

BOLTON & MENK, INC.
Consulting Engineers & Surveyors

Engineer's Survey and
Examination Report

to
Kandiyohi County
for
*providing Wastewater
System Improvements*
To
Diamond Lake



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August 2009

BMI PROJECT NO. W13.101057

**Engineer's Survey and Examination Report
to
Kandiyohi County
for providing
Wastewater System Improvements
to
Diamond Lake
Kandiyohi County, Minnesota**

August 2009

I hereby certify that this report was prepared
by me or under my direct supervision and that
I am a duly Registered Professional Engineer
under the laws of the State of Minnesota.

By:  _____

Bradley C. DeWolf, P.E.
License No. 24000

Date: August 25, 2009

Bolton & Menk, Inc.
CONSULTING ENGINEERS & SURVEYORS
Mankato – Fairmont – Sleepy Eye – Burnsville – Willmar – Ramsey – Chaska, MN
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SECTION 1

INTRODUCTION

A. PURPOSE

Diamond Lake encompasses an area of 1564 acres located in East Central Kandiyohi County. Seasonal and permanent residential units surround Diamond Lake. There is one private seasonal resort, 'North Breeze Resort,' located on the southwest shore of Diamond Lake which has one year round home; eight seasonal cabins and five non-sewered recreational vehicle campsites. There are also two seasonal campgrounds on Diamond Lake, 'Wheeler Campground,' which has twenty non-sewered recreational vehicle campsites and is located on the southwest shore of Diamond Lake and Kandiyohi County Park No. 3 which has fifty-five non-sewered recreational vehicle campsites and is located on the west shore of Diamond Lake.

In July of 2004, the Kandiyohi County Board of Commissioners contracted with Bolton & Menk, Inc. to prepare an Engineering Feasibility Report to review the feasibility and cost of extending sanitary sewer to the Diamond Lake Area. The feasibility study provided an understanding of existing wastewater problems in the Diamond Lake area so that the Diamond Lake Area Recreational Association and the Kandiyohi County Board could plan for future wastewater collection system improvements. Meetings were held with the residents of the Diamond Lake Area to define to them what the proposed wastewater collection system improvements would consist of, and what the cost of the system would be. At that time, no action was taken by either the Diamond Lake Area Recreational Association or the Kandiyohi County Board.

In the fall of 2007, residents around Diamond Lake formed the Diamond Lake Wastewater Committee to continue to research a long-term wastewater treatment option for the residents of Diamond Lake. In 2008, the Diamond Lake Wastewater Committee along with the Kandiyohi County Environmental Services Offices completed an inspection of 292 of the 371 individual sewer treatment systems (ISTS) around Diamond

Lake. The results of the inspections indicate that 69% of the existing individual sewer treatments systems are non-compliant, 29% were compliant and 2% were undetermined. Following the Inspection Report, the Diamond Lake Wastewater Committee had a “Wastewater Treatment Alternative Analysis” completed. The “Wastewater Treatment Alternative Analysis” looked at following three alternatives:

- 1) Managed Individual Sewer Treatment Systems
- 2) Cluster Systems for seven Service Areas
- 3) Connection to the Green Lake Sanitary Sewer & Water District

The Engineer’s Survey and Examination Report is being reviewed based on the City of Kandiyohi receiving a grant to construct the trunk infrastructure needed to allow both the City of Kandiyohi and Diamond Lake the opportunity to connect to the Green Lake Sanitary Sewer and Water District.

The Engineer’s Survey and Examination Report will provide an understanding of the existing wastewater treatment problems, and will allow the Diamond Lake Area Recreation Association and the Kandiyohi County Board to plan for future wastewater collection system improvements. Residences around Diamond Lake are currently served by individual on-site wastewater treatment systems that consist of holding tanks, mound systems and drain field systems. Recommendations made in the Engineer’s Survey and Examination Report will allow the Kandiyohi County Board to establish priorities, plan, fund and implement wastewater collection system improvements. The Engineer’s Survey and Examination Report evaluates public sanitary sewer only, providing water services from the Green Lake Sanitary Sewer and Water District was not reviewed as part of the report.

B. AUTHORIZATION

The Kandiyohi County Board authorized the preparation of the Engineer’s Survey and Examination Report at their County Board meeting on May 5, 2009. In accordance with Minnesota State Statutes Chapter 116A, the County Board named Bradley C. DeWolf, P.E. of Bolton & Menk, Inc. the Project Engineer for extending sanitary sewer to Diamond Lake in Kandiyohi County.

C. REPORT ORGANIZATION

The Engineer's Survey and Examination Report is organized into six sections.

The sections are as follows:

- | | |
|-----------|---|
| Section 1 | Introduction |
| Section 2 | Existing Wastewater Treatment Facilities |
| Section 3 | Wastewater Design Considerations and Parameters |
| Section 4 | Wastewater Collection System and Recommended Improvements |
| Section 5 | Wastewater Collection System Cost Estimates |
| Section 6 | Recommendations and Proposed Implementation Schedule |

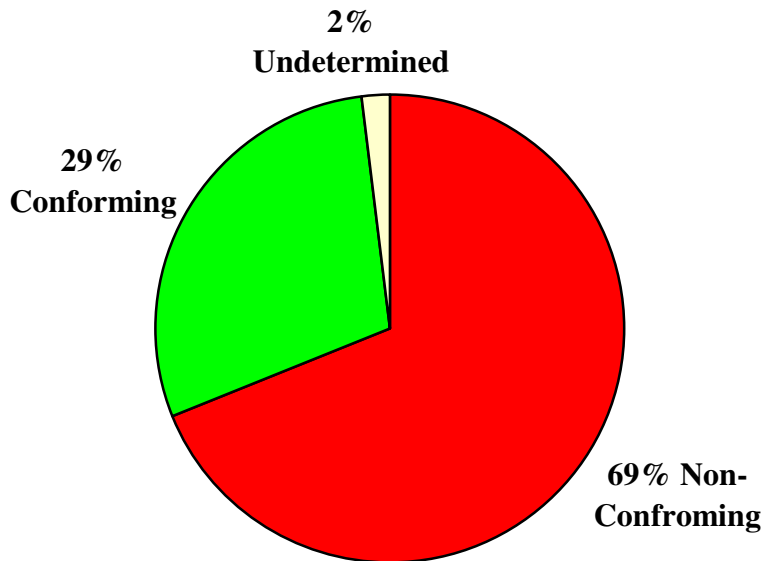
SECTION 2

EXISTING WASTEWATER TREATMENT FACILITIES

A. GENERAL

Residential homes, cabins, one resort and two campgrounds are located around Diamond Lake and are not currently served by a public sanitary sewer collection and treatment system. These residential homes, cabins, resort and campgrounds are served by individual on-site treatment systems that consist of subsurface drain field systems, mound systems, holding tanks, cesspools and privy systems. Chart 2-1 show the results of the August 2008 “Diamond Lake Individual Sewage Treatment System Inspection Project” indicated that 69% of the individual wastewater treatment systems around Diamond Lake are considered non-conforming in accordance with the current Minnesota Pollution Control Agency regulations, 29% are considered conforming and 2% are undetermined. In addition, the report indicated that 19% of the systems were non-compliant due to non-watertight septic tank or lack of a sealed tank under a privy and 4% of the systems were found to be an imminent threat to public health and safety. The following discussion focuses on the status of the existing wastewater treatment systems.

