PI 4178 | 07042001-4 | 020-5205-419.70-16 | 3,475.00 |
| | 9/27/2017 | 10987 | ENVIRONMENTAL PRODUCT & ACCESS | PI 4133 | 230348 | 020-5415-435.60-23 | 739.76 |
| | | | | | | 9/27/2017 TOTAL - | 23,532.75 |
| | | | | | | CUMULATIVE TOTAL - | 310,313.64 |
| | 9/28/2017 | 90 | NAPA AUTO PARTS | PI 3930 | 2210881287 | 020-0000-141.00-00 | 63.54 |
| | | | | PI 3931 | 2210881287 | 020-0000-141.00-00 | 29.73 |
| | | | | PI 3932 | 2210881287 | 020-0000-141.00-00 | 3.99 |
| | | | | PI 3933 | 2210881287 | 020-0000-141.00-00 | 38.62 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|----------|-----------|--------------------------------|------------|------------------|--------------------|------------|
| | | | | PI 4308 | 2210881272 | 020-5305-438.60-20 | 160.23 |
| | | | | PI 4310 | 2210881317 | 020-5305-438.60-20 | 29.70 |
| | | | | PI 4313 | 2210881322 | 020-5305-438.60-20 | 37.12 |
| 9/28/2017 | 92 | | WHITE STAR MACHINERY & SUPPLY | PI 4029 | 07192977 | 020-5305-438.60-20 | 454.66 |
| 9/28/2017 | 255 | | SAF T GLOVE INC | PI 3991 | 85118601 | 020-0000-141.00-00 | 38.52 |
| 9/28/2017 | 399 | | LOCKE SUPPLY COMPANY | PI 3878 | 3254303100 | 020-5100-437.70-17 | 245.18 |
| | | | | PI 3879 | 3254319700 | 020-5100-437.70-17 | 11.48 |
| 9/28/2017 | 1581 | | MID CONTINENT CONCRETE CO | PI 4180 | 1582721 | 020-5305-438.60-27 | 468.00 |
| 9/28/2017 | 4358 | | MCNEILUS TRUCK & MFG., INC | PI 4168 | 3779737 | 020-0000-141.00-00 | 925.75 |
| 9/28/2017 | 5042 | | H G FLAKE SUPPLY CO | PI 3895 | 0350560 | 020-5405-434.60-23 | 5.00 |
| | | | | PI 3896 | 3502041 | 020-5405-434.60-23 | 305.91 |
| 9/28/2017 | 5334 | | EVANS ENTERPRISES INC - TULSA | PI 3857 | 30152 | 020-5415-435.40-28 | 1,705.00 |
| 9/28/2017 | 5371 | | PREMIER TRUCK GROUP | PI 3934 | 125210721 | 020-0000-141.00-00 | 128.22 |
| 9/28/2017 | 5421 | | LUBER BROS INC. | PI 3870 | INV00163294 | 020-0000-141.00-00 | 236.83 |
| | | | | PI 3994 | FRT00163294 | 020-0000-141.00-00 | 36.19 |
| 9/28/2017 | 5936 | | CONTINENTAL BATTERY CO | PI 3831 | 10930928171250 | 020-0000-141.00-00 | 301.00 |
| 9/28/2017 | 5941 | | LOWES | PI 3973 | 01950 | 020-5305-438.60-24 | 378.10 |
| 9/28/2017 | 8679 | | CORE & MAIN | PI 4095 | H824590 | 020-5406-434.60-38 | 216.00 |
| 9/28/2017 | 9700 | | ADVANCED INDUSTRIAL SOLUTIONS | PI 4055 | 232225B02 | 020-0000-141.00-00 | 75.39 |
| | | | | PI 4060 | 232456B01 | 020-0000-141.00-00 | 57.80 |
| 9/28/2017 | 10233 | | PETROLEUM TRADERS CORP | PI 3929 | 1177878 | 020-0000-141.00-00 | 14,295.48 |
| 9/28/2017 | 10833 | | ENGLAND FORD INC | PI 4114 | S021 | 020-5410-435.70-02 | 32,431.50 |
| | | | | | | 9/28/2017 TOTAL - | 51,695.38 |
| | | | | | | CUMULATIVE TOTAL - | 362,009.02 |
| 9/29/2017 | 90 | | NAPA AUTO PARTS | PI 3935 | 2210881366 | 020-0000-141.00-00 | 33.90 |
| | | | | PI 3936 | 2210881366 | 020-0000-141.00-00 | 3.40 |
| | | | | PI 3937 | 2210881366 | 020-0000-141.00-00 | 9.16 |
| | | | | PI 3938 | 2210881366 | 020-0000-141.00-00 | 40.37 |
| | | | | PI 3939 | 2210881397 | 020-0000-141.00-00 | 82.44 |
| | | | | PI 4244 | 2210881440 | 020-0000-141.00-00 | 7.98 |
| | | | | PI 4245 | 2210881440 | 020-0000-141.00-00 | 7.98 |
| | | | | PI 4246 | 2210881440 | 020-0000-141.00-00 | 51.48 |
| | | | | PI 4247 | 2210881440 | 020-0000-141.00-00 | 3.08 |
| | | | | PI 4314 | 2210881369 | 020-5120-437.60-23 | 3.99 |
| | | | | PI 4317 | 2210881394 | 020-5305-438.60-20 | 17.19 |
| | | | | PI 4319 | 2210881432 | 020-5210-419.60-20 | 33.02 |
| 9/29/2017 | 101 | | WELDON PARTS TULSA | PI 4021 | 1996029000 | 020-5125-436.60-20 | 81.75 |
| 9/29/2017 | 179 | | TRANS CONTINENTAL SUPPLY INC | PI 4230 | 1028124 | 020-5415-435.60-23 | 112.50 |
| 9/29/2017 | 399 | | LOCKE SUPPLY COMPANY | PI 4117 | 3255675100 | 020-5100-437.70-17 | 31.31 |
