



CITY COUNCIL MEETING AGENDA
Council Chambers, 1000 Laurel Street

May 6, 2013
Monday

Study Session
7:00 p.m.

- 1. Call to Order**
- 2. Roll Call of Council Members**
- 3. Study Items**
 - a. Solid Waste Contract Discussion
 - b. Surprise Lake Water Quality Report
 - c. Preferred Water Well Drilling Site
- 4. Adjournment**

Note: Public comment is generally not taken at Study Sessions. However, on some occasions, public comments may be allowed at the discretion of the Chair and Council. The public may also submit written communications, via letters or emails to dperry@cityofmilton.net. Any item received by noon on the day of the meeting will be distributed to Council.

If you need ADA accommodations, please contact City Hall at (253) 517-2705 prior to the meeting. Thank you.

PENDING COUNCIL AGENDA CALENDAR (Dates are Subject to Change) FOR PLANNING PURPOSES ONLY

May 2013			
Mon 05/13	7:00 pm	Regular Meeting	A. Public Hearing - PSE Franchise Renewal B. Appointments to the Events Committee C. Adoption of Franchise Agreement – Zayo Group D. 2013 Budget Amendment Ordinance #2 E. Amendment to Court Contract F. Energy Conservation Supplemental Contract
Mon 05/20	7:00 pm	Regular Meeting	A. Adoption of PSE Franchise Agreement B. Olofsson Estates Park Rezoning Request C. Public Hearing on Sale of Property at 20 th Ave Reservoir Site
Mon 06/03	7:00 pm	Study Session	A. 6 – Year Transportation Improvement Program B. Electric Systems Plan Update C. DWLS Impound Ordinance
Mon 06/10	7:00 pm	Regular Meeting	A. Public Hearing & Adoption of 6 – Year Transportation Improvement Program B. Granting of Easement to DOE
Mon 06/17	7:00 pm	Regular Meeting	A. Adoption of 2012 Stormwater Manual
July 2013			
Mon 07/01	7:00 pm	Study Session	A. Mid-Year Budget Review & Prelim 2014 Revenue Picture. B. 2012 Stormwater Manual C. Street Presentation
Mon 07/08	7:00 pm	Regular Meeting	
Mon 07/15	7:00 pm	Regular Meeting	A. 2013 2 nd Quarter Financial Report & Mid-Year Budget Review
Mon 08/05	7:00 pm	Study Session	
Mon 08/12	7:00 pm	Regular Meeting	
Mon 08/19	7:00 pm	Regular Meeting	**MEETING CANCELLED**
September 2013			
Tue 09/03	7:00 pm	Study Session	
Mon 09/09	7:00 pm	Regular Meeting	
Mon 09/16	7:00 pm	Regular Meeting	A. 2014 Revenue Estimates & Fee Schedule Changes
Mon 09/30		No Council Meeting	Preliminary Budget Distributed to Council
October 2013			
Mon 10/07	7:00 pm	Study Session	A. General Fund Budget Review



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To: Mayor Perry & City Council Members
 From: City Administrator Mukerjee
 Date: May 6, 2013, Study Session
 Re: **Solid Waste Contract Discussion**

- ATTACHMENTS:**
- A. DM Disposal Rates - Current & Proposed w/ Hinged Carts
 - B. Photos of DM Disposal company provided hinged carts.
 - C. Waste Management Brochure

TYPE OF ACTION:

Information Only Discussion Action Expenditure Required:

Recommendation/Action: Discuss options for solid waste contract.

Previous Council Review: NA

Issue: The city's solid waste contract with DM Disposal expires at the end of this year. The purpose of this discussion is to see if there are any new or different types of services that the city would like to explore, and whether the city should negotiate a new contract with DM Disposal, or seek other proposals through a RFP process.

Background: The current contract for solid waste services is with DM Disposal. The city also has an interlocal solid waste agreement with Pierce County to implement the Year 2000 Tacoma-Pierce County Solid Waste Management Plan, and solid waste contracts must comply with the plan.

DM Disposal Current Contract:

Original contract: November, 2000 for 5 years; renewed 2006 thru December 2008; and then renewed 2008 thru 2013.

Current rates: See Attachment A. Rate increases are tied to CPI; every March, rates can increase or decrease by 80% of the percentage change in the preceding year's 3rd quarter CPI, which was 1.84% in 2013. Additionally, taxes and fuel surcharge of anything above \$3.50 per gallon are allowed.

Bi-monthly billing service provided by contractor

Spring Cleanup is included.

Minimum level of service of a micro-can (12-gallon) required on all city accounts. A standard can is a 32-gallon container provided by the customer.

Regular garbage collection is mandatory, and is provided weekly from cans which are provided by customer.

Curb-side recycling (except for glass) and yard waste services are offered on alternate weeks, in containers with hinged lids provided by the contractor.

Glass recycling is available through a community-wide container, currently located at the Albertson's parking lot. Glass recycling is provided for multi-family and commercial accounts.

Discussion: Listed below are some options to consider, some of which will impact rates. Council should discuss these options and indicate which options they would like staff to pursue in negotiating a new contract.

1. Contractor provided Carts:

One of the issues that has been voiced by the public is garbage can lids being blown away, especially during winter months. This can be addressed by converting to carts with hinged lids, provided by the company. These carts also have wheels for easier maneuverability (see *Attachment B*). The cost of purchase of the carts and trucks by the company would impact the rates slightly. The rate changes for the DM Disposal company are shown in *Attachment A*. For most customers using a 32 gallon cart, there would be a monthly increase of \$1.26 for this service. If the Council decides not to go with the company providing hinged carts, the current rates with the same terms regarding annual review of dump fee and CPI costs would apply.

2. Lower Rate for Micro / Mini Carts:

The proposed rates from DM Disposal provide for reduction for the 10 gallon, micro-carts and maintains the current rate for the 20 gallon, mini-carts. This is designed to help senior customers, as well as provide an incentive to all customers to reduce waste, and go to a smaller cart service.

3. Glass Recycling

The Pierce County Solid Waste Management Plan, does not allow for curb-side glass recycling which is co-mingled with other recyclable items such as paper, aluminum or plastics. Therefore, the collection of glass is currently only available to residential customers through a community-wide container. If there is interest in pursuing curb-side recycling, the city could seek proposals for a separate curb-side glass collection service. This would most probably require a separate collection truck, which would add to the cost of service.

4. Exception to Services:

Another option that could be considered is exceptions to the minimum service requirements, based on city approval for the following:

- If an owner owns the adjacent property, one solid waste account may be shared.
- If a residential customer also owns a business in the city, the residential customer may be exempted.

5. Franchise Fee:

The city does not impose a franchise fee, but charges a 6% utility tax (\$44K approx). The City of Sumner currently has both, a 2.5% franchise fee and a 6% utility tax. The fees and taxes are passed through to customers and reflected on the bills. If Milton were to impose a franchise fee, it would generate another \$18K approximately.

6. Timing:

The current contract with DM Disposal runs through December 31st of this year. If Council wishes to extend the current contract with DM Disposal, with any of the service options described above, it could be implemented anytime between October and the end of the year. Of course, the new rates would go into effect at the time the new contract.

7. RFP

If the council wants to receive competitive bids from other providers, the city would need to develop and advertise a RFP (request for proposal) and seek proposals from interested vendors. A brochure from Waste Management is attached (*see Attachment C*). After receiving proposals, it would need to evaluate them and negotiate a new contract with the selected vendor. This process could take almost 6 months to a year, and an extension of the current contract may be required.

MMC Amendments

Depending on the types of services selected, the city codes on solid waste, MMC 13.12 & 13.14 may need to be amended.

DM Disposal (City of Milton)

<u>Svc Level</u>	<u>Customers</u>	<u>Current</u>	<u>New</u>	<u>Monthly Difference</u>	
10-gallon	59	\$10.38	\$8.02	(\$2.36)	10-gallon
20-gallon	83	\$15.80	\$15.80	\$0.00	20-gallon
1-32gallon	1282	\$19.43	\$20.69	\$1.26	32-gallon
2-32gallon	291	\$28.31	\$30.83	\$2.52	64-gallon
3-32gallon	15	\$39.15	\$42.93	\$3.78	96-gallon
4-32-gallon	0	\$47.91	NA	NA	
5-32-gallon	0	\$58.23	NA	NA	
90-gallon YD Service	1054	\$5.18	\$5.18	\$0.00	
Extra Can Trash		\$5.30			
Extra Bag Trash		\$5.30			

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10 Gallon Insert



20 Gallon Cart



32 Gallon Cart



64 – Gallon Cart



96 Gallon Cart



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MUNICIPAL SOLUTIONS



Community and environmental stewardship at its best.

Great communities — and sustainable environments — are the result of the dedicated efforts of people working together. All across Washington, Waste Management is proud to be part of that effort.

As North America's leading environmental services company, we offer much more than waste and recycling services. We provide innovative sustainability solutions that encourage effective environmental stewardship at all levels and focus on moving our customers to zero waste.