Chart 2-1
Results from Diamond Lake Individual Sewer Treatment Systems Inspection Project



B. STATUS OF EXISTING SYSTEMS

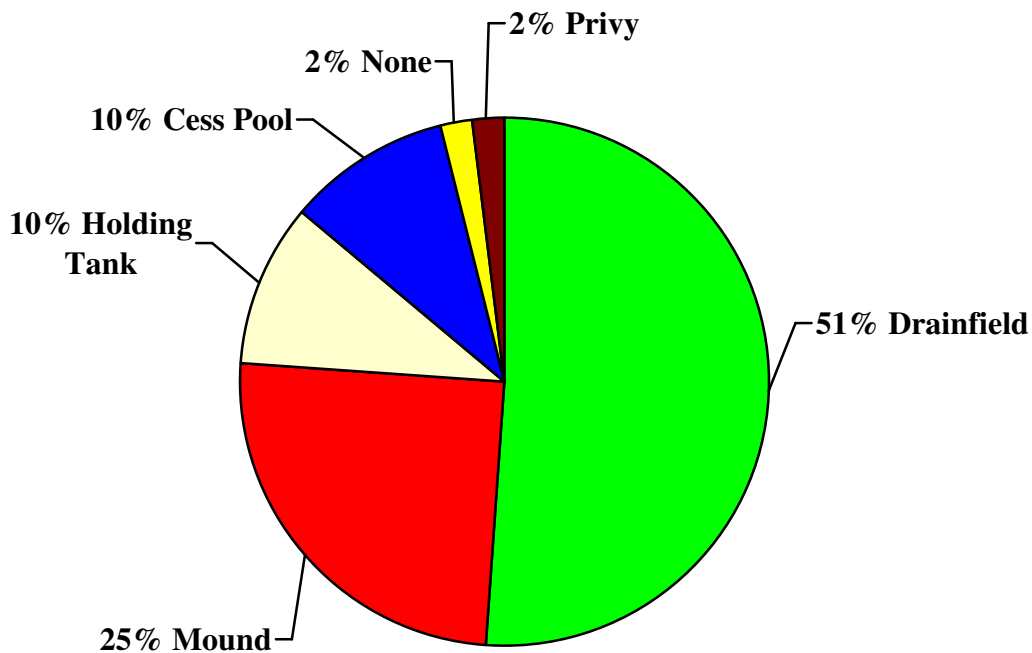
The existing on-site systems around the lake include the following:

- 1) No wastewater treatment system
- 2) Pit privies
- 3) Septic tanks with subsurface drain field systems
- 4) Septic tanks with mound type systems
- 5) Holding tanks

Each of these systems presents problems for the long-term protection of the environment given the small lot size and high groundwater in the area. The inspection report indicates that 69% of the individual sewer treatment systems are non-compliant in accordance with Minnesota Pollution Control Agency regulations, while 29 % were compliant and 2% were undetermined. In addition, 4% were deemed to be imminent threat to public health and safety. Chart 2-2 shows the breakdown of the existing wastewater treatment systems around Diamond Lake.

Chart 2-2

Existing Diamond Lake Individual Sewer Treatment Systems



Pit privies are allowed by the Minnesota Pollution Control Agency as long as they are properly constructed, have a minimum of three feet of separation from groundwater, and they meet required setbacks. The poorly drained soil conditions, high groundwater tables, and substandard lot sizes around Diamond Lake make the pit privies a poor method to dispose of sewage. In addition, pit privies allow for disposal of toilet waste, but do not allow adequate disposal of other wastewater generated from the residences.

The systems that consist of a septic tank and a drain field are limited due to the high groundwater and substandard lot sizes. Mound type systems would be required to meet the new treatment standard around a majority of the lake. Therefore, nearly all of the existing trench style drain fields around Diamond Lake would be considered non-compliant in accordance with the current Minnesota Pollution Control Agency rules.

Historically, holding tanks have been allowed in an effort to alleviate short-term environmental hazards. This appears to be the case around Diamond Lake as 25 holding tanks have been installed. In addition, there are 9 other holding tanks that were discovered when completing the “Diamond Lake Individual Sewage Treatment System Inspection Project”. Generally, holding tanks are not considered a viable long-term solution for handling wastewater needs. Concerns with holding tanks are as follows:

- 1) Long-term expense of pumping and disposing of the waste
- 2) Inadequate maintenance
- 3) Overflowing or backup of raw sewage

Holding tanks are only allowed under extreme circumstances and are generally restricted to short term or extremely limited use.

SECTION 3

DESIGN CONSIDERATIONS AND PARAMETERS

A. GENERAL

The purpose of this study is to recommend a wastewater collection and treatment option that will allow the Diamond Lake Area Recreational Association and Kandiyohi County to plan for future wastewater improvements. In Section 5, a cost analysis for the proposed wastewater collection system will be presented. In order to recommend the most cost effective alternative, preliminary design information has been provided. The preliminary design is based on the design parameters discussed below.

B. PLANNING PERIOD

Facility planning for wastewater collection systems is typically done for a 50 year period. For the purposes of this study, wastewater collection options will be evaluated for current conditions, with capacity for expansion to meet the ultimate design requirements. The collection system components will be designed to meet the ultimate (50 year) design requirements.

C. PLANNING AREA

The planning area outlined for the Diamond Lake area is shown in Figure 3-1. This reflects the Kandiyohi County zoning of the area, which is the existing shorelands zoned for general development. This area extends 1000 feet from the shoreline of Diamond Lake. Approximately 371 existing households are located within the Diamond Lake planning area with potential of 476 acres available for development. Future development of this area is difficult to estimate. For this study, a rate of one home per two acres will be used with a total of 238 additional households proposed within the study area.