| 9/29/2017 | 890 | | B & M OIL COMPANT - TULSA | PI 4064 | 0464342 | 020-0000-141.00-00 | 592.50 |
| 9/29/2017 | 1409 | | SMITH FARM & GARDEN CO | PI 4025 | 786983 | 020-5305-438.60-20 | 5.93 |
| 9/29/2017 | 5440 | | EWING | PI 4128 | 4125543/ 4174250 | 020-5305-438.60-24 | 1,565.50 |
| 9/29/2017 | 5941 | | LOWES | PI 4275 | 01097/ | 020-5305-438.60-23 | 66.45 |
| | | | | PI 4277 | 13412 | 020-5415-435.60-23 | 7.71 |
| 9/29/2017 | 6822 | | TULSA WNNELSON COMPANY | PI 4227 | 02030000 | 020-5410-435.60-23 | 37.29 |
| 9/29/2017 | 8539 | | ALL MAINTENANCE SUPPLY INC | PI 4063 | 0006140001 | 020-0000-141.00-00 | 84.80 |
| 9/29/2017 | 9213 | | HITCH IT TRAILERS, PARTS, SERV | PI 4115 | 12195CS | 020-5205-419.60-20 | 790.00 |
| 9/29/2017 | 9719 | | RICKERT LANDSCAPING & TREE SVC | PI 4189 | 2017526 | 020-5305-438.40-28 | 600.00 |
| 9/29/2017 | 9784 | | EUROFINS EATON ANALYTICAL INC | PI 3853 | L0348117 | 020-5405-434.60-34 | 200.00 |
| 9/29/2017 | 9892 | | GOODYEAR COMMERCIAL TIRE | PI 3873 | 2541009435 | 020-0000-141.00-00 | 1,557.00 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|------------|-----------|--------------------------------|------------|------------|--------------------|------------|
| | 9/29/2017 | 10526 | EXPRESS PRESS | PI 4132 | 34065 | 020-5130-437.60-10 | 215.20 |
| | 9/29/2017 | 10946 | AMERI FLEX HOSE & ACCESSORIES | PI 4074 | 293500 | 020-5305-438.60-20 | 247.89 |
| | 9/29/2017 | 11049 | CINCINNATI FAN | PI 4097 | 275331 | 020-5405-434.60-45 | 545.03 |
| | | | | | | 9/29/2017 TOTAL - | 7,034.85 |
| | | | | | | CUMULATIVE TOTAL - | 369,043.87 |
| | 9/30/2017 | 3361 | RHOMAR INDUSTRIES INC | PI 4169 | 89780 | 020-0000-141.00-00 | 1,231.71 |
| | | | | | | 9/30/2017 TOTAL - | 1,231.71 |
| | | | | | | CUMULATIVE TOTAL - | 370,275.58 |
| | 10/02/2017 | 8 | BRENNTAG SOUTHWEST INC | PI 4080 | BSW890704 | 020-5410-435.60-34 | 793.63 |
| | 10/02/2017 | 90 | NAPA AUTO PARTS | PI 4248 | 2210881595 | 020-0000-141.00-00 | 77.67 |
| | | | | PI 4249 | 2210881595 | 020-0000-141.00-00 | 23.58 |
| | | | | PI 4250 | 2210881595 | 020-0000-141.00-00 | 10.52 |
| | | | | PI 4341 | 2210881562 | 020-5210-419.60-20 | 146.61 |
| | 10/02/2017 | 377 | KIMS INTERNATIONAL | PI 4147 | 0100693 | 020-5125-436.60-20 | 104.28 |
| | 10/02/2017 | 399 | LOCKE SUPPLY COMPANY | PI 4136 | 3256364400 | 020-5100-437.70-17 | 16.92 |
| | | | | PI 4137 | 3256374300 | 020-5100-437.70-17 | 26.35 |
| | | | | PI 4138 | 3256653100 | 020-5100-437.70-17 | 15.99 |
| | | | | PI 4139 | 3256665500 | 020-5100-437.70-17 | 26.94 |
| | 10/02/2017 | 1409 | SMITH FARM & GARDEN CO | PI 4171 | 787220 | 020-0000-141.00-00 | 91.06 |
| | | | | PI 4196 | 787218 | 020-5405-434.60-20 | 22.99 |
| | | | | PI 4198 | 787250 | 020-5305-438.60-20 | 17.96 |
| | | | | PI 4199 | 787267 | 020-5305-438.60-20 | 27.60 |
| | 10/02/2017 | 2372 | WATKINS SAND COMPANY INC | PI 4235 | 16280X | 020-5400-434.60-27 | 400.00 |
| | 10/02/2017 | 4407 | MESHEK & ASSOCIATES PLC | PI 4207 | 4945 | 020-5400-434.70-17 | 1,000.00 |
| | 10/02/2017 | 6671 | TULSA CLEANING SYSTEMS | PI 4242 | 62328 | 020-5120-437.60-23 | 340.00 |
| | 10/02/2017 | 7296 | CHRIS NIKEL CHRYSLER JEEP DODG | PI 4102 | 679784 | 020-5200-419.60-20 | 92.71 |
| | 10/02/2017 | 9569 | TWIN CITIES READY MIX INC | PI 4237 | 153834 | 020-5305-438.60-27 | 320.00 |
| | 10/02/2017 | 9700 | ADVANCED INDUSTRIAL SOLUTIONS | PI 4065 | 232529BO | 020-0000-141.00-00 | 29.88 |
| | 10/02/2017 | 9892 | GOODYEAR COMMERCIAL TIRE | PI 4104 | 2541009455 | 020-0000-141.00-00 | 857.00 |
| | | | | PI 4162 | 2541009451 | 020-5200-419.60-19 | 850.88 |
| | 10/02/2017 | 10218 | THE CARY COMPANY | PI 4047 | 607625 | 020-5410-435.60-23 | 64.41 |
| | 10/02/2017 | 10788 | EASY AUTOMOTIVE EQUIPMENT | PI 4156 | 2977 | 020-5120-437.70-04 | 13,900.00 |
