



Post-Construction Compliance Monitoring Plan

MAY 1, 2025

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Revision Summary

May 2025

Section 1	Added references to CD paragraphs and Appendix A.
Section 2	Updated to include flow monitoring location changes will be included in Peoria's CSO Annual Reports.
Section 3	Clarified that CSO Remedial Measure projects in the Final Conditions H&H Model will be modeled in accordance with Peoria's Green Infrastructure Design Manual.
Section 4	Revised section based on the Water Quality Monitoring Plan added as Appendix A.
Section 5	Added references to CD paragraphs 44.c and 44.f in Sections 5.1 and 5.3.
Section 6	Clarified that Peoria will submit the PCCM QAPP to the Agencies prior to implementing the approved PCCM Plan.
Appendix A	Added Water Quality Monitoring Plan as Appendix A.

1.0 PCCM Overview

On March 4, 2021, the City of Peoria (Peoria) and the Greater Peoria Sanitary District (GPSD) entered into a Consent Decree (CD) with the United States Environmental Protection Agency (EPA) and Illinois Environmental Protection Agency (IEPA). The EPA and IEPA are collectively referred to as “the Agencies” in this report. As part of the CD, both Peoria and GPSD are implementing Combined Sewer Overflow (CSO) Remedial Measures to reduce CSO discharges to the Illinois River. The Post-Construction Compliance Monitoring (PCCM) plan is a vital element of the CD. The purpose of the PCCM is to demonstrate the effectiveness of the CSO Remedial Measures in meeting the Final Performance Criteria established in the CD.

This document outlines Peoria’s plan for PCCM to fulfill the requirements of the CD. The monitoring and reporting activities detailed in this report are designed in accordance with paragraphs 42 through 44 of the CD, and the EPA’s *CSO Post-Construction Compliance Monitoring Guidance*, dated May 2012. Implementation of this PCCM plan will commence after the CSO Remedial Measures have been implemented, which is expected no later than January 1, 2040.

1.1 Monitoring

The terms of the CD require Peoria to conduct at least two years of flow monitoring following the completion of the CSO Remedial Measures. This monitoring will involve collecting and analyzing comprehensive data on rainfall, flow rates, and CSO discharges to determine whether the CSO Remedial Measures are effectively reducing CSO events and volumes in accordance with the Final Performance Criteria. Additionally, the CD requires monitoring and sampling of CSO outfalls and receiving waters to assess the impact of CSO discharges on water quality in the Illinois River. The Water Quality Monitoring Plan is included as Appendix A.

1.2 Reporting

Within six months after the conclusion of the PCCM period, Peoria is required to submit a PCCM Report to the Agencies for review and approval. This report will provide a detailed analysis of rainfall and flow monitoring data, CSO discharge events, and water quality impacts. Furthermore, the report will include a modeling analysis using an updated, calibrated and validated, version of Peoria’s Hydrologic and Hydraulics (H&H) model (referred to as the Final Conditions H&H Model) that represents the system at that time, to demonstrate compliance with the Final Performance Criteria. The PCCM Report is essential for verifying that the CSO Remedial Measures are functioning as intended and that Peoria is meeting its obligations under the CD.

1.3 Compliance with CSO Final Performance Criteria

The PCCM is designed to verify that the CSO Remedial Measures are achieving the Final Performance Criteria defined in the CD. These criteria focus on the control of CSOs as outlined below:

- Eliminate CSOs during all storms less than or equal to the Six-Month Design Storm.
- Eliminate CSOs for all but one precipitation event (July 21, 1949) during Peoria's Typical Year.
- Limit the CSO volume discharged during the July 21, 1949 storm to no more than 16.3 million gallons when analyzed in Peoria's Final Conditions H&H Model.
- No CSOs during a precipitation event equal to or smaller than Peoria's Six-Month Design Storm event and Peoria's Typical Year Precipitation events (excluding the July 21, 1949 event).

2.0 Rainfall Data and Flow Monitoring

2.1 Rainfall Data

Rainfall data is an integral component of the PCCM. It will be used to inform the flow monitoring analyses and Final Conditions H&H Model updates. Peoria maintains a network of eight rain gauges throughout the collection system, as shown in Figure 1. The gauges monitor rainfall in both the combined and separated portions of the collection system tributary to the Riverfront Interceptor. Peoria plans to maintain this rain gauge network during the two-year monitoring period and will add additional gauges to support PCCM efforts, if necessary. Rainfall data will be used in the analysis of the system's performance related to CSO discharges to determine which events are equal to or smaller than Six-Month Design Storm. This data will also be used for Final Conditions H&H Model calibration and validation.

2.2 Flow Monitoring

Flow monitoring is critical to assess the performance of the CSO Remedial Measures. Flow meter data will support the PCCM by providing insights into the collection system's behavior during the two-year monitoring period. The data will be used to

1. determine the frequency, duration, and volume of CSO discharges and
2. calibrate and validate the Final Conditions H&H Model, before the model is used to verify compliance with the Final Performance Criteria.

As part of Peoria's CSO Remedial Measures Program, a comprehensive Flow Monitoring Implementation Plan was prepared. This plan defines the flow monitoring locations and approaches to determine CSO discharge events and volumes for the duration of CD implementation. Peoria intends to maintain this network of flow monitors throughout the two-year PCCM period to support the two objectives outlined above for flow monitoring.

Additional monitoring locations will be added to support calibration and validation of the Final Conditions H&H Model. In 2015, Peoria installed a network of flow meters throughout the system to characterize flows and support model development. Flow monitoring locations used for calibration and validation of the Starting Conditions H&H Model will be used during PCCM, in addition to the CSO discharge flow monitors. Figure 2 shows the planned flow monitoring locations for PCCM.

Revisions to the monitoring locations may be necessary depending on where improvements take place. For example, flow meters for monitoring regulator inflow may need to be re-located depending on how GPSD implements regulator and throttle pipe improvements. Flow monitoring locations upstream in the system may be adjusted to target flows downstream of a specific area with green infrastructure projects. Whether changes occur to the proposed monitoring locations, the objectives of flow monitoring during the PCCM period will remain. If revisions are made to the proposed flow monitoring locations, they will be documented in Peoria's yearly CSO Annual Report.

3.0 Final Conditions H&H Model Assessment for Compliance with CSO Final Performance Criteria

The Final Conditions H&H Model is another key component of the PCCM. This model will aid in assessing the system's performance at the conclusion of CSO Remedial Measures implementation and demonstrating compliance with the Final Performance Criteria. The Final Conditions H&H Model will be used to perform a comprehensive analysis of the system's response to the Six-Month Design Storm and Typical Year benchmarks, thereby supporting the overall objectives of the PCCM.

3.1 Final Conditions H&H Model Development

When construction of the CSO Remedial Measures is complete, the H&H Model will be updated to reflect the associated changes to the system. This model is referred to as the Final Conditions H&H Model. The CSO Remedial Measures, including both Peoria and GPSD projects, will be incorporated into the model consistent with Peoria's Green Infrastructure Design Manual to accurately represent the system at that time. The Final Conditions H&H Model will be recalibrated to account for changes in flow and validated against observed data. The calibration and validation will include dry weather and wet weather flows and will not exclude precipitation events because they exceed the Design Storm.

3.2 Model Evaluations for the Six-Month Design Storm and Peoria's Typical Year

The Final Conditions H&H Model will be used to evaluate the system's performance for the Six-Month Design Storm and Peoria's Typical Year rainfall. This evaluation will involve running the model with precipitation data corresponding to these scenarios and analyzing the outputs to determine if the system meets the Final Performance Criteria. Specifically, the model will be used to assess whether CSO discharges are eliminated for the Six-Month Design Storm and all events in Peoria's Typical Year, except the July 21, 1949 event. For this event, the model will be used to confirm the CSO discharge volume is no more than 16.3 million gallons. The results of these evaluations will be documented in the Post-Construction Compliance Monitoring Report, providing a clear indication of the system's effectiveness in meeting the Final Performance Criteria.

