

Edl, Michele

From: Craig Madson [cmadson@phd6.idaho.gov]
Sent: Wednesday, November 12, 2008 10:43 AM
To: Edl, Michele
Subject: Re: Bear Lake information request
Attachments: 6040002.doc

>>> "Edl, Michele" <Michele.Edl@idwr.idaho.gov> 11/12/2008 10:36 AM >>>

Craig,

Sandy from IDEQ Pocatello was kind enough to supply me your name and email address. The size of the system is such that DEQ does not have any sanitary surveys in their files, which is where your name came up.

I am attempting to process a water right permit. The permit is for additional use on an existing water system. The permit holder in our records is Bear Lake Sands Inc. The water system development has had a colorful past and gone through several incarnations. The current owner of the water system may be East Shore Water Company. The system serves several subdivisions on Bear Lake including Villas, East Shore and Bear Lake Sands II. I am trying to establish a progression of additional use since 1988. The amount I can license depends on the date that connections were confirmed to be in place. I am assuming that routine sanitary surveys have been made which can help me. I would like to compare available surveys or field inspection records from the period 1987-1997 to those after 1997.

Please let me know if you have any information about this system. From a conversation I had with IDEQ Pocatello Region staff, sanitary surveys may not be available. Any other records you have confirming the number of connections before and after 1997 will be extremely helpful.

Thank you very much.

Michele Edl
Idaho Department of Water Resources
322 East Front Street
Boise ID 83720
Phone 208-287-4946

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11/12/2008

September 16, 2002

East Shore Subdivision
Jack P. Balling
693 Park Shadows Circle
Bountiful, UT 84010

RE: East Shore Subdivision water system sanitary survey PWS# 6040002

Dear Mr. Balling:

On September 6, 2002 this agency conducted a sanitary survey of the East Shore Subdivision water system. The purpose of the survey was to determine compliance of the water system with the requirements of IDAPA 16.01.08 Idaho Rules for Public Drinking Water Systems. Thank you for taking time to accompany me during the survey. The following paragraphs describe the system as observed.

General Description

The East Shore Subdivision water system is a non-community/transient water system that serves about 200 people, mostly on weekends. The East Shore Subdivision is approximately 3 miles south of Bear Lake Hot Springs on the east shore of Bear Lake. East Shore and Bear Lake Sands II Subdivisions are also both recreational and seasonal.



Sources

A 16" cased well located on the west side of the road just south of the subdivision serves the water system. The well is about 200 feet from high water on Bear Lake. The well is about 200 feet deep and is equipped with a pitless adaptor. There is a vent on the well and a check valve was found. Well site is fenced to keep out unauthorized people and animals.



Storage

There is a 96,000 gallon concrete storage tank on the system located 13,000 feet up the hill on the east side of the subdivision. The water tank is fenced for protection. The tank is inspected annually.



Treatment

There is no treatment of the water.



Distribution System

Water is conveyed from the storage tank via 10" PVC pipe to two subdivisions. Bear Lake Sands II to the south and East Shore to the north. There are 13 connections in the Bear Lake Sands II Subdivision and 17 connections in the East Shore Subdivision. Individual connections are $\frac{3}{4}$ " PVC. There are three fire hydrants, two in East Shore Subdivision and one in Bear Lake Sand II.

Monitoring/Reporting/Data Verification

All monitoring and reporting is current.

Pumps/Pumping Facilities and Controls

A 20 hp submersible pump delivers water to the storage tank. A pressure gauge is present and operational with the pressure switch set at 40-75 psi. A flow meter is also present.

Management

The East Shore Water and Sewer Company owns the water system. Jack P. Balling is the water system operator and Dean Peterson as backup.

Groundwater Under Direct Influence of Surface Water (GWUDI)

This system is not considered to be under the direct influence of surface water.

Violations Observed

1. No violations noted

Sincerely,

Craig Madson, EHS
Drinking Water Coordinator

C: Edward A. Marugg, REHS
Environmental Health Director

Barbara Jones, DEQ

Engineering Report

PART 1: EXISTING SUBDIVISIONS AND THE PROPOSED LAKEFRONT SUBDIVISION

PART 2: THE EAST SHORE FUTURE DEVELOPMENT MASTER PLAN

BEAR LAKE, IDAHO

JANUARY 2008

Submitted To:

Idaho Department of Environmental Quality
444 Hospital Way, #300
Pocatello, Idaho 84320

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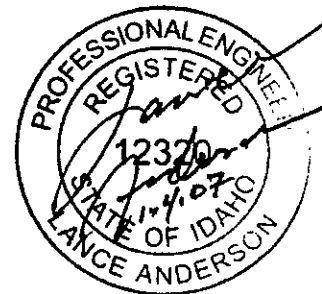


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EXECUTIVE SUMMARY

Bear Lake Sands, Inc. (BLS) requested that Cache-Landmark Engineering complete an engineering report (ER) for the proposed Lakefront Subdivision, including the existing utility service area and the overall future master plan (see Sheet M-1, Appendix A).