D. WASTEWATER FLOWS

Wastewater design flows for the current development, as well as the ultimate development, are shown in Tables 3-1 through Tables 3-3. The following are the design parameters that were used to develop the numbers shown in Tables 3-1 through 3-3:

- 1) The wastewater flow is estimated to be 100 gallons per person per day to calculate average flows.
- 2) There are currently 371 households around Diamond Lake planning area. With secondary development, the maximum number of households for the area is estimated to be 609.
- 3) The 2000 Census data indicates that on average, there are 2.57 people per household in Harrison Township and 2.53 people per household in Kandiyohi County. Population projections are based on 2.6 people per household.
- 4) A campground's sanitary sewage flow is estimated at 50 gallons of water use per day per Recreational Vehicle (RV). It is estimated that a camp site is used 50 days per year, which would include weekends from May through September, summer, holidays and a 7-day vacation, the seasonal use of a RV would generate 2,500 gallons of sanitary sewer flow per year.
- 5) A resort cabin sanitary sewer flow is estimated at 65 gallons of water per day per cabin. If a cabin was used 113 days per year, which would include weekends in May and September and a 75 percent occupancy rate in June, July and August, the typical cabin would generate 7,345 gallons of sanitary sewer flow per year.
- 6) "Ten States Standards" for wastewater facilities recommends using a peaking factor of "4" for an area the size of Diamond Lake to determine the Maximum Daily Wastewater Flow.
- 7) The ultimate design year refers to the maximum estimated development of an area. For the purposes of this study, the ultimate design will correspond to a 50-year design life. The ultimate design year will be 2059.
- 8) Based on the existing population of the City of Kandiyohi and of Diamond Lake, the lift station located at Kandiyohi County Park No. 3 has been designed to pump at a rate of 360 gallons per minute.

**Table 3-1
Diamond Lake Study Area Estimated Ultimate Flows**

Zone	Area	Future Density	Households	Population	Wastewater Flow
Future Area	476	1-home/2 acres	238	618	61,800
Existing Homes			371	964	96,400
North Breeze Resort					620*
Wheeler Campground					1,000*
Kandiyohi County Park 3					2,750*
Totals	476		609	1,582	162,570

*Flow based on peak summer month averages

**Table 3-2
Diamond Lake Area Estimated Current Flows**

Zone	Equivalent Dwelling Units	Population	Wastewater Flow
Existing Homes	371	964	96,400
North Breeze Resort	3.0*		620*
Wheeler Campground	1.5*		1,000*
Kandiyohi County Park 3	4.2*		2,750*
Totals	379.7	964	100,770

*Flow based on peak summer month averages

E. WASTEWATER LOADINGS

The influent Carbonaceous Biochemical Oxygen Demand (CBOD₅) and Total Suspended Solids (TSS) loading for the current and ultimate design years have been calculated using values recommended by “Ten States Standards”. These Standards recommend design parameters of 0.17 pounds per person per day for CBOD₅, and 0.20 pounds per person per day for TSS.

**Table 3-3
Existing & Future Wastewater Loadings**

Design Year	Population	CBOD₅ (lb/day)	TSS (lb/day)
2009	964	164	193
2059 (Ultimate)	1,582	269	316

F. TRUNK LIFT STATION DESIGN

The proposed lift station, located at Kandiyohi County Park No. 3, is being installed as part of the City of Kandiyohi Wastewater Regionalization Project with the Green Lake Sanitary Sewer and Water District and has been designed with the capacity to accommodate the flows from the Diamond Lake area. In addition, the trunk infrastructure has been sized to accommodate the ultimate design flow from the Diamond Lake area.

SECTION 4

WASTEWATER COLLECTION SYSTEM AND ALTERNATIVES

A. GENERAL

A sanitary sewer collection system has never been constructed in the Diamond Lake Study Area. In 2008, the Diamond Lake Wastewater Committee completed a “Wastewater Treatment Alternative Analysis” to address the long-term sanitary sewer treatment of wastewater around Diamond Lake. The following are three alternatives that were considered:

- 1) Managed Individual Sewer Treatment Systems
- 2) Cluster Systems for Seven Service Areas
- 3) Connect to the Green Lake Sanitary Sewer & Water District

The “Wastewater Treatment Alternative Analysis” reviewed the three different alternatives and provided cost comparisons. While the above options have been analyzed, three items have made the option of connecting to the Green Lake Sanitary Sewer & Water District more economically feasible, they are as follows:

- 1) Cost sharing of the trunk line improvements with the City of Kandiyohi
- 2) Shared Grinder Pump Stations
- 3) Multiple User Shared Grinder Pump Stations

Should the project move forward, items 2 and 3 above will be considered during final design in order to provide the most economical option available to the residents around Diamond Lake. The benefits of the shared Trunk Line Improvements with the City of Kandiyohi are presented in Sections 5 and 6 of the report.

For this report two options have been considered for the long-term treatment of sanitary sewer around Diamond Lake and they are as follows:

- 1) Cluster Systems for Seven Service Areas
- 2) Low-pressure Wastewater Collection System

B. CLUSTER SYSTEMS FOR SERVICE AREAS

The type of cluster system proposed in “Diamond Lake Wastewater Treatment Alternative Analysis” was to use seven different cluster sites to treat the wastewater effluent from multiple individual wastewater treatment systems in each service area. The “Diamond Lake Wastewater Treatment Alternative Analysis” did not include all of the homes in each service area for the proposed cluster systems. The analysis of the cluster system did not include for any future growth or for the replacement of cabins with year round homes. With the cluster system option, property owners would still have a holding tank on their property. If the existing holding tank is not compliant it would need to be replaced. The construction required to each individual system at each home would consist of electrical work, pump, control panel, floats, a discharge line and restoration. A form of monitoring the usage from each residence would also need to be developed. Each individual discharge line would connect to a common line that would convey the wastewater effluent to the cluster site for treatment. The common line and individual lines would be installed by trenchless construction methods to limit the amount of surface disturbance. Each cluster site would be sized for future replacement of the drain field. In order for this type of system to be cost effective, land must be purchased near the groups of homes in the cluster site area. If this option would be chosen, negotiations with the various property owners for the drain field sites would need to take place.

C. LOW-PRESSURE WASTEWATER COLLECTION SYSTEM

The low pressure wastewater collection improvements would consist of constructing a low-pressure system to serve all lake and non-lake homes that surround Diamond Lake. To reduce the project cost and to limit the amount of restoration that needs to be completed a low-pressure wastewater collection system is proposed to be installed by using underground boring construction techniques around Diamond Lake within the existing right-of-ways.