4.0 Water Quality Monitoring

In accordance with paragraphs 42.e and 42.f of the CD, Peoria will monitor and sample CSO outfalls and the Illinois River and Peoria Lake in the immediate vicinity of the CSO discharges to evaluate the effectiveness of the CSO Remedial Measures in reducing pollutant loadings. Peoria's Water Quality Monitoring Plan, included as Appendix A, details the sampling program. The monitoring plan includes sampling and testing for fecal coliform bacteria, *E. coli* bacteria, pH, and dissolved oxygen (DO) to meet the minimum requirements for general use per Title 35 Section 302, Subpart B. The sampling locations, conditions, and frequency are also described in the Water Quality Monitoring Plan. The plan includes information on change control since the monitoring activities are expected to begin more than a decade after the development of the plan and changes may occur over that time necessitating changes to the plan.

5.0 PCCM Report

Within six months of the PCCM concluding, Peoria will prepare and submit a PCCM Report to the Agencies for review and approval. The PCCM Report will include information related to rainfall data, flow monitoring data, CSO discharges, the Final Conditions H&H Model, and water quality monitoring. These items are described below.

5.1 Rainfall Data

- Summarized rainfall data from the PCCM period.
- A tabular list and analysis that determines which precipitation events during the PCCM were equal to or less than Peoria's Six-Month Design Storm in accordance with paragraph 44.e of the CD.

5.2 Flow Monitoring

- Summarized flow monitoring data from the PCCM period and throughout the implementation of the CSO Remedial Program.

5.3 CSO Discharges

- CSO outfall monitoring analysis including frequency, duration, and volume discharged.
- An analysis that determines if any of the CSO discharges that occurred during PCCM occurred during rainfall events that were equal to or smaller than Peoria's Six-Month Design Storm in accordance with paragraph 44.f of the CD, and, if applicable, a technical demonstration to show the cause for discharge.

5.4 Final Conditions H&H Modeling

- Dry weather and wet weather model calibration and validation that meets the requirements of paragraph 44.d of the CD.
- Final Condition H&H Model runs of Peoria's Six-Month Design Storm and Typical Year with modeling output, analysis, and summary tables, to demonstrate whether the implemented CSO Remedial Measures achieve the Final Performance Criteria.

5.5 Water Quality Monitoring

- Results from water quality monitoring and an analysis of CSO discharges' impact on water quality in the immediate vicinity of Peoria's CSO outfalls.

6.0 Quality Assurance Project Plan

Prior to commencing the PCCM, Peoria will develop a Quality Assurance Project Plan (QAPP) so that all data collected are deemed scientifically sound, reliable, and capable of producing accurate and reproducible results. Peoria will submit the PCCM QAPP to the Agencies prior to implementing the approved PCCM. This section outlines the anticipated QAPP in accordance with the EPA's guidelines summarized in the document titled *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* dated March 2001. This section is divided into the four groups of elements, as described by EPA in the QAPP guidance document.

6.1 Project Management

Effective project management will be essential to the success of the PCCM plan. The QAPP will clearly define the roles and responsibilities of all personnel involved, including project managers, QA officers, modeling staff, field staff, and laboratory personnel. The project objectives, such as assessing the effectiveness of CSO Remedial Measures and compliance with the Final Performance Criteria, will be clearly outlined. Additionally, a detailed timeline for all project activities, from data collection to reporting, will be established to facilitate timely and efficient execution.

6.2 Data Generation and Acquisition

Data generation and acquisition will be described in the QAPP. This will include defining the sampling locations, frequencies, and methods to achieve representative and unbiased data collection. Standardized procedures for sample collection, preservation, and transportation will be outlined to maintain data integrity. The use of EPA-approved analytical methods in water samples will be specified, making certain that the data collected will be accurate, reliable, and suitable for their intended use. Regular calibration and maintenance of all equipment used in data collection and analysis will be conducted to maintain reliable performance.

6.3 Assessment and Oversight

Assessment and oversight will be vital for maintaining the quality and integrity of the data collected. This will involve implementing quality control measures, including field and laboratory blanks, duplicates, and calibration checks, to assess potential contamination and variability in the sampling process.

6.4 Data Validation and Usability

Data validation and usability will be crucial so that the data collected meet the established quality criteria and are suitable for their intended use. This process will include reviewing and validating data for completeness, accuracy, and consistency with field observations. Validation criteria will be defined, including acceptable ranges for key parameters and methods for addressing outliers and anomalies. Effective data management practices will be implemented, including maintaining detailed records of all project activities, data sources, field logs, chain-of-custody forms, and laboratory reports.

FIGURE 1

Rain Gauge Locations

FIGURE 2

Flow Monitoring Locations

APPENDIX A

Water Quality Monitoring Plan



Water Quality Monitoring Plan

MAY 1, 2025

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1.0 Goals and Objectives

1.1 Goals and Objectives

The City of Peoria (Peoria) developed this Water Quality Monitoring Plan as part of the Post Construction Compliance Monitoring (PCCM) Plan to address the paragraphs 42.e and 42.f of the Consent Decree (CD). As part of PCCM, Peoria will monitor and sample Combined Sewer Overflow (CSO) outfalls, stormwater outfalls, and surface waters, including the Illinois River and Peoria Lake in the immediate vicinity of the CSO discharges, to evaluate the effectiveness of the CSO Remedial Measures in reducing pollutant loadings. The post-construction water quality monitoring activities will begin after the CSO Remedial Measures are implemented, which is expected no later than January 1, 2040.

The primary objectives of the Water Quality Monitoring Plan are to:

- Conduct measurements to evaluate parameters relative to water quality standards and protection of designated uses in the Illinois River.
- Determine the relative impacts of CSO discharges on water quality in the Illinois River and Peoria Lake, particularly in the immediate vicinity downstream of the CSO outfalls.
- Calculate select pollutant loads from CSO discharges to the Illinois River and evaluate the effectiveness of the CSO Remedial Measures by assessing reductions in CSOs and their effects.

The Water Quality Monitoring Plan is designed to collect data to support the objectives of Peoria's PCCM Plan.

2.0 Review of Existing Data and Information

2.1 Summary of Existing Data and Information

A water quality monitoring program was implemented by Peoria in 2007. This study provided a baseline analysis of the water quality in the Illinois River, specifically from Peoria Lake to the Peoria Lock and Dam. The primary objectives were to determine in-stream compliance with state water quality standards, define baseline water quality conditions absent CSO discharges, and characterize the relative impacts of CSOs on the receiving waters. The study involved sampling and analysis of various water quality parameters, including dissolved oxygen (DO), fecal coliform bacteria (fecal coliform), and *E. coli* bacteria (*E. coli*), under different hydrologic conditions.

The findings of the study revealed elevated concentrations of fecal coliform and *E. coli* were present in the Illinois River during both wet weather events with CSO discharges and dry weather. It was observed that tributaries and stormwater runoff, which are not related to CSOs, contributed significantly to the elevated bacteria levels within the CSO study area. Additionally, sources upstream of the CSO outfalls contribute to elevated bacteria concentrations to the river. The study also found that *E. coli* concentrations were higher in sampling locations closest to the Peoria shoreline compared to the rest of the river during both dry and wet weather.

