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September 10, 2013

Jeremy Balousek
Dane County Department of Land and Water Resources
Land Conservation Division
1 Fen Oak Ct, Room 208
Madison, WI 53718

RE: 2013 Dane County Urban Water Quality Grant – 2 Applications

Mr. Balousek,

The City of Madison is requesting cost-sharing funds through the 2013 Dane County Urban Water Quality Grant Program for two separate construction projects: (1) Willow Creek outfall into Lake Mendota and (2) Alum treatment in Starkweather Creek. The total cost for these projects are estimated to be \$500,000 and \$700,000, respectively, and we are requesting the maximum of 75% cost share for both (\$375,000 for Willow Creek and \$525,000 for Starkweather Creek).

The total amount from the Dane County Urban Water Quality Grant funds we are requesting is \$900,000 for both projects. We appreciate the opportunity to request support in improving storm water quality.

Sincerely,

Robert F. Phillips, P.E., City Engineer

This proposed project will address one of Dane County's Top Ten Stormwater Outfalls, and so we are requesting a 75% match. The City of Madison proposes to team with UW-Madison and DOA to complete a project that will restore the shoreline of Willow Creek to a more native and stable condition, dredge the creek bottom and sediment island in University Bay, and construct a stormwater treatment device at the primary discharge point to the creek. Because of the extent of this project, we are planning to do it in three phases. We have already consulted with the DNR on sediment sampling that will be required prior to dredging, and plan to complete sediment bores this fall.

Phase I of this project will include dredging approximately 200 cubic yards of material and installing a treatment device that will capture trash and large sediment particles.

Practice Performance

Annual Sediment Delivery

We estimate that the annual TSS loading is 243 tons. In addition, there are approximately 1,770 pounds of phosphorus delivered to this outfall annually.

Sediment Removal Efficiency

The current removal efficiency of this watershed is about 16% for TSS, 11% for Total Phosphorus. With the addition of the stormwater treatment device, we anticipate achieving a 24% TSS removal and 16% TP removal efficiency, or 58 tons of sediment and 286 pound of TP annually. The large watershed draining to this site necessarily means high flows, which are difficult to treat with an inline system. Given the size of the watershed and the site constraints, we believe this is the best treatment option.

Contributing Watershed Area

The area of the watershed draining to this location (ME01) is 1,904 acres of primarily low to high density residential and commercial.

Proximity to a Beach

The Memorial Union Pier, a swimming destination if not an actual beach, is located approximately one mile to the east of the outlet of Willow Creek on Lake Mendota.

Cost

Total Cost

We estimate Phase I of the project to cost \$500,000, which includes some dredging and the treatment device (materials and installation cost). Sediment cores and future dredging are additional costs, and were covered prior to this phase or will be completed after this phase.

Cost-Benefit Ratio

The cost per LB TSS removed: \$4.30; Cost per LB TP removed: \$1,748.30.

Percent Local Match

City of Madison anticipates matching 25% of the cost of this project, or \$125,000.

Demonstration Value

Location

Willow Creek is located on the western end of the UW-Campus, and is just north of University Avenue. Many locals are familiar with either Willow Creek or at least the sediment plume it has created at its outlet into Lake Mendota, which is visible in aerial photos.

Public Accessibility

There are two public bike paths that cross over or near the drainageway.

Educational Value

The demonstration value of this project will be significant for treatment of high storm flows in confined areas. Phase II includes shoreline restoration farther down the drainageway by UW-Madison, further enhancing the corridor.

Maintenance

Monitoring Plan

City crews will monitor and maintain the structure at a minimum of twice per year.

