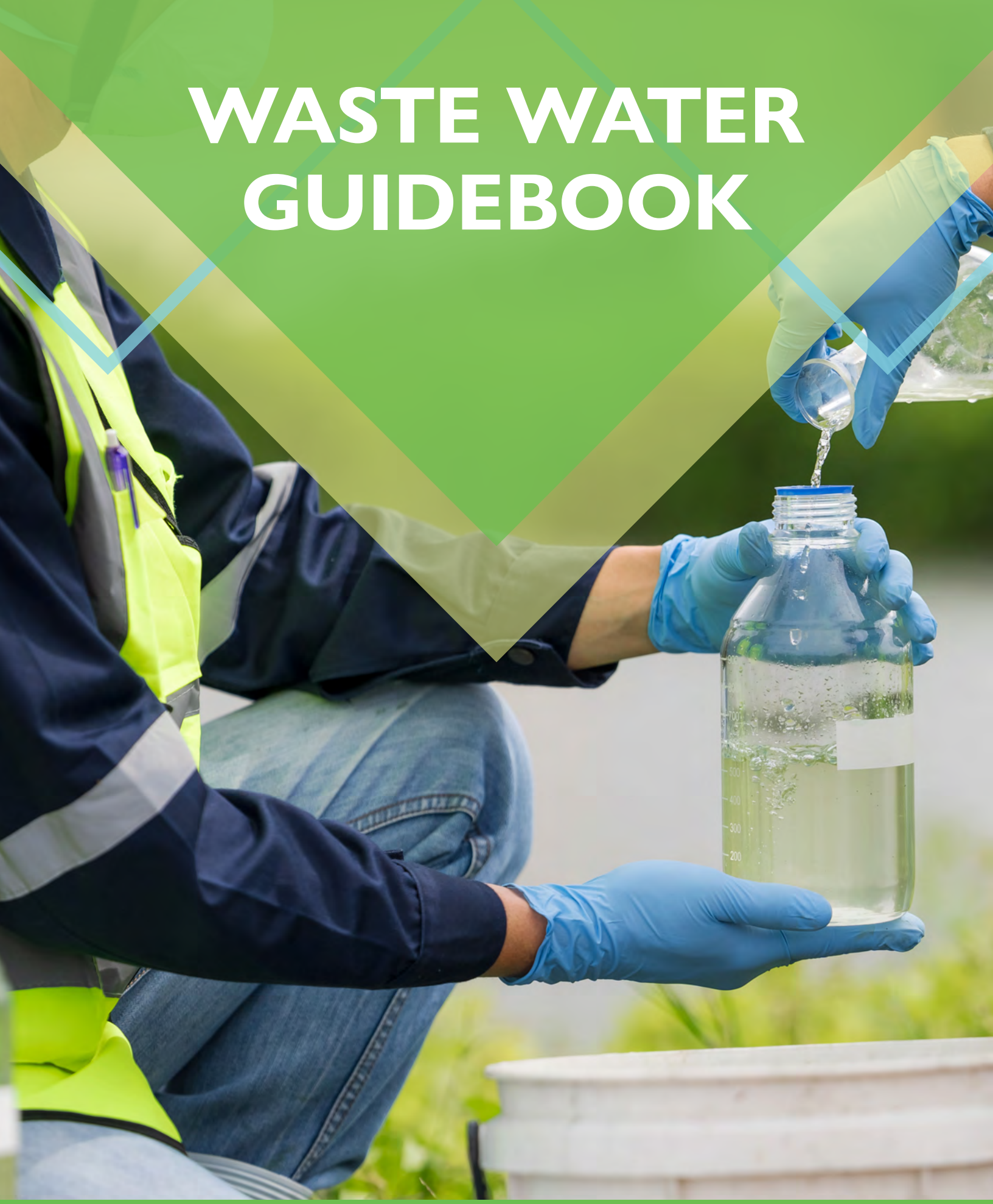
WASTE WATER GUIDEBOOK



Choctaw Nation of Oklahoma

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Choctaw Nation of Oklahoma Environmental Protection Service
P.O. Box 1210, Durant, OK 74702.

Purpose

The purpose of this guidebook is to provide comprehensive guidelines for the operation and maintenance of water systems, ensuring compliance with regulatory standards, promoting water quality management, and supporting long-term system sustainability. It covers essential topics such as water quality parameters (e.g., chlorine levels and TTHMs), system capacity, routine and preventative maintenance, and record-keeping requirements.

Additionally, the guidebook offers information on certification, training, and regulatory bodies of the Department of Environmental Quality (DEQ), the Oklahoma Water Resources Board (OWRB), and the Environmental Protection Agency (EPA), as well as other key contacts for permits, enforcement, and grants.

