FACILITY PLAN

FOR A

WASTEWATER COLLECTION AND TREATMENT SYSTEM

FOR THE

CLEAR LAKE BETTERMENT ASSOCIATION
MARSHALL COUNTY, SOUTH DAKOTA

HELMS PROJECT #A4716

MAY 2010

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I hereby certify that this plan, specification or 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 South Dakota.

By _____
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1 INTRODUCTION

1.1 PURPOSE

The Board of Directors for the Clear Lake Betterment Association contracted with the engineering firm of Helms and Associates (Helms) to complete an investigation for a proposed wastewater collection and treatment system. The intent of the study is to develop an alternative to the septic tanks that are currently in use.

The result of the completed investigation is presented in this Facility Plan. The Facility Plan contains the information on which the Clear Lake Betterment Association can base cost-effective decisions relating to the proposed wastewater collection and treatment systems. The Board of Directors for the Clear Lake Betterment Association will, after appropriate public input, determine the best options to make any needed improvements that are identified in the Facility Plan.

Loan and grant funding will undoubtedly be desired to make any of the improvements that are recommended herein. This Facility Plan will be a valuable tool for the community to pursue the funding necessary in its efforts to make needed public improvements.

1.2 AUTHORIZATION

The firm of Helms and Associates was authorized as per a Letter of Agreement dated January 19, 2006, by the Board of Directors for the Clear Lake Betterment Association to proceed with the preparation and evaluation of potential alternatives to the current wastewater treatment systems. The following report presents the findings and conclusions resulting from the authorized study.

1.3 STUDY PURPOSE AND SCOPE

The Purposes of this study are:

1. To evaluate the ability of the existing on-site wastewater system to perform their required functions;

2. To present and evaluate any deficiencies which are identified during the course of the study;

3. To develop and evaluate alternative methods for the collection and treatment of wastewater flows, both present and future, from those sources which are identified;

4. To recommend the alternative method which will best result in compliance with the requirements of the South Dakota Department of Environment and Natural Resources (DENR) and the United States Environmental Protection Agency; and

5. To present the preliminary design for the selected alternatives.

2 COMMUNITY DESCRIPTION

2.1 GENERAL INFORMATION

The Clear Lake Betterment Association is located in southeastern Marshall County, South Dakota, approximately three miles east of the intersection of State Highway 10 and State Highway 25 or approximately 14 miles west of Sisseton, South Dakota. (Refer to Figure 2.1-1.)

Marshall County is in the northeastern corner of South Dakota. It has a total surface area of approximately 542,784 acres. Other communities located within the county include Eden, Langford, Veblen and Britton, the county seat. General livestock and farming are the major sources of income within the county, with about 96% of the total acreage of the county devoted to crop production. Corn, soybeans, hay and wheat are the main crops.

The Clear Lake Betterment Association was formed in 1983 for the purpose of preventing further degradation of the water quality of Clear Lake caused by non-point source pollution problems. The area represented by the Betterment Association includes approximately 207 homes and cabins within the area immediately surrounding and adjacent to Clear Lake.

The South Dakota Water and Environmental Engineering Research Center is in the process of studying the water quality in Clear Lake. Mr. David German of the Center was contacted on May 17, 2010, to discuss the findings of the study to date. Mr. German indicated that the Center has been collecting water quality data at the center of the lake since the early 1990's. Although Mr. German indicated that there has been no significant deterioration at the center of the lake over the past ten (10) years, he has observed an overproduction of attached algae and macrophytes around the edges of the lake which has, in his opinion, been increasing over the years. This is corroborated in part by the anecdotal evidence in the form of statements made by various residents who live around and use the lake.

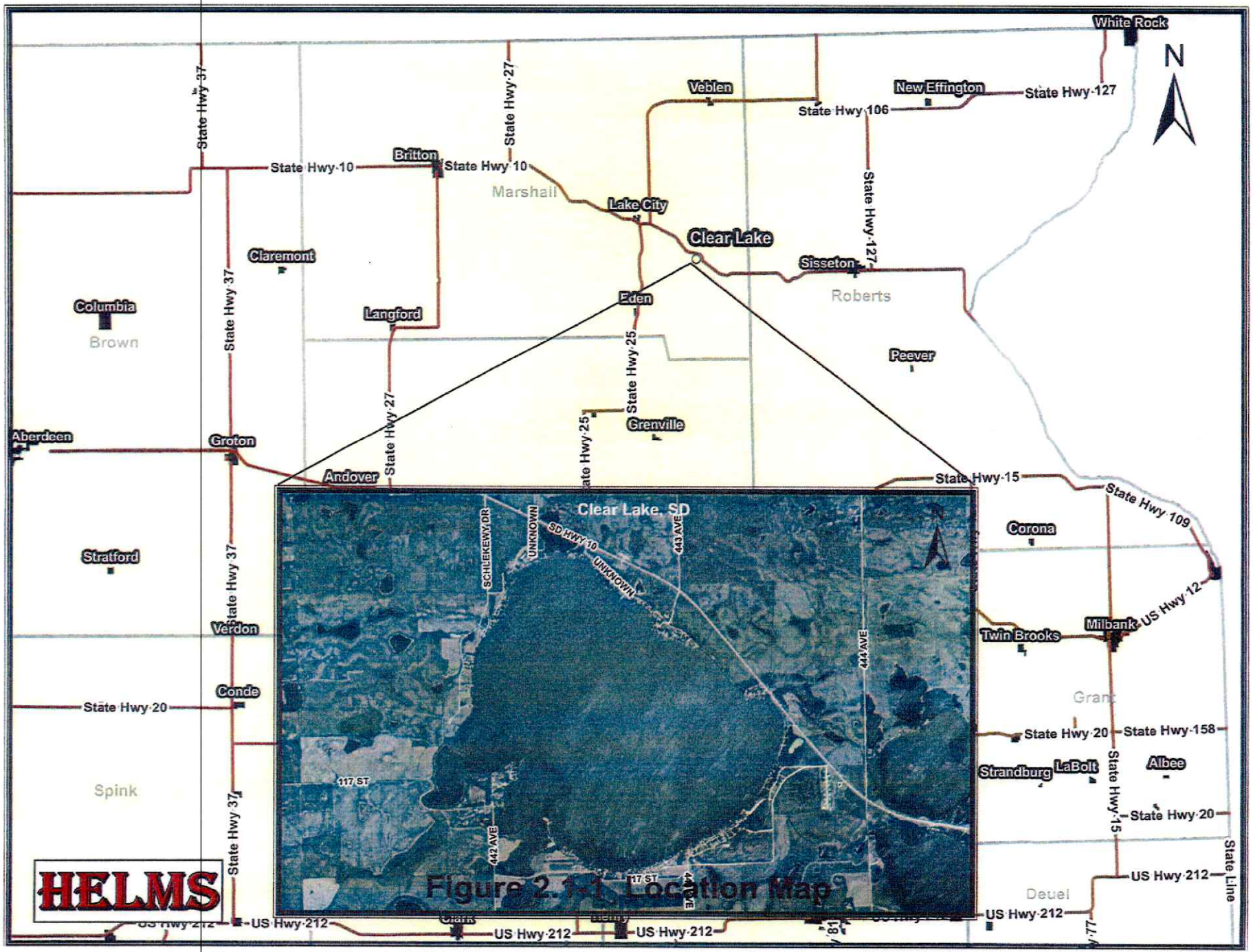


Figure 2.1-1 Location Map

Mr. German stated that he believes that this increase in algae and macrophytes is due to the discharges from the septic tanks serving the homes and cabins around the lake. His evaluation of the NRCS soils data for the soils in the area leads him to believe that the soils are not suitable for the use of septic tanks and drain fields. There is too much gravel in some areas leading to a direct leaching of wastewater directly to the lake. There is too much clay in other areas that lead to the surface discharge of wastewater that reaches the lake.

Mr. German stated that he is aware of one major algae bloom that has occurred in the lake within the past ten (10) years. Statements made by various residents who live around and use the lake confirm this statement. Mr. German indicated that he believes that this bloom was triggered by an abundance of nutrients in the lake, the most likely source of which is discharges from the septic tanks.

Mr. German has indicated that it his opinion that the Clear Lake Betterment Association is correct in taking a proactive approach in its efforts to protect the water quality of Clear Lake. As Mr. German stated, "It is easier and much more cost effective to maintain the water quality than it is to try to restore the lake after the water quality is degraded."

The Clear Lake Betterment Association is governed by a Board of Directors elected at large from the association. Currently, the individual homeowners are responsible for the operation and maintenance of their own septic tank and drain field systems. In the event a centralized system is constructed for the collection and treatment of wastewater, the Board of Directors will hire a superintendent who will have direct responsibility for the operation and maintenance of the wastewater collection and treatment facility.

2.2 POPULATION CHARACTERISTICS

Since the Clear Lake Betterment Association is a newly formed entity, there are no population data or statistics available for the area. The area encompassed by the Clear Lake Betterment Association contains 207 residences and cabins. The area includes one public access area that has boat launching facilities with limited restroom facilities. The public access area does not provide long-term recreational facilities such as camping, etc.

The population of the Clear Lake Betterment Association is composed of full-time, weekend and seasonal residents. The residential make-up of the property owners and homes around Clear Lake is similar to that of the other lakes in the Northeast Lake Region of South Dakota. As with the other lake areas in the region, the average residence or cabin is home to approximately 1.5 persons per day over the course of an average year. On this basis, it can be reasonably concluded that the 207 homes and cabins have a population equivalent of approximately 310 people per day.

Because there is no organized political entity, it is not possible to obtain any census data that would provide information relative to the area's median household income or a comparison with the county or state data.

2.3 POPULATION PROJECTIONS

Clear Lake is primarily a seasonal recreational area which has developed over a fairly long period of time. The historical population data for Marshall County shows that the population has remained relatively steady since 1970. There is nothing that would indicate that this trend will not continue for the foreseeable future. It is projected that this trend will continue.

There are always efforts by the communities in Marshall County to entice new industrial and commercial enterprises into locating in the communities located within the county. The potential impact of an industry or commercial enterprise on wastewater collection and treatment systems like those serving the Clear Lake Betterment Association is significant and nearly impossible to predict. Therefore, any consideration to increasing

the wastewater loadings as a result of that possibility will not be utilized in determining the project wastewater flows.

As a result, the population equivalent is not expected to increase significantly over the next twenty (20) years. Therefore, for purposes of this study and report, the population equivalent currently being served will be used as the projected population equivalent for purposes of sizing the proposed alternatives.

2.4 TOPOGRAPHY / CLIMATE

Marshall County is in the northern section of the Coteau des Prairies known locally as the Sisseton Hills. The Continental Divide runs east and west through the northern part of the county. The land south of the Continental Divide drains to the Gulf of Mexico and the land north of the Continental Divide drains to the Hudson Bay.

The area's climate is generally described as a continental climate. Winters are cold while summers are hot. Most of the precipitation occurs during the warm period of late spring and early summer. Approximately 80% of the total annual precipitation falls in April through September. Normal precipitation for the area is 18.81 inches annually.