Based on the 2007 loading estimates, the study concluded that the majority of the bacteria load in the Illinois River appeared to come from sources other than Peoria CSOs. The results of the 2007 study were documented in a 2008 Technical Memorandum and included in Peoria's 2010 CSO Long Term Control Plan Update No. 1. Additionally, while DO concentrations were reduced during CSO discharges, they did not fall below the water quality standards.

This Water Quality Monitoring Plan will be used to collect data for reassessing the 2007 observations, evaluations, and conclusions. The updated data will be utilized to re-evaluate the water quality and impact of CSO discharges after the completion of the CSO Remedial Measures.

2.2 Data Gap Analysis and Management of Change

The post-construction water quality monitoring activities will begin after the CSO Remedial Measures are implemented, which is expected no later than January 1, 2040. Prior to initiating the monitoring activities, Peoria will review the following to determine if there are changes that might necessitate revisions to this Water Quality Monitoring Plan. If this results in significant revisions to the Water Quality Monitoring Plan, the changes will be documented in Peoria's yearly CSO Annual Report.

- Physical characterization of the collection system
- CSO discharge volumes and frequencies by outfall
- Water quality standards (e.g. Title 35, Subtitle C, Part 302)
- Rainfall and river flow data
- Industrial discharges to the river
- Stormwater outfalls

3.0 Parameters to be Analyzed

A variety of parameters will be analyzed as part of the water quality monitoring efforts. The parameters in Table 1 will be analyzed to compare the in-stream river and lake water quality to the standards for general use (Title 35 Part 302.201). The Environmental Protection Agency's (EPA's) communication on December 19, 2024, stated that fecal coliform/*E.coli*, pH, and DO must be sampled at a minimum in-stream within the Illinois River and Peoria Lake. Title 35 Section 302, Subpart B General Use Water Quality Standards are currently set for fecal coliform, pH, and DO.

E.coli does not have a numerical standard set in Title 35 Section 302, but it will be sampled in addition to fecal coliform. The high variability of the fecal coliform concentrations in replicate samples tends to obscure trends and patterns and therefore it is not as useful an indicator of water quality trends as *E. coli*, which exhibits less variability.

Samples will be analyzed for parameters appropriate for the sampling method and sampling location. Additional parameters may be analyzed to support the overall goals and objectives of this monitoring plan. Other optional parameters may be added to this list. The testing method will depend on the water quality parameter. For example, fecal coliform samples will be tested in a laboratory, while temperature will be measured in the field.

Table 1 | Water Quality Parameters

Water Quality Parameter	Primary Application	Description
Fecal Coliform	Indicator for possible pathogens and health risks	EPA minimum requirements, parameter to be sampled
<i>E.coli</i>	Indicator for possible pathogens and health risks	EPA minimum requirements, parameter to be sampled
Dissolved Oxygen (DO)	Impacted by raw sewage discharges	EPA minimum requirements, parameter to be sampled
pH	Indicates habitat quality for aquatic species	EPA minimum requirements, parameter to be sampled.
Turbidity and or Specific Conductivity	Associated with point load sources and indicates habitat quality for aquatic species	May be sampled to support monitoring goals and objectives
BOD5 (5-Day Biochemical Oxygen Demand)	Associated with CSO discharges	May be sampled to support monitoring goals and objectives
Temperature	Indicates habitat quality for aquatic species	May be sampled to support monitoring goals and objectives

4.0 Monitoring Program

The monitoring program is designed to capture water quality data over a two-year period, focusing on various hydrological and hydraulic conditions. This plan includes monitoring locations along the Illinois River, Peoria Lake, stormwater outfalls, CSO outfalls, and tributaries to the Illinois River. The program includes collecting data during different conditions, such as dry weather and wet weather events, to study baseline water quality, pollutant loads from CSOs, and their effects on the Illinois River. A tabular summary of the sampling program is provided in Table 2 and Table 3 in Section 4.3 and Figures 1 through 6 show the proposed sampling locations.

The monitoring program consists of the following main elements:

- Duration of Monitoring Program
- Monitoring/Sampling Locations
- Criteria and Frequency of Sampling
- Sampling Protocols
- Flow Measurement Protocols

Each of these elements is discussed in more detail in this section. Besides EPA's minimum sampling requirements, Peoria may adjust this plan to accommodate changes noted in Section 2.2 that may occur from now until the post-construction monitoring program begins.

4.1 Duration of Monitoring Program

The monitoring program is projected to span a two-year period. This timeframe is expected to be necessary for obtaining a data set that captures the desired conditions of rainfall, CSO response, and Illinois River stage levels. Diverse sampling conditions are instrumental in comprehending baseline water quality, pollutant loads, and the impact of CSOs on water quality.

4.2 Monitoring Locations

The proposed monitoring locations are based on the current system and surface waters and are shown on Figures 1 through 6. Since the monitoring will occur approximately 15 years in the future, changes to the monitoring locations may be necessary. See Section 2.2 for more detail.

4.2.1 Illinois River and Peoria Lake Transects

Surface water samples will be collected from a minimum of six transects along the Illinois River and Peoria Lake. These transects have been selected to capture a representative range of Illinois River conditions and CSO influence. In order to assess post-construction improvements, the monitoring transect locations were selected to match the locations evaluated in 2007, with the exception of an additional transect in Peoria Lake downstream of CSO Outfall 003. The proposed approximate locations of these transects and sample points are shown on Figures 1 through 6.

- Upstream Boundary: 4 sample points (R1-R4) near the west side, center, and east side of the Illinois River. This is within Peoria Lake.
- Downstream of CSO Outfall 003 in Peoria Lake: 4 sample points (R21-R24) near the west side, center, and east side of the Illinois River.
- Downtown Riverfront: 4 sample points (R5-R8) near the west side, center, and east side of the Illinois River.
- South of Farm Creek: 4 sample points (R9-R12) near the west side, center, and east side of the Illinois River.
- South of CSO Outfall 019 and Upstream of the Greater Peoria Sanitary District (GPSD) Wastewater Treatment Plant (WWTP): 4 sample points (R13-R16) near the west side, center, and east side of the Illinois River.
- Downstream Boundary: 4 sample points (R17-R20) near the west side, center, and east side of the Illinois River.

Each transect will have a minimum of four sampling locations, aiming to capture the variance in water quality across Peoria Lake and the Illinois River's width. Attempts will be made to collect the river samples: 1) halfway between mid-channel and East Peoria shore, 2) mid-channel, 3) halfway between mid-channel and the Peoria shore, and 4) approximately 100 feet off the Peoria shore. This approach will help discern the impacts of CSO discharges on Illinois River water quality and assess the dispersion patterns into the Illinois River's full flow.

4.2.2 In-Stream Tributary Locations

Surface water sampling in Kickapoo Creek, Farm Creek, and the Channel near Caterpillar will be conducted concurrently with the proposed Illinois River and Peoria Lake sampling to quantify inputs from surface water to the Illinois River. Samples from the tributaries listed below will be taken near the center of tributary and upstream of backwater conditions. If possible, the samples should be collected without the use of a boat. The locations of these tributaries and sample points are shown on Figures 1, 4, and 5.

- Kickapoo Creek (K1): One sample location near the bridge approximately 1,700 feet upstream of the Illinois River confluence.
- Farm Creek (F1): One sample location at Main Street in East Peoria.
- Channel near Caterpillar (C1): One sample location near Cass Street in East Peoria.

4.2.3 CSO Locations

Sampling of CSO discharges will be conducted on a per event basis. Proposed locations selected for sampling were chosen based on a review of historical CSO discharge frequency, volumes, and duration. The outfalls selected for sampling have the highest frequency and volume of discharges.