Throughout the state, Waste Management is closing the loop by developing smarter solutions that increase our diversion rate and derive sustainable, clean energy from the materials we collect every day.

Rely on Waste Management to provide you with smart solutions that create cleaner, safer environments and close the sustainability loop. Together, we can tailor solutions that answer your needs, respect your budget and protect the environment we all share.

Solutions for Every Need

From convenient residential recycling options and motivational rebate programs to cost-effective commercial recycling and safe handling of potentially toxic materials, Waste Management has the solution. Count on us for every need: hazardous household wastes, electronics, fluorescent lights, medical waste and more.





Single-Stream Recycling **Simply the Easiest Way to Recycle**

No more separating recyclables and carrying multiple bins to the curb! By enabling customers to dispose of recyclable paper, plastic and glass using a single bin, Single-Stream Recycling programs have greatly increased recycling rates.



eCycling Services **Recycle Used Electronics Safely and Responsibility**

Electronic waste, such as computers, printers, mobile devices and music players, is the fastest-growing waste stream in North America. Our full range of eCycling services include end-of-life equipment processing, product refurbishment and reuse, and certified data destruction. Supported by ISO-certified processing centers and depot collection locations, our eCycling services can be completely customized to meet your specific needs.



At Your Door Special CollectionSM **Responsible Recycling for Challenging Household Items**

Waste Management makes it easy for residents to dispose of and recycle home-generated waste – including household hazardous waste – safely and responsibly with front-porch collection. We'll carry away the pesticides, sharps, batteries, fluorescent lamps, automotive waste (including oil), paints, thinners, and dozens of other potentially hazardous items that don't belong with other recyclables or regular curbside pickup. Plus, we're able to recycle as much as 75% of the items we collect.



Recyclebank Rewards **Motivating and Rewarding Recycling in the Community**

Recyclebank rewards people for taking everyday green actions with discounts and deals from local and national businesses. By joining Waste Management's curbside collection infrastructure — the largest in the nation — with Recyclebank's vast online community and incentive platform, we're helping to mobilize more people, communities and schools to recycle and create a more sustainable future by increasing household recycling, reducing energy usage and taking other environmentally preferred actions.



Organics **Every Aisle is Stocked with Opportunity**

The grocery industry turns to Waste Management for sustainable solutions that save money and produce environmentally positive results. Our Organics Recycling program is a naturally efficient disposal alternative that can benefit companies, communities and the environment by increasing recycling and diversion rates and using cost-effective, earth-friendly disposal options to food and other organic materials into compost, soil amendments, energy and other valued products.



Solar-Powered Trash Compactors **Turning Public Spaces into Clean, Eco-Friendly Zones**

Solar-powered trash compactors keep public spaces clean while vastly reducing waste collection costs. They can hold as much as five times more refuse than a standard 35-gallon trash barrel, so they don't need to be emptied as often. And when a compactor fills up, it sends out a signal indicating that it's ready for collection. Solar-powered kiosk units collect plastic bottles, newspapers, glass and other recyclables.



Cartridges for Kids® (CFK)

Environmentally Friendly Fundraisers for School or Youth Groups

Cartridges for Kids® (CFK) pays cash to schools and non-profit organizations for recyclable items while helping to keep electronics out of landfills and preserve our natural resources. Schools and non-profits collect empty print cartridges, cell phones, laptops and other electronics and send them postage-paid to CFK for cash. It's an ideal fundraiser — and a great way to kids involved in recycling.



Think Green From Home® Recycling Kits

Bulb and Battery Recycling Solutions for Consumers

Our Think Green From Home recycling kits provide streamlined mail-in solutions for the cut your operating costs. The SmartEnergy Compactor's electronic controls are powered by solar energy, while the compactor cycle is traditionally powered, providing the compaction performance and cycle times of traditional compactors with lower energy usage. If the compactor doesn't have the maximum solar charge, its constant AC-powered backup lets you run a cycle while the battery recovers.



MedWaste TrackerSM

Safe Solutions for Your Community's Medical Waste Needs

If used sharps, syringes and lancets are not properly disposed of, they may end up in the environment. Our MedWaste Tracker programs are designed to protect your community members — especially those in municipal jobs, environmental services, home care and other areas — from the risk of injury or infection. Each program is an easy, environmentally sound way to contain used sharps and provide for their safe disposal and destruction.



LampTracker®

Promoting Sustainability, Safety and Compliance

LampTracker provides a safe and cost-effective way to manage the often overlooked environmental and health hazard of mercury leaking from broken fluorescent lamps. Our exclusive, patent-pending Mercury VaporLok™ packaging reduces the risk of mercury exposure for employees and carriers during collection, storage and shipment, thus reducing the liability. LampTracker services are also available for the safe and responsible recycling of used batteries and ballasts.

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To: Mayor Perry and City Council Members
From: Public Works Director Neal
Date: May 6, 2013 Study Session
Re: **Surprise Lake Monitoring Program – Summary and Results to date**

ATTACHMENTS: A. Volunteer Lake Monitoring Program report

TYPE OF ACTION:

Information Only Discussion Action Expenditure Required:

Recommendation/Action: With Council consent, staff will continue to partner with Pierce Conservation District for volunteer water quality sampling of Surprise Lake, with the goal of monitoring long-term trends in the health of Surprise Lake.

Fiscal Impact/Source of Funds: Minor expenditures and minimal staff time is necessary to continue this program, and have been included in the adopted budget. In previous years, less than \$200 has been spent on miscellaneous supplies for this effort, and staff time commitment for this project has been approximately 60 hours.

Previous Council Review: N/A

Issue: Brief the Council on the volunteer lake monitoring program and present the results of the first 2 years of sampling.

Discussion: Pierce Conservation District – Stream Team is a program that started in 1994 and is a coalition of volunteers whose goal is to improve the water quality of lakes and streams for the benefit of fish, wildlife, and people. Stream Team volunteers help protect water resources through a variety of activities such as water quality monitoring and planting native vegetation along streams. Stream Team also educates the public through events such as the Western Washington State Fair and with workshops and tours.

In 2000, the City contracted with Gray & Osborne to complete a study of the Surprise Lake Drainage Basin. The purpose of the study was to identify the areas tributary to Surprise Lake, quantify and qualify those areas with respect to the existing and proposed level of development, and identify the impacts these areas have on the lake with respect to water quality, drainage conveyance systems, and flooding in and around Surprise Lake. The intent of the study was to educate the citizens and Council and present a strategy for preserving, protecting, and restoring Surprise Lake as a valuable natural resource while still allowing for development within the basin.

The study resulted in a 2001 document titled, “Surprise Lake Drainage Basin Analysis”. This document acknowledged evidence of water quality problems in Surprise Lake, and also suggested that “the only means to determine the health status of the lake and the impacts from development would be to conduct a comprehensive, scientific, long-term study of the lake.”

Early in 2011, City staff partnered with the Pierce Conservation District – Stream Team to implement a volunteer lake monitoring program for residents of the Surprise Lake watershed. The purpose of this effort was threefold:

- To monitor long-term water quality trends of Surprise Lake, in response to residents’ concerns about stormwater impacts;
- To establish a baseline for Surprise Lake in anticipation of future water quality requirements in the City’s National Pollution Discharge Elimination System (NPDES) permit; and
- To fulfill one of the current NPDES requirements for public outreach/education and public involvement.

In March/April 2011, staff reached out to residents of the Surprise Lake Watershed for volunteers interested in participating this program. The Surprise Lake watershed drains, for the most part, into Surprise Lake and includes those areas bordered to the west of the lake by 23rd Avenue, to the north by Birch Court, to the east by Meridian, and to the south by Taylor Street and Queens Way.

Training for volunteers was provided by Stream Team staff and included an overview of lake ecology, the importance of tracking lake conditions, as well as a demonstration of equipment handling/use and safety.

The first year’s results, from 2011, were inconclusive – a single year’s data is merely a single snapshot of time and does not show any trends or changes in the health of the lake. The attached report presents the data and results from two years of water sampling. It is important to note that even with two years of data it is difficult to draw any long-term conclusions.

Milton

Volunteer Lake Monitoring Program

Introduction

October 2012 marked the end of the second year of data collection for the Surprise Lake volunteer monitoring program. In 2012, seven volunteers participated in the monitoring program contributing a total of 30 hours of volunteer time. The program began in 2011 with the goal of collecting data to establish long-term trends in lake water quality, provide the citizens and the City a better understanding of lake processes, and provide information on Surprise Lake that will be helpful in making appropriate management decisions. This packet includes a description of the parameters measured and the data collected in 2012 as well as 2011. Lakes are complex ecosystems that are influenced by a number of factors including size of the lake watershed, lake depth, surrounding geology, and the quality and quantity of water flowing into and out of the lake. Water quality varies with depth and with the season, weather conditions, and long term climate changes. Because of this variability a long data record is essential to determining and understanding changes in lake conditions. With only two seasons of data it is difficult to identify and separate differences associated with year to year variation from other factors.

