Norman Stormwater Monitoring Workplan FY-2026

Prepared by: Oklahoma Water Resources Board (OWRB)

Date: November 2025

Project Background

In 2013, the City of Norman received a Total Maximum Daily Load (TMDL) final report for Lake Thunderbird from the Oklahoma Department of Environmental Quality (ODEQ). The TMDL aims to reduce nutrient and sediment loads to restore water quality, thereby achieving designated beneficial uses and removing Lake Thunderbird from Oklahoma's 303(d) list of impaired waters.

Lake Thunderbird is currently not meeting the designated uses for:

- Fish and Wildlife Propagation for Warm Water Aquatic Community due to dissolved oxygen and turbidity
- Public and Private Water Supply due to chlorophyll-a

A Wasteload Allocation (WLA) was established for the City of Norman's MS4 (Municipal Separate Storm Sewer System) area. In response, the City developed a TMDL Compliance Plan to reduce sediment and nutrient loads.

To support the Compliance Plan, the City of Norman contracted the Oklahoma Water Resources Board (OWRB) to implement and maintain a comprehensive stormwater monitoring program beginning in 2015. In FY-2026, the program will expand to include new monitoring locations and data collection efforts.

Objectives

The primary objectives of the stormwater monitoring program are to:

- Track and assess compliance with the Lake Thunderbird TMDL WLA
- Measure and analyze pollutant loads, including sediment, nitrogen, and phosphorus
- Evaluate long-term trends using statistical analysis
- Support the adaptive implementation of the City's TMDL Compliance Plan
- Provide data for public reporting and regulatory submissions

Routine Monitoring

Sampling Locations and Frequency

- 10 primary monitoring stations sampled monthly during baseflow conditions and at least 4 times during storm events. A storm event collection may substitute as a monthly collection if all sites are sampled.
    - Storm sampling can require 2-6 personnel, depending on event intensity.
- 14 major stormwater outfalls sampled 4 times during storm events.
- Rainfall amounts will be recorded from the Norman Mesonet station.

Sampling Procedures

- Water samples are collected as grab samples and sent to ODEQ for analysis. Storm samples may be collected via automated refrigerated samplers (autosamplers) and will collect at 15-minute intervals over the course of the stream hydrograph.
- Parameters analyzed:
    - Nitrate-Nitrite (NO2-NO3)
    - Total Kjeldahl Nitrogen (TKN)
    - Total Phosphorus (TP)
    - Total Suspended Solids (TSS)
- In-situ field measurements using a multiparameter sonde will measure:
    - Water temperature
    - Dissolved oxygen
    - Specific conductivity
    - pH
- Water samples collected via autosampler will not include in-situ parameters such as water temperature or dissolved oxygen.
- Turbidity will be measured in the field using a portable turbidimeter.
- A field blank will be collected during each monthly sampling trip, and during some storm events to monitor sample contamination.
- A replicate sample will be collected during each monthly sampling trip, and during some storm events to monitor consistency with sampling procedures.
- Flow measurements will be collected at the 10 permanent monitoring stations, as channel conditions allow, and as sampling personnel deem appropriate. Flow will be collected at both baseflow and high flow conditions.
    - FlowTracker or ADCP will be used based on channel conditions.
- Dataloggers will record stream stage and precipitation data at 15-minute intervals and transmit the data in real-time. Stage data will be adjusted by OWRB personnel as necessary.
- Monthly reports will be submitted to the City of Norman, summarizing sampling activities, field measurements, laboratory results, flow data (if applicable),

hydrographs, and rainfall totals. Additional deliverables can be requested by the City of Norman.

Biological Monitoring

All biological sampling will be performed according to OWRB Standard Operating Procedures (SOPs).

Macroinvertebrate Sampling

- Conducted at all 10 permanent monitoring stations once per sampling season (May 15th-September 15th).
- Macroinvertebrate samples will be sent to Rithron Associates, Inc. for analysis.

Fish and Habitat Surveys

- Performed at 2 permanent stations per year, such that all 10 locations will be surveyed once over a 5-year period.