Underground boring is a construction method that uses a direction-drilling machine to install sewer and forcemain pipe. The benefits of this type of construction method are as follows:

- 1) Minimizes environmental impacts
- 2) Allows lines to be installed in restrained digging conditions
- 3) Eliminates the amount of restoration required because the ground surface is not disturbed.

The areas where restoration would be required are at the service line and low-pressure forcemain connection (at the road) and at the service line, grinder pump and sewer line from the home connection (at the grinder pump).

A 2-inch to 4-inch low-pressure forcemain would be installed around Diamond Lake for all of the individual low-pressure systems to pump into. The layout presented for the low-pressure consists of the following components: Common Line System, Individual Pressure System, Shared Pressure System, Multiple User System and Trunk Wastewater Improvements.

1) COMMON LINE SYSTEM

The common line system consists of the 2-inch to 4-inch low-pressure forcemain and intermediate lift stations that will connect to the trunk sanitary sewer system being installed by the City of Kandiyohi. The common line is a split loop which is split on the southeast side of the lake near West View Lane and County Road 137. The north / east common line would convey the wastewater in a counterclockwise direction to an intermediate lift station located near County Road 28 & Breezy Point Road. The south and west shores would convey wastewater to a second intermediate lift station would be located near County Road 4 & Shady Oaks Road. From the intermediate lift stations, the wastewater will be pumped to the trunk infrastructure that is being installed by the City of Kandiyohi. The layout of the proposed improvements is shown in Figure 4-1. Both of the common low-pressure forcemains will require the use of intermediate lift stations in order to

overcome friction losses in the system.

2) INDIVIDUAL PRESSURE SYSTEM

On an individual pressure system, each individual home or cabin would have a small grinder pump station installed adjacent to the existing septic tank. The grinder pump stations are 24-inches in diameter and approximately 11-feet in depth. Figure 4-2 shows a schematic of a grinder pump station. An electric control panel would be placed near each grinder pump station for the operation of the grinder pump station. Most residential units would be required to have a new electrical meter socket installed and wired to a turtle meter (sub-meter) that is used to monitor the electrical use at the grinder pump station. Kandiyohi Power Cooperative will provide monthly billing of the wastewater use to all residents. Figure 4-3 shows a picture of a new meter socket, sub-meter and electrical control panel for the grinder pump station. The grinder pump station would connect to the low-pressure forcemain by a 1¼-inch service line that would be constructed by directional boring to limit disturbance. Each existing septic tank or holding tank will be abandoned by pumping out all of the waste and filling the tank with sand. All areas disturbed as part of the construction of the individual pressure system would be seeded. However, all property owners would be required to remove and replace all decorative landscaping that could be damaged during the construction of the individual pressure system.

3) SHARED PRESSURE SYSTEM

On a shared pressure system, two homes would share a small grinder pump station that would be installed on the property line. Gravity lines would be installed from each resident's septic tank to the grinder pump station. The grinder pump station would be the same as that of the individual grinder pump station. An electric control panel placed would be placed near each grinder pump station for the operation of the grinder pump station. With this option, one of the property owners would be responsible for providing the electrical

service to the grinder pump station. Each property owner would receive a base fee and usage charge from Kandiyohi Power Cooperative by monitoring water usage from a water meter. The home that supplies the power to the grinder pump station would most likely be required to have a new electrical meter socket installed at the residence. The grinder pump station would connect to the low-pressure forcemain by a 1¼-inch service line that would be constructed by directional boring to limit disturbance. Each existing septic tank or holding tank will be abandoned by pumping out all of the waste and filling the tank with sand. All areas disturbed as part of the construction of the individual pressure system would be seeded. However, all property owners would be required to remove and replace all decorative landscaping that could be damaged during the construction of the individual pressure system.

4) MULTIPLE USER SYSTEM

On a multiple user system several homes would share a duplex grinder pump station that would be installed within the existing right-of-way or in an area that an easement had been obtained. Gravity service lines would be installed from each residence to a gravity collection line that would then convey the wastewater to the duplex grinder pump station. The duplex grinder pump station would have two pumps and the basin would be 36-inches in diameter. Figure 4-4 shows a schematic of a duplex grinder pump station. An electric control panel would be placed near the duplex grinder pump station for the operation of the grinder pump station. With this option, the GLSSWD would be responsible for providing power and maintenance of the duplex grinder pump station. Each property owner would receive a base fee and usage charge from Kandiyohi Power Cooperative by monitoring water usage from a water meter. The grinder pump station would connect to the low-pressure forcemain by a 2-inch service line that would be constructed by directional boring to limit disturbance. Each existing septic tank or holding tank will be abandoned by pumping out all of the waste and filling the tank with sand. All areas

disturbed as part of the construction of the individual pressure system would be seeded. However, all property owners would be required to remove and replace all decorative landscaping that could be damaged during the construction of the individual pressure system.

D. TRUNK WASTEWATER IMPROVEMENTS

The City of Kandiyohi is in the process of constructing a wastewater regionalization project that will pump wastewater from the City of Kandiyohi to the GLSSWD. As part of this project, the City will be installing a trunk lift station at Kandiyohi County Park No. 3 and the trunk forcemain from Kandiyohi County Park No. 3 to the GLSSWD. The proposed lift station has been designed with capacity to accommodate the wastewater flows from Diamond Lake. Kandiyohi County is working with the City of Kandiyohi to find an equitable cost-sharing agreement for Diamond Lake to use the trunk infrastructure installed system. It is anticipated that Diamond Lake would reimburse the City of Kandiyohi based on the percentage of the remaining loan costs.

E. WASTEWATER COLLECTION SYSTEM RECOMMENDATIONS

A split loop low-pressure wastewater collection system utilizing the individual, shared and multiple user pressure systems would be recommended for collecting wastewater around Diamond Lake. It is also recommend that the wastewater collected around Diamond Lake use the trunk wastewater collection system that is being installed by the City of Kandiyohi to connect to the Green Lake Sanitary Sewer & Water District.

SECTION 5

COST ESTIMATES

A. GENERAL

The estimated costs presented in this section are for the capital cost and the operations and maintenance costs for both the cluster system and the low-pressure wastewater collection system. The costs for the cluster systems are based on the costs presented in the 2008 “Diamond Lake Wastewater Treatment Alternatives Analysis”. The costs presented for the cluster system have been increased to include by 3% increase to account for inflation in the cost of construction in 2009 and 2010. The low-pressure system cost estimates are based on the 2008 Henderson Lake, George Lake, and Nest Lake bid abstract and also include a 3% per year increase to account for inflation in the cost of construction in 2009 and 2010. The Total Project Costs include construction, contingency, engineering, administration and financing costs. An evaluation of user rates is presented in Section 6.