2.5 ENVIRONMENTAL REVIEW INFORMATION

As part of the environmental assessment requirement for the facility planning process, the project sponsor is required to contact various state and federal agencies. Environmental assessment letters have been sent to the following agencies. It is expected that no adverse environmental impacts will occur.

2.5.1 Floodplains and Wetlands

2.5.1.1 Flood Hazard Evaluation

The U.S. Army Corps of Engineers was contacted for the purpose of soliciting input on the proposed improvements. Correspondence related to this contact will be placed in Appendix A upon receipt.

2.5.1.2 Floodplain Construction Permits

The U.S. Army Corps of Engineers was contacted for the purpose of soliciting its review and comments related to the possible need for permits authorized under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Correspondence related to this contact will be placed in Appendix A upon receipt.

2.5.1.3 Wetlands

The U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish and Parks were contacted for the purpose of soliciting input related to potential impacts on wetlands. Correspondence related to these contacts will be placed in Appendix A upon receipt.

2.5.2 Agricultural Lands

The U.S. Department of Agriculture State Soil Scientist was contacted for the purpose of soliciting input on the proposed improvements. Correspondence related to this contact will be placed in Appendix A upon receipt.

2.5.3 Wild and Scenic Rivers

Comments were requested in regards to "Wild and Scenic Rivers" in the area. Correspondence related to this contact will be placed in Appendix A upon receipt.

2.5.4 Fish and Wildlife Protection

2.5.4.1 Endangered Species

The U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish and Parks were contacted for the purpose of soliciting input related to potential impacts on endangered species which might result from construction of the proposed improvements. Correspondence related to these contacts will be placed in Appendix A upon receipt.

2.5.4.2 Critical Habitat

The U.S. Fish and Wildlife Service and the South Dakota Department of Game, Fish and Parks were contacted for the purpose of soliciting input related to potential impacts on critical wildlife habitats which might result from construction of the proposed improvements. Correspondence related to these contacts will be placed in Appendix A upon receipt.

2.5.5 Water Quality and Quantity

The South Dakota Department of Environment and Natural Resources was contacted for the purpose of soliciting review and comments related to potential impact on water quality and quantity that could result from the proposed project. Correspondence related to this contact will be placed in Appendix A upon receipt.

2.5.6 Historic and Archaeological Sites

If the Clear Lake Betterment Association applies for state funding, then the State Historical Preservation Office will be contacted for the purpose of soliciting input on the proposed improvements. The funding agency will need to contact the State Historical Preservation Office because neither the Association nor the engineer is allowed to contact this office directly.

2.6 DIRECT AND INDIRECT IMPACTS

Negative environmental impacts which may be expected during a project of this nature include, but are not necessarily limited to, soil erosion, noise pollution, traffic obstruction, and increased surface runoff due to trench dewatering operations. However, such impacts are temporary and will not significantly affect the environment over the long term.

Positive environmental impacts include enhanced human health and safety and more efficient delivery and treatment of municipal water. Such impacts are of long-term value to the residents of the Clear Lake Betterment Association and Marshall County.

2.7 MITIGATION ADVERSE IMPACTS

Adverse impacts will be minimized to the greatest extent possible by the implementation of accepted cautionary measures. Temporary and permanent erosion control will be included in construction contracts. Appropriate permits will be secured prior to the discharge of any trench dewatering or storm waters, and protection of public health, safety and welfare will be incorporated into the specifications and contract documents. Additionally, should any permanent adverse impacts result from the project, mitigating measures will be followed to the satisfaction of the appropriate review agency.

3 WASTEWATER SYSTEM ANALYSIS

3.1 GENERAL SYSTEM INFORMATION

Currently, the Clear Lake Betterment Association does not have a centralized wastewater collection or treatment system. Each homeowner utilizes a septic tank for the treatment and disposal of their wastewater. However, the residents of the Betterment Association are interested in eliminating the septic tanks due to problems that are experienced with the drain fields during periods of wet weather. An evaluation by personnel from the South Dakota Water and Environmental Engineering Research Center of the NRCS soils data for the area indicates that in general the soils are not suitable for the use of septic tanks and drain fields. There is too much gravel in some areas that can lead to a direct leaching of wastewater directly to the lake. There is too much clay in other areas that can lead to the surface discharge of wastewater that reaches the lake.

3.2 COLLECTION SYSTEM FLOW PROJECTIONS

Because the Clear Lake Betterment Association does not have a centralized wastewater collection system, an evaluation of existing wastewater flows cannot be accomplished. For purposes of this report, the wastewater flows to be used for the sizing of the piping and pumping facilities that will make up the wastewater collection system can be determined from the application of standardized procedures developed over a long period of time by pumping system manufacturers and regulatory agencies.

The Manual for Alternative Wastewater Collection Systems (EPA/625/1-91/024) published by the US Environmental Protection Agency in October 1991 provides a comparison of many of the available methodologies for the estimation of wastewater flows. The EPA manual presents and recommends the use of a simplified equation that was developed for determining design wastewater flows that can be expected in wastewater collection systems of this nature.

The formula for determining design wastewater flows that can be expected in wastewater collection systems is as follows:

$$Q = AN + B$$

Where:

Q = Design Flow (GPM)

A = A coefficient selected by the Design Engineer, (typically 0.5)

N = Number of Equivalent Dwelling Units

B = A factor selected by the Design Engineer (typically 20)

For purposes of this report, the formula $Q = 0.5N + 20$ will be used for the preliminary sizing of the wastewater collection piping and the centralized pumping facilities that will make up the system. The individual homes and cabins will be served by pumping units that are sized and designed for the handling of waste from individual homes or small numbers of homes in a cluster and connected to a single facility. On the basis of the 207 homes and cabins, the total peak flow that can be expected is 125 Gallons Per Minute (GPM).

Based on the preliminary wastewater flows estimated by the use of the above equation, the wastewater piping in the collection system will range in size from a minimum of two inches to six inches in diameter.

3.3 WASTEWATER TREATMENT SYSTEM FLOW PROJECTIONS

As mentioned earlier, the Clear Lake Betterment Association does not have a centralized wastewater collection or treatment system. As a result, an evaluation of existing wastewater flows cannot be accomplished. For purposes of this report, the wastewater flows to be used for the sizing of the wastewater treatment alternatives will be determined from the application of standardized information developed over a long period of time by the South Dakota Department of Environment and Natural Resources.

Chapter 1.C.2 of the Recommended Design Criteria for Wastewater Collection and Treatment Facilities as published by the South Dakota Department of Environment and Natural Resources (SD DENR) states, "If wastewater flow data are not available, the design average daily flow shall be based on 75 Gallons Per Capita Per Day (gpcpd) for communities with less than 1 Million Gallons Per Day (MGD)". It is therefore concluded that 75 gpcpd will be used as the domestic wastewater flow. Based on a population equivalent of 310 people, the average daily wastewater flow that can be expected from the users of the Clear lake Betterment Association will be 23,250 Gallons Per Day (GPD).

Chapter 1.C.2 of the Recommended Design Criteria for Wastewater Collection and Treatment Facilities as published by the South Dakota Department of Environment and Natural Resources (SD DENR) states: "a person will generate 0.17 pound of organic waste (BOD_5) per day and 0.20 pounds of suspended solids (TSS) per day." When the use of garbage grinders in a system is significant, the Recommended Design Criteria for Wastewater Collection and Treatment Facilities suggests that the design basis should be increased to 0.22 pounds of BOD_5 per day and 0.25 pounds of TSS per day.

The use of garbage grinders is unknown within the Clear Lake Betterment Association. Therefore, for purposes of this report it is assumed that the use of garbage grinders will be significant thus resulting in a waste loading of 68.2 pounds of BOD_5 per day and 77.5 pounds of TSS per day for the design population of 310.

4 DEVELOPMENT AND EVALUATION OF ALTERNATIVES

The alternatives for the Clear Lake Betterment Association were developed to demonstrate several options for a proposed centralized wastewater collection and treatment system. As described earlier in this report, the Clear Lake Betterment Association has no industries or federal facilities that would contribute to the system. Treatment of the types of wastes commonly generated by these types of facilities will not be considered.

4.1 CAUTIONARY NOTES CONCERNING COST ESTIMATES

The opinions of probable cost provided with the following alternatives reflect the anticipated costs for administration, engineering design, construction, contingencies, construction observation, and other costs related to completion of the project. The costs as presented are based on an analysis and comparison of projects of similar size and scope. The actual construction and project costs will vary on an individual project basis. The actual bid cost will reflect the bidder's evaluation of construction problems, weather, soils and difficulty of work. Thus, the engineer cannot be held responsible for the accuracy of the estimates made in this report, as the engineer has no control over the contractors' bid costs.

Changes in materials, equipment and energy costs, as well as availability of other construction work at the time of the bid opening, could substantially influence actual project cost. Construction costs will also vary somewhat based on the quantity of items necessary to construct the project. The quantities and costs contained in this report are preliminary estimates based on our best judgment without field measurements. Final quantities and opinions of probable cost and final construction costs must be based upon final design.

Different funding sources have different requirements for some non-construction items. Therefore, actual costs of non-construction items should be considered tentative at this time and subject to later modifications and adjustments as current situations and funding sources dictate. Further, inasmuch as the period of construction cannot be accurately

predicted, the costs as presented in this report have not been adjusted to reflect projected inflation factors. Therefore, it is important that the estimate of costs as presented be reviewed and updated periodically to reflect construction cost trends.

4.2 EQUIVALENT UNIFORM ANNUAL COST

The alternatives relating to the Clear Lake Betterment Association's proposed wastewater collection and treatment system that were evaluated are described in the following sections. In addition to an opinion of cost for each alternative discussed in this section, a breakdown of the estimated equivalent uniform annual cost (EUAC) is also given. The EUAC not only takes the capital costs into account when evaluating the options but also looks at the salvage value of the components and the expected annual operation and maintenance costs. The result is a comparison of the alternatives on an overall basis throughout a design life of 20 years. As a result, the EUAC may show that the lowest capital cost alternative is not the lowest cost alternative. This situation would occur when options have a low capital cost but high operation and maintenance costs. The terms and values utilized in performing the EUAC are given in Table 4.2-1.

Table 4.2-1 Equivalent Uniform Annual Cost Terminology and Values Used

Term	Definition	Value Used
Interest = I	Annual interest rate	4.50%
Salvage Value = SV	Value of component at end of 20-year design life	0% or 60%
Present Worth = PW	Present worth (equal to opinion of cost for that item)	Variable
Net Present Worth of Salvage Value = PWSV	Present worth of salvage value	41.5%
Net Present Worth of Capital Costs = NPW	Present worth less the present worth of the salvage value	Variable
Net Present Worth of Annual Costs	Present worth of annual costs over the 20-year design life	1300%
Equivalent Uniform Annual Costs = EUAC	Annual cost of total present worth of capital and annual costs	7.69%
Design Life	Length of time facilities are projected to operate and/or meet design parameters	20 years

4.3 PROPOSED WASTEWATER COLLECTION SYSTEM IMPROVEMENTS

4.3.1 Collection System Alternative 1: Do Nothing

The first wastewater collection system alternative that was considered is the "do nothing" alternative. This alternative will not eliminate the potential problem with surfacing sewage that may occur during wet periods; nor will this alternative eliminate the source of the problem that is causing the reduction in water quality in Clear Lake. Therefore, this alternative is determined to be unacceptable and no further consideration will be given.