This guidebook illustrates the Choctaw Nation of Oklahoma's cultural commitment to fostering sustainable communities. It reflects the Nation's longstanding stewardship values and dedication to responsible resource management for the benefit of present and future generations. Furthermore, it aligns with the objectives and provisions set forth in the Tribal Water Settlement Agreement, reinforcing the Nation's commitment to cooperative water governance and environmental sustainability. By providing clear instructions and practical resources, this guidebook aims to help water system operators maintain efficient, safe, and compliant operations.

Departmental Contacts

Choctaw Nation Office of Water Resource Management

The Office of Water Resource Management is a department within the Environmental Protection Services at Choctaw Nation of Oklahoma. Established as a division to oversee the Tribal Water Settlement Agreement, this management team is dedicated to bettering the well-being of both the Choctaw people and the environment by improving and managing water resources. Their efforts focus on monitoring and improving water quality, planning sustainable water use, ensuring reliable infrastructure, and protecting the watersheds within the Choctaw Nation.

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Choctaw Nation Utility Authority

The Choctaw Nation Utilities Authority is a department within Integrated Services at the Choctaw Nation of Oklahoma. The Utilities Authority oversees all purchased water, wastewater operations, and electricity, as well as utility locations and billing within Choctaw Nation facilities. Their efforts focus on providing safe drinking water to all Choctaw Nation-owned properties, quality effluent discharge water, and the accurate locations of Choctaw Nation utilities.

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Jonathon Davis | Utility Authority Manager
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Oklahoma Department of Environmental Quality (ODEQ)

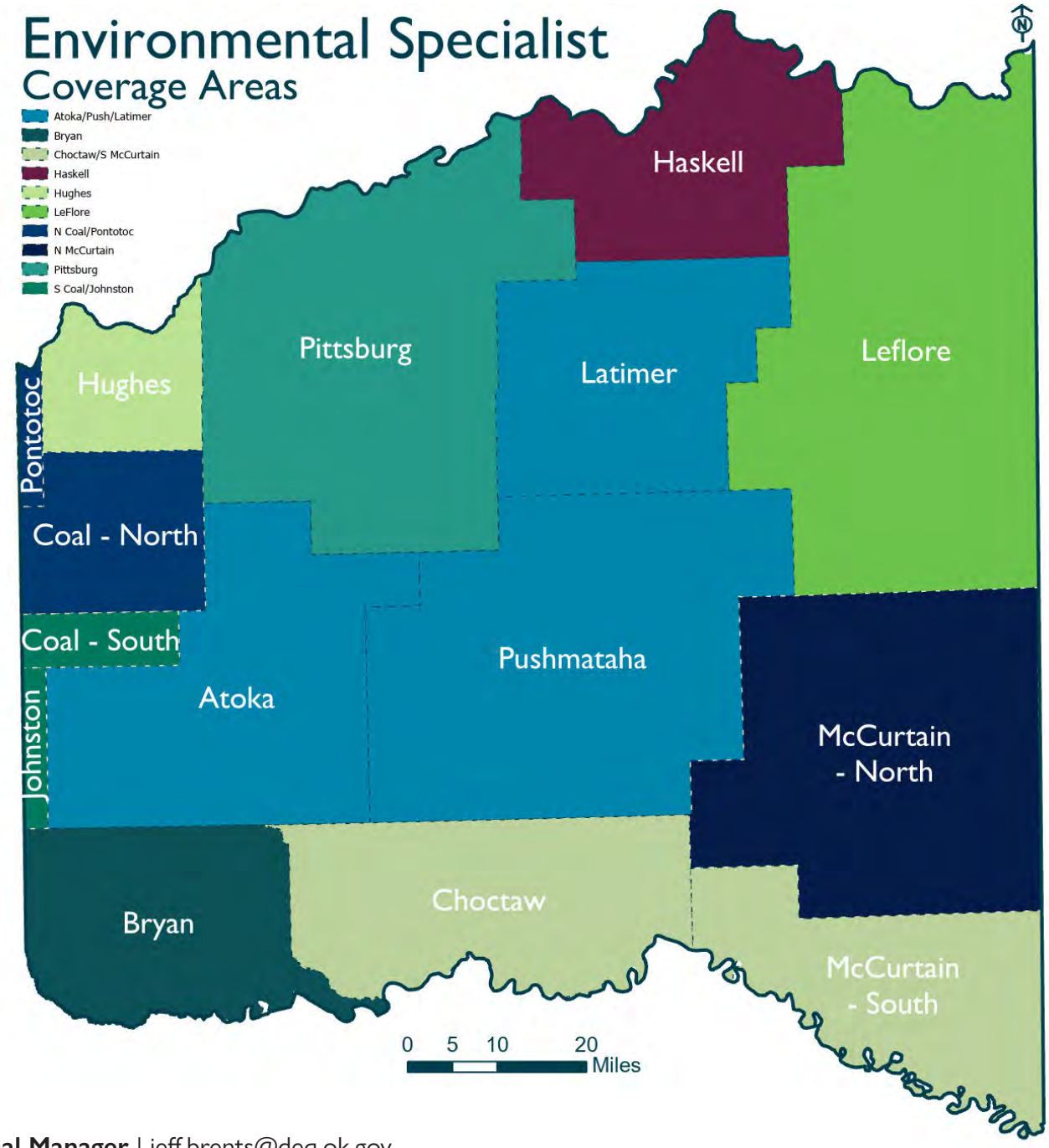
The Oklahoma Department of Environmental Quality (DEQ) is the primary state agency responsible for protecting human health and safeguarding Oklahoma's air, water, and land resources. The agency monitors and enforces water and wastewater quality standards for all water systems in the state. The agency also regulates and is responsible for the permitting of water systems and infrastructure improvements on existing and new construction. The following are contacts for the Choctaw Nation's tribal area.