Turbidity Monitoring

- Turbidity meters will be installed by the OWRB at locations designated by the City of Norman.
- Cameras will be installed in tandem at these locations for visual stream monitoring.
- Equipment will be maintained monthly by the OWRB, with cleaning occurring monthly and calibration occurring as needed.
- Data will be logged at 15-minute intervals and will be housed in a cloud-based real-time database that is maintained by the OWRB.
- Turbidity data will be downloaded, and the data will be corrected to account for drift from fouling and calibration, per OWRB SOPs.
- Quarterly baseflow and 4 storm event samples will be collected by OWRB personnel
    - Water samples will be collected as grab samples and will be sent to ODEQ for analysis. Samples will be tested for:
        - Nitrate-Nitrite (NO2-NO3)
        - Total Kjeldahl Nitrogen (TKN)
        - Total Phosphorus (TP)
        - Total Suspended Solids (TSS)
    - In-situ field measurements using a multiparameter sonde will measure:

        - Water temperature
        - Dissolved oxygen
        - Specific conductivity
        - pH
    - Turbidity will be collected and measured using a portable turbidimeter.

Site Modifications and Adjustments

- Monitoring locations may be added, removed, or relocated as needed and as determined by the City of Norman.
- Equipment may be added, removed, or relocated from any monitoring location as needed and as determined by the City of Norman.
- Water quality and water quantity measurements may be added or removed from monitoring locations as needed and as determined by the City of Norman.
- Any changes to sampling locations must be agreed upon by both the City of Norman and the OWRB with the understanding that additional costs, such as personnel or equipment, may be needed to perform additional monitoring. These costs must be discussed and approved by both parties before additional work can be implemented.

Budget Overview

The following tables outline the anticipated costs associated with implementing and maintaining the stormwater monitoring program in FY-2026. Costs are broken down by task type, with some items, such as equipment installation, occurring only in Year 1.

Routine Monitoring

This includes personnel costs for monthly and storm event sampling, equipment maintenance, laboratory analysis by ODEQ, and cellular plans for telemetry. A $20,000 contingency fund is included to replace one station in case of flooding or vandalism. Use of contingency funds will require joint approval from the City of Norman and OWRB.

Item	Cost per Year
Personnel	$144,163.83
ODEQ Lab	$24,785.20
Data Plans	$3,600.00
Equipment/Supplies	$7,500.00
Equipment Contingency	$20,000.00
Total	$200,049.03

Table 1 Budget for Monitoring and Maintaining 10 Permanent Stations

Biological Monitoring

This includes costs for collecting and processing macroinvertebrate samples and conducting fish and habitat surveys. Samples will be sent to Rithron Associates, Inc. for analysis. Certain activities, such as scouting, are only required in the first year.

Item	Cost (Year 1)	Cost (Year 2)
Rithron	$7,000.00	$7,000.00
Bug Sampling	$1,554.91	$1,554.91
Fish & Habitat	$2,831.41	$2,831.41
Misc Tasks	$4,798.89	$3,199.26
Equipment	$615.00	$615.00
Total	$16,800.20	$15,200.58

Table 2 Budget for Biological Sampling

Turbidity Monitoring

This includes the cost of installing and maintaining two turbidity meters and associated cameras at two locations designated by the City of Norman. Installation costs are included in Year 1 only. Personnel costs cover monthly maintenance, data download and correction, equipment calibration, and the collection of water samples during baseflow and storm events.

Item	Cost (Year 1)	Cost (Year 2)
Equipment (x2)	$12,700.00	$250.00
Personnel	$6,360.07	$5,243.21
ODEQ Lab	$1,802.56	$1,982.82
Total	$20,862.63	$7,476.03

Table 3 Budget for Turbidity Monitoring

Total Budget Summary

The table below provides a consolidated summary of the anticipated costs for the FY-2026 Norman Stormwater Monitoring Program. This total includes all major project components, including routine monitoring, biological assessments, and turbidity monitoring. Equipment and installation costs are included in Year 1 only, while ongoing maintenance, data collection, and analysis costs are reflected in both Year 1 and Year 2 where applicable. The total budget also accounts for laboratory analysis, personnel, data management, and a contingency fund for unforeseen equipment replacement needs.

Item	Cost (Year 1)	Cost (Year 2)
Routine Monitoring	$200,049.03	$200,049.03
Biological Monitoring	$16,800.20	$15,200.58
Turbidity Monitoring	$20,862.63	$7,476.03
Total	$237,711.86	$222,725.64

Table 4 Total Budget for Norman Monitoring Programs