4.3.2 Collection System Alternative 2: New Gravity System

Collection System Alternative 2 recommends the installation of a gravity collection system. The sanitary sewer main line would consist of 8" PVC and the services would be 4" PVC. It is not possible to connect all of the customers to the proposed gravity system due to the existing ground elevations. Therefore, this alternative is determined to be unacceptable with no further consideration given.

4.3.3 Collection System Alternative 3: Pressure System w/Grinder Pumps

Collection System Alternative 3 gives the Clear Lake Betterment Association another option for a wastewater collection system. Each system customer would have a grinder pump on the service line outside their home. The grinder pump would pump their wastewater to a common force main pipe that would carry the wastewater to a main lift station on the west end of the lake that would serve the entire system. The main lift station would then pump the wastewater to the treatment ponds. There would be no gravity sewer with this system. All of the existing septic tanks would be eliminated. The entire system would be a pressure system.

The layout of the project is shown in Figure 4.3.3-1 and the cost estimate is shown in Table 4.3.3.-1 with the Equivalent Uniform Annual Cost information shown in Table 4.3.3-2.

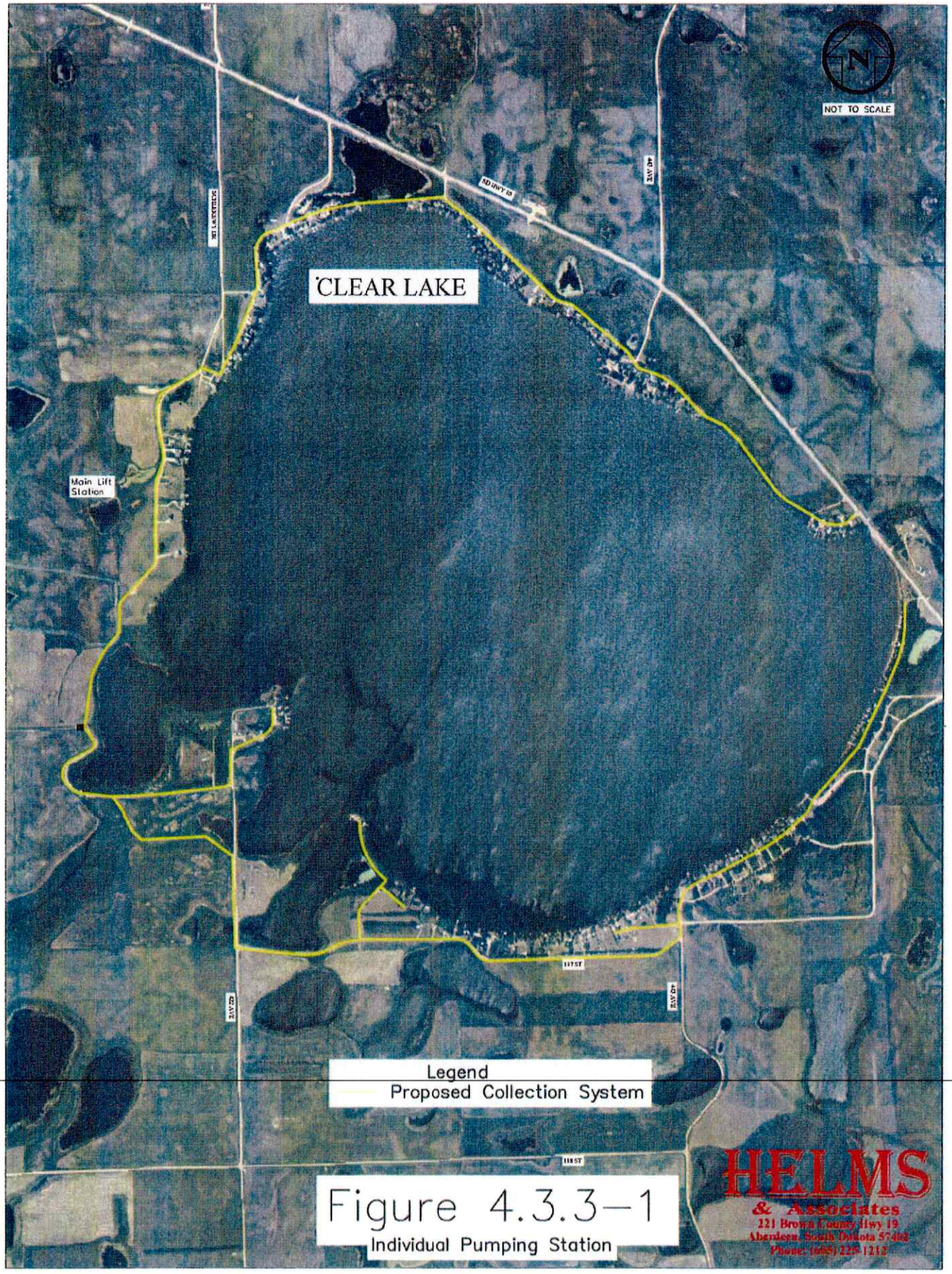


Figure 4.3.3–1

Individual Pumping Station

Table 4.3.3-1 Opinion of Probable Cost for Collection System Alternative 3

Item	Description	Quantity		Unit Price	Total Cost
1	Mobilization	1	LS	$220,000.00	$220,000.00
2	Air Release Manhole	15	EA	$4,000.00	$60,000.00
3	Remove and Dispose of Existing Septic Tank	193	EA	$500.00	$96,500.00
4	1 1/4" Pressure Sewer Service	19,000	LF	$14.00	$266,000.00
5	1 1/4" PVC Force Main	1,300	LF	$8.00	$10,400.00
6	2" PVC Force Main	5,000	LF	$8.00	$40,000.00
7	3" PVC Force Main	12,500	LF	$10.00	$125,000.00
8	4" PVC Force Main	19,200	LF	$15.00	$288,000.00
9	6" PVC Force Main	4,800	LF	$15.00	$72,000.00
10	10" Steel Casing Pipe	50	LF	$100.00	$5,000.00
11	Directionally Bore 4" PVC Force Main	1,500	LF	$20.00	$30,000.00
12	Miscellaneous Fittings	1	LS	$50,000.00	$50,000.00
13	2" Flush Clean-out	4	EA	$900.00	$3,600.00
14	3" Flush Clean-out	4	EA	$1,200.00	$4,800.00
15	Connect to Existing Sewer Service	207	EA	$250.00	$51,750.00
16	Individual Simplex Grinder Lift Station	207	EA	$6,500.00	$1,345,500.00
17	Spare Grinder Pump for Individual Lift Station	5	EA	$1,100.00	$5,500.00
18	Submersible Lift Station w/Valve Pit	1	LS	$60,000.00	$60,000.00
19	Stand-By Generator w/Auto Transfer Switch	1	LS	$25,000.00	$25,000.00
20	Traffic Control	1	LS	$10,000.00	$10,000.00
21	Gravel Surfacing (3")	12,000	TN	$10.00	$120,000.00
22	Topsoil, Seed, Fertilize & Mulch	90,000	SY	$1.00	$90,000.00
				Subtotal	$2,979,050.00
				Contingencies (15%)	$447,000.00
				Construction Total	$3,426,050.00
				Design Engineering	$220,000.00
				Bidding and Contract Documents	$5,000.00
				Construction Engineering	$300,000.00
				Administration & Legal (3%)	$103,000.00
				Total Project Cost	$4,054,050.00

Table 4.3.3-2 EUAC for Collection System Alternative 3

Item	Cost	SV	PW SV	NPW
Mobilization	$220,000.00	$0.00	$0.00	$220,000.00
Air Release Manhole	$60,000.00	$36,000.00	$14,927.14	$45,072.86
Remove and Dispose of Existing Septic Tank	$96,500.00	$0.00	$0.00	$96,500.00
1 1/4" Pressure Sewer Service	$266,000.00	$159,600.00	$66,177.00	$199,823.00
1 1/4" PVC Force Main	$10,400.00	$6,240.00	$2,587.37	$7,812.63
2" PVC Force Main	$40,000.00	$24,000.00	$9,951.43	$30,048.57
3" PVC Force Main	$125,000.00	$75,000.00	$31,098.21	$93,901.79
4" PVC Force Main	$288,000.00	$172,800.00	$71,650.29	$216,349.71
6" PVC Force Main	$72,000.00	$43,200.00	$17,912.57	$54,087.43
10" Steel Casing Pipe	$5,000.00	$3,000.00	$1,243.93	$3,756.07
Directionally Bore 4" PVC Force Main	$30,000.00	$0.00	$0.00	$30,000.00
Miscellaneous Fittings	$50,000.00	$30,000.00	$12,439.29	$37,560.71
2" Flush Clean-out	$3,600.00	$2,160.00	$895.63	$2,704.37
3" Flush Clean-out	$4,800.00	$2,880.00	$1,194.17	$3,605.83
Connect to Existing Sewer Service	$51,750.00	$0.00	$0.00	$51,750.00
Individual Simplex Grinder Lift Station	$1,345,500.00	$807,300.00	$334,741.18	$1,010,758.82
Spare Grinder Pump for Individual Lift Station	$5,500.00	$3,300.00	$1,368.32	$4,131.68
Submersible Lift Station w/Valve Pit	$60,000.00	$36,000.00	$14,927.14	$45,072.86
Stand-By Generator w/Auto Transfer Switch	$25,000.00	$15,000.00	$6,219.64	$18,780.36
Traffic Control	$10,000.00	$0.00	$0.00	$10,000.00
Gravel Surfacing (3")	$120,000.00	$72,000.00	$29,854.29	$90,145.71
Topsoil, Seed, Fertilize & Mulch	$90,000.00	$0.00	$0.00	$90,000.00
Capital Costs	$1,075,000.00	$0.00	$0.00	$1,075,000.00
Total Construction Cost	$4,054,050.00	$1,488,480.00	$617,190.00	$3,436,860.00

B. Operation and Maintenance Costs for Proposed Construction

Item	Annual Cost	NPW
Labor	$2,500.00	$32,519.84
Utilities	$2,000.00	$26,015.87
Simplex Grinder Maintenance	$500.00	$6,503.97
Equipment Replacement	$1,000.00	$13,007.94
Materials	$500.00	$6,503.97
Miscellaneous	$500.00	$6,503.97
Subtotal	$7,000.00	$91,055.56

C. Equivalent Uniform Annual Cost

NPW Construction Cost	$3,436,860.00
NPW of O & M Costs	$91,055.56
Total Net Present Worth	$3,527,915.56
Equivalent Uniform Annual Cost	$271,212.55

4.3.4 Collection System Alternative 4: Pressure System w/Effluent Pumps

Collection System Alternative 4 gives the Clear Lake Betterment Association another option for a wastewater collection system. Each system customer would have an effluent pump installed on the outlet line outside of the septic tank serving their home. As with Alternative 3, the effluent pump would pump the wastewater to a common force main pipe that would carry the wastewater to a main lift station on the west end of the lake that would serve the entire system. The main lift station would then pump the wastewater to the treatment ponds. There would be no gravity sewer with this system. All of the existing septic tanks would be eliminated. The entire system would be a pressure system.