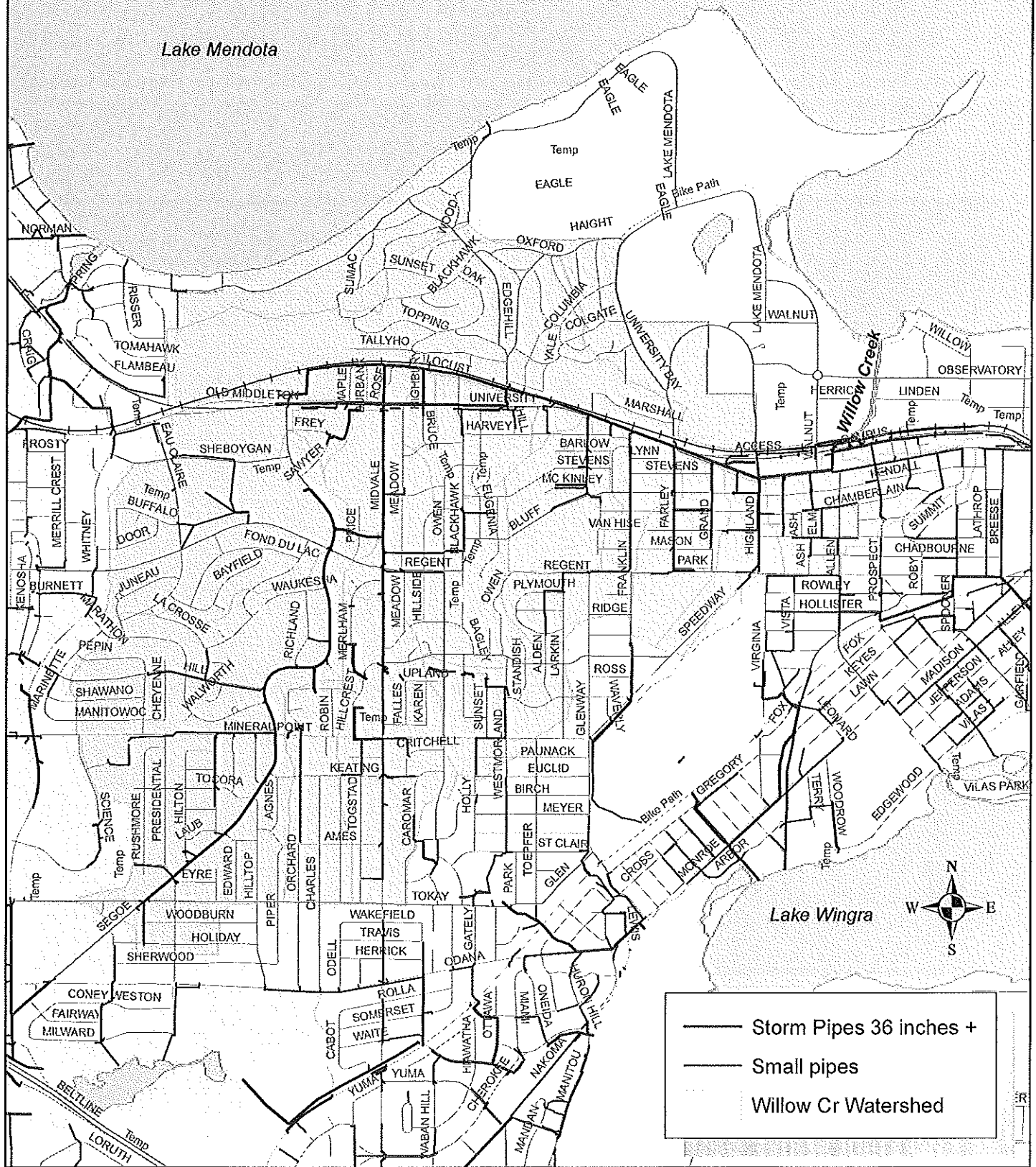
Schedule




With the cooperation of the University the City of Madison would lead this first portion of the project with design and permitting beginning in 2014 and construction beginning in late 2014 or early 2015.

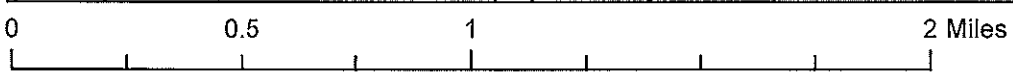
Cost

The cost for this project is approximately \$500,000.