- Outfall 003: Spring Street
- Outfalls A06/B06: Old/New Eaton Street
- Outfall A07: Fayette Street
- Outfall 016: Cedar Street
- Outfall 017: South Street
- Outfall 018: Sanger Street
- Outfall 019: Darst Street

4.2.4 Stormwater Effluent Locations

Sampling of stormwater discharges will also be conducted as part of the water quality monitoring efforts to quantify the potential pollutant contribution to the Illinois River from the municipal separate storm sewer system (MS4) portion of Peoria.

The locations of MS4 outfalls were reviewed and two outfalls proposed for monitoring. One storm sewer outfall is located on Liberty Street and is within an area that was separated during the 1980s improvements. The second outfall is located on Oak Street and receives stormwater from the riverfront industrial area.

- Liberty Street MS4 Outfall (TS11)
- Oak Street MS4 Outfall (TS12)

4.3 Criteria and Frequency of Sampling

Surface water, stormwater, and CSO sampling will occur under various hydrological and hydraulic conditions, targeting both dry weather (no rainfall driven discharges) and wet weather (rainfall driven discharges). Sampling will also consider low and high flow conditions, if possible, in the Illinois River during dry weather and wet weather to assess pollutant impacts at different flow levels. Table 2, below, summarizes the target number of sampling events for each weather and river flow condition, with details provided in the following subsections.

Table 2 | Summary of Target Sampling Events

		Target River Flow Rate		Target Total Sampling Events
		Low Flow	High Flow	
Target Weather	Dry Weather	1	1	2
	Less than Six-Month Design Storm ¹ No CSO Discharges Anticipated	1	2	3
	Greater than Six-Month Design Storm ¹ Likely CSO Discharges	2	4	6
Target Total Sampling Events		4	7	11

¹ The Six-Month Design Storm as defined in the CD

4.3.1 River Levels Targeted for Sampling

Considering the range of flow levels that are experienced in the Illinois River, sampling will target periods when the Illinois River is at low levels and at high levels. From the analysis completed for the 2007 monitoring, the average flow, based upon United States Army Corps of Engineering (USACE) data from the lock and dam at Peoria from 1988 to 2004, is 16,300 cubic feet per second (cfs). At flow rates below approximately 18,000 to 21,000 cfs, the gate operations at the lock and dam maintain the river level in the pool between approximately 440.0 and 441.6 feet above mean sea level. At these lower flow rates, there is no unique relationship between flow rate and pool level. Above approximately 21,000 cfs, pool level increases with flow rate, which indicates unregulated flow over the spillway crest at the lock and dam. In summary, it appears two flow regimes exist 1) a regulated pool when flow is below 18,000 cfs and 2) free flowing over the lock and dam spillway when flow exceeds 21,000 cfs.

The following target Illinois River flow rates have been selected for initiating a sampling event:

- Low to average (regulated pool) conditions: lower than 14,200 cfs
- Average to high (free flowing) conditions: higher than 25,600 cfs

The target conditions occur, on average, 4 out of every 5 years during the months of March through May, based on 1988 to 2004 data. Not all years experience both conditions in the same season, so there is a high probability that both target conditions may not occur during the monitoring program. For this reason, the flow conditions are considered targets, not absolute requirements. USACE river flow forecasts will be considered, but not required, when sampling events are selected. In addition, prior to the initiation of the post-construction water quality and CSO sampling, the USACE river flow data for the most recent 15-year period (e.g. 2023 to 2038) will be reviewed to determine if these target flow rates should be modified.

4.3.2 Dry Weather Sampling

Dry weather sampling will help define the background surface water quality and document whether water quality criteria are being met without input from CSO discharges from Peoria. To define background surface water quality and natural variation, samples are targeted to be collected at least once during high flow and at least once during low flow within the Illinois River, with no local or nearby measurable input from CSO discharges or stormwater discharges in the prior 72 hours (generally a period with less than 0.1 inch of rainfall).

Dry weather sampling will take place at the Illinois River and Lake Peoria transects described in Section 4.2.1 and the in-stream tributary locations listed in Section 4.2.2. Velocity data may be collected at each sampling location to determine travel times between sampling locations. Locations of each sampling point will be determined using GPS (or the current applicable technology).

4.3.3 Wet Weather Sampling

Wet weather sampling is targeted to be performed during both high flow and low flow conditions in the Illinois River, if possible, to characterize impacts from upstream pollutant sources, as well as local stormwater and CSO contributions to the receiving waters. If the targeted river flow conditions are not present, wet weather sampling will occur at any river stage to ensure wet weather samples are obtained within the monitoring period. See Section 4.3.1 for details on the target river stages.

Wet weather sampling is targeted to occur during two storm sizes, see Table 2 above for number of sampling events by storm size:

- Events expected to be smaller than the Six-Month Design Storm, as defined in the CD, and anticipated not to cause discharges from Peoria CSOs.
- Events forecasted to be larger than the Six-Month Design Storm, as defined in the CD, during which CSO discharges are likely to occur.
- Capture samples during frontal storms, instead of thunderstorms, if possible.

The CSO monitoring will occur after the CSO Remedial Measures are implemented, which will reduce the frequency of CSO discharges. Although CSO discharges occur frequently during wet weather events currently, the frequency will decrease in the future. Efforts will be made to sample CSO discharges during events larger than the Six-Month Design Storm; however, depending on the rainfall during the monitoring period, the targeted number of CSO discharge sampling events identified in Table 2 may not be achieved.

CSO and stormwater outfall sampling for each event will generally include time-composite sampling for the first 10 to 30 minutes of discharge (first flush), followed by time-composite samples of various lengths of time for the remainder of the storm. Automatic samplers will be activated in advance of an anticipated overflow event based on available weather and radar information and each sampler will be programmed to collect a water sample at variable intervals depending upon the location and anticipated storm characteristics. Not all samples collected may be analyzed. For example, if the discharge event is particularly long in duration, only select samples may be analyzed in order to characterize the first flush and a representative composition of the discharge following the first flush. The decision to select which samples will be analyzed will be based on the intensity and duration of the CSO discharge and storm event.

Sampling of the Illinois River, Peoria Lake, and in-stream tributaries during wet weather events will occur during the timeframes of pre-storm (before the start of local rainfall), during stormwater and/or CSO discharge, post-discharge (within 4 hours of the end of discharges), and river flushed (at least 24 hours after the end of stormwater and CSO discharges), if possible. Peoria's ability to sample the Illinois River and other locations may be impacted by the weather and ability to maintain the safety of the sampling crews; if safe conditions are not present, samples will not be taken.

Placement of sampling crew(s) will be evaluated to complete a sampling event during a single storm event. Time of travel between various sampling locations may necessitate the use of multiple crews when sample collection must occur within a certain time period, such as during CSO discharges.

4.3.3.1 Wet Weather Determination

Potential weather conditions will be monitored by contacting the National Weather Service (NWS) – Central Illinois Weather Forecast Office and/or monitoring select Internet weather related sites (NWS – www.weather.gov) and/or local television weather reporting for current and predicted weather conditions. This will be done to assist in predicting the type of storms, estimated total rainfall, and estimated intensity.