| | | | | | | 10/02/2017 TOTAL - | 19,256.98 |
| | | | | | | CUMULATIVE TOTAL - | 389,532.56 |
| | 10/03/2017 | 90 | NAPA AUTO PARTS | PI 4344 | 2210881660 | 020-5305-438.60-20 | 10.00 |
| | | | | PI 4348 | 2210881717 | 020-5120-437.60-20 | 5.69 |
| | | | | PI 4349 | 2210881718 | 020-5400-434.60-20 | 27.24 |
| | | | | PI 4350 | 2210881719 | 020-5120-437.60-20 | 34.14 |
| | 10/03/2017 | 225 | SUMMIT TRUCK GROUP | PI 4210 | 411147000 | 020-5125-436.60-20 | 195.07 |
| | | | | PI 4211 | 411147001 | 020-5125-436.60-20 | 221.88 |
| | | | | PI 4212 | 411147003 | 020-5125-436.60-20 | 1,441.83 |
| | 10/03/2017 | 244 | GREEN ACRE SOD FARMS DBA | PI 4155 | 107426 | 020-5400-434.60-80 | 75.00 |
| | 10/03/2017 | 399 | LOCKE SUPPLY COMPANY | PI 4140 | 3257392600 | 020-1700-419.60-23 | 22.01 |
| | | | | PI 4141 | 3257525000 | 020-1700-419.60-23 | 26.06 |
| | | | | PI 4142 | 3258018200 | 020-5100-437.70-17 | 8.72 |
| | 10/03/2017 | 452 | GELCO UNIFORMS & SHOES INC | PI 4153 | 00206527 | 020-5400-434.60-10 | 98.99 |
| | 10/03/2017 | 5941 | LOWES | PI 4323 | 01872 | 020-5415-435.60-23 | 27.49 |
| | | | | PI 4324 | 01876 | 020-5305-438.60-23 | 16.14 |

| FUND 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|---------------|----------|-----------|-------------------------------|------------|----------------|--------------------|------------|
| | | | | PI 4326 | 01931- | 020-5305-438.60-20 | 8.16- |
| | | | | PI 4327 | 01953 | 020-5305-438.60-23 | 101.55 |
| | | | | PI 4329 | 02363 | 020-5305-438.60-20 | 16.31 |
| | | | | PI 4331 | 02430 | 020-5405-434.60-23 | 75.05 |
| | | | | PI 4332 | 13332 | 020-1700-419.60-23 | 4.11 |
| 10/03/2017 | 9569 | | TWIN CITIES READY MIX INC | PI 4238 | 153903 | 020-5305-438.60-27 | 160.00 |
| 10/03/2017 | 10010 | | PROCESS SOLUTIONS INC. | PI 4380 | INV0001825 | 020-5405-434.60-45 | 3,617.98 |
| 10/03/2017 | 10699 | | KUBOTA CENTER WEST TULSA | PI 4161 | P13228 | 020-5305-438.60-20 | 288.66 |
| | | | | | | 10/03/2017 TOTAL - | 6,455.66 |
| | | | | | | CUMULATIVE TOTAL - | 395,988.22 |
| 10/04/2017 | 35 | | A & N TRAILER PARTS INC | PI 4076 | 00296435 | 020-5125-436.60-20 | 6.29 |
| 10/04/2017 | 90 | | NAPA AUTO PARTS | PI 4251 | 2210881753 | 020-0000-141.00-00 | 205.38 |
| | | | | PI 4252 | 2210881753 | 020-0000-141.00-00 | 14.87 |
| | | | | PI 4253 | 2210881753 | 020-0000-141.00-00 | 115.09 |
| | | | | PI 4354 | 2210881782 | 020-5125-436.60-20 | 20.05 |
| | | | | PI 4355 | 2210881785 | 020-5120-437.60-20 | 7.98 |
| | | | | PI 4356 | 2210881810 | 020-5125-436.60-20 | 11.99 |
| 10/04/2017 | 92 | | WHITE STAR MACHINERY & SUPPLY | PI 4243 | 07169550 | 020-5400-434.60-20 | 78.36 |
| 10/04/2017 | 94 | | WHOLESALE TOOL COMPANY | PI 4241 | 01799249 | 020-5120-437.60-21 | 42.70 |
| 10/04/2017 | 225 | | SUMMIT TRUCK GROUP | PI 4172 | 411147047 | 020-0000-141.00-00 | 126.25 |
| | | | | PI 4173 | 411147096 | 020-0000-141.00-00 | 183.89 |
| | | | | PI 4213 | CM411147003 | 020-5125-436.60-20 | 60.00- |
| | | | | PI 4214 | 411147082 | 020-5125-436.60-20 | 94.59 |
| | | | | PI 4215 | 411147059 | 020-5125-436.60-20 | 101.46 |
| 10/04/2017 | 452 | | GELCO UNIFORMS & SHOES INC | PI 4154 | 00206563 | 020-5125-436.60-10 | 125.00 |
| 10/04/2017 | 4730 | | DELL MARKETING L.P. | PI 4157 | 10194619923 | 020-5125-436.60-24 | 824.03 |
| 10/04/2017 | 8629 | | PROMOMAN | PI 4170 | 17922 | 020-0000-141.00-00 | 650.00 |
| 10/04/2017 | 9822 | | MORTON SALT INC | PI 4195 | 5401408081 | 020-5405-434.60-34 | 5,643.94 |
| 10/04/2017 | 9892 | | GOODYEAR COMMERCIAL TIRE | PI 4105 | 2541009469 | 020-0000-141.00-00 | 411.16 |
| | | | | | | 10/04/2017 TOTAL - | 8,603.03 |
| | | | | | | CUMULATIVE TOTAL - | 404,591.25 |
| 10/05/2017 | 90 | | NAPA AUTO PARTS | PI 4254 | 2210881840 | 020-0000-141.00-00 | 53.94 |