Willow Creek Watershed Map

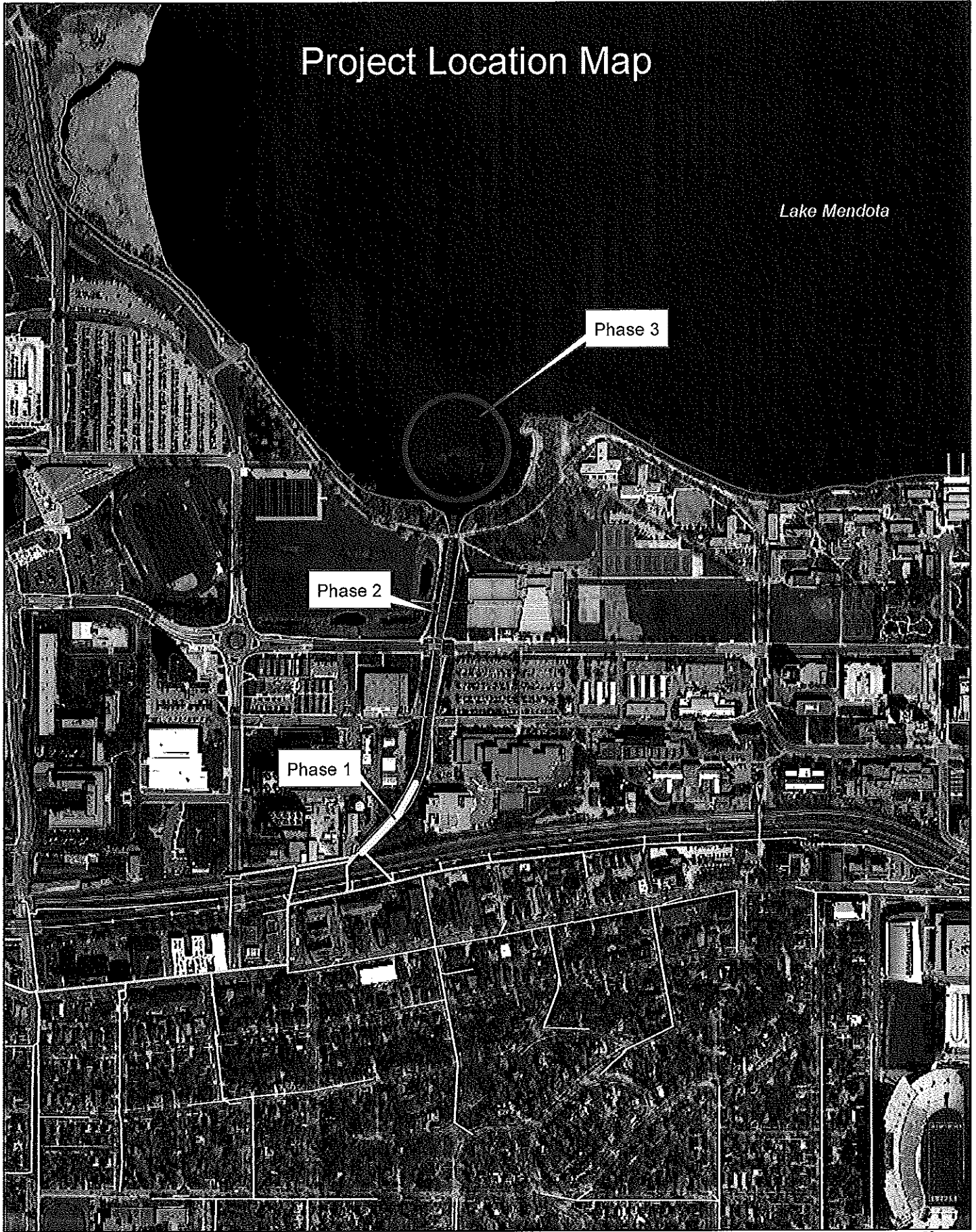


 Storm Pipes 36 inches +
 Small pipes
 Willow Cr Watershed



Grant Request for Phase 1

Project Location Map



Lake Mendota

Phase 3

Phase 2

Phase 1

0 250 500 1,000 1,500 Feet



Starkweather Creek @ Garver Feed Mill

In the 2012 Yahara CLEAN Strategic Action Plan for Phosphorus Reduction, a goal of 50% reduction of phosphorus is established for Lake Monona, a primarily urban watershed. Urban practices are typically less efficient than rural practices due to the nature of the runoff and site constraints, so we often have to be extra creative when it comes to removing sediment or phosphorus from urban storm runoff. In the plan mentioned earlier, the concept of adding alum to an existing practice or during a storm event is listed as an "Emerging Technology". Use of alum is widespread in other areas of the world and in Florida, but not as common in the Midwest, making this one of just a few alum based treatment systems that could serve as a demonstration for use in other locations.