Table 3 | Target Sampling Location and Frequency Summary

Monitoring Locations	Location	Sample Point	Dry Weather Approximate Number of Samples	Wet Weather Approximate Number of Samples	Proposed Parameters & Method Grab (G), Field Measured (F), Composite Sampler (C), Not Applicable (n/a)						
					Fecal Coliform	<i>E.coli</i>	BOD5	pH	DO	Temperature	Turbidity and/or Conductivity
Illinois River and Peoria Lake Transects	Upstream Boundary (in Peoria Lake)	R1	2 surface water quality samples per sample point (1 discrete sample for 2 flow conditions)	36 surface water quality samples per sample point (4 discrete samples per event; 9 events) Samples intended to occur pre-storm, during discharge, after discharge, and river flushed, if possible	G	G	n/a	F	F	F	F
		R2									
		R3									
		R4									
	Downstream of CSO Outfall 003 in Peoria Lake	R21									
		R22									
		R23									
		R24									
	Downtown Riverfront	R5									
		R6									
		R7									
		R8									
	South of Farm Creek (Cedar Street and Bob Michael Bridge)	R09									
		R10									
		R11									
		R12									
	South of CSO Outfall 019 and Upstream GPSD WWTP	R13									
		R14									
		R15									
		R16									
	Downstream Boundary (5.5 miles upstream of I-474 Bridge)	R17									
		R18									
		R19									
		R20									

Monitoring Locations	Location	Sample Point	Dry Weather	Wet Weather	Proposed Parameters & Method						
			Approximate Number of Samples	Approximate Number of Samples	Grab (G), Field Measured (F), Composite Sampler (C), Not Applicable (n/a)						
					Fecal Coliform	E.coli	BOD5	pH	DO	Temperature	Turbidity and/or Conductivity
In-Stream Tributary	Kickapoo Creek at GPSD Bridge	K1	2 surface water quality samples per sample point	36 surface water quality samples per sample point (4 discrete samples per event; 9 events)	G	G	n/a	F	F	F	F
	Farm Creek at Main Street Bridge	F1	(1 discrete sample for 2 flow conditions)	Samples intended to occur pre-storm, during discharge, after discharge, and river flushed, if possible							
	Channel near Cass Street	C1									
CSO Outfall	Outfall 003 near Spring Street	003	n/a	The number of samples is dependent on whether CSO discharges occur during the storm events and the duration of discharges. Sampling is intended to occur during the following conditions: • Low Flow: One events less than Six-Month Design Storm and two events greater than Six-Month Design Storm • High Flow: Two events less than Six-Month Design Storm and four events greater than the Six-Month Design Storm Sampling per event, the first 10-30 mins of discharge (first flush), followed by select composites for the remainder of the storm. Not all samples collected may be analyzed, see Section 4.3.3 for more details. CSO discharges may not occur for all wet weather sampling events, see Section 4.3.3 for more details.	C	C	C	n/a	n/a	n/a	n/a
	Outfall A06/B06 near Eaton Street	006									
	Outfall A07 near Fayette Street	007									
	Outfall 016 near Cedar Street	016									
	Outfall 017 near South Street	017									
	Outfall 018 near Sanger Street	018									
	Outfall 019 near Darst Street	019									
Stormwater Outfall	Stormwater Outfall near Liberty Street	TS11	n/a	The number of samples is dependent on whether stormwater discharges occur during the storm events and the duration of discharges. Sampling is intended to occur during the following conditions: • Low Flow: One events less than Six-Month Design Storm and two events greater than Six-Month Design Storm • High Flow: Two events less than Six-Month Design Storm and four events greater than the Six-Month Design Storm Sampling per event, the first 10-30 mins of discharge (first flush), followed by select composites for the remainder of the storm. Not all samples collected may be analyzed, see Section 4.3.3 for more details.	C	C	C	n/a	n/a	n/a	n/a
	Stormwater Outfall near Oak Street	TS12									

Table 3 Notes:
The two flow conditions are high flow and low flow within the Illinois River, per Section 4.3.1 of the Water Quality Monitoring Plan.
Peoria may modify this sampling plan based on future conditions of the system, water quality standards, river flow data, industrial discharges to the river, and stormwater system.
See Table 1 for which parameters are a minimum requirement and which **may be** analyzed.

4.4 Sampling Protocols

4.4.1 Grab Samples

Grab samples will be collected in accordance with applicable standard methods that are in place at the time when sampling is completed. Discrete grab samples will be collected from the Illinois River transect locations and in-stream locations using the direct or dip sampling methods. Illinois River samples will be collected by boat. Sampling locations on the tributaries may be accessed from a bridge or by using waders and walking to the sample site from a downstream location.

Samples will be collected from just below the surface of the water (e.g. six inches). A Kemmerer bottle (or similar device) will be used to obtain samples from bridges or overpasses as necessary. Sterile, laboratory supplied sample bottles will be used for grab samples.

4.4.2 Field Data Collection

Multi-parameter sondes (or similar devices) will be used for in-situ measurements of field monitored parameters such as temperature, DO, pH, conductivity, and turbidity. These measurements will be taken in similar locations to the grab samples and provided real-time data on water quality conditions. The sondes (or similar devices) will be used to measure field parameters in the river and tributaries.

Field personnel will maintain and calibrate the field equipment used to measure field monitored parameters. Appropriate documentation and recording keeping will be performed for field collected data.

4.4.3 Auto Samplers

Auto samplers will be used for composite, and possibly discrete, sampling of CSO discharge and stormwater discharge. Auto samplers and bottles will be cleaned prior to use in accordance with the manufacturer's recommendations and EPA guidelines.

Auto samplers will be packed with ice and deployed immediately prior to a storm event, or a refrigerated auto sampler will be used. The samplers can typically hold up to 30 sample bottles and have internal data logger for remote access. The samplers will be initiated prior to a storm event to begin sampling before the initiation of a CSO discharge and stormwater discharge. Samples will be removed from the samplers as soon as possible after the CSO discharge and stormwater discharge has ended. The samples will be analyzed for fecal coliform, *E. coli*, and possibly BOD5 and other parameters. Not all samples collected may be analyzed, see Section 4.3.3 for more details.

4.4.4 Sample Duplicates

Quality control samples will be collected in accordance with Table 4, which describes the samples that will be collected for quality assurance and quality control (QA/QC). Collection of duplicate samples will minimize the potential for sample loss during transport to the laboratory. Duplicate samples will be analyzed as a check for sampling and analytical reproducibility.

4.4.5 Sample Handling

Once the samples have been collected, they will be transferred into clean laboratory-supplied sample containers and labeled with an identifying sample number, location, date, sample depth (for surface water), and sampling personnel. The sample bottles will be stored in a plastic Ziploc bag (or similar) and immediately placed on ice in a cooler with the lid closed and maintained at approximately 4 degrees Celsius from the time of sample collection until receipt by the analytical laboratory. The water samples will be delivered to the analytical laboratory under chain-of-custody procedures. The Quality Assurance Project Plan (QAPP) will contain complete details regarding trip blanks, duplicates, chain of custody, etc.

Due to the expected need to sample outside of normal laboratory hours (late night, weekends, etc.), bacterial samples will be submitted to the laboratory as soon as lab personnel are available. The goal will be to deliver the samples within the 6-hour window, but no later than 48-hours after sample collection.

4.4.6 Decontamination Procedures

Reusable sampling equipment will be decontaminated before collecting the first sample and between successive sampling locations by washing with a trisodium phosphate solution (or equivalent) followed by two distilled water rinses. Equipment blanks will be collected from non-disposable sampling equipment where appropriate and will be outlined in the QAPP.

4.5 Flow Measurement Protocols

Peoria prepared a Flow Monitoring Implementation Plan as part of its CSO Remedial Measures Program. This plan defines the flow monitoring locations and approaches to determine CSO discharge events and volumes for the duration of CD implementation. As described in the PCCM Plan, Peoria intends to maintain this network of flow monitors throughout the two-year PCCM period. Flow monitoring data will be used for the calculation of volumes and loads per sampling event for CSO discharges.

For the determination of contributions to the Illinois River from stormwater discharges, a calculated approach will be used to estimate the volumes and loads per sampling event.

For the determination of daily contributions to the Illinois River from the tributaries in the vicinity of Peoria, water depth and velocity will be recorded during each sampling event at sample locations K1, F1, and C1. Cross sections of the tributaries at these sample locations will be surveyed so that discharge and loads to the Illinois River from each tributary can be calculated.

