

Item 7b.

Sunfish Lake Engineer's Report for April 3, 2012

By: *Don Sterna, PE, City Engineer*

Date: *April 27, 2012*

1. Engineering Activities Undertaken in the Month of April

Guard Rail Repair – The cable guard rail along Charlton Road was repaired this past month for under \$515 which is under the Council-approved, not-to-exceed costs. The repair cost invoice will be processed next month.

Charlton Road Repairs – Charlton Road was regraded this past month, and I had them add aggregate material in some spots to re-establish a crown in the road. I also took this opportunity to clean out some of the ditch lines along the roadway to improve the drainage prior to the grading operations to take advantage on equipment mobilization costs and to prevent future damage from ditch-cleaning operations to the road surface. The total cost for the ditch work, aggregate material, and grading was \$6,173.76. The City budget assigned a value of \$4,000 for ditch work and \$2,400 for grading, and this work is under the budgeted amount. This cost also included the new sign on Windy Hill Road. We may have to regrade the roadway as we approach the winter months this fall which should be around \$1,000.

Windy Hill Court Stop Sign Repair – The stop sign was replaced on Windy Hill Court this past month. The costs for the new sign were included in the Charlton Road grading and ditch work costs.

Sunfish Lake Water Quality Memorandum – The water quality memo was completed and mailed out this past month.

2. Public Works Activities Undertaken in the Month of March

Crack Seal Quotes – We sent out seven (7) requests for crack sealing quotes this past month, and we received five (5) quotes back. Attached to this report you will find the tabulated quote results along with our recommendation of award to Precision Incorporated out of Princeton, Wisconsin, in the amount of \$13,000. This company has preformed similar work in the surrounding metro area communities and has a good reputation. The total poundage of material we assumed for the quotes was just our estimate, and the total poundage of crack fill material will be the quantity actually applied. We are asking for the ability to overrun the quantity if we start running short to complete the work but not to exceed a total contract value of \$17,500.

3. Anticipated Engineering and Public Works Activities for the Month of April

- **Pavement, Culvert and Street Sign Evaluation** – All 3.76 miles of paved City streets will be evaluated along with the City-owned culverts and street signs to determine their condition and maintenance recommendations.
- **CIP Update** – The draft of the 2012 CIP will be updated based on the results of the pavement, culvert and sign evaluation report of the City's infrastructure. A revised draft will be prepared and forwarded to the Council for review and comment at the June Council meeting. I would like to receive input at this meeting and then finalize the report for approval at the July Council meeting. The CIP will be utilized to set the 2013 engineering budgets.
- **Pavement and Shoulder Repair Work Evaluation** – There are a few areas where the pavement has failed and should be patched this year. I will be reviewing the paved City streets, as well as the shoulders to see what repairs should be made. I will also provide the Council with an estimate of the repairs for review at the June Council meeting.

The above constitutes the Engineering Report for the City of Sunfish Lake for May 2012.

Respectfully submitted,

WSB & Associates, Inc.



Donald W. Sterna, PE
City Engineer

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April 27, 2012

Honorable Mayor and City Council
City of Sunfish Lake
1 Acorn Drive
Sunfish Lake, MN 55077

Re: 2012 Crack Seal Project Quotes
WSB Project No. 1629-97

Dear Mayor and Council Members:

The City received five quotes to complete crack sealing on City streets shown on the attached figure. Quotes were requested from seven companies. The five quotes we received are as follows:

1. Precision Inc.	\$ 13,000
2. American Pavement Solutions Inc.	\$ 17,290
3. Asphalt Surface Technologies Corp.	\$ 19,120
4. Fahrner Asphalt Sealers LLC	\$ 25,280
5. Allied Blacktop Company	\$ 26,660

These prices are similar to quotes recieved on similar projects bid in the metro this year. Precision Inc., has completed this type of work in past years for communities such as Champlin, Andover, and Eden Prairie and has done a good job. They are doing the City of Champlin's crack seal project this year, as well as other metro area communities.

Engineering recommends award of this crack seal contract to Precision in the amount of \$13,000. It should be noted that we based our bid quantity request on historic bid prices to stay within the amount budgeted for this project. With the low bids we received, we are able to do more crack sealing work as necessary. It is estimated we will need additional quantity and will do so as necessary with a cost not to exceed \$17,500 for the project construction cost.

Sincerely,

WSB & Associates, Inc.

Don Sterna, PE
City Engineer

Attached: Project Map, Bid Quotes



April 18, 2012

Honorable Mayor and City Council
City of Sunfish Lake
1 Acorn Drive
Sunfish Lake, MN 55077

Re: Lake Water Quality Treatment Options
WSB Project No. 1011-99

Dear Mayor and Council Members:

The City has been utilizing MCES CAMP program to monitor the yearly changes in water quality since 2006. The water quality in Sunfish Lake has improved since 2006, but in 2011, the levels of Phosphorus increased along with Chlorophyll (CLA) from the previous year. WSB reviewed available data and background information, including the following to investigate potential causes to decrease the water quality:

- Previous studies completed by WSB
- MS4 permit data
- City Comprehensive Stormwater Management Plan
- Met Council Lake Study
- WSB Water Resources staff who have reviewed the area in the past

Sunfish Lake Background Information:

- Lake has a surface area of 49 acres
- Lake's maximum depth is listed at 32 feet
- Classified by MPCA as a shallow lake (80% of lake is shallower than 15-feet)
- Sunfish Lake is landlocked with a relatively small drainage area, 232 acres
- Lake is surrounded by private properties – 34 total (no public access)

Met Council Study Findings:

The 2010 Study of the Water Quality of 185 Metropolitan Area Lakes done by Met Council shows lake grade went down from a B grade in 2009 to a C grade in 2010. Previous data in 1984, 1985, 1986, 1991, and 2006-2008 showed the lake grade as a C.