Sampling Program

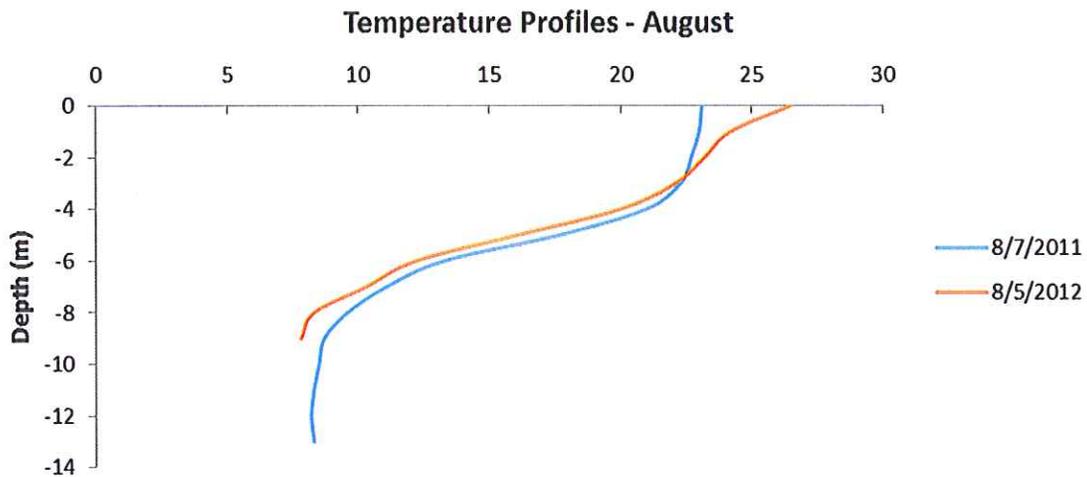
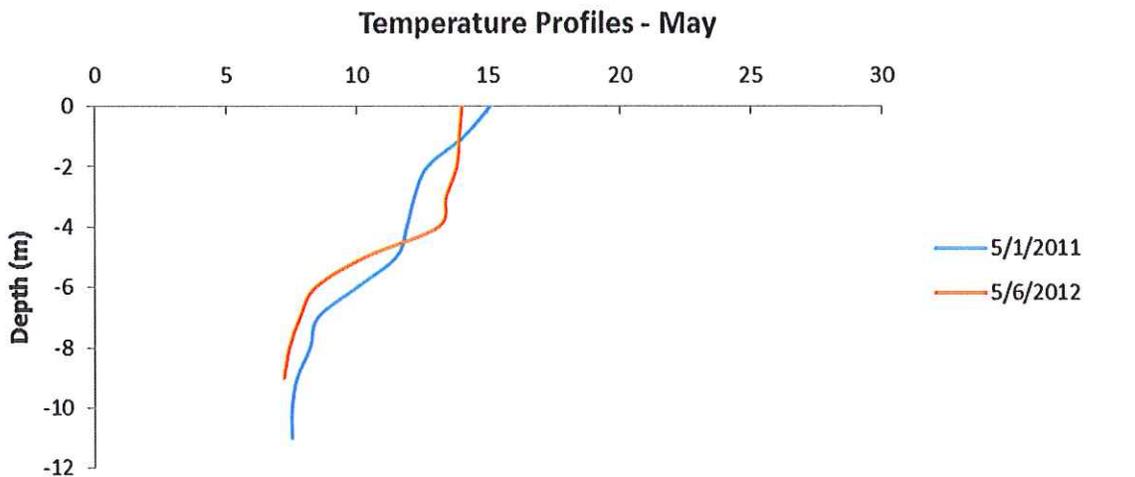
Water chemistry and physical characteristics of lakes vary both seasonally and with depth. The “growing season” for lakes in western Washington occurs from early spring through fall. Lake volunteers collect physical data (secchi depth, water color, weather conditions), temperature and dissolved oxygen profile measurements, and water samples for chemical analysis (total phosphorus, chlorophyll *a*) on a monthly basis beginning in early May through the end of October. These samples were collected at one meter below the surface of the lake and one additional sample was collected from one meter above the lake bottom for analysis of total phosphorus. Additional shallow samples were collected three times during the monitoring season to determine the number and type of algae present. City staff collected samples for bacterial analysis at three sites around the lake four times during the monitoring season. Field data along with lab analysis results of samples collected can be found in Table 1.

Dissolved Oxygen and Water Temperature Profiles

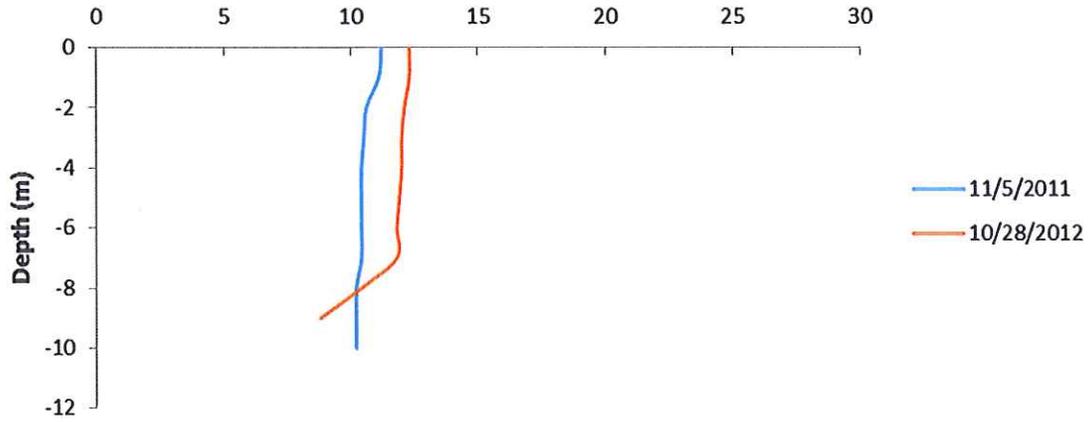
Typically in spring and early summer, deep lakes begin to stratify thermally, with a warmer layer at the surface (known as the epilimnion) and a cooler layer at the bottom (known as the hypolimnion). Between the epilimnion and the hypolimnion is a layer of rapidly changing temperature called the thermocline. Once these layers develop there is usually no vertical mixing between the layers until the time of the fall turnover, when vertical convection currents produce a water body of uniform temperature.

During the period of thermal stratification, the vertical profiles of dissolved oxygen and temperature are similar in shape. Because oxygen from the atmosphere readily diffuses into the epilimnion, it will have higher levels of dissolved oxygen than the hypolimnion, even though colder water can contain more dissolved oxygen than warm water. Oxygen production as the byproduct of photosynthesis occurring in aquatic plants and algae is another factor in increased oxygen levels in the epilimnion. Oxygen concentrations at depth are degraded because of the lack of contact with the atmosphere and the bacterial decomposition of organic matter that has fallen into the hypolimnion from above.

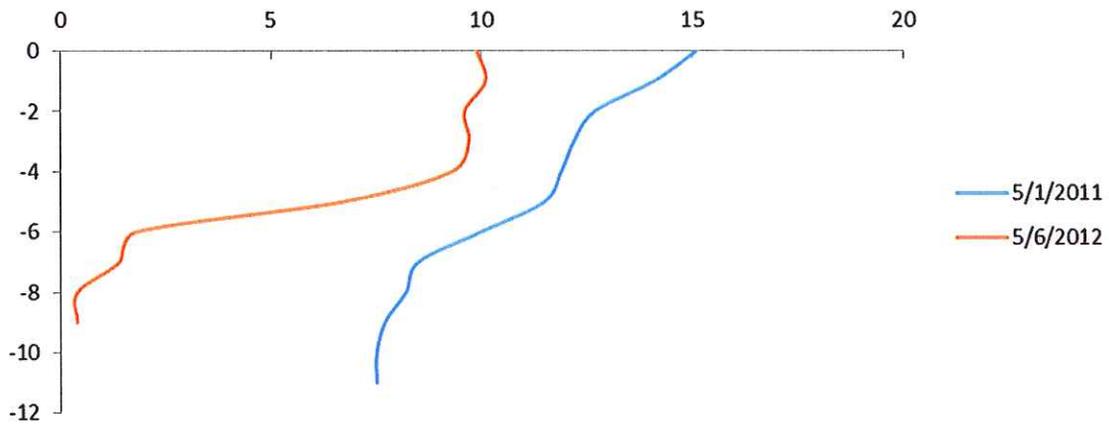
The temperature and dissolved oxygen profiles for Surprise Lake in 2012 (Fig. 1) show stratification has begun in early May and the lake remained stratified throughout the summer and early fall. Turnover of the lake was almost complete by late October, as can be seen from the nearly uniform temperatures from the lake surface to the bottom. The 2012 profiles are very similar to the 2011 profiles.