B. ESTIMATED CONSTRUCTION COSTS

Preliminary construction cost estimates presented for the low pressure wastewater collection system are based on the Henderson Lake, George Lake, and Nest Lake bid abstract and include an inflation factor. Various material manufacturers, suppliers and contractors were contacted for information affecting the proposed cost estimates. Published data on costs for similar kinds of construction were also utilized. The cost estimates are based on 2010 estimated construction cost.

The cost estimates presented are meant to be used as a guideline in the decision making process. Once preparation of final drawings and specifications is complete, a more refined cost estimate will be available.

Total estimated project costs for the cluster system and low-pressure wastewater collection system are presented in Table 5-1.

TABLE 5-1

Total Estimated Project Costs

	Total Project Cost
Cluster System	\$6,385,100.00
Low-Pressure Wastewater Collection System	\$6,058,300.00

C. ANNUAL OPERATIONAL & MAINTENANCE (O & M) COSTS

The annual operational and maintenance costs for the cluster system are provided by the “Diamond Lake Wastewater Treatment Alternative Analysis”, included is a 3% increase to account for inflation in the operational and maintenance costs for 2009 and 2010. The annual operational and maintenance costs for the low-pressure wastewater collection system are based on the current charges from the Green Lake Sanitary Sewer & Water District along with confirmation of electrical charges from property owners on Henderson Lake; this example is base on an average wastewater usage of 3,000 gallons per month. The operation and maintenance costs for cluster system and low-pressure wastewater collection system are presented in Table 5-2.

TABLE 5-2

Annual Operation & Maintenance Costs

Cluster System	Low-Pressure Wastewater Collection System	
\$520.00 ¹	Annual Billing Fee (\$2.14/month)	\$25.68
	Annual Base Fee (\$20.40/month)	\$244.80
	Annual Usage Fee (\$4.04/1,000 gal) ²	\$145.44
	Total	\$415.92

¹Value provided by “Wastewater Treatment Alternative Analysis”

² Based on 3,000 gallons of usage per month

It is anticipated that the \$6.00 per month trunk fee that is included in the \$20.40 base fee would be used to finance the debt services for Diamond Lake’s portion of the trunk wastewater collection systems costs.

D. SUMMARY

Based on the cost presented, a low-pressure wastewater collection system is recommended for collecting wastewater around Diamond Lake. It is also recommended that the proposed low-pressure wastewater system utilized the trunk wastewater collection system that will be installed as part of the City of Kandiyohi wastewater regionalization with the Green Lake Sanitary Sewer & Water District.

SECTION 6

RECOMMENDATIONS AND PROPOSED IMPLEMENTATION SCHEDULE

A. GENERAL

Previous sections of this report evaluated the proposed wastewater treatment collection system. These options were considered in terms of cost, environmental, and operational considerations. The evaluation indicates that a low-pressure collection system by underground boring construction methods is the most cost effective. The evaluation indicates that the trunk wastewater collection system that is being installed as part of the City of Kandiyohi project has the capacity to handle the wastewater flow from Diamond Lake.

B. RECOMMENDED ALTERNATIVE

Based on the costs presented in Section 5, a low-pressure wastewater collection system is recommended for collecting wastewater around Diamond Lake. The trunk wastewater collection system that is being installed as part of the City of Kandiyohi project has the capacity to handle the wastewater flow from Diamond Lake.

C. ARRANGEMENTS FOR IMPLEMENTATION

1) INSTITUTIONAL RESPONSIBILITY

The Diamond Lake Area Recreational Association does not have the legal authority to construct the proposed sanitary sewer improvements. Kandiyohi County, which is the owner of the Green Lake Sanitary Sewer and Water District (GLSSWD) will be the governing body for implementation of the project. It is proposed that the project be completed in accordance with Minnesota State Statute Chapter 116A and that the boundaries of the GLSSWD be expanded to include Diamond Lake.

2) FINANCIAL ASSISTANCE

In order to implement the recommended wastewater treatment system, some form financing the improvements will be necessary.

A) Assessment

All of the capital cost of the project can be assessed to local property owners under Minnesota State Statute Chapter 116A. The proposed project will be financed through Kandiyohi County and assessments levied to each property owner. It is estimated that the approximate rate of interest for the assessment will be 6% for a period of up to 20 years. If a property owner would like to pay their assessment in full, they may do so within thirty days of the assessment hearing and accrue no interest costs.

B) City of Kandiyohi & Kandiyohi County

The Kandiyohi County Board has recognized the value of having lakes serviced by a public wastewater collection system. The City of Kandiyohi is in the process of constructing a Wastewater Regionalization Project with the Green Lake Sanitary Sewer & Water District. The City of Kandiyohi has received a significant grant and low interests loans that does not require Kandiyohi County to have to fund the trunk wastewater infrastructure. Kandiyohi County is working with the City of Kandiyohi to find an equitable cost-sharing agreement for using the trunk forcemain should Diamond Lake connect to the trunk system. It is proposed that the residents pay for the debt service of the trunk wastewater lines by paying a trunk fee to the Green Lake Sanitary Sewer and Water District. It is assumed that a \$6.00/month trunk fee be billed based on (EDU) and the fee collected will be adequate to repay the City of Kandiyohi for the trunk line cost.

C) Green Lake Sanitary Sewer & Water District

Green Lake Sanitary Sewer & Water District has provided an incentive for property owners that connect to the system by waiving the existing connection fee for a period of up to one year. Currently the connection fee is \$2,000.00.

3) USER RATES & BILLING FEE

The monthly user sewer rates charged by Green Lake Sanitary Sewer & Water District are provided in Table 6-1. For 2009 the rates are set at \$20.40/month for each EDU (Equivalent Dwelling Unit) and a usage rate of \$4.04/1000 gallons. In addition to the user rates there is also a billing fee. The billing fee is from Kandiyohi Power Cooperative, this fee is for cost associated with reading the meter and mailing out the bills, the current billing fee is \$2.14 per month.

Table 6-1
Monthly User Rates & Billing Fee

Billing Fee (Kandiyohi Power Cooperative)	\$2.14
Base Fee	\$20.40
Usage Rate (3,000/month)	\$12.12
Monthly Total	\$34.66

D. PROPOSED ASSESSMENTS

The proposed assessments are broken down into two separate assessments: Individual Service Improvements and Common Low-Pressure Line Improvements. Please refer to Table 6-2 for proposed assessments for the recommended alternative.

