



**Memorandum of Understanding for Leaf Collection Study in the  
City of Madison for 2020 – 2023  
Between the League of Wisconsin Municipalities and  
the City of La Crosse**

**1. Parties**

The parties to this MOU are the League of Wisconsin Municipalities (“League”) and the City of La Crosse.

**2. Background**

Many regulated municipal separate storm sewer systems (MS4s) in Wisconsin are subject to Total Maximum Daily Load (TMDL) requirements including reducing total phosphorus (TP) from their MS4 discharge. Studies have identified a variety of sources of phosphorus in urban stormwater including leaf litter from street canopy trees. Previous United States Geological Survey (USGS) and Wisconsin Department of Natural Resources (DNR) joint studies have shown that frequent removal of leaf litter from street surfaces before phosphorus leaches into the storm water can reduce phosphorus loading from MS4 systems.

In 2018, WDNR published new guidance allowing municipalities to claim partial phosphorus reduction credits for leaf collection, provided narrowly defined criteria for the methods of collection are met. The guidance acknowledges that the collection method criteria may be broadened to include additional leaf collection scenarios once more data becomes available from ongoing or future studies.

**3. Purpose**

The purpose of this Memorandum of Understanding is to identify the scope and benefits of a proposed leaf study (“Project”) so as to justify the City contributing money to help fund this state-wide initiative. The Project will acquire additional data as to the effectiveness of leaf collection practices under a broader range of scenarios than are currently described in the WDNR guidance. The goal is to enable more municipalities to claim phosphorus reduction credits using existing leaf collection programs.

**4. Project Location**

The Project study will be conducted in the City of Madison.

**5. Project Scope**

A description of the scope of the Project and associated activities is included in Exhibit A, attached hereto.

**6. Project Administration**

The League of Municipalities will coordinate the cooperative funding of the Project by various municipal contributors. The Project study will be conducted by the USGS in cooperation with the City of Madison and the WDNR .

**7. Project Schedule and Cost**

The Project will be conducted over three years. Data will be collected in 2020, 2021 and 2022. The final Study Report will be prepared in 2023. The total cost for the Project over the three years is estimated to be \$143,000. (Contributions from MS4 communities will cover at least \$90,000 of the cost. The USGS and DNR will cover the remainder.)

**8. Financial Contributions**

The following agencies will participate: USGS; WI League of Municipalities; and the WDNR. Each participating municipality, including the City, will contribute \$1,000 per year for each of three consecutive years (2021, 2022, and 2023) for a total Project contribution from each participating municipality of \$3,000. The League will issue an invoice in January of each year of the Project to each participating municipality. Payment will be due within 30 days of receipt of the invoice.

**9. Products and Deliverables**

The final study report will be completed by March 1, 2023 and delivered in PDF format to each participating municipality of the Project on or about May 1, 2023.

**10. Authorization:**

For the City of La Crosse:

  
[Municipal Representative]  
[Title]

Bernard N. Leitz  
- Utility Manager

7-8-20

Date

For League of Wisconsin Municipalities:

  
Jerry Deschane

Executive Director  
League of Wisconsin Municipalities  
131 W. Wilson, Suite 505  
Madison, WI 53703

July 8, 2020

Date

## Exhibit A

### Goals and Activities

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The primary objective of this project is to quantify changes in nutrient concentrations and load as a result of municipal leaf collection practices compared to no practices. A secondary objective will be to assess the potential impact of leaf management, or lack thereof, to the phosphorus retention capabilities of wet ponds.

Two medium-density residential catchments with high tree canopy in Madison, WI have been selected to quantify the water-quality benefits of leaf management by use of a mechanical broom street cleaner operated at a frequency of once per week. One catchment will serve as the control and will have minimal to no leaf collection. At this level, the intent is to show what would happen if a city did next to nothing. Any leaves that fell in the street would stay there. The second catchment will serve as the test which will measure the response of phosphorus in stormwater after implementation of the municipal leaf collection activity described above.

A water-quality monitoring station will be placed near the outfall in each catchment for collection of water quality and quantity data. Because each outfall drains to an adjacent wet pond, resulting nutrient concentrations will represent both effluent discharged from the study catchment as well as influent to the wet pond. Additional water-quality monitoring stations will be used to measure the quantity and quality of pond effluent. Comparison of concentrations and loads measured in the pond influent and effluent will help inform whether leaf collection and street cleaning programs in the test catchment influence the phosphorus removal efficiency of wet ponds compared to no leaf removal or street cleaning in the control catchment.

Each catchment will be monitored for a period of two years. The first year will serve as a calibration period to develop a quantifiable relationship between the control and test basins. Each catchment will have no leaf control during the calibration period. After the first year, the control catchment will maintain no leaf control while the test catchment will implement the selected leaf collection activity and frequency. Results from water-quality samples will be used to create seasonal regressions for concentrations and loads of nutrients between the control and test basins. If the regressions between the control and test basin changes significantly between the calibration and treatment phases, the difference will be attributed to leaf collection and street cleaning practices. An analysis of covariance will be used to statistically quantify changes in nutrient load due to treatment. Similarly, water-quality data from the influent and effluent of each wet pond will be evaluated to determine if the presence or absence of leaf collection and street cleaning affect nutrient removal efficiency.

Water-quality samples will be collected over a period of two years beginning in October 2020. Each water-quality sample will be composited into a single event-mean concentration. Additional samples will be collected to ensure compliance with normal USGS quality control guidelines. Concentrations of the following constituents will be determined by the Wisconsin State Laboratory of Hygiene:

- Total Suspended Solids
- Total Phosphorus

- Dissolved Phosphorus
- Orthophosphate
- Total Nitrogen
- Dissolved Nitrogen
- pH
- Chloride

Data will be compiled and analyzed by the USGS. All runoff and precipitation data will be stored in the USGS data base and posted on the USGS National Water Information System (NWIS) website as it becomes available.