| | | | | PI 4255 | 2210881851 | 020-0000-141.00-00 | 137.42 |
| | | | | PI 4256 | 2210881851 | 020-0000-141.00-00 | 87.18 |
| | | | | PI 4257 | 2210881925 | 020-0000-141.00-00 | 35.04 |
| | | | | PI 4258 | 2210881925 | 020-0000-141.00-00 | 14.87 |
| | | | | PI 4259 | 2210881925 | 020-0000-141.00-00 | 54.94 |
| | | | | PI 4358 | 2210881857 | 020-5120-437.60-23 | 6.20 |
| 10/05/2017 | 225 | | SUMMIT TRUCK GROUP | PI 4174 | 411147135 | 020-0000-141.00-00 | 58.84 |
| | | | | PI 4217 | 411147157 | 020-5125-436.60-20 | 163.04 |
| | | | | PI 4218 | 411147155 | 020-5400-434.60-20 | 93.36 |
| 10/05/2017 | 5936 | | CONTINENTAL BATTERY CO | PI 4088 | 10931005171012 | 020-0000-141.00-00 | 129.84 |
| 10/05/2017 | 5941 | | LOWES | PI 4338 | 02669 | 020-5305-438.60-23 | 56.77 |
| | | | | PI 4339 | 02727 | 020-5305-438.60-23 | 20.85 |
| 10/05/2017 | 6656 | | SOUTH EAST AUTO TRIM INC. | PI 4219 | 55942 | 020-5406-434.40-20 | 350.00 |
| 10/05/2017 | 9892 | | GOODYEAR COMMERCIAL TIRE | PI 4106 | 2541009477 | 020-0000-141.00-00 | 102.79 |
| | | | | PI 4166 | 2541009476 | 020-5125-436.60-20 | 90.00 |
| | | | | | | 10/05/2017 TOTAL - | 1,455.08 |
| | | | | | | CUMULATIVE TOTAL - | 406,046.33 |

| FUND | 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | I NVOI CE NO | ACCOUNT NO | AMOUNT |
|------------|----------|-------------|--------------|--------------------------------|---------------|-----------------|--------------------|------------|
| 10/06/2017 | 90 | | | NAPA AUTO PARTS | PI 4368 | 2210881968 | 020-5200-419.60-20 | 15.38 |
| | | | | | PI 4370 | 2210882000 | 020-5305-438.60-20 | 14.97 |
| 10/06/2017 | 5936 | | | CONTINENTAL BATTERY CO | PI 4089 | 17191006171031 | 020-0000-141.00-00 | 233.88 |
| | | | | | | | 10/06/2017 TOTAL - | 264.23 |
| | | | | | | | CUMULATIVE TOTAL - | 406,310.56 |
| 10/09/2017 | 141 | | | CUMMINS SOUTHERN PLAINS | 003029 | 02741261 | 020-5405-434.40-29 | 2,696.40 |
| 10/09/2017 | 501 | | | CHAMBER OF COMMERCE | 003026 | 41703 | 020-5205-419.30-11 | 800.00 |
| 10/09/2017 | 2673 | | | ACCURATE ENVIRONMENTAL LLC | 003014 | 7105025 | 020-5410-435.30-34 | 60.00 |
| | | | | | 003015 | 7111041 | 020-5405-434.30-34 | 220.00 |
| | | | | | 003016 | 7111040 | 020-5405-434.30-34 | 160.00 |
| 10/09/2017 | 2878 | | | TOM D COOK JR | 003010 | 10/05/17 | 020-0503-415.50-03 | 57.50 |
| 10/09/2017 | 3444 | | | ADMIRAL EXPRESS LLC | 002959 | C19033090 | 020-5100-437.60-03 | 11.29 |
| | | | | | 002960 | C19033091 | 020-5100-437.60-03 | 11.08 |
| | | | | | 002961 | 172619S | 020-5100-437.60-03 | 599.25 |
| | | | | | 002969 | 172580S | 020-5200-419.60-03 | 133.68 |
| | | | | | 002970 | 172572S | 020-5205-419.60-03 | 718.43 |
| | | | | | 002979 | 172797S | 020-5410-435.60-03 | 66.55 |
| | | | | | 002980 | 172566S | 020-5305-438.60-03 | 75.18 |
| | | | | | 002981 | 172795S | 020-5400-434.60-03 | 28.99 |
| | | | | | 002983 | 172665S | 020-5130-437.60-03 | 198.22 |
| 10/09/2017 | 4462 | | | REGIONAL METROPOLITAN UTILITY | 003054 | 412231 | 020-5410-435.40-45 | 98,214.06 |
| 10/09/2017 | 4513 | | | CUSTOM SERVICES | 003030 | 365079 | 020-1700-419.40-07 | 412.00 |
| 10/09/2017 | 6044 | | | CURTIS SUMMERS | 002987 | 10/03/17 | 020-5400-434.30-11 | 23.00 |
| 10/09/2017 | 8766 | | | EUGENE BRYAN CAREY | 002991 | 10/02/17 | 020-5415-435.30-11 | 23.00 |
| 10/09/2017 | 9767 | | | ROBERT STEWART | 003255 | 10/06/17 | 020-5410-435.30-11 | 23.00 |
| 10/09/2017 | 10360 | | | JAVA DAVES EXECUTIVE COFFEE SE | 003037 | 116646 | 020-5205-419.60-23 | 57.57 |
| 10/09/2017 | 10485 | | | SUPERIOR OUTDOOR SERVICES LLC | 003058 | 1337 | 020-5305-438.40-28 | 1,211.00 |
| 10/09/2017 | 10500 | | | J & J BOWERS LAWN CARE LLC | 003034 | 92417 | 020-5305-438.40-28 | 500.00 |
| 10/09/2017 | 10611 | | | BENCHMARK LAWN MAINTENANCE LLC | 003020 | 202631 | 020-5305-438.40-28 | 1,605.00 |