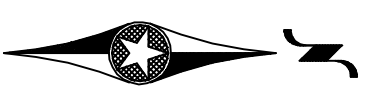
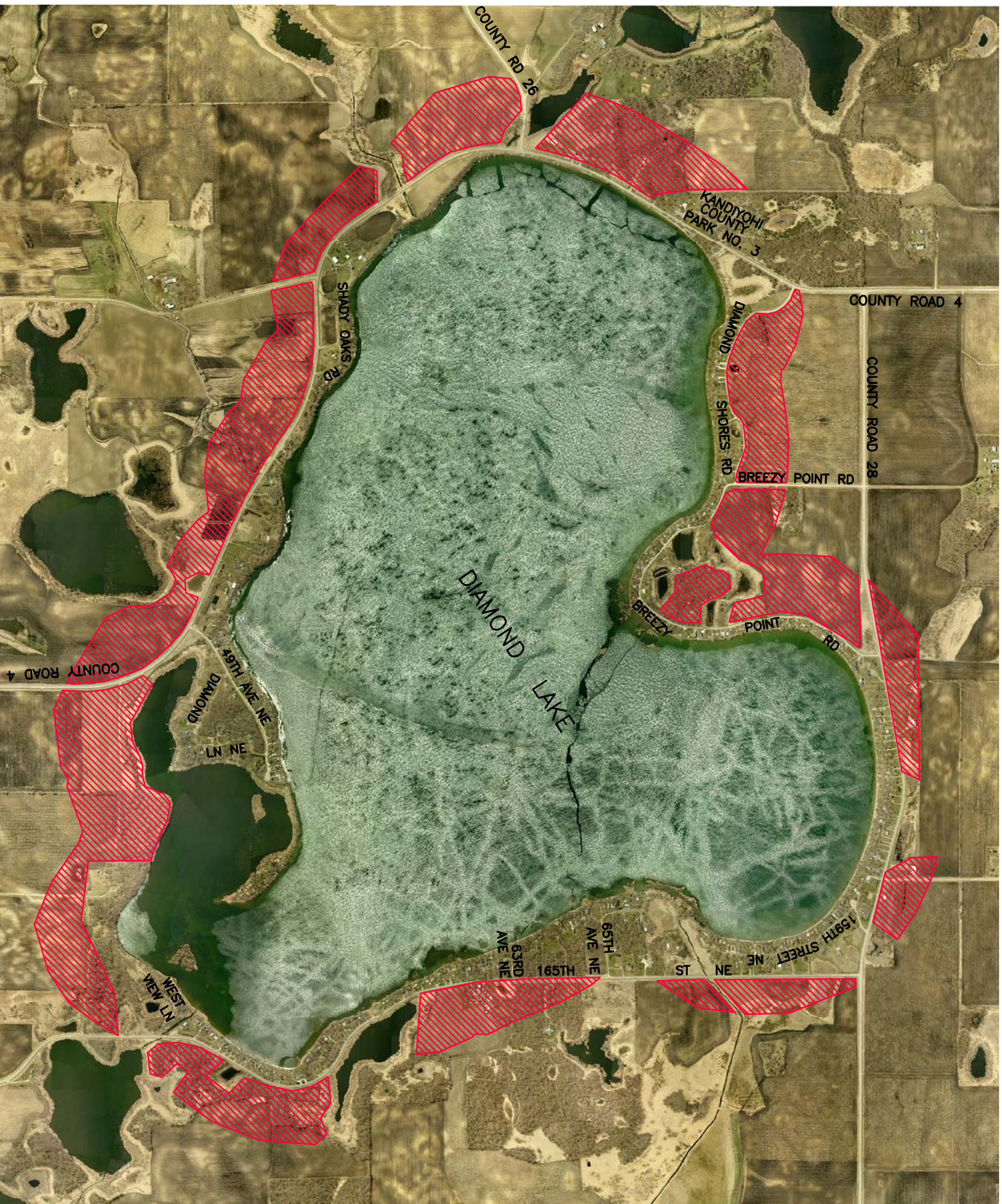
Table 6-2
Proposed Assessment for Diamond Lake

Proposed Project	Amount Per Unit
Individual Service Improvements	\$9,761/unit
Common Low-Pressure Line Improvements	\$6,568/unit
TOTAL ASSESSMENT	\$16,329/unit


E. PROJECT SCHEDULE

- 1) Diamond Lake Area Recreational Association and Kandiyohi County hold informational meetings–August 28 & 29, 2009.
- 2) Diamond Lake Area Recreational Association and Kandiyohi County hold an open house on the wastewater collection improvements– September 18, 2009.
- 3) Kandiyohi County Board is scheduled to hold a public hearing on the proposed District expansion and the wastewater collection improvements– September 18, 2009.
- 4) Kandiyohi County gives notice to proceed with preliminary and final design – September 18, 2009.
- 5) Final Plans Completed for Bidding– February 2010.
- 6) Open Bid- March 2009
- 7) Kandiyohi County holds Open House for Improvement Hearing- March 2010.
- 8) Kandiyohi Board will hold an improvement hearing based on “As Bid” numbers- April 2010
- 9) Award Project – April 2010.
- 10) Begin construction – April 2010.
- 11) Project completion - October 2011.
- 12) Kandiyohi County holds Open House for Assessment Hearing- October 2010.
- 13) Kandiyohi Board will hold an improvement hearing based on “As Bid” numbers- November 2010.

FIGURES



LEGEND

 FUTURE SERVICE AREA

KANDIYOHI COUNTY, MINNESOTA
 DIAMOND LAKE STUDY
 FUTURE SERVICE AREA

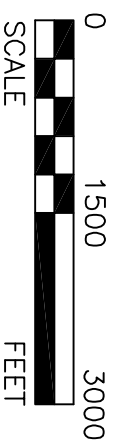
AUGUST, 2009

FIGURE NO. 3-1






BOLTON & MENK, INC.
 Consulting Engineers & Surveyors

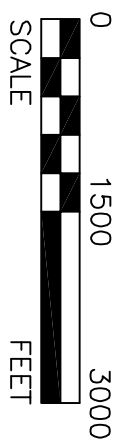
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
 BURNSVILLE, MN CHASKA, MN AMES, IA