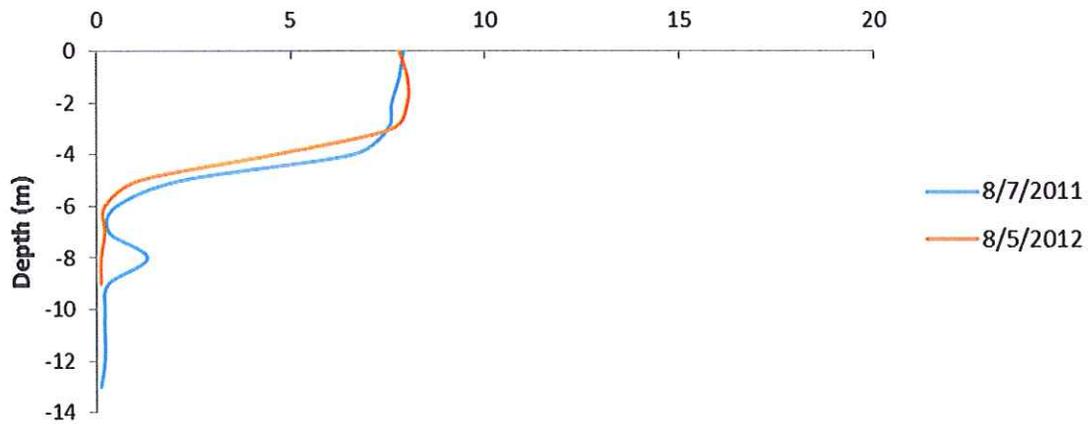
Temperature Profiles - October



Dissolved Oxygen Profiles - May



Dissolved Oxygen Profiles - August



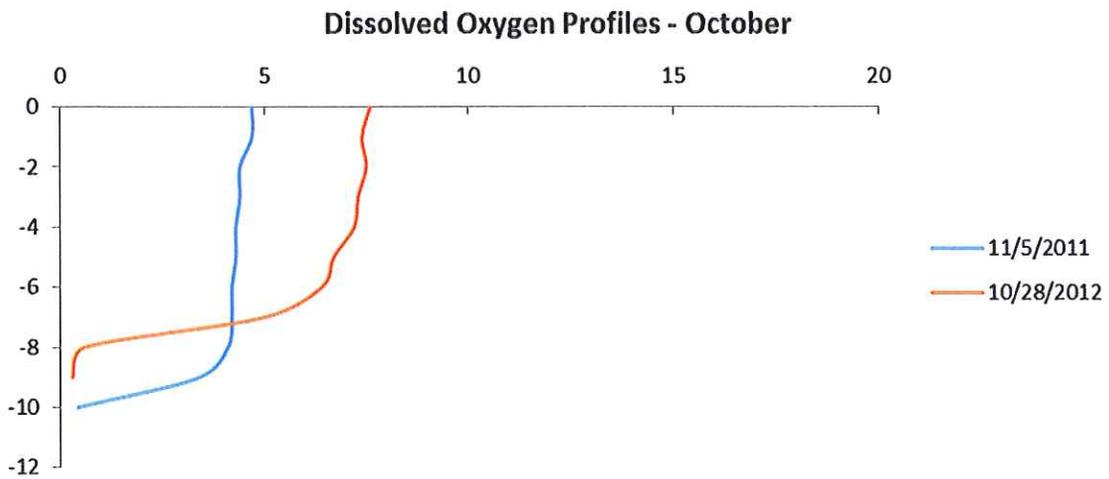


Figure 1.

Transparency

Water transparency is measured using a secchi disk and is reported as secchi depth. Transparency is influenced by several factors such as dissolved substances, algae, and sediment particles (turbidity). Transparency readings can also be affected by waves, wind, and glare. A decrease in transparency is often seen with an increase in algae, an influx of sediment and detritus due to a major storm event, or because of human activities in the watershed.

Secchi depth measurements ranged from 2.5 to 4.0 meters during the 2012 monitoring season and generally showed a decrease in secchi depth with an increase in algal densities as measured by chlorophyll *a* concentrations. Secchi depth was slightly less in 2012 than in 2011 (Fig.2).

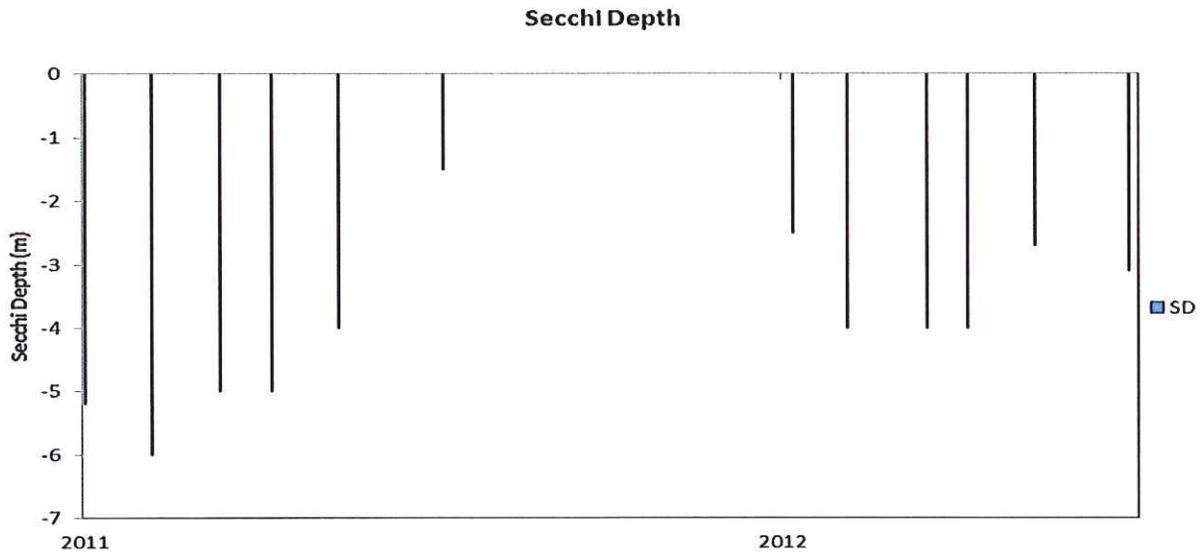


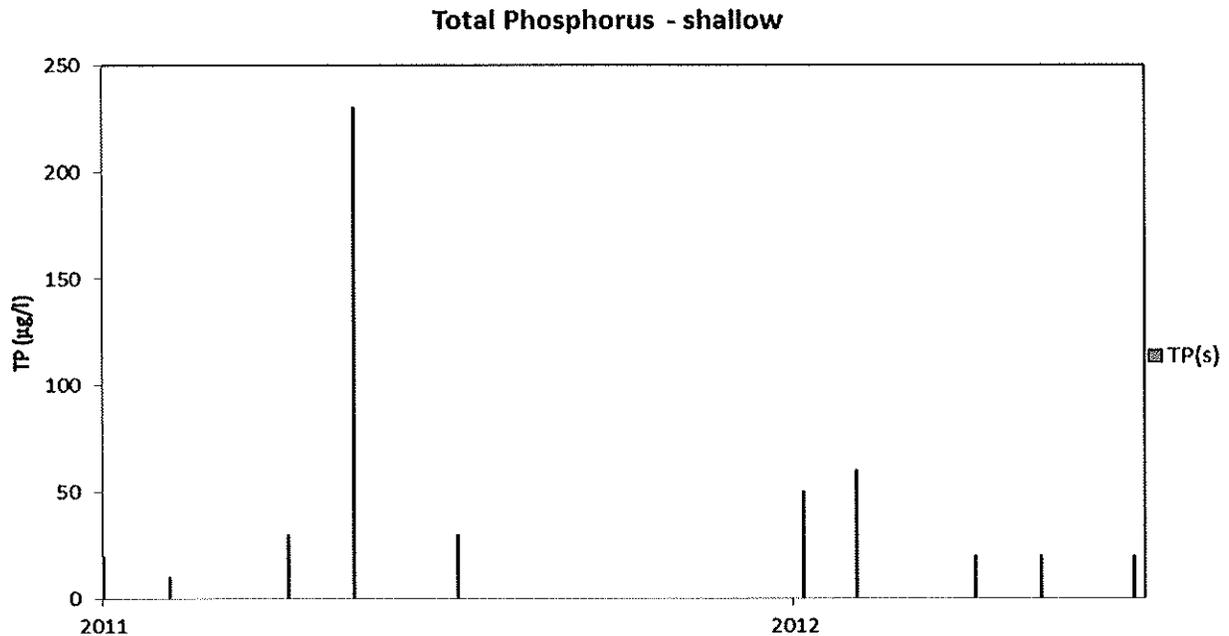
Figure 2.