| | | | | | 003021 | 202630 | 020-5305-438.40-28 | 40.00 |
| 10/09/2017 | 11068 | | | KEVIN PETERSEN | 002995 | 09/29/17 | 020-5305-438.30-11 | 117.50 |
| 10/09/2017 | 11074 | | | DUSTIN TURNER | 002989 | 10/02/17 | 020-5120-437.30-11 | 33.00 |
| 10/09/2017 | 11075 | | | DOUGLAS ARCHER | 002988 | 10/05/17 | 020-5120-437.30-11 | 18.00 |
| | | | | | | | 10/09/2017 TOTAL - | 106,468.96 |
| | | | | | | | CUMULATIVE TOTAL - | 512,779.52 |
| 10/10/2017 | 92 | | | WHITE STAR MACHINERY & SUPPLY | 003180 | 07168960 | 020-5305-438.40-32 | 393.90 |
| 10/10/2017 | 241 | | | GRAND RIVER DAM AUTHORITY | 003122 | 44679 | 020-5405-434.50-94 | 313.20 |
| 10/10/2017 | 1057 | | | TULSA WORLD | 003162 | 407387 | 020-5130-437.50-05 | 115.62 |
| | | | | | 003163 | 407397 | 020-5130-437.50-05 | 118.08 |
| | | | | | 003164 | 407401 | 020-5130-437.50-05 | 115.62 |
| 10/10/2017 | 1693 | | | SAIA MOTOR FREIGHT LINE INC | 003145 | 656773 | 020-5305-438.40-20 | 99.41 |
| 10/10/2017 | 2673 | | | ACCURATE ENVIRONMENTAL LLC | 003093 | 7111039 | 020-5405-434.30-34 | 335.00 |
| 10/10/2017 | 5904 | | | ADDCO ELECTRIC INC. | 003095 | 22637 | 020-5415-435.40-28 | 1,750.00 |
| 10/10/2017 | 6454 | | | WASTE MANAGEMENT QUARRY LANDFI | 003167 | 218347810069 | 020-5125-436.40-30 | 72.28 |
| | | | | | 003168 | 004858021852 | 020-5125-436.40-30 | 1,350.82 |
| | | | | | 003169 | 004858621859 | 020-5125-436.40-30 | 404.04 |
| 10/10/2017 | 6789 | | | GREEN COUNTRY TESTING | 003123 | 60393 | 020-5415-435.30-34 | 650.00 |
| | | | | | 003124 | 60396 | 020-5410-435.30-34 | 1,472.00 |
| 10/10/2017 | 7514 | | | DAVISON SOFTWARE | 003111 | 4152 | 020-5410-435.30-87 | 600.00 |

| FUND | 020 BAMA | DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | I NVOI CE NO | ACCOUNT NO | AMOUNT |
|------------|----------|-------------|--------------|--------------------------------|---------------|-----------------|--------------------|------------|
| 10/10/2017 | 8018 | | | THE UPS STORE #3764 | 003156 | 13717 | 020-5130-437.50-39 | 13.59 |
| | | | | | 003157 | 13769 | 020-5130-437.50-39 | 16.25 |
| | | | | | 003158 | 13814 | 020-5130-437.50-39 | 62.38 |
| | | | | | 003159 | 13845 | 020-5130-437.50-39 | 11.10 |
| 10/10/2017 | 9151 | | | CLEAN THE UNI FORM CO OKLAHOMA | 003185 | 50845642 | 020-5400-434.40-31 | 151.59 |
| | | | | | 003186 | 50845642 | 020-5406-434.40-31 | 48.53 |
| | | | | | 003187 | 50845643 | 020-5415-435.40-31 | 52.66 |
| | | | | | 003188 | 50846098 | 020-5405-434.40-28 | 8.10 |
| | | | | | 003189 | 50846096 | 020-5405-434.40-31 | 78.93 |
| | | | | | 003190 | 50846099 | 020-5410-435.40-31 | 18.72 |
| | | | | | 003191 | 50846756 | 020-5200-419.40-31 | 13.04 |
| | | | | | 003192 | 50846759 | 020-5115-437.40-31 | 42.40 |
| | | | | | 003196 | 50846761 | 020-5130-437.40-31 | 3.86 |
| | | | | | 003197 | 50846762 | 020-5120-437.40-31 | 105.35 |
| | | | | | 003198 | 50846763 | 020-5125-436.40-31 | 197.32 |
| | | | | | 003199 | 50846764 | 020-5100-437.40-33 | 19.00 |
| | | | | | 003200 | 50846764 | 020-5120-437.40-33 | 25.00 |
| | | | | | 003202 | 50847204 | 020-5305-438.40-31 | 143.61 |
| | | | | | 003204 | 50847205 | 020-5305-438.40-33 | 2.60 |
| | | | | | 003212 | 50846757 | 020-5400-434.40-31 | 153.68 |
| | | | | | 003213 | 50846757 | 020-5406-434.40-31 | 48.53 |
| | | | | | 003214 | 50846758 | 020-5415-435.40-31 | 52.66 |
| | | | | | 003218 | 50847843 | 020-5200-419.40-31 | 13.04 |
| | | | | | 003219 | 50847844 | 020-5100-437.40-33 | 4.00 |
| | | | | | 003220 | 50847845 | 020-5400-434.40-31 | 153.68 |
| | | | | | 003221 | 50847845 | 020-5406-434.40-31 | 48.53 |
| | | | | | 003222 | 50847846 | 020-5415-435.40-31 | 52.66 |
| | | | | | 003223 | 50847847 | 020-5115-437.40-31 | 46.01 |
| | | | | | 003225 | 50847849 | 020-5130-437.40-31 | 3.86 |