For the determination of daily loads in the Illinois River, Peoria will use data from the United States Geological Survey (USGS) flow gauge at the Peoria Lock and Dam, which is located just downstream of the study area. If the lock and dam is removed prior to the initiation of the sampling, this sampling plan may be modified. The flow contribution from upstream will be estimated by taking the average daily USGS flow gauge rate information for the time period in question and subtracting out the estimated flows from the other sources (CSOs, stormwater discharges, tributaries, and wastewater treatment plants). While it is recognized that this method does not take into account holding back river flow at the dam, the flow contribution is so large in comparison to the total, that

small variations in this value do not notably alter the analysis. This flow rate will be multiplied by the event duration to obtain a volume in million gallons. The upstream Illinois River contributes a large percentage of the water that flows into the study area. It is assumed that the volumes from the direct industrial contact and non-contact cooling water sources within the study area are insignificant in relation to the annual river flows. This assumption is based on knowledge that such point source discharges are typically small in comparison to the total flows of the rivers studied and they typically have insignificant bacteria concentrations.

5.0 Quality Assurance & Quality Control Procedures

QA/QC procedures are necessary both in the field during sampling and in the laboratory to ensure the data collected during the monitoring events are of known quality and reliability. QA/QC samples will be collected as described in Table 4. Prior to commencing the PCCM Plan, Peoria will develop a QAPP which will include QA/QC procedures. See Section 6.0 of the PCCM Plan for more details.

Table 4 | QA/QC Samples

	QC Sample Type	Frequency of Sample/Analysis	Details
Field Samples	Duplicate Samples	1 duplicate per 20 samples per matrix, or 1 duplicate per sample matrix if less than 20 samples.	Duplicate sample to be collected by the same methods at the same time as the original sample. Used to verify sample and analytical reproducibility.
	Equipment Blanks	If non-disposable sampling equipment is utilized, 1 equipment blank per 20 samples with a minimum of 1 equipment blank per day per sample matrix.	Distilled water placed into contact with sampling equipment. Used to assess quality of data from field sampling and decontamination procedures.
Laboratory Samples	Matrix Spike/Matrix Spike Duplicate (MS/MSD)	1 MS/MSD per 20 samples or in accordance with laboratory standard operating procedure (SOP).	Laboratory spiked sample to evaluate matrix and measurement methodology.
	Method Blanks	1 method blank per daily run or in accordance with laboratory SOP.	Laboratory blank sample to assess potential for contamination from laboratory instruments or procedures.
	Laboratory Control and Duplicates	Analyzed as per method requirements and laboratory SOPs.	Evaluates laboratory reproducibility.