ODEQ | https://oklahoma.gov/deq

OPEN RECORDS | https://oklahoma.gov/oeqa/about-oeqa/contact-us/open-records-request.html

ADMINISTRATION | https://oklahoma.gov/deq/divisions/water-quality/public-water-supply/technical-assistance-enforcement.html

ENFORCEMENT | https://oklahoma.gov/deq/divisions/water-quality/public-water-supply/technical-assistance-enforcement.html



ECLS

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Regional Manager | cassandra.atwood@deq.ok.gov

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Choctaw County | kody.johnson@deq.ok.gov | 572.206.9513

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Bryan County | derek.kinard@deq.ok.gov | 572.206.9498

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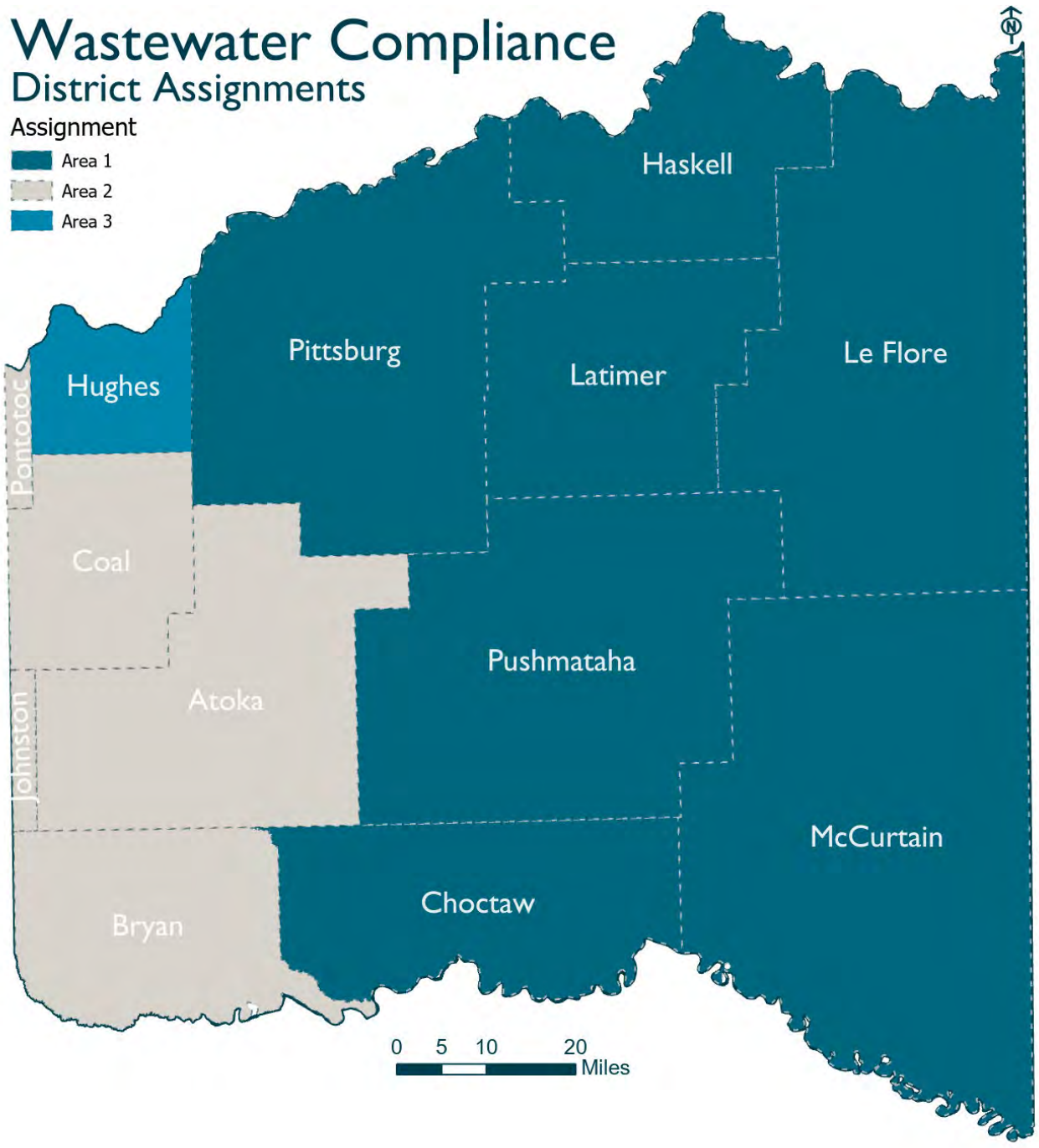
Bryan County | kevin.smith@deq.ok.gov | 572.206.9503