| | | | | | 003226 | 50847850 | 020-5120-437.40-31 | 105.35 |
| | | | | | 003227 | 50847852 | 020-5120-437.40-33 | 29.00 |
| 10/10/2017 | 9539 | | | TULSA HEALTH DEPARTMENT | 003160 | 31928 | 020-5410-435.30-34 | 2,795.00 |
| | | | | | 003161 | 31962 | 020-5410-435.30-34 | 900.00 |
| 10/10/2017 | 9916 | | | WASTE ZERO INC | 003170 | 29045 | 020-5125-436.60-25 | 7,931.28 |
| 10/10/2017 | 10081 | | | MECHANICAL AIR SYSTEMS INC | 003134 | 3291 | 020-5405-434.40-55 | 135.00 |
| 10/10/2017 | 10214 | | | TULSA'S GREEN COUNTRY STAFFING | 003165 | 56789 | 020-5125-436.50-37 | 5,818.80 |
| 10/10/2017 | 10407 | | | ALLIANCE MAINTENANCE INC | 003099 | 97096 | 020-1700-419.40-28 | 1,415.00 |
| 10/10/2017 | 10485 | | | SUPERIOR OUTDOOR SERVICES LLC | 003153 | 1339 | 020-5305-438.40-28 | 1,211.00 |
| 10/10/2017 | 10500 | | | J & J BOWERS LAWN CARE LLC | 003128 | 10217 | 020-5305-438.40-28 | 750.00 |
| 10/10/2017 | 10611 | | | BENCHMARK LAWN MAINTENANCE LLC | 003103 | 202636 | 020-5305-438.40-28 | 1,605.00 |
| | | | | | 003104 | 202635 | 020-5305-438.40-28 | 40.00 |
| 10/10/2017 | 10949 | | | ROUTEWARE INC. | 003144 | 98696 | 020-5125-436.70-18 | 435.00 |
| | | | | | | | 10/10/2017 TOTAL - | 32,551.08 |
| | | | | | | | CUMULATIVE TOTAL - | 545,330.60 |
| 10/11/2017 | 40 | | | AVB | 003266 | SEPT 2017 | 020-0503-415.50-28 | 397.38 |
| 10/11/2017 | 229 | | | AT&T | 003239 | 10534843224 | 020-1700-419.50-22 | 16.53 |
| 10/11/2017 | 257 | | | SAFETY KLEEN CORP | 003355 | 74771101 | 020-5120-437.40-33 | 340.00 |
| 10/11/2017 | 307 | | | OTA PIKEPASS CENTER | 003320 | 20170900112 | 020-5120-437.50-03 | 1.45 |
| | | | | | 003321 | 20170900112 | 020-5125-436.50-03 | 45.19 |
| | | | | | 003322 | 20170900112 | 020-5200-419.50-03 | 12.35 |

| FUND | 020 BAMA | DATE | VENDOR | VENDOR | VOUCHER | I NVOI CE | ACCOUNT | AMOUNT |
|------------|----------|------|--------|-----------------------------------|---------|-------------|---------------------|------------|
| | | DUE | NO | NAME | NO | NO | NO | |
| | | | | | 003323 | 20170900112 | 020-5205-419.50-03 | 44.80 |
| | | | | | 003324 | 20170900112 | 020-5210-419.50-03 | 9.45 |
| | | | | | 003325 | 20170900112 | 020-5400-434.50-03 | 5.10 |
| | | | | | 003326 | 20170900112 | 020-5406-434.50-03 | 4.75 |
| | | | | | 003327 | 20170900112 | 020-5410-435.50-03 | 226.92 |
| | | | | | 003328 | 20170900112 | 020-5415-435.50-03 | 2.05 |
| 10/11/2017 | 319 | | | OKLAHOMA MUNI CI PAL LEAGUE | 003307 | 065946 | 020-5200-419.30-11 | 230.00 |
| | | | | | 003309 | 065946 | 020-5401-434.50-03 | 175.00 |
| 10/11/2017 | 355 | | | I NCOG | 003291 | 221959 | 020-1700-419.30-85 | 1,836.37 |
| | | | | | 003292 | 221967 | 020-1700-419.30-85 | 9,796.87 |
| 10/11/2017 | 556 | | | OFFI CE TEAM | 003354 | 49385691 | 020-0302-413.50-37 | 624.68 |
| 10/11/2017 | 2227 | | | HAYNES EQUI PMENT CO | 003353 | 8118353 | 020-5415-435.40-28 | 69.50 |
| 10/11/2017 | 3964 | | | THE ARROW GROUP | 003338 | 62847 | 020-1700-419.50-76 | 2,014.50 |
| | | | | | 003340 | 62846 | 020-1700-419.50-76 | 126.00 |
| 10/11/2017 | 4019 | | | MCAFFEE & TAFT | 003295 | 521512 | 020-1700-419.30-08 | 885.50 |
| 10/11/2017 | 4462 | | | REGI ONAL METROPOLI TAN UTI LI TY | 003332 | 411223 | 020-5410-435.70-15 | 81,632.56 |
| 10/11/2017 | 5606 | | | OFMA | 003297 | 2021 | 020-5200-419.30-85 | 35.00 |
| | | | | | 003298 | 2025 | 020-5205-419.30-85 | 25.00 |
| | | | | | 003299 | 2024 | 020-5205-419.30-85 | 25.00 |
| | | | | | 003300 | 2023 | 020-5210-419.30-85 | 25.00 |
| | | | | | 003301 | 2008 | 020-5210-419.30-85 | 25.00 |
| 10/11/2017 | 6789 | | | GREEN COUNTRY TESTING | 003289 | 60066 | 020-5405-434.40-55 | 960.00 |
| 10/11/2017 | 8260 | | | DATAPROSE INC | 003285 | DP1702836 | 020-0503-415.50-28 | 11,499.65 |