The proposed Lakefront subdivision plans to connect to the existing utility (water & sewer) purveyor—East Shore Water Company (Hereafter called “ESWC”). The ESWC serves three existing subdivisions—East Shore Subdivision, Bear Lake Sands #2 (No correlation with BLS), and Bear Lake Villas (see Sheet M-1, Appendix A). The ESWC provides water services to all three subdivisions and sewer service only to East Shore.

This ER will evaluate the capacity and condition of ESWC’s existing infrastructure (water and sewer) to ensure the ESWC can service the proposed Lakefront subdivision. Lakefront subdivision will add an additional 12 water connections (11 residential and 1 common irrigation connection) and 11 sewer connections. This ER will also evaluate the future master plan for the 205-acres of existing and proposed development that could be serviced by the East Shore Water Company (see Sheet M-1, Appendix A).

ESWC’s existing water infrastructure consists of a well that is capable of 162 gallons per minute (gpm), concrete pump house, 96,000-gallon concrete reservoir, and distribution lines. The system currently supplies culinary water to 53 connections with 36 vacant lots in East Shore Subdivision, Bear Lake Sands 2, and the Bear Lake Villas, along with three irrigation common area connections. Lakefront Subdivision is proposing to add 11 residential connections with an irrigation common connection. There are 89 existing and vacant lot connections with an additional 12 connections from the proposed Lakefront Subdivision, totaling 101 connections. Idaho State Law requires that any water system that provides water to more than 25 connections must have two water sources. Therefore, BLS is proposing to construct a new well (see C-2.1, Appendix B) located north of the East Shore Subdivision, east of the county road. The new well would be managed and operated by the ESWC. The current ESWC water system is adequate to provide service for the complete build-out of East Shore, Bear Lake Sands, Bear Lake Villas, and Lakefront subdivisions, with the addition of a new pump capable of pumping at least 300 gpm or 20,000 gallons of additional storage. Development beyond the subdivisions above would require the construction of additional of water storage and or improving the existing water well.

ESWC’s existing sewer infrastructure consists of gravity distribution lines, two sewer lift stations, and a sewer lagoon system (four cells). Currently, the sewer system serves 27 recreational homes and uses a half of one cell of what originally was a three-cell lagoon. The half of the middle lagoon cell is not sufficient to effectively dispose of the wastewater, based upon Idaho DEQ’s requests that 100

percent occupancy be used and that no seepage is allowed. The ESWC is required to use supplemental water to ensure the lagoon maintains operational water levels. Based upon current design standards the lagoons have capacity for 488 full-time residents. The addition of the eleven lots in the Lakefront Subdivision will not impact the current lagoon system and will reduce the supplemental water required to maintain the existing lagoons. The addition of the Lakefront Subdivision increases the number of sewer connections to 38. Assuming 3.4 people per connection results in 136 people served by the lagoons, which is well below the capacity of 488 residents.

In conclusion the Company currently is in need of a second culinary water source, because they are providing water service to 53 connections, more than the allowed 25 connections. The construction and implementation of a secondary culinary water source will provide adequate capacity to the existing water system for the proposed Lakefront Subdivision. Additional development beyond the Lakefront Subdivision will require more water storage or additional wells. If the Company increases the storage capacity of the water system and allows additional users into the system, the increase of wastewater effluent will help the existing lagoon system to diminish the need for supplemental water within the lagoon system. This ER will explore the existing water and sewer systems, the existing and proposed culinary well systems, and the future water and sewer systems based upon the master plan.

PART 1: EXISTING SUBDIVISIONS AND THE PROPOSED LAKEFRONT SUBDIVISION

1.0 GENERAL PROJECT INFORMATION

Bear Lake Sands, Inc. (BLS) requested that Cache-Landmark Engineering complete an engineering report (ER) for the proposed Lakefront Subdivision, including the existing utility service area.

The proposed Lakefront subdivision is an 11-lot residential subdivision located on the east shore of Bear Lake, Idaho (see Sheet M-1, Appendix A). BLS is the group that is developing the 7-acre parcel into 11-lots, which BLS plans to connect to the existing utility (water and sewer) purveyor—East Shore Water Company (Hereafter called “ESWC”). The ESWC serves three existing subdivisions—East Shore Subdivision, Bear Lake Sands #2 (No correlation with BLS), and Bear Lake Villas (see Sheet M-1, Appendix A). The ESWC provides water services to all three subdivisions and sewer service only to East Shore Subdivision.

The East Shore subdivision is located north of the proposed Lakefront development and contains 69-lots, with only 27 of the lots having residential dwellings (see Sheet M-1, Appendix A). Currently there are 35 vacant lots within the East Shore Subdivision and seven of the existing homes occupy two lots due to the small size of the East Shore lots. The subdivision was developed and constructed in 1976 by KLOD Development Company under contract with Sidney Nebeker. The ESWC currently provides water and sewer services to the subdivision. Bear Lake Sands 2 subdivision is located directly north of Lakefront and contains 20 developed lots (see Sheet M-1, Appendix A). Currently only 15 of the lots have residential dwellings. There are three vacant lots within Bear Lake Sands 2 and in three cases, one homeowner has built on two, three or four lots. Bear Lake Sands 2 was developed and constructed in the mid-1970's and receives water service from the ESWC. The Bear Lake Villas is a five-lot subdivision located on the south boundary of the Lakefront development. There are 85 combined residential dwellings and vacant lots from the three subdivision mentioned above. Also there are four common irrigation connections resulting in 89 total existing and vacant lot possible connections.