Nutrients

Nutrients are chemicals necessary for the growth of all aquatic plants, including algae. Phosphorus and nitrogen are the main nutrients of concern in a lake system. In many lakes, phosphorus is typically present in very small concentrations and therefore acts to limit the extent of plant and algal growth. Once the limited supply of phosphorus is exhausted, the algae population will stop expanding.

In lakes that stratify, total phosphorus concentrations in the hypolimnion increase and remain higher than in the epilimnion until the time of turnover, or until the water column is mixed due to weather conditions. This increase of phosphorus in the lake's hypolimnion is caused by the decomposition of organic matter and the release of phosphorus from bottom sediments in low-oxygen environments. When vertical mixing eventually occurs in the lake during the fall, phosphorus that has accumulated in the hypolimnion is brought to the surface where it is available to algae present in the epilimnion. It is not unusual for algal blooms to develop in the epilimnion at that time from the sudden influx of nutrients from below.

The shallow total phosphorus levels at the one-meter depth for Surprise Lake (see Fig. 3) ranged from below detection to 60 $\mu\text{g/l}$, with the higher concentrations occurring early in the sampling season. Generally shallow total phosphorus concentrations were lower in 2012 than 2011. Deep samples were collected monthly in 2012 and had total phosphorus concentrations ranging from 60 to 240 $\mu\text{g/l}$, with the highest concentration occurring in September. The 2012 deep total phosphorus concentrations were higher in 2012 than in 2011 (see Fig. 3).



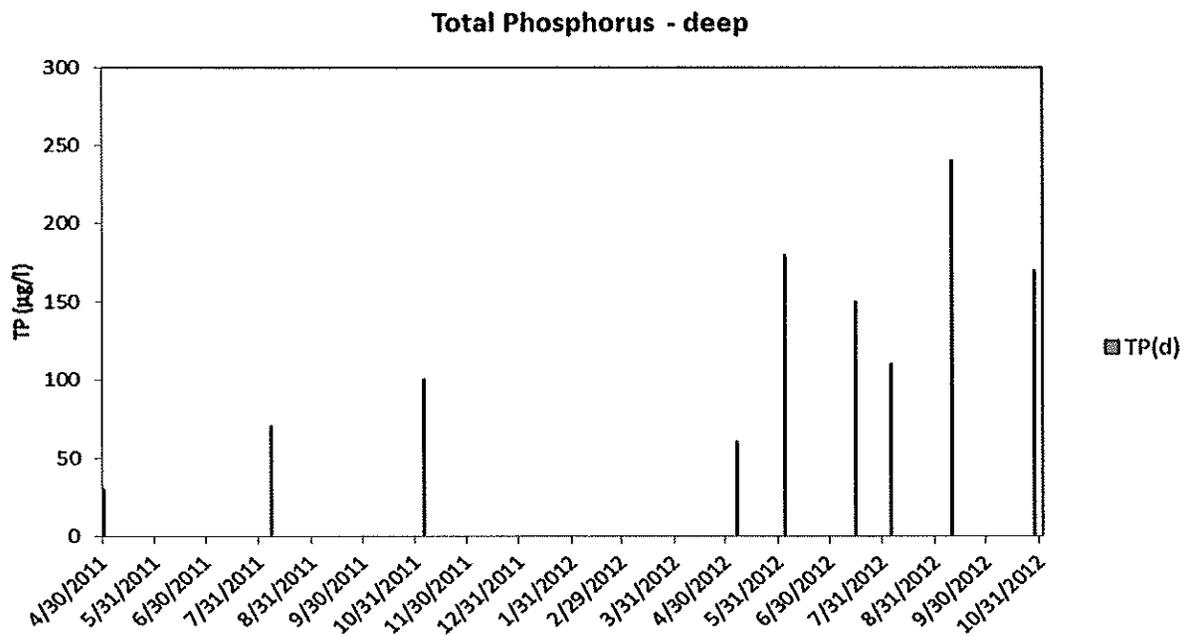


Figure 3.

Chlorophyll *a*

Chlorophyll *a* is one of the green pigments found in nearly all algae. The concentrations of chlorophyll *a* are commonly used to estimate algal biomass and to assess the productivity (trophic state) of the lake. Test results must be interpreted carefully, however, because chlorophyll *a* levels can be highly variable for a number of reasons. For example, various species of algae contain differing amounts of chlorophyll per cell. The amount of chlorophyll can also vary with the health and age of the algal population, as well as with weather conditions. Additionally, algae can concentrate at different levels in the water column and thereby avoid being collected.

Chlorophyll *a* concentrations at the one-meter depth ranged from below detection to 4 mg/m³ (see Fig. 4). Similar to the shallow total phosphorus results, chlorophyll *a* concentrations for 2012 were lower than in 2011.

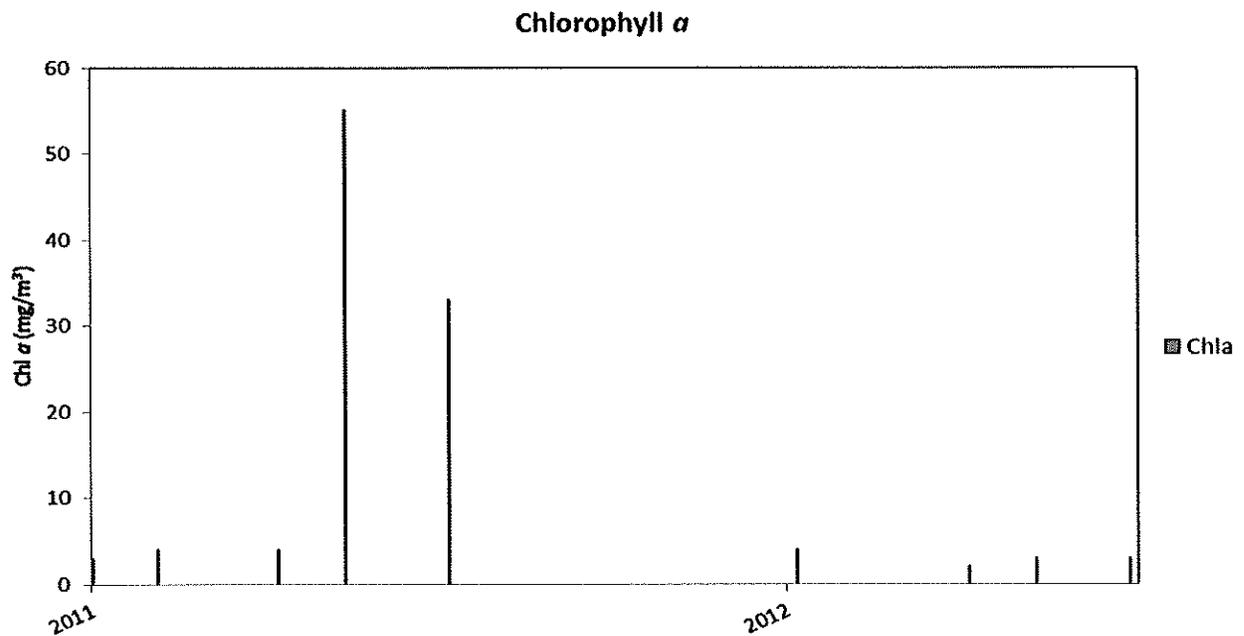


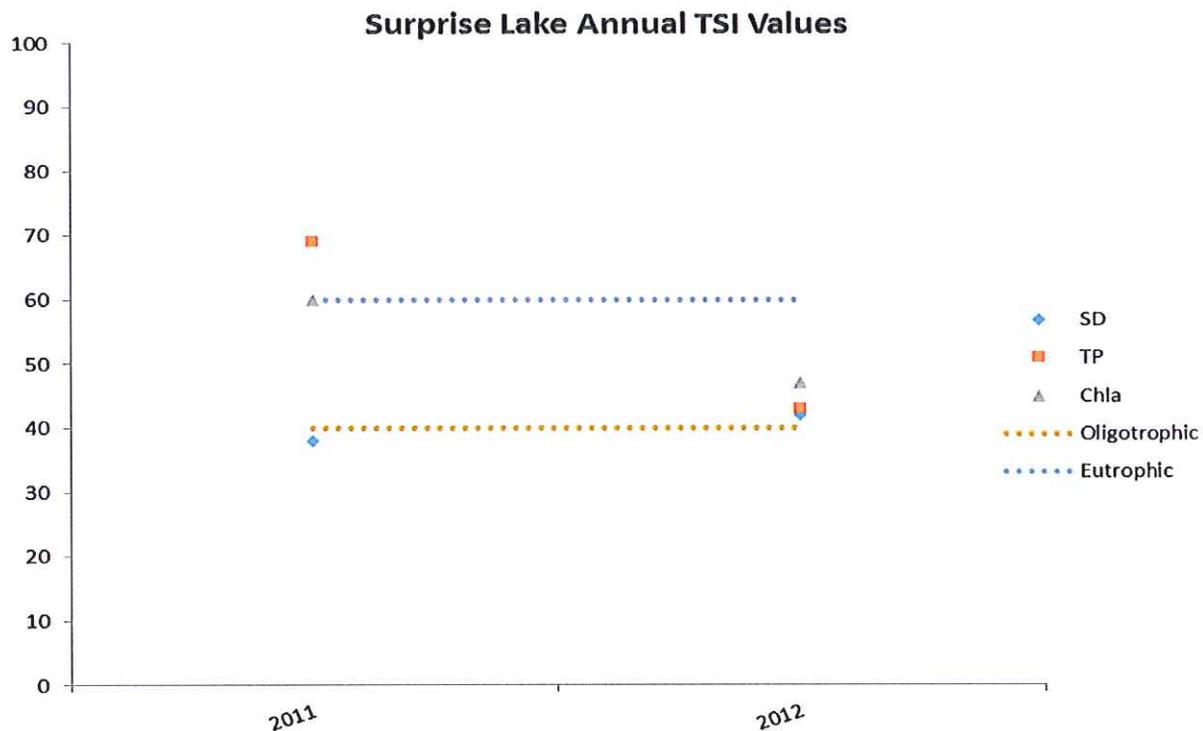
Figure 4.