Lake Monona has an average annual phosphorus load from direct drainage of 16,500 pounds. Another 24,900 pounds comes from Lake Mendota. The target reduction of 50% of incoming phosphorus (8,250 pounds) will be difficult to achieve with conventional methods. We believe incorporating an alum treatment system at the confluence of the east and west branches of Starkweather Creek will remove about 5,100 pounds of phosphorus each year. This one project could move Madison over 60% closer to the goal for phosphorus reduction to Lake Monona and approximately 1/3 of the way toward the City of Madison's required reduction of total phosphorus called for by the Rock River TMDL.

Practice Performance

Annual Sediment/Phosphorus Delivery

This project is focused on phosphorus removal, while some additional sediment can be expected with this system due to the flocculation that alum provides it is not the focus of this project. Based on past testing of phosphorus loads in the base flow of Starkweather Creek we anticipate that at the pumping rates we believe we can sustain we will remove over 5,000 pounds per year of phosphorus from the current discharge to Lake Monona.

Sediment Removal Efficiency

From the water pumped into the treatment system we would anticipate Total Phosphorus removal to be approximately 95%. Given the pumping rates and the loading of the base flows in the creek we anticipate this to result in 5,100 pounds of phosphorus being removed per year.

Contributing Watershed Area

The Starkweather Creek watershed draining to this location is about 23.5 sq mi.

Proximity to a Beach

Olbrich Beach is about 2,700 feet downstream from the proposed project site.

Cost

Total Cost

The estimated cost is \$700,000.

Starkweather Creek @ Garver Feed Mill

Cost-Benefit Ratio

Using a 20 year life cycle the cost per pound of phosphorous removed is \$6.87 /pound removed (a very low cost).

Percent Local Match

The City of Madison anticipates covering 25% of the total cost, or \$175,000, plus annual maintenance costs.

Demonstration Value

Location

The location is fairly easily accessible within the City of Madison limits, behind Olbrich Gardens with access being off of Fair Oaks Avenue. The same access used by our streets crews to provide leaf collection to Olbrich Gardens (where they make compost) and by our Streets crews to place snow storage during the winter months.

Public Accessibility

There are nearby parking lots and bike paths to the site. The project will include walking paths around the facility tying into Olbrich Gardens. Long term plans include a new bike path bridge over Starkweather Creek that would connect to this area.

Educational Value

This is a unique project that should prove useful both in controlling phosphorus loading to Lake Monona as well as for other municipalities trying to control phosphorus with limited space to do so.

Maintenance

Monitoring Plan

The system would include three automatic water samplers. The first would be installed to measure the influent water or the base water conditions of Starkweather Creek. The second would be installed at the effluent of the treatment system to validate the capture amounts of nutrients and sediment due to treatment. The third sampler would be installed within Starkweather Creek downstream of the treatment system to demonstrate the treatment's effectiveness to Starkweather Creek water quality.

Schedule

The automatic samplers would initially be set on a bi-monthly frequency and sent to Madison and Dane County Public Health Department for analysis. The treatment system would contain a long channel to allow the floc to settle out. Therefore, the channel would require periodic dredging and disposal of the material. It is anticipated that the channel would be required to be cleaned four times per year to ensure adequate nutrient removal efficiencies.

Starkweather Creek @ Garver Feed Mill

Cost

The maintenance costs would consist of monitoring the treatment effectiveness and removal of floc removal. The samplers would generate 72 samples per year. Each sample would cost about \$250 for a total of \$18,000 per year. Removal of floc and material is expected to be delivered to the landfill. The costs for removal are expected to be \$7,000 per dredging for a total of \$28,000 per year. The total annual costs for monitoring and dredging are expected to be \$46,000.

PROJECT LOCATION - Starkweather Creek Alum Treatment