Currently the ESWC provides water to 49 residential connections and 4 common irrigation connections for a total of 53 connections. Idaho State law requires that any water system, which supplies water for more than 25 connections, must have two water sources. Currently the ESWC has one well located between the East Shore subdivision and Bear Lake Sands 2 (see Sheet C-2.1, Appendix B). Hence the addition of the Lakefront subdivision requires that a second water source be

developed. Cache-Landmark Engineering has identified a well site that would provide the second water source, and has completed the well site evaluation report for the new well (see Sheet C-2.1, Appendix B). The well site evaluation report was submitted to the Idaho Department of Environmental Quality during the fall of 2006 and Idaho DEQ approved the well site location. The new well will allow the ESWC to meet current Idaho state code, while adding additional capacity to the current water system.

The sewer system that is operated by the ESWC currently provides sewer service for the East Shore subdivision. The sewer system consists of a four-cell sewer lagoon system that contains the effluent from the 29 connections in the East Shore subdivision (see Sewer Lagoon As-Built and ESWC Water and Sewer System, Appendix B). The lagoon system was originally designed and installed in 1976 to provide service for 1,000 connections. ESWC currently utilizes half of the middle cell to maximize the efficiency of the sewer system. The proposed eleven homes will reduce the supplemental water required to maintain the existing lagoons. But half of the middle cell is not sufficient area to treat the wastewater due in part to Idaho DEQ's requirements that all connections are considered to be 100 percent occupied and no seepage is allowed. Therefore both middle cells will be required to be lined with an impermeable geo-membrane to sufficiently treat the incoming wastewater.

BLS plans to connect to the ESWC utilities for the Future Development, realizing that additional water storage, water lines, sewer lift stations, gravity sewer lines, pressure sewer lines, and all associated infrastructure would be the responsibility of BLS. This ER will present the Future Development water and sewer master plan, in Part 2 of this report, consistent with the existing water and sewer infrastructure.

2.0 EAST SHORE WATER COMPANY

After completing Bear Lake Sands 2 in the early 1970's, the BLS contracted with a Bountiful, Utah based developer (KLOD) to create the East Shore Subdivision. The existing marina was constructed, the sewage lagoons were excavated, culinary water well was drilled, and lots were subdivided and sold. The water reservoir storage system, however, was not completed. In the late 1980's BLS constructed a rectangular concrete steel reinforced 96,000-gallon water reservoir for culinary use.

In 1995 a Utah mutual non-profit water company was formed and an agreement was reached between BLS and the homeowners of the East Shore Subdivision. The company was given the name, East Shore Water Company (ESWC). Through that process the East Shore homeowners (and later, the Bear Lake Sands 2 homeowners) formally retain the responsibility of improving, maintaining, and servicing the water and sewer systems. Also the ESWC assesses homeowners for

the water and sewer service. At the time of the formation of the ESWC, BLS deeded assets (water well, water reservoir, sewage lagoons, and associated infrastructure) to the East Shore Water Company for water shares and an exclusive right to expand the water and sewer system, as necessary, for future development (see Deeds, Appendix C).

Currently a board of directors, which includes the following individuals, directs the company: Jack P. Balling (P.E. President), James Nebeker (Vice President), Dale Capps (Sec./Treas.), Steven Spencer (Electrical Engineer), Terry Smith (Meters and Inspection), DonRey Secrist (Meters and Inspection), Jim Child (Water Meters, valves, and mains), and Scott Balling (P.E. Idaho). The board meets twice a year or as needed to meet the needs of the company. Each water connection is given one vote as shareholder and the connection is the verification of the stock certificate as long as the water is used and the fees are paid.

The ESWC has issued a "will serve" letter to the developer of the proposed Lake Front Subdivision. After the agreed upon items within the letter are completed the ESWC will provide water and sewer services to the proposed subdivision (see ESWC Will Serve Letter, Appendix C).

3.0 Water System: Existing and Proposed Lakefront Infrastructure

The existing water system serves 53 water connections in the East Shore Subdivision, Bear Lake Sands 2 Subdivision, and the Bear Lake Villas Subdivision. There are only 38 shareholders in the ESWC, due to the fact that some of the lot owners have more than one connection. In 1993 a detailed as-built drawing was created of the water and sewer system (see East Shore Water Company Water and Sewer System, Appendix B). The system is self-contained and operates with the following infrastructure:

- Well
 - A 16" Well equipped with a 20 h.p. Grunfos Pump with a 230 Volt, 3-phase Hitachi Motor (see East Shore Subdivision Culinary Water Pump House Details, Appendix B).
 - Wellhead Elevation 5848 feet (mean sea level (msl))
 - Submersible pump
 - 180 gpm
 - Pump elevation is 125 ft below ground elevation
- A 6-ft x 10-ft concrete pump house, equipped with a 3" check valve, 3" Badger Meter, 3" surge valve into an 8" discharge line (see East Shore Subdivision Culinary Water Pump House Details, Appendix B).
- 96,000-gallon Water Reservoir (40' x 24' x 15') (see Water Reservoir As-Built, Appendix B)
 - Reinforced Concrete