Municipal Wastewater Enforcement Contacts

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AREA 2
Jack English | 405.702.0100 ext. 8173

AREA 3
Ian Skinner, E.I. | 405.702.0100 ext. 8236

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405.426.7634 | www.wade-engr.com

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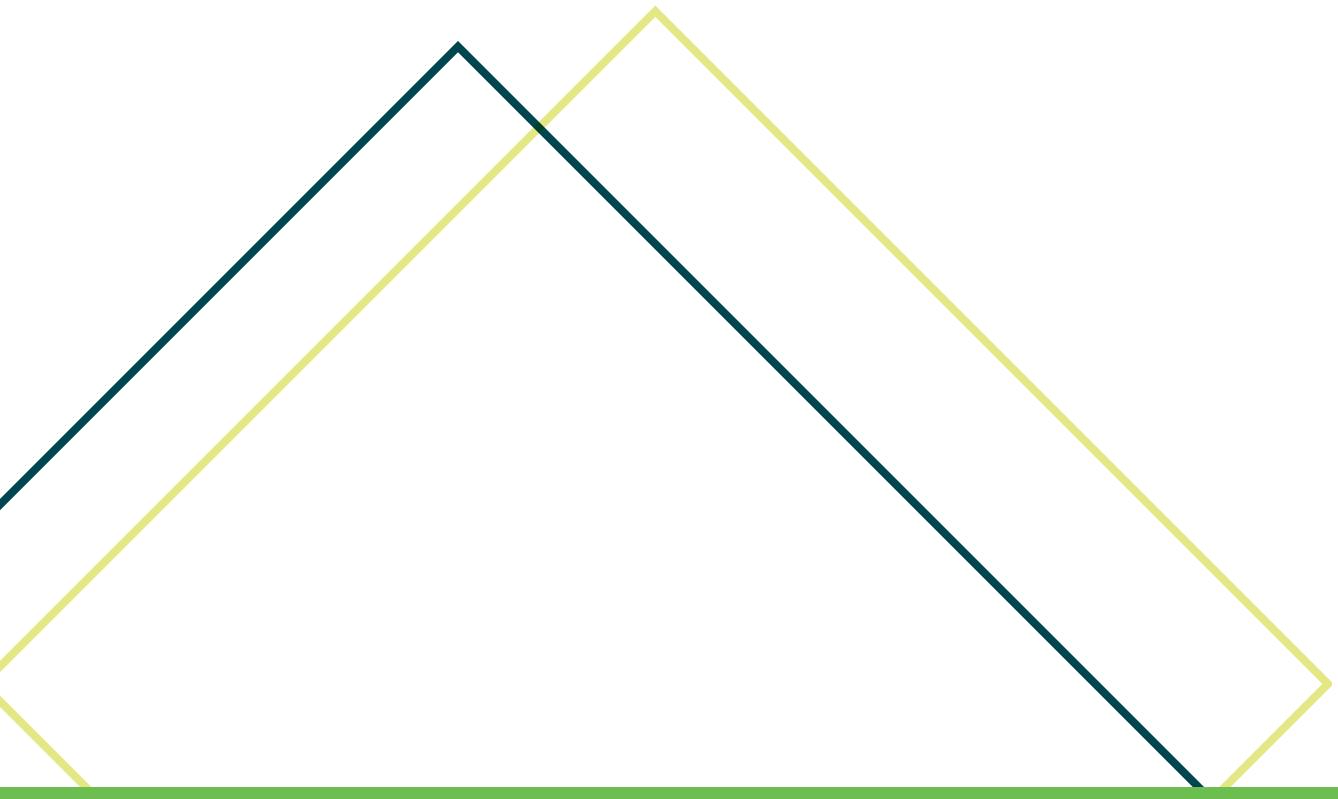