Trophic State Index

The Trophic State Index (TSI) is a rating system that describes the biological productivity of a lake, that is its capacity to produce and support aquatic life such as algae, plants, and animals, especially fish. The index is a scale that ranges from 1 to 100 with low TSI values indicating low biological productivity and high TSI values indicating high biological productivity. Lakes with low productivity (low TSI values) have low levels of nutrients and algae, support fewer plants, algae, and animals, and have higher water clarity (greater secchi depths). Lakes with high productivity have high concentrations of nutrients and algae, support a greater amount plants and animals, and have low clarity (low secchi disk depth). Lakes have traditionally been classified into four different groups, based on their level of productivity. The groups from the lowest to highest productivity level are oligotrophic, mesotrophic, eutrophic, and hypereutrophic. Using mathematical formulas, a TSI value can be calculated individually for total phosphorus concentration, chlorophyll *a* concentration, and secchi depth. Generally, lakes with TSI values between 0 and 40 are considered to be oligotrophic, those between 41 and 60 are mesotrophic, and those between 61 and 70 are eutrophic. Hypereutrophic lakes are those whose TSI values are greater than 70. Once the TSI value has been calculated for a lake, the result can be compared to other lakes or the value can be recalculated each year to determine whether there is an upward or downward trend in productivity for the lake.

TSI calculations for lakes are typically based on summer values (mid-June through mid-September) of chlorophyll *a*, total phosphorus, and secchi depth. TSI can be calculated for a single day's values or, preferably, the averaged summer values. For Surprise Lake the results from three sampling trips (July, August, and September) were used to calculate the TSI value for secchi depth, total phosphorus, and

chlorophyll α . With only three values being used to calculate the TSI value, one dramatically different result can significantly impact the TSI value. Figure 5 contains the TSI average values and a graph comparing TSI values for the 2011 and 2012 seasons. As shown in the figure, the TSI values calculated for the 2012 summer season are lower than those calculated for the 2011 season. Based on 2012 TSI calculations, Surprise Lake is classified as a mesotrophic lake.



Surprise			
	TSI (SD)	TSI (TP)	TSI (Chl-a)
2011	38	69	60
2012	42	43	47

Figure 5.

Algae

Algae are a vital part of lake ecosystems; they provide the food and oxygen necessary for most aquatic life. However, when algae become excessive, the resulting blooms can lead to fish kills, unpleasant odors, and even health problems if the blooms are toxic. Freshwater algae are a diverse group of organisms and come from all the major groups of algae that have been identified by scientists. Algae identification and counts were performed by Water Management Labs on water samples collected by Surprise Lake volunteers. The identified algae are divided into several groups based on taxonomy and anatomical structures. The algae types found in Surprise Lake belong to the following four groupings – green, cyanobacteria (blue-green), diatoms, and flagellates.

Green algae can occur year round in lakes, but prefer the warm water temperatures and high light levels of the summer. There were no green algae found in the samples collected this year (2012) in Surprise Lake.

Cyanobacteria are actually bacteria that contain chlorophyll. Cyanobacteria are able to grow quickly in phosphorus rich waters. Generally, they grow well in warm water with high levels of light, and therefore are considered to be summer algae. Some members of this group are able to absorb nitrogen from sources (such as the atmosphere) not available to other algae thereby allowing them to dominate in nitrogen limited lakes. Although considered to be summer algae, several species of cyanobacteria can increase their population every year and have significant blooms in spring and fall. The only type of cyanobacteria seen in Surprise Lake this season was *Aphanizomenon*.

Diatoms are most common during spring and early summer; they grow well in cool temperatures and low light. Diatoms have hard siliceous coverings for their cells, and their growth can be limited by the amount of silica present. The two types of diatoms found in Surprise Lake this season included *Cyclotella* and *Melosira*.

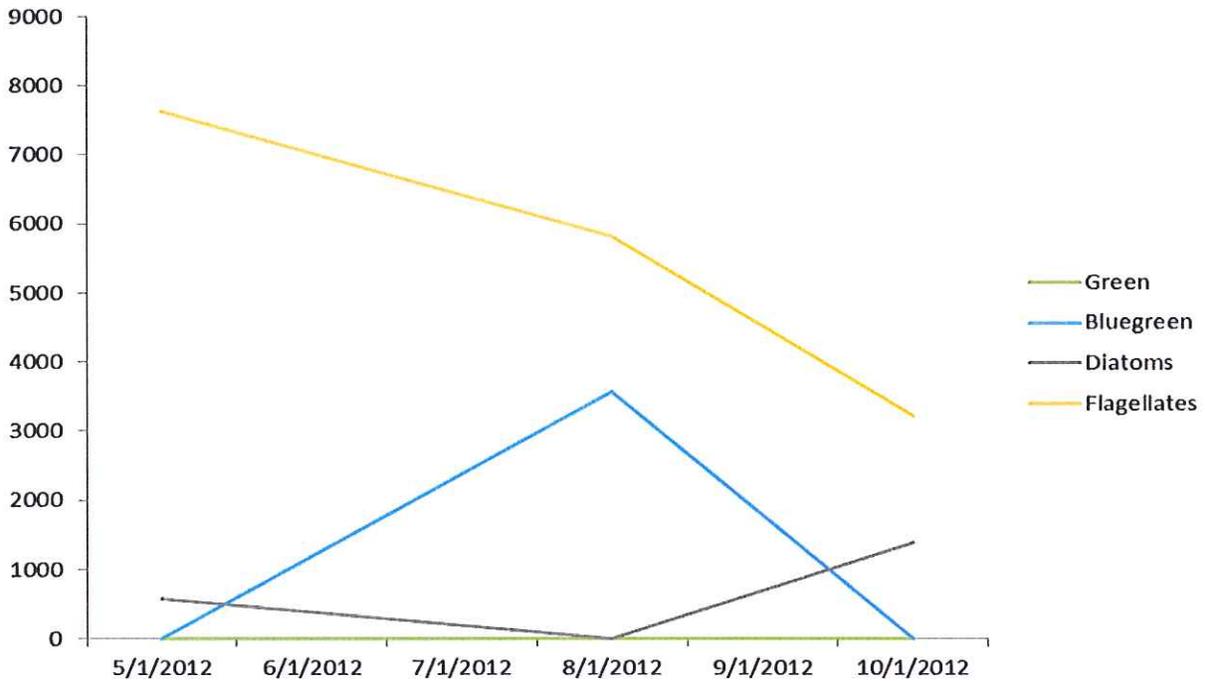
The flagellates have flagella (as their name suggests) which they use to propel themselves. They share both animal-like and plant-like characteristics, and are generally considered to be a summer algae. The most common flagellate was *Dinobryon*.

Changing conditions in lakes allow different groups of algae to become dominant as the seasons progress. Each lake has a characteristic set of algal populations that do well in its waters. Although the relationship between algae and other components of the lake ecosystem are too complex to make major conclusions based on sampling results, the presence of certain indicator species of algae can be indicative of certain conditions in a lake. To summarize, the determination of the type and number of algae present is a tool that can provide significant information on the status of a lake. The 2012 season was the first season of algae sampling in Surprise Lake and the flagellates were the dominant group of algae present during the sampling season. Figure 6 shows the algae sampling results in table and graph form. Long-term sampling will help to determine trends and cycles in algae populations.