The layout of the system is identical to that shown in Figure 4.3.3-1. The cost estimate is shown in Table 4.3.4-1 with the Equivalent Uniform Annual Cost information shown in Table 4.3.4-2.

Table 4.3.4-1 Opinion of Probable Cost for Collection System Alternative 4

Item	Description	Quantity		Unit Price	Total Cost
1	Mobilization	1	LS	$220,000.00	$220,000.00
2	Air Release Manhole	15	EA	$4,000.00	$60,000.00
3	1 1/4" Pressure Sewer Service	19,000	LF	$14.00	$266,000.00
4	1 1/4" PVC Force Main	1,300	LF	$8.00	$10,400.00
5	2" PVC Force Main	5,000	LF	$8.00	$40,000.00
6	3" PVC Force Main	12,500	LF	$10.00	$125,000.00
7	4" PVC Force Main	19,200	LF	$15.00	$288,000.00
8	6" PVC Force Main	4,800	LF	$15.00	$72,000.00
9	10" Steel Casing Pipe	50	LF	$100.00	$5,000.00
10	Directionally Bore 4" PVC Force Main	1,500	LF	$20.00	$30,000.00
11	Miscellaneous Fittings	1	LS	$50,000.00	$50,000.00
12	2" Flush Clean-out	4	EA	$900.00	$3,600.00
13	3" Flush Clean-out	4	EA	$1,200.00	$4,800.00
14	Connect to Existing Sewer Service	207	EA	$250.00	$51,750.00
15	Individual Simplex Effluent Lift Station	207	EA	$5,000.00	$1,035,000.00
16	Spare Effluent Pump for Individual Lift Station	5	EA	$1,000.00	$5,000.00
17	Submersible Lift Station w/Valve Pit	1	LS	$60,000.00	$60,000.00
18	Stand-By Generator w/Auto Transfer Switch	1	LS	$25,000.00	$25,000.00
19	Traffic Control	1	LS	$10,000.00	$10,000.00
20	Gravel Surfacing (3")	12,000	TN	$10.00	$120,000.00
21	Topsoil, Seed, Fertilize & Mulch	90,000	SY	$1.00	$90,000.00
				Subtotal	$2,571,550.00
				Contingencies (15%)	$386,000.00
				Construction Total	$2,957,550.00
				Design Engineering	$220,000.00
				Bidding and Contract Documents	$5,000.00
				Construction Engineering	$300,000.00
				Administration & Legal (3%)	$89,000.00
				Total Project Cost	$3,571,550.00

Table 4.3.4-2 EUAC for Collection System Alternative 4

Item	Cost	SV	PW SV	NPW
Mobilization	$220,000.00	$0.00	$0.00	$220,000.00
Air Release Manhole	$60,000.00	$36,000.00	$14,927.14	$45,072.86
1 1/4" Pressure Sewer Service	$266,000.00	$159,600.00	$66,177.00	$199,823.00
1 1/4" PVC Force Main	$10,400.00	$6,240.00	$2,587.37	$7,812.63
2" PVC Force Main	$40,000.00	$24,000.00	$9,951.43	$30,048.57
3" PVC Force Main	$125,000.00	$75,000.00	$31,098.21	$93,901.79
4" PVC Force Main	$288,000.00	$172,800.00	$71,650.29	$216,349.71
6" PVC Force Main	$72,000.00	$43,200.00	$17,912.57	$54,087.43
10" Steel Casing Pipe	$5,000.00	$3,000.00	$1,243.93	$3,756.07
Directionally Bore 4" PVC Force Main	$30,000.00	$0.00	$0.00	$30,000.00
Miscellaneous Fittings	$50,000.00	$30,000.00	$12,439.29	$37,560.71
2" Flush Clean-out	$3,600.00	$2,160.00	$895.63	$2,704.37
3" Flush Clean-out	$4,800.00	$2,880.00	$1,194.17	$3,605.83
Connect to Existing Sewer Service	$51,750.00	$0.00	$0.00	$51,750.00
Individual Simplex Effluent Lift Station	$1,035,000.00	$621,000.00	$257,493.22	$777,506.78
Spare Effluent Pump for Individual Lift Station	$5,000.00	$3,000.00	$1,243.93	$3,756.07
Submersible Lift Station w/Valve Pit	$60,000.00	$36,000.00	$14,927.14	$45,072.86
Stand-By Generator w/Auto Transfer Switch	$25,000.00	$15,000.00	$6,219.64	$18,780.36
Traffic Control	$10,000.00	$0.00	$0.00	$10,000.00
Gravel Surfacing (3")	$120,000.00	$72,000.00	$29,854.29	$90,145.71
Topsoil, Seed, Fertilize & Mulch	$90,000.00	$0.00	$0.00	$90,000.00
Capital Costs	$1,000,000.00	$0.00	$0.00	$1,000,000.00
Total Construction Cost	$3,571,550.00	$1,301,880.00	$539,820.00	$3,031,730.00

B. Operation and Maintenance Costs for Proposed Construction

Item	Annual Cost	NPW
Labor	$2,500.00	$32,519.84
Utilities	$2,000.00	$26,015.87
Simplex Grinder Maintenance	$500.00	$6,503.97
Equipment Replacement	$1,000.00	$13,007.94
Materials	$500.00	$6,503.97
Miscellaneous	$500.00	$6,503.97
Subtotal	$7,000.00	$91,055.56

C. Equivalent Uniform Annual Cost

NPW Construction Cost	$3,031,730.00
NPW of O & M Costs	$91,055.56
Total Net Present Worth	$3,122,785.56

Equivalent Uniform Annual Cost $240,067.71

4.3.5 Collection System Alternative 5: Pressure System w/ Shared Pumps

Collection System Alternative 5 gives the Clear Lake Betterment Association another option for a sanitary collection system. The users of the collection system would be grouped to share a grinder pump facility. Each grinder pump facility would serve four to six connections. The wastewater from the homes would be collected and transported by gravity to the pumping unit which would then pump the wastewater to a common force main pipe that would carry the wastewater to one main lift station located near the west end of the lake. This main lift station would serve the entire system. The main lift station would then pump the wastewater to the treatment ponds. There would be limited gravity sewer with this system.

There are drawbacks for this alternative. First, this alternative assumes that several homes will share lift stations. If there are problems with the lift station, the homes connected to the pumping facility would be without sewer and a conflict could arise as to responsibility for the problem. Second, if multiple homes share a lift station, then a question arises as to responsibility for the electrical costs. This alternative proposes that some homes share lift stations in order to save cost and so the pumps cycle more frequently.

The location of the project is shown in Figure 4.3.5-1 while the cost estimate is shown in Table 4.3.5-1 with the Equivalent Uniform Annual Cost information shown in Table 4.3.5-2.