Wastewater Conversion Factors

Basic Units and Conversions

1 foot (ft) = 12 inches = 0.305 meters
1 mile (mi) = 5,280 feet
1 acre (ac) = 43,560 square feet
1 square mile (mi^2) = 640 acres
1 ton = 2,000 pounds
1 psi (pound per square inch) = 2.31 feet of water
1 cubic foot (ft^3) = 7.4805 gallons = 0.02832 cubic meters
1 cubic foot per second (cfs) = 7.4805 gallons per second = 0.646 million gallons per day (MGD)
1 cubic foot per second (cfs) = 448.8 gallons per minute (GPM)
1 cubic foot per second (cfs) = 1.983 acre-feet per day
1 cubic foot per second (cfs) = 2,447 cubic meters of water per day
1 acre-foot (ac-ft) = 43,560 cubic feet = 325,851 gallons = 1,233 cubic meters
1 acre-foot (ac-ft) = 0.504 cubic feet per second per day (cfs/day)
1 gallon (gal) = 0.1337 cubic feet = 3.79 liters
1 million gallons (MG) = 3.07 acre-feet = 1.547 cfs per day
1 part per million (ppm) = 1 mg/L = 8.35 lbs per million gallons

Water Weights

1 gallon of water = 8.34 pounds
1 cubic foot of water = 62.4 pounds

Time Conversions

1 day = 1,440 minutes

Miscellaneous

π (pi) ≈ 3.14159
1% concentration = 10,000 mg/L

Temperature (Celsius to Fahrenheit)

0° C= 32° F

(Degrees Celsius) x 1.8 +32= Degrees Fahrenheit

Common formulas

Pounds per day (lbs./day) = (Flow, MGD) * (Concentration, mg/L) * (8.34)

Concentration (mg/L) = (lbs/day) / (Flow, MGD) * (8.34)

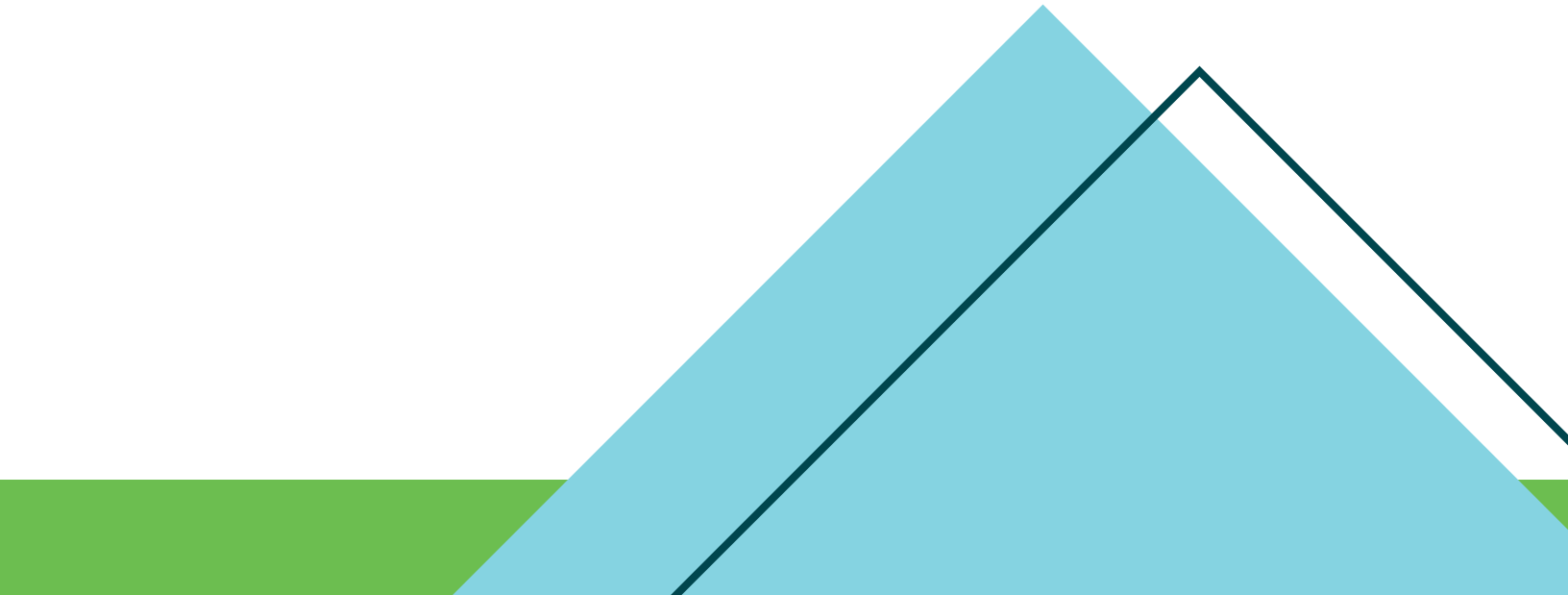
$$\text{Biochemical Oxygen Demand (BOD5)} = \frac{(\text{Initial DO-Final DO, mg/L}) * (\text{Total Volume,mL})}{\text{Sample Volume, mL}}$$