FIGURE 1

Water Quality Monitoring Locations Overview

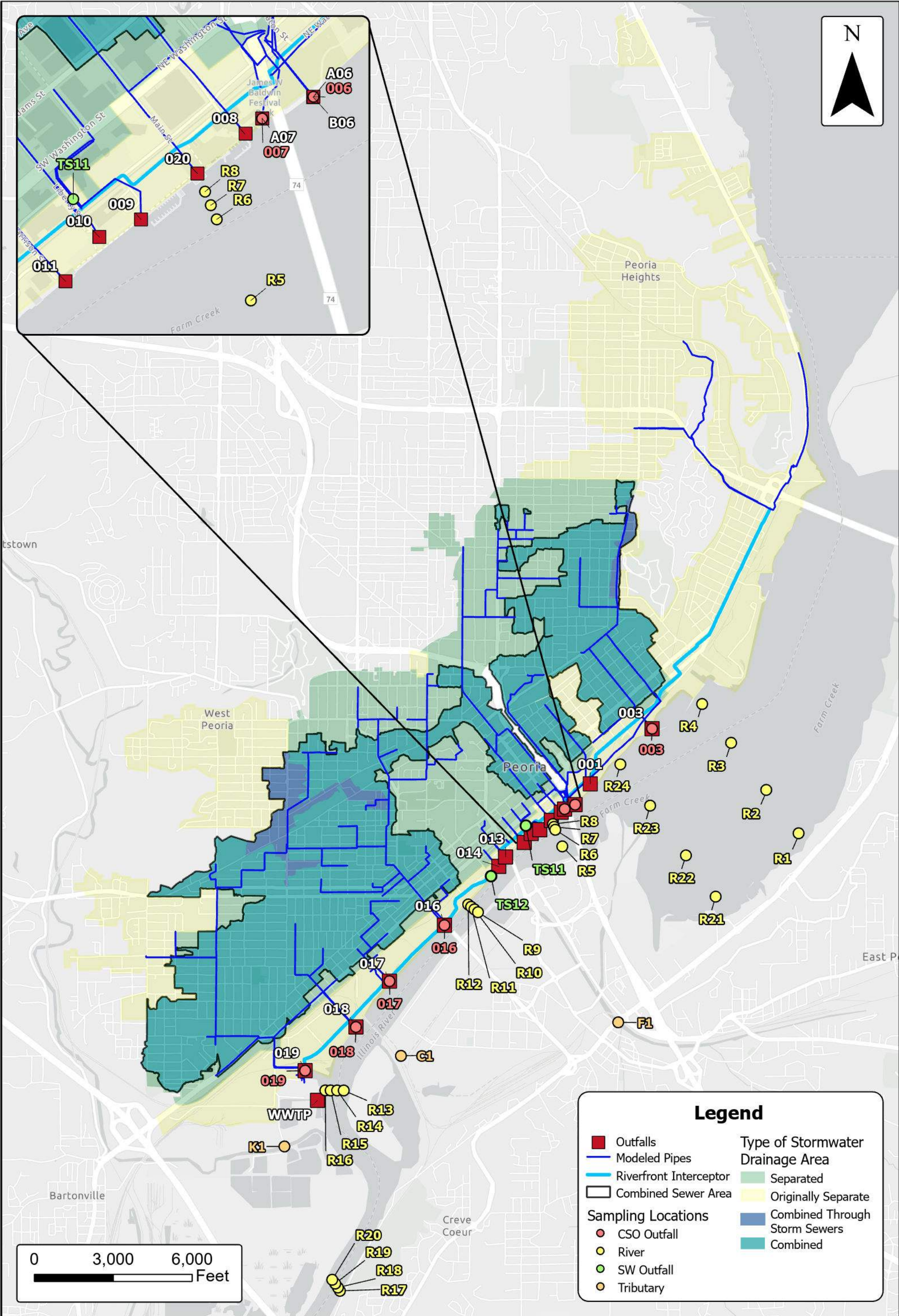


FIGURE 2

Upstream Boundary & Peoria Lake

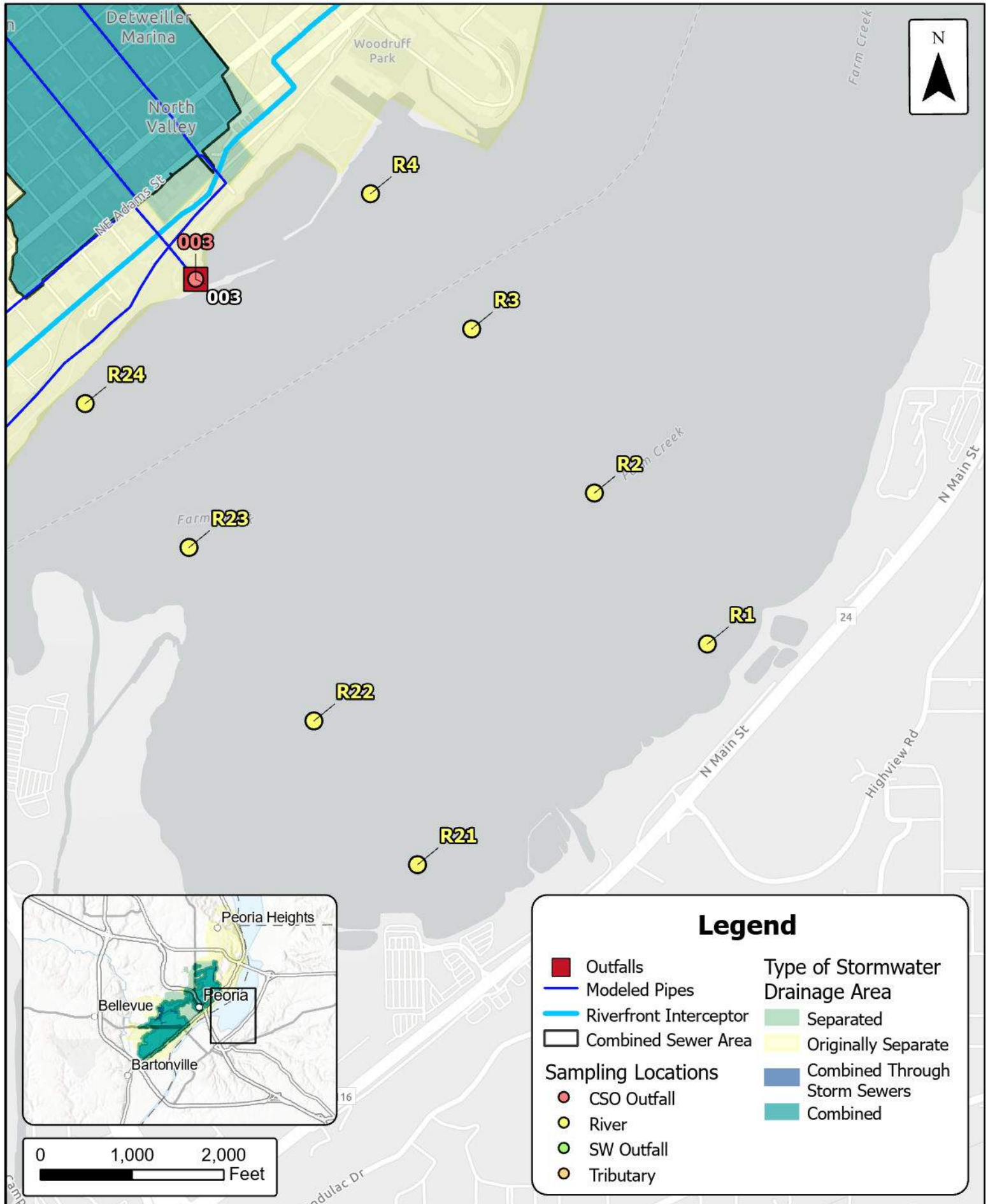


FIGURE 3

Downtown Riverfront



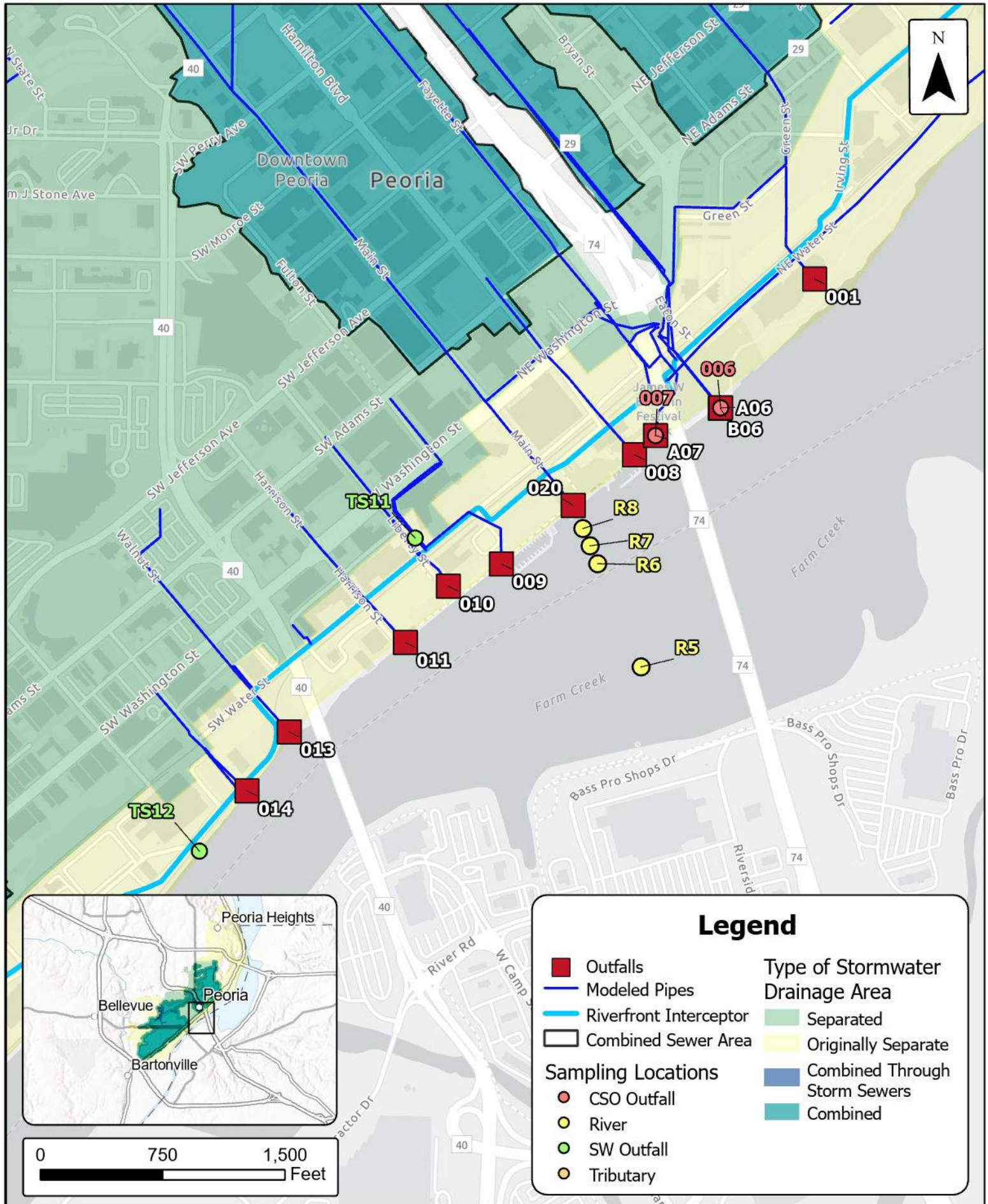


FIGURE 4