- Elevation 6,120 feet
- Piping, Valves and Fire Hydrants
 - 1600 lf of 10-inch PVC pipe (reservoir supply line)
 - 3300 lf of 8-inch PVC pipe (supply line)
 - 1150 lf of 6-inch PVC pipe (supply line)
 - 700 lf of 3-inch PVC pipe (supply line)
 - 1400 lf of 2-inch PVC pipe (supply line)
 - 54 – ¾" water laterals and meters
 - 5 – 6-inch Centurion Fire Hydrants Mueller A 423
 - 3 – 10-inch gate valves with boxes
 - 2 – 8-inch gate valves with boxes
 - 3 – 6-inch gate valves with boxes
 - 3 – 3-inch gate valves with boxes

3.0.1 Existing Water Usage

Table 1 below shows the water usage from 2005.

Table 1: Water Usage (2005)

Subdivision	Connections	Total Water Usage (Annual-Gallons)
East Shore Subdivision	30	2,510,000
Bear Lake Sands # 2	17	3,786,280
Bear Lake Villas	6	116,410
TOTAL	53	6,412,690

The above water usage values for 2005 reflect the indoor and irrigation water consumption. From the meter readings it is estimated that 90% of the water consumption is from May 1st to November 1st. During the six winter months the irrigation lines are drained and the most homes are winterized. The last five-year average annual water usage for the company is 6,625,000 gallons, which includes the indoor and irrigation consumption. The 2005 annual water usage is within three percent of the five-year annual average water usage. The five-year annual water usage value will be used to calculate the gallons per day per connection. Since 90% of the water usage takes place during a six month period the average water usage per connection is as follows:

$$\begin{aligned}
 &90\% * 6,625,000 \text{ gallons / year} = 5,962,500 \text{ gallons / year} \\
 &\frac{5,962,500 \text{ gallons / year}}{6 \text{ months} * 30 \text{ days}} = 33,125 \text{ gallons / day} \\
 &\frac{33,125 \text{ gallons / day}}{53 \text{ connections}} = 625 \text{ gallons / connection / day}
 \end{aligned}$$

Therefore the *average daily* consumption of water per connection is 625 gallons, which value includes the **indoor and outdoor** consumptive uses.

3.0.2 *Existing Source Capacity*

The existing source for the system is an underground well with a capacity of 162 gallons per minute (gpm), based upon a pump test completed by Lance Anderson, a licensed Engineer in the State of Idaho (see Pump Test, Appendix C). The pump test was performed by monitoring the flow meter in the pump house for a specified amount of time. The 162 gpm-pump test is within the design range specified by the pump curve provided by Mountain States Pumps for the Grunfos pump. With a flow rate of 162 gpm the total dynamic head is 320 feet with efficiency of 73% (see Grunfos Pump Curve, Appendix C). Westlake Drilling completed the well in 1980 (see Well Drillers Report, Appendix C) and the well pump tested at 400 gpm. It is the opinion of Cache-Landmark that the existing well has a capacity of 400 gpm, even though the flow test with the existing pump yielded only 162 gpm. This topic will be discussed in detail in section 3.0.5 of this report.

As-built drawing of the pump house is shown on the *Pump House Details* sheet (see Appendix B). The specifications for the construction of the pump house can be seen in Appendix D. The well lot is owned by the ESWC (see Deeds, Appendix C) and is 0.2031 acres. The well lot provides direct access to the well and pump house from the County Road (see Boundary Survey, Appendix C). The permit to appropriate water was received by James Nebeker of BLS on the 23rd of July, 1990 (see Permit to Appropriate Water, Appendix C) and the proof of beneficial use was approved on the 14th of April, 1997 (see Water Right No. 11-7372, Appendix C).

By Idaho State law a water system with more than 25 connections is required to have a second water source. As part of the Lakefront Subdivision BLS plans to install a new well, located east of the existing county road (see C-2.1, Appendix B).

3.0.3 *Lakefront Subdivision New Water Source*

The proposed well site has been approved by Department of Environmental Quality Idaho (DEQ Idaho) and will be constructed as part of the Lakefront construction (see C-2.1, Appendix B). Based upon the report *Source Water Assessment Delineation Report: East Shore Subdivision, Bear Lake County, Idaho, Well No. 2* prepared by Scott H. Clark, a Professional Geologist, the proposed well site has the following aquifer characteristics as shown in Table 2.

Table 2. Aquifer Characteristics (Scott H. Clark, 2006)

Characteristic	Value
Transmissivity (T)	1800 ft ² /d
Hydraulic Conductivity (K)	18 ft/d
Gradient of groundwater flow (i)	0.040
Direction of groundwater flow	N 90° W
Discharge (Q = gpd)	400 gpm or 576,000 gpd
Porosity (n)	0.20
Aquifer thickness (b)	100 ft

The estimated discharge from the well is 400 gpm. The new well will be connected to an existing 8-inch water main at the north side of the East Shore Subdivision (see C-2.1, Appendix B).

After completion of the well site BLS will deed the well and associated equipment, land, and any other considerations to the ESWC. Based upon the agreements of the ESWC, BLS has the exclusive right to expand the water system for future development. The new well will provide the second water source, which is required per Idaho State law and also will provide additional capacity to the ESWC water system.