$$\text{Percentage Removal} = \frac{(\text{Influent BOD} - \text{Effluent BOD}) * (100\%)}{\text{Influent BOD}}$$

$$\text{Detention Time (days)} = \frac{\text{Volume (gallons)}}{\text{Flow Rate (gpd)}}$$

Chlorine

- Residual (mg/L) = Dosage (mg/L) – Demand (mg/L)
- Demand (mg/L) = Dosage (mg/L) – Residual (mg/L)
- Dosage (mg/L) = Demand (mg/L) + Residual (mg/L)



Glossary & Definitions *Also See Guidelines Section

A

Alkalinity | Buffering capacity to maintain pH. Desired effluent range is 60 mg/L or more.

Anaerobic Lagoon | Operates without oxygen, relying on bacteria that thrive in low-oxygen conditions.

ARPA | American Rescue Plan Act

B

BIA | Bureau of Indian Affairs

BOD5 | 5-day Biochemical Oxygen Demand *

BOR | Bureau of Reclamation

C

CBOD5 | 5-day Carbonaceous Biochemical Oxygen Demand *

CDBG | Community Development Block Grant

COD | Chemical Oxygen Demand *

CO | Consent Order

CWSRF | Clean Water State Revolving Fund

D

DO | Dissolved Oxygen *

F

F/M ratio | Food to Microorganisms Ratio *

Facultative Lagoon | Contains both aerobic and anaerobic zones, supporting a diverse range of microorganisms.

Flow | The movement of water through the system.

G

gpd | Gallons per Day

gpm | Gallons per Minute

H

hp | Horsepower

HUC | Hydrologic Unit Code

I

IHS | Indian Health Services

L

lbs. | Pounds

lbs./day | Pounds per day

M

mg/L | Milligrams per Liter

mL | Milliliter

MLSS | Mixed Liquor Suspended Solids *

MLVSS | Mixed Liquor Volatile Suspended Solids *

MS4 | Municipal Separate Storm Sewer System

N

NOD | Notice of Deficiency

NON | Notice of Noncompliance

NOV | Notice of Violation

NPDES | National Pollutant Discharge Elimination System

Nutrients | Essential elements (such as nitrogen and phosphorus) required for microbial growth.

O

ODEQ | Oklahoma Department of Environmental Quality

OEH | Office of Environmental Health

OEL | Operational Evaluation Level

OPDES | Oklahoma Pollutant Discharge Elimination System

ORWA | Oklahoma Rural Water Association

P

PER | Preliminary Engineering Report

PI | Pi (π)

PWA | Public Works Authority

PWS | Public Water System

pH | A measure of acidity or alkalinity in water. Best treatment results occur in a pH range of 6.5-8.5, although permit requirements may vary depending on regulatory standards.

Q

Q | Flow

R

RAS | Return Activated Sludge

REAP | Rural Economic Action Plan (Grant)

RIG | Rural Infrastructure Grant

RWD | Rural Water District

S

SS | Settleable Solids *

SSO | Sanitary Sewer Overflow

SSV30 | Settled Sludge Volume 30 min

SW | Surface Water

SVI | Sludge Volume Index

T

TOC | Total Organic Carbon *

TSS | Total Suspended Solids *

V

VS | Volatile Solids *

W

WAS | Waste Activated Sludge

WWTP | Wastewater Treatment Plant

Environmental Factors

Ambient Temperature | Can cause disruptions in bacterial growth within the treatment process.

Weather Conditions | Rainy conditions (I & I) can cause noncompliance of most reportable parameters.

Seasonal Changes | Spring and Winter seasons may cause nitrification/denitrification of the treatment process.

Stormwater Inflow and Infiltration | I & I can overflow the Collection System and will increase costs to correct.

Naturally occurring nutrients | Waste Load Allocation (WLA) depends on the nutrient levels of the receiving waters. Excess nutrients will affect discharge limits when renewing a permit.

Animal activity | Increased animal and bird activity will increase the nutrient levels within a treatment facility.