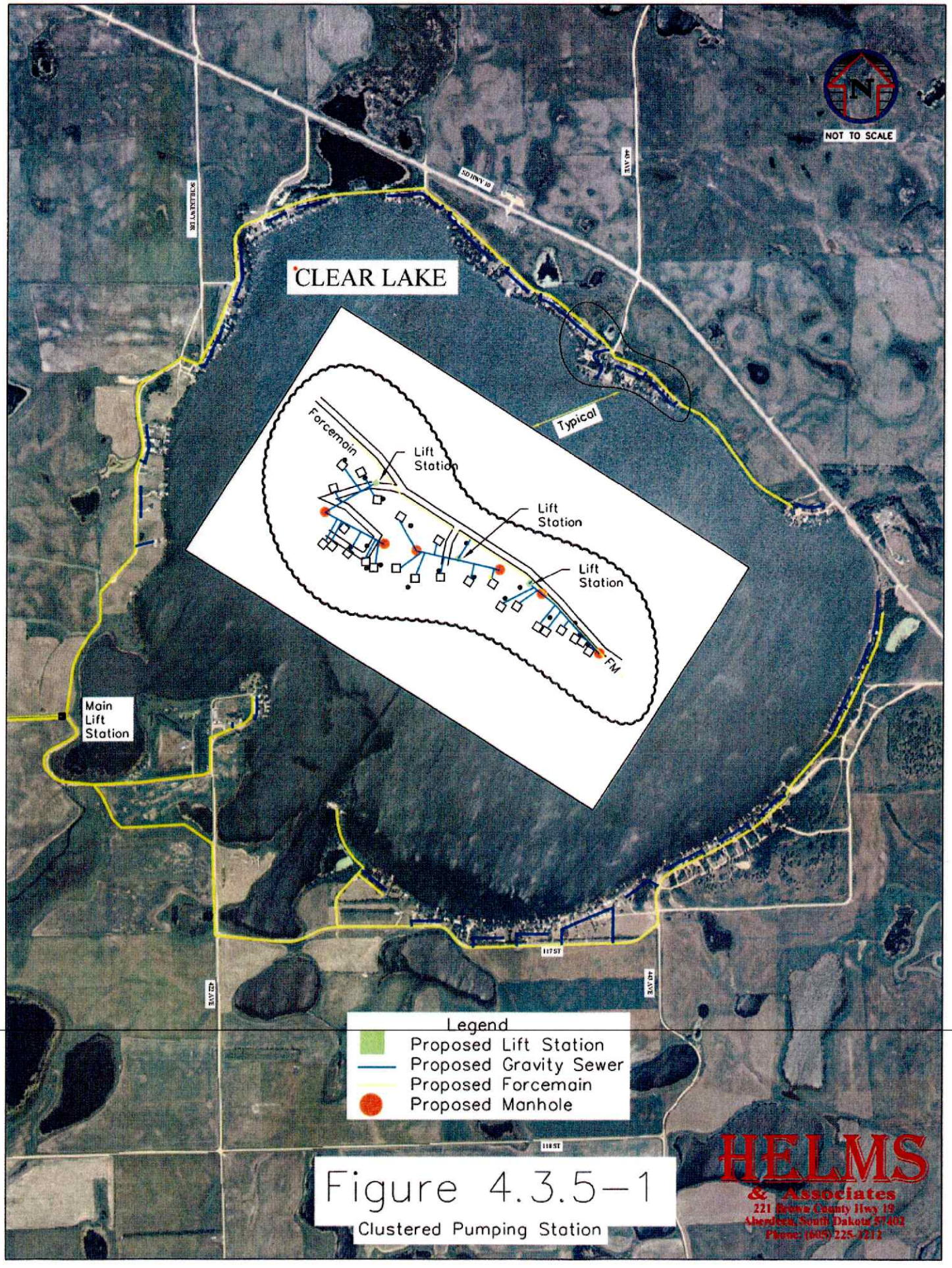


Figure 4.3.5–1

Clustered Pumping Station

Table 4.3.5-1 Opinion of Probable Cost for Collection System Alternative 5

Item	Description	Quantity		Unit Price	Total Cost
1	Mobilization	1	LS	$260,000.00	$260,000.00
2	Air Release Manhole	15	EA	$4,000.00	$60,000.00
3	Remove and Dispose of Existing Septic Tank	193	EA	$500.00	$96,500.00
4	Connect to Existing Sewer Service	207	EA	$250.00	$51,750.00
5	Gravity Sewer Manholes	44	EA	$3,000.00	$132,000.00
6	Gravity Sewer Service Piping	15,150	LF	$30.00	$454,500.00
7	Gravity Sewer Main Line	13,530	LF	$20.00	$270,600.00
8	1 1/4" PVC Force Main	2,480	LF	$8.00	$19,840.00
9	2" PVC Force Main	6,410	LF	$8.00	$51,280.00
10	3" PVC Force Main	12,070	LF	$10.00	$120,700.00
11	4" PVC Force Main	16,150	LF	$15.00	$242,250.00
12	6" PVC Force Main	4,800	LF	$15.00	$72,000.00
13	10" Steel Casing Pipe	50	LF	$100.00	$5,000.00
14	Directionally Bore 4" PVC Force Main	1,500	LF	$20.00	$30,000.00
15	Miscellaneous Fittings	1	LS	$50,000.00	$50,000.00
16	2" Flush Clean-out	4	EA	$900.00	$3,600.00
17	3" Flush Clean-out	4	EA	$1,200.00	$4,800.00
18	Individual Simplex Grinder Lift Station	3	EA	$6,500.00	$19,500.00
19	Duplex Grinder Lift Station	34	EA	$9,000.00	$306,000.00
20	Spare Grinder Pump for Individual Lift Station	5	EA	$1,500.00	$7,500.00
21	Submersible Lift Station w/Valve Pit	1	LS	$60,000.00	$60,000.00
22	Stand-By Generator w/Auto Transfer Switch	1	LS	$25,000.00	$25,000.00
23	Traffic Control	1	LS	$10,000.00	$10,000.00
24	Gravel Surfacing (3")	12,000	TN	$10.00	$120,000.00
25	Topsoil, Seed, Fertilize & Mulch	90,000	SY	$1.00	$90,000.00
				Subtotal	$2,562,820.00
				Contingencies (15%)	$385,000.00
				Construction Total	$2,947,820.00
				Design Engineering	$250,000.00
				Bidding and Contract Documents	$5,000.00
				Construction Engineering	$300,000.00
				Administration & Legal (3%)	$89,000.00
				Total Project Cost	$3,591,820.00

Table 4.3.5-2 EUAC for Collection System Alternative 5

Item	Cost	SV	PW SV	NPW
Mobilization	$260,000.00	$0.00	$0.00	$260,000.00
Air Release Manhole	$60,000.00	$36,000.00	$14,927.14	$45,072.86
Remove and Dispose of Existing Septic Tank	$96,500.00	$0.00	$0.00	$96,500.00
Connect to Existing Sewer Service	$51,750.00	$0.00	$0.00	$51,750.00
Gravity Sewer Manholes	$132,000.00	$79,200.00	$32,839.71	$99,160.29
Gravity Sewer Service Piping	$454,500.00	$272,700.00	$113,073.11	$341,426.89
Gravity Sewer Main Line	$270,600.00	$162,360.00	$67,321.41	$203,278.59
1 1/4" PVC Force Main	$19,840.00	$11,904.00	$4,935.91	$14,904.09
2" PVC Force Main	$51,280.00	$30,768.00	$12,757.73	$38,522.27
3" PVC Force Main	$120,700.00	$72,420.00	$30,028.44	$90,671.56
4" PVC Force Main	$242,250.00	$145,350.00	$60,268.34	$181,981.66
6" PVC Force Main	$72,000.00	$43,200.00	$17,912.57	$54,087.43
10" Steel Casing Pipe	$5,000.00	$3,000.00	$1,243.93	$3,756.07
Directionally Bore 4" PVC Force Main	$30,000.00	$0.00	$0.00	$30,000.00
Miscellaneous Fittings	$50,000.00	$30,000.00	$12,439.29	$37,560.71
2" Flush Clean-out	$3,600.00	$2,160.00	$895.63	$2,704.37
3" Flush Clean-out	$4,800.00	$2,880.00	$1,194.17	$3,605.83
Individual Simplex Grinder Lift Station	$19,500.00	$11,700.00	$4,851.32	$14,648.68
Duplex Grinder Lift Station	$306,000.00	$183,600.00	$76,128.43	$229,871.57
Spare Grinder Pump for Individual Lift Station	$7,500.00	$4,500.00	$1,865.89	$5,634.11
Submersible Lift Station w/Valve Pit	$60,000.00	$36,000.00	$14,927.14	$45,072.86
Stand-By Generator w/Auto Transfer Switch	$25,000.00	$15,000.00	$6,219.64	$18,780.36
Traffic Control	$10,000.00	$0.00	$0.00	$10,000.00
Gravel Surfacing (3")	$120,000.00	$72,000.00	$29,854.29	$90,145.71
Topsoil, Seed, Fertilize & Mulch	$90,000.00	$0.00	$0.00	$90,000.00
Capital Costs	$1,029,000.00	$0.00	$0.00	$1,029,000.00
Total Construction Cost	$3,591,820.00	$1,214,740.00	$503,680.00	$3,088,140.00

B. Operation and Maintenance Costs for Proposed Construction

Item	Annual Cost	NPW
Labor	$2,500.00	$32,519.84
Utilities	$2,000.00	$26,015.87
Simplex Grinder Maintenance	$500.00	$6,503.97
Equipment Replacement	$1,000.00	$13,007.94
Materials	$500.00	$6,503.97
Miscellaneous	$500.00	$6,503.97
Subtotal	$7,000.00	$91,055.56

C. Equivalent Uniform Annual Cost

NPW Construction Cost	$3,088,140.00
NPW of O & M Costs	$91,055.56
Total Net Present Worth	$3,179,195.56
Equivalent Uniform Annual Cost	$244,404.30

4.4 PROPOSED WASTEWATER TREATMENT SYSTEM IMPROVEMENTS

4.4.1 Treatment System Alternative 1: Do Nothing

The first alternative is to do nothing. Treatment System Alternative 1 is not considered acceptable because it will not provide the Clear Lake Betterment Association with a treatment system.

4.4.2 Treatment System Alternative 2: 180-Day Storage

The second treatment alternative considered is to provide the Clear Lake Betterment Association with a conventional three-cell system that would discharge twice a year on average. The feasibility of this alternative was discussed with personnel from the Office of Water Quality at the SD DENR. Most of the streams and waterways in the immediate area drain into either Clear Lake or Roy Lake. As a result, a treatment facility with a discharge will not be accepted by the SD DENR.

The feasibility of discharging to an isolated wetland that could not reach either Clear Lake or Roy Lake was discussed. It was pointed out that even if a wetland could be located that was totally isolated from either of these two lakes, it is highly likely that the wetland does now or has the potential to support fish life. Even if the wetland is classified now for uses other than fish life propagation, the classification could change in the future. As a result, a treatment facility with a discharge will not be accepted by the SD DENR.

In summary, the personnel from the SD DENR Office of Water Quality have indicated that a discharging facility will in all likelihood be determined to be unacceptable. Therefore, no further consideration will be given to this alternative.

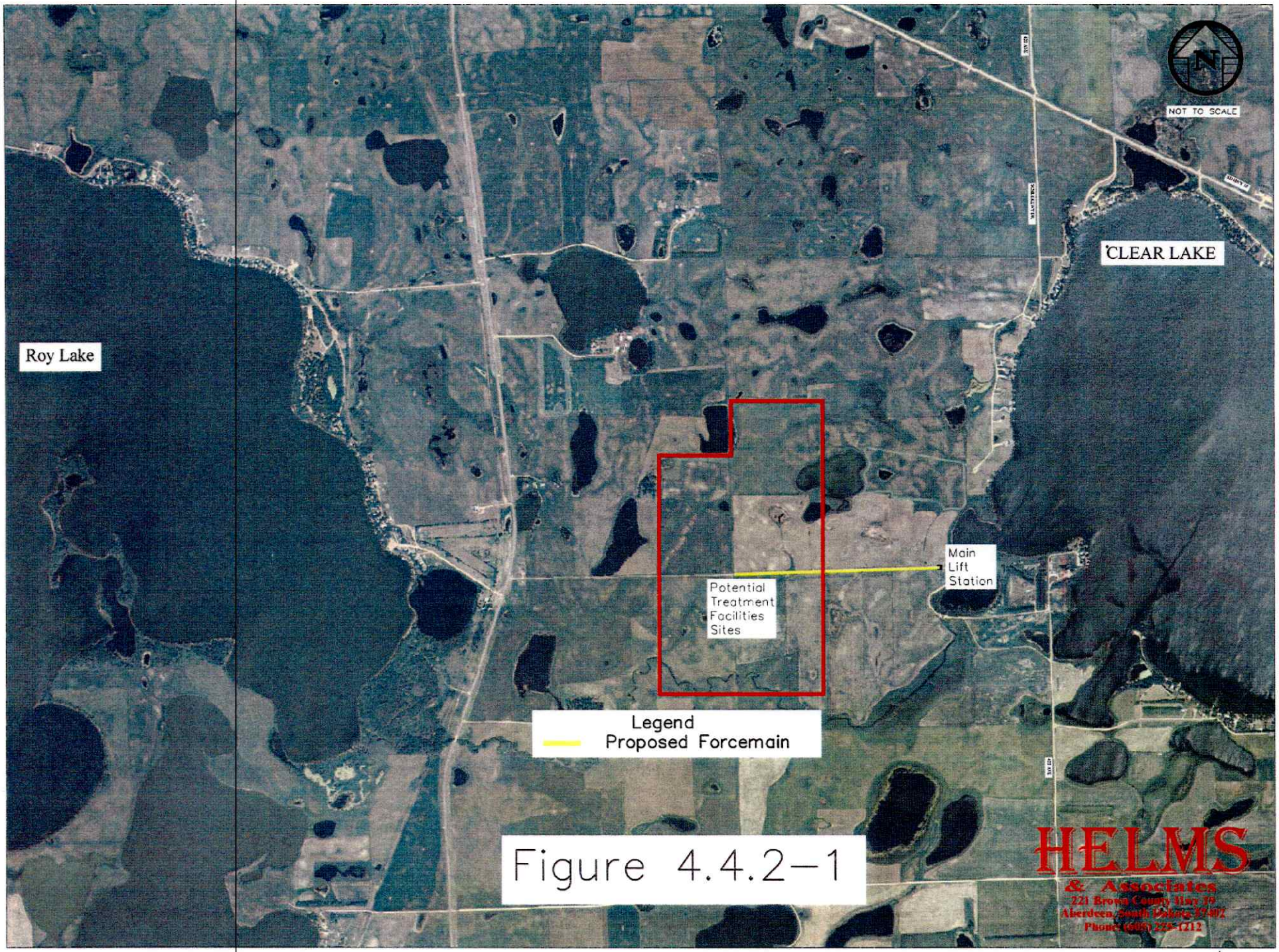
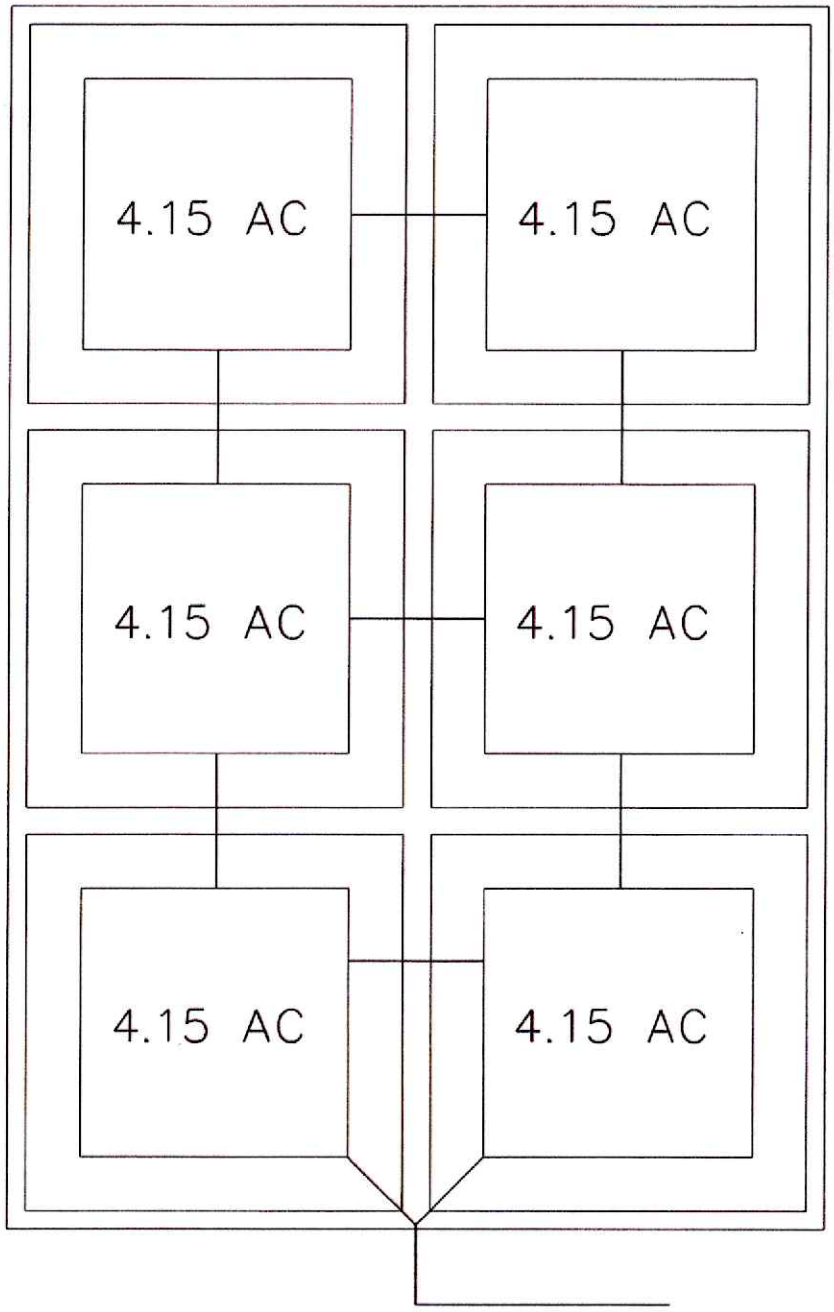