Surprise Lake Algae Data

Date	5/6/2012	8/5/2012	10/28/2012
Algae count/ml	8200	9400	4600
Green	0%	0%	0%
Blue-Green	0%	38% <i>Aphanizomenon</i>	0%
Diatoms	7% <i>Cyclotella</i>	0%	30% <i>Melosira</i>
Flagellates	93% <i>Dinobryon</i> <i>Chrysococcus</i>	62% <i>Dinobryon</i> <i>Chrysococcus</i> <i>Euglena</i>	70% <i>Dinobryon</i> <i>Euglena</i> <i>Phacus</i> <i>Trachelomonas</i>

Surprise Lake Annual Algae Counts



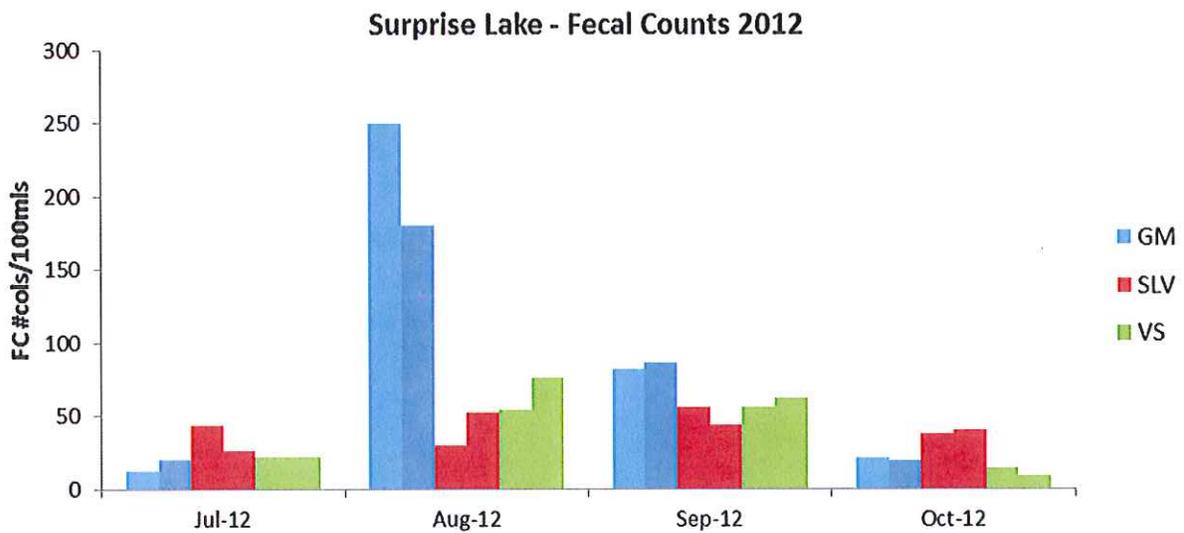
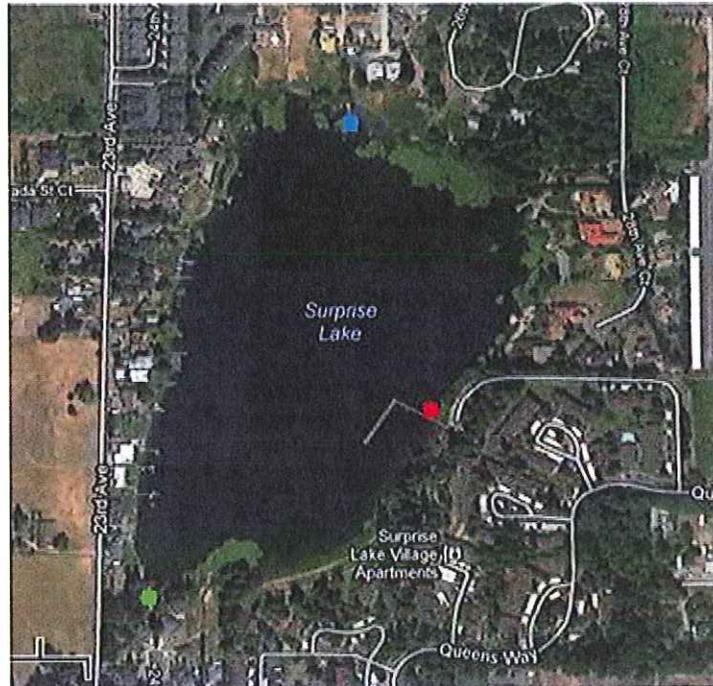
Fecal Coliform Bacteria

Concentrations of fecal coliform bacteria are used as an indicator of bacterial contamination from sewage and its resulting potential human health risk. Although high fecal coliform counts indicate sewage is present in the water, it does not necessarily indicate that humans are the source of that contamination. Many other animals such as dogs, cats, waterfowl, livestock, and other wildlife are sources of fecal contamination in lakes. Unless there is evidence that human sewage is being discharged into a lake either through failing septic systems or a sanitary sewer overflow, the major source of fecal coliform bacteria is generally assumed to be of nonhuman origin. Discouraging waterfowl use of adjacent lawns and docks by planting vegetation along the shoreline will minimize bacteria from waterfowl. Shoreline vegetation has the added benefit of filtering storm water runoff, another source of bacterial contamination, before it enters the lake. Proper disposal of pet waste, and ensuring proper function of septic systems are additional steps lakeshore property owners can take to minimize bacterial inputs to lakes.

The state of Washington has set a two-part standard for concentrations of fecal coliform bacteria in lakes. The regulation states that fecal coliform concentrations must not exceed a geometric mean value of 50 colonies/100ml, with not more than 10% of the samples obtained for calculating the geometric mean value exceeding 100 colonies/100ml

Sampling for fecal coliform bacteria was conducted at three sites around Surprise Lake in July, August, September, and October (see Fig 7). Bacterial concentrations exceeded (violated) State standards in August and September (yellow highlighted values in table on the following page).

Fecal Coliform Bacteria Sampling Sites



Date	Fecal Counts (cfu/100mls)						Geo Mean
	GM	GM-2	SLV	SLV-2	VS	VS-2	
Jul-12	12	20	44	26	22	22	23
Aug-12	250	180	30	52	54	76	81
Sep-12	82	86	56	44	56	62	63
Oct-12	21	19	38	40	14	9	21

Figure 7.

Surprise Lake Data - Summer 2012

Lake	Date	Site Depth (m)	Secchi Depth (m)	Water Temp (°C) Top	Dissolved Oxygen (mg/l) Top	Water Temp (°C) Bottom	Dissolved Oxygen (mg/l) Bottom	Water Color	Suspended Algae	Chlorophyll a (mg/m ³)	Total Phosphorus (µg/l) shallow	Total Phosphorus (µg/l) deep	
Surprise	5/6/2012	9.5	2.5	14	9.9	7.2	0.4	6	light	4	50	60	Breezy - difficult to see 25 waterfowl seen
	6/3/2012	12.1	4	19.1	9	7.3	0.33	1	light	<2*	60	180	200+ geese & ducks conditions, ripples 100 waterfowl seen
	7/15/2012	11	4	22.6	11.9	7.7	0.38	7		<2*	<10*	150	98. 200 waterfowl seen
	8/5/2012	10.5	4	26.5	7.8	7.8	0.07	6	none	2	20	110	bald eagle
	9/9/2012	11.3	2.7					1	none	3	20	240	500 waterfowl.
	9/16/2012	10.2	3.6	20.4	7.5	8.2	0.09	6	light				DO meter data
	10/28/2012	10	3.1	12.3	7.6	8.8	0.3	6	none	3	20	170	300 waterfowl

*below detection limit

Back to Agenda Bill

Table 1.



[Back to Agenda](#)

To: Mayor Perry and City Councilmembers
 From: Public Works Director Neal
 Date: May 6, 2013 Study Session
 Re: Water Revenue Bonds: Additional Water Source – Test Drilling Project

ATTACHMENTS: A. Well Siting Technical Report

TYPE OF ACTION:

Information Only Discussion Action Expenditure Required:

Recommendation/Action: With Council consent, staff will work with the consultant on completing the next steps in the project and will come back to Council at a later date for formal bid award for the construction phase.

Fiscal Impact/Source of Funds: Although this project was not included in the adopted 2013 budget, it is anticipated that this project would be almost entirely funded with revenue bond money. If there is any overage, it would come out of the water utility fund.

Previous Council Review: At its February 4, 2013 meeting, the City Council looked at the status of the water revenue bond projects and directed staff to bring back a scope and fee for an additional project: Additional Water Source – Test Drilling. On March 11, 2013, Council approved the scope and fee for Robinson & Noble to proceed with the project.

Issue: We are currently projecting that there will be \$208,111 remaining from the original amount of revenue bond proceeds, once all of the currently approved projects are completed.

Background: As discussed with the Council previously, we will have successfully completed seven (7) priority water utility capital improvement projects in the last 3 years with the assistance of revenue bond funds:

1. Corridor Wells Treatment Facility - completed
2. 15th Avenue Booster Station Upgrades - completed
3. 1 MG Reservoir Booster Station Upgrades – completed

4. 15th Avenue Tank Painting – completed
5. Birch Street Crossing – under construction
6. 434 Zone Modifications – under construction
7. Porter Way Watermain Project – under construction

From the remaining projects listed in the Water System Plan, staff identified three (3) projects that should be considered for construction with the remaining revenue fund money.