3.0.4 Water System Capacity Analysis

The State of Idaho requires that with any pump out of service, the remaining pump or pumps shall be capable of providing the peak hour demand of the system or maximum day demand plus equalization storage (Idaho Administrative Code 58.01.08.541.02). The proposed new well is designed to have a capacity of 400 gpm, the existing well has a capacity of 162 gpm. The water system capacity will be calculated with the new well out of service, while meeting the **peak hourly demand** of the system.

The peak hourly demand of the system will be calculated from the average measured water demand of the current East Shore Water System. Based upon the recommendation from DEQ in the letter dated August 24, 2007, comment seven, the preferred method of determining the peak day demand rate is by actual measurements of the system. Based upon Cache-Landmark's experience designing and analyzing water systems the ratio of the peak hourly demand to the average daily demand is approximately a value three. Due to the fact that the East Shore Water

System is small, recreational resort, Cache-Landmark recommends a ratio of peak hourly demand to average daily demand of three and half.

The measured average daily water value from section 3.0.1 is 625 gallons per day per unit, which includes *indoor* and *outdoor* consumption. Based upon the ratio of three and half, described above, the peak hourly water demand per unit is described below:

$$\frac{\text{PeakHourlyDemand}}{\text{Connection}} = \frac{625 \text{ gallons / day / connection} * 3.5}{24 \text{ hours}} = 91.15 \text{ gallons / hour}$$

The peak hourly demand for the ESWC is 91.15 gallons per hour based upon actual measured flow data. Table 3 shows the peak hourly demand for the existing subdivisions and the proposed 11-lot Lakefront subdivision.

Table 3. Lakefront and Existing Development Peak Hourly Demand
Lakefront and Existing Development Connections Peak Hourly Demand

	# Units	Units	Volume Required	Volume
Indoor & Outdoor				
<i>Residential Indoor and Outdoor Proposed¹</i>				
Lake Front	11	lots	91.15 gph	1002.65
Subtotal (gpd)				1002.65 gallons/hour
<i>Residential Indoor and Outdoor Existing¹</i>				
East Shore Subdivision	63	connections	91.15 gph	5742.45
Bear Lake Sand 2	20	connections	91.15 gph	1823.00
Villas	6	connections	91.15 gph	546.90
Subtotal (gpd)				8112.35 gallons/hour
		Total Indoor and Outdoor		9115.00
Total Peak Hour Water Demand (gpd)				9115.00 gallons/hour
Total Peak Hour Water Demand (gpm)				151.92 gallons/minute

¹ The peak day demand is equal to 3.5*average day demand, which is based upon an actual measured, value of 625 gpd.

Table 3 illustrates that a peak hourly demand per connection of 91.15 gallons/hour yields a total of 9,115 gallons/hour, which equals a value of 151.92 gallons per minute. As was stated above, Idaho Administrative Code 58.01.08.541.02 requires with any pump out of service the remaining pump shall be capable of meeting the peak hourly demand. Section 3.0.2 of this report references a pump test of the existing well. The pump test yielded 162-gpm capacity of the current pump (with a capacity that could be 400 gpm). With the proposed new well out of service (proposed 400 gpm) the existing well shall be capable of meeting the peak hourly demand rate of 151.92 gpm (see Table 3). The existing well is capable of meeting the peak hourly demand rate with an excess capacity of 10.09 gpm, with the potential of having 248.09 gpm excess capacity if the existing well does indeed have the capacity to yield 400 gpm.

It is the recommendation of Cache-Landmark Engineering that the existing water system with the addition of the new water well has sufficient capacity to service the existing three subdivisions and the proposed 11-lot Lakefront Subdivision to meet Idaho State standards.

3.0.5 Fire Flow Analysis

According to Idaho Administrative Code 58.01.08 subsection 501-17, which pertains to redundant fire flow capacity, states that a public water system shall provide the maximum day demand plus fire flow instead of the peak hour demand plus fire flow. Pumping systems supporting fire flow capacity must be designed so that fire flow may be provided with the largest pump out of service. The system will be analyzed in this section while meeting the maximum day demand plus fire flow.

According to Appendix B, Section B105 of the 2006 International Fire Code the fire flow requirement for one and two family dwellings having a fire-flow calculation area that does not exceed 3,600 square feet shall be 1,000 gallons per minute. Bear Lake County, the local fire authority, has a fire flow requirement of 500 gpm for two hours. But the fire flow requirement from the IRC of 1,000 gpm for two hours will be used for this project (see Fire Marshall Approval Letter, Appendix C).

Based upon Cache-Landmark's experience with design and analysis of water works systems the ratio of maximum day demand and average day demand is two. A ratio of two will be used for this project. Table 4 shows the maximum day demand values for the existing subdivisions (East Shore, Villas, and Bear Lake Sands 2) plus the proposed 11-lot Lakefront Subdivision.