South of Farm Creek



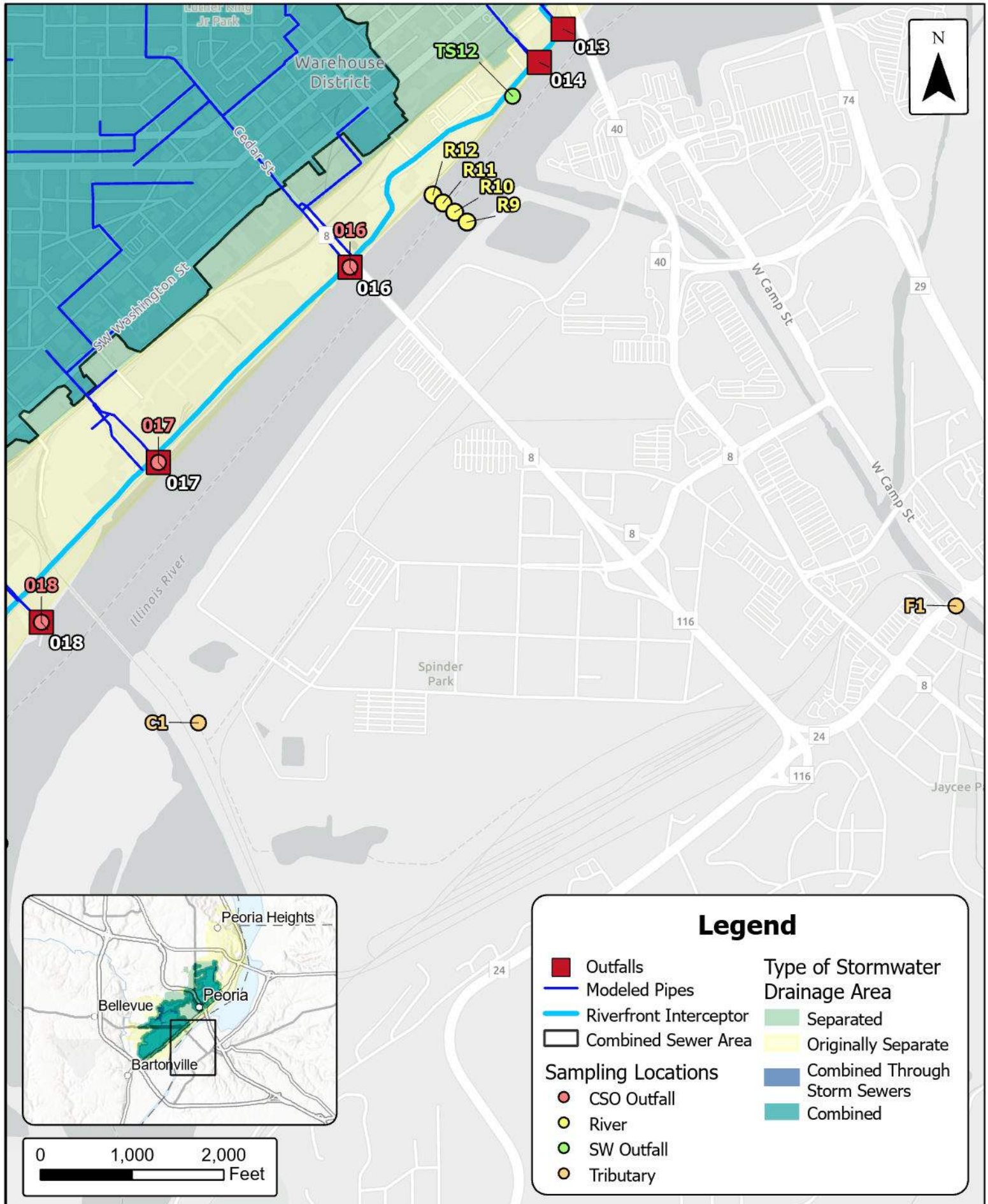


FIGURE 5

South of CSO Outfall 019 & Upstream of WWTP

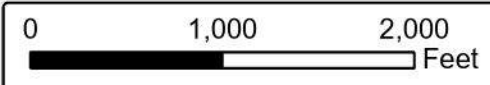
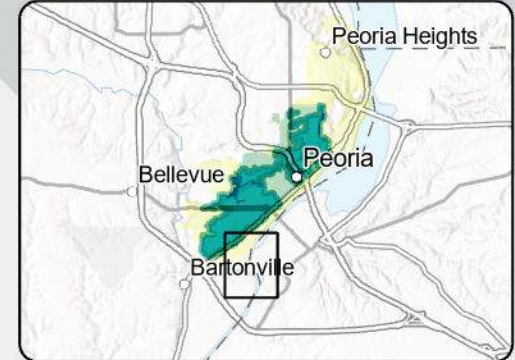
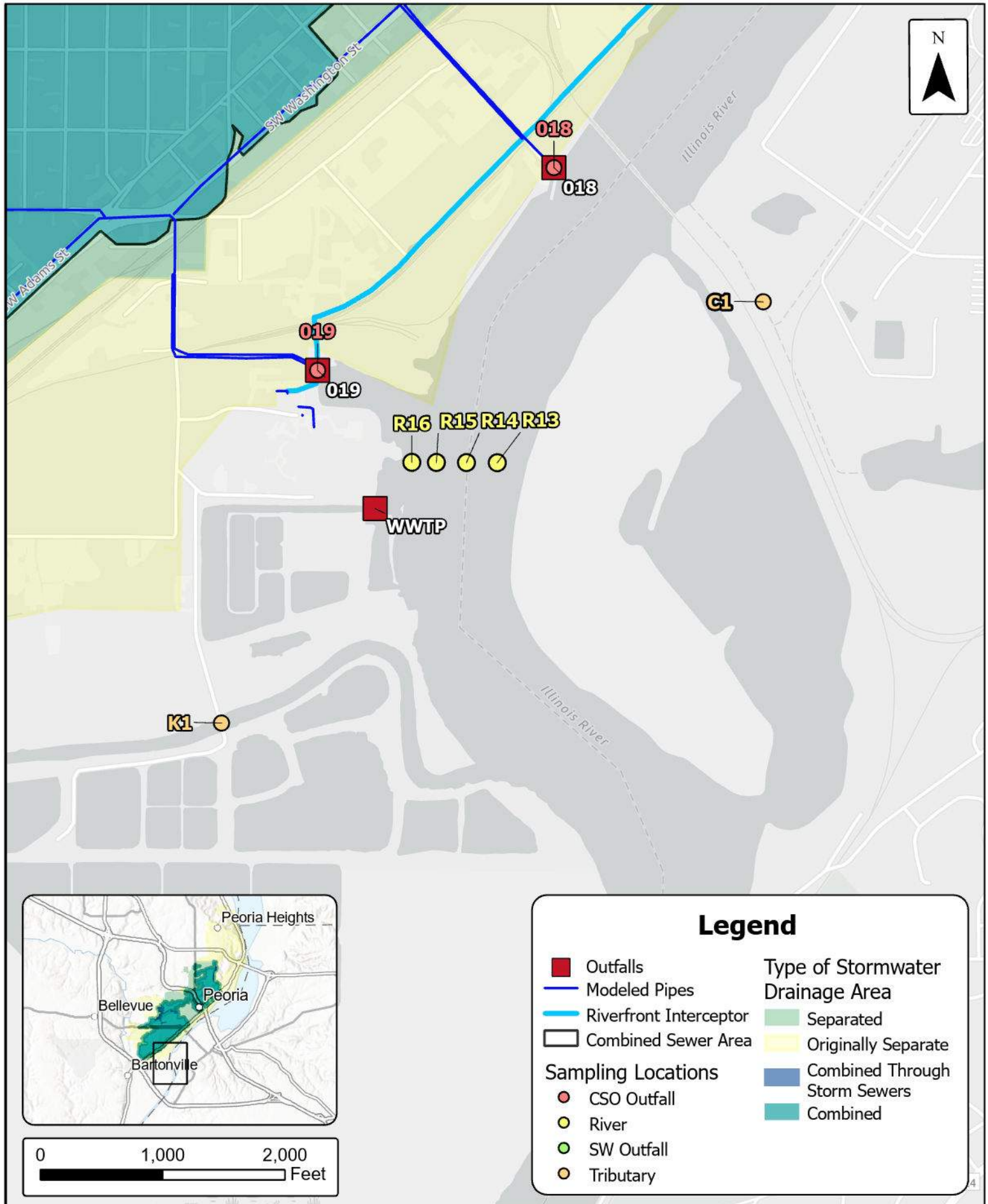


FIGURE 6

Downstream Boundary