General Guidelines

Operator licensing requirements are determined by the complication of the treatment process and population size.

Facility Classification	Population Size
Class “D” Total Retention Lagoons	1,500 or less
Class “C”	>1,500 - <15,000
Class “B”	>15,000 - <50,000
Class “A”	>50,000

Renewal Certification

Operator certification- Renewal period July 1 - June 30 every year.
Hours are determined by class of license as follows:

Class A | 16 hours/year (4 must be in class)

Class B | 12 hours/year (4 must be in class)

Class C | 8 hours/year (4 must be in class)

Class D | 4 hours/year (4 must be in class)

Monthly Reporting

DEQ

Monthly Operational Reports (MOR) | 10th of the following month. Filed by mail or electronically. Copies must be kept on-site.

Discharge Monitoring Reports (DMR) | 10th of the following month to the County DEQ office. Facilities that have not been delegated to DEQ, a copy must be submitted to EPA Region 6.

Record Keeping Requirements

Records are required to be stored on-site and updated for:

MOR | 3 years

DMR | 3 years

Biosolids | 5 years

Unpermitted discharges | 3 years

Lab | 3 years

Logbooks | 3 years

Maintenance | 3 years

Sample Sheets | 3 years

Optional Records

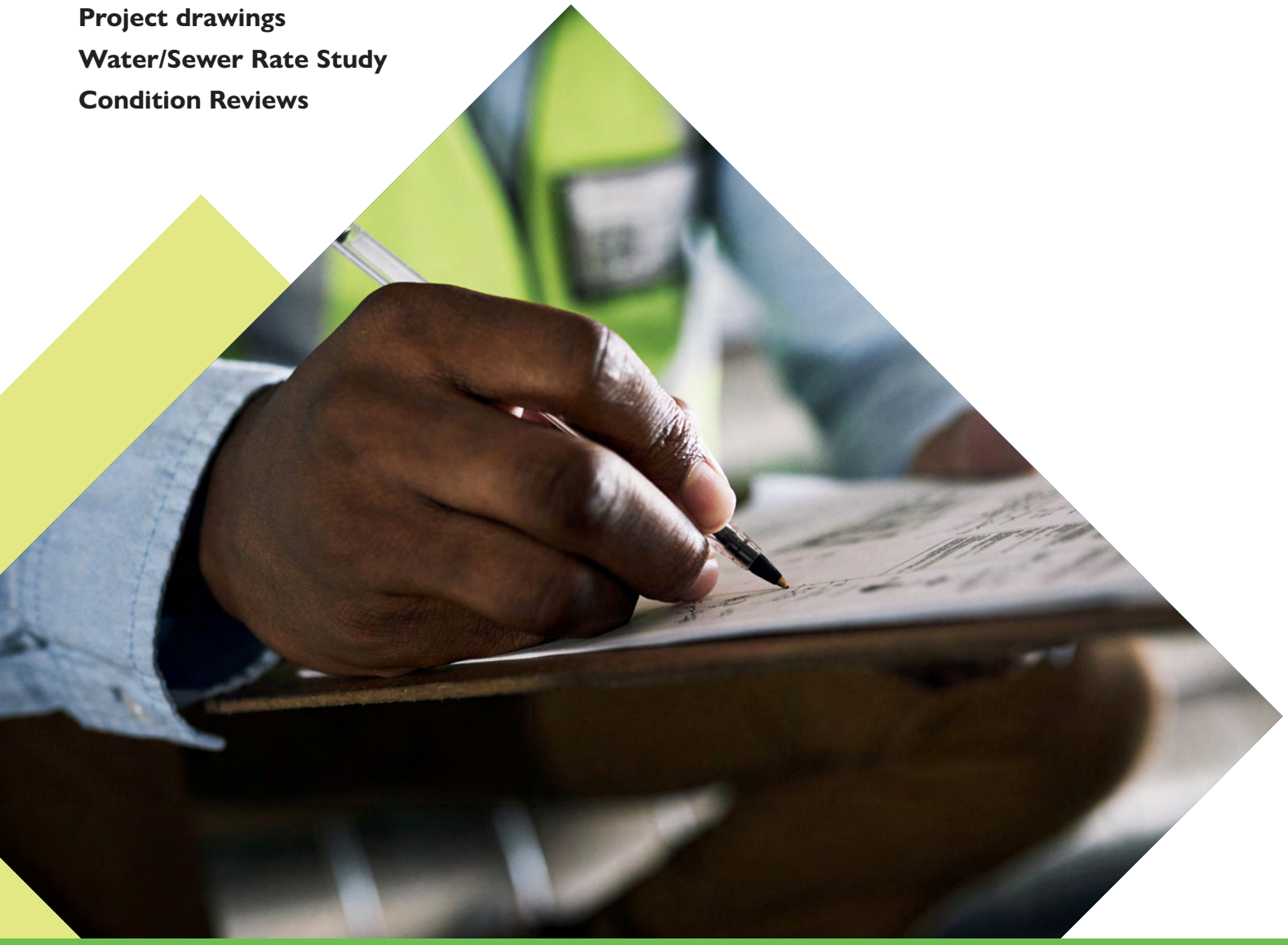
Records that are not required may be kept on-site but should be updated regularly. This is to account for inflation of materials and other expenses.