Table 4. Lakefront and Existing Development Max Day Demand

Lakefront and Existing Development Connections Max Day Water Demand

	# Units	Units	Volume Required	Volume
Indoor & Outdoor				
<i>Residential Indoor and Outdoor Proposed¹</i>				
Lake Front	11	lots	1,250 gpd	13,750
<i>Subtotal (gpd)</i>				13,750 gpd
<i>Residential Indoor and Outdoor Existing¹</i>				
East Shore Subdivision	63	connections	1,250 gpd	78,750
Bear Lake Sand 2	20	connections	1,250 gpd	25,000
Villas	6	connections	1,250 gpd	7,500
<i>Subtotal (gpd)</i>				111,250 gpd
			<i>Total Indoor and Outdoor</i>	125,000
Total Max Day Demand (gpd)				125,000 gpd
Total Max Day Demand (gpm)				87 gpm

¹ The maximum day demand is equal to 2*average day demand, which is based upon an actual measured, value of 625 gpd.

Table 4 shows a value of 125,000 gpd or 87 gpm for the maximum day demand value. Based upon Idaho Administrative Code 58.01.08.501.17 the water system shall provide the maximum day demand plus fire flow, with the largest pump out of service. Thus the required fire flow capacity is 1,000 gpm for a two-hour period (fire flow) and 87 gpm (maximum day demand) for a total of 1,087 gpm.

The existing storage capacity of the water system is a 96,000-gallon reservoir (see East Shore Water Company Water and Sewer System, Appendix B). DEQ commented that the storage within the piping system is considered dead storage. Section 58.01.08.12.a of the Idaho Administrative Code details that dead storage "is either not available for use in the system or can provide substandard flows and pressures." It is the opinion of Cache-Landmark Engineering that the storage in the 10-inch supply line from the water well to the reservoir would not be considered dead storage, because it is available to the system and would provide adequate flows and pressure. The length of the 10-inch supply line is 1,702 feet (see East Shore Culinary Water Pumping System Plan and Profile, Appendix B). The supply line has 6,940-gallons of available storage, for a total of 102,940-gallons of storage combined with the reservoir.

The required storage capacity to meet the 1,000 gpm for two-hour fire flow capacity is 120,000 gallons. The existing storage shall account for 102,940 gallons leaving 17,060-gallons or 142.18 gpm to be handled by the existing well, plus the 87 gpm maximum day requirement for a total of 229.18 gpm. The existing well has a capacity of 162 gpm based upon the pump test (see Section 3.02), which is 67.18 gpm short of the needed flow capacity to meet fire flow requirements plus maximum day demand. It is the opinion of Cache-Landmark that the current East Shore Water System does not have sufficient storage capacity and flow from the existing pumps to meet the State of Idaho requirements. Cache-Landmark recommends that a flow test be performed on the existing well. When the existing well was originally flow tested in 1980 (see Well Drillers Log, Appendix C) it had a capacity of 400 gpm, which could be verified by a flow test. Idaho DEQ recommended using a higher flow rate than the flow test value of 162 gpm, with proper justification. If the flow test verifies that the well is capable of producing 300-400 gpm, then it is the recommendation of Cache-Landmark to upgrade the existing pump with a new pump capable of pumping 300-400 gpm. The new well would need to be capable of pumping at least 229.18 gpm, but Cache-Landmark recommends that the new well be able to pump 300 gpm.

If the flow test shows that the well is not capable of producing more than the required 229.18 gpm, then the East Shore Water Company shall be required to add storage volume to the existing reservoir. Currently the

Appendix C

- 1 – Property Deeds
- 2 – Grunfos Pump Curve
- 3 – Well Driller Report
- 4 – Boundary Survey
- 5 – Permit to Appropriate Water
- 6 – Water Right No. 11-7372
- 7 – Compaction Permeability Test Results
- 8 – Myer Grinder Pump Curves
- 9 - Water Well Pump Test

WELL DRILLER'S REPORT

State law requires that this report be filed with the Director, Department of Water Resources within 30 days after the completion or abandonment of the well.