- The variation from 2009 to 2010 is within typical variations that may be experienced in a lake from year to year to due to environmental variations, such as from variations in precipitation and temperature.

Things That Can Affect a Lake's Water Quality:

- Temperature differences
 - Early ice-out could bring on warmer lake temperatures sooner, which would likely cause the lake to go anaerobic sooner.
 - Hot summers
- Precipitation / Rainfall amounts
- Wind and wave action
- Erosion

Sunfish Lake Water Quality Issues:

Reasons for water quality issues are most likely due to the following:

- Shallow lake make it susceptible to eutrophication
- Lake will warm quickly, and the lake will develop anaerobic conditions near the lake bottom
- Anaerobic conditions develop and generate high amounts of soluble phosphorus due to the breakdown of organic material
- Wave action will mix the lake and bring the phosphorus to the surface
- Phosphorus causes algae blooms (shown by data of greater than 60 ppb in July)
- Algae die and settle to the bottom and store phosphorus there
- Cycle repeats itself

Potential Water Quality Fixes:

1. Alum treatment (in lake treatment) to lock phosphorus in bottom
 - Alum treatment will further reduce the phosphorus available to algae
 - Success of alum treatment dependent causes of lake bottom sediment agitation done by
 - Amount of rough fish
 - Wind action
 - Powered boat action
2. Provide portable active treatment system (offline - not in lake) that will filter the water
 - Can treat on quarter of the lake water over a period of four to six months.
 - This will filter out the soluble phosphorus breaking or reducing the algae bloom cycle.

Other Less Costly and Less Effective Fixes:

Other things the City can do to help the lake (although will provide much less significant results to water quality and may not produce any significant results):

- Continue ongoing BMP practices as described in MS4 permit
- Planting of aquatic plants
- Reduce erosion
- Check septic systems
- Repair culverts and drainage ways

Treatment Options and Cost Estimates:

Alum treatment is one of the more widely used methods of removing suspended phosphorus from lake water. The delivery systems can either be by dispensing it from moving boats which is known as an in-lake treatment or with an offline treatment system. These two options are the best known options that provide relatively quick and significant water quality improvements to the lake.

Please note both of these treatments require water data monitoring over the course of a few months to determine the lake's alkalinity and temperature profiles. This data is necessary to determine the dosing requirements for either treatment methods.

Costs below are estimated ranges since we don't know, at this time, what it will take for dosing requirements and for site development. The costs below were developed based on the previous listed lake background information:

- **In Lake Alum Treatment** (1 time treatment) estimated cost range: \$50,000 - \$80,000.
- **Portable Active Flocculation Treatment System** estimated cost range: \$70,000 - \$100,000 (set up, permits and site development) first year, \$20,000 - \$30,000 subsequent years.
- **Water data monitoring (to determine dosing)** estimated cost range per year: \$10,000 - \$15,000.

The residents or the City may elect to perform an in-lake alum treatment for two years and observe the results. Potential issues for this treatment may be acquiring permitting from the MPCA and other agencies. These can be difficult to obtain for a one-time treatment and may be even more difficult for additional treatments.

The portable active flocculation treatment system is recommended since it removes the soluble and insoluble phosphorus from the lake water and also suspended sediments in the water. The flocculent is then discharged down the sanitary sewer and out of the lake's water system. Permitting from the MPCA and owner of the sanitary sewer treatment plant will be necessary and could be an issue to obtain.

It should be noted that alum treatment only locks the phosphorus up to settle out to the bottom of the lake. Any agitation of the bottom sediments can re-suspend this phosphorus back in the lake water. Since the costs are very close in price and the active flocculation provides much better and more permanent results, it is the recommended option if only one option is chosen.

Funding Options:

It should be noted that since Sunfish Lake has no public access (surrounded by private properties), grants from the DNR and other public agencies will be difficult to obtain since this is commonly a requirement.

In order to pay for these water quality treatment options, an assessment policy could be set up. Residents could petition the City who has bonding authority which could bond for the project and then repay the bond with assessments that can be spread out over a ten-year period. There are costs associated (approximately 3%-4% of the project costs) with the management and acquiring of the bond; therefore, we recommend a fee option as discussed below.

In-Lake Alum Treatment Providers

There are companies that perform in-lake treatment with alum. One company in the metro that we know is Lake Restoration Inc. (www.lakerestoration.com) if you want to learn more about what services they provide. There are other companies that also can provide this service if you are looking for comparable estimates.

Sincerely,

WSB & Associates, Inc.



Don Sterna, PE
City Engineer

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