Engineering Reports

Project drawings

Water/Sewer Rate Study

Condition Reviews



Common Collection Information

Pipe Material

- **Ductile Iron** | Submains and trunk lines. Can handle heavy loads and any depth.
- **PVC** | Will not corrode but can become brittle or freeze.
- **Reinforced Concrete Pipe** | High compressive strength, used in submains or trunk lines.
- **Vitrified Clay** | Lateral lines, submains, and trunk lines.

Fats, Oils, and Grease (FOG)

- It can cause blockages in pipes resulting in maintenance of line or line replacement.
- If you do not have a FOG policy, an example can be requested from the OWRM Resource Planners or at **chocta.ws/sustainable-communities**

Repairs

- Repairs can be mitigated by proper maintenance of major components and extend the life of the equipment.
- A routine cleaning schedule is recommended.
- Inspections should be done and any issues identified, repaired, and documented.
- Documentation should include:
  - Dates (Found and Repaired)
  - Location
  - Descriptions of issues
  - Repairs done

Safety

Safety needs to be considered when planning repairs.

Common safety hazards

- **Trenching/ Shoring** | If trenches are not properly shored, cave-ins can occur. This usually happens without warning and there is no time to escape.
  - Cave-in protection is recommended for trenches 4 or more feet deep.
  - Shoring is required by OSHA for trenches that are 5 or more feet deep.
- **Confined spaces** | Any small spaces that are not properly vented such as chemical rooms, manholes, and lift stations.
  - DO NOT ENTER confined spaces without being properly trained.
  - Follow confined space protocol and make sure that you are not alone.
- **Hazardous gases** | Gases within a collection system can be dangerous. Many gases do not have an odor and can be toxic or flammable.

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Gas	Chemical Formula	Properties
Methane	CH4	Colorless, tasteless, flammable, explosive
Hydrogen Sulfide	H2S	Rotten egg odor, colorless, flammable, explosive, poisonous
Carbon Dioxide	CO2	Colorless, tasteless, odorless
Chlorine	CL2	Greenish-yellow, strong odor, highly corrosive

Routine Maintenance Steps

Asset Management and Capital Improvement Planning | Public water systems can significantly improve long-term planning by implementing Asset Management Plans and Capital Improvement Plans. These plans track the condition, usefulness, and replacement costs of essential assets, such as equipment or materials valued at $5,000 or more. By using these planning tools, systems can allocate budgets more effectively, supporting long-term sustainability and self-reliance.

Daily, Weekly, and Monthly Checks for Water Systems | These checks should be performed on lift stations, manholes, and mechanical operations within the treatment process. Checks should involve visual inspections, security, and any conditions that might beneficial or useful for the proper operations.

Preventative Maintenance Schedules for Pumps, Valves, and Weather | Maintenance programs are extremely beneficial for the smooth running of daily operations of public wastewater systems. These structured and date driven programs can be as easy as setting calendar dates on an online calendar, and as complex as a purchased online preventative maintenance program. These records can be kept electronically as well as on file and should be kept for the lifespan of the equipment that is being maintained.

Sample Forms and Logs

- **Daily Logs**
  - Maintenance Checks: Performed at the beginning of a shift to confirm ensure that equipment is working properly. This log will help an operator learn the workings of the system.
  - Lab Logs: Hard written copies of any testing done on-site. These copies are required to be kept on-site for 3 years.
- **Job Descriptions**
  - Documents stating the duties of the supervisor/superintendent, operators, and line operators.
- **Maintenance Records**
  - Records that should describe any maintenance done on a piece of equipment. One should be filled out when an issue is found and when work is completed. These can help when budgeting for certain equipment as well.
- **Standard Operating Procedures (SOPs)**
  - Provides detailed procedures for operators to follow when performing work duties. There should be detailed step-by-step instructions to ensure quality work and the safety of the operator. SOPs should be done for every position,

Sample forms, logs, and planning documents can be found by scanning the QR code or visiting **chocta.ws/sustainable-communities**

Grants

A list of loan and grant information water projects can be found at the QR code below of by visiting **chocta.ws/sustainable-communities**

Choctaw Nation

Water Resource Management