1. WS-2: Phase 1 Additional Source: Exploratory Drilling and Land Acquisition
2. D-21: Milton Way and 13th Avenue
3. D-13: 19th Avenue

Staff recommended proceeding with WS-2: Test Drilling, and Council concurred.

Discussion: The first task identified in Robinson & Noble's approved scope of work is the submittal of a technical memorandum describing the preferred well location and drilling method for review by the City Council.

As stated in the attached technical memorandum, the preferred location for test drilling of the new well is the 2MG Reservoir site.

The next steps in this project include the following tasks:

- prepare technical specifications for contractor bidding
- site inspection by Tacoma – Pierce County Department of Health
- obtaining a temporary permit from DOE to drill and test for water
- approval of project and appropriation of funds by City Council



ROBINSON
NOBLE

Technical Memorandum
City of Milton
New Test Well Drilling Program

Date: April 30, 2013

To: Leticia Neal, PE
Public Works Director

From: Burt G. Clothier, LHG
Principal Hydrogeologist

Subject: Selection of a Well Site for the New Test Well Drilling Program

Site Selection

At the City's direction, we have prepared the following memorandum to discuss our decision making process in selecting the site for the proposed test well. The test well project is the next step in a water resources expansion effort that the City has been undertaking over the past six years. In concert with Robinson Noble and the City's water rights attorney, Tom Pors, the City identified the need for new water sources to expand existing production and spread the locations of that production out away from the main well locations in the Hylebos Creek valley. As part of this effort, Robinson Noble was commissioned to produce a hydrogeologic study of the Milton – Edgewood area of the Federal Way upland. We completed our study entitled *Water Source and Hydrogeologic Analysis Technical Memorandum* in 2008. The goal of the work was to identify and prioritize a set of possible well drilling sites based on location, geologic properties (to the degree known), and available City properties.

One of the key findings of our effort was to try and identify deeper aquifer systems below the depth of the City's current sources. It is hoped that a deep aquifer similar to that used by Lakehaven Utility District to the north can be found in the vicinity of the City. This deeper aquifer is the target of the drilling program, but having no previous data to confirm the existence of the system, we recommended this test well drilling program.

On the attached Figure 12 from our 2008 report, we note 15 possible sites for drilling. We recommend selection of either sites 12 or 14 on the upland or site 13 in the valley. Sites 12 and 14 are roughly equivalent with the exception that if the intermediate aquifer is found at site 14, the proximity to the Mountain-View Edgewood (MVE) wells makes the water rights process more complex as we will have to assure that no impairment of those wells would occur. The greater distance from the key MVE wells afforded by site 12 makes that location slightly more desirable geologically, but the facilities at site 14 make that location more beneficial from an engineering standpoint.

We believe that even with the deeper drilling depths at the upland sites 12 or 14 (as opposed to the valley drilling at site 13), they have greater benefit to the City as potential test well sites. This is because we may drill through one more aquifer system, hopefully increasing the chances of finding at least one that would support the desired withdrawals. An upland location will

also provide more information on the geology of the upland which may help to better define the next move if the test well does not identify an adequate source aquifer. This may include selection of the other of the two upland sites as a second drill site rather than moving down into the valley.

The valley site is more speculative (based on the limited data available) and faces the infrastructure problems of pumping water up the hill from a site distant from the City's existing infrastructure. That said, site 13 represents a good back-up location if the upland drilling does not find an aquifer.

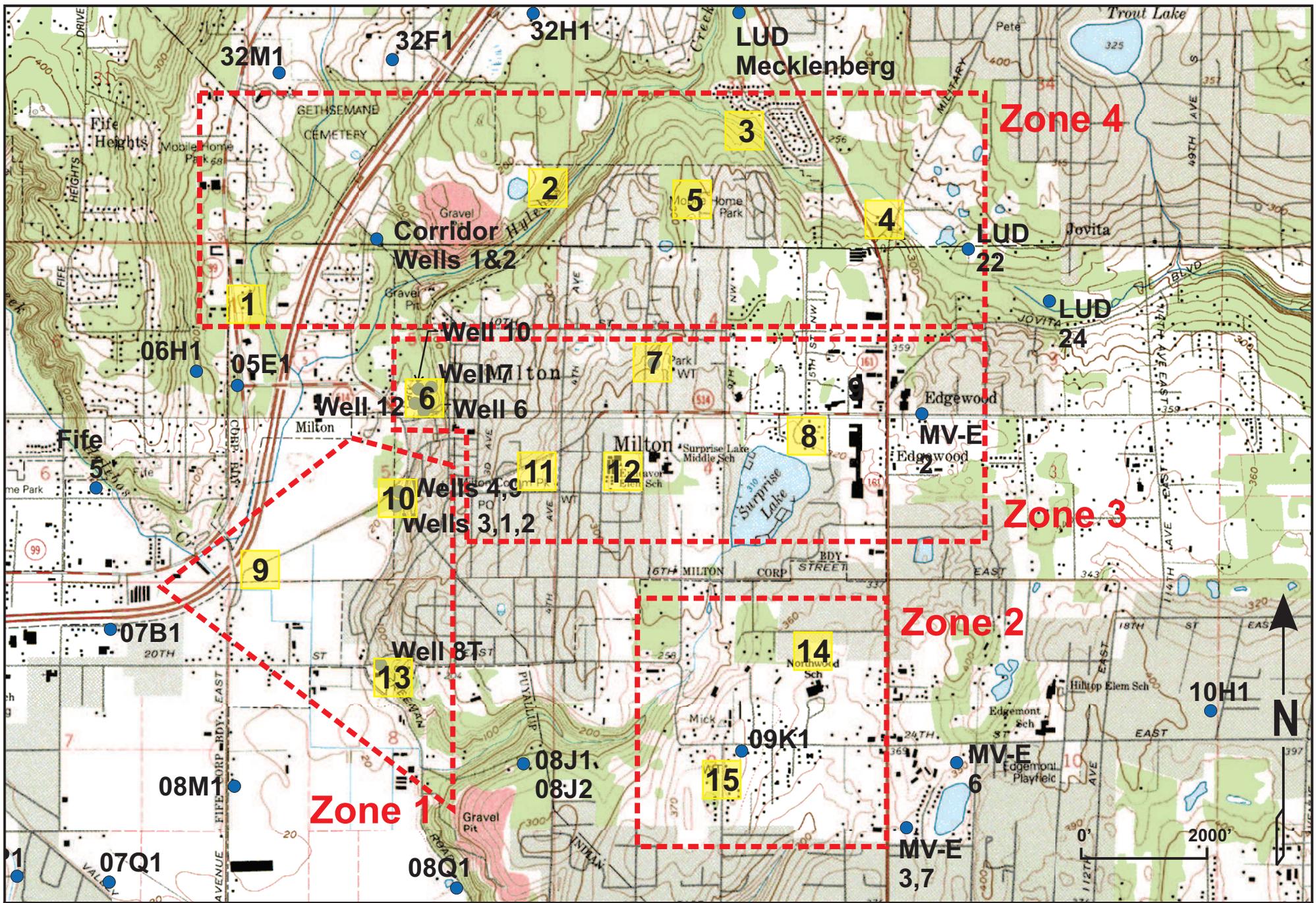
In the end, the team identified site 14 as its preferred location because of the logistical benefits of a large property (which makes the drilling project easier) and the proximity to the storage tank (which facilitates the engineering of a final production well).

Mud Rotary Drilling Methods

Fluid rotary drilling in the Pacific Northwest is commonly used for deep exploration drilling. A drill bit on the bottom of a string of drill rods is rotated in a borehole. The bit breaks the material at the bottom of the hole into small pieces (cuttings). The cuttings are removed by pumping drilling fluid (water or water mixed with a fluid enhancer, such as bentonite) down through the drill rods and bit and up the annulus between the borehole and the drill rods. The drilling fluid also serves to lubricate and cool the drill bit and to stabilize the borehole wall.

Hydrogeologists typically conduct a series of geophysical logs in the fluid-filled borehole after the drill rods are removed. This provides valuable information of the water-bearing potential of the sediments penetrated. The exploration hole can be completed and tested for yield and water quality. If yield or quality is bad, the borehole is typically abandoned. Larger diameter production wells are constructed based on the information gathered by the hydrogeologist from the test well.

The feasibility study identified the possibility that we might have two aquifer systems at the upland locations, the Intermediate Aquifer and the Deep Aquifer. In the instance where both aquifers are encountered by the drilling, it is possible we will recommend testing in both. This can be accomplished by setting a temporary screen in the Deep Aquifer, testing, removing the screen, abandoning the bottom zone, and then re-setting the screen in the upper system for a final test. This provides data for both systems encountered, but the final construction of the well will have it completed only in the upper of the two zones.



Note: Basemap taken from USGS Poverty Bay / Puyallup quad.

PM: BGC
June 2008
1610-009A

Pierce & King County
T 20 N/R 04 E
Scale 1" = 2000'

Figure 12
Potential Drilling Site Location Map
City of Milton: Water Rights & Well Drilling Support