| | | | | | 003286 | DP1702836 | 020-0503-415.50-39 | 28,074.57 |
| 10/11/2017 | 9539 | | | TULSA HEALTH DEPARTMENT | 003356 | 31935 | 020-5405-434.30-34 | 636.00 |
| | | | | | | | 10/11/2017 TOTAL - | 139,802.17 |
| | | | | | | | CUMULATI VE TOTAL - | 685,132.77 |
| 10/12/2017 | 8 | | | BRENNTAG SOUTHWEST INC | 003366 | BSW874082 | 020-5405-434.40-28 | 4,055.40 |
| 10/12/2017 | 37 | | | ANCHOR STONE CO | 003363 | 171638104 | 020-5400-434.70-15 | 173.70 |
| | | | | | 003367 | 171678309 | 020-5405-434.40-28 | 131.74 |
| 10/12/2017 | 9569 | | | TW N CI TIES READY MI X I NC | 003361 | 149197 | 020-5400-434.70-15 | 610.00 |
| 10/12/2017 | 11077 | | | PAX WATER TECHNOLOGI ES | 003362 | 00004032 | 020-5400-434.70-15 | 141,092.00 |
| | | | | | | | 10/12/2017 TOTAL - | 146,062.84 |
| | | | | | | | CUMULATI VE TOTAL - | 831,195.61 |
| 10/17/2017 | 113 | | | WAGONER COUNTY RURAL WATER #4 | 001013 | 367100 | 020-5415-435.50-23 | 13.30 |
| 10/17/2017 | 309 | | | OKLAHOMA NATURAL GAS CO | 002830 | 114920245 | 020-5415-435.50-24 | 22.77 |
| | | | | | 002902 | 183825191 | 020-5415-435.50-24 | 38.41 |
| | | | | | 002903 | 253746364 | 020-5415-435.50-24 | 41.68 |
| | | | | | 002904 | 253746509 | 020-5415-435.50-24 | 42.95 |
| | | | | | 002919 | 178921936 | 020-1700-419.50-24 | 56.78 |
| | | | | | 002921 | 178922373 | 020-1700-419.50-24 | 50.10 |
| | | | | | 002927 | 253868218 | 020-5415-435.50-24 | 42.59 |
| | | | | | 002932 | 219682564 | 020-5100-437.50-24 | 115.66 |
| | | | | | 005429 | 253746364 | 020-5415-435.50-24 | .63 |
| | | | | | 005430 | 253746509 | 020-5415-435.50-24 | .63 |
| | | | | | 005600 | 254063282 | 020-5415-435.50-24 | .86 |
| | | | | | 008116 | 111532618 | 020-5415-435.50-24 | 26.46 |
| | | | | | 008724 | 254063282 | 020-5415-435.50-24 | 53.76 |
| | | | | | 008768 | 253746873 | 020-5415-435.50-24 | 42.33 |

| FUND | 020 BAMA DATE DUE | VENDOR NO | VENDOR NAME | VOUCHER NO | INVOICE NO | ACCOUNT NO | AMOUNT |
|------------|-------------------------|--------------|----------------------------|---------------|---------------|--------------------|-----------|
| 10/17/2017 | | 442 | AMERICAN ELECTRIC POWER | 009768 | 253746873 | 020-5415-435.50-24 | .64 |
| | | | | 000156 | 9511708090 | 020-5100-437.50-25 | 35.05 |
| | | | | 000157 | 9514846980 | 020-5120-437.50-25 | 34.21 |
| | | | | 000158 | 9515293420 | 020-5100-437.50-25 | 1,469.24 |
| | | | | 000159 | 9527441030 | 020-5120-437.50-25 | 1,126.18 |
| | | | | 000160 | 9589441030 | 020-5100-437.50-25 | 1,048.88 |
| | | | | 000165 | 9526531031 | 020-5410-435.50-25 | 4,425.17 |
| | | | | 000166 | 9574890770 | 020-5410-435.50-25 | 19,268.98 |
| | | | | 000167 | 9594523000 | 020-5410-435.50-25 | 63.48 |
| | | | | 000326 | 9572394130 | 020-5415-435.50-25 | 88.56 |
| | | | | 000931 | 9515241030 | 020-5415-435.50-25 | 684.95 |
| | | | | 000975 | 9553112580 | 020-5415-435.50-25 | 6,276.69 |
| | | | | 001202 | 9552921030 | 020-5415-435.50-25 | 38.42 |
| | | | | 001900 | 9591574610 | 020-5415-435.50-25 | 53.39 |
| | | | | 002886 | 9521969410 | 020-5305-438.50-25 | 113.72 |
| | | | | 002887 | 9562295260 | 020-5305-438.50-25 | 34.21 |
| | | | | 002888 | 9568940540 | 020-5305-438.50-25 | 34.21 |
| | | | | 005276 | 9504700320 | 020-5415-435.50-25 | 40.26 |
| | | | | 005277 | 9520493673 | 020-5415-435.50-25 | 87.52 |
| | | | | 005278 | 9528706400 | 020-5415-435.50-25 | 47.21 |
| | | | | 005280 | 9544731030 | 020-5415-435.50-25 | 57.91 |
| | | | | 005282 | 9563338071 | 020-5415-435.50-25 | 127.12 |
| | | | | 005283 | 9565957711 | 020-5415-435.50-25 | 47.77 |
| | | | | 005284 | 9566631030 | 020-5415-435.50-25 | 43.87 |
| | | | | 005285 | 9567901211 | 020-5415-435.50-25 | 1,437.59 |
| | | | | 005286 | 9571918810 | 020-5415-435.50-25 | 266.32 |