NOT TO SCALE
CLEAR LAKE
Roy Lake
Main
Lift
Station
Potential
Treatment
Facilities
Sites
Legend
Proposed Forcemain
HELMS
& Associates

Figure 4.4.2–1



Typical Layout
Total Retention Facility

Figure 4.4.3.1

HELMS
& Associates
221 Brown County Hwy 19
Aberdeen, South Dakota 57402
Phone: (605) 225-1212

4.4.3 Treatment System Alternative 3: Total Retention

The third treatment alternative considered is the construction of a multi-cell system designed for total retention. The system would be sized to dispose of all of the expected wastewater flow during a period of one year by means of evaporation and perhaps seepage if the soils are suitable. Because of the large number of wetlands and lakes in the area, it is anticipated that any wastewater facility effluent limits placed on the discharge from the proposed system would be difficult to meet. The total retention system would have no problem with meeting those discharge limits because the system would not discharge. The sizing of a total retention facility is shown in Table 4.4.3-1.

Table 4.4.3-1 Hydraulic Sizing for a Total Retention System

Influent	Current 2010	Future 2040
Population	310	310
Wastewater Flow (gpcpd)	75	75
Domestic Wastewater Flow (gpd)	23,250	23,250
Pond Influent (gal/yr)	8,486,250	8,486,250
Pond Influent (cf/yr)	1,134,525	1,134,525
Losses		
Preciptiation vs Evaporation		
Evaporation (in/yr)	31.7	31.7
Precipitation (in/yr)	18.81	18.81
Net Pond Evaporation (in/sf/yr)	12.89	12.89
Seepage		
Pond Seepage Rate (in/sf/day)	0.00	0.00
Total Losses (in/sf/yr)	12.89	12.89
Water Surface Area (sf)	1,056,191	1,056,191
Water Surface Area (acres)	24.25	24.25
Water Surface Area (adjusted for dike slope)	24.82	24.82

The proposed location for the treatment system has not been identified at this time. A potential location is shown on Figure 4.4.2-1. The proposed layout of the treatment system alternative is shown in Figure 4.4.3-1. The estimated cost and EUAC for Treatment System Alternative 3 are shown in the following Table 4.4.3-2 and Table 4.4.3-3.

Table 4.4.3-2 Opinion of Probable Cost for Treatment System Alternative 3

Item	Description	Quantity		Unit Cost	Total Cost
1	Mobilization	1	LS		$50,200.00
2	Remove and Stockpile Topsoil	19,000	CY	$1.60	$30,400.00
	Unclassified Excavation & Embankment	69,000	CY	$1.65	$113,850.00
3	w/35% Shrinkage				
4	Pond Clay Liner	32,300	CY	$2.30	$74,290.00
5	Place Topsoil (4")	19,000	CY	$1.35	$25,650.00
6	Inlet Manhole	1	EA	$2,500.00	$2,500.00
7	Inter-Pond Piping (12" DIP)	4,480	LF	$50.00	$224,000.00
8	12" Gate Valve	6	EA	$2,400.00	$14,400.00
9	Siphon Breaker	6	EA	$4,000.00	$24,000.00
10	Inlet Structure	7	EA	$1,500.00	$10,500.00
11	Outlet Structure	6	EA	$4,000.00	$24,000.00
12	Pond Depth Indicator	5	EA	$2,000.00	$10,000.00
13	Site Fencing	4,900	LF	$4.00	$19,600.00
14	Pond Warning Signs	18	EA	$125.00	$2,250.00
15	Pond Pre-Filling	1	LS	$20,000.00	$20,000.00
16	Seeding and Fertilizing	6	AC	$1,000.00	$6,000.00
17	Mulching Seeded Areas	6	AC	$200.00	$1,200.00
18	Erosion Control	4900	LF	$5.00	$24,500.00
				Subtotal	$677,340.00
				Contingencies (15%)	$101,700.00
				Construction Total	$779,040.00
				Soils Investigation	$5,000.00
				Design Engineering	$55,000.00
				Bidding and Contract Documents	$10,000.00
				Construction Administration	$15,000.00
				Construction Observation and Testing	$160,000.00
				Land Purchase (30 acres)	$105,000.00
				Administration & Legal (3%)	$23,400.00
				Total Project Cost	$1,152,440.00

Table 4.4.3-3 EUAC for Treatment System Alternative 3

Item	Cost	SV	PW SV	NPW
Mobilization	$50,200.00	$0.00	$0.00	$50,200.00
Remove and Stockpile Topsoil	$30,400.00	$0.00	$0.00	$30,400.00
	$113,850.00	$0.00	$0.00	$113,850.00
Unclassified Excavation & Embankment w/3				
Pond Clay Liner	$74,290.00	$0.00	$0.00	$74,290.00
Place Topsoil (4")	$25,650.00	$0.00	$0.00	$25,650.00
Inlet Manhole	$2,500.00	$1,500.00	$621.96	$1,878.04
Inter-Pond Piping (12" DIP)	$224,000.00	$134,400.00	$55,728.00	$168,272.00
12" Gate Valve	$14,400.00	$8,640.00	$3,582.51	$10,817.49
Siphon Breaker	$24,000.00	$14,400.00	$5,970.86	$18,029.14
Inlet Structure	$10,500.00	$6,300.00	$2,612.25	$7,887.75
Outlet Structure	$24,000.00	$14,400.00	$5,970.86	$18,029.14
Pond Depth Indicator	$10,000.00	$6,000.00	$2,487.86	$7,512.14
Site Fencing	$19,600.00	$11,760.00	$4,876.20	$14,723.80
Pond Warning Signs	$2,250.00	$0.00	$0.00	$2,250.00
Pond Pre-Filling	$20,000.00	$0.00	$0.00	$20,000.00
Seeding and Fertilizing	$6,000.00	$0.00	$0.00	$6,000.00
Mulching Seeded Areas	$1,200.00	$0.00	$0.00	$1,200.00
Erosion Control	$24,500.00	$0.00	$0.00	$24,500.00
Capital Costs	$475,100.00	$0.00	$0.00	$475,100.00
Total Construction Cost	$1,152,440.00	$197,400.00	$81,850.00	$1,070,590.00

B. Operation and Maintenance Costs for Proposed Construction

Item	Annual Cost	NPW
Labor	$500.00	$6,503.97
Materials	$500.00	$6,503.97
Miscellaneous	$500.00	$6,503.97
Subtotal	$1,500.00	$19,511.90

C. Equivalent Uniform Annual Cost

NPW Construction Cost	$1,070,590.00
NPW of O & M Costs	$19,511.90
Total Net Present Worth	$1,090,101.90
Equivalent Uniform Annual Cost	$83,802.83

4.4.4 Treatment System Alternative 4: Artificial Wetland

The fourth treatment alternative considered is an artificial wetland type treatment facility. The SD Design Criteria requires a minimum of two cells before the wetland for wetland type facilities that discharge. The feasibility of this alternative was discussed with personnel from the Office of Water Quality at the SD DENR. Most of the streams and waterways in the immediate area drain into either Clear Lake or Roy Lake. As a result, a treatment facility with a discharge will not be accepted by the SD DENR.

The feasibility of discharging to an isolated wetland that could not reach either Clear Lake or Roy Lake was discussed. It was pointed out that even if a wetland could be located that was totally isolated from either of these two lakes, it is highly likely that the wetland does now or has the potential to support fish life. Even if the wetland is classified now for uses other that fish life propagation, the classification could change in the future. As a result, a treatment facility with a discharge will not be accepted by the SD DENR.

In summary, the personnel from the SD DENR Office of Water Quality have indicated that a discharging facility will in all likelihood be determined to be unacceptable. Therefore, no further consideration will be given to this alternative.

5 SELECTION OF ALTERNATIVES

5.1 WASTEWATER COLLECTION SYSTEM

Table 5.1-1 summarizes the capital cost and EUAC cost for each of the collection system alternatives.