LEGEND

-  LOW PRESSURE FORCEMAIN PIPE
-  FORCEMAIN PIPE
-  LIFT STATION



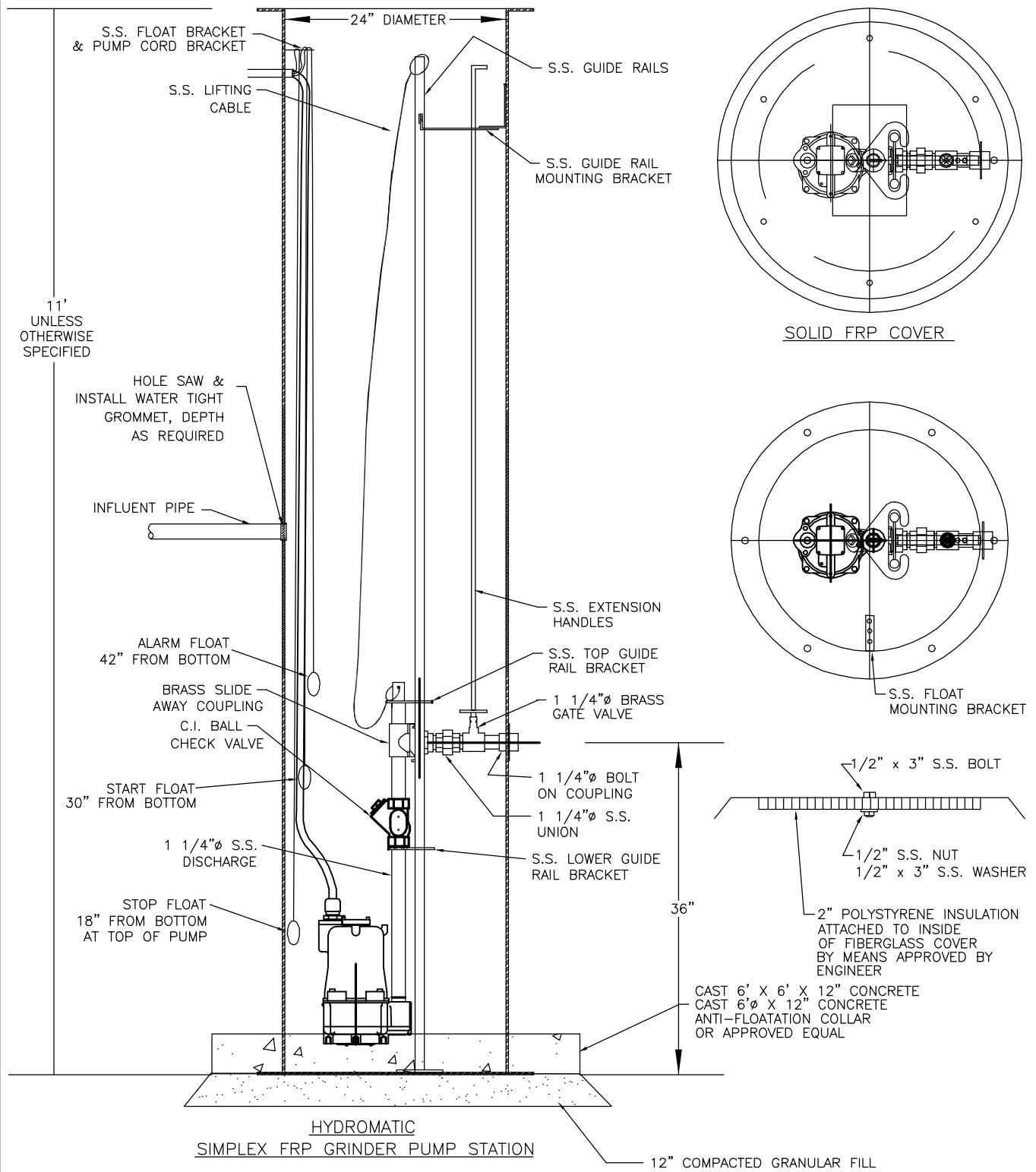
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BOLTON & MENK, INC.
 Consulting Engineers & Surveyors
 MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
 BURNSVILLE, MN CHASKA, MN AMES, IA

KANDIYOHI COUNTY, MINNESOTA
 DIAMOND LAKE STUDY
 PROPOSED LOW PRESSURE SEWER SYSTEM
 AUGUST, 2009

FIGURE NO. 4-1

BASE BID GRINDER PUMP STATION



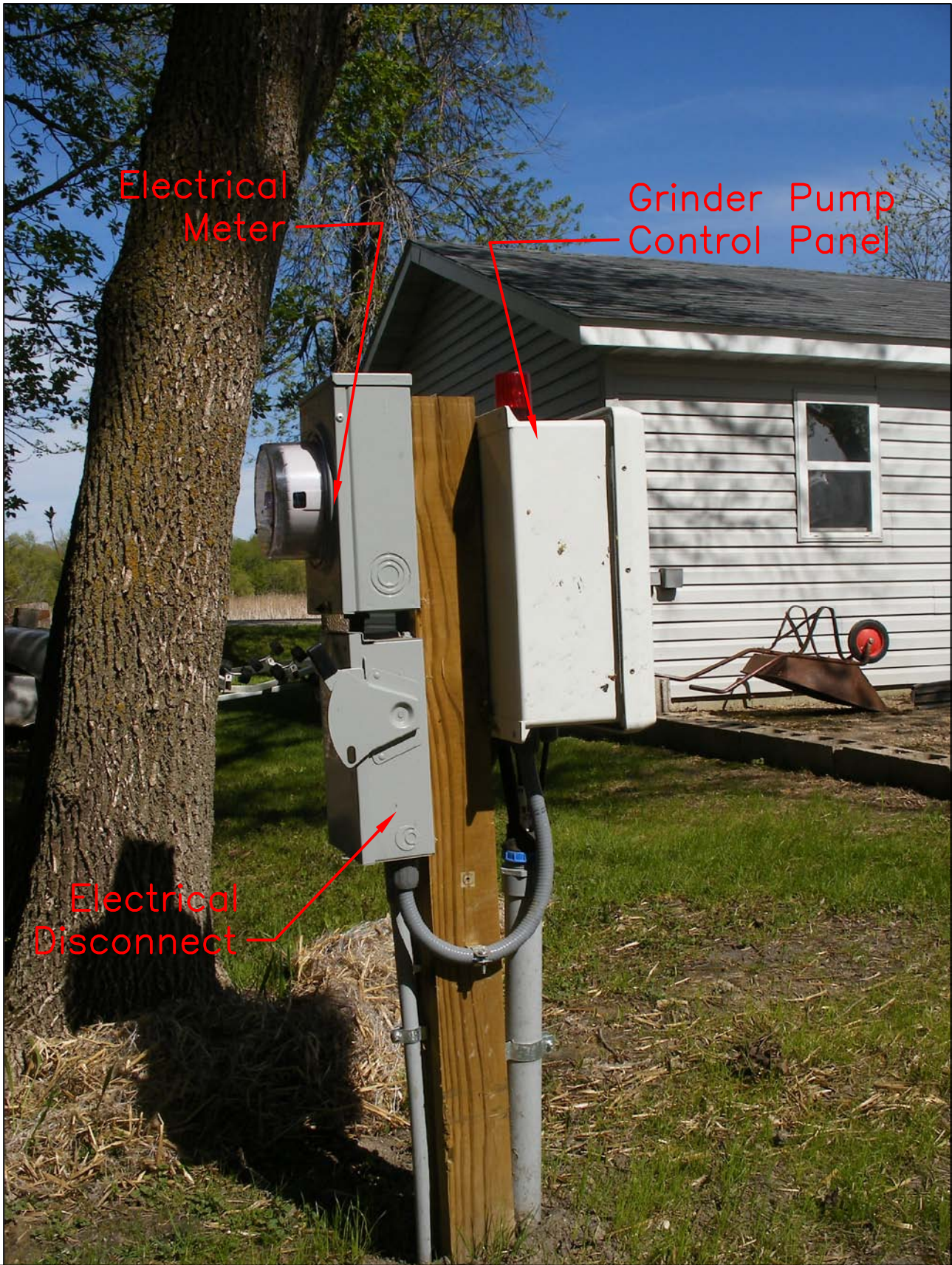
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 BURNSVILLE, MN CHASKA, MN AMES, IA