1. WELL OWNER (801-364-3342) Name <u>BEAR LAKE PINES (ORIGINAL)</u> Address <u>145 W 4500 S</u> <u>SALT LAKE CITY UT 84107</u> Owner's Permit No. <u>11-7088</u>		7. WATER LEVEL Static water level <u>50</u> feet below land surface Flowing? ☐ Yes ☒ No G.P.M. flow _____ Temperature _____ ° F. Quality _____ Artesian closed-in pressure _____ p.s.i. Controlled by ☐ Valve ☐ Cap ☐ Plug																																																																																					
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Abandoned (describe method of abandoning)		8. WELL TEST DATA ☐ Pump ☐ Bailer ☒ Other <u>AIR</u> Discharge G.P.M. <u>400</u> Draw Down <u>60</u> Hours Pumped <u>2</u>																																																																																					
3. PROPOSED USE ☒ Domestic ☐ Irrigation ☐ Test ☐ Other (specify type) ☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection		9. LITHOLOGIC LOG																																																																																					
4. METHOD DRILLED ☒ Cable ☐ Rotary ☐ Dug ☐ Other		<table border="1"><thead><tr><th>Hole Diam.</th><th>Depth From</th><th>To</th><th>Material</th><th>Water Yes</th><th>No</th></tr></thead><tbody><tr><td>18"</td><td>0</td><td>13</td><td>CLAY EREY</td><td></td><td>X</td></tr><tr><td>18"</td><td>13</td><td>61</td><td>BOWLDERS & CLAY</td><td></td><td>X</td></tr><tr><td>18"</td><td>61</td><td>70</td><td>RED GRAVEL & CLAY</td><td></td><td>X</td></tr><tr><td>18"</td><td>70</td><td>72</td><td>GRAVEL</td><td></td><td>X</td></tr><tr><td>18"</td><td>72</td><td>87</td><td>HARD PAN</td><td></td><td>X</td></tr><tr><td>18"</td><td>87</td><td>98</td><td>GRAVEL & CLAY RED</td><td></td><td>X</td></tr><tr><td>18"</td><td>98</td><td>116</td><td>" " LOOSE</td><td></td><td>X</td></tr><tr><td>16"</td><td>116</td><td>122</td><td>RED ROCK FRACTURED</td><td></td><td>X</td></tr><tr><td>16"</td><td>122</td><td>143</td><td>ROCK TAN</td><td></td><td>X</td></tr><tr><td>16"</td><td>143</td><td>146</td><td>ROCK RED FRACTURED</td><td></td><td>X</td></tr><tr><td>16"</td><td>146</td><td>183</td><td>" " HARD</td><td></td><td>X</td></tr><tr><td>16"</td><td>183</td><td>187</td><td>" " FRACTURED</td><td></td><td>X</td></tr><tr><td>16"</td><td>187</td><td>201</td><td>" " HARD</td><td></td><td>X</td></tr></tbody></table>		Hole Diam.	Depth From	To	Material	Water Yes	No	18"	0	13	CLAY EREY		X	18"	13	61	BOWLDERS & CLAY		X	18"	61	70	RED GRAVEL & CLAY		X	18"	70	72	GRAVEL		X	18"	72	87	HARD PAN		X	18"	87	98	GRAVEL & CLAY RED		X	18"	98	116	" " LOOSE		X	16"	116	122	RED ROCK FRACTURED		X	16"	122	143	ROCK TAN		X	16"	143	146	ROCK RED FRACTURED		X	16"	146	183	" " HARD		X	16"	183	187	" " FRACTURED		X	16"	187	201	" " HARD		X
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5. WELL CONSTRUCTION Diameter of hole <u>12 3/4</u> inches Total depth <u>201</u> feet Casing schedule: ☒ Steel ☐ Concrete Thickness inches Diameter inches From feet To feet <u>325</u> inches <u>16</u> inches <u>1</u> feet <u>119</u> feet <u>365</u> inches <u>12 3/4</u> inches <u>1</u> feet <u>200</u> feet Was casing drive shoe used? ☒ Yes ☐ No <u>16" x 12"</u> Was a packer or seal used? ☐ Yes ☒ No Perforated? ☒ Yes ☐ No How perforated? ☒ Factory ☐ Knife ☐ Torch Size of perforation <u>1/8</u> inches by <u>4</u> inches Number <u>2560</u> perforations From <u>120</u> feet To <u>199</u> feet perforations feet feet perforations feet feet Well screen installed? ☐ Yes ☒ No Manufacturer's name _____ Type _____ Model No. _____ Diameter _____ Slot size _____ Set from _____ feet to _____ feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☒ Yes ☒ No Size of gravel <u>3/8"</u> Placed from <u>118</u> feet to <u>200</u> feet Surface seal depth <u>129</u> Material used in seal ☒ Cement grout ☒ Pudding clay ☐ Well cuttings Sealing procedure used ☐ Sherry pit ☐ Temporary surface casing ☒ Overbore to seal depth		10. Work started <u>7-15-80</u> finished <u>8-10-80</u> 11. DRILLERS CERTIFICATION <u>847-0391</u> Firm Name <u>WESTLAKE DRILLING</u> Firm No. <u>114</u> Address <u>RT 2 MONTPELIER</u> Date <u>9-22-80</u> Signed by (Firm Official) <u>Bert Westlake</u> and (Operator) <u>Bert Westlake</u>																																																																																					
6. LOCATION OF WELL Sketch map location must agree with written location. Subdivision Name <u>BEAR LAKE</u> Lot No. _____ Block No. _____ County <u>BEAR LAKE</u> <u>SW 1/4 SE 1/4 Sec. 16 T. 16 N. R. 44 E.</u>																																																																																							