Table 5.1-1 Wastewater Collection System Alternatives

	Capital Cost	EUAC
Collection Alternative 3 (New Pressure System w/ Individual Grinder Pumps)	$4,055,000.00	$271,212.55
Collection Alternative 4 (New Pressure System w/ Individual Effluent Pumps)	$3,572,000.00	$240,067.71
Collection Alternative 5 (New Pressure System w/ Shared Pumps)	$3,591,820.00	$244,404.30

Collection System Alternative 1 (Do Nothing) is not recommended because it would not eliminate the surfacing sewage that occurs during wet periods of the year.

Collection System Alternative 2 recommends the installation of a gravity collection system. Because it is not possible to connect all of the customers to the proposed gravity system due to the existing ground elevations, this alternative is not recommended.

Collection System Alternative 3 (New Pressure System w/ Individual Grinder Pumps) with a total project cost of $4,055,000 is not recommended at this time. This alternative is not the most cost effective in either capital cost or in the EUAC cost.

Collection System Alternative 4 (New Pressure System w/ Individual Effluent Pumps) with a total project cost of $3,572,000 is recommended. This alternative will give the Clear Lake Betterment Association a new wastewater collection system. This alternative is the most cost effective capital cost and has an EUAC which is the most cost effective.

Collection System Alternative 5 (New Pressure System w/ Shared Pumps) with a total project cost of $3,591,820 is not recommended at this time. This alternative is not the most cost effective in either capital cost or in the EUAC cost.

5.2 WASTEWATER TREATMENT SYSTEM

Table 5.2-1 summarizes the capital cost and EUAC cost for each of the treatment alternatives.

Table 5.2-1 Wastewater Treatment System Alternatives

	Capital Cost	EUAC
Treatment Alternative 2 (180-Day Storage)	$0.00	$0.00
Treatment Alternative 3 (Total Retention)	$1,152,440.00	$83,802.83
Treatment Alternative 4 (Artificial Wetland)	$0.00	$0.00

Treatment Alternative 1 (Do Nothing) is not recommended because it would not provide the Clear Lake Betterment Association with a wastewater treatment system.

Treatment Alternative 2 (180-Day Storage) is not recommended. Due to the determination by SD DENR that because of the large number of wetlands and lakes in the area, it will not be possible to discharge. Therefore, this alternative is not acceptable.

Treatment Alternative 3 (Total Retention) with a total project cost of $1,152,440 is recommended. This alternative would consist of the construction of a multi-cell system that would be designed to contain all wastewater expected during an entire year and dispose of the wastewater by means of evaporation and perhaps limited seepage. This system is not the most cost effective. In fact, this alternative has the highest capital cost as well as the highest EUAC cost. However, the existing site conditions and potential restrictions on the effluent limitations as a result of the surrounding lakes and other water bodies make this alternative the most feasible.

Treatment Alternative 4 (Artificial Wetland) is not recommended. Due to the determination by SD DENR that because of the large number of wetlands and lakes in the area, it will not be possible to discharge. Therefore, this alternative is not acceptable.

5.3 IMPACT ON USER FEES

A summary of the costs associated with the alternatives that were chosen is given in Table 5.3-1.

Table 5.3-1 Summary of Costs

Wastewater Collection	
Alternative 4: New Pressure Sewer System with Effluent Pumps	$3,572,000
Wastewater Treatment	
Alternative 3: Total Retention	$1,152,440
	$4,724,440

As part of the cost analysis of the recommended improvements, the estimated impact on the monthly user fees has been calculated. Currently, the Clear Lake Betterment Association does not have a monthly sewer charge. In order to be eligible for DENR grant dollars, a sewer rate that is at or above a minimum rate of $17.00 per month for a 5,000-gallon user is required.

Table 5.3-2 summarizes the financial data that is used to determine the proposed operational status of the wastewater fund with the recommended improvements. Table 5.3-2 also reflects the anticipated annual payment to retire the debt that would be associated with the proposed project. These calculations are based on a 100% loan. The nature and/or source of the funding that is available for the project are not known at this time. It is anticipated that due to the project's life cycle, the Clear Lake Betterment Association would qualify for a Clean Water State Revolving Fund (SRF) loan from the South Dakota Department of Environmental and Natural Resources at an interest rate of 3.25% with a repayment period of thirty (30) years.

Also reflected in Table 5.3-2 is an anticipated amount that should be set aside for the replacement of short-lived assets. At this time, the only short-lived assets that need to be considered are the individual pumps. It is anticipated that the average expected life of the pumps is 10 years. Therefore, the Betterment Association should budget sufficient

money to replace all of the pumps at least once during the ten-year life expectancy. The recommended short-lived asset replacement value is shown in Table 5.3-3. This table indicates how much the Clear Lake Betterment Association needs to budget for lift station pumps.

The actual rates will be dependent upon the actual funding that would be obtained.

Table 5.3-2 Operation of the Wastewater Fund

Current Gross Revenue	$0.00
Proposed O & M Cost	$8,500.00
Retirement of Current Debt	$0.00
Short Lived Asset Replacement	$11,800.00
Other Current Cost	$0.00
Net Income	**-$20,300.00**
Retirement of Debt Incurred with this Project	$248,891.61
Amount to Be Set Aside for Debt Reserves	$24,889.16
Remaining Surplus After Project	**-$294,080.77**
Proposed Sewer Charge	$120.00
Number of Accounts	207
Added Revenue	$298,080.00
Surplus After Increase in Sewer Charge	**$3,999.23**

A monthly sewer rate of $120.00 per month is needed in order to balance the sewer fund.

Obviously, the Clear Lake Betterment Association will desire to search for possible grant funding or other lower interest rate loans in order to make the project more affordable to the Clear Lake Betterment Association and its residents. Table 5.3-3 breaks down different grant/loan combinations and shows how the sewer rates will be affected for the members of the Clear Lake Betterment Association.

Because of the seasonal nature of many of the users of the system, an alternative rate analysis was completed. This rate analysis is based on the actual usage of the system taking into consideration the number of months of occupancy. Because it is not known how the users of the system will be invoiced for the costs, the following analysis provides an annual cost as well as an equivalent monthly cost per user. As noted previously, there are 207 permanent homes and cabins that will be served by the wastewater collection and treatment system. Of these, 32 are permanent residences and 175 are seasonal residences.

The following rate analysis is founded on the premise that the charges for the operation and maintenance (O&M) costs of the system will be based on the actual usage of the system. It has been assumed that there will be two classes of users: a permanent residence class and a seasonal residence class. A permanent residence is one that will be essentially used for 12-months of the year. A seasonal residence is one that will be used for six months or less per year. Based on 12-month occupancy, the permanent residences are equivalent to a total of 384 "user months". Assuming an average occupancy of six months for the remainder of the 175 users, the seasonal users are equivalent to a total of 1050 "user months". The total number of "user months" of the system is 1,434. Based on 1,434 "user months" and an estimated annual O&M cost of $8,500, the typical monthly charge for O&M costs is approximately $5.93 per month of occupancy. For a 100% loan with 0% grant, this would equate to $71.13 per year for a permanent residence and $35.56 per year for a seasonal residence.

Short Term Replacement Cost for the replacement of pumps will be incurred whether the system is being used or not. The nature of the pumping system indicates that the expected life of the pumps is not dependent on use. In fact, the life of a pump that is not used on a frequent routine basis can be expected to be shorter than a pump that is used on a daily basis. Therefore, the following rate analysis is based on the premise that the cost of the Short Term Asset Replacement for the system will be computed on a monthly basis independent of usage. With 207 users and an estimated annual Short Term Replacement Cost of $11,800, the typical monthly charge for Short Term Replacement Cost is

approximately $4.75 per month per connection to the system. For a 100% loan with 0% grant, this would equate to $57.00 per year for each connection to the system.

As with the Short Term Replacement Cost, the annual debt retirement for the system will be incurred whether the system is being used or not. For purposes of this rate analysis, it is assumed that the cost of the debt retirement and debt reserve for the system will be computed on a monthly basis independent of usage. Based on 207 users, an annual debt retirement of $248,892 and a annual debt reserve of $24,889, the typical monthly charge for Debt Retirement is approximately $110.22 per month per connection to the system. For a 100% loan with 0% grant, this would equate to $1,322.64 per year for each connection to the system.

The above rate analysis is illustrated in Table 5.3-3 and reflects the various grant and loan ratios that are possible.

Table 5.3-3 Rate Analysis

	0/100 grant/loan	25/75 grant/loan	30/70 grant/loan	35/65 grant/loan	40/60 grant/loan	45/55 grant/loan	50/50 grant/loan	55/45 grant/loan	60/40 grant/loan	65/35 grant/loan	70/30 grant/loan	75/25 grant/loan	80/20 grant/loan
Annual O & M	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500	$8,500
Grant Amount	~~$4,724,440~~	$1,181,110	$1,417,332	$1,653,554	$1,889,776	$2,125,998	$2,362,220	$2,598,442	$2,834,664	$3,070,886	$3,307,108	$3,543,330	$3,779,552
Loan Amount	$4,724,440	$3,543,330	$3,307,108	$3,070,886	$2,834,664	$2,598,442	$2,362,220	$2,125,998	$1,889,776	$1,653,554	$1,417,332	$1,181,110	$944,888
Annual Loan Payment	$248,892	$186,669	$174,224	$161,780	$149,335	$136,890	$124,446	$112,001	$99,557	$87,112	$74,667	$62,223	$49,778
Debt Reserves	$24,889	$18,667	$17,422	$16,178	$14,933	$13,689	$12,445	$11,200	$9,956	$8,711	$7,467	$6,222	$4,978
Short Term Asset Replacement	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800	$11,800
Total Annual Costs	$294,081	$225,636	$211,947	$198,258	$184,568	$170,879	$157,190	$143,501	$129,812	$116,123	$102,434	$88,745	$75,056
Current Annual Revenue	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surplus/Deficit After Project	-$294,081	-$225,636	-$211,947	-$198,258	-$184,568	-$170,879	-$157,190	-$143,501	-$129,812	-$116,123	-$102,434	-$88,745	-$75,056
Proposed Rate (5,000 gal)	$118.39	$90.84	$85.32	$79.81	$74.30	$68.79	$63.28	$57.77	$52.26	$46.75	$41.24	$35.73	$30.22

4.7 # -14,855 3.5 30 year

3.3

Table 5.3-3 Rate Analysis (continued)

	0/100 grant/loan	25/75 grant/loan	30/70 grant/loan	35/65 grant/loan	40/60 grant/loan	45/55 grant/loan	50/50 grant/loan	55/45 grant/loan	60/40 grant/loan	65/35 grant/loan	70/30 grant/loan	75/25 grant/loan	80/20 grant/loan
Full Time Residence O & M	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13	$71.13
Full Time Residence Annual Debt Retirement Cost	$1,322.61	$991.96	$925.83	$859.70	$793.57	$727.44	$661.31	$595.18	$529.04	$462.91	$396.78	$330.65	$264.52
Full Time Residence Annual Short Term Asset Replacement Cost	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00
Total Annual Full Time Residence Cost	$1,450.75	$1,120.09	$1,053.96	$987.83	$921.70	$855.57	$789.44	$723.31	$657.18	$591.05	$524.92	$458.79	$392.66
Seasonal Residence O & M Annual Cost	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56	$35.56
Seasonal Residence Annual Debt Retirement Cost	$1,322.61	$991.96	$925.83	$859.70	$793.57	$727.44	$661.31	$595.18	$529.04	$462.91	$396.78	$330.65	$264.52
Seasonal Residence Annual Short Term Asset Replacement Cost	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00	$57.00
Total Annual Seasonal Residence Cost	$1,415.18	$1,084.53	$1,018.40	$952.27	$886.14	$820.01	$753.88	$687.75	$621.61	$555.48	$489.35	$423.22	$357.09
Total Annual Revenue													
Full Time Residences (32)	$46,424	$35,843	$33,727	$31,611	$29,494	$27,378	$25,262	$23,146	$21,030	$18,914	$16,797	$14,681	$12,565
Seasonal Residences (175)	$247,657	$189,793	$178,220	$166,647	$155,074	$143,501	$131,928	$120,355	$108,783	$97,210	$85,637	$74,064	$62,491
Total Annual Revenue	$294,081	$225,636	$211,947	$198,258	$184,568	$170,879	$157,190	$143,501	$129,812	$116,123	$102,434	$88,745	$75,056

5.4 CAPITAL FINANCING PLAN

The Clear Lake Betterment Association should make applications to state and federal resources for loan and grant assistance to complete the project during the 2010 construction season.