SIMPLEX GRINDER PUMP SCHEMATIC
 DIAMOND LAKE WASTEWATER COLLECTION SYSTEM
 KANDIYOHI COUNTY, MINNESOTA

AUGUST, 2009

FIGURE NO. 4-2



Electrical
Meter

Grinder Pump
Control Panel

Electrical
Disconnect



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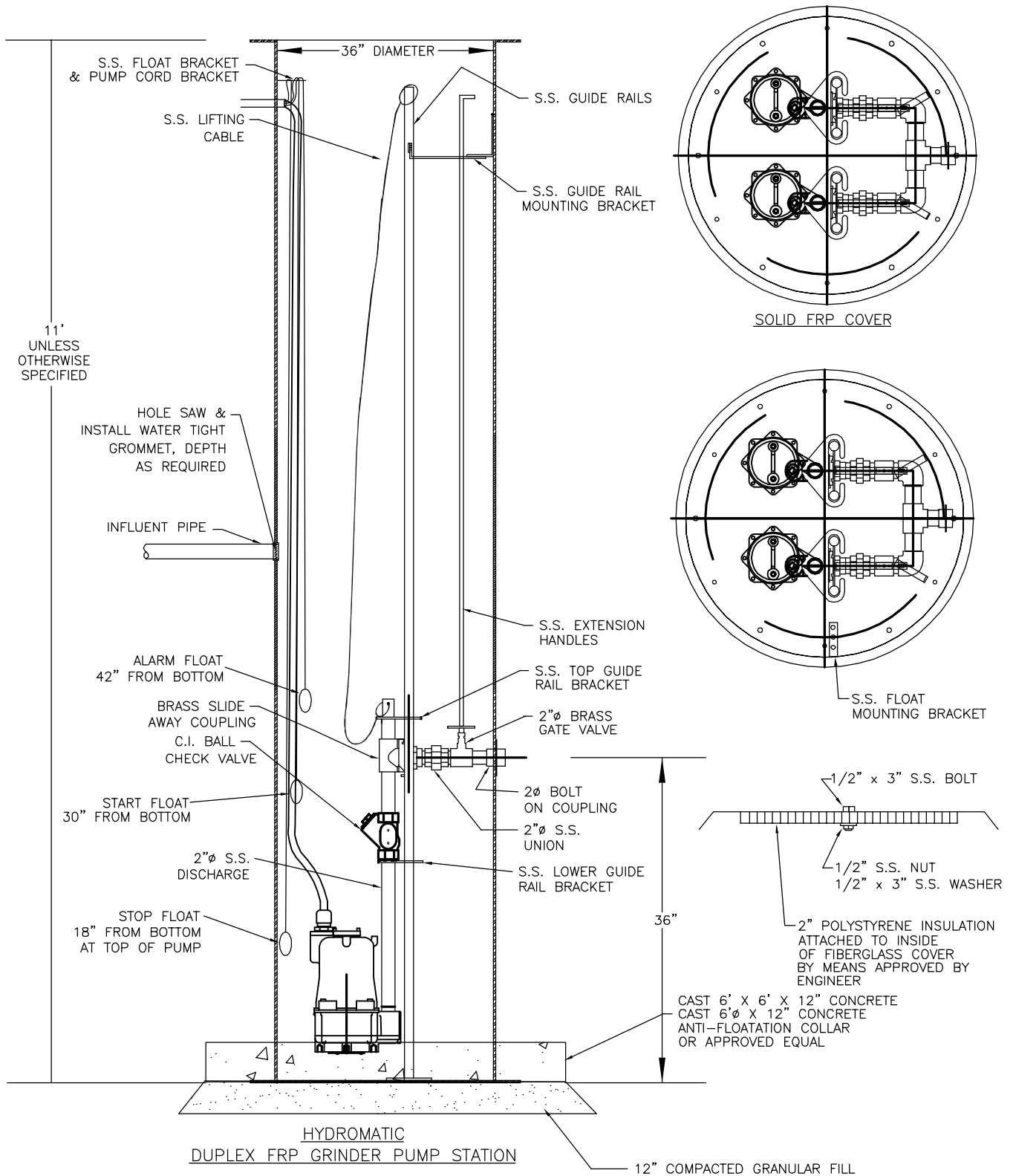
MANKATO, MN FAIRMONT, MN SLEEPY EYE, MN WILLMAR, MN
BURNSVILLE, MN CHASKA, MN AMES, IA

GRINDER PUMP CONTROL PANEL
DIAMOND LAKE WASTEWATER COLLECTION SYSTEM
KANDIYOHI COUNTY, MINNESOTA

AUGUST, 2009

FIGURE NO. 4-3

DUPLEX GRINDER PUMP STATION



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BURNSVILLE, MN CHASKA, MN AMES, IA

DUPLEX GRINDER PUMP SCHEMATIC
DIAMOND LAKE WASTEWATER COLLECTION SYSTEM
KANDIYOHI COUNTY, MINNESOTA

AUGUST, 2009

FIGURE NO. 4-4