PERFORMANCE CURVES

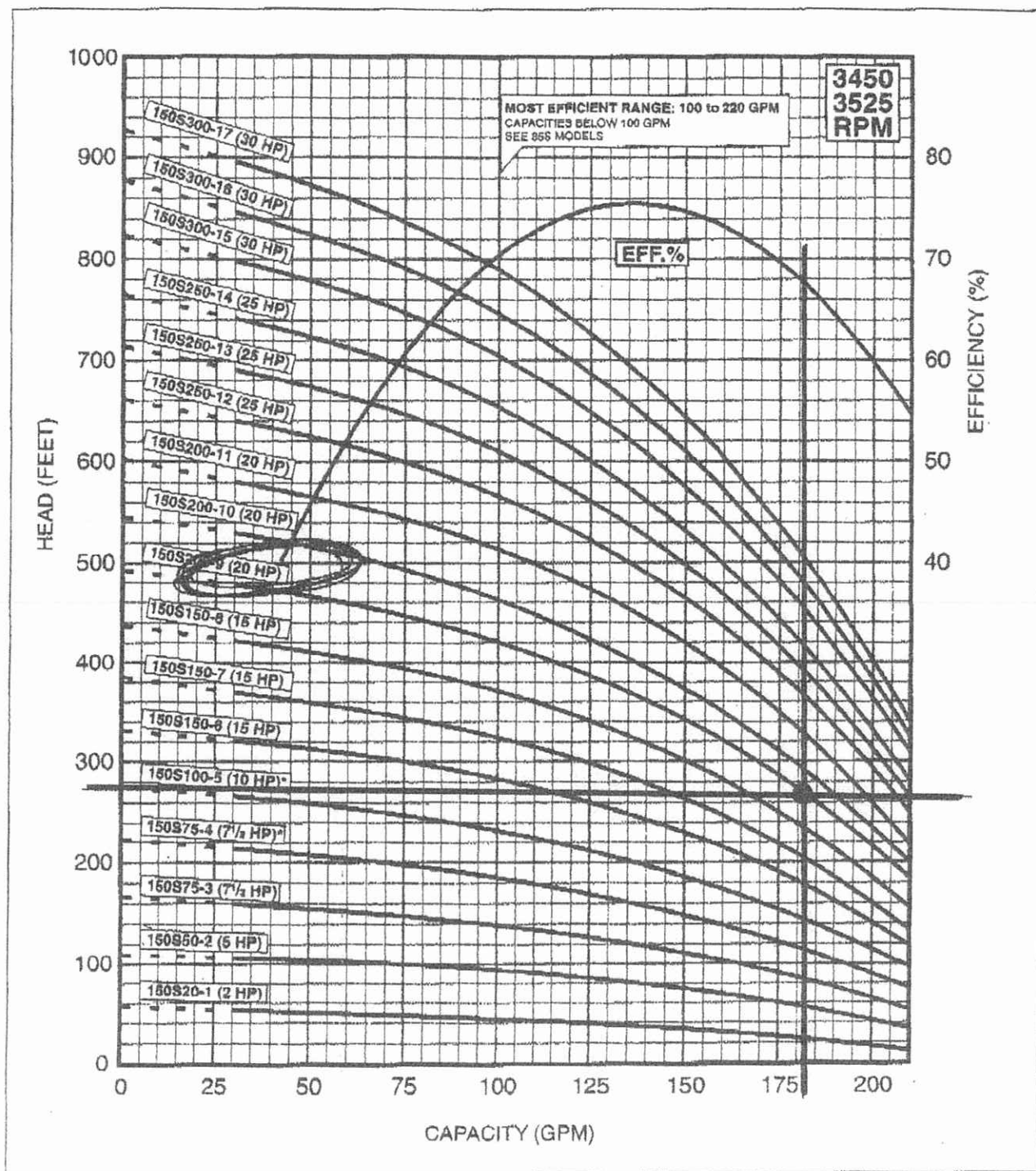
150 GPM

MODEL 150S

FLOW RANGE: 30 -220 GPM

OUTLET SIZE: 3" NPT

NOMINAL DIA. 6"



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

4" MOTOR STANDARD, 2-10 HP/3450 RPM

6" MOTOR STANDARD, 7.5-60 HP/3450 RPM.

8" MOTOR STANDARD, 75 HP/3525 RPM.

* Alternate motor sizes available.

Performance conforms to ISO 9906, 1999 (E) Annex A
Minimum submergence is 5 feet.

208-334-2080

No. C 172222		Due no later than Mar 31, 2008 Annual Report Form		2. Registered Agent and Office (NOT A P.O. BOX) KAY BECK 19081 US HWY 89 OVIDID83254	
Return to: SECRETARY OF STATE 450 N 4th STREET PO BOX 83720 BOISE, ID 83720-0080 NO FILING FEE IF RECEIVED BY DUE DATE		1. Mailing Address: Correct in this box if needed. EAST SHORE WATER COMPANY 159 SOUTH 750 EAST BOUNTIFULUT84010		3. <u>Now</u> Registered Agent Signature.	
4. Corporations: Enter Names and Business Addresses of President, Secretary, Directors and (optional) Treasurer.					
Office Held	Name	Street or PO Address	City	State	Country Postal Code
PRESIDENT	JACK BALLING	693 PARK SHADOW	BACTEL	UT	DAVIS 84010
VIC PRES.	JAMES NEBEKER	2230 S 3270 W	WVC	UT	84119
SEC/TRES	DALE CAPPS	159 S 750 E	BNTCL	UT	DAVIS 84010
DIRECTOR	GARY STANLEY	2639 N 225 W	SUNSET	UT	84015
DIRECTOR	STEVEN SPENCER	3500 N RIVER DR	LIBERTY	UT	84310
DIRECTOR	TERRY SMITH	P.O. Box 135	FIELDING	UT	84311
5. Organized Under the Laws of:		6.		Signature: <u>C. Dale Capps</u> Date: <u>5-7-08</u>	
UTAH C 172222		Name (type or print): <u>C. DALE CAPPS</u>		Title: <u>SEC.</u>	
Issued 05/07/2008 by MLB				200803005606	