5.5 VIEWS OF THE PUBLIC AND CONCERNED INTEREST GROUPS

The Clear Lake Betterment Association is planning to conduct a public hearing on the proposed project. Information related to the hearing will be submitted after it is conducted.

6 SELECTED PLAN, DESCRIPTION AND IMPLEMENTATION ARRANGEMENTS

6.1 JUSTIFICATION AND DESCRIPTION OF SELECTED PLAN

The alternative chosen for the wastewater collection system will provide the Clear Lake Betterment Association with a wastewater collection system.

The alternative chosen for the wastewater treatment system will provide the Clear Lake Betterment Association with a wastewater treatment system.

Both chosen alternatives will provide the facilities to assist the Clear Lake Betterment Association in its efforts to maintain and protect the water quality of Clear Lake.

6.2 DESIGN OF SELECTED PLAN

The design of the improvements to the collection and treatment systems will provide enhanced flexibility in operation and will be designed in accordance with the SD DENR Criteria and other accepted principles and standards.

6.3 ARRANGEMENT FOR IMPLEMENTATION

This report provides information to describe the proposed project and to support the Board's decision to proceed with the selected options as quickly as possible. Final design will be completed by the Clear Lake Betterment Association's consultant and approved by the Department of Environment and Natural Resources as it is definitely a "work of sanitary significance." Cost estimates have been prepared and are referenced elsewhere in this document.

The project will be bid in accordance with state statutes that govern municipal corporations and will be constructed by the lowest responsible bidder.

A proposed schedule is presented in Table 6.3-1 that reflects a reasonable time table for the implementation of the various steps and tasks that would be required for a timely completion of the Project. This schedule may be amended as needed to reflect actual time frames required to complete the individual steps.

Table 6.3-1 Proposed Schedule

Facility Plan Submitted to Funding Agencies	June 1, 2010
Environmental Review Completed	July 1, 2010
Funding Agency Approval of Facility Plan	July 1, 2010
Final Funding Package Complete	November 1, 2010
Begin Design	November 1, 2010
Plans & Specifications Submitted to DENR	March 1, 2011
Plans & Specifications Approved by DENR	April 1, 2011
Advertisement for Bids	April 15, 2011
Open Bids	May 15, 2011
Award Bids	June 1, 2011
Begin Construction	July 15, 2011
Construction Complete	November 15, 2011
Project Close-out	January 1, 2012

6.4 LAND ACQUISITION

Land acquisition will be required for the proposed treatment improvements.

6.5 INTERAGENCY AGREEMENTS

Operating agreements with other agencies may be needed if the Clear Lake Betterment Association joins with Lake City and the Roy Lake User Association in the ownership, operation and maintenance of a common wastewater treatment system.

Loan documents will have to be executed with the appropriate lender but as Clear Lake Betterment Association is a legally organized entity under the laws of the State of South Dakota, it has the legal authority to enter into such agreements. Clear Lake Betterment Association's attorney will advise the Board on any legal matters related to this issue.

7 FINANCING OPTIONS

7.1 GENERAL

Financing any major construction project is difficult for a community that has limited resources. "Routine" community needs such as the improvements to streets, equipment replacement, correction of drainage problems, and solid waste issues cannot be neglected. These needs must be met and projects relating to addressing them must continue to be financed.

These "routine" types of projects frequently consume all or nearly all available community financial resources just to maintain an acceptable level of service. Consequently, to finance major capital improvement projects, other methods of obtaining capital must be investigated.

7.2 PAY-AS-YOU-GO

For small communities and organizations, the most common method of financing needed improvements is the "pay-as-you-go" method. This method obtains revenue from general taxation, fees, service charges, special funds and/or special assessments. The advantages of this method are:

1) No interest payments; and
2) Greater budget flexibility.

Disadvantages of this method are:

1) Inequities between age groups (older citizens pay for a share of the project and younger citizens who may not have paid any of the costs realize greater benefits simply because of greater life spans);

2) Difficulty in generating large amounts of capital that is often required for large scale capital improvements; and

3) Large scale capital improvements often cannot be constructed efficiently by phased construction.

7.3 RESERVE FUNDS

A variation of the "pay-as-you-go" method is using reserve fund financing. Communities using this method accumulate funds in advance for construction of needed capital improvements. This accumulation may be the result of surplus operating funds that are allowed to remain in the operating budget from year to year. These funds are often "earmarked" for a specific purpose. It may also be revenues from a certain percentage of the water or sewer rate that are specifically placed in a depreciation account. Financing projects in this manner is often attractive to communities.

This method can have its drawbacks. The most obvious drawback is that the fund has to have been established for some time to allow it to generate sufficient capital for a project that is needed today. Also, good management is required to ensure that the investment pays an adequate return. If the interest generated on the investment is not greater than the inflation rate, then gains in the accumulation of the fund may be lost to inflation.

7.4 BONDS

Another method of generating revenue for capital improvements is through the sale of bonds on the private bond market. Three different types of bonds are frequently used to finance capital improvement projects. Each has different requirements and will need the involvement of the Clear Lake Betterment Association Attorney. The three types are General Obligation (GO), revenue and special assessment.

7.4.1 GENERAL OBLIGATION BONDS

General Obligation bonds pledge the taxing authority of the issuing body to repay the bond. General Obligation bonds are not an option for the Clear Lake Betterment Association in that it does not have the legal authority to assess taxes on the property within its jurisdictional boundaries.

7.4.2 REVENUE BONDS

Revenue bonds, which pledge revenues (that is, user fees) generated from the project, are often sold to finance capital improvement projects. They, like special assessment bonds, do not require a bond election, However, with any action of a governmental body, the enabling ordinance that must be approved by the Board can be referred.

7.4.3 SPECIAL ASSESSMENT BONDS

Special assessment bonds have a limited payback period. Assessment for principal and interest repayment are levied against and collected from adjacent property owners over a given period of years. The special assessments are collected with property tax payments. As with General Obligation bonds, Special Assessment Bonds are not an option for the Clear Lake Betterment Association in that it does not have the legal authority to assess taxes or special assessments on property within its jurisdictional boundaries.

7.5 LEASE-PURCHASE

Local financial institutions are frequently interested in financing community improvements through lease-purchase programs. This interest appears to be the result of recently passed federal legislation that provides tax advantages to financial institutions that participate in community improvement efforts.

7.6 OTHER SOURCES OF FINANCING

All of the previously discussed methods of financing rely on 100% local funding. Often it is difficult, if not impossible, for a community to finance projects with 100% local funding. Fortunately, there are other resources and programs available that can be used in conjunction with local funding to assist communities in financing projects such as the one being considered by the Clear Lake Betterment Association.

7.7 FEDERALLY FUNDED LOANS / GRANTS

Federal agencies such as the US Department of Agriculture's Rural Development / Rural Utility Service (RD / RUS) has both grant and loan funds available for financing community improvements. RD / RUS requires a preliminary engineering report and pre-application, along with certain other information, before it can invite a community to

submit a full application for project funding. This report will satisfy the requirements for the Preliminary Engineering Report.

While the RD / RUS is the primary federal agency that funds local projects, there are other federal agencies that do assist local communities under "special" circumstances. These agencies include, but are not limited to, the Federal Emergency Management Agency (FEMA), the Economic Development Administration (EDA) and the US Department of Housing and Urban Development (HUD). However, these federal agencies normally do not become involved in funding local projects unless there has been a declared disaster or a major economic development activity is imminent.

7.8 STATE FINANCED LOANS / GRANTS

The State of South Dakota has several programs that can provide financial assistance for community facility improvements. The programs are operated through various departments of state government. Some are financed with 100% state resources, some use a combination of state and federal funds and some are federal "pass-through" funds.

7.9 DENR PROGRAMS

The Department of Environment and Natural Resources (DENR) has a low interest loan and grant program known as the Consolidated Water Facilities Construction Program (CWFCP). This program was established in 1986 by combining several existing grant and loan programs. It is funded entirely with state financing and is designed to provide financial assistance through grants and loans for water and wastewater projects throughout the state.

DENR also operates the State Revolving Fund (SRF) loan program. It began in 1987 as a result of amendments to the Federal Clean Water Act. This program was designed to replace the EPA, the federal construction grants program. EPA had, for a number of years, provided grants directly to communities to construct and/or rehabilitate wastewater treatment and collection systems. The funding from the construction grants program has been made available to the state. The federal funds are to be used in combination with state funds to create a revolving loan program that will be self-perpetuating. SRF funds

are targeted specifically to wastewater treatment and collection systems, storm drain systems and other construction activities that will improve surface and groundwater quality.

7.10 SUMMARY OF FUNDING OPTIONS

None of the existing programs will provide a 100% grant to finance a project. Most of the programs (both state and federal) require (or strongly recommend) that the applicant provide some local funding. Low interest loans and grant offers are frequently "packaged" with available local funds to completely finance capital improvement project activities. DENR also has minimum rate requirements that must be met by a community for it to be eligible for grant funding under the CWFCP. The department is recommending that the minimum rate for municipal wastewater is $17.00 per month for 5,000 gallons of water used. If a community does not have its rates at or above this level, it will not be eligible for grant assistance from the consolidated program.

7.11 FUNDING RECOMMENDATIONS

Given the cost of construction of a project of this scope and the limited amount of local finances available, it is recommended that the Clear Lake Betterment Association should:

1. Make application to DENR to place this project on the State Water Facilities Plan.

2. Evaluate its own financial resources, rate structure and various funding sources available to construct capital improvement projects to see if rate increases or other funding options may be used to finance all or part of the proposed project.

3. Complete applications for financial assistance to programs such as the CWFCP, DENR SRF Program and/or USDA's Rural Development / Rural Utility Service Water and Sewer Program when the project is approved for the State Water Facilities Plan.

The process of completing applications for financial assistance could begin when an application to the State Water Facilities Plan is submitted. Early application for financial assistance could speed the process of obtaining financing for project construction as obtaining financing can be a lengthy process.

8 REFERENCES

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