| | | | | 005290 | 9595686240 | 020-5415-435.50-25 | 2,902.86 |
| | | | | 005291 | 9597631030 | 020-5415-435.50-25 | 75.41 |
| | | | | 005294 | 9523741030 | 020-5415-435.50-25 | 159.09 |
| | | | | 005295 | 9528041030 | 020-5415-435.50-25 | 46.43 |
| | | | | 005296 | 9540041030 | 020-5415-435.50-25 | 67.99 |
| | | | | 005303 | 9581731030 | 020-5415-435.50-25 | 130.00 |
| | | | | 005304 | 9588531030 | 020-5415-435.50-25 | 80.77 |
| | | | | 005305 | 9591431030 | 020-5415-435.50-25 | 63.21 |
| | | | | 005306 | 9593621030 | 020-5415-435.50-25 | 40.39 |
| | | | | 005935 | 9540921930 | 020-5415-435.50-25 | 35.82 |
| | | | | 005936 | 9563531030 | 020-5415-435.50-25 | 45.44 |
| | | | | 006140 | 9506407251 | 020-5415-435.50-25 | 86.18 |
| | | | | 008726 | 9524580750 | 020-5415-435.50-25 | 255.58 |
| 10/17/2017 | | 888 | PREFERRED BUSINESS SYSTEMS | 002937 | 076827 | 020-5410-435.40-33 | 167.00 |
| | | | | 002938 | 076850 | 020-5400-434.40-33 | 165.00 |
| | | | | 003076 | INV1713 | 020-5410-435.40-55 | 13.50 |
| | | | | 003077 | INV1713 | 020-5130-437.40-55 | 18.47 |
| | | | | 003078 | INV1713 | 020-5100-437.40-55 | 13.46 |
| | | | | 003079 | INV1713 | 020-5120-437.40-55 | 7.73 |
| | | | | 003080 | INV1713 | 020-5205-419.40-55 | 222.29 |
| | | | | 003085 | INV1713 | 020-0503-415.40-55 | 40.43 |
| | | | | 003086 | INV1713 | 020-5400-434.40-55 | 12.87 |
| | | | | 003090 | INV1713 | 020-5405-434.40-55 | 16.35 |
| | | | | 003091 | INV1713 | 020-5406-434.40-55 | 13.29 |
| | | | | 000843 | 108291766 | 020-5405-434.40-93 | 1,019.18 |
| 10/17/2017 | | 1307 | CITY OF TULSA UTILITIES | | | | |

PREPARED 10/13/17, 7:31:07
 PROGRAM GM314L
 CITY OF BROKEN ARROW

ACCOUNTS PAYABLE BY FUND/ DUE DATE

PAGE 22

| FUND | 020 BAMA | | | | | | |
|------------|----------|--------|---------------------------------|---------|------------|--------------------|------------|
| DATE | | VENDOR | VENDOR | VOUCHER | I NVOI CE | ACCOUNT | |
| DUE | | NO | NAME | NO | NO | NO | AMOUNT |
| | | | | 000844 | 106727183 | 020-5405-434.40-93 | 6,908.98 |
| | | | | 002900 | 107351421 | 020-5305-438.40-28 | 469.15 |
| | | | | 002901 | 108753518 | 020-5125-436.40-30 | 379.50 |
| 10/17/2017 | 6347 | | COX COMMUNI CATI ONS | 002712 | 066381301 | 020-5100-437.50-22 | 576.96 |
| | | | | 002713 | 066260701 | 020-5410-435.50-23 | 189.94 |
| 10/17/2017 | 7724 | | W NDSTREAM | 007885 | 0351000542 | 020-5205-419.50-22 | 2.30 |
| | | | | 008976 | 2598272 | 020-5100-437.50-22 | 277.22 |
| | | | | 008978 | 0351000560 | 020-5405-434.50-22 | 275.68 |
| | | | | 008979 | 2513145 | 020-5405-434.50-22 | 37.22 |
| | | | | 008980 | 4554762 | 020-5410-435.50-22 | 186.83 |
| | | | | 008981 | 2501858 | 020-5410-435.50-22 | 42.31 |
| | | | | 008982 | 3558751 | 020-5415-435.50-22 | 37.22 |
| | | | | 008983 | 3554226 | 020-5415-435.50-22 | 37.22 |
| | | | | 008984 | 3572456 | 020-5415-435.50-22 | 37.22 |
| | | | | 008985 | 3572503 | 020-5415-435.50-22 | 37.22 |
| 10/17/2017 | 10381 | | CROSSLAND CONSTRUCI ON COMPANY, | 002914 | NOV 2017 | 020-0000-234.04-00 | 49,870.80 |
| | | | | 002915 | NOV 2017 | 020-1700-419.80-02 | 3,917.11 |
| | | | | | | 10/17/2017 TOTAL - | 106,482.08 |
| | | | | | | FUND 020 TOTAL - | 937,677.69 |

PREPARED 10/13/17, 7:31:07
PROGRAM GM314L
CITY OF BROKEN ARROW

ACCOUNTS PAYABLE BY FUND/ DUE DATE

PAGE 23

| FUND | 021 | BAMA | SALES TAX | | | | | |
|------------|-----|--------|-----------|--------------------------------|---------|------------|--------------------|--------|
| DATE | | VENDOR | | VENDOR | VOUCHER | I NVOI CE | ACCOUNT | |
| DUE | | NO | | NAME | NO | NO | NO | AMOUNT |
| 10/11/2017 | | 596 | | OKLAHOMA WATER RESOURCES BOARD | 003365 | RES. #1058 | 021-5405-473.80-01 | 500.00 |
| | | | | | | | 10/11/2017 TOTAL - | 500.00 |
| | | | | | | | FUND 021 TOTAL